



Report
of
The Railway Accidents
Enquiry Committee 1978

Part II

May, 1980

REPORT
OF
THE RAILWAY ACCIDENTS
ENQUIRY COMMITTEE 1978

PART II

May, 1980

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CHAPTER I INTRODUCTORY

This is the second and final part of the Report by the Railway Accidents Enquiry Committee, 1978.

2. *Setting up of the Committee.*—The Railway Accidents Enquiry Committee 1978 (hereinafter referred to as the Committee) was set up as an aftermath of two serious railway accidents which occurred in quick succession during October and November 1977, involving heavy casualties and damage to railway property. This greatly agitated the public and deep concern was voiced in the Parliament and the Press. Subsequently, the Government, through their notification of January 3, 1978, appointed a High-Power Accidents Enquiry Committee to go into the whole question of accidents. The terms of reference of the Committee were :—

- (i) to review the position of Accidents on the Indian Railways since the appointment of the Railway Accidents Inquiry Committee, 1968 and to review the implementation of their recommendations; and
- (ii) to examine the adequacy of the existing organisation, equipment and practices for ensuring safe running of trains on the Indian Railways, and to suggest measures for prevention of accidents.

3. *Subject matter of the Report.*—The subject matter in Part I of the Committee's Report, was chiefly a review of the action taken by the Government on the recommendations made by the Railway Accidents Inquiry Committee-1968 (Wanchoo Committee) and a brief statistical appreciation of important categories of train accidents on the Indian Railways during the period 1968-69 to 1977-78. A detailed review of the accidents was then not possible due to the statistical information in respect of these not having been received from the zonal railways on the proforma required by the Committee. In this part of the Report we give a detailed review of accidents on the Indian Railways during 1968-69 to 1977-78. We have also addressed ourselves to the second term of reference, requiring the Committee to examine the adequacy of the existing organisation, equipment and practices for ensuring safe running of trains on Indian Railways and to suggest measures for prevention of accidents. During the course of our review in Part I of our Report of the action taken by Government on the recommendations made by the Wanchoo Committee, we had deferred final comments on certain matters pending further examination. Such of these matters on which, after further enquiry, something needed to be said have been dealt with in this part of the Report. Some of those matters, however, we found, did not call for any further comment and we have not referred to them again.

4. *Programme of Work of the Committee.*—At the very outset, it was appreciated by the Committee that, an accident is caused not only by a specific human,

material or equipment failure but it is also the end result of some weaknesses or deficiencies in the organisation, systems and practices themselves. Focussing only on the direct causes of accidents as brought out in various accident inquiry reports without also identifying the more basic weaknesses in the organisation, systems and practices, can yield only limited results. The need to go deeper into the system so as to determine the weaknesses or deficiencies was, therefore, felt and a programme was drawn up to tour all the zonal railways and production units, visit field installations and interview staff and officers connected with operation of trains and maintenance of railway assets so as to ascertain first hand, the prevailing conditions of working and practices obtaining. It was expected to complete the work of the Committee on the above lines by 30th. September, 1980.

5. *Progress of Work of the Committee.*—After submission of Part I of our Report in July 1979, the Committee started tours of the zonal railways from August, 1979. Due to their other pre-occupations the Chairman and the Members were available for the work of the Committee only part-time. The General Elections also intervened in January, 1980, and kept two of the Members extremely busy. In spite of the above constraint, the Committee were able to complete by March, 1980 tours of seven railways systems, three production units, the Research, Designs and Standards Organisation and four premier railways training institutions. A schedule of meetings, visits and tours of the Committee appears at Appendix 'T'.

6. In the first week of April, 1980, the Committee were requested by the Minister of Railways to submit their report on the basis of evidence already collected, positively by the end of April, 1980. This date was subsequently extended upto the end of May 1980. Due to the aforesaid time limit, the Committee had to cancel their programme of visit to the headquarters of the Western Railways and the Central Railway systems. For the same reason, discussions had to be rushed through with the officers of the Commission of Railway Safety, officers of the Railway Board, the two recognised trade union federations of railway workers and Members and Chairman of the Railway Board. It was, however, not possible within the stipulated period, to hold the contemplated discussions with representatives of some State Governments and certain departments of the Central Government concerned with law and order and other subjects having considerable impact on the safe operation of trains.

7. During the course of the tours, the Committee visited a very large number of railway installations including workshops, locomotive sheds, electrical multiple unit sheds, carriage and wagon maintenance depots and sicklines, washing and pitlines, marshalling yards, stations, level crossings, sections of track bridges, signalling installations like route-relay interlocking, centralised traffic control, panel interlocking

traffic and traction control centres, running rooms, basic training schools, zonal training schools etc. During these visits, the Committee had occasion to meet a very large number of staff and officers connected with almost all facets of railway working. The Committee also specifically interviewed railway staff in different categories connected with the operation of trains and maintenance of railway assets, and officers both in the divisions and headquarters of zonal railways. In all, over 500 railwaymen from the level of gangmen to general managers of zonal railways were covered. Such of the unions and associations of different categories of railway staff who had volunteered to appear before the Committee were also invited to give their suggestions. Some members of the public and retired railwaymen also appeared before the Committee and gave their views. The list of the places visited, staff and officers interviewed or with whom discussions were held appear in Appendix II. The evidence recorded during these interviews runs into about 5000 pages. In addition to this, the Committee also received an overwhelmingly large number of suggestions through replies to questionnaires, memoranda from individuals as well as from unions and associations of railway staff and officers, trade union federations of railway workers

both at the divisional and headquarters levels of the zonal railways.

8. *Formulation of Part II Report.*—On the basis of the observations made during our visits, sifting of evidence tendered before us and the data furnished by the zonal railways and further in the light of discussions held with the Commission of Railway Safety, Research, Designs and Standards Organisation, trade union federations of railway workers and the Railway Board, we have come to certain conclusions and made recommendations with a view to promoting greater safety on Indian Railways. In the Chapters which follow, we give our findings, conclusions and recommendations. In view of the constraint of time, we have deliberately kept the discussions on the evidence and the detailed reasoning behind our conclusions and recommendations to the barest minimum. Wherever necessary and in the light of the material and information which has now become available to the Committee, we have amplified, supplemented and even amended some of the views and recommendations made by us in Part I of our Report.

9. The overall impressions of the Committee have been summarised in the 'Overview' placed as Chapter XVIII.

CHAPTER II

REVIEW OF ACCIDENTS ON THE INDIAN RAILWAYS DURING 1968-69 TO 1977-78

10. *General.*—In Chapter II in Part I of our Report, we had given a brief statistical appreciation of important categories of train accidents that occurred during the 10-year period from 1968-69 to 1977-78. On the basis of the information since furnished to us by zonal railways, we undertook a detailed review of accidents which occurred on the Indian Railways during the aforesaid 10-year period. To update our review, we had also called for from zonal railways, in June 1979, information in respect of accidents which occurred during the year 1978-79. Part information in this regard had been made available by only three zonal railways at the time of finalisation of this report; as such we have not been able to incorporate the position pertaining to the year 1978-79 in the present review. However, from the information collected by the Committee on its own, trends of important accidents on the Indian Railways during the years 1978-79 and 1979-80 have been commented upon.

11. The results of our detailed review have been tabulated in Annexures I to CIX of this Part. In the paragraphs which follow, we have commented on the main trends. For a complete appreciation of the position, these should be read in conjunction with the relevant annexure (s) shown within brackets.

COLLISIONS

12. *Trend of total number of collisions on the Indian Railways.*—The trend of collisions on the Indian Railway upto 1977-78 had been commented upon in paras 21 and 22 in Part I of our Report. On the broad, metre and narrow gauge systems of the Indian Railways, we find that, after a drop in the total number of collisions to 48 during 1976-77, a rising trend has set in, reaching a peak of 72 collisions during 1979-80. This was the worst performance in any one year since 1965-66. The deteriorating trend of the last few years is a matter for great concern.

(Annexure I)

13. *Incidence of collisions in 5-year periods.*—We find that, on the broad gauge, after a drop in the total number of collisions to 205 during 1968-69 to 1972-73 as compared to 269 during 1963-64 to 1967-68, their number had again increased to 245 during 1973-74 to 1977-78. The incidence of collisions per million train kilometres also indicates a similar trend.

(Annexure II)

14. Analysing the position on individual railways, we find that on the broad gauge of Southern and South Eastern Railways, after a drop in the number and incidence of collisions per million train kilometres during 1968-69 to 1972-73 as compared to the previous 5-year period, the number and incidence

of collisions had again gone up during the last 5-year period from 1973-74 to 1977-78. The increase in the incidence of collisions on the South Eastern Railway was to the extent of 66.7 per cent and on the Southern Railway it was 36.4 per cent. On the Eastern Railway, there had been a steady increase in the number and incidence of collisions from one 5-year period to the next. Against 39 collisions during 1963-64 to 1967-68, there were 41 collisions during 1968-69 to 1972-73 and 60 collisions during 1973-74 to 1977-78. The incidence of collisions per million train kilometres which stood at 0.14, as reviewed by the Wanchoo Committee, increased to 0.20 in the last 5-year period which, along with the incidence on the South Eastern Railway, was the highest amongst broad gauge railways. Special efforts are called for to arrest the trend.

(Annexure II)

15. On the broad gauge of Central, Northern, Northeast Frontier and Western Railways there has been improvement in the number and incidence of collisions per million train kilometres during the 10 years under review as compared to the 5-year period from 1963-64 to 1967-68 which was reviewed by the Wanchoo Committee. The number and incidence of collisions on zonal railways, year-wise, is given in Annexure IV.

(Annexure II)

16. On the metre gauge, there has been a continuous drop in the number and incidence of collisions on the Indian Railways from one 5-year period to the next.

(Annexure III)

17. On the metre gauge of the South Central Railway, the incidence of collisions during 1973-74 to 1977-78 had gone up by 22 per cent as compared to the position obtaining in 1968-69 to 1972-73. On the Western Railway the incidence of collisions on the metre gauge which had dropped to 0.05 in the previous 5-year period had again gone up to 0.07 in the next 5-year period. The number and incidence of collisions on zonal railways, year-wise, is given in Annexure V.

(Annexure III)

18. On the narrow gauge of Indian Railways, there has been improvement in the number and incidence of collisions in recent years.

(Annexure VI)

19. *Incidence of collisions taken separately for passenger and other trains.*—Collisions involving passenger trains on the broad gauge had increased to 121 during 1973-74 to 1977-78 as compared to 78 in the previous 5-year period. The number of collisions involving other trains recorded a slight drop during the same period. On the Eastern Railway, the

number of collisions involving passenger trains on the broad gauge more than doubled to 35 during 1973-74 to 1977-78 as compared to 17 in the previous 5-year period. The incidence of collisions per million passenger train kilometres had shot up to 0.23 from the earlier 0.12. On the Northern Railway, the incidence went up to 0.17 during the last 5-year period as compared to 0.11 in the previous 5-year period.

(Annexure VII)

20. On the metre gauge there was a drop in the number of collisions, involving both passenger and other trains.

(Annexure VIII)

21. *Types of collisions.*—The largest number of collisions in all the three 5-year periods were between two trains which also includes collisions between a train and a light engine. The proportion of collisions of this type to the total number of collisions was 50.6, 61.5 and 70.2 per cent in the three respective 5-year periods which shows a rising trend. We also find that the collisions between a train and a trolley or a lorry which caused the third largest number of collisions during 1963-64 to 1967-68 came to the second position during 1973-74 to 1977-78.

(Annexure IX)

22. During the 5-year period from 1973-74 to 1977-78, on the broad gauge there were 172 collisions between two trains. The comparative figures of collisions were 136 and 126 during 1963-64 to 1967-68 and 1968-69 to 1972-73 respectively, showing considerable deterioration, which was mainly on the Central, Eastern, Northern, Southern, South Central and South Eastern Railways.

Annexures IX and XI

23. On the broad gauge of Indian Railways, collisions between a train and trolley or a lorry caused by non-protection of trolleys and lorries increased from 17 during 1968-69 to 1972-73 to 27 during 1973-74 to 1977-78. On the Central, Eastern, Southern and South Eastern Railways, the position had deteriorated in particular.

(Annexure XIII & XV)

24. Collisions between a train and buffer ends or stationary objects which had dropped to 6 during 1968-69 to 1972-73 as compared to 11 in the previous 5-year period again increased to 10 during 1973-74 to 1977-78. The deterioration was mainly on the Eastern, South Eastern and Western Railways.

(Annexures IX & XI)

25. On the metre gauge, the continuous decline in the number of collisions from one 5-year period to the next was also noticeable in collisions of all types on all zonal railways except on the South Central and Western Railways where collisions between two trains, including a train and a light engine, increased during 1973-74 to 1977-78 as compared to the previous 5-year period. On the North Eastern and Western Railways also, there was a slight increase in collisions between a train and a rake or load or vehicles stabled on a running line during 1973-74 to 1977-78 as compared to the previous 5-year period.

(Annexures X & XI)

26. *Types of collisions taken separately for passenger and other trains.*—Collisions involving passenger trains on the broad and metre gauges went up to 107 during 1973-74 to 1977-78 as compared to 68 during the period 1968-69 to 1972-73 and 69 during 1963-64 to 1967-68.

(Annexure XII)

27. *Collisions classified according to main causes.*—We find that on the broad gauge of Indian Railways almost 50 per cent of the collisions during the 10 years under review occurred due to drivers disregarding signals or failing to control their trains. The total number of collisions due to this cause has also been going up from one period to the next. The position has deteriorated on the Central, Eastern, Northern, Southern, South Central and South Eastern Railways.

(Annexures XIII & XV)

28. Reception of a train on a blocked line or despatch into a blocked section accounted for the second highest number of collisions on the broad gauge during 1973-74 to 1977-78. Collisions due to this cause, after dropping to 66 during 1968-69 to 1972-73 from 144 in 1963-64 to 1967-68, again increased to 78 during 1973-74 to 1977-78. On the Eastern and South Eastern Railways, the position showed considerable deterioration during 1973-74 to 1977-78 as compared to the previous 5-year period.

(Annexures XIII & XV)

29. On the metre gauge, collisions caused by drivers disregarding signals or failing to control trains increased to 34 during 1968-69 to 1972-73 from 29 during the previous 5-year period. During the period 1973-74 to 1977-78, however, the number dropped to 27. The railwaywise position is given in Annexure XV.

(Annexure XIV)

Collisions on the broad and metre gauges classified according to the main causes, during the three 5-year periods, are shown in Chart I.

30. *Collisions due to failures of station staff classified.*—Of the collisions due to failure of station staff on the broad gauge, the largest number, i.e. 52 out of 144 (or 36.1 per cent), occurred due to reception of a train on an occupied line. Another 14 collisions or 9 per cent of the total, occurred due to sending of a train into a blocked section.

(Annexure XVI)

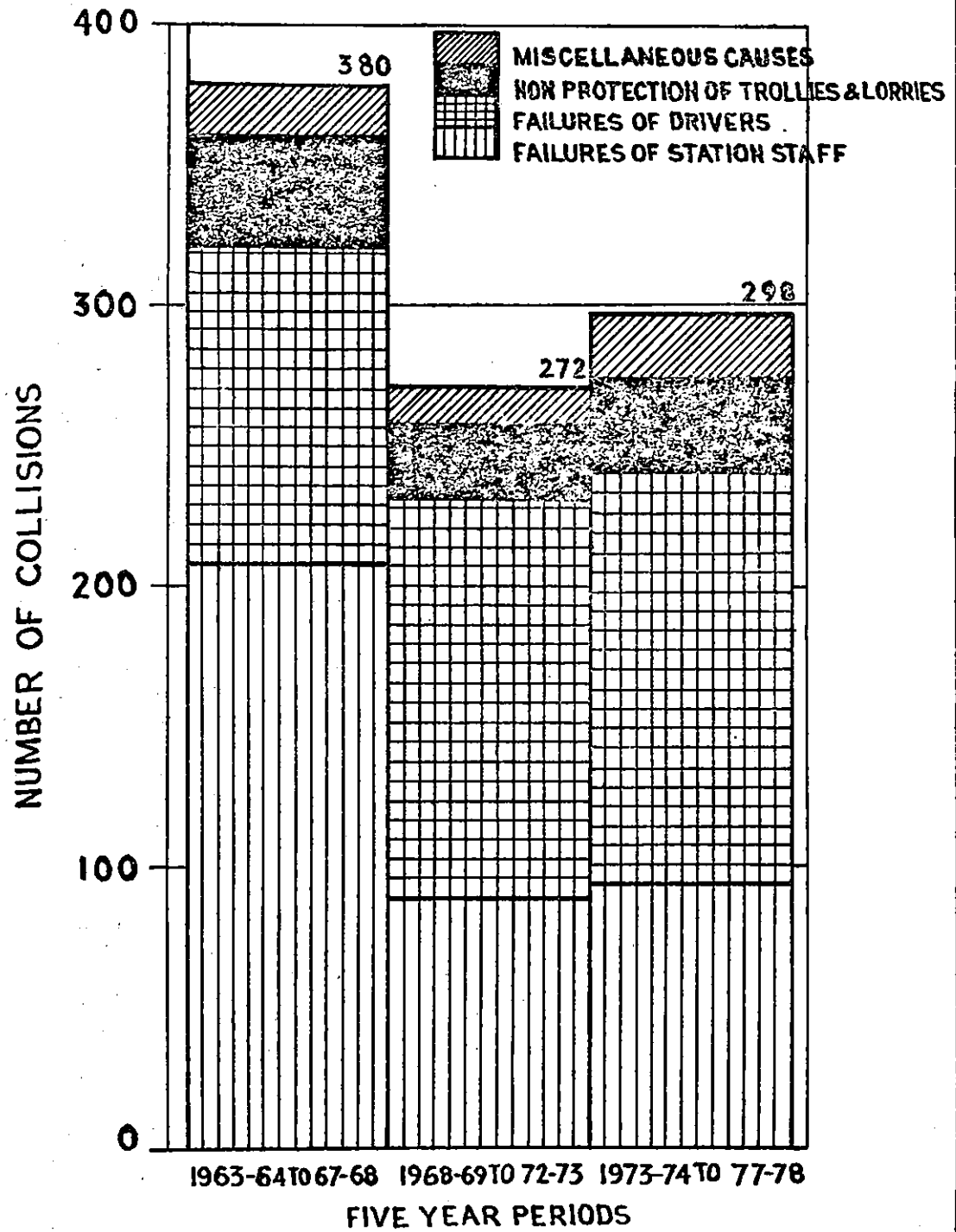
31. On the metre gauge, out of 45 collisions due to failure of station staff during 1968-69 to 1977-78, there were 12 collisions due to reception of a train on an occupied line and 2 collisions due to despatch of train into a blocked section.

(Annexure XVI)

32. On the broad and metre gauges, out of 189 collisions due to failure of station staff, 29 collisions or 15.3 per cent occurred due to fouling mark not having been cleared by trains.

(Annexure XVI)

INDIAN RAILWAYS COLLISIONS ON BROAD GAUGE AND METRE GAUGE SYSTEMS



S. SINGH

33. *Collisions due to failures of drivers-classified.*—Out of 296 collisions attributed to failures of drivers, on both the broad and metre gauges taken together, 196 were due to the driver's disregarding signals or overshooting. (Annexure XVII)

34. Non-observance of rules by drivers when passing automatic signals resulted in 48 collisions out of a total of 296 (16.2 per cent). Of these, 41 and 7 collisions occurred on the broad and metre gauges. South Eastern Railway witnessed the highest number of collisions, i.e. 21 of this type. (Annexure XVII)

35. *Staff held responsible for collisions.*—During the 10 years from 1968-69 to 1977-78, out of 742 railway staff held responsible for collisions, 277 were drivers. In the same period, 132 staff in the categories of station masters and assistant station masters, forming 17.8 per cent of the total, were held responsible. Looking at the position of individual railways, we find that drivers formed a relatively larger proportion of the staff held responsible for collisions on the Central, North Eastern, Northeast Frontier and South Eastern Railways.

(Annexure XVIII)

36. *Casualties and damages due to collisions.*—We find that in the matter of casualties the worst record is that of the Eastern Railway, who accounted for 50 per cent of the total casualties in collisions on Indian Railways during the 10 years ending 1977-78, even though their share in the total number of collisions was only 18 per cent. (Annexure XIX)

DERAILMENTS

37. *Trend of total number of derailments.*—The trend of derailments on the Indian Railways upto 1977-78 had been commented upon in paras 25 and 26 in Part I of our Report. Taking all gauges together, we notice that, after a drop in the total number of derailments to 636 during 1976-77, a rising trend had set in, with 712 derailments during 1977-78 and 778 during 1978-79. This is the highest number in any one year since 1967-68. During 1979-80 there was a drop in the total number of derailments to 691.

(Annexure I)

38. *Number and incidence of derailments—railway-wise, gauge-wise taken in 5-year periods.*—We find that on the broad gauge, after a drop in the total number of derailments from 2167 during 1963-64 to 1967-68 to 1,421 during 1968-69 to 1972-73, their number increased to 1,531 during 1973-74 to 1977-78. The incidence of derailments per million train kilometres, however, remained steady at 0.92 during the last two 5-year periods as compared to 1.60 during the period reviewed by the Wanchoo Committee.

(Annexure XX)

39. The improving trend in the incidence of derailments per million train kilometres on the broad gauge is also evident on the zonal railways, except South Eastern and Western Railways. On the South Eastern Railway, after a drop in the incidence of derailments to 0.93 during 1968-69 to 1972-73 from

2.68 during 1963-64 to 1967-68, it again rose to 1.39 during 1973-74 to 1977-78. On the Western Railway, a similar trend is visible. The incidence was 0.73 during 1973-74 to 1977-78 as compared to 0.82 and 0.58 during 1963-64 to 1967-68 and 1968-69 to 1972-73 respectively. The year-wise number and incidence of derailments on the broad gauge of zonal railways is given in Annexure XXIII. (Annexure XX)

40. On the metre gauge of Indian Railways, there has been a continuous decline in the total number of derailments from one 5-year period to the next. The incidence of derailments per million train kilometres which had dropped to 2.43 during 1968-69 to 1972-73 as compared to 3.86 in the previous 5-year period, increased to 2.58 during 1973-74 to 1977-78.

(Annexure XXI)

41. On the metre gauge of the Northern and Northeast Frontier Railways, there has been consistent improvement in the number and incidence of derailments per million train kilometres from one 5-year period to the next. On the North Eastern, Southern and Western Railways, after improvement in the incidence during 1968-69 to 1972-73, there was deterioration during 1973-74 to 1977-78. The increase in incidence was 32.4, 23.7 and 31.2 per cent on the above mentioned railways respectively. On the South Central Railway, the incidence had dropped to 2.54 during 1973-74 to 1977-78 as compared to 3.18 during 1968-69 to 1972-73. In spite of the consistent improvement in the incidence of derailments on the Northeast Frontier Railway, it still remained the highest of all zonal railways in all the three 5-year periods. The year-wise number and incidence of derailments on the metre gauge of zonal railways is given in Annexure XXIV.

(Annexure XXI)

42. On the narrow gauge of Indian Railways, the number of derailments in each of the last two 5-year period was 232 as compared to 315 during 1963-64 to 1967-68. The incidence of derailments per million train kilometres which dropped to 4.11 during 1968-69 to 1972-73 as compared to 5.5 in the previous 5-year period went up to 4.85 during 1973-74 to 1977-78.

(Annexure XXII)

43. The highest incidence of derailments per million train kilometres on the narrow gauge was on the Northeast Frontier Railway. Against the incidence of 11.9 and 10.66 during 1963-64 to 1966-67 and 1968-69 to 1972-73 respectively, it went up almost three-fold to 30.98 during 1973-74 to 1977-78. On the Eastern, Southern, South Eastern and Western Railways, the incidence of derailments went up during 1973-74 to 1977-78 as compared to the previous 5-year period. The increase was 61.8, 53.5, 52.0 and 69.9 per cent respectively. On the Central and Northern Railways there has been a continuous decline, both in the number and the incidence of derailments, from one 5-year period to the next. During 1973-74 to 1977-78, the incidence on the Northern Railway was 1.94, which was the lowest of all zonal railways. On the South Central Railway

also, there was a drop in the incidence of derailments per million train kilometres from 5.57 during 1968-69 to 1972-73 to 4.44 during 1973-74 to 1977-78. The year-wise number and incidence of derailments on the narrow gauge of zonal railways is given in Annexure XXV. (Annexure XXII)

44. *Number of derailments at stations and in mid-section.*—The increase in derailments on the board gauge of Indian Railways to 1531 during 1973-74 to 1977-78 as compared to 1421 during 1968-69 to 1972-73 was entirely due to a larger number of mid-section derailments, which increased from 464 to 701. The latter figure of derailments during 1973-74 to 1977-78 was the highest witnessed in any 5-year period. The increase was due to a larger number of mid-section derailments mainly on the Central, Eastern, Northern, South Eastern and Western Railways. The increase on the South Eastern Railway was exceptionally high from 120 derailments during 1968-69 to 1972-73 to 223 in 1973-74 to 1977-78.

(Annexure XXVI)

45. The number of derailments at stations on the broad gauge declined continuously from 1,572 during 1963-64 to 1967-68 to 957 and 830 during 1968-69 to 1972-73 and 1973-74 to 1977-78 respectively. The improving trend is visible in each zonal railway also, except the South Eastern Railway where the number of derailments at stations went up from 117 during 1968-69 to 1972-73 to 137 during 1973-74 to 1977-78 and Western Railway where the number increased from 67 to 98 during the periods mentioned above. (Annexure XXVI)

46. In spite of the declining trend of total number of derailments on the metre gauge of Indian Railways, derailments in mid-section had increased to 1033 during 1973-74 to 1977-78 as compared to 975 and 928 during 1963-64 to 1967-68 and 1968-69 to 1972-73 respectively. The increase was due to larger number of mid-section derailments, mainly on the North Eastern, Southern and Western Railways. Derailments at stations show a declining trend. On the North Eastern Railway, however, their number went up from 145 during 1968-69 to 1972-73 to 160 in 1973-74 to 1977-78.

(Annexure XXXI)

47. *Main causes of derailments at stations.*—Coming to the main causes of derailments at stations on the broad gauge, staff failures continued to be the most prominent cause. The number of derailments due to staff failures, however, dropped from 814 during 1963-64 to 1967-68 to 497 and 409 in the next two 5-year periods respectively. In each of the three 5-year periods, the proportion of derailments due to staff failures to the total remained more or less in the region of 50 per cent.

Derailments at stations due to carriage and wagon defects, after a drop to 187 during 1968-69 to 1972-73 as compared to 289 in the previous 5-year period, again increased to 201 during 1973-74 to 1977-78. The proportion of such derailments to the total number of derailments at stations, i.e. 18.4,

19.6 and 24.2 per cent during the three respective 5-year periods shows a consistent increase. The number of derailments at stations attributable to permanent way failures, engine defects and miscellaneous causes showed improvement from one 5-year period to the next. The trend of derailments at stations on the zonal railways, attributable to each of the main causes, is given in Annexure XXVIII.

(Annexure XXVII)

48. The main cause of derailments at stations on the metre gauge during all the three 5-year periods was staff failures, followed by carriage and wagon defects. We find that there was a decline in the number of derailments attributable to staff failures, permanent way failures, engine defects and miscellaneous causes from one 5-year period to the next. However, derailments at stations due to carriage and wagon defects increased from 187 during 1968-69 to 1972-73 to 210 during 1973-74 to 1977-78. This was due to a larger number of derailments at stations on the Northeast Frontier and Southern Railways. Derailments due to carriage and wagon defects taken as a percentage of the total number of derailments at stations has also increased from 23.5 to 34.7 per cent in the last two 5-year periods.

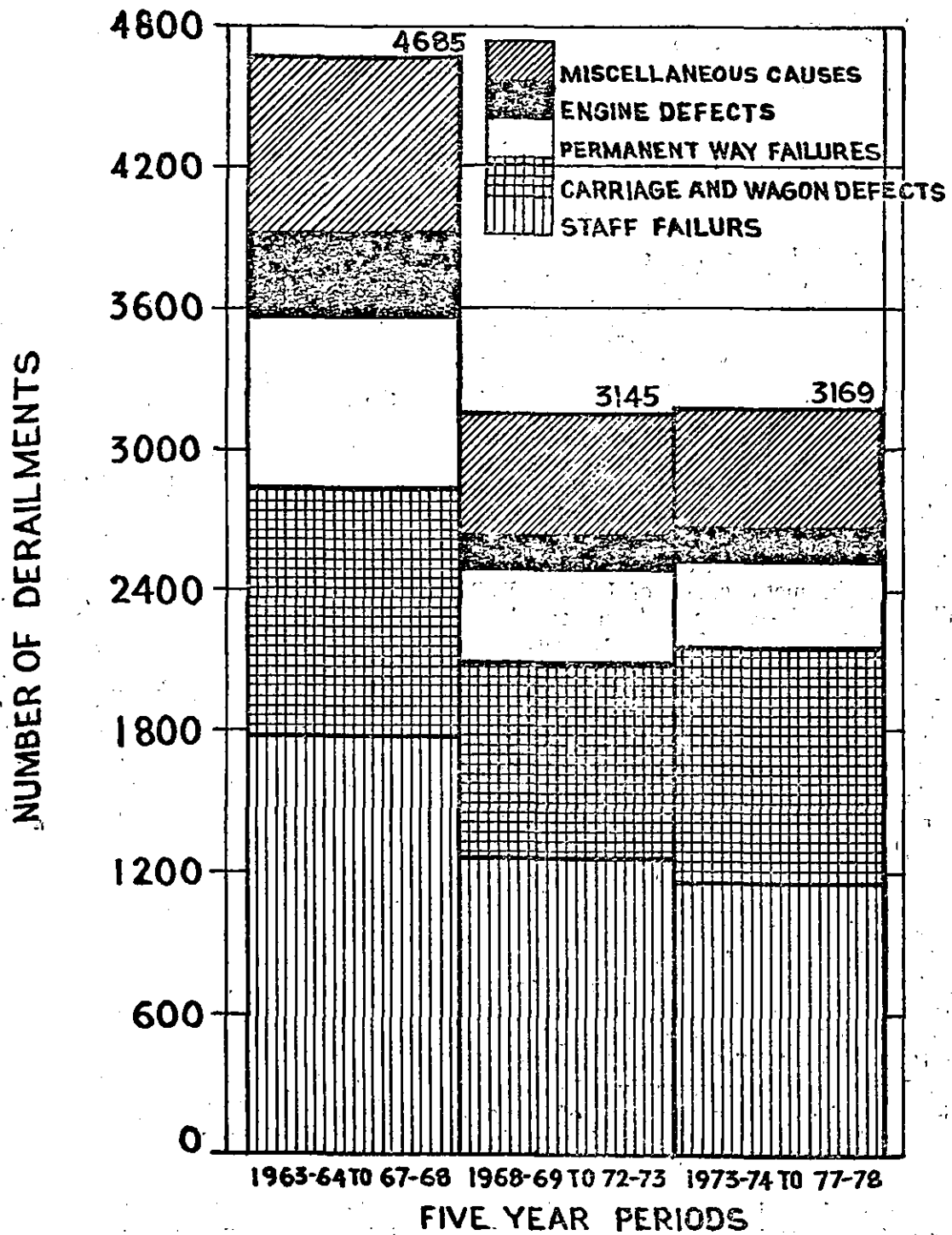
(Annexures XXXII & XXXIII)

49. *Main causes of derailments in mid-section.*—On the broad gauge, the increase in the total number of derailments in mid-section to 701 during 1973-74 to 1977-78 as compared to 464 in the previous 5-year period, was mainly due to a large number of derailments attributable to carriage and wagon defects, staff failures and permanent way failures, in that order. Derailments in mid-section due to all the main causes except permanent way failures had increased during 1973-74 to 1977-78 even beyond the level obtaining during 1963-64 to 1967-68. Carriage and wagon defects continued to be the most prominent contributory factor, and the number of derailments on this account were 178, 146 and 260 in the three respective 5-year periods. The deterioration was very marked on the South Eastern Railway on which their number went up from 41 during 1968-69 to 1972-73 to 105 during 1973-74 to 1977-78.

Derailments in mid-section due to staff failures increased to 148 during 1973-74 to 1977-78 as compared to 95 and 94 during 1963-64 to 1967-68 and 1968-69 to 1972-73 respectively; this increase was mainly due to larger number of derailments on the Northern, South Eastern and Western Railways.

Derailments in mid-section due to permanent way failures were 170, 72 and 119 during the three respective 5-year periods. The increase during 1973-74 to 1977-78 was due to a large number of such derailments, mainly on the Central and South Eastern Railways. Derailments in mid-section due to engine defects were 27, 14 and 28 in the three respective 5-year periods. Increase in such derailments during 1973-74 to 1977-78, as compared to the previous 5-year period, was mainly on Central, Northern South Central and South Eastern Railways.

INDIAN RAILWAYS DERAILMENTS ON BROAD GAUGE AND METRE GAUGE SYSTEMS



The trend of derailments in mid-section according to main causes on zonal railways is given in Annexure XXIX.

(Annexure XXVIII)

50. On the metre gauge, the main causes of increase in derailments in mid-section to 1038 during 1973-74 to 1977-78, as compared to 928 in the previous 5-year period, were staff failures, permanent way failures, carriage and wagon defects and engine defects.

Staff failures, as a single factor, contributed the highest number of derailments, i.e. 366 forming 35.4 per cent of the total during 1973-74 to 1977-78. The number of mid-section derailments due to staff failures i.e. 202, 320 and 366 has been continuously increasing from one 5-year period to the next. The increase in the last 5-year period took place mainly on the North Eastern, Southern and Western Railways.

The period 1973-74 to 1977-78 witnessed the highest number of derailments due to carriage and wagon defects. There occurred 316, 315 and 341 derailments due to this cause in the three respective 5-year periods. The increase was mainly on the North Eastern, Southern and Western Railways. On the Western Railway, the number of derailments due to this cause had more than doubled from 46 during 1968-69 to 1972-73 to 99 in 1973-74 to 1977-78.

Derailments in mid-section due to permanent way failures which had dropped from 162 during 1963-64 to 1967-68 to 77 in 1968-69 to 1972-73 again increased to 105 during 1973-74 to 1977-78. The increase in such derailments was most prominent on the Northern and Western Railways.

Derailments in mid-section due to engine defects increased to 57 during 1973-74 to 1977-78 as compared to 49 and 32 during 1963-64 to 1967-68 and 1968-69 to 1972-73 respectively. The increase in such derailments was more prominent on the Northern, North Eastern and Southern Railways.

The railway-wise position of derailments at stations and in mid-section combined is given in Annexure XXX for broad gauge and Annexure XXXV for metre gauge. The position of derailments on the broad and metre gauges combined, split up into main causes is shown in Chart II.

(Annexures XXXII and XXXIV)

51. *Incidence of derailments of passenger trains.*—On the broad gauge of Indian Railways, the incidence of derailments of passenger trains per million passenger train kilometres witnessed a slight decline from 0.47 during 1963-64 to 1967-68 to 0.44 and 0.45 during 1968-69 to 1972-73 and 1973-74 to 1977-78 respectively. The year-wise number and incidence of derailments of passenger trains on Indian Railways is given in Annexure XXXVII. On the Central, Eastern and South Central Railways, the incidence went up during 1973-74 to 1977-78 as compared to the previous two 5-year periods.

(Annexures XXXVI & XXXVIII)

52. On the metre gauge of Indian Railways, after a drop in the incidence of derailments of passenger trains to 0.70 during 1968-69 to 1972-73 as compared to 0.88 in 1963-64 to 1967-68 it rose to 0.98 during 1973-74 to 1977-78, indicating considerable deterioration.

The year-wise number of such derailments on Indian Railways is given in Annexure XXXIX.

On the Central, Northern and South Central Railways, the incidence of derailments of passenger trains on the metre gauge had gone up consistently from one 5-year period to the next. On the North Eastern, Southern and Western Railways, there was increase in the incidence during 1973-74 to 1977-78 as compared to the previous 5-year period. Consistent improvement in incidence of derailments of passenger trains was recorded on the Northeast Frontier Railway.

(Annexures XXXVI & XL)

53. *Incidence of derailments of other trains.*—On the broad gauge, the incidence of derailments of other trains* per million other train kilometres had come down appreciably from 2.8 during 1963-64 to 1967-68 to 1.4 during the 10-year period under review. The year-wise number and incidence of derailments of other trains on Indian Railways is given in Annexure XXXVII.

The improvement in incidence of derailments of other trains on the broad gauge during 1968-69 to 1972-73 as compared to the previous 5-year period is noticed on all the zonal railways except on the North-east Frontier Railway. The same trend was maintained during 1973-74 to 1977-78 also, except on the South Eastern and Western Railways; on South Eastern Railway the incidence rose from 1.17 during 1968-69 to 1972-73 to 1.95 in 1973-74 to 1977-78. On the Western Railway, the increase during the same period was from 0.97 to 1.34.

(Annexures XXXVI & XXXVIII)

54. On the metre gauge of Indian Railways, the incidence of derailments of other trains per million other train kilometres had dropped sharply to 4.84 during 1968-69 to 1972-73 as compared to 8.5 in the previous 5-year period. During 1973-74 to 1977-78, there was a slight increase in the incidence to 4.97. The year-wise number and incidence of derailments of other trains on Indian Railways is given in Annexure XXXIX.

There was an improving trend on the zonal railways during 1968-69 to 1972-73 except on the Central Railway. During 1973-74 to 1977-78, the incidence went up on the North Eastern, North-east Frontier, Southern and Western Railways. We may also point out that the incidence of derailments of other trains on the metre gauge of the North-east Frontier Railway was more than double the all-India level.

(Annexures XXXVI & XL)

*Other trains refer to all trains other than passenger trains.

55. *Incidence of derailments of passenger and other trains on the narrow gauge.*—On the narrow gauge of the Indian Railways, after a drop in the incidence of derailments of passenger trains per million passenger train kilometres to 4.19 during 1968-69 to 1972-73 as compared to 4.4 in the previous 5-year period, the incidence sharply increased to 5.27 during 1973-74 to 1977-78.

(Annexure XXXVI)

56. Taking the zonal railways individually, we find that there was deterioration in the incidence of derailments of passenger trains mainly on the Northeast Frontier Railway where it rose sharply to 38.46 during 1973-74 to 1977-78 as compared to 19.5 and 12.12 during 1963-64 to 1967-68 and 1968-69 to 1972-73 respectively. This sharp increase is a matter for concern. On the Southern, South Eastern and Western Railways also, the incidence of derailments of passenger trains during 1973-74 to 1977-78 was the highest as compared to the two previous 5-year periods. On the Central and Northern Railways, there was consistent improvement in the incidence of derailments of passenger trains from one 5-year period to the next.

(Annexure XLI)

57. The incidence of derailments of other trains on the narrow gauge, declined to 3.96 during 1968-69 to 1972-73 as compared to 8.6 in the previous 5-year period; during 1973-74 to 1977-78, there was, however, a slight increase in the incidence to 4.03. This rise was mainly due to the higher incidence of derailments of other trains on the Northeast Frontier, Southern, South Eastern and Western Railways.

(Annexures XXXVI & XLI)

58. On the narrow gauge, the relative incidence of derailments of passenger and other trains correlated to the density of traffic was :

	1963-64 to 1967-68	1968-69 to 1972-73	1973-74 to 1977-78
Passenger trains	4.4	4.19	5.27
Other trains	8.6	3.96	4.03

Thus, the incidence of derailments of passenger trains which was only about 50 per cent of the incidence of derailments of other trains during 1963-64 to 1967-68, rose to a level 30 per cent above the latter during 1973-74 to 1977-78. The same trend is to be seen on many of the zonal railways also.

(Annexures XXXV & XLI)

59. *Main causes of derailments of passenger trains.*—The increase in derailments of passenger trains on the broad gauge during the 10 years under review was mainly due to the staff failures and miscellaneous causes. Staff failures caused 129 derailments out of 32 passenger train derailments (or 33.8 per cent) during 1973-74 to 1977-78. Derailments of passenger trains attributable to permanent way failures and carriage and wagon defects which dropped during 1968-69 to 1972-73 as compared to the previous 5-

year period again increased to the level obtaining in 1963-64 to 1967-68.

(Annexure XLII)

60. On the metre gauge, the spurt in derailments of passenger trains to 374 during 1973-74 to 1977-78 as compared to 287 in 1968-69 to 1972-73, was due to larger number of derailments attributable to each of the main causes. Staff failures resulted in 116 derailments or 31.0 per cent of the total. It may be mentioned that the share of staff failures in the total number of derailments has been continuously going up from one 5-year period to the next.

(Annexure XLIII)

61. *Main causes of derailments of other trains.*—On the broad gauge, staff failures continued to be the main contributory cause of derailments of other trains. This factor resulted in 428 derailments or 37.3 per cent of the total during 1973-74 to 1977-78. This was closely followed by 398 derailments due to carriage and wagon defects in the same 5-year period. Though the total number of derailments of other trains during 1973-74 to 1977-78 had declined to two-thirds of those in 1963-64 to 1967-68, derailments attributable to carriage and wagon defects rose to the same level as was obtaining in the latter period. During 1973-74 to 1977-78, derailments of other trains due to permanent way failures also increased to 160 as against 141 in the previous 5-year period.

(Annexure XLII)

62. On the metre gauge, the consistent decline in the total number of derailments of other trains is also reflected in each one of the main causes except in the case of derailments due to carriage and wagon defects. Derailments due to carriage and wagon defects, after dropping to 443 during 1968-69 to 1972-73 from 493 in the previous 5-year period, again increased to 483 during 1973-74 to 1977-78. It may be mentioned that the share of derailments attributable to carriage and wagon defects in the total number of derailments of other trains, i.e. 22.9, 30.8 and 38.2 per cent has been continuously increasing from one 5-year period to the next.

(Annexure XLIII)

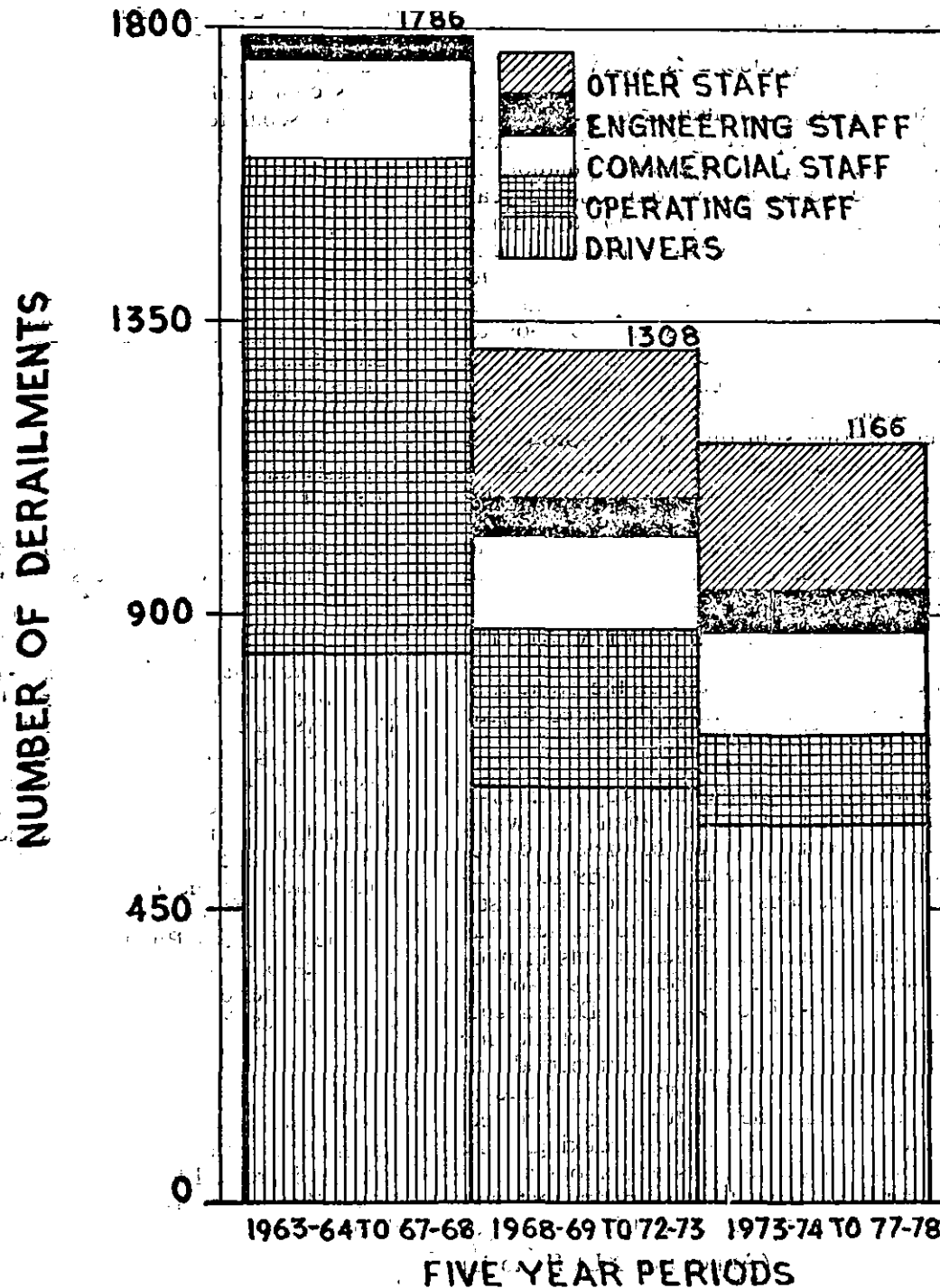
63. *Derailments due to staff failures—classified.*—On the broad gauge, there has been a continuous decline in the number of derailments attributable to failures of operating staff.

Derailments attributable to failures of commercial staff due to defective loading viz. uneven loading, shifting of loads etc. which had dropped to 39 during 1968-69 to 1972-73 as compared to 71 in the previous 5-year period went up to 66 during 1973-74 to 1977-78. The increase of such derailments was mainly on the Central, Northern, Southern and South Eastern Railways.

Derailments attributable to drivers disregarding approach or departure signals increased from 123 during 1963-64 to 1967-68 to 155 and 140 during 1968-69 to 1972-73 and 1973-74 to 1977-78, respectively. The increase was on the Central, Northern and Western

INDIAN RAILWAYS

DERAILMENTS DUE TO FAILURE OF STAFF ON BROAD GAUGE AND METRE GAUGE SYSTEMS



NOTE: OTHER STAFF FAILURES WAS NOT TAKEN AS A SEPARATE CATEGORY BY WANCHOO COMMITTEE.

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Railways. Derailments attributable to drivers running at excessive speed or failing to control their trains, were 161, 84 and 107 during the three respective 5-year periods. The increase during the last 5-year period was mainly contributed by the South Eastern and Western Railways.

Derailments attributable to engineering staff due to non-protection of engineering works, failures to issue caution orders for engineering works or inadequate protection at site have been increasing continuously from 14 during 1963-64 to 1967-68 to 29 and 31 during 1968-69 to 1972-73 and 1973-74 to 1977-78 respectively. The increase was mainly on the Central, Northern and Southern Railways.

(Annexures XLIV & XLV)

64. On the metre gauge, the number of derailments attributable to failures of operating staff due to incorrect setting, non-locking or other mismanipulation of points, etc. decreased continuously from one 5-year period to the next. Derailments attributable to failures of drivers running at excessive speed or failing to control their trains resulting in overshooting increased to 201 during 1973-74 to 1977-78 as compared to 172 and 168 during 1963-64 to 1967-68 and 1968-69 to 1972-73 respectively. The increase was mainly on the Northeast Frontier, South Central and Western Railways. Derailments on the metre gauge attributable to failures of engineering staff due to non-protection of engineering works, failures to issue caution orders for engineering works or inadequate protection at site increased from 8 during 1963-64 to 1967-68 to 27 and 31 during 1968-69 to 1972-73 and 1973-74 to 1977-78 respectively. The increase was mainly on the Southern, Northern and North Eastern Railways.

(Annexures XLVI & XLVII)

Derailments due to failures of staff on the broad and metre gauges taken together, during the three 5-year periods are shown in Chart III.

65. *Derailments due to permanent way failures—classified.*—On the broad gauge of Indian Railways, derailments due to permanent way failures, after recording a sharp drop to 184 during 1968-69 to 1972-73 from 399 in the previous 5-year period, increased to 208 during 1973-74 to 1977-78. The increase was mainly due to a larger number of derailments in mid-section which increased from 72 during 1968-69 to 1972-73 to 119 in 1973-74 to 1977-78. Derailments at stations due to permanent way failures had shown a decrease. The increase in the last 5-year period as compared to 1968-69 to 1972-73 was mainly due to permanent way defects in the nature of incorrect gauge, rail fractures and slack or loose packing. The railway-wise number of derailments at stations and in mid-section, according to the type of permanent way failures, are given in Annexures LI & LII.

(Annexures XLVIII to L)

66. On the metre gauge, even though there has been a continuous decline in the total number of derailments due to permanent way failures from one 5-year period to the next, the number of mid-section derailments

had increased from 77 during 1968-69 to 1972-73 to 105 during 1973-74 to 1977-78. The increase in mid-section derailments was mainly on account of sinkage of track, badly aligned curves or incorrect super-elevation or kinks in track, defective track materials, rail fractures and slack or loose packing. The increase on account of each cause is given in Annexure LV and the railway-wise position separately for derailments at stations and in mid-section is given in Annexures LVI and LVII.

(Annexures LIII & LIV)

67. *Derailments due to rail fractures.*—We find that, on the broad and metre gauges of Indian Railways, the number of derailments due to rail fractures had gone up by 79 per cent during 1973-74 to 1977-78 as compared to the previous 5-year period. The position separately at stations and in mid-section was:

Gauge	Number of derailments due to rail fractures					
	1968-69 to 1972-73			1973-74 to 1977-78		
	S	MS	T	S	MS	T
Broad Gauge	5	4	9	9	13	22
Metre Gauge	7	3	10	5	7	12
Total	12	7	19	14	20	34

S: at stations

MS: in mid-section

T: total

While derailments at stations increased from 12 to 14, those in mid-section increased from 7 to 20.

(Annexures L & LV)

68. *Incidence of derailments due to defects in coaching vehicles.*—On the broad gauge of Indian Railways, the number of derailments due to defects in coaching vehicles had increased from 46 during 1968-69 to 1972-73 to 63 during 1973-74 to 1977-78. The incidence of derailments of coaching vehicles per 100 million vehicle kilometres increased from 0.31 to 0.38 during the same period. The increase was mainly contributed by the Central, Eastern, Northern, South Eastern and Western Railways. The incidence doubled on the Northern Railway from 0.12 during 1968-69 to 1972-73 to 0.24 in 1973-74 to 1977-78. During the same period, the increase on the South Eastern Railway was from 0.11 to 0.35.

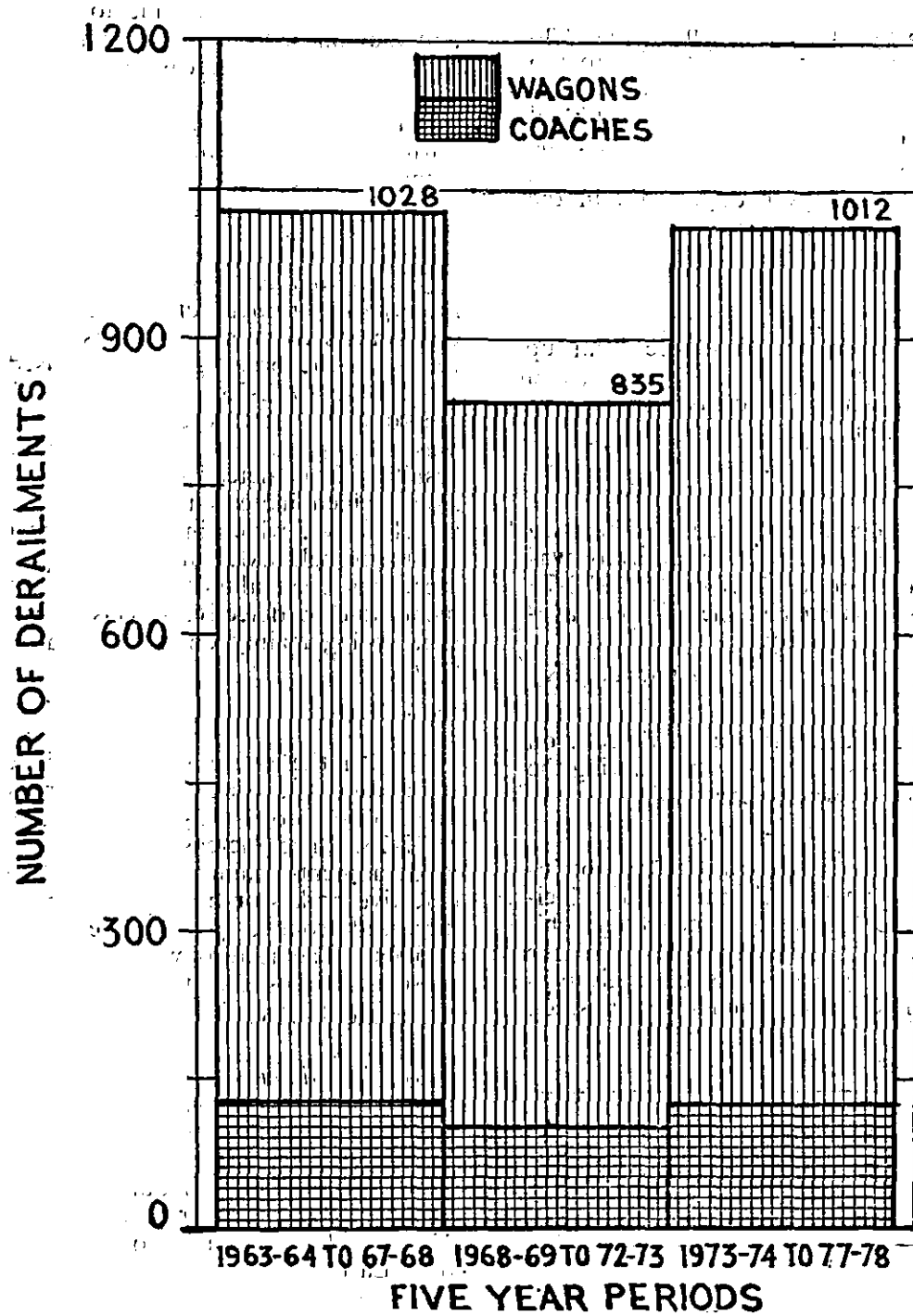
(Annexures LVIII & LIX)

69. On the metre gauge of the Indian Railways, the number of derailments due to defects in coaching vehicles increased from 59 during 1968-69 to 1972-73 to 68 during 1973-74 to 1977-78; the incidence of derailments per 100 million vehicle kilometres increased from 0.76 to 0.90. This increase was mainly contributed by the North Eastern, Northeast Frontier and Southern Railways. On the Southern Railway, the incidence had sharply risen from 0.06 during 1968-69 to 1972-73 to 0.60 in 1973-74 to 1977-78.

(Annexures LVIII & LX)

INDIAN RAILWAYS

DERAILMENTS DUE TO CARRIAGE AND WAGON DEFECT ON BROAD GAUGE AND METRE GAUGE SYSTEMS



70. *Incidence of derailments due to defects in goods wagons.*—On the broad gauge of Indian Railways, the number of derailments due to defects in goods wagons had increased from 287 during 1968-69 to 1972-73 to 398 in 1973-74 to 1977-78. During the same period, the incidence of derailments of goods wagons per 100 million wagon kilometres increased from 0.65 to 0.81. This increase was contributed by all the zonal railways except the Northern and South Central Railways.

(Annexures LVIII & LEX)

71. On the metre gauge of Indian Railways, the number of derailments due to defects in wagons had increased from 443 during 1968-69 to 1972-73 to 483 in 1973-74 to 1977-78. The incidence of such derailments per 100 million wagon kilometres increased from 3.63 to 4.36. Taking individual railways, the incidence on the North Eastern, Northeast Frontier, Southern and Western Railways had gone up in the last 5-year period as compared to 1968-69 to 1972-73.

The deterioration in position was very marked on the Southern Railway where the incidence went up from 2.19 to 3.98, an increase by 81.7 per cent; and on the Western Railway where it increased from 2.32 to 3.51 i.e. by 51.3 per cent.

(Annexures VIII & LX)

72. The incidence of derailments due to defects in goods wagons on the Northeast Frontier Railway was 8.97 and 9.85 during the periods 1968-69 to 1972-73 and 1973-74 to 1977-78 as against the all-India average of 3.63 and 4.36 respectively.

(Annexure LX)

Derailments due to carriage and wagon defects, on the broad and metre gauges taken together, during the three 5-year periods are shown in Chart IV.

73. For a comparison with the position as obtained at the time of the Wanchoo Committee, the incidence of derailments due to defects in coaching vehicles and goods wagons combined per 100 million vehicles and wagon kilometres has been given in Annexures LVIII to LX. The summarised position is as under :

Gauge	Incidence of derailments due to defects in coaching vehicles and goods wagons		
	1963-64 to 1967-68	1968-69 to 1972-73	1973-74 to 1977-78
Broad Gauge	0.9	0.56	0.70
Metre Gauge	2.5	2.52	2.96

74. *Derailments due to carriage and wagon defects—classified.*—From the analysis of derailments due to the type of carriage and wagon defects, we find that on the broad gauge of Indian Railways the number of derailments due to breakage of undergear and

vacuum or brake fittings, broken hot axles and defective buffers went up during 1973-74 to 1977-78 as compared to the number in 1963-64 to 1967-68. The number of derailments due to seized roller bearings went up from 16 during 1968-69 to 1972-73 to 24, i.e. an increase of 50 per cent, during 1973-74 to 1977-78. The railway-wise position of derailments according to the type of carriage and wagon defect during the three 5-year periods is given in Annexure LXII.

(Annexure LXI)

75. On the metre gauge of Indian Railways, the number of derailments due to breakage of undergear and vacuum or brake fittings and broken hot axles had shown consistent increase from one 5-year period to the next. The railway-wise position of derailments according to the type of carriage and wagon defects during the three respective 5-year periods is given in Annexure LXVII.

(Annexure LXVI)

76. *Derailments of passenger trains according to the type of carriage defects.*—As indicated in para 68, derailments of passenger trains due to defects in carriages on the broad gauge, increased from 46 during 1968-69 to 1972-73 to 63 in 1973-74 to 1977-78, thus recording an increase of 37.0 per cent. This increase was mainly due to a larger number of derailments resulting from defective or broken springs or suspensions, which increased from 5 to 9; due to defective wheel or tyre which increased from 6 to 17; and due to broken cold axle which went up from 1 to 4. Thus, there has been almost three-fold increase in derailments due to defective wheels or tyres, the deterioration being mainly on the Central and Eastern Railways.

(Annexures LXIII & LXIV)

77. On the metre gauge, derailments of passenger trains due to carriage defects increased from 59 during 1968-69 to 1972-73 to 68 during 1973-74 to 1977-78. The increase was due to a larger number of derailments mainly due to binding brake blocks or defective brakes or brake power, the number of which increased from 1 to 6 in the two respective 5-year periods. The railway-wise position of derailments of passenger trains due to carriage defects is given in Annexure LXIX.

(Annexure LXVIII)

78. *Derailments of other trains according to the type of defects wagons.*—On the broad gauge, the number of derailments of other trains attributable to defects in wagons increased from 287 during 1968-69 to 1972-73 to 398 during 1973-74 to 1977-78, an increase of 38.7 per cent. The increase was mainly due to a larger number of derailments on the Central, Eastern, Southern, South Eastern and Western Railways. We wish to point out that the position had shown very significant deterioration on the South Eastern Railway where the number of such derailments attributable to defects in wagons increased to 147 during 1973-74 to 1977-78 as compared to 78 in the previous 5-year period.

(Annexures LXIII & LXV)

79. The types of defects in wagons due to which derailments of other trains increased during 1973-74 to 1977-78 as compared to the previous 5-year period are summarised below :

Type of defecting wagon	Number of derailments of other trains		Percentage increase (3) — (2) x 100 (2)
	1968-69 to 1972-73	1973-74 to 1977-78	
1. Defective or broken springs or suspensions	34	51	50.0
2. Breakage of under-gear and vacuum or brake fittings	45	57	26.7
3. Defective or broken axle boxes	17	25	47.1
4. Binding brake blocks or defective brakes or brake power	8	15	87.5
5. Defective wheel or tyre	25	31	24.0
6. Broken axle or journal			
(a) Hot axle	62	69	11.3
(b) Cold axle	31	39	25.8
7. Seized roller bearings	45	23	53.3
8. Coupling failures	4	7	75.0
9. Defective buffers	8	12	50.0
10. Defective bogie bolster hangers	1	7	600.0

The position has deteriorated specifically on the Central, Eastern, South Eastern and Western Railways. (Annexures LXIII & LXV)

80. On the metre gauge of Indian Railways, the number of derailments of other trains went up from 443 during 1968-69 to 1972-73 to 483 in 1973-74 to 1977-78, an increase of 9 per cent. This increase was mainly due to a larger number of derailments on the North Eastern, Southern and Western Railways. The increase on the Southern Railway was from 33 to 55 and on the Western Railway from 86 to 126 in the two respective 5-year periods.

(Annexures LXVIII & LXX)

81. The increase in the number of derailments of other trains on the metre gauge, during 1973-74 to 1977-78, was mainly due to the following defects in wagons :—

Type of defect in wagon	Number of derailments of other trains		Percentage increase (3) — (2) x 100 (2)
	1968-69 to 1972-73	1973-74 to 1977-78	
1. Breakage of under-gear and vacuum or brake fittings	49	91	85.7
2. Defective wheel or tyre	13	18	38.5
3. Broken axle or journal			
(a) Hot axle	22	32	45.5
(b) Cold axle	26	43	65.4

The railway-wise position of derailments of other trains on the metre gauge, according to the type of wagon defects, is given in Annexure LXX.

(Annexure LXVIII)

82. Incidence of derailments due to engine defects.—On the broad gauge, there was a marked drop in the incidence of derailments due to engine defects per million train kilometres to 0.028 during 1968-69 to 1972-73 from 0.063 in 1963-64 to 1967-68. During 1973-74 to 1977-78, there was, however, a slight increase in the incidence to 0.033. The position deteriorated on the Northern Railway where the incidence increased to 0.044 and 0.043 in the last two 5-year periods as compared to 0.031 in 1963-64 to 1967-68. On the South Eastern Railway also, the incidence of derailments due to defects in engines went up during 1973-74 to 1977-78 to 0.027 as compared to 0.016 during 1968-69 to 1972-73 and 0.018 in 1963-64 to 1967-68. On the Central and Eastern Railways, the incidence increased during 1973-74 to 1977-78 as compared to the previous 5-year period. (Annexure LXXI)

83. On the metre gauge of the Indian Railways, after a marked drop in the incidence of derailments due to defects in engines from 0.330 during 1963-64 to 1967-68 to 0.109 in 1968-69 to 1972-73, there was an increase in the incidence to 0.132 during 1973-74 to 1977-78. We find that continuous deterioration has taken place on the Northern Railway, the incidence was 0.181, 0.198 and 0.258 respectively during the three 5-year periods. On the North Eastern, South Central and Western Railways, there was deterioration during 1973-74 to 1977-78. On the North-east Frontier and Southern Railways, the incidence of derailments due to engine defects per million train kilometres has recorded continuous improvement.

(Annexure LXXII)

84. Derailments due to defects in engines—classified. On the broad gauge of the Indian Railways, increase in the number of derailments to 55 during 1973-74 to 1977-78 as compared to 44 in the previous 5-year period was mainly due to defective wheels or tyres and breakage of axles or journals of locomotives. Derailments due to engine defects classified according to the nature of defect on the zonal railways is indicated in Annexure LXXIV.

(Annexure LXXIII)

85. On the metre gauge of the Indian Railways, the increase in number of derailments to 84 during 1973-74 to 1977-78 as compared to 77 in the previous 5-year period was due to breakage of under-gear or brake fittings, defective brake power, which deteriorated continuously from one 5-year period to the next. The number of derailments on zonal railways classified according to the nature of defect in engines is given in Annexure LXXVII.

(Annexure LXXV)

86. Derailments due to miscellaneous causes—classified.—On the broad gauge of the Indian Railways, the number of derailments attributable to miscellaneous causes declined continuously from one 5-year period to the next.

Coming to the detailed causes, we find that the number of derailments due to obstruction caused by road vehicles and by signalling failures have increased, while those due to other detailed causes have declined. Out of 18 derailments during 1973-74 to 1977-78 due to obstruction caused by road vehicles, 13 occurred on the Northern Railway alone.

(Annexures LXXVII & LXXVIII)

87. On the metre gauge, the number of derailments attributable to miscellaneous causes has shown considerable decline, during the 10 years under review, as compared to the position obtaining during 1963-64 to 1967-68. During 1973-74 to 1977-78, out of 245 derailments attributable to miscellaneous causes, in the case of 61 (or 24.9 per cent), the cause could not be determined; the largest number, i.e. 26 being on the Northeast Frontier Railway, followed by 12 on the Western Railway.

Annexures LXXIX & LXXX)

88. *Staff held responsible for derailments.*—We find that, out of 5090 staff held responsible for derailments on all gauges of the Indian Railways, 1458 or 28.7 per cent were drivers. This was followed by 1137 employees (or 22.3 per cent) in the categories of train examining staff and carriage and wagon maintenance staff. It is also seen that 431 permanent way inspectors and 439 other permanent way staff were also held responsible for derailments; taken together, these categories accounted for 17.1 per cent of the total.

The railway-wise position of the staff held responsible for derailments is given in Annexure LXXXII.

(Annexure LXXXI)

89. *Casualties and damages due to derailments.*—The railway-wise position of casualties and damages due to derailments from 1968-69 to 1977-78 is given in Annexure LXXXIII.

ACCIDENTS AT LEVEL CROSSINGS

90. *Number and incidence of accidents at level crossings.*—On the Indian Railways, taking all gauges together, the number of accidents at manned and unmanned level crossings, declined steadily from one 5-year period to the next. The position was as follows :—

Type of level crossing	Number of accidents		
	1963-64 to 1967-68	1968-69 to 1972-73	1973-74 to 1977-78
Manned	202	186	159
Unmanned	441	424	390
Total	643	610	549

The number of accidents on the broad and metre gauges, during the three respective 5-year periods, is shown in Chart V, (Annexure LXXXIV)

91. The steady declining trend is, by and large, noticeable on the three gauge systems, taken separately, except on the metre gauge, after a drop in the number of accidents at unmanned level crossings to 185 during 1968-69 to 1972-73, as compared to

190 in the previous 5-year period, the number went up to 198 during 1973-74 to 1977-78. The number and incidence of accidents at level crossings, yearwise, per million train kilometres separately for the broad, metre and narrow gauge systems of Indian Railways are given in Annexures LXXXVI to LXXXVIII. From the railway-wise position of accidents at level crossings we find that, out of 1159 accidents at manned and unmanned level crossings on all gauges during the 10-year period from 1968-69 to 1977-78, the largest number, i.e. 277 or 23.9 per cent occurred on the Northern Railway. This was followed by 172, 169 and 157 accidents on the Southern, North Eastern and Western Railways.

(Annexures LXXXIV, LXXXV & XCV)

92. *Accidents at level crossings correlated to the density of rail traffic.*—When correlated to the density of traffic, we find that the incidence of accidents at manned level crossings per million train kilometres has shown a steady drop, from one 5-year period to the next, on the broad, metre and narrow gauges, taken separately. The same trend is noticeable in the incidence of accidents at unmanned level crossings on the broad gauge. On the metre gauge, however, the incidence of accidents at unmanned level crossings, having dropped to 0.26 during 1968-69 to 1972-73 from 0.28 in the previous 5-year period, again went up to 0.31 during 1973-74 to 1977-78.

(Annexure LXXXV)

93. *Level crossing accidents correlated to population of level crossings.*—The rate of accidents per manned level crossing dropped to 0.0022 during 1973-74 to 1977-78 as compared to 0.0025 and 0.0026 during 1963-64 to 1967-68 and 1968-69 to 1972-73 respectively. On the Northern, North Eastern, Northeast Frontier and South Eastern Railways, the rate of accidents per manned level crossing has remained consistently higher than the all-India average during the 10 years under review.

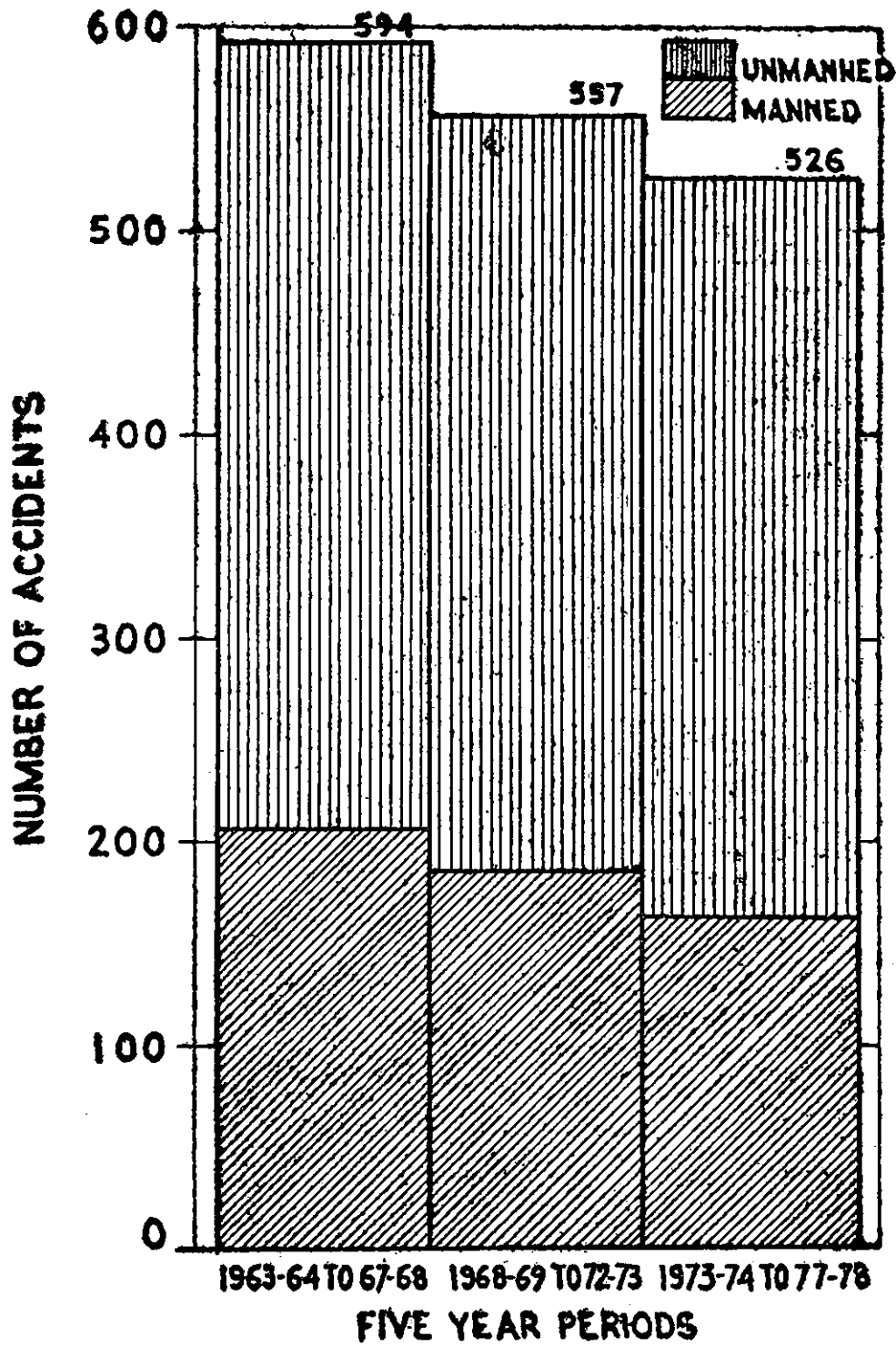
(Annexure XC)

94. The rate of accidents at unmanned level crossings during the 10 years under review was 0.0035 as compared to 0.0034 during the period reviewed by the Wanchoo Committee. On the Northern, North Eastern and Southern Railways, the rate of accidents at unmanned level crossings was consistently higher than the all-India average during the 10 years under review. (Annexure XC)

95. *Accidents at level crossings involving passenger trains and other trains, taken separately.*—On the broad and metre gauge systems of the Indian Railways, the number of accidents at level crossings according to the type of train involved was as follows :—

Type of train involved	Number of accidents at level crossings		
	1963-64 to 1967-68	1968-69 to 1972-73	1973-74 to 1977-78
Passenger trains	338	359	355
Other trains	256	198	171

INDIAN RAILWAYS ACCIDENTS AT LEVEL CROSSINGS ON BROAD GAUGE AND METRE GAUGE SYSTEMS



S. SINGH

The increase in accidents at level crossings involving passenger trains during the last two 5-year periods as compared to 1963-64 to 1967-68 was mainly due to more accidents at unmanned level-crossings on both the broad and metre gauges.

The year-wise incidence of accidents involving passenger trains and other trains at manned and unmanned level crossings, on the broad and metre gauges combined, is given in Annexure XCIII. The position in this regard on the zonal railways is shown in Annexures XCIV to XCVII.

(Annexures XCI, XCII & XCVIII)

96. *Accidents at manned level crossings-cause-wise.*—From the causes of accidents at manned level crossings on the Indian Railways, we find that, during the period 1968-69 to 1977-78, the largest number, i.e. 181 out of 345 (or 52.5 per cent) occurred due to open or improperly closed or secured gates. This was followed by 73 accidents (or 21.2 per cent of the total), due to road vehicles crashing into the lifting barriers or swing type gates or breaking the lock and opening it. Another 16.5 per cent of the total accidents at manned level crossings were caused by road vehicles coming on to the level crossing where barriers on the other side had been closed or due to road vehicles breaking or opening the chains at a level crossing closed by chains or road vehicles left at level crossings or infringing the track. Disregard of signals by drivers resulted in 4.3 per cent of the accidents at manned level crossings.

(Annexure XCVIII)

97. On the North Eastern Railway, 40 out of 63 accidents at manned level crossings occurred due to open or improperly closed or secured gates; the same cause was responsible for 26 out of 34 accidents on the Northeast Frontier Railway and 22 out of 27 accidents on the Western Railway. This is a pointer to the laxity in observing the working instructions at manned level crossings. We also find that on the Eastern Railway, 8 out of 29 accidents or 27.6 per cent, during the 10-year period under review, occurred due to road vehicles breaking or opening the chain at a level crossing. Another 6 accidents occurred due to disregard of signals by drivers.

(Annexures XCVIII & XCIX)

98. *Accidents at unmanned level crossings-cause-wise.*—During the 10-year period from 1968-69 to 1977-78, we find that, out of 814 accidents at unmanned level crossings, 811 occurred due to the fault of road users; and in the case of only 3 accidents railway staff (drivers) were held responsible.

99. *Accidents at level crossings—State-wise, according to the type of vehicle involved.*—The largest number of vehicles of any single category involved in level crossing accidents were motor trucks. During 1968-69 to 1977-78, 434 motor trucks were involved in level crossing accidents forming 37.5 per cent of all vehicles involved in accidents at level crossings. The extent of involvement of other types of vehicles, in comparison to the position obtaining at the time of the Wanchoo Committee is given below :—

Type of road vehicle involved	1963-64 to 1967-68		1968-69 to 1977-78	
	Number	Percentage	Number	Percentage
Motor trucks	249	38.8	434	37.5
Passenger buses	39	6.1	102	8.8
Taxis, cars and jeeps	48	7.4	129	11.1
Tractors	25	3.9	172	14.8
Tongas	3	0.4	11	1.0
Bullock carts	182	28.4	284	24.5
Others	97	15.0	27	2.3
Total	643	100.0	1159	100.0

It will be seen that involvement of tractors has increased from 3.9 per cent during 1963-64 to 1967-68 to 14.8 per cent during the 10-years under review.

In Punjab, tractors formed 44.7 per cent of all vehicles involved in accidents at level crossings; the extent of their involvement in Haryana and Uttar Pradesh was 22.6 and 20.7 per cent respectively.

(Annexure C)

100. *Involvement of motor trucks in accidents at level crossings.*—The highest involvement of motor trucks in accidents at level crossings was in the State of West Bengal. Motor trucks formed 62 per cent of all vehicles so involved. In the State of Assam, Gujarat, Madhya Pradesh and Rajasthan, involvement of motor trucks varied from 45 to 50 per cent; in Uttar Pradesh and Bihar it was 42 per cent.

(Annexure C)

101. *Involvement of bullock carts in accidents at level crossings.*—In the State of Tamil Nadu and Andhra Pradesh, almost 60 per cent of the total number of vehicles involved in accidents at level crossings were bullock carts. In Orissa, Karnataka and Maharashtra involvement of bullock carts was to the extent of 37.8, 33.9 and 31.4 per cent of the total number of vehicles involved in level crossing accidents.

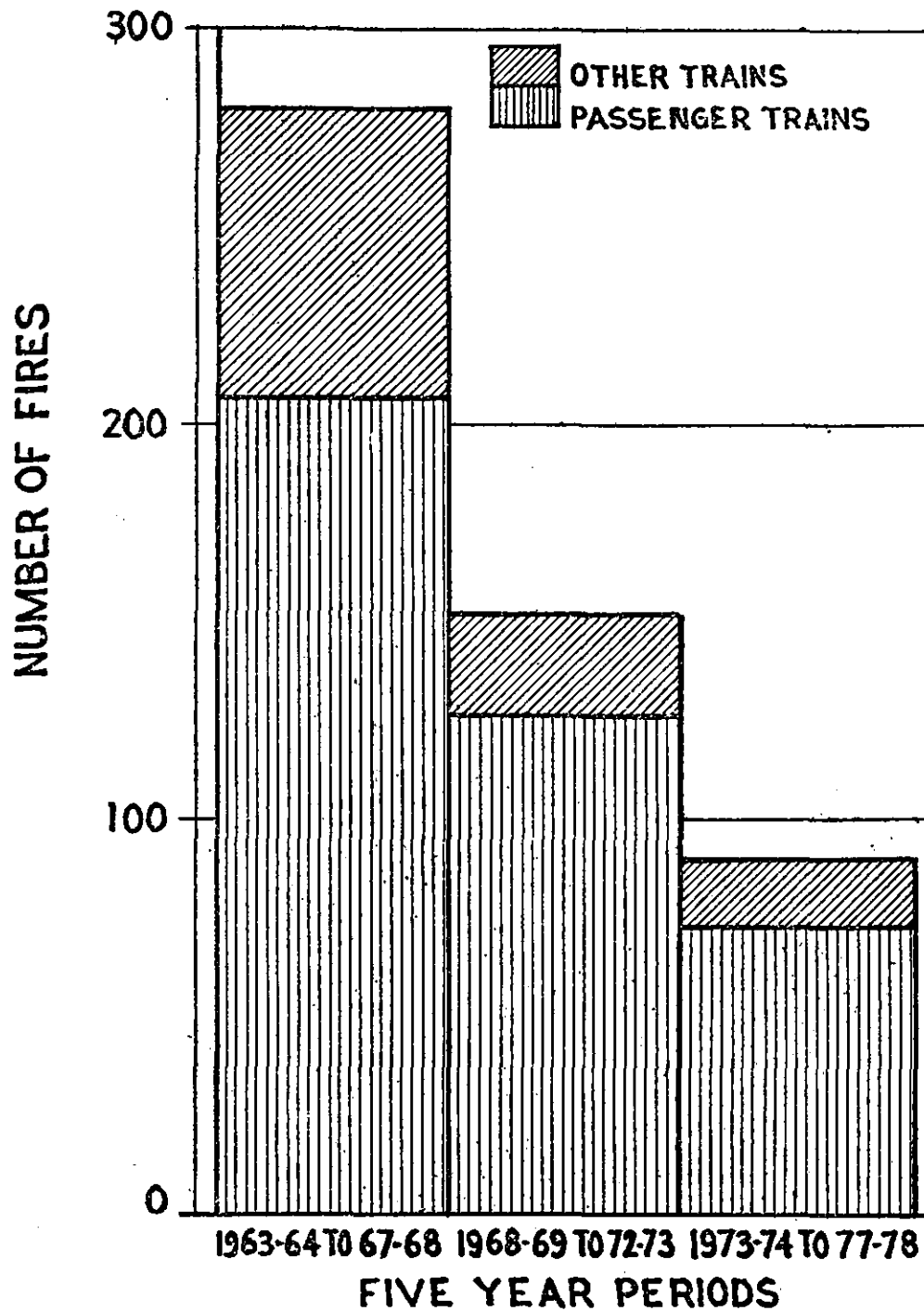
(Annexure C)

102. *Rate of accidents at manned level crossings provided with/without telephones.*—In a study which we undertook regarding accidents at manned level crossings provided with/without telephones, on the basis of information furnished by zonal railways for the period 1968-69 to 1977-78, the relative incidence of accidents at manned level crossings provided with/without telephones was as under :—

	Provided with telephones	Not provided with telephones
Number of accidents at manned level crossings	112	201
Total number of manned level crossings	7031	4096
Rate of accidents per level crossing	0.02	0.06

(Figures are for all railways except Eastern Railway)

INDIAN RAILWAYS FIRES IN TRAINS ON BROAD GAUGE AND METRE GAUG SYSTEMS



S. SINGH

It will be seen that the rate of accidents at manned level crossings provided with telephones was much less than that at level crossings not provided with telephones. (Annexure CI)

103. Categories of railway staff held responsible for accidents at manned level crossings are given in Annexure CII.

FIRES IN TRAINS

104. *Number of fires in trains.*—On the broad gauge there were 38, 25 and 14 fires in trains per year on the average during the three respective 5-year periods. The corresponding figures of fires in trains on the metre gauge were 18, 5 and 4. The same trend is noticeable in the incidence of fires in trains per million train kilometres. (Annexure CIII)

The number of fires in trains on the broad and metre gauges, during the three 5-year periods, are shown in Chart VI.

105. *Incidence of fires in trains, railway-wise.*—On the broad gauge, during 1968-69 to 1977-78, the highest incidence of fires in trains per million train kilometres, i.e. 0.11 on the Western Railway, followed by South Central and Central Railways where the incidence was 0.10 and 0.09 respectively. (Annexure CIV)

106. On the metre gauge, during 1968-69 to 1977-78, the highest incidence of fires in trains, i.e. 0.06 was on the North Eastern and South Central Railways. (Annexure CIV)

107. *Incidence of fires in passenger trains and other trains.*—Taking the broad and metre gauges together on the Indian Railways, the incidence of fires in passenger trains per million passenger train kilometres has shown a declining trend from one 5-year period to the next. The same trend is to be seen in the incidence of fires in other trains per million other train kilometres on the broad gauge. In the case of other trains on the metre gauge, after a decline to 0.003 during 1968-69 to 1972-73 from 0.05 in the previous 5-year period, the incidence rose to 0.02 in the last 5-year period. (Annexure CV)

108. *Number of cases of fires in passenger and other trains, railway-wise.*—Out of 241 fires in all trains, during the period 1968-69 to 1977-78, 199 fires (or 82.6 per cent) occurred in passenger trains and 42 (or 17.4 per cent) occurred in goods trains. The largest number of fires in passenger trains, i.e. 48, occurred on the Central Railway, followed by 36 on Western Railway and 30 on South Central Railway. The largest number of fires in goods trains, i.e. 18 (or 42.9 per cent of the total) occurred on the Western Railway. (Annexure CVI)

109. *Causes of fires in passenger trains.*—On the broad and metre gauges, the most prominent cause of fires in passenger trains was defect in or failure of electrical equipment or short circuiting. This factor was responsible for 46 out of a total of 199 (or 23.1 per cent) fires in passenger trains which occurred during 1968-69 to 1977-78. During the same period

the largest number of fires in passenger trains i.e. 12, occurred on the Central Railway followed by 10 and 8 cases on the Western and South Eastern Railways respectively. (Annexure CVII)

110. Negligence by passengers and other outsiders in throwing cigarette ends, lighting of fires in carriages and carrying of inflammable goods were responsible for 42 fires in passenger trains, forming 21.1 per cent of the total. The largest number of fires in passenger trains due to such causes, i.e. 13, occurred on the Northern Railway, followed by Eastern and Central Railways with 10 and 8 cases respectively. (Annexure CVII)

111. We find that in 71 fires in passenger trains on the broad and metre gauges, which come to 35.6 per cent of the total, the actual cause of fire remained undetermined. (Annexure CVII)

112. On the Central Railway, in 24 out of 48 fires in passenger trains, which occurred during the 10-year period, the cause remained undetermined; on the Western Railway there were 20 such cases out of a total of 36 (or 55.5 per cent). (Annexure CVII)

113. *Causes of fires in other trains.*—Out of 42 fires in other trains on the broad and metre gauges, during the 10-year period from 1968-69 to 1977-78, the cause could not be determined in 16 forming 38 per cent of the total; in another 9 cases, the cause was accidental. Negligence of railway staff in the examination of loading of explosives, dangerous or inflammable goods, rough shunting, wrong marshalling, etc., was responsible for 7 fires in other trains out of which 5 occurred on the Western Railway alone. (Annexure CVIII)

114. *Fires in EMU trains.*—During 1973-74 to 1977-78, there were 9 fires in EMU trains on the broad gauge, as against 6 during 1968-69 to 1972-73. Out of the aforesaid 9 cases, 4 occurred on the Central Railway, followed by 3 and 2 cases on the Western and South Eastern Railways respectively.

On the metre gauge, there was no case of fire in EMU trains during the 10-year period of our review.

(Annexure CIX)

INDICATIVE ACCIDENTS

115. In our review so far we have dealt with consequential accidents, viz. collisions, derailments, accidents at level crossings and fires in trains. There are other types of accidents, viz. averted collisions, breach of block rules, trains passing signals at danger and train partings which are termed as 'technical' or 'indicative' and which carry the seeds of serious accidents, although they may not result in a serious accident, owing to some fortuitous circumstances. The nature of lapses which lead upto averted collisions or breach of block rules or result in disregard of signals are fundamentally not different from acts of omission and commission which result in an accident with grave consequences. It is, therefore, essential that serious note should be taken of such accidents.

116. We had called for the figures regarding averted collisions, breach of block rules, disregard of signals and train partings which occurred on the zonal railways during the years 1968-69 to 1977-78. The figures furnished show the occurrence of accidents of these categories to be incredibly low on some of the zonal railways. For instance, on the Eastern Railway 4 averted collisions occurred in each of the 5-year periods viz. 1968-69 to 1972-73 and there was no case in 1973-74 to 1977-78; only one case of breach of block rules occurred during 1968-69 to 1972-73 and 1973-74 to 1977-78. Viewed against the significant rising trend of collisions on the Eastern Railway during the two 5-year periods reviewed by us, as compared to the period 1963-64 to 1967-68, the figures of averted collisions and breach of block rules furnished lose much of their credibility. This holds true in case of the incidence of averted collisions and breach of block rules on some of the other zonal railways also.

Similarly, we find from the figures furnished to us that there has been an incredible drop in the cases of train partings during 1973-74 to 1977-78 as compared to 1968-69 to 1972-73 on some of the zonal railways. For instance, the number of train partings on the Northern Railway dropped from 92 to 17 on the broad gauge and 81 to 3 on the metre gauge, on the Southern Railway these dropped from 91 to 22

on the broad gauge and from 166 to 21 on the metre gauge during the two 5-year periods under review. Understatement in the reporting of these types of accidents was found by us during scrutiny of accident records on some of the divisions and this fact was also admitted by the management at the divisional and headquarters levels on the zonal railways.

117. There is no gainsaying the fact that the attention of the Railway Administration can be focussed on the danger potential inherent in these types of indicative train accidents only if there is truthful reporting of their occurrence. Any analysis on our part of the incidence of these indicative train accidents, on the basis of the data furnished by the zonal railways, which appeared to be palpably doubtful, would have been an infructuous exercise and would have led us to draw conclusions which would have been wide off the mark and would not highlight the actual position. We have, therefore, refrained from making any review of these types of train accidents. We strongly urge the Railway Board and the Railway Administrations to evolve a suitable foolproof methodology which can ensure the truthful reporting of indicative accidents so that measures aimed at preventing their occurrence can be evolved and implemented. We have commented on this aspect in Chapter XII Accident Statistics.

CHAPTER III

THE HUMAN ELEMENT

118. *Significance of human element.*—The detailed review of accidents during the 10-year period from 1968-69 to 1977-78, presented by us in Chapter II, brings out that a substantial number of the accidents are caused by the failure of human element. Even where accidents are caused by failure of materials, equipment and systems, in a large number the cause can be traced to failure of human element due to poor maintenance or workmanship, inspection, etc. In Annexure CX we give the number of consequential accidents in which staff were held responsible directly or indirectly. During 1968-69 to 1977-78, on the broad and metre gauges, out of 7957 consequential accidents, in which the cause was established, 3218 or about 40 per cent were caused due to direct failure of staff. Further, in 2430 consequential accidents, or 31.0 per cent of those in which the cause was established, staff were involved indirectly. Thus it is seen that staff failures, direct or indirect, were responsible for 71 per cent of the consequential accidents.

This highlights the significance of human element.

119. *Personnel Management.*—Since human failure account for about two-thirds of the total number of railway accidents, ensuring proper performance of work by employees at all levels in the organisation has to be an important part of the effort to promote safety on the Railways. It is in this context that sound personnel management has a very important bearing on railway safety, especially since railway working is highly labour-intensive.

120. Personnel management is now recognised to be an important function in all organisations, medium and large, and covers a wide range of activities like manpower planning, recruitment, training induction, deployment, promotions, transfers etc., industrial relations and collective bargaining, regulation of discipline, grievance processing, welfare and so on. It is also now recognised that optimum performance of the personnel management function calls for specialised professional training, including training in behavioural sciences like industrial psychology and sociology besides laws and rules relating to an organisation. Acquisition of the skills of negotiation, human relations and problem solving is also necessary. An adequate exposure to such subjects, concepts and skills is necessary not only to personnel managers but also to line managers to enable them to cope adequately with the multifarious problems that inevitably arise when dealing with a large number of workers.

121. Our enquiry indicates that the railways, in spite of the vast work-force that they employ, have not so far paid sufficient attention to building up of a personnel management organisation adequate both in size and quality, although very recently a beginning

is stated to have been made in establishing such a specialised organisation. The view that seems to have prevailed in the Railways so far has been that personnel management is coterminous with administration of rules framed for employees. Thus, the position of Chief Personnel Officers on the most zonal railways are filled from among the senior departmental officers according to availability. Even very large railway workshops employing several thousand workers do not seem to have any properly trained personnel officers at senior levels. Whenever minor or major confrontations develop with employees at local levels, there is no personnel man with proper understanding of industrial relations and trade union behaviour, to help and advise the officers who may have to face the employees. A large number of officers and supervisors frankly expressed a sense of helplessness, in dealing with what they called labour indiscipline, erosion of authority and declining work standards. We, therefore, recommend that :—

- (i) the railways should set up, speedily, an adequate personnel management organisation manned by persons with proper professional training and the right aptitude, and such organisation should reach all levels and points on the Railways at which administration has to deal with large number of employees;
- (ii) the departmental officers and supervisors who have to lead, take work from and look after the problems of workers, should be adequately exposed to the various subjects, concepts and skills in the area of management of people.

122. *Lack of discipline and erosion of authority.*—That there is lack of discipline, erosion of authority and decline in work standards is a general complaint on the railways. The situation is worse in some zonal railways, namely, Eastern, Northern, North Eastern, Northeast Frontier and South Eastern than in others. It is, of course, not possible that railways can stand insulated from the general social embaunce in this respect. To bring about a change for the better in this social embaunce is a challenge to the society as a whole and especially to the political leadership of the country. That, however, should not become an alibi for the administration on the railways not doing whatever is within its powers, to cope with the problem.

123. The erosion of discipline and decline in work-standards can arise from legitimate discontent and frustration among workers due to unsatisfactory industrial relations, accumulation of and long delays in the redressal of grievances, unsympathetic and high-handed attitude of some officers and supervisors towards workmen and so on. Needless to say, such matters are well within the powers of administration

to deal with, and an effective personnel management organisation backed up by an attitude of scrupulous fairness and a genuine concern for the workers as people, should provide administration with the capability of dealing with these matters.

124. *Plurality of trade unions.*—But indiscipline and poor work standards can also arise from other causes. Trade union rivalries and more specially the role of category-wise trade unions have been cited as one such cause. This problem was gone into at some length by the Wanchoo Committee and does not call for an elaborate discussion by us, although we recognise the problem to be a really serious and complex one. We would simply reiterate what the Wanchoo Committee had recommended that from the point of view of discipline among staff, functioning of the administration and the workers themselves, it is advantageous that there should be only one recognised employees union on each railway with a recognised federation at the apex.

125. *Category-wise unions and associations.*—So far as category-wise unions and associations are concerned, the only way of discouraging them seems to be for the administration to ignore them entirely, taking care at the same time to speedily resolve the problem of different categories of workers when these are brought up through the recognised unions. We have got the impression that the present attitude of the administration towards category-wise unions is ambivalent, not recognising them formally, but dealing with them all the same. This can only encourage them. The two recognised federations of railwaymen strongly complained that the category-wise unions were getting pampered by the policy of the administration. The policy of ignoring category-wise unions altogether will, no doubt, be resented by them, and some dislocation of operations may result from their effort to force administration to deal with them. Such temporary dislocation of operations must be viewed as the price that must be paid to overcome this problem and bring greater order to industrial relations on the Railways. This strategy, of course, is not easy nor painless; but the problem is such as does not lend itself to simple and painless solution. Administration must consciously build up its capability to cope with the temporary dislocations in operations forced by the category-wise unions.

126. *Supervisors as members of staff unions.*—Wherever we went on the zonal railways, opinion was unanimous that membership of supervisors in unions of railway staff is untenable with their position as junior members of the management. Difficult situations arise when a foreman or inspector who himself is a member of one union has to deal with staff who belong to a rival union. Even where a fair decision is given in such a set-up, there is lack of faith amongst staff due to his being a member of another union. It is also difficult for the management to look for an unbiased attitude and judgement from such supervisors. We are strongly of the opinion that membership of supervisors in staff unions is not consistent with the position of supervisors as a part of the management. The exact modalities as to how this is to be achieved require serious consideration by the Government.

127. *Dealing with errant workers.*—An equally serious cause of lack of discipline is a feeling among workers and even among officers and supervisors, that administration does not have the strength nor the will to deal firmly with errant workers. A number of officers who gave evidence before us expressed such a feeling. The front line officers complain that if and when they try to deal firmly with workers guilty of gross indiscipline, the issue gets escalated by the intervention of unions and when, as a result, confrontation develops, senior levels of administration instead of standing by the officer, patch up the issue to avoid confrontation and the errant worker goes scot free. Similarly, it is complained that outside pressure from political quarters often brought to bear upon the administration to let off errant worker.

128. We would stress that firmness is as important as fairness and sympathy in administration's style and strategy for dealing with its employees. It is the responsibility of the higher echelons of Railway Administration to create confidence among front line supervisors and officers that so long as they act in good faith and are not high-handed or vindictive, they will be backed in ensuring discipline and proper work-standards. Equally, Government also must act in such a way that the hands of administration and its officers and supervisors are not weakened by extraneous political pressures.

129. *Redressal of grievances.*—We got the impression from our enquiry that Railway Administration considers employee welfare to cover what should really be viewed as normal grievance redressal work. We found that the work of processing employees' complaints regarding non-payment or short payment of dues, confirmation, seniority etc. is entrusted to welfare inspectors. It should be stressed that what the employee seeks in such complaints is not welfare, but what he deems to be his rightful due. Viewed as welfare, perhaps, the urgency of redressing the grievance gets diluted and this may be the cause of the large accumulation of and long delays in processing employees' complaints. Redressing grievances should be treated by administration not as a welfare activity, but as extending to the employee his rightful due and the necessary sense of urgency brought to bear on this activity.

130. *Staffing of the Personnel Branch.*—The function of redressal of grievances is the responsibility of the Personnel Branch. Accumulation of grievances which was commented upon in Para 71 in Part I of our Report, is an adverse reflection on the machinery. Our discussions with officers at the divisional and headquarters levels in all the zonal railways revealed that the strength of staff in the personnel branch is grossly inadequate to shoulder the increasing responsibility due to greater number of railway employees and increasing awareness amongst them of their rights and privileges. We were told that over the last two decades, due to the ban on creation of posts by Government, there has been no increase in the strength of the Personnel Branch except for some recent ad hoc increases allowed to the Railways. We are of the considered opinion that the Railway Board must give serious thought to the question of adequately

manning of Personnel Branch so that each employee is given his rightful due within a reasonable time, before it shows up as a grievance. A properly managed Personnel Branch should be able to take care of the grievances of staff.

131. *Announcement of awards in respect of pay and allowances of staff.*—It was very forcefully represented to us at all levels of management that the single factor which has been responsible for the maximum workload and pressure on the Personnel Branch during the last few years has been the sanctions of awards by Government which affect the pay and allowances of staff retrospectively. Following the announcement of an award, while staff clamour for early payment of the dues, the Personnel Branch are ill-staffed to handle the workload which in some cases may require reference to pay-sheets of employees for the last 3-5 years. The resultant delays are a source of bitterness amongst staff. To remedy this situation we feel that, all awards should have prospective effect; and in the case of an award with retrospective effect. Government should indicate the lump sum payments which should be made to staff, thus obviating the need to go into old records and detailed calculations.

132. *Decentralisation of Personnel functions.*—One of the General Managers of zonal railways drew our attention to the over-centralisation in personnel functions which has been continuing on the Railways in certain areas whereby the payment of dues, leave records and matters pertaining to other privileges are dealt with only at the headquarters of divisions for all the line staff who are scattered over the division. It was stated that this is one of the main reasons for increasing grievances of staff, specially relating to matters of payment of pay, allowances, advances, overtime-claimed and grant of increments. On the Southern Railway arrangements are being tried out on one of the divisions to decentralise these functions by locating personnel clerks etc. at station with a large strength of railway employees, in major sheds etc. We commend the efforts which are being made in this direction and recommend that similar measures should be adopted by other zonal railways, for efficient discharge of the personnel functions, which give rise to the maximum number of staff grievances, in the hope of making railway staff a happier lot.

133. *Employee welfare measures.*—Welfare in the correct sense means such activities as health and medical services, educational facilities, housing, sport, recreation and cultural activities, family welfare programme, provision of clean and wholesome food through workshop/yard canteens, and so on. Welfare organisation on the railways was discussed by us in para 68 to 74 in Part I of our Report. We find that at present the so-called Welfare Organisation on zonal railways does little in most of these areas. We would urge that greater attention is devoted to welfare in the real sense of the term and not confuse it with normal grievance redressal function of the administration.

134. *Workload of welfare inspectors.*—Our attention has also been drawn to the unwieldy jurisdiction of welfare inspectors who sometimes have staff strength as high as 5000 to be looked after. It would, per-

haps, be impossible for a single inspector to devote attention to the welfare needs of such a large number of employees and to arrange speedy relief. We recommend rational determination of their optimum workload.

135. *Schools for children of railway employees.*—We would make special mention of one important welfare activity which appears to be a felt need of the staff. Concern for the education of their children, we found, is a factor that causes considerable anxiety to railway men at almost all levels. Many, therefore, try to secure postings at centres with good educational facilities and to avoid transfers to or postings at centres where such facilities are not satisfactory. This causes problems to administration too since many railwaymen have unavoidably to do duty at distant, out-of-the-way and backward locations. For most railwaymen, it is not possible to work at one centre and keep their children elsewhere for their education.

136. Railways have, no doubt, established schools at some places for the children of their employees. These, however, are too few and far between, and can be availed of only by a very small proportion of railwaymen. Besides, most of these provide only primary education and their standard is also not considered satisfactory by the staff. Since this is a genuine problem, we would suggest that the Railways consider expanding these facilities greatly. Since it will not be possible for railways to open a school at every place where its employees work, large schools with residential facilities could be established in co-operation with the Central Schools Organisation, at a fairly large number of suitable locations distributed all over the country. Uniformity of curricula, media of instruction and educational standards of such schools would mitigate any inconvenience due to transfers, and railwaymen would feel reassured that their employer organisation makes due provision for their children's education. Railways do subsidise the educational expenses of employees' children and the subsidy in respect of those who avail of the schools, would partly offset the expenditure on them.

137. *Reservation of posts during promotions for Scheduled Castes and Scheduled Tribes.*—In accordance with the national policy, the Railway Ministry has made a number of provisions to meet the claims of the members of Scheduled Castes and the Scheduled Tribes and provide them with 'Equality of opportunity'. While the reservation of posts in the initial recruitment grade was not seriously opposed by staff, provisions, which reserve some posts which are filled by promotion or selection have come in for severe criticism before us. It was stated that this reservation leads to accidents, though no specific case has been pointed to us. It was urged that it leads to frustration in persons who are superseded only on the ground that the post is reserved for members of the Scheduled Castes or the Scheduled Tribes. It was added that frustration leads to carelessness and unsafe practices and eventually to accidents. It is clear that the Constitution permits reservation of posts filled by promotion or selection—at least till the decision of the Supreme Court in the General Manager, Southern

Railway Vs. Rangachari, is overruled. But Article 335 specifically provides that the provisions to help the members of the Scheduled Castes and Scheduled Tribes should be consistent with the maintenance of efficiency of administration. The Supreme Court in the above case said that "The efficiency of administration is of such paramount importance that it would be unwise and impermissible to make any reservation, at the cost of efficiency of administration."

138. In the Railways it is even more important to see that no accident is liable to occur due to people not fully qualified being given posts which are concerned with the safety of the public. The Railway Board realised this and have made special provisions for promotions in safety categories. This, however, takes some care of the efficiency of the promotee but does not appear to consider the effect of promotion on persons who have been superseded. As is stated above, the persons who have been superseded feel frustrated and disheartened because they see no justice in being discriminated against only because Government wants to help members of the Scheduled Castes and Scheduled Tribes. The result of frustration may be inattention, carelessness and eventually accidents. But we have not been able to examine in depth the extent of frustration caused and its effects on the safety of railway working. We recommend that this matter be studied further. We understand that the Supreme Court is currently hearing arguments on various aspects of reservation of posts which are filled by promotion or selection and the Railways would naturally be guided by the judgements of the Supreme Court.

139. *Psycho-Technical Cell and Labour Science Research.*—We had discussed the question of application of psycho-technical tests to categories of staff and the progress made to widen the activities of the Psycho-Technical Cell in paras 95 to 100 and 102 to 106 in Part I of our Report.

The question of application of psycho-technical tests to in-service staff was discussed by us with the trade union federations. There was a general apprehension that this may create a problem in respect of staff who do not qualify. It was stated that the absorption of relatively small number of staff who are medically decategorised is already creating problems, and psycho-technical testing may throw up problems of much greater dimensions. Looking at the results of such testing when applied at the recruitment stage in the case of some categories of staff, we feel that the apprehensions of the trade union federations are not misplaced. On the other hand the usefulness of psycho-technical testing in furthering safety on the Railways is undoubted as has also been proved by broad reviews made by the RDSO in respect of the field performance of staff initially selected on the basis of aptitude tests. We are of the view that psycho-technical testing should be used in the spirit of counselling procedure for the present, to help the employee to improve his performance.

We find that large numbers of employees who were initially recruited as casual labour/substituets in Class IV category, find their way by promotions, and may occupy positions vital for safety in train operation. We suggest that all staff, who have such channel of promotion open to them, should also be brought within the scope of psycho-technical testing right at the initial recruitment stage.

140. In view of the expanding role which we envisage for the Psycho-Technical Cell both in the field of testing of staff and research, expansion of this cell will be necessary. This cell is, at present, manned by an officer in the Senior Scale assisted by 4 more officers; another 4 officers are assigned to the zonal railways with headquarters at New Delhi, Bombay, Calcutta and Madras. We have been informed that due to inadequate strength of personnel in the cell, there have occurred considerable delays in the recruitment of staff in vital categories to whom Psycho-Technical tests are applied. In view of the foregoing and in part fulfilment of the aims set forth by the Wanchoo Committee, we recommend the setting up of a Directorate of Psycho-Technical Research in the RDSO, which would pursue the various areas of testing of staff and research in psycho-technology which have relevance to safety in train operation. We would also assign the following specific areas for special attention by the proposed Directorate :

- (i) Personnel selection for introduction of job-oriented aptitude testing schemes for all categories connected with safety;
- (ii) development of job training;
- (iii) personality research and counselling psychology;
- (iv) social psychology and communication processes; and
- (v) human engineering, work psychology, ergonomics and industrial medicine.

141. We have also been informed that limited collaboration sought in the field of psycho-technical investigations with outside technical institutions are not proving quite productive and useful. We are unable to accent this point of view and feel that inter-action of the Psycho-Technical Cell with the applied psychology departments in Universities and other institutions would be of definite advantage and recommend accordingly.

142. During the course of our discussions with officers of the present Psycho-Technical Cell we were constrained to note that the fast turnover of personnel in the cell. During the last 7-8 years, we were told, 6 persons had left for better prospects elsewhere in defence laboratories etc. In structuring the proposed Directorate of Psycho-Technical Research in the RDSO, the Government will no doubt keep the inadequacies of the present cell in view and guarantee reasonable prospects for the technical personnel commensurate with those obtaining elsewhere in similar circumstances.

CHAPTER IV
RECRUITMENT, TRAINING AND PROMOTION
POLICY

143. *Recruitment.*—During the course of our tours on the railways, the inadequacy of manpower in a number of important areas connected with safe operation of trains was pointedly brought to our notice. Detailed discussions with officers on the divisions and in the headquarters of zonal railways revealed that not only was there improper planning in the matter of staff requirements, but this was compounded by the exceedingly tardy procedure of recruitment through Railway Service Commissions, resulting in long delays ranging from 18 to 36 months in sensitive categories even like station masters, guards etc. we had commented on this matter in paras 201 to 206 in Part I of our Report. Arrangements must be made to streamline the recruitment procedures so as to make available candidates as soon as vacancies arise.

We find that the manpower actually available at a given time is often far less than even the strength required for normal work, not to speak of adequate margin for periodic rest, leave and trainee reserves. The position had further deteriorated in the recruitment to some categories, which we had referred to in detail in para 196 in Part I of our Report.

144. Coming to the qualitative aspect, it was distressing to find that while technology and sophistication in railway operation are going up, the educational background of the persons recruited by the Railways is continuously falling and the Railways appear to have gone into the reverse during the last 10 year period with stoppage of direct recruitment to many of the intermediate levels in safety categories of staff. We find that in some major departments, directly connected with safety in train operations, the intake is mainly at the lowest level where persons are recruited either as casual labour or substitutes without any literacy standard at all. A large proportion of this staff, in course of time, find their way up by promotion to higher levels and responsibilities but in the absence of any education, it is not possible for them to come up to the needs of the change in technology and the new challenges thrown up by introduction of modern equipment, practices, etc. in different fields. We find that even where lateral induction has been permitted, the same has not been fully utilised by the Railways for one reason or the other.

145. *Recruitment of firemen Grade 'A'.*—We find that as from November 1970, direct recruitment in the category of firemen Grade 'A' has been stopped. This matter was discussed by us at various levels on the divisions and in the headquarters of zonal railways. The mass of evidence points to a general deterioration in the calibre of drivers due to stoppage of direct recruitment to this category. In their replies to our questionnaire zonal railways have stated that direct recruitment of firemen would definitely enable them to get

staff with better qualifications and skills for handling modern locomotives. With the increasing introduction of diesel and electric traction, we feel that the stoppage of direct recruitment in the category of firemen Grade 'A' was a retrograde step. We would strongly recommend that direct recruitment to the category of firemen Grade 'A' should be revived with immediate effect.

146. *Recruitment of trade apprentices for mechanical workshops.*—Officers from mechanical workshops forcefully pointed out the dilution of skills in the workmen primarily due to stoppage of recruitment of trade apprentices. The trade apprentices scheme was in vogue upto 1959. Under this scheme the Railways trained their own apprentices for a period of 5 years and absorbed them in the vacancies in the skilled categories. This was replaced by the enforcement of the apprentices scheme under the apprenticeship Act of 1961. Due to pressure of staff for promotional opportunities for the lowest levels of workers the scheme for training apprentices for direct absorption in skilled categories was discontinued. In January 1977, the Railway Board decided that direct recruitment quota to fill upto 50 per cent vacancies can be resorted to provided suitable staff, after trade testing in the lower grade, were not available. Later as a result of discussions in the Departmental Council Meeting (Joint Consultative Machinery), zonal railways were advised in February 1979 that direct recruitment quota of 50 per cent should be revived as follows :—

- (i) 25 per cent from serving semi-skilled and unskilled staff with educational qualifications as laid down in the Apprentice Act, who should be given appropriate training before they are absorbed in the skilled cadre;
- (ii) 25 per cent by selection from course completed Act Apprentices, ITI passed candidates and matriculates from the open market who are to be given training to bring them upto the standards of the earlier trade apprentices. Serving employees who are course-completed Act Apprentices or ITI qualified and are not more than 25 years of age should also be considered for absorption in the skilled grade.

147. From the foregoing it will be seen that for a period of nearly two decades, there has been absolutely no policy on the Railways for inducting persons with basic technical qualifications into workshops. There can be no doubt that this is a major factor in diluting skills in workshop cadres resulting in fall in the standards of maintenance of rolling stock.

148. In order to improve the skills, we would recommend that :—

- (i) The scheme of training apprentices in railway workshops should be revived forthwith.

- (i) 50 per cent of the vacancies in the skilled cadres should be filled from trained apprentices.
- (ii) The remaining 50 per cent should be filled from amongst railwaymen in lower grades with minimum educational qualifications of 8th class. They should receive intensive training for an appropriate period, and be subjected to a suitable trade test before being absorbed in skilled categories.

149. *Recruitment of signal maintainers and inspectors.*—We have reviewed the present policy of recruitment, qualifications and training of signal maintainers and signal inspectors. We find that even the basic minimum percentage of direct recruitment for different grades of signal maintainers and inspectors prescribed in the Indian Railway Establishment Manual has remained unfulfilled. With progressive increase of sophisticated modern signalling, higher levels of electrical and electronic engineering background are required from these maintainers and inspectors. The Railways have also decided that tokenless block, route relay interlocking etc. should be maintained by electrical signal maintainers of the highest grade (Grade I).

150. In order to meet these requirements it is necessary to have lateral recruitment of electrical signal maintainers in Grade I. We recommend that :—

- (i) In Grade I, 50 per cent vacancies should be filled by direct recruitment from graduates in Physics and Mathematics or diploma holders in Electrical/Electronics Engineering followed by one year training. The remaining 50 per cent should be filled up by promotion.
- (ii) In Grade II, all vacancies should be filled by promotion from grade III.
- (iii) In Grade III, the existing practice of filling 50 per cent by direct recruitment should continue.
- (iv) Direct recruitment for mechanical signal maintainers Grade III should be given up, as this category is being fast displaced by electrical signal maintainers on account of the modernisation programme.

151. We consider that coming from the same academic and technical disciplines, the signal inspector should be able to maintain in addition to signalling, common telecommunication equipment in his jurisdiction after some initial training and the category of telecommunication inspectors should be confined to specialised communication installations like Microwave, VHF and other wireless equipment and large telephone exchanges. Under these circumstances it may be advisable to combine the requirements of signal inspectors and telecommunication inspectors for recruitment purposes as both require an Electronics background and the annual requirement in each category is small. The minimum educational qualification for inspectors Grade III (extent 40 to 50 per cent) should be a diploma in Electronics/Telecommunication Engineering and for inspectors in intermediate Grade II (extent 35 per cent) a degree in Electronics/Telecommunication Engineering.

152. To facilitate full utilisation of the training facilities in Indian Railways Institute of Signal Engineering and Telecommunication, Secunderabad, we recommend that all the Railway Service Commissions should synchronise their time table for recruitment of apprentice signal and telecommunication inspectors in the initial and intermediate grades so that the candidates for all zonal railways, in one category, are recruited at the same time and made available to the Institute at one time in the year instead of each railway sending its batch at different times of the year.

153. Vacancies should take into account, both permanent and temporary cadres including the anticipated requirements of signalling and telecommunication works, deputation to RILES, RDSO and countries abroad and the percentages for lateral recruitment should take into account for a minimum of three grades of promotion for each level of recruitment, to ensure proper career planning.

154. *Recruitment of welfare inspectors.*—In Chapter III we have outlined the new role which the welfare organisation on the Railways should play. For achieving this objective the welfare inspectors would have to be specially selected and trained. On some zonal railways, selection of welfare inspectors is restricted to clerical cadres in the Personnel Branch. We feel that the field of selection of welfare inspectors should be enlarged to cover other departments also, and persons with the required aptitude and qualifications in social work inducted into this organisation and trained.

155. *Direct recruitment to Class IV categories.*—Recruitment to fill up Class IV vacancies is done by the zonal railways. For this purpose, the unit of recruitment is normally a division, major workshop, loco shed or the jurisdiction of a permanent way inspector etc. We find that, even though procedure exists in stipulating literacy as an essential qualification for recruitment to Class IV categories, this procedure has been held in abeyance due to the very large number of casual labour on the Railways who are to be regularised. Most of them are illiterate. We see no remedy to this situation unless it is ensured that only persons with minimum educational qualification are recruited in the lowest category and even as casual labour.

156. *Recruitment to gazetted cadre.*—We were struck by the distortions in the cadres of officers which have occurred on the divisions and in some of the departments on the zonal railways taken as a whole. For example, we found that on the Adra Division of the South Eastern Railway, out of 83 officers, only 71 were Class I and the remaining were promotees. In the Mechanical Engineering Department of the South Central Railway, we were informed of the acute scarcity of Class I officers, due to which difficulties were experienced in placing persons in different posts. We feel that in the matter of manpower planning and officer cadre planning, there has been no fresh thinking in spite of the fact that a large number of officers, mostly Class I, have been sent on deputation either in this country or abroad. We would strongly recommend to the Railway Board that the matter of officer's cadre planning must be taken up in all seriousness to correct the imbalances which have occurred in different departments and which also get reflected in the field units.

157. *Induction of graduate engineers.*—One glaring fact which came out during our visits to the workshops, production units and open line was the small number of engineering graduates compared to the size of the unit. Considering the fact that in most of the technical departments there have been rapid technological advances, it is necessary to find ways of injecting adequately qualified personnel in the different levels. In this context it also came to our notice that even the existing provision of direct recruitment of engineering graduates in supervisory categories is not being fully taken advantage of.

158. *Training* :— Training has to form an essential ingredient in any safety programme. During the course of our visits to the railways and from the discussions we had with staff and officers whom we interviewed, we find that adequate attention to the training of staff, including refresher training, in the lower formations is lacking. Cases came to our notice where staff connected with safety in train operations had not been to any kind of training courses at all for periods as long as 10 to 15 years. This, in our opinion, is one of the main reasons for the dilution in skills which has become so evident in workshops, sicklines, etc. Our visits to the training schools and institutions did not reveal, by and large, a satisfactory state of affairs in the matter of utilisation of capacity, quality of instructors equipment, models, literature and even libraries.

159. *Utilisation of training capacity and backlog of refresher training.*—From our discussions with the teaching faculty in the schools and institutes we visited, and the information made available to us, we found that the capacity available for training has been utilised only partially; in fact the utilisation was poor in some categories of staff. For instance, the utilisation of training capacity at Zonal Training School, Alipurduar Junction on the Northeast Frontier Railway in the categories of station masters, guards, cabinmen, pointsmen and permanent way inspectors was only 57, 61, 52, 34 and 21 per cent respectively during 1978-79. At the Signal and Telecommunication Training School at Pandu on the Northeast Frontier Railway, the utilisation of training capacity had fallen from 83.6 per cent in 1976-77 to 59 and 39 per cent in 1977-78 and 1978-79 respectively.

The annual utilisation of seats allotted to zonal railways for refresher training of signal inspectors at the Indian Railway Institute of Signal Engineering and Telecommunication (IRISET) varied from 63 to 88 per cent during 1975 to 1979. Even though our observations relate to only a few of the training institutes/schools, but from the discussions which we had and the information made available to us, we feel that a similar position is obtaining in many other schools and training institutes on the zonal railways. This was also commented upon in paras 150 to 154 in Part I of our Report.

160. In the face of poor utilisation of the capacity in training schools, we were struck by the heavy arrears in refresher training in certain categories of staff, such as, station masters, switchmen, yard masters, shunting jamadars and shuntmen on Eastern Railway, drivers on South Central Railway, train examiners and fitters

on Northeast Frontier Railway, etc. We also came across cases of staff who had not undergone any refresher training at all. Much remains to be done if the backlog in refresher training is to be cleared and the refresher training programmes placed on a sound footing. We had discussed this question in paras 156 to 158 in Part I of our Report.

161. The reasons for poor utilisation of the training capacity were given as shortage of staff, inadequate trainee reserves, poor hostel accommodation, unwillingness of staff to go to training due to loss of emoluments, etc. Some of these aspects have been discussed in detail further in this chapter. Refresher training is an integral part of the safety programme and it is necessary that this is imparted to staff at the prescribed intervals. We reiterate what we had stated in Part I of our Report that all factors which stand in the way of full utilisation of the available training capacity should be identified and remedied at the earliest.

162. *Monitoring the training of staff.*—During our visits to the railways or discussions with officers at the divisional and headquarters' level, we did not come across any evidence of planning being done for the training of staff. Instances did come to our notice when the officers of the Safety Organisation and others pointed to the arrears in refresher training of staff in their inspection notes. We found that at the divisional and headquarters offices in zonal railways, thinking on the matter of training only commences when the allotment of seats is advised by the school/institute and ceases after the staff have been nominated for the same. In our view, planning training of staff is an essential function of the Personnel Department, which does not appear to have received due importance so far. We would strongly recommend that the subject of training of staff and officers should be placed under the charge of a senior officer in the headquarters of each zonal railway.

In the functions which we have envisaged for the Safety Organisation, commented upon in Chapter XI, the responsibility for monitoring refresher training of safety categories of staff has also been enjoined on the divisional safety officers and chief safety superintendents who should also keep the senior officer incharge in the Personnel Department apprised of the requirements of training.

163. *Payment of advance travelling allowance to trainees.*—Signal inspectors represented to us that some in their category who had been booked for refresher training in courses at IRISET did not attend the course due to non-payment of advance TA to cover the messing charges for the period of their stay at IRISET. We were informed that the trainees are required to pay messing charges (Rs. 250/-) in advance every month. As per extant rules, trainees are given advance TA restricted to a maximum of one month pay, which does not cover the aforesaid charges over a period of 2-3 months i.e., the duration of the course. We feel that this is a matter which should have automatically received the attention of the Railway Administrations. Before the trainees proceed on training courses, advance TA should be paid to them for the whole period of their course.

164. *Capacity for refresher courses at IRISSET.*—Signal inspectors are required to be sent to IRISSET for refresher training, once in five years. On the basis of present strength of signal inspectors on all zonal railways, i.e., 2125 approximately, the annual number of persons to be given refresher training should not be less than 425. Against this we find that on an average only 104 signal inspectors were given refresher training per year from 1975 to 1979. In this background and with actual utilisation in the range of 62 per cent, we cannot escape the conclusion that refresher training of signal inspectors is greatly in arrears. We recommend that adequate capacity for the refresher training of signal inspectors should be generated and utilisation thereof also ensured in greater measure.

165. *Problems of language in training institutes.*—It was mentioned to us by the faculty members at IRISSET that the trainees coming from the northern part prefer to take instructions in Hindi, for which arrangements do not exist at present. It was stated that this problem does not arise at the higher levels of staff, like signal inspectors, etc. in whose case the educational standards are better. Another instance was quoted in which staff nominated by the Western Railway for a promotion course for maintainers, could not even understand Hindi, and had to be given the option to return to the railway. We feel that this problem is likely to grow, with the promotions of increasing number of staff who have risen from Class IV cadres. We would recommend that :—

- (i) there should be decentralisation of training for artisan staff and promotional and other special courses for such staff should be conducted in the zonal training schools where teaching could be done in the local language; and
- (ii) railway administrations should also ensure that the staff who are nominated for training are in a position to understand the language in which the course is being conducted.

166. *Feedback on failures of S&T gear and accidents on S&T account.*—During the visits to the some Signal and Telecommunication Training Schools, we were informed that they do not get any feedback on failures of signalling and interlocking gear and reports of accident enquiries, where signalling was held to be the cause. We consider that such feedback and information should be sent to the signal training schools and institutes regularly, so that the instruction to staff is more practical and useful. In this context we would also invite reference to Chapter VIII where we have suggested that a detailed analysis of the signal failures together with the remedial measures should be made out and circulated to the field staff. Such information should also be sent to the training schools.

167. *Models and equipment in training schools and institutes.*—During our visits to the signal and zonal training schools and institutes we found that they were not fully equipped with working models for imparting training to staff in equipment which had already been installed in the field. We found that even at IRISSET,

models of some of the equipment in use on the railways were not available. We would strongly recommend that the signal and zonal training schools should be fully equipped with models for ensuring a good standard of training. In this context we would suggest that, at the time of introduction of any new equipment or system, provision should be made in the project estimates of all new installations for the supply of models/spare equipment to IRISSET and other signal and zonal training schools.

168. *Training to loco maintenance staff.*—In our review of accidents in Chapter II, we have commented on the trend of accidents resulting from defects in locomotives and some of the areas which need concerted attention have been discussed in Chapter IX—Motive Power. During the course of our discussions with officers of the Mechanical Engineering Department on the zonal railways it was forcefully brought out that while running staff are being given training in various schools and institutes, training of loco maintenance staff has remained neglected. It is necessary that staff employed on repair and maintenance of locomotives are made aware of the functions and importance of different components and materials for ensuring safety in train operation. We recommend that regular training courses should be conducted for categories of loco maintenance staff.

169. *Recruitment and training of diesel and electric locomotive drivers.*—In paras 130 to 136 in Part I of our Report, we had gone into the question of recruitment, educational qualifications and training of diesel and electric locomotive drivers. Our attention was drawn to the deteriorating standard of drivers and supporting crew both for diesel and electric traction. It was stated that the persons who are now coming over from the steam side, by and large, have neither adequate education nor technical proficiency required for handling modern diesel and electric locomotives. Diesel drivers working mail/express/passenger trains are not only required to be familiar with the manipulation of controls but should also have a working knowledge of the various mechanisms so that minor faults developed enroute could be rectified by them. To achieve this we recommend the following :—

- (i) The policy of selection of diesel and electric drivers should provide avenues for drafting surplus staff from the steam side and direct recruitment from the open market.
- (ii) A minimum standard of education may be laid down for the selection of diesel and electric drivers from the steam side as well as for direct recruits.
- (iii) Selected staff should be put through an intensive training course in the Diesel/Electric Training Schools.

170. In paras 139 and 140 in Part I of our Report we had gone into the question of simulators for training of drivers. During discussions with the officers on zonal railways, the general view was that for speeds obtaining at present, the conventional form of training would be enough and simulators for training purposes were not necessary. Considering the fact that some railways in more developed countries also,

have given up the use of simulators for training locomotive drivers, we do not wish to pursue this matter.

171. *Training of drivers and running staff in signalling matters.*—During our visits to the zonal railways we found that while some drivers/running staff complained bitterly regarding failure of signals, the signalling staff responsible for maintenance on the same section felt that there is a lot of confusion and misconception in the minds of running staff about the aspects of signals. We were informed that on the Central Railway there is an arrangement for sending motormen to the Signal Training School at Byculla. In order to fully familiarise the drivers with the functioning of signals, we feel that training in signalling matters, covering specially signal aspects and failures thereof, should form a part of syllabi for refresher training to drivers.

Instruction on ill-effects of drugs, liquors and intoxicants on the reflexes of a person, especially drivers and other running staff, should also form a Part of the syllabi prescribed for different courses for running staff in the training schools.

172. *Training of train examiners and artisans.*—In our review of accidents in Chapter II we have commented on the rise in the number of derailments due to carriage and wagon defects, during the 5-year period 1973-74 to 1977-78, as compared to the previous 5-year period. We found that except on some railways where a small number of train examiners were undergoing training in the system technical and other schools, by and large, no training is being given to this category of staff. While there was no provision for training train examiners or artisan staff on the carriage and wagon side on some zonal railways, in others we were informed that though provision for imparting training exists, staff cannot be sent for the same due to acute shortage. We also find that increasing number of staff from lower formations, namely, khalasis and safaiwalas of the carriage and wagon department have been promoted to skilled cadres as a result of mass upgradation in that cadre. We were informed on some zonal railways that due to large scale upgradations, even proper trade tests were not conducted and the staff have been absorbed in working posts in skilled and highly skilled positions. Our enquiry revealed that no scheme of training had so far been thought of for such promotees. We feel that indiscriminate promotions to staff by keeping in abeyance the rules of trade testing coupled with generally low educational qualifications and inadequate training are mainly responsible for dilution of skills on the carriage and wagon side. We, therefore, strongly recommend the following :—

- (i) All staff in the carriage and wagon department on first promotion to semi-skilled, and highly-skilled grades should be given intensive training for an appropriate period before they are placed in their new positions.
- (ii) In the context of recent upgradations and promotions of carriage and wagon safaiwalas into semi-skilled skilled grades special intensive courses should be conducted for such staff at the earliest. The course con-

tent should take into account the educational background of such staff.

- (iii) Refresher and vocational training courses must be planned for train examiners and other artisan staff at regular intervals. It should be ensured that the staff are regularly spared for these.

173. *Training of train examiners in Integral Coach Factory.*—We find that there is no regular practice of sending train examiners to Integral Coach Factory, Perambur for training. On some railways we were informed that only a few seats every year are made use of. In our view, training of train examiners in the Integral Coach Factory, Perambur, will improve their performance resulting in a higher standard of maintenance of rolling stock.

174. *Training to artisans in workshops.*—We found that even though system technical schools and/or basic training centres are available in major workshops there is no proper system of sending artisan staff in workshops for refresher and vocational training. Senior supervisors in some shops told us that there is no standard system of training for workshop staff, including artisans and supervisors. On one zonal railway we were told that even though there is programme for imparting training to artisans, since such staff are earning 30 per cent incentive bonus, they do not want to take the training due to monetary loss involved. It is necessary that this is remedied. We recommend that artisan staff in workshops should be given regular refresher and vocational training and there should be a proper system of monitoring the same, artisan staff sent for training should not suffer any monetary loss and their emoluments should be protected in the same manner as is being done in the case of running staff.

175. *Training for operators of ultrasonic rail flaw detectors.*—In Chapter VI-Permanent way, we have alluded upon the Railways to extend and intensify ultrasonic testing of rails in running lines. For so doing, it is necessary to develop a trained corps of operators and maintenance staff who will look after this relatively new and expanding sphere of activity. For successful rail testing, the person-in-charge or operator should be thoroughly familiar with the testing method. He must have a good theoretical knowledge as well as thorough practical experience. We would, therefore, recommend that regular training courses, including refresher training, should be given to operators and maintenance staff employed on ultrasonic rail flaw detectors.

176. *Training to welfare inspectors.*—The Wanchoo Committee had recommended imparting of orientation training to the welfare inspectors, to enable them to accomplish what their designation implies. This was reviewed by us in paras 68 and 73 in Part I of our Report. Our visits to the zonal railways and the discussions we had with some welfare inspectors, did not reveal any impact of the training courses envisaged by the Wanchoo Committee. In fact most of the welfare inspectors had not undergone any training at all relevant to the nature of their assignment. We feel that to enable welfare inspectors to take up effectively

the activities which we have outlined for the Welfare Organisation, in Chapter II, they should be given appropriate training.

177. *Calibre of instructors.*—We are informed that minimum educational qualifications for instructors are not laid down, some of the persons working as instructors have not undergone even the instructors' training course. For instance, only seven of the nineteen instructors in the Zonal Training School, Alipurduar Jn. on the Northeast Frontier Railway had received training in imparting instructions. It was suggested to us that the instructors in the zonal training schools should be at least graduates and should undergo an instructors' training course. We would like the Railway Administration to examine this question in all its aspects so that persons of high calibre, having aptitude for teaching, are posted as instructors. Such persons should undergo instructors' training course before taking over charge.

178. *Scales of pay of instructors.*—We find that persons with an outstanding record of work on the open line do not like to come to the training schools due to lack of incentives for working as instructors. It was represented that in some cases there is loss in total emoluments, the deputation allowance being very meagre. The grades of pay of instructors are also far below those of senior supervisors in the field, the gap having widened after the upgradations. For instance, the scales of Rs. 840-1040 and Rs. 840-1200 introduced on the open line, for inspectors and supervisors for a certain number of posts in each discipline of railway working, do not opt for any posts in the training schools. We consider this aspect unhealthy and not conducive to achieving a higher standard of training in the schools. We consider that instructors in training schools should be only in the highest grades obtaining in the field viz. Rs. 840-1040 and Rs. 840-1200.

179. *Heads of zonal training schools.*—We came across instances where heads of training schools had been transferred at very short intervals. In another case a person who had all along worked in the commercial department was posted as Principal. We feel that the heads of zonal training schools should be selected with care and discrimination preferably from one of the 5 major departments concerned with safety of train operation i.e. Operating, Mechanical Engineering, Civil Engineering Signal & Tele-communication Engineering and Electrical Traction. The incumbents should ordinarily be allowed to remain at their posts for not less than 3 years.

180. *Assessment of refresher training.*—We find that at the end of a refresher course, the trainees are given only an oral test which has taken the place of written examination and the assessment has become perfunctory. Moreover, if a person fails in a refresher course he is either given a repeat course for a few days in continuation or sent back to his job and again called for refresher training after 6 months. During this period he continues to do the same work as before even though his knowledge of rules and procedures may have been found to be wanting. We consider that from the point of view of safety in train opera-

tion, this is not a good practice. We urge that this situation should be rectified, and the modalities of doing so, we leave to the Railway Board.

181. *Training of Class II officers.*—The system of training of Class II officers on their promotion from Class III does not at present cover all the officers concerned within a reasonable period, nor is the period of training adequate. We find that during the five years from 1973 to 1977, 1297 officers were promoted to Class II from Class III out of whom 835 underwent training. We came across cases where promotee officers had been in working posts for 6-7 years before going for training. We recommend that, before taking over charge as a Class II officer, he should be given adequate training.

182. *Trainee reserve posts.*—During the course of our visits to zonal railways and in the evidence tendered before us, inadequate trainee reserve and/or non-provision of trainee reserves was stated as the main factor coming in the way of relieving staff for training courses. We were informed that posts have not been sanctioned as required for different reasons, including general ban on creation of posts. We verified the position in this regard and found that in November 1979, the Railway Board had issued instructions empowering the General Managers to create trainee reserve posts for running staff as well as for staff directly connected with safe working of trains in accordance with the prescribed norms so that the concerned categories of running or stationary staff are given adequate training, including refresher training, at the prescribed intervals. We were struck by the fact that even as late as March 1980, officers on most of the divisions and even some heads of departments were not aware of these instructions. We would urge the Railway Administration that the required number of trainee reserve posts for running staff as well as staff directly connected with safe working of trains should be created without any further delay and positions filled up at the earliest. It should also be ensured that staff connected with safe working of trains are sent for refresher training at the prescribed intervals.

183. *Deputation of officers to seminars.*—It was represented to us by a number of officers that the present powers of the General Managers to nominate officers for seminars within the country is limited to Rs. 500/- maximum fee per person per seminar with an annual limit of Rs. 10,000/-, and these are a serious limitations in deputing officers to such seminars. With about 900 officers on the rolls of some zonal railways the aforesaid limits appear ridiculously low. The need for greater participation in seminars where they can interact with managers from other public sector and private organisations cannot be over-emphasized. Deputing of officers to seminars and short term management courses should be left to the General Manager who should be given full powers in this matter without assigning any monetary limits.

184. *Railway Staff College, Vadodara.*—The Railway Staff College at Vadodara was established in January 1952. It is the premier training institution of the Railways which serves the needs of various

railway departments in giving foundation training to new entrants to officer cadres and also to inservice officers. During the course of our visit to the Railway Staff College and in the discussions we had with members of the faculty, certain matters came to our notice on which we are commenting in the following paragraphs.

185. *Strength of teaching facility.*—In most of the disciplines like Civil Engineering, Mechanical Engineering, Transportation, Signal & Telecommunication Engineering, the faculty consists of a single professor. Our enquiries revealed that since there is only one professor for each subject, the courses are so planned that the concerned professor is available because in his absence there is no one else to take up the subject. It was mentioned to us by some professors that the teaching workload is 2½ to 3 lectures daily or 15 to 18 lectures per week. Besides they have to conduct examinations, group discussions, etc. Some members of the faculty have also been assigned certain administrative functions like looking after the maintenance of the campus, messing arrangements for trainee officers, etc. Due to the heavy workload and the time required for preparing for lectures, we were told that very little is done in the matter of development of studies or research by the members of the faculty. We considered that the teaching workload in itself is quite heavy for an institution of this type and taking into consideration the other functions which members of the faculty are also required to perform, the faculty should be strengthened in the major disciplines enumerated above.

186. We also feel that some of the major disciplines should be provided with technical or research assistants who will help the professors in developing studies in various aspects and initiating research programmes. This will also enable the faculty to make full use of the potential and facilities available and in collection of material.

187. *Honorarium for visiting lecturers.*—We were told that at present the quantum of honorarium given to visiting lecturers is Rs. 50/- per day which was not considered enough by many of the lecturers called to the college. This, we are informed, was coming in the way of getting persons with specialised background to come and address the trainee officers. There is need to revise the scale of honorarium for visiting lecturers.

188. *Promotion policy.*—Several representations were received regarding the very poor prospects of promotion for staff in almost all the categories directly connected with safety. We were informed that almost 90 per cent of gangmen retire as gangmen. In the categories of permanent way inspectors we found acute stagnation in the initial grade of recruitment. With 67 per cent of the posts of permanent way inspectors in the initial recruitment grade of Rs. 425-700, two-third of their service is spent in this grade only. The next higher grade of Rs. 550-750 overlaps with the initial grade except for the last two incremental stages. Some of the assistant station masters stated that they had been in the initial grade of recruitment for the last 20 to 25 years without any hope of promotion in the near future. This position is aggravated by some of the promotional vacancies being reserved. Carriage and wagon staff at the level of fitters and train examiners, very strongly represented to us that there was little scope for promotion and they have to remain in the initial grade for two to three decades. One of the carriage and wagon inspectors mentioned that he had been able to get promotion only after 24 years of service in the initial grade. Signal inspectors and maintainers also stated that they stagnate in the initial grade for almost 20 years irrespective of their qualifications and efficiency. It was represented by one of the trade union federations that the stagnation in Class III and Class IV categories of staff was so acute that in spite of the higher grade posts agreed to by the Railway Board recently, there had not been much improvement. They suggested a scheme of time bound promotions so as to sustain the interest of staff in their work.

189. Another aspect which came up during our discussions was that, by and large, the recruitment in all categories is restricted mainly to the lowest of the grade without any relation to the number of posts in higher grades, with the result that while staff in the lowest recruitment grade is increasing, the relative prospects for promotion to higher grades are diminishing.

190. We, thus, find that the present promotional policy on the railways has resulted in deep discontent amongst staff. We are aware of the inherent complexities of this problem and do not wish to oversimplify. Some steps, however, will have to be taken urgently, to modify the policy to mitigate the more glaring aspects of discontent.

OTHER STAFF MATTERS

191. *Priority for allotment of quarters* :—In para 162 in Part I of our Report it was mentioned that no clear definition of who should be treated as essential staff had so far been laid down by the Railway Board, and there was no uniformity on the zonal railways in so classifying the staff. Our enquiries on the zonal railways revealed considerable differences in approach as to who should and who should not be treated as essential staff. On some railways the list of such categories runs to 300. We were also informed that any modification in the extent categorisation would not be without repercussions and problems. We realise that there would be difficulty in strictly defining the essential categories, but it will not be denied that atleast the staff in the categories of drivers, assistant drivers, firemen, station masters, assistant station masters, switchmen, cabinmen and guards are essential and merit allotment of quarters on priority near the place of work. We recommend accordingly.

192. *Railway quarters for essential categories of staff* :—In paras 163 to 169 in Part I of our Report we had gone into the question of provision of housing for railway staff. During the course of our inspections and in evidence tendered before us, there were widespread complaints regarding non-availability of housing accommodation. We have surveyed the position regarding housing of certain essential categories of staff on the zonal railways as on 31-3-1978, in comparison to the position which existed on 31st March of 1964 and 1968, which was reviewed by the Wanchoo Committee in para 315 in Part I of their Report. This we have placed as Annexure CXI. It will be seen that the percentage of essential categories of staff provided with railway quarters as on 31-3-1978 had declined on the Eastern, Northern, Southern, South Central and Western Railways as compared to the position obtaining on 31-3-1968. On all the zonal railways except Central Railway, the percentage of drivers and shunters provided with railway quarters declined during the last ten years. On the Western railway it was as low as 38.5 per cent against an average of 55.8 per cent for all categories of essential staff included in our review.

193. Some essential staff stated that while other categories of staff were given quarters near the station, running and other essential staff are allotted quarters in general colonies, from where it takes about two hours to reach their place of duty. Some of the essential staff posted at stations also represented that they are not provided with residential accommodation resulting in their families being kept elsewhere which distracts them from discharging their duties efficiently. Some senior drivers complained about inadequate accommodation in the two-roomed quarters to which they are presently entitled. Some others complained that they had to make do with only one room quarter. They found it difficult to take proper rest in

these. They stated that previously a part of the running allowance was also taken into account for allotment of quarters, due to which drivers were entitled to Type IV quarters but this had now been discontinued.

194. One General Manager was of the view that 90 to 100 per cent of running staff should have railway quarters where as actually the percentage is only 50 to 60. He suggested that to ease the situation, railway staff in headquarters, workshops, etc. should be assisted to build their own houses.

195. In view of the foregoing, we recommend the following :—

(i) In order to improve the position of housing of essential categories of staff, whom we have so identified in para 191, construction of new staff quarters should be taken up for specific categories of staff like drivers, guards, firemen, assistant station masters, etc., with a view to improving the declining percentage housed in each of these categories.

(ii) The entitlement of railway accommodation to drivers, guards and such other essential categories of staff should be reviewed so as to enable them to take proper rest. It may be necessary to revise the minimum requirement of accommodation for these categories and not to link it with all other general categories, on the basis of grades of pay as is the case at present.

(iii) Railway staff at divisional and headquarters of zonal railways, workshops, etc. should be encouraged to build their own houses to ease the pressure on railway accommodation. Housing cooperatives amongst railway workers should be encouraged and incentives given by way of easy loans and allotment of spare railway land.

196. *Leave Reserve* :—In paras 195 to 199 in Part I of our Report, the question of leave reserves on the railways was examined. During the course of our visits to the zonal railways, we were informed that leave reserves being operated at present are grossly inadequate in comparison to the level of absenteeism in almost all categories of staff connected with operation of trains. The result was greater resort to staff working without adequate rest or overtime working. It was mentioned to us that the leave reserves permitted at present do not fully cover even the leave entitlements of staff. It was stated that though a range (minimum and maximum level) for the operation of leave reserves has been specified for different categories of staff (reference Annexure IX in Part I of our Report), however, the zonal railways are permitted to operate only at the minimum of the prescribed percentages for most categories of staff except loco running staff, in whose case operation of the maximum percentage has been allowed,

In the workshops also, we were informed that against the permitted leave reserve of 12½ per cent, the actual absenteeism goes well beyond 20 per cent thus making it extremely difficult to cope with the workload.

From the mass of evidence before us, we feel convinced that the leave reserves which the zonal railways are being permitted to operate are grossly inadequate, resulting in overtime working and staff working without adequate rest. We would strongly recommend that the leave reserve percentages for different categories of staff should be reviewed in the light of leave entitlements of staff which have been greatly liberalised since the leave reserve percentages were fixed.

197. *Running Rooms*:—During the course of our visits to zonal railways and in the evidence tendered before us, widespread complaints were voiced by drivers and guards regarding the condition of running rooms. We were informed that running rooms are of dormitory type with as many as 16 beds in each hall, thus making it practically impossible to take rest due to the disturbance caused by incoming and outgoing staff and service of the call book. Even the number of beds is inadequate to meet the requirements of staff at certain hours and many had to either go without accommodation or await their turn for a bed for considerable time. In certain running rooms, the dining table was also kept in the same room where beds had been kept, thus adding to the disturbance. The Chief Medical Officer of one zonal railway expressed grave doubts whether a driver who comes to a running room for rest does get it. He mentioned from personal knowledge that running rooms are, by and large, overcrowded causing a lot of disturbance to those taking rest. He suggested that better arrangements in the form of cubicles be provided. Complaints were also voiced regarding poor cleanliness and insanitary conditions in running rooms. It was mentioned that linen is scanty, bedsheets are soiled, water supply is inadequate. At some stations, running rooms were being used by outsiders much to the inconvenience of running staff. Due to power cuts, which, in some areas, are for almost 20 hours in a day, it had become extremely difficult for the staff to stay in running rooms and be able to have necessary sleep and rest before proceeding on duty. At a number of places we were also informed that there are no proper arrangements for cooking in the running rooms. In some cases, medically de-categorised staff had been posted as cooks very much to the dislike of the running staff.

198. From the mass of evidence before us, we conclude that a majority of the running rooms on zonal railways are in an unsatisfactory condition from the point of view of accommodation, facilities, location, arrangements for cooking food and management. Facilities in running rooms have not kept pace with increase in staff strength. We would recommend the following:—

- (i) Running rooms should be provided with individual cubicles in which staff can take rest undisturbed. The concept of providing halls with one or two dozen beds is outdated and should be discarded at the earliest possible.

- (ii) Provision of basic necessities like clean linen, mosquito nets, adequate water supply, electricity, etc. should be arranged and sanitary conditions improved.
- (iii) Ways and means should be devised by the Railway Administrations to insulate running rooms against misuse by outsiders.
- (iv) Running rooms should be located in close proximity to the place of duty.
- (v) Trained cooks should be provided in running rooms to meet the needs of staff fully.
- (vi) Railways should also consider establishing regular canteens in the larger running rooms.

199. *Crew rest vans*.—Drivers who tendered evidence before us complained about the unsatisfactory condition of crew rest vans. It was stated on the North Eastern Railway that these vans are old parcel/horse vans in which a few planks have been put in. They found it extremely difficult to take proper rest in the crew rest vans—there are no arrangements to cook food and to sleep. Vibration in these crew rest vans was stated to be so intense that there is always a danger of slipping down. In fact it was mentioned that 4-wheeler crew rest vans are not at all suitable for travelling purposes and the crew are forced to work without adequate rest. On some zonal railways we were informed that the work of fully equipping crew rest vans has been taken in hand and completed partly. Crew rest vans play a very important role in providing proper comfort and rest to the spare crew who travel on trains provided with double crew. We recommend that crew rest vans should be provided with cushioned berths, lighting, fans, water, cooking facilities, bathroom, etc.

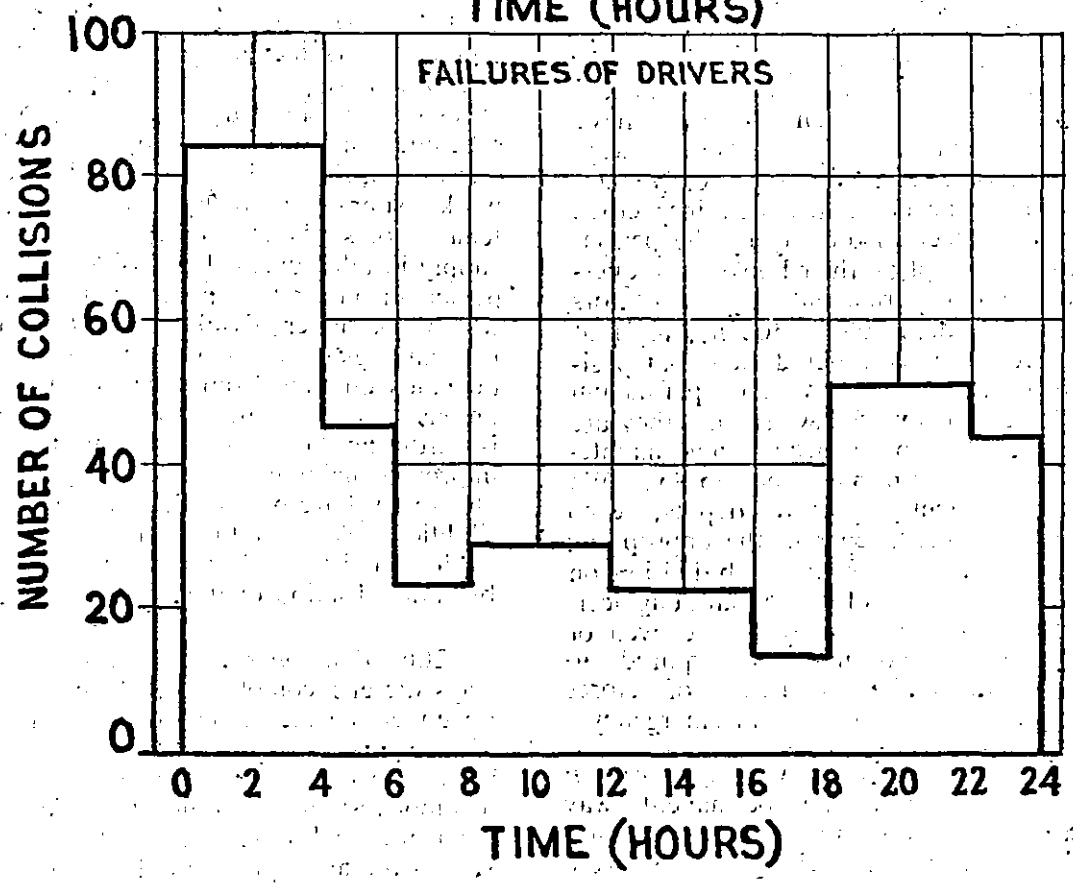
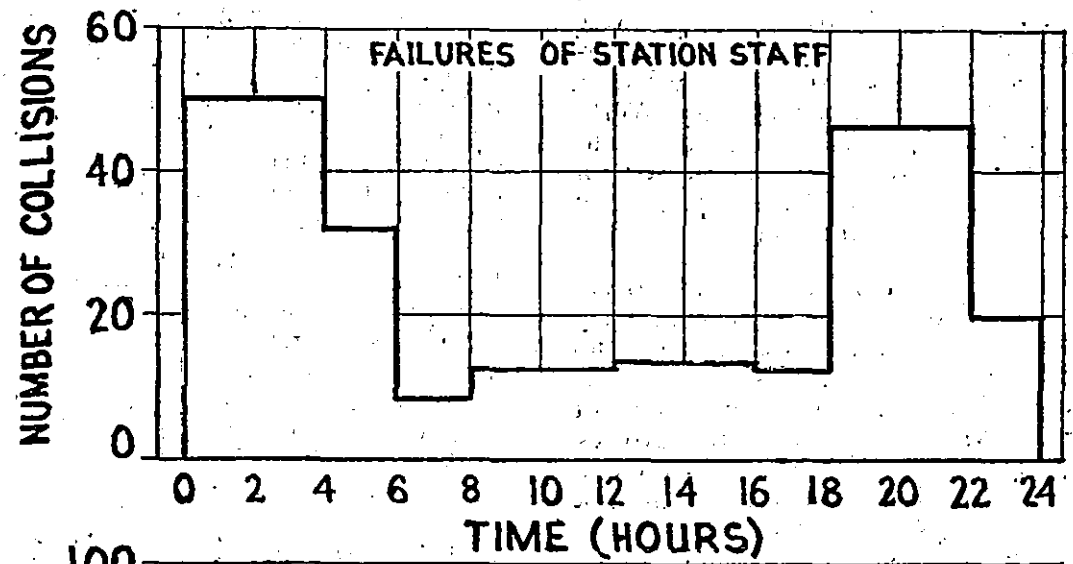
We would also urge the Railway Board to consider development of a proper type of crew rest van in place of the existing 4-wheeler, which we feel, is incapable of affording proper rest.

200. *Night duty of running staff*.—It has been represented to us by the loco running staff that, at present, no distinction is made in duty of running staff during day and night. It was mentioned that staff working during night have to perform their duty under much greater stress and strain because of a number of factors like restricted visibility, inactive surroundings and general slackness of mental functions during night. They suggested that, duty hours of running staff during night should be less than during the day.

On the basis of information furnished to us by zonal railways we have carried out a limited study correlating collisions caused by failures of drivers and station staff to the time of their occurrence. The results are shown in Chapter VII. We find that nearly three-fourth of the collisions caused by failures of drivers and station staff occurred during night time, reckoned from 1800 to 0600 hours.

We feel that duty during night would result in more fatigue in running/station staff than would be the case for a corresponding period during day. We would

INDIAN RAILWAYS COLLISSIONS DUE TO FAILURES OF DRIVERS AND STATION STAFF CORELATED TO TIME FACTOR ON BROAD GAUGE AND METRE GAUGE SYSTEMS



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suggest that this problem be studied by the RDSO and an assessment of the fatigue level in running/station staff in performing duty at night vis-a-vis day should be made. This should form a rational basis for determining the limit of duty hours during night time.

201. *Jurisdiction and workload of permanent way inspectors*:—In para 209 in Part I of our Report, we had considered the need to review the jurisdiction of permanent way inspectors in the face of considerable changes in track structure, methods of maintenance and inspection, increase in traffic and speeds of trains. During the course of our visits to zonal railways, a large number of permanent way inspectors represented regarding the increase in their workload not only in the matter of track inspections and works but also staff matters which are increasing day by day. We were informed that the schedules of inspection which a permanent way inspector is required to complete in a month, as per the Indian Railways Way and Works Manual, will in fact require a much longer period to complete. We feel that there is a strong case for review of the jurisdiction and workload of permanent way inspectors, and recommend the same.

202. *Stores workload of permanent way inspectors*:—We have been informed by permanent way inspectors that the posting of a stores clerk has in no way lessened their responsibility in the matter of stores. The ultimate accountability for stores, the value of which runs to Rs. 50 lakhs in some cases, still devolves on them. The permanent way inspectors interviewed by us stated that this responsibility bothers them not only while in service, but even after retirement, due to the non-finalisation of the stores returns, and consequent non-payment of settlement dues to them. We have also been told that the permanent way depots which have been set up, one on each division, have not relieved the permanent way inspectors in any way. These depots have become store houses for scrap materials which are sent by the permanent way inspectors, new materials are still received directly by the permanent way inspectors and kept on their books. The question of stores workload of permanent way inspectors was discussed by us in paras 297 to 302 in Part I of our Report. We are of the considered view that positive steps need to be taken to relieve the permanent way inspectors of the stores workload, so that they are able to devote more time for inspection and maintenance of track which is their prime responsibility. We recommend that, permanent way stores depots, each under the charge of a store keeper in the appropriate grade, should be set up, one for each sub-division on the open line, under the charge of an assistant engineer. The permanent way inspectors must be relieved of stores charge under them, and should be required to look after only a small number of items of stores which may be required for use during an emergency.

203. *Workload of permanent way inspectors in establishment matters*.—Some of the permanent way inspectors represented regarding the considerable establishment workload under their charge. We were informed that on the main trunk routes, some permanent way inspectors have as many as 500 employees under their control. All establishment records of these

staff are required to be maintained in the permanent way inspector's office. The one clerk provided for this purpose is grossly inadequate and, by and large, all permanent way inspectors requisition the assistance of literate casual labour working under them. We do not consider these to be satisfactory arrangements, and feel that to meet the requirements and aspirations of staff, this work should be placed on a satisfactory footing. We recommend accordingly.

204. *Workload of inspectors of works*.—It has been represented to us by inspectors of works that they have exceptionally long sections extending to 100 to 120 kilometres and are consequently unable to complete inspection of bridges and other structures. They mentioned that carrying out of scheduled inspections as laid down in the Indian Railways Way and Works Manual would, in fact, require double the time actually provided therefor. They urged that presently there is no yardstick or norm available for beats of inspectors of works, which should be laid down. One chief track engineer also informed us that there has been no rationalisation of the workload of inspectors of works. We find that the Efficiency Bureau of the Railway Board had carried out a study on the workload of inspectors of works in 1968 but for some reasons, this study report was not released. In view of the fact that inspectors of works are closely connected with safety and maintenance of bridges, we feel that there is urgent need to lay down norms or yardsticks for inspectors of works on the basis of which their workload should be rationalised.

205. *Workload of assistant engineers*.—The assistant engineers incharge of sub-divisions on the open line whom we interviewed, mentioned to us about the excessive workload under their charge. Besides the scheduled monthly inspections of track, we find that assistant engineers have to record measurements for works, supplies of ballast, attend to repair and maintenance of staff quarters, service buildings and water supply installations. The assistant engineer is also the personnel officer for about 1500 or more employees who work under his charge. With increasing awareness amongst staff about their rights and privileges and demands on time from the numerous categorywise unions and associations of staff, the assistant engineer is hardly able to devote any time towards planning for improved maintenance and increased productivity as also the welfare of his staff which are his prime responsibilities. We would recommend a study into the workload of assistant engineers on the open line followed by rationalisation of their jurisdictions.

206. *Traction cadre*.—We find that on the Railways diesel locomotives are being maintained in a set-up under the mechanical department, assisted by electrical engineers at the appropriate level. Separate facilities have been set up for the maintenance of electric locomotives which fall under the charge of the electrical department who are also assisted from the mechanical side at the appropriate level to look after the mechanical portion of the transmission and running gear of electric locomotives. The running of locomotives of both these types is being monitored separately by the

mechanical and electrical departments respectively. During the course of our visits to zonal railways and discussions with the officers, we were informed that difficulties often arose due to the isolation of functions of the mechanical and electrical departments. A strong suggestion has been put forward before us for the creation of a traction cadre consisting of mechanical and electrical engineers who would be responsible for the maintenance and running of both diesel and electric locomotives.

207. The electric and diesel locomotives are highly sophisticated assets which require personnel who are well versed in both Electrical and Mechanical disciplines. Under the circumstances the Railways would do well to create a combined cadre of what today constitutes their Mechanical and Electrical Departments and, after giving them the requisite training at Jamalpur, put them in charge of the running and maintenance of locomotives, carriages and wagons of all types. It will be desirable under these circumstances to separate the workshop cadre from the traction cadre as the work in workshop is also becoming highly technical and calls for a high degree of specialisation. The training for the workshop and traction officers could perhaps be common for 2 years and then get specialised in the remaining 2 to 3 years of the apprenticeship before absorption in their respective cadres. With the increasing introduction of diesel and electric traction all over the Indian Railways, we feel that the Government must give serious thought to this question so that the management and maintenance of this highly developed asset are appropriately looked after.

208. *Incentives to officers and supervisors for membership of technical and professional institutes.*—During visits to the zonal railways officers and supervisors

forcefully represented that they find themselves handicapped, in the matter of developments which take place in more advanced countries of the world, due to their inability to become members of technical and professional institutes and societies because of financial constraints. There is no gain saying the fact that technology is fast advancing and in this context it is important that all officers and supervisors on the Railways keep themselves apprised of these advancements so that they can give their best to the discipline to which they belong. We feel that every encouragement needs to be given to all officers and supervisors to take up membership of technical and professional institutes and societies in this country as well as abroad. As a positive step we recommend that membership fee and subscription paid by all officers to one national and one international institute/society and that paid by senior supervisors to one national institute/society should be reimbursed.

209. *Incentive for acquiring higher educational, technical and professional qualifications.*—Our discussions with a large number of staff and officers in the field revealed that in the present state of affairs, there is no incentive either to the staff or the officers for acquiring higher educational, technical or professional qualifications. We found that there was hardly a case where officers and staff had taken advantage of the existing rules for taking study leave. We feel that encouragement needs to be given to the officers and staff to acquire higher qualifications so that they give a better account of themselves. We have been told that in the Defence Services, professional officers are encouraged to acquire higher qualifications by giving them adequate facilities and allowing a qualification pay/lumpsum grant on their having acquired higher professional qualifications. We suggest that the Government consider providing similar facilities and incentives to railway officers and staff.

CHAPTER VI

PERMANENT WAY

210. *Trend of accidents attributable to permanent way failures.*—In the review of accidents given in Chapter II, derailments caused by permanent way failures have been commented upon. The position obtaining on the broad and metre gauges of the Indian Railways during the 10-year period from 1968-69 to 1977-78, split into two 5-year periods, in comparison to the position obtaining during 1963-64 to 1967 to 68, which was reviewed by the Wanchoo Committee is as follows :—

	1963-64 to 1967-68	1968-69 to 1972-73	1973-74 to 1977-78
Broad Gauge			
(1) Number of derailments due to permanent way failures.	399	184	208
(2) Total number of derailments on Indian Railways	2167	1421	1531
(3) Percentage	18.4	13.0	13.6
(1) —x100			
(2)			
Metre Gauge			
(4) Derailments due to permanent way failures	363	157	149
(5) Total number of derailments on Indian Railways	2548	1724	1638
(6) Percentage	14.4	9.1	9.1
(1) —x100			
(2)			

211. We are happy to note that there has been a marked improvement in the number of derailments attributable to permanent way failures, during the 10-year period under review, on both broad and metre gauges, as compared to the position obtaining during the 5-years from 1963-64 to 1967-68. During the latter half of the 10-year period reviewed by us, there has, however, been a slight increase in the number of derailments on the broad gauge attributable to permanent way failures.

212. *Track structure.*—The recommendation of the Wanchoo Committee for the use of rail section 60 Kg per metre (hereinafter called 60 Kg rail) on broad gauge section where density of traffic may not have reached 20 gross million tonnes per annum but may be rapidly increasing, was not accepted by the Railway Board, as stated in Para 218 in Part I of our Report. Our discussions with the Research, Designs and Standards Organisation have revealed that the

standard of rail section adopted in this country is rather low. In foreign countries, for traffic of 10 gross million tonnes or more, the general standard is 60 Kg rail. On the strength of evidence which has subsequently come up before us, we reiterate the recommendation of the Wanchoo Committee made in Para 221 in Part II of their Report that 60 Kg rails should be laid not only on section carrying traffic more than 20 gross million tonnes but also on other routes where the density of traffic may not have reached that level but may be rapidly increasing.

213. On the metre gauge system, track generally consists of rail sections 29.76 Kg per metre (60 lb per yard) and 37.13 Kg per metre (75 lb per yard). Some sections on branch lines still have rail sections 24.80 Kg per metre (60 lb per yard). The Railway Board have already permitted the use of rail section 44.61 Kg per metre (90 lb per yard) on selected metre gauge sections. We consider this a step in the right direction. This, together with rail section 37.13 Kg per metre (75 lb per yard), should progressively replace 29.76 Kg per metre (60 lb per yard) and lighter rail section on metre gauge routes.

214. *Track structure in yards.*—Track in some of the important yards on the broad gauge still continues to have 85 lb per yard rails and other lighter non-standard rail sections which are now obsolete by Indian Railways standards. We are told that fittings for these are no longer procured as a regular measure, resulting in shortages which affect the maintenance of track. We recommend that the standard of track in yards should be upgraded in keeping with the standard prevailing elsewhere on the running lines. In doing so, priority should be given to tracks in important yards which handle large volumes of traffic.

215. *Track renewals.*—During the course of our visits to the zonal railways and in the evidence tendered before us, great concern has been voiced by staff and officers connected with permanent way, regarding the deteriorating position of track renewals and the increase in backlog thereof. We were informed that this has resulted in increased number of rail fractures, defective rails in truck, deterioration in track maintenance standards and imposition of speed restrictions on increasing length of track. Our review of accidents in Chapter II shows that, on the broad gauge derailments attributable to permanent way failures had increased to 208 during 1973-74 to 1977-78, as compared to 184 in the previous 5-year period. This is a matter for concern and is a pointer to the deteriorating condition of track on some sections. We had discussed the subject of track renewals at length in paras 249 to 257 in Part I of our Report and had expressed the hope that the Railways full requirement of funds for track renewals, will be

made available in the coming years so that the arrears are wiped out at the earliest. Our discussions with the Railway Board show that out of the funds placed at their disposal by the Government, it is not possible to meet even the modest requirement of Rs. 560 crores in 5 years i.e. Rs. 112 crores per annum during the current 5-year period 1978-79 to 1982-83. The allocations in the last two years have been much less. We feel that this need has not received sufficient attention from the levels of Government which determine the allocation of resources. In our view, economy in matters like this can only be at the cost of greater danger to safe running of trains. The requirement should, therefore, not be viewed by the Government on considerations of economy only but as an essential input for safety and should get commensurate priority.

It should also be noted that as the renewals are put off, the costs of such renewals keep on escalating and the possibility of catching up with the needs gets more and more remote. Unless, therefore, much larger financial allocations are made for this purpose, with immediate effect, the backlog will get totally out of hand.

216. *Arrears of track renewals on Northeast Frontier Railway.*—We find that derailments on the metre gauge sections of the Northeast Frontier Railway due to the permanent way failures have all along been disproportionately high; out of 306 derailments attributed to this cause during 1968-69 to 1977-78, 100 derailments (or 33 per cent) occurred on this Railway alone. In this background the mounting arrears of track renewals on the metre gauge sections of the Northeast Frontier Railway is distressing. The track is mostly laid with 29.76 Kg per metre (60 lb per yard) rails, which we were informed, are more than 40 years old. The wear of rails was generally in the range of 15–20 per cent and goes upto a maximum of 26 per cent at some locations which is far beyond the permissible limit. The most vulnerable section is from Gauhati to Furkating on which the number of rail fractures has also gone up from an average of 2 per year during the years 1969 to 1972 to 39 during 1978 and 137 during 1979 (upto 22-10-1979). Besides, 50 per cent of the rails were found defective on ultrasonic testing because of which speed restriction has been imposed on a length of 227 kilometres out of 330 kilometres of metre gauge main line section from Agthori to Furkating. We consider this state of affairs far from satisfactory even from safety standards and would strongly incommend that track renewals on these and other similarly 'distressed' sections should be taken up on an urgent basis and completed within the shortest possible time.

217. *Renewals on account of running of heavy axle locomotives.*—There are a large number of branch lines on which locomotives with light loads only are permitted to operate. We have been informed that a large number of steam locomotives which are in the light axle load category are getting overaged, condemned and withdrawn from service and in lieu thereof heavier axle load locomotives are being increasingly deployed on the branch lines. Due to this

the track on most branch lines needs to be upgraded through secondary renewals. We were also informed that on one of the branch lines on the Northern Railway where heavier axle load locomotives were introduced without upgrading the standard of track, unsafe situation had developed. We would urge the Railway Board to draw up a time-bound programme for upgrading the track on branch lines, which should be completed prior to the introduction of heavier axle load locomotives on these lines.

218. *Speed restrictions due to unserviceable sleepers in track.*—On the basis of information furnished to us by the railways, we have examined the prevalent practices for imposition of speed restrictions due to unserviceable sleepers in track. We find that while the limits of speed have been stipulated by some railways on the basis of the extent and disposition of unserviceable sleepers in track, certain other railways are silent on the subject. We consider that quid lines should be laid down in respect of the percentage of unserviceable sleepers that can be permitted in track and the extent of speed restriction which should be imposed with progressive increase in the number of unserviceable sleepers in the track.

219. *Organisation for track renewals.*—We commend the idea mooted by the Chairman, Railway Board, during the discussions we had with the Railway Board that, a separate organisation should be set up for executing track renewal programmes on the Railways. With the higher financial outlays for track renewals which we are calling upon the Government to provide with immediate effect, we visualise the need for a sound organisation which can plan and execute track renewals on zonal railways on a much larger scale than obtaining at present. We feel that an all-India organisation under the charge of a separate General Manager, encompassing the functions of planning of renewals, procurement of permanent way materials and execution of track renewals in the field is called for. In setting up the proposed organisation, the Railways should draw upon their experience with the Railway Electrification Organisation which was established on similar lines.

220. *Supply of rails.*—Our attention was drawn to the unsatisfactory position of supply of rails which was coming in the way of speedy track renewals. We were informed that inspite of the capacity being available, there was great reluctance on the part of the steel plants to meet the Railways' full requirements. Rather, in recent years, even the commitments to meet the part requirements in rail sections 52 Kg per metre, 44.61 Kg per metre (90 lb. per yard) and 37.13 Kg per metre (75 lb per yard), had not been kept up. Supplies of rail section 29.76 Kg per metre (60 lb per yard) have failed continuously for more than 5 years, which has seriously affected the progress of track renewals on the metre gauge. Further, the steel plant, which had hitherto been supplying 29.76 Kg per metre (60 lb per yard) rails, has now stopped production thereof. To meet the urgent requirements of this rail section, the Railway Board have also gone in for imports. We do not consider this to be a real solution in the wake of rising backlog of renewals.

We have been informed that the pricing of rails, is coming in the way of adequate supplies. Steel plants do not find the prices of rails, determined by the Government, remunerative enough as compared to prices of other comparable steel materials and the tendency, therefore, has been to take up larger production of the latter. We feel that the question of pricing of rails, which is seriously affecting supplies to the Railways, must be looked into by the Government at the highest level. Conditions should be created so that the steel plants meet the Railways' increasing requirements of rails in full.

221. *Reprofiling of second-hand released rails.*—Second-hand released rails are being increasingly used in track renewals on the broad and metre gauges. It has been opined that in the interest of satisfactory running and maintenance of both track and rolling stock, it would be advisable to lay a released rails in track only after it has been reprofiled. In line with the practice followed by railways in more developed countries, we recommend that released rails should be reprofiled before being relaid in track. As a first step in this direction, 90 lb rails, released from broad gauge track, must be reprofiled before these are relaid in metre gauge track.

222. *Measurement of rail wear.*—Track renewal programmes are presently framed on the basis of condition of rails and sleepers. In this process the actual wear of rails is an important deciding factor. Therefore, collection and collation of data thereof assumes importance. The methods presently in use for determining the extent of wear of rails involve measurement of cross section of the rail and even weighing of the rail after it has been taken out of the track. These methods cannot be adopted to any great extent. We have been informed that on some railway systems in more developed countries, a system of automatic rail wear inspection is in use which enables the sampling of rail wear at intervals while the self-propelled vehicle is travelling at a speed of 30 kilometres per hour. The results come out in the form of a point-out which can be used for record also. We recommend the use of such a system on the Indian Railways.

223. *Development of special quality rails.*—We have been informed that the medium manganese quality of rails supplied by the steel plants in this country undergo rapid wear on sharp curves, in ghat and suburban sections. It would be desirable to lay wear-resistant rails at such locations. We have been informed that wear-resistant rails had to be imported due to inability of the steel plants to supply the same for some reasons. Considering that the railways will have recurring requirement of wear-resistant rails, arrangements for supply thereof by steel plants in this country need to be finalised early.

224. For the manufacture of stronger points and crossings required for high speed heavy density routes, the railways will require thick web rails. As a trial measure, some quantity of these rails are proposed to be imported by the Railway Board for fabrication into points and crossings. We would urge that development and manufacture of thick web rails should be undertaken on a priority basis.

225. *Supply of sleepers.*—In paras 259 and 260

in Part I of our Report we had gone into the question of unserviceable sleepers in track. During the course of our visits to zonal railways, permanent way engineers and inspectors have given evidence that due to poor availability of wooden sleepers for maintenance, there has been an increase in the number of unserviceable sleepers in track. We find that on large lengths of metre gauge track on the Western and Northeast Frontier Railways, speed restrictions had to be imposed on this account. One of the Senior Divisional Engineers stated that against an annual requirement of 20,000 wooden sleepers for proper maintenance of track under his charge, less than 5,000 wooden sleepers had been supplied in a period of 3 years from 1977-78 to 1979-80. Concern over inadequate supplies of wooden sleepers was voiced on other railways also. The availability of wooden sleepers is not likely to improve in future and indeed may get worse. The technology for use of concrete sleepers for broad gauge has already been developed and with some effort it should be possible to adopt it for metre gauge also. The long term remedy to the problem of unserviceable sleepers, therefore, lies in speedily developing and enlarging production capacity for concrete sleepers on both the broad and metre gauges. This will also assist in the matter of progressing track circuiting which is now possible on concrete sleepers.

226. *Procurement of permanent way materials.*—Complaints of shortage of permanent way materials, specially track fittings, were voiced to us wherever we went on the Railways. This has affected the progress of track renewal works and also maintenance of track in some areas. We were informed that this situation has existed since the takeover of procurement of permanent way fittings by the Stores Department on the Railways from the Directorate General of Supplies and Disposals in 1975 without providing necessary infrastructure for the purpose. In September 1979, the Railway Board, in consideration of the fact that the Stores Department of the railways is already overburdened with other purchase functions and is not able to devote undivided attention to the procurement of track fittings, transferred the entire procurement work relating to these items to the Civil Engineering Department. We were informed by some Chief Engineers that the new arrangement is likely to improve the position for the time being, due to extra efforts which are being put in. They, however, strongly felt that necessary organisation, which has so far not been provided in the new arrangement, will be absolutely necessary if the procurement effort is to be sustained. We feel that by not providing the necessary organisational infrastructure, the Railway Board, is repeating the mistake of 1975, which led to the present situation; we strongly recommend that necessary organisation must now be provided in the Civil Engineering Department.

227. We have been informed that in the present arrangement for procurement of permanent way materials required for programmed track renewal works, financial commitments are made only after the commencement of the fiscal year. Due to the long lead time for supply of these materials, supplies actually mature towards the end of the financial year only which results in considerable delay in the execution of

work and throw-forward from year to year. Considering the fact that track renewal is a continuous activity for which permanent way materials are required year after year, we recommend that ordering of these materials and financial commitments therefor should be ensured well in advance so that supplies are received in time to carry out the work during the fiscal year itself.

228. *Use of concrete sleepers for track circuiting works.*—In para 233 in Part I of our Report, we had referred to the use of concrete sleepers for track circuiting works. We find that in this matter not much headway has so far been made on the railways. While on one railway we were advised that concrete sleepers had been successfully used in track circuiting works, on another railway we were informed that trials were under way. There was also some resistance to the laying of concrete sleepers on platform lines due to difficulties in operation of concrete sleeper laying machine. In our view, these reservations and objections have little force. We would impress upon the railways to make full use of the available concrete sleepers for track circuiting works. It must also be ensured that concrete sleepers are laid in continuous lengths to avoid discontinuity in track structure.

229. *Ballasting of track.*—Ballasting of track was discussed in paras 246 to 248 in Part I of our Report, wherein we had stressed on the need for taking urgent steps to increase the procurement of ballast to meet fully the requirements for normal recouplement. During the course of our visits to the Railways, we have found that here are constraints both in the procurement and training out of ballast. The procurement has been affected by the steep rise in cost and the allotment of funds has not kept pace with the same. Training out of ballast is affected by the very low efficiency of ballast trains worked by old steam locomotives and also due to non-availability of adequate traffic blocks. It has been suggested to us that the efficiency of ballast trains would improve 3-4 fold with the use of diesel shunters. We strongly reiterate that, the ballasting programme on the Railways must be speeded up to meet the requirements for recouplement of ballast on the basis of accepted norms. Adequate funds for this purpose should be made available. The functioning of ballast trains should also be streamlined by providing adequate traffic blocks and suitable motive power.

230. *Disturbance of ballast in track.*—On some sections of the South Eastern Railway, miscreants, in the process of removing coal dropped on the track, from wagons on running trains, also rip up and sometimes remove stone ballast from track, thus disturbing the packing under the sleepers. This problem has assumed such serious proportions that on certain sections speed restrictions have been imposed. This is a serious law and order problem and, because of its implication on the safe running of trains, we urge the Railway Administration to take up these matters with the State Government (s) at the highest level. We have commented on this problem in Chapter XV dealing with Law and Order.

231. *Gang Strength.*—The question of gang strength was examined by us in paras 266 to 268 in Part I of our Report; we had mentioned that evolution of

a rational formula for determining the gang strength had already been considerably delayed and had urged the Railway Board to finalise this expeditiously. During the course of our visits to the railways and also in discussions with one federation of railway workers, certain new aspects have been highlighted. We found that while at the senior levels of administration there was a firm thinking that the gang strength was adequate, the staff and officers in the field represented that the strength of gauges was not in keeping with maintenance practices in vogue. We were informed that blanket cuts in the strength of gangs have been imposed in regions where neither modern methods of track maintenance nor modern track structure obtains. This has left a large number of vacancies in the gangs to the detriment of track maintenance.

In our view, the strength of gangs should be correlated to the maintenance practices in vogue and the track structure actually obtaining on that section. Arbitrary cuts in the hope of introducing modern methods of track maintenance and track structure will not be rational. We reiterate the recommendation made in Part I of our Report that finalisation of the gang strength formula should not be delayed any longer and the strength of gangs on the sections must be rationalised on the same basis within the shortest possible time.

232. *Track tolerances.*—We find that the Commissioners of Railway Safety in their enquiry reports on some serious accidents, attributable primarily to track defects, have recommended the laying down of minimum acceptable track tolerances beyond which the track should not be allowed to deteriorate even on branch and unimportant lines. We have discussed this subject with a wide cross section of staff and officers responsible for the maintenance of permanent way. We were informed that the 'service' tolerances followed at present on the main trunk routes are based on considerations of comfort and good riding quality; they felt that since 'safety' tolerances will be more liberal than these, laying down the same may encourage a complacent attitude on the part of permanent way maintenance staff and lead to a general deterioration in the track standards. In this matter the RDSO have also opined that laying down of safety tolerances cannot be viewed in isolation from the type and condition of maintenance of rolling stock. Considering the evidence before us, we feel that if 'service' tolerances are adhered to on all sections, the requirements of safety will automatically be met. We, therefore, recommend that 'service' tolerances, indicating the limits beyond which track will need attention, must be laid down for various speeds and categories of tracks including branch and unimportant lines and these must be rigorously implemented through an effective system of monitoring.

In the present conditions because of shortage and pilferage of track materials, it may often not be possible to maintain the 'service' tolerances on certain sections. The question would then arise as to how much departure from the 'service' tolerances will be permissible without safety being jeopardised, we feel that this is a point which needs to be examined by the RDSO.

233. *Monitoring of track* :—The use of track recording cars and Hallade track recorders for monitoring the parameters of track was gone into in detail in paras 290, 291, and 293 to 295 in Part I of our Report. We had referred to the good work done with track recording cars in the field of monitoring of track and the need to extend its scope to increasing lengths of track. We had also taken a view that no useful purpose would be served by equipping each division of the Railways with a Hallade track recorder. During the course of our discussions with permanent way engineers and with the RDSO the advantages using a portable accelerometer over the Hallade track recorder for monitoring the riding quality of track have been highlighted. In view of the advantages of this equipment and the ease with which it can be handled, without the need for arranging any special runs on the concerned sections, we feel its use must be extended to give the permanent way engineers and staff the means of quantifying and checking the quality of running of track free of human subjectivity. We recommend that the zonal railways must be equipped with adequate number of portable accelerometers to supplement monitoring by the track recording cars.

234. *Track geometry rating*.—At present, on the main trunk routes of the Indian Railways, the individual parameters of track are recorded and the improvement or deterioration is reckoned on the basis of comparison with the previous recording. We find that on the Northern Railway, a system for arriving at the track geometry rating has been developed which gives a ready index to quantify the condition of track and affording a ready tool to the management for measuring difference in work quality between gangs, measuring track improvement/deterioration with time. Such a rating will also enable a comparison of the efficacy of the different track maintenance methods on a long-term basis. We feel that track geometry rating has a useful role to play in assessing the state of track maintenance and RDSO should lay down guidelines therefor for the benefit of zonal railways.

235. *Speed restrictions on new track*.—Speed restrictions are imposed during the course of execution of certain engineering works. It was stated by some drivers that from the jerks they experience while moving on newly laid track they have a feeling that it was sometimes not fit for the speed limit stipulated. Our discussions with permanent way staff revealed that there are no guidelines for determining the permissible speed at the site of work on the basis of track parameters actually obtaining. The Railway Board have laid down that normal speed may be restored after the track irregularities are brought within the tolerances, generally prevailing on the section of track with normal speed. We feel that such a blanket provision will not be of much assistance to the field staff. We recommend that guidelines in respect of tolerances for gauge, alignment, sleeper spacing, cross-levels, unevenness and condition of sleeper packing etc. should be laid down for the guidance of field staff for imposing and progressively raising speed limits at engineering works.

236. *Imposition of speed restrictions in connection with engineering works*.—On some railways the existing practice requires the engineering official to serve

caution message at midnight for the imposition of speed restriction in connection with engineering works. We were further informed that, in this arrangement also, there is no certainty if the caution message has been accepted for imposition of speed restriction resulting in considerable disruption of work. From our review of accidents we find that, derailments due to non-protection of engineering works, failure to issue caution order for engineering works or inadequate protection at site increased from 22 during the 5-year period 1963-64 to 1967-68 to 124 during the 10-year period 1968-69 to 1977-78. We feel that the causes leading to the aforesaid increase in derailments are entirely within the control of the Railways and everything possible must be done to eliminate the same. We suggest that, within the overall limitation of time provided for engineering works, speed restrictions for engineering works should be planned in advance and become operative from a pre-determined hour.

237. *Display of speed restriction boards*.—Drivers have drawn our attention to the non-display of speed restriction boards as required under the rules. We have also been informed that the distances at which such boards are displayed have not been revised in accordance with the maximum braking distance of trains operating on the section. For ensuring the safety of trains and permanent way staff, it is necessary that engineering restriction boards are displayed at the maximum braking distance of trains operating on the section. It should also be ensured that the speed restriction boards are displayed properly and those which require to be lit at night are done so, effectively.

238. Our attention has also been drawn to the use of electrically lit 'speed indicator lamps' which have taken the place of conventional speed restriction boards on railway systems in more developed countries. We would recommend the development and use of such a 'lamp' by the Indian Railways.

239. In Para 312 in Chapter VIII on Signalling and Interlocking, we have drawn attention to the system in use on the German Federal Railways wherein the Automatic Warning and Stop (AWS) equipment on the track is used for enforcement of speed restrictions. Under this arrangement, if the driver fails to heed the visual and audible warning in the cab, the brakes are applied automatically. We recommend the use of AWS system on track for protection of speed restrictions on sections where this system is in operation.

240. *Track recording-cum-research car*.—The Indian Railways had acquired a track recording-cum-research car in 1976 at a cost of Rs. 1 crore. During the visit of the Committee to RDSO they had the opportunity to see this research car and discuss its potentialities in the field of track-vehicle interaction and vehicle dynamics with senior officers of the RDSO. We understand that due to certain reasons, it has so far not been possible to make extensive use of this research car and during a period of 4 years, it has been used for about 25 per cent of the available time only and that too mostly for testing and not much for research. We were informed that a number of research projects, to be undertaken

with the help of this car, have been drawn up. In view of the potentialities of the track recording-cum-research car, we would urge the Railway Board and the RDSO to plan for its intensive use. The projects assigned to this research car should be taken up with a sense of priority so that the benefits may flow to the field.

241. *Maintenance of yards.*—During our visits to the zonal railways we have been apprised of the poor conditions of maintenance in some major yards due to inadequate yard drainage and absence of regular arrangements for cleaning. Staff and officers from the carriage and wagon side and yard staff stated that falling materials from wagons cause obstruction in free movement for examination and repair of wagons and for yard operations. On the other hand, from the permanent way side we were informed that yard lines are not made available for maintenance resulting in deterioration in their condition. We would stress on the need for proper cleaning and maintenance of yards so that the interspaces between tracks are kept clear and free from obstruction. Drainage should also be improved. Yard lines in major yards should be made available for track maintenance on the basis of a pre-planned schedule.

242. *Welding of rails in yards.*—We find that in some of the major yards considerable reduction in the number of derailments has been achieved through the welding of rails. We were informed that this also prevents entanglement of the skids at rail joints. We consider that welding of rails in major yards will not only reduce derailments but also improve the maintenance and enhance the life of rails. We recommend accordingly.

243. *Ultrasonic rail flaw detectors.*—Incidence of rail failures on the Indian Railways was examined by us in paras 278 and 279 in part I of our Report. The availability of ultrasonic rail flaw detectors for carrying out the work of testing was discussed in paras 273 to 277 *ibid.* On the basis of further information made available to us some railways, we find that during the last 5 years the number of rails requiring removal from track as a result of visual examination or ultrasonic testing of rails has been increasing from year to year as the following figures will show :—

Year	Number of rails requiring removal from track*
1974-75	5,297
1975-76	10,934
1976-77	9,333
1977-78	12,516
1978-79	15,599

* Information is for the Eastern, Northern, South Central, South Eastern and Western Railways only. This pertains to the sections where such testing has been done.

From our review of accidents in Chapter II, we also find that both on the broad and metre gauges the number of derailments due to rail fractures has gone up from 19 during the period 1968-69 to 1972-73 to 34

during 1973-74 to 1977-78. The increase was mainly in mid-section derailments. In this background we feel that more determined and urgent steps are called for to extend and intensify ultrasonic testing of rails in running lines and also for timely removal of rails found defective.

244. During the course of our visits to the railways we found shortage of ultrasonic rail flaw detectors on some divisions. In some cases the equipment is shared between two or even more divisions. On one division, ultrasonic testing equipment had not been returned for almost a year with consequent arrears in the testing programme. We also find that arrangements for maintenance and expeditious repairs of ultrasonic rail flaw detectors are lacking on some railways as a result of which equipment sent for repairs is returned after considerable delay. We would strongly recommend that adequate number of rail flaw detectors must be provided on each division of the zonal railways to enable regular testing of rails on running lines.

245. We consider that schedules for testing of rails with ultrasonic rail flaw detectors must be laid down for all types of track on the basis of importance of the line, traffic carried, speed of trains, age of rails and trend of rail fractures, etc. Such schedule could be revised on the basis of the experience gained during the testing process. The railways must also develop adequate facilities for repair and maintenance and periodic calibration of ultrasonic rail flaw detectors.

246. *Arrangements for recording on ultrasonic rail flaw detectors.*—The inference drawn during testing by ultrasonic rail flaw detectors depend considerably on the ability of the individual operators to identify and interpret signals received on the oscilloscope screen. We have been told that continuous scanning by the operator is a very difficult and fatiguing task. Under the circumstances, he is likely to misinterpret signals received on the screen during continuous movement of the instrument on rails. It may, perhaps, be quite dangerous if, in such a state, a highly developed flaw is either not picked up or reckoned as non-dangerous by the operator. In this background we recommend the provision of recording arrangement on ultrasonic rail flaw detectors which will be available for scrutiny after the recording session is over. This will, to a great extent, eliminate the influence of human subjectivity in the evaluation of results of testing.

247. *Ultrasonic rail flaw inspection car.*—The progress of testing with ultrasonic rail flaw detectors is necessarily slow, being linked to walking pace of the operator and his ability to pick up signals from the screen of the instrument. We were informed that the target coverage with the help of even two operators on each equipment is about 40 kilometres per month. In the background of increase in the number of defective rails on sections where ultrasonic testing has been done so far, and with many more perhaps remaining undetected, on sections where testing of rails by ultrasonic means has so far not been commenced, we feel that there is need for adopting faster means of testing of rails in track. In this regard we refer to the suggestion given by the Wanchoo Committee in para

269 in Part II of their Report, for taking in hand research and development of a self-propelled ultrasonic rail inspection car in the hope of providing one car on each zonal railway before long. We are constrained to state that no progress has been made in this regard so far. The self-propelled ultrasonic rail inspection car has proved itself on the German, French and British railways systems. By way of comparison we wish to point out that as against about 10,000 kilometres of track which was tested on all the zonal railways with 42 ultrasonic rail flaw detectors during the year 1975-76, on the French National Railways about 14,000 kilometres of track were tested annually in the early 1970's with the help of two self-propelled ultrasonic rail inspection cars. We would strongly recommend that the railways should go in for ultrasonic rail inspection cars at the earliest possible so as to quicken the pace of testing of rails in running track.

248. *Studies pertaining to propagation of defects in rails.*—As a follow-up of the testing of rails with ultra-sonic rail flaw detectors we find that at present no suitable guideline is available with the railways as to when a rail is to be removed from track on the basis of the defect detected. Rails which are found to be defective as a result of ultrasonic testing are basically being categorised as those requiring immediate removal from track and those which are to be kept under further observation. We have been informed that due to lack of sufficient data, it is not possible, at this stage, to give a precise limit of defect necessitating removal of rail or allowing it to continue in track. The rate at which a particular type of defect may develop, on the basis of which retesting of rail can be arranged or replacement undertaken, is also not known. We consider it necessary that RDSO carry out studies on the relationship between defects or flaws in rails and their propagation under actual traffic conditions.

249. *Analysis of rail failures.*—The RDSO carry out numerical analysis of rail fractures, every year, on the basis of the reports received from zonal railways. The results of these analyses from 1969-70 to 1977-78 showing the different types of rail fractures, are depicted in CHART VIII. We find that since 1975-76, weld failures have come to be the main cause. The proportion of weld failures to the total number of reported rail failures on the Railways, which ranged from 9 to 14.5 per cent during the period 1969-70 to 1975-76 shot up to 30.5 and 52.2 per cent during 1976-77 and 1977-78 respectively. Of the reported weld failures over 75 per cent were those of thermit welds and over 50 per cent of these had failed within the first three years of welding.

250. The RDSO has informed us that in the thermit welding process, there are some inherent defects due to the involvement of human element for judging the temperature of rail surfaces which are heated and which cannot be free of error due to colour deception and other factors. We feel that everything possible must be done to reduce if not eliminate altogether failures of this type. We recommend that in view of the inherent weaknesses in the thermit welding pro-

cess, flash butt welding of rails should be done to the maximum extent possible and all new thermit welded joints must be ultrasonically tested.

251. *Ultrasonic testing of new rails.*—We also find from the numerical analyses that a sizeable proportion of rail failures on the Indian Railways are attributable to manufacturing defects in the rails. The proportion of such failures to the total number of reported rail failures was 21 per cent during 1977-78. Rail failures of the above type, can only be reduced by exercising greater quality control and check at the manufacturer's works. In conformity with the practices obtaining in most foreign countries, some arrangement should be made whereby every rail put in track is subject to ultrasonic testing in advance.

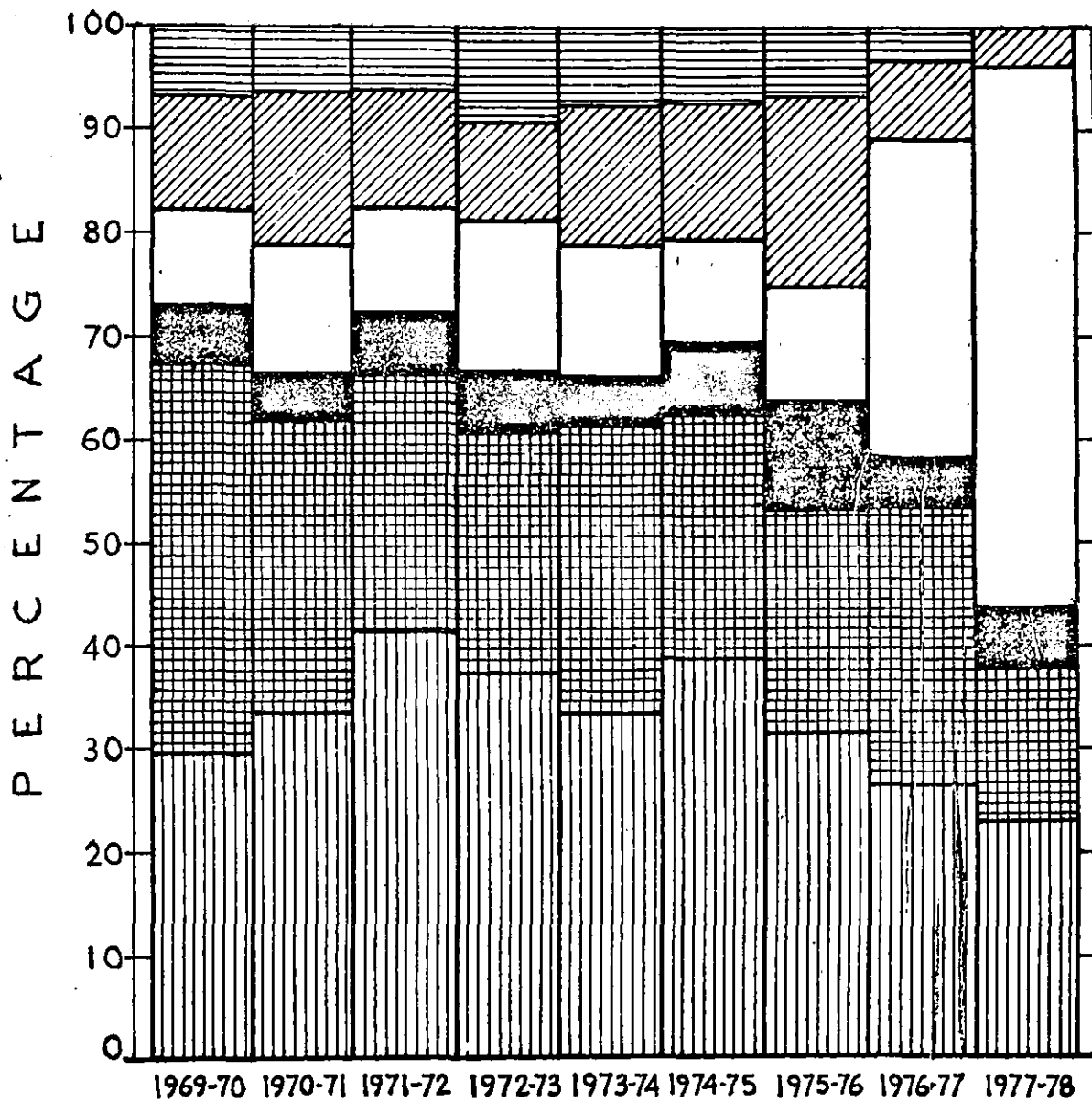
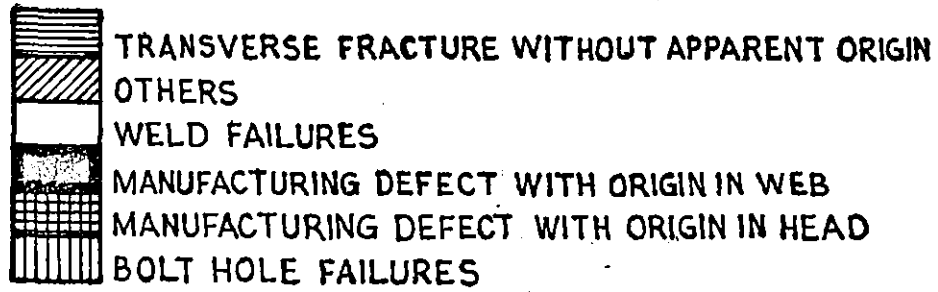
252. *Reporting of rail failures.*—We find that the reporting of rail failures as required by the RDSO is not being regularly done by zonal railways. While the RDSO has been impressing upon the zonal railways the need for submitting all reports of rail failures including those detected with ultrasonic rail flaw detectors. We find that in certain years some zonal railways had not submitted even a single report of such failure. The Railway Board should ensure that the required information on rail failures is furnished by all zonal railways to the RDSO.

We also note that there has been considerable delay in the publication of numerical analyses by the RDSO. Analyses pertaining to the years 1975-76 and later had not been circulated to the zonal railways till the end of 1979. The Railway Board should ensure that information required by the RDSO for numerical analysis of rail failures, is furnished by all zonal railways, timely. The results of the numerical analysis should be published and circulated to zonal railways with the least delay.

253. *Effect of flat tyres on track.*—Our attention has been drawn to the deleterious effect on rails in track by flat tyres, specially of loaded BOX wagons. We have been informed that these are potential causes of rail/weld fractures specially during winter months; the stresses produced by the flat tyres, which are presently permitted in accordance with the rules for maintenance of rolling stock, exceed the endurance limits of thermit welded joints and also the yield point in normal rail steel. With the laying of long welded rails in track, the stress pattern in rails has undergone considerable change from what it was in the case of single jointed rails. We feel there is a case for review of the permissible limit of flat tyre on rolling stock which we urge the RDSO to undertake. Effective means also need to be developed for detecting flat tyres, which should, under no circumstances, be permitted on running trains.

254. *Facilities for Inspection of bridges.*—With the increase in the number of distressed bridges on the Indian Railways, as indicated in Para 263 in Part I of our Report, inspection of the bridges and the follow-up action assumes great importance. We find that in the field of bridge inspection, specially in the case of high bridges with arches which are otherwise not easily approachable, inspection presents considerable

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difficulties. Railway systems in more developed countries make use of self-propelled access platforms which can be extended and re-traced from the unit which moves on the track so as to give ready access for inspection and maintenance of bridges. We feel that provision of self-propelled access platforms will greatly facilitate maintenance of bridges and over-head structures and must be progressively introduced.

255. *Theft of permanent way fittings from track.*—Widespread theft of permanent way fittings from track in certain sections of the Eastern and South Eastern Railways passing through the states of Bihar and West Bengal has been reported to us. Steel keys, and cotters are stolen in very large numbers, fishbolts are stolen even if the ends are burred, tie bars are cut from track and taken away. On this account it has even become necessary to impose speed restrictions over the affected portions of track. We would, urge the Railway Board and the railway administrations to take up this issue at the highest level with the State Government(s) so that safety in train operation is not jeopardised. We have also commented on this aspect in Chapter XV—Law and Order.

256. Besides organised theft by criminals our attention was also drawn to the stealing of two-way keys, pandrol clips and such other fittings which either fall out or can be removed from the track with ease by passerby and shepherds, who sell the same to the village blacksmiths for fabrication into agricultural implements. In this context, we feel that such track fittings should be developed, as to make their pilferage difficult. We suggest accordingly to the RDSO.

257. *Telephones for permanent way inspectors.*—We find that some of the permanent way inspectors responsible for the maintenance of open line tracks are still to be provided with telephones at their residences. We feel that for a permanent way inspector to func-

tion effectively and to be available in an emergency, a telephone at his residence is a must. We would urge the zonal railways to complete the provision of this basic necessity in the shortest possible time.

258. *Maintenance of platform lines.*—During the course of our visits to zonal railways we have seen that, even at some important junction stations, platform lines have not been provided with washable aprons. The track was water-logged resulting in mud-pumping under the sleepers with consequent deterioration of track parameters and creation of unsafe conditions. Some of the engineering officials who appeared before us bitterly complained about problems of maintaining tracks on platform lines at stations. It was stated that due to intensive occupation of platform lines, time for maintenance of tracks was not made available. The problem was aggravated due to soiling of tracks by droppings of passengers wastes from trains and sweepings from the platforms. This also creates problems in the maintenance of coaching rakes on platform lines. To remedy this situation, we recommend the following :—

- (i) At important stations where trains stop on platform lines, washable aprons should be provided. The zonal railways should take up provision of these on a time-bound programme.
- (ii) Platform occupation should be planned in such a manner so as to leave adequate time for the maintenance of tracks on platform lines.
- (iii) The subject of droppings of passenger wastes from trains needs serious thought. With increase in the volume of passengers handled this problem will aggravate and there is need to devise improved arrangements whereby platform lines do not give the impression of open air latrines.

CHAPTER VII

LEVEL CROSSINGS

259. *Trends of accidents at level crossings.*—The trend of accidents at level crossings during the 10-year period from 1968-69 to 1977-78 has been reviewed in Chapter II. We find that there has been a steady decline in the number of accidents at both manned and unmanned level crossings. We have also discussed the main causes of accidents at level crossings, involvement of different types of road vehicles in such accidents, and the categories of railway staff held responsible.

260. *Manning/upgradation of level crossings.*—In paras 306 to 310 in Part I of our Report we had stressed the need for laying down norms for manning unmanned level crossings and upgrading manned level crossings. We find that, even after the need to man an unmanned level crossing or upgrade a manned level crossing is established, the actual manning/upgradation of the same takes a very long time due to delays in getting the work sanctioned and in obtaining the concurrence of the State Governments. We also find that, even in cases of unmanned level crossings which have been categorised as 'accident-prone' on the basis of the norms laid down by the Railway Board and which are required to be manned entirely at the cost of the Railways, the proposals are remitted to the Railway Board for approval which process takes time. In view of the heavy toll of life and limb which accidents at level crossings continue to take, we recommend that:—

(i) manning of accident-prone unmanned level crossings, on the basis of norms laid down by the Railway Board, must be left to zonal railways themselves who should complete this work within the shortest possible time, and

(ii) once the need for manning an unmanned level crossing/upgrading a manned level crossing on the basis of existing norms is established, the work should be processed and completed expeditiously by zonal railways; adjustments of cost etc. could in our opinion, be settled with the State Governments later.

261. *Census at level crossings.*—During the course of our visits to zonal railways, it came to our notice that at some of the level crossing gates where rail and road traffic has increased substantially, conduct of census has been delayed seriously. As per extent instructions, zonal railways are required to conduct periodic census of traffic at such unmanned level crossings and census-cum-job analysis at each manned level crossing once in 5 years. The need for regular conduct of census at level crossings and follow-up action on the results thereof cannot be overemphasized.

262. *Manning of level crossings by one gateman.*—Manning of level crossing gates was reviewed by us

in paras 311 to 315 in Part I of our Report. We had expressed unhappiness with certain aspects like introduction of split-shift rosters for single gateman to open the gates during specified night hours. On the basis of further information received by us from zonal railways, we find that there were 353 level crossings situated outside station limits, where the incidence of road traffic was not enough to justify an additional gateman for the night and at such level crossings split-shift rosters have been introduced. In our opinion, manning of level crossings by one gateman with split-shift roster does not afford a satisfactory and safe arrangement. We feel that at level crossings, where opening of the gates becomes necessary at night also, two gatemen must be provided on 12-hour shift duty. Alternatively, level crossings with light road traffic at night should be considered for being kept closed during that period.

263. *Railway Safety Works Fund.*—In paras 316 to 321 in Part I of our Report we had commented on the poor utilisation of Railway Safety Works Fund in some of the States. Our discussions with some State Govts revealed considerable awareness of this aspect on their part; not only had these States spent the entire allocation but had to slow down planning and execution of additional works due to lack of funds. Thus, while safety works in some States are being retarded due to non-availability of funds, greater accumulation is taking place due to its poor utilisation in most other States. As indicated in para 319 in Part I of our Report, the unspent amount at the credit of the Railway Safety Works Fund totalled Rs. 14 crores as on 31-3-1979. In view of the foregoing, we recommend that it would be in the overall interest of safety in train operation as well as of the public if the States are encouraged to utilise the fund to the extent of actual requirements, adjustments vis-a-vis actual share of each State on the basis of extent rules of apportionment being done on a long-term basis. We also consider that the Railways must be free to use accumulated funds for manning/upgrading of level crossings and for provision of road over/under bridges. We realise that such an arrangement may have political implications. However, in view of the accidents which continue to take place at level crossings, endangering public life, we consider that such an arrangement should be worked out at the highest level in the overall interest of safety.

264. *Telephone communication at level crossings.*—In our review of accidents in Chapter II, we have indicated that the rate of accidents at manned level crossings provided with telephones was much less than that at those without telephones. In the context of reducing the number of accidents at level crossings, the importance of providing telephone communication at manned level crossings is, therefore, evident. We

had discussed the progress made in the provision of telephone communication between the gatemen at a level crossing and the adjoining station in Paras 322-326 in Part I of our Report. We strongly reiterate that the provision of telephone communication at all mid-section manned level crossings must be completed within the shortest possible time.

265. *Provision of undulations and bumps on approaches to level crossings.*—Our analysis of accidents at level crossings has shown that 21.2 per cent of the accidents at manned level crossings during the period 1968-69 to 1977-78 occurred due to road vehicles crashing into the lifting barriers or swing type gates or breaking the lock and opening it. Further, out of 814 accidents at unmanned level crossings, 811 occurred due to the fault of road users. On the North Eastern Railway we were informed that the incidence of road vehicles dashing against the lifting barriers and sometimes breaking both the barriers was on the increase. During the year 1979 alone, there were 33 such cases on the Varanasi Division of the North Eastern Railway. We are of the considered opinion that some means need to be provided at both manned and unmanned level crossings to act as a restraint on the drivers against speeding in the vicinity of level crossings. We have gone into this question in paras 338-341 in Part I of our Report wherein we have mentioned that the reaction of some of the State Governments to providing speed breakers at level crossings had not been entirely favourable, perhaps in consideration of the damage which may occur to the road vehicles moving with speed on such roads. We find that provision of speed breakers/bumps or rumble strips in the vicinity of city areas, collieries etc. is an accepted policy of the local authorities and the State Governments. During our tours we found that these measures had been adopted even on national highways so as to arrest, effectively, speeding by road vehicles. In view of the danger to public and safety of train operation, we feel that such measures must also be provided in the vicinity of all level crossings. We strongly recommend that speed breakers/bumps or rumble strips should be provided on approaches to all level crossings. The drivers of approaching road vehicles will need to be pre-warned adequately of their existence.

266. *Interlocking of level crossing gates with signals.*—In paras 342 to 344 in Part I of our Report we had reviewed the implementation of the recommendation made by the Wanchoo Committee for interlocking gates with signals. We have been informed that due to the deteriorating law and order position the gatemen at level crossings which are not protected by gate signals are finding it difficult to comply with the stipulation that the gates be normally kept closed to road traffic. For increasing the level of safety, we suggest that all Special, A and B class manned level crossings in mid-section should be protected by gate signals. In doing so, all such level crossings in CTC and Automatic Signalling territories should be given priority.

267. *Warning devices at level crossings.*—In the review of accidents at level crossings in Chapter II,

we found that 52.5 per cent of the accidents at manned level crossings were caused due to open or improperly closed or secured gates and another 21.2 per cent because of road vehicles crashing into lifting barriers or swing type gates at level crossings. We feel that for guarding against some of these accidents, devices in the nature of loud warning bells/hooters which are actuated by approaching trains would be necessary. Such devices would serve as an indication to the gatemen that a train is approaching and also give warning to the approaching road vehicles. As a first step we would recommend the provision of such devices at all manned level crossings in mid-section; priority should be given to level crossings in areas where the incidence of accidents of the aforesaid type has been high.

268. As indicated in para 265, more than 99 per cent of the accidents at unmanned level crossings during the period 1968-69 to 1977-78 occurred due to the fault of road users. In many of these which involved heavy casualties, we found that the drivers of road vehicles had been taken unawares by the approaching trains. We consider that the provision of warning devices at unmanned level crossings would warn the drivers of road vehicles and serve as an effective means of bringing down the number of such accidents.

269. We appreciate the enormity of the problem in so providing warning devices at such a large number of manned and unmanned level crossings spread all over the country. We suggest that zonal railways adopt a selective approach while implementing these measures, taking up first, level crossings in areas where accidents have been high or where road traffic is high and/or is increasing. It has also been suggested to us that providing of overhead wires for such warning devices, as an alternative to underground cables, may prove economical. In our view RDSO must take upon itself the problem of developing a warning device which will function satisfactorily in the conditions obtaining on the Railways.

270. *Educating public about the dangers at level crossings.*—We find that in the States of Punjab, Haryana and Uttar Pradesh, the involvement of tractors in accidents at level crossings has greatly increased. Staff and officers monitoring safety of train operations informed us that the increase was due to large scale unauthorised driving of tractors. Zonal Railways passing through these States must take up with the State Governments the question of tractor drivers observing safety rules in the overall interest of safety of public and of train operations.

271. In the southern and central parts of the country we find that the involvement of bullock carts in accidents at level crossings is high. Such accidents mainly occur in rural areas. We feel that mass media can play a very important role in creating a sense of awareness amongst the rural population about the hazards at level crossings. We strongly recommend that the Railways, should, in consultation with the State Governments, undertake a continuous programme of educating the public in rural areas of the

dangers at level crossings and their responsibilities in this regard, through mass media like radio, television, newspapers and cinema.

272. *Policy in regard to unmanned level crossings*—Of all types of accidents, those at level crossings have caused the highest fatalities. In para 20 in Part I of our Report, we had indicated that during the period 1968-69 to 1977-78 accidents at level crossings were alone responsible for 45 per cent of the total fatalities although they formed only 13 per cent of all important accidents. On certain sections, level crossings, manned and unmanned, are located in very close proximity—at times three or even more level crossings are within a kilometre or so. In view of the dangers inherent at level crossings, the Railways in consultation with the State Governments may like to examine the possibility of closing down some of them.

273. Our review of accidents also shows that for the last three 5-year periods the incidence of accidents was consistently higher at unmanned level crossings than at manned level crossings. New unmanned level crossings should, therefore, normally not be permitted, and, if they have to be provided, the decision should be taken only at a high level.

274. *Posting of literate gatemen*—We find that at some of the mid-section level crossings under the control of the engineering department, where telephone communications have been provided with the adjacent stations, gatemen posted are illiterate and cannot exchange private numbers with the station masters. This is an unsafe arrangement and we recommend that only literate gatemen should be posted at such level crossings.

275. *Working instructions at level crossings*.—We find that instructions for the working of level crossings have not been provided at a large number of level crossing gates, specially those which fall under the control of the engineering department. We would urge the Railways to ensure that working instructions are available at each level crossing and an assurance is taken from each gateman about his having understood these.

276. *Automatic half-barriers at level crossings*.—The question of provision of automatic half-barriers at level crossings in implementation of the recommendation made by the Wanchoo Committee was discussed in paras 333 to 337 in Part I of our Report. We had mentioned therein the considerable difference of opinion and the reluctance on the part of zonal always to undertake trials with automatic half barriers at level crossings even though one such trial

had met with success and had been favoured by the public and the State Government. The police authorities have also not favoured such trials in metropolitan areas. In the discussions we had on zonal railways we found that the idea of providing automatic half-barriers was generally appreciated and acceptable, but there was difference of opinion regarding the actual conduct of the trials. We feel that having met with good results in the first trial installations on the Northern Railway, it is necessary to gather more data on this subject and in this context we recommend more extensive trials on non-suburban sections, away from metropolitan cities.

277. *Provision of road-over bridges*—During the course of our discussions with the representatives of State Governments, certain suggestions were given in the matter of providing road-over/under bridges in replacement of level crossings, which we have serialised below :—

- (i) The apportionment of the cost of a road over-bridge between the Railways and the State Government is done on the basis of 2-lane bridge only. It was stated that in metropolitan cities where the road traffic is high, the requirement is normally of a 4-lane bridge or even more. The State Government suggested that the apportionment of cost of road-over/under bridges should be done on the basis of the actual requirement of the width of the road which should be left for the State Government/Local Authorities to decide.
- (ii) According to the present norms for sharing the cost of the road-over bridges between the Railways and the State Government, the cost of land is required to be borne entirely by the State Government. It was suggested that the total cost of the road-over bridge including the cost of land, should be shared equally by the Railways and the State Government.
- (iii) It was stated that matching allocations for works for which the State Government has made provisions is at times not made in the Railway Budget which hampers the progress of works. They suggested that the Railways should take into consideration allocations made by the State Governments while making provisions in the Railway Budget.

We are not in a position to comment on these matters of policy and rules of business and would suggest that Government may look into these for such action as it may deem fit.

SIGNALLING AND INTERLOCKING

278. Safety in operation of trains very largely depends upon a very reliable signalling system. Modern technology has helped the signalling systems to make substantial advances both in India and elsewhere in the world. It is important that the systems now existing are operated at the maximum level of effectiveness and continuously updated to keep in step with technological advances. Since Indian Railways have already introduced a number of super fast trains, and it is contemplated to further step up the maximum speeds, the critical importance of signalling systems needs no emphasis.

279. *Provision of rudimentary interlocking at non-interlocked stations* :—The progress made in the provision of rudimentary interlocking at non-interlocked stations, in implementation of the recommendation made by the Wanchoo Committee, was discussed by us in paras 407 to 411 in Part I of our Report. On the strength of the discussions which we had during the course of our visits to zonal railways, we are convinced that for ensuring minimum basic safety as well as to guard against derailments at stations, at least rudimentary interlocking must be provided. We have already recommended in para 411 in Part I of our Report that rudimentary interlocking should be provided at all stations on the broad and metre gauges. We have now come to the conclusion that such rudimentary interlocking needs to be provided at all stations on the narrow gauge also and we recommend accordingly.

280. *Improvements in the standard of interlocking at stations*.—We find that, on some metre gauge sections of the Western Railway where the density of train services per day has increased to over 24 trains both ways on single line and on which important express trains with booked speed of 50 kilometres per hour have also been introduced, stations continue to be provided with only rudimentary interlocking. In the interest of greater safety, we consider that the interlocking on such sections must be raised to Standard I. We also consider that guidelines should be laid down for upgrading the standards of interlocking at stations on the basis of density and speed of traffic.

281. *Items requiring issue of disconnection notices*:—We have been given to understand that, on most railways, the signalling and interlocking gears, for the maintenance of which a disconnection notice should be issued, have not been identified. We recommend that, for the guidance of maintenance and operating staff, maintenance work at signalling installations should be analysed and split into its various component units, separating items of routine maintenance like cleaning, oiling, greasing and obstruction tests, not requiring disconnection, from items of adjustments of signal and points fittings etc. requiring disconnection.

282. We further consider that in view of the complexities of sophisticated electrical signalling and its inherent vulnerability to unauthorised tampering, only electrical signal maintainers in the highest grade (Grade I) should be permitted to sign the reconnection notice in Form S&T/DN prescribed in the Indian Railways Signal Engineering Manual, while the disconnection notice may be signed, by an electrical signal maintainer in a lower grade.

283. *Time for maintenance of signalling gears*:—As indicated in para 397 in Part I of our Report, the Railway Board did not accept the recommendation of the Wanchoo Committee for making provision for fixed time blocks in the time tables. From the evidence given before us, during the course of our visits to the Railways, we find that disconnection notices for maintenance of signalling equipment are frequently not accepted or are accepted very late and for much shorter periods by the operating staff on the plea of heavy intensity of train services and the possibility of detention to trains. The problem is becoming more acute day by day due to the increase in the density of traffic and the provision of more and more sophisticated signalling equipment which need intensive maintenance. This is also giving rise to adoption of short-cut methods by staff for rectifying failures. The Railway Board had earlier advised that instructions already exist to the effect that disconnection notices issued for maintenance of signalling gear should be accepted by the traffic staff. We feel constrained to say that the position remains unsatisfactory and has deteriorated on some sections with the increase in traffic making preventive maintenance all the more difficult. It is imperative that all problems connected with the maintenance of signalling equipment should be thoroughly examined and a practicable and realistic solution is found so that the availability of adequate time for maintenance of signalling equipment is ensured. We reiterate the recommendation made by the Wanchoo Committee that necessary time blocks should be provided in the time table for the maintenance of signalling and interlocking equipment, specially on busy sections. Such time blocks can be used for integrated maintenance programmes of track and overhead equipment also.

284. *Recovery time on signalling account*:—We were informed that one of the main reasons for increasing resort to shortcut methods by signalling maintenance staff is the fear of detentions and the consequent punishment. In fact there have been some serious accidents on this account due to the anxiety of staff to save detentions to trains. We feel that, the operation of trains, as planned at present, does not cater to the requirements of failures which may occur any time in a signalling system as in any other engineering system. We recommend, that, some minimum recovery time must be provided in

the time tables, atleast on the busy sections where important trains run, which will cover detentions to trains on account of signal failures.

285. *Testing of electrical signalling equipment* :—At present the emphasis is only on periodical testing of locking between levers in the lever frames and overhauling of lever frames and the electrical signalling portion including the circuitry which also provides interlocking between signals and points does not receive such attention. Even cable-testing is not being done according to schedule on the plea that it is time consuming and affects the running of trains severely, if done strictly according to rules and requirements of safety. With the growing tendency to adopt shortcut methods, which have been commented upon elsewhere also, and the ease with which electrical circuitry can be tampered with, we consider it necessary that all electrical signaling equipment and circuitry are inspected and tested according to stipulated schedules. Adequate time must also be provided on the sections to enable the signaling staff to effectively carry out inspection and testing of such equipment.

286. *Maintenance of route relay installations and other sophisticated equipment*.—There is no gain-saying the fact that the maintenance of route relay installations, automatic block signalling, tokenless block and other sophisticated signalling equipment requires a higher standard of expertise than is needed for maintenance of conventional signaling equipment. We, therefore, consider that only inspectors and maintainers who have undergone special training in these subjects in the Indian Railways. Institute of Signal Engineering & Telecommunication, Secunderabad, should be entrusted with the maintenance of such equipment.

287. We would suggest that, a system of issuing competency certificates to staff, on the successful completion of their training in the relevant specialised field, should be introduced. While posting staff in the field, specially on modern signalling installations, this should be taken into account.

288. *Electric lighting of distance signals* :—In para 356 in Part I of our Report, we had referred to the instructions issued by the Railway Board to the zonal railways for completing electric lighting of semaphore distant signals by 30-9-1979. During the course of our visits, we found that while on some divisions a few distant signals have been provided with electric lighting, on most other divisions there has been no progress at all; we were informed that indents had been placed for the requirement of materials, on receipt of which the job would be undertaken. On the other hand, drivers who tendered evidence before us complained bitterly about the non-lighting of distant signals. Both the progress and the follow up action in implementing this important safety measure has been extremely tardy. We feel that the Railway Board having taken a decision should have pursued it effectively. We stress that this work should now be completed without further delay.

289. *Night visibility of Semaphore signals*:—It has been repeatedly emphasised in the evidence tendered before us that, many out-of signal lamps are not lighted during night time and where lit, these get extinguished after some time due to a variety of reasons and generally offer poor visibility to the driver on account of non-standard wicks, non-cleaning of roundels and lenses, poor quality of kerosene oil and bad focussing. We, therefore, consider that effective steps should be taken by all the concerned departments through more frequent inspections at different levels to improve the visibility of signals at night. As a long-term measure, we reiterate the recommendation made in para 357 in Part I of our Report and stress that the work of electric lighting of semaphore signals should be progressed at a faster pace.

290. *Visibility of colour light signals* :—We have received complaints during our tours that the visibility of colour light signals is often poor during day time, particularly on east-west alignments due to glare of the sun or due to low-voltage or voltage fluctuations. It has also been suggested to us that visibility in such cases can be improved by use of :—

- (i) automatic voltage stabilisers at different locations of signals,
- (ii) higher wattage bulbs of 33 watts instead of 25 watts.
- (iii) improved design of double lenses, production of which has recently commenced, and
- (iv) power supply from OHE instead of local supply.

We recommend adoption of these measures uniformly on all such colour light signalled sections.

291. *Signal sighting inspections*:—It was represented to us that the footplate inspections of signals by signal inspectors individually or jointly with loco inspectors and traffic inspectors are not carried out in accordance with the prescribed schedule on account of the heavy workload of inspectors. We emphasise that, in view of the increasing speeds and density of traffic, the joint inspection of signals by signal, loco and traffic inspectors as per schedule should be made more effective and intensive in order to ensure proper visibility of signals by day and by night.

292. *Operation of distant signals*:—It has been repeatedly brought to our notice by drivers that distant signals are not normally taken "off" by cabinmen for reception of trains and in the absence of any positive indication at the distant signal, the drivers have to unnecessarily restrict the speed of the trains or take risks. On account of the location of the distant signals at distances exceeding one kilometre from the cabin, the cabinman finds it strenuous to operate such signals manually. At locations, where distant signal is worked electrically, no such complaints have been received. We, therefore, recommend that all semaphore distant signals should be provided with electric signal motors, and these should be made to assume automatically the signal aspects corresponding to the position of the home signals.

293. *Colour light signalling* :—In paras 347 to 351 in Part I of our Report we had commented on the progress made in the provision of colour light signalling. While it is the policy to provide colour light signalling on electrified sections we find that a few single line sections with A.C. traction have been left out. We recommend that all these sections should be provided with colour light signals, taking advantage of the OHE power supply.

294. We note that, on many of the electrified sections, signals on passenger running lines only are colour light while goods running and stabling lines still have semaphore signals. We consider that, this mixture of multi-aspect colour light and two-aspect semaphore signals is a source of confusion to the running staff. The conversion of semaphore signals into colour light signals at such stations should be taken up on a programmed basis.

295. *Provision of route relay inter-locking at important yards* :—In the evidence tendered before us it has been stated that, in some of the major yards and at important junction stations, where trains from a number of directions converge, very heavy train movements have to be dealt with. Moreover, the movement has to be coordinated between various persons in different cabins which increases the possibility of human failure. The example of Mughalsarai was cited to us, where we understand over 500 such movements take place in a period of 24 hours under the control of certain cabins. We feel that, in the interest of safety as well as efficiency of train operation, route relay inter-locking, which aims at centralising the control, must be provided at the more important junction stations.

296. *Norms for signalling failures* :—Failures of signal and interlocking gears were discussed by us in para 414 in Part I of our Report. At that stage we felt the need for correlating failures not only to the density of traffic but also to the population of signalling gears. Signalling system like any other engineering system is apt to fail, specially when the system itself is designed to 'fail safe'. We, however, find that there are at present no norms regarding failures of signalling and inter-locking gears on the basis of which the efficacy of the system could be judged. We recommend the laying down of such norms.

297. *Analysis of signal failures* :—We were informed that, presently, only such signal failures are reviewed which affect important trains and after the explanation therefor, howsoever inept, the occurrence is forgotten. The analysis of failures at most levels, which we had occasion to see, is confined to a statistical summary for assigning responsibility. We consider that signal failures must be reviewed with the intention to learn more about the inadequacies of the system for taking corrective measures. In this context we commend the practice followed on the Bombay Division of the Western Railway, where important signalling and interlocking failures are analysed and discussed in detail with remedial measures, and are circulated to staff in the field for guidance. We recommend that such action is taken uniformly on all the zonal railways.

298. *Reporting of signal failures* :—On a few divisions we found that while the drivers had a lot to complain about signalling deficiencies and failures, the signalling staff whom we interviewed did not seem to be aware of such complaints. Drivers invariably report deficiencies in the signals, noticed by them on the run, in the signal defect registers maintained in the loco sheds. There is no systematic way of retrieving this information for rectifying the reported defects. We stress that the defects reported by drivers should receive the attention of the signalling maintenance staff and remedial action taken without any delay.

299. We find that, it is a general practice now that wherever a signal maintainer is available round the clock at the station, the station master does not report in writing the failures of signalling and inter-locking gear which occur at the station, notwithstanding the provisions of the General and Subsidiary Rules. The signal maintainer, by attending to the failure on oral instructions, exposes himself to the charge of unauthorised tampering with the equipment in case of an accident. This also results in the actual number of failures not being reflected in the records. We consider that the station master on duty should report in writing or by telegram all cases of signal failures.

300. *Statistics of signal failures* :—It came out in the evidence that the incidence of signal failures as reported to the headquarters office did not reflect the correct position. Even the failures recorded in the signal failure registers did not correspond to those which actually occurred. This was also confirmed by one Chief Signal & Telecommunication Engineer. The record of signal failures helps the administration to analyse the causes of failures for evolving remedial measures. It is, therefore, necessary to ensure that signal failures which actually occur are faithfully recorded and reported and there must be cross-checks on the reported figures of signal failures to ensure their veracity.

301. *Adoption of short-cut methods by signalling staff* :—It has been repeatedly represented to us that short-cut methods are adopted by signalling staff in their maintenance work, particularly while rectifying signal failures. A number of accidents have also occurred on this account. The "looping" or bridging of relays, under conditions of failure of a signal, points or track circuit, by signal staff, either individually or jointly with traffic staff, is an undesirable practice fraught with serious consequences and should be prohibited under rules. We, therefore, recommend that, where any sectional release is required in the interests of train operation, authorised technical solutions like calling on signals and emergency cancellation switches should be employed with built-in safeguards for safe movement of trains.

302. *Securing of relay rooms* :—We have been informed that the relay rooms at some stations were devoid of any locking arrangements; in some cases, relay rooms were also used as offices. To safeguard against tampering with vital equipment in relay rooms and also to guard against the adoption of short-cut methods, we recommend double locking of all relay rooms by the traffic and signalling staff.

303. *Track circuiting* :—We had discussed the progress made in the provision of track circuiting at stations in paras 375 to 383 in Part I of our Report. As mentioned therein, progress mainly relates to providing of track circuiting of run-through lines at way-side stations on the trunk routes and some important main lines. Even in this limited programme, 285 and 72 stations on the broad and metre gauges respectively, were still left over. In reference to the suggestions given by the Wanchoo Committee in para 347 in Part II of their Report, the Railway Board have informed us that track circuiting of 2284 passenger lines at important junction and way side stations on trunk and important main line routes still remains to be done. The requirement of funds for the remaining works is estimated to be Rs. 39 crores. At the present level of allotment of funds, i.e., Rs. 3 crores per year, and after taking into account the accumulated throw-forward as obtaining during 1979-80, completion of the aforesaid remaining works may take another 15 years. This does not take into account the heavy increases in cost of labour and materials and also the fact that the track circuiting as now executed at many stations is only from fouling mark to fouling mark. Thus, if these safety works have to be completed within a reasonable span of time, a much higher level of allocation of funds will be necessary. We recommend accordingly.

304. We are disturbed to notice a distinct lack of decisiveness in the Railway Board's policy regarding extension of track circuiting to those stations where it has not been done so far. The thinking all along has been that track circuiting of such stations was to get high priority. Assurances to this effect were also given by the Minister of Railways in Parliament. However, in actual implementation, there has been continuous vacillation. The question of availability of wooden sleepers has been raised again and again. Even the import of wooden sleepers, to make good the shortfall in their indigenous availability, which had been seriously considered at one time appears to have been abandoned for reasons not clear to us. The present thinking of the Railway Board seems to be to use axle counters in lieu of wooden sleepers for track circuiting.

305. We seriously apprehend that this vacillation between the two proposals, track circuiting with wooden sleepers on the one hand and with axle counters on the other, will result in neither being pursued with sufficient speed and a large number of stations remaining without any kind of effective protection. We strongly feel that, the installation of an adequate number of axle counters whether by import or by indigenous production is not likely to materialise within a reasonable period of time and therefore the original proposal to extend track circuiting using wooden/concrete sleepers for the remaining stations is the only feasible one. Any difficulties such as shortage of wooden sleepers or use of concrete sleepers for track circuiting are not, in our opinion, insurmountable. We, therefore, maintain that the work of track circuiting using wooden/concrete sleepers, at the remaining stations, must be proceeded with and completed without any further delay.

306. *Track circuiting between block clearance points*:—We had gone into the question of track circuiting between block clearance points in Paras 384 to 388 in Part I of our Report. From the evidence before us we find that, not much progress has been made in extending track circuiting to block clearance points and at present there is no means by which the station/cabin staff can ascertain the presence or otherwise of a train between the starter and advanced starter particularly during night, thus, increasing the chances of collisions which have occurred on some sections of zonal railways. It will be pertinent to point that, during the years 1968-69 to 1977-78, 116 side collisions occurred on the broad and metre gauge systems of Indian Railways, of which 53 involved passenger trains. The side collisions can be prevented by track circuiting between block clearance points. We consider that the portion between fouling mark and advance starter at stations on trunk routes and main lines must be provided with track circuiting using wooden sleepers or axle counters on high priority and constraints of funds and materials must not be allowed to stand in the way.

307. *Track circuiting at block huts*:—We find that, on the main trunk routes where the run-through main line at stations has been track-circuited, track at block huts has not been provided with track-circuiting. We consider that track circuiting must be provided at block huts also to cater for the eventuality when a train comes to a stop at the block hut.

308. *Effect of dropped loads on track circuiting*:—It has been stated in the evidence recorded on the Northeast Frontier Railway that loads remain stabled on the CTC section for very long periods. Due to heavy rains and rusting of rails, the electrical conductivity deteriorates with the result that a signal could be taken off for an occupied line. In such circumstances the Railway Administration should ensure by regular checks that the conductivity of rails is maintained at satisfactory levels.

309. *Axle counters*:—As stated earlier, it is the policy of the Railway Board to install axle counters in the face of continuing shortage of wooden sleepers which had held up works of track circuiting. Wherever safety works of this type have been planned, these should be taken up on a time-bound programme and nothing should be allowed to come in the way of its implementation.

310. We have been informed that there has been delay in the production of axle counters due to teething troubles and failures. Manufacture of axle counters on the basis of a new design evolved by the RDSO is now being undertaken by the Southern and Central Railways. In this context it has also been mentioned that imported axle counters installed on the Grand Chord section of the Eastern Railway and also on Central and South Central Railways had worked relatively trouble-free. We suggest that the Railway Board give sufficient thought to the design now being adopted for manufacture in regard to its reliability in service so that this important safety device, does not meet the fate of other devices like vigilance control device, speedometers, etc. We recommend

that, in the event of reliability in the performance of the indigenous design of axle counters being in question, the Railways should not hesitate to adopt imported designs which have stood the test of time and import axle counters in part to cover the interim period of indigenous development.

311. *Automatic warning and stop system*:—In parts 390 to 392 in Part I of our Report we had discussed this subject and recommended that a time-bound programme be drawn up for extending the Automatic warning and Stop (AWS) system on all trunk routes with speed of 100 kmph and above, covering all passenger and goods trains. We wish to add that, in addition to the first stop signal which is proposed to be covered under the present scheme, the last stop signal which is the authority to enter the block section, should also be provided with AWS equipment.

312. We have been advised that the AWS equipment on the track now being provided for the protection of station stop signals can also be used between stations for protection of level crossings and speed restrictions. The permanent way inspector can easily fit up the portable, passive track equipment to locations of permanent and temporary speed restrictions and, if the driver fails to heed the visual and audible warnings in the cab, the brakes will be applied automatically. As such systems are used on the German Federal Railways and elsewhere, we would recommend their adoption on Indian Railways also, thus providing a total continuous protection system for the train from the start of the journey to the end.

313. We understand that the AWS system, now being provided on the suburban sections of Western Railway, has the necessary infrastructure to facilitate introduction of a simplified system of cab signalling. We, therefore, recommend that, taking advantage of this feature and the availability of continuous track circuiting and in view of the prevalence of curves, tall structures, road and foot-over bridges, affecting continuous visibility of signals and track on suburban sections, cab signalling may be provided on busy suburban sections.

314. *Performance of Automatic warning and stop system*:—During our visit to the Eastern Railway we have examined the performance of AWS on Howrah-Burdwan (Chord) and Gaya-Mughalsarai sections. We found that more than 50 per cent of the field equipment had been stolen and replacement had taken more than a year. Only a small number of locomotives were fitted with AWS equipment to cover mail and express trains alone and some of these locomotives were subsequently diverted to other links, with the result that even all mail and express trains were not covered. We are deeply concerned at the absence of any effective monitoring and serious lack of interest in such a vital safety pilot project at all levels of administration, particularly when the railway has been in a position to maintain satisfactorily other installation like colour light signalling and track circuiting equipment spread all over the line on these electrified sections in spite of thefts and other outside interference. We, therefore, consider that an effective monitoring system should be set up at different levels

of maintenance and user departments for such key projects. Pilfer-proof housings should be provided for all field equipment of AWS system and, on the lines or Central Railway's proposal, the circuitry should incorporate earlier warning to the driver if the track equipment is stolen.

Working in automatic signalling and centralised traffic control territories

315. *Automatic signalling*:—During the last few years there have been a large number of collisions in territories with Automatic Signalling and Centralised Traffic Control. Some of these accidents in the suburban sections took a heavy toll of life and limb and aroused deep concern. Our detailed review of accidents has shown that non-observance of rules by drivers when passing automatic signals accounted for 48 out of 296 collisions (or 16 per cent) attributed to failures of drivers. The South Eastern Railway alone contributed 21 of these collisions which formed about 40 per cent of the collisions on that railway. In view of the extreme gravity of such accidents and the repetitive nature of the primary cause viz. drivers' failure to observe properly the 'Stop and Proceed' rule, we have examined in detail the Automatic Block and Absolute Permissive Block system with particular reference to the various repercussions of the 'permissive' working involved in the 'Stop and Proceed' rule on the suburban sections in Bombay, Calcutta and Madras areas as well as the high density CTC territories on North Eastern and Northeast Frontier Railways. We have also carefully considered the evidence tendered by all sections of staff and officers on different aspects of such working. Since the permissive working on such high traffic density sections cannot be dispensed with, we consider that adequate safeguards should be built into the system of working, both by way of technical aids, designed as an integral part of the equipment of the system and rules stipulating specific procedures without any ambiguity.

316. We consider that the provision of AWS system shall be an effective means to ensure the observance of 'Stop and Proceed' rule by the drivers. In para 392 in Part I of our Report we had urged the Railway Board to take steps to fulfil at least their commitment of providing AWS system on trunk routes and suburban sections at the earliest. In view of the serious nature and consequences of collisions on suburban sections, these should be given priority. AWS system should be commissioned on suburban sections of Bombay, Calcutta and Madras on a speedy time-bound programme, by taking full advantage of the available sources of supply in the country and abroad. In respect of the suburban sections of the Southern Railway and Sealdah Division of the Eastern Railway advance planning for provision of AWS system should be initiated straightaway.

317. The AWS system should incorporate a 20 kilometres per hour speed check, so that trains after stopping at an automatic signal at 'ON' cannot pick up speed in excess of 20 kilometres per hour till a signal displaying the 'OFF' aspect is reached.

318. While there have been collisions on the suburban sections involving two EMU trains, in some

cases, one of the trains involved was other than an EMU train. As recommended earlier, AWS equipment of the type envisaged in para 317 above, should be provided not only on EMU trains but on other passenger and goods trains also.

319. As an interim measure, till AWS system is introduced, we recommend provision of an auxiliary warning switch in the motorman's compartment in EMU trains as on South Eastern Railway which should be operated by the motorman when he stops at an Automatic Signal at 'ON', to display a red light as a reminder to him of having passed an Automatic Signal at 'ON'.

320. *Rules of working in automatic territories* :— We note that General Rules 277 and 436 enjoin upon the driver, after stopping at the automatic or permissive stop signal at 'ON', to proceed ahead towards the next stop signal in advance, exercising great caution so as to stop short of any obstruction but does not prescribe any speed restriction except where the visibility is poor, in which case a speed restriction of 8 kilometres per hour is specified. We consider that a speed limit should be specified for normal conditions of visibility also, and recommend that the 20 kilometres per hour restriction, now being enforced by Central Railway, is adopted by all other Railways under 'Stop and Proceed' rule during normal conditions of visibility in automatic signalling and CTC territories.

321. We further recommend that the guard should be enjoined under General Rules 278 and 437, to apply the brake with a view to bring the train to a stop when he observes the driver exceeding the speed restrictions laid down.

322. We consider that motormen and drivers of trains in automatic signalling and CTC territories should be given a special course of training in Automatic Block and Absolute Permissive Block Systems in Signal and Telecommunication training schools in all aspects of the permissive working and further they should undergo refresher courses atleast once every year.

323. *Flashing tail lamps on EMUs*.—We find that on the Western Railway flashing tail lamps have been provided on the last vehicle of EMU rakes as a more prominent indication to attract the attention of a driver of the following train. We recommend that other railways also provide the flashing lights in the rear of the EMU trains.

324. *Flickering/bobbing of signals* :—It has been repeatedly brought to our notice that automatic signals on suburban sections often display flickering/bobbing of signals and also display of more than one aspect by the same signal at the same time. We recommend that technical measures suggested by a Committee of Directors of the Railway Board and the Research, Designs and Standards Organisation to overcome these problems should be implemented without delay. Further, General Rules 277 and 436 should be amended to classify flickering/bobbing and display of more than

one aspect by the same signal as defective signals, on the lines of General Rules 78 and 79.

325. *Cascading of signals*.—We recommend that the 'cascading' principle should be uniformly adopted on all Automatic Signalling and CTC territories so that when the green aspect bulb fuses, yellow aspect is displayed and so on and, under no circumstances, the driver comes across a signal without any light due to the fusing of the signal bulb. It must also be ensured that not more than one aspect of the signal appears at any one time, by using an improved design of lamp-proving relay.

326. *Telephones in CTC territories* :—It has been brought to our notice that out of 78 telephones provided on signals in the CTC section on Northeast Frontier Railway, 45 were reported lost; a similar position exists on the CTC section of North Eastern Railway. General Rule 436 lays down that the drivers shall wait for the stipulated period and pass the permissive stop signal at 'ON' after contacting the station master of the next block station or the CTC operator if telephone communication is provided near the signal. Both Railways seem to have taken no action to replace the telephones reported lost since General Rule 436 also provides for working the CTC system without telephones. We consider that the Railways should take steps including use of pilfer-proof fittings to ensure that all telephones at signals on CTC section are replaced and kept in good working condition so that drivers can ascertain position of the line upto the next signal and avert collisions like the one between 26 DN Passenger train and 1 Dn Avadh Tirhut Mail on 23-12-1979 on the CTC section of Northeast Frontier Railway in which 18 lives were lost.

We further recommend the provision of similar telephone facility in non-suburban Automatic Signalling sections like Raikharswan-Sini-Chandil-Kandra on the South Eastern Railway and Sitarampur-Pradhankanta section of the Eastern Railway.

327. *Overhauling of lever frames and block instruments* :—It has come to our notice that on some railways a high percentage of lever frames are over due overhauling. On the Eastern Railway, 400 lever frames and in Vijayawada division of South Central Railway, 28 lever frames were due overhauling. It was stated that this was due to the non-availability of assistant station masters and traffic blocks for non-interlocked working. Overhauling of lever frames according to the stipulated schedule is necessary to ensure safety and to prevent frequent failures, particularly in the context of increase in the intensity of train services. We had gone into the question of overhauling of lever frames in paras 421 to 425 in Part I of our Report. We consider that, on the basis of arrears and normal workload of overhauling of lever frames and similar equipment, maintenance gangs including assistant station masters required for non-interlocked working in the affected yards must be set up and co-ordinated programmes of traffic-blocks drawn up for every division.

328. *Yardsticks for signalling staff* :—There are three tiers of signalling staff responsible for the inspection and maintenance of signalling gears viz. super-

visory signal inspectors, sectional signal inspectors and signal maintainers. We had gone into the question of yardstick for the above categories of signalling staff in para 426 in Part I of our Report. While yardsticks are available for the supervisory signal inspectors, we find that no yardsticks have been evolved for the sectional signal inspectors and signal maintainers. The sectional signal inspector has to perform the dual functions of inspection as well as maintenance of signalling gears. The supervisory signal inspector is assigned the duties of inspections only. The signal maintainers are responsible for basic maintenance of signalling gears assigned to them and rectification of all failures. There has been considerable increase in electrical signalling installations on trunk routes and main lines in the last decade, as even from the Annual Report of railways and the maintenance cadre strength has not been keeping pace in regard to optimum levels of workload and jurisdiction, particularly in the context of the heavy increase in traffic on such sections. We consider that yardsticks should be evolved without any further delay for both sectional signal inspectors and signal maintainers, based on the workload in equated signal units with due allowance for local conditions on individual sections.

329. *Strength of officers, Inspectors and maintainers in the Signalling Department* :—It has been repeatedly represented to us that the strength of officers at all levels, signal inspectors and signal maintainers is inadequate to cope with the increased workload of inspections and maintenance of signalling gears. This aspect was discussed in paras 399 to 406 in Part I of our Report. It has been represented to us that even though detailed studies had been conducted by the Efficiency Bureau of the Railway Board on the workload of signal and telecommunication engineers and supervisory signal inspectors, the strength of officers and inspectors on railways is far below the requirements according to norms laid down in the Efficiency Bureau's Report. We consider that the cadre of signal and telecommunication engineers and signal inspectors must be strengthened to the levels envisaged in the study of the Efficiency Bureau to ensure safe and efficient maintenance of signalling and telecommunication equipment.

330. *Duty hours of signal maintainers* :—In paras 171 to 174 in Part I of our Report, we had gone into the question of roster of duty hours of signal maintainers. During the course of our visits to the railways we received representations from signal maintainers that they had to attend to signal failures outside their duty hours. Often failures occurred at wayside stations away from their headquarters and this entails considerable time in travelling to and returning from such stations which was not counted for overtime. We consider that the position needs to be remedied by adjustment of jurisdictions, provision of adequate rest givers and by restoring of signal maintainers on the basis of proper job analysis of their work and properly remunerating them for the time spent in travelling. We would also recommend provision of night maintenance staff on all trunk routes and busy yards.

331. *Supply of instruments and equipment to signal maintainers and signal inspectors* :—From the evidence tendered before us, we find that the electrical signal maintainers and signal inspectors are not provided with instruments and equipment like multimeters, insulated pliers, etc. for testing of electrical signalling gear. As this is a serious handicap in the actual performance of maintenance duties on the line, we strongly recommend that testing instruments and equipment as are necessary for the performance of duties by signal maintainers and signal inspectors must be supplied to them and maintained in good order.

332. *Dual trained inspectors on signalling side* :—We find that on some sections of the South Eastern Railway, separate inspectors for mechanical and electrical signalling are still continuing even though instructions to combine the two cadres were issued many years ago. We recommend expeditious posting of dual-trained signal inspectors on all sections on the railway.

333. *Token balancing missed and damaged tokens* :—We observe that the procedure followed for balancing of tokens and tablets on single line sections is not safe. The traffic on most of the sections is not balanced between up and down directions and the tokens stored in the block instrument at a station get exhausted at frequent intervals, resulting in suspension of block working on the section, unless the excess number of tokens from the block instrument of the adjacent station are brought by train by signal maintainer or inspector, sufficiently in advance and placed in the instrument, the tokens in which are on the point of being exhausted. If safety of train operation is to be ensured, during the process of token balancing, block working should be suspended and the passenger train by which the signal maintainer is travelling should be worked on paper line clear system and the maintainer should get down at every station, open the block instrument, remove the excess tokens and proceed to the next block station to replenish the stock of tokens in the instrument there and then restore the block working and so on to the next station, till the entire section is covered. While this time-consuming procedure can be followed in sections with light and medium levels of traffic, it affects train services adversely on heavy density sections and hence maintenance staff resort to the unsafe practice of balancing the tokens without suspending block working. Further, we have noted that the incidence of tokens being missed or over-carried by drivers, particularly on high speed trunk routes, is on the increase. The existing token system demands from the driver of a fast train a careful scrutiny of the token or tablet handed over to him while running through the station to ensure that he has in his possession the correct token. The token pick-up apparatus is not provided on all sections and, even where provided imposes a physical strain on the driver.

We, therefore, recommend that token-less block instruments, manufacture of which has been well established indigenously in more than one sector, are provided on trunk routes in replacement of the outmoded token or tablet instrument.

334. *Signals on Vaigai Express route of the Southern Railway*:—We find that the instructions of the Railway Board for providing bracketted home signals or alternatively track curcuting of main and loop lines with electrical detectors for facing points on sections of multiple aspect upper quadrant signalling with single arm home signals have so far not been complied with by Southern and Northeast Frontier Railways. Even though speeds in excess of 75 kmph are not to be permitted normally with single arm home signals, Vaigai Express, on Southern Railway is being run between Madras and Madurai at 100 kmph. We find that stipulations laid down by the Commissioner of Railway Safety, for running Vaigai Express between Madras-Madurai, viz., the distant signals to be relocated at 1 km. from the home signals and provision of bracketted home signals have not been complied with so far. We consider that, having commenced the running of a super-fast train on the aforesaid metre gauge section, the basic requirements of signalling to permit safe operation at that speed, must be provided without any further delay.

335. *Development of mobile communications*:—Not much progress has been made in the field of mobile communication on the Indian Railways. Such communication will have vast applications on the operation of trains particularly in the field of safety like protection of trains when stopped in mid-section or at signals, working of trains under conditions of interruption of block and communication circuits, etc. We understand that with the trunk routes of zonal railways having been covered by Microwave network, communication between train, station and control office is no longer an insurmountable problem and in fact, such communication has been provided in Brindavan Express. We would, therefore, recommend this as one of the priority projects on which work must be undertaken with a view to develop satisfactory and reliable communication between trains in motion and the ground stations and also between functionaries on the train itself.

336. *Communication facilities in yards*:—Our attention has been drawn to the poor facilities for communication in major yards, both passenger and goods. We recommend that walkie-talkie wireless packets be provided extensively in all busy yards for use by traffic and loco staff dealing with movements in the yard.

337. *Signal Engineering Manual*:—We suggest that hand books on installation and maintenance of different types of signalling equipment should be prepared and supplied to signal inspectors and signal maintainers for their guidance. Further even the Indian Railways Signal Engineering Manual in its present form is outdated and not sufficiently comprehensive to cover all aspects of modern signalling systems. We suggest that the revision of the manual is taken in hand without further delay and copies of the manual are supplied to all inspectors. Relevant sections, should be translated into regional languages and supplied to artisans and maintainers for their better understanding.

338. *'One train one slot' principle*:—We consider that reception and departure signals taken off for a firm the impression that the prescribed brake power, is not always available on passenger and goods trains

the possibility of a following train observing the "OFF" position of the signal and entering a blocked or occupied line due to the failure of the cabinman in forgetting to put back the signal is eliminated. We recommend that, this arrangement incorporating one train-one slot principle should be adopted on all single and double line sections on trunk routes and main lines.

339. *Last vehicle check device*:—It has been brought to the notice of the Committee that, difficulties are being faced by station masters, switchmen and cabinmen in verifying the complete arrival of a train before giving permission to approach or for taking off signals for another train, particularly during night and inclement weather. A further strain is imposed on the station master wherever a central cabin or panel is provided for operation of all signals and points. A last vehicle check device, which is to be fitted on the last vehicle of every train along with the tail board or tail lamp and which, in conjunction with the track equipment fitted inside the home signal, gives the necessary release to the signal and block circuits after complete arrival of the train, has been under development for over two decades with little success. Some proven devices in use of railways abroad could have been imported and, after trials, a design suitable for Indian conditions could have been easily evolved during this period. We recommend that, in view of the distinct benefits available in such a device, particularly from the safety angle, limited to import of last vehicle check devices may be resorted to, pending development of a suitable indigenous design which should be pursued by the Railway Board with a sense of urgency.

340. *Use of solar energy in signalling*:—we have also been informed that solar cells can be used for ensuring proper visibility of self-luminous sign boards, provided for the guidance of drivers. It has also been mentioned that solar cells can be used for lighting of semaphore signals and even approach lighting of colour light signals. We suggest that RDSO should investigate the use of solar energy for such purpose.

341. *Braking distances and inter-signal distances*:—We have already referred to this subject in paras 364 to 371 in Part I of our Report and commented that except for the high-speed route, from Howrah to Delhi, no action has been taken to resite signals on the basis of braking distance trials on other sections. The Railway Board had taken a series of policy decisions. In July, 1969, like provision of a second distant signal, conversion of 'B' class stations to 'A' class and where not feasible, separation of warning signal or provision of multiple aspect signalling or modified lower quadrant signalling, etc. with the warning/distant signals located at 1.5 kilometres from the first stop signal. But we find from our visits to zonal railways that none of these decisions have been implemented so far to any significant extent. Only sighting/warning boards have been re-located on the basis of emergency braking distances for goods and passenger trains.

342. The evidence tendered before us and our own examination of the results of trials conducted by the zonal railways and neutral control organisation, confirm the impression that, the prescribed brake power is not always available on passenger and goods trains

with the vacuum brake system. Since a total change-over to a more positive system like air brakes for all types of passenger and goods trains is not possible in the foreseeable future, we consider that the signalling systems should take in to account the variations in brake power from the prescribed values.

343. As a step towards this objective, we consider that the present method of taking emergency braking distance as the basis for inter-signal distances should give way to service braking distance being taken as the basis. This parameter is followed by railway systems in Europe, United States of America and Japan and provides an in-built safety factor in bringing the train to a stop, covering the vagaries in weather conditions while sighting a signal, variation in reaction time from driver to driver and the deviations in brake power from the prescribed values. Further, the application of emergency braking by the driver every time he has to stop suddenly, involves considerable discomfort to passengers, apart from repercussions on trains with long loads. We, therefore, recommend that the Railways should design all their future signalling systems on the basis of service braking distances and in regard to existing signalling systems, signals on routes where high speed trains run, should be re-located on this basis.

344. At the same time, we feel that the Railways cannot be continually altering inter signal distances to keep pace with the continuing upward trend in increase of braking distances, as this will involve large scale alterations to cabling and re-location of all line equipment. We, therefore, recommend that a system of modular additions, like the super-imposition of another distant signal over the existing signalling system for a block increase of one kilometre or below in braking distance, should be adopted for all high speed routes, as has been done for the route between Howrah and New Delhi.

345. We further reiterate that any proposal of increase of speed on a route for one train or a class of trains should be treated as a composite project involving the motive power, carriage and wagon, permanent way and signalling disciplines of the Railways and braking distance and inter-signal distance studies should be conducted jointly by all the concerned disciplines.

346. *Manufacture of signalling equipment*:—The Kunzru and Wanchob Committees had considered at length the subject of manufacture of modern signalling equipment in one or more workshops. Arising out of the recommendation of the Kunzru Committee to set up a central signal workshop the Railway Board decided to develop the Railway Signal Workshops at Podanur (Southern Railway), Mettuguda (South Central Railway) and Gorakhpur (North Eastern Railway) and also encourage a public sector firm in Calcutta and a private sector firm in Bombay for the production of electrical signalling equipment. This multipronged action does not appear to have produced the anticipated results as seen from the evidence tendered before us. Shortage of vital electrical signalling materials has been brought to our notice by zonal railways. Further, it has been represented that on account of marked fluctuations in allocation of funds

to signalling in some years, the utilisation of production capacity of different factories in regard to these specialised equipment has been adversely affected. Equitable distribution of orders between the different railway signal workshops and the public and private sector factories, based on their individual capabilities, could not be ensured as the railway signal workshops are managed by the zonal railways. Production of certain items has been given up by some of the factories on account of dwindling orders.

From the foregoing it is obvious that better co-ordination of the activities in the different signalling workshops with a view to utilising their full production capacity is called for. Appropriate steps should be taken to ensure this.

347. *Investment trends in signalling*:—An examination of the investment made under the plan 'Signalling and Telecommunication' over the years 1968-69 and the proportion of allocation made for signalling to the total plan outlay as placed at Annexure CXII reveals no improvement. If the escalation in material and labour costs over the years is taken into account, there has in fact been a declining trend in the allocation of resources and consequently replacement and modernisation programme has suffered.

348. The constraints that were inhibiting the Railways in the past from resorting to a greater use of modern signalling technologies in furtherance of safety continue to pose difficulties in the execution of signalling works. The progress of even essential safety works like track circuiting and Automatic Warning and Stop systems has been poor. The reasons given for such halting progress, apart from lack of funds, like non-availability of wooden and concrete sleepers and waiting for indigenous development are not convincing. It has been pointed out that, wooden sleepers could be made available through Government agencies provided reasonable prices are paid; alternatively, a part of the production of concrete sleepers could be earmarked for track circuiting of main and loop lines (stations) and axle counters and A W S equipment could be imported in part to cover the interim period of indigenous development. Even where such constraints are not involved and no sophisticated or imported technology is required, as in the case of resetting of signals to suit braking distances of trains, separation of warning from outer signal, provision of reversers on reception and despatch signals on the 'one slot-one fair' principle, interlocking of level crossing gates and providing them with telephones and electric lighting of distant signals, there has been no noticeable progress.

349. Such a situation, in spite of repeated recommendations of the Kunzru and Wanchob Committees in the matter of accelerating programmes for upgrading and modernisation of signalling, reveals a lack of appreciation of the importance of such improvements. We recommend that, with a view to inject a sense of urgency and appreciation of the impact of signalling on safety and efficiency of train operation and evolve measures for speedy implementation of such projects on a planned basis the decision making body in the Railway Board needs to be strengthened at the appropriate technical level.

CHAPTER IX

MOTIVE POWER

350. *Trend of accidents due to defects in engines:*—The review of accidents on the Indian Railways made in Chapter II has shown that, both on the broad and metre gauges, the number of derailments due to engine defects has declined considerably during the 10-year period from 1968-69 to 1977-78, as compared to the period 1963-64 to 1967-68, which was reviewed by the Wanchoo Committee. The position was as under:—

	1963-64 to 1967-68		1968-69 to 1972-73		1973-74 to 1977-78	
	BG	MG	BG	MG	BG	MG
Total number of derailments	2167	2518	1421	1724	1531	1678
Number of derail- ments due to engine defects (all railways)	90	228	44	77	55	84
Percentage (2) of — × 100 (1)	4.15	9.1	3.1	4.5	3.6	5.1
Incidence million kilometres	0.063	0.33	0.028	0.109	0.033	0.132

A rising trend is noticeable in the number of derailments due to engine defects during the second half of the 10-year period under review. The main contributory causes for derailments due to engine defects were defective wheel or tyre, breakage of axle, under-gear or brake fittings.

351. *Maintenance of steam locomotives:*—The question of attention to overaged steam locomotives was gone into in paras 466 to 468 in Part I of our Report. During the course of our visits to steam sheds on the railways and also from the evidence tendered before us, we find that the maintenance of steam locomotives is not being done in a satisfactory manner. We had occasion to examine engine repair books in some of which the repairs entered by the drivers had not been fully executed; these books had not been signed or checked by any supervisor or inspector. With the aging of locomotives and redeployment of well-qualified personnel from steam to diesel and electric sheds, there is no gainsaying the fact that maintenance of steam locomotives is suffering. This position is further aggravated by inadequate and delayed supplies of vital stores; even when such materials and spares are supplied, they are not of the requisite quality. It was also brought to our notice that this is increasingly leading to the adoption of unconventional and undesirable practices like resorting to welding in place of bolting or rivetting even where welding is not recommended, cannibalisation of parts, and repair of certain items as a make-shift arrangement

instead of replacing them. Steam locomotives are going to be with the railways for a long time to come; therefore, the organisation for their maintenance must not be weakened.

352. *Headlights of steam locomotives:*—In the evidence tendered before us it has been stated that the actual performance of headlights on most steam locomotives is not satisfactory. This, we were informed, is because of the poor quality of the reflector used in the headlight and also due to improper fixing and focussing of the bulb in the headlight. It was also mentioned to us that in many cases the holder for the bulb is completely missing and the bulb is tied with a wire or a rope, on account of which there is complete or partial failure of the headlight. We would stress the need to maintain headlights in fully operative condition.

353. *Sanding equipment on locomotives:*—Serious complaints regarding the non-functioning of sanding equipment on steam locomotives have been made to us. We were informed that the sanding equipment does not work in most of the cases. This results in detentions and sometimes parting of the train. We would stress the need to provide and maintain sanding equipment on steam locomotives in proper working order. This equipment should be specially certified at the time when the locomotive leaves the shed.

354. *Vigilance control device:*—In paras 458 to 464 in Part I of our Report, we had discussed the recommendation made by the Wanchoo Committee regarding provision of driver's vigilance control device on diesel locomotives. During our visits to the railways and production units, we found that the vast majority of running staff and officers were not convinced of the need for a vigilance control device on diesel locomotives, particularly where these are manned by two employees. We were informed that the engine crew are averse to the vigilance control device because of its nuisance value, arising from its repetitive operation. A view was also put forward that operation of this device at such short intervals is apt to distract the driver from his important safety functions like noting the aspects of signals and controlling of trains on graded sections. One senior divisional mechanical engineer mentioned to us that even though every diesel locomotive is turned out with vigilance control device in working order, on line even mail and express trains do not have this equipment in working order. The same state of affairs was prevalent, by and large, on all the zonal railways. This, we were informed by one General Manager, was due to design of the equipment not having been well-developed to match with the delicate repeat-functioning of the equipment and to stand up to the working conditions normally obtaining on the railways and also due to the difficulties in maintenance of such delicate equipment. We were also informed that the provision of the vigilance control device adds to the tension in the minds of the

driver. In fact, one of the federations of railway workers went to the extent of stating that since the vigilance control device places a lot of strain on the driver, his working hours must be reduced from 10 to 6 if this device is provided.

355. In this context we would like to draw attention to para 454 in Part I of our Report in which we had referred to the study undertaken by the Psycho-Technical Cell of the RDSO which revealed that operation of vigilance control device by the driver did not generate fatigue and exhaustion to any significant level likely to impair efficiency. On the strength of evidence given before us by all categories of drivers and field officers responsible for the operation of trains, we have serious doubts about the validity of the above conclusions.

356. The evidence now before us has led us to reconsider the subject. We feel that the vigilance control device as now installed in diesel locomotives has had a fairly long period of trial and its utility has been found to be very limited. We have also been informed that there is considerable rethinking on the utility of vigilance control device on the British, German and other foreign railways. Further, with the progressive provision of Automatic Warning and Stop (AWS) system on the sub-urban and heavy density routes, the vigilance control device in the locomotive will become redundant since the AWS equipment will also do the same job. In view of the foregoing, we are now of the view that installation of the vigilance control device in diesel and electric locomotives, recommended by the Wanchoo Committee, need not be pursued under conditions of train operation now obtaining on the Indian Railways, namely, two employees manning every, diesel and electric locomotive.

357. We, however, feel that a device of this kind may find application if and when the Indian Railways adopt a system of single-manned crews on diesel and electric locomotives. We, therefore, stress that research and developmental efforts for evolving a suitable design of vigilance control device, which will function satisfactorily without the present disabilities, may be continued. We understand that a system on British Railways makes use of the movement of any one of the driver's normal locomotive controls to indicate his alertness and it operates only if he fails to act over a pre-set distance. On the German Railways and the Swiss "Integra" system, the alertness of the driver is tested through the AWS system in force and if he does not heed the warning at locations of speed restrictions, level crossings and other vulnerable points between stations, the brakes are applied automatically.

358. *Speedometers*:—The provision of speedometers/speed recorders on locomotives was discussed in paras 438 to 442 in Part I of our Report wherein we had stated that the recommendation made by the Wanchoo Committee that all locomotives working trains must be equipped with speedometers had not been fully implemented. The mass of evidence tendered before us during the course of our visits to the zonal railways corroborates this conclusion. It was mentioned to us that, even with 40 per cent spare speedometers in the sheds and workshops, it has not

been possible to ensure that every locomotive, which goes out of the shed to work a train, is fitted with a speedometer in working order. We were informed that the speedometers are expected to be in service in good order for about 3 months, but they actually go out of order within a few days. We found that most of the locomotive workshops which we visited had well equipped speedometer repair sections. We were, however, informed that the maintenance becomes difficult because of high failure rate of the VDO speedometers in use at present. The difficulty is aggravated due to non-availability of spare parts. It was the unanimous opinion that this speedometer, which was designed for motor vehicles is not suitable for locomotives.

359. We had in para 456 in Part I of our Report also referred to the decision taken by the Railway Board, on the basis of the recommendations made by the 47th Loco Standards Committee in March, 1978, to import Hasler speed recorders for all main line diesel locomotives and also for replacing VDO speed recorders. We find that till December, 1979, Diesel Locomotive Works, Varanasi, who were asked to co-ordinate the import of Hasler speed recorders, had received the indents from only three zonal railways. We are constrained to say that this matter is not even now being pursued with a sense of urgency.

360. On the question of development of a reliable indigenous speedometer/speed recorder, we had in Para 445 in Part I of our Report referred to the action taken by the Railway Board to draw up a collaboration scheme for their indigenous manufacture. We have now been informed that the efforts to develop manufacture of Teloc-Hasler or Deuta instruments have not borne fruit since none of these firms is interested in establishing manufacture of their equipment in India. Considering that this problem has been with the railways for nearly two decades now, we feel that there has been a lack of determined effort to develop a suitable speedometer/speed recorder indigenously.

361. Attention of the Committee has been drawn to instruction issued vide Railway Board's letter No. 77/M(M&P)/467/7, dated 19-1-1980, making drivers responsible for changing speedometer charts so as to provide against multiple recording and to ensure that charts are changed every trip. Under these instructions, it is also the driver's responsibility to see that a correct chart is fitted in the speed recording instruments and that it records correctly. We consider that this procedure, where the driver has free access to the speed recorder charts, is apt to defeat the very purpose for which speed recording is found to be necessary.

362. *Indication of train-parting to drivers of diesel hauled-goods trains*:—In para 548 in Part I of our Report, we had gone into the reported difficulty of diesel drivers not getting a proper indication of their engine in the event of application of vacuum in guard's brake-van or even parting of the train. While the weight of the evidence tendered before us suggests that the drop in vacuum, after application of brakes in guard's brake-van or as a result of train parting, should attract the attention of driver, some guards

did bring to our notice instances where the driver had continued to proceed to the next station unaware of the train-parting in the rear. At the RDSO we were informed that a new type of brake equipment manufactured by British Westinghouse, in which the driver gets a clear indication of train parting, is presently on trial on the Kottavalasa-Kirandul section of the South Eastern Railway. Equipment of this type would be useful and its trials should be expedited.

363. *Working of diesel locomotives with long hood leading:*—Diesel locomotive drivers gave evidence that difficulty is experienced by them in observing signals when the locomotive is worked with long hood leading. They also stated that under this method of working, toxic gases from the exhaust fumes of the locomotive find entry into the driver's cab causing inconvenience and perhaps injury to their health. On the basis of information furnished to us by the zonal railways, we have undertaken an analysis of the involvement of diesel locomotives in collisions depending upon whether these were worked with long or short hood leading. The results of our review for the period 1968-69 to 1977-78 are given in Annexure CXIII. These are summarised below :—

	Number of collisions involving diesel locomotives		
	Long hood Leading	Short hood leading	Total
Broad gauge	109	16	125
Metre gauge	19	8	27

It will be seen that 87 and 70 per cent of the collisions involving diesel locomotives on the broad and metre gauges respectively, occurred while these locomotives were worked with long hood leading. Considering that the kilometrage run by locomotives with long hood and short hood leading would be roughly equal, the above figures show greater accident-proneness of diesel locomotives while working with long hood leading.

364. The RDSO, whom we consulted in this matter, have advised that the visibility with long hood leading is not worse than that obtained in steam locomotives which were working regularly before the introduction of diesel traction. They further feel that the ability of the engine crew to sight signals is not in any way impaired if the diesel locomotive is driven with long hood leading instead of short hood leading. However, from the data made available by the RDSO regarding visibility of track and signals from diesel locomotives working with long hood/short hood leading, which is given in Annexure CXIV, we find that, in the matter of visibility of both track and signals, the driver has a distinct advantage when working with the short hood leading.

365. We may also mention that, while according sanction for running of superfast trains, the Additional Commissioners of Railway Safety (now Commissioners of Railway Safety) had stipulated that high speed trains should always be worked by locomotives with short hood leading and in the event of such trains being worked by locomotives with long hood leading,

the maximum speeds should be reduced by 10 per cent.

366. On the question of effect of diesel fumes on diesel locomotive drivers, the RDSO has advised us that, on the basis of studies carried out by the British Railways and the field studies conducted on broad gauge main line WDM 2 locomotives by the Central labour Institute, Bombay, it has been concluded that diesel engine crew are not exposed to any health hazard due to engine fumes coming into the cab.

367. On the basis of the foregoing, we feel that working of diesel locomotives with long hood leading does present more difficulties in visibility of track and signals and has greater accident-proneness. While we appreciate the operational problems that are likely to arise if a blanket stipulation is made that trains should not be worked with long hood leading, we are of the considered view that in the overall interest of safety, this stipulation will have to be made. As a beginning, this restriction may be imposed on all passenger-carrying trains, with maximum permissible speed of 100 kms per hour and over on the broad gauge, and 75 kms per hour and over on the metre gauge. This safety measure should also be extended to all trains hauled by diesel locomotives which run over difficult sections where the visibility of signals is restricted due to sharp cuttings, curves etc.

As a long-term solution to this problem, provision of a second driving cab on diesel locomotives should be given serious consideration.

368. *Water level gauge on WDM 2 locomotives:*—On the WDM2 diesel locomotives, the gauge of the overhead water tank is located awkwardly in the nose of the engine, making it difficult to read the water level. We were informed that the driver/assistant driver has to climb to the top of the engine to determine the water level. On electrified sections, there have been some cases of assistant drivers getting killed because of contact with overhead cantenary when they went up to check the water level. We recommend that the water level gauge should be modified so as to serve the purpose for which it is intended.

369. *Headlights and cow-catchers on WDM 1 locomotives:*—We have been informed that WDM 1 locomotives which are still in use on the Eastern and South Eastern Railways and which, quite often, are required to work in both directions do not have any headlights and cow-catchers in the rear. Due to long length of the portion of the locomotive in the rear of the driver's cab, the driver faces considerable difficulty in ascertaining clear position of track while moving in the reverse direction. We would recommend that cow-catchers and headlights must be provided in the rear of WDM 1 locomotives.

370. *Facilities for maintenance of electric locomotives:*—We have been informed that facilities for maintenance of electric locomotives have not kept with the increase in their population on the Indian Railways. This is specially so on the Eastern and South Eastern Railways. Because of this it is not possible to follow the schedules of maintenance laid down. The unsatisfactory position in respect of failures of

electric locomotives was discussed in paras 436 and 437 in Part I of our Report. We would impress on the Railways Board the need to provide adequate maintenance facilities in workshops, and sheds for electric locomotives, which should keep pace with additions to the locomotive fleet.

371. *Manufacture of locomotives and EMUs with basic fittings for AWS system:*—The Indian Railways have planned to go in increasingly for the Automatic Warning and Stop (AWS) systems. To start with, these systems are being installed on the suburban sections and, in due course, shall be extended to the important routes covering high-speed traffic. We recommend that all diesel and electric locomotives and electric multiple units manufactured in the country should be provided with the basic fittings so that mounting of AWS equipment on the driving unit could be done without much difficulty at a later stage.

372. *Bell communication between motormen and guards in EMUs:*—Complaints have been voiced that quite frequently there is failure of communication

system between motormen and guards in electric multiple units (EMUs) trains on suburban services. The communication is in the form of a bell and failures occur due to its pilferage and development of other defects. We would stress that steps should be taken to tone up the maintenance of bell communication between motorman and guard in suburban services and ensure that these are kept in working order. In Chapter VIII—Signalling and Interlocking, we have recommended development of communication system between the driver, guard and the ground control to be used while the train is on the run. This should be extended to EMU train services also.

373. *Locking of motorman's/guard's compartment in EMU trains:*—We were informed on the Southern Railway that, with the running of 8-coach EMUs on the metre gauge, the unoccupied motorman's/guard's compartment falls in the middle, i.e. 4th and the 5th coaches which are often occupied by mischievous/anti-social elements who tamper with the gears. We feel that a reliable locking arrangement for the unoccupied compartments should be devised so as to make them inaccessible to outside elements.

COACHING AND GOODS ROLLING STOCK

374. *Trend of accidents due to Carriage and wagons costs.*—In Chapter II we have commented on the trends of derailments due to defects in carriages and wagons. The comparative position in this regard is summarised below :—

	1963-64 to 1967-68		1968-69 to 1972-73		1973-74 to 1977-78	
	BG.	MG.	BG.	MG.	BG.	MG.
1. Total number of derailments	2167	2518	1421	1724	1531	1638
2. Derailments caused by defects in carriages	NA	NA	46	59	63	68
3. Derailments caused by defects in wagons	NA	NA	1287	1443	1398	1483
4. Derailments caused due to defects in carriages and wagons	467	561	333	502	461	551
5. Percentage (4) × 100 (1)	21.6	22.3	23.4	29.1	30.1	33.6

It will be seen that there has been an increase in the number of derailments attributable to defects in carriages and wagons during the 5-year period from 1973-74 to 1977-78 on both the broad and metre gauges as compared to the previous period. Further, the proportion of such derailments to the total number of derailments has been going up from one 5-year period to the next. This is a matter for concern.

375. The main areas responsible for the increase in the number of derailments were defective or broken springs or suspensions, breakage of under-gear and vacuum or brake fittings, defective or broken axle boxes, defective brakes or inadequate brake power, defective wheels or tyres, broken axles, seized roller bearings and defective bogie bolster hangers.

376. *Examination of goods trains* :—In paras 414 to 475 in Part I of our Report we had discussed the examination of goods trains. As mentioned therein two types of examinations of goods trains are undertaken on the Railways, viz. intensive and safe to run.

377. From the information furnished by zonal railways we find that there is no uniformity in the pattern of train examinations. While the Railway Board have laid down that intensive and safe to run examinations are to be conducted at intervals of 500 and 200 kms respectively, we find that in actual practice, distance between two intensive examination points varies considerably. Evidence given before us shows that not much sanctity is presently attached to the pattern

of examination laid down and examinations are sometimes skipped. This evidently happens because the old system of train examinations is no longer valid in view of the changed operating conditions, introduction of diesel and electric traction and use of newer types of rolling stock fitted with roller bearings. Trains are now running over long distances without the need of long halts at intermediate points, sometimes in close circuit movement, and full benefits of these can be achieved only if the train examining points are re-located to suit these new streams of traffic.

378. On the basis of the information and evidence before us we feel convinced that the present pattern of goods train examination is not in keeping with the changing streams of traffic and modern types of rolling stock. This matter would require in-depth study on an all-India basis. We recommend that the Railway Board set up a committee consisting of officers of the mechanical and operating departments who will go into the pattern of goods train examination and rationalise it on an all-India basis, stipulating the places where examination should be carried out together with the type of examination to be done, time required, facilities, equipment and manpower required for this purpose. The work of this Committee should be completed as quickly as possible.

379. While rationalisation of goods train examination on the aforesaid lines may take some time, in the background of rising trend of derailments due to wagon defects during the 5-year period from 1973-74 to 1977-78, as compared to the previous 5-year period both on the broad and metre gauges, we stress the need of ensuring thorough examination of goods trains at all the stipulated points. Skipping of examination should ordinarily not be permitted, but in case it becomes unavoidable, arrangements must be made to get the load examined within the shortest possible distance thereafter.

380. *Strength of train examining gangs and facilities for goods train examination* :—During the course of our visits to some goods yards and also interviews with staff and officers, inadequate gang strength and time for examination of and repairs to goods wagons was forcefully represented. We were informed that against the requirements of 40/50 man hours for carrying out intensive examination, as per guidelines of the Railway Board, the actual availability was only 16 to 20 man hours. Consequently it was not possible to carry out proper examination of and repairs to goods wagons. This subject was discussed in paras 473 to 475 in Part I of our Report wherein we had mentioned that a final decision in the matter of additional requirements of staff is yet to be taken and this position persists.

381. It was also mentioned to us that facilities and equipment obtaining in the yards for carrying out the

stipulated examination and repairs of goods wagons are not adequate. Vacuum testing equipment is not installed in some yards. There were no arrangements for material handling, which work was mostly done by khalasis in the Carriage and Wagon Department. With shrinkage in their cadre, consequent to the recent upgradations, lot of difficulties are being experienced because sufficient number of helpers for skilled and semi-skilled staff were not available. It was also represented by the train examining staff that the yards are mostly cluttered with materials falling from wagons which not only endanger their personal safety while moving alongside the trains but also stand in the way of making an effective examination of all the wagons.

The Committee recommended to be set up in para 378 should also go into the aspects mentioned above.

382. Examination of goods loads in marshalling yards :—We find that at Mughalsarai, it is the practice to examine newly formed loads on the sorting lines in the marshalling yard. According to the procedure adopted, the first 40 wagons are examined in the sorting lines and the remaining after the load has been drawn into the departure lines. In the evidence tendered before us, it was stated by staff and officers that this is not a satisfactory arrangement both from the point of view of ensuring proper examination of rolling stock as well as safety of the men employed on this job. We were informed that, even though the sorting line is isolated before commencement of examination of wagons on it, some fatal accidents involving staff had occurred. Due to the fear of personal danger, examination cannot be conducted properly. We consider that the practice of examining goods loads on sorting lines in marshalling yards should be stopped wherever it exists.

383. Examination of stabled loads and loads originating from non-train examining points :—We find except for one or two zonal railways, loads stabled at wayside stations are neither examined nor retested for vacuum before these are moved again after an interval of a number of days and even weeks. One divisional mechanical engineer mentioned to us that retesting of such loads is done only if the driver is adamant and insists on the issue of a fresh vacuum certificate.

384. Another point which came out on the Northern Railway was that there is no proper system of conducting examination or testing of vacuum of goods trains such as foodgrain specials, which originate from wayside stations. We were informed that the driver and guard carry out the examination and advise if anything is lacking.

385. We feel that both in the matter of stabled loads and goods trains originating from wayside stations, the practice of moving them without proper examination and test of vacuum is not free from danger. We recommend for adoption, the practice followed on the South Eastern Railway of deputing a mobile gang to examine the load and give a fresh vacuum certificate before a stabled goods load/goods train originating from a wayside station is moved.

386. Brake power on goods trains :—This subject was discussed by us in paras 530 to 540 in Part I of

our Report wherein we had also referred to the test checks made by us through the neutral control organisation which revealed a highly unsatisfactory state of affairs. These observations were corroborated during our visits to zonal railways. Complaints regarding shortage of brake power, especially in the case of goods trains, have been made to us by many drivers. In many cases, adequate brake power is not available at the originating station and this fades away on the run. Some drivers also mentioned to us that brake power, much below the prescribed levels, had led to certain accidents. Some of the running staff who gave evidence before us stated that they had represented to the section controllers regarding inadequate brake power but they were asked to continue to operate their trains on the condition that they would not be held responsible for the consequences thereof. We would reiterate the recommendation made by us in Part I of our Report that the Railways must ensure that trains leave the originating station/s with the stipulated brake power. All impediments which stand in the way of achieving this aim must be effectively removed.

387. Vacuum gauges on trains :—We find that in the case of mail and express trains running between the North Eastern and Northeast Frontier Railways, vacuum gauge is fitted in one brake van only so that in the return direction there is no vacuum gauge in the guard's brake van. We consider that the provision of a vacuum gauge in the guard's brake van is an important safety measure and the Railways should take steps to see that it is invariably provided in all cases.

388. We had referred to the absence of the vacuum gauges in brake vans of goods trains in Paras 538 to 540 in Part I of our Report. Guards working goods trains forcefully represented the difficulties encountered in fixing vacuum gauge in the brake van. We were informed that the adapters required for fitting the vacuum gauge are usually missing. It was stated that the guard certifies and signs on the vacuum certificate on the strength of the reading given on the portable vacuum gauge which the maintenance staff carry with them. Some guards mentioned to us that even in cases where the vacuum gauge can be fitted, it is not possible for the instrument to stay in position during the run due to the intense vibrations in the brake van; because of this the vacuum gauge either falls down or gets damaged internally.

We feel that the existing arrangements for providing vacuum gauges in guard's brake vans are not satisfactory. It must be ensured that guards have a vacuum gauge fitted in the brake van.

389. Loss of brake power on the run :—In para 537 in Part I of our Report we had referred to the drop in the brake power on trains during the run. We discussed this subject further during our tours. While the RDSO has informed that the drop in brake power should be in the range of 8 to 9 per cent after about a run of 400 kilometres, on zonal railways it was complained to us by many drivers that the drop was much more. It was stated that the poor quality of rubber materials used in the automatic vacuum brake system and the inadequate supply of these materials were responsible for the loss of brake power. We consider

that zonal railways should undertake trials to determine the extent of the loss of brake power in different trains under actual field conditions and take remedial measures accordingly.

390. *Air brakes* :—During discussions with the RDSO it was indicated that the present automatic vacuum brake system has been stretched to its maximum limit. It was suggested by them and the zonal railways that air brakes, will provide a more efficient braking system, particularly with the introduction of heavier and faster trains. Director General, RDSO informed us that the question of air brakes has been examined by them, and recommendations regarding the manner in which air brakes may be adopted, have been made to the Railway Board. In view of the importance of this matter we would urge the Railway Board to take an early decision.

391. *Maintenance of coaching stock* :—Coaching stock on the Railways is examined and repaired in washing and pit lines, sicklines, maintenance depots and workshops. We visited these places on many zonal railways and interviewed the concerned staff and officers. On the basis of our observation, the evidence tendered before us and the information made available to us by the zonal railways, we find that the capacity and the facilities at almost all stages of examination, maintenance and repair of coaching stock are inadequate. The gap between the actual requirements and availability of facilities is further widened due to introduction of a number of new trains and extension of existing passenger train services. Viewed in the context of increase in derailments, due to defects in carriages, by 37.0 and 15.3 per cent on the broad and metre gauges respectively during the 5-year period 1973-74 to 1977-78 as compared to the previous 5-year period, the unsatisfactory position of carriage maintenance facilities is indeed distressing.

392. *Examination of and repair to coaching rakes in station yards* :—Provision of facilities for the examination and maintenance of coaching rakes was discussed in paras 500 to 502 in Part I in our Report. On the basis of the information made available to us now, we find that, at a large number of stations, a substantial number of coaching rakes are not placed on the washing and pit lines for maintenance. The proportion of such rakes to the total number of rakes handled at some major stations is given in Annexure CXV. It will be seen that during the quarter ending 30-9-1979, 75 per cent of the coaching rakes at Bhopal, 66.3 per cent at Jhansi, 36.1 per cent at Madras Central and 60 per cent at Cochin Harbour Terminus were not placed on washing and pit lines for maintenance. Slip coaches are receiving even less attention, since at many stations, none is placed on washing and pit lines. The main reasons given were inadequate number of washing and pit lines, inadequate capacity of stabling lines and operational reasons. In the evidence tendered before us it was also mentioned that there are a large number of stations where passenger trains either originate or terminate, but at these there is no washing and pit line for maintenance.

Because of this coaching rakes are being examined, at times, on platform lines or are not being given any examination at all.

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393. In some cases pit lines are of inadequate length and most of the longer rakes of 16 coaches and above cannot be attended to in one placement. We also found that the lighting arrangements and drainage of pit lines was unsatisfactory, thus inhibiting the staff from carrying out proper examination and repairs to the undergear.

394. We feel that this state of affairs should not continue and strongly recommend the following steps :—

(i) Timely placement/withdrawal of rakes on/from pit lines must be ensured.

(ii) Adequate stabling capacity must be created to stable examined loads and release the pit lines for placement of other rakes.

(iii) Railways must immediately undertake a review of the pit line facilities and equipment required and make up the deficiencies on a time-bound programme.

(iv) All pit lines should be long enough to accommodate the longest passenger-carrying train in service and that contemplated in the near future.

(v) Adequate lighting of pit lines should be ensured.

(vi) Drainage in pit lines should be improved. Perhaps a change in the basic design of the examination pit is called for.

(vii) All slip coaches should be examined on pit lines.

395. *Policy for introduction of new passenger trains* :—We have noted in the foregoing paras that while accidents attributable to carriage defects have increased lately the gap between the requirement and availability of maintenance facilities is widening. The policy for introducing new train services has to be reconsidered in this context.

396. It was mentioned to us by some senior officers on zonal railways that, on most occasions, new trains have to be introduced and existing services extended under pressure, without ensuring that adequate maintenance facilities are available. Introduction of new trains and extension of existing services, apart from straining the available maintenance facilities, have also caused acute shortage of spare coaches. As a result, coaches due POH cannot be spared in time, nor replacement provided for coaches marked sick. Also, in an effort to muster more coaches for running additional services and augmenting existing services, integrity of rakes which is essential for effective control of maintenance, is being disturbed. Thus, the introduction of new trains without providing necessary maintenance facilities and additional coaches, has very adversely affected the overall maintenance of coaching stock. Since it would take time to set up the required maintenance facilities, we feel that the Railways have to be extremely cautious in the matter of introducing new train services and extending the run of existing ones. There are obvious limits to the resistance which the Railway Board and zonal railways can put up in the face of popular demand for more and faster trains. We would therefore, urge on the political authority in the country not to stretch the railway system too far.

397. *Facilities and equipment in sicklines and maintenance depots* :—Most of the sicklines visited by us were devoid of the basic facilities like adequate covered space for protection of workers from inclement weather, pucca flooring and pathways for easy and quick movement of men and materails. We were also informed of inadequate lighting in sicklines. Shortage/non-availability of jacks, equipment for ultrasonic testing and welding and pneumatic tools, were reported. Wheel lathes were available in very few maintenance depots and even these were very old. In one depot the wheel lathe was so outdated that it took 48 hours for turning a pair of wheels. Because of this constraint wheels have to be regularly sent to workshops for turning, with consequent delays which affected repair work. It was also mentioned that the funds made available for this purpose through the annual Machinery and Plant Programme of zonal railways were grossly inadequate.

398. We are of the opinion that occasional efforts at providing a shed in one depot or a machine in another depot on an annual basis do not serve any purpose. Deficiencies have to be made good in a coordinated manner. We, therefore, recommend that modernisation of sicklines and depots, which should cover the provision of facilities like sheds, flooring, pathways for workers, plant and machinery, equipment for handling materials, requirements of electric power, requirements of staff and their training should be taken up as a project. We feel that a task force, not bothered by the day to day stresses of railway working, must be set up to carry out this work within a period of five years. Necessary resources will, no doubt, have to be provided.

399. *Periodical overhaul to coaching stock on superfast trains* :—Periodical overhaul (POH) of coaching stock is presently undertaken at the following time intervals :—

	POH interval (months)
(i) Passenger carrying vehicles (PCVs) and other coaching vehicles (OCVs) on mail/express trains.	12
(ii) PCVs of other than mail/express rakes.	18
(iii) OCVs of other than mail/express rakes.	24

Our enquiry revealed unanimity amongst staff and officers that rakes of superfast trains should be given POH at shorter intervals. We were informed that the rakes of some superfast trains are now running 4 lakh kilometres per annum against 1 lakh kilometres in the past. Such extensive use results in extra strain and wear and tear on the coaching stock. We feel that, to ensure a high standard of maintenance, POH of coaching stock should be planned on the basis of kilometres earned so that more intensively worked rakes are given POH at shorter intervals than at present. We understand that this matter is already engaging the attention of the Railway Board and we would suggest an early decision on the same.

400. Reduction in time intervals between successive POHs in the case of intensively worked rakes will, no doubt, enhance the workload in workshops. We feel that arrangements to take up the increased workload should precede the stipulation of revised intervals between POHs. The requirements of spare coaches may also have to be reviewed, having regard to the fact that the coaches will now have to be sent to the workshops more often with attendant delays in transit and yards. These factors would, no doubt, be taken into consideration before revising the POH intervals.

401. *Lifting of BEML coaches* :—We were informed on the Northern Railway that the lifting (IOH) of BEML coaches required to be done every six months as per extant instructions is not being done at Delhi and New Delhi due to the non-availability of capacity and materials for repairs. If this is so, we would urge the Northern Railway Administration to take urgent steps to organise undertaking of the stipulated schedule within the shortest possible time. Other zonal railways should also review the position and take action likewise.

402. *POH of EMUs* :—It was deposed before us by senior officers on the Eastern Railway that the capacity for POH/AOH* of EMUs is not enough to meet the requirements. Besides there is backlog of POH of EMUs due to rakes not being spared for the shed. With the aging of motors, additional facilities for lifting were stated to be necessary. We consider that EMU services should be so planned as to provide for the required time in the shed. Besides, the Railway Administration should also plan for expansion of the existing facilities for POH/AOH to meet the maintenance requirements in full.

403. *Examination of roller bearings in sicklines* :—Since 1976, quarterly examination of roller bearings on coaching stock is being done in sicklines. The staff are required to open the face plate, check the locking plate and bolts and the condition of grease. As mentioned in para 569 in Part I of our Report, this examination which was required to be conducted in nominated sicklines under the supervision of a senior supervisor of workshops, was ordered with a view to immediately arresting roller bearing failures, a number of which had caused accidents.

404. During the course of our inspections on zonal railways we found that, at most places the quarterly examination of roller bearings is being done in washing and pit lines in the open, in dusty and dirty surroundings. Even though instructions exist for providing shields over the axle boxes for excluding dust, water, etc., we found that these instructions were, by and large, not complied with. We, therefore, have grave reservations on the desirability of continuing quarterly examination of roller bearings in sicklines.

405. We discussed this question with the RDSO. They advised us that since roller bearing components are machined to very close tolerances and made to a high degree of precision, these should be handled with utmost care so as to obtain the designed service life. It was stated that if conditions of roller bearings are

*AOH—stands for Auxiliary Overhaul.

kept close to the ideal by proper care in use and maintenance, long service life can be expected from them.

On the zonal railways, some Chief Mechanical Engineers were of the firm view that opening up of roller bearings must be done only in workshops. It was mentioned that, with proper care of roller bearings in workshops, these should not require attention more frequently than POH to POH.

406. We fully agree with this assessment, which needs to be given practical shape. The quarterly examination of roller bearings in sicklines was ordered by the Railway Board as a temporary expedient because of a number of failures of roller bearings and this should not be made a regular maintenance practice. We recommend that the standard of maintenance of roller bearings in workshops should be improved so that attention to these on line does not become necessary at all during the interval between two POHs.

407. If, however, the Railway Board and the Railway Administrations feel that inspection of roller bearings between two POHs is absolutely necessary, then conditions similar to those obtaining in workshops should be created in nominated sicklines and maintenance depots.

408. *Facilities and equipment in workshops for maintenance of roller bearings*:—While adequate arrangements for giving proper attention to roller bearings exist in some workshops, in a number of others much remains to be done. In the workshops at Ajmer, Hubli and Kharagpur, we found that the work of dismantling the incoming roller bearings had been isolated from the cleaning and assembly side. In some of these, pressurised chambers were available for cleaning of roller bearings. We found in some other workshops that the cleaning and assembly sections had not been segregated, there were no arrangements for pressure washing of roller bearings and this job was done manually with brushes. We urge the Railway Administrations to initiate urgent steps to provide adequate facilities for inspection and maintenance of roller bearings.

409. *Implementation of the recommendations of the One-Man Committee on roller bearings*:—In para 570 in Part I of our Report, we had referred to the recommendations made by the One-man Committee appointed by the Railway Board in December, 1975, to investigate the incidence of roller bearing failures and to go into various aspects of servicing, maintenance and design of roller bearings. During our inspections of the servicing facilities on line and in workshops we found that some recommendations made by the said Committee, and accepted by the Railway Board, have so far not been implemented by zonal railways. We recommend expeditious implementation of the accepted recommendations.

410. *Condition monitoring of roller bearings*:—From the information made available to us, we find that, M/s. SKF, in collaboration with M/s. SPM Instrument, Sweden, have developed a method for diagnosing faults in bearings *in-situ*, using the high frequency shock impulse transmitted by the roller elements and have developed an effective instrument

for this purpose. These special instruments are at present used for the condition monitoring of bearings on traction motors so as to avoid failures in service. In view of the vastly increasing population of roller bearings we feel that new ways and means would have to be devised so as to monitor the condition of roller bearings fitted on stock without the need to open them. We recommend the taking up of such a project by the R.D.S.O.

411. *Quality of indigenous roller bearings*:—We found that in many of the workshops there were complaints regarding the quality of indigenously manufactured roller bearings. At the Integral Coach Factory the Committee were told that during a period of about one month in early 1980, a little less than one per cent of the new roller bearings inspected for fitment on new coaches, were rejected. The rejections were due to either missing rollers, scratches on the inside face or due to excessive clearance etc. Some of the staff in the field mentioned to us that there were cases where new roller bearings had failed within a period of 2 years of having been put into service. It was the general impression that the quality of imported roller bearings was much better and there were fewer failures. There is thus need for an urgent dialogue with the manufacturers of roller bearings who should be apprised of the failures in service for affecting improvement in the product.

412. *Identification marking on roller bearings*:—We find that there is no uniform practice of giving identification numbers on roller bearings so as to be able to identify and collate information regarding their age, kilometres run etc. in case of failure. We saw that at ICF and in some workshops, etching of identity numbers on roller bearings is done and records thereof, giving the axle number on which it was mounted, are also maintained. We feel that, for a purposeful investigation of roller bearing failures, it will be necessary to know the history of the bearing which will be possible only if identification numbers are given on all bearings and proper records maintained. We recommend that, workshops and depots on zonal railways, should follow a uniform system of giving identification numbers on roller bearings and maintaining record of the axle number on which it is mounted.

413. *Overloading of BOX wagons*:—The question of overloading of BOX wagons was examined by us in paras 507 to 518 in Part I of our Report. Most of the supervisors in charge of maintenance of box wagons stated that the heavy breakage of springs in box wagons is primarily due to the overloading of box wagons. Checks made by us in the field, evidence tendered before us by staff and officers and the documents made available to us, have also confirmed our earlier impressions that large-scale overloading of box wagons is rampant. Our scrutiny of the weight register pertaining to Andal yard on Eastern Railway, revealed that a very large number of box wagons were overloaded with coal. In some box rakes, out of 30 boxes, 28 to 29 boxes were overloaded generally to the extent of 6 to 12 tonnes, with the maximum going upto 15.7 tonnes. The results of this scrutiny are given in Annexure CXVI. A study made by the South Central Railway had shown that 70 to 80 per cent of

the box wagons were overloaded. This study was made by checking the camber of springs of the loaded box wagons. Against the maximum permissible negative camber of 4mm the actual camber in springs in the loaded condition was found to be going even upto -24 mm in over 20 per cent of the cases.

414. The reasons for overloading of box wagons were stated to be:—

- (i) non-availability of weigh-bridges in most of the loading siding and in some cases wagons not being passed over the weigh-bridges;
- (ii) weighbridges remaining out of order;
- (iii) Difficulties in readjusting loads in wagons found overloaded.

We had elaborated in para 507 in Part I of our Report the measures being taken to instal more weigh-bridges at loading points which are capable of weighing wagons on the move. On the Eastern Railway we were also informed that under the scheme of rationalisation of coal loading points, it is proposed to provide weigh-bridges in individual coal sidings.

415. During our inspections we found that even where weigh-bridges have been provided at stations or in sidings, their upkeep was far from satisfactory. For instance, the weigh-bridge at New Gauhati (Northeast Frontier Railway) was out of order for the last 3 years and the one at Kanstoria colliery siding (Eastern Railway) remained out of order for 80 days in 1976, 21 days in 1977, 94 days in 1978 and 89 days in 1979 upto the month of October. The position at other places may not be very different. This indicates a highly unsatisfactory state of affairs which needs to be remedied. We were surprised to know that orders had been issued not to weigh the loads at Bhojudih destined for Bhilai Durgapur and Rourkela Steel Plants due to congestion in Bhojudih yard and consequently the loads for these steel plants were being allowed to go without weighment since August, 1979. Such orders could lead to serious accidents, apart from conveying the impression to staff that the administration gives scant respect to its own safety rules.

416. On the question of adjustments of load in overloaded wagons, we were informed by one head weighment clerk that it is possible to readjust the load only in the case of 4-wheeler wagons, which form about 40 per cent of the total number of wagons loaded with coal in that region, the remaining box wagons cannot be readjusted and are passed on as they are. He stated that there is difficulty in detaching the overloaded box wagons as well as in making adjustment in its load which may be 8-12 tonnes at times. One senior divisional operating superintendent also mentioned to us that, the adjustment of overloaded box wagons would in fact involve a major planning work. Here we would invite attention to para 511 in Part I of our Report where we had referred to the instructions given by Railway Board to the zonal railways that adjustment and unloading the excess contents of the overloaded wagons could conveniently be carried out when box rakes arrive

weighment wait for considerable time in the yard or in the outgoing lines. The Railway Board had also expressed a desire that necessary adjustment should be made so that no box wagon with excess load was despatched from the booking station. In actual practice we find that all overloaded box wagons are passed on unadjusted. In fact, with the existing facilities and conditions of working, the officers and staff in the field consider it impossible to implement the aforesaid directions. Thus, this serious problem is still eluding practical solution and earnest efforts need to be made to resolve it. We further recommend that:—

- (i) Weigh-bridges capable of weighing wagons on the move be provided at coal and mineral loading points.
- (ii) Arrangements be made for the proper upkeep and maintenance of weigh-bridges.
- (iii) Deterrent penalties like confiscation of materials in over-loaded wagons be considered in order to discourage overloading.

417. *Failure of laminated springs on BOX wagons*:—From our discussions on some zonal railways we find that considerable problems are posed by the failure of laminated bearing springs on BOX wagons. Not only does this create unsafe conditions but also affects the operational efficiency due to immobilisation of a very large number of wagons. A study made by the RDSO, on the basis of reports from zonal railways, shows that about 8000 breakages of laminated bearing springs take place every year. Information furnished to the Committee shows high incidence of breakages on some divisions. On Adra Division, the average number of cases of breakage of springs detected during 1979 was 235 per month which comes to about 4.5 per cent of the BOX wagons examined on that division; at Mughalsarai the average breakages per month during the period August to October 1979, including those detected at Gaya and Dehri-on-Sone, was 166.

418. The other cause of breakages of laminated springs has been given to us as their sub-standard quality. In a study on broken springs conducted on the South Central Railway, it was found that in almost 60 per cent of the cases the hardness of the top plate of the spring was outside the permissible limits. An investigation made by the RDSO into the spurt in the failures of laminated bearing springs on the Eastern and South Eastern Railways revealed that, besides indiscriminate loading of BOX wagons, many workshops are not equipped for proper manufacture and repair of springs. They had also given recommendations regarding the equipment to be provided in spring manufacturing shops for process and quality control. Our inspections of spring repair shops in workshops, on some zonal railways, revealed that most of these had so far not been provided with the required equipment. While supervisors in some shops pleaded ignorance about the requirements, at some other shops we were informed that indents for the required equipment had been placed. We find that the follow-up on the advice given by the RDSO for

improving the quality of springs has been tardy. We would recommend that expeditious action should be taken by the Railway Administrations to improve the quality of springs manufactured in railway workshops.

419. *Testing of Springs*:—As per the present standards, scrag test is to be carried out on all the springs and the load deflection test which gives the characteristics of the spring, is required to be done only on 5 per cent of the carriage and wagon springs and 100 per cent of locomotive springs. We find that springs on carriages and wagons were responsible for 13 and 25 per cent of the total number of derailments attributable to all carriage and wagon defects on the broad and metre gauges respectively, during the period 1973-74 to 1977-78. More extensive testing of springs is, therefore, needed before these are put into service. We would recommend that the statistically optimum sample size should be ascertained, and that percentage of springs should be subjected to load deflection test.

420. *Clamping of broken bearing springs on BOX wagons*:—In paras 504 and 505 in Part I of our Report we had mentioned about the practice on some zonal railways of permitting movement of BOX wagons with clamped springs, inspite of instructions of the Railway Board issued in August 1969, calling upon zonal railways to discontinue the practice. Officers with whom we discussed this issue were unanimous that even after clamping of the broken springs it is safe to move over short distances only. But in the evidence tendered by some staff it was stated that wagons with broken springs were being made to run right upto the destination/unloading point which may be over 100 kms away, and that on a particular division it had been ordered not to detach wagons with a broken spring. We were informed that clamping leads to uneven loading on the two wheels of the same axle, one having the healthy spring and the other with the broken spring, and continuing to run the wagon in this condition, is fraught with danger. We are of the view that, while clamping of broken BOX wagon bearing springs may be permitted as an expedient to enable these wagons to be moved at restricted speed to the nearby station, having facilities for repair, the practice of moving such wagons over long distances upto the destination, is definitely unsafe and should be curbed effectively.

421. *Permitting wagons with broken helical springs*:—In the evidence tendered before us on one of the divisions of the Northeast Frontier Railway, it came to light that some sicklines and depots are turning out wagons without replacing the broken helical springs due to their non-availability. This, we gathered, has been the practice for quite a long period now. Even though the gravity of the problem was appreciated at the field level by both staff and officers, they appeared to be helpless in the matter. We take strong exception to this practice even as a temporary expedient and urge that it be stopped forthwith.

422. *Failure of axles on the metre gauge*:—A larger number of failures of axles on both carriages and wagons have been reported on the metre gauge

sections of the Northeast Frontier, South Central and Western Railways since 1978. Many of these failures resulted in derailments also. In a study into these failures which the South Central Railway had undertaken, it was found that a majority conformed to one pattern, i.e., failure in the vicinity of the wheel-seat. Another common feature that emerged was that the carriages and wagons on which the axles failed had undergone POH in Hubli Workshops and the axles involved were old, having been in service for more than 20 to 25 years and had been provided with new wheel discs. We have been informed that it is an old practice to forge down and machine old broad gauge axles to lower diameter, for use on metre gauge rolling stock. In the study referred to above, the South Central Railway had come to the conclusion that failures are mainly due to reduction in the fatigue strength in the press-fit zone. Doubts were also expressed about the desirability of pressing out old wheel discs from usable axles. These issues would need to be investigated in detail through collection and analysis of more data and laboratory tests. We recommend that RDSO should undertake this study so as to standardise the practice of using old broad gauge axles.

423. *Ultrasonic testing of axles*:—Even though some workshops and maintenance depots have been equipped with ultrasonic testing equipment, the testing is restricted to a percentage of wagon axles only, while all axles of locomotives and coaches are tested. Our inquiries into the failures of a large number of axles of wagons and coaching stock on metre gauge sections on the South Central, Western and Northeast Frontier Railways reveal that old axles had been reused after a visual examination only and no ultrasonic testing thereof was undertaken. We would stress the need for ultrasonic testing of all axles in workshops and in maintenance depots where re-tyring or re-discing of axles is undertaken. It is essential that adequate equipment is available in the workshops and maintenance depots for this purpose.

424. *Failure of draw bars on the metre gauge*:—We find that on some of the metre gauge divisions there has been very heavy incidence of draw bar failures, resulting in train partings both in station yards as well as in mid-section. In the evidence tendered before us on the Northeast Frontier Railway it was stated that failure of draw bars is basically due to substantial increase in the loads of trains on metre gauge from 700 tonnes to 1200 tonnes. Breakages have also occurred due to mismanagement by engine crew, material defects and fatigue. On the Alipurduar division of the Northeast Frontier Railway we found that about 40 per cent of the accidents during the last 3 years were attributable to breakage of draw bars. The year-wise position was as under:—

Year	Total number of accidents	Number of drawbar breakages
1976-77	112	49
1977-78	88	32
1978-79	90	35

425. In 200 cases of draw bar failures which were investigated by the New Bongaigaon workshops the cause-wise breakup was as follows :—

Cause of failure	Number of failures	Percentage of the total
Mismanagement by engine crew	78	39
Manufacturing defect in draw bar	30	15
Material defects	56	28
Fatigue failures	36	18
Total	200	100

Thus, in 61 per cent of the failures, material and quality of the draw bar were in question. Our enquiry on the zonal railways also revealed that provision of modified draw bars on metre gauge stock has still not been implemented to any significant extent. In view of the dangers to safety of train operation which failures of draw bars entail, it is necessary that all-out efforts are made to check this trend. In this context, we recommend the following :—

- (i) Provision of modified draw bar on metre gauge goods stock should be completed within the shortest possible time.
- (ii) Quality control and testing of material for draw bars and process control during their manufacture should be tightened.

426. *Neutral control examination* :—We had gone into the question of neutral control examination of rolling stock in workshops, marshalling yards and sicklines in paras 590 to 594 in Part I of our Report wherein we had expressed the opinion that, in the interest of safety of train operation and to improve the condition of rolling stock on the Indian Railways, extension of neutral control examination would appear to be an effective means. We had the opportunity to look into the working of the neutral control organisation. We found that a large percentage of wagons turned out of workshops, wagon maintenance depots and sicklines are rejected by neutral control staff. It is true that in some cases rejection by neutral control is for reasons which do not have any bearing on safety. Similarly, in many cases the local passing is after the deficiencies pointed out by neutral control staff are rectified. Still some wagons at least would be going out under this arrangement, with some safety deficiencies unattended.

427. In order to arrest the trend of increasing derailments due to carriage and wagon defects, we recommend that :—

- (i) The Neutral Control Organisation should be brought under the charge of Director Mechanical Engineering in the Railway Board so as to give it the necessary status and make it an effective organ of inspection.
- (ii) Neutral control examination should be extended to all the workshops and major carriage and wagon maintenance depots.

(iii) At the remaining depots and sicklines, neutral control staff can be deputed on a selective basis depending upon the importance of the unit.

(iv) Neutral control examination should be extended to selected major yards depending upon the pattern of goods train examination, which will be adopted on the suggestions of the Committee, the setting up of which has been suggested by us earlier in this chapter.

428. *'S' Marked defects in Conference Rules* :—In para 601 in Part I of our Report we had referred to the finalisation of the list of defects in coaching and goods stock which have a direct bearing on safety or 'S' marked items in the Conference Rules. Our discussions with staff on zonal railways showed considerable difference in opinion whether certain items really pertain to safety. We have been informed that this matter is still under review. Finalisation of this matter has been pending for a very long time and in view of its implications on safety of train operations we urge the Railway Board to finalise this issue without further delay.

429. *Handbooks for carriage and wagon maintenance staff* :—We would also consider it necessary that rules pertaining to the maintenance of carriages and wagons which are applicable to the work carried out by staff at different work spots like yards, sicklines, depots, workshops, should be prepared in the form of separate handbooks for guidance of staff. These handbooks should also illustrate the type of deficiencies which the staff are likely to come across during their work and the hazard which these may pose if not attended to properly. These handbooks should also be brought out in local languages for the benefit of staff not knowing English.

430. *Maintenance of rolling stock* :—The South Eastern Railway has furnished the following information regarding expenditure per maintenance unit of rolling stock :—

Year	Expenditure on materials per maintenance unit (In rupees)	Percentage escalation in price of materials as compared to the Previous year	Expenditure on materials at 1974-75 prices
1974-75	759	—	759
1975-76	993	9.9	904
1976-77	1166	8.6	977
1977-78	1124	10.1	855
1978-79	1215	10.9	834
1979-80	1094	20.0	626

It will be seen that, after providing for the escalation in the cost of materials, the actual expenditure on materials at 1974-75 prices per maintenance unit of rolling stock has continuously declined since 1976-77.

In a period of 4 years, the drop has been approximately 30 per cent. This, we were advised, was due to non-procurement non-availability of materials which had caused extreme shortages. During our visit to this Railway widespread shortages of materials for carrying out repairs and maintenance of carriages and wagons were reported.

Both staff and officers stated that large-scale cannibalisation of parts was being resorted to. Our detailed review of accidents shows that, on the broad gauge of the South Eastern Railway, the number of derailments attributable to carriage and wagon defects has gone up steeply from 80 during the 5-year period 1968-69 to 1972-73 to 153 during 1973-74 to 1977-78. Prima facie, there is correlation between the number of accidents and extent of shortages of and fall in expenditure in materials for repair. Since all zonal railways suffer from such shortages, we strongly recommend that effective steps be taken to overcome them.

431. *Modifications to rolling stock* :—During the course of our visits to the workshops, we found that considerable delays have taken place in carrying out safety modifications to rolling stock. On the basis of information furnished to us by some zonal railways, we have reviewed the progress of implementation of a few safety modifications on goods and coaching stock. This is placed at Annexure CXVII. We find that safety modifications on coaches and wagons ordered as far back as 1967 and 1968 were still to be implemented in a substantial manner on some zonal railways. For example, the work of replacement/repositioning of defective vacuum reservoir suspension straps on broad gauge ICF coaches was still to be completed on 406 out of 600 coaches on the Central Railway. The modification to pressed steel axle guards to eliminate their failure in service which was ordered in November 1968 was still to be completed on 43304 out of 44808 wagons on the Central Railway, on 4373 out of 4776 wagons on the South Central Railway, and on 13020 out of 28020 wagons on the South Eastern Railway. Modification to retaining ring on BOX/BCX wagons centre pivot assembly ordered by RDSO in 1971 and 1972 was still to be done on 6196 BOX wagons on the Central Railway due to non-availability of materials. Like wise, there are several other examples in which work on safety modifications has so far not commenced on some zonal railways.

In reply to our enquiry, the Eastern Railway has given only general comments regarding the implementation of safety modifications and has not advised us the actual number of coaches/wagons modified so far.

432. Discussions with officers in workshops and in the headquarters of zonal railways revealed that the main constraints in implementing the modifications were non-availability of adequate manpower and materials in the workshops. We were informed that the number of man-hours required for carrying out some of these modifications is so high that it cannot be managed within the available strength in workshops.

433. It is imperative that modifications ordered in the interest of safety are executed within a specified time and everything possible is done to achieve this. We recommend the following :—

- (i) While ordering safety modifications, the Railway Board should lay down a period within which these should be completed. If additional manpower is required for this purpose, the Zonal Railway Administration should have the authority to sanction the same.
- (ii) A special drive should be launched to complete all pending safety modifications speedily.
- (iii) Neutral Train Examiners posted in workshops, should make a special check on the execution of safety modifications on all coaches/wagons turned out of workshops.

434. *Machinery and plant in workshops* :—During the course of our visits to the workshops, we found that a very large number of old and obsolete machines are still in use. This was stated to be due to the replacement of these machines, under the annual Machinery and Plant Programme, being very slow due to shortage of funds. We understand that recently a few major workshops have been selected for modernisation and funds for these have been obtained on loan from the World Bank. This will, no doubt, improve the position in these workshops, but we would recommend that replacement of old and obsolete machines in other workshops should also be done at a faster pace.

435. *Hand-brake in EMU* :—It was represented to us by the motormen on the South Eastern Railway that in the EMUs built since 1977-78, the hand-brake, which used to be earlier provided inside the motorman's cab, has now been relocated. It was stated that the hand-brake enables them to protect the train from moving in case of prolonged power failure or on falling gradient. With the hand-brake away from the cab, the motorman can no longer make use of it. Instead, it is now accessible to outsiders and miscreants, unauthorised operation by whom had resulted in a case of skidding on the South Eastern Railway.

We do not consider the new arrangement satisfactory since the hand-brake should be available readily to the motorman. Besides, there is always the danger of its unauthorised use which will also be detrimental to safety in train operations. We recommend that the hand-brake should be provided in the motorman's cab.

436. *Problem of corrosion in coaches* :—During the course of our visits to carriage workshops on zonal railways we saw the extensive damage to coaching stock due to corrosion, not only in the vicinity of the lavatories but all along the base of the side paneling which had also affected the longitudinal members of the frame. We gathered that the workload on this account has gone up considerably in recent years, necessitating the opening of corrosion repair shops in certain workshops. In the RDSO we were informed that new formulations of anti-corrosion paints had been developed in the laboratory and put on service

trials. Suggestions had also been given by them to ICF in the mater of steel to be used for coaches. A manual for corrosion repair and maintenance of ICF coaches has also been issued by the RDSO. While the remedy suggested by the RDSO should continue to be made use of, we feel that there is need for further research into this problem, in collaboration with other research institutes.

437. *Height of couplings in CRT wagons* :—It was represented to us by the staff that, due to the coupling in CRT wagon being at a greater height than in other types, there is a tendency for the coupling to slip out in the case of jerk. There is also the danger of injury to the hand during coupling. We examined this matter and found that, depending upon the tolerances in the wagons, the coupling in the CRT wagon is higher than the coupling in the 4-wheeler wagon by 98 mm in the worst case. We feel that, in view of the difficulties indicated, this matter should be looked into thoroughly.

438. *Marshalling of anti-telescopic coaches on passenger trains* :—Marshalling of anti-telescopic coaches on passenger trains was dealt with in paras 549—552 of Part I of our Report wherein it was mentioned that the extant instructions on marshalling passenger trains are not always followed. On the basis of further information furnished to us by zonal railways, we have examined the availability of anti-telescopic/steel bodied second, luggage, brakes on the basis of marshalling instructions of the Railway Board. The railway-wise position is given in Annexures CXVIII & CXIX. The overall position is as under :—

Anti-Telescopic/ Steel Bodied SLR.s	Broad Gauge		Metro Gauge	
	SLRs	Coaches	SLRs	Coaches
Requirement	2459	9434	2091	8373
Holding . . .	1925	10501	909	6858
Shortage . . .	634	—	1182	1515

439. Zonal railways have advised us that, due to shortage of anti-telescopic/steel bodied coaches and SLRs on the metre gauge and anti-telescopic/steel bodied SLRs on the broad gauge, it is not possible to comply with the instructions for safety marshalling of mail/express/passenger trains as laid down by the Railway Board. It is disappointing to find that, even after the lapse of over a decade since instructions regarding safety marshalling were first issued by the Railway Board, zonal railways are still not in a position to comply with the same due to shortage of anti-telescopic/steel bodied SLRs on both the gauges. There are also instances of wooden bodied coaches being marshalled next to the engine and in the rear.

In view of the implications of this on safety, we would urge the Railway Board to plan the production of adequate number of anti-telescopic Steel bodied SLRs and coaches for the broad and metre gauges to enable strict compliance with the marshalling instructions.

440. In para 551 in Part I of our report we had also referred to the question of treating steel bodied coaches at par with anti-telescopic coaches manufactured by ICF. We have been informed during discussion with RDSO and ICF that the modified design recently finalised for the steel bodied coaches (BEML) envisages strengthening of the ends and it is expected that the modified steel bodied coach shall perform as well as the ICF. We do not consider it necessary to pursue this matter further.

441. *Use of centre buffer couplers for coaching stock* :—On the British Railways it is reported to have been found that the use of centre buffer couplers on coaching stock reduces the number of casualties in the event of accidents. We would like this matter to be examined further and, if the claims made are found to be correct, the adoption of this type of coupler for coaching stock on Indian Railways should be considered.

SAFETY ORGANISATION

442. *Set up of the safety organisation* :—The set up of the safety organisation on the Indian Railways, created in pursuance of the recommendations of the Kunzru Committee and enlarged and strengthened on the basis of further recommendations made by the Wanchoo Committee, is now functioning in a three-tier arrangement. At the apex there is the Safety Directorate in the Railway Boards' office under the charge of a Director, assisted by two Joint Directors and supporting staff. In the headquarters of the zonal railways, there is a Chief Safety Superintendent in the Senior Administrative grade assisted by a Senior Transportation Officer (Safety). On the divisions, there is a Divisional Safety Officer in the senior scale with a team of safety counsellors drawn from different disciplines.

443. *Impressions of the present safety organisation* :—We had the opportunity, through discussions with staff and officers, to go into the role and functioning of the safety organisation. We found that, by and large, the personnel working in the safety organisation were not of high calibre. Instances came to our notice of officers holding posts of divisional safety officers who had all along worked in the Commercial Department and had neither the flair nor the background for the work which they are now called upon to do. Except for a few instances, divisional safety officers were Class II officers, who were on the verge of superannuation and were holding these posts on first promotion to senior scale. With their attention understandably concentrated on their impending retirement, they lacked involvement in their tasks and the drive to achieve results. The general impression given was that this organisation is a refuge for unwanted persons and rejects of the departments and for accommodating employees with health or domestic problems. Both amongst officers and the staff in this organisation, the majority felt that, given the chance, they would like to go back to their parent department.

444. The incumbents of the posts of divisional safety officers as also chief safety superintendents were getting frequently transferred; the stay of a person in one post, during the last 5 years, was in some cases as low as 6 to 9 months only.

445. We found that the divisional safety officers are allotted a variety of duties unrelated to safety, such as supply of uniforms, postings and transfers of operating staff, etc. In addition, they are also often deployed on sundry trouble-shooting assignments for the Operating Department. By a recent order, they are also required to deal with disciplinary enquiries on commercial matters pertaining to station masters, guards, etc.

446. A handicap which was forcefully represented on all the divisions was the relatively junior status of the divisional safety officers. In the present set up,

when all the divisional officers of the executive departments are in the junior administrative grade, the divisional safety officer, who is in the senior scale, is placed at a disadvantage in status and is unable to carry weight with his peers in other departments.

447. The officers manning the safety organisation in its three-tier arrangement are, at present, all drawn from the Traffic Department, and in some cases from the Commercial Department also. There was near unanimity among officers from other departments that there is need to make the safety organisation more broad-based by drawing officers from the other major departments like Mechanical Engineering, Civil Engineering, Signal and Telecommunication Engineering and Electric Traction, which play a major role in safety of train operations. The need for inducting other technical officers was accepted by some officers of the Safety and Operating Departments also.

448. In so far as safety counsellors are concerned we found that there is no uniformity in the composition of the team on the divisions. On some railways major disciplines like Signalling and Telecommunication, and Electric Traction have no safety counsellors at the divisional level. There were cases where safety counsellors are shared between two divisions which, apart from being inadequate, results in their spending large part of their time in journey only. The posts of safety counsellors in some cases had remained unfilled for long periods. Not infrequently, the divisional safety officers had to be content with men of indifferent calibre posted as counsellors. As against this, instances were quoted where persons specially selected for the job were not spread by the executive departments.

449. The safety counsellors themselves were not very clear about their functions. Examination of the work done by safety counsellors on some of the railways showed that they have become yet another category of inspectors who do little else besides pointing out acts of omission and commission on the part of staff, and calling for remarks and explanations. They seem to have very little idea what the counselling function is and how to go about it; they had not been trained and guided for such work.

450. Both at the divisional and headquarters levels on the zonal railways, our inquiry revealed that there was no system of effectively monitoring the follow-up action on recommendations made by committees of inquiry into railway accidents.

451. Very little is being done by way of regular statistical studies and analyses of long-term trends of various types of accidents by the safety organisations now functioning at the divisional and headquarters levels on almost all the railways and even at the Railway Board level. In the paragraphs to follow, we have

given our views and recommendations on the safety organisation.

452. *Role of the safety organisation.*—The responsibility of ensuring safety on the railways is squarely that of the different departments and their accountability in this respect must not be diluted. The safety organisation has to be essentially a service department helping the other departments to discharge their safety functions effectively. The safety organisation has to be structured at all the three levels to perform this service function usefully, but should not be burdened with direct executive responsibility of other departments in the name of safety. The concept of the safety organisation as a service organisation can best be served by inducting into it officers from any of the major departments, namely, Operating, Civil, Engineering, Mechanical Engineering, Signal and Telecommunication Engineering, and Electric Traction Departments, who are mainly concerned with safety in train operations.

453. *Functions of the safety organisation at the divisional and headquarters levels.*—Taking the divisional level first, we feel that the main functions of the safety organisation should be to carry out preventive and spot checks, safety counselling of staff and conduct of safety propaganda and education, putting up periodic reports to the Divisional Railway Manager/Divisional Superintendent on the deficiencies and problems so that the latter can get the executive officers to take action, watching the conduct of refresher training of all staff connected with operation of trains on the division, dealing with accident cases and arranging inquiries in connection therewith, and ensuring the implementation of various recommendations made by the inquiry committees and other bodies which may have been accepted by the Government.

454. At the level of headquarters of zonal railways, we visualise the Chief Safety Superintendent reporting directly to the General Manager. His functions, inter alia, will include compiling information relating to accidents, highlighting weak links and points in the system and advising remedial action to be taken, steps taken for the promotion of safety-consciousness amongst the staff, follow-up action taken on recommendations by various officers and committees inquiring into accidents, conducting on-the-spot checks to detect unsafe practices and eliminate them, keeping a watch on refresher training of staff of all departments connected with operation of trains and undertaking analysis of various types of accidents, organising safety campaigns and use of mass media for educating the public about hazards.

455. To enable a more effective discharge of the aforesaid functions by the safety organisation at the divisional and headquarters levels we make the following recommendations :—

(i) The general impression that the safety organisation is a refuge for unwanted people has to be corrected. This can be achieved by posting men of ability and dynamism in this organisation, which should be given a fair share of such officers, along with other departments.

(ii) Persons posted to the safety organisation should have a minimum tenure of 2 years.

(iii) The status of the divisional safety officers should be brought on par with divisional officers of other executive departments.

(iv) The divisional safety officer should be relieved of his miscellaneous functions and left free to concentrate on his main responsibility of promoting safety on the division.

(v) Each division should have safety counsellors from the four main disciplines, namely, Operating, Civil Engineering, Mechanical Engineering and Signal and Telecommunication Engineering. There should be provision to add to these, counsellors from specialised disciplines like Electric Traction wherever necessary.

(vi) Safety counsellors should be appointed after a careful selection so as to ensure that they have, in addition to some technical background, a proper understanding of human nature and flair for counselling work.

(vii) The persons selected as safety counsellors should be given appropriate training in counselling techniques.

(viii) An effective system of monitoring the follow-up action on recommendations made by committees of inquiry into railway accidents evolved at the divisional and headquarters levels of zonal railways.

(ix) Regular statistical studies and analysis of the short and long-term trends of various types of accidents must be done at the divisional and headquarters levels of zonal railways.

456. *Functions of the safety organisation in the Railway Board.*—We endorse the view expressed by the Wanchoo Committee that the Directorate of Safety in the Railway Board has a useful function to perform inasmuch as it focusses attention, at the highest level, on matters having a bearing on safety. In their view the Directorate of Safety should continue to perform, as a permanent measure, functions relating to analyses of long-term trends of accidents, examination of various suggestions and recommendations to promote safety, and follow-up the implementation of the recommendations coupled with on-the-spot checks to see whether short-cut methods are being adopted and how these can be eschewed. We find that in the implementation of the recommendations, conducting spot checks, and analysing of long-term trends of accidents, much remains to be done.

457. We find that the Director, originally sanctioned exclusively for 'safety', is now required to deal with 'coaching' matters also. The latter work has become quite onerous lately and it will be unfair to expect that he can do justice to both. We are of the considered view that Director Safety should exclusively address himself to the functions detailed above. Besides, we also expect the Directorate of Safety to coordinate the efforts of zonal railways in the field of safety, monitor such of the problems as have inter-railway ramifications, coordinate the efforts of various railways for use of mass-media for promotion of safety-consciousness amongst railway staff and also among the public.

CHAPTER XII

ACCIDENT STATISTICS

458. *Definition of 'accident'*:—Accident statistics must truly reflect the safety record of the Railways and identify the important areas which call for remedial action to minimise accidents'. In para 5 of Part I of our Report, we had mentioned that the term 'accident' in railway parlance covers a variety of occurrences which may affect safety or may cause interference with normal working such as failure of railway equipment, namely, locomotives, rolling stock, permanent way, etc. which may not necessarily mean a mishap. According to present definition, there are 4 distinct groups of occurrences reckoned as 'accidents'. These were listed by us in para 12 of Part I of our Report and are reproduced below for ready reference.

- Group I— Collisions, derailments, accidents at level crossings and fires in trains. These are referred to as 'Consequential' accidents.
- Group II— Failure of railway equipment, namely, failure of locomotives, rolling stock, permanent way, overhead wires, signalling apparatus, etc.
- Group III— Miscellaneous accidents, such as trains running over obstructions, collisions involving light engines, trolleys, derailments of light engines, fires at stations, etc.
- Group IV— Technical accidents such as breach of block rules, disregard of signals by drivers, averted collisions and train partings*, also referred to as 'Indicative' accidents.

459. The relative importance of accidents is judged by the casualties and extent of damage which occur in each group. Here we invite reference to para 15 in Part I of our Report, where in Table 1 we had mentioned that 95.5 per cent of the casualties and 77.3 per cent of the damages in all accidents during the period 1968-69 to 1977-78 had been caused by accidents in Group I alone. Thus, it is clear that accidents of the types falling in Group I and some categories of accidents falling in Group III only, are indicative of the standard of safety in train operation and would be of interest to the public. Failures of railway equipment, which fall under Group II, are mainly indicative of defective design, manufacture and maintenance or faulty management of assets.

460. Accident statistics as compiled today and placed before Parliament include figures of accidents in Group I, II and III. In the table below, we give the group-wise number of accidents which occurred during the 10-year period from 1968-69 to 1977-78:—

	Number of accidents	Percentage of the total
Group I	8753*	11.2
Group II	58424	74.6
Group III	11118	14.2
Total :	78295	100.00

It will be seen that only one-fourth of all accidents shown in the statistics, as compiled at present, pertain to Groups I and III and the remaining three-fourths are failures of railway equipment. Thus, inclusion of failures of railway equipment in statistics of accidents unnecessarily inflates the figures and pushes the more important categories of accidents into relative background. We feel that this situation should be rectified so that accident figures give the correct picture of safety in train operation, which would also be of interest to the public. Statistics pertaining to failure of railway equipment would really be of interest only to the concerned department. Hence such incidences, in which no actual mishaps to trains are involved, should not be mixed up so that the public do not get a misleading picture of the safety performance of the railways.

461. We, therefore, feel that the term 'accident' needs to be redefined. In our opinion, the term 'accident' should be applied to what are at present termed 'Consequential' accidents listed under Group I above and certain categories of accidents under Group III—Miscellaneous accidents, excluding those of the types like trains running over cattle, fires at stations, etc. this would also be nearer to the practice followed by the International Union of Railways (UIC).

Indicative accidents such as breach of block rules, averted collisions, disregard of signals, etc., although not to be included under accidents must be investigated, analysed and statistics thereof compiled since they are indicative of lapses which lead to unsafe acts or unsafe conditions of work and are, thus, important sources of potential danger.

462. *Classification of train partings*.—We find that train partings which were earlier treated as indicative accidents, have been shown as 'failure of railway equipment' from 1-4-1979. Our study has revealed that train partings were the cause of 13 derailments and 8 collisions during the 10 years from 1968-69 to 1977-78. One of these derailments was a serious accident causing the death of one person and was inquired into by the Commissioner of Railway Safety. In this connection our attention has been drawn to

*As from 1-4-1979 train partings have been treated as 'failure of railway equipment' under Group II.

*Note—This figure is based on the information furnished to us by zonal railways. The number of accidents differs slightly from those given in Annexure I in Part I of our Report.

the reference made by the Chief Commissioner of Railway Safety to the Railway Board, pointing out that the deletion of train partings from the category of indicative train accidents was not a wise step in view of the accident potential of such occurrences. We have gone into this matter carefully and are of the view that train partings should continue to be reckoned as indicative accidents.

463. *Broken rails.*—We find that cases of broken rails are reported and included in statistics but cases of fractures detected by permanent way staff during normal maintenance are excluded. It is obvious that the statistics of broken rails only partially reflect the position and this is likely to divert the attention of the Railways from the nature of the occurrences. A broken rail is a source of potential danger to trains irrespective of whether it is detected by the permanent way staff during their normal course of maintenance or is detected by other than permanent way staff. The incidence of broken rails, in fact, indicates the health of the asset, i.e. track in this case. We consider it essential that every case of rail fracture is reported and is included in the statistics of permanent way failures.

464. *Failures of tyres, axles, brake, apparatus, couplings and draft gears.*—Failures of tyres, wheels, axles, brake apparatus and couplings and draft gears figure in the accident statistics only when the rolling stock is attached to the running trains or the failures result in serious damage to property, i.e. in excess of Rs. 2,000/- or loss of life or injury to persons. Thus, a large number of failures of these components, which do not fulfil the above conditions, are not reflected in the statistics. We consider this prevents the Railway Administrations from giving attention to the causes of such failures. It is necessary that a methodology is evolved by which the failures of the components mentioned earlier are indicated in totality for the benefit of the Railway Administrations.

465. *Failure of signalling and interlocking gears.*—The Wanchoo Committee had suggested that breakdown of modern signalling installation or means of communication may also be classified under the head "failure of railway equipment." In acceptance thereof, the Railway Board had classified the following failures of signalling apparatus as accidents:

- (a) Failure of route relay interlocking causing detention to traffic for more than one hour;
- (b) Failure of centralised traffic control causing detention to traffic for more than one hour;
- (c) Failure of automatic signalling;

(d) Total interruption of communications affecting running of trains; and

(e) Any failure of signalling apparatus on the unsafe side.

Compilation of separate statistics of the aforesaid failures commenced from 1975-76.

466. We find that, presently, statistics of failures of signalling apparatus are being compiled only in respect of failures of sophisticated signalling installations like route relay interlocking, centralised traffic control and automatic signalling. There cannot be two opinions that every failure of a signalling apparatus is a failure of equipment which needs to be investigated for evolving remedial action to prevent a repetition of the failure. We feel that failures of other signalling equipment also, which affect the running of trains, should be compiled. The criterion of detention to traffic should apply not only in the case of failures of route relay interlocking and centralised traffic control installations but also in the case of failures of other signalling and interlocking gears which result in sizable detention to traffic.

467. *Accidents in yards and stations.*—We found that accidents in the yards or at stations like derailments of light engines, trolleys, vehicles and wagons not involving a train or a part of a train, such as derailments in marshalling yards, shunting yards, loco yards and sidings etc. are not reported if the cost of the damage is less than Rs. 500/-. There is no denying the fact that the computation of the cost of damage is always subjective and creates a tendency of underestimating in order to avoid reporting of such accidents. We are unable to understand the basis on which the aforesaid limit of damage was prescribed. In our view, all occurrences of this nature in yards or at stations should be reported irrespective of the cost of damage involved. Statistics thereof should be locally compiled and analysed for taking remedial measures.

468. *Accident records.*—The maintenance of accident records on zonal railways, both at the divisional and headquarters level, leaves much to be desired. In many instances, the records were very shabbily kept and the posting was grossly in arrears. Besides, many of the essential data to be recorded, were also not entered. A comparison of the accident registers maintained by stations/yards with those maintained in the loco sheds regarding breakdown trains, revealed serious discrepancies.

Serious notice of these deficiencies should be taken and it should be ensured that the maintenance of accident records is put on satisfactory footing.

CHAPTER XIII

THE COMMISSION OF RAILWAY SAFETY

469. *Historical.*—The origin of the Commission of Railway Safety (hereinafter referred to as the Commission) was gone into at length by the Wanchoo Committee in paras 572 to 580 in Part II of their Report.

470. The Commission, earlier designated as the Railway Inspectorate, functioned under the control of the Railway Board since the establishment of the latter in 1905. The independent Commission of today has its foundations in the Government of India Act, 1935, Section 131(3) of which provided that functions for securing the safety both of the members of public and all persons operating the railways, including holding of inquiries into the causes of accidents should be entrusted to officers independent of the Federal Railway Authority. The Pacific Locomotive Committee of 1939 headed by Lt. Col. A. H. L. Mount, then Chief Inspecting Officer, British Railways, also suggested that steps should be taken to end subordination of the Railway Inspectorate to the Railway Board, so as to eradicate the anomaly of the Board being the inspecting as well as the executive authority.

471. The principle of separation of the Railway Inspectorate from the Railway Board was endorsed by the Central Legislature which recommended that Senior Government Inspectors of Railways (now designated as Commissioners of Railway Safety) should be placed under the administrative control of some authority of the Government of India other than the Railway Board. Accordingly, the Railway Inspectorate was placed under the administrative control of the Department of Communications in May 1941. At this stage the post of Chief Government Inspector of Railways (later designated as Commissioner of Railway Safety and now as Chief Commissioner of Railway Safety) was created to enable the Ministry under which the Railway Inspectorate was placed to exercise effective technical control. Subsequently, the Inspectorate was placed under the Department of Posts and Air, and then the Ministry of Transport and Communications. Since May 1967, the administrative control over the Commission is exercised by the Ministry of Tourism and Civil Aviation.

472. *Functions.*—Under the Indian Railway Board Act, 1905 and Notification No. 801 dated 24-3-1905 of the Department of Commerce and Industry, the Railway Board is vested with powers and functions of the Central Government and is authorised to make General Rules for the operation of railways. The responsibility for safety in the working and operation of railways rests solely with the Railway Board and the zonal railway authorities.

473. The Commission functions through the Chief Commissioner of Railway Safety (hereinafter referred to as Chief Commissioner) as the head of the organi-

sation, and the Commissioners of Railway Safety (hereinafter referred to as Commissioners), each holding the charge of a circle. The Chief Commissioner is the principal technical adviser to the Government in all matters pertaining to the Commission. He directs the technical activities of the organisation and supervises the work of the Commissioners. He is responsible for advising the controlling Ministry in matters relating to recruitment, transfer and promotion of officers and staff, budget and expenditure.

Commissioners derive their authority from Section 4(2) (a) and (b) of the Indian Railways Act, 1890. These have been further amplified in Sections 18 to 21, 23 and 24 of the said Act. These mainly pertain to the inspection of new lines, undertaking of periodic inspections of railway or of rolling stock and conducting of statutory enquiries into train accidents.

The functions and duties of the Chief Commissioner and the Commissioners were given in detail in paras 577 to 580 in Part II Report of the Wanchoo Committee, and we do not wish to dilate further on these.

474. *Organisation and jurisdiction.*—Prior to February 1960, the organisation of the Commission of Railway Safety consisted of 4 circles—Northern, Eastern, Southern and Western, each under the charge of an Additional Commissioner of Railway Safety (now designated Commissioner of Railway Safety). On account of development works under the Five Year plans, the workload increased considerably, specially in the Eastern circle, which at that stage included the Eastern, South Eastern and North-east Frontier Railways aggregating to 14,465 route kilometres. An additional circle known as 'Construction Circle' was, therefore, created on 1-3-1960 based at Calcutta, to deal with major projects, the Electrification on the Eastern and South Eastern Railways and the new Dandakaranya Bolangir-Kiriburu Railway Construction. The position was reviewed during the year 1967-68 and the Construction Circle was renamed as the South Eastern Circle with headquarters at Calcutta and jurisdiction over the South Eastern and Northeast Frontier Railways. The Eastern Circle was redesignated as the North Eastern circle, Calcutta with jurisdiction over the Eastern and North Eastern Railways. This was the position at the time when the Wanchoo Committee was appointed.

475. Pursuant to the recommendations of the Wanchoo Committee, two more circles called the 'Central Circle' and 'North Eastern Circle' located at Bombay and Gorakhpur respectively, started functioning from February and April, 1973 respectively. The erstwhile North Eastern Circle headquartered at Calcutta was renamed Eastern Circle. Each circle is under the charge of a Commissioner. The present

jurisdiction of the seven circles showing the Railway/s which each covers, is given below:—

Circle	Headquarters	Railway(s)
1. Western	Bombay	Western Railway
2. Central	Bombay	Central Railway
3. Eastern	Calcutta	Eastern Railway
4. South Eastern	Calcutta	South Eastern Railway.
5. Northern	Lucknow	Northern Railway
6. North Eastern	Gorakhpur	North Eastern and Northeast Frontier Railways.
7. Southern	Bangalore	Southern and South Central Railways.

476. Each Commissioner also exercises jurisdiction over the various Metropolitan Transport Projects, Company managed Railways, Port Trust Railways and District Board lines within their Circles.

477. *Technical wing of the Commission.*—There is a Technical Wing in the headquarters of the Commission, which assists the Chief Commissioner and the Commissioners in carrying out inspections and checks on the quality and standard of maintenance of locomotives, rolling stock, state of equipment, safety aspects of actual practices followed by the zonal railways and observance of rules and regulations affecting the safe operation of trains. In this cell there are four Deputy Commissioners of Railway Safety (hereinafter referred to as Deputy Commissioner) from each of the disciplines, Signal and Telecommunication, Electrical Traction, Mechanical Engineering and Operation.

478. The Chief Commissioner is also assisted by one Deputy Commissioner of Railway Safety, an officer from the Civil Engineering Department of the Railways who also acts as a leave reserve officer and is utilised in place of the Commissioners when they proceed on leave.

479. *Administrative control over the Commission.*—We have held detailed discussions with the officers of the Commission and also with the Railway Board on matters relevant to the functioning of the Commission. We were informed that in the present arrangements where the Commission works under the administrative control of the Ministry of Tourism and Civil Aviation and executive authority on matters dealt with by the Commission vests in the Railway Board, under the Ministry of Railways, a number of problems arise. It was mentioned that even on purely technical matters the officers of the Commission are greatly handicapped, because in the present system of working they are required to address the Railway Board through their controlling Ministry. It was argued that since the officers of the controlling Ministry are not in a position to fully appreciate the technical aspects and the points disputed with the Railway Board, the Commission's view-point does not find sufficient backing in inter-ministerial deliberations. We were informed that officers of the Commission do not have powers even in minor establishment matters and have to approach the controlling Ministry. These difficulties stand in the way of effective functioning of

the Chief Commissioner as the principal technical adviser to the Government in the field of railway safety.

480. For streamlining the functioning of the Commission, we have received a number of suggestions including the one to place it under the Ministry of Home Affairs. Here we also wish to draw attention to the views of the Reviewing Committee who in para 27 of their Report on the Review of the Report of the Railway Accidents Enquiry Committee, 1954, had observed as under:—

“27..... It does not, therefore, seem to us to matter much, from the public angle, whether a particular organisation functions under one Ministry or some other, provided that there is a rational and well-established relationship between its work and the general field of activities of the Ministry to which it is attached. Expert enquiries into major railway accidents could, therefore, be conducted as suitably by an organisation under the Railway Ministry as by an organisation under any other Ministry. In our opinion, however, the time has come to take a wider view and deal with all matters affecting public safety, and public property, under the common law of the land. There appears to be no reason why major railway accidents should not, therefore, be dealt with in a manner similar to road accidents or air accidents, i.e. under the law. The enquiries necessary to ascertain the causes, prevent recurrence and fix responsibility could then be entrusted either to magistrates or to judicial officers, trained in legal procedures.....”

481. We have given serious thought to the problems posed and the suggestions given. The overall constitutional responsibility for safety on the Railways is that of the Minister of Railways. It is, therefore, proper that the Chief Commissioner of Railway Safety should function as the Principal Technical Adviser to the Minister of Railways on all matters of railway safety. His independence can be ensured by not subordinating him to the Railway Board and by enabling him to report directly to the Minister of Railways. Under this arrangement, differences between the Railway Board and the Commission in various matters affecting railway safety could be resolved more easily and expeditiously.

The Chief Commissioner should also be given suitable status.

482. *Inquiries into accidents by officers of the Commission.*—One of the important functions of the Commission is to inquire into serious accidents. In exercise of the powers conferred under Section 84 of the Indian Railways Act 1890 (9 of 1890), the Central Government (Ministry of Tourism and Civil Aviation) vide Notification No. RS. 13-T(8)/71, dated 19-4-1973 have framed rules, captioned “Statutory Investigation into Railway Accident Rules, 1973” for inquiry into accidents by officers of the Commission. According to these rules, accidents of a serious nature are to be enquired into by either the Chief Commissioner or by a Commissioner. Accidents of a serious nature are defined under Rule 2(2) *ibid*, which states so :

"G.S.R. 587—Rule 2(2)—For the purpose of this rule, every accident to a train carrying passengers which is attended with loss of human life, or with grievous hurt as defined in the Indian Penal Code to a passenger or passengers in the train or with serious damage to railway property of the value exceeding one lakh rupees and any other accident which, in the opinion of the *Commissioner of Railway Safety or the *Additional Commissioner of Railway Safety, requires the holding of an inquiry shall be deemed to be an accident of such a serious nature as to require the holding of an inquiry.

Explanation.—The inquiry under this rule shall be obligatory only in those cases where the passengers killed or grievously hurt were travelling in the train. If a person travelling on the foot-board or roof of a passenger train is killed or grievously hurt or if a person is run over at a level crossing or elsewhere on the railway track, an inquiry under this rule shall not be obligatory. Similarly, if in a collision between a road vehicle and a passenger train at a level crossing, no passenger in the train is killed or grievously hurt, it shall not be obligatory to hold an inquiry. For the purpose of this rule, workman's trains or ballast trains carrying workmen shall also be treated as passenger trains and in the event of a workman being killed or grievously hurt as a result of an accident to the train, an inquiry under this rule shall be obligatory".

483. In pursuance of the recommendations made by the Wanchoo Committee (Reference item 270(i) in Part II of their Report) the Commissioners are also required to, as far as possible, inquire into two or three accidents per year of the types, namely, (i) accidents at manned level crossings involving collisions between trains—whether goods or passenger and road vehicles in which there is loss of life or grievous injury to passengers in road, vehicles, and (ii) collisions and derailments of goods trains in which there is loss of life or grievous injury to any person.

484. The holding of an inquiry by the Commissioner into an accident of the description specified in Rule 2(2) of the aforesaid rules is obligatory. Accidents of the types, other than those deemed to be serious in nature, are inquired into departmentally. The rules also provide that if, for any reason, the Commissioner is unable to hold an inquiry at an early date after the occurrence of such an accident, he shall inform the head of the Railway Administration concerned to arrange for a departmental inquiry.

485. Officers of the Commission have represented some issues in the interest of streamlining the inquiry procedures. These are:—

(i) The Commission should be given powers to summon witnesses from the public.

(ii) The Commission should be permitted to issue a press note giving their preliminary findings as soon as the inquiry is over.

486. *Powers to summon public witnesses.*—In respect of item (i) of the above para we have been told that since the Commission do not have powers to summon public witnesses, in certain inquiries where evidence of witnesses from the public is relevant as in the case of level crossing accidents between a train and a road vehicle, difficulties arise in coming to the correct conclusions. We feel that everything possible should be done to enable the Commissioners to come to correct conclusions in their inquiries into serious accidents. We recommend that the Commissioners be empowered to summon witnesses from the public as in the case of Commissions of Inquiry. Necessary amendments in this regard should be incorporated in the Indian Railways Act, 1890 which we are informed is presently under revision.

487. *Issue of press note by the Commissioners.*—Regarding the question of press note by the Commissioners, we feel that in view of the widespread attention and concern among the public caused by serious accidents, speedy communication to the public of the findings of the inquiry would greatly help in winning public confidence. This would also help to uphold the prestige of the Commission as an independent authority inquiry into serious accidents. We would, therefore, recommend that the Commissioner should be permitted to issue brief press note giving the factual position and his findings in non-technical language, after completing his inquiry.

488. *Statutory inquiries open to public.*—A suggestion was made that it would perhaps inspire greater faith in public mind if statutory inquiries are thrown open to the public. We have discussed this question at length with the officers of the Commission and are of the considered view that opening of such inquiries to the general public may not be free from complications, due to the fact that officers of the Commission do not enjoy the same legal powers as Commissions of inquiry. However, we feel that permitting a few accredited representatives of recognised railway passengers' associations and the press would certainly go a long way in generating greater confidence in the public mind. We would, therefore, recommend that Commissioners inquiring into accidents should permit some representatives of recognised railway passengers' associations and the press to be present in the inquiry proceedings, except in cases where the Commissioner feels the need to take evidence in camera.

489. *Presence of railway officers during inquiries by officers of the Commission.*—We were informed that, in inquiries conducted by officers of the Commission, officers of the zonal railway sometimes sit along with the inquiring authority at the time of taking of evidence. It was represented that this tends to overawe the witnesses and they do not, therefore, come out with all that they wish to depose. It was argued by one of the trade union federations that since the presence of the railway officers at the inquiry enables them to put across the Railway Administrations' view point, the witnesses should also have the option to have a trade union representative or a helper with them during the conduct of the inquiry. The Commissioners who were questioned on this stated

*Note: Now designated as the Chief Commissioner of Railway safety and Commissioner of Railway safety.

that, while railway officers are sometimes permitted to sit with them, they are not permitted to ask questions which have not been approved by them or are likely to overawe the witnesses.

490. Having considered all aspects, we are of the view that, to ensure independence and objectivity in inquiries by officers of the Commission and to have the confidence of the public as well as the staff, no railway officer should be allowed to sit with the inquiring authority. The railway officer could, however, be available to the inquiring authority for consultations.

491. *Circulation of draft inquiry report by Commissioners.*—According to existing procedure, the Commissioner holding the inquiry sends copies of his draft report of inquiry to the Railway Administration, other Commissioners, the Chief Commissioner and the Railway Board. The Railway Administration, in turn, sends its remarks on the draft report to the Chief Commissioner, the concerned Commissioner and the Railway Board. Irrespective of the fact whether the comments made by Railway Administration relate to factual material or other aspects, we consider that this procedure is undesirable as it appears to vitiate the independence of the statutory authority. We, therefore, recommend that the practice of sending the draft report of inquiry to the Railway Administration and the Railway Board for comments, should be given up.

492. *Inquiry into certain types of accidents.*—We wish to point out that at present certain types of accidents are not required to be inquired into by the Commissioners under the present rules even though they may be potentially very serious as for instance any mishap to a super-fast train. We recommend that all derailments and collisions involving super-fast trains, irrespective of the casualties, should be inquired into by officers of the Commission.

493. *Inspections by officers of the Commission.*—Prior to 1953, annual inspections of different sections of the Indian Railways were carried out independently by Commissioners (Then designated Government Inspector of Railways) accompanied by the heads of departments of the zonal railways. These inspections were carried out as a statutory obligation under Section 4(2) (b) of the Indian Railways Act, 1890. In July, 1953 the Central Government decided to discontinue with effect from 1-8-1953, annual routine inspections of the Indian Railways, except in the case of Company managed railways. All the officers of the Commission, who appeared before us were unanimous about the need for revival of the system of annual inspections of the zonal railways. It was argued that with the discontinuance of the inspections, the Commissioners are now accompanying the General Manager during his annual inspections along with the heads of departments. They stated that the inspection performed by them in the company of the General Manager was not thorough because of the inadequate time available which necessarily has to be fixed to suit the convenience of the General Manager and his commitments in the matter of dealings with the public and meetings with unions of railway workers. Besides, the attention during such inspections is primarily oriented towards operational, commercial and staff matters. It was argued that even

though the Commissioners carried out inspections at other times for their own purpose, when they are accompanied by a few selected divisional officers, they do not carry the weight or value of the erstwhile inspections which used to be carried out by them.

494. Considering all aspects which have been placed before us, we feel that independent inspections by officers of the Commission have considerable advantage in that the Commissioner and the officers accompanying him focus their entire attention on only one aspect of railway working, i.e., safety of travelling public. Also regular inspection by an independent authority like the Commissioner in our opinion, is likely to have considerable psychological effect on the staff. A meaningful inspection by the Commissioner accompanied by heads of departments would, in our opinion be able to highlight unsafe practices, inadequacies of maintenance and other related aspects. During the course of our discussions with the Railway Board this view of ours was also endorsed by the Chairman, Railway Board. We, therefore, recommend that the system of independent annual inspections by Commissioners should be revived.

495. We also recommend that maintenance certificates submitted by the various heads of departments of zonal railways which are appended to the annual reports of the General Managers, should be countersigned by the Commissioners, as was the old practice.

496. *Strengthening of the Commission.*—As mentioned in para 475, five Commissioners have jurisdiction over one zonal railway each and the other two over two zonal railways each. It has been represented to us that due to the considerable increase in activities on the zonal railways, the workload of the Commissioners pertaining to inspections and sanctioning of new lines and rolling stock has gone up considerably. Further with the rising trend of serious accidents, 114 of which occurred during the 5-year period 1973-74 to 1977-78 as compared to 85 and 79 during 1968-69 to 1972-73 and 1963-64 to 1967-68 respectively the number of statutory inquiries has also gone up.

497. Keeping in view the aforesaid factors and the additional responsibility of making inquiries into accidents involving superfast trains which we have enjoined on the Commissioners, we consider that in the interest of effective functioning each Commissioner should have jurisdiction extending over one zonal railway only. We recommend that the Commission should be expanded from the present seven to nine circles; each circle covering one zonal railway only.

498. *Upgrading of the Deputy Commissioner of Railway Safety (General).*—We also consider that the Deputy Commissioner (General) who assists the Chief Commissioner at the headquarters and who is also utilised in place of the Commissioners when they proceed on leave, should also be in the rank of Commissioner. He should normally be drawn from a discipline different to the one to which the Chief Commissioner belongs.

499. *Vacancies of Commissioners.*—We are distressed to note that posts of Commissioners and other officers in the Commission continue to remain unfilled

for very long periods. In the process, certain Commissioners are called upon to look after two or even more circles at one time. We find that at times the Chief Commissioner himself is saddled with responsibility to look after a circle in addition to his own charge. In view of the heavy charge of each circle, we feel that arrangements as above, even though ad hoc in nature are detrimental to efficient functioning of officers of the Commission. The Government must take special steps to set right this state of affairs and ensure that the existing vacancies are filled without further delay.

500. *Expeditious publication of inquiry reports.*—We find that a number of reports of inquiry into serious accidents by the Commissioners are either not published or publication thereof is done after long delays. We recommend that all reports of inquiries made by officers of the Commission should be published promptly without exception.

501. *Publication of annual report of the Commission.*—We find that there have been considerable delays

in bringing out the Annual Reports of the Commission. We stress that annual reports should be published within the shortest possible time after the end of the year.

502. *National Transportation Safety Board.*—Officers of the Commission have suggested to us that, as an ideal long term arrangement, an autonomous safety board as a statutory authority under an Act of Parliament, covering all modes of transport in the country, namely, rail, aviation, highways, pipeline, coastal shipping (including inland water transport), should be set up on the same lines as the National Transportation Safety Board in the United States of America. This will integrate the existing safety organisations into one body. It has been stated that as all modes of transport have in common several aspects in the deployment of technology and human resources, such an apex body would, with its broader perspective, be in a position to share the available expertise and evolve an integrated safety approach. We feel that setting up of such a body will be in the overall national interest and should be considered by the Government.

CHAPTER XIV
THE RESEARCH, DESIGNS AND STANDARDS
ORGANISATION

503. *Origin.*—The origin of the Research, Designs and Standards Organisation (RDSO) was traced in paras 633 to 635 in Part II Report of the Wanchoo Committee. We would like to mention that this organisation came to be set up at Lucknow in 1957, consequent to the merger of the Central Standards Office, Simla (set up in Delhi in 1930), and the Railway Testing and Research Centre created in 1952 at Lucknow. From a modest beginning, the RDSO's activities have now expanded to cover all aspects of railway working. We have been told that it occupies an eminent position amongst railway research institutions of the world in having the largest number of disciplines under one organisation undertaking a multitude of functions in the field of research, designs, standards, specifications, inspection, service engineering and consultancy.

504. *Functions.*—The main functions of the RDSO can be briefly summarised as :—

- (i) preparation and standardisation of designs and specifications;
- (ii) research and developmental testing of all types of fixed assets such as track, bridges, formation, signalling and telecommunication equipment, etc. and all types of locomotives, passenger coaches and freight wagons;
- (iii) investigating 'in-service' behaviour of capital assets with a view to providing technical guidance necessary for their efficient maintenance and improved performance;
- (iv) maintaining effective liaison with the manufacturer and undertaking inspection of railway equipment at their premises;
- (v) monitoring and inspection at all stages from proto-type development to bulk manufacture;
- (vi) development of indigenous substitutes for imported items and local industries in indigenisation;
- (vii) acting as internal consultant to the Railway Board, zonal railways and production units and helping them in solving technical problems which may arise from time to time; and
- (viii) giving advice to the zonal railways and production units in respect of user's requirements and gauging their reaction to proto-types of new equipment and also to new ideas or innovations.

505. The research activities of the RDSO are based on the guidelines laid down by the Central Board of Railway Research. This Board consists of eminent scientists, technologists, managers, educationists and senior executives from other research organisations as well as industries. There are expert sub-committees of this Board in various disciplines like Civil Engineering, Electrical Engineering, Mechanical Engineering, Metallurgical and Chemical Engineering and Signal-

ling and Telecommunication, who review the work done by the RDSO from time to time.

506. *Present Organisation.*—The RDSO is headed by a Director General who is assisted by Directors/Additional Directors controlling the following disciplines :—

- (i) Architecture;
- (ii) Civil (Permanent way, bridges and structures);
- (iii) Electrical (Electric rolling stock, locomotive and EMUs, train-lighting, air-conditioning and general electrical engineering);
- (iv) Electrical (Traction installation);
- (v) Metallurgical and Chemical;
- (vi) Motive Power (Steam locomotives, diesel locomotives and cranes);
- (vii) Carriage (Main line coaches, electric multiple units, diesel railcars and containerisation);
- (viii) Wagon (Design, consultancy and inspection);
- (ix) Metropolitan Transportation Projects (MTP) rolling stock;
- (x) Research;
- (xi) Signalling and Telecommunication; and
- (xii) Traffic Research.

507. *Performance of the RDSO.*—We are impressed by the good work done by this organisation in the matter of standardisation of railway equipment and designs, research and feasibility studies for enhancing speeds of trains on the Indian Railways and, in general, in helping the Railways and the production units to improve their efficiency. It was claimed by the Director General, RDSO, that modern track laid recently with long welded rails, concrete sleepers and clastic fastenings can compare with the best anywhere in the world. A number of research projects in the field of vehicle-rail interaction are also proposed to be taken up with the help of the track recording-cum-research car which this organisation acquired a few years ago. The RDSO has also developed thyristor control for electric locomotives.

508. *Personnel policy.*—We gather that the bureaucratic procedures and rules operating on zonal railways are applied rigidly in the RDSO also. Moreover, the pay scales and promotion policy are also the same. These make it extremely difficult for this organisation to attract and retain really top class talent for research. Examples were quoted to us where specially qualified persons had to be transferred from RDSO to zonal railways since they could not be given the promotion, due to them, in the organisation itself. This not only deprives the organisation of the expertise developed over years but also causes a break in the continuity of research projects much to their detriment.

509. At present, the permanent staff in RDSO consist mainly of probationers from Class III, all of whom cannot be expected to do full justice in the field of research due to their modest academic background. All the same the continuity in the organisation is provided mainly by this staff. It was mentioned to us by the Director General, RDSO that whereas other premier research institutes have Ph.D's even at junior levels in the field of research, in the RDSO even graduates are not in position in adequate numbers. He stated that permanent staff on the rolls of the RDSO needs to be of much higher basic educational qualification in the interest of continuity and expertise being retained in the organisation. We were also informed that the organisation is presently working with a heavy depleted strength of officers largely because of the recent up-gradations and consequent transfers.

510. In view of the foregoing we feel there is need for a more enlightened policy in respect of recruitment and promotion of personnel in the RDSO. We recommend the following :—

- (i) Officers in RDSO should be retained for a minimum tenure period of 5-6 years.
- (ii) Officers engaged on specific projects in RDSO should not be transferred till after the completion of the project. The service and promotional prospects of such officers should be fully safe-guarded.
- (iii) The permanent cadre in RDSO should consist of persons with higher basic qualifications and to make this possible the pay scales should be more attractive.

511. *Inspection.*—We find that, at present, the RDSO has been burdened with miscellaneous job like inspection and testing. These in our opinion, are not the functions of a research organisation, which should be left free to concentrate on research exclusively. In the matter of inspection of wagons, which is done by the RDSO at present, a view-point was put forward that this enables the Wagon Directorate in the RDSO to look into the question of modification to designs of wagons which become necessary due to constraints of materials, etc. This we feel is still possible without the actual inspection function being with the RDSO. Such functions which tend either to dilute or diffuse the focus on research should not be assigned to RDSO. We recommend that the RDSO be relieved of routine inspections, except those pertaining to the development of new products, equipment and materials.

512. *Procurement of stores and equipment.*—We have been informed that in the matter of procurement of stores, particularly for development items, considerable delays arise due to these orders having to be routed through the Railway Board. We would suggest that within the overall availability of funds the RDSO should have complete powers to procure all stores required for research and development projects approved by the Railway Board.

513. *Trials and monitoring of rolling stock.*—It was very forcefully pointed to us that projects/trials started by the RDSO on zonal railways do not receive adequate attention at the field level and in most cases, such trials are treated as intrusions. Similar difficulty

was expressed in the case of monitoring of new rolling stock. We feel that all facilities should be made available to the RDSO to enable them to monitor projects/rolling stock in the field. In this connection we would suggest that at the time of commencement of a project or trial on any zonal railway one senior officer of the concerned department should be nominated by the zonal railway to liaise with RDSO and to look into any problems which may arise in the conduct of the project/trial on that railway.

514. *Test track.*—During the course of our discussions with the RDSO, the handicap posed due to non-availability of a test track was forcefully represented. It was mentioned that, at present, for arranging any trial run, it takes months of correspondence with zonal railways. We were informed that the provision of a test track will not only enable them to reproduce the required field conditions but will also give freedom of action and thus quicken the pace of many research projects. We had discussed this subject in paras 628 to 630 in Part I of our Report and would reiterate the recommendation made therein that the Railway Board should give priority to the setting up of a test track at the earliest.

515. *Computer for research.*—A serious deficiency which came to our notice was that a premier research organisation like the RDSO does not have a modern essential aid like computer for research. We understand that this has recently been sanctioned, but must observe that the RDSO should have had the help of this facility, in house, much earlier.

516. *Deputation of officers abroad.*—With the rapid development that is taking place in science and technology it is necessary for any research organisation to keep in touch with the advances made elsewhere in the world. In this matter, interaction between the officers of the RDSO and other research institutes, international bodies, etc. is very essential. We were advised that, at times, officers are required to be deputed at short notice to participate in international seminars and conferences, but because of the time consuming processes and getting clearance from the Ministry, no one is sent. We consider that the RDSO must be given powers in line with other premier research institutes in the country which will enable them to depute their officers and staff to participate in such seminars, conferences abroad.

517. *Consultancy work.*—We were informed that the RDSO is presently undertaking a lot of consultancy work for which charges are duly realised. However, they have no freedom to create and fill up posts required for this purpose. We consider that for such consultancy work which has been approved by the Railway Board, the RDSO should be free to create and fill up posts required and debit the expenditure against the fees recovered.

518. *Extension of R & D activity in Production Units.*—We were surprised by the absence of any research and development activity in the production units and in some of the major workshops. While on the one hand it was felt by officers of the RDSO that even routine and relatively simple problems are being referred to them, on the other, it was the general feeling in the production units that there is far too much cen-

tralisation of the research and development functions in the RDSO and very little has been left to the field organisations. Officers of the production units felt that research and development wings relating to production activity should be attached to the production unit itself. We feel that research and development activity cannot be divorced from any production unit. We recommend that research and development cells must be set up in the production units. Similarly, major workshops on the Railways should have small cells which could review the processes, methods and materials for improving their performance. Activities of these cells should be co-ordinated by the RDSO.

519. *Interaction with institutes of advanced training.*—We found little evidence of interaction between

the institutes of advanced training in various railway disciplines and the RDSO. In fact one would have thought that these would be working in close co-operation and suitable research projects would also be carried out at the training institutes themselves so as to further the pace of research and developmental work as well as to keep the quality of training in step with the latest developments in the various disciplines. We suggest that there should be greater integration between the RDSO and the advanced training institutes in different disciplines which should be given practical shape by visits of faculty and trainees to the RDSO, involvement of teaching faculty in the institutes in some research projects initiated by the RDSO and by more frequent visits of officers of the RDSO to these institutes.

LAW AND ORDER, THEFT AND VANDALISM

520. One factor which has assumed great importance in recent years in the context of safety on the Railways is the disturbed law and order situation in the country. In certain parts of the country this has become a real menace to the safe running of trains.

521. *Theft and Vandalism*.—Perhaps, the most serious aspect of the disturbed law and order situation which affects safety adversely, we have been informed, is the rampant pilferage of railway property. Our attention has been drawn wherever we went, to the thefts of signal and telecommunication wires and fittings, track fittings, rolling stock components and even wires, and fittings from overhead electrical installations. Such thefts pose direct hazards to trains by rendering safety devices and signalling inoperative or defective. They also create indirect hazards by making it impossible to maintain rolling stock and track and signalling to the required safety standards.

522. Some idea of the dimensions of such thefts can be had from the information that was given to us during the course of our visits to the zonal railways. Widespread thefts of permanent way fittings from track were reported on certain sections of the Eastern and South Eastern Railways passing through Bihar and pockets of West Bengal. In certain sections on these railways tie bars of cast iron sleepers had been cut and removed from the track thereby putting it out of gauge and rendering it unsafe. The South Eastern Railway has had to impose speed restrictions in such locations. On some other sections of this Railway, miscreants in the process of removing coal which had been dropped on the track from the wagons on running trains, also rip-up and some times remove the stone ballast in the track thus disturbing the packing under the sleepers. This problem has assumed such serious proportions that on certain sections speed restrictions have been imposed due to deficiency of ballast and disturbed packing under the sleepers. In Annexure CXX details of such speed restriction imposed on one division of the South Eastern Railway are shown.

523. One General Manager also informed us that about 2000 wagons were lying immobilised in Calcutta Docks due to their having been completely stripped of their vital components. Senior Officers on the other zonal railways informed us of locations and yards which are so notorious that not a single wagon passes through without fittings being pilferaged. On divisional railway manager mentioned to us that the main reason behind shortage of stores for maintenance of rolling stock is the increase in requirements due to large scale thefts.

524. On the CTC section of the North Eastern Railway during the last 4 years, large scale thefts of telephone equipment provided at automatic signals had taken place. Due to difficulties in their main-

tenance this equipment was no longer operational on that section. We also find that the ground equipment for the Automatic Warning and Stop system installed on some sections of the Eastern Railway, is being repeatedly tampered with and stolen, right from the date of commissioning. The thefts of track magnets are so frequent that the maintenance organisation is unable to cope with it and the AWS system remains inoperative at many places. We were informed that on some sections of the North Eastern Railway, signal wire pulleys are stolen as soon as these are fitted and in lieu thereof only wire loops are being used which affects the efficiency of the system. Similarly junction boxes, signal motor reversers are being tampered with on a very large scale and parts stolen. Besides signal wires are tied up to make the signals inoperative. One chief signal and telecommunication engineer suggested to us that sections with concentration of sophisticated signalling equipment should be walled off, so as to make it difficult for miscreants to operate.

525. On electrified sections, especially on the Eastern Railway and, to some extent on the Southern Railway also, heavy thefts of catenary and overhead electrical equipment have also been reported.

526. We find that while on the one hand staff and officers of the executive departments gave a picture of thefts and pilferage which was really distressing, the same was not always corroborated by chief security officers on many zonal railways. In fact, on one zonal railway, it was stated that the figures of reported thefts did not reveal any disturbing increase. Officers from executive departments stated that all the instances of thefts are not reported in the official records. We were informed by some staff that in the case of track fittings, cases of thefts reported to the Railway Protection Force (RPF) are not taken note of and the argument put forward is that these may be cases of loose fittings dropping off. It was also mentioned to us that no one wanted to report shortage of material for fear of being taken up for the theft. Contrary to this position some of the chief security officers alleged that railway staff feel shy to report these cases, because some of them are involved in the same.

527. The security of railway assets is the responsibility of the RPF which is deployed at various strategic points. Railway track outside station limits and telegraph and telephone lines along the track are not guarded by RPF and responsibility for prevention and detection of crime including theft of railway property is that of the State Police organisations. During the course of our discussions with chief security officers the inadequacy of the strength of RPF was brought out. With the present strength, and the wide dispersal of railway property, they find it difficult to protect the same. Also, they do not have legal power to

deal with criminals. They have only limited powers under the Railway Property (Unlawful possession) Act, 1968, and have to depend upon the State Police in dealing with these types of cases.

528. We discussed the question of thefts with representatives of some State Governments and feel that there is lack of coordination between the RPF on the one hand and the State Police authorities including Government Railways Police (GRP) on the other. Sometimes, jurisdictional disputes hold up not only registering of thefts but also their investigation.

529. *Interference with normal railway operations.*—On the suburban sections of the Eastern and South Eastern Railways, we were informed that the passengers in their anxiety to reach their destinations quickly, often pressurise and coerce the EMU drivers even to violate safety requirements such as stopping for the prescribed period at signals at danger. Similarly, station staff are also forced not to detain trains even on consideration of safety. On the North Eastern Railway cases were cited when drivers/firemen were forced to run trains from one station to the other, against all rules. Tampering with signalling equipment by students was stated to be a regular affair. On many sections of the Northern, North Eastern, Northeast Frontier and Eastern Railways alarm chain apparatus provided in passenger carrying trains, for the safety of passengers themselves, had been blanked off due to its gross misuse. Instances were also reported of hose pipes being disconnected while trains were on the run, to stop trains out of course.

530. Disregard of safety rules by drivers of road vehicles is also another aspect of the same problem. Figures show that in 21.2 percent of accidents at level crossings, road vehicles crashed through one or both the gates of level crossings while the gates were closed.

531. An obvious hazard which needs no elaboration is deliberate sabotage by tampering with track or other railway equipment. From the discussions we had with the chief security officers on zonal railways we find that sabotage in railways is committed mostly in the track due to its vulnerability. We were informed that in majority of the cases of sabotage, it is the railway track which is tampered with either by removal of fishplates on either side of the rail or in some cases by removal/displacement of a piece of rail, insertion of foreign bodies in rail joints such as steel keys, spikes, etc. Some chief security officers mentioned that there have been occasions where railwaymen, particularly casual labour and engineering gangmen manipulated a scene of sabotage either to earn a reward or to get more employment by forcing the Railway Administration to introduce night patrolling.

532. The Railways have no powers or the organisational capability to effectively curb such miscreant activity. As stated before, the Railway Protection Force available to zonal railways is far from adequate both in size and powers, to prevent such lawlessness and the damage and dangers resulting therefrom. The Railway Police deployed by the State Governments from among their own police force has also not been

found to be fully equal to the task. We were informed that the State Governments, are preoccupied with many major law and order problems in their States as a whole and devote very little attention to lawlessness on the Railways. Jurisdictional problems in this area can be quite frustrating, for, while miscreant activity generally takes place on railway property, the miscreants themselves take shelter outside such property. The situation can be tackled with any hope of success only if there is a much higher degree of co-operation among the three agencies concerned, viz. the RPF, Railway Police and the State Police than exists at present. Evidence given before us indicated that such cooperation and imaginative study and measures can yield salutary results.

In this matter we commend the efforts made by the Chief Security Officer of the Southern Railway in creating an anti-sabotage cell in Tamil Nadu, Kerala and Karnataka consisting of representatives of the State CID and Railway Police. They exchange notes periodically and extend full cooperation. We were also informed by the chief security officer of the Southern Railway that a joint control centre and task force have been set up in accordance with the State Police, State Electricity Board and P & T Department for speedy action in case of thefts of wires in any area. A vehicle has been kept at the disposal of this task force and they have been found pretty quick in the job due to which some cases of thefts have been apprehended. Special courses have also been introduced to impart specialised training to the State Police personnel.

533. *Need to take remedial measures.*—we have no doubt that theft and pilferage of railway material have gone up to such proportions that they have become a real menace to the safe running of trains. The law and order situation in some areas is far from conducive to around safe operation of trains. We appreciate that the Railways cannot remain insulated from what goes on in the surrounding. However, we do feel that the situation calls for urgent remedial steps. We recommend as follows:—

- (i) The whole responsibility and jurisdiction, and mutual relationship of the security agencies namely, Railway Protection Force, Government Railway Police and State Police, which are involved in safeguarding of railway property be examined with a view to ensuring optimum cooperation among them for preventing thefts and other forms of lawlessness.
- (ii) Conditions must be created in which staff, even at junior levels will be encouraged to report the theft, without fear.
- (iii) Joint control centres be set up in cooperation with State Police, State Electricity Board, Posts and Telegraph Department for speedy action in the case of theft of overhead electrical equipment, telephone wires etc.
- (iv) Measures should be taken by the Railway Administrations, in consultation with the RDSO to evolve equipment which will be difficult to steal.

(v) Policing alone is unlikely to prove fully effective in preventing lawlessness. Efforts need to be made to educate the public about the nature and consequences of miscreant activity. The people at large should be made fully aware of the grave dangers to life and limb caused by these activities. Mass media like Cinema, T.V., Radio and Newspapers should be pressed into service

in this effort. The people at large, alerted against mischief, should be enlisted as allies of the RPF, Government Railway Police and the State Police in fighting the menace. Appropriate institutional and procedural arrangements should be evolved to enable the people at large to help in tackling the hazards posed on the Railways by the disturbed law and order conditions.

RULES, OPERATION AND POST ACCIDENT
RELIEF MEASURES

534. **General Rules.**—The General Rules, at present in force on the Railways, were adopted in 1929 superseding those of 1906. The Indian Railway Enquiry Committee of 1947 had recommended that a new rule book should be compiled which would not only contain all orders necessary to secure safety but would also point the way for the future developments of systems of work and signalling on progressive lines. The Kunzru Committee had suggested that a revised set of General Rules consistent with the conditions obtaining at the time and likely to obtain in the foreseeable future was overdue and should be issued without undue delay. The Wanchoo Committee had stated that they would welcome a revised set of rules which would provide for the technological changes that have taken place in recent years and will suit the requirements of the growing system and from which all the out-dated rules have been weeded out without disturbing the basic complexion of rules at present in force.

535. We have been informed that a revised set of General Rules was framed, sanctioned and printed in 1976, to replace the General Rules of 1929 which are at present in force. Viewed against the stress laid by the High-Power Committees of 1947, 1962 and 1968, we are disappointed that inordinate delay has already occurred in the introduction of the revised set of General Rules-1976 on the Railways. It is obvious that the General Rules in force at present continue to suffer from short-comings pointed out by the High Power Committees. We urge the Railway Board to take effective action to overcome hurdles, if any, in the way of bringing into force the revised set of General Rules speedily.

536. **Rule Books.**—It was represented to us that there were frequent amendments in the General and Subsidiary Rules with the result that the rule books had become very cumbersome and shabby with a very large number of correction slips. We found that on one railway the General and Subsidiary Rule Book was issued as early as 1960 and had as many as 189 correction slips. Some of the staff whom we questioned were not even aware of the number of correction slips issued. To prevent the rule books from becoming cumbersome and unwieldy, we recommend that important rule books may be reprinted periodically, say once in 5 years or when the number of correction slips exceeds 25 in number.

Another useful method of introducing corrections without making the rule books bulky would be to bring them in a loose leaf form, whenever a correction becomes necessary, instead of issuing correction slips which are required to be pasted, the relevant full page(s) of the rule book should be reprinted, incorporating the corrections.

537. **Simplification and translation of rules.**—In the evidence tendered before us, it was mentioned that certain rules were phrased in such a language that it was very difficult for the staff to understand them. The rules must be drafted in simple language easily understood by the staff. These should also be in the regional language where necessary.

538. **Station Working Rules.**—The practice with regard to the issue, revision and re-issue of station working rules varies from railway to railway. While in some railways the station working rules were revised and issued only when there were more than three correction slips, on certain other railways the practice was to revalidate them after a specified time interval varying from 3 to 4 years, regardless of the number of correction slips issued. On some railways, it was observed that station working rules had neither been revised nor revalidated even after a lapse of 10 to 11 years. Scrutiny of the inspection notes of officers at different levels also revealed the need for replacement/revision of the station working rules at some stations. We consider that a uniform procedure applicable to all zonal railways should be devised by which the station working rules are reviewed and reissued at regular intervals of 3 to 5 years.

539. A point was also made that the station working rules, as now formulated are voluminous and, at least in respect of staff like cabinmen, pointmen, etc. the station working rules should be made into separate parts and they need familiarise themselves only with the parts concerning them.

540. **Working time tables.**—We received complaint about the inaccuracies in the working time tables. We undertook a limited study of the working time tables of some of the Railways in force from 1st October, 1979. Our study disclosed that inaccuracies and deficiencies in the operational details contained in the working time tables still exist, notwithstanding the fact that the need for close attention to this aspect was stressed by both the Kunzru and Wanchoo Committees. A few of the inaccuracies and deficiencies noticed by us are enumerated below :—

(i) In certain cases, the normal running time of some trains was less than the corresponding inter-sectional minimum running time. For instance, on the Northern Railway, the normal running time of 2 Dn. Kalka Mail between Manda Road and Jigna stations was 4 minutes against the minimum running time of 5 minutes. On the North Eastern Railway, the normal running time of 513 Up Express over Pusa Road—Silant section was 17 minutes against the minimum running time of 22-1/2 minutes.

(ii) In some cases there is no margin between the normal running time and minimum running time of certain trains on some sections. For instance, on the

South Central Railway, the normal running time and minimum running time of 121, 123, 125 and 139 express trains are the same over Jamikunta-Bisurgirshariff, Rupalliwada-Vampalli sections.

(iii) The minimum running time has been given in some cases for trains worked by certain classes of engines while for others worked by a different class of engines minimum running time has not been indicated. For instance, on the North Eastern Railway, on the Gonda-Gorakhpur Cantt. section, some trains are worked by YP class locomotives while some others like 18 Dn. Vaishali Express, 2 Dn. Avadh Tirhut Mail and 10 Dn. Kanpur Express are worked by YDM-4 locomotives. Whereas the minimum running time for trains worked by YP class locomotives has been shown, the minimum running time for YDM-4 class of locomotives has not been given.

(iv) The inter-sectional normal running time and minimum running time in case of super-fast trains have been shown in fractions, such as 1/4, 1/2, 3/4 of a minute. In some cases, the timings have been shown upto the second place of decimals, viz. 7/11.63, 7/18.04, 7/22.21 and so on. This has been done in case of timings for 101 Up Rajdhani Express arrived at by computer and shown for Tundla-Ghaziabad section in the Working Time Table of Allahabad Division of the Northern Railway. The normal running time and minimum running time are shown in the Working Time Tables for the drivers to regulate the running of their trains to the timings shown. To expect a driver firstly to reckon the timing in terms of minutes and seconds and then to work to it is more theoretical and is unrealistic in practical working. During our tours it was mentioned to us by drivers and guards that they found the timings shown in fractions of a minute confusing. The timings should be so shown that a driver can regulate the running of his train accordingly. We are, therefore, of the view that timings should be shown in integers, i.e., whole numbers and not in fractions of a minute.

541. We bring these inaccuracies and deficiencies to the notice of the Railway Board with a view to ensure that greater care is exercised in the correct preparation of working time tables.

542. *Impracticable rules and procedures.*—It was urged before us that there were a number of rules in the General and Subsidiary rules, Conference Rules and other rule books which were not entirely practicable but continued to be in the rule books even after recent revisions. It was further contended that it was within the knowledge of the supervisors and officers that such rules were not being observed generally; even so, when an accident occurs because of the non-compliance of such rules, the administration comes down heavily on the staff with deterrent penalties.

543. It was also urged before us that there were certain rules which were not very specific in nature but fixed responsibility on certain categories of staff such as General Rule 76(b) which requires the drivers to be vigilant and cautious and not trust entirely to signals etc. There were also rules which when

acted upto faithfully, could lead to serious dislocation of operations and, therefore, 'work-to-rule' had acquired a bad connotation on the Railways.

The various aspects mentioned above point to the need for a fresh look at the rules in the various rule books. As it is, staff have come to regard some of these rules as an instrument for fixation of responsibility somehow on someone in the event of an accident.

We have examined the implications of certain rules and procedures indicated by the staff to be impracticable or cumbersome in the paras that follow.

544. *Protection of trains.*—It was repeatedly represented to us that the procedure laid down for the guard to protect his train, in the event of a train being held up in mid-section or outside signals of a station is impracticable and is generally not observed because of long trains and inclement weather. We agree that when a train is held up between stations, outside signals or anywhere else, there is the likelihood of a collision with another train which may enter the occupied section due to lapses on the part of station staff or driver. We, therefore, consider protection of the stationary train essential but it is necessary that the procedure for protection of a train should be practical. It was suggested during the course of evidence that reliable means of communication should be provided among the guard, driver and the station on either side. We have discussed this matter in detail earlier in para 335 in Chapter VIII on Signalling and Interlocking. As a first phase in this scheme, field telephone should be provided to the guard of each goods train so that he can contact station masters on either side of the occupied section.

545. *Reception of trains against defective signals.*—In the matter of reception of trains when signals become defective, a number of points to be negotiated by a train have to be clamped and padlocked; station masters questioned by us were, unanimous in their view that the procedure is not only time consuming but it is also not feasible and yet they are held responsible in case of an accident. We consider that display of the normal and reverse positions of the facing points in the station master's office on indicators would greatly assist the station master in the discharge of his duties and ensuring safety. It may also be adequate if he denotes the cabinman for clamping and padlocking of points and for piloting the train without having to inspect the facing points every time for verifying their correct setting, clamping and padlocking.

546. *Working of hump yards.*—Our attention has been drawn to the very serious damage sustained by wagons which were shunted and marshalled in hump yards where effective means for controlling speed of wagons rolling down the hump are completely absent. We were informed that this was putting a very heavy burden on sicklines and the wagon maintenance denots in turn leading to arrears in maintenance and unfit wagons finding their way into traffic streams. We recognise that gravity hump shunting is inescapable, but we found that in the skid operation, presently followed, the supervision is very poor. Skid porter has to look after 3 lines at the same time which

is not possible. Heavy humps in some cases caused serious damage to buffers in and CBC couplers. While hump shunting with the use of skid porters may be alright in the case of less busy yards, in bigger yards, the pressure for humping is bound to increase and this may result in increased damages. We are, therefore, of the view that mechanised humps should be provided in these yards.

A study should be made to determine the workload beyond which the use of skids would become impractical and mechanisation becomes necessary.

547. Speed restriction in automatic territories.—We found that on the Southern Railway the working time table incorporated information showing the inter-signal time to be taken by trains after passing automatic signal at 'on' in Madras Beach-Tambram automatic signalling territory. This time was computed between successive signals on the assumption that the train would be moving at 16 kmph after passing the automatic signal at 'on'. We were informed that this was done on the basis of the rules in force earlier, on the South Indian Railway, for working of trains in automatic block territory which stipulated the speed of 16 kmph after the automatic signal was passed in the 'ON' position. Consequent to revision of these rules, the information in the working time table was discontinued from 1st November, 1972. Working in automatic signalling territories has been discussed in detail in Chapter VIII on Signalling and Interlocking. In para 320, we have recommended the laying down of a speed limit of 20 kmph for a train passing automatic signal at 'ON' position for normal conditions of visibility. We suggest that the working time tables should show the time to be taken, between successive signals, by trains running at the aforesaid restricted speed.

548. Tail lamps and hand signal lamps.—It was repeatedly represented to us that the oil tail lamps and hand signal lamps are unsuitable for the service expected of them. Because of the poor quality of kerosene oil and non-standard wicks, they emit heavy smoke and the visibility is poor. They also get extinguished easily. Moreover, the wicks and glasses are not cleaned properly and regularly. The introduction of battery power operated tail lamps and hand signal lamps in lieu of oil lamps should be considered by the Railways.

549. Train working records.—We were surprised to find that the supply of books and forms required for maintaining records of train working like train signal register, authority to pass a defective signal, etc. is irregular and staff have to use some miscellaneous registers and manuscript forms for the purpose. This matter should receive immediate attention.

550. Working of trains without brake-vans.—We were deeply concerned to find that running of trains and industrial pilots without brake vans in terms of GR 93 has become quite common in some railways. Some of these trains and pilots traverse long distances on main lines. Complete arrival and passing through stations of such trains and pilots is certified by verifying the last vehicle number. This procedure which

is to be resorted to in emergency seems to have become a normal feature to meet the chronic shortages of brake vans. This is a hazardous practice and needs to be curbed effectively.

551. Working conditions in cabins.—We received complaints about the poor working conditions and lack of basic facilities in cabins such as poor lighting, broken benches and chairs, lack of cleanliness and arrangements for drinking water, non-existence of urinals. We feel that the working conditions and facilities in cabins need to be improved.

552. Workload of cabinmen.—Some of the cabinmen on the quadruple line sections of the Eastern Railway and on some other railways represented about the very heavy workload requiring them to handle block instruments for 4 lines, do train passing duties etc. Similar representations were received from the cabin staff in busy cabins at important junction stations like Howrah and Mughalsarai. It was mentioned to us that, in spite of the manifold increase in the number of train movements, neither the staff had been increased nor had their duty hours been reduced. We consider that, in all such situations, job analysis and work measurement according to modern industrial engineering techniques should be undertaken to determine if any relief by way of additional strength or reduction in duty hours is warranted and the same should be provided at the earliest after the study.

553. Safety equipment at stations and on trains.—The following deficiencies in the safety equipment at stations and in brake vans were brought to our notice :—

- (i) Hand signal lamps deficient in red or green glasses;
 - (ii) non-standard wicks for signal lamps;
 - (iii) shortage of fire extinguishers in trains;
 - (iv) use of time-expired fog signals;
 - (v) shortage of portable telephones;
 - (vi) shortage of and deficiencies in first aid boxes;
 - (vii) shortage of fuses;
 - (viii) non-provision or shortage of locks and clamps;
 - (ix) red and green flags without batons; etc.
- These deficiencies need to be made good.

554. Short cut methods and violation of rules.—Representations were received from different categories of staff that officers primarily responsible for the movement of traffic often pressurise them to work trains in disregard of safety rules. This state of affairs was partly attributed to the steep increase in traffic. In our view, the problem is real and cannot be wished away. It is for the railway administration to take effective remedial action to restore the faith of staff in the sanctity of rules and check the drift towards the adoption of short cut methods and violation of rules.

555. Hydraulic buffers at dead end platforms.— In our review of accidents in Chapter II, we have commented on the increase in the number of collisions between a train and buffer ends or stationary objects from 6 during 1968-69 to 1972-73 to 10 during 1973-74 to 1977-78. Nearly one-half of the aforesaid collisions during the 10 years under review, occurred due to trains running into dead ends at terminal stations where hydraulic buffers are not provided. Of 5 such collisions on the Eastern Railway during 1973-74 to 1977-78, 2 were serious accidents, resulting in the death of one person and injuries to a few others. The Commissioner of Railway Safety had recommended the provision of shock absorbing hydraulic buffers at the dead ends of platform lines at Howrah and Sealdah stations. We find that no progress has so far been made in this regard. The Railway Board have informed us that, at present, no suitable indigenous design of hydraulic buffer is available. We feel that with increasing length of trains requiring the driver to pull up his train to the maximum extent on the platform line and also due to increase in frequency of suburban trains the likelihood of collisions of the aforesaid type is apt to increase. We recommend that hydraulic buffers should be provided at dead ends of platform lines at terminal stations which are used for the reception of a large number of passenger carrying trains. A suitable design of a hydraulic buffer should be evolved speedily.

556. Responsibility for relief and restoration.— After the occurrence of an accident the Railway Administration has to undertake relief and restoration operations. It is the responsibility of the Railways to afford prompt medical aid to the injured in a railway accident. For this purpose, not only the ser-

vices of the railway medical staff but also of other medical personnel are requisitioned. In order to afford medical aid expeditiously, at present the medical vans are stabled at every 160 to 200 kilometers from where they can be readily despatched to the site of the accident. In addition, chests containing medical equipment are kept at stations 75 to 100 kilometers apart. These are required to be transported by train to the site of an accident.

557. Proceeding to the site of accident.—In the evidence tendered before us it was pointed out that the railway doctors are not able to rush to the site of accidents quickly due to lack of road transport even where the site was accessible by a convenient road. We are of the view that railway doctors should have the powers to hire road transport vehicles so that they may proceed to the site of an accident by the quickest means.

558. Equipment of accident relief trains.—The tools, stores and equipment provided in the accident relief trains and the auxiliary vans attached to the medical relief vans need to be reviewed from time to time in the light of experience gained. In this matter we would suggest the following :—

(i) For dealing with accidents involving gas cylinders the provision of gas masks as a part of the equipment of the accident relief train is necessary.

(ii) With the introduction of electric traction, it would be necessary to have more and more of hydraulic jacks or MFD equipment for re-railing operations.

(iii) With the introduction of heavier locomotives and wagons it is necessary to have more powerful cranes than at present.

CHAPTER XVII

STORES

559. *Shortage of stores.*—During our tours wherever we went on the railways, whether to a workshop, sick-line, depot, yard or station, we got a very dismal picture regarding the supply of stores. We were informed that the position had deteriorated specially during the last few years. There were complaints in almost all the workshops regarding the poor supply position of components required for repair and maintenance of rolling stock and raw materials required for manufacturing components. Staff from sicklines and carriage and wagon depots informed us that due to shortages, cannibalisation had to be resorted to, which not only increases the workload but also creates other problems. On one railway, due to non-availability of springs, broken helical springs were permitted on wagons on metre gauge, greatly risking safety. For the same reason, the holding of immobilised coaches in yards had also gone up affecting running of trains with their full complement, thus inviting a lot of protest from the public. On one division of the Southern Railway, there had been a spurt of derailments attributable to sharp flange which was due to acute shortage of wheels and tyres. In Chapter X—Goods and Coaching Stock, we have referred to the ill-effects on brake power of trains due to shortage of brake components and poor quality of rubber items which was causing considerable reduction in brake power on trains. On the North Eastern Railway, we found that in one locoshed, in a period of 13 months from July 1978 to July 1979, the position of supply of safety item of stores was as under :—

Number of safety items	Quantity supplied, taken as a percentage of the sectioned scale
10	1 to 24
16	25 to 49
25	50 to 74
14	99

Similar information was also furnished to us in many other establishments. Accentuating the problem of wide-spread shortages was the sub-standard quality of some safety items like draw bars due to failure of which a number of train partings had occurred.

560. On the signalling side it was complained to us that not only is there shortage in the supply of stores specially for modern signalling but their quality had also gone down as a result of which maintenance problems had increased. Bulb for colour light signalling were stated to last only 2-3 days. Ground equipment of AWS system at a number of stations on the Eastern Railway was out of commission for considerable periods for want of replacements. For the same reason the facility of telephones on the CTC sections of the North Eastern and Northeast Frontier Railways was no longer available.

561. On the permanent way side there was acute shortage of rails, sleepers and fittings. We were told that on many sections, fittings like keys and cotters are missing in large numbers because of which speed res-

trictions have been imposed. It was mentioned to us that on some sections defective rails continue to remain in track for want of replacements. Shortage of wooden and concrete sleepers is also affecting track circuiting works.

562. On the electrical side we were informed that the supply position of batteries, fans, bulbs, cables, etc. is very bad, specially due to bad power situation in Calcutta area. One of the senior divisional electrical engineers deposed before the Committee that there are major constraints in the maintenance of electric locomotive due to shortage in the supply of components for undergear.

563. During inspection at some stations, we saw that the available hand signal lamps were without the red/green glasses and in some cases even batons for red/green flags were not available. Padlocks, clamps essentially required for locking points at stations were very much in short supply. Detonators were time-expired by as much as 3 years.

From the foregoing paragraphs it is quite clear that the position regarding supply of stores is extremely unsatisfactory and all possible steps should be taken to remedy the same. Arising out of discussion with officers on the zonal railways and the production units, we have discussed some aspects of the problem in the following paragraphs.

564. *Stores Organisation.*—On the railways the purchase function at present is centralised in the headquarters of zonal railways under the Controller of Stores and receipt, inspection and distribution of stores is carried out by the various stores depots organised primarily on functional basis. There are two main types of stores depots namely, workshop stores depots dealing with steam locomotives, carriage and wagon items and general stores depots dealing with supply of items of general nature. Also separate depots exist to deal with supply of stores required for diesel and electric locomotive sheds and surplus EMU car sheds. The stores depots are under the charge of stores officers who are controlled directly by the headquarters of zonal railways. During the course of our discussions with officers in the divisions and headquarters of zonal railways, the need for reorganising the purchase functions and setting up of stores depots was forcefully brought out. It was argued that stores is the only function which does not fall within the control of the divisions though all departments are vitally concerned with it. It was suggested to us that stores depots should be planned in divisional headquarters to serve divisions and some of the purchase work should be decentralised to these depots. This question was also gone into at length by the Committee on Yardsticks for Gazetted Organisation of Stores Department who, in their report of 1979, suggested the setting up of a fullfledged divisional stores organisation. We feel that for improving compliance of demands and better availability of stores, bringing the divisional stores officer(s) under the direct control of

the divisional railway manager should be implemented at the earliest. This organisation should also be assigned the purchase functions in respect of such items for which supplies could be obtainable from local sources, after it has been suitably strengthened.

565. Simultaneously with the divisionalisation of stores set up and assignment of selected purchase functions to the divisional stores depots, we feel that adequate powers for undertaking this purchase should also be delegated to divisional railway managers and divisional stores officers so that the stores organisation can function effectively.

566. *Stores Organisation for workshops.*—In the case of stores depots which serve specified workshops, the stores officer should be placed under the control of the head of the workshop in the same way as the divisional stores officer would function under the divisional railway manager.

567. *Procurement policy for stores.*—We were given to understand that the shortages of stores are, by and large, the result of general shortages in the country, situation in the eastern part, and power shortages. These are areas over which the Railway have little or no control. In the evidence tendered by some officers on zonal railways, we were informed that at times even when the required stores are available in the country, the extent rules and procedures stand in the way of making these stores available. We feel that the Railways should pursue a more dynamic policy of purchase rather than be led by rules and procedures which were laid down a long time ago when, perhaps, it was the 'buyers' market. Instances were brought to our notice where limitation in the powers of General Managers in the matter of purchase of stores acted as constraints in overcoming the prevailing shortages. As example we have two such instances. One pertains to the sanction of exgratia payments to cover the losses sustained by suppliers subject to the limit of 5 per cent of the total value of the contract (Railway Board's letter No. 74/RS(G)/379/1 dated 25-6-79) and the second relating to the question of splitting up of the tendered quantity with the stipulation that the limit of difference in the rate between the lowest acceptable rate and the rate of the next higher offer would not be more than 10 per cent (Railway Board's letter No. 76/R(S)G/779/36 dated 8-11-1979). Many controllers of stores frankly confessed that it was not possible to work within either of the two stipulations in the prevailing circumstances. We feel that with the responsibility of efficiency and safety of railway operations assigned to the General Managers, full powers should be given to them in the matter of procurement of stores, keeping in view the situation prevailing in any particular part of the country.

568. *Risk purchase system.*—According to the extent procedures, even when a supplier defaults against a contract for genuine reasons such as sudden and unprecedented increases in prices of major inputs, e.g. petroleum, steel products, and such other goods making the contract totally unremunerative to him, the only remedy available to the purchase officer is to resort to risk purchase. This procedure, besides resulting in drying up of the established source, is beset with legal complications, delays etc. We feel that the

procedure of risk purchase is not conducive to making quick alternate purchases which may be very necessary due to failure of the earlier contract. We consider that, especially in the case of small value purchases, a penalty for default or forfeiture of the security deposit of the order and/or removal from the list of approved suppliers would be more appropriate than resorting to risk purchase.

569. *Safety items of stores.*—We have observed during our visits to zonal railways that there is no uniform procedure in regard to the procurement of safety items of stores. The classification of safety items is mainly confined to loco, carriage and wagon parts and many vital items like track and signal fittings are not covered under this classification. We recommend that a comprehensive list of safety items or stores pertaining to different departments should be drawn up and procurement of such safety items should be through limited tenders, only from established and proven manufacturers of such stores.

570. *Stores Inventory control.*—One General Manager mentioned to us that the system of inventory control is outmoded and is responsible for the shortages. It has been deposed before us by the controllers of stores also that in the present system of inventory control, it is the endeavour of the stores organisation to keep the inventory low as on the 31st March every year and in doing so, they try to issue the high value items in the period approaching the end of the financial year. We feel that such a procedure of inventory control is detrimental to the availability of stores at all times of the year, since the arising of the demand will not differentiate whether it is the end of financial year or not. This position needs to be remedied. It has been suggested to us that the average of 12 months inventory holdings should be taken into account and the present system, based on the value of inventories at the end of the financial year, should be discontinued. We recommend this for the consideration of the Railway Board.

571. *Difficulties in movement of stores.*—The movement of stores was given as a serious problem on some of the zonal railways. Some controllers of stores mentioned, that even though certain stores were available, movement thereof was difficult because of general restrictions in booking. We find that carriage of railway materials has been accorded priority 'C'. Even though instructions are there that materials meant for railway consignees should be exempted from booking restrictions, this is not adequate and problems in the field are stated to arise very often. We feel that railway materials should be given priority 'A' and should be exempt from all booking restrictions.

572. *Materials management.*—The science of Materials Management is now quite highly developed and procedures and norms are available for ensuring continued availability of a wide variety of stores items without carrying excessive inventories and also without running into frequent stock-outs. We did not find much evidence on the Railways that these modern techniques have been used to any significant extent. In view of the large variety as well as value of inventories which the Railways have necessarily to carry, we are convinced that unless modern materials management systems are followed on the Railways, the position will not improve.

OVERVIEW

573. *Safety Performance.*—It is natural that news of any accident on the Railways resulting in deaths and injuries to persons, causes a feeling of alarm among people. Our enquiry, however, does not show that during recent years, taken as a whole, consequential railway accidents have shown any significant rise in number or in incidence, nor for that matter, any significant fall. There have, no doubt, been some variations in their number from year to year; but these have been fairly narrow. As compared to the period covered by the Wanchoo Committee, the annual figure as well as the incidence of accidents per million train kilometres has been distinctly lower during the period since 1968.

574. During this period, railways have laid about 4300 kms. of new running lines, introduced a number of new trains, some of them fast and superfast and also increased the number of coaches on a number of trains, and on the other hand, have suffered from certain severe handicaps like paucity of resources, difficulties in procurement of stores for maintenance and replacement, general aging of track and rolling stock, increasing pilferage and miscreant activity in parts of the country and an erosion of discipline and authority among railwaymen as in the society at large. Viewed in this context, the performance of railways in the field of safety is not to be scoffed at.

575. Vast numbers of humble railway employees, majority of them with little or no education and far from well paid, scattered over far corners of the country, working in uncongenial and difficult conditions on the line, at isolated wayside stations, in workshops and sheds with very little supervision, as also the officers and supervisors with their technological and administrative knowledge and skills, are responsible for keeping trains running. That they are doing so at the present level of safety is something which the travelling public should not lose sight of in its natural alarm at the accidents which unfortunately do take place.

576. We would also note with appreciation some of the work being done in the Research, Designs and Standards Organisation, such as the scheme for gradual introduction of air-brakes in place of the present vacuum brakes on all new stock to be run on superfast trains and on closed circuit goods traffic, development of maintenance tolerances for track, defining the parameters for classifying a bridge as distressed, development of concrete sleepers suitable for track circuiting and so on. These and other similar work will undoubtedly promote greater safety on the Railways.

577. *Accidents and accident statistics.*—As explained by us in para 12 in Part I of our Report, railways

use the term "accident" not only to denote an actual mishap, but even incidents like averted collisions, driver passing signal at danger and failure of a locomotive are classed as "accidents" although no actual mishap may have resulted therefrom. The apparently large figures of "accidents" every year defined in this broad way probably cause a degree of alarm which the number of actual mishaps may perhaps not cause. Sometimes, the Railway Board itself changes the coverage of the term "accident" as, for instance, when it decided sometime ago that train partings which were till then being viewed as an indicative accident would not be so viewed thereafter. We are of the view that Government should evolve a clear definition of a railway "accident" so as to convey to the public a clear and realistic idea of its nature, frequency and gravity.

578. We are also not satisfied about the accuracy of the accident statistics put out by the railways. Our examination of the accident registers at some centres revealed some disparities between the entries there and the figures reported to the Zonal Administration.

579. This, however, is not to say that conditions on the Railways in respect of safety provide room for satisfaction or complacency. Far from it. The number of accidents and the toll they take of life, limb and property is still disturbingly high. Although the total number of consequential accidents has come down, there has been some rise in "serious" accidents.* There are still too many avoidable hazards in the systems, equipment and practices on the Railways and, in our opinion, much more purposeful efforts are called for to eliminate these hazards.

580. An accident is caused by a specific human, material or equipment failure. But it is also the end result of some weaknesses or deficiencies in the organisation, systems and practices themselves. Focusing on only the immediate specific cause of an accident without also identifying and remedying the more basic weaknesses in the organisation, systems and practices, can yield only very limited results. We, therefore, discuss below some of what we feel to be the basic weaknesses in the hope that they will receive due attention at the highest level.

581. *Organisation, systems and practices.*—Transport of passengers and goods by rail on a vast scale over long distances, is a gigantic industrial activity demanding a high degree of planning, both short-term and perspective speedy making and implementation of decisions, quick response to changes, a high degree of accountability of personnel for results and corresponding delegation of authority at all levels, speedy information and monitoring systems, and so on. Modern industrial management science has evolved

*See para 50 of Part I of our Report.

principles, methods and systems suited for such tasks. We find, however, that both the organisation and practices on railways are still typically bureaucratic with all the inevitable centralisation of authority, paper work, voluminous and complicated rules, elaborate procedures, long delays and low accountability that go with bureaucratic systems. The inherent inertia and inefficiency of the system affects safety also adversely. In Part I of our Report, we have highlighted how a number of recommendations of the Wanchoo Committee and even of the Kunzru Committee, accepted by Government, have remained virtually unimplemented. In the course of our enquiry we similarly found that a number of modifications to rolling stock prescribed by the Research, Designs and Standards Organisation on grounds of safety, have not been fully carried out on the zonal railways several years after these were issued.

582. Poor follow up.—One of the disturbing features of this state of affairs is that follow-up of the implementation of decisions and directives emanating from the Railway Board is very poor. We found that the Railway Board often issues a directive on a decision taken by it and sits back without ensuring that action at lower levels is in fact taken to give effect to the directive. On the other hand, whenever something new needs to be done on a zonal railway for which there is no authorisation from the Railway Board, the zonal railway makes a reference to the Railway Board and sits back awaiting a decision. Very little action results although long correspondence to and fro often goes on. Even on such fairly straight-forward matters as adoption of a dependable type of speedometer for locomotives, track circuiting at all stations or developing adequate productive capacity for concrete sleepers or manufacture of hydraulic buffers for terminal stations, the present situation continues to be totally unsatisfactory although years have passed since the necessary policy decisions were taken. This, we feel, is the result of a way of working which is more related to administration of a secretariat than to management of a vast transport service.

583. Research, Designs and Standards Organisation.—The bureaucratic culture of the railways has not spared even the research activity. The Research, Designs and Standards Organisation is officially the sole centre of all research activity on the railways and little use is made of the large technological facilities and expertise existing in the major production units and workshops, as also of the several institutes of advanced training in different railway disciplines, for any research and development work. On the other hand, Research, Designs and Standards Organisation itself is not left free to concentrate on research exclusively, but is burdened with various other jobs like testing, inspection, answering queries from zonal railways and so on. Its budget is inadequate and due to the bureaucratic systems and rules, and the adoption of the same job hierarchies and pay scales operating elsewhere on the railways, it finds it impossible to attract and keep really top class talent for research. The RDSO does not still have a computer (although it expects to get one soon) with the zonal railways installed computers years ago. Nor

does the RDSO have a test track which it has been demanding for years. We have dealt with these problems elsewhere in this Report.

584. Financial Resources.—A major threat to safety on the railways arises from the fact that while adequate financial resources facilities and materials are not available to them for optimum upkeep of existing track, rolling stock, signalling equipment and so on, they are under constant pressure to extend their services, and superfast services at that, lay new lines and increase the loads. Unless a judicious balance is struck between meeting people's demands on the one hand and the capability of the railways to devote adequate resources for proper upkeep of their assets on the other, it must be realised, hazards to trains are bound to increase.

585. Procurement and supply.—The problem of proper maintenance of railway assets is further aggravated by the difficulties in procurement of necessary stores, spares, rails, sleepers, track fittings, etc. A part of these difficulties is, no doubt, due to the overall shortage of these materials in the country, compounded by acute power shortage and industrial unrest. But at least a part of the difficulties arise from the failure of the railways to generate and encourage ancillary units for the production and supply of various kinds of stores instead of depending heavily on a few established sources in a particular part of the country. The overall centralised purchase and stores organisations on the zonal railways and the dilatory purchase procedures, slowed down further by fear of CBI and Vigilance, have also been a drag on speedy procurement and supply of necessary stores and spares to the consuming points.

586. Track renewals.—The funds allocated by Government to the railways for renewal of overaged tracks, have always been far short of requirements with the result that the condition of track in some parts of the country has deteriorated seriously and rail fractures are becoming more frequent. Use of modern equipment like ultrasonic rail flaw detectors has, fortunately, forestalled major catastrophes on this account so far. We must warn, however, that the rapidly rising proportion of overaged track and the exceedingly slow pace of renewing it, can only result in serious aggravation of hazards to train movement.

587. The net financial burden on account of new rails for track renewals may not be very large since the scrap value of old rails is by no means small. But the finance and accounting procedures on railways do not seem to permit the scrap value of old rails to augment the resources allocated for track renewals. Similarly, although the RDSO earns a tidy sum through its consultancy services, that sum is not available to that organisation to augment its all-too-meagre budgetary allocation.

588. Pricing policy.—Differences over pricing seem to have been a cause of inadequate availability of some important materials like rails of different sizes and quality, even though capacity exists in the country for producing these. Such differences, we feel,

need to be speedily resolved, with the help of the appropriate Government agencies like the Bureau of Industrial Costs and Pricing if necessary, so that avoidable scarcity of materials does not handicap railways.

589. *Imports.*—Government has been reluctant to import items like speedometers, scotchlite etc. which are needed from safety considerations but are not indigenously available. Development of indigenous capability was also not vigorously pursued. We would stress that there should be no hesitation in importing vital safety items till adequate indigenous capacity is established.

590. *Manpower.*—In the name of economy, we also find severe constraints have been placed on railways in deploying the manpower needed for operation and maintenance. The picture here is rather confusing. At some senior levels, railway officials assert that there is no ban on creating posts that may be needed especially on considerations of safety. At the intermediate and lower levels, however, the experience seems to be that it is virtually impossible to get additional manpower even when a very sound case exists for it, unless what is termed "matching surrender" of existing posts is agreed to. In practice, it appears to us, although perhaps an absolute ban, in terms, on creation of posts may not be in force, the elaborate rules and time-consuming procedures coupled with the concept of matching surrender has resulted in a virtual ban operating de facto.

591. The problem of inadequacy of manpower in several important areas is further compounded by the the exceedingly tardy procedures of recruitment which we have discussed elsewhere. This results in such long delays, generally ranging from 18 to 36 months, in filling up vacancies that the manpower actually available at a given time is often far less than even required for normal work, not to speak of adequate margins or periodic rest, leave and trainee reserves.

582. The supervisor-to-staff and officer-to-staff ratios on the railways continue to be exceedingly low although the Wanchoo Committee had invited pointed attention to these over a decade ago. Besides, the intake of adequately qualified direct recruits at both the officer and supervisor levels is very low. A large proportion of officers have come up by promotion and many of them have not had the benefit of adequate higher education to enable them to keep pace with the demands which higher positions and changing technology make on them. The railways in our view thus suffer from an inadequacy of higher technological and managerial talent compared to their needs.

593. *Personnel management.*—A grave deficiency in the railway organisation has been the neglect of the personnel management function. In fact, the function as understood in modern management thinking, seems to have been recognised on the railways only very recently, and a set up of adequate size

and quality to discharge this function effectively, is still absent. This has made it difficult for the administration to successfully cope with problems of employee discontent, inter-union rivalries, erosion of discipline, decline in work standards and general dilution of skills. The organisational inadequacy in this respect has been compounded by extraneous pressures, mainly from political quarters which officers find difficult to resist.

594. *Dilution of skills, erosion of discipline.*—We found a distinct dilution of skills, erosion of discipline and consequent decline in work standards and a feeling of helplessness among first line supervisors, and even among quite senior officers in coping with these problems. Better personnel management practices and skills, speedy redressal of employees' grievances and well-thought-out welfare programmes on the one hand and firm and fair handling of specific acts of indiscipline or poor work performance on the other, need to be purposefully adopted to meet the situation. Otherwise, upkeep and maintenance of railway assets to the desirable safe standards and observance of safe operating practices will become progressively difficult.

595. *Law and order.*—Railways have been seriously handicapped in their work, at least in some parts of the country, by the generally disturbed law and order situation there. Stealing of fittings and components from signalling equipment, track, rolling stock and even from electrical overhead installations, adds greatly to the difficulty of maintenance. Threats to railway staff, especially drivers, from the travelling public on suburban sections, sometimes even force them to disregard safety requirements and rules. The cooperation between railways and the State law and order authority, we find, needs to be greatly improved to effectively curb such miscreant activities.

596. *Power shortage.*—Shortage of power supply has become a serious drag on the production units and workshops of the railways as on other industries in most parts of the country. This shortage is not likely to end soon and the railways have to devise their strategy for keeping work going in spite of the shortage. Thought must be given forthwith at the highest level to all possible options like installation of captive generating capacity, securing for railway workshops and production units the same priority in power supply as is available for traction, and so on, if more serious difficulties causing unsafe conditions are to be forestalled.

597. Some of the above factors are external to the railways. But many of them are symptomatic of the basic weaknesses and deficiencies in their organisation, systems and practices. In either case, they contribute to creating unsafe conditions on the railways. If these persist, the efforts to remedy specific unsafe factors in the various areas of railway working are likely to get stultified and will not yield the expected results.

SUMMARY OF RECOMMENDATIONS

We summarise in the following paragraphs the recommendations made by us in Chapters III to XVII of this part of our Report.

CHAPTER—III : THE HUMAN ELEMENT :—

1. The Railways should set up speedily an adequate personnel management organisation manned by persons with proper professional training and the right aptitude and such organisation should reach all levels and points on the Railways at which administration has to deal with large number of employees.

(Paras 119—121)

2. The departmental officers and supervisors who have to lead, take work from and look after the problems of workers, should be adequately exposed to the various subjects, concepts and skills in the area of management of people.

(Paras 119—121)

3. An effective personnel management organisation backed up by an attitude of scrupulous fairness and a genuine concern for the workers as people should provide administration with the capability of dealing with the factors leading to erosion of discipline and decline in work standards.

(Paras 122 & 123)

4. There should only one recognised employees union on such railway with a recognised federation at the apex.

(Para 124)

5. The only way of discouraging category-wise unions seems to be for the administration to ignore them entirely, taking care at the same time to speedily resolve the problems of different categories of workers when these are brought up through the recognised unions. Administration must consciously build up its capability to cope with the temporary dislocations in operations forced by the category-wise unions.

(Para 125)

6. Membership of supervisors in staff unions is not consistent with the position of supervisors as a part of the management. The exact modalities of how this is to be achieved requires consideration by the Government.

(Para 126)

7. Firmness is as important as fairness and sympathy in administration's style and strategy for dealing with its employees. It is the responsibility of the higher echelons of Railway Administration to create confidence among front line supervisors and officers that, so long as they act in good faith and are not high-handed or vindictive, they will be backed in ensuring discipline and proper work-standards. Equally, Government also must act in such a way that the hands of administration and its officers and supervisors are not weakened by extraneous political pressures.

(Paras 127 & 128)

8. Redressing grievances should be treated by the administration not as a welfare activity, but as exten-

ding to the employee his rightful due and the necessary sense of urgency brought to bear on this activity.

(Para 129)

9. The Railway Board must give serious thought to the question of adequately manning the Personnel Branch so that each employee is given his rightful due within a reasonable time before it shows up as a grievance.

(Para 130)

10. To remedy the situation created by sanction of awards concerning pay of staff which take retrospective effect, all awards should have prospective effect. In case of an award with retrospective effect, Government should indicate the lump-sum payments which should be made to staff, thus obviating the need to go into old records and detailed calculations.

(Para 131)

11. Measures to decentralise personnel functions to stations with a large strength of railway employees and major sheds should be adopted by zonal railways on the lines being tried out by the Southern Railway.

(Para 132)

12. Greater attention should be devoted to welfare in the real sense of the term and not confuse it with normal grievance redressal function of the administration.

(Para 133)

13. Rational determination of the optimum workload of welfare inspectors should be undertaken.

(Para 134)

14. (i) The Railways should consider expanding schooling facilities for employees' children greatly.

(ii) Large schools with residential facilities should be established in cooperation with the Central Schools Organisation, at a fairly large number of suitable locations, distributed all over the country.

(Para 135 & 136)

15. (i) It is important to see that no accident is liable to occur due to people not fully qualified being given posts which are concerned with the safety of the public.

(ii) While special provisions for promotion of Scheduled Castes/Scheduled Tribes employees to safety categories, take some care of the efficiency of the promotee, they do not appear to consider the effect of such promotions on persons who have been superseded, and feel frustrated and disheartened. The depth and extent of frustration caused and its ill effects on safety of railway working should be studied further.

(Para 138)

16. Psycho-technical testing should for the present, be used in the spirit of counselling procedure to help the employees to improve their performance.

(Para 139)

17. All staff initially recruited in Class IV category, who by promotion may occupy positions vital for safety in train operation, should also be brought within the scope of psycho-technical testing right at the initial recruitment stage.

(Para 139)

18. Directorate of Psycho-Technical Research should be set up in the RDSO which would pursue the various areas of testing of staff and research in applied psychology having relevance to safety in train operation.

(Para 140)

19. The Directorate of Psycho-Technical Research should have greater interaction with the departments of applied psychology in Universities and other institutions.

(Para 141)

20. In structuring the proposed Directorate of Psycho-Technical Research in the RDSO, the inadequacies of the present cell and the guaranteeing of reasonable prospects for personnel in this Directorate, commensurate with those obtaining elsewhere, be kept in view.

(Para 142)

CHAPTER IV : RECRUITMENT TRAINING AND PROMOTION POLICY :—

21. Arrangements must be made to streamline the recruitment procedures so as to make available candidates as soon as vacancies arise.

(Para 143)

22. Direct recruitment to the category of firemen grade 'A' should be reviewed with immediate effect.

(Para 145)

23. (i) The scheme of training apprentices in railway workshops should be revived forthwith.

(ii) 50 per cent of the vacancies in the skilled cadres in workshops should be filled from trained apprentices.

(iii) The remaining 50 per cent vacancies in the skilled cadres should be filled from amongst railway men in lower grades with minimum educational qualifications of 8th class. They should receive intensive training for an appropriate period, and be subjected to a suitable trade test before being absorbed in skilled categories.

(Para 148)

24. In order to meet the larger requirements of electrical signal maintainers in Grade I :—

(i) 50 per cent vacancies in Grade I, should be filled by direct recruitment from graduates in Physics and Mathematics or diplomas holders in Electrical/Electronics Engineering followed by one year training. The remaining 50 per cent should be filled up by promotion.

(ii) In Grade II, all vacancies should be filled by promotion from Grade III.

(iii) In Grade III, the existing practice of filling 50 per cent by direct recruitment should continue.

(Para 150)

25. Direct recruitment for mechanical signal maintainers Grade III should be given up, as this category is being fast displaced by electrical signal maintainers.

(Para 150)

26. (i) Signal inspectors should maintain, in addition to signalling, common telecommunication equipment in their jurisdiction after some initial training. Telecommunication inspectors should be entrusted with specialised communication installations like Microwave, VHF and other wireless equipment and large telephone exchanges.

(ii) Lateral recruitment in the cadres of signalling and telecommunication inspectors should take into account a minimum of three grades of promotion, for each level of recruitment.

(iii) The minimum educational qualification for signal and telecommunication inspectors Grade III (extent 40 to 50 per cent) should be a diploma in Electronics/Telecommunication Engineering and for inspectors in intermediate Grade II (extent 25 per cent) it should be a degree in Electronics/Telecommunication Engineering.

(iv) The requirements of signal inspectors and telecommunication inspectors for recruitment purposes should be combined.

Vacancies should take into account, both permanent and temporary cadres including the anticipated requirements for works, deputation to RITES, RDSO and countries abroad.

(v) All the Railway Service Commissions should synchronise their time table for recruitment of apprentices signal and telecommunication inspectors in the initial and intermediate grades.

(Paras 151 to 153)

27. The field of selection of welfare inspectors should be enlarged to cover other departments also; persons with the required aptitude and qualifications in social work should be inducted into the welfare organisation and trained.

(Para 154)

28. In the lowest recruitment grades in Class IV category, including casual labour, only persons with minimum educational qualification should be recruited.

(Para 155)

29. Officers cadre planning must be taken up in all seriousness to mitigate the acute scarcity of Class I (Category A) officers and to correct the imbalances which have occurred in different departments and in the divisions.

(Para 156)

30. Ways and means should be found of injecting adequately qualified engineers at different levels in the workshops, production units and open line.

(Para 157)

31. All factors which stand in the way of full utilisation of the available training capacity should be identified and remedied at the earliest.

(Para 161)

32. The subject of training of staff and officers should be placed under the charge of a senior officer of the Personnel Department in the headquarters of each zonal railway.

(Para 162)

33. Before the trainees proceed on training courses advance TA should be paid to them for the whole period of their course.

(Para 163)

34. Adequate capacity for the refresher training of signal inspectors should be generated and utilisation thereof also ensured in greater measure.

(Para 164)

35. Training of signal artisan staff, and promotional and other special courses should be decentralised and conducted in the zonal training schools where teaching could be done in the local language.

(Para 165)

36. Feedback on failures of signalling and interlocking gear and reports of accident enquiries, where signalling was held to be a cause, should be sent to the signal training schools and institutes regularly.

(Para 166)

37. The signal and zonal training schools/institutes should be fully equipped with models and equipment. Provision therefor should be made in the project estimates of all new installations.

(Para 167)

38. Regular training courses should be conducted for loco maintenance staff.

(Para 168)

39. (i) The policy of selection of diesel and electric drivers should provide avenues for drafting surplus staff from the steam side and direct recruitment from the open market.

(ii) A minimum standard of education may be laid down for the selection of diesel and electric drivers from the steam side as well as for direct recruits.

(iii) Selected staff should be put through an intensive training course in the Diesel/Electric training schools.

(Para 169)

40. Training in signalling matters covering specially signal aspects and failures thereof, should form a part of syllabi for refresher training to drivers. Lectures covering ill-effects of drugs, liquors and intoxicants on the reflexes of a person, especially drivers and other running staff, should also form a part of the syllabi.

(Para 171)

41. (i) All staff in the carriage and wagon department on first promotion to semi-skilled, skilled and highly-skilled grades should be given intensive training for an appropriate period before they are placed in their new positions.

(ii) Safaiwalas of the carriage and wagon department who have been promoted into semi-skilled/skilled grade should be given special intensive courses at the earliest. The course content should take into account the educational background of such staff.

(iii) Refresher and vocational training courses must be planned for train examiners and other arti-

san staff at regular intervals. It should be ensured that the staff are regularly spared for these.

(Para 172)

42. Train Examiners should be regularly sent for training at the Integral Coach Factory, Perambur.

(Para 173)

43. Artisan staff in workshops should be given regular refresher and vocational training. There should be a proper system for monitoring their training. Such staff should not suffer any monetary loss while they are away on training.

(Para 174)

44. Regular training courses, including refresher training, should be given to operators and maintenance staff employed on ultrasonic rail flaw detectors.

(Para 175)

45. Welfare inspectors should be given adequate and appropriate training to enable them to take up effectively the welfare activities of staff.

(Para 176)

46. Persons of high calibre having aptitude for teaching, should be posted as instructors in the schools/institutes of training. Such persons should undergo instructors training course before taking over charge.

(Para 177)

47. Instructors in training schools should be only in the highest grades of supervisory staff, namely, Rs. 840-1040 and Rs. 840-1200.

(Para 178)

48. Heads of zonal training schools should be selected from one of the 5 major departments concerned with safety of train operation. They should ordinarily have a tenure of not less than 3 years.

(Para 179)

49. The Railway Board should find ways and means of ensuring that staff who fail in refresher training course, are not employed on train passing duties till they pass such a course.

(Para 180)

50. Before taking over charge, a Class II officer should be given adequate training.

(Para 181)

51. The required number of trainee reserve posts for running staff as well as staff directly connected with safe working of trains should be created without any further delay and positions filled up at the earliest. It should also be ensured that staff connected with safe working of trains are sent for refresher training at the prescribed intervals.

(Para 182)

52. Deputing of officers to seminars and short term courses should be left to the General Manager who should be given full powers in this matter.

(Para 183)

53. (i) The faculty at the Railway Staff College, Vadodara are should be strengthened in the major disciplines.

(ii) Major disciplines should be provided with technical or research assistants to help the professors in developing studies and research programmes.

(iii) There is need to revise the scale of honorarium for visiting lecturers.

(Paras 185 to 187)

54. Some urgent steps will have to be taken to modify the promotion policy to mitigate the more glaring aspects of discontent amongst staff.

(Para 190)

CHAPTER V OTHER STAFF MATTERS

55. Essential categories of staff should be allotted quarters on priority near the place of work.

(Para 191)

56. (i) Construction of new staff quarters should be taken up for specific categories of staff like drivers, guards, firemen, assistant station masters etc. to improve their position of housing.

(ii) The entitlement of railway accommodation to drivers, guards and such other essential categories of staff should be reviewed so as to enable them to take proper rest.

(iii) Railway staff at divisional and headquarters of zonal railways, workshops, etc. should be encouraged to build their own houses to ease the pressure on railway accommodation. Housing cooperatives amongst railway workers should be encouraged and incentives given by way of easy loans and allotment of spare railway land.

57. Leave reserve percentages for different categories of staff should be reviewed in the light of present leave entitlements of staff.

(Para 196)

58. (i) Running rooms should be provided with individual cubicles in which staff can take rest undisturbed.

(ii) Provision of basic necessities like clean linen, mosquito nets, adequate water supply, electricity, etc., should be arranged and sanitary conditions improved.

(iii) Ways and means should be devised by the Railway Administrations to insulate running rooms against misuse by outsiders.

(iv) Running rooms should be located in close proximity to the place of duty.

(v) Trained cooks should be provided in running rooms to meet the needs of staff fully.

(vi) Railways should also consider establishing regular canteens in the larger running rooms.

(Paras 197 & 198)

59. (i) Crew rest vans should be provided with cushioned berths, lighting, fans, water, cooking facilities, bathrooms, etc.

(ii) Development of proper type of crew rest van in place of the existing 4-wheeler should be considered.

(Para 199)

60. Assessment of the fatigue level in running/station staff in performing duty at night vis-à-vis day should be studied by the RDSO. This should form a rational basis for determining the limit of duty hours during night time.

(Para 200)

61. The jurisdiction and workload of permanent way inspectors should be reviewed.

(Para 201)

62. (i) Permanent way inspectors must be relieved of the stores charge under them.

(ii) Permanent way stores depots each under the charge of a store keeper, in appropriate grade, should be set up, one for each sub-division on the open line.

(Para 202)

63. Adequate assistance should be given to permanent way inspectors to look after establishment matters properly.

(Para 203)

64. Yardsticks should be laid down for the workload of inspectors of works on the basis of which their jurisdiction should be rationalised.

(Para 204)

65. The workload of assistant engineers on the open line should be studied and their jurisdictions rationalised.

(Para 205)

66. (i) The creation of a traction cadre consisting mechanical and electrical engineers, who would be responsible for the maintenance and running of diesel and electric locomotives, should be considered.

(ii) The workshop cadre should be separate from the traction cadre.

(Para 206)

67. Encouragement should be given to all officers and supervisors to take up membership of technical and professional institutes and societies in this country as well as abroad. Membership fee and subscription paid by all officers to one national and one international institute/society and that paid by senior supervisors to one national institute/society should be reimbursed.

(Para 208)

68. Encouragement should be given to officers and staff to acquire higher qualifications by providing them with facilities and granting incentives.

(Para 209)

CHAPTER VI PERMANENT WAY

69. Rail section 60 Kg per metre should be laid not only on sections carrying traffic more than 20 gross million tonnes but also on other routes where the density of traffic may not have reached that level but may be rapidly increasing.

(Para 212)

70. Use of rail section 41.61 Kg per metre (90 lb per yard) on selected metre gauge sections is a step in the right direction. This together with rail section 37.13 Kg per metre (75 lb per yard) should progressively replace 29.76 Kg per metre (60 lb per yard) and lighter rail sections on metre gauge routes.

(Para 213)

71. The standard of track in yards should be upgraded in keeping with the standard prevailing elsewhere on the running lines. In doing so priority

should be given to tracks in important yards which handle large volumes of traffic.

(Para 214)

72. The requirement of funds for track renewals should be viewed by Government as an essential input for safety and should get commensurate priority. With escalating costs of renewals, unless much larger financial allocations are made, with immediate effect, the backlog will get totally out of hand.

(Para 215)

73. The condition of track from Gauhati to Furkatting, on the Northeast Frontier Railway is far from satisfactory even from safety standards. Track renewals on this and other similarly 'distressed' sections should be taken up on an urgent basis and completed within the shortest possible time.

(Para 216)

74. The Railway Board should draw up a time-bound programme for upgrading the track on branch lines, which should be completed prior to the introduction of heavier axle locomotives on these lines.

(Para 217)

75. Guidelines be laid down regarding the percentage of unserviceable sleepers that can be permitted in track and the extent of speed restriction which should be imposed with their progressive increase.

(Para 218)

76. An all-India Organisation under a separate General Manager should be set up for planning and execution of track renewals on the Railways.

(Para 219)

77. The question of pricing of rails which is seriously affecting supplies to the Railways must be looked into by Government at the highest level. Conditions should be created so that the Steel Plants meet the requirements of the Railways in full.

(Para 220)

78. Released rails should be reprofiled before being relaid in track. As a first step in this direction, 44.61 Kg per metre (90 lb per yard) rails released from broad gauge track must be reprofiled before these are relaid in metre gauge track.

(Para 221)

79. For monitoring of the rail wear, use should be made of the system of automatic rail wear inspection, with a self-propelled vehicle.

(Para 222)

80. Arrangements for supply of wear-resistant rails by steel plants must be finalised early to meet the recurring requirements of the Railways.

(Para 223)

81. Development and manufacture of thick web rails should be undertaken on a priority basis.

(Para 224)

82. Production capacity for concrete sleepers, on both the broad and metre gauges, must be developed speedily for a long-term remedy of the problem of unserviceable sleepers.

(Para 225)

83. Necessary organisation must now be provided in the Civil Engineering Department to sustain the effort for procurement of permanent way fittings.

(Para 226)

84. Ordering of permanent way materials required for track renewals and financial commitments therefor should be ensured well in advance, so that supplies are received in time to carry out the work during the fiscal year itself.

(Para 227)

85. The Railways must make full use of the available concrete sleepers for track circuiting works. It should also be ensured that concrete sleepers are laid in continuous lengths to avoid discontinuity in track structure.

(Para 228)

86. (i) The ballasting programme on the Railways must be speeded up to meet the requirements for recouplement of ballast on the basis of accepted norms. Adequate funds for this purpose should be made available.

(ii) The functioning of ballast trains should be streamlined by providing adequate traffic blocks and suitable motive power.

(Para 229)

87. The serious problem created by miscreant activity on certain sections of the South Eastern Railway in removing stone ballast from track and disturbing the packing under the sleepers, should be taken up by the Railway Administration with the State Government at the highest level.

(Para 230)

88. (i) The strength of permanent way gangs should be correlated to the maintenance practices in vogue and the track structure actually obtaining. Arbitrary cuts in the hope of introducing modern methods of track maintenance/track structure will not be rational.

(ii) Finalisation of the gang strength formula should not be delayed any longer and the strength of gangs must be rationalised on its basis within the shortest possible time.

(Para 231)

89. (i) 'Service' tolerances, indicating the limits beyond which track will need attention, must be laid down for various speeds and categories of tracks including branch and unimportant lines. These must be rigorously implemented through an effective system of monitoring.

(ii) The RDSO should examine the question of how much departure from the 'service' tolerances will be permissible without jeopardising safety.

(Para 232)

90. The Railways must be equipped with an adequate number of portable accelerometers to supplement monitoring of track by track recording cars.

(Para 233)

91. The RDSO should lay down guidelines for working out the track geometry rating, on the basis of the parameters of track which are monitored, for assessing the state of track maintenance.

(Para 234)

92. Guidelines should be laid down regarding tolerances for gauge, alignment, sleeper spacing, cross-levels, unevenness, etc. to assist the permanent way staff to impose and progressively raise speed limits at engineering works. (Para 235)

93. Speed restrictions for engineering works should be planned in advance and within the overall limitations of time provided for engineering works in the time table, these should become operative from a pre-determined hour. (Para 236)

94. (i) Engineering restriction boards must be displayed at the maximum braking distance of trains operating on the section.

(ii) It must be ensured that the speed restriction boards are displayed properly and those which require to be lit at night are done so affectively.

(iii) Development of electrically lit 'speed indicator lamps', to take the place of conventional speed restriction boards, should be undertaken for use on the Railways. (Paras 237 and 238)

95. Railways should make use of AWS system on track for protection of speed restrictions on sections where the AWS system is operative. (Paras 239 & 312)

96. More intensive use of the track recording-cum-research car must be planned. The projects assigned to this research car should be taken up with a sense of priority so that the benefits may flow to the field. (Para 240)

97. (i) In major yards, tracks should be made available for maintenance on the basis of a pre-planned schedule.

(ii) Welding of rails in track, in major yards, should be undertaken.

(iii) Proper cleaning and maintenance of yards must be ensured so as to keep the interspaces between tracks clear and free from obstruction. Drainage in yards should be improved. (Paras 241 & 242)

98. (i) Schedules for testing of rails with ultrasonic rail flaw detectors must be laid down for all types of tracks on the basis of importance of the line, traffic carried, speeds of trains, age of rails, trend of rail fractures, etc.

(ii) More determined and urgent steps should be taken to extend and intensify ultrasonic testing of rails in running lines.

(iii) Adequate number of rail flaw detectors must be provided on each division of the Railways to enable regular testing of rails on running lines.

(iv) Rails found defective by ultrasonic testing must be removed from track, timely.

(v) The Railways must develop adequate facilities for repair and maintenance and periodic calibration of ultrasonic rail flaw detectors. (Paras 243 to 245)

99. An arrangement should be provided on ultrasonic rail flaw detectors to record the flaws in rails detected during testing. (Para 246)

100. The Railways should go in for ultrasonic rail inspection cars as early as possible, with a view to quicken the pace of testing of rails in running track. (Para 247)

101. The RDSO should carry out studies on the relationship between defects or flaws in rails and their propagation under actual traffic conditions, so as to arrive at the precise limit of defects in rails, necessitating their removal from track. (Para 248)

102. (i) In view of the inherent weaknesses in the thermit welding process, flash butt-welding of rails should be done to the maximum extent possible.

(ii) All new thermit welded joints must be ultrasonically tested. (Para 249)

103. Manufacturing defects in the rails caused 21 per cent of the reported rail failures during 1977-78. Some arrangement should be made whereby every new rail put in track is subject to ultrasonic testing in advance. (Para 251)

104. (i) The Railway Board should ensure that information required by the RDSO for numerical analysis of rail failures, is furnished by all zonal railways, timely.

(ii) The RDSO should ensure that the results of yearly numerical analysis of rail failures are published and circulated to zonal railways with the least delay. (Para 252)

105. (i) In view of the deleterious effect of flat tyres on rails in track, its permissible limit should be reviewed by the RDSO.

(ii) Effective means should be developed for detection of flat tyres on rolling stock. These should, under no circumstances, be permitted on running trains. (Para 253)

106. Self-propelled access platforms must be progressively introduced to facilitate inspection and maintenance of bridges and overhead structures. (Para 254)

107. The serious problem created by widespread theft of permanent way fittings from running lines on certain sections of the Eastern and South Eastern Railways passing through the States of Bihar and West Bengal, must be taken up by the Railway Board and Railway Administrations, with the State Government(s) at the highest level. (Para 255)

108. The RDSO should undertake development of track fittings with a view to make their puterage difficult. (Para 256)

109. The Railways must ensure that the basic necessity of a telephone is provided at the residence of all permanent way inspectors on the open line. (Para 257)

110. (i) At important stations where trains stop on platform lines, washable aprons should be provided.

(ii) Platform occupation should be planned in such a manner as to leave adequate time for the maintenance of tracks on platform lines.

(iii) The subject of dropping wastes from passenger carrying trains should be given serious thought. Improved arrangements need to be devised so that platform lines do not give the impression of open air latrines. (Para 258)

CHAPTER—VII : LEVEL CROSSINGS :—

111. (i) Manning of accident-prone unmanned level crossings, on the basis of stipulated norms, must be left to the Railways themselves who should complete this work within the shortest possible time.

(ii) Once the need for manning an unmanned level crossing/upgrading a manned level crossing is established, the work should be processed and completed expeditiously by the Railways; adjustment of cost etc. could be settled with the State Government(s) later. (Para 260)

112. Census at level crossings should be conducted regularly and expeditious follow-up action taken on the results thereof. (Para 261).

113. At level crossings where opening of the gates becomes necessary at night also, two gatemen must be provided on 12-hour shift duty. Alternatively, level crossings with light road traffic at night should be considered for being kept closed during that period. (Para 262)

114. (i) State Governments should be encouraged to utilise the Railway Safety Works Fund to the extent of actual requirements, adjustments vis-a-vis actual share of each State, on the basis of extant rules of apportionment could be done on a long-term basis.

(ii) The Railways must be free to use accumulations under the Railway Safety Works Fund for manning of unmanned level crossing/upgrading of manned level crossings and for provision of road over/under bridges.

Arrangements outlined above may have political implications, however, in view of the large number of accidents endangering public, which continue to take place at level crossings, these should be worked out at the highest level. (Para 263)

115. The rate of accidents at manned level crossings provided with telephones was much less than those without telephones. We strongly reiterate what we had recommended in Part I of our Report (paras 322-

328) that telephone communication must be provided at all mid-section manned level crossings within the shortest possible time. (Para 264)

116. Speed breakers/bumps or rumble strips should be provided on approaches to all level crossings used by road vehicles. The drivers of approaching road vehicles should be pre-warned adequately of the existence of these. (Para 265)

117. All Special, A and B class manned level crossings in mid-section should be protected by gate signals. All such level crossings in Centraised Traffic Control and Automatic Signaling territories should be given priority. (Para 266)

118. (i) Devices in the nature of loud warning bells/hooters which are actuated by approaching trains should be provided at all manned level crossings in the mid-section. Priority should be given to level crossings in sections where the incidence of accidents has been high. Such devices should also be provided at unmanned level crossings frequented by road vehicles.

(ii) The RDSO should develop a warning device for level crossings, which will function satisfactorily in the conditions obtaining on the Railways. (Paras 267-269)

119. The involvement of tractors in accidents at level crossings has greatly increased in the States of Punjab, Haryana and Uttar Pradesh. The Railways serving these States must take up with the State Governments the question of tractor drivers being made to observe safety rules at level crossings. (Para 270)

120. In certain areas there is high involvement of bullock carts in accidents at level crossings. The Railways should, in consultation with the State Governments, undertake a continuous programme of educating the public in rural areas, through mass media of the hazards at level crossings and their responsibilities in this regard. (Para 271)

121. (i) The Railways, in consultation with the State Governments, should examine the possibility of closing down some of the level crossings which are located in close proximity.

(ii) New unmanned level crossings should normally not be permitted and if they have to be provided, the decision should be taken only at a high level. (Para 273)

122. Literate gatemen only, should be posted at manned level crossings having telephone communications. (Para 274)

123. More extensive trials with automatic half-barriers should be conducted on non-suburban sections, away from metropolitan cities. (Para 276)

124. The Railways must ensure that working instructions are available at every level crossing and an assurance is taken from each gateman about his having understood these. (Para 275)

CHAPTER—VIII : SIGNALLING AND INTER-LOCKING :—

125. For ensuring minimum basic safety of train operation as well as to guard against derailments at a station, rudimentary interlocking must, at least, be provided at all stations on the narrow gauge.

(Para 279)

126. Guidelines should be laid down for upgrading the standards of interlocking at stations on the basis of density and speed of traffic.

(Para 280)

127. Maintenance work at signalling installations should be analysed and split into its various component units, separating items of routine maintenance from items of adjustments of signal and points fittings etc. requiring disconnection.

(Para 281)

128. Only electrical signal maintainers in Grade I should be permitted to sign the Reconnection Notice in Form S&F/DN prescribed in Signal Engineering Manual. The disconnection notice may be signed by an electrical signal maintainer in a lower grade.

(Para 282)

129. (i) All problems connected with maintenance of signalling equipment should be thoroughly examined and a practicable and realistic solution found so as to ensure the availability of adequate time for maintenance.

(ii) Necessary time blocks should be provided in the time table for the maintenance of signalling and interlocking equipment, specially on busy sections. Such time blocks can also be used for integrated maintenance programmes of track and overhead equipment.

(Para 283)

130. Some minimum recovery time must be provided in the time tables which will cover detentions to trains on account of signal failures at least on the busy sections where important trains run.

(Para 284)

131. (i) At present the emphasis is only on periodical testing of locking and overhauling of lever-frames, and the electrical signalling portion including the circuitry does not receive such attention. All electrical signalling equipment and circuitry must be inspected and tested according to stipulated schedules.

(ii) Adequate time must also be provided on the sections to enable the signalling staff to effectively carry out inspection and testing of electrical signalling equipment.

(Para 285)

132. (i) Only inspectors and maintainers who have undergone special training in sophisticated signalling equipment in the Indian Railways Institute of Signal Engineering and Telecommunication, Secunderabad, should be entrusted with the maintenance of such equipment.

(ii) A system of issuing competency certificates to staff, who successfully complete training in the specialised field of signalling, should be introduced. While

posting staff in the field, specially on modern signalling installations, this should be taken into account.

(Paras 286 & 287)

133. The progress and the follow-up action in the matter of providing electric lighting of distant signals has been extremely tardy. The Railway Board, having taken a decision, should have pursued it effectively. We stress that this work should now be completed without further delay.

(Para 288)

134. (i) Effective steps should be taken by all the concerned departments through more frequent inspections at different levels to improve the visibility of signals at night.

(ii) The work of electric lighting of semaphore signals should be progressed at a faster pace.

(Para 289)

135. For improving the visibility of colour light signals :

(i) automatic voltage stabilisers be provided at different locations of signals;

(ii) higher wattage bulbs, i.e. 33 watts instead of 25 watts should be used;

(iii) improved design of double lenses should be used; and

(iv) power supply should be drawn from OHE instead of local supply.

(Para 290)

136. Joint inspection of signals by signal, loco and traffic inspectors, as per schedule, should be made more effective and intensive in order to ensure proper visibility of signals by day and by night.

(Para 291)

137. All semaphore distant signals should be provided with electric signal motors, and these should be made to assume automatically the signal aspects, corresponding to the position of the home signals.

(Para 292)

138. Colour light signalling should be provided on a few remaining single line sections with A.C. traction. In doing so, advantage should be taken of the OHE power supply.

(Para 293)

139. The conversion of semaphore signals into colour light signals at stations where signals of both types are there should be taken up on a programmed basis.

(Para 294)

140. Route relay interlocking, which aims at centralising the control, must be provided at the more important junction stations.

(Para 295)

141. Norms for failures of signalling and interlocking equipment should be laid down for judging the efficiency of the system.

(Para 296)

142. Signal failures must be reviewed with the intention to learn more about the inadequacies of the system for taking corrective measures. The practice followed on some divisions of the Western Railway important signalling and interlocking failures are analysed and discussed in detail along with remedial measures and are circulated to staff in the field for guidance, should be followed on all the railways.

(Para 297)

143. Signal defects or failures reported by drivers should receive prompt attention of the signal maintenance staff and remedial action taken without delay.

(Para 298)

144. The station master on duty should report in writing or by telegram all cases of signal failures irrespective of whether a signal maintainer is available round the clock or not.

(Para 299)

145. Signal failures which actually occur should be faithfully recorded and reported and there must be cross-checks on the reported figures to ensure their veracity.

(Para 300)

146. (i) Shortcut methods are adopted by signalling staff in their maintenance work, particularly while rectifying signal failures. The 'looping' or bridging of relays, under conditions of failure of a signal, points or track circuit, by signal staff, either individually or jointly, with traffic staff, should be prohibited under rules.

(ii) Where any sectional release is required in the interests of train operation, authorised technical solutions like calling-on signals and emergency cancellation switches should be employed with built-in safeguards for safe movement of trains.

(Para 301)

147. Double locking of all relay rooms by the traffic and signalling staff as a safeguard against tampering with vital equipment in relay rooms and also to guard against the adoption of shortcut methods should be followed.

(Para 302)

148. (i) Much higher allocation of funds will be necessary to complete track circuiting works within a reasonable span of time.

(ii) The installation of an adequate number of axle counters, whether by import or by indigenous production, is not likely to materialise within a reasonable period of time and, therefore, the original proposal to extend track circuiting using wooden/concrete sleepers for the remaining stations should be proceeded with and completed without delay.

(Paras 303 to 305)

149. The portion between fouling mark and advance starter at stations on trunk routes and main lines must be provided with track circuiting using wooden sleepers or axle counters, on high priority. Constraints of funds and materials must not be allowed to stand in the way.

(Para 306)

150. Track circuiting must be provided at block huts also on main trunk routes where the run-through main line at stations has been track-circuited.

(Para 307)

151. On CTC sections where loads remain stabled for long periods, the Railways should take steps to ensure that the conductivity of rails in such cases is maintained at satisfactory levels.

(Para 308)

152. (i) The Railway Board should give sufficient thought to the design now being adopted for manufacture of axle counters in regard to its reliability in service. They should not hesitate to adopt imported designs of axle counters if reliability of indigenous design is in question.

(ii) Axle counters should be imported in part to cover the interim period of indigenous development.

(iii) The availability of axle counters, from sources within and outside the country, must be stepped up so that works of track circuiting are carried out on a time-bound programme.

(Paras 309 & 310)

153. While extending the Automatic Warning and Stop (AWS) system on all trunk routes with speed of 100 kmph. and above, covering all passenger and goods trains, recommended in Part I of our Report, the last stop signal, which is the authority to enter the block section, should also be provided with AWS equipment, in addition to the first stop signal.

(Para 311)

154. AWS equipment provided on the suburban sections of the Western Railway has the necessary infrastructure to facilitate introduction of a simplified system of cab signalling, which should be provided on such busy suburban sections.

(Para 313)

155. (i) An effective monitoring system should be set up at different levels of maintenance and user departments for protection of AWS equipment from theft and outside interference.

(ii) Pilfer-proof housings should be provided for all field equipment of AWS system and the circuitry should incorporate earlier warning to the driver if the rack equipment is stolen.

(Para 314)

156. (i) In view of the serious nature and consequences of collisions on suburban sections, AWS system should be commissioned, on priority, on suburban sections of Bombay, Calcutta, Madras on a speedy time-bound programme.

(ii) Advance planning for provision of AWS system on suburban sections of the Southern Railway and Sealdah division of the Eastern Railway should be initiated straightaway.

(Para 316)

157. The AWS system should incorporate a 20 kilometres per hour speed check so that trains, after stopping at an Automatic Signal at 'ON', cannot pick

up speed in excess thereof till a signal displaying the 'OFF' aspect is reached.

(Para 317)

158. AWS equipment (of the type indicated in Para 317) should be provided not only on all Electric Multiple Unit trains but also on all main line passenger and goods trains running on the section.

(Para 318)

159. As an interim measure till AWS system is introduced, an auxiliary warning switch to operate a red light in the motorman's compartment, should be provided as on the South Eastern Railway. This should be operated by the motorman when he stops at an Automatic Signal at 'ON'.

(Para 319)

160. (i) A speed limit of 20 kilometres per hour should be specified for normal conditions of visibility under "Stop and Proceed" rule in automatic signalling and CTC territories.

(ii) The guard should be enjoined upon, under General Rules 278 and 437, to apply the brake with a view to bring the train to a stop when he observes the driver exceeding the speed restrictions laid down.

(Paras 320 & 321)

161. Motormen and drivers of trains in automatic signalling and CTC territories should be given a special course of training in signal training schools covering all aspects of the permissive working, as applicable to Automatic Block and Absolute Permissive Block Systems.

Further they should undergo refresher courses at least once every year.

(Para 322)

162. Flashing lights in the rear of EMU trains, similar to those provided by the Western Railway, should be provided as a more prominent indication to attract the attention of the driver of a following train.

(Para 323)

163. (i) Technical measures suggested by a Committee of Directors of the Railway Board and the RDSO to overcome the problems of flickering/bobbing of signals and also display of more than one aspect by signals at the same time, should be implemented without delay.

(ii) General Rules 277 and 436 should be amended to include flickering/bobbing and display of more than one aspect by signals at the same time as defective signals on the lines of General Rules 78 and 79.

(Para 324)

164. (i) The 'cascading' principle should be uniformly adopted on all Automatic Signalling and CTC territories so that when the green aspect bulb fuses, yellow aspect is displayed and so on and, under no circumstances, the driver comes across a signal without any light due to the fusing of signal bulb.

(ii) It must also be ensured that not more than one aspect of the signal appears at any one time, by using an improved design of lamp-proving relay.

(Para 325)

165. (i) Railways should take steps including use of pilfer-proof fittings to ensure that all telephones at signals on CTC sections are kept in good working condition.

(ii) Telephone facility on signals should be provided in non-suburban Automatic Signalling sections like Rajkharswan-Sini-Chandil-Kandra on the South Eastern Railway and Sitarampur-Pradhankanta on the Eastern Railway.

(Para 326)

166. Maintenance gangs including assistant station masters required for non-interlocked working in the affected yards must be set up on the basis of arrears and normal workload of overhauling of lever frames and similar equipment and coordinated programmes of traffic-blocks should be drawn up for every division.

(Para 327)

167. Yardsticks should be evolved, without further delay, for sectional signal inspectors and signal maintainers based on the workload in equated signal units with due allowance for local conditions.

(Para 328)

168. The cadre of signal and telecommunication engineers and signal inspectors must be strengthened to the levels envisaged in the study of the Efficiency Bureau on the workload of these categories.

(Para 329)

169. Adjustment of jurisdictions of signal maintainers, provision of adequate rest givers and rostering of signal maintainers on the basis of proper job analysis of their work should be done. The time spent by maintainers in travelling should be properly remunerated. Signal staff for night maintenance on all trunk routes and busy yards should also be provided.

(Para 330)

170. Testing instruments and equipment required by signal maintainers and signal inspectors for the performance of their duties must be supplied to them and maintained in good order.

(Para 331)

171. Railways should ensure that dual-trained signal inspectors are posted on all sections.

(Para 332)

172. Tokenless block instruments should be provided on trunk routes in replacement of the outmoded token or tablet instruments.

(Para 333)

173. Instructions of the Railway Board for providing bracketted home signals or alternatively track circuiting of main and loop lines with electrical detectors for facing points on sections of multiple aspect upper quadrant signalling with single arm home signals should be complied with by the Southern and Northeast Frontier Railways at the earliest.

(Para 334)

174. Having commenced the running of superfast Vaigai Express between Madras-Madurai on the metre gauge system of the Southern Railway the

basic requirements of signalling to permit safe operation of trains at that speed must be provided without any further delay. (Para 334)

175. A satisfactory and reliable communication should be developed between trains in motion and ground station and also between functionaries on the train itself. (Para 335)

176. Walkie-talkie wireless pack-sets should be provided extensively in all busy yards for use by traffic and loco staff dealing with movements in the yard. (Para 336)

177. Hand books on installation and maintenance of different types of signalling equipment should be prepared and supplied to signal inspectors and signal maintainers for their guidance. (Para 337)

178. (i) Revision of the Signal Engineering Manual should be taken in hand without further delay.

(ii) Copies of the Signal Engineering Manual should be supplied to all inspectors.

(iii) Relevant sections of the Signal Engineering Manual should be translated into regional languages and supplied to artisans and maintainers for their better understanding. (Para 337)

179. The arrangement whereby reception and departure signals taken 'OFF' for a train should be restored to their normal position of 'ON' automatically by the passage of a train, incorporating 'one train-one slot' principle, should be adopted on both single and double line sections on trunk routes and main lines. (Para 338)

180. (i) The Railway Board should pursue with urgency development of a suitable indigenous design of last vehicle check device.

(ii) Pending development of a last vehicle check device, limited import may be resorted to. (Para 339)

181. RDSO should investigate the use of solar energy for lighting of semaphore signals and even approach lighting of colour light signals. (Para 340)

182. The Railways should design all their future signalling systems on the basis of service braking distances. Existing signals on routes, where high speed trains run, should be relocated on this basis. (Paras 341 to 343)

183. A system of modular additions, like the superimposition of another distant signal over the existing signalling system for a block increase of one kilometre or below in braking distance, should be adopted for all high speed routes, as has been done for the route between Howrah and New Delhi. (Para 344)

184. Any proposal of increase of speed on a route for one train or a class of trains should be treated as

a composite project involving the motive power, carriage and wagon, permanent way and signalling disciplines, and braking distance and inter-signal studies should be conducted jointly by all the concerned disciplines. (Para 345)

185. Appropriate steps should be taken to coordinate the activities in different signalling workshops with a view to utilising their full production capacity. (Para 346)

186. With a view to inject a sense of urgency and appreciation of the impact of signalling on safety and efficiency of train operation and evolve measures for speedy implementation of such projects on a planned basis the decision making body in the Railway Board needs to be strengthened at the appropriate technical level. (Paras 347 to 349)

CHAPTER—IX MOTIVE POWER :-

187. Steam locomotives are going to be with the Railways for a long time to come, therefore, the organisation for their maintenance must not be weakened. Nothing should be done to reduce the effectiveness of this organisation by redeployment of well-qualified/ personnel to the diesel/electric side. (Para 351)

188. Head lights in steam locomotives must be maintained in fully operative condition. (Para 352)

189. Sanding equipment should be provided and maintained in proper working order on steam locomotives. This equipment should be specially certified at the time locomotive leaves the shed. (Para 353)

190. (i) Installation of the vigilance control device in diesel and electric locomotives, need not be pursued under conditions of train operation now obtaining on the Indian Railways, namely, two employees manning every diesel and electric locomotive.

(ii) The vigilance control device may find application if and when the Indian Railways adopt a system of single man crew on diesel and electric locomotives. Research and developmental efforts for evolving a suitable design, which will function satisfactorily without the present disabilities, may be continued. (Paras 354 to 357)

191. VDO speedometer in use at present on the Railways, which was designed for motor vehicles, is not suitable for locomotives. Import of Hasler speed recorders must be pursued with a sense of urgency. (Paras 358 & 359)

192. Considering that the speedometer problem has been with the Railways for nearly two decades, we feel that there has been a lack of determined effort to develop a suitable speedometer/speed recorder indigenously. (Para 360)

193. The new procedure for changing charts of speed recorders on locomotives, in force since January

CHAPTER X
COACHING AND GOODS ROLLING STOCK

1980, according to which the driver has full access to the speed recorder charts, is apt to defeat the very purpose for which speed recording is found to be necessary.

(Para 361)

194. Equipment of the type on trial on the Kottavalasa—Kirandul section of the South Eastern Railway, which gives a clear indication to the driver in case of train parting, would be useful and its trials should be expedited.

(Para 362)

195. (i) Working of diesel locomotives with long hood leading has greater accident-proneness and also presents more difficulties in visibility of track and signals. In the overall interest of safety, trains should not be worked by diesel locomotives with long hood leading.

(ii) As a beginning, this restriction may be imposed on all passenger-carrying trains with maximum permissible speed of 100 kmph and over on the broad gauge and 75 kmph and over on the metre gauge.

(iii) This safety measure should also be extended to all trains hauled by diesel locomotives which run over difficult sections where the visibility of signals is restricted due to sharp cuttings, curves, etc.

(iv) As a long term solution, provision of a second driving cab on diesel locomotives should be given serious consideration.

(Paras 363 to 367)

196. Water level gauge in WDM2 diesel locomotives should be modified so as to serve the purpose for which it is intended.

(Para 368)

197. Cow-catchers and headlights should be provided in the rear of WDMI locomotives.

(Para 369)

198. Adequate maintenance facilities should be provided in workshops and sheds for electric locomotives. These should keep pace with additions to the electric locomotive fleet.

(Para 370)

199. All diesel and electric locomotives and electrical multiple units manufactured in the country should be provided with the basic fittings so that mounting of AWS equipment on the driving unit could be done without much difficulty at a later stage.

(Para 371)

200. It must be ensured that the bell communication between motormen and guards on EMU trains is maintained satisfactorily.

(Para 372)

201. A reliable locking arrangement should be devised for the unoccupied motorman's/guard's compartments in EMU trains.

(Para 373)

202. The Railway Board should set up a committee consisting of officers of the mechanical and operating departments who will go into the pattern of goods train examination and rationalise it on an all-India basis, stipulating the places where examination should be carried out together with the type of examination to be done, and the time, facilities, equipment and manpower required for this purpose. The work of this Committee should be completed as quickly as possible.

(Para 376 to 378)

203. Skipping of examination of goods trains should, ordinarily, not be permitted, but in case it becomes unavoidable, arrangements must be made to get the load examined within the shortest possible distance thereafter.

(Para 379)

204. The practice of examining goods loads on sorting lines in marshalling yards should be stopped wherever it exists.

(Para 382)

205. The practice followed on the South Eastern Railway of deputing a mobile gang to examine a stabled load and give a fresh vacuum certificate, before it is allowed to move, should be adopted on other Railways.

(Para 383)

206. Adequate brake power and proper maintenance of brake rigging must be ensured.

(Para 386)

207. Railways should take steps to see that the vacuum gauges are invariably provided in guards' brake vans of all passenger carrying trains.

(Para 387)

208. It must be ensured that guards have a vacuum gauge fitted in the brake vans of goods trains. There is need for providing a satisfactory fixing arrangement for vacuum gauges.

(Para 388)

209. The Railways should undertake trials to determine the extent of the loss of brake power in different trains, under actual field conditions, and take remedial measures accordingly.

(Para 389)

210. Recommendations made by the RDSO regarding introduction of air brakes should be examined by the Railway Board and an early decision taken thereon.

(Para 390)

211. With a view to ensuring satisfactory examination and maintenance of coaching stock :—

(i) timely placement/withdrawal of rakes on/from pit lines must be ensured;

(ii) adequate stabling capacity must be created to stable examined loads and release the pit lines for placement of other rakes;

(iii) Railways must immediately undertake a review of the pit line facilities and equipment required and make up the deficiencies on a time-bound programme;

(iv) all pit lines should be long enough to accommodate the longest passenger-carrying train in service and that contemplated in the near future;

(v) adequate lighting of pit lines should be ensured;

(vi) drainage in pit lines should be improved. Perhaps a change in the basic design of the pit is called for;

(vii) all slip coaches should be examined on pit-lines.

(Paras 392 to 394)

212. (i) The Railways should be extremely cautious in the matter of introducing new train services and extending the run of the existing one. They must ensure that adequate maintenance facilities for carriages are created before new services are introduced.

(ii) In the face of popular demand for more and faster trains there are obvious limits to the resistance which the Railway Board and zonal railways can put up. The political authority in the country should also not stretch the railway system too far.

(Paras 395 & 396)

213. Modernisation of sicklines and depots covering the provision of facilities like sheds, flooring, pathways for workers, plant and machinery, equipment for handling materials, requirements of electric power, requirements of staff and their training should be taken up as a project. A task force, not bothered by the day to day stresses of railway working, must be set up to carry out this work within a period of five years. Necessary resources will have to be provided.

(Paras 397 & 398)

214. (i) POH of coaching stock should be planned on the basis of kilometres earned so that more intensively worked rakes are given POH at shorter intervals than at present.

(ii) Arrangements to take up the increased workload of POH should precede the stipulation of revised intervals between two POHs.

(iii) The requirement of spare coaches should also be reviewed having regard to the fact that the coaches will have to be sent to the workshops more often.

(Paras 399 & 400)

215. EMU services should be so planned as to provide for the required time in shed. The Eastern Railway Administration should expand the existing facilities for POH/AOH to meet the maintenance requirements in full.

(Para 402)

216. (i) The standard of maintenance of roller bearings in workshops should be improved so that attention to those on line does not become necessary at all during the intervals between two POHs.

(ii) If, however, the Railway Board and the Railway Administrations feel that inspection of roller bearings between two POHs is absolutely necessary, then conditions similar to those obtaining in workshops should be created in nominated sicklines and maintenance depots.

(Paras 403 to 407)

217. The Railway Administrations should take urgent steps to provide adequate facilities for inspection and maintenance of roller bearings in workshops.

(Para 408)

218. The recommendations made by the One-man Committee on roller bearings should be implemented expeditiously.

(Para 409)

219. The RDSO should develop some device to monitor the condition of roller bearings fitted on stock without the need to open them.

(Para 410)

220. An urgent dialogue should be opened with the manufacturers of roller bearings, who should be apprised of the failures in service, for effecting improvement in the product.

(Para 411)

221. The workshops and depots on zonal railways should follow a uniform system of giving identification numbers on roller bearings and maintaining record of the axle number on which it is mounted.

(Para 412)

222. In order to check the overloading of box wagons :—

(i) weigh-bridges capable of weighing wagons on the move be provided at coal and mineral loading points;

(ii) arrangements be made for the proper upkeep and maintenance of weigh-bridges;

(iii) deterrent penalties like confiscation of materials in overloaded wagons be considered.

(Paras 413 to 416)

223. (i) Expeditious steps should be taken by the Railway Administrations to improve the quality of laminated springs manufactured in railway workshops.

(ii) Statistically optimum sample size should be ascertained, and that percentage of springs should be subjected to load deflection test in workshops.

(Paras 417 to 419)

224. The practice of moving box wagons over long distances with clamped broken bearing springs is unsafe and should be curbed effectively.

(Para 420)

225. The practice of turning out wagons from sick lines and depots with broken helical springs should be stopped forthwith.

(Para 421)

226. In view of the large scale failures of axles on carriages and wagons on the metre gauge, the RDSO must investigate the practice of using old broad gauge axles for metre gauge rolling stock. The desirability of pressing out old wheel discs from usable axles must also be gone into.

(Para 422)

227. Adequate equipment for ultrasonic testing of all axles should be made available in workshops and maintenance depots.

(Para 423)

228. (i) Provision of modified draw bar on metre gauge goods stock should be completed within the shortest possible time.

(ii) Quality control and testing of material for draw bars and process control during their manufacture should be tightened.

(Paras 424 & 425)

229. (i) The Neutral Control Organisation should be brought under the charge of Director Mechanical Engineering in the Railway Board.

(ii) Neutral control examination should be extended to all workshops and major carriage and wagon maintenance depots.

(iii) At the remaining depots and sicklines, neutral control staff can be deputed on a selective basis depending upon the importance of the unit.

(iv) Neutral control examination should be extended to selected major yards depending upon the pattern of goods train examination, which will be adopted on the suggestions of the Committee, the setting up of which has been suggested by us in para 378.

(Paras 426 & 427)

230. Railway Board should finalise expeditiously the list of defects in coaching and goods stock which have a direct bearing on safety or 'S' marked items in the Conference Rules. (Para 428)

231. Hand books for the guidance of carriage and wagon maintenance staff should be brought out in local languages for the benefit of staff not knowing English.

(Para 429)

232. (i) While ordering safety modifications, the Railway Board should lay down a period within which these should be completed. The zonal Railway Administrations should have the authority to sanction additional manpower required for this purpose.

(ii) A special drive should be launched to complete all pending safety modifications on coaching and goods stock speedily.

(iii) Neutral train examiners posted in workshops, should make a special check on the execution of safety

modifications on all coaches/wagons turned out of workshops.

(Paras 431 to 433)

233. Replacement of old and obsolete machines in workshops should be done at a faster pace.

(Para 434)

234. The hand brake in EMUs should be provided in the motorman's cab.

(Para 435)

235. There is need for further research into the problem of corrosion in steel-bodied coaches. This should be undertaken in collaboration with other research institutes.

(Para 436)

236. Problems arising out of the greater height of coupling in CRT wagons than in other types should be examined and remedial action taken.

(Para 437)

237. Railway Board should plan production of adequate number of anti-telescopic/steel bodied SLRs and coaches for broad and metre gauges to ensure strict compliance of marshalling instructions.

(Paras 438 & 439)

238. In the light of experience on the British Railways, the advantages of using centre buffer couplers on coaching stock in reducing casualties during accidents should be examined with a view to determining whether it would be desirable to adopt this on the Indian Railways.

(Para 441)

CHAPTER XI

SAFETY ORGANISATION

239. The Safety Organisation should primarily be a service organisation and not an executive department. The responsibility of ensuring safety on the Railways is squarely that of the different departments and their accountability in this respect must not be diluted.

(Para 452)

240. The Safety Organisation should be manned by officers from any of the 5 major departments, namely, Operating, Civil Engineering, Mechanical Engineering, Signal & Telecommunication Engineering and Electric Traction, who are mainly concerned with safety in train operations.

(Paras 447 & 452)

241. At the divisional level, the Divisional Safety Officer should put up periodic reports to the Divisional Railway Manager/Divisional Superintendent on deficiencies and problems so that the latter can get the executive officers to take action. At the headquarters level, the Chief Safety Superintendent should report directly to the General Manager.

(Paras 453 & 454)

242. Men of ability and dynamism should be posted to the Safety Organisation to dispel the impression that it is a refuge for unwanted people.

(Paras 443 & 455)

243. Persons posted to the Safety Organisation should have a minimum tenure of 2 years.

(Paras 444 & 455)

244. The Divisional Safety Officer should be relieved of his miscellaneous function and left free to concentrate on his main responsibility of promoting safety on the division.

(Paras 445 & 455)

245. The status of the Divisional Safety Officers should be brought on par with divisional officers of other executive departments.

(Paras 446 & 455)

246. Each division should have safety counsellors from the four main disciplines, namely, Operating, Civil Engineering, Mechanical Engineering and Signal and Telecommunication Engineering. There should be provision to add to these counsellors from specialised disciplines like Electric Traction, wherever necessary.

(Paras 448 & 455)

247. Safety counsellors should be appointed after a careful selection so as to ensure that they have, in addition to some technical background, a proper understanding of human nature and a flair for counselling work.

(Paras 448 & 455)

248. The persons selected as safety counsellors should be given appropriate training in counselling techniques.

(Para 455)

249. An effective system of monitoring the follow-up action on recommendations made by committees of inquiry into railway accidents should be followed at the divisional and headquarters levels of zonal railways.

(Paras 450 & 455)

250. Regular statistical studies must be done at the divisional and headquarters levels of zonal railways to analyse the short and long-term trends of various types of accidents and take remedial measures.

(Paras 451 & 455)

251. Safety should be the only charge of Director, Safety in the Railway Board. He should also coordinate the efforts of zonal railways in the field of safety.

(Para 457)

CHAPTER XII

ACCIDENTS STATISTICS

252. (i) The term "accident" should be applied to only the consequential accidents (Group I) and certain categories of miscellaneous accidents under Group III.

(ii) Train partings should continue to be reckoned as indicative accidents.

(Paras 458 to 462)

253. Every case of rail fracture should be reported and included in the statistics of permanent way failures.

(Para 463)

254. A methodology should be evolved by which failures of tyres, wheels, axles, etc., are reported in totality to the Railway Administrations irrespective of the damage and other consequences.

(Para 464)

255. The criterion of detention to traffic for classifying failures of signalling apparatus as failures of railway equipment should apply not only in the case of failures of route relay interlocking and CTC installations but also in the case of failures of other signalling and interlocking gears.

(Para 465)

256. Accidents like derailments of light engines, trolleys, vehicles and wagons, etc. which occur in yards and at stations must be all reported irrespective of the cost of damage involved. Statistics thereof should be compiled and analysed for taking remedial measures.

(Para 467)

257. Truthful reporting and compiling of all accidents must be ensured so that accident records reflect the true picture of performance in the field of safety in operations.

(Para 468)

258. Maintenance of accident records, both at the divisional and headquarters level, must be placed on a satisfactory footing.

(Para 468)

CHAPTER XIII

COMMISSION OF RAILWAY SAFETY

259. The Commission of Railway Safety should be placed under the Ministry of Railways but independent of the Railway Board. The Chief Commissioner of Railway Safety should have direct access to the Minister of Railways. He should also be given a suitable status.

(Para 481)

260. The officers of the Commission of Railway Safety should be empowered to summon witnesses from the public as in the case of Commissions of Inquiry.

(Para 486)

261. The officers of the Commission of Railway Safety should be permitted to issue a brief press note giving the factual position and findings in non-technical language after the inquiry has been completed.

(Para 487)

262. A few accredited representatives of recognised railway passenger associations and the press should be permitted to be present at the inquiries conducted

by officers of the Commission of Railway Safety, except where the inquiring officer feels the need to take evidence in camera.

(Para 488)

263. No railway officer should be allowed to sit with the inquiring officers of the Commission of Railway Safety during the course of the inquiries.

(Paras 489 & 490).

264. The practice of sending the draft report of inquiry to the Railway Administration and the Railway Board should be given up.

(Para 491)

265. All derailments and collisions involving super-fast trains, irrespective of the casualties, should be inquired into by officers of the Commission of Railway Safety.

(Para. 492)

266. (i) The system of independent annual inspections by Commissioners of Railway Safety should be revived.

(ii) Maintenance certificates submitted by the various heads of departments of the zonal railways, which are appended to the annual reports of the General Managers, should be countersigned by the Commissioners of Railway Safety, as was the practice in the past.

(Paras 493 to 495)

267. The Commission of Railway Safety should be expanded so that each circle covers one zonal railway only.

(Paras 496 & 497)

268. The Deputy Commissioner (General) at the headquarters of the Commission of Railway Safety should be in the rank of a Commissioner. He should normally be drawn from a discipline different to the one to which the Chief Commissioner belongs.

(Para 498)

269. The Government must take special steps to see that vacancies of Commissioners of Railway Safety and other officers of the Commission of Railway Safety, are not allowed to lie unfilled for long.

(Para 499)

270. All reports of inquiries into accidents made by officers of the Commission of Railway Safety should be published promptly without exception.

(Para 500)

271. Delays in the publication of annual reports of the Commission of Railway Safety should be avoided.

(Para 501)

272. The setting up of a National Transportation Safety Board on the same lines as in the U.S.A. must be considered by the Government.

(Para 502)

CHAPTER XIV

RESEARCH, DESIGNS AND STANDARDS ORGANISATION

273. (i) There is the need for a more enlightened policy in respect of recruitment and promotion of personnel in the RDSO with a view to attracting and retaining really top class talent.

(ii) Officers in RDSO should be retained for a minimum tenure period of 5-6 years.

(iii) Officers engaged on specific projects in RDSO should not be transferred till after the completion of the project. The service and promotional prospects of such officers should be fully safe-guarded.

(iv) The permanent cadre in RDSO should consist of persons with higher basic qualifications and to make this possible the pay scales should be more attractive.

(Paras 508 to 510)

274. The RDSO should be relieved of routine inspections of all items except those pertaining to the development of new projects, equipment and materials.

(Para 511)

275. The RDSO should have complete powers to procure all stores required for research and development in respect of projects approved by the Railway Board.

(Para 512)

276. For effective monitoring of projects/rolling stock initiated by the RDSO in the field, zonal railways should nominate one senior officer of the concerned department to liaise with the RDSO.

(Para 513)

277. The Railway Board should give priority to the setting up of a test track in the RDSO at the earliest.

(Para 514)

278. The RDSO must be given powers, in line with other premier research institutes in the country, to enable them to depute their officers and staff to participate in appropriate seminars and conferences abroad.

(Para 516)

279. The RDSO should be free to create and fill up posts required in connection with consultancy work and debit the expenditure against the fees recovered.

(Para 517)

280. Research and Development cells must be set up in production units and major workshops to review the processes, methods and materials for improving performance. The activities of these cells should be coordinated by the RDSO.

(Para 518)

281. There should be greater integration and close cooperation between the RDSO and the institutes of advanced training on the Railways, through exchange

of visits, involvement of teaching faculty in research projects initiated by the RDSO.

(Para 519)

CHAPTER XV

LAW AND ORDER—THEFT AND VANDALISM

282. The whole responsibility, jurisdiction and mutual relationship of the security agencies, namely, Railway Protection Force, Government Railway Police and State Police, which are involved in safeguarding of railway property be examined with a view to ensuring optimum cooperation among them for preventing thefts and other forms of lawlessness.

(Paras 528, 532 & 533)

283. Conditions must be created in which staff, even at junior levels will be encouraged to report the theft, without fear.

(Paras 526 & 533)

284. Joint control centres be set up in cooperation with State Police, State Electricity Boards, Posts and Telegraph Department for speedy action in the case of theft OHE equipment and telephone wires, etc.

(Paras 532 & 533)

285. Measures should be taken by the Railway Administrations, in consultation with the RDSO, to evolve equipment which will be difficult to steal.

(Para 533)

286. Efforts need to be made to educate the public about the nature and consequences of miscreant activity through mass media. Appropriate institutional and procedural arrangements should be evolved.

(Para 533)

CHAPTER XVI

RULES, OPERATION AND POST ACCIDENT RELIEF MEASURES

287. The Railway Board should take effective action to overcome hurdles, if any, in bringing into force speedily the revised set of General Rules.

(Paras 534 & 535)

288. (i) Important rule books should be reprinted periodically, say once in 5 years, or when the number of correction slips exceeds 25.

(ii) Issue of rule books in a loose leaf form should also be considered.

(Para 536)

289. Rules must be drafted in simple language easily understood by staff. These should also be in the regional language, where necessary.

(Para 537)

290. (i) A uniform procedure applicable to all the zonal railways should be devised by which the station

working rules are reviewed and reissued at regular intervals of 3 to 5 years.

(ii) Station working rules should be made into separate parts for the use of different categories of station staff.

(Paras 538 & 539)

291. (i) Greater care should be exercised in the correct preparation of working time tables.

(ii) Working time tables should show inter-sectional running time of trains in integers correct to a minute and not a fraction thereof.

(Para 541)

292. Field telephone should be provided to the guard of each goods train so that he can contact the station master on either side of the occupied section.

(Para 544)

293. The display of the normal and reverse positions of the facing points on indicators in the station master's office should be arranged.

(Para 545)

294. A study should be made to determine the workload in hump yards beyond which the use of skids would become impractical and mechanisation becomes necessary. In non-mechanised hump yards, skid porters should be provided in every sorting line.

(Para 546)

295. The working time tables should show the time taken between successive signals, by trains running at the restricted speed of 20 kmph after stopping at an automatic signal in 'ON' position.

(Para 547)

296. The introduction of battery power operated tail lamps and hand signal lamps in lieu of oil lamps should be considered by the Railways/

(Para 548)

297. The running of trains and pilots without brakevans should be curbed effectively by mitigating the chronic shortage of brakevans.

(Para 550)

298. Working conditions and facilities in cabins should be improved.

(Para 551)

299. In the case of staff connected with train passing duties, job analysis and work measurement according to modern industrial techniques must be undertaken to determine if any relief by way of additional strength or reduction in duty hours is warranted.

(Para 552)

300. The Railway Administrations should take effective remedial action to restore the faith of staff in the sanctity of rules and check the drift towards the adoption of shortcut methods and violation of rules.

(Para 554)

301. Hydraulic buffers should be provided at dead ends on platform lines at terminal stations. A suitable

design of a hydraulic buffer should be evolved speedily.

(Para 555)

302. Railway doctors should be given powers to hire road transport vehicles so that they may proceed to the site of the accident by the quickest means.

(Para 557)

303. (i) For dealing with accidents involving gas cylinders, gas masks should be provided as a part of the equipment of the accident relief train.

(ii) With the introduction of electric traction, it would be necessary to have more and more of hydraulic jacks or MFD equipment for re-railing operations.

(iii) With the introduction of heavier locomotives and wagons it is necessary to have more powerful cranes than at present.

CHAPTER XVII

STORES

304. (i) For improving the availability of stores, the stores organisation should be divisionalised.

(ii) Divisional Stores Officers should be brought under the direct control of the Divisional Railway Manager/Divisional Superintendent.

(iii) The set up at the divisional level should be assigned the purchase functions in respect of such items for which supplies could be obtainable from local sources, after it has been suitably strengthened.

(iv) For undertaking the purchase function effectively adequate powers should be delegated to the Divisional Stores Officer and Divisional Railway Manager.

(v) In the case of stores depots which serve specified workshops, the Stores Officer should be placed under the control of the head of the workshop.

(Paras 565 & 566)

305. In matters pertaining to escalation as well as splitting up of the tendered quantity amongst more than one tenderer, the General Manager should have full powers.

(Para 567)

306. The procedure of risk purchase is not conducive to making quick alternate purchases. In the case of small value purchases, a penalty for default or forfeiture of the security deposit of the order and/or removal from the list of approved suppliers would be more appropriate than resorting to risk purchases.

(Para 568)

307. A comprehensive list of safety items of stores pertaining to different departments should be drawn up and procurement of these items should be through limited tenders, only from established and proven manufacturers of such stores.

(Para 569)

308. The performance of the stores department in the matter of inventory control should not be judged only on the value of the inventory at the end of the financial year but on the basis of the average value of inventory over the entire 12-month period.

(Para 570)

309. Railway materials should be given highest priority for movement and should be exempted from all booking restrictions.

(Para 571)

310. Modern materials management systems should be adopted on the Railways.

(Para 572)

ACKNOWLEDGEMENTS

We acknowledge the assistance and cooperation given by the Railway Board and the Railway Administrations which furnished the information called for by the Committee. We are grateful to the General Managers, other officers and staff of the Railway Administrations for the courtesy extended to us during the course of our tours. We thank all officers and staff of Zonal Railways and Production Units who expressed their views freely and frankly while tendering evidence before us. Our thanks are also due to the Chairman and Members of the Railway Board, Officers of the Commission of Railway Safety, Chairman of the Railway Service Commissions, Director General and other officers of the RDSO, Principals and staff of training colleges/institutes/schools, Officers of the State Governments of West Bengal and Tamil Nadu for having given us the benefit of their advice on matters to which we attach importance. We are also grateful to the retired officers who sent us some valuable suggestions in response to our request and those who took the trouble of appearing before us. We are thankful to the All India Railwaymen's Federation, National Federation of Indian Railwaymen and Federation of Railway Officers' Associations for sparing their time at short notice and giving their views on the relevant matters.

2. We are greatly indebted to Shri S. M. Gowri Shankar, ex-Chief Administrative Officer, Railways, who as Consultant, spared his valuable time for the deliberations of the Committee and rendered expert advice on signalling and telecommunication matters. We greatly value the assistance given by him.

3. Lastly, we would like to place on record our deep appreciation of the excellent work done throughout by Shri R. S. Soin, our Secretary, who worked extremely hard to ensure the timely completion of this Report. His clear mind, indefatigable energy and qualities of cheerfulness and leadership greatly helped our deliberations. We could not have had a better Secretary. We also acknowledge the excellent work done by Shri V. K. Thapar who was our Secretary for the first 9 months.

4. The Section Officer, Inspectors and the staff* of the Committee worked very hard to meet the demands and completed their assigned tasks in time. Shri

*List of staff is at Appendix III.

J. C. Ahuja, Section Officer ably assisted the Secretary and we greatly appreciate his high sense of loyalty and devotion to duty. In particular, we would like to commend the services rendered by Shri S. P. Sethi, Transportation Inspector (Redt.) and late Shri B. K. Khanna, Inspector, who died in harness while working with the Committee. Finally, we would like to acknowledge the untiring efforts made by the Personal Assistants and Stenographers attached to the Committee for shouldering the onerous responsibility of recording evidence and completing the task in time. We greatly value their diligence and devotion to duty.

Sd/- (S. M. SIKRI)
Chairman

Sd./- (DR. MURLI MANOHAR JOSHI)
Member

Sd/-(KHURSHID ALAM KHAN)
Member

Sd/-(BAGARAM TULPULE)
Member

Sd/-(P. SAHAI)
Member

Sd/-(C. S. PARAMESWARAN)
Member

I fully agree with the report.

A supplementary note is enclosed.

Sd/- (ARYA BHUSHAN)
Member

DR. MURLI MANOHAR JOSHI
Member

(R. S. SOIN)
Secretary

SUPPLEMENTARY NOTE BY SHRI ARYA BHUSHAN

While fully agreeing with the contents of this Report, I wish to place on record some observations. In Chapter I, reference has been made to the manner in which the Committee have been rushed up in their work. I feel that a Committee which was set up to review and go into matters purely technical in nature relevant to the safety performance of the railways should have been shown greater consideration and allowed to complete their work as was programmed by them.

My views on some additional aspects relevant to the safety performance of the railways are given below :—

1. (i) *Organisation—Railway Board* : The Railway Board has to be suitably strengthened to be able to cope with increased problems of the present day working. The strength of the Railway Board is the same as it was in 1947 whereas the problems have increased manifold. The recommendation of the Administrative Reforms Commission to increase the strength by two Members—one for dealing with staff matters and the other for electrical and electronics engineering, it is understood, was accepted but has not been implemented on grounds of economy. In addition, I feel there is need for a post of a Member Planning also.

(ii) The need for fixing a tenure for certain key posts cannot be over-emphasized. The Administrative Reforms Commission had recommended that the posts of Chairman and Members should be selection posts and persons selected should have a minimum tenure of 3 years as Chairman and 5 years as Member. This is important as, in such key posts, very little can be achieved and results shown unless one has sufficient time to show himself up.

(iii) There is also a case for upgrading the posts of Directors in the Railway Board in the more important directorates to those of Directors General who should be of the same rank as General Managers so that there can be easy dialogue between them to settle most of the matters at that level. Only those, which cannot be settled at that level, need be put up to the Railway Board, thereby relieving them from day to day problems and leaving them free for policy making, forward planning and decision making.

2. *Career Planning* : Discontent breeds in staff and officers when they find that adequate avenues of promotion and prospects commensurate to those available in other departments and even public sector undertakings are not available. No doubt, the Railways have implemented certain ad hoc 'upgradations', but, in my view, this is touching only the fringe of the problem. It cannot be denied that these matters have done good to some staff and officers, but they cannot be treated as any long-term solution. However, the manner in which these have been brought about, have caused considerable 'upset' at different levels. In the officers cadre, while it is necessary to provide time-scale promotions the upgradations have been done on the basis of so-called worth of charge. In this process, the time proven command structure on the Railways has become completely distorted. One cannot deny its effect on performance. Government should consider and decide these matters by taking a total view of the organisation.

Similarly, in the case of staff also, there is need to plan and implement measures so that the mass of employees do not feel let down and discontented. Time-scale promotions to higher grades linked to performance are called for.

3. *Policy of punishments in accidents* : I feel that emphasis on punishments has resulted in a tendency to hide facts, hush up accidents and manipulate safety statistics. The philosophy of deterrent punishment is a retrograde step. I have observed that the administration is readily satisfied if an individual is blamed for an accident and gets punished. If, however, the fault is found with the system, the organisation opposes it and the matter does not get finalised for long. The basic weaknesses of the system are thus lost sight of, and these continue to persist, resulting in repeated accidents of the type.

The purpose of inquiries should be to find facts by eliminating fear of punishment from the staff. If this is done, the staff will appreciate that inquiries are held, not to find scapegoats but to probe deeper into the causes and determine the basic faults and flaws in the system.

Sd/- (ARYA BHUSHAN)

ANNEXURE I

NUMBER AND INCIDENCE OF CONSEQUENTIAL ACCIDENTS ON ALL THE GAUGES COMBINED CORRELATED TO DENSITY OF TRAFFIC—ALL RAILWAYS; YEAR-WISE

A—Number of accidents
B—Incidence of accidents per million train kilometres.

Years	Collisions		Derailments		Accidents at level crossings		Fires in trains		All consequential accidents	
	A	B	A	B	A	B	A	B	A	B
1963-64	86	0.20	1277	3.08	164	0.39	115	0.27	1642	3.94
1964-65	86	0.20	1028	2.42	133	0.31	32	0.07	1279	3.00
1965-66	79	0.18	951	2.17	128	0.29	42	0.09	1200	2.73
1966-67	68	0.15	865	1.95	104	0.23	53	0.11	1090	2.44
1967-68	70	0.16	879	1.97	114	0.25	42	0.09	1105	2.47
1968-69*	48	0.11	692	1.54	129	0.28	47	0.10	916	2.03
1969-70	53	0.11	760	1.63	111	0.23	43	0.09	967	2.06
1970-71	58	0.13	653	1.42	121	0.26	11	0.02	843	1.83
1971-72	56	0.12	668	1.43	118	0.25	10	0.03	860	1.83
1972-73	60	0.13	604	1.29	131	0.27	32	0.06	827	1.75
1973-74	66	0.15	580	1.36	115	0.26	11	0.02	772	1.79
1974-75	66	0.15	701	1.62	140	0.32	22	0.05	929	2.14
1975-76	68	0.14	772	1.60	105	0.21	27	0.05	972	2.00
1976-77	48	0.09	636	1.26	96	0.18	16	0.03	796	1.56
1977-78*	52	0.10	712	1.40	93	0.18	14	0.02	871	1.70
1978-79	55	0.11	778	1.55	86	0.17	12	0.02	931	1.85
1979-80	72	N.A.	691	N.A.	114	N.A.	21	N.A.	898	N.A.

*Information for the years 1968-69 to 1977-78 is based on information furnished to the Committee by the Zonal Railways. Some minor differences in the annual number of accidents with reference to those shown in the figures published by the Railway Board and which were also given by us in Part I of our Report, are there.

N.A.—denotes 'Not available'.

ANNEXURE II

NUMBER AND INCIDENCE OF COLLISIONS ON THE BROAD GAUGE CORRELATED TO DENSITY OF TRAFFIC—RAILWAY-WISE; IN 5 YEAR PERIODS

A—Number of collisions
B—Number of collisions as a Percentage of the total number of collisions on Indian Railways
C—Incidence of collisions per million train Kilometres

Railway	1963-64 to 1967-68			1968-69 to 1972-73			1973-74 to 1977-78		
	A	B	C	A	B	C	A	B	C
Central	52	19.3	0.17	47	23.0	0.16	43	17.6	0.13
Eastern	39	14.5	0.14	41	20.0	0.15	60	24.5	0.20
Northern	43	16.0	0.16	40	19.5	0.13	40	16.3	0.13
North Eastern	1	0.4	0.85	Nil	Nil	Nil	1	0.4	0.32
Northeast Frontier	3	1.2	0.26	2	1.0	0.51	2	0.8	0.12
Southern	35	13.0	0.26	13	6.3	0.11	17	7.0	0.15
South Central	2	0.3	0.06	13	6.3	0.10	13	5.3	0.09
South Eastern	66	24.5	0.30	30	14.6	0.12	53	21.6	0.20
Western	28	10.3	0.18	19	9.3	0.11	16	6.5	0.08
All Railways	269	100.0	0.18	205	100.0	0.13	245	100.0	0.15

NOTE:—The South Central Railway was formed on 02-10-1966 and the number of accidents pertain to the period thereafter.

ANNEXURE III

**NUMBER AND INCIDENCE OF COLLISIONS ON THE METRE GAUGE CORRELATED TO DENSITY OF TRAFFIC—
RAILWAY -WISE; IN 5-YEAR PERIODS**

A—Number of collisions

B—Number of collisions taken as a percentage of the total number of collisions on Indian Railways

C—Incidence of collisions per million train kilometers

Railway	1963-64 to 1967-68			1968-69 to 1972-73			1973-74 to 1977-78		
	A	B	C	A	B	C	A	B	C
1	2	3	4	5	6	7	8	9	10
Central	2	1.8	0.08	1	1.5	0.15	Nil	—	—
Northern	10	9.0	0.15	3	4.5	0.04	2	3.8	0.03
North Eastern	30	27.1	0.20	19	28.4	0.13	17	32.1	0.13
Northeast Frontier	26	23.4	0.33	20	29.9	0.26	8	15.1	0.13
Southern	27	24.3	0.14	8	11.9	0.05	6	11.3	0.04
South Central	4	3.6	0.15	8	11.9	0.09	9	17.0	0.11
Western	12	10.8	0.08	8	11.9	0.05	11	20.7	0.07
AN Railways	111	100.0	0.16	67	100.0	0.09	53	100.0	0.08

NOTE:—The South Central Railway was formed on 02-10-1966 and the number of accidents pertain to the period thereafter.

ANNEXURE

NUMBER AND INCIDENCE OF COLLISIONS ON THE BROAD GAUGE CORRELATED

Railway	YEAR									
	1968-69		1969-70		1970-71		1971-72		1972-73	
	A	B	A	B	A	B	A	B	A	B
1	2	3	4	5	6	7	8	9	10	11
Central	6	0.11	12	0.21	13	0.23	6	0.10	10	0.17
Eastern	10	0.19	6	0.10	8	0.14	9	0.16	8	0.14
Northern	10	0.17	6	0.10	8	0.13	5	0.08	11	0.18
North Eastern	Nil	—	Nil	—	Nil	—	Nil	—	Nil	—
Northeast Frontier	Nil	—	Nil	—	Nil	—	1	4.55	1	0.34
Southern	3	0.13	2	0.09	5	0.22	2	0.08	1	0.05
South Central	2	0.08	4	0.16	4	0.15	2	0.07	1	0.04
South Eastern	2	0.04	5	0.10	6	0.12	9	0.17	8	0.16
Western	4	0.12	4	0.11	3	0.08	3	0.08	5	0.14
All Railways	37	0.12	39	0.13	47	0.15	37	0.12	45	0.14

ANNEXURE

NUMBER AND INCIDENCE OF COLLISIONS ON THE METRE GAUGE CORRELATED

Railway	YEAR									
	1968-69		1969-70		1970-71		1971-72		1972-73	
	A	B	A	B	A	B	A	B	A	B
1	2	3	4	5	6	7	8	9	10	11
Central	Nil	—	Nil	—	Nil	—	Nil	—	1	0.71
Northern	Nil	—	1	0.07	1	0.08	1	0.08	Nil	—
North Eastern	2	0.07	2	0.07	4	0.13	5	0.17	6	0.20
Northeast Frontier	3	0.20	6	0.40	2	0.13	5	0.33	4	0.26
Southern	2	0.06	1	0.03	1	0.03	3	0.09	1	0.03
South Central	3	0.17	2	0.11	2	0.11	1	0.06	Nil	0.00
Western	1	0.03	2	0.06	1	0.03	2	0.06	2	0.06
	11	0.08	14	0.10	11	0.08	17	0.12	14	0.10

ANNEXURE 7

NUMBER AND INCIDENCE OF COLLISIONS ON THE NARROW GAUGE CORRELATED

Railway	YEAR									
	1968-69		1969-70		1970-71		1971-72		1972-73	
	A	B	A	B	A	B	A	B	A	B
1	2	3	4	5	6	7	8	9	10	11
Central	Nil									
Eastern	Nil									
Northern	Nil									
Northeast Frontier	Nil	—	Nil	—	Nil	—	Nil	—	1	3.7
Southern	Nil									
South Central	Nil									
South Eastern	Nil	—	Nil	—	Nil	—	2	0.5	Nil	—
Western	Nil									
All Railway	Nil	—	Nil	—	Nil	—	2	0.18	1	0.09

IV

TO DENSITY OF TRAFFIC—RAILWAY-WISE; YEAR-WISE

A—Number of collisions

B—Incidence of Collisions per million train kilometres

1973-74		1974-75		1975-76		1976-77		1977-78		Total for 10 years	
A	B	A	B	A	B	A	B	A	B	A	B
12	13	14	15	16	17	18	19	20	21	22	23
7	0.12	9	0.15	8	0.12	11	0.16	8	0.11	90	0.15
16	0.29	12	0.22	13	0.22	7	0.11	12	0.19	101	0.18
10	0.18	7	0.12	12	0.18	6	0.08	5	0.08	80	0.13
Nil	—	Nil	—	1	1.96	Nil	—	Nil	—	1	0.23
1	0.41	1	0.35	Nil	—	Nil	—	Nil	—	4	0.19
4	0.19	3	0.15	1	0.04	3	0.12	6	0.24	30	0.13
3	0.11	2	0.07	3	0.10	3	0.09	2	0.06	26	0.09
11	0.24	16	0.34	12	0.22	6	0.11	8	0.14	83	0.16
6	0.17	2	0.05	2	0.05	5	0.12	1	0.02	35	0.09
58	0.19	52	0.17	52	0.15	41	0.11	42	0.12	450	0.14

V

TO DENSITY OF TRAFFIC—RAILWAY-WISE; YEAR-WISE

A—Number of collisions

B—Incidence of collisions per million train kilo-metres

1973-74		1974-75		1975-76		1976-77		1977-78		Total for 10 years		
A	B	A	B	A	B	A	B	A	B	A	B	
11	12	13	14	15	16	17	18	19	20	21	22	23
Nil	—	Nil	—	Nil	—	Nil	—	Nil	—	1	0.07	
Nil	—	Nil	—	Nil	—	Nil	—	2	0.18	5	0.04	
3	0.12	4	0.17	4	0.15	4	0.14	2	0.07	36	0.13	
1	0.09	4	0.36	1	0.08	1	0.08	1	0.07	28	0.20	
2	0.08	1	0.04	1	0.03	2	0.07	Nil	—	14	0.05	
1	0.07	1	0.07	5	0.31	Nil	—	2	0.12	17	0.16	
Nil	—	4	0.13	5	0.15	Nil	—	2	0.06	19	0.06	
7	0.06	14	0.12	16	0.12	7	0.05	9	0.07	120	0.09	

VI

TO DENSITY OF TRAFFIC—RAILWAY-WISE; YEAR-WISE

A—Number of collisions

B—Incidence of collisions per million train kilo-metres.

1973-74		1974-75		1975-76		1976-77		1977-78		Total for 10 years	
A	B	A	B	A	B	A	B	A	B	A	B
12	13	14	15	16	17	18	19	20	21	22	23
						Nil					
Nil	—	Nil	—	Nil	—	Nil	—	Nil	—	1	0.52
						Nil					
1	0.3	Nil	—	Nil	—	Nil	—	1	0.03	4	0.10
						Nil					
1	0.10	Nil	—	Nil	—	Nil	—	1	0.09	5	0.05

NUMBER AND INCIDENCE OF COLLISIONS ON THE BROAD GAUGE CORRELATED TO DENSITY OF TRAFFIC

Railway	Year											
	1968-69				1969-70				1970-71			
	P		O		P		O		P		O	
	A	B	A	B	A	B	A	B	A	B	A	B
1	2	3	4	5	6	7	8	9	10	11	12	13
Central	4	.13	2	.07	2	.06	10	.36	5	.16	8	.28
Eastern	6	.22	4	.16	Nil	—	6	.20	3	.11	5	.10
Northern	5	.15	5	.20	1	.13	5	.19	2	.06	6	.2
North Eastern	Nil	—	Nil	—	Nil	—	Nil	—	Nil	—	Nil	—
Northeast Frontier	Nil	—	Nil	—	Nil	—	Nil	—	Nil	—	Nil	—
Southern	1	.08	2	.22	1	.08	1	.10	3	.23	2	.21
South Central	2	.16	Nil	—	2	.16	2	.16	2	.15	2	.15
South Eastern	1	.06	1	.03	1	.05	4	.11	3	.17	3	.09
Western	1	.05	3	.18	Nil	—	4	.24	Nil	—	3	.18
All Railways	20	.13	17	.12	7	.05	32	.20	18	.12	29	.19

NUMBER AND INCIDENCE OF COLLISIONS ON THE METRE GAUGE SEPARATELY FOR PASSENGER AND OTHER

Railways	Year											
	1968-69				1969-70				1970-71			
	P		O		P		O		P		O	
	A	B	A	B	A	B	A	B	A	B	A	B
1	2	3	4	5	6	7	8	9	10	11	12	13
Central	Nil	—	Nil	—	Nil	—	Nil	—	Nil	—	Nil	—
Northern	Nil	—	Nil	—	Nil	—	1	.16	1	.13	Nil	—
North Eastern	1	.06	1	.09	1	.05	1	.08	2	.11	2	.17
Northeast Frontier	Nil	—	3	.37	3	.42	3	.37	Nil	—	2	.26
Southern	2	.09	Nil	—	Nil	—	1	.10	1	.04	Nil	—
South Central	1	.10	2	.25	Nil	—	2	.24	1	.10	1	.12
Western	Nil	—	1	.06	Nil	—	2	.12	Nil	—	1	.06
All Railways	4	.05	7	.12	4	.05	10	.16	5	.06	6	.10

SEPARATELY FOR PASSENGER AND OTHER TRAINS—RAILWAY-WISE; YEAR-WISE

A—Number of collisions
 B—Incidence of collisions per million passenger train/
 other train kilometres
 P—Passenger trains
 O—Other trains

1971-72				1972-73				Total for 5 years 1968-69 to 1972-73			
P		O		P		O		P		O	
A	B	A	B	A	B	A	B	A	B	A	B
14	15	16	17	18	19	20	21	22	23	24	25
1	·03	5	·17	2	·06	8	·27	14	·09	33	·23
6	·21	3	·11	2	·07	6	·22	17	·12	24	·18
3	·09	2	·08	7	·20	4	·15	18	·11	22	·17
Nil	—	Nil	—	Nil	—	—	Nil	Nil	—	Nil	—
Nil	—	1	50·0	Nil	—	1	·59	Nil	—	2	1·13
2	·15	Nil	—	Nil	—	1	·11	7	·11	6	·12
1	·07	1	·07	Nil	—	1	·07	7	·11	6	·09
4	·22	5	·13	2	·11	6	·18	11	·12	19	·11
1	·05	2	·12	2	·10	3	·18	4	·04	15	·18
18	·11	19	·12	15	·09	30	·19	78	·10	127	·16

VIII

TRAINS RAILWAYS-WISE ; YEAR-WISE

A—Number of collisions
 B—Incidence of collisions per million passenger train/
 other train kilometres
 P—Passenger trains
 O—Other trains

1971-72				1972-73				Total for 5 year 1968-69 to 1972-73			
P		O		P		O		P		O	
A	B	A	B	A	B	A	B	A	B	A	B
14	15	16	17	18	19	20	21	22	23	24	25
Nil	—	Nil	—	Nil	—	1	·11	Nil	—	1	·25
1	·13	Nil	—	Nil	—	Nil	—	2	·05	1	·04
3	·16	2	·18	4	·21	2	·19	11	·12	8	·16
2	·27	3	·38	1	·13	3	·38	6	·17	14	·35
1	·04	2	·21	1	·05	Nil	—	5	·05	3	·06
Nil	—	1	·13	Nil	—	Nil	—	2	·04	6	·15
1	·06	1	·06	Nil	—	2	·12	1	·01	7	·90
8	·10	9	·15	6	·07	8	·14	27	·40	40	·13

ANNEXURE

NUMBER AND INCIDENCE OF COLLISIONS ON THE BROAD GAUGE CORRELATED TO DENSITY OF TRAFFIC

Railway	YEAR											
	1973-74				1974-75				1975-76			
	P		O		P		O		P		O	
	A	B	A	B	A	B	A	B	A	B	A	B
1	26	27	28	29	30	31	32	33	34	35	36	37
Central	3	·10	4	·13	3	·10	6	·20	3	·09	5	·15
Eastern	8	·27	8	·32	7	·24	5	·19	7	·22	6	·21
Northern	7	·23	3	·13	4	·13	3	·12	8	·22	4	·14
North Eastern	Nil	—	Nil	—	Nil	—	Nil	—	1	2·13	Nil	—
Northeast Frontier	Nil	—	1	·80	1	·82	Nil	—	Nil	—	Nil	—
Southern	3	·26	1	·11	2	·19	1	·11	Nil	—	1	·10
South Central	Nil	—	3	·23	Nil	—	2	·15	1	·06	2	·14
South Eastern	3	·17	8	·28	6	·34	10	·33	3	·16	9	·25
Western	2	·10	4	·24	Nil	—	2	·11	2	·09	Nil	—
All Railways	26	·17	32	·22	23	·15	29	·19	25	·15	27	·16

ANNEXURE

NUMBER AND INCIDENCE OF COLLISIONS ON THE METRE GAUGE SEPARATELY FOR PASSENGER AND OTHER

Railways	YEAR											
	1973-74				1974-75				1975-76			
	P		O		P		O		P		O	
	A	B	A	B	A	B	A	B	A	B	A	B
1	26	27	28	29	30	31	32	33	34	35	36	37
Central	Nil	—	Nil	—	Nil	—	Nil	—	Nil	—	Nil	—
Northern	Nil	—	Nil	—	Nil	—	Nil	—	Nil	—	Nil	—
North Eastern	3	·18	Nil	—	1	·07	3	·37	1	·16	1	·10
Northeast Frontier	Nil	—	1	·18	1	·18	3	·54	Nil	—	1	·15
Southern	1	·06	1	·13	1	·07	Nil	—	Nil	—	1	·12
South Central	Nil	—	1	·15	1	·12	Nil	—	1	·11	4	·59
Western	Nil	—	Nil	—	1	·07	3	·20	2	·12	3	·19
All Railways	4	·06	3	·06	5	·08	9	·18	6	·07	10	·19

VII.—(Contd.)

SEPARATELY FOR PASSENGER AND OTHER TRAINS—RAILWAY-WISE; YEAR-WISE

A—Number of collisions
 B—Incidence of collisions per million passenger train/
 other train kilometres
 P—Passenger trains
 O—Other trains

												YEAR.	
1976-77				1977-78				Total for years 1973-74 to 1977-78					
P		O		P		O		P		O			
A	B	A	B	A	B	A	B	A	B	A	B		
38	39	40	41	42	43	44	45	46	47	48	49		
4	·11	7	·20	4	·10	4	·11	17	·10	26	·16		
5	·16	2	·07	8	·24	4	·13	35	·23	25	·18		
5	·13	1	·03	5	·14	Nil	—	29	·17	17	·08		
Nil	—	Nil	—	Nil	—	Nil	—	1	·30	Nil	—		
Nil	—	Nil	—	Nil	—	Nil	—	1	·13	1	·11		
1	·07	2	·10	4	·27	2	·20	10	·15	7	·14		
2	·11	1	·07	2	·11	Nil	—	5	·06	8	·11		
Nil	—	6	·16	4	·18	4	·11	16	·16	37	·22		
2	·09	3	·15	1	·04	Nil	—	7	·06	9	·09		
19	·10	22	·12	28	·15	14	·08	121	·14	124	·15		

VIII.—(Contd.)

TRAINS—RAILWAY-WISE; YEAR-WISE

A—Number of collisions
 B—Incidence of collisions per million passenger train/
 other train kilometres
 P—Passenger trains
 O—Other trains

												YEAR.	
1976-77				1977-78				Total for 5 years 1973-74 to 1977-78					
P		O		P		O		P		O			
A	B	A	B	A	B	A	B	A	B	A	B		
38	39	40	41	42	43	44	45	46	47	48	49		
Nil	—	Nil	—	Nil	—	Nil	—	Nil	—	Nil	—		
Nil	—	Nil	—	1	·15	1	·23	1	·03	1	·04		
2	·10	2	·20	1	·05	1	·10	10	·11	7	·16		
1	·15	Nil	—	1	·13	Nil	—	3	·09	5	·16		
2	·10	Nil	—	Nil	—	Nil	—	4	·04	2	·05		
Nil	—	Nil	—	1	·10	1	·16	3	·07	6	·18		
Nil	—	Nil	—	1	·06	1	·06	4	·05	7	·09		
5	·06	2	·04	5	·06	4	·08	25	·07	28	·81		

ANNEXURE IX

TYPES OF COLLISIONS ON THE BROAD GAUGE—ALL RAILWAYS : YEAR-WISE

A—No. of collisions

B—Percentage with respect to total of all types.

Year	Between two trains including between a train and light engine		Between a train and shunting engine or vehicles during shunting		Between a train and rake or load or vehicles stabled on running line.		Between a train or a trolley or lorry.		Between a train and buffer ends or other stationary objects.		Total of all types
	A	B	A	B	A	B	A	B	A	B	A
1	2	3	4	5	6	7	8	9	10	11	12
1963-64	31	53.5	12	20.7	11	18.9	3	5.2	1	1.7	58
1964-65	31	57.4	13	24.1	—	—	9	16.7	1	1.8	54
1965-66	25	43.1	10	17.2	9	15.5	11	18.9	3	5.2	58
1966-67	25	49.0	6	11.8	7	13.7	7	13.7	6	11.8	51
1967-68	24	50.00	7	14.6	7	14.6	10	20.8	—	—	48
Total of 5 years	136	50.6	48	17.8	34	12.6	40	14.9	11	—	269
1968-69	22	59.5	5	13.5	4	10.8	4	10.8	2	5.4	37
1969-70	19	48.7	9	23.1	8	20.5	2	5.1	1	2.6	39
1970-71	28	59.6	11	23.4	6	12.8	2	4.3	Nil	—	47
1971-72	30	81.1	2	5.4	2	5.4	3	8.1	Nil	—	37
1972-73	27	60.0	6	13.3	3	6.7	6	13.3	3	6.7	45
Total of 5 years	126	61.5	33	16.1	23	11.2	17	8.3	6	2.5	205
1973-74	40	69.0	7	12.1	3	5.2	6	10.3	2	3.4	58
1974-75	38	73.1	6	11.5	Nil	—	6	11.5	2	3.9	52
1975-76	38	73.0	4	7.7	4	7.7	5	9.6	1	1.9	52
1976-77	29	70.7	2	4.9	4	9.8	4	9.8	2	4.9	41
1977-78	27	64.3	5	11.9	1	2.4	6	14.3	3	7.1	42
Total of 5 years	172	70.2	24	9.8	12	4.9	27	11.0	10	4.1	245

NOTE:—The South Central Railway was formed on 02-10-1966 and the number of accidents pertain to the period thereafter.

ANNEXURE X

TYPES OF COLLISIONS ON THE METRE GAUGE—ALL RAILWAYS; YEAR-WISE

A—Number of Collisions

B—Percentage with respect to total of all types.

Year	Between two trains including between a train and light engine		Between a train and shunting engine or vehicles during shunting		Between a train and rake or load or vehicles stabled on running line.		Between a train or a trolley or lorry.		Between a train and buffer ends or other stationary objects.		Total of all types
	A	B	A	B	A	B	A	B	A	B	
1	2	3	4	5	6	7	8	9	10	11	12
1963-64	9	36.0	6	24.0	7	28.0	2	8.0	1	4.0	25
1964-65	8	27.6	6	20.7	7	24.1	8	27.6	—	—	29
1965-66	13	61.9	2	9.5	5	23.8	1	4.8	—	—	21
1966-67	5	31.2	5	31.2	2	12.5	3	18.8	1	6.3	16
1967-68	8	40.0	3	15.0	4	20.0	4	20.0	1	5.0	20
Total of 5 years	43	38.8	22	19.8	25	22.5	18	16.2	3	2.7	111
1968-69	7	63.6	1	9.1	1	9.1	2	18.2	Nil	—	11
1969-70	6	42.8	4	28.6	2	14.3	2	14.3	Nil	—	14
1970-71	6	54.5	2	18.2	2	18.2	1	9.1	Nil	—	11
1971-72	10	58.9	3	17.6	3	17.6	1	5.9	Nil	—	17
1972-73	10	71.4	1	7.1	3	21.5	Nil	—	Nil	—	14
Total of 5 years	39	58.2	11	16.4	11	16.4	6	9.0	Nil	—	67
1973-74	7	100.0	Nil	—	Nil	—	Nil	—	Nil	—	7
1974-75	11	78.6	1	7.1	2	14.3	Nil	—	Nil	—	14
1975-76	9	56.3	4	25.0	2	12.5	1	6.2	Nil	—	16
1976-77	4	57.1	2	28.6	1	14.3	Nil	—	Nil	—	7
1977-78	6	66.7	Nil	—	3	33.3	Nil	—	Nil	—	9
Total of 5 years	37	69.8	7	13.2	8	15.1	1	1.5	Nil	—	53

NOTE.—The South Central Railway was formed on 02-10-1966 and the number of accidents pertain to the period thereafter.

ANNEXURE

TYPES OF COLLISIONS ON THE BROAD AND

Broad Gauge

Railways	Between two trains including between a train and light engine.						Between a train and shunting engine or vehicles during shunting					
	A		B		C		A		B		C	
	No.	%	No.	%	No.	%	No.	%	No.	%	No.	%
1	2	3	4	5	6	7	8	9	10	11	12	13
Central	22	16.2	25	19.8	28	16.3	8	16.6	9	27.3	5	20.8
Eastern	25	18.4	30	23.8	42	24.4	4	8.3	6	18.2	5	20.8
Northern	17	12.5	17	13.5	30	17.4	9	18.8	11	33.3	2	8.4
North Eastern . . . . .	..	..	Nil	—	Nil	—	1	2.0	Nil	—	Nil	—
Northeast Frontier	2	1.5	1	0.8	1	0.6	..	..	1	3.0	1	4.2
Southern	11	8.1	6	4.8	11	6.4	5	10.5	3	9.1	2	8.3
South Central	1	0.7	9	7.1	11	6.4	1	2.0	Nil	—	2	8.3
South Eastern	42	30.8	28	22.2	39	22.7	14	20.3	1	3.0	6	25.0
Western	16	11.8	10	8.0	10	5.8	6	12.5	2	6.1	1	4.2
All Railways	136		126		172		48		33		24	

Metre Gauge

Central	1	2.3	1	2.5	Nil	—	1	4.6	Nil	—	Nil	—
Northern	3	7.0	Nil	—	1	2.7	2	9.1	2	18.2	Nil	—
North Eastern	16	37.1	12	30.8	11	29.8	4	18.4	4	36.3	2	28.5
Northeast Frontier	6	14.0	11	28.2	6	16.2	8	36.3	2	18.2	2	28.6
Southern	10	23.3	5	12.8	4	10.8	5	22.8	1	9.1	1	14.3
South Central . . . . .	..	..	4	10.3	7	18.9	..	..	1	9.1	1	14.3
Western	7	16.3	6	15.4	8	21.6	2	9.1	1	9.1	1	14.3
All Railways	43		39		37		22		11		7	

NOTE:—The South Central Railway was formed on 02-10-1966 and the number of accidents pertain to the period thereafter.

ANNEXURE

TYPES OF COLLISIONS OF THE BROAD AND METRE GAUGES COMBINED SEPARATELY

Year	Between two trains including between a train and light engine				Between a train and a shunting engine or vehicles during shunting			
	Passenger trains		Other trains		Passenger trains		Other trains	
	A	B	A	B	A	B	A	B
	1963—64	10	41.7	30	50.9	2	8.3	16	27.1
1964—65	13	50.0	26	45.7	5	19.2	14	24.5
1965—66	16	44.5	22	51.1	6	16.7	6	14.0
1966—67	11	55.0	19	40.4	2	10.0	9	19.1
1967—68	19	54.3	13	39.4	3	8.6	7	21.1
Total for 5 years	69	48.9	110	46.0	18	12.8	52	21.8
1968—69	16	66.7	13	54.2	4	16.7	2	8.3
1969—70	7	63.6	18	42.9	2	18.2	10	23.8
1970—71	13	56.5	21	60.0	6	26.1	7	20.0
1971—72	19	73.1	21	75.0	3	11.5	3	10.7
1972—73	13	61.9	24	63.2	4	19.0	3	7.9
Total for 5 years	68	64.8	97	58.1	19	18.1	25	15.0
1973—74	19	63.3	28	80.0	6	20.0	1	2.9
1974—75	24	85.7	35	65.8	2	7.1	5	13.2
1975—76	20	64.5	27	73.0	5	16.1	3	8.1
1976—77	20	83.3	13	54.2	2	8.3	2	8.3
1977—78	24	72.7	9	50.0	2	6.1	3	16.7
Total for 5 years	107	73.3	102	67.1	17	11.6	14	9.2

Note : The South Central Railway was formed on 2-10-1966 and the number of accidents pertain to the period thereafter.

XI

METRE GAUGE—RAILWAY-WISE IN 5-YEAR PERIODS

A—Period 1963-64 to 1967-68.

B—Period 1968-69 to 1972-73

C—Period 1973-74 to 1977-78.

Between a train and rake or load or vehicles stabled on a running line					Between a train and a trolley or lorry					Between a train and buffer ends or other stationary objects							
14	15	16	17	18	19	20	21	22	23	24	25	26	27	28	29	30	31
12	35.3	6	26.1	3	25.0	6	15.0	5	29.4	7	25.9	4	36.4	2	33.3	Nil	—
4	11.8	2	8.7	2	16.7	2	5.0	1	5.9	6	22.3	4	36.4	2	33.3	5	50.0
10	29.3	6	26.1	2	16.7	6	15.0	5	29.4	5	18.5	1	9.1	1	16.7	1	10.0
..	..	Nil	—	1	8.3	..	..	Nil	—	Nil	—	..	..	Nil	—	Nil	—
..	..	Nil	—	Nil	—	1	2.5	Nil	—	Nil	—	..	..	Nil	—	Nil	—
4	11.8	3	13.0	2	16.7	15	37.5	1	5.9	2	7.4	..	..	Nil	—	Nil	—
..	..	2	8.7	Nil	—	..	..	2	11.8	Nil	—	..	..	Nil	—	Nil	—
2	5.9	1	4.4	1	8.3	8	20.0	Nil	—	5	18.5	..	..	Nil	—	2	20.0
2	5.9	3	13.0	1	8.3	2	5.0	3	17.6	2	7.4	2	18.1	1	16.7	2	20.0
34		23		12		40		17		27		11		6		10	
..	..	Nil	—	Nil	..	..	..	Nil	—	Nil	..	..	..	Nil	—	Nil	—
5	20.0	1	9.1	1	12.5	..	..	Nil	—	Nil	..	..	..	Nil	—	Nil	—
6	24.0	2	16.2	3	37.5	3	16.7	1	16.6	1	100.0	1	33.3	Nil	—	Nil	—
7	28.0	4	36.3	Nil	—	4	22.2	3	50.0	Nil	—	1	33.3	Nil	—	Nil	—
5	20.0	1	9.1	1	12.5	6	33.3	1	16.7	Nil	—	1	33.4	Nil	—	Nil	—
..	..	2	18.2	1	12.5	4	22.2	1	16.7	Nil	—	..	..	Nil	—	Nil	—
2	8.0	1	9.1	2	25.0	1	5.6	Nil	—	Nil	—	..	..	Nil	—	Nil	—
25		11		8		18		6		1		3		Nil		Nil	

XII

FOR PASSANGER AND OTHER TRAINS—ALL RAILWAYS; YEAR-WISE

A—Number of collisions

B—Percentage with respect to total of all types

Between a train and rake or load or vehicles stabled on a running line				Between a train and a trolley or lorry				Between a train and buffer ends or other stationary objects				Total of all types			
Passenger trains		Other trains		Passenger trains		Other trains		Passenger trains		Other trains		Passenger trains		Other trains	
A	B	A	B	A	B	A	B	A	B	A	B	A	B	A	B
7	29.2	11	18.6	3	12.5	2	3.4	2	8.3	—	—	24	59		
2	7.7	5	8.5 _a	6	23.1	11	19.4	—	—	1	1.7	26	57		
5	13.9	9	20.9	8	22.2	4	19.3	1	2.7	2	4.7	36	43		
2	10.0	7	15.0	1	5.0	9	19.1	4	20.0	3	6.4	47	47		
5	14.5	6	18.2	7	20.0	7	21.1	1	2.8	—	—	35	33		
21	14.9	38	15.9	25	17.7	33	13.8	8	5.7	6	2.5	141	239		
1	4.2	4	16.7	1	4.2	5	20.9	2	8.3	Nil	—	24	24		
2	18.2	8	19.0	Nil	—	5	11.9	Nil	—	1	2.4	11	42		
3	13.0	5	14.3	1	4.3	2	5.7	Nil	—	Nil	—	23	35		
2	7.7	3	10.7	2	7.7	1	3.6	Nil	—	Nil	—	26	28		
1	4.8	5	13.2	1	4.8	5	13.2	2	9.5	1	2.6	21	38		
9	8.6	25	15.0	5	4.8	18	10.8	4	3.8	2	1.2	105	167		
2	6.7	1	2.9	2	6.7	4	11.4	1	3.3	1	2.9	30	35		
Nil	—	2	5.3	Nil	—	6	15.8	2	7.1	Nil	—	28	38		
3	9.7	3	8.1	2	6.4	4	10.8	1	3.2	Nil	—	31	37		
1	4.2	4	16.7	Nil	—	4	16.7	1	4.2	1	4.2	24	24		
1	3.0	3	16.7	4	12.1	2	11.1	2	6.1	1	5.6	33	18		
7	4.8	13	8.5	8	5.5	20	13.2	7	4.8	3	2.0	146	152		

ANNEXURE XIII

COLLISIONS ON THE BROAD GAUGE ACCORDING TO MAIN CAUSES—ALL RAILWAYS; YEAR-WISE

Year	Reception of a train on a blocked line or despatching into a blocked section		Drivers disregarding signals or failing to control trains		Trolleys or lorries not being protected		Miscellaneous		Total of all causes
	A	B	A	B	A	B	A	B	
1963—64	42	72.4	11	19.0	2	3.4	3	5.2	58
1964—65	28	51.8	17	31.2	7	13.0	2	3.7	54
1965—66	32	55.2	15	25.8	8	13.8	3	5.2	58
1966—67	23	45.1	20	39.2	5	9.8	3	5.9	51
1967—68	19	39.6	23	47.9	6	12.5	Nil	—	48
Total of 5 years	144	53.5	86	32.0	28	10.4	11	4.1	269
1968—69	13	35.1	19	51.4	4	10.8	1	2.7	37
1969—70	21	53.8	14	35.9	3	7.7	1	2.6	39
1970—71	14	29.8	29	61.7	2	4.3	2	4.2	47
1971—72	7	18.9	24	64.9	3	8.1	3	8.1	37
1972—73	11	24.4	23	51.1	5	11.1	6	13.4	45
Total of 5 years	66	32.2	109	53.2	17	8.3	13	6.3	285
1973—74	18	31.0	32	55.2	5	8.6	3	5.2	58
1974—75	15	28.8	29	55.8	5	8.6	3	5.8	52
1975—76	20	38.5	24	40.1	3	5.8	5	9.6	52
1976—77	11	26.8	24	58.5	3	7.3	3	7.4	41
1977—78	14	33.3	14	33.3	11	26.2	3	7.2	42
Total of 5 years	78	31.8	123	50.2	27	11.0	17	7.0	245

Note :—The South Central Railway was formed on 02-10-1966 and the number of accidents pertain to the period thereafter

ANNEXURE XIV

COLLISIONS ON THE METRE GAUGE ACCORDING TO MAIN CAUSES—ALL RAILWAYS; YEAR-WISE

Year	Reception of a train on a blocked line or despatching into a blocked section		Drivers disregarding signals or failing to control trains		Trolleys or lorries not being protected.		Miscellaneous		Total of all causes.
	A	B	A	B	A	B	A	B	
1963—64	14	56.8	7	28.0	2	8.0	2	8.0	2
1964—65	16	55.2	5	17.2	7	24.1	1	3.5	29
1965—66	14	66.7	7	33.3	—	—	—	—	21
1966—67	9	56.3	4	25.0	1	6.2	2	12.5	16
1967—68	10	50.0	6	30.0	3	15.0	1	5.0	20
Total of 5 years	63	56.8	29	26.1	13	11.7	6	5.4	111
1968—69	5	45.4	5	45.5	1	9.1	Nil	—	11
1969—70	5	35.7	7	50.0	2	14.3	Nil	—	14
1970—71	5	45.4	5	45.5	1	9.1	Nil	—	11
1971—72	7	41.2	8	47.1	1	5.9	1	5.8	17
1972—73	4	28.6	9	64.3	Nil	—	1	7.1	14
Total of 5 years	26	38.8	34	50.7	5	7.5	2	3.8	67
1973—74	2	28.6	4	57.1	Nil	—	1	14.3	7
1974—75	3	21.4	9	64.3	Nil	—	2	14.3	14
1975—76	8	50.8	5	31.3	1	6.2	2	12.5	16
1976—77	1	14.3	5	71.4	Nil	—	1	14.3	7
1977—78	4	44.4	4	44.5	Nil	—	1	11.1	9
Total of 5 years	18	34.8	27	51.0	1	1.8	7	13.2	53

Note :—The South Central Railway was formed on 02-10-1966 and the number of accidents pertain to the period thereafter.

ANNEXURE-XV

COLLISIONS ON THE BROAD AND METRE GAUGES ACCORDING TO MAIN CAUSES—RAILWAY-WISE; IN 5 YEAR PERIODS

Railway	Reception of a train on a blocked line or despatching it into a blocked section						Drivers disregarding signals or failing to control trains						Trolleys or lorries not protected						
	A		B		C		A		B		C		A		B		C		
	No.	%	No.	%	No.	%	No.	%	No.	%	No.	%	No.	%	No.	%	No.	%	
Central	36	25.0	17	25.8	11	14.1	9	10.5	21	19.3	23	18.7	4	14.3	5	29.4	7	25.9	
Eastern	11	7.6	8	12.1	16	20.5	23	26.7	30	27.5	36	29.3	2	7.1	1	5.9	6	22.2	
Northern	27	18.8	16	24.2	15	19.2	14	16.3	16	14.7	16	13.0	1	3.6	5	29.4	5	18.5	
North Eastern	1	0.7	Nil	—	1	1.3	—	—	Nil	—	Nil	—	—	—	Nil	—	Nil	—	
Northeast Frontier	2	1.4	Nil	—	1	1.3	—	—	2	1.8	1	0.8	1	3.6	Nil	—	Nil	—	
Southern	15	10.4	5	7.6	5	6.4	5	5.8	6	5.5	9	7.3	12	42.9	1	5.9	2	7.4	
North Central	1	0.7	7	10.6	7	9.0	1	1.2	4	3.7	4	3.2	—	—	2	11.8	Nil	—	
South Eastern	35	24.3	4	6.1	14	17.9	24	27.9	24	22.0	28	28.8	6	21.4	Nil	—	5	18.5	
Western	16	11.1	9	13.6	8	10.3	10	11.6	6	5.5	6	4.9	2	7.1	3	17.6	2	7.5	
All Railways	144		66		78		86		109		123		28		17		27		
METRE GAUGE																			
Central	1	1.6	1	3.8	Nil	—	—	—	Nil	—	Nil	—	—	Nil	—	—	Nil	—	
Northern	9	14.3	2	7.7	Nil	—	1	3.5	1	2.9	2	7.4	—	—	—	Nil	Nil	—	
South Eastern	13	20.6	4	15.4	3	16.7	13	44.8	13	38.2	10	37.0	2	15.4	1	20.0	1	100.0	
Northeast Frontier	1	28.6	8	30.8	2	11.1	6	20.7	9	26.5	4	14.8	2	15.4	2	40.0	Nil	—	
Southern	16	25.4	2	7.7	3	16.7	4	13.8	5	14.7	2	7.4	4	30.8	1	20.0	Nil	—	
South Central	—	—	4	15.4	4	22.2	—	W	3	8.8	4	14.9	4	30.7	1	20.0	Nil	—	
Western	6	9.5	5	19.2	6	13.3	5	17.2	3	8.9	5	18.5	1	7.7	Nil	—	Nil	—	
All Railways	63		26		18		29		34		27		13		5		1		

Note :—The South Central Railway was formed on 2-10-1966 and the number of accidents pertain to the period thereafter.

ANNEXURE—XV-(contd.)

A—Period 1963-64 to 1967-68

B—Period 1968-69 to 1972-73

C—Period 1973-74 to 1977-78

Railway	Miscellaneous						Total					
	A		B		C		A		B		C	
	No.	%	No.	%	No.	%	No.	%	No.	%	No.	%
Central	3	27.3	4	30.8	2	11.8	52	19.3	47	22.9	43	17.6
Eastern		27.3	2	15.4	2	11.8	39	14.5	41	20.0	60	24.3
Northern	1	9.1	3	23.1	4	23.5	43	16.0	40	19.5	40	6.51
North East	—	—	Nil	—	Nil	—	1	0.4	Nil	—	1	0.4
Northeast Frontier	—	—	Nil	—	Nil	—	3	1.1	2	1.0	2	0.8
Southern	3	27.2	1	7.7	1	5.9	35	13.0	13	6.3	17	7.0
South Central	—	—	Nil	—	2	11.7	2	0.8	13	6.4	13	5.3
South Eastern	1	9.1	2	15.4	6	35.3	66	24.5	30	14.6	53	21.6
Western	—	—	1	7.6	Nil	—	28	10.4	19	9.3	16	6.5
All Railways	11		13	17			269		205		245	

METER GAUGE

Central	1	16.7	Nil	—	Nil	—	2	1.8	1	1.5	Nil	—
Northern	—	—	Nil	—	Nil	—	10	9.0	3	4.5	2	3.8
North Eastern	2	33.3	1	50.0	3	42.9	30	27.0	19	28.4	17	32.1
Northeast Frontier	—	—	1	50.0	2	28.6	26	23.5	20	29.9	8	15.1
Southern	3	50.0	Nil	—	1	14.3	27	24.3	8	11.9	6	11.3
South Central	—	—	Nil	—	1	14.2	4	3.6	8	11.9	9	17.0
Western	—	—	Nil	—	Nil	—	12	10.8	8	11.9	11	20.7
All Railways	6	2			7		111		67		53	

Note :—The South Central Railway was formed on 2-10-1966 and the number of accidents pertain to the period thereafter.

ANNEXURE XVI

NUMBER OF COLLISIONS ON THE BROAD AND METRE GAUGES DURING 1968-69 TO 1977-78 CLASSIFIED ACCORDING TO THE NATURE OF FAILURE OF STATION STAFF—RAILWAY-WISE

A—Number of collisions.

B—Number of collisions taken as a percentage of the total.

Nature of failure of Station staff	Central		Eastern		Northern		North Eastern		Northeast Frontier		Southern		South Central		South Eastern		Western		Total for all Railways				
	BG	MG	BG	MG	BG	MG	BG	MG	BG	MG	BG	MG	BG	MG	BG	MG	BG	MG	BG		MG		
																			A	B	A	B	
1. Reception of a train on a blocked line due to :																							
(a) line being occupied	11	—	12	—	13	—	1	3	—	3	1	1	4	1	3	—	7	4	52	49.5	12	34.3	
(b) incorrect setting of points	2	—	2	—	—	—	—	—	—	2	4	3	6	3	3	—	2	3	19	18.1	11	31.4	
(c) signals taken off for a train not put back to "on"	—	—	—	—	1	—	—	—	—	—	1	—	—	—	1	—	—	—	3	2.9	—	—	
(d) fouling mark not clear	5	—	3	—	6	—	—	1	—	3	—	—	1	—	1	—	2	2	18	17.1	6	17.1	
(e) obstruction of line during shunting	2	—	1	—	1	—	—	1	—	1	—	1	1	2	3	—	—	1	8	7.6	6	17.2	
(f) at stations in automatic territories	—	—	—	—	3	—	—	—	—	—	1	—	—	—	—	—	1	—	5	4.8	—	—	
Total	20	—	18	—	24	—	1	5	—	9	7	5	12	6	11	—	12	10	105	100.0	35	100.0	
2. When despatching a train :																							
(a) by sending it into a blocked section	2	—	5	—	1	—	—	—	—	—	—	—	1	1	4	—	1	1	14	40.0	2	40.0	
(b) fouling mark not clear	2	—	—	—	3	—	—	—	—	—	—	—	—	—	—	—	—	—	5	14.3	—	—	
(c) obstruction during shunting or bumping against train going away	2	—	1	—	2	1	—	1	1	1	1	—	1	—	1	—	2	—	11	31.4	3	60.0	
(d) incorrect setting of points	2	—	—	—	1	—	—	—	—	—	2	—	—	—	—	—	—	—	5	14.3	—	—	
Total	8	—	6	—	7	1	—	1	1	1	3	—	2	1	5	—	3	1	35	100.0	5	100.0	
3. Collisions in block section or at stations due to vehicles escaping	—	1	—	—	—	1	—	1	—	1	—	—	—	1	2	—	2	—	4	2.8	5	11.5	
Grand Total	28	1	24	—	31	2	1	7	1	11	10	5	14	8	18	—	17	11	144	100.0	45	100.0	

ANNEXURE XVII

NUMBER OF COLLISIONS ON THE BROAD AND METRE GAUGES DURING 1968-69 TO 1977-78 CLASSIFIED

Nature of failure of drivers	Central		Eastern		Northern		North Eastern		Northeast Frontier	
	BG	MG	BG	MG	BG	MG	BG	MG	BG	MG
1. Collisions caused by drivers :										
(a) disregarding signals or overshooting	38	—	41	—	20	3	—	17	3	14
(b) failing to control trains on account of defective brake power	2	—	10	—	2	—	—	—	—	—
(c) mismanagement of the engine crew or running at excessive speed	2	—	8	—	1	—	—	2	—	—
(d) not observing rules when passing automatic signal	2	—	2	—	8	—	—	2	—	2
(e) moving against signals during shunting	—	—	5	—	1	—	—	2	—	—
2. Total	44	—	66	—	32	3	—	23	3	16

ANNEXURE XVIII

CATEGORIES OF STAFF HELD RESPONSIBLE FOR COLLISIONS DURING 1968-69 TO 1977-78

Categories of staff held responsible	Central		Eastern		Northern		North Eastern	
	A	B	A	B	A	B	A	B
1. Station Masters, Asstt. station masters and cabin asstt. station masters	23	25.3	24	13.4	15	16.3	6	18.2
2. Switchmen	—	—	22	12.3	3	3.3	—	—
3. Pointsmen	3	3.3	1	0.5	2	2.2	1	3.0
4. Levermen and Cabinmen	3	3.3	8	4.5	10	10.9	1	3.0
5. Shunting staff and other yard staff	3	3.3	5	2.8	5	5.4	1	3.0
6. Guards	4	4.4	12	6.7	15	16.3	—	—
7. Drivers	40	43.9	60	33.5	25	27.2	20	60.6
8. Firemen/Asstt. drivers (Diesel and Electric)	—	—	18	10.0	2	2.2	—	—
9. Motormen	3	3.3	6	3.4	—	—	—	—
10. Shunters	—	—	3	1.7	—	—	1	3.0
11. Permanent Way Inspectors	5	5.5	3	1.7	2	2.2	—	—
12. Permanent Way Mistries, gang-mates, keymen and gangmen	5	5.5	7	3.9	7	7.6	2	6.1
13. Loco maintenance staff	—	—	3	1.7	2	2.2	—	—
14. Train examining staff and Carriage & Wagon maintenance staff	1	1.1	—	—	—	—	—	—
15. Signal Inspectors	—	—	1	0.5	—	—	—	—
16. Signal maintainers and other signalling staff	1	1.1	2	1.1	3	3.2	—	—
17. Other staff like the Commercial Staff and electrical staff	—	—	4	2.2	1	1.0	1	3.0
18. Total	91	—	179	—	92	—	33	—

ACCORDING TO THE NATURE OF FAILURES OF DRIVERS.

A—Number of collisions
B—Number of collisions taken as a percentage of the total.

Southern		South Central		South Eastern		Western		Total of all Railways.			
BG	MG	BG	MG	BG	MG	BG	MG	BG		MG	
								A	B	A	B
6	2	5	4	28	—	8	7	149	64.2	47	73.4
—	1	—	—	—	—	—	1	14	6.0	2	3.1
2	3	2	1	3	—	3	—	21	9.1	6	9.4
7	1	—	2	21	—	1	—	41	17.7	7	10.9
—	—	—	—	—	—	—	—	7	3.0	2	3.2
15	7	8	7	52	—	12	8	232		64	

(BROAD AND METRE GAUGES COMBINED)

A—Number of staff held responsible for Collision.
B—Number of staff taken as a percentage of total.

Northeast Frontier		Southern		South Central		South Eastern		Western		Total of all Railways	
A	B	A	B	A	B	A	B	A	B	A	B
6	16.2	8	18.2	10	23.3	9	10.3	31	22.8	132	17.8
1	2.7	1	2.3	3	7.0	4	4.6	9	6.6	43	5.8
1	2.7	3	6.8	1	2.3	—	—	10	7.4	22	3.0
3	8.1	1	2.3	2	4.7	4	4.6	5	3.7	37	5.0
—	—	5	11.4	5	11.6	—	—	11	8.1	35	4.7
1	2.7	—	—	1	2.3	2	2.3	15	11.0	50	6.7
21	56.8	20	45.4	16	37.2	48	55.3	27	19.8	277	37.3
—	—	—	—	—	—	—	—	16	11.8	36	4.8
—	—	1	2.3	—	—	6	6.9	3	2.2	19	2.6
1	2.7	1	2.3	—	—	2	2.5	1	0.7	9	1.2
—	—	2	4.5	1	2.3	2	2.3	2	1.5	17	2.3
1	2.7	1	2.3	2	4.7	—	—	6	4.4	31	4.2
—	—	—	—	—	—	1	1.1	—	—	6	0.8
—	—	—	—	—	—	4	4.6	—	—	5	0.7
—	—	—	—	1	2.3	—	—	—	—	2	0.3
1	2.7	—	—	—	—	4	4.6	—	—	11	1.5
1	2.7	1	2.2	1	2.3	1	1.2	—	—	10	1.3
37		44		43		87		136		742	100.0

ANNEXURE XIX

CASUALTIES AND LOSS DUE TO DAMAGE IN COLLISIONS DURING THE PERIOD 1968-69 TO 1977-78

Railway	Total number of collisions.	Number of Casualties		Total	Damage loss in lakhs of Rupees i.e.
		Persons killed	Persons injured		
Central	91	31	309	340	120.07
Eastern	101	380	1970	2350	192.70
Northern	85	54	133	187	16.49
North Eastern	37	48	147	195	14.36
Northeast Frontier	33	4	52	56	15.31
Southern	44	34	463	497	39.97
South Central	43	35	315	350	44.23
South Eastern	87	113	427	540	185.08
Western	54	32	109	141	23.15
All Railways	575	731	3925	4656	651.36

ANNEXURE XX

NUMBER AND INCIDENCE OF DERAILMENTS ON THE BROAD GAUGE—RAILWAY-WISE IN 5-YEAR PERIODS

A—Number of derailments
B—Incidence of derailments per million train kilometres

RAILWAY	1963-64 to 1967-68		1968-69 to 1972-73		1973-74 to 1977-78	
	A	B	A	B	A	B
Central	477	1.69	291	1.01	312	0.96
Eastern	208	0.82	187	0.68	192	0.65
Northern	349	1.26	251	0.85	226	0.75
North Eastern	1	0.19	4	3.45*	6	1.91
Northeast Frontier	42	4.14	35	8.95*	31	1.84
Southern	379	2.93	134	1.18	121	1.06
South Central	47@	1.37	178	1.36	133	0.88
South Eastern	532	2.68	237	0.93	360	1.39
Western	132	0.82	104	0.58	150	0.73
All Railways	2167	1.60	1421	0.92	1531	0.92

*The increase in incidence is due to decrease in traffic density during the period.

@The South Central Railway was formed on 2-10-1966.

ANNEXURE XXI

NUMBER AND INCIDENCE OF DERAILMENTS ON THE METRE GAUGE—RAILWAY-WISE; IN 5-YEAR PERIODS.

A—Number of derailments
B—Incidence of derailments per million train kilometres

Railway	1963-64 to 1967-68		1968-69 to 1972-73		1973-74 to 1977-78	
	A	B	A	B	A	B
Central	42	19.6	37	5.52	23	3.11
Eastern			No Metre Gauge			
Northern	195	3.10	176	2.61	140	2.41
North Eastern	673	4.99	261	1.76	313	2.33
Northeast Frontier	691	10.38	463	6.12	369	5.85
Southern	510	2.73	245	1.56	258	1.93
South Central	73*	2.83	273	3.18	200	2.54
South Eastern			No Metre Gauge			
Western	334	2.13	2.26	1.60	335	2.40
All Railways	2518	3.86	1724	2.43	1638	2.58

The South Central Railway was formed on 2-10-1966

ANNEXURE XXII

NUMBER AND INCIDENCE OF DERAILMENTS ON THE NARROW GAUGE—RAILWAY-WISE; IN 5-YEAR PERIODS.

A—Number of derailments.
B—Incidence of derailments per million train kilometres.

Railway	1963-64 to 1967-68		1968-69 to 1972-73		1973-74 to 1977-78	
	A	B	A	B	A	B
Central	68	6.2	39	6.0	31	4.92
Eastern	5	4.5	5	1.86	8	3.01
Northern	46	6.7	40	6.15	7	1.94
North Eastern			No Narrow Gauge			
Northeast Frontier	32	11.9	13	10.66	22	30.98
Southern	13	7.2	8	4.65	2	7.14
South Central	5*	3.1	27	5.57	19	4.44
South Eastern	106	5.2	68	5.29	93	5.00
Western	40	3.3	32	2.6	50	4.40
All Railways	315	5.5	232	4.14	232	4.83

The South Central Railway was formed on 2-10-1966.

NUMBER AND INCIDENCE OF DERAILMENTS ON THE BROAD GAUGE CORRELATED TO

Railway	Year							
	1968-69		1969-70		1970-71		1971-72	
	A	B	A	B	A	B	A	B
Central	66	1.20	76	1.34	49	0.85	48	0.81
Eastern	56	1.06	29	0.51	32	0.58	32	0.58
Northern	52	0.89	56	0.94	55	0.95	47	0.79
North Eastern	1	4.17	1	4.17	1	4.35	Nil	—
Northeast Frontier	7	29.17	7	29.17	2	8.70	12	54.54
Southern	27	1.21	33	1.46	30	1.32	25	1.05
South Central	37	1.50	39	1.57	31	1.18	40	1.40
South Eastern	43	0.88	52	1.00	54	1.07	47	0.91
Western	15	0.40	27	0.74	13	0.37	20	0.54
All Railways	303	1.02	320	1.03	267	0.87	271	0.86

ANNEXURE XXIV

NUMBER AND INCIDENCE OF DERAILMENTS ON THE METRE GAUGE CORRELATED TO DENSITY

Railway	Year							
	1968-69		1969-70		1970-71		1971-72	
	A	B	A	B	A	B	A	B
Central	10	8.33	6	5.00	7	5.00	6	4.00
Eastern			No Metre Gauge					
Northern	40	3.03	29	2.09	43	3.23	32	2.24
North Eastern	65	2.33	55	1.83	42	1.39	52	2.10
Northeast Frontier	105	7.07	111	7.32	62	4.16	109	7.10
Southern	39	1.25	59	1.85	55	1.72	47	1.45
South Central	43	2.43	70	3.89	67	3.74	48	2.91
South Eastern			No Metre Gauge					
Western	45	1.33	60	1.76	63	1.91	51	1.53
All Railways	347	2.46	390	2.70	339	2.38	355	2.50

ANNEXURE XXV

NUMBER AND INCIDENCE OF DERAILMENTS ON THE NARROW GAUGE CORRELATED TO

Railway	Year							
	1968-69		1969-70		1970-71		1971-72	
	A	B	A	B	A	B	A	B
Central	12	8.57	5	3.57	9	6.92	1	0.83
Eastern	1	1.87	1	1.87	1	1.83	Nil	—
Northern	9	6.43	5	3.57	9	6.92	10	8.32
North Eastern			No Narrow Gauge					
Northeast Frontier	1	4.76	3	13.64	1	3.85	4	15.83
Southern	1	2.62	3	8.33	2	5.71	2	5.41
South Central	6	5.94	11	11.22	1	1.02	3	3.16
South Eastern	11	2.66	17	4.15	13	3.15	17	4.13
Western	1	0.40	5	2.02	11	4.60	5	1.99
All Railways	42	3.63	50	4.36	47	4.18	42	3.77

DENSITY OF TRAFFIC-RAILWAY-WISE AND YEAR-WISE DURING THE YEARS 1968-69 TO 1977-78

A—Number of derailments

B—Incidence of derailments per million train kilometres.

1972-73		1973-74		1974-75		1975-76		1976-77		1977-78	
A	B	A	B	A	B	A	B	A	B	A	B
52	0.86	47	0.80	52	0.88	70	1.08	66	0.96	77	1.04
38	0.67	37	0.63	53	0.95	35	0.58	35	0.57	32	0.51
41	0.67	43	0.78	43	0.77	49	0.76	38	0.56	53	0.88
1	4.17	Nil	—	Nil	—	2	3.92	3	3.00	1	0.91
7	2.35	6	2.47	9	3.18	8	2.17	6	1.58	2	0.49
19	0.86	27	1.31	28	1.44	28	1.21	22	0.85	16	0.64
31	1.16	22	0.82	25	0.91	38	1.25	30	0.92	18	0.53
41	0.81	38	0.84	73	1.54	82	1.53	72	1.28	95	1.68
30	0.81	30	0.83	30	0.71	32	0.80	31	0.73	27	0.60
260	0.82	250	0.83	313	1.01	344	1.0.	303	0.84	321	0.88

OF TRAFFIC—RAILWAY-WISE AND YEAR-WISE DURING 1968-69 TO 1977-78.

A—Number of derailments.

B—Incidence of derailments per million train kilometres.

		Year									
		1972-73		1973-74		1974-75		1976-77		1977-78	
		A	B	A	B	A	B	A	B	A	B
8	5.71	1	0.71	3	2.31	4	2.67	4	3.75	5	63
No Metre Gauge											
32	2.30	34	3.33	30	2.70	35	2.78	22	1.65	19	1.73
37	1.25	40	1.65	67	2.90	70	2.54	72	2.45	64	2.14
76	4.94	68	6.16	93	8.29	74	5.65	67	5.17	67	4.55
45	1.51	41	1.59	56	2.50	69	2.40	40	1.38	52	1.89
45	2.87	33	2.23	35	2.34	58	3.60	29	1.74	45	2.78
No Metre Gauge											
50	1.48	60	2.00	56	1.93	76	2.34	62	1.81	81	2.39
293	2.10	277	2.	3634001	3.	386	2.92	298	2.17	337	2.50

DENSITY OF TRAFFIC—RAILWAY—WISE AND YEAR-WISE DURING 1968-69 TO 1977-78

A—Nuber of derailments

B—Incidence of derailments per million train kilometres

1972-73		1973-74		1974-75		1975-76		1976-77		1977-78	
A	B	A	B	A	B	A	B	A	B	A	B
12	10.0	11	10.00	4	3.33	3	2.50	6	5.00	7	4.38
2	3.70	Nil	—	2	4.12	Nil	—	Nil	—	6	10.22
7	5.83	1	1.66	3	5.00	Nil	—	2	2.86	1	0.91
No Narrow Gauge											
4	14.81	3	15.79	8	88.88	3	25.00	3	25.00	5	26.31
Nil	—	1	6.25	Nil	—	1	33.33	Nil	—	Nil	—
6	6.45	8	10.26	5	6.17	3	3.41	1	1.10	2	2.2
10	2.40	19	5.01	19	5.12	21	5.74	16	4.40	18	4.75
10	3.98	10	4.24	7	3.21	11	4.76	7	3.15	15	5.14
51	4.60	53	5.58	48	5.27	42	4.51	35	3.74	54	5.14

ANNEXURE XXVI

DERAILMENTS AT STATIONS AND IN MID-SECTION ON THE BROAD GAUGE—RAILWAY-WISE; IN 5-YEAR PERIODS

Railway	1963-64 to 1967-68				1968-69 to 1972-73				1973-74 to 1977-78			
	Mid-section		At stations		Mid-section		At stations		Mid-section		At stations	
	Number	Per-centage	Number	Per-centage	Number	Per-centage	Number	Per-centage	Number	Per-centage	Number	Per-centage
1. central	108	22.6	369	77.4	95	32.6	196	67.4	135	43.3	177	56.7
2. Eastern	74	35.6	134	64.4	67	35.8	120	64.2	83	43.2	109	56.8
3. Northern	105	30.1	244	69.9	58	23.1	193	76.9	102	45.1	124	54.9
4. North Eastern	Nil	—	1	100.0	1	25.0	3	75.0	Nil	—	6	100.0
5. Northeast Frontier	9	21.4	33	78.6	5	14.3	30	85.7	9	29.0	22	71.0
6. Southern	64	17.0	315	83.0	27	20.1	107	79.9	37	30.6	84	69.4
7. South Central	11	23.4	36	76.6	54	30.3	124	69.7	60	45.1	73	54.9
South Eastern	197	37.1	335	62.9	120	50.6	117	49.4	223	61.9	137	38.1
Western	27	20.5	105	79.5	37	35.6	67	64.4	52	34.7	98	65.3
All Railways	595	27.4	1572	72.6	464	32.7	957	67.3	701	45.8	830	54.2

Note : The South Central Railway was formed on 2-10-1966.

ANNEXURE XXVII

DERAILMENTS AT STATIONS AND IN MID-SECTION ON THE BROAD GAUGE ACCORDING TO MAIN CAUSES—ALL RAILWAYS; IN 5 YEAR PERIODS

A—Number of derailments
B—Number of derailments due to cause taken as a percentage of the total

Main cause	1963-64 to 1967-68		1968-69 to 1972-73		1973-74 to 1977-78	
	A	B	A	B	A	B
	Derailments at stations					
1. Staff failure	814	51.8	497	51.9	409	49.3
2. Permanent way failures	229	14.6	112	11.7	89	10.7
3. Carriage and wagon defects	289	18.4	187	19.6	201	24.2
4. Engine defects	63	4.0	30	3.1	27	3.3
5. Miscellaneous causes	177	11.2	131	13.7	104	12.5
6. Total	1572	100.0	957	100.0	830	100.0
Derailments in mid-section						
1. Staff failures	95	16.0	94	20.3	148	21.1
2. Permanent way failures	170	28.4	72	15.5	119	17.0
3. Carriage and wagon defects	178	30.0	146	31.5	260	37.1
4. Engine defects	27	4.6	14	3.0	28	4.0
5. Miscellaneous causes	125	21.0	138	29.7	146	20.8
6. Total	595	100.0	464	100.0	701	100.0
All Derailments						
1. Staff failures	909	42.0	591	41.6	557	36.4
2. Permanent way failures	399	18.4	184	13.0	208	13.6
3. Carriage and wagon defects	467	21.6	333	23.4	461	30.1
4. Engine defects	90	4.0	44	3.1	55	3.6
5. Miscellaneous causes	302	14.0	269	18.9	250	16.3
6. Total	2167	100.0	1421	100.0	1531	100.0

ANNEURE-XXVIII

DERAILMENTS AT STATIONS ON THE BROAD GAUGE ACCORDING TO MAIN CAUSES—RAILWAY-WISE; IN 5-YEAR PERIODS

A—Percentage of the failure to the total on each Railway.

B—Percentage of the failures on each rail- of the total of (all Railways).

Main Cause		1963-64 to 1967-68										1968-69 to 1972-73				
		CR	ER	NR	NER	NFR	SR	SCR	SER	WR	All Rajil-ways	CR	ER	NR	NER	NFR
Staff failures	No.	217	44	138	1	16	165	16	167	50	814	87	52	117	2	21
	A	58.8	32.8	56.5	100.0	48.4	52.4	44.5	49.9	47.6	51.8	44.4	43.3	60.6	66.7	70.0
	B	26.6	5.4	17.0	0.1	2.0	20.3	2.0	20.5	6.1	100.0	17.5	10.5	23.5	0.4	4.2
Permanent way failures	No	28	20	25	Nil	6	73	5	54	18	229	21	13	14	Nil	1
	A	7.6	15.0	10.2	—	18.2	23.2	13.8	16.1	17.1	14.6	10.7	10.8	7.3	—	3.3
	B	12.2	8.7	10.9	—	2.6	31.9	2.2	23.6	7.9	100.0	18.8	11.6	12.5	—	0.9
Carriage and wagon defects]	No	66	41	42	Nil	3	31	4	81	21	289	36	40	27	1	5
	A	17.9	30.6	17.3	—	9.1	9.8	11.1	24.2	20.1	18.4	18.4	33.4	14.0	33.3	16.7
	B	22.3	14.1	14.5	—	1.0	10.7	1.3	28.4	7.2	100.0	19.3	21.4	14.4	0.5	2.7
Engine defects	No	12	14	6	Nil	3	15	3	4	6	63	7	3	9	Nil	1
	A	3.2	10.4	2.5	—	9.1	4.8	8.3	1.1	5.7	4.0	3.6	2.5	4.7	—	3.3
	B	19.1	23.2	9.5	—	4.8	23.8	4.8	6.3	9.5	100.0	23.3	10.0	10.0	—	3.3
Miscellaneous causes	No	46	15	33	Nil	5	31	8	29	10	177	45	12	26	Nil	3
	A	12.5	11.2	13.5	—	15.2	9.8	22.3	8.7	9.5	11.2	22.9	10.0	13.4	—	6.7
	B	26.0	8.5	18.6	—	2.8	17.5	4.6	16.4	5.6	100.0	34.4	9.2	19.8	—	1.5
Total number of derailments at stations	A	369	134	244	1	33	315	36	335	105	1572	196	120	193	3	30
	B	23.5	8.5	15.5	—	2.1	20.1	2.3	21.3	6.7	100.0	20.5	12.5	20.2	0.3	3.1

Note : The South Central Railways was found on 2-10-1966.

ANNEXURE-XXVIII—(Contd.)

DERAILMENT AT STATIONS ON THE BROAD GAUGE ACCORDING TO MAIN CAUSES—RAILWAYWISE IN 5 YEAR PERIODS

A—Percentage of the failures to the total on each railway.

B—Percentage of the failures on each railway to the total on all railways.

Main Causes		1968-69 to 1972-73							1973-74 to 1977-78							
		SR	SCR	SER	WR	All Railways	CR	ER	NR	NER	NFF	SE	SCR	SER	WR	All Railways
k Staff failures	No.	76	62	47	33	497	72	34	73	3	9	68	37	64	49	409
	A	71.0	50.0	40.2	49.3	51.9	40.7	31.2	50.0	40.9	81.0	50.7	46.8	50.0	50.0	49.3
	B	15.3	12.5	9.5	6.6	100.0	17.6	8.3	17.9	0.7	2.2	16.6	9.0	15.7	12.0	100.0
Permanent way failures	No.	4	35	12	12	112	16	18	10	Nil	4	3	15	11	12	89
	A	3.8	28.2	10.3	17.9	11.7	9.0	16.5	8.1	—	18.2	3.6	20.5	8.0	12.3	10.7
	B	3.6	31.2	10.7	10.7	100.0	18.0	20.2	11.2	—	4.5	3.4	16.9	12.3	13.5	100.0
Carriage and wagon defects	No.	12	14	39	13	187	48	36	18	2	6	8	11	48	24	201
	A	11.2	11.3	33.3	19.4	19.6	23.8	17.9	9.0	1.0	3.0	4.0	5.5	23.9	11.9	100.0
	B	6.4	7.5	20.9	6.9	100.0	21.8	17.9	9.0	1.0	3.0	4.0	5.5	23.9	11.9	100.0
Engine defects	No.	4	2	2	2	30	8	7	6	Nil	1	Nil	Nil	3	2	27
	A	3.7	1.6	1.7	3.0	3.1	4.5	6.4	4.8	—	6.5	—	—	2.2	2.0	30
	B	13.3	6.7	6.7	6.7	100.0	29.7	25.9	22.2	—	3.7	—	—	11.1	7.4	1.03
Miscellaneous causes	No.	11	11	17	7	131	33	14	17	1	2	5	10	11	11	104
	A	10.3	8.9	14.5	10.4	13.7	18.7	12.9	13.7	16.7	9.1	5.9	13.7	8.0	11.2	12.5
	B	8.4	8.4	13.0	5.3	100.0	31.7	13.5	16.3	1.0	1.9	4.8	9.6	10.6	10.6	100.0
Total number of derailments at stations	No.	107	124	117	67	957	177	109	124	6	22	84	73	137	98	830
	B	11.2	13.0	12.2	7.0	100.0	21.3	13.1	15.0	0.7	2.7	10.1	8.8	16.5	11.8	100.0

Note : The South Central Railways was found on 2-10-1966.

ANNEXURE-XXIX

DERAILMENTS IN MID-SECTION ON THE BOARD GAUGE ACCORDING TO MAIN CAUSES—RAILWAY-WISE; IN 5-YEAR PERIODS

A—Percentage of the failures to the total on each railway.

B—Percentage of the failures on each railway to the total on all railways.

Main cause		1963-64 to 1967-68									1968-69 to 1972-73					
		CR	ER	NR	NER	NFR	SR	SCR	SER	WR	All Railways	CR	ER	GR	NER	NFR
k Staff failures	No.	25	9	25	Nil	1	5	3	26	1	95	29	13	11	Nil	Nil
	A	23.1	12.1	23.8	—	11.1	7.8	27.2	13.2	3.7	16.0	30.5	19.4	19.0	—	—
	B	26.3	9.5	26.3	—	1.0	5.3	3.2	27.4	1.0	100.0	30.9	13.8	11.7	—	—
Permanent way failures	No.	16	18	11	Nil	5	27	3	81	9	170	10	14	8	Nil	Nil
	A	14.8	24.3	10.5	—	55.6	42.2	27.3	41.1	33.3	28.4	10.5	20.9	13.8	—	—
	B	9.4	10.6	6.5	—	2.9	15.9	1.8	47.6	5.3	100.0	13.9	19.4	11.1	—	—
Carriage and wagon defects	No.	30	29	36	Nil	1	19	3	50	10	178	24	31	16	Nil	Nil
	A	27.8	39.2	34.2	—	11.1	29.7	27.3	25.4	37.1	30.0	25.3	46.3	27.6	—	—
	B	16.8	16.3	20.2	—	0.5	10.7	1.7	28.0	5.8	100.0	16.4	21.2	11.0	—	—
Engine defects	No.	7	5	3	Nil	1	7	1	Nil	3	27	1	3	4	Nil	1
	A	6.5	6.8	2.9	—	11.1	10.9	9.1	—	11.1	4.6	1.1	4.5	6.9	—	20.0
	B	25.9	18.6	11.1	—	3.7	25.9	3.7	—	11.1	100.0	7.2	21.4	28.6	—	7.1
Miscellaneous causes	No.	30	13	30	Nil	1	6	1	40	4	125	31	6	19	1	4
	A	27.8	17.6	28.6	—	11.1	9.4	9.1	20.3	14.8	21.0	32.6	8.9	32.7	100.0	80.0
	B	24.0	10.4	24.0	—	0.8	4.8	0.8	3.2	32	100.0	22.5	4.3	13.8	0.7	2.9
Total number of derailments in mid-section	No.	108	74	105	Nil	9	64	11	197	27	595	95	67	58	1	5
	B	18.2	12.4	17.4	—	1.5	10.8	1.9	33.1	4.5	100.0	20.5	14.4	12.5	0.2	1.1

Note : The South Central Railway was formed on 2-10-1966.

DERAILMENTS IN MID-SECTION ON THE BROAD GAUGE ACCORDING TO MAIN CAUSES—

Main causes		1968-69 to 1972-73				
		SR	SCR	SER	WR	All rail-ways
Staff failures	No.	13	9	16	3	94
	A	48.2	16.7	13.3	8.1	20.3
	B	13.8	9.6	17.0	3.2	100.0
Permanent way failures	No.	3	9	17	1	72
	A	11.1	16.7	14.2	29.	15.5
	B	4.2	12.5	23.6	15.	100.0
Carriage and wagon defects	No.	5	16	41	1	146
	A	18.5	29.6	34.2	35.	31.5
	B	3.4	11.0	28.1	8.	100.0
Engine defects	No.	Nil	2	2		14
	A	—	3.7	1.7	2.	3.0
	B	—	14.3	14.3	7.	100.0
Miscellaneous causes	No.	6	18	44	9	138
	A	22.2	33.3	36.6	24.3	29.7
	B	4.4	13.0	31.9	6.5	100.0
Total number of derailments in mid-section	No.	27	54	120	37	464
	B	5.8	11.6	25.9	8.0	100.0

DERAILMENTS AT STATIONS AND IN MID-SECTION COMBINED, ON THE BROAD GAUGE ACCORDING TO MAIN

Main causes		1963-64 to 1967-68				
		CR	ER	NR	NER	NFR
Staff failures	No.	242	53	163	1	17
	A	50.7	25.5	46.7	100.0	40.5
	B	26.6	5.8	18.0	0.1	1.9
Permanent way failures	No.	44	38	36	Nil	11
	A	9.2	18.3	10.3	—	26.2
	B	11.0	9.5	9.0	—	2.8
Carriage and wagon defects	No.	96	70	78	Nil	4
	A	20.1	33.6	22.3	—	9.5
	B	20.6	15.0	16.9	—	0.8
Engine defects	No.	19	19	9	Nil	4
	A	4.0	9.1	2.6	—	9.5
	B	21.0	21.2	10.0	—	4.4
Miscellaneous causes	No.	76	28	63	Nil	6
	A	16.0	13.5	18.1	—	14.3
	B	25.2	9.3	20.9	—	2.0
Total number of derailments at station and mid-section combined	No.	477	208	349	1	42
	B	22.0	9.2	16.1	—	2.0

Note : The South Central Railway was formed on 2-10-1966.

—(Contd)

RAILWAY-WISE; IN 5-YEAR PERIODS

A—Percentage of the failures to the total on each railway

B—Percentage of the failures on each railway to the total on all railway

1973-74 to 1977-78									
CR	ER	NR	NER	NFR	SR	SCR	SER	SWR	All rail-ways.
35	10	29	Nil	1	16	10	38	9	148
25.9	12.0	28.4	—	11.1	43.3	16.7	17.0	17.3	21.1
23.6	6.8	19.6	—	0.7	10.7	6.8	25.7	6.1	100.0
23	12	13	Nil	3	2	13	39	14	119
17.0	14.5	12.7	—	33.3	5.4	21.7	17.5	26.9	17.0
19.3	10.1	10.9	—	2.5	1.7	10.9	32.8	11.8	100.0
31	44	24	Nil	2	10	21	105	23	260
23.0	53.0	23.5	—	22.2	27.0	35.0	47.1	44.3	37.1
11.9	16.9	9.2	—	0.8	3.8	8.1	40.4	8.9	100.0
5	1	7	Nil	Nil	3	7	4	1	28
3.7	1.2	6.9	—	—	8.1	11.6	1.8	1.9	4.0
17.8	3.6	25.0	—	—	10.7	25.0	14.3	3.6	100.0
41	16	29	Nil	3	6	9	37	5	146
30.4	19.3	28.5	—	33.4	16.2	15.0	16.6	9.6	20.8
28.1	11.0	19.9	—	2.0	4.1	6.2	25.3	3.4	100.0
135	83	102	Nil	9	37	60	223	52	70.70 ¹
19.3	11.8	14.6	—	1.3	5.3	8.6	31.8	7.3	100.0

CAUSES—RAILWAY-WISE; IN 5-YEAR PERIODS

A—Percentage of failures to the total on each railway.

B—Percentage of the failures on each railway to the total on all railways.

1968-69 to 1972-73									
SR	SCR	SER	WJ	All rail-ways.	CR	ER	NR	NER	NFR
170	19	193	51	909	116	65	128	2	21
44.9	40.4	36.3	38.6	42.0	39.9	34.8	51.0	50.0	60.0
18.7	2.1	21.2	5.6	100.0	19.6	11.0	21.7	0.3	3.6
100	8	135	27	399	31	27	22	Nil	1
26.4	17.0	25.4	20.5	18.4	10.7	14.4	8.8	—	2.9
25.1	2.0	33.8	6.8	100.0	16.8	14.7	12.0	—	0.5
50	7	131	31	467	60	71	43	1	5
13.2	15.0	24.6	23.5	21.6	20.6	38.0	17.1	25.0	14.3
10.7	1.5	28.0	6.5	100.0	18.1	21.3	12.9	0.3	1.5
22	4	4	9	90	8	6	13	Nil	2
5.8	8.5	0.8	6.8	4.0	2.7	3.2	5.2	—	5.7
24.5	4.4	4.4	10.0	100.0	18.3	13.6	29.5	—	4.5
37	9	69	14	302	76	18	45	1	6
9.7	19.1	12.9	10.6	14.0	26.1	9.6	17.9	25.0	17.1
12.3	3.0	22.8	4.5	100.0	28.3	6.7	16.7	0.4	2.2
379	47	532	132	2167	291	187	251	4	35
17.9	2.2	24.5	6.1	100.0	20.5	13.2	17.7	0.3	2.4

ANNEXURE-XXX—(Contd.)

DERAILMENTS AT STATIONS AND IN MID-SECTION COMBINED, ON THE BROAD GAUGE ACCORDING TO MAIN CAUSES—RAILWAY-WISE;
IN 5-YEAR PERIODS

A—Percentage of failures to the total on each railway.
B—Percentage of the failures on each railway to the total on all railways.

Main causes	1968-69 to 1972-73					1973-74 to 1977-78										
	SR	SCR	SER	WR	All rail-ways	CR	ER	NR	NER	NFR	SR	SCR	SER	WR	All rail-ways	
Staff failures	No.	89	71	63	36	591	107	44	102	3	10	84	47	102	58	557
	A	66.4	39.9	26.6	34.6	41.6	34.3	22.9	45.1	50.0	32.3	69.4	35.3	28.3	38.7	36.4
	B	15.0	12.0	10.7	6.1	100.0	19.2	7.9	18.3	0.6	1.8	15.1	8.4	18.3	10.4	100.0
Permanent way failures	No.	7	44	29	23	184	39	30	23	Nil	7	5	28	50	26	208
	A	5.2	24.7	12.2	22.1	13.0	12.5	15.6	10.2	—	22.6	4.1	21.1	13.9	17.3	13.6
	B	3.8	23.9	15.8	12.5	100.0	18.8	14.4	11.0	—	3.4	2.4	13.5	24.0	12.5	100.0
Carriage and wagon defects	No.	17	30	80	26	333	79	80	42	2	8	18	32	153	47	461
	A	12.7	16.9	33.8	25.0	23.4	25.3	41.7	18.6	33.3	25.8	14.9	24.0	42.5	31.3	30.1
	B	5.1	9.0	24.0	7.8	100.0	17.2	17.4	9.1	0.4	1.7	3.9	6.9	33.2	10.2	100.0
Engine defects	No.	4	4	4	3	44	13	8	13	Nil	1	3	7	7	3	55
	A	3.0	32.2	1.7	2.9	3.1	4.2	4.2	5.8	—	3.2	2.5	5.3	1.9	2.0	3.6
	B	9.1	9.1	9.1	6.8	100.0	23.6	14.5	23.7	—	1.8	5.5	12.7	12.7	5.5	0.001
Miscellaneous causes	No.	17	29	61	16	269	74	30	46	1	5	11	19	48	16	250
	A	12.7	16.3	25.7	15.4	18.9	23.7	15.6	20.3	16.7	16.1	9.1	14.3	13.4	10.7	16.3
	B	6.3	10.8	22.7	5.9	100.0	29.6	12.0	18.4	0.4	2.0	4.4	7.6	19.2	6.4	100.0
Total number of derailments station and mid-section combined	No.	134	178	237	104	1421	312	192	226	6	31	121	133	360	150	1531
	B	9.4	12.5	16.7	7.3	100.0	20.4	12.5	14.8	0.4	2.0	7.9	8.7	23.5	9.8	100.0

Note : The South Central Railway was formed on 2-10-1966.

ANNEXURE XXXI

DERAILMENTS AT STATIONS AND IN MID-SECTION ON THE METRE GAUGE—RAILWAY-WISE :IN YEAR PERIODS

Railway	1963-64 to 1967-68				1968-69 to 1972-73				1973-74 to 1977-78			
	Mid-section		At stations		Mid-section		At stations		Mid-section		At stations	
	Number	Percentage	Number	Percentage	Number	Percentage	Number	Percentage	Number	Percentage	Number	Percentage
1. Central	28	66.7	14	33.3	31	83.3	6	16.2	21	91.3	2	8.7
2. Eastern	No Metre Gauge											
3. Northern	107	54.9	88	45.1	111	63.1	65	36.9	116	82.9	24	17.1
4. North Eastern	138	20.5	535	79.5	116	44.4	145	55.6	153	48.9	160	51.1
5. Northeast Frontier	313	45.3	378	54.7	227	49.0	236	51.0	199	53.9	170	46.1
6. Southern	220	43.1	290	56.9	138	56.3	107	43.7	169	65.5	89	34.5
7. South Central	32	43.8	41	56.2	182	66.7	91	33.3	148	74.0	52	26.0
8. South Eastern	No Metre Gauge											
9. Western	137	41.1	197	58.9	123	45.7	146	54.3	227	67.8	108	32.2
All Railways	975	38.8	1543	61.2	928	53.8	796	46.2	1033	63.1	605	36.9

NOTE: The South Central Railway was formed on 2-10-1966.

ANNEXURE XXXII

DERAILMENTS AT STATIONS AND IN MID-SECTION ON THE METRE GAUGE ACCORDING TO MAIN CAUSES ALL RAILWAYS ; IN 5-YEAR PERIODS

A—Number of derailments

B—Number of derailments due to cause taken as a percentage of the total.

Main cause	1963-64 to 1967-68		1968-69 to 1972-73		1973-74 to 1977-78	
	A	B	A	B	A	B
Derailments at stations						
1. Staff failures	675	43.8	397	49.9	243	40.1
2. Permanent way failures	201	13.0	80	10.1	44	7.3
3. Carriage and wagon defects	245	15.8	187	23.5	210	34.7
4. Engine defects	179	11.6	45	5.7	27	4.5
5. Miscellaneous causes	243	15.8	87	10.8	81	13.4
Total	1543	100.0	796	100.0	605	100.0
Derailments in mid-Section						
1. Staff failures	202	20.7	320	34.5	366	35.5
2. Permanent way failures	162	16.6	77	8.3	105	10.2
3. Carriage and wagon defects	316	32.4	315	33.9	341	33.0
4. Engine defects	49	5.0	32	3.5	57	5.5
5. Miscellaneous causes	246	25.3	184	19.8	164	15.9
Total	975	100.0	928	100.0	1033	100.0
All Derailments						
1. Staff failures	877	34.8	717	41.6	609	37.21
2. Permanent way failure	363	14.4	157	9.1	149	9.1
3. Carriage and wagon defects	561	22.3	502	29.1	551	33.6
4. Engine defects	228	9.1	77	4.5	84	5.1
5. Miscellaneous causes	489	19.4	271	15.7	245	15.0
Total	2518	100.0	1724	100.0	1638	100.0

DERAILMENTS AT STATIONS ON THE METRE GAUGE ACCORDING TO MAIN

Main causes		1963-64 to 1967-68				
		CR	ER	NR	NER	NFR
(1)		2	3	4	5	6
Staff failures	No.	4	No metre gauge	32	274	142
	A	28.6		36.4	51.2	37.6
	B	0.6		4.8	40.6	21.0
Permanent way failures	No.	Nil		11	49	70
	A	—		12.5	9.2	18.5
	B	—		5.4	24.4	34.8
(Carriage and wagon defects	No.	3		27	69	51
	A	21.4		30.7	12.9	13.5
	B	1.2		11.0	28.2	20.8
Engine defects]	No.	1		10	74	22
	A	7.1		11.3	13.8	5.8
	B	0.6		5.6	41.3	12.3
Miscellaneous causes	No.	6		4.8	69	93
	A	42.9		9.1	12.9	24.6
	B	2.5		3.3	28.4	38.2
Total number of derailments at stations	No.	14	88	535	378	
	B	0.3	5.7	34.7	24.7	

DERAILMENTS IN MID-SECTION ON THE METRE GAUGE ACCORDING TO MAIN

Main causes		1963-64 to 1967-68				
		CR	ER	NR	NER	NFR
1	2	3	4	5	6	7
Staff failures	No.	4	No metre gauge	29	27	48
	A	14.3		27.1	19.6	15.3
	B	1.9		14.4	13.4	23.8
Permanent way failures	No.	2		18	14	73
	A	7.1		16.8	10.1	23.3
	B	1.2		11.1	8.7	45.1
Carriage and wagon defects	No.	10		37	47	76
	A	35.7		34.6	34.1	24.3
	B	3.1		11.7	14.9	24.1
Engine defects	No.	1		2	10	16
	A	3.5		1.9	7.2	5.1
	B	2.0		4.1	20.4	32.7
Miscellaneous causes	No.	11		21	40	100
	A	39.4		19.6	29.0	32.0
	B	4.5		8.5	16.3	40.7
Total number of derailments in mid-section	No.	28	107	138	313	
	B	2.9	10.9	14.1	32.1	

XXXIII

CAUSES—RAILWAY-WISE : IN 5-YEAR PERIODS

A—Percentage of the failures to the total on each railway.

B—Percentage of the failures on each railway to the total on all railways.

1968-69 to 1972-73									
SR	SCR	SER	WR	All railways	CR	ER	NR	NER	NFR
7	8	9	10	11	12	13	14	15	16
115	16		92	675	2		36	74	96
39.7	39.0		46.7	43.8	33.3		55.4	51.0	40.7
17.0	2.4		13.6	100.0	0.5		9.1	18.7	24.2
51	4	No metre gauge	16	201	2	No metre gauge	10	12	28
17.6	9.8		8.1	13.0	33.3		15.4	8.3	11.9
25.4	2.0		8.0	100.0	2.5		12.5	15.0	35.0
48	11		36	245	2		5	43	61
16.5	26.8		18.3	15.8	33.4		7.7	29.7	25.8
19.6	4.5		14.7	100.0	1.1	2.7	23.0	32.6	
33	2	No metre gauge	37	179	Nil	No metre gauge	6	3	20
11.4	4.9		18.8	11.6	—		9.2	2.1	8.5
18.4	1.1		20.7	100.0	—		13.3	6.7	44.4
43	8	No metre gauge	16	243	Nil	No metre gauge	8	13	31
14.8	19.5		8.1	15.8	—		12.3	8.9	13.1
17.7	3.3		6.6	100.0	—		9.2	14.9	35.6
290	41		197	1543	6		65	2145	236
18.8	2.6		12.7	100.0	0.8		8.2	18.2	29.6

XXXIV

CAUSES—RAILWAY-WISE : IN 5-YEAR PERIODS

A—Percentage of failures to the total on each railway.

B—Percentage of the failures on each railway to the total on all railways.

1968-69 to 1972-73									
SR	SCR	SER	WR	All railways	CR	ER	NR	NER	NFR
8	9	10	11	12	13	14	15	16	17
56	8		30	202	11		40	22	42
25.4	25.0		21.9	20.7	35.5		36.0	18.9	18.5
27.7	3.9		14.9	100.0	3.4		12.5	6.9	13.1
41	6	No metre gauge	8	162	2	No metre gauge	6	9	30
18.6	18.7		5.8	16.6	6.5		5.4	7.8	13.2
25.3	3.7		4.9	100.0	2.6		7.8	11.6	39.0
75	5		66	316	13		32	45	103
34.1	15.6		48.2	32.4	41.9		28.8	38.8	45.4
23.7	1.6	20.9	100.0	4.1	10.2	14.3	32.7		
15	2	No metre gauge	3	49	2	No metre gauge	7	6	10
6.9	6.3		2.2	5.0	6.5		6.3	5.2	4.4
30.6	4.1		6.1	100.0	6.3		21.9	18.7	31.2
33	11	No metre gauge	30	246	3	No metre gauge	26	34	42
15.0	34.4		21.9	25.3	9.6		23.5	29.3	18.5
13.4	4.4		12.2	100.0	1.6		14.1	18.5	22.8
220	32		137	975	31		111	116	227
22.6	3.3		14.1	100.0	3.3		12.0	12.5	24.5

NOTE : The South Central Railway was formed on 2-10-1966.

		1968-69 to 1972-73				
Main causes		SR	SCR	SER	WR	All railways
1	2	17	18	19	20	21
Staff failures	No.	78	45	No metre gauge	66	397
	A	72.9	49.5		45.2	49.9
	B	19.6	11.3		16.6	100.0
Permanent way failures	No.	4	12		12	80
	A	3.7	13.2		8.2	10.1
	B	5.0	15.0		15.0	100.0
Carriage age and wagon defects	No.	5	19		52	187
	A	4.7	20.9		35.6	23.5
	B	2.7	10.1		27.8	100.0
Engine defects	No.	10	4		2	45
	A	9.3	4.4		1.4	5.7
	B	22.2	8.9		4.5	100.0
Miscellaneous causes	No.	10	11		14	87
	A	9.4	12.0		9.6	10.8
	B	11.5	12.7		16.1	100.0
Total number of derailments at stations	No.	107	91	146	796	
	B	13.4	11.4	18.4	100.0	

Note : The South Central Railway was formed on 2-10-1966.

		1968-69 to 1972-73				
Main causes		SR	SCR	SER	WR	All railways
1	2	18	19	20	21	22
Staff failures	No.	80	81	No metre gauge	44	320
	A	58.0	44.5		35.8	34.5
	B	25.0	25.3		13.8	100.0
Permanent way failures	No.	3	17		10	77
	A	2.2	9.4		8.1	8.3
	B	3.9	22.1		13.0	100.0
Carriage and wagon defects	No.	29	47		46	315
	A	21.0	25.8		37.4	33.9
	B	9.2	14.9		14.6	100.0
Engine defects	No.	Nil	6		1	32
	A	—	3.3		0.8	3.5
	B	—	18.8		3.1	100.0
Miscellaneous causes	No.	26	31		22	184
	A	18.8	17.7		17.9	19.8
	B	14.1	16.9		12.0	100.0
Total number of derailments in mid-section	No.	138	182	123	928	
	B	14.9	19.6	13.2	100.0	

XXXIII—Contd.

1973-74 to 1977-78										
CR	ER	NR	NER	NFR	SR	SCR	SER	WR	All railways	
22	23	24	25	26	27	28	29	30	31	
1	No metre gauge	11	71	38	53	20	No metre gauge	49	243	
50.0		45.8	44.3	22.4	59.6	38.5		45.4	40.1	
0.4		4.5	29.2	15.7	21.8	8.2		20.2	100.0	
1		2	6	17	3	.7		8	44	
50.0		8.3	3.8	10.0	3.4	13.5		7.4	7.3	
2.3		4.5	13.6	38.7	6.8	15.9		18.2	100.0	
Nil		5	39	88	22	19		37	210	
—		20.4	24.4	51.8	24.7	36.5		34.3	34.7	
—		2.8	18.6	41.9	10.5	9.0		17.6	100.0	
Nil		2	16	3	1	1		4	27	
—	8.4	10.0	1.7	1.1	1.9	3.7	4.5			
—	7.4	59.3	11.1	3.7	3.7	14.8	100.0			
Nil	4	28	24	10	5	10	81			
—	16.7	17.5	14.1	11.2	9.6	9.2	13.4			
—	4.9	34.6	29.6	12.3	6.2	12.4	100.0			
2		24	160	170	89	52		108	605	
0.3		4.0	26.4	28.1	14.7	8.6		17.9	100.0	

XXXIV—Contd.

1973-74 to 1977-78										
CR	ER	NR	NER	NFR	SR	SCR	SER	WR	All railways	
23	24	25	26	27	28	29	30	31	32	
6	No metre gauge	39	33	53	97	68	No metre gauge	70	366	
28.6		33.6	21.6	26.6	57.4	45.9		30.8	35.4	
1.6		10.7	9.0	14.5	26.5	18.6		19.1	100.0	
2		23	12	25	5	21		17	105	
9.5		19.8	7.8	12.6	3.0	14.2		7.5	10.2	
1.9		21.9	11.4	23.8	4.8	20.0		16.2	100.0	
9		17	59	81	42	34		99	341	
42.9		14.7	38.6	40.7	24.9	23.0		43.6	33.0	
2.6		5.0	17.3	23.8	12.3	10.0		29.0	100.0	
Nil		13	14	13	5	10		2	57	
—	11.2	9.2	6.5	2.9	6.8	0.9	5.5			
—	22.8	24.6	22.8	8.8	17.5	3.5	100.0			
4	24	35	27	20	15	39	164			
19.0	20.7	22.8	13.6	11.8	10.1	17.2	15.9			
2.4	14.6	21.3	16.5	12.2	9.2	23.8	100.0			
21		116	153	199	169	148		227	1033	
2.0		11.2	14.8	19.3	16.4	14.3		22.0	100.0	

DERAILMENT AT STATIONS AND IN MID-SECTION COMBINED, ON THE METRE GAUGE ACCORDING TO

Main causes		1963-64 to 1967-68				
		CR	ER	NR	NER	NFR
1	2	3	4	5	6	7
Staff failures	No.	8	No metre gauge	61	301	190
	A	19.0		31.2	44.7	27.5
	B	1.0		7.0	34.3	21.6
Permanent way failures	No.	2		29	63	143
	A	4.8		15.0	9.4	20.6
	B	0.6		8.0	17.3	39.4
Carriage and wagon defects	No.	13		64	116	127
	A	30.9		32.8	17.2	18.4
	B	2.3		11.4	20.7	22.7
Engine defects	No.	2		12	84	38
	A	4.8		6.1	12.5	5.5
	B	0.9		5.2	36.8	16.7
Miscellaneous causes	No.	17		29	109	193
	A	40.5	14.9	16.2	28.0	
	B	3.5	5.9	22.3	39.5	
Total number of derailments at stations and in mid section combined	No.	42	195	673	691	
	B	1.7	7.8	26.7	27.4	

Main causes		1968-69 to 1972-73				
		SR	SCR	SER	WR	All railways
1	2	18	19	20	21	22
Staff failures	No.	158	126	No metre gauge	110	717
	A	64.5	46.1		40.9	41.6
	B	22.0	17.6		15.3	100.0
Permanent way failures	No.	7	29		22	157
	A	2.9	10.6		8.2	9.1
	B	4.5	18.5		14.0	100.0
Carriage and wagon defects	No.	34	66		98	502
	A	13.9	24.2		36.4	29.1
	B	6.8	13.1		19.5	100.0
Engine defects	No.	10	10		3	77
	A	4.1	3.7		1.1	4.5
	B	13.0	13.0		3.9	100.0
Miscellaneous causes	No.	36	42		36	271
	A	14.6	15.4	13.4	15.7	
	B	13.3	15.5	13.3	100.0	
Total number of derailments at stations and in mid-section combined	No.	245	273	269	1724	
	B	14.2	15.8	15.6	100.0	

XXXV

MAIN CAUSES—RAILWAY-WISE; IN 5-YEAR PERIODS

A—PERCENTAGE OF THE FAILURE TO THE TOTAL ON EACH RAILWAY

B—Percentage of the failures on each railway to the total on all railways.

1968-69 to 1972-73									
SR	SCR	SER	WR Allrailways		CR	ER	NR	NER	NFR
8	9	10	11	12	13	14	15	16	17
171	24	No metre gauge	122	877	13	No metre gauge	76	96	138
33.5	33.0		36.5	34.8	35.2		43.2	36.8	29.8
19.5	2.7		13.9	100.0	1.8		10.6	13.4	19.3
92	10		24	363	4		16	21	58
18.0	13.7		7.2	14.4	10.8		9.1	8.0	12.5
25.3	2.8		6.6	100.0	2.5		10.2	13.4	36.9
123	16		102	561	15		37	88	164
24.1	21.9		30.5	22.3	40.5		21.0	33.7	35.4
21.9	2.9		18.1	100.0	3.0		7.4	17.5	32.7
48	4		40	228	2		13	9	30
9.4	5.4		12.0	9.1	5.4		7.4	3.5	6.5
21.1	1.8		17.5	100.0	2.6		16.9	11.7	38.9
76	19		46	489	3		34	47	73
15.0	26.0		13.8	19.4	8.1		19.3	18.0	15.8
15.5	3.9		9.4	100.0	1.1		12.5	17.4	26.9
510	73	334	2518	37	176	261	463		
20.3	2.9	13.2	100.0	2.2	10.2	15.1	26.9		

Note : The South Central Railway was formed on 2.10. 1966.

1973-74 to 1977-78									
CR	ER	NR	NER	NFR	SR	SCR	SER	WR Allrailways	
23	24	25	26	27	28	29	30	31	32
7	No metre gauge	50	104	91	150	888	No metre gauge	119	609
30.4		35.7	33.2	24.7	58.2	44.0		35.5	37.2
1.1		8.2	17.1	14.9	24.6	14.5		19.6	100.0
3		25	18	42	8	28		25	149
13.0		17.9	5.8	11.4	3.1	14.0		7.5	9.1
2.0		16.8	12.1	28.2	5.4	18.8		16.7	100.0
9		22	98	169	64	53		136	551
39.2		15.7	31.3	45.8	24.8	26.5		40.6	33.6
1.6		4.0	17.8	30.7	11.6	9.6		24.7	100.0
Nil		15	30	16	6	11		6	84
—		10.7	9.6	4.3	2.3	5.5		1.8	5.1
—		17.9	35.7	19.0	7.1	13.2		7.1	100.0
4		28	63	51	30	20		49	245
17.4		20.0	20.1	13.8	11.6	10.0		14.6	15.0
1.6		11.4	25.7	20.8	12.3	8.2		20.0	100.0
23	140	313	369	258	200	335	1638		
1.4	8.5	19.1	22.5	15.8	12.2	20.5	100.0		

ANNEXURE XXXVI

NUMBER AND INCIDENCE OF DERAILMENTS OF PASSENGER AND OTHER TRAINS GAUGE-WISE ALL RAILWAYS: IN 5-YEAR PERIODS

A—Number of derailments

B—Incidence of derailments per million passenger train/other train kilometres.

BROAD GAUGE				
Years	Passenger trains		Other trains	
	A	B	A	B
1963-64 to 1967-68	329	0.47	1838	2.8
1968-69 to 1972-73	345	0.44	1076	1.40
1973-74 to 1977-78	382	0.45	1149	1.40
METRE GAUGE				
1963-64 to 1967-68	349	0.88	2169	8.5
1968-69 to 1972-73	287	0.70	1437	4.84
1973-74 to 1977-78	374	0.98	1264	4.97
NARROW GAUGE				
1963-64 to 1967-68	161	4.4	154	8.6
1968-69 to 1972-73	148	4.19	84	3.96
1973-74 to 1977-78	168	5.27	64	4.03

ANNEXURE XXXVII

NUMBER AND INCIDENCE OF DERAILMENTS OF PASSENGER TRAINS AND OTHER TRAINS ON THE BROAD GAUGE-ALL RAILWAYS; YEAR-WISE

A—Number of derailments

B—Incidence of derailments per million passenger/other train kilometres

Year	Passenger trains		Other trains	
	A	B	A	B
1	2	3	4	5
1963-64	56	0.41	567	4.4
1964-65	66	0.49	386	3.1
1965-66	68	0.48	318	2.4
1966-67	66	0.46	272	2.1
1967-68	73	0.50	295	2.0
Total of 5 years	329	0.47	1838	2.8
1968-69	88	0.58	215	1.47
1969-70	63	0.41	257	1.64
1970-71	65	0.42	202	1.33
1971-72	56	0.35	215	1.38
1972-73	73	0.46	187	1.89
Total of 5 years	345	0.44	1076	1.40
1973-74	57	0.37	193	1.33
1974-75	77	0.49	236	1.55
1975-76	84	0.49	260	1.53
1976-77	69	0.38	234	1.32
1977-78	95	0.50	226	1.29
Total of 5 years	382	0.45	1149	1.40

ANNEXURE XXXVIII

NUMBER AND INCIDENCE OF DERAILMENTS OF PASSENGER AND OTHER TRAINS ON THE BROAD GAUGE RAILWAY WISE; IN 5-YEAR PERIODS

A—Number of derailments

B—Incidence of derailments per million passenger/other train kilometres

1	1963-64 to 1967-68		1968-69 to 1972-73		1973-74 to 1977-78	
	A	B	A	B	A	B
	2	3	4	5	6	7
PASSENGER TRAINS						
Central	60	0.45	64	0.42	80	0.48
Eastern	51	0.38	49	0.35	67	0.43
Northern	90	0.55	87	0.51	81	0.47
North Eastern	1	0.88	4	4.44	2	0.76
Northeast Frontier	9	1.7	10	4.67	11	1.38
Southern	54	0.68	31	0.47	31	0.48
South Central	9	0.47	37	0.56	47	0.58
South Eastern	41	0.54	40	0.46	40	0.42
Western	14	0.1	23	0.24	23	0.21
All Railways	329	0.41	45	0.44	382	0.45
OTHER TRAINS						
Central	417	2.8	227	1.64	232	1.45
Eastern	157	1.3	138	1.01	125	0.90
Northern	259	2.3	164	1.29	145	1.10
North Eastern	Nil	—	Nil	—	4	8.0
Northeast Frontier	33	6.8	25	14.12	20	2.25
Southern	325	6.5	103	2.15	90	1.84
South Central	38	2.5	141	2.16	86	1.21
South Eastern	491	4.0	197	1.17	320	1.95
Western	118	1.6	81	0.97	127	1.34
All Railways	1838	2.8	1076	1.40	1149	1.40

ANNEXURE XXXIX

NUMBER AND INCIDENCE OF DERAILMENTS OF PASSENGER TRAINS AND OTHER TRAINS ON THE METRE GAUGE ALL RAILWAYS; YEAR-WISE

A—Number of derailments

B—Incidence of derailments per million passenger/other train kilometres

Year	Passenger trains		Other trains	
	A	B	A	B
1963-64	73	0.99	520	10.4
1964-65	64	0.83	441	8.6
1965-66	61	0.77	447	8.4
1966-67	67	0.82	396	7.6
1967-68	84	1.00	365	7.7
Total of 5 years	349	0.88	2169	8.5
1968-69	50	0.62	297	4.92
1969-70	68	0.83	322	5.19
1970-71	49	0.59	290	4.91
1971-72	70	0.84	285	4.87
1972-73	50	0.61	243	4.26
Total of 5 years	287	0.70	1437	4.84
1973-74	62	0.88	215	4.55
1974-75	71	1.10	269	5.55
1975-76	94	1.18	292	5.60
1976-77	66	0.80	232	4.25
1977-78	81	0.98	256	4.93
Total of 5 years	374	0.98	1264	4.97

ANNEXURE XL

NUMBER AND INCIDENCE OF DERAILMENTS OF PASSENGER TRAINS AND OTHER TRAINS ON THE METRE GAUGE—RAILWAY-WISE; IN 5-YEAR PERIODS

A—Number of derailments
B—Incidence of derailments per million passenger/other train kilometres

Railway	1963-64 to 1967-68		1968-69 to 1972-73		1973-74 to 1977-78	
	A	B	A	B	A	B
Passenger Trains						
Central	8	0.64	2	0.74	3	1.07
Eastern			No metre gauge			
Northern	35	0.99	41	1.05	39	1.13
North Eastern	91	1.0	69	0.75	119	1.33
Northeast Frontier	85	2.3	61	1.70	52	1.62
Southern	81	0.65	37	0.33	60	0.63
South Central	9	0.61	38	0.83	58	1.28
South Eastern			No metre gauge			
Western	40	0.49	39	0.46	43	0.52
All Railways	349	0.88	287	0.70	374	0.98
Other Trains						
Central	34	3.8	35	8.75	20	4.34
Eastern			No metre gauge			
Northern	160	5.8	135	4.75	101	4.26
North Eastern	582	13.3	192	3.41	194	4.36
Northeast Frontier	606	20.5	402	10.11	317	10.21
Southern	429	6.9	208	4.48	198	5.13
South Central	64	5.8	235	5.91	142	4.26
South Eastern			No metre gauge			
Western	294	3.9	230	2.80	292	3.71
All Railways	2169	8.5	1437	4.84	1264	4.79

ANNEXURE XLI

NUMBER AND INCIDENCE OF DERAILMENTS OF PASSENGER TRAINS AND OTHER TRAINS ON THE NARROW GAUGE SYSTEM—RAILWAY-WISE; IN 5-YEAR PERIODS

A—Number of derailments
B—Number of derailments per million passenger/other train kilometres.

Railway	1963-64 to 1967-68		1968-69 to 1972-73		1973-74 to 1977-78	
	A	B	A	B	A	B
Passenger Trains						
Central	52	8.1	29	7.63	26	6.84
Eastern	5	4.7	5	4.96	8	4.58
Northern	17	5.0	17	4.86	4	2.11
Northeast Frontier	16	19.5	8	12.12	20	38.64
Southern	8	4.9	7	4.61	1	7.69
South Central	4	4.0	22	6.71	17	5.56
South Eastern	25	2.2	30	2.53	44	3.72
Western	34	3.1	30	3.10	48	5.39
All Railways	161	4.4	148	4.19	168	5.27
Other Trains						
Central	16	4.1	10	3.70	5	2.0
Eastern	Nil	—	Nil	—	Nil	—
Northern	29	8.1	23	7.67	3	1.76
Northeast Frontier	16	19.1	5	8.93	2	10.53
Southern	5	27.8	1	5.0	1	6.67
South Central	1	1.8	5	3.18	2	1.46
South Eastern	81	11.0	38	4.42	49	7.25
Western	6	13.9	2	0.74	2	0.81
All Railways	154	8.6	84	3.96	64	4.03

ANNEXURE XLII

DERAILMENTS OF PASSENGER TRAINS AND OTHER TRAINS ON THE BROAD GAUGE CLASSIFIED ACCORDING TO MAIN CAUSES—ALL RAILWAYS; IN 5-YEAR PERIODS.

A—Number of derailments.

B—Number of derailments due to cause taken as a percentage of the total.

S. No.	Main Cause	1963-64 to 1967-68		1968-69 to 1972-73		1973-74 to 1977-78	
		A	B	A	B	A	B
Passenger Trains.							
1.	Staff failures	85	25.9	129	37.4	129	33.8
2.	Permanent way failures	48	14.6	40	11.6	48	12.5
3.	Carriage and wagon defects.	64	19.4	46	13.3	63	16.5
4.	Engine defects	51	15.5	24	7.0	35	9.2
5.	Miscellaneous causes	81	24.6	106	30.7	107	28.0
6.	Total	329	100.0	345	100.0	382	100.0
Other Trains.							
1.	Staff failures	824	44.8	462	42.9	428	37.3
2.	Permanent way failures	351	19.1	144	13.4	160	13.9
3.	Carriage and wagon defects.	403	21.9	287	26.7	398	34.6
4.	Engine defects	39	2.2	20	1.9	20	1.7
5.	Miscellaneous causes	221	12.0	163	15.1	143	12.5
6.	Total	1838	100.0	1076	100.0	1149	100.0

ANNEXURE XLIII

DERAILMENTS OF PASSENGER TRAINS AND OTHER TRAINS ON THE METRE GAUGE CLASSIFIED ACCORDING TO MAIN CAUSES—ALL RAILWAYS; IN 5-YEAR PERIODS.

A—Number of derailments.

B—Number of derailments due to cause taken as a percentage of the total.

S. No.	Main Cause	1963-64 to 1967-68		1968-69 to 1972-73		1973-74 to 1977-78	
		A	B	A	B	A	B
Passenger Trains.							
1.	Staff failures	72	20.4	83	28.9	116	31.0
2.	Permanent way failures	50	14.2	25	8.7	38	10.2
3.	Carriage and wagon defects.	68	19.7	59	20.6	68	18.2
4.	Engine defects.	58	16.5	33	11.5	46	12.3
5.	Miscellaneous causes	101	29.2	87	30.3	106	28.3
6.	Total	349	100.0	287	100.0	374	100.0
Other Trains							
1.	Staff failures	805	36.7	634	44.1	493	39.0
2.	Permanent way failures	313	14.5	132	9.2	111	8.8
3.	Carriage and wagon defects	493	22.9	443	30.8	483	38.2
4.	Engine defects	170	7.9	44	3.1	38	3.0
5.	Miscellaneous causes	388	18.0	184	12.8	139	11.0
6.	Total	2169	100.0	1437	100.0	1264	100.0

ANNEXURE XLIV

DERAILMENTS ON THE BROAD GAUGE CLASSIFIED ACCORDING TO THE TYPES OF STAFF FAILURES—ALL RAILWAYS; IN 5 YEAR PERIODS

A—Number of derailments.

B—Number of derailments due to cause taken as a percentage of the total.

Sl. No.	Staff failures classified	1963-64 to 1967-68		1968-69 to 1972-73		1973-74 to 1977-68	
		A	B	A	B	A	B
Operating Staff							
1.	Incorrect setting or nonlocking or mis-manipulation of points; incorrect setting of trap points or bursting of points.	410	45.1	129	21.9	75	13.5
2.	Empty wagon between loaded wagons or mis-marshalling.	11	1.2	3	0.5	1	0.2
Commercial Staff							
3.	Defective loading; viz. uneven loading, shifting of loads etc.	71	7.8	39	6.6	66	11.8
Drivers							
4.	Starting or stopping a train with jerk or sudden application of brakes	38	4.2	25	4.2	20	3.6
5.	Rough shunting, bumping or disregard of shunting signals	81	8.9	21	3.6	7	1.3
6.	Disregard of approach or departure signals	123	13.5	155	26.4	140	25.1
7.	Excessive speed or failing to regulate running train, failure to control trains resulting in overshooting	161	17.8	84	14.2	107	19.2
Engineering Staff							
8.	Non-protection of engineering works, failure to issue caution orders, for engineering works or inadequate protection at site	14	1.5	29	4.9	37	6.6
9.	Other trains	*—	—	106	17.9	104	18.7
10.	Total	909	100.0	591	100.0	557	100.0

*—Separate figures are not available.

ANNEXURE XLV

DERAILMENTS ON THE BROAD GAUGE CLASSIFIED ACCORDING TO THE TYPE OF STAFF FAILURE—RAILWAY-WISE; IN 5-YEAR PERIODS

NUMBER OF DERAILMENTS

S. No.	Nature of staff failures	1963-64 to 1967-68										1968-69 to 1972-73				
		CR	ER	NR	NER	NFR	SR	SCR	SER	WR	All Railways	CR	ER	NR	NER	NFR
1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17
Operating Staff																
1.	Incorrect setting or non-locking or mis-manipulation of points, incorrect setting of trap points, bursting of points.	113	22	82	nil	9	79	6	78	21	410	30	18	28	nil	7
2.	Empty wagon between loaded wagons or mis-marshalling	7	1	Nil	Nil	nil	nil	1	2	nil	11	1	nil	nil	nil	nil
Commercial Staff																
3.	Defective loading, viz., uneven loading, shifting of loads etc.	17	9	6	nil	1	15	nil	20	3	71	17	1	3	nil	nil
Drivers																
4.	Starting or stopping train with a jerk or sudden application of brakes	7	2	9	nil	nil	9	1	8	2	38	4	2	10	nil	nil
5.	Rough shunting, bumping or disregard of shunting signals	20	nil	14	nil	2	20	1	20	4	81	5	1	2	nil	3
6.	Disregard of approach or departure signals]	21	12	19	nil	1	28	6	30	6	123	28	16	40	1	8
7.	Excessive speed or failing to regulate running train, failure to control trains resulting in overshooting	56	5	29	1	4	17	4	31	14	161	12	12	23	nil	3
Engineering Staff																
8.	Non-protection of engineering works, failure to issue caution orders for engineering works or inadequate protection at site	1	2	4	nil	nil	2	nil	4	1	14	9	2	3	nil	nil
9.	Other failures.	nil	nil	nil	nil	nil	nil	nil	nil	nil	*nil	10	13	19	1	nil
10.	Total	242	53	163	1	17	170	19	193	51	909	116	65	128	2	21

*Separate figures are not available.

ANNEXURE XLV—contd.
NUMBER OF DERAILMENTS

S. No.	Nature of staff failures	1968-69 to 1972-73					1973-74 to 1977-78									
		SR	SCR	SER	WR	All Railways	CR	ER	NR	NER	NFR	SR	SCR	SER	WR	All Railway
1	2	18	19	20	21	22	23	24	25	26	27	28	29	30	31	32
Operating Staff																
1.	Incorrect setting or non-locking or mis-manipulation of points, incorrect setting of trap points, bursting of points	13	14	7	12	129	15	12	10	2	2	10	10	9	6	75
2.	Empty wagon between loaded wagons or mis-marshalling.	nil	nil	2	nil	3	nil	1	nil	nil	nil	nil	nil	nil	nil	1
Commercial Staff																
3.	Defective loading, viz., uneven loading, shifting of loads etc.	1	11	6	nil	39	23	2	10	nil	nil	5	4	16	6	66
Drivers																
	Starting or stopping train with a jerk or sudden application of brake.	1	5	1	2	25	4	2	4	nil	nil	3	1	4	2	20
5.	Rough shunting, bumping or disregard of shunting signals	nil	2	1	7	21	4	nil	1	nil	nil	1	nil	1	1	7
6.	Disregard of approach or departure signals	14	20	24	4	155	22	10	21	nil	2	19	17	32	17	140
7.	Excessive speed or failing to regulate running train, failure to control trains resulting in overshooting	4	13	10	7	84	14	9	22	1	4	8	10	24	15	107
Engineering Staff																
8.	Non-protection of engineering works, failure to issue caution orders for engineering works or inadequate protection at site.	10	2	3	nil	29	2	1	18	nil	2	11	1	1	1	37
9.	Other failures	46	4	9	4	106	24	7	16	nil	nil	28	3	16	10	104
10.	Total	89	71	63	36	591	107	44	102	3	10	84	47	102	58	557

Note:—The South Central Railway was formed on 2-10-1966

*Separate figures are not available

ANNEXURE XLVI

DERAILMENTS ON THE METRE GAUGE CLASSIFIED ACCORDING TO THE TYPES OF STAFF FAILURES—ALL RAILWAYS; IN 5-YEAR PERIODS

A—Number of derailments.

B—Number of derailments due to cause taken as a percentage of the total.

S. No.	Staff failures classified	1963-64 to 1967-78		1968-69 to 1972-73		1973-74 to 1977-78	
		A	B	A	B	A	B
Operating Staff							
1.	Incorrect setting or non locking or mis-manipulation of points, incorrect setting of trap points or bursting of points	310	35.4	111	15.5	58	9.5
2.	Empty wagon between loaded wagons or mis-marshalling	19	2.2	9	1.3	8	1.3
Commercial staff							
3.	Defective loading, viz. uneven loading, shifting of loads etc.	99	11.3	99	13.8	86	14.1
Drivers							
4.	Starting or stopping a train with jerk or sudden application of brakes.	117	13.3	92	12.8	58	9.5
5.	Rough shunting, bumping or disregard of shunting signals	89	10.1	32	4.5	9	1.5
6.	Disregard of approach or departure signals	63	7.2	63	8.8	41	6.8
7.	Excessivespeed or failing to regulate running train, failure to control trains resulting in overshooting	172	19.6	168	23.4	201	33.0
Engineering staff							
8.	Non-protection of engineering works, failure to issue caution orders for engineering works or inadequate protection at site	8	0.9	27	3.8	31	5.1
9.	Other failures	*—	—	116	16.1	117	19.2
TOTAL		877	100.0	717	100.0	609	100.0

*—Separate figures are not available

DERAILMENTS ON THE METRE GAUGE CLASSIFIED ACCORDING TO THE TYPE OF STAFF
FAILURE—RAILWAYS-WISE : IN 5-YEAR PERIODS

NUMBER OF DERAILMENTS

1	2	1963-64 to 1967-68					1963-64 to 1967-68					1968-69 to 1972-73				
		CR	ER	NR	NER	NF	SR	SCR	SER	WR	All Railways	CR	ER	NR	NER	NFR
Operating Staff																
	1. Incorrect setting or nonlocking or mis-mainpulation of points, incorrect setting of trap points, bursting of points	2	N O	18	119	64	55	6	N O	46	310	Nil	N O	7	25	32
	2. Empty wagon between loaded wagon or mis-marshalling	2	M E T	4	1	6	2	1	M E T	3	19	Nil	M E T	2	Nil	4
Commercial staff																
	3. Defective loading, viz., uneven loading, shifting of loads etc.	Nil	R E G	7	19	36	26	6	R E G	5	99	3	R E G	10	8	29
Drivers																
	4. Starting or stopping train with a jerk or sudden application of brakes	2	A U G	6	41	24	24	4	A U G	16	117	5	A U G	7	8	9
	5. Rough hunting, bumping or disregard of hunting signal	Nil	E	4	41	20	12	3	E	9	89	Nil	E	1	6	10
	6. Disregard of approach or departure signals	Nil		1	34	6	18	2		2	63	1		6	14	20
	7. Excessive speed or failing to regulate running train, failure to control train resulting in overshooting	2		21	44	29	34	2		40	172	4		20	24	25
Engineering staff																
	8. Non-protection of engineering works, failure to issue caution orders for engineering works or inadequate protection at side	Nil		Nil	2	5	Nil	Nil		1	8	Nil		Nil	Nil	3
	9. Other failure	Nil		Nil	Nil	Nil	Nil	Nil		Nil	Nil	Nil		23	11	5
Total		8		61	301	190	171	24		122	877	13		76	96	138

ANNEXURE XLVI—contd.

S. No	Nature of staff failures	1968-69 to 1972-73					1973-74 to 1977-78										
		SR	SCR	SER	WR	All Railways	CR	ER	NR	NER	NFR	SR	SCR	SER	WR	All Railways	
1	2	18	19	20	21	22	23	24	25	26	27	28	29	30	31	32	
Operating staff																	
	1. Incorrect setting or non-locking or mis-mainpulation of points, incorrect setting of trap points, bursting of points	23	9	N O	15	111	nil	N O M E T R	2	29	7	6	3	N O M E T R	11	58	
	2. Empty wagon between loaded wagon or mis-marshalling	nil	1	M E T	2	9	nil	E G A G	2	1	1	2	nil	E	2	8	
Commercial staff																	
	3. Defective loading, viz. uneven loading, shifting of loads, etc.	15	25	R E G	9	99	1	G A G	11	6	28	15	18	G	7	86	
Drivers																	
	4. Starting or stopping train with a jerk or sudden application of brakes	8	34	A U G	21	92	1	E	4	19	6	5	5	A U G	18	58	
	5. Rough shunting, bumping or disregard of shunting signals	nil	3	B	12	32	1		nil	4	nil	nil	nil		4	9	
	6. Disregard of approach or departure signals	6	10		6	63	nil			11	10	7	7		6	41	
	7. Excessive speed or failing to regulate running train, failure control trains resulting in overshooting	34	36		25	168	3		15	21	34	36	45		47	201	
Engineering staff																	
	8. Non-protection of engineering works, failure to issue caution orders for engineering works or inadequate protection at site	21	2		1	27	nil		5	4	4	17	nil		1	31	
	9. Other failures	51	6		19	116	1		11	9	1	62	10		23	11	
TOTAL		158	126		110	717	7		50	104	91	150	88		119	609	

Note :—The South Central Railway was formed on 2-10-1966.
Separate figures are not available.

ANNEXURE XLVIII

DERAILMENTS ON THE BROAD GAUGE CLASSIFIED ACCORDING TO THE NATURE OF PERMANENT WAY FAILURE
ALL RAILWAYS; IN 5-YEAR PERIODS.

A—Number of derailments.
B—Number of derailments due to cause taken as a percentage of the total.

S. No.	Nature of permanent way failure	1963-64 to 1967-68		1968-69 to 1972-73		1973-74 to 1977-78	
		A	B	A	B	A	B
1.	Incorrect gauge.	54	13.5	30	16.3	39	18.7
2.	Defective cross or longitudinal levels.	56	14.0	22	12.0	20	9.6
3.	Sinkage of track.	124	31.1	43	23.4	26	12.5
4.	Badly aligned curve or incorrect superelevation or kinks in track.	26	6.5	19	10.3	17	8.2
5.	Defective track material	13	3.3	13	7.1	14	6.7
6.	Defective points, crossings or turn outs.	15	3.8	9	4.9	5	2.4
7.	Combined effect of defects in track and rolling stock or engine or high speed but defect in track being the predominant cause, other factors being secondary	53	13.3	23	12.5	42	20.2
8.	Rail fractures.	—	—	9	4.9	22	10.6
9.	Buckling of track.	—	—	3	1.6	3	1.5
10.	Slack or loose packing.	—	—	5	2.7	15	7.2
11.	Weld failures.	—	—	nil	—	1	0.5
12.	Other track defects.	58	14.5	8	4.3	4	1.9
12A.	Sub-Total of items (8) to (12).	(58)	(14.5)	(25)	(13.5)	(45)	(21.7)
13.	Total.	1399	100.00	184	100.00	208	100.00

Note:— Figures within brackets indicate total of items (8) to (12) which were taken as 'other defects' by the Wanchou Committee

ANNEXURE XLIX

**DERAILMENTS ON THE ROAD GAUGE CLASSIFIED ACCORDING TO THE NATURE OF PERMANENT
WAY FAILURE—RAILWAY-WISE; IN 5-YEAR PERIODS
NUMBER OF DERAILMENTS**

S. No.	Nature of permanent way failure	1963-64 to 1967-68									1968-69 to 1972-73					
		CR	ER	NR	NER	NFR	SR	SCR	SER	WR	All rail-ways	CR	ER	NR	NER	NFR
1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17
1.	Incorrect gauge	4	9	6	nil	2	18	1	13	1	54	10	7	5	nil	nil
2.	Defective cross or longitudinal levels	5	10	3	nil	nil	11	2	30	4	56	3	4	nil	nil	nil
3.	Sinkage of track	11	7	5	nil	2	21	2	70	6	124	2	3	1	nil	1
4.	Badly aligned curve or incorrect superelevation or kinks in track	1	4	2	nil	nil	7	1	8	3	26	2	6	2	nil	nil
5.	Defective track materials	4	nil	2	nil	3	3	nil	3	nil	13	5	nil	2	nil	nil
6.	Defective points, crossings or turn outs	3	1	2	nil	nil	7	1	nil	1	15	1	2	4	nil	nil
7.	Combined effect of defects in track and rolling stock or engine or higher speed but defects in track being the predominant cause other factors being secondary	2	6	7	nil	nil	20	nil	12	6	53	nil	2	3	nil	nil
8.	Rail fractures											3	1	1	nil	nil
9.	Bakling of track											nil	1	1	nil	nil
10.	Stack or loose packing											nil	1	1	nil	nil
11.	Weld failures											nil	nil		nil	nil
12.	Other track defects	13	1	9	nil	4	13	1	11	6	58	5	nil	2	nil	nil
12A.	Sub-total of items (8) to (12)	(13)	(1)	(9)	(nil)	(4)	(13)	(1)	(11)	(6)	(58)	(8)	(3)	(5)	(nil)	(nil)
13.	Total :	44	38	36	nil	11	100	8	135	27	399	31	27	22	nil	1

Note (1) Figures in brackets indicate total of items (8) to (12) which were taken as other defects' by the wanchoo Committee.

(2) The South Central Railway was formed on 2-10-1966.

ANNEXURE—XLIX—Contd.

S. No.	Nature of permanent way failure	1968-69 to 1972-73										1973-74 to 1977-78				
		SR	SCR	SER	WR	All rail-ways	CR	ER	NR	NER	NFR	SR	SCR	SER	WR	All rail-ways
1	2	18	19	20	21	22	23	24	25	26	27	28	29	30	31	32
1.	Incorrect gauge	1	1	3	3	30	7	8	3	nil	2	2	5	10	2	39
2.	Defective cross or longitudinal levels	nil	6	7	2	22	4	3	3	nil	nil	nil	4	5	1	20
3.	Sinkage of track	3	19	6	8	43	4	2	2	nil	1	nil	4	6	7	26
4.	Badly aligned curve or incorrect superelevation or kinks in track	nil	2	3	4	19	3	5	1	nil	nil	nil	nil	7	1	17
5.	Defective track material	1	2	nil	3	13	5	nil	4	nil	nil	1	1	2	1	14
6.	Defective points, crossings or turn cuts	nil	nil	2	nil	9	nil	2	1	nil	nil	1	1	nil	nil	5
7.	Combined effect of defects in track and rolling stock or engine or high speed but defects in track being the predominant cause, other factors being secondary	nil	11	7	nil	23	nil	5	8	nil	1	nil	10	15	3	42
8.	Rail fractures	2	1	nil	1	9	4	4	1	nil	2	1	2	3	5	22
9.	Buckling of track	nil	1	nil	nil	3	2	nil	nil	nil	1	nil	nil	nil	nil	3
10.	Slack or loose packing	nil	1	nil	2	5	8	nil	nil	nil	nil	nil	nil	2	5	15
11.	Weld failures	nil	nil	nil	nil	nil	nil	1	nil	nil	nil	nil	nil	nil	nil	1
12.	Other track defects	nil	nil	1	nil	8	2	nil	nil	nil	nil	nil	1	nil	1	4
12A.	Sub-total of items (8) to (12)	(2)	(3)	(1)	(3)	(25)	(16)	(5)	(1)	(nil)	(3)	(1)	(3)	(5)	(11)	(45)
13.	Total	7	44	29	23	184	39	30	23	nil	7	5	28	50	26	208

ANNEXURE L

DERAILMENTS AT STATIONS AND IN MID-SECTION ON THE BROAD GAUGE CLASSIFIED ACCORDING TO THE NATURE OF PERMANENT WAY FAILURE ALL RAILWAYS : IN 5-YEAR PERIODS.

A—Number of derailments.

B—Number of derailments due to cause taken as a percentage of the total

S. Nature of Permanent No. way failure	Derailments at stations				Derailments in Mid-Section			
	1968-69 to 1972-73		1973-74 to 1977-78		1968-69 to 1972-73		1973-74 to 1977-78	
	A	B	A	B	A	B	A	B
1. Incorrect gauge.	18	16.1	13	14.6	12	16.7	26	21.9
2. Defective cross or longitudinal levels	7	6.3	3	3.4	15	20.8	17	14.3
3. Sinkage of track	30	26.8	12	13.5	13	18.1	14	11.8
4. Badly aligned curve or incorrect super elevation or kinks in track	10	8.9	6	6.8	9	12.5	11	9.2
5. Defective track material	9	8.0	10	11.2	4	5.6	4	3.4
6. Defective points, crossings or turn outs.	9	8.0	5	5.6	nil	—	nil	—
7. Combined effect of defects in track and rolling stock or engine or high speed but defects in track being the predominant cause, other factors being secondary	17	15.2	19	21.4	6	8.3	23	19.3
8. Rail fractures	5	4.5	9	10.1	4	5.5	13	10.9
9. Buckling of track	2	1.8	1	1.1	1	1.4	2	1.7
10. Slack or loose packing	1	0.9	9	10.1	4	5.5	6	5.0
11. Weld failures	nil	—	1	1.1	nil	—	nil	—
12. Other track defects	4	3.5	1	1.1	4	5.6	3	2.5
13. Total	112	100.00	89	100.00	72	100.0	119	100.00

Note:— The Wanchoo Committee did not make a similar analysis. Hence, comparative position for the period 1963-64 to 1967-68 could not be given.

DERAILMENTS AT STATIONS ON THE BROAD GAUGE CLASSIFIED ACCORDING TO THE NATURE

Number of derailments

S. No.	Nature of permanent way failure	1968-69 to 1972-73									
		CR	ER	NR	NER	NFR	SR	SCR	SER	WR	All railways
1	2	3	4	5	6	7	8	9	10	11	12
1.	Incorrect gauge	6	5	4	Nil	Nil	1	Nil	1	1	18
2.	Defective cross or longitudinal levels	2	1	Nil	Nil	Nil	Nil	2	2	Nil	7
3.	Sinkage of track	2	Nil	Nil	Nil	1	1	18	2	6	30
4.	Badly aligned curve or incorrect super-elevation or kinks in track	Nil	2	1	Nil	Nil	Nil	2	2	3	10
5.	Defective track material	5	Nil	1	Nil	Nil	1	2	Nil	Nil	9
6.	Defective points, crossings or turn outs	1	2	4	Nil	Nil	Nil	Nil	2	Nil	9
7.	Combined effect of defects in track and rolling stock or engine or high speed but defects in track being the predominant cause, other factors being secondary	Nil	2	2	Nil	Nil	Nil	10	3	Nil	17
8.	Rail fractures	2	Nil	Nil	Nil	Nil	1	1	Nil	1	5
9.	Buckling of track	Nil	1	1	Nil	Nil	Nil	Nil	Nil	Nil	2
10.	Slack or loose packing	Nil	Nil	Nil	Nil	Nil	Nil	Nil	Nil	1	1
11.	Weld failures	Nil	Nil	Nil	Nil	Nil	Nil	Nil	Nil	Nil	Nil
12.	Other track defects	3	Nil	1	Nil	Nil	Nil	Nil	Nil	Nil	4
13.	Total	21	13	14	Nil	1	4	35	12	12	112

DERAILMENTS IN MID-SECTION ON THE BROAD GAUGE CLASSIFIED

Number of derailments

S. No.	Nature of permanent way failure	1968-69 to 1972-73									
		CR	ER	NR	NER	NFR	SR	SCR	SER	WR	All railways
1	2	3	4	5	6	7	8	9	10	11	12
1.	Incorrect gauge	4	2	1	Nil	Nil	Nil	1	2	2	12
2.	Defective cross or longitudinal levels	1	3	Nil	Nil	Nil	Nil	4	5	2	15
3.	Sinkage of track	Nil	3	1	Nil	Nil	2	1	4	2	13
4.	Badly aligned curve or incorrect superelevation or kinks in track	2	4	1	Nil	Nil	Nil	Nil	1	1	9
5.	Defective track material	Nil	Nil	1	Nil	Nil	Nil	Nil	Nil	3	4
6.	Defective points, crossings or turnouts	Nil									
7.	Combined effect of defects in track and rolling stock or engine or high speed but defects in track being the predominant cause, other factors being secondary	Nil	Nil	1	Nil	Nil	Nil	1	4	Nil	6
8.	Rail fractures	1	1	1	Nil	Nil	1	Nil	Nil	Nil	4
9.	Buckling of track	Nil	Nil	Nil	Nil	Nil	Nil	1	Nil	Nil	1
10.	Slack or loose packing	Nil	1	1	Nil	Nil	Nil	1	Nil	1	4
11.	Weld failures	Nil									
12.	Other track defects	2	Nil	1	Nil	Nil	Nil	Nil	1	Nil	
13.	Total	10	14	8	Nil	Nil	3	9	17	11	72

L I

OF PERMANENT WAY FAILURE—RAILWAY-WISE; IN 5-YEAR PERIODS.

Number of derailments									
1973-74 to 1977-78									
CR	ER	NR	NER	NFR	SR	SCR	SER	WR	All railway
13	14	15	16	17	18	19	20	21	22
2	3	1	Nil	1	1	2	2	1	13
Nil	1	Nil	Nil	Nil	Nil	1	1	Nil	3
2	1	1	Nil	Nil	Nil	3	2		12
1	3	Nil	Nil	Nil	Nil	Nil	1	1	6
3	Nil	3	Nil	Nil	1	1	1	1	10
Nil	2	1	Nil	Nil	1	1	Nil	Nil	5
Nil	3	4	Nil	Nil	Nil	6	3	3	19
2	4	Nil	Nil	2	Nil	1	Nil	Nil	9
Nil	Nil	Nil	Nil	1	Nil	Nil	Nil	Nil	1
5	Nil	Nil	Nil	Nil	Nil	Nil	1	3	9
Nil	1	Nil	Nil	Nil	Nil	Nil	Nil	Nil	1
1	Nil	Nil	Nil	Nil	Nil	Nil	Nil	Nil	1
16	18	10	Nil	4	3	15	11	12	89

L II

ACCORDING TO THE NATURE OF PERMANENT WAY FAILURE—RAILWAY-WISE; IN 5-YEAR PERIODS

Number of derailments									
1973-74 to 1977-78									
CR	ER	NR	NER	NFR	SR	SCR	SER	WR	All railways
13	14	15	16	17	18	19	20	21	22
5	5	2	Nil	1	1	3	8	1	26
4	2	3	Nil	Nil	Nil	3	4	1	17
2	1	1	Nil	1	Nil	1	4	4	14
2	2	1	Nil	Nil	Nil	Nil	6	Nil	11
2	Nil	1	Nil	Nil	Nil	Nil	1	Nil	4
Nil									
Nil	2	4	Nil	1	Nil	4	12	Nil	23
2	Nil	1	Nil	Nil	1	1	3	5	13
2	Nil	Nil	Nil	Nil	Nil	Nil	Nil	Nil	2
3	Nil	Nil	Nil	Nil	Nil	Nil	1	2	6
Nil									
1	Nil	Nil	Nil	Nil	Nil	1	Nil	1	3
13	12	13	Nil	3	2	13	39	14	119

ANNEXURE LIII

DERAILMENTS ON THE METRE GAUGE CLASSIFIED ACCORDING TO THE NATURE OF PERMANENT WAY FAILURE—ALL RAILWAYS; IN 5-YEAR PERIODS.

A—Number of derailments.

B—Number of derailments due to cause taken as a percentage of the total.

S. Nature of permanent way failure No.	1963-64 to 1967-68		1968-69 to 1972-73		1973-74 to 1977-78	
	A	B	A	B	A	B
1. Incorrect gauge	47	13·0	28	17·8	19	12·8
2. Defective cross or longitudinal levels	35	9·6	28	17·8	16	10·7
3. Sinkage of track	80	22·0	19	12·1	20	13·4
4. Badly aligned curve or incorrect super elevation or kinks in track	10	2·8	4	2·5	7	4·7
5. Defective track material	16	4·4	2	1·3	6	4·0
6. Defective points, crossings or turn outs.	7	1·9	3	1·9	1	0·7
7. Combined effect of defects in track and rolling stock or engine or high speed but defects in track being the predominant cause, other factors being secondary	80	22·0	43	27·4	58	38·9
8. Rail fractures	—	—	10	6·4	12	8·0
9. Buckling of track	—	—	2	1·3	nil	—
10. Slack or loose packing	—	—	6	3·8	5	3·4
11. Weld failures	—	—	nil	—	nil	—
12. Other track defects	88	24·3	12	7·6	5	3·4
12.A. Sub-total of items (8) to (12)	(88)	(24·3)	(30)	(19·1)	(22)	(14·8)
13. Total	363	100·0	157	100·0	149	100·0

Note:—Figures within brackets indicate total of items (8) to (12) which were taken as 'other defects by the Wanchoo Committee'.

ANNEXURE LIV

DERAILMENTS ON THE METRE GAUGE CLASSIFIED ACCORDING TO THE NATURE OF
PERMANENT WAY FAILURE—RAILWAY-WISE; IN 5-YEAR PERIODS

Number of derailments

S. No.	Nature of permanent way failure	1963-64 to 1967-68										1968-69 to 1972-73				
		CR	ER	NR	NER	NFR	SR	SCR	SER	WR	All rail-ways	CR	ER	NR	NFR	NFR
1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17
1.	Incorrect gauge	Nil		1	12	19	14	Nil		1	47	Nil		1	2	16
2.	Defective cross or longitudinal levels	Nil		4	2	2	26	1		Nil	35	2		3	2	11
3.	Sinkage of track	1		3	16	29	19	5		7	80	Nil		1	5	2
4.	Badly aligned curve or incorrect superelevation or kinks in track	Nil		Nil	1	4	4	Nil		1	10	Nil		2	1	Nil
5.	Defective track material	Nil	No	1	10	1	4	Nil	No	Nil	16	Nil	No	Nil	Nil	1
6.	Defective points, crossings or turn outs	Nil	metre gauge	2	3	Nil	1	Nil	metre gauge	1	7	nil	metre gauge	2	Nil	Nil
7.	Combined effect of defects in track and rolling stock or engine or high speed but defects in track being the predominant cause, other factors being secondary	1		11	8	38	15	3		4	80	Nil		3	4	20
8.	Rail fractures											Nil	1	1	2	2
9.	Buckling of track			Taken in 'other defects'								Nil		Nil	1	1
10.	Slack or loose packing											Nil		2	2	Nil
11.	Weld failures											Nil		Nil	Nil	Nil
12.	Other track defects	Nil		7	11	50	9	1		10	88	2		1	2	5
12A.	Sub-total of items (8) to (12)	Nil		(7)	(11)	(50)	(9)	(1)		(10)	(88)	(2)		(4)	(7)	(8)
13.	Total	2		29	63	143	82	10		24	363	4		16	21	58

Note : (1) Figures in brackets indicate total of items (8) to (12) which were taken as 'other defects' by the Wanchoo Committee.
(2) The South Central railway was formed on 2-10-1966.

ANNEXURE LIV Contd.

DERAILMENTS ON THE METRE GAUGE CLASSIFIED ACCORDING TO THE NATURE OF
PERMANENT WAY FAILURE—RAILWAY-WISE; IN 5-YEAR PERIODS

Number of Derailments

S. No.	Nature of permanent way failure	1968-69 to 1972-73					1973-74 to 1977-78									
		SR	SCR	SER	WR	All rail-ways	CR	ER	NR	NER	NFR	SR	SCR	SER	WR	All rail-ways
1	2	18	19	20	21	22	23	24	25	26	27	28	29	30	31	32
1.	Incorrect gauge	1	3		5	28	Nil		2	1	7	Nil	4		5	19
2.	Defective cross or longitudinal levels	1	8		1	28	2		2	3	3	1	4		1	16
3.	Sinkage of track	3	2		6	19	Nil		2	5	5	3	1		4	2
4.	Badly aligned curve or incorrect superelevation or kinks in track	Nil	1		Nil	4	Nil		Nil	Nil	5	1	Nil		1	7
5.	Defective track material	Nil	Nil	No	1	2	Nil	No	Nil	1	1	1	Nil	No	3	6
6.	Defective points, crossings or turn outs	Nil	Nil	metre gauge	1	3	Nil	metre gauge	Nil	Nil	Nil	Nil	Nil	metre gauge	1	1
7.	Combined effect of defects in track and rolling stock or engine or high speed but defects in track being the predominant cause, other factors being secondary	1	11		4	43	Nil		14	5	15	Nil	17		7	58
8.	Rail fractures	1	1		3	10	Nil		3	Nil	4	1	2		2	12
9.	Buckling of track	Nil	Nil		Nil	2	Nil		Nil	Nil	Nil	Nil	Nil		Nil	Nil
10.	Slack or loose packing	Nil	1		1	6	Nil		2	1	1	Nil	Nil		1	5
11.	Weld failures	Nil	Nil		Nil	Nil	Nil		Nil	Nil	Nil	Nil	Nil		Nil	Nil
12.	Other track defects	Nil	2		Nil	12	1		Nil	2	1	1	Nil		Nil	5
12A.	Sub-total of items (8) to (12)	(1)	(4)		(4)	(30)	(1)		(5)	(3)	(6)	(2)	(2)		(3)	(22)
13.	Total	7	29		22	157	3		25	18	42	8	28		25	149

ANNEXURE LV

DERAILMENTS AT STATIONS AND IN MID-SECTION ON THE METRE GAUGE CLASSIFIED ACCORDING TO THE NATURE OF PERMANENT WAY FAILURE ALL RAILWAYS; IN 5-YEAR PERIODS

A—Number of derailments.

B—Number of derailments due to cause taken as a percentage of the total.

S. No.	Nature of permanent way failure	Derailments at stations				Derailments in Mid-Section			
		1968-69 to 1972-73		1973-74 to 1977-78		1968-69 to 1972-73		1973-74 to 1977-78	
		A	B	A	B	A	B	A	B
1.	Incorrect gauge . . .	19	23.8	11	25.0	9	11.7	8	7.6
2.	Defective cross or longitudinal levels. . .	10	12.5	6	13.6	18	23.4	10	9.5
3.	Sinkage of track . . .	16	20.0	5	11.4	3	3.9	15	14.3
4.	Badly aligned curve or incorrect superelevation or kinks in track. . .	1	1.2	Nil	—	3	3.9	7	6.7
5.	Defective track material . . .	1	1.2	2	4.5	1	1.3	4	3.8
6.	Defective points, crossings or turn outs. . .	3	3.8	1	2.3	Nil	—	Nil	—
7.	Combined effect of defects in track and rolling stock or engine or high speed but defects in track being the predominant cause, other factors being secondary . . .	16	20.0	12	27.3	27	35.0	46	43.8
8.	Rail fractures . . .	7	8.7	5	11.4	3	3.9	7	6.7
9.	Buckling of track. . .	1	1.2	Nil	—	1	1.3	Nil	—
10.	Stack or loose packing . . .	3	3.8	Nil	—	3	3.9	5	4.8
11.	Weld failures. . .	Nil	—	Nil	—	Nil	—	Nil	—
12.	Other track defects . . .	3	3.8	2	4.5	9	11.7	3	2.8
13.	Total . . .	80	100.0	44	100.0	77	100.0	105	100.0

Note:— The Wanchoo Committee did not make a similar analysis. Hence, the comparative position for the period 1963-64 to 1967-68 could not be given.

ANNEXURE

DERAILMENTS AT STATIONS ON THE METRE GAUGE CLASSIFIED ACCORDING TO THE NATURE OF
Number of

1968-69 to 1972-73

S. No.	Nature of permanent way failure	1968-69 to 1972-73									
		CR	ER	NR	NER	NFR	SR	SCR	SER	WR	All railways
1	2	3	4	5	6	7	8	9	10	11	12
1.	Incorrect gauge	Nil		Nil	2	12	1	2		2	19
2.	Defective cross or longitudinal levels	Nil		3	2	1	Nil	3		1	10
3.	Sinkage of track	Nil		1	4	2	2	2		5	16
4.	Badly aligned curve incorrect superelevation or kinks in track	Nil		Nil	Nil	Nil	Nil	1		Nil	1
5.	Defective track material	Nil		Nil	Nil	1	Nil	Nil		Nil	1
6.	Defective points, crossings or turn-outs	Nil	No metre gauge	2	Nil	Nil	Nil	Nil	No metre gauge	1	3
7.	Combined effect of defects in track and rolling stock or engine or high speed but defects in track being the predominant cause, other factors being secondary	Nil		2	1	9	1	3		Nil	16
8.	Rail fractures	Nil		1	1	1	Nil	1		3	7
9.	Buckling of track	Nil		Nil	Nil	1	Nil	Nil		Nil	1
10.	Slack or loose packing	Nil		1	2	Nil	Nil	Nil		Nil	3
11.	Weld failures	Nil		Nil	Nil	Nil	Nil	Nil		Nil	Nil
12.	Other track defects	2		Nil	Nil	1	Nil	Nil		Nil	3
13.	Total	2		10	12	28	4	12		12	80

ANNEXURE

DERAILMENTS IN MID-SECTION ON THE METRE GAUGE CLASSIFIED
Number of

1968-69 to 1972-73

S. No.	Nature of permanent way failure	1968-69 to 1972-73							
		CR	ER	NR	NER	NFR	SR	SCR	SER
1.	Incorrect gauge	Nil		1	Nil	4	Nil	1	
2.	Defective cross or longitudinal levels	2		Nil	Nil	10	1	5	
3.	Sinkage of track	Nil		Nil	1	Nil	1	Nil	
4.	Badly aligned curve or incorrect superelevation or kinks in track	Nil		2	1	Nil	Nil	Nil	
5.	Defective track material	Nil		Nil	Nil	Nil	Nil	Nil	
6.	Defective points, crossings or turn outs	Nil	No metre gauge	Nil	Nil	Nil	Nil	Nil	No metre gauge
7.	Combined effect of defects in track and rolling stock or engine or high speed but defects in track being the predominant cause, other factors being secondary	Nil		1	3	11	Nil	8	
8.	Rail fractures	Nil		Nil	1	1	1	Nil	
9.	Buckling of track	Nil		Nil	1	Nil	Nil	Nil	
10.	Slack or loose packing	Nil		1	Nil	Nil	Nil	1	
11.	Weld failures	Nil		Nil	Nil	Nil	Nil	Nil	
12.	Other track defects	Nil		1	2	4	Nil	2	
13.	Total :	2		6	9	30	3	17	

LVI

PERMANENT WAY FAILURE—RAILWAY-WISE : IN 5-YEAR PERIODS

Derailments

1973-74 to 1977-78									
CR.	ER	NR	NER	NFR	SR	SCR	SER	WR	All railways
13	14	15	16	17	18	19	20	21	22
Nil		Nil	1	5	Nil	2		3	11
Nil		Nil	2	2	1	1		Nil	6
Nil		Nil	1	2	1	Nil		1	5
Nil		Nil	Nil	Nil	Nil	Nil		Nil	Nil
Nil		Nil	Nil	Nil	Nil	Nil		2	2
	No metre gauge						No metre gauge		
Nil		Nil	Nil	Nil	Nil	Nil		1	1
Nil		Nil	1	8	Nil	3		Nil	12
Nil		2	Nil	Nil	1	1		1	5
Nil		Nil	Nil	Nil	Nil	Nil		Nil	Nil
Nil		Nil	Nil	Nil	Nil	Nil		Nil	Nil
Nil		Nil	Nil	Nil	Nil	Nil		Nil	Nil
1		Nil	1	Nil	Nil	Nil		Nil	2
1		2	6	17	3	7		8	44

LVII

ACCORDING TO THE NATURE OF PERMANENT WAY FAILURE—RAILWAY-WISE ; IN 5-YEAR PERIODS

Derailments

1973-74 to 1977-78											
WR	All railways	CR	ER	NR	NER	NFR	SR	SCR	SER	WR	All railways
3	9	Nil		2	Nil	2	Nil	2		2	8
Nil	18	2		2	1	1	Nil	3		1	10
1	3	Nil		2	4	3	2	1		3	15
Nil	3	Nil		Nil	Nil	5	1	Nil		1	7
1	1	Nil		Nil	1	1	1	Nil		1	4
Nil	Nil	Nil	No metre gauge	Nil	Nil	Nil	Nil	Nil	No metre gauge	Nil	Nil
4	27	Nil		14	4	7	Nil	14		7	46
Nil	3	Nil		1	Nil	4	Nil	1		1	7
Nil	1	Nil		Nil	Nil	Nil	Nil	Nil		Nil	Nil
1	3	Nil		2	1	1	Nil	Nil		1	Nil
Nil	Nil	Nil		Nil	Nil	Nil	Nil	Nil		Nil	Nil
Nil	9	Nil		Nil	1	1	1	Nil		Nil	3
10	77	2		23	12	25	5	21		17	105

ANNEXURE LVIII

DERAILMENTS ON THE BROAD AND METRE GAUGES DUE TO CARRIAGE AND WAGON DEFECTS
CORRELATED TO VEHICLE/WAGON KILOMETRES—ALL RAILWAYS ; IN 5-YEAR PERIODS.

Period	Coaching vehicles		Goods wagons		Coaching and goods vehicles combined	
	Number of derailments	Incidence per 100 million vehicle kilometres.	Number of derailments	Incidence per 100 million wagon kilometres.	Number of derailments	Incidence per 100 million vehicle and wagon kilometres combined
BROAD GAUGE						
1963-64 to 1967-68	NA	—	NA	—	467	0.9
1968-69 to 1972-73	46	0.31	287	0.65	333	0.56
1973-74 to 1977-78	63	0.38	398	0.81	461	0.70
METRE GAUGE						
1963-64 to 1967-68	N.A.	—	N.A.	—	561	2.5
1968-69 to 1972-73	59	0.76	443	3.63	502	2.52
1973-74 to 1977-78	68	0.90	483	4.36	551	2.96

NA—denotes information not available.

ANNEXURE LIX

DERAILMENTS ON THE BROAD GAUGE DUE TO CARRIAGE AND WAGON DEFECTS CORRELATED TO VEHICLE/
WAGON KILOMETRES—RAILWAY-WISE ; IN 5-YEAR PERIODS.

A—Number of derailments.

B—Incidence of derailments per 100 million vehicle/wagon/vehicle and wagon combined kilometres.

Railway	Coaching Vehicles				Goods Wagons				Coaching and Goods vehicles combined					
	1968-69 to 1972-73		1973-74 to 1977-78		1968-69 to 1972-73		1973-74 to 1977-78		1963-64 to 1967-68		1968-69 to 1972-73		1973-74 to 1977-78	
	A	B	A	B	A	B	A	B	A	B	A	B	A	B
Central	12	0.42	18	0.55	48	0.60	61	0.64	96	0.9	60	0.56	79	0.62
Eastern	13	0.53	17	0.67	58	0.74	63	0.78	70	0.7	71	0.69	80	0.75
Northern	4	0.12	9	0.24	39	0.50	33	0.38	78	0.8	43	0.38	42	0.33
North Eastern	1	4.59	Nil	—	Nil	—	2	9.97	Nil	—	1	3.65	2	2.43
Northeast Frontier	Nil	—	Nil	—	5	1.24	8	1.68	4	1.0	5	0.95	8	1.23
Southern	4	0.31	Nil	—	13	0.50	18	0.65	50	1.3	17	0.44	18	0.43
South Central	4	0.30	5	0.29	26	0.77	27	0.65	7	0.6	30	0.63	32	0.55
South Eastern	2	0.11	6	0.35	78	0.82	147	1.56	131	1.9	80	0.71	153	1.37
Western	6	0.37	8	0.44	20	0.41	39	0.66	31	0.5	26	0.40	47	0.61
All Railways	46	0.31	63	0.38	287	0.65	398	0.81	467	0.9	333	0.56	461	0.70

Notes:— (i) Information regarding incidence per 100 million vehicles kilometres and per 100 million wagon kilometres separately is not available for 1963-64 to 1967-68.

(ii) The South Central Railway was formed on 2-10-1966.

ANNEXURE LX

DERAILMENTS ON THE METRE GAUGE DUE TO CARRIAGE AND WAGON DEFECTS CORRECTED TO VEHICLE/
WAGON KILOMETRES—RAILWAY-WISE; IN 5-YEAR PERIODS.

A—Number of derailments.

B—Incidence of derailments per 100 million vehicle/wagon/vehicle and wagon combined/
kilometres.

Railway	Coaching vehicles				Goods Wagons				Coaching and Goods vehicles combined					
	1968-69 to 1972-73		1973-74 to 1977-78		1968-69 to 1972-73		1973-74 to 1977-78		1963-64 to 1967-68		1968-69 to 1972-73		1973-74 to 1977-78	
	A	B	A	B	A	B	A	B	A	B	A	B	A	B
1. Central	1	2.34	1	2.26	14	11.82	8	6.06	13	2.3	15	9.31	9	5.08
2. Eastern	No metre gauge													
3. Northern	9	1.21	7	1.01	28	2.41	15	1.43	64	3.6	37	1.94	22	1.26
4. North Eastern	17	0.87	18	0.93	71	2.60	80	3.74	116	2.4	88	1.88	98	2.40
5. Northeast Frontier	10	1.22	14	1.76	154	8.97	155	9.85	127	4.8	164	6.46	169	7.13
6. Southern	1	0.06	9	0.60	33	2.19	55	3.98	123	3.2	34	1.10	64	2.22
7. South Central	9	1.19	9	1.16	57	4.53	44	3.66	16	2.6	66	3.27	53	2.68
8. South Eastern	No metre gauge													
9. Western	12	0.66	10	0.56	86	2.32	126	3.51	102	2.1	98	1.78	136	2.53
10. All Railways	59	0.76	68	0.90	443	3.63	483	4.36	561	2.5	502	2.52	551	2.96

Notes:— (i) Information regarding incidence per 100 million vehicle kilometres and per 100 million wagon kilometres separately is not available for 1963-64 to 1967-68.

(ii) The South Central Railway was formed on 2-10-1966.

ANNEXURE LXI

DERAILMENTS ON THE BROAD GAUGE ACCORDING TO THE TYPE OF CARRIAGE AND WAGON DEFECT—ALL
RAILWAYS : IN 5-YEAR PERIODS.

A—Number of derailments.

B—Number of derailments due to defect
taken as a percentage of the total.

S. No.	Carriage and Wagon defects classified.	1963-64 to 1967-68		1968-69 to 1972-73		1973-74 to 1977-78	
		A	B	A	B	A	B
1.	Defective or broken springs or suspensions	81	17.35	39	11.71	60	13.02
2.	Breakage of undergear and vacuum or brake fittings.	65	13.92	65	19.52	74	16.05
3.	Defective or inadequate or excessive play in brasses.	10	2.14	8	2.40	6	1.30
4.	Defective or broken axle boxes.	35	7.49	18	5.41	25	5.42
5.	Binding brake-blocks or defective brakes or brake power.	42	9.00	10	3.00	17	3.69
6.	Defective wheel or tyre.	54	11.56	31	9.31	48	10.41
7.	Broken axle or Journal :						
	(a) Hot axle	35	7.49	62	18.62	72	15.62
	(b) Cold axle	65	13.92	32	9.61	43	9.33
8.	Seized roller bearings.	*Nil	—	16	4.80	24	5.21
9.	Coupling failures.	14	3.00	4	1.20	7	1.52
10.	Defective buffers.	12	2.57	8	2.40	13	2.82
11.	Defective bogie bolster hangers.	13	2.78	5	1.50	10	2.17
12.	Combined effect of rolling stock and track defects or excessive speed but primary cause being in Carriage and Wagon.	41	8.78	17	5.11	41	8.89
13.	Other defects	*Nil	—	18	5.41	21	4.55
14.	Total	467	100.0	333	100.0	461	100.0

*Separate figures are not available.

ANNEXURE LXII

DERAILMENTS ON THE BROAD GAUGE ACCORDING TO THE TYPE OF CARRIAGE AND WAGON DEFECT;
RAILWAY-WISE; IN 5-YEAR PERIODS

Number of Derailments

Sl. No.	Carriage and wagon defects classified	1963-64 to 1967-68										1968-69 to 1972-73				
		CR	ER	NR	NER	NFR	SR	SCR	SER	WR	All rail-ways	CR	ER	NE	NER	NFR
1.	Defective or broken springs or suspensions	19	11	16	Nil	Nil	7	1	23	4	81	10	6	1	1	3
2.	Breakage of undergear and vacuum or brake fittings	14	9	8	Nil	Nil	6	2	19	7	65	13	11	8	Nil	1
3.	Defective or inadequate or excessive play in brasses	1	2	2	Nil	Nil	2	Nil	3	Nil	10	Nil	4	1	Nil	Nil
4.	Defective or broken axle boxes	8	5	1	Nil	1	4	Nil	15	1	35	3	8	Nil	Nil	Nil
5.	Binding brake blocks or defective brakes or brake power	7	7	7	Nil	1	Nil	Nil	18	2	42	2	2	2	Nil	Nil
6.	Defective wheel or tyre	18	4	10	Nil	Nil	6	Nil	14	2	54	5	11	1	Nil	1
7.	Broken axle or journal :															
	(a) Hot axle	4	12	9	Nil	Nil	1	1	3	5	35	9	10	16	Nil	Nil
	(b) Cold axle	12	9	15	Nil	Nil	9	2	13	5	65	6	1	2	Nil	Nil
8.	Seized roller bearings										*	Nil	9	Nil	Nil	Nil
9.	Coupling failure	3	Nil	1	Nil	Nil	2	Nil	7	1	14	1	Nil	2	Nil	Nil
10.	Defective buffers	4	1	Nil	Nil	1	1	Nil	4	1	12	2	3	1	Nil	Nil
11.	Defective bogie holster hangers	2	Nil	3	Nil	Nil	4	Nil	4	Nil	13	4	1	Nil	Nil	Nil
12.	Combined effect of rolling stock and track defects or excessive speed but primary cause being in carriage and wagon	4	10	6	Nil	1	8	1	8	3	41	4	4	3	Nil	Nil
13.	Other defects									*	1	6		Nil	Nil	
14.	Total	96	70	78	Nil	4	50	7	131	31	467	60	71	43	1	5

Note : The South Central Railway was formed on 2-10-1966.

*Separate figures are not available.

ANNEXURE LXII(Contd.)

Number of Derailments

Sl. No.	Carriage and wagon defects classified	1968-69 to 1972-73					1973-74 to 1977-78									
		SR	SCR	SER	WR	All rail-ways	CR	ER	NR	NER	NFR	SR	SCR	SER	WR	All rail-ways
1.	Defective or broken springs or suspensions	6	5	4	3	39	17	14	4	Nil	2	1	3	13	6	60
2.	Breakage of undergear and vacuum or brake fittings	1	7	18	6	65	10	17	3	1	Nil	Nil	4	31	8	74
3.	Defective or inadequate or excessive play in brasses	Nil	1	Nil	2	8	Nil	1	1	Nil	Nil	Nil	3	1	6	
4.	Defective or broken axle boxes	1	Nil	5	1	18	2	5	4	Nil	Nil	1	Nil	12	1	25
5.	Binding brake blocks or defective brakes or brake power	Nil	Nil	3	1	10	2	2	2	1	2	Nil	Nil	4	4	17
6.	Defective wheel or tyre	1	2	8	2	31	11	13	1	Nil	Nil	1	3	16	3	48
7.	Broken axle or journal :															
	(a) Hot axle	3	5	18	1	62	6	4	13	Nil	3	6	10	27	3	72
	(b) Cold axle	Nil	1	14	8	32	4	4	4	Nil	Nil	Nil	5	13	13	43
8.	Seized roller bearings	1	2	4	Nil	16	2	11	3	Nil	Nil	1	Nil	4	3	24
9.	Coupling failures	1	Nil	Nil	Nil	4	3	1	1	Nil	Nil	Nil	1	1	Nil	7
10.	Defective buffers	Nil	Nil	1	1	8	3	2	1	Nil	Nil	Nil	1	5	1	13
11.	Defective bogie holster hangers	Nil	Nil	Nil	Nil	5	6	1	Nil	Nil	Nil	Nil	Nil	2	1	10
12.	Combined effect of rolling stock and track defects or excessive speed but primary cause being in carriage and wagon	Nil	2	3	1	17	4	5	5	Nil	1	1	5	17	3	41
13.	Other defects	3	5	2	Nil	18	9	Nil	Nil	Nil	Nil	7	Nil	5	Nil	21
14.	Total	17	30	80	26	333	79	80	42	2	8	18	32	153	47	461

ANNEXURE LXIII

DERAILMENTS OF PASSENGER AND OTHER TRAINS ON THE BROAD GAUGE ACCORDING TO THE TYPE OF CARRIAGE AND WAGON DEFECTS ALL RAILWAYS : IN 5-YEAR PERIODS

A—Number of derailments.

B—Number of derailments due to cause taken as percentage of the total.

S. No.	Carriage/wagon defects classified	Passenger trains				Other trains			
		1968-69 to 1972-73		1973-74 to 1977-78		1968-69 to 1972-73		1973-74 to 1977-78	
		A	B	A	B	A	B	A	B
1	2	3	4	5	6	7	8	9	10
1.	Defective or broken springs or suspensions	5	10.8	9	14.3	34	11.8	51	12.8
2.	Breakage of undergear and vacuum or brake fittings	20	43.5	17	27.0	45	15.7	57	14.3
3.	Defective or inadequate or excessive play in brasses	Nil	—	2	3.2	8	2.8	4	1.0
4.	Defective or broken axle boxes	1	2.2	Nil	—	17	5.9	25	6.3
5.	Binding brake-blocks or defective brakes or brake power	2	4.4	2	3.1	8	2.8	15	3.8
6.	Defective wheel or tyre	6	13.0	17	27.0	25	8.7	31	7.8
7.	Broken axle or journal :								
	(a) Hot axle	Nil	—	3	4.8	62	21.6	69	17.3
	(b) Cold axle	1	2.2	4	6.4	31	10.8	39	9.8
8.	Seized roller bearings	1	2.2	1	1.6	15	5.2	23	5.8
9.	Coupling failures	Nil	—	Nil	—	4	1.4	7	1.8
10.	Defective buffers	Nil	—	1	1.6	8	2.8	12	3.0
11.	Defective bogie bolster hangers	4	8.7	3	4.8	1	0.4	7	1.8
12.	Combined effect of rolling stock and track defects or excessive speed but primary cause being in carriage and wagon	1	2.2	2	3.1	16	5.6	39	9.8
13.	Other defects	5	10.8	2	3.1	13	4.5	19	4.7
14.	Total	46	100.0	63	100.0	287	100.0	398	100.0

NOTE : The Wanch to Committee did not make a similar analysis. Hence, the comparative position for the period 1963-64 to 1967-68 could not be given.

DERAILMENTS OF PASSENGER TRAINS ON THE BROAD GAUGE ACCORDING TO THE

Number of derailment

S. No.	Carriage defects classified	1968-69 to 1972-73									
		C.R.	E.R.	N.R.	N.E.R.	NFR.	S.C.R.	S.C.R.	SER	W.E.R.	All Railways
1	2	3	4	5	6	7	8	9	10	11	12
1.	Defective or broken springs of suspensions	1	1	Nil	1	Nil	1	Nil	Nil	1	5
2.	Breakage of undergear and vacuum or brake fittings	5	6	2	Nil	Nil	Nil	3	2	2	20
3.	Defective or inadequate or excessive play in brasseo	Nil	Nil	Nil	Nil	Nil	Nil	Nil	Nil	Nil	Nil
4.	Defective or broken axle boxes	Nil	1	Nil	Nil	Nil	Nil	Nil	Nil	Nil	1
5.	Binding brake-blocks or defective brakes or brake power	1	Nil	Nil	Nil	Nil	Nil	Nil	Nil	1	2
6.	Defective wheel or tyre	1	3	Nil	Nil	Nil	Nil	1	Nil	1	6
7.	Broken axle or Journal :										
	(a) Hot axle	Nil	Nil	Nil	Nil	Nil	Nil	Nil	Nil	Nil	Nil
	(b) Cold axle	Nil	Nil	Nil	Nil	Nil	Nil	Nil	Nil	1	1
8.	Seized roller bearings	Nil	1	Nil	Nil	Nil	Nil	Nil	Nil	Nil	1
9.	Coupling failures	Nil	Nil	Nil	Nil	Nil	Nil	Nil	Nil	Nil	Nil
10.	Defective buffers	Nil	Nil	Nil	Nil	Nil	Nil	Nil	Nil	Nil	Nil
11.	Defective bogie bolster hangers	3	1	Nil	Nil	Nil	Nil	Nil	Nil	Nil	4
12.	Combined effect of rolling stock and track defects or excessive speed but primary cause being in carriage	1	Nil	Nil	Nil	Nil	Nil	Nil	Nil	Nil	1
13.	Other defects	Nil	Nil	2	Nil	Nil	3	Nil	Nil	Nil	5
14.	Total	12	13	4	1	Nil	4	4	2	6	46

ANNEXURE

DERAILMENTS OF OTHER TRAINS ON THE BROAD GAUGE ACCORDING TO THE

Number of Derailment

Sl. No.	Wagon defects classified	1968-69 to 1972-73									
		CR	ER	NR	NER	NFR	SR	SCR	SER	WR	All Railways
1	2	3	4	5	6	7	8	9	10	11	12
1.	Defective or broken springs or suspensions	9	5	1	Nil	3	5	5	4	2	34
2.	Breakage of undergear and vacuum or brake fittings	8	5	6	Nil	1	1	4	16	4	45
3.	Defective or inadequate or excessive play in brasses	Nil	4	1	Nil	Nil	Nil	1	Nil	2	8
4.	Defective or broken axle boxes	3	7	Nil	Nil	Nil	1	Nil	5	1	17
5.	Binding brake-blocks or defective brakes or brake power	1	2	2	Nil	Nil	Nil	Nil	3	Nil	8
6.	Defective wheel or tyre	4	8	1	Nil	1	1	1	8	1	25
7.	Broken axle or journal :										
	(a) Hot axle	9	10	16	Nil	Nil	3	5	18	1	62
	(b) Cold axle	6	1	2	Nil	Nil	Nil	1	14	7	31
8.	Seized roller bearings	Nil	8	Nil	Nil	Nil	1	2	4	Nil	15
9.	Coupling failures	1	Nil	2	Nil	Nil	1	Nil	Nil	Nil	Nil
10.	Defective buffers	2	3	1	Nil	Nil	Nil	Nil	1	1	8
11.	Defective bogie bolster hangers	1	Nil	Nil	Nil	Nil	Nil	Nil	Nil	Nil	1
12.	Combined effect of rolling stock and track defects or excessive speed but primary cause being in carriage and wagon	3	4	3	Nil	Nil	Nil	2	3	1	16
13.	Other defects	1	1	4	Nil	Nil	Nil	5	2	Nil	13
14.	Total	48	58	39	Nil	5	13	26	78	20	287

LXIV

TYPES OF CARRIAGE DEFECTS—RAILWAY-WISE : IN 5-YEAR PERIODS.

Number of Derailments

1973-74 to 1977-78

C.R.	E.R.	N.R.	N.E.R.	N.F.R.	S.R.	S.C.R.	S.E.R.	W.R.	All Railways
13	14	15	16	17	18	19	20	21	22
2	2	2	Nil	Nil	Nil	Nil	3	Nil	9
3	7	1	Nil	Nil	Nil	2	1	3	17
Nil	Nil	1	Nil	Nil	Nil	Nil	1	Nil	2
Nil	Nil	Nil	Nil	Nil	Nil	Nil	Nil	Nil	Nil
1	Nil	1	Nil	Nil	Nil	Nil	Nil	Nil	2
6	6	1	Nil	Nil	Nil	2	1	1	17
1	Nil	2	Nil	Nil	Nil	Nil	Nil	Nil	3
Nil	Nil	Nil	Nil	Nil	Nil	Nil	Nil	4	4
Nil	1	Nil	Nil	Nil	Nil	Nil	Nil	Nil	1
Nil	Nil	Nil	Nil	Nil	Nil	Nil	Nil	Nil	Nil
Nil	1	Nil	Nil	Nil	Nil	Nil	Nil	Nil	1
3	Nil	Nil	Nil	Nil	Nil	Nil	Nil	Nil	3
Nil	Nil	1	Nil	Nil	Nil	1	Nil	Nil	2
2	Nil	Nil	Nil	Nil	Nil	Nil	Nil	Nil	2
18	17	9	Nil	Nil	Nil	5	6	8	63

LXV

TYPE OF DEFECTS IN WAGONS—RAILWAY-WISE : IN 5-YEAR PERIODS

Number of Derailments

1973-74 to 1977-78

CR	ER	NR	NER	NFR	SR	SCR	SER	WR	All Railways
13	14	15	16	17	18	19	20	21	22
15	12	2	Nil	2	1	3	10	6	51
7	10	2	1	Nil	Nil	2	30	5	57
Nil	1	Nil	Nil	Nil	Nil	Nil	2	1	4
2	5	4	Nil	Nil	1	Nil	12	1	25
1	2	1	1	2	Nil	Nil	4	4	15
5	7	Nil	Nil	Nil	1	1	15	2	31
5	4	11	Nil	3	6	10	27	3	69
4	4	4	Nil	Nil	Nil	5	13	9	39
2	10	3	Nil	Nil	1	Nil	4	3	23
3	1	1	Nil	Nil	Nil	1	1	Nil	7
3	1	1	Nil	Nil	Nil	1	5	1	12
3	1	Nil	Nil	Nil	Nil	Nil	2	1	7
4	5	4	Nil	1	1	4	17	3	39
7	Nil	Nil	Nil	Nil	7	Nil	5	Nil	19
61	63	33	2	8	18	27	147	39	398

ANNEXURE LXVI

DERAILMENTS ON THE METRE GAUGE ACCORDING TO THE TYPE OF CARRIAGE AND WAGON
DEFECT—ALL RAILWAYS ; IN 5 YEAR PERIODS.

A—Number of Derailments.

B—Number of Derailments due to cause taken as a percentage of the total.

S. No.	Carriage and Wagon defects classified	1963-64 to 1967-68		1968-69 to 1972-73		1973-74 to 1977-78	
		A	B	A	B	A	B
1.	Defective or broken springs or suspensions	170	30.3	158	31.4	136	24.7
2.	Breakage of undergear and vacuum or brake fittings	57	10.2	66	13.1	107	19.4
3.	Defective or inadequate or excessive play in brasses	50	8.9	38	7.6	28	5.1
4.	Defective or broken axle boxes	37	6.6	26	5.2	23	4.2
5.	Binding brake-blocks or defective brakes or brake power	27	4.8	24	4.8	20	3.6
6.	Defective wheel or tyre	38	6.8	20	4.0	26	4.7
7.	Broken axle or Journal :						
	(a) Hot axle	8	1.4	24	4.8	37	6.7
	(b) Cold axle	56	10.0	37	7.4	53	9.6
8.	Seized roller bearings	*—	—	1	0.2	Nil	—
9.	Coupling failures	8	1.4	7	1.4	6	1.1
10.	Defective buffers	17	3.0	12	2.4	12	2.2
11.	Defective bogie bolster hangers	12	2.2	3	0.6	7	1.3
12.	Combined effect of rolling stock and track defects or excessive speed but primary cause being in Carriage and Wagon in	81	14.4	38	7.6	39	17.1
13.	Other defects	*—	—	48	9.5	57	10.3
14.	Total	561	100.0	502	100.0	551	100.0

*Separate figures are not available.

DERAILMENTS ON THE METRE GAUGE ACCORDING TO THE TYPE OF CARRIAGE AND WAGON DEFECT—
—LWAY-WISE; IN 5-YEAR PERIODS

Number of Derailments

Sl. No.	Carriage and wagon defects classified	1963-64 to 1967-68					1963-64 to 1967-68					1968-69 to 1972-73				
		CR	ER	NR	NER	NFR	SR	SCR	SER	WR	All rail-ways	CR	ER	NR	NER	NFR
1.	Defective or broken springs or suspensions	8		20	29	34	49	7		23	170	9		2	23	59
2.	Breakage of undergear and vacuum or brake fittings	Nil		2	27	2	10	1		15	57	1		Nil	19	23
3.	Defective or inadequate or excessive play in brasses	Nil		9	2	14	3	Nil		22	50	2		4	3	20
4.	Defective or broken axle boxes	1		3	15	8	5	2		3	37	Nil		7	5	6
5.	Binding brake-blocks or defective brakes or brake power	Nil	No metre gauge	1	5	15	5	Nil	No meter gauge	1	27	1	No metre gauge	Nil	2	15
6.	Defective wheel or type	Nil		7	5	7	9	Nil		10	38	1		2	Nil	
7.	Broken axle or journal :															
(a)	Hot axle	Nil		Nil	3	Nil	4	1		Nil	8	1		10	6	4
(b)	Cold axle	Nil		13	9	8	9	1		16	56	Nil		Nil	7	4
8.	Seized roller bearings	—		—	—	1	—	—		—	—	—		1	Nil	Nil
9.	Coupling failures	Nil		Nil	Nil	3	2	Nil		3	*8	Nil		1	4	1
10.	Defective buffers	1		1	2	12	Nil	Nil		1	17	Nil		1	2	4
11.	Defective bogie bolster hangers	1		Nil	7	1	2	Nil		1	12	Nil		Nil	Nil	1
12.	Combined effect of rolling stock and track defects or excessive speed but primary cause being in carriage and wagon	2		8	12	23	25	4		7	81	Nil		5	2	13
13.	Other defects	—		—	—	—	—	—		—	—	Nil		3	15	3
14.	Total	13		64	116	127	123	16		102	56	15		37	88	164

Note : The South Central Railway was formed on 2-10-1966.

*Separate figures are not available.

ANNEXURE—LXVII Contd

Number of Derailments

Sl. No.	Carriage and wagon defects classified	1968-69 to 1972-73					1973-74 to 1977-78									
		SR	SCR	SER	WR	All rail-ways	CR	ER	NR	NER	NFR	SER	SCR	SER	WR	All rail-ways
1.	Defective of broken springs or suspensions	17	29		18	185	4		2	16	51	14	10		39	136
2.	Breakage of undergear and vacuum or brake fittings	1	11		11	66	1		Nil	29	50	3	11		13	107
3.	Defective or inadequate or excessive play in brasses	3	Nil		6	38	1		1	3	16	1	Nil		6	28
4.	Defective or broken axle boxes	1	Nil		7	26	Nil		Nil	4	7	2	Nil		10	23
5.	Binding brake-blocks or defective brakes or brake power	Nil	Nil		6	24	Nil		3	6	7	1	Nil		3	20
6.	Defective wheel or tyre	Nil	2	No metre gauge	4	20	1	No metre gauge	2	5	6	2	1	No metre gauge	9	26
7.	Broken axle or journal :															
(a)	Hot axle	Nil	Nil	metre gauge	3	24	Nil	metre gauge	8	13	5	8	Nil	metre gauge	3	37
(b)	Cold axle	6	5		15	37	2		Nil	7	3	10	12		19	53
8.	Seized roller bearings	Nil	Nil		Nil	1	Nil		Nil	Nil	Nil	Nil	Nil		Nil	Nil
9.	Coupling failures	Nil	Nil		1	7	Nil		2	2	Nil	2	Nil		Nil	6
10.	Defective buffers	1	Nil		4	12	Nil		Nil	4	2	4	Nil		2	12
11.	Defective bogie boister hangers	Nil	Nil		2	3	Nil		2	4	Nil	1	Nil		Nil	7
12.	Combined effect of rolling stock and track defects or excessive speed but primary cause being in carriage and wagon	2	8		8	38	Nil		2	3	13	1	4		16	39
13.	Other defects	3	11		13	48	Nil		Nil	2	9	15	15		16	57
14.	Total	34	66		98	502	9		22	98	169	64	53		136	551

ANNEXURE LXVIII

DERAILMENTS OF PASSENGER AND OTHER TRAINS ON THE METRE GAUGE ACCORDING TO THE TYPE OF CARRIAGE AND WAGON DEFECT—ALL RAILWAYS : IN 5-YEAR PERIODS

A—Number of Derailments.

B—Number of Derailments due to cause taken as percentage of the total.

S. No.	Carriage and wagon defects classified	Passenger trains				Other trains			
		1968-69 to 1972-73		1973-74 to 1977-78		1968-69 to 1972-73		1973-74 to 1977-78	
		A	B	A	B	A	B	A	B
1.	Defective or broken springs or suspensions	7	11.9	7	10.3	151	34.1	129	26.7
2.	Breakage of undergear and vacuum or brake fittings	17	28.8	16	23.5	49	11.1	91	18.9
3.	Defective or inadequate or excessive play in brasses	2	3.4	2	2.9	36	8.1	26	5.4
4.	Defective or broken axle boxes	2	3.4	Nil	—	24	5.4	23	4.8
5.	Binding brake-blocks or defective brakes or brake power	1	1.7	7	8.8	23	5.2	14	2.9
6.	Defective wheel or tyre	7	11.9	8	11.8	13	2.9	18	3.7
7.	Broken axle or journal :								
	(a) Hot axle	2	3.4	5	7.4	22	5.0	32	6.6
	(b) Cold axle	11	18.6	10	14.7	26	5.9	43	8.9
8.	Seized roller bearings	Nil	—	Nil	—	1	0.2	Nil	—
9.	Coupling failures	1	1.7	Nil	—	6	1.3	6	1.2
10.	Defective buffers	Nil	—	Nil	—	12	2.7	12	2.5
11.	Defective bogie balster hangers	Nil	—	4	5.9	3	0.7	3	0.6
12.	Combined effect of rolling stock and track defects or excessive speed but primary cause being in carriage and wagon	3	5.1	5	7.4	35	7.9	34	7.0
13.	Other defects	6	10.1	5	7.3	42	9.5	52	10.8
14.	Total	59	100.0	68	100.0	443	100.0	483	100.0

Note : The Wanchoo Committee did not make a similar analysis. Hence the comparative position for the period 1963-64 to 1967-68 could not be given.

ANNEXURE LXIX

DERAILMENTS OF PASSENGER TRAINS ON THE METRE GAUGE ACCORDING TO THE TYPE OF COACHING DEFECT—RAILWAY-WISE : IN 5-YEAR PERIODS
Number of Derailments

S. No.	Carriage defects classified	1968-69 to 1972-73									1973-74 to 1977-78										
		CR	ER	NR	NER	NFR	SR	SCR	SER	WR	All Railways	CR	ER	NR	NER	NFR	SR	SCR	SER	WR	All Railways
1.	Defective or broken springs or suspensions	Nil		1	Nil	3	Nil	1		2	7	Nil		1	Nil	4	Nil	1		1	7
2.	Breakage of undergear and vacuum of brake fittings	1		Nil	5	3	Nil	5		3	17	1		Nil	5	4	2			2	16
3.	Defective or inadequate or excessive play in brasses	Nil		2	Nil	Nil	Nil	Nil		Nil	2	Nil		1	Nil	1	Nil	Nil		Nil	2
4.	Defective or broken axle boxes	Nil		1	1	Nil	Nil	Nil		Nil	2	Nil		Nil	Nil	Nil	Nil	Nil		Nil	Nil
5.	Binding brake-blocks or defective brakes or brake power	Nil	No metre gauge	Nil	1	Nil	Nil	Nil	No metre gauge	Nil	1	Nil	No metre gauge	3	2	1	Nil	Nil	No metre gauge	Nil	6
6.	Defective wheel or tyre	Nil		2	Nil	3	Nil	Nil		2	7	Nil		Nil	2	1	2	1		2	8
7.	Broken axle or Journal :																				
	(a) Hot axle	Nil		2	Nil	Nil	Nil	Nil		Nil	2	Nil		Nil	2	2	1	Nil		Nil	5
	(b) cold axle	Nil		Nil	5	1	Nil	2		1	1	Nil		Nil	4	Nil	4	Nil		Nil	Nil
8.	Seized roller bearings	Nil		Nil	Nil	Nil	Nil	Nil		Nil	Nil	Nil		Nil	Nil	Nil	Nil	Nil		Nil	Nil
9.	Coupling failures	Nil		Nil	Nil	Nil	Nil	Nil		Nil	Nil	Nil		Nil	Nil	Nil	Nil	Nil		Nil	Nil
10.	Defective buffers	Nil		Nil	Nil	Nil	Nil	Nil		Nil	Nil	Nil		Nil	Nil	Nil	Nil	Nil		Nil	Nil
11.	Defective bogie bolster hangers	Nil		Nil	Nil	Nil	Nil	Nil		Nil	Nil	Nil		Nil	2	2	Nil	Nil		Nil	4
12.	Combined effect of rolling-stock and track defects or excessive speed but primary cause being in carriage and wagon	Nil		Nil	2	Nil	Nil	Nil		1	3	Nil		Nil	1	1	Nil	Nil		3	5
13.	Other defects	Nil		Nil	3	Nil	1	1		1	6	Nil		Nil	Nil	Nil	Nil	4		1	5
14.	Total	1		9	17	10	1	9		12	59	1		7	18	14	9	9		10	68

ANNEXURE LXX

DERAILMENTS OF OTHER TRAINS ON THE METRE GAUGE ACCORDING TO THE TYPE OF DEFECTS IN WAGONS—RAILWAY-WISE : IN 5-YEAR PERIODS
Number of Derailments

Wagon defects classified	1968-69 to 1972-73									1973-74 to 1977-78											
	CR	ER	NR	NER	NFR	SR	SCR	SER	WR	All Railways	CR	ER	NR	NER	NFR	SR	SCR	SER	WR	All Railways	
1.	Defective or broken springs or suspensions	9		2	23	56	17	28		16	151	4		1	16	47	14	9		38	129
2.	Breakage of undergear and vacuum or brake fittings	Nil		Nil	14	20	1	6		8	49	Nil		Nil	24	46	1	9		11	91
3.	Defective or inadequate or excessive play in brasses	2		2	3	20	3	Nil		6	36	1		Nil	3	15	1	Nil		6	26
4.	Defective or broken axle boxes	Nil		6	4	6	1	Nil		7	24	Nil		Nil	4	7	2	Nil		10	23
5.	Binding brake blocks or defective brakes or brake power	1	No metre gauge	Nil	1	15	Nil	Nil	No metre gauge	6	23	Nil	No metre gauge	Nil	4	6	1	Nil	No metre gauge	3	14
6.	Defective wheel or tyre	1		Nil	Nil	8	Nil	2		2	1	1		1	3	5	Nil	Nil		7	18
7.	Broken axle or Journal :																				
	(a) Hot axle	1		8	6	4	Nil	Nil		3	22	Nil		8	11	3	7	Nil		3	32
	(b) Cold axle	Nil		Nil	2	3	6	3		12	26	2		Nil	3	3	6	11		18	43
8.	Seised roller bearings	Nil		1	Nil	Nil	Nil	Nil		Nil	1	Nil		Nil	Nil	Nil	Nil	Nil		Nil	Nil
9.	Coupling failures	Nil		Nil	4	1	Nil	Nil		1	6	Nil		2	2	Nil	2	Nil		Nil	6
10.	Defective buffers	Nil		1	2	4	1	Nil		4	12	Nil		Nil	4	2	4	Nil		2	12
11.	Defective bogie bolster hangers	Nil		Nil	Nil	1	Nil	Nil		2	3	Nil		2	2	Nil	1	Nil		Nil	3
12.	Combined effect of rolling-stock and track defects or excessive speed but primary cause being in wagon	Nil		5	Nil	13	2	8		7	35	Nil		Nil	2	12	1	4		13	34
13.	Other defects	Nil		3	12	3	2	10		12	42	Nil		Nil	2	9	15	11		51	52
14.	Total	14		28	71	154	33	57		86	443	8		15	80	155	55	44		126	483

ANNEXURE—LXXI

NUMBER AND INCIDENCE OF DERAILMENTS ON THE BROAD GAUGE DUE TO ENGINE DEFECTS—
RAILWAY-WISE : IN 5-YEAR PERIODS

A—Number of derailments.

B—Incidence of derailments per million train kilometres.

Railway	1963-64 to 1967-68		1968-69 to 1972-73		1973-74 to 1977-78	
	A	B	A	B	A	B
Central	19	0·063	8	0·028	13	0·040
Eastern	19	0·069	6	0·022	8	0·027
Northern	9	0·031	13	0·044	13	0·043
North Eastern	Nil	—	Nil	—	Nil	—
Northeast Frontier	4	0·363	2	0·512	1	0·059
Southern	22	0·164	4	0·035	3	0·026
South Central	4	0·111	4	0·031	7	0·046
South Eastern	4	0·018	4	0·016	7	0·027
Western	9	0·055	3	0·017	3	0·015
All Railways	90	0·063	44	0·028	55	0·033

Note:—The South Central Railway was formed on 2-10-1966.

ANNEXURE—LXXII

NUMBER AND INCIDENCE OF DERAILMENTS ON THE METRE GAUGE DUE TO ENGINE DEFECTS—
RAILWAY-WISE: IN 5-YEAR PERIODS.

A—Number of derailments.

B—Incidence of derailments per million train kilometres.

Railway	1963-64 to 1967-68		1968-69 to 1972-73		1973-74 to 1977-78	
	A	B	A	B	A	B
Central	2	0·083	2	0·299	Nil	—
Eastern			No Metre Gauge			
Northern	12	0·181	13	0·198	15	0·258
North Eastern	84	0·591	9	0·061	30	0·224
Northeast Frontier	38	0·487	30	0·396	16	0·254
Southern	48	0·246	10	0·064	6	0·045
South Central	4	0·147	10	0·117	11	0·140
South Eastern			No Metre Gauge			
Western	40	0·248	3	0·018	6	0·038
All Railways	228	0·330	77	0·109	84	0·132

Note:—The South Central Railway was formed on 2-10-1966.

ANNEXURE—LXXIII

DERAILMENTS DUE TO DEFECTS IN ENGINES ON THE BROAD GAUGE ACCORDING TO NATURE OF
THE DEFECT—ALL RAILWAYS : IN 5-YEAR PERIODS.

A—Number of derailments.

B—Number of derailments due to cause taken as a percentage of the total.

S. No.	Nature of engine defect	1963-64 to 1967-68		1968-69 to 1972-73		1973-74 to 1977-78	
		A	B	A	B	A	B
1.	Defective or broken springs or suspensions	8	8·9	8	18·2	4	7·3
2.	Defective or broken axle boxes	4	4·4	1	2·3	1	1·8
3.	Defective wheel or tyre	25	27·8	7	15·9	13	23·6
4.	Breakage of axle or Journal	17	18·9	6	13·6	11	20·0
5.	Breakage of undergear or brake fittings	13	14·5	7	15·9	8	14·5
6.	Defective brake power	3	3·3	1	2·3	Nil	—
7.	Other engine defects	12	13·3	12	27·3	13	23·7
8.	Combined effect of defects in engine and track but engine defect being the predominant factor	8	8·9	2	4·5	5	9·1
9.	Total	90	100·0	44	100·0	55	100·0

DERAILMENTS DUE TO DEFECTS IN ENGINES ON THE BROAD GAUGE ACCORDING TO NATURE

Number of derailments

S. No.	Nature of engine defect	1963-64 to 1967-68										1968-69 to 1972-73				
		CR	ER	NR	NER	NFR	SR	SCR	SER	WR	All Railways	CR	ER	NR	NER	NFR
1.	Defective or broken springs or suspensions	1	4	1	Nil	Nil	1	Nil	Nil	1	8	Nil	1	1	Nil	1
2.	Defective or broken axle boxes	Nil	1	Nil	Nil	Nil	2	Nil	1	Nil	4	Nil	Nil	1	Nil	Nil
3.	Defective wheel or tyre	4	1	5	Nil	1	6	2	2	4	25	Nil	1	4	Nil	1
4.	Breakage of axle or journal	5	4	2	Nil	1	3	Nil	Nil	2	17	3	1	Nil	Nil	Nil
5.	Breakage of underger or brake fittings	3	4	Nil	Nil	Nil	3	1	Nil	2	13	1	1	2	Nil	Nil
6.	Defective brake power	2	Nil	1	Nil	Nil	Nil	Nil	Nil	Nil	3	1	Nil	Nil	Nil	Nil
7.	Other engine defects	3	5	Nil	Nil	1	2	1	Nil	Nil	12	3	1	5	Nil	Nil
8.	Combined effect of defects in engine and track but engine defect being the predominant factor	1	Nil	Nil	Nil	1	5	Nil	1	Nil	8	Nil	1	Nil	Nil	Nil
9.	Total	19	19	9	Nil	4	22	4	4	9	90	8	6	13	Nil	2

Note:—the South Central Railway was formed on 2-10-1966.

OF THE DEFECT RAILWAY-WISE ; IN 5-YEAR PERIODS.

ANNEXURE—LXXIV—(Contd)

Number of Derailments

S. No.	Nature of engine defect	1968-69 to 1972-73					1973-74 to 1977-78									
		SR	SCR	SER	WR	All rail-ways	CR	ER	NR	NER	NFR	SR	SCR	SER	WR	All rail-ways
1.	Defective or broken springs or suspensions	1	2	1	1	8	Nil	Nil	Nil	Nil	Nil	1	1	1	1	4
2.	Defective or broken axle boxes	Nil	Nil	Nil	Nil	1	Nil	Nil	Nil	Nil	Nil	Nil	Nil	Nil	1	1
3.	Defective wheel or tyre	Nil	Nil	1	Nil	7	Nil	4	6	Nil	Nil	Nil	Nil	3	Nil	13
4.	Breakage of axle or journal	1	1	Nil	Nil	6	6	Nil	4	Nil	1	Nil	Nil	Nil	Nil	11
5.	Breakage of undergear or brake fittings	Nil	Nil	1	2	7	1	2	Nil	Nil	Nil	1	1	2	1	8
6.	Defective brake power	Nil	Nil	Nil	Nil	1	Nil	Nil	Nil	Nil	Nil	Nil	Nil	Nil	Nil	Nil
7.	Other engine defects	2	Nil	1	Nil	12	6	Nil	3	Nil	Nil	1	2	1	Nil	13
8.	Combined effect of defects in engine and track but engine defect being the predominant factor	Nil	1	Nil	Nil	2	Nil	2	Nil	Nil	Nil	Nil	3	Nil	Nil	5
9.	Total	4	4	4	3	44	13	8	13	Nil	1	23	7	7	3	55

ANNEXURE LXXV

DERAILMENTS DUE TO DEFECTS IN ENGINES ON THE METRE GAUGE ACCORDING TO THE NATURE
OF THE DEFECT—ALL RAILWAYS: IN 5-YEAR PERIODS

A—Number of derailments.

B—Number of derailments due to cause taken as a percentage of the total.

S. No.	Nature of engine defect	1963-64 to 1967-68		1968-69 to 1972-73		1973-74 to 1977-78	
		A	B	A	B	A	B
1.	Defective or broken springs or suspensions	20	8.8	10	13.0	10	11.9
2.	Defective or broken axle boxes	7	3.1	10	13.0	3	3.6
3.	Defective wheel or tyre	41	17.9	15	19.4	10	11.9
4.	Breakage of axle or Journal	14	6.2	6	7.8	3	3.6
5.	Breakage of undergear or brake fittings	14	6.2	14	18.2	25	29.8
6.	Defective brake power	1	0.4	3	3.9	5	5.9
7.	Other engine defects	97	42.5	15	19.5	18	21.4
8.	Combined effect of defects in engine and track but engine defect being the predominant factor	34	14.9	4	5.2	10	11.9
9.	Total	228	100.0	77	100.0	84	100.0

DERAILMENTS DUE TO DEFECTS IN ENGINES ON THE METRE GAUGE ACCORDING TO NATURE OF DEFECT—RAILWAY-WISE : IN 5-YEAR PERIODS

Number of Derailments

S. No.	Nature of engine defect	1963-64 to 1967-68										1968-69 to 1972-73				
		CR	ER	NR	NER	NFR	SR	SCR	SER	WR	All rail-ways	CR	ER	NR	NERNFR	
1.	Defective or broken springs or suspensions	Nil		Nil	6	7	4	1		2	20	1		1	1	6
2.	Defective or broken axle boxes	Nil		Nil	4	Nil	2	Nil		1	7	Nil		Nil	Nil	8
3.	Defective wheel or tyre	1	No	5	4	2	5	Nil	No	24	14	Nil	No	3	1	5
4.	Breakage of axle or journal	1		4	2	Nil	5	Nil		2	14	Nil		2	2	2
5.	Breakage of undergear or brake fittings	Nil	metre	Nil	5	1	4	Nil	Metre	4	14	Nil	Metre	1	2	5
6.	Defective brake power	Nil		Nil	1	Nil	Nil	Nil		Nil	1	Nil		2	1	Nil
7.	Other engine defects	Nil	gauge	2	56	18	15	Nil	gauge	6	97	1	gauge	4	2	1
8.	Combined effect of defects in engine and track but engine defect being the predominant factor	Nil		1	6	10	13	3		1	34	Nil		Nil	Nil	3
9.	Total	2		12	84	38	48	4		40	228	2		13	9	30

Note : The South Central Railway was formed on 2-10-1966.

DERAILMENTS DUE TO DEFECTS IN ENGINES ON THE METRE GAUGE ACCORDING TO NATURE OF DEFECT—RAILWAYS-WISE : IN 5-YEAR PERIODS

Number of Derailments

S. No.	Nature of engine defect	1968-69 to 1972-73					1973-74 to 1977-78									
		SR	SCR	SER	WR	All rail-ways	CR	SR	NR	NER	NFR	SR	SCR	SER	WR	All rail-ways
1.	Defective or broken springs or suspensions	1	Nil		Nil	10	Nil		1	7	Nil	Nil	2		Nil	10
2.	Defective or broken axle boxes	Nil	2		Nil	10	Nil		1	Nil	2	Nil	Nil		Nil	3
3.	Defective wheel or tyre	4	1	No	1	15	Nil	No	Nil	2	2	1	Nil	No	5	10
4.	Breakage of axle or journal	Nil	Nil		Nil	6	Nil		Nil	2	1	Nil	Nil		Nil	3
5.	Breakage of undergear or brake fittings	2	3	metre	1	14	Nil	metre	1	15	7	Nil	2	metre	Nil	25
6.	Defective brake power	Nil	Nil		Nil	3	Nil		4	Nil	Nil	Nil	Nil		1	5
7.	Other engine defects	2	4	gauge	1	15	Nil	gauge	8	3	2	2	3	gauge	Nil	18
8.	Combined effect of defects in engine and track but engine defect being the predominant factor	1	Nil			4	Nil		Nil	1	2	3	4		Nil	10
9.	Total	10	10		3	77	Nil		15	30	16	6	11		6	84

Note :—The South Central Railway was formed on 2-10-1966.

ANNEXURE LXXVII

DERAILMENTS ON THE BROAD GAUGE ACCORDING TO MISCELLANEOUS CAUSES CLASSIFIED — ALL RAILWAYS; IN 5—YEAR PERIODS

A - Number of derailments.

B - Number of derailments due to cause taken as a percentage of the total

S. No.	Miscellaneous causes	1963-64 to 1967-68		1968-69 to 1972-73		1973-74 to 1977-78	
		A	B	A	B	A	B
1.	Obstructions of track (ballast not clear, tools left on track, goods falling from wagons, infringement of standard dimensions etc etc.	116	38.4	44	16.4	33	13.2
2.	Obstruction caused by road vehicles	5	1.7	3	1.1	18	7.2
3.	Cattle run over	30	9.9	21	7.8	26	10.4
4.	Tampering with track (sabotage)	24	7.9	15	5.6	13	5.2
5.	Cause not determined	38	12.6	25	9.3	31	12.4
6.	Accidental *(boulders falling on track, land slips, breaches, collapse of bridge, sand on track and there is no failure of human element etc.)	—	—	32	11.9	25	10.0
7.	Tampering with track not amounting to sabotage.	—	—	43	16.0	24	9.6
8.	Derailments resulting from train partings.	—	—	2	0.7	3	1.2
9.	Signal and telecommunication failures	—	—	13	4.8	18	7.2
10.	Electrical defects	—	—	5	1.9	3	1.2
11.	Other causes	81	26.8	66	24.5	55	22.0
12.	Causes not finalised	8	2.7	Nil	—	1	0.4
13.	Total	302	100.0	269	100.0	250	100.0

*Causes listed against items 6 to 11 in the above Annexure were taken under the title 'Other Causes' by the Wanchoo Committee.

DERAILMENTS ON THE BROAD GAUGE ACCORDING TO MISCELLANEOUS CAUSES CLASSIFIED—
ALL RAILWAYS-WISE: IN 5-YEAR PERIODS.

S. No.	Miscellaneous causes	Number of Derailments										1968-69 to 1972-73					
		1963-64 to 1967-68										All rail-ways	CR	ER	NR	NER	NFR
		CR	ER	NR	NER	NFR	SR	SCR	SER	WR							
1.	Obstruction of track (ballast not clear tools left on track, goods falling from wagons, infringement of standard dimensions etc. etc.)	27	11	19	Nil	3	17	3	30	6	116	9	6	12	Nil	2	
2.	Obstruction caused by road vehicles	Nil	Nil	2	Nil	Nil	Nil	Nil	3	Nil	5	1	1	1	Nil	Nil	
3.	Cattle run over	2	7	12	Nil	Nil	2	Nil	4	3	30	3	4	10	1	Nil	
4.	Tampering with track (sabotage)	2	Nil	Nil	Nil	Nil	1	Nil	19	2	24	1	1	2	Nil	2	
5.	Cause not determined	19	Nil	2	Nil	Nil	3	1	10	3	38	6		16	Nil	Nil	
6.	Accidental* (boulders falling on track, land slips, breaches, collapse of bridge, sand on track and there is no failure of human element etc.)	—	—	—	—	—	—	—	—	—	—	6	1	4	Nil	2	
7.	Tampering with track not amounting to sabotage	—	—	—	—	—	—	—	—	—	—	3	4	3	Nil	Nil	
8.	Derailments resulting from train partings	—	—	—	—	—	—	—	—	—	—	1	Nil	1	Nil	Nil	
9.	Signal and telecommunication failures	—	—	—	—	—	—	—	—	—	—	6	Nil	3	Nil	Nil	
10.	Electrical defects	—	—	—	—	—	—	—	—	—	—	Nil	Nil	Nil	Nil	Nil	
11.	Other causes	26	10	28	Nil	3	11	1	2	Nil	81	40	Nil	3	Nil	Nil	
12.	Causes not finalised	Nil	Nil	Nil	Nil	Nil	3	4	1	Nil	8	Nil	Nil	Nil	Nil	Nil	
13.	Total	76	28	63	Nil	6	37	9	69	14	302	76	18	45	1	6	

*Causes listed against items 6 to 11 in the above Annexure were taken under the title 'other causes' by the Wanchoo Committee.

Note : The South Central Railway was formed on 2-10-1966.

S. No.	Number of Derailments										1973-74 to 1977-78					
	1968-69 to 1972-73					All rail-ways	CR	ER	NR	NER	NFR	SR	SCR	SER	WR	All-rail-ways
	SR	SCR	SER	WR												
1.	Obstruction of track (ballast not clear tools left on track, goods falling from wagons, infringement of standard dimensions etc. etc.)	Nil	5	7	3	44	6	8	10	1	1	Nil	4	Nil	3	33
2.	Obstruction caused by road vehicles	Nil	Nil	Nil	Nil	3	Nil	1	13	Nil	Nil	Nil	3	Nil	1	18
3.	Cattle run over	1	Nil	Nil	2	21	4	10	9	Nil	1	Nil	Nil	1	1	26
4.	Tampering with track (sabotage)	2	4	2	1	15	2	Nil	5	Nil	2	1	Nil	3	Nil	13
5.	Cause not determined	1	2	6	3	25	12	3	1	Nil	1	3	3	5	2	31
6.	Accidental* (boulders falling on track, land slips, breaches, collapse of bridge, sand on track and there is no failure of human element etc.)	4	7	7	1	32	9	3	3	Nil	Nil	1	3	6	Nil	25
7.	Tampering with track not amounting to sabotage	2	7	24	Nil	43	Nil	3	Nil	Nil	Nil	4	2	14	Nil	24
8.	Derailments resulting from train partings	Nil	Nil	Nil	Nil	2	Nil	1	1	Nil	Nil	Nil	Nil	Nil	1	3
9.	Signal and telecommunication failures	Nil	2	Nil	3	13	7	Nil	4	Nil	Nil	Nil	2	Nil	5	18
10.	Electrical defects	Nil	1	Nil	3	5	Nil	1	Nil	Nil	Nil	Nil	Nil	2	2	3
11.	Other causes	7	1	15	Nil	66	34	Nil	Nil	Nil	Nil	2	1	18	Nil	55
12.	Causes not finalised	Nil	Nil	Nil	Nil	Nil	Nil	Nil	Nil	Nil	Nil	Nil	Nil	Nil	1	1
13.	Total	17	29	61	16	269	74	30	46	1	5	11	19	48	16	250

ANNEXURE—LXXIX

DERAILMENTS ON THE METRE GAUGE ACCORDING TO MISCELLANEOUS CAUSES CLASSIFIED—ALL RAILWAYS
RAILWAY-WISE : IN FIVE-YEAR PERIOD

A-Number of derailments.

B-Number of derailments due to cause taken as a per centage of the total

S. No.	Miscellaneous causes	1963-64 to 1967-68		1968-69 to 1972-73		1973-74 to 1977-78	
		A	B	A	B	A	B
1.	Obstruction of track (ballast not clear, tools left on track, goods falling from wagons, infringement of standard dimensions etc.)	184	37.6	36	13.3	37	15.1
2.	Obstruction caused by road vehicles	6	1.3	6	2.2	7	2.9
3.	Cattle run over	57	11.6	47	17.4	36	14.7
4.	Tampering with track (sabotage)	21	4.2	18	6.7	11	4.5
5.	Cause not determined	49	10.0	47	17.3	61	24.9
6.	Accidental* (boulders falling on track, land slips, breaches, collapse of bridge, sand on track and there is no failure of human element etc.)	—	—	54	19.9	39	15.9
7.	Tampering with track not amounting to sabotage	—	—	19	7.0	12	4.9
8.	Derailments resulting from train partings.	—	—	5	1.8	1	0.4
9.	Signal and telecommunication failures	—	—	3	1.1	4	1.6
10.	Electrical defects	—	—	Nil	—	4	1.6
11.	Other causes	157	32.2	35	12.9	32	13.1
12.	Causes not finalised	15	3.1	1	0.4	1	0.4
13.	Total:	489	100.0	271	100.0	245	100.0

*Causes listed against items 6 to 11 in the above Annexure were taken under the title 'Other Causes' by the Wanchoo Committee.

ANNEXURE LXXX

DERAILMENTS ON THE METRE GAUGE ACCORDING TO MISCELLANEOUS CAUSES
CLASSIFIED—RAILWAY-WISE; IN 5-YEAR PERIODS

Number of Derailments

S. No.	Miscellaneous causes	1963-64 to 1967-68								1968-69 to 1972-73						
		CR	ER	NR	NER	NFR	SR	SCR	SER	WR	All railways	CR	ER	NR	NER	NFR
1.	Obstruction of track (ballast not clear, tools left on track, goods falling from wagons, infringement of standard dimensions etc.)	5		14	65	42	36	5		17	184	1		2	8	15
2.	Obstruction caused by road vehicles	Nil		Nil	2	1	3	Nil		Nil	6	Nil		2	3	1
3.	Cattle run over	1		9	12	13	3	4		15	57	Nil		10	12	6
5.	Tampering with track (sabotage)	Nil		Nil	4	10	4	1		2	21	Nil		2	3	6
5.	Cause not determined	8	No metre gauge	3	13	10	6	1	No metre gauge	8	49	Nil	No metre gauge	5	2	2
6.	Accidental* (boulders falling on track, land slips, breaches, collapse of bridge, sand on track and there is no failure of human element etc.)	—		—	—	—	—	—		—	—	1		12	7	10
7.	Tampering with track not amounting to sabotage	—		—	—	—	—	—		—	—	1		1	6	1
8.	Derailments resulting from train partings	—		—	—	—	—	—		—	—	Nil		Nil	Nil	2
9.	Signal telecommunication failures	—		—	—	—	—	—		—	—	Nil		Nil	Nil	Nil
10.	Electrical defects	—		—	—	—	—	—		—	—	Nil		Nil	Nil	Nil
11.	Other causes	2		3	13	114	23	2		Nil	157	Nil		Nil	6	11
12.	Causes not finalised	1		Nil	Nil	3	1	6		4	15	Nil		Nil	Nil	Nil
13.	Total	17		29	109	193	76	19		46	489	3		34	47	73

*Causes listed against items 6 to 11 in the above annexure were taken under the title 'other causes' by the Wanchoo Committee.

Note : The South Central Railway was formed on 2-10-1966.

ANNEXURE LXXXI

Number of Derailments

S. No.	Miscellaneous causes	1968-69 to 1972-73						1973-74 to 1977-78								
		SR	SCR	SER	WR	All Railways	CR	ER	NR	NER	NFR	SR	SCR	SER	WR	All Railways
1.	Obstruction of track (ballast not clear, tools left on track, goods falling from wagons, infringement of standard dimensions etc. etc.)	Nil	4		6	36	1		3	10	6	4	5		8	37
2.	Obstruction caused by road vehicles	Nil	Nil		Nil	6	Nil		3	3	Nil	Nil	Nil		1	7
3.	Cattle run over	7	2		10	47	2		4	12	3	3	2		10	36
4.	Tampering with track (sabotage)	1	5		1	18	Nil		Nil	6	Nil	2	2		1	11
5.	Cause not determined	7	6		6	47	Nil		7	6	26	5	5		12	61
6.	Accidental* (boulders falling on track, land slips, breaches, collapse of bridge, sand on track and there is no failure of human element etc.)	4	14	No metre gauge	6	54	Nil	No metre gauge	9	7	8	2	4		9	39
7.	Tampering with track not amounting to sabotage	3	6	No metre gauge	1	19	Nil	No metre gauge	1	7	Nil	2	1	No metre gauge	1	12
8.	Derailments resulting from train partings	Nil	3		Nil	5	Nil		Nil	Nil	1	Nil	Nil		Nil	1
9.	Signal and telecommunication failures	Nil	2		1	3	Nil		Nil	3	Nil	Nil	Nil		1	4
10.	Electrical defects	Nil	Nil		Nil	Nil	Nil		1	1	2	Nil	Nil		Nil	4
11.	Other causes	14	Nil		4	35	1		Nil	7	5	12	1		6	32
12.	Causes not finalised	Nil	Nil		1	1	Nil		Nil	1	Nil	Nil	Nil		Nil	1
13.	Total	36	42		36	271	4		28	63	51	30	20		49	245

ANNEXURE LXXXII

STAFF HELD RESPONSIBLE FOR DERAILMENT ON ALL GAUGES—RAILWAYWISE : FROM 1968-69 TO 1977-78

A—Number of staff held responsible.
B—Number of staff in the category as a percentage of the total.

Category of staff	CR		ER		NR		NER		NFR		SR		SCR		SER		WR		All Railways	
	A	B	A	B	A	B	A	B	A	B	A	B	A	B	A	B	A	B	A	B
1. Station Masters, Assistant Station Masters and Cabin Assistant Station Masters	20	5.2	22	6.5	48	6.1	26	6.4	29	5.3	31	6.4	15	2.8	20	4.5	89	7.5	299	5.9
2. Switchmen	Nil	—	18	5.3	9	1.1	Nil	—	Nil	—	1	0.4	1	0.2	10	2.3	7	0.6	47	0.9
3. Pointsmen	7	1.8	1	0.3	11	1.4	9	2.3	19	3.4	13	2.7	2	0.4	Nil	—	54	4.6	116	2.3
4. Levermen and Cabinmen	11	2.9	15	4.4	23	2.9	18	4.6	6	1.1	9	1.8	6	1.1	4	0.9	19	1.6	111	2.2
5. Shunting staff and other yard staff	3	0.8	1	0.3	5	0.6	2	0.5	10	1.8	5	1.0	6	1.1	4	0.9	28	2.3	64	1.3
6. Guards	28	7.3	24	7.1	64	8.1	23	5.9	11	2.0	13	2.7	24	4.5	5	1.1	80	6.8	272	5.3
7. Drivers	117	30.6	62	18.3	220	27.9	124	31.9	142	25.7	166	34.1	214	40.3	139	31.6	274	23.2	1458	28.8
8. Firemen/Assistant Drivers (Diesel & Electric)	1	0.3	12	3.6	16	2.0	1	0.3	1	0.2	Nil	—	1	0.2	1	0.2	48	4.1	81	1.6
9. Motormen	2	0.5	3	0.9	Nil	—	Nil	—	Nil	—	Nil	—	Nil	—	Nil	—	Nil	—	5	0.1
10. Shunters	Nil	—	1	0.3	Nil	—	Nil	—	Nil	—	Nil	—	Nil	—	Nil	—	1	0.1	2	—
11. Permanent Way Inspectors	31	8.1	32	9.5	80	10.1	26	6.7	46	8.3	32	6.6	43	8.1	51	11.6	90	7.6	431	8.5
12. Permanent Way Mistries, Gangmates, Keymen and Gangemen	38	9.9	38	11.2	59	7.5	22	5.7	54	9.8	56	11.5	61	11.5	27	6.1	84	7.1	439	8.6
13. Loco Maintenance staff	10	2.7	4	1.2	41	5.2	22	5.6	32	5.8	18	3.7	22	4.1	14	3.2	58	5.0	221	4.3
14. Train examining staff and Carriage and wagon staff	66	17.3	87	25.8	165	20.9	96	24.7	160	28.9	96	19.7	66	12.5	146	33.3	255	21.5	1137	22.3
15. Signal Inspectors	1	0.3	2	0.6	5	0.6	Nil	—	Nil	—	Nil	—	1	0.2	Nil	—	3	0.3	12	0.2
16. Signal Maintainers and other Signalling staff	8	2.1	2	0.6	8	1.0	2	0.5	2	0.4	Nil	—	8	1.5	1	0.2	14	1.2	45	0.9
17. Other staff like the Commercial staff and Electric staff	39	10.2	14	4.1	36	4.6	19	4.9	50	7.3	46	9.4	61	11.5	18	4.1	77	6.5	350	6.9
18. Total	382	100.0	338	100.0	790	100.0	389	100.0	552	100.0	487	100.0	531	100.0	440	100.0	1181	100.0	5090	100.0

ANNEXURE-LXXXIII

CASUALTIES AND DAMAGES DUE TO DERAILMENTS ON ALL GAUGES—RAILWAY-WISE : FROM
1968-69 to 1977-78

Railway	Total number of de-rail-ments	Casualties			Damage i.e loss in lakhs of rupees
		Killed	Injured	Total	
Central	733	26	244	250	172.49
Eastern	392	13	238	251	113.58
Northern	840	27	92	119	80.16
North Eastern	584	95	214	309	42.37
Northeast Frontier	933	106	228	334	116.21
Southern	768	42	259	301	157.12
South Central	830	10	53	63	104.91
South Eastern	758	16	143	159	325.47
Western	940	33	129	162	123.62
All Railways	6778	368	1580	1948	1235.57

ANNEXURE-LXXXIV

NUMBER OF ACCIDENTS AT MANNED AND UNMANNED LEVEL CROSSINGS ON ALL GAUGES—
ALL RAILWAYS—YEAR WISE.

Year	Number of accidents at		
	Manned	Un-manned	All level crossings
1963-64	56	108	164
1964-65	38	95	133
1965-66	48	80	128
1966-67	27	77	104
1967-68	33	81	114
Total	202	441	643
Percentage of the total	31.4	68.6	100.0
1968-69	40	89	129
1969-70	35	76	111
1970-71	31	90	121
1971-72	37	81	118
1972-73	43	88	131
Total	186	424	610
Percentage of the total	30.5	69.5	100.0
1973-74	34	81	115
1974-75	44	96	140
1975-76	27	78	105
1976-77	25	71	96
1977-78	29	64	93
Total	159	390	549
Percentage of the total	29.0	71.0	100.0

ANNEXURE-LXXXV

NUMBER AND INCIDENCE OF ACCIDENTS AT MANNED AND UN-MANNED LEVEL CROSSINGS—
ALL RAILWAYS IN 5-YEAR PERIODS

A—Number of accidents

B—Incidence of accidents per million train
kilometres.

Broad Gauge

Year	Manned		Un-manned		All level crossings	
	A	B	A	B	A	B
1963-64 to 1967-68	110	0.08	202	0.14	312	0.22
1968-69 to 1972-73	114	0.07	189	0.12	304	0.20
1973-74 to 1977-78	98	0.06	170	0.10	268	0.16
Metre Gauge						
1963-64 to 1967-68	92	0.13	190	0.28	282	0.41
1968-69 to 1972-73	69	0.10	185	0.26	254	0.36
1973-74 to 1977-78	60	0.09	198	0.31	258	0.39
Narrow Gauge						
1963-64 to 1967-68	Nil	—	49	0.86	49	0.86
1968-69 to 1972-73	3	0.05	50	0.88	3	0.94
1973-74 to 1977-78	1	0.02	22	0.46	23	0.48

ANNEXURE-LXXXVI

NUMBER AND INCIDENCE OF ACCIDENTS AT MANNED AND UN-MANNED LEVEL CROSSINGS ON
THE BROAD GAUGE—ALL RAILWAYS; YEAR-WISE

A—Number of level crossing accidents

B—Incidence of level crossing accidents
per million train kilometres.

Year	Manned		Un-manned		All level crossings	
	A	B	A	B	A	B
1968-69	25	0.08	41	0.14	66	0.22
1969-70	23	0.07	37	0.12	60	0.19
1970-71	18	0.06	43	0.14	61	0.20
1971-72	21	0.07	28	0.09	49	0.16
1972-73	27	0.08	40	0.13	67	0.21
Total for 5 years	114	0.07	189	0.12	303	0.20
1973-4	20	0.07	41	0.14	61	0.20
1974-5	28	0.09	46	0.15	74	0.24
1975-76	17	0.05	38	0.11	55	0.16
1976-77	11	0.03	23	0.06	34	0.09
1977-78	22	0.06	22	0.06	44	0.12
Total for 5 years	98	0.06	170	0.10	268	0.16

ANNEXURE-LXXXVII

NUMBER AND INCIDENCE OF ACCIDENTS AT MANNED AND UNMANNED LEVEL CROSSINGS ON THE METRE GAUGE—ALL RAILWAYS; YEAR-WISE

A—Number of level crossing accidents
B—Incidence of level crossings accident per million train kilometres.

Year	Manned		Un-manned		All level crossings	
	A	B	A	B	A	B
1968—69	15	0·11	38	0·27	53	0·38
1969—70	12	0·08	32	0·22	44	0·30
1970—71	12	0·08	35	0·25	47	0·33
1971—72	16	0·11	40	0·28	56	0·40
1972—73	14	0·10	40	0·29	54	0·39
Total for 5 years	69	0·10	185	0·26	254	0·36
1973—74	14	0·12	46	0·39	60	0·51
1974—75	15	0·13	45	0·40	60	0·53
1975—76	10	0·08	36	0·27	46	0·35
1976—77	14	0·10	34	0·25	48	0·35
1977—78	7	0·05	37	0·27	44	0·33
Total for 5 years	60	0·09	198	0·31	258	0·41

ANNEXURE LXXXVIII

NUMBER AND INCIDENCE OF ACCIDENTS AT MANNED AND UNMANNED LEVEL CROSSINGS ON THE NARROW GAUGE—ALL RAILWAYS; YEAR WISE

A—Number of level crossing accidents
B—Incidence of level crossing accident⁰⁰ per million train kilometres.

Year	Manned		Un-manned		All level crossings	
	A	B	A	B	A	B
1968—69	Nil	—	10	0·86	10	0·8
1969—70	Nil	—	7	0·61	7	0·61
1970—71	1	0·09	12	1·07	13	1·15
1971—72	Nil	—	13	1·17	13	1·17
1972—73	2	0·18	8	0·72	10	0·90
Total for 5 years	3	0·05	50	0·88	53	0·94
1973—74	Nil	—	4	0·42	4	0·42
1974—75	1	0·11	5	0·55	6	0·66
1975—76	Nil	—	4	0·43	4	0·43
1976—77	Nil	—	4	0·43	4	0·43
1977—78	Nil	—	5	0·38	5	0·38
Total for 5 years	1	0·02	22	0·46	23	0·48

ANNEXURE-LXXXIX

RATE OF ACCIDENTS PER MANNED AND UN-MANNED LEVEL CROSSING—ALL RAILWAYS;
IN 5-YEAR PERIODS

Particulars	1963-64 to 1967-68	1968-69 to 1972-73	1973-74 to 1977-78
Manned Level Crossings			
1. Number of level crossings (Average over 5-year period)	16300	14811.5	14438.0
2. Number of accidents per year (Average over 5-year period)	40.4	37.2	31.8
3. Rate of accidents per manned level crossing	0.0025	0.0026	0.0022
Un-manned level crossings			
1. Number of level crossings (Average over 5-year period)	26085	23903.4	22408
2. Number of accidents per year (Average over 5-year period)	88.2	84.8	78.0
3. Rate of accidents per un-manned-level crossing	0.0034	0.0035	0.0035
Manned and Un-manned level crossings			
1. Total number of manned and un-manned level crossings (Average over 5 year period)	42385	38714.9	6846.0
2. Number of accidents per year (Average over 5-year period)	128.6	122	109.8
3. Rate of accidents per manned and un-manned level crossing	0.0030	0.0031	0.0030

ANNEXURE-XC

RATE OF ACCIDENTS PER MANNED/UN-MANNED LEVEL CROSSING—ALL RAILWAYS :
IN 5-YEAR PERIODS

Particular	Year	RAILWAYS									
		Central	Eastern	North- ern	North East- ern	North- east Frontier	South- ern	South Central	South East- ern	West- ern	Total
1	2	3	4	5	6	7	8	9	10	11	12
Manned level crossing	1963-64 to 1967-68	1905	1503	2929	2480	698	2536	1048	773	2628	16300
Number of level crossings (Average over 5-year period)	1968-69 to 1972-73	1538	1321.4	2910.3	1555.4	799	2002.4	1043.2	833.8	2809	14811.5
	1973-74 to 1977-78	1542.5	1332	2774.5	1433.6	726	1992.6	1042.6	881.2	2713	14438.0
Number of accidents per year (Average over 5-year period)	1963-64 to 1967-68	1.0	7.0	8.2	5.4	4.4	3.6	1.4	2.8	6.6	40.4
	1968-69 to 1972-73	2.8	3.6	10.2	7.2	3.4	2.6	1.4	2.6	3.4	37.2
	1973-74 to 1977-78	3.0	2	8.8	5.4	3.4	1.0	2.2	3.8	2.0	31.8

1	2	3	4	5	6	7	8	9	10	11	12
Rate of accidents per manned level crossing											
	1963-64 to 1967-68	0.0005	0.0046	0.0028	0.0022	0.006	0.0014	0.001	0.0036	0.0025	0.0025
	1968-69 to 1972-73	0.0018	0.0027	0.0035	0.0046	0.004	0.0013	0.001	0.0031	0.012	0.0026
	1973-74 to 1977-78	0.0019	0.0016	0.0032	0.0038	0.005	0.0005	0.002	0.0043	0.0007	0.002
Unmanned level crossings											
Number of level crossings (Average over 5-year period)											
	1963-64 to 1967-68	1894.0	1118	4599	1442	1517	5029	2149	3354	4983	26085
	1968-69 to 1972-73	1094.8	672.4	4858.3	1998.3	1690	3124	2147	3265.6	4963	23903.4
	1973-74 to 1977-78	932.3	787	3085.3	2322	1587	3048.6	2120.4	3528.4	4997	22408
Number of accidents per year (Average over 5-year period)											
	1963-64 to 1967-68	4.2	6.6	11.4	10.8	10.2	20.0	2.4	10.2	12.4	88.2
	1968-69 to 1972-73	2.6	1.8	19.2	8.4	6.4	16.9	8.4	14.0	6.4	84.8
	1973-74 to 1977-78	3.6	2.0	17.2	12.8	3.8	14.0	6.4	6.8	12.0	78.0
Rate of accidents per -unmanned level crossing											
	1963-64 to 1967-68	0.0022	0.0059	0.0025	0.0075	0.007	0.0040	0.001	0.0030	0.0025	0.0034
	1968-69 to 1972-73	0.0026	0.0023	0.0040	0.0042	0.004	0.0053	0.004	0.0019	0.0028	0.0035
	1973-74 to 1977-78	0.0030	0.0025	0.0056	0.0055	0.022	0.0046	0.003	0.0019	0.0024	0.035
Manned and unmannced level crossgs											
Total number of manned and un-manned level crossings (Average over-5-year period)											
	1963-64 to 1967-68	3799.0	2421	7528	3922	2215	7565	3197	4127	7611	42385
	1968-69 to 1972-73	2632.8	2083.8	7768.5	3553.7	2489	5126.4	3290.4	7772	7772	38714.9
	1973-74 to 1977-78	2474.8	2119	5859.8	3755.6	2312	5041.2	3163.0	4409.6	7710	46846.0
Number of accidents per year (Average over 5-year period)											
	1963-64 to 1967-68	52.2	13.6	19.6	16.2	14.6	23.6	3.8	13.0	19.0	128.6
	1968-69 to 1972-73	5.6	5.4	29.4	15.6	9.8	19.3	9.8	9.0	17.4	122.0
	1973-74 to 1977-78	6.6	4.2	26.0	18.2	7.2	16.8	8.6	14.0	14.0	109.8
Rate of accidents per manned and un-maned level crossing											
	1963-64 to 1967-68	0.0014	0.0056	0.0026	0.0041	0.007	0.0031	0.001	0.0031	0.0025	0.0030
	1968-69 to 1972-73	0.0021	0.0026	0.0038	0.0044	0.004	0.0038	0.003	0.0022	0.0022	0.0031
	1973-74 to 1977-78	0.0027	0.0019	0.0044	0.0048	0.003	0.0033	0.003	0.0024	0.0019	0.0030

ANNEXURE-XCI

NUMBER OF ACCIDENTS AT MANNED AND UNMANNED LEVEL CROSSING ON THE BROAD AND METRE
GUAGES TAKING PASSENGER AND OTHER TRAINS SEPARATELY—ALL RAILWAYS;
IN-5-YEAR PERIODS

Year	Number of Accidents					
	Passenger Trains			Other Trains		
	Manned	Unmanned	All level Crossings	Manned	Unmanned	All level Crossings
1963-64 to 1967-68	95	243	338	107	149	256
1968-69 to 1972-73	98	261	359	85	113	198
1973-74 to 1977-78	91	264	355	67	104	171

ANNEXURE-XCII

NUMBER OF ACCIDENTS AT MANNED AND UN-MANNED LEVEL CROSSINGS ON THE BROAD AND
METRE GUAGES TAKING PASSENGER AND OTHER TRAINS SEPARATELY ALL RAILWAYS ; YEAR
WISE

Year	Passenger trains						Other trains					
	Broad Guauge			Metre Guage			Broad Guauge			Metre Guage		
	Manned	Un-manned	Total	Manned	Un-manned	Total	Manned	Un-manned	Total	Manned	Un-manned	Total
1963-64	15	22	37	12	37	49	14	18	32	15	15	30
1964-65	1	30	31	17	22	39	8	23	31	12	15	27
1965-66	13	14	27	8	25	33	16	16	32	11	15	26
1966-67	9	25	34	1	23	24	10	17	27	7	4	11
1967-68	14	23	37	5	22	27	10	14	24	4	12	16
Total for 5 years	52	114	166	43	129	172	58	88	146	49	61	11
1968-69	15	28	43	8	25	33	10	13	23	7	13	20
1969-70z	11	24	36	8	23	31	12	12	24	4	9	13
1970-71	8	28	36	7	26	33	10	15	25	5	9	14
1971-72	9	20	29	11	32	43	12	8	20	5	8	13
1972-73	14	25	39	7	29	36	13	15	28	7	11	18
Total for 5 years	57	126	183	41	135	176	57	63	120	28	50	78
1973-74	14	29	43	6	37	43	6	12	18	8	9	17
1974-75	14	33	47	8	31	39	41	13	27	7	14	21
1975-76	10	23	33	7	29	36	7	15	22	3	7	10
1976-77	7	16	23	12	22	34	4	7	11	2	12	14
1977-78	10	16	26	3	28	31	12	6	18	4	9	13
Total for 5 years	55	117	172	36	147	183	43	53	96	24	51	75

ANNEXURE-XCIII

NUMBER AND INCIDENCE OF ACCIDENTS AT MANNED AND UN-MANNED LEVEL CROSSINGS ON THE
BROAD AND METRE GAUGES INVOLVING PASSENGER AND OTHER TRAINS ALL RAILWYS; YEAR-
WISE

A—Number of accidents

B—Incidence of accidents per million pas-
senger train/other train kilometres.

Years	Number of accidents					
	Manned		Un-manned		All level crossings	
	A	B	A	B	A	B
Passenger trains						
1963-64 to 1967-68	95	0.09	243	0.22	338	0.31
1968-69	23	0.10	53	0.23	76	0.33
1969-70	19	0.08	48	0.20	67	0.29
1970-71	15	0.06	54	0.23	69	0.29
1971-72	20	0.08	52	0.21	72	0.30
1972-73	21	0.09	54	0.22	75	0.31
Total for 5 years	98	0.07	261	0.22	359	0.30
1973-74	20	0.09	66	0.29	86	0.39
1974-75	22	0.10	64	0.29	86	0.39
1975-76	17	0.07	52	0.21	69	0.28
1976-77	19	0.07	38	0.14	57	0.22
1977-78	13	0.05	44	0.17	57	0.21
Total for 5 years	91	0.07	264	0.21	355	0.29
Other trains						
1963-64 to 1967-68	107	0.12	149	0.16	256	0.28
1968-69	17	0.08	26	0.13	43	0.21
1969-70	16	0.07	21	0.1	3	0.18
1970-71	15	0.07	24	0.11	39	0.18
1971-72	17	0.08	16	0.07	33	0.15
1972-73	20	0.09	26	0.12	46	0.21
Total of 5 years	85	0.08	113	0.11	198	0.19
1973-74	14	0.07	21	0.11	35	0.18
1974-75	21	0.10	27	0.3	48	0.24
1975-76	10	0.05	22	0.10	32	0.14
1976-77	6	0.03	19	0.08	25	0.11
1977-78	16	0.07	15	0.07	31	0.14
Total for 5 years	67	0.06	104	0.10	171	0.16

ANNEXURE-XCIV

INCIDENCE OF ACCIDENTS AT LEVEL CROSSINGS ON THE BROAD AND METRE GAUGES COMBINED INVOLVING PASSENGER AND OTHER TRAINS—RAILWAY-WISE IN 5-YEAR PERIODS

A—Number of level crossing accidents
 B—Incidence of accidents per million passenger train/other train/total train kilometres.

Railway	Passenger Trains						Other Trains						Total					
	1963-64 to 1967-68		1968-69 to 1972-73		1973-74 to 1977-78		1963-74 to 1967-68		1968-69 to 1972-73		1973-74 to 1977-78		1963-64 to 1967-68		1968-69 to 1972-73		1973-74 to 1977-78	
	A	B	A	B	A	B	A	B	A	B	A	B	A	B	A	B	A	B
Central	15	0.1	14	0.09	15	0.08	8	0.05	13	0.09	13	0.08	23	0.07	27	0.09	27	0.0
Eastern	24	0.18	13	0.09	14	0.09	44	0.31	14	0.10	7	0.05	68	0.25	27	0.10	21	0.0
Northern	1	0.31	93	0.45	81	0.39	35	0.25	3	0.34	49	0.31	9	0.27	14	0.40	139	0.30
North Eastern	51	0.57	62	0.67	0.71	0.71	30	0.69	16	0.28	25	0.56	81	0.56	78	0.52	91	0.6
Northeast Frontier	31	0.73	20	0.4	23	0.7	26	0.76	20	0.0	8	0.20	7	0.64	40	0.2	31	0.3
Southern	80	0.39	79	0.4	4	0.34	34	0.31	19	0.20	16	0.18	114	0.3	98	0.36	70	0.2
South Central	12	0.36	29	0.26	32	0.2	7	0.26	18	0.17	11	0.11	19	0.30	47	0.22	43	0.1
South Eastern	21	0.24	18	0.21	29	0.31	38	0.31	18	0.11	20	0.12	69	0.27	36	0.14	49	0.1
Western	43	0.26	31	0.17	42	0.22	34	0.23	27	0.1	22	0.13	77	0.24	8	0.17	64	0.1
All Railways	338	0.31	359	0.30	385	0.29	256	0.28	198	0.19	171	0.16	594	0.28	557	0.25	526	0.2

Note :—South Central Railway was formed on 2-10-1966. The figures are from 2-10-1966 to 31-3-1968.

ANNEXURE-XCV

NUMBER OF ACCIDENTS AT MANNED AND UN-MANNED LEVEL CROSSINGS ON ALL GAUGES—RAILWAY-WISE; FROM 1968-69 to 1977-78

Railway	Number of accidents at			Percentage of the total
	Manned level crossings	Unmanned level crossings	All level crossings	
Central	29	32	61	5.3
Eastern	29	19	48	4.1
Northern	95	182	277	23.9
North Eastern	63	106	169	14.6
Northeast Frontier	34	51	85	7.3
Southern	18	154	172	14.8
South Central	18	74	92	7.9
South Eastern	32	66	98	8.5
Western	27	130	157	13.6
All Railways	345	814	1159	100.0

ANNEXURE XCVI

NUMBER OF ACCIDENTS AT MANNED AND UNMANNED LEVEL CROSSINGS INVOLVING PASSENGER TRAINS—GAUGE-WISE : RAILWAY-WISE AND YEAR-WISE.

Railway	Manned											Un-manned						
	1968-69	1969-70	1970-71	1971-72	1972-73	total for 5 years	1973-74	1974-75	1975-76	1976-77	1977-78	Total for 5 years	1968-69	1969-70	1970-71	1971-72	1972-73	Total for 5 years
BROAD GAUGE																		
Central	3	2	1	—	—	6	4	—	—	1	2	7	3	—	—	3	1	7
Eastern	2	1	2	1	3	9	3	1	3	1	—	8	—	1	—	3	—	4
Northern	7	5	2	4	7	25	6	7	3	—	6	22	10	14	14	6	13	57
North Eastern	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Northeast Frontier	—	—	1	—	—	1	—	—	2	—	—	2	1	—	1	—	—	2
Southern	—	2	—	—	1	3	—	—	—	—	—	—	—	3	3	2	5	18
South Central	—	—	—	1	2	3	—	2	1	1	1	5	4	2	6	2	1	15
South Eastern	1	—	—	3	1	5	1	2	3	3	1	10	2	3	4	1	3	13
Western	2	1	2	—	—	5	—	—	—	1	—	1	3	2	—	3	2	10
All Railways	15	11	8	9	14	57	14	14	10	7	10	55	28	25	28	20	25	126
METRE GAUGE																		
Central	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	1	1
Northern	—	—	—	1	—	1	1	—	1	—	—	2	1	2	1	4	2	10
North Eastern	6	6	7	6	4	29	2	3	2	7	1	15	6	6	6	9	6	33
Northeast Frontier	1	—	—	—	2	3	1	2	3	4	1	11	2	3	3	3	3	14
Southern	1	2	—	2	—	5	—	1	—	1	1	3	6	12	12	9	14	53
South Central	—	—	—	—	1	1	1	2	—	—	—	3	3	—	2	2	3	10
Western	—	—	—	2	—	2	1	—	1	—	—	2	6	—	2	5	1	14
All Railways	8	8	7	11	7	41	6	8	7	12	3	36	25	23	26	32	29	135
NARROW GAUGE																		
Central	—	—	—	—	—	—	—	—	—	—	—	—	—	1	—	—	—	1
Eastern	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Northern	—	—	—	—	—	—	—	—	—	—	—	—	—	1	—	—	—	1
Northeast Frontier	—	—	—	—	—	—	—	—	—	—	—	—	—	—	2	4	1	7
Southern	—	—	—	—	—	—	—	—	—	—	—	—	1	1	Nil	—	—	2
South Central	—	—	—	—	—	—	—	—	—	—	—	—	—	1	—	1	—	2
South Eastern	—	—	—	—	—	—	—	—	—	—	—	—	2	—	—	2	1	5
Western	—	—	—	—	1	1	—	—	—	—	—	—	5	2	8	5	4	24
All Railways	—	—	—	—	1	1	—	—	—	—	—	—	8	6	10	12	6	42

ANNEXURE XCVI—Contd.

Railway	Un-manned						Total manned and un-manned											
	1973-74	1974-75	1976-76	1976-77	1977-78	Total for 5 years	1968-69	1969-70	1970-71	1971-72	1972-73	Total for 5 years	1973-75	1974-76	1975-76	1976-77	1977-78	Total for 5 years
	BROAD GAUGE																	
Central	—	2	3	1	1	7	6	2	1	3	1	13	4	2	3	2	3	14
Eastern	1	2	1	1	1	6	2	2	2	4	3	13	4	3	4	2	1	14
Northern	18	13	9	2	6	48	17	19	16	10	20	82	24	20	12	2	12	70
North																		
Eastern	—	—	—	—	1	1	—	—	—	—	—	—	—	—	—	—	1	1
Northeast																		
Frontier	1	1	1	—	—	3	1	—	2	—	—	3	1	3	1	—	—	5
Southern	2	6	2	1	1	12	5	4	3	2	6	21	2	6	2	1	1	12
South Central	4	3	3	3	2	15	4	2	6	3	3	18	4	5	4	4	3	20
South																		
Eastern	2	4	4	7	2	19	3	3	4	4	4	18	3	6	7	10	3	29
Western	1	2	—	1	2	6	5	3	2	3	2	15	1	2	—	2	2	7
All Railways	29	33	23	16	16	117	43	36	36	29	39	183	43	47	33	23	26	172
METRE GAUGE																		
Central	—	—	—	—	1	—	1	—	—	—	—	1	—	—	—	—	—	—
Northern	3	1	1	2	2	9	1	2	1	5	2	11	4	1	2	2	2	11
North																		
Eastern	11	11	13	9	6	50	12	12	13	15	10	62	13	14	15	16	7	65
Northeast																		
Frontier	1	—	4	2	—	7	3	3	3	3	5	17	2	2	7	5	1	18
Southern	10	8	5	5	11	39	7	14	12	11	14	58	10	9	9	6	12	42
South																		
Central	2	3	1	1	2	9	3	—	2	2	4	11	3	5	1	1	12	12
Western	10	8	5	3	7	33	6	—	2	7	1	16	11	8	6	3	7	35
All Railways	37	31	29	22	28	147	33	31	33	43	36	176	43	39	36	34	31	183
NARROW GAUGE																		
Central	—	1	1	1	2	5	—	1	—	—	—	1	—	1	1	1	2	5
Eastern	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Northern	—	—	—	—	—	—	—	1	—	—	—	1	—	—	—	—	—	—
Northeast																		
Frontier	1	—	1	—	1	3	—	—	2	4	1	7	1	—	1	—	1	3
Southern	—	—	—	—	—	—	1	1	—	—	—	2	—	—	—	—	—	—
South																		
Central	—	—	—	—	—	—	—	1	—	1	—	2	—	—	—	—	—	—
South																		
Eastern	—	1	—	1	1	3	2	—	—	2	1	5	—	1	—	1	1	3
Western	2	2	1	1	—	6	5	2	8	5	5	25	2	2	1	1	—	6
All Railways	3	4	3	3	4	17	8	6	10	12	7	43	3	4	3	3	4	17

ANNEXURE XCVII

NUMBER OF ACCIDENTS AT MANNED AND UN-MANNED LEVEL CROSSINGS INVOLVING
OTHER TRAINS—GAUGE WISE RAILWAY-WISE AND YEAR-WISE

Railway	Manned											Un-manned						
	1968- 69	1969- 70	1970- 71	1971- 72	1972- 73	Total for 5 years	1973- 74	1974- 75	1975- 76	1976- 77	1977- 78	Total for 5 years	1968- 69	1969- 70	1970- 71	1971- 72	1972 73	Total for 5 years
BROAD GAUGE																		
Central	3	—	2	1	2	8	1	2	2	1	1	7	1	1	—	—	1	3
Eastern	1	3	1	2	2	9	1	2	—	—	—	3	2	1	2	—	—	5
Northern	5	3	4	4	5	21	2	4	3	1	6	17	5	2	7	4	4	22
North																		
Eastern	—	—	—	—	—	—	—	—	—	—	—	—	—	1	—	—	—	1
Northeast																		
Frontier	1	1	1	1	—	4	—	—	—	1	1	1	—	1	—	—	—	1
Southern	—	—	1	1	—	2	—	—	1	—	—	1	—	2	1	—	3	6
South																		
Central	—	—	—	1	—	1	—	—	—	1	1	2	2	1	1	2	3	9
South																		
Eastern	—	3	—	1	4	8	1	5	—	1	2	9	2	1	4	1	2	10
Western	—	2	1	1	—	4	—	1	1	—	1	3	1	2	—	1	2	6
All Railways	10	12	10	12	13	57	6	14	7	4	12	43	13	12	15	8	15	63
METRE GAUGE																		
Central	—	—	—	—	—	—	—	—	—	—	—	—	1	—	—	1	—	2
Northern	2	1	—	—	1	4	—	2	—	—	1	3	1	2	—	1	2	6
North																		
Eastern	1	—	2	1	3	7	3	3	3	—	3	12	1	1	2	1	3	8
Northeast																		
Frontier	3	2	1	—	3	9	1	1	—	1	—	3	2	1	2	—	1	6
Southern	—	—	1	2	—	3	1	—	—	—	—	1	3	1	3	—	1	8
South																		
Central	—	1	—	1	—	2	—	—	—	1	—	1	1	3	—	2	—	6
Western	1	—	1	1	—	3	3	1	—	—	—	4	4	7	2	3	4	14
All Railways	7	4	5	4	7	28	8	7	3	2	4	24	13	9	9	8	11	50
NARROW GAUGE																		
Central	—	—	—	—	—	—	—	1	—	—	—	1	—	—	—	—	—	—
Eastern	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Northern	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Northeast																		
Frontier	—	—	—	—	—	—	—	—	—	—	—	—	—	—	1	1	—	2
Southern	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
South																		
Central	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
South																		
Eastern	—	—	—	—	—	—	—	—	—	—	—	—	1	1	1	—	1	4
Western	—	—	1	—	1	2	—	—	—	—	—	—	1	—	—	—	1	2
All Railways	—	—	1	—	1	2	—	1	—	—	—	2	2	1	2	1	2	8

ANNEXURE XCVII—Contd.

OTHER TRAINS

Railway	Un-manned						Total manned and un-manned											
	1973-	1974-	1975-	1976-	1977	Total	1968-	1969-	1970-	1971-	1972-	Total	1973-	1974-	1975-	1976-	1977-	Total
	74	75	76	77	78		69	70	71	72	73		5	74	75	76	77		78	5
						years						years						years
BROAD GAUGE																		
Central	2	1	—	2	1	6	4	1	2	1	3	11	3	3	2	3	2	13
Eastern	—	1	2	—	1	4	3	4	3	2	2	14	1	3	2	—	1	7
Northern	4	6	6	2	—	18	10	5	11	8	9	43	7	10	9	3	6	35
North																		
Eastern	—	—	—	—	—	—	—	1	—	—	—	1	—	—	—	—	—	—
Northeast																		
Frontier	—	—	1	—	—	1	1	2	1	1	—	5	—	—	1	—	1	2
Southern	2	2	1	—	—	5	—	2	2	1	3	8	2	2	2	—	—	6
South																		
Central	—	1	1	—	—	2	2	1	1	3	3	10	—	1	1	1	1	4
Eastern	3	1	2	3	2	11	2	4	4	2	6	18	4	6	2	4	4	20
Western	1	1	2	—	2	6	1	4	1	2	2	10	1	2	3	—	3	9
All Railways	12	13	15	7	6	53	23	24	25	20	28	120	18	27	22	11	18	96
METRE GAUGE																		
Central	—	—	—	—	—	—	1	—	—	1	—	2	—	—	—	—	—	—
Northern	1	4	2	1	3	11	3	3	—	1	3	10	1	6	2	1	4	14
North																		
Eastern	3	2	3	3	2	13	2	1	4	2	6	15	6	5	6	3	5	25
Northeast																		
Frontier	—	1	1	1	—	3	5	3	3	—	4	15	1	2	1	2	—	6
Southern	2	3	—	3	1	9	3	1	4	2	1	11	3	3	—	3	1	10
South																		
Central	2	2	—	2	—	6	1	4	—	3	—	8	2	2	—	3	—	7
Western	1	2	1	2	3	9	5	1	3	4	4	17	4	3	1	2	3	13
All Railways	9	14	7	12	9	51	20	13	14	13	18	78	17	21	10	14	13	75
NARROW GAUGE																		
Central	—	—	—	—	—	—	—	—	—	—	—	—	—	1	—	—	—	1
Eastern	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Northern	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Northeast																		
Frontier	—	1	1	—	—	2	—	—	1	1	—	2	—	1	1	—	—	2
Southern	1	—	—	—	1	2	—	—	—	—	—	—	1	—	—	—	1	2
South																		
Central	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
South																		
Eastern	—	—	—	1	—	1	1	1	1	—	1	4	—	—	—	1	—	1
Western	—	—	—	—	—	—	1	—	1	—	2	4	—	—	—	—	—	—
All Railways	1	1	1	1	1	5	2	1	3	1	3	10	1	2	1	1	1	6

ANNEXURE XCVIII

ACCIDENTS AT MANNED LEVEL CROSSING ON ALL GAUGES—CAUSE-WISE ALL RAILWAYS; FROM 1968-69 TO 1977-78

Causes of accidents	Number of accidents	Percentage of total
1. Due to open or improperly closed or secured gates	181	52.5
2. Road vehicles coming over the level crossing where barriers on the other side had been closed	22	6.4
3. Road vehicles crashing into the lifting or swing type gates or breaking the lock and opening it	73	21.2
4. Road vehicles breaking or opening the chains at a level crossing closed by chains	15	4.3
5. Road vehicles left at level crossings or infringing the track	20	5.8
6. Disregard of signal by drivers	15	4.3
7. Other causes	19	5.5
8. Total	345	100.0

ANNEXURE XCIX

ACCIDENTS AT MANNED LEVEL CROSSINGS ON ALL GAUGES—CAUSE-WISE, RAILWAY-WISE; FROM 1968-69 TO 1977-78

Cause of accidents	Number of Accidents									Total number of accidents for all Railways	Percentage of the total
	RAILWAYS										
	C	E	N	NE	NF	S	SC	SE	W		
1	2	3	4	5	6	7	8	9	10	11	12
1. Due to open or improperly closed or secured gates	12	6	49	40	26	8	5	13	22	181	52.5
2. Road vehicles coming over the level crossing where barriers on the other side had been closed	6	2	5	Nil	2	3	Nil	4	Nil	22	6.4
3. Road vehicles crashing into the lifting or swing type gates or breaking the lock and opening it	1	2	26	16	1	7	9	9	2	73	21.2
4. Road vehicles breaking or opening the chains at a level crossing closed by chains	Nil	8	2	2	1	Nil	2	Nil	Nil	15	4.3
5. Road vehicles left at level crossings or infringing the track	2	5	7	3	1	Nil	1	Nil	1	20	5.8
6. Disregard of signals by drivers	2	6	3	1	Nil	Nil	1	2	Nil	15	4.3
7. Other causes	6	Nil	3	1	3	Nil	Nil	4	2	19	5.5
8. Total	29	29	95	63	34	18	18	32	27	345	100.0

ANNEXURE C

ACCIDENTS AT LEVEL CROSSINGS ACCORDING TO THE TYPE OF THE ROAD VEHICLE INVOLVED—ALL GAUGES—ALL RAILWAYS;
STATE-WISE; FROM 1968-69 TO 1977-78

A—Number of accidents at level crossings
B—Number of accidents taken as a percentage of the total number of accidents at all level crossings in the State.

State-wise distribution of level crossings																					
S. Number of level crossings in 1977-78 No.		Andhra Pradesh	Assam	Bihar	Gujarat	Haryana	Himachal Pradesh	Jammu & Kashmir	Karnataka	Kerala	Madhya Pradesh	Maharashtra	Orissa	Punjab	Rajasthan	Tamil Nadu	Uttar Pradesh	West Bengal	Pondicherry	Delhi	Total
1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22
1. Manned level crossings		876	378	1344	1248	1350*	NA	NA	549	265	1055	1000	192	NA	1150*	1109	1219*	1166	17	NA	12918
2. Un-manned level crossings		1855	635	1555	3727	3730*	NA	NA	1109	222	1781	1235	1040	NA	1966*	1688	1919*	1407	14	NA	23911
3. Total number of manned and un-manned level crossings		2731	1013	2899	4975	5080*	NA	NA	1658	487	2836	2253	1242	NA	3116*	2797	3138*	2573	31	NA	36829
Number of accidents																					
Type of vehicle		A	B	A	B	A	B	A	B	A	B	A	B	A	B	A	B	A	B	A	B
1		2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21
1. Minor trucks		12	16.7	20	40.5	34	42.0	52	48.6	21	39.6	3	100.0	1	50.0	20	32.3	4	20.0	34	45.9
2. Passenger buses		5	6.9	6	14.0	6	7.4	13	12.2	6	11.3	Nil	—	Nil	—	6	9.7	2	10.0	8	10.8
3. Taxis, cars and jeeps		8	11.1	6	13.9	12	14.8	21	19.6	8	15.1	Nil	—	Nil	—	1	1.6	10	50.0	8	10.8
4. Tractors		3	4.2	3	7.0	7	8.6	14	13.1	12	22.6	Nil	—	Nil	—	6	9.7	Nil	—	4	5.4
5. Tongas		Nil	—	Nil	—	Nil	—	1	0.9	1	1.9	Nil	—	1	50.0	1	1.6	Nil	—	Nil	—
6. Bullock cart		43	59.7	8	18.6	20	24.7	6	5.6	3	5.7	Nil	—	Nil	—	21	33.9	3	15.0	17	23.0
7. Others		1	1.4	Nil	—	2	2.5	Nil	—	2	3.8	Nil	—	Nil	—	7	11.2	1	5.0	3	4.1
8. Total		72	100.0	43	100.0	81	100.0	107	100.0	53	100.0	3	100.0	2	100.0	62	100.0	20	100.0	74	100.0
Number of accidents—contd.																					
Type of vehicle		A	B	A	B	A	B	A	B	A	B	A	B	A	B	A	B	A	B	A	B
1		22	23	24	25	26	27	28	29	30	31	32	33	34	35	36	37	38	39	40	41
1. Motor trucks		18	35.3	14	37.8	23	20.1	22	48.9	16	17.4	95	41.9	44	62.0	Nil	—	1	20.0	434	37.5
2. Passenger buses		4	7.8	3	8.1	10	8.7	6	13.3	6	6.5	14	6.2	7	9.9	Nil	—	Nil	—	102	8.8
3. Taxis, cars and jeeps		6	11.8	5	13.5	14	12.3	5	11.1	3	3.3	12	5.3	10	14.1	Nil	—	Nil	—	120	11.1
4. Tractors		7	13.7	Nil	—	51	44.7	5	11.1	9	9.8	47	20.7	1	1.4	Nil	—	3	60.0	172	14.8
5. Tongas		Nil	—	Nil	—	3	2.6	Nil	—	Nil	—	2	0.9	1	1.4	Nil	—	1	20.0	11	1.0
6. Bullock cart		16	31.4	14	37.8	13	11.4	6	13.3	56	60.9	54	23.7	4	5.6	Nil	—	Nil	—	284	24.5
7. Others		Nil	—	1	2.8	Nil	—	1	2.2	2	2.1	3	1.3	4	5.6	Nil	—	Nil	—	27	2.3
8. Total		51	100.0	37	100.0	114	100.0	45	100.0	92	100.0	227	100.0	71	100.0	Nil	—	5	100.0	1159	100.0

NOTE : *Northern Railway has not furnished the number of level crossings on their system State-wise. Therefore, the number of level crossing shown under the States of Haryana, Rajasthan and Uttar Pradesh does not give the complete position of level crossings in these States.
NA—Denotes information not available.

ANNEXURE CI

ACCIDENTS AT MANNED LEVEL CROSSINGS PROVIDED/NOT PROVIDED WITH TELEPHONE—ALL RAILWAYS;
YEAR-WISE.

Year	Number of accidents at level crossings		
	Provided with telephones	Not provided with telephones	Total*
1968-69	10	24	34
1969-70	7	19	26
1970-71	69	18	27
1971-72	10	25	35
1972-73	14	22	36
1973-74	15	20	33
1974-75	14	27	41
1975-76	8	15	23
1976-77	10	14	24
1977-78	15	17	32
Total	112	201	313
Total Number of level crossings	7031	4096	11127*
Rate of accidents per level crossing	0.0159	0.0491	0.0281

Note:—*Figure for all Railways except the Eastern Railway who did not furnish the information.

@Figures of total number of manned level crossings provided with/not provided with telephones have been extracted from Annexure XXV in part I of our Report, excluding those on the Eastern Railway.

ANNEXURE CII

CATEGORIES OF STAFF HELD RESPONSIBLE FOR CAUSING ACCIDENTS AT LEVEL CROSSINGS—RAILWAY-WISE ; FROM 1968-69 TO 1977-78

Category of staff	Number of Staff held responsible.									
	C.Rly.	E.Rly.	N.Rly.	NE.Rly.	NF. Rly.	S.Rly.	SC. Rly.	SE. Rly.	W. Rly.	All Railways
1. Gatemen—Traffic	2	4	9	10	5	2	Nil	3	4	39
2. Gatemen—Engineering	6	8	37	27	14	4	4	13	5	118
3. Loco running staff	3	8	3	2	3	Nil	1	2	Nil	23
4. Station staff	2	2	4	3	5	2	2	Nil	2	21
5. Other staff	Nil	Nil	Nil	Nil	Nil	Nil	Nil	Nil	Nil	Nil
6. Total	14	22	52	42	27	8	7	18	11	201

ANNEXURE CIII

INCIDENCE OF FIRES IN TRAINS ON THE BROAD AND METRE GAUGES—ALL RAILWAYS; YEARS-WISE

YEAR	BROAD GAUGE		METRE GAUGE	
	Number	Rate per million train kilometres	Number	Rate per million train kilometres
1963-64	77	0.28	35	0.26
1964-65	21	0.08	10	0.07
1965-66	32	0.11	10	0.07
1966-67	34	0.11	19	0.13
1967-68	26	0.09	16	0.11
Average for 5-years	38	0.13	18	0.13
1968-69	37	0.12	10	0.07
1969-70	33	0.11	10	0.07
1970-71	9	0.03	2	0.01
1971-72	18	0.06	—	—
1972-73	28	0.09	4	0.03
Average for 5-years	25	0.08	5.2	0.035
1973-74	10	0.03	1	0.01
1974-75	18	0.06	4	0.03
1975-76	19	0.05	8	0.06
1976-77	12	0.03	4	0.03
1977-78	11	0.03	3	0.02
Average for 5-years	14	0.04	4	0.03

ANNEXURE CIV

INCIDENCE OF FIRES IN TRAINS ON THE BROAD AND METRE GAUGES—RAILWAY-WISE : DURING 1968-69 TO 1977-78

Railway	Broad Gauge		Metre Gauge	
	Number	Rate per million train kilometres	Number	Rate per million train kilometres
Central	53	0.09	—	—
Eastern	24	0.04	—	—
Northern	29	0.05	2	0.01
North Eastern	—	—	16	0.06
Northeast Frontier	—	—	3	0.02
Southern	6	0.03	2	0.01
South Central	29	0.10	10	0.06
South Eastern	13	0.02	—	—
Western	41	0.11	13	0.04
All Railways	195	0.06	46	0.03

ANNEXURE CV

INCIDENCE OF FIRES IN PASSENGER AND GOODS TRAINS ON THE BROAD AND METRE GAUGES—
ALL RAILWAYS ; YEAR-WISE

A—Cases of fires in trains

B—Incidence of fires in trains per million train kilometres.

Year	Broad Gauge				Metre Gauge			
	Passenger trains		Other trains		Passenger trains		Other trains	
	A	B	A	B	A	B	A	B
1963-64	53	0.41	24	0.19	26	0.35	9	0.18
1964-65	15	0.11	6	0.05	9	0.11	1	0.02
1965-66	20	0.14	12	0.09	10	0.11	—	—
1966-67	26	0.18	8	0.06	18	0.22	1	0.02
1967-68	18	0.12	8	0.06	15	0.18	1	0.02
Total for 5-Years	132	0.19	58	0.09	78	0.19	12	0.05
1968-69	35	0.23	2	0.01	9	0.11	1	0.02
1969-70	27	0.15	6	0.03	10	0.12	—	—
1970-71	8	0.05	1	0.00	2	0.02	—	—
1971-72	14	0.08	4	0.02	—	—	—	—
1972-73	17	0.10	11	0.06	4	0.04	—	—
Total for 5-years	101	0.13	24	0.03	25	0.06	1	0.003
1973-74	8	0.05	2	0.01	1	0.01	—	—
1974-75	15	0.09	3	0.01	2	0.03	2	0.04
1975-76	14	0.08	5	0.02	5	0.06	3	0.06
1976-77	12	0.06	—	—	4	0.05	—	—
1977-78	9	0.04	2	0.01	3	0.04	—	—
Total for 5-years	58	0.07	12	0.01	15	0.04	5	0.02

ANNEXURE CVI

NUMBER OF CASES OF FIRES IN PASSENGER AND GOODS TRAINS ON THE BROAD AND METRE GAUGES—
RAILWAY-WISE ; DURING 1968-69 TO 1977-78

Railway	Broad Gauge			Metre Gauge			Broad and Metre Gauges		
	Passenger trains	Goods trains	Total	Passenger trains	Goods trains	Total	Passenger trains	Goods trains	Total
Central	48	5	53	—	—	—	48	5	53
Eastern	22	2	24	—	—	—	22	2	24
Northern	25	4	29	2	—	2	27	4	31
North Eastern	—	—	—	15	1	16	15	1	16
Northeast Frontier	—	—	—	3	—	3	3	—	3
Southern	4	2	6	2	—	2	6	2	8
South Central	20	9	29	10	—	10	30	9	39
South Eastern	12	1	13	—	—	—	12	1	13
Western	28	13	41	8	5	13	36	18	54
All Railways	159	36	195	40	6	46	199	42	241

FIRES IN PASSENGER TRAINS ON THE BROAD AND METRE GAUGES

Causes		Central		Eastern		Northern		North Eastern	
		1963-64 to 1967-68	1968-69 to 1977-78	1963-64 to 1967-68	1968-69 to 1977-78	1963-64 to 1967-68	1968-69 to 1977-78	1963-64 to 1967-68	1968-69 to 1977-78
		1. Defect in or failure of electrical equipment or short circuiting of electrical wires	A	4	12	14	6	8	4
	B	12.5	25.0	40.0	27.3	53.3	14.8	22.2	26.7
2. Sparks from engines	A	Nil	Nil	6	1	Nil	1	4	Nil
	B	—	—	71.1	4.5	—	3.7	22.2	—
3. Negligence of passengers and other outsiders e.g., bidi and cigarette ends thrown carelessly, lighting of fires in carriages, carrying of inflammable goods etc.	A	3	8	9	10	Nil	13	7	1
	B	9.4	16.6	25.7	45.5	—	48.2	39.0	6.7
4. Negligence of railway staff, e.g., improper examination of loading of explosives, dangerous or inflammable goods, rough shunting, wrong marshalling etc.	A	1	2	1	1	Nil	1	Nil	2
	B	3.1	4.2	2.9	4.5	—	3.7	—	13.3
5. Accidental e.g. wire contacts due to pilferage of fittings, overheating of paints, etc.	A	3	2	4	2	3	1	Nil	1
	B	9.4	4.2	11.4	9.1	20.0	3.7	—	6.7
6. Causes not determined	A	21	24	1	2	4	6	3	7
	B	65.6	50.0	2.9	9.1	26.7	22.2	16.6	46.6
7. Cases not finalised	A	Nil	Nil	Nil	Nil	Nil	1	Nil	Nil
	B	—	—	—	—	—	3.7	—	—
8. Total	A	32	48	35	22	15	27	18	15

ANNEXURE

FIRES IN OTHER TRAINS ON THE BROAD AND METRE GAUGES

Causes		Central		Eastern		Northern		North Eastern	
		1963-64 to 1967-68	1968-69 to 1977-78	1963-64 to 1967-68	1968-69 to 1977-78	1963-64 to 1967-68	1968-69 to 1977-78	1963-64 to 1967-68	1968-69 to 1977-78
		1. Defect in or failure of electrical equipment or short circuiting of electrical wires	A	Nil	11	Nil	Nil	1	1	Nil	Nil
	B	—	20.0	—	—	16.7	25.0	—	—
2. Sparks from engine	A	1	Nil	Nil	Nil	Nil	1	Nil	1
	B	7.2	—	—	—	—	25.0	—	100.0
3. Negligence of passengers and other outsiders e.g. bidi and cigarette ends thrown carelessly, lighting of fires in carriages, carrying of inflammable goods etc.	A	Nil	1	4	Nil	2	1	Nil	Nil
	B	—	20.0	66.7	—	33.3	25.0	—	—
4. Negligence of railway staff e.g., improper examination of loading of explosives, dangerous or inflammable goods, rough shunting, wrong marshalling etc.	A	3	1	2	Nil	1	Nil	Nil	Nil
	B	21.4	20.0	33.3	—	16.7	—	—	—
5. Accidental e.g., wire contacts due to pilferage of fittings, over heating of paint etc.	A	Nil	Nil	Nil	2	1	Nil	Nil	Nil
	B	—	—	—	100.0	16.7	—	—	—
6. Causes not determined	A	10	2	Nil	Nil	1	1	Nil	Nil
	B	71.4	40.0	—	—	16.6	25.0	—	—
7. Cases not finalised	A	Nil	Nil	Nil	Nil	Nil	Nil	Nil	Nil
	B	—	—	—	—	—	—	—	—
8. Total	A	14	5	6	2	6	4	Nil	1

CVII

ACCORDING TO THE NATURE OF CAUSE—RAILWAY-WISE ; IN 5-YEAR PERIODS.

A—Number of cases of fires in passenger trains.

B—Number of cases of fires due to cause taken as a percentage of the total on that Railway.

Northeast Frontier		Southern		South Central		South Eastern		Western		All Railways	
1963-64 to 1967-68	1968-69 to 1977-78	1963-64 to 1967-68	1968-69 to 1977-78	1963-64 to 1967-68	1968-69 to 1977-78	1963-64 to 1967-68	1968-69 to 1977-78	1963-64 to 1967-68	1968-69 to 1977-78	1963-64 to 1967-68	1968-69 to 1977-78
Nil	Nil	19	1	Nil	1	16	8	2	10	67	46
—	—	34.0	16.6	—	3.3	84.1	66.5	18.0	27.7	31.9	23.1
Nil	Nil	8	1	3	2	Nil	1	1	1	22	7
—	—	14.3	16.6	23.1	6.7	—	8.4	9.0	2.7	10.5	3.5
10	2	6	3	Nil	1	1	2	2	2	38	42
91.0	66.7	10.7	50.2	—	3.3	5.3	6.7	18.0	5.5	18.1	21.1
Nil	Nil	18	Nil	5	3	Nil	Nil	Nil	1	25	10
—	—	32.1	—	38.4	10.0	—	—	—	2.7	11.9	5.0
1	1	4	1	Nil	12	1	Nil	Nil	2	16	22
9.0	33.3	7.1	16.6	—	40.0	5.3	—	—	5.5	7.6	11.0
Nil	Nil	5	Nil	4	11	1	1	6	20	41	71
—	—	1.0	—	30.8	36.7	5.3	8.4	55.0	55.5	19.5	35.6
Nil	Nil	Nil	Nil	1	Nil	Nil	Nil	Nil	Nil	1	1
—	—	—	—	7.7	—	—	—	—	—	0.5	0.7
11	3	56	6	13	30	19	12	11	36	210	199

CVIII

ACCORDING TO THE NATURE OF THE CAUSE—RAILWAY-WISE ; IN 5-YEAR PERIODS.

A—Number of cases of fires in other trains.

B—Number of cases of fires due to cause taken as a percentage of total on that Railway.

Northeast Frontier		Southern		South Central		South Eastern		Western		All Railways	
1963-64 to 1967-68	1968-69 to 1977-78	1963-64 to 1967-68	1968-69 to 1977-78	1963-64 to 1967-68	1968-69 to 1977-78	1963-64 to 1967-68	1968-69 to 1977-78	1963-64 to 1967-68	1968-69 to 1977-78	1963-64 to 1967-68	1968-69 to 1977-78
Nil	Nil	1	Nil	Nil	Nil	1	Nil	Nil	Nil	3	2
—	—	11.1	—	—	—	8.3	—	—	—	4.3	4.8
Nil	Nil	4	Nil	Nil	Nil	5	1	Nil	1	10	4
—	—	44.5	—	—	—	11.7	100.0	—	5.5	14.3	9.5
4	Nil	1	2	Nil	Nil	Nil	Nil	1	Nil	12	4
40.0	—	11.1	100.0	—	—	—	—	7.7	—	17.1	9.5
2	Nil	2	Nil	Nil	1	1	Nil	3	5	14	7
20.0	—	22.2	—	—	11.2	8.3	—	23.1	28.0	20.0	16.8
2	Nil	1	Nil	Nil	4	4	Nil	Nil	3	8	9
20.0	—	11.1	—	—	44.4	13.4	—	—	16.5	11.4	21.4
2	Nil	Nil	Nil	Nil	4	1	Nil	9	9	23	16
20.0	—	—	—	—	44.4	8.3	—	69.2	50.0	32.9	38.0
Nil	Nil	Nil	Nil	Nil	Nil	Nil	Nil	Nil	Nil	Nil	Nil
—	—	—	—	—	—	—	—	—	—	—	—
10	Nil	9	2	Nil	9	12	1	13	18	70	42

ANNEXURE CI

NUMBER OF INCIDENCE OF FIRES IN TRAINS TAKING EMU TRAINS SEPARATELY ON THE BROAD GAUGE-RAILWAY WISE; IN 5-YEAR PERIODS

A—Number of cases of fires in trains.
B—Incidence of fires in passenger trains/other trains per passenger/other train kilometres.

Type of Trains	BROAD GAUGE																			
	Central				Eastern				Northern				North Eastern				Northeast Frontier			
	1968-69 to 1972-73		1973-74 to 1977-78		1968-69 to 1972-73		1973-74 to 1977-78		1968-69 to 1972-73		1973-74 to 1977-78		1968-69 to 1972-73		1973-74 to 1977-78		1968-69 to 1972-73		1973-74 to 1977-78	
	A	B	A	B	A	B	A	B	A	B	A	B	A	B	A	B	A	B	A	B
1. Passenger trains excluding EMU trains	35	0.30	7	0.06	13	0.12	8	0.8	13	0.08	12	0.07	—	—	—	—	Nil	—	Nil	—
2. EMU trains	2	0.05	4	0.09	1	0.02	—	—	—	—	—	—	—	—	—	—	Nil	—	Nil	—
3. Total of passenger and EMU trains (1+2)	37	0.24	11	0.07	14	0.10	8	0.05	13	0.08	12	0.07	—	—	—	—	Nil	—	Nil	—
4. Other trains	4	0.03	1	0.01	2	0.01	—	—	4	0.03	—	—	Nil	—	Nil	—	Nil	—	Nil	—
5. All trains	41	0.14	12	0.04	16	0.06	8	0.03	17	0.06	12	0.04	—	—	—	—	Nil	—	Nil	—

ANNEXURE CIX—contd.

	ANNEXURE CIX—contd.																					
	Southern				South Eastern				South		Eastern		Western				Total of all Railways		Grand total			
	1968-69 to 1972-73		1973-74 to 1977-78		1968-69 to 1972-73		1973-74 to 1977-78		1968-69 to 1972-73		1973-74 to 1977-78		1968-69 to 1972-73		1973-74 to 1977-78		1968-69 to 1972-73		1973-74 to 1977-78			
	A	B	A	B	A	B	A	B	A	B	A	B	A	B	A	B	A	B	A	B		
1. Passenger trains excluding EMU trains	2	0.03	2	0.03	10	0.15	10	0.12	7	—	3	—	15	0.22	7	0.09	95	—	49	—	144	—
2. EMU trains	Nil	—	Nil	—	Nil	—	Nil	—	Nil	—	2	—	3	0.11	3	0.09	6	—	9	—	15	—
3. Total of passenger and EMU trains (1+2)	3	0.03	2	0.03	10	0.15	10	0.12	7	0.08	5	0.05	18	0.18	10	0.09	101	0.13	58	0.07	159	0.10
4. Others trains	Nil	—	2	0.04	6	0.09	3	0.04	1	0.05	Nil	—	7	0.08	6	0.06	24	0.03	12	0.01	36	0.02
5. All trains	2	0.02	4	0.03	16	0.12	13	0.08	8	0.03	5	0.02	25	0.14	16	0.07	125	0.08	70	0.04	195	0.06

ANNEXURE CX

CONSEQUENTIAL ACCIDENTS ON THE BROAD AND METRE GAUGES COMBINED DUE TO FAILURE OF HUMAN ELEMENT—ALL RAILWAYS; FROM 1968-69 TO 1977-78

S. No.	Description	Category of accidents				All consequential accidents
		Collisions	Derailments	Accidents at level crossings	Fires in trains	
(1)	Total number of accidents	570	6314	1083	241	8208
(2)	Number of accidents where cause could not be determined	Nil	164	Nil	87	251
(3)	Number of accidents where cause was established	570	6150	1083	154	7957
(4)	Number of accidents due to failure of staff (Direct)	531	2474	196	17	3218
(5)	Percentage $\frac{(4) \times 100}{(3)}$	93.2	40.2	18.1	11.0	40.4
(6)	Number of accidents attributable to failure of material, equipment or systems where staff was responsible indirectly	Nil	2382	181	48	2430
(7)	Percentage $\frac{(6) \times 100}{(3)}$	—	38.7	—	31.2	30.5
(8)	Number of accidents due to failure of staff (Direct and indirect)	531	4856	196	65	5648
(9)	percentage $\frac{(8) \times 100}{(3)}$	93.2	78.9	18.1	42.2	70.9

ANNEXURE
PROVISION OF RAILWAY QUARTERS TO

S. No.	Category of staff	Central			Eastern			Northern			North Eastern		
		A	B	C	A	B	C	A	B	C	A	B	C
1.	Station Masters.	96.6	99.4	88.6	92.8	93.5	99.0	89.5	93.4	91.1	88.4	89.9	—
2.	Assistant Station Masters and Switchmen.	69.5	65.4	59.8	64.8	64.5	67.5	79.7	83.8	70.9	68.5	72.9	—
3.	Cabinmen, levermen and Pointsmen.	57.8	54.5	56.3	59.7	52.3	52.5	72.4	75.4	68.8	64.8	64.6	—
4.	Shunting Jamadars, Gunners, Shunting Masters and other shunting staff.	44.6	37.4	47.0	51.8	59.6	42.4	68.5	73.2	78.7	52.4	59.2	—
5.	Guards.	45.9	48.6	47.8	72.4	73.6	59.8	58.9	58.2	51.1	49.4	52.8	—
6.	Drivers and shunters.	50.1	43.6	51.2	53.3	87.4	62.9	52.3	58.4	55.8	45.3	45.3	—
7.	Firemen and Assistant drivers.	30.3	31.8	35.5	48.2	61.4	59.2	54.4	56.8	48.4	37.9	38.1	—
8.	Motormen.	80.0	82.1	76.3	62.9	72.0	32.2	61.1	77.7	100.0	—	—	—
9.	Train Examiners.	29.4	21.9	34.0	70.5	69.7	60.0	56.2	66.6	53.5	73.3	71.7	—
10.	Block, Electric, Mechanical Signal Maintainers.	53.5	55.8	47.0	76.1	73.9	61.1	59.1	72.9	47.7	44.4	56.8	—
11.	Total all categories.	51.2	48.8	50.5	57.8	67.0	58.4	64.8	68.8	60.6	55.9	57.2	—

Note— North Eastern Railway have not furnished information as on 31-3-1978.

2. Position as on 31-3-1964 and 31-3-1967 has been taken from Annexure LXXIII in part I Report of the Wanchoo Committee.

CXI

ESSENTIAL CATEGORIES—RAILWAY-WISE

A—As on 31-3-1964
 B—As on 31-3-1968
 C—As on 31-3-1978

Northeast Frontier			Southern			South Central			South Eastern			Western		
A	B	C	A	B	C	A	B	C	A	B	C	A	B	C
91.2	88.6	86.8	95.0	97.7	57.1	—	94.6	72.4	100.0	88.4	98.1	97.7	97.9	80.5
80.0	68.3	75.2	71.2	63.3	*31.9	—	67.5	63.5	72.3	72.2	73.7	79.7	81.0	
77.1	69.1	64.1	66.0	71.0	48.6	—	67.7	72.6	62.5	61.2	65.8	76.6	80.3		66.5
80.5	79.2	75.7	44.0	53.2	53.8	—	70.8	44.5	51.0	63.7	64.9	57.8	61.9	60.9
73.0	71.0	81.0	59.8	71.8	44.3	—	55.4	47.5	60.9	63.3	66.9	45.2	46.1	38.9
73.2	76.4	73.5	53.9	56.5	48.0	—	71.0	48.7	72.2	81.7	73.9	58.8	61.2	38.5
45.8	52.1	72.0	37.4	40.7	46.5	—	44.7	41.3	32.2	49.1	62.1	40.3	43.8	44.3
—	—	—	73.8	90.5	69.2	—	—	—	—	—	56.2	30.8	28.6	35.8
76.8	70.0	85.0	47.1	46.9	34.5	—	56.8	47.1	74.8	78.4	63.4	44.8	51.2	48.2
67.8	63.5	71.4	61.3	63.8	53.6	—	37.5	45.8	62.9	64.9	65.6	43.8	62.3	53.5
71.3	68.6	71.5	58.7	61.6	49.0	—	62.7	55.9	60.5	65.1	68.3	63.9	66.6	55.8

*Switchmen only

ANNEXURE CXII

STATEMENT SHOWING THE EXPENDITURE ON SIGNALLING AND INTERLOCKING WORKS

(Figures in lakhs of Rs.)

Year	Total investment on the principal categories of development works (in Rs. lakhs)	Investment on signalling and inter locking works (Signalling portion only) (in Rs. lakhs)	Percentage (3)×100 (2)
(1)	(2)	(3)	(4)
1968-69	250	9.81	3.925
1969-70	234	8.12	3.469
1970-71	206	7.66	3.715
1971-72	271	16.98	6.244
1972-73	325	15.04	4.630
1973-74	342	12.27	3.577
1974-75	370	13.16	3.557
1975-76	407	14.78	3.630
1976-77	427	13.79	3.233
1977-78	450	13.73	3.05
1978-79	540	20.20	3.70
1979-80	634	20.44	3.20
1980-81	651	20.20	3.20

ANNEXURE CXIII

COLLISIONS INVOLVING DIESEL LOCOMOTIVES ON THE BROAD AND METRE GAUGES ACCORDING TO THE MODE OF WORKING RAILWAY-WISE: FROM 1968-69 to 1977-78

LH—Long hood leading
SH—Short hood leading

	Head on collisions			Rear-end collisions			Side-collisions			All kinds of collisions		
	LH	SH	Total	LH	SH	Total	LH	SH	Total	LH	SH	Total
Broad Gauge												
Central	4	—	4	24	1	25	5	—	5	33	1	34
Eastern	2	—	2	12	—	12	2	1	3	16	1	17
Northern	6	—	6	1	5	6	1	2	3	8	7	15
North Eastern	—	—	—	—	—	—	—	—	—	—	—	—
Northeast Frontier	—	—	—	—	—	—	—	—	—	—	—	—
Southern	6	3	9	11	2	3	3	1	4	10	5	16
South Central	3	1	4	6	—	6	1	—	1	10	1	16
South Eastern	12	—	12	11	—	11	2	—	2	25	—	25
Western	3	—	3	3	—	3	1	—	1	7	1	7
All Railways	36	4	40	58	8	66	15	4	19	109	16	125
Metre Gauge												
Central	—	—	—	—	—	—	—	—	—	—	—	—
Northern	—	—	—	—	—	—	—	—	—	—	—	—
North Eastern	2	—	2	—	—	—	—	—	—	2	—	2
Northeast Frontier	4	4	8	1	2	3	2	1	3	7	7	14
Southern	2	1	3	—	—	—	—	—	—	2	1	3
South Central	1	—	1	—	—	—	1	—	1	2	—	2
Western	3	—	3	2	—	2	1	—	1	6	—	6
All Railways	12	5	17	3	2	5	4	1	5	19	8	27

ANNEXURE CXIV

VISIBILITY OF TRACK AND SIGNALS FROM BROAD GAUGE WDM 2 DIESEL LOCOMOTIVE WITH LONG HOOD/SHORT HOOD LEADING

	Distance beyond which track/signal is visible (in metres)	
	Long hood leading	Short hood leading
Visibility of track		
(i) Driver at maximum seat height	14.910	3.310
(ii) Driver at minimum seat height	16.041	3.561
(iii) Assistant driver at maximum seat height	14.531	2.931
(iv) Assistant driver at minimum seat height	16.585	3.153
Visibility of signals		
(i) Driver	Beyond 215.563	Beyond 38.292
(ii) Assistant Driver	Unlimited	Unlimited

Note :—Visibility/field of vision has been indicated as the distance beyond which a driver/assistant driver can observe track and signals on account of infringement/invisibility due to locomotive superstructure.

Source : On the basis of information furnished by the Research Designs and Standards Organisation.

ANNEXURE CXV

STATEMENT SHOWING PLACEMENT OF RAKES/SECTIONAL COACHES ON WASHING AND PIT LINES. POSITION FOR QUARTER ENDING 30.9.1979.

Stations	Number of washing lines	Total rakes to be placed	Number of rakes not placed on pit line	Percentage of rakes not placed	Total sectional coaches to be placed	Sectional coaches not placed on pit line	Percentage of sectional coaches not placed	Remarks
JHANSI	3	736	488	66.3	390	390	100.0	Nagpur : (i) Rake of 392/391 could not be placed on washing/siding due to its late arrival and late release by TXR afterwards no margin for placement on washing/siding.
BHOPAL	1	368	276	75.0	788	788	100.0	
NAGPUR	4	828	387	46.9	274	nil	nil	
MADRAS CENTRAL	10	3312	1196	36.1	62	62	100.0	
COCHIN HARBOUR					(in a week)	(in a week)		(ii) Rake of 399/400 could not be placed on washing siding/ due to no washing siding vacant. (iii) Rake of 394/393 could not be placed on washing/siding due to rake placed on alternate days.
TERMINUS	1	460	276	60.0	Nil	Nil	Nil	
AHMEDABAD	6	3036	1012	33.3	50/100 Units	1/2 Units.	2.0	
RAJKOT	1	552	184	33.3	15/30 Units	3/6 Units	20.0	
..								

ANNEXURE CXVI

OVERLOADING OF BOX WAGONS LOADED AT COLLIERY SIDINGS ON THE EASTERN RAILWAYS

(Results of actual weightment at ANDAL during October, 1979)

Date	Name of Colliery	Consignee	Total Number of box wagons in rake	Number of Box wagons overloaded	Maximum overloading found
30-9-79	Parasea	Adityapur I & S Co. Ltd.			Upto 15.7
1-10-79	Nolea Kogaru	Bandel T.P.S.	30	29	12.2
1-10-79	Kumardih & Tilahouri		31	29	7.7
1-10-79	Lower Kenda Bahule	BTPS Pandel WBSEB	30	28	11.0
10-10-79	Lower Kenda & Bahule	Jagadhri	16 BCX 26 CRT	13 26	-14.9
			(CC=27.3 to 27.6)		
10-10-79	Kumardih & Tilahouri	DCM Chemicals Dayabasti.	35	33	Upto 8.5
12-10-79	Kumardih	Ludhiana Rehson Cyele	30	29	-7.3
15-10-79	Bahule	Harduaganj	30	28	Upto 11.7
15-10-79	Kumardih & Tilahouri	Titagarh Paper	30	30	8.2
18-10-79	Kumardih	Ludhiana	35	35	10.0
23-10-79	Lower Kenda Bahule	BTPS Pandel WBSEB	30	23	10.1
25-10-79	Kumardih	Titagarh Paper	31	28	Upto 9.0

(Source : Data from Weightment Registers, ANDAL, E. Rly.)

ANNEXURE CXVII

A PROGRESS OF IMPLEMENTATION OF SAFETY MODIFICATIONS ON COACHING/GOODS STOCK

S. No.	Modifications	Date when ordered	Nos. to be modified	Nos. modified	Balance	Railways
1	2	3	4	5	6	7
Broad Gauge (Coaching Stock)						
1.	Replacement/repositioning of defective vacuum reservoir suspension straps on ICF coaches	6-12-67	600 910	194 716	406 194	Central Northern
2.	Modification to the securing arrangement of guide caps in the primary suspension of ICF bogies	29-1-69	922 1002	104 650	818 352	Central Northern
3.	Modifications to the equalising stays of BG ICF bogies to avoid joining in service	18-2-69	800 512	411 60	389 452	Central South Eastern
4.	Modification of the safety strap for brake beam and brake beam bracket on ICF BG bogies	26-12-70 and 2-1-73	942 1049 512 587	177 327 215 262	765 722 297 325	Central Northern South Eastern Southern
5.	Modification to stay cubes of equalising stay of ICF bogie by altering the dia from 40 mm to 50 mm and using heavy quality tube to IS : 1239	12-11-71	800 705 112	408 488 61	392 217 51	Central Northern South Eastern
6.	Improved design of dynamo suspension bracket for BEML coaches	20-7-77	650 (app) 714 402 732	40 Nil 39 164	510 714 363 568	Central Northern Material awaited Central Material awaited Southern Material awaited
7.	Modified design of straps for vacuum reservoir on BEML coaches	21-9-77	714 653 522 732	62 223 18 524	652 330 504 208	Northern South Eastern South Central Southern
Metre Gauge (Coaching Stock)						
8.	Modification to the design of MG-IRS coaching axle with increased wheel seat diameter	25-9-67	2608 904	238 68	2370 836	South Central Southern
9.	Modification to the equalising stay to eliminate breakage in MG ICF bogies (45 CWSC recommendations)	7-12-71	210	103	107	Northern
10.	Modified fixing arrangements for centre pivot pin in MG ICF coaches	10-10-75	296 631	31 147	265 484	Northern Southern
11.	Modification to the safety straps in MG ICF bogies	10-10-75	296 638	31 237	265 401	Northern Southern
12.	Safety strap for brake pull rod to prevent the pull rod from working out and closing infringement (BOX wagons)	23-8-67	2258 3001 2524	515 23 370	1743 2978 2154	Central South Central Southern
13.	Modified head stock/diagonal knee joints for BOX wagons to avoid damage to head stock and diagonals	18-5-71	2344	Nil	2344	South Central
14.	Modification to head stock/diagonal knee joint for BCX wagons to avoid damages to head stock and diagonals	18-8-71	657	Nil	657	South Central
15.	Strengthening of standard brake beam for BG wagons to prevent local breaking, when utilised in wagons with heavier axle loads	5-3-74	4776	Nil	4776	South Central

ANNEXURE CXIX

AVAILABILITY OF ANTI-TELESCOPIC/STEEL BODIED COACHES—RAILWAY WISE

Broad Gauge					
Railway	Requirement	Spare for POH/Sick/ stand by	Total requirement	Total holdings	Balance (holding requirement)
IN NUMBERS					
Central	584	96	680	1513	(+)883
Eastern	717	222	939	948	(+)9
Northern	1560	587	2147	2269	(+)122
North Eastern	42	13	55	49	(-)6
Northeast Frontier	272	114	386	400	(+)14
Southern	1178	379	1557	1645	(+)8
South Central	725	263	988	974	(-)1
South Eastern	1293	425	1718	1618	(-)100
Western	730	234	964	1085	(+)121
All Railways	7101	2333	9434	10501	(+)1067
(+) indicates excess		(-) indicates shortage.			
Metre Gauge					
Northern	501	187	688	657	(-)31
North Eastern	1542	499	2041	1640	(-)401
Northeast Frontier	927	369	1296	950	(-)346
Southern	1031	333	1364	1253	(-)111
South Central	496	168	664	585	(-)79
Western	1770	550	2320	1773	(-)547
All Railways	6267	2106	8373	6858	(-)1515
(+) indicates excess		(-) indicates shortage.			

ANNEXURE CXX

DETAILS OF SPEED RESTRICTIONS IMPOSED DUE TO DEFICIENCIES IN TRACK FITTINGS AND BALLAST
TRACK FITTINGS ON ADRA DIVISION OF THE SOUTH EASTERN RAILWAY

Section	Kilometrage		Speed restriction in kmph.	Reasons for speed restriction
	from	To		
Adra— Midnapur	196	198	30	Deficient track fittings.
Adra— Midnapur	202/6	203/10	30	Heavy creep due to deficient track fittings.
Adra— Midnapur	206/10	208	30	Due to heavy percentage of keys missing
Adra— Midnapur	246/6	249/6	30	Due to theft of tie bars and keys.
Adra— Midnapur	247/6	249/6	50	Keys and tie-bars missing.
Anara— Chandil	299/1	13	30	Disturbed ballast
Anara— Chandil	334/19	335/19	30	Due to theft of sleepers and fittings.
Muri— Chandrapura	394/4	394/11	30	Deficiency of packing materials.

APPENDIX—I
SCHEDULE OF MEETINGS/VISITS/TOURS OF THE RAILWAY ACCIDENTS ENQUIRY COMMITTEE-1978
DURING THE COURSE OF THEIR TENURE FROM 27-3-1978 TO 31-5-1980.

S. No.	Date/Period	Place of Meetings/Visits/Tours	Remarks
1	2	3	4
1.	27-3-78	New Delhi	Preliminary discussions regarding methodology of work. Discussions with Minister of Railways, Minister of State for Railways, Chairman and Members of Railway Board.
2.	2-4-78	Tughlakabad	Visit to Central Tower Yard Cabin, Diesel Loco Shed and Route Relay Cabin of Northern Rail
3.	29-4-78 & 1-5-78	New Delhi	Formulation of Questionnaire to be issued to the Railways.
4.	23-5-78	Bombay	Evidence Session.
5.	24-5-78	Pune	Visit to Indian Railways Institute of Advanced Track Technology ; and evidence session.
6.	25-5-78 to 27-5-78	Bombay	Visit to car shed, Kurla. Route Relay Cabins at Kurla and Churchgate and Central Labour Institute, National Safety Council and Air India Training College.
7.	28-5-78	Bangalore	Visit to System Technical School Southern Railway and evidence session.
8.	29-5-78	Mysore	Visit to Workshops on Southern Railway; evidence session.
9.	30-5-78	Bangalore	Visit to Bharat Earth Movers Ltd. & International Instruments Ltd.
10.	25-6-78 to 30-6-78	Simla	Discussion of feedback from the Railway Board and Zonal Railways regarding the action taken on recommendations made by the Wanchoo Committee.
11.	8-8-78 to 10-8-78	New Delhi	Discussion of feedback from the Railway Board and Zonal Railways regarding the action taken on recommendations made by the Wanchoo Committee.
12.	12-9-78 to 13-9-78	New Delhi	Discussion of feedback from the Railway Board and Zonal Railways regarding the action taken on recommendations made by the Wanchoo Committee.
13.	6-11-78 to 8-11-78	New Delhi	Discussion on Working Papers Nos. 1 to 23 for Part-I Report of the Committee.
14.	4-1-79 to 6-1-79	New Delhi	Discussion on Working Papers Nos. 24 to 43 for Part-I Report of the Committee.
15.	14-2-79 to 16-2-79	New Delhi	Discussion on Working Papers Nos. 44 to 59 and draft Chapter-I for Part I Report of the Committee.
16.	2-4-79 to 6-4-79	New Delhi	Discussion on draft Chapter III and Working Papers Nos. 60 to 117 for Part-I Report of the Committee.
17.	3-5-79 to 7-5-79	New Delhi	Discussion on Chapters I, II, III & IV for part-I Report of the Committee.
18.	4-6-79 to 14-6-79	Simla	Finalisation of Part-I Report of the Committee.
19.	16-7-79 to 17-7-79	New Delhi	Presentation of Part-I Report to Minister of Railways ; Formulation of programme of tours of Railways and methodology for formulating Final Report of the Committee.
20.	19-8-79 & 20-8-79	Vijayawada South Central Railway.	Visit to Route Relay Interlocking Cabin, Hump Yard Running Rooms and Wagon Repairs Depot. Evidence Session.
21.	21-8-79	Hospet South Central Railway.	Demonstration of Gooty Design of drivers Vigilance Central Device and digital speedometer. Trailing window inspection EX ; Hospet to Hubli. Inspection of level crossings & bridges.
22.	22-8-79	Hubli South Central Railway.	Visit to Loco, Carriage and Wagon Shops. Inspection of Accident/Relief Train. Evidence Session, Intermediate overhauling Depot for highspeed rakes at Mauli Ali.
23.	23-8-79 to 24-8-79	Secunderabad South Central Railway.	Visit to Loco, Carriage and Wagon Shop ; Lallaguda Coaching Maintenance Lines Secunderabad. Visit to Indian Railway Institute of Signal Engineering and Telecommunication. Evidence session.
24.	24-9-79 to 28-9-79	Lucknow	Visit to Research Designs and Standards Organisation, Visit to Workshops of Northern and North Eastern Railway. Evidence session.
25.	15-10-79 & 16-10-79	New Delhi	Evidence Session.
26.	29-10-79 & 30-10-79	Alipurduar Northeast Frontier Railway.	Visit to Zonal Training School, Inspection of Accident Relief Train. Evidence Session.

1	2	3	4
27.	31-10-79	New Bongaigaon Northeast Frontier Railway	Visit to Carriage and Wagon workshop. Inspection of Centralised Traffic Control Centre from New Bongaigaon to Changsari ; Evidence Session.
28.	1-11-79	Gauhati Northeast Frontier.	Visit to Wagon Maintenance Depot, Noonmati, washing and pit lines, Carriage and Maintenance Depot and Train Lighting Depot, Evidence Session.
29.	2-11-79	Pandu Northeast Frontier Railway.	Visit to Signal and Telecommunication Staff Training School; Evidence Session.
30.	6-11-79	Maligaon Northeast Frontier Railway.	Evidence Session.
31.	19-11-79	Mughalsarai Eastern Railway.	Visit to Central Tower, Up Hump Yard. Evidence Session.
32.	20-11-79 & 21-11-79	Jamalpur Eastern Railway	Visit to Jamalpur Workshop, Indian Railway Institute of Mechanical and Electrical Engineering Evidence Session.
33.	22-11-79	Chittaranjan	Visit to Chittaranjan Locomotive Works. Evidence Session.
34.	23-11-79 & 24-11-79	Asansol Eastern Railway.	Visit to Kanueteria Colliery. Evidence Session.
35.	17-12-79 to 18-12-79	New Delhi	Evidence Session.
36.	17-1-80	Ghaziabad	Visit to Signal and Telecommunication Training School and Workshop of Northern Railway. Evidence Session.
37.	18-1-80 to 22-1-80	New Delhi	Visit to Traction and Traffic Control Centres. Evidence Session.-
38.	23-1-80 to 25-1-80	New Delhi	Evidence Session. Meetings with Minister of Railway and Minister of State for Railways.
39.	5-2-80	Adra South Eastern Railway.	Visit to Wagon Repairs Shop. Inspection of Accident Relief Medical Van. Evidence Session.
40.	6-2-80 & 7-2-80	Kharagour South Eastern Railway.	Visit to Carriage and Wagon and Loco Shops, System Technical School. Evidence Session.
41.	8-2-80 to 9-2-80	Calcutta (Garden Reach) South Eastern Railway.	Visit to EMU car shed, Tikiyara, South Eastern Railway. Evidence Session.
42.	11-2-80 & 13-2-80	Calcutta (Fairlie Place) Eastern Railway.	Visit to Carriage and Wagon Workshop, Liluah. Evidence Session. Discussion with Representatives of West Bengal Government.
43.	25-2-80	Ajmer Western Railway.	Visit to Carriage and Wagon Workshop Evidence Session.
44.	27-2-80	Udaipur Western Railway.	Visit to Zonal Training School. Evidence Session.
45.	28-2-80 & 29-2-80	Vadodara Western Railway.	Visit to Railway Staff College. Evidence Session.
46.	10-3-80	Varanasi	Visit to Diesel Locomotive Works. Evidence Session .
47.	11-3-80 & 12-3-80	Varanasi North Eastern Railway.	Visit to Wagon Maintenance Depot and Manduadih Transhipment shed. Evidence Session.
48.	13-3-80 & 14-3-80	Gorakhpur North Eastern Railway	Visit to Loco, Carriage and Wagon Workshops, Centralised Traffic Control Room. Evidence Session.
49.	24-3-80	Tondjarpet Southern Railway.	Visit to Wagon Repair Depot, Sick lines, Marshalling Yard, Area Control Office, Hump Yard and Guards' Running Room.
50.	24-3-80	Madras Southern Railway.	Evidence Session.
51.	25-3-80 & 26-3-80	Madras Southern Railway	Visit to washing and pit lines, Carriage Maintenance Depot. Evidence Session.
52.	27-3-80	Perambur	Visit to Integral Coach Factory. Evidence Session.
53.	28-3-80 & 29-3-80	Madras Southern Railway.	Evidence Session. Discussions with representatives of Tamil Nadu Government.
54.	14-4-80	New Delhi	Evidence Session.
55.	15-4-80	New Delhi	Evidence Session. Discussion of draft Part II Report of the Committee.
56.	16-4-80 & 17-4-80	New Delhi	Evidence Session.
57.	18-4-80	New Delhi	Discussion with Members of Railway Board.
58.	19-4-80	New Delhi	Evidence Session.
59.	21-4-80	New Delhi	Discussion of draft Part II Report of the Committee.
60.	22-4-80	New Delhi	Evidence Session.
61.	23-4-80 to 25-4-80	New Delhi	Discussion of draft Part II Report of the Committee.
62.	12-5-80 to 15-5-80	New Delhi	Finalisation of Part II Report of the Committee.
63.	17-5-80 to 19-5-80	New Delhi	Finalisation of Part II Report of the Committee.

APPENDIX—II

LIST OF PLACES AND INSTALLATIONS VISITED AND PERSONS INTERVIEWED BY THE RAILWAY
ACCIDENTS ENQUIRY COMMITTEE—1978.

Date	Place	Installations/Offices visited	S. No.	Persons interviewed.
2-4-78	Tughlakabad	Control Tower, Yard Cabin, Diesel Loco Shed and Route Relay Cabin, Northern Railway.		
23-5-78	Bombay	Office of the Additional Commissioner of Railway Safety, Western Circle.	1.	Shri Suresh Chandra, Deputy Commissioner of Railway Safety, Lucknow (Looking after the duties of Additional Commissioner of Railway Safety, Western Circle Bombay).
24-5-78	Pune	Indian Railways, Institute of Advanced Track Technology.	2.	Shri P. O. Thomas, Principal.
25-5-78	Bombay	National Safety Council ; Central Labour Institute ; Air India Training College.		
26-5-78	Bombay	EMU Car Shed and Route Relay Interlocking Cabin, Kurla, Central Railway.		
27-5-78	Bombay	Route Relay Cabin at Churchgate, Western Railway.		
27-5-78	Bangalore	System Technical School, Southern Railway.		
28-5-78	Bangalore	....	3.	Shri Chandrasekhar Shetty, Principal.
			4.	Shri A. V. Jacob, Additional Commissioner of Railway Safety, Bangalore (Looking after the duties of Commissioner of Railway Safety).
29-5-78	Mysore	Locomotive, Carriage and Wagon Workshop Southern Railway.	5.	Sh. Roy V. Paul, Works Manager, Workshops.
30-5-78	Bangalore	M/S Bharat Earthmovers Ltd. M/S International Instruments Private Ltd.		
19-8-79	Vijayawada	Route Relay Interlocking Cabin, Hump yard Running Room and Wagon Repair Depot, South Central Railway. Divisional Office, South Central Railway.	6.	Sh. B. Ramanna, Shunting Jamadar, Vijayawada.
			7.	Sh. K. Karunakaran, Head Train Examiner, Vijayawada.
			8.	Sh. M. Dharmagnani, Train Examiner, Vijayawada.
			9.	Sh. P. Narasimha Rao, Fitter-in-Charge, Vijayawada.
			10.	Sh. P. Krishnamurthy, Assistant Station Master, Pithapuram.
			11.	Sh. T. Koteswara Rao, Cabinman, Vijayawada.
			12.	Sh. T. O. Magao, Driver, (Diesel) Grade 'A'
			13.	Sh. D. N. Murthy, Driver (Diesel), Grade 'C' Rajahmundry.
			14.	Sh. P. Hanumiah, Electrical Signal Maintainer, Vijayawada.

Date	Place	Installations/Offices visited.	S. No.	Persons interviewed.
19-8-79	Vijayawada	Divisional Office, South Central Railway.	15.	Sh. Samuel, Neutral Train Examiner, Vijayawada.
			16.	Sh. Ramulu, Station Superintendent, Vijayawada.
			17.	Sh. Thirunnam Karasu, Yard Master Vijayawada.
			18.	Sh. A. K. Mohan, Guard 'special' Grade, Vijayawada.
20-8-79	Vijayawada	Divisional Office, South Central Railway.	19.	Sh. S. Venkateswarulu, Senior Fuel Inspector, Vijayawada.
			20.	Sh. Kameswara Rao, Welfare Inspector, Vijayawada.
			21.	Sh. Venkateswara Rao, Permanent Way Inspector, Kurnool.
			22.	Sh. S. A. Hamid, Guard, Grade 'C', Vijayawada.
			23.	Sh. M. M. Adiga, Senior Divisional Electrical Engineer, Vijayawada.
			24.	Sh. V. Suryanarayaniah, Senior Divisional Engineer, I, Vijayawada.
			25.	Sh. A. V. Viswanathan, Divisional Signal & Telecommunication Engineer, Vijayawada.
			26.	Sh. P. Venkata Rao, Divisional Mechanical Engineer (Carriage and Wagon), Vijayawada.
20-8-79	Vijayawada	Divisional Office, South Central Railway.	27.	Shri V. B. Naik, Divisional Safety Officer, Vijayawada.
			28.	Shri M. C. Das, Divisional Railway Manager, Vijayawada.
21-8-79	Hospet	Demonstration of Gooty design of driver's vigilance control device and digital speed- ometer fitted on WDM-2 diesel loco- motives.		
21-8-79	Hospet	Trailing window inspection by Special Goods Train ex. Hospet to Hubli, Inspection of level crossings, stations curves, track, running room, bridges.		
22-8-79	Hubli	Loco, Carriage and Wagon shops, South Central Railway.	29.	Sh. V. R. Karur, Shop Superintendent (Inspection).
			30.	Sh. C. M. Alaganandam, Shop Superintendent (Carriage).
			31.	Sh. B. Surya Rao, Shop Superintendent (Wagon Shop).
22-8-79	Hubli	Loco, Carriage and Wagon shops, South Central Railway.	32.	Sh. M. N. Mudaliar, Foreman-in-Charge (Roller Bearing and Wheel shop).
			33.	Sh. C. S. Jeevaratnam, Neutral Train Examiner, (Workshops).
			34.	Sh. K. Pandu, Works Manager,
			35.	Sh. R. R. Badagi, Deputy Chief Mechanical Engineer (Workshops).
23-8-79	Hubli	Accident Relief Train, South Central Railway. Divisional Office, South Central Railway.	36.	Sh. Y. V. L. N. Subba Rao, Station Master, Hubli.

Date	Place	Installations/Offices visited.	S. No.	Persons interviewed			
23-8-79	Lallaguda Secunderabad	Loco, Carriage and Wagon shop, Lallaguda, South Central Railway.	37.	Sh. G. Krishna Murty, Guard Grade 'C'. Hospet.			
			38.	Sh. M. S. F. Barboza, Divisional Safety, Officer, .			
			39.	Sh. S. D. Venkatanarasiah, Divisional Mechanical Engineer, (Carriage and Wagon).			
			40.	Sh. A. J. Gurushankar, Divisional Railway Manager,			
			41.	Sh. C. Satyanarayana, Shop Superintendent/Wagon Shop.			
			42.	Sh. Y. Suryanarayana, Shop Superintendent/ Roller Bearing.			
			43.	Sh. Mohanrajan, Shop Superintendent (Speedometer), Workshops.			
			44.	Sh. Harry Stephens, Head Neutral Train Examiner, (Workshops).			
			45.	Sh. A. Shankar Rao, Chargeman Grade 'C' (Workshops).			
			46.	Sh. Pandurangan, Highly Skilled Fitter, (Workshops).			
			47.	Sh. Narayana Swamy T., Machinist (Workshops).			
			48.	Sh. D'Monte, Machinist (Workshops).			
			24-8-79	Secunderabad	Indian Railways Institute of Signal Engineering and Telecommunications.	49.	Sh. R. Satyamurty, Works Manager (Workshops).
50.	Sh. P. Muthu Swamy, Production Engineer (Workshops).						
51.	P. G. Reddy, Deputy Chief Mechanical Engineer, (Workshops).						
52.	Sh. C. V. N. Swamy, Principal.						
53.	Sh. C. Krishnanandam, Assistant Professor (Electronics).						
54.	Sh. K. Vishwanathan, Assistant Professor, (Signal I).						
55.	Sh. T. M. Baby, Chief Train Examiner, Sicklines, Secunderabad.						
56.	Sh. Eugene Horne, Train Examiner, Sicklines. Secunderabad.						
24-8-79	Secunderabad	Intermediate overhauling Depot for high speed rakes at Maula Ali, South Central Railway. Headquarters Office, South Central Railway.				57.	Sh. N. Sankaranarayanan, Chief Electrical Engineer.
						58.	Sh. K. T. V. Raghavan, Chief Mechanical Engineer.
			59.	Sh. M. S. D. Jetly Chief Workshop Engineer.			
			60.	Sh. R. Parthasarathy, Chief Engineer.			
			61.	Sh. V.N. Swamy, Chief Signal and Telecommunication Engineer.			
			62.	Sh. R. Raman, Controller of Stores.			
			63.	Sh. P. C. Bhalla, Chief Medical Officer.			

Date	Place	Installations/Offices visited.	S. No.	Persons interviewed.
24-9-79	Lucknow	Laboratories in Research, Design and Standards Organisation. Research Design and Standards Organisa- tion.	64. 65. 66. 67. 68.	Sh. K. Vijaya Rama Rao, Chief Security Officer. Sh. P. A. Pai, Chief Operating Superintendent. Sh. K. Subramonian, Chief Personnel Officer. Sh. S. Balasubramanian, Chief Safety Superintendent. Sh. N. Neelakanta Sarma, General Manager.
25-9-79	Lucknow	Track Recording cum Research Car in Research Designs and Standards Organisation. Research, Design and Standards Organisation.	69. 70. 71. 72. 73. 74.	Sh. G. V. Himatsinghani, Additional Director Standards, (Wagon). Sh. S. K. Singh, Senior Scientific Officer (Psychology). Sh. M. V. Kelkar, Additional Director Standards, (Carriage). Sh. K. J. N. Kutty, Additional Director Standards, (Bridges and Structures). Sh. J. N. Tandon, Director Standards (Wagon.) Sh. M. S. Krishnan, Director Standards (Wagon).
25-9-79	Lucknow	Research, Designs and Standards Organisation.	75. 76. 77. 78. 79.	Sh. Y. B. L. Mathur, Director, Traffic Research. Sh. A. Sitanath Director Standards (Motive Power). Sh. S. L. Agarwal, Additional Director Standards (Track). Sh. N. A. P. S. Rao, Additional Director Standards, (Electrical). Sh. A. Chellam, Director Research.
26-9-79	Charbagh, Lucknow Lucknow	Loco Workshops, Charbagh, Northern Railway. Divisional Office, Northern Railway.	80. 81. 82. 83. 84. 85. 86.	Sh. A. K. Bhattacharya, Director (M & C). Sh. T. R. Batra, Shop Superintendent Erecting, Loco Workshop, Charbagh. Sh. Gian Singh, Chargeman, Diesel Loco Workshop, Charbagh. Sh. R. C. Tewari, Machinist, Light Machine Shop, Loco Workshop, Charbagh. Sh. P. R. Saini, Assistant Inspecting Officer, Loco Workshop, Charbagh. Sh. A. S. Mathur Deputy Chief Mechanical Engineer (Workshop) Loco Workshop, Charbagh. Sh. S. C. Pandey, Electrical Signal Maintainer, Safidabad.

Date	Place	Installations/Office visited.	S. No.	Persons interviewed.
26-9-79	Lucknow . . .	Divisional Office, Northern Railway.	87. Sh. G. C. Verma, Divisional Signal Inspector, Lucknow. 88. Shri Avinash Dixit, Gangman, Northern Railway, Lucknow. 89. Sh. A. Sabastian, Permanent Way Inspector, Northern Railway, Lucknow. 90. Sh. B. R. Pande, Driver, Grade 'A', Northern Railway, Lucknow. 91. Sh. Chunni Lal, Driver Grade 'C', Lucknow. 92. Sh. B. D. Bajpayee, Guard, Grade 'C', Lucknow. 93. Sh. Ram Lakhan, Carriage Fitter, (Incharge), Lucknow.	
27-9-79	Lucknow . . .	Carriage and Wagon workshops, Alambagh, Northern Railway. Divisional Office, Northern Railway.	94. Sh. U. P. Tewari, Assistant Station Master, Lucknow. 95. Sh. H. L. Khatri, Chargeman, Grade 'B', Carriage and Wagon Shop, Alambagh. 96. Sh. B. N. Tandon, Production Engineer, Carriage and wagon Workshop, Alambagh. 97. Sh. M. L. Gulati, Divisional Mechanical Engineer, (Carriage and Wagon). 98. Sh. Udain Singh, Superintendent, Mechanical Workshops, Loco Workshops, Charbagh. 99. Shri. S. M. Shukla Section Controller, Lucknow. 100. Sh. Mishri Lal, Traffic Inspector (Movement), Lucknow.	
27-9-79	Lucknow . . .	Divisional Office, Northern Railway.	101. Shri V. K. Raizada, Senior Divisional Engineer I. 102. Shri A. N. Srivastava Divisional Safety Officer. 103. Shri Prakash Narain, Divisional Railway Manager.	
28-9-79	Lucknow . . .	Systems Technical School, Northern Railway. Loco Shed (MG) North Eastern Railway, Accident Relief Train, North Eastern Railway, Drivers Running Room, North Eastern Railway.	104. Shri K. L. Chatterjee, Principal.	
28-9-79	Lucknow . . .	Divisional Office, Northern Railway.	105. Shri F. A. Azmi, Loco Foreman, North Eastern Railway, Lucknow. 106. Shri Arjun Kumar, Fitter Incharge, Loco Shed, North Eastern Railway, Lucknow.	

Date	Place	Installations/Offices visited.	S. No.	Persons interviewed.
15-10-79	New Delhi		107. Shri S. A. Khan, Driver, Grade 'C' North Eastern Railway, Charbagh, Lucknow. 108. Shri Romesh Kumar, Senior Divisional Mechanical Engineer (Loco), North Eastern Railway. 109. Shri B. N. Nigam, Divisional Signal and Telecommunication Engineer, North Eastern Railway. 110. Shri K. K. Sarkar, Divisional Safety Officer, North Eastern Railway. 111. Shri L. M. Bhaskar, Divisional Railway Manager, North Eastern Railway. 112. Shri R.A. Mittal 113. Shri Subodh Chandra Das. 114. Shri M. L. Bhagia 115. Shri R. N. Bajpai 116. Shri S. K. Bansal 117. Shri S. G. Gogate. 118. Shri J. P. Dubey 119. Shri B. M. Goyal 120. Shri L. Alfred (Appeared on 16-10-79 also).	} Representatives of All India Train Examiners Asso- ciation. } } Representatives of All India Loco Running Staff Association.
16-10-79	New Delhi		121. Shri N. S. Bhangoo 122. Shri K. Hassan 123. Shri S. C. Tandon 124. Shri M. C. Johri 125. Shri O. P. Bhardwaj 126. Shri J. P. Dave 127. Shri H. S. Chowdhury 128. Shri T. Hanumaiah	} Representatives of Indian Railway Signal & Tele- communication staff Association (a constituent of All India Railway Employees Con- federation), } } Representatives of All India Loco Running Staff Association.
29-10-79	Alipurduar	Zonal Training School, Northeast Frontier Railway. Divisional Office Northeast Frontier Railway.	129. Shri S. Chakravarthy, Principal. 130. Shri J. N. Nandi, Keyman, Changamari 131. Shri N. N. Roy, Cabinman, Salsalabari. 132. Shri S. K. Bose, Assistant Station Master, Alipurduar Jn. 133. Shri D. K. Adhikari, Guard, Grade 'C', New Cooch Bihar. 134. Shri I. Daniel, Driver Diesel Grade 'A', Alipurduar. 135. Shri B. K. Nandi, Mechanical Signal Maintainer, New Mal Jn. 136. Shri J. C. Roy, Carriage & Wagon Inspector, Alipurduar Jn. 137. Shri A. K. Chowdhury, Permanent Way Inspector, New Alipurduar.	
30-10-79	Alipurduar	Accident Relief Train Divisional Office Northeast Frontier Railway. Divisional Office, Northeast Frontier Railway.	138. Shri N. C. Bose, Safety Counsellor (Loco), Alipurduar Jn. 139. Shri K. C. Chakravarty, Divisional Signal & Telecommunication Engineer.	

Date	Place	Installations/Offices visited.	S. No.	Persons interviewed.
			140.	Shri S. K. Iyer, Senior Divisional Mechanical Engineer, (Power).
			141.	Shri S. P. Vatsa, Divisional Engineer II.
			142.	Shri A. K. Bagchi, Divisional Safety Officer.
30-10-79	Alipurduar	Divisional Office, Northeast Frontier Railway.	143.	Shri A. N. Perumal, Divisional Railway Manager.
31-10-79	New Bongaigaon	Carriage & Wagon Workshops, Northeast Frontier Railway. Office of the Works Manager, Carriage & Wagon Workshops Northeast Frontier Railway.	144.	Shri R. Janakiraman, Shop Superintendent (Wagon), New Bongaigaon.
			145.	Shri R. N. Sharma, Shop Superintendent (Wheel & Roller Bearings), New Bongaigaon.
			146.	Shri E. Hussain, Neutral Train Examiner (Workshops), New Bongaigaon.
			147.	Shri D. C. Beri. Works Manager, Carriage and Wagon Workshop., New Bongaigaon.
			148.	Shri Hira Swamy, Neutral Inspector, (Brake Power Testing and centralised traffic control), Gauhati.
		Centralised Traffic Control from New Bongaigaon to Changsari, Northeast Frontier Railway.		
1-11-79	Gauhati	Wagon Maintenance Depot Noonmati, Washing and pit lines, Carriage Maintenance Depot, Train lighting Depot, Northeast Frontier Railway. Gauhati station.	149.	Shri Gulab Chandra Nath, Pointsman 'B' Gauhati.
			150.	Shri N. C. Mazumdar, Assistant Operating Superintendent, Gauhati.
			151.	Shri R. K. Basak, Fireman 'B', Lumding.
			152.	Shri T. K. Sen, Wagon Foreman, New Gauhati.
1-11-79	Gauhati	Gauhati station	153.	Shri B. Roy, Carriage Foreman, Gauhati.
			154.	Shri B. N. Bardoli, Safety Counsellor, Traffic, Lumding.
			155.	Shri H. N. Kohli, Senior Divisional Engineer, Lumding.
			156.	Shri N. L. Seal, Driver Grade 'C'. Lumding.
			157.	Shri I. Bandopadhyay, Divisional Mechanical Engineer, Lumding.
			158.	Shri S. B. Chowdhury, Divisional Safety Officer, Lumding.
			159.	Shri R. K. Sabarwal, Divisional Railway Manager, Lumding.

Date	Place	Installations/Offices visited	S. No.	Persons interviewed.				
2-11-79	Pandu	Signal & Telecommunication staff training school, Northeast Frontier Railway.		160. Shri P. K. Ghosal, Assistant Signal & Telecommunication Engineer (Workshop).				
				161. Shri S. N. Chatterjee, Chief Mechanical Engineer.				
	Maligaon	Headquarters Office, Northeast Frontier Railway.		162. Shri C. Chatterjee, Chief Workshop Engineer.				
				163. Shri S. Sen, Chief Signal & Telecommunication Engineer.				
2-11-79	Maligaon	Headquarters Office, Northeast Frontier Railway.	164. Shri P. Sathiapalan, Chief Electrical Engineer.					
			165. Shri A. R. S. Rao, Chief Engineer.					
			166. Shri M. K. Menon, Controller of Stores.					
			167. Shri K. Balakrishnan, Chief Operating Superintendent.					
3-11-79	Maligaon	Headquarters Office, Northeast Frontier Railway.		168. Shri R. N. Sharma, Chief Medical Officer.				
				169. Shri M. R. Choudhury, Chief Security Officer.				
				170. Shri K. K. Berry, Chief Personnel Officer.				
				171. Shri C. M. Kulshreshtha, Chief Safety Superintendent.				
				172. Shri B. Venkataramani, General Manager.				
19-11-79	Mughalsarai	Control Tower UP hump yard, Eastern Railway. Divisional Office, Eastern Railway.		173. Shri B. K. Mandal, Head yard Master Mughalsarai.				
				174. Shri N. C. Saini, Yard Superintendent, Mughalsarai.				
				175. Shri R. P. Saxena, Head Train Examiner Goods (Sicklines), Mughalsarai.				
				176. Shri C. R. Das, Train Examiner, (Breakdown yard), Mughalsarai.				
				177. Shri V. S. Sharma, Carriage & Wagon Superintendent, Mughalsarai.				
				19-11-79	Mughalsarai.	Divisional Office, Eastern Railway		178. Shri N. K. P. Sinha, Neutral Train Examiner (Goods sick lines), Mughalsarai.
								179. Shri S. H. Lall, Permanent Way Inspector (North), Mughalsarai.
				180. Shri M. K. Mishra, Senior Divisional Operating Superintendent.				
				181. Shri N. C. Gupta, Divisional Superintendent.				
20-11-79	Jamalpur	Jamalpur Workshops, Eastern Railway.		182. Shri K. P. Mahato, Shop Superintendent (Wheel Shop).				
				183. Shri M. S. Birdi, Shop Superintendent (Spring shop & Blacksmith shop).				
				184. Shri B. N. Mallick, Assistant Power and Transport Instructor (Mechanical) System Technical School.				
				185. Shri Mahesh Chandra, Deputy Chief Mechanical Engineer (Finishing).				

Date	Place	Installations/Offices visited	S. No.	Persons interviweed.
			186.	Shri B. Rangarajan, Superintendent Mechanical (W).
			187.	Shri B. N. Thakur, Signal Inspector, Danapur.
			188.	Shri H. S. Hazra, Permanent Way Inspector Danapur.
			189.	Shri G. B. Singh, Carriage & Wagon Inspector, Danapur.
			190.	Shri S. N. Pande, Safety Counsellor (Traffic). Danapur.
21-11-79	Jamalpur . . .	Indian Railways Institute of Mechanical & Electrical Engineering.	191.	Shri Debasibish Roy, Senior Assistant Professor.
			192.	Shri S. N. Mahant, Principal,
			193.	Shri S. K. Sinha, Divisional Mechanical Engineer (Carriage & Wagon), Danapur.
			194.	Shri D. S. Mishra, Divisional Safety Officer, Danapur.
			195.	Shri M. D. Khattar, Senior Divisional Engineer (Main Line) Danapur.
22-11-79	Chittaranjan . . .	Chittaranjan Locomotive Works	196.	Lt. Col. M. N. Khanna, Chief Mechanical Engineer (Steel Foundry).
			197.	Shri J. C. Gupta, Chief Electrical Engineer Chittaranjan Locomotive Works.
			198.	Shri A. K. Mukherjee, Chief Mechanical Engineer (Works) Chittaranjan Locomotive Works.
23-11-79	Asansol . . .	Kunustoria Colliery. Divisional Office, Eastern Railway.	199.	Shri G. M. Dass, Station Superintendent, Asansol.
			200.	Shri P. Prasad, Guard, Grade 'C' Asansol.
			201.	Shri Lallan Misra, Switchman, Sitarampur.
23-11-79	Asansol	Divisional Office, Eastern Railway.	202.	Shri Baleswar Pande, Diesel Driver, Grade 'C', Asansol.
			203.	Shri P. K. Saha, Electrical Driver Grade 'C', Asansol.
			204.	Shri D. K. Chatterjee, Head Weighment Clerk Barakar.
			205.	Shri B. M. Chakravarthy, Head Train Examiner (Sickliness), Asansol.
			206.	Shri N. K. Hazra, Coal Pilot Guard, Grade 'B', Asansol.
			207.	Shri D. P. Chatterjee, Safety Counsellor (Carriage & Wagon) Asansol.
			208.	Shri P. N. Dharuman, Senior Divisional Mechanical Engineer, (Carriage & Wagon.)
			209.	Shri Swastik Mishra, Senior Divisional Operating Superin- tendent (Transportation.)

Date	Place	Installations/Offices visited.	S. No.	Persons interviewed.
24-11-79	Asansol	Divisional Office, Eastern Railway	210.	Shri P. K. Bandhopadhyay, Senior Divisional Commercial Superintendent.
			211.	Shri R. S. Dhar, Senior Divisional Signal and Telecommunication Engineer.
			212.	Shri A. K. Das, Divisional Safety Officer.
			213.	Shri M. D. Mathur, Divisional Railway Manager.
17-12-79	New Delhi		214.	Shri R.N. Ghosh
			215.	Shri R. K. Das Gupta,
			216.	Shri H. S. Chatterjee
			217.	Shri B. R. Vohra
			218.	Shri Sudarshan Luthar.
			219.	Shri D. P. Bhatia
			220.	Shri Surendra Mohan
17-12-79	New Delhi		221.	Shri S.K. Aggarwal
			222.	Shri R. S. Sehgal
			223.	Shri S. P. Garg
			224.	Shri Jai Dutt
			225.	Shri G. L. Vig.
17-12-79	New Delhi		226.	Shri C. D. Dixit
			227.	Shri R. P. Singh
			228.	Shri G. Chakrapani
			229.	Shri K. Santhanam
			230.	Shri S. Niamutullah
18-12-79	New Delhi.		231.	Shri C.L. Upadhyay
			232.	Shri A. S. Ahuja
			233.	Shri M. M. D'Souza.
			234.	Shri S. C. Dhar.
			235.	Shri K. C. Mehra
			236.	Shri S. N. Vyas.
			237.	Shri B. S. Sharma
			238.	Shri S. S. Ahuja.
			239.	Shri R. P. Yadav.
18-12-79	New Delhi.		240.	Shri K. Duraisamy
			241.	Shri R. Sunder Raj
			242.	Shri C.V. Appu
			243.	Shri V.R. S. Maini
			244.	Shri T. Muthukrishnan
			245.	Shri S. C. Pillai.
18-12-79	New Delhi.		246.	Shri J. K. Gupta
17-1-80	Ghaziabad	Signal Workshop Signal & Telecommunication Training Centre.	247.	Shri Susheel Kumar, Assistant Signal and Telecommunication Engineer.
			248.	Shri Chandra Kishore, Train Examiner, Ghaziabad.
			249.	Shri Y. P. Kaushal, Chief Trains Examiner, Ghaziabad.
			250.	Shri B. D. Abhyankar, Permanent Way Inspector, Ghaziabad.
			251.	Shri Ved Brat, Head Neutral Train Examiner (Sicklines) Ghaziabad.
			252.	Shri J. K. Saxena, Assistant Station Master, Route Relay Pannel Operator, Ghaziabad.

Representatives of the All India Station Master's Association.

Representatives of Northern Railway Civil Engineering Works Subordinates Association.

Representatives of Research Designs and Standards Organisation Class II Officers Association

Representatives of All India Guards Council.

Representatives of All India Oppressed Employees Association.

Retired Assistant Mechanical Engineer Lucknow.

Date	Place	Installations/Offices visited	S. No.	Persons interviewed			
18-1-80	New Delhi	Traction Control Office, Traffic Control Office, Divisional Office, Northern Railway.	253. Shri Janaki Dass, Chief Yard Master, Ghaziabad.				
			254. Shri Mukandi Lall, Station Superintendent, Ghaziabad.				
			255. Shri M. K. Mehta, Permanent Way Inspector, New Delhi.				
			256. Shri Sri Bhagwan, Electrical Signal intainer Grade I, New Delhi.				
			257. Shri Inder Kumar Gupta, Head Train Examiner (Coaching), New Delhi.				
			258. Shri M. M. Khan, Signal Inspector (East), New Delhi.				
			259. Shri Narain Das Electric Loco Driver 'C'. Delhi.				
			260. Shri S. D. Sharma, Assistant Station Master (Indoor), New Delhi.				
			261. Shri R. K. Nanda, Route Relay Panel Operator, Delhi.				
			262. Shri Iqbal Singh, Carriage Foreman, (Washing & Fitting), New Delhi.				
			263. Shri G. A. Woodward, Electric Loco Driver, Grade 'A', Kanpur.				
			264. Shri A. C. Mathur, Signal Inspector (Route Relay), Delhi.				
			265. Shri V. P. Chiber, Carriage Foreman, Delhi.				
			266. Shri M. L. Raizada, Guard Special Grade (Rajdhani). Kanpur.				
			267. Shri Narbada Prasad, Diesel Driver, Special Grade (Rajdhani) Kanpur.				
			268. Shri Ram Charan, Safety Counsellor (Traffic) New Delhi.				
			269. Shri M. L. Khera, Chief Traction Power Controller, New Delhi.				
			270. Shri Chander Prakash, Station Superintendent, New Delhi.				
			19-1-80	New Delhi.	Divisional Office, Northern Railway	271. Shri Dhanbir Singh, Safety Counsellor; (Carriage & Wagon), New Delhi.	
						272. Shri Kuldeep Singh, Senior Welfare Inspector, New Delhi.	
						273. Shri Gurcharanjit Singh, Senior Divisional Engineer.	
						274. Shri A. K. Saxena, Senior Divisional Operating Superintendent	
						275. Shri Aditya Prasad, Senior Divisional Mechanical Engineer (Carriage & Wagon).	
						276. Shri R. C. Iyer, Senior Divisional Signal & Telecommuni- cation Engineer.	

Date	Place	Installations/Offices visited.	S. No.	Persons interviewed.
			277.	Shri Y. B. Sharma, Senior Divisional Mechanical Engineer (Diesel), Tughlakabad.
			278.	Shri A. J. Gupta, Senior Divisional Electrical Engineer.
			279.	Shri R. D. Malhotra, Senior Divisional Personnel Officer.
			280.	Shri Vijay Singh, Divisional Railway Manager.
			281.	Shri Amar Nath, Divisional Safety Officer.
21-1-80	New Delhi.	Headquarters Office, Northern Railway.	282.	Shri A. N. Mittal, Senior Transportation Officer (Safety).
			283.	Shri Dilraj Singh, Chief Mechanical Engineer.
			284.	S. K. Gandotra, Chief Engineer.
21-1-80	New Delhi	Headquarters Office, Northern Railway.	285.	Shri S. M. Bammi, Chief Workshop Engineer.
			286.	Shri Gauri Shanker, Chief Track Engineer.
			287.	Shri M. L. Khullar, Chief Electrical Engineer.
			288.	Shri S. M. Vaish, Chief Bridge Engineer.
			289.	Shri L. C. Vaswani, Chief Signal & Telecommunication Engineer
			290.	Shri M. C. Khorwal, Chief Medical Officer.
			291.	Shri R. S. Roy, Chief Security Officer.
			292.	Shri B. R. Pawha, Chief Personnel Officer.
			293.	Shri P. C. Gupta, Financial Advisor & Chief Accounts Officer.
			294.	Shri J. P. Moorjani, Controller of Stores.
22-1-180	New Delhi	Headquarters Office, Northern Railway.	295.	Shri P. Bhalla, Senior Deputy General Manager.
			296.	Shri C. S. Christian, Chief Safety Superintendent.
			297.	Shri R. K. Natesan, General Manager.
23-1-80	New Delhi.		298.	Shri V. C. Paranjape, Chairman, Wagon, India, Ltd.
			299.	Shri M. P. K. Menon, Chairman, Railway Service Commission, Madras.
			300.	Shri K. S. Tilak, Chairman, Railway Service Commission Secunderabad.
25-1-80	New Delhi.		301.	Shri D. N. Dutt Chowdhury, Deputy Commissioner of Railway Safety (Mechanical) Lucknow.
			302.	Shri F. J. Correya, Deputy Commissioner of Railway Safety (Operating) Lucknow.
			303.	Shri R. K. Jain, Directory (Vigilance) Railway Board.
5-2-80	Adra	Wagon repair shop South Eastern Railway. Divisional Office South Eastern Railway.	304.	Shri Ram Prasad, Driver, Grade 'B', Adra.
			305.	Shri Sarafuddin Khan, Switchman, Ranchi.

Date	Place	Installations/Offices visited.	S. No.	Persons interviewed.
			306.	Shri J. C. Sirkar, Head Train Examiner, Bhojudih.
			307.	Shri A. G. Chatterjee, Permanent Way Inspector. Grade I Purulia.
			308.	Shri B. Ghosh, Signal Inspector, Grade II Adra.
			309.	Shri G. Rama Rao, Safety Counsellor (Operating), Adra.
			310.	Shri S. B. Chakravarty, Loco Foreman, Adra.
			311.	Shri A. C. Mukerjee, Station Master Class I. Adra.
			312.	Shri K. Natarajan, Divisional Signal & Telecommunication Engineer.
			313.	Shri D. C. Sanyal, Senior Divisional Mechanical Engineer (Carriage & Wagon.)
			314.	Shri D. P. Kunhi Krishnan, Senior Divisional Engineer.
5-2-80	Adra	Divisional Office South Eastern Railway.	315.	Shri O. P. Lobo, Divisional Safety Officer.
			316.	Shri I. S. Sandhu, Divisional Superintendent.
5-2-80	Adra	Accident Relief Medical Van, South Eastern Railway.		
6-2-80	Kharagpur	Carriage & Wagon and Loco shops and System Technical School, South Eastern Railway Divisional Office South Eastern Railway.	317.	Shri S. Mukherjee, Principal, System Technical School.
			318.	Shri S. C. Bera, Switchman Panchkura.
			319.	Shri S. K. Sen, Block Maintainer, Grade I Kolaghat.
			320.	Shri A. C. Jacob, Block Signal Inspector, Kolaghat.
			321.	Shri M. Govinda Rao, Fitter, Kharagpur.
			322.	Shri S. R. Khobragade, Chargeman, Grade A, Kharagpur.
			323.	Shri A. K. Chodhury, Shop Superintendent (Spring), Kharagpur.
			324.	Shri T. N. Mukhopadhyaya, Shop Superintendent (Wheel & Roller Bearing), Kharagpur.
			325.	Shri J. M. Sinha, Neutral Train Examiner I/c Wagon Shop, Kharagpur.
			326.	Shri A. B. Das, Production Engineer
			327.	Shri P. S. Srivastava, Deputy Chief Mechanical Engineer (Wagon).
			328.	Shri N. Sarkar, Deputy Chief Mechanical Engineer (Carriage & Wagon.)
6-2-80	Kharagpur	Divisional Office, South Eastern Railway	329.	Shri A. K. Mukherjee, Additional Chief Mechanical Engineer (Workshops).
			330.	Shri D. K. Chowdhury, Electric Driver, Grade 'C', Kharagpur.

Date	Place	Installations/Offices visited.	S. No.	persons interviewed.
7-2-80	Kharagpur	-do-	331.	Shri S. K. Chatterjee, Guard, Grade 'B', Kharagpur.
			332.	Shri J. K. Das Gupta, Station Superintendent, Kharagpur.
			333.	Shri S. A. Padmanabhan, Divisional Electrical Engineer, Electrical Driver, Training School, Tatanagar.
			334.	Shri A. K. Das, Senior Divisional Operating Superintendent.
			335.	Shri T. K. Singh, Senior Divisional Engineer.
			336.	Shri A. D. Tejpal, Senior Divisional Electrical Engineer (Traction.)
			337.	Shri S. N. Parida, Motorman (EMU) Kharagpur.
			338.	Shri N. L. Braganza, Senior Divisional Signal & Telecommunications Engineer.
			339.	Shri H. K. Padhee, Divisional Safety Officer.
			340.	Shri R. K. Dang, Divisional Railway Manager.
8-2-80	Calcutta.	EMU/Car Shed, Tikiapara.		
9-2-80	Calcutta	Headquarters Office, South Eastern Railway	341.	Shri G. Kumar, Divisional Electrical Engineer EMU Car Shed, Tikiapara.
			342.	Shri P. K. Benerjee, Shop Superintendent (Rolling Stock), Tikiapara.
			343.	Shri K. C. Priyadarshee, Chief Electrical Engineer,
			344.	Shri B. K. Srinivasan, Chief Engineer.
			345.	Shri R. C. Tandon, Chief Workshop Engineer.
			346.	Shri K. J. M. Jacob, Chief Signal & Telecommunications Engineer.
			347.	Shri P. K. Datta, Controller of Stores.
			348.	Shri E. C. King, Senior Deputy General Manager.
			349.	Shri A. K. Roy Chaudhury, Financial Advisor and Chief Accounts Officer.
9-2-80	Calcutta	Headquarters Office, South Eastern Railway	350.	Shri P. S. Choudhary, Chief Personnel Officer.
			351.	Dr. A. L. Goswami, Chief Medical Officer.
			352.	Shri S. M. Misra, Chief Security Officer,
			353.	Shri N. Dutt, Chief Operating Superintendent.
			354.	Shri M. G. Verma, Chief Mechanical Engineer.
			355.	Shri M. K. Verma, Chief Safety Superintendent.
11-2-80	Liluah	Carriage and Wagon Workshop, Eastern Railway.		
		Headquarters Office, Eastern Railway.	356.	Shri P. K. Bose, (Route Relay, Cabin Operator) Senior Cabin Assistant Station Master, Howrah.

Date	Place	Installation/Offices visited	S. No. : Persons interviewed
			357. Shri Harihar Banerjee, Signal Inspector, Liluah.
			358. Shri B. Bhattasali, Electrical Fitter Grade II, Liluah.
			359. Shri Sujit Kumar Roy Guard Grade 'B', Howrah.
			360. Shri A. K. Chakravarthy, Chargeman, Grade 'A' Wagon repair Shop, Liluah.
			361. Shri Ashim Kumar Banerjee, Shop Superintendent (Roller Bearings) Liluah.
			362. Shri H. B. Das, Shop Superintendent (Springs), Liluah.
			363. Shri P. Mukherjee, Assistant Neutral Control Officer, Howrah.
			364. Shri A. K. Das, Production Engineer, Liluah.
			365. Shri T. S. B. Verma, Deputy Chief Mechanical Engineer (Work- shop), Liluah.
			366. Shri R. R. Singh, Driver, Special Grade (Rajdhani), Mughalsarai.
			367. Shri P. K. Minze, Driver, Special Grade (Electrical), Howrah.
			368. Shri V. N. Singh, Guard, Special Grade, Mughalsarai.
			369. Shri H. R. Bhattacharjee, Motor man (EMU), Howrah.
12-2-80	Calcutta.	Headquarters Office, Eastern Railway.	370. Shri N. Basak, Senior Divisional Engineer, Howrah.
			371. Shri M. K. Mukherjee, Safety Counsellor Traffic, Howrah.
			372. Shri R. M. Neogi, Senior Divisional Signal & Telecommuni- cation Engineer.
			373. Shri K. P. Biswas, Superintendent (Carriage & Wagon) Tikiapara.
			374. Shri Lallan Prasad, Senior Divisional Electrical Engineer (Traction).
			375. Shri S. M. Chatterjee, Senior Welfare Inspector, Howrah.
			376. Shri G. P. Ambasta, Divisional Safety Officer, Howrah.
			377. Shri S. K. Gupta, Divisional Railway Manager, Howrah.
			378. Shri P. Varadachari, Chief Electrical Engineer.
			379. Shri S. K. Mitra, Chief Mechanical Engineer.
			380. Shri V. S. Murti, Chief Engineer.

Date	Place	Installations/Officers visited.	S. No.	Persons interviewed.
13-2-80	Calcutta.	Headquarters Office Eastern Railway.	381.	Shri A. K. Srivastava, Chief Workshop Engineer.
			382.	Shri K. Subramaniam, Chief Signal and Telecommunication Engineer.
			383.	Shri A. B. Banerjee, Controller of Stores.
			384.	Dr. J. M. Ghosh, Chief Medical Officer.
			385.	Shri A. Sen, Chief Personnel Officer
			386.	Shri M. L. Gupta, Chief Operating Superintendent.
			387.	Shri SatyaPal, Deputy Chief Vigilance Officer (Engineer- ing.
			388.	Shri H. K. Bandopadhyaya, Chief Savety Superintendent.
			389.	Shri Prabhinder Singh, General Manager
			390.	Shri G. S. Banerjee, Secretary, Home (Transport) Department, Government of West Bengal,
			391.	Shri Sukumar Sen, Deputy Secretary Home (Transport) Department, Government of West Bengal
			392.	Shri A. K. Das Gupta, Engineer in chief and Ex-officio Secretary, Public Works Department Government of west Bengal.
			393.	Shri A. N. Datta, Deputy Inspector General of Police (Railways) Government of West Bengal.
25-2-80	Ajmer	Carriage and Wagon Workshops, Western Railway.	394.	Shri Sukhdev Prasad, Fitter Grade II (Shop Floor).
			395.	Shri N. K. Sharma, Chargeman (Shop Floor).
			396.	Shri B. S. Kalra, Assistant Shop Superintendent (Shop Floor).
			397.	Shri J. M. Patney, Asstt. Shop Superintendent (Wheel and Roller Bearings).
25-2-80	Ajmer	Carriage & Wagon Workshops Western Railway.	398.	Shri B. S. Kulgod, Shop Superintendent (Wagon Shop).
			399.	Shri J. D. Sharma, Smith Shop Superintendent.
			400.	Shri J. Lancelot, Netural Train Examiner.
			401.	Shri Abdul Wahid, Deputy Chief Mechanical Engineer (Workshop).
25-2-80	Ajmer	Divisional Office Western Railway	402.	Shri J. L. Sethi, Guard Grade 'C' Abu Road
			403.	Shri K. Chandu Lal, Driver Grade 'A'.
			404.	Shri R. P. Bhatnagar, Signal Inspector
			405.	Shri A. E. Peters, Divisicnal Transportation Inspector.
26-2-80	Ajmer	Divisional Office, Western Railway.	406.	Shri K. N. Gosai, Station Superintendent, Ajmer.
			407.	Shri S. N. Singla, Senior Divisicnal Engineer, Ajmer.
			408.	Shri N. L. Tewari, Divisional Mechanical Engineer (Carriage & Wagon) Ajmer.

Date	Place	Installations/Offices visited	S. No.	Persons interviewed.			
27-2-80	Udaipur	Zonal Training School	409.	Shri J. P. Pradhan, Divisional Signal and Telecommuni- cations Engineer, Ajmer.			
			410.	Shri P. R. Sharma, Divisional Safety Officer, Ajmer.			
			411.	Shri R. D. Kitson, Divisional Railway Manager, Ajmer.			
			412.	Shri M. C. Meena, Principal.			
			413.	Shri C. Sharan Singh, Instructor, (Transportation), Udaipur.			
			414.	Shri S. P. Bhasin, Assistant Station Master, Udaipur City.			
			415.	Shri G. G. Maheswari, Station Master, Ranapratapnagar.			
			416.	Shri R. M. Jambholkar, Assistant Engineer (Open Line), DUNGARPUR.			
			28-2-80	Vadodara	Railway Staff College.	417.	Shri S. Suryanarayanan, Professor, Civil Engineering.
						418.	Shri R. K. Grover, Professor, Transportation.
419.	Shri M. K. Kaul, Professor, Signal.						
420.	Shri G. S. Loomba, Professor Mechanical Engineering.						
421.	Shri B. Raghunath Ram, Vice Principal.						
422.	Shri Mela Lakha, Switchman, Vadodara, Western Railway.						
423.	Shri Ved Kumar Ghai, Guard Grade 'C', Vadodara, Western Railway.						
424.	Shri A. G. Mansuri, Driver Grade 'B', Dhaboi, Western Railway.						
425.	Shri K. P. Talati, Electric inter Grade I Uttar Sanda, Western Railway.						
426.	Shri S. Y. Nitnaware, Head Train Examiner, Ahmedabad, Western Railway.						
427.	Shri Inderjeet Singh, Signal Inspector, Grade II, Vadodara, Western Railway.						
428.	Shri Rasiklal J. Thakkar, Safety Counsellor (Traffic) Western Railway Vadodara.						
28-2-80	Vadodara.	Railway Staff College				429.	Shri Inderjeet Singh, Flora, Station Superintendent Vadodara, Western Railway.
29-2-80	Vadodara.		430.	Shri Arya Mitra, Senior Divisional Operating Superinte- ndent Vadodara, Western Railway.			
			431.	Shri D. N. Mehra, Senior Divisional Personnel Officer, Western Railway.			
			432.	Shri M. S. Ekbbote, Senior Divisional Engineer, Western Railway.			
			433.	Shri R. Mehrotra, Divisional Mechanical Engineer (Carriage & Wagon) Western Railway.			

Date	Place	Installations/Officers visited	S. No.	Persons interviewed.
			434.	Shri Rajendra Kumar, Senior Divisional Signal and Telecommunication Engineer.
			435.	Shri G. V. Raghavan, Divisional Safety Officer, Western Railway
			436.	Shri K. A. Khan, Divisional Railway Manager, Western Railway, Vadodara.
10-3-80	Varanasi	Diesel Locomotive Works.	437.	Shri K. B. Kapur, Chief Mechanical Engineer,
			438.	Shri V. K. Rajna. Chief Inspecting Officer.
			439.	Shri N. Viswanathan. Controller of Stores,
			440.	Shri K. P. Jayaram, General Manager.
11-3-80	Varanasi	Wagon Maintenance Depot Manduadih Transshipment Shed, North Eastern Railway. Divisional office, North Eastern Railway	441.	Shri Ram Nandan Prasad, Supervisor Transshipment Manduadih,
			442.	Shri L. P. Viswakarma. Assistant Station Master, Aunihar.
			443.	Shri Bishnu Dev Rai, Chief Train Examiner. Manduadih.
			444.	Shri Chedi Prasad Pandey, Allied, Fitter, Carriage Depot Varanasi.
			445.	Shri Sudama Pandey, Head Train Examiner Varanasi.
			446.	Shri L. L. Gupta Driver, Grade 'A' Chupra Kanhuri.
			447.	Shri Sukarullah, Cabinman, Sadat.
			448.	Shri R. S. Sharma Safety Counsellor (C & W) Varanasi.
			449.	Shri Shiv Nath Gangmate, Kammudhin pur.
			450.	Shri Opendra Sharma, Gateman, Varanasi.
12-3-80	-do-	-do-	451.	Shri J. B. Bhartaria. Permanent Way Inspector, Varanasi.
			452.	Shri M. N. Roy, Divisional Engineer.
			453.	Shri J. R. Oberai, Divisional Electrical Engineer,
			454.	Shri A. P. Mukherjee, Divisional Signal & Telecommunication Engineer.
			455.	Shri P. C. Maulik, Divisional Mechanical Engineer (Carriage and Wagon.)
			456.	Shri M. S. Akhtar, Divisional Safety Officer.
			457.	Shri Kranti Kumar, Divisional Railway Manager.
13-3-80	Gorakhpur	Loco Carriage and Wagon Workshops North Eastern Railway. Headquarters Office North Eastern Railway.	458.	Shri Sheo Pujan Sharma, Fitter, Gorakhpur.

Date	Place	Installations/Offices visited.	S. No.	Persons interviewed.
			459.	Shri S. K. Abrol, Chargeman, Gorakhpur.
			460.	Shri C. D. Jha, Neutral Train Examiner Workshops (Carriage & Wagon), Gorakhpur.
			461.	Shri G. P. Handa, Deputy Chief Mechanical Engineer Workshops),
			462.	Shri H. C. S. Jagati, Chief Mechanical Engineer.
			463.	Shri D. N. Singh, Chief Engineer.
			464.	Shri P. L. Rawal, Chief Workshops Engineer
			465.	Shri Ajit Rosha, Chief Operating Superintendent.
			466.	Shri C. P. Gupta, Chief Electrical Engineer.
			467.	Shri N. P. Vithal, Chief Bridge Engineer.
14-3-80	Gorakhpur	Centralised Traffic Control Room, Gorakhpur, North Eastern Railway. Headquarters Office North Eastern Railway	468.	Shri M. G. Israni, Chief Signal & Telecommunication Engineer.
			469.	Shri Shyamji Sehgal, Controller of stores,
			470.	Dr. B. D. Harbola, Chief Medical Officer.
			471.	Shri T. V. Madhav, Chief Personnel Officer,
			472.	Shri Satya Pal Sharma, Chief Security Officer,
			473.	Shri U. A. Kamath, Senior Deputy General Manager.
			474.	Shri V. K. Chaube, Chief Safety Superintendent.
			475.	Shri Laljee Singh, General Manager.
24-3-80	Tondiarpet	Wagon Repair Depot Sick lines, Marshalling Yard, Area Control Office, Hump Yard, and Guards Running Room Southern Railway.	476.	Shri T. M. Ramaswamy, Chief Train Examiner. Tondiarpet.
	Madras	Divisional Office Southern Railway.	477.	Shri K. R. Thirupathi, Head Neutral Train Examiner, Tondiarpet. Marshalling Yard.
			478.	Shri T. A. Jayaraj, Highly skilled carriage and Wagon, Fitter, Grade I, Egmore.
			479.	Shri K. Rangaswamy, Chief Yard Master, Tondiarpet Marshalling Yard.
			480.	Shri A. C. Govindaswamy, Shunting Jamadar, Salt Cotaurs.
			481.	Shri T. M. Rathim Raj, Diesel Shunter Tondiarpet Marshalling Yard.
			482.	Shri V. Bhaskaran, Carriage & Wagon Superintendent Egmore.
			483.	Shri V. Nangabhushanam, Cabin Assistant Station Master, Egmore.

Date	Place	Installations/Office visited.	S. No.	Persons interviewed.
25-3-80	Madras	Washing & Pit Lines carriage maintenance depot, Southern Railway.	484.	Shri Chelliah Pilley, Electrical Signal Maintainer, Punneru.
25-3-80	Madras	Divisional Office Southern Railway.	485.	Shri A. M. Vanderputt, Safety Counsellor (Mechanical), Madras.
26-3-80	Madras	Divisional Office Southern Railway.	486.	Shri M. C. Narayanan Motorman, Tambaram,
			487.	Shri T. Kodandaraman Guard 'B' (EMU) Tambaram.
			488.	Shri N. Venkataraman. Chief Train Examiner. Madras Central.
			489.	Shri T. K. Niranjanan Carriage & Wagon Superintendent, Madras Central.
			490.	Shri K. Deenadayalu, Permanent Way Inspector Ambur.
			491.	Shri K. Balakrishnan Signal Inspector, Tambaram.
			492.	Shri C. Xavier, Leverman. Chenglepet.
			493.	Shri W. Doyle Diesel Driver Grade 'A' , Tondiarpet.
			494.	Shri T. J. Gaughan, Guard, Special Grade, Madras Central.
			495.	Shri D. S. Mani, Diesel Driver, Grade 'B' Tandiarpet.
			496.	Shri E. S. Dharma Raj, Guard Grade B, Tambaram.
			497.	Shri R. Krishnan Raju. Safety Counsellor (Traffic), Madras Central.
26-3-80	Madras	Divisional Office Southern Railway.	498.	Shri T. A. A. Rahim, Senior Divisional Electrical Engineer (Rolling Stock).
			499.	Shri V. Krishna Murthy, Senior Divisional Engineer.
			500.	Shri M. H. Balakrishnan, Senior Divisional Mechanical Engineer (Carriage & Wagon),
			501.	Shri T. V. S. Sundaram, Senior Divisional Signal and Telecommuni- cation Engineer, Madras.
			502.	Shri A. S. Krishna Murthy, Senior Divisional Operating Superinten- dent, Madras.
26-3-80	Madras	Divisional Office Southern Railway	503.	Shri S. K. Shanmuga, Sundaram, Divisional Safety Officer, Madras.
			504.	Shri M. N. Prasad, Divisional Railway Manager, Madras.
27-3-80	Perambur	Integral Coach Factory	505.	Shri R. K. Rau, Chief Mechanical Engineer.
			506.	Shri K. S. Samba, Murthy, Chief Electrical Engineer.

Date	Place	Installation/Offices Visited.	S. No.	Persons interviewed.			
28-3-80	Madras	Headquarters Office Southern Railway	507.	Shri N. Venkata Subramanian, Controller of Stores (Looking after as General Manager).			
			508.	Shri K. G. Belliappa, Chief Mechanical Engineer.			
			509.	Shri M. V. S. Murthy, Chief Electrical Engineer.			
			510.	Shri R. K. Thyagarajan, Chief Workshop Engineer.			
			511.	Shri K. Ramaswami, Chief Track Engineer.			
			512.	Shri S. Panchapakesen Chief Signal and Telecommunication Engineer.			
			513.	Shri K. A. Jacob. Additional General Manager (Technical Services)			
			514.	Shri A. V. Sugawaneswara , Controller of Stores			
			515.	Shri A. V. Subramaniam, Chief Personnel Officer.			
			516.	Dr. S. Singh Chief Medical Officer			
			517.	Shri P. Dorai, Chief Security Officer.			
			29-3-80	Madras	Headquarters Office Southern Railway.	518.	Shri S. G. Raman, Additional General Manager (Operation)
						519.	Shri R. Narasimhan, Financial Adviser and Chief Accounts Officer.
						520.	Shri B. Madhavan Senior Deputy General Manager.
						521.	Shri S. K. Nair, Chief Safety Superintendent.
						522.	Shri T. M. Thomas General Manager.
						523.	Dr. Krishna moorthy Srinivas, Consultant, Medical Services.
524.	Shri K. J. M. Shetty, Transport Secretary, Government of Tamil Nadu, Madras.						
525.	Shri K. S. Lokavinayagam, Chief Engineer, Highways and Rural Works. Government of Tamil Nadu Madras.						
14-4-80	New Delhi.					526.	Shri K. Ganapati, Commissioner of Railway Safety, Eastern and South Eastern Circles.
						527.	Shri A. K. Chakravarti, Director (Safety & Coaching), Railway Board.
			528.	Shri R. P. Singh, Director, Traffic Transportation Railway Board.			
			529.	Shri K. Subramanyam, Director (Signal and Telecommunication), Railway Board.			
			15-4-80	New Delhi.		530.	Shri M. C. Misra, Director (Security), Railway Board.
531.	Shri H. D. Bhalla, Director, Mechanical Engineering, Railway Board.						
6-4-80	New Delhi.					532.	Shri T. N. Ramachandran, Director, Civil Engineering. Railway Board.
			533.	Shri K. M. Purohit			
			534.	Shri J. P. Chaube			
			535.	Shri A. V. K. Chaitanya			
			536.	Shri B. S. Sen			
			537.	Shri Jai Narain Singh.			
538.	Shri T. N. Bajpai						

} Representatives of
All India Railway
Men's Federation

Date	Place	Installations/Offices visited.	S. No.	Persons	interviewed.
			539.	Shri K. S. N. Murthy.	
			540.	Shri Muni Lal.	
			541.	Shri I. H. Khan.	
			542.	Shri Sujit Roy	
			543.	Shri V. B. Mahadeshwar.	
			544.	Shri J. D. Kulkarni	
			545.	Shri M. R. Saini.	
			546.	Shri Janardhan.	
			547.	Shri N. A. Mathews	
			548.	Shri A. Khan.	
			549.	Shri J. C. Chakravotry.	
			550.	Shri A. Johri.	} Representatives of Federation of Rail- way officers Asso- ciation.
			551.	Shri Shanti Narain	
			552.	Shri J. C. Singhla.	
			553.	Shri B. S. Agarwal.	
			554.	Shri A. J. Kumar.	
			555.	Shri K. C. Tandon	
17-4-80	New Delhi.		556.	Shri D. J. De, Adviser, Industrial Relations, Railway Board.	
			557.	Shri S. T. Udeshi, Advisor, Electrical Engineering, Railway Board.	
			558.	Shri A. A. Rego, Commissioner of Railway Safety, Central and Northern Circles, Bombay.	
			559.	Shri T. V. Anandan	} Representatives of of National Feder- ation of Indian Ra- ilway men.
			560.	Shri S. M. Shukla	
			561.	Shri J. N. Chaki	
			562.	Shri Guman Singh	
			563.	Shri J. G. Muhurkar.	
			564.	Shri M. V. Talreja.	
			565.	Shri Ramji Lal Sharma	
			566.	Shri H. P. Dwivedi	
			567.	Shri B. B. L. Lewer	
			568.	Shri R. K. Chabra	
			569.	Shri C. M. Chopra	
			570.	Shri A. I. Kaushal	
			571.	Shri K. L. Nagpal.	
			572.	Shri J. N. Dogra,	
			573.	Shri O. P. Khanna	
			574.	Shri T. Ramaswamy.	
			575.	Shri B. N. Tewari.	
			576.	Shri J. S. Chauhan	
18-4-80	New Delhi.		577.	Shri M. Menezes, Chairman, Railway Board, New Delhi.	
			578.	Shri P. N. Jain, Financial Commissioner for Railways, Railway Board, New Delhi.	
			579.	Shri K. S. Ramaswamy, Member, Mechanical, Railway Board, New Delhi.	
			580.	Shri Krishna Chandra, Member Engineering, Railway Board, New Delhi.	
			581.	Shri S. N. Sachdev, Member Traffic, Railway Board, New Delhi.	
19-4-80	New Delhi.		582.	Shri P. N. M. Moorthy, Chief Commissioner of Railway Safety, Lucknow.	
22-4-80	New Delhi.		583.	Shri B. Mohanty, Director General, Research Designs and Standards Organisation, Lucknow.	

APPENDIX III

LIST OF SECRETARIAT STAFF

Shri J. C. Ahuja, Section Officer
 Shri Kundan Lal, Special Assistant to Chairman
 S/Shri

S. P. Sethi.
 Late B. K. Khanna
 H. L. Sharma
 A. C. Kapoor
 S. N. N. Mittal
 Jaspal Vir Singh
 Prahlad Singh

Inspectors

S/Shri
 S. M. Choudhury
 D. V. Ramesam
 K. K. Handa
 O. P. Vasudeva

Assistants

S/Shri
 P. N. Arora
 S. K. Sharma
 J. N. Murty
 J. K. Marwaha

Personnel Assistants

S/Shri
 Mohd. Ashraf
 Mukand Lal
 M. C. Jha
 R.K. Arora
 Pritam Singh
 Shyam Singh II

Stenographer Grade 'D'
 U. D. C.
 L. D. C.
 L. D. C.
 Daftry
 Peon

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