



सत्यमेव जयते

GOVERNMENT OF INDIA
MINISTRY OF TOURISM AND CIVIL AVIATION
(COMMISSION OF RAILWAY SAFETY)

RAILWAY ACCIDENT INVESTIGATION REPORT ON

Rear-end collision of No. 32 Down Kanpur-Barauni Passenger with No. 2 Down
Avadh Tirhut Mail Between Durandaha and Chaiwa Stations of North
Eastern Railway's Varanasi Division at about 21.15 hrs.

on

13th February, 1981

SUMMARY

- | | | | | | | | |
|-----------------------------------|-------|-------|-------|-------|---|-----|----------|
| (1) Date | .. .. | .. .. | .. .. | .. .. | 15-2-1981. | | |
| (2) Time | .. .. | .. .. | .. .. | .. .. | 21.15 hours. | | |
| (3) Railway | .. .. | .. .. | .. .. | .. .. | North Eastern. | | |
| (4) Gauge | .. .. | .. .. | .. .. | .. .. | Metre (1000 mm). | | |
| (5) Location | .. .. | .. .. | .. .. | .. .. | At Km. 367/9-10 on the Duraundha-Chainwa Block Section. | | |
| (6) Nature of Accident | .. .. | .. .. | .. .. | .. .. | Rear-end Collision. | | |
| (7) Trains involved | .. .. | .. .. | .. .. | .. .. | (i) No. 32 Down (Kanpur-Barauni Passenger). (ii) No. 2 Down (Avadh Tirhut Mail). | | |
| (8) Consisting of | .. .. | .. .. | .. .. | .. .. | (i) 32 Dn.—14 coaches hauled by YP steam Engine No. 2692. (ii) 2 Dn.—20 coaches hauled by YDM—4 Diesel loco No. 6420. | | |
| (9) Speed at the moment of impact | .. .. | .. .. | .. .. | .. .. | (i) 32 Dn.—15 Km/p. (ii) 2 Dn.—Stationery. | | |
| (10) Operation | .. .. | .. .. | .. .. | .. .. | Absolute Permissive Block System and Centralised Traffic Control (CTC) | | |
| (11) No. of tracks | .. .. | .. .. | .. .. | .. .. | Single. | | |
| (12) Gradient | .. .. | .. .. | .. .. | .. .. | Level. | | |
| (13) Alignment | .. .. | .. .. | .. .. | .. .. | Straight. | | |
| (14) Weather | .. .. | .. .. | .. .. | .. .. | Clear | | |
| (15) Visibility | .. .. | .. .. | .. .. | .. .. | Good. | | |
| (16) Cost of damage | .. .. | .. .. | .. .. | .. .. | Engine | Rs. | 1,500 |
| | | | | | Coaching Stock | Rs. | 1,27,200 |
| | | | | | OCVs | Rs. | 4,100 |
| | | | | | Track | Rs. | 900 |
| | | | | | Total | Rs. | 1,33,700 |
| (17) Casualties | .. .. | .. .. | .. .. | .. .. | Killed—14 (9 Railwaymen and 5 others). Injured—23 (4 grievous and 19 simple—all Railwaymen). | | |
| (18) Cause | .. .. | .. .. | .. .. | .. .. | Due to 32 Down's Driver Passing IPS Signal No. 36802 at 'Danger'. | | |
| (19) Responsibility | .. .. | .. .. | .. .. | .. .. | <i>Primary</i> : Shri Jai Shree Prasad, Driver of 32 Dn. <i>Contributory</i> : (i) Shri Lalit Kumar, 1st Fireman of 32 Dn; (ii) Shri Santoo Prasad, Guard of 2 Down. | | |
| (20) Important Recommendations : | | | | | | | |
| | | | | | <i>Immediate</i> | | |
| | | | | | (1) The Railway to organise a rigorous check on the proper functioning of the approach lighting principle and also institute a programme for periodic inspections in this regard; and | | |

(ii)

(2) The Railway to obtain the written acknowledgement of each Driver, operating on the CTC territory that, after leaving a Station at night on a Yellow Starter, he should disregard any Green Signal sighted immediately ahead, as such a Signal would not obviously be applicable to his train.

Short-term

- .. (1) All the Railways to be instructed to quickly instal the improved tail-lamps designed by the RDSO within a short time-frame.
- (2) The Railway to quickly complete the provision of line wire terminations on the posts of Permissive Stop Signals and issue telephone hand-sets to Drivers in order to re-establish communications between the Driver and the CTC Operator.
- (3) The Railway to immediately process the provision of double-filament signal lamps on the CTC territory.
- (4) Controllers and CTC Operators to be suitably cautioned against sending slow moving trains into the Block Section ahead of fast moving trains moving in the same direction.
- (5) The Railway to pay particular attention to the one-day intensive training course for Drivers detailed to work in the CTC territory;
- (6) The Railway to organise surprise checks to test the alertness of Drivers in there compliance with the provisions of GR 436.
- (7) The Railway to consider the formation of separate night gangs for attending the night failures on CTC.

Long-term

- .. (1) The Railway and the concerned State Governments to get together for evolving an effective strategy to curb the rampant menace of alarm chain pulling.
- (2) The Railway to plan the progressive incorporation of the 'cascading principle' and 'Red Lamp Protection' within the CTC territory.
- (3) The Railway to be advised to recruit Drivers directly from literate and technically qualified personnel.

CONFIDENTIAL

No. SAC/14/81

GOVERNMENT OF INDIA

MINISTRY OF TOURISM & CIVIL AVIATION
(COMMISSION OF RAILWAY SAFETY)

FROM :

The Commissioner of Railway Safety,
Central Circle,
Churchgate Station Building Annexe,
2nd Floor, Maharshi Karve Road,
Bombay-400 020.

TO

The Secretary to the Government of India,
Ministry of Tourism & Civil Aviation,
Sardar Patel Bhavan, Parliament Street,
New Delhi-110 001.

Through : The Chief Commissioner of Railway Safety, Lucknow-226 001.

SIR,

I have the honour to submit, in accordance with Rule 4 of the "Statutory Investigation into Railway Accidents Rules, 1973", issued by the Ministry of Tourism & Civil Aviation under their Notification No. RS. 13-T(8)/71 dated 19-4-1973, the Report of my Inquiry into the Rear-End Collision of No. 32 Down (Kanpur-Barauni Passenger) with the rear of the stationery No. 2 Down (Avadh Tirhut Mail) at Km. 367/9-10 situated in the Duraundha-Chainwa Block Section on the then Metre Gauge Siwan-Chhapra Singal Line. Section of the North Eastern Railway's Varanasi Division at about 21.15 hours on 15-2-1981.

2. Inspection and Inquiry :

(a) I reached the site of accident during the after-noon of 17-2-1981 by a Special Train in the company of the Member 'Engineering' of the Railway Board and the General Manager of Railway, in whose company was straightaway inspected the scene, where the sole reminder of this accident comprised the wreckage of Coach No. 7213 GS, which had been left by the track-side. Later that night, in the company of the Railway's Chief Bridge Engineer, Chief Transportation Safety Superintendent and the Divisional Railway Manager of Varanasi, a trial was conducted by simulating, as far as practicably feasible, the conditions that obtained just two nights earlier. The damaged coaching stock of 32 Down, the tail lamp recovered from the wreckage of coach No. 7213 GS of 2 Down and the Signalling Location Case at Km. 367/13-14 were inspected on 18-2-81, whereas on the next day the damaged locomotive No. YP 2692 of 32 Down and the East CTC Relay Bungalow were inspected as also the bulbs of Singal No. 36802 examined on the 20th. Arising from these inspections, I caused some plans and other schematic drawings to be prepared, which appear as Annexures III(a) & (b) and IV (a) & (b) in this Report.

(b) A Press Notification appeared in atleast 2 Hindi Dailies ('Jagaran' from Gorakhpur and 'Aaj' of Varanasi) of 17-2-81, inviting members of the public having knowledge relating to this accident to give evidence at the inquiry, which I commenced at Siwan on 18-2-81, or to communicate with me by post. The District Magistrates and the District Superintendents of Police were also duly notified at Siwan as well as Chhapra.

(c) Shri V. N. Misra, the District Magistrate of Siwan, who was also the first Senior Civil Official to reach the site of Accident, appeared briefly on the afternoon of 20-2-81 and discussed about the relief measures set in motion. The following Railway Officers were present at the Inquiry :

Shri. N. Appukuttan

Chief Bridge Engineer,
Gorakhpur (throughout, except on 20-2-81).

Shri R. L. Seth

Chief Transportation Safety
Superintendent, Gorakhpur.

Shri R. S. P. Kedia

Divisional Railway Manager, Varanasi.

(d) Evidence was recorded of 42 witnesses in all, including one non-railway passenger, who sustained injuries in this Accident. The assistance of Shri Vishwa Prakash, Dy. Commissioner of Railway Safety (S&T) of the Technical Wing of the Commission of Railway Safety, Lucknow, who was of much help during the inspection and tests, is thankfully acknowledged.

(e) Having first visited the Railway Hospital at Gorakhpur on 17-2-81 in the company of the Member "Engineering" of the Railway Board and of the Railway's General Manager and the Chief Medical Officer, and then the Railway Hospital at Sonpur on 19-2-81 in the company of the Divisional Railway Managers of Sonpur and Varanasi, I satisfied myself fully that the quality of medical care and attention, being bestowed upon the persons who sustained injuries in this accident, were all that could be desired.

(f) Both 2 Dn and 32 Dn were travelling in the same direction and, unless otherwise apparent from the context, the terms "right"/"left", "leading"/"trailing", "front"/"rear", etc. are in reference to the direction of travel of these trains.

3. The Accident :

(a) 32 Down Kanpur-Barauni Passenger (hereinafter termed as 32 Down) was admitted on the Platform loop of Duraundha station of the then Metre Gauge Siwan-Chhapra Single Line Section of North Eastern Railway's Varanasi Division, at 20.56 hours and was detained there to give precedence to 2 Down Avadh Tirhut Mail (hereinafter called as 2 Down). 2 Down then ran through Duraundha station at 21.03 hours, but most unfortunately came to halt at 21.10 hours in mid-section between the Intermediate Permissive Signals (IPSs) No. 36802 and 36512 due to ACP (Alarm Chain Pulling), possibly because 3 villages (Chitavanpur, Kurari and Baidpur) were in close proximity to this location. The 'Yellow' aspect of the Starter having been taken off for it at 21.06 hours, 32 Down started from Duraundha at 21.10 hours to follow 2 Down, as trains are worked on the Absolute Permissive Block System on the CTC (Centralised Traffic Control) Territory.

(b) At about 21.15 hours, as 2 Down was ready to move ahead after recreating vacuum, 32 Down rammed against its rear after passing the first IPS No. 36802 at Danger. As a result, 2 Down, which had stopped earlier with its engine positioned just ahead of TP (Telegraph Post) No. 367/4, had been pushed forward by the impact, with the new position of its engine short of TP No. 367/3. Whilst the rear 5 metres of the last coach of 2 Down got badly smashed up as it predictably rode up the front of 32 Down's YP engine because of the profile created by the cattle guard, the 4 coaches marshalled 17th to 19th from behind the engine of 2 Down had parted from one another at both ends. A distance of 10.6 metres separated the 17th and the 18th coaches, whilst the 3 coaches 18th to 20th were huddled together. In this process, although the bogies under 2 Down's last coach collected in front of the 32 Down's YP engine, none of the 19 other coaches of 2 Down derailed.

(c) As already mentioned, the YP engine of 32 Down virtually ploughed through and under the rear-most coach of 2 Down and in this process all the wheels of its front bogie as well as all its coupled driving wheels had jumped off the rails due to the impact of the collision and derailed on the left side. The rear-most (radial wheels) axle of the engine and all the 4 axles of the tender were, however, on the track. Behind the tender, the first 6 coaches were affected by the derailment to various degrees, whereas the rear string of 8 coaches did not suffer any damage.

(d) According to the speed-chart recovered from 32 Down's YP engine after the accident, the maximum speed attained by it after Duraundha was 50 km/h, whence it dropped to zero upon the collision.

(e) It was moon-lit night with moon-rise around 17.45 hours in this part of the country on 15-2-81. As it was nearing full moon (12th day), and further as the weather was clear, the general night-time visibility was quite good, although it could have been somewhat slightly impaired by the presence of smoke generated in the 3 near-by villages.

(f) The post-accident examination of 32 Down's YP engine revealed that its regulator was closed, vacuum brake was in fully applied position, both needles of the vacuum gauge were reading zero and the reversing gear was forward of the centre (corresponding roughly to 3/4th position). Considering the fortunate circumstance that, when it got rammed into from its rear, 2 Down had already recreated its vacuum after the ACP, did permit energy-dissipation to some extent via its forward movement, I opine that the speed of 32 Down (the colliding train) was of the order of 15 km/h at the moment of impact, having regard to the extent of damage sustained by the two trains.

4. Casualties.

(a) It is with deep regret that I have to report that, as a result of this rear-end collision, 14 persons died and 23 more were injured, with 4 of them grievously. Of the 14 dead, 1 was still alive—but, barely so—immediately after the collision but, badly trapped as he was in the smashed-up rear-most coach of 2 Down, he too succumbed within minutes.

(b) All the casualties were from 2 Down's ill-fated last coach, in which, against its seating capacity of 64, the actual occupation was around 90 according to the Railway's estimate. All but 5 of them were Railwaymen as may be noted from the following statistics :

| | Railwaymen | Others | Total |
|----------------------------|------------|--------|-------|
| Dead | 9 | 5* | 14 |
| Grievously injured | 4 | .. | 4 |
| Simple injuries | 19 | .. | 19 |
| Total | | 5 | |

*Only 3 were identified; the other 2 are presumed to be non-Railwaymen, as otherwise their identity would have been established.

(c) Background to the circumstance that the last over-crowded coach on 2 Down comprised essentially Railwaymen is the feature that several of the Railway Workshops' staff working in Gorakhpur have their homes in or around Sonpur and that, as an amenity to these staff, the Railway has for some years been running a staff coach between Gorakhpur and Sonpur to enable them to avail of their day at their homes. Another feature is that the Railway Workshops at Gorakhpur are closed on Mondays because of the need to stagger holidays in the industrial sector due to load-shedding in power supply. 15-2-81 being Sunday, the "staff coach" was attached, as usual, at the tail-end of 2 Down to run from Gorakhpur to Sonpur.

(d) In fact, the Railway Protection Force (RPF) escort on 2 Down as well as the Government Railway Police (GRP) Havildar of Siwan alighted from the train to investigate further, as soon as it stopped in mid-section due to ACP. At least 2 of them espied the on-rushing 32 Down and, apprehending danger, shouted out a warning to the occupants of the last 3 coaches, enabling some of them were to rush out of their coaches to safety. There is no doubt that, had it not been for this commendable display of presence of mind shown by the RPF/GRP personnel in that crisis and thanks also to the not-so-unusual habit of passengers to get off their train and "inter alia" stretch their limbs, no matter when such an opportunity arises, the outcome would have been even more grim and tragic.

(e) As regards the "offending train", the first 6 coaches behind the engine of 32 Down were providentially, an empty 1st Class Coach (which, proceeding as a spare coach and hence locked, had no passengers inside it) 2 VPUs and a VP, a wooden bodied GS Coach (which was occupied only by 3 Railwaymen) and an SLR, all in that order. Thus, with most of the impact of the collision absorbed by these empty or nearly empty coaches and OCVs, mercifully heavier casualties did not occur.

II. RELIEF MEASURES

5. Intimation:

(a) The first intimation of the accident was given at 21.30 hours by the Assistant Operating Superintendent of Sonpur Division (who happened to be travelling by 2 Down) who had got the PCP (portable control phone) installed at the site. Within minutes all concerned were informed by the Centralised Traffic Control office at Gorakhpur but it appears that the Breakdown trains and Accident Relief Medical Equipment Vans were not ordered sooner than 21.45 hours.

(b) Minutes later, information reached Duraundha and Siwan stations independently, whereby the local Civil and Police officials were immediately alerted. When it was realised that the site of accident fell within the jurisdiction of Chhapra Police Circle, the Superintendent of Police at Chhapra was also intimated of this accident.

6. Medical Attention:

(a) Whereas First-aid was immediately organised at the site itself, 7 of the injured were shifted by bus at 23.30 hours to the Civil Hospital at Siwan. The Chhapra-based Assistant District Medical Officer arrived a by road (the quickest mode of transport under the prevailing circumstances) at the site by 00.30 hours on 16-2-81 and immediately organised the rendering of proper medical care, duly assisted by the local Civil doctors, to all those who were injured. Those with light or trivial injuries were also discharged after providing the necessary medical aid.

(b) The Sonpur-based Accident Relief Medical Equipment Van arrived at 03.55 hours and it remained on stand-by duties. On the other hand, the Gorakhpur-based Accident Relief Medical Equipment Van, ordered at 21.45 hours of 15-2-81, arrived at Duraundha only at 04.30 hours on the next day. As it was not required at the site any further, it was detailed to pick up all the 7 injury cases—they being all Railwaymen—from the Sonpur Civil Hospital and move them to the Railway Hospital at Gorakhpur for proper medical attention.

(c) I am happy to record that none of those who were admitted to the Railway Hospitals (either at Gorakhpur or at Sonpur) succumbed to their injuries.

(d) Referring to para 4(a) supra, wherein it was stated that one of the 14 fatalities was found alive immediately after the accident, it was quite clear that, as this person died within minutes, he could not have been in all probability saved at all, particularly as his body was found to be badly mangled and entangled in the collapsed steel-work of 2 Down's last coach.

7. Clearance and Restoration :

(a) The permission having been obtained from the Siwan District Magistrate for this move, the front part of 2 Down comprising the engine and 15 coaches, were worked forward to Chainwa at 00.30 hours on 16-2-81. In the meanwhile, a Relief Train loaded with emergency train lighting equipment and re-railing equipment was ordered from Siwan and it arrived the accident site at 00.15 hours. With the prior permission of the Siwan District Magistrate and Police Officials, the Relief Train engine No. 3486 YG was utilised to work the unaffected rear portion of 32 Down, comprising its last 8 coaches at 00.55 hours back to Siwan.

(b) Police clearance for taking up further restoration measures was received only at 07.20 hours on 16-2-81. As regards the affected portion of 32 Down [comprising the YP steam engine and 6 coaches, vide para 4 (e) supra], the last 2 coaches (the SLR and the wooden bodied coach) were re-railed simply by jacking up and down. In the meantime the Gorakhpur-based Breakdown Train (which happened to be at Nakaha Jungle and not at Gorakhpur at that time) subsequently suffered a late start and arrived at the accident site at 06.25 hours. The Sonpur-based Breakdown Train ordered at 22.05 hours on 15-2-81 arrived at the accident site at 07.35 hours the next day, and the first 4 coaches of 2 Down (which were coupled up by securing the broken draw gear with chains) were drawn forward to Chainwa.

(c) As it became clear that the dead bodies could not be extricated from the last coach of 2 Down without resorting to gas-cutting, the Siwan District Magistrate organised for the expeditious supply of gas cutting equipment from a local Sugar Factory and it was possible, by commanding the services of the skilled Workshop staff who were survivors from this ill-fated coach, to commence cutting up the side panels and the bottom troughing in right earnest even before the arrival of the Breakdown Trains. The first body was thus extricated by 05.00 hours on 16-2-81 and the 9th by 11.00 hours. As no more progress could be achieved in this direction without shifting this coach in order to expose a fresh location to make another entry, it was lifted off by the Sonpur Breakdown Train and deposited aside well clear of the track, where-after flame-cutting was re-commenced to extricate 5 more bodies by 13.15 hours. During this entire period, great care was exercised to cool the metallic surfaces being cut, by dowsing with plenty of water and, as a further precaution, portable fire extinguishers were kept in readiness. In the event, because of the precautions taken, fire did not erupt at all.

(d) Each re-railed unit of the 32 Down's front portion had to be immediately worked back to Duraundha station in order to provide access to the units, ahead. The track was thus cleared of the wreckage (i.e. 2 Down's last vehicle) and all derailed stock (i.e. 32 Down's loco and leading 6 coaches) by 15.00 hours and thereafter declared safe for traffic at 15.25 hours. The first train to pass was 18 Down Vaishali Express at 17.30 hours on 16-2-1981.

(e) Because it was possible to re-route train services via the Chhapra Kachery-Thawe-Siwan Loop, there was no major set-back to through communications between Siwan and Chhapra as a result of this accident. Thus, whereas no train had to be cancelled, only one passenger train needed to be terminated short of its destination.

III. COMPOSITION OF TRAINS AND DAMAGE

8. Composition of 2 Down and 32 Down :

A consideration of the train-consist and other particulars for these two is not, in this case, germane to either the cause of this accident or the gravity of the consequential damages to life, limb or railway property.

9 Cost of Damage :

Whereas no damage was caused to any signalling equipment, the total cost of damage to railway assets was estimated at Rs. 1,33,700/- which is broken down into component elements as under:—

| | | | | |
|--------------------------|----|----|-----|----------|
| Engine of 32 Down | .. | .. | Rs. | 1,500 |
| Passenger Coaching Stock | .. | .. | Rs. | 1,27,200 |
| OCVs | .. | .. | Rs. | 4,100 |
| Track | .. | .. | Rs. | 900 |
| | | | | 900 |
| Total | .. | .. | Rs. | 1,33,700 |

IV LOCAL FEATURES

10. The Section and the Site :

(a) At the site of accident, the track runs generally East-West and 2 Down and 32 Down were both travelling east-wards. The track is on a dead straight from Duraundha station for at least 4 kilometres in the direction of travel of these 2 trains. The accident took place on a level stretch of track located on a bank of about 1 metre height.

(b) The track-structure comprised 75 R rails laid in 1965, welded into 5-rail panels and supported on Board Gauge treated wooden sleepers just recently laid to M+4 density in 1981 and fixed by standard 3-holed ACB plates with 2 steel two-way keys each. This section was due for conversion from Metre Gauge to Broad Gauge, which accounted for the presence of BG wooder sleepers as also broken-stone ballast of 50 mm size and good quality provided to a depth of cushion of 200 mm.

(c) The maximum permissible speed on the Section was 75 Km/h and there was no speed restriction, either permanent or temporary, imposed in the vicinity of the accident site and at the time of the accident. Records showed that the track was regularly inspected at various levels at the prescribed frequency and that through packing was last done on 15-1-81 (i.e. very recently).

(d) The kilometrages (omitting residual fractions) of all stations herein referred to, as reckoned from Katihar where the North-Eastern and Northeast Frontier Railways meet, are given below in the direction of travel of the 2 trains involved :-

| | | | |
|--------------------|----|----|---------|
| Gorakhpur Junction | .. | .. | 506 Km. |
| Gorakhpur Cantt. | .. | .. | 503 " |
| Bhatni Junction | .. | .. | 436 " |
| Siwan | .. | .. | 387 " |
| Duraundha (DDA) | .. | .. | 369 " |
| Accident Site | .. | .. | 367 " |
| Chainwa (CW) | .. | .. | 361 " |
| Chhapra Junction | .. | .. | 326 " |
| Chhapra Kacheri | .. | .. | 324 " |
| Sonpur | .. | .. | 272 " |

11. System of Train Working and Signalling :

(a) On the Varanasi Division, a total route length of 176.61 Km. between Gorakhpur Cantt. (exclusive) and Chhapra Junction (exclusive) functions on the Centralised Traffic Control (CTC) System of train working and signalling ; the 2 major junction Stations (viz. Bhatni and Siwan) are also excluded from the CTC's purview. The nerve centre for the control of all trains on this route is the CTC Control Panel which, located in CTC Control Office at Gorakhpur and worked by the CTC Operator(s), is split up into 3 territories to which "Control Codes" in the form of electrical impulses can be transmitted separately but simultaneously in order to facilitate a speedy control over train-movements.

(b) Signals are of 2 types; either Manual Stop Signals or Permissive Stop Signals. The Manual Stop Signals, comprising the 'Home' and 'Starter', control the entry into and exit from Stations and these can be, if necessary, subject to "Local Control" by the Station Master. The 'Starter' is a standard 3-aspect MACL Signal. The 'Home' is also 3-aspect and additionally provided with 2 Junction Indicators, each comprising a row of 5 white lights. When a train is to be admitted on the Main Line, the Junction Indicator will *not* be lit, whereas for reception on a Loop Line the aspect of the 'Home' will not be Green but Yellow, with one or more lights on the appropriate Junction Indicator lit up, depending upon which loop line that the route is set to.

(c) Permissive top Signals are located only in the Block Section. This Signal, which can be distinguished from the Manual Stop Signal by the fixture of a standard 'P' Marker, is also of 2 types: the 4-aspect Approach Permissive Stop (APS) Signal located immediately in *rear* of a Home Signal and the 3-aspect Intermediate Permissive Stop (IPS) Signal located in *advance* of Starters within the Block Section.

(d) The inter-Signal distances at all Stations had been standardised at precisely 1000 feet (about 305m.) between the Starter Signals in one direction and the adjacent Home for the opposite direction and at precisely 4000 feet (about 1219m.) between the Home Signal and the APS Signal in rear of it. Throughout the CTC territory, Permissive Signals are all provided in pairs, located on opposite sides of the track and paced at an appropriate distance apart depending upon the actual length of the Block Section, but rough round 4000 ft (or, around 1219m.).

(e) Train operations are on the Absolute Permissive Block (APB) System, which functions with MACL (Multiple Aspect Colour Light) Signals. The movement of trains between any 2 continuous Block Stations is controlled by establishing for the time being the direction of traffic by the CTC Operator and, once this direction is established, a train can follow another in the same Block Section (with each signalling section accommodating, if need be, a single train running in the same direction). As the Permissive stop Signals installed to the right of the line operate automatically in the set direction of motion, whereas in the opposite direction (or, to the left of the line) all the corresponding paired Permissive Stop Signals assume the 'ON' aspect.

(f) The Block Section Duraundha (DDA)—Chainwa (CW), within which the rear-end collision took place, is divided into 2 Panels : the 'DDA Panel' extends from the Up "Home" of DDA to the 2nd APS Signal No. 36512, wherefrom the 'CW Panel' extends up to the Down "Home" of CW. The DDA panel is further split into 4 track circuits (TCs); 36801 AT and 36801 T from the DDA Up 'Home' to the IPS Signal No. 36802 and 36802 T and 36802 AT from IPS Signal No. 36802 to IPS Signal No. 36512.

12. The concept of Approach Lit Signals.

(a) The essence of this concept lies in conserving the energy-consumption, the need for which gains particular importance in the context of batteries forming the main energy-source. As a spin-off from this theme is the prolonged service-life of bulbs, which get lit only when necessary and also just for the minimum duration required.

(b) Over the entire CTC territory, all Signals (i.e. the Manual Stop Signals as well as the Permissive Stop Signals) are approach lit. In other words, all signals are normally "blind" or "blank", unless and until a train clears the preceding Signal immediately in its rear, as reckoned with respect to the established direction of traffic. However, once a train enters the previous signalling section, the Signal ahead gets lit (or, comes to life, as it were) to exhibit its appropriate aspect, depending upon the state of occupation of the signalling sections ahead, excepting otherwise as may be decided by the CTC Operator in Gorakhpur (or, by the Station Master, if "Local Control" has been introduced) in the case of Manual Stop Signals.

(c) On the other hand, once a train has passed the Home Signal at any station, all the starter Signals at that Station get lit and will remain thus lit, so long as a train or a vehicle remains on any running line between the 2 Home Signals which control the entry into the "Station Limits."

(d) All the Signals being MACL-type, each Signal is pre-warned. In other words, every Signal aspect conveys information about the track-occupation of not only the next signalling section ahead but also of the subsequent signalling section as well. Indeed, as the inter-Signal distance of 4000 and over between the successive Permissive Stop Signals is sensibly much more than the braking distance for Metre Gauge operation, the safety element is in no way jeopardized.

13. Features relating to Maintenance of CTC

(a) Maintenance-wise, the accident site falls under the jurisdiction of the following :—

- As per the Weekly Sectional Gang Maintenance system, under Signal Inspector (Grade III) located at Siwan, and who inspects and attends to DDA on Fridays and the DDA-CW Block Section on Saturdays, and who further reports to the—
- Signal Inspector (Grade I), located also at Siwan and who is responsible to thoroughly inspect his Section once a quarter and who further reports to the—
- Assistant Signalling and Telecommunication Engineer (Siwan), headquartered at Gorakhpur and who is responsible for a thorough inspection of his entire territory once a year and who reports further to the—
- Senior Divisional Signalling and Telecommunication Engineer (CTC), with headquarters at Gorakhpur.

(b) The Sectional Gang's work-schedule is so designed that all the various types of equipment are checked and maintained at the prescribed periodicity, special attention being paid, inter alia, to the following :—

- Power equipment installed in the CTC Relay Bungalows;
- Testing of all the vital track relays for operating current (not later than once a month) and voltage, depending upon the seasonal variation in the resistance of Track Circuits;
- Condition of Track Circuits and bonding, the feed-end voltages, etc;
- Maintenance of Point Machines (Operating current, physical parameters like the throw/gauge/detection, etc.); and
- Condition of Signal lamps and their focussing.

(c) A separate gang not having been formed specially for attending to night-time failures, this duty also devolves on the Sectional Gang; it is thus not unusual for this Gang to spend almost a whole night attending to night failures and yet also be on day-duty the following morning for the routine weekly work scheduled for that day. Obviously, this practice impedes the efficiency as well as effectiveness of the Gang in the performance of its important tasks spelt out in sub-para (b) above.

(d) Supplementing the basic maintenance activities of the Sectional Gang, the Repair Gang attached to the Grade I Signal Inspector undertakes, by concentrating its efforts for a week or less at each Station, all the intensive maintenance comprising the "heavy" tasks and clears any back-log of repair/attention that may have accumulated during the preceding quarter.

(e) The latest inspections conducted at various levels prior to this accident were as below, with reference to DDA Station and the DDA-CW Block Section, none of these inspections having revealed anything particularly abnormal :

—Signal Inspector (Grade III), Siwan—

—DDA-CW Section by Trolley on 15-2-1981.

—Signal Inspector (Grade I), Siwan—

—DDA-CW Section by Foot-plate on 28-11-1980.

—DDA-CW Section by trolley on 4-12-1980.

—DDA Station on 25-12-1980.

—Assistant Signalling and Telecommunication Engineer (CTC), Gorakhpur—

—DDA-CW Section by foot-plate on the night of 5/6-11-1980.

—DDA Station on 25-12-1980.

—Senior DSTE (CTC), Gorakhpur—

—DDA Station and DDA-CW Section by trolley on 25-10-1980.

(f) During the 3-month period immediately preceding the date of this accident, there were recorded in all 10 Signal failures at DDA, of which 3 cases pertained to fused bulbs. It is noteworthy that *none* of these failures was on the "unsafe" side.

14. Other Features relevant to this Accident :

(a) If the Block Section ahead is clear of any train, then any train starting from a station will naturally start on a 'Green' aspect of its Starter Signal. On the other hand, if there does happen to be a train in the Block Section ahead and moving in the "same" direction, then for any train standing at a Station in the meanwhile the Starter meant for the line occupied by it would exhibit 'Red', until the entire train ahead clears the next signalling section; this Starter would exhibit 'Yellow' only when the necessary step is taken by the CTC Operator (or, the Station Master, if 'Local Control' has been established) to take it 'OFF' and provided that all of the train ahead has passed the first IPS Signal ahead, at which juncture this latter Signal would display its 'Red' aspect.

(b) Thus, any Driver starting from the 'Yellow' aspect of the Starter Signal to follow a train that has entered the Block Section ahead shall ordinarily expect to see the next Signal exhibiting 'Red' (or, at best, a 'Yellow' aspect, if, per chance, the train ahead has managed in the interim to clear the *second* signalling territory after the Starter). Provided that he continues to be in motion (i.e. if he has not stopped just ahead of the Starter), he cannot under any circumstances expect, having started on a 'Yellow' Starter, the next Signal displaying 'Green' for his train.

(c) The action to be taken by a Driver when he comes across a Permissive Stop Signal at 'ON' is spelt out in General Rule 436 and its associate Subsidiary Rule of the North Eastern Railway, which specify the action to be taken by the Guard of a train under the same circumstance. Similarly the procedure prescribed during the failure of Permissive Stop Signals is described in General Rule 438 and its associate Subsidiary Rule of the Railway.

(d) With respect to the stoppage of 2 Down in mid-section, the revised General Rule 442 had only recently been brought into force vide the Railway's Correction Slip No. 117; its text, on the subject of protection of a train stopped in an Absolute Permissive Block Signalling Section, is given in Annexure II(c).

(e) Measurements at site showed that, after it passed IPS Signal No. 36802, 32 Down had traversed in all a distance of 282.5 m before finally coming to halt, having rammed into the rear of 2 Down. Vide the Railway's letter No. M/537/3 Pt. I (OPTG) of 23-3-1981, following are the theoretical braking distances in metres for a YP steam engine-hauled train-consist of 14 coaches, with only one vacuum cylinder ineffective and on the basis of 45 cm and 38 cm for the vacuum levels respectively on the engine and in the brake-van:—

| Speed(Km/hr) | Braking Distance(m) |
|--------------|---------------------|
| 30 | 149 |
| 40 | 226 |
| 50 | 315 |
| 60 | 416 |

(f) YP Steam Engine No. 2692 worked 32 Down only ex Gorakhpur. There was a change of engine crew at Siwan, while the Guard continued even beyond, upto its collision. According to the Train Crew [Shri Ram Nath Prasad (the Driver), Shri Ram Narayan Yadava, (the Fireman) and Shri Jaganath Singh (the Guard)], no trouble was experienced on the run from Gorakhpur to Siwan in controlling or stopping 32 Down. Moreover, when the rear unaffected string of 8 coaches of 32 Down were examined for brake power, at Siwan after the accident, all the 16 vacuum cylinders were found to be operative.

(g) The head-light of YP-2692 was switched on when 32 Down halted at Chakra, one station before Siwan. According to all evidence, the head-light was found to be functioning ever since, (until it got damaged in the collision), but there were doubts about its brightness.

(h) As regards the Driver of 32 Down (the 'offending' train) ex : Siwan, although Shri Jai Shree Prasad came on transfer from Varanasi Division to Sonpur Division in September '79, his service record (and, in particular, the 'B' card which compiles all the punishments) was not received in Sonpur until after the lapse of one full year (i.e. in September, '80). That, before his joining Sonpur Division, Shri Jai Shree Prasad had already accumulated an accident index of 351.51 (and was thus to be treated as a "potential safety risk" in terms of Railway Board's directive No. 69/Psych/14 of 15-10-1969) remained accordingly unknown; yet, routine counselling of this Driver, who had nevertheless had an accident-free record during the past 5 years, was done on 5-4-1980 by the Sonpur Division's Safety Counsellor (Loco).

(i) In compliance with the directive contained in Railway Board's letter No. 80/Safety-I/25/3 dated 10-4-80 (to the effect that, after conducting systematic checks by qualified Inspectors, via a one-day intensive training course, as to the knowledge of Drivers/Motormen of the rules regarding Automatic Signalling and Absolute Permissive Block Signalling at intervals not exceeding one year, Competency Certificates should be issued/renewed) Shri Jai Shree Prasad was issued such a certificate on 21-12-80 by the Loco Inspector (LI), Sonpur, which was also countersigned by the Asstt. Mechanical Engineer (AME), Sonpur, on 7-1-81. When the original of this certificate was sighted, it seemed rather suspicious that the date of the LI's signature read 21-12-81 with the numeral "1" in 81 over-written by "0", it was also no less odd that the AME had appended his signature not at the proper place but further down the Form in the position earmarked for use at the stage of re-examination.

(j) Inspection of Tail lamp of 2 Down, recovered off the smashed-up rear of 2 Down's last vehicle, showed that it was intact, with surprisingly not even a fresh-looking scratch on its exterior, nor any damage on its ruby red glass. Examination of its inside revealed, however, indications of considerable soaking in Kerosene oil and plenty of soot on the underside of its top. The dubber itself presented evidence of leakage past its front right-hand side joint and was quite empty, while the wick-holder of the burner seemed freshly broken partially to the extent of roughly one-thirds. There was just about 12 mm of the wick left and its upper edge had a crumbling feel indicative of its having been lit and in use recently. The red glass was very dirty inside.

(k) Emergency lighting equipment was *not* available in the Guard's break-van of either 2 Down or 32 Down. How far the situation in respect of deficiencies in the Guard's equipment had degenerated may be gauged from the fact that, in the Brake-van of either 2 Down or 32 Down, not even the vacuum gauge was fitted, not to mention any stretchers. Only one portable fire extinguisher was with 32 Down's Guard, while none was carried on 2 Down.

(l) As mentioned in para 7(a) supra, a Relief Train was ordered from Siwan. Its YG steam locomotive No. 3486 was driven by Shri Satyanarayan of Gorakhpur Loco Shed and on the relief engine besides himself were Servashri Dinanath Baitha (Station Master), V.N. Srivastava (Head Train Examiner), A.N. Lal (Loco Inspector) and Madan Jha (Asstt. Loco Foreman)—all from Siwan. They arrived the accident site at 00.15 hours of 16-2-81. Coincidentally, this relief train had also been admitted on Platform No. 1 at DDA and all the officials present on the engine testified to the effect that the IPS Signal No. 36802 could not be

seen for some duration even after they cleared the Starter Signal (under the authority of the appropriate Form T. 13, as this Signal was 'ON'). When it could be seen eventually, this IPS Signal was found to be displaying its 'RED' aspect.

(m) After the accident, under the instructions of the Railway's General Manager, a joint observation of Signal No. 36802 was carried out at about 03.00 hours on 16-2-81 by the Assistant Engineer, Chhapra, the Assistant Mechanical Engineer (CTC), Gorakhpur, and the Assistant Signal and Telecommunication Engineer (CTC), Gorakhpur, which showed that the IPS Signal No. 36802 was normally showing no light (i.e. as long as there was no train occupying the signalling section in its rear) and that, when track occupation was simulated by shunting the rails, its Red aspect correctly showed up, because the signalling section ahead was occupied by the accident-affected vehicles. This position was also demonstrated during my first inspection of the site on 17-2-81 in the company of the Member (Engineering), Railway Board, and the Railway's General Manager.

(n) As mentioned in para 2(a), a trial was conducted on the night of 17-2-81 by replicating as far as practicable those conditions that had precisely obtained 2 nights previously with reference to the passage of 32 Down.

(o) On 18-2-1981, the signalling apparatus provided in the "double" Location Box at IPS Signal No. 36802 was examined and the signal unit of this particular Signal was inspected on 20-2-81.

(p) While returning from a visit to the accident site back to Siwan on 18-2-81, it was noticed en-passant and purely by a coincidence that, as 31 Up Barauni-Kanpur Passenger cleared the Up Starter at DDA, the Green aspect of the next Up IPS Signal appeared instantaneously. This fortuitous circumstance brought into sharp focus the discrepancy in the performance of the approach lighting principle in the Up and Down directions at DDA. On the forenoon of 20-2-1981, detailed tests were therefore carried out by Shri Viswa Prakash jointly with officials of the Railway's S&T Department, utilizing an AVO-meter (Model 260, Series 6 m, of Simpson make) for this purpose.

(q) In order to comprehensively appreciate the situation as it unfolded itself on 15-2-81 to Shri Jai Shree Prasad (the Driver of the ill-fated 32 Down), it was considered necessary to conduct another trial in order to give an opportunity to him to recapitulate the sequence of events clearly. Accordingly, another trial was conducted on the evening of 20-2-81 with a Special train arranged from Siwan Junction and hauled by YG Steam Engine No. 4038 with Shri Janak Prasad as Driver and with Shri Jai Shree Prasad as an observer along with myself, the DRM of Varanasi Division and other officials.

V. SUMMARY OF EVIDENCE

15. Evidence of the Station Master on Duty at DDA :

(a) SHRI H.N. SINGH stated that his duty started at 16.00 hrs. on 15-2-81. 32 Down was regulated on Platform line No. 1 to give precedence to 2 Down. After the safe passage of 2 Down, with its tail lamp burning, the Starter for 32 Down showed 'Yellow' aspect and he rang the Station bell to enable the latter to depart. 32 Down started immediately, but very slowly.

(b) Queried as to how he managed to exchange signals with 2 Down's crew, he clarified that he had to go through one of 32 Down's compartments for this purpose.

16. Evidence of 2 Down's Driver :

(a) SHRI RAM PRASAD stated that 2 Down stopped at 21.11 hrs. due to ACP. Although he was ready to start by 21.15 hrs. after re-creating the vacuum, he could not do so, because the guard was still to get back into his brake-van.

(b) The IPS Signal ahead was showing 'GREEN' all the time that 2 Down halted in its rear. He clarified that he could not see 32 Down's approach, because he must have been unsighted by the rear of his own train.

17. Evidence of 2 Down's Guard :

(a) SHRI SANTOO PRASAD stated that, when 2 Down stopped due to ACP in mid-section after passing DDA, he immediately alighted on the left side from the brake-van* and purposefully started moving towards the front, trying to locate that particular coach where the vacuum was destroyed. He had walked some 4 coach-lengths when he got the signal from the front Brakes-man that the vacuum was restored; so, he started re-tracing his steps back and, as he reached the VPU 1260 (4th from rear), he could see another train approaching from behind the rear of his train. He had immediately set his Hand Signal lamp to show 'Red' and shouted out simultaneously, but the other train rammed into the rear of his train regardless.

*Marshalled the 3rd from the rear of the 18th behind the engine.

(b) During the ensuing cross-examination he confirmed that he had lit his Tail Lamp at Bhatni Junction (just before it was 7 PM) and that he found it OK when he checked the same at Siwan, 2 Down's last stop prior to the collision. As regards the tail lamps, leaking dubber, he felt that this could be the consequential effect of the collision.

(c) He also stated that, other than PCP No. 152, he did not take over any other equipment at Gorakhpur at the time of taking charge of 2 Down. As recorded in his journal, there was no vacuum gauge, no ELF (emergency light fitting) nor FE (fire extinguisher).

(d) Queried about General and Subsidiary Rules (G&SR), he was unable to recall either the number or the contents of the latest Correction Slip. He also failed to produce the G&SR Book, which was stated to be missing after this accident alongwith some other items, although he had not yet filed a report about the said losses. He was unaware of the provisions of the revised GR 442 which called upon a Guard to immediately exhibit a RED signal towards the rear and also satisfy himself that the tail lamp is working, when a train shops in an Absolute Permissive Block Section.

18. Evidence of 32 Down's Guard :

(a) SHRI JAGANNATH SINGH was working the ill-fated 32 Down ex : Gorakhpur upto Chhapra. The train had been detained at DDA to let 2 Down overtake it. After the concerned Starter exhibited its 'Yellow' aspect and the 'bell' was rung, the train left DDA, and, after travelling a kilometer or so, it came abruptly to a halt with a jerk. Realising from the shouts and clamour made by the passengers that an accident had occurred, he immediately set the 'side-lights' of his brake-van to Red and protected his train from the rear, which had just cleared the IPS Signal No. 36802 by barely 6 metres or so.

(b) He clarified that at no stage of 32 Down's run ex : Gorakhpur did he sense any difficulty in the train being controlled or stopped. He could not also recall experiencing, before it eventually stopped after the collision, the usual sensation that accompanied the hard braking of his train.

19. Evidence of Gateman of Gate No. 90-A (between Siwan and Pachrukhi*)

SHRI RAM AVTAR, who was on duty on 15-2-81 from 14.00 hours to 22.00 hours, recalled the passage of 32 Down, as the headlight of its engine was so dim that the track ahead was hardly getting focussed by it. Some time later, 2 Down passed by and its headlight was powerful.

20. Evidence of 32 Down's Driver :

(a) SHRI JAI SHREE PRASAD stated that, after 32 Down left Siwan at 20.25 hours, there was no difficulty in working the train up to DDA, where it was detained for giving precedence to 2 Down, or thereafter.

(b) He left DDA with the Starter Signal displaying 'Yellow'; hence, he proceeded cautiously. After passing some distance, he could see a Permissive Signal showing 'Green', but even then he proceeded cautiously. A few minutes later, he saw a Signal post without any light; so, he immediately shut off the steam and directed his Fireman to open the blower and keep a sharp look out ahead for any obstruction on the track. In the mean time he himself could see the rear-end of a train on the track ahead, whereupon he at once resorted to the full application of the vacuum brake and also put the engine in reverse gear. Even when he realised that a collision was imminent, he did not leave his position and continued to exert his utmost to prevent an accident.

(c) During the ensuing cross examination, he clarified that, out of a total length of about 28 years of service, he had 15 years experience on the CTC (i.e. right from the inception of the latter). He did realise that, having started on a 'Yellow' Starter, he could not expect the next Signal exhibiting the 'Green' aspect; it was for this reason that he was proceeding cautiously, even after sighting a Green signal ahead. Still, until he came upto some 30 m behind the first IPS Signal, he was not quite certain that there really was a dead signal ahead of him in the intervening distance in rear of the Signal which had already been displaying its 'Green' aspect.

(d) He maintained that the headlight was functioning satisfactorily and he could see up to about 100 m along the track. For the reason, however, that the Signal post was some distance away from the track, he became aware of it only when he was some 30 m. behind it.

(e) As to the weather, it was a clear moon-lit night, but the presence of some smoke and dust because of the nearby villages impaired the visibility some-what. Also 2 Down's tail lamp, if any, did not register in his awareness of the situation.

*Pachrukhi is one Station in rear of DDA.

(f) Immediately after the accident, the Driver sought to raise doubts about the structural integrity of the signalling system by pointing out to several officials that the IPS Signal No. 36802 was blank; conveniently no mention was made of the 'Approach Lighting' principle, whereby this Signal ought not anyhow to be showing any light whatsoever, in the absence of any vehicle occupying the signalling section immediately in its rear.

(g) He admitted to being aware of the inter-signal distances and, when presented with the substance of other evidence [paras 14(k) & (l)] by way of joint observations by groups of Senior Subordinates and Assistant Officers, which showed that at least the Red aspect of IPS Signal No. 36802 was properly functioning, he maintained his stand that this Signal exhibited no light whatsoever all the time that he was in its rear. As required under the rules, he did keep a sharp look out ahead (while also looking back at the trailing load from time to time and simultaneously performing his other duties as an engine Driver) and, had that Signal been displaying any light, he would certainly have become aware of the same.

(h) Although he was aware of the General Rule 82(a), which enjoined that a dead signal should be treated as one exhibiting its most restrictive aspect, he had no satisfactory explanation for his inability to bring 32 Down to a stop within a distance of over 300 m. that happened to be available in rear of the stationary 2 Down.

(i) While also denying the following hypothesis, which was suggested to him, he later on admitted that his only mistake was to assume that the Green Signal seen by him was meant for 32 Down and that, going by that premise, his reaction of immediate confusion, upon seeing a blank Signal ahead as he was virtually at it, was understandable :

(i) That, having already sighted a Green Signal ahead, he got to be otherwise busy continuously upto the time of just passing IPS Signal No. 36802 ;

(ii) That, accordingly, the 'Red' aspect of this Signal (which started shining only after the lapse of some time after 32 Down entered the Main Line) could not be registered in his mind; and

(iii) That, when he walked back to this Signal after the accident, he found it blank (as it ought to appear at that point of time, in the absence of any vehicle occupying the track in its rear), which impression had probably implanted itself very firmly in his memory, thus impelling him to convince himself that this Signal had been blank even earlier on, all the time that 32 Down was approaching it.

(j) Confronted with the evidence by way of speed-chart recovered from the YP engine, he conceded that he did touch a speed of 50 Km/h after leaving DDA and clarified that his earlier estimate of speed of 15-20 Km/h referred in fact to the speed at the time of impact.

(k) He had received the Competency Certificate on 21-12-1980 and, while this certificate was handed over to him, he was asked a number of questions on the signalling aspects and what their meaning was, to all of which he replied to the Loco Inspector's satisfaction. There was, however, no formal training session as such.

21. Evidence of the 1st* Fireman of 32 Down :

(a) SHRI LALIT KUMAR corroborated the Driver's evidence as out-lined in paras 20(a) to (e) As regards para 20(d), however, the engine headlight was according to himself quite dim and the intensity of its light beam was fluctuating. As regards para 20(e), he too was unable to recall having noticed 2 Down's tail lamp although the weather was, according to himself, quite clear.

(b) As regards para 20(c), when he was told that at the stage that the engine was about 30 m. in rear of a Signal, the Fireman would not be able to sight it because the body of the engine itself would come in the way of sighting the Signal, he clarified that he himself did not actually see the IPS Signal No. 36802 displaying no light, but rather that the Driver had mentioned this circumstance to him

(c) When queried about his familiarity with the route, he admitted that he was not given any specific opportunity to learn the road and that, ever since his promotion as Grade I Fireman, he had been working in the CTC territory for the past 9 months or so.

*Shri Jang Bahadur Ram the 2nd Fireman, was breaking coal on the tender and knew nothing of this accident, excepting that the 1st Fireman had shouted that there a train ahead and the Driver's immediate response to control the train could not prevent the collision.

22. Evidence of Shri. Satyendra Kumar, Chief Commercial Superintendent, N. E. Railway :

(a) He was travelling on duty by 2 Down which was stopped many times en-route due to ACP. When the train stopped at about 21.10 hours, the Coach Attendant confirmed to him that this was yet another case of ACP. The collision had taken place at 21.15 hours and when, after organising the contact with the CTC Control via the PCP and relief/protection arrangements, he made enquiries, he was told by passengers that they became aware of the other train braking only when it was 100-150 yards from 2 Down. They became aware of it by its Headlight and many passengers from the last coaches rushed out when a general alarm was raised. No one from the offending train sustained any injuries.

(b) He then took 32 Down's Driver aside to question him confidentially and he was told by the Driver that, after starting from DDA on a 'Yellow' Starter, he found the next Signal also showing 'Yellow'. The Driver had no recollection of seeing 2 Down's tail lamp and that he could see the rear of 2 Down in the moon-light only when he was just 100-150 yards away. When specifically asked if he saw any 'Red' or extinguished Signal, the Driver denied the same.

*Although this discussion was generally accepted as having taken place, its contents as above were, however, denied by Shri Jai Shree Prasad.

(c) To improve the visibility of tail lamps, he said that RDSO's Traffic Research Directorate had developed 2 designs which were accepted by the Railway Board, but not yet widely introduced :

- (i) a dual-purpose lamp, which could use either an electric bulb fed by 24 V. DC supply or also the standard kerosene-oil dubber; and
- (ii) a lamp with an electric bulb, the filament of which is positioned at the focus of a parabolic reflector.

He added that, while on this Railway, he had developed an electric lamp with a re-chargeable battery for use essentially on freight trains and that trials on its performance showed it in excellent light.

23. Evidence of the GRP Havildar on 2 Down :

(a) SHRI RAM AHLAD RAI was seated in the second coach from the rear. Some 2 or 3 minutes after 2 Down had stopped in mid-section, he could hear the sound* of an approaching engine, which prompted him to look west-wards. A little while later, when he was able to see the head-light of the other engine, he realised that it was still in motion and coming towards 2 Down. Apprehending danger, he had at once shouted out a warning for passengers to get down and run away; as a result, many people could save themselves, although the collision did take place.

(b) Subsequently, he got busy with arranging for the victims to be transported to the Hospital at Siwan preventing any looting from the damaged coaches, the orderly emptying of the affected coaches and keeping at bay the villagers who came in their hundreds to watch the proceedings, etc.

24. Evidence of the LI, Siwan, who had tested 32 Down's Driver :

Confirming that he did issue the Competency Certificate to Shri Jai Shree Prasad on 21-12-1980, Shri L. C. Tiwari clarified as follows :

- (i) At that time he had found this Driver very experienced and quite knowledgeable;
- (ii) Although it was customary for the LI to be provided with a list of all Drivers whose Accident Index exceeded 300, he himself was not aware that this particular Driver also fell in that "accident prone" category;
- (iii) There was no set procedure nor any prescribed syllabus for the one-day's intensive training to be imparted to CTC Drivers, nor do any detailed instructions exist in this regard;
- (iv) There were no audio-visual aids provided, but the CTC Manual and the Rule/Code Books are referred to as and when required;
- (v) In view of the multifarious duties of a LI, the procedure followed was to call whoever Drivers might be on hand on a day that the LI was comparatively free and question them closely on the Signalling aspects and their significance; and

*Neither the Driver nor his Fireman mentioned about whistling, although 2 Railwaymen [Shri Parmanand Rai (Highly Skilled Fitter) and Shri Ram Gyan Rai (Welder)] travelling in 2 Down's last coach testified that 32 Down gave 2 long whistles, just a second or so prior to the impact of collision.

(vi) No special training had been given to him as to how to conduct such sessions; nevertheless, he felt confident and competent about performing this task satisfactorily.

25. *Evidence of Shri K. K. Bajpayee, Sr. DSTE (CTC) :*

(a) He clarified that the Location Boxes had been provided with steel casings and 'E'-type locks to prevent the theft of batteries. Further, even if the battery were stolen (or, got defective), the circuitry admitted of feed from the battery-charger itself and, proved that the AC power supply was available, the Signals would get lit as and when required. However, if the battery-charger is also stolen (or is defective) or with failure of AC power supply, the Signals will become blank.

(b) In response to further queries, he said that it was beyond the realms of probability that a Signal lamp should get lit, extinguished, and then re-lit sporadically, for apparently no valid reason.

(c) The normal day-time visibility of Colour Light Signals being of the order of only 500 to 600 m, it was a pity* that the testing of Signals by Signalling staff could not discover the deficiency that the IPS Signal No. 36802 failed to get lit as soon as the preceding signalling section was occupied. Whereas in actual practice that Signal was 'coming to life' only when the Up Home (located some 1219 m in its rear) was cleared, actually even this feature could not be ascertained, being beyond detection during day-time inspections.

*This was also corroborated, by the evidence deposed by Shri B. C. Srivastava, SI (Grade I) of Siwan.

VI. TESTS AND OBSERVATIONS

26. *Trials and Investigations at Site :*

(a) Details of tests conducted at various times during the period from 17th to 20th as also the results of these tests have already been referred to in paras 14(n) to (q) and Annexure I(d).

(b) Also, my own inspection of 2 Down's last coach on the 17th and of the first 6 coaches of 32 Down (which were adversely affected by this collision and subsequently stabled at DDA) on the 18th confirmed the extent of the incurred damage as described in Annexure I(b). Likewise, my inspection of 32 Down's YP engine at Siwan on 19-2-81 confirmed the extent of damage as described in Annexure I(b). Results of the examination of 2 Down's tail lamp have already been mentioned in para 14(j) supra.

27. *Failure of IPS Signal No. 36802 to light up, immediately upon the clearance of a Down Starter at DDA:*

(a) As the field test [para 3(b) of Annexure I(d)] revealed the sub-standard performance of the current-sensitive AE Relay of this Signal, the Railway was requested to have the condition of this particular relay examined in sufficient details as to determine whether the said faulty performance was due to any specific deficiency in one of its component elements or due to the normal ageing process of such relays.

(b) Accordingly, when the Type B "plug in" DC Relay (Srl. No. 410108, Catalogue No. A 62-275 and Part Reference No. 56001-787 GR2, supplied by the General Railways Signal Co. of USA) was carefully tested by the Railway in the CTC Test Room at Gorakhpur (utilizing a DC Current Meter of American make, Weston Model 1, Srl. No. 65821), its actual drop-away value was found to be 72 milli-amps, which corresponded very well with its "rated" parameter. This led to a check of the AVO-Meter previously used for the field tests, whereupon it was discovered that the AVO-Meter was consistently under-estimating the current by 25 milli-amps.

(c) This new development in turn meant that the 111 Ohms variable resistance had in effect got somehow mal-adjusted, to cause in point of fact a current of 100 milli-amps to flow through the circuit until the Up Home was passed; and, at that current-level the AE Relay in circuit would certainly not drop.

(d) With reference to para 3(e) of Annexure I(d), the actual current flowing in the circuit when none of the Down Starter Signals was passed must actually be reckoned to be 165 milli-amps, when duly corrected for the erroneous functioning of the AVO-Meter used for testing.

28. *Further Observations on the said partial failure of the Approach Lighting circuit for IPS Signal No. 36802.*

(a) Annexure IV(a) presents the following diagrams (all in relation to IPS Signal No. 36802), reading from bottom to top :

- The Signal Light Circuit, which clearly shows that, without the dropping away (DA) of the AE Relay, the circuit will remain broken and, hence, no aspect of Signal will appear;
- The Schematic Outline for the Approach Lighting Circuit, showing the presence of a 111 Ohms rheostat in series, which can be shunted out by the other paths provided in parallel;

- The actual circuitry for the 2-4B NW TP Relay, showing its component elements related to the disposition of the turn-outs and associated Track Circuits (TCs) at the East-end of DDA yard; and
- The Schematic Signalling Diagram, showing all the related TCs provided at the East-end of DDA yard and towards IPS Signal No. 36802.

(b) The following depicts the effect of the passage of a Down Train as it successively clears the various TCs.

- With the Down direction for traffic established, as connoted by the DA of the 2E AS Relay the 111 Ohms rheostat continues to be shunted out of the reckoning, by the availability of another path in parallel : (With the knowledge that the intensity of current at this stage was 165 milli-amps and assuming an operating voltage of 10V, we may conclude that the overall equivalent resistance of the Approach Lighting Circuit for IPS Signal No. 36802 was at this stage $10 \div 0.165 = 60.6$ Ohms);
- With a Down train clearing one or the other of the Starters, one or the other of the TCs “drops” and, as the train reaches the Up Home, the related TCs also “drop” one by one, causing the parallel paths to be broken, leaving the current to flow only through the 111 Ohm rheostat. (With the knowledge that the intensity of current during this phase was 100 milli-amps and given the applied voltage of 10 V, the overall equivalent resistance of the circuit at this stage can be computed as $10 \div 0.100 = 100$ Ohms; the implication is that this rheostat must have been set or adjusted to include in series a resistance of $100 - 60.6 = 39.4$ Ohms only); and
- With TC 36801 AT (or, later on, the TC 36801 T) dropping the circuit gets broken and; as at this stage no current can flow, DA of the AE Relay occurs at last through its de-energisation.

(c) It is easy to analysis the situation obtaining when the whole of the 111 Ohms resistance is placed in series; the overall equivalent resistance in circuit would then equal $60.6 + 111 = 171.6$ Ohms and the corresponding intensity of flow of electricity can now be calculated, considering again an applied voltage of 10V, as $10 \div 171.6 = 58.3$ milli-amps, at which current-level the AE Relay would DA.

(d) Analogously, it is also possible to fix the threshold for the quantum of the variable resistance to be included in series out of the 111 Ohms rheostat, which would ensure the proper performance of the Approach Lighting principle. For a DA current of 75 milli-amps, the overall resistance has to be at least $10 \div 0.075 = 133.3$ Ohms, requiring the rheostat to be adjusted to include marginally a resistance of $133.3 - 60.6 = 72.7$ Ohms or over.

(e) Against this requirement of minimum 72.7 Ohms, the resistance actually included in series was 39.4 Ohms only—the result, no doubt, of inadvertent mal-adjustment of this vital piece of electrical equipment, perhaps at some unknown time during the periodic dusting/cleaning of the installation.

(f) The principal issue now is to determine what was the purpose in providing this adjusting facility for the 111 Ohms resistance by way of a rheostat. Probing this matter in some depth, the Senior DSTE (CTC) of Gorakhpur concluded, vide his letter No. N/537/1/1-CTC/329 of 29-4-81, that this facility must have been conceived just solely for making the necessary adjustments at the time of the original installation of the CTC equipment so as to be able to ensure that the DA of the current-sensitive AE Relay, the performance of which had a distinct influence on the safety domain, did occur directly as this resistance (which is in fact introduced in series just for the express purpose of reducing the intensity of current) was not shunted.

(g) This appraisal was accepted by the Railway's CSTE who advised the Commission under his letter No. N/537/1/3/BSB of 1-5-81 that action was being taken to remove the adjustable contact of this 111 Ohms rheostat over the entire CTC Territory.

29. Previous Collisions on this Railway's CTC Territory :

(a) Excepting under the Automatic Block System or the Absolute Permissive Block System (when a Permissive Stop Signal at 'ON' can be passed as expressly provided for in GR 436), a Signal cannot under any circumstance be passed without the receipt of a written authorisation to do so.

(b) As a breach of the provisions of GR 436 bristles with danger, an idea of the collisions that occurred so far in the Railway's CTC Territory becomes relevant.

30. *Some Factors leading to Accident Proneness of Drivers*

(a) The absence of "cascading facility" (by which is meant the automatic "cutting in" of the next restrictive aspect on the same Signal unit, in the case of a defective lamp/bulb) evidently affects the "line capacity" adversely and, in a situation where the maintenance policy is to replace bulbs/lamps after they have already become defective, it will psychologically induce, with the lapse of time, at least those comparatively less rule-minded Drivers to disregard the IPS Signals generally.

(b) Indeed, the really potential hazard lies in the outcome of a combination of this PSD (Passing Signals at Danger) proclivity on the part of Drivers with the absence also of the standard "Red Lamp Protection" (or, the automatic "cutting in"—when the lamp/bulb for the 'RED' aspect of any Signal becomes defective for any reason, and provided that the next signalling section is occupied and hence requiring the 'RED' aspect to be lit—of the 'RED' aspect of the next Signal immediately in its rear).

(c) 2 factors [firstly that ECRs (Lamp Proving Relays) had not been provided in the original circuitry of the CTC System on this Railway and, secondly, that in a system based on the "approach lighting" principle for its Signals, such protection becomes ordinarily "ultra vires", as a Signal gets lit only after its preceding Signal has already been passed (i.e. by which time, it is truly too late to think in terms of the aspects of the preceding Signal)] do not permit the incorporation of the "Red Lamp Protection" and "cascading" on this Railway's CTC Territory. According to the Senior DSTE (CTC) of the Railway, the requisite additions and alterations might cost as much as Rs. 50 lacs, if these are to be provided now.

(d) Double-filament lamps are an essential safeguard under such circumstances and, adverting to Railway Board's orders on Item 824 of the 50th Signal Standards Committee on the subject of "Control Circuitry for Double Filament Lamps in Colour Light Signalling Territory", it is seen that on this Railway neither do such double-filament lamps figure in the CTC system as provided, nor is there any proposal to introduce them now.

(e) In the Automatic Signalling Territory as elsewhere, the location of each and every Signal shall be known to all the Drivers operating on the route, who shall also establish individually the location of the "land-marks" for each and every Signal whence to sight the latter. Acquisition of the requisite knowledge and familiarity in respect of all this is essentially an integral part of the "road learning" exercise, which renders the Driver fit to discharge his duty with regard to GR 82(a).

(f) In the case of the APB System, too, unless the Drivers are equally thoroughly familiar with the precise location of the Permissive Stop Signals, the situation would obviously be fraught with danger. Soon after the subject accident, a surprise trial was conducted by the Railway by blanking off one of the IPS Signals in the CTC Territory in the face of a run-through Mail train, the Driver of which had actually run through at unrestricted speed regardless or unmindful of this Signal, simply because he just was not even aware of this development. This situation cannot merely be put down to the argument that Mail train Drivers (who proceed at a speed of 60-75 Km/h) pass such Signals (which are spaced at just over 1.2 Km. apart) at the rate of one Signal in about a minute—because, the situation obtaining on the Automatic Signalling Territories on the Indian Railways is indeed not any different.

(g) This trial showed up clearly that Drivers operating on the CTC Territory were wont to condition their thinking somewhat on the lines of working under the Absolute Block System (where the taking 'OFF' of the Starter is proof enough that the line is clear right upto the entry-point of the next station-limit) and tended to overlook the possibility of another train ahead in the Block Section and accordingly disregard the Permissive Stop Signals generally.

(h) The paucity of complaints regarding fused Signal bulbs may perhaps be regarded as another pointer in this direction.

(i) There is no denying that literacy is a key factor that influences a person's learning capabilities (i.e. the speed and degree of excellence in the acquisition of skills and proficiency) and conditions his reflexes and attitudes towards any changes in the structure of his work-environment as also his aptitudes towards or adaptability to any new developments affecting his work-patterns. The category of Drivers is no exception and whenever the work-situation calls for an appreciation of advanced technology (like, for instance, when operating Diesel-electric or Electric locos, or working in a CTC Territory, etc.) a Driver must be capable of displaying a sufficient depth of his understanding of the factors affecting the safe working of his train and he must also possess a marked sensitivity towards those subtleties and nuances, the cogent comprehension of which makes all the difference between "safety-mindedness" and "accident-proneness". For, often in Railway operations, even though this border-line is sharply defined, a proper appreciation of the finer points and more importantly the "whys and wherefores" underlying them forms an essential "sine qua non" for Drivers. For this to happen, it is necessarily important that a Driver must have been not only literate, but have also been exposed to some scientific thinking.

(j) As regards the Drivers already classified as accident-prone, (i.e. with an Accident Index of over 300), the Railway had given an assurance to the Commission under its letter No. T/55-69/54 of 20-3-81 that, while the performance of such Drivers was being kept under close watch, suitable safety-counselling was also being conducted at various levels ranging from the Senior Divisional Mechanical Engineer down to Loco Inspectors and Safety Counsellors (Loco).

31. *The pressing need for early introduction of improved Tail Lamps*

(a) Since 1974, when the Railway Board entrusted this task to RDSO's Traffic Research Directorate, the development of an improved Tail Lamp has been continuously engaging the RDSO's attention. No doubt, a lot of time and effort has been spent in this direction, but rather than view this issue in isolation, it was needlessly clubbed with other matters like miniaturisation of the presently heavy design for a "Guard Box", the rationalisation of Guard's "personal" equipment leading to the use of a light-weight container, etc.

(b) The delaying consequences of any such widening of scope are only to be expected and the entire matter had got further tangled up, as is apparent from Railway Board's letter No. 70/EB/901 of 10-7-1978 which stated that, although the Board had accepted all but 2 (viz. those contained in paras 75.2 and 76.16) recommendations of RDSO's "Study Report on the Introduction of Light Weight Container (Guard Box)", final instructions as to their actual implementation would follow only after consultations with the 2 Staff Federations as well as the Guard Council. Incidentally, even this letter called only for trials with the newer types of Tail Lamps developed by the RDSO.

(c) In so far as the need-based improvement to the tail lamps is concerned, seven years have passed by almost uneventfully, whereas this issue in itself is not so complex as to merit investigations only by a specialist set-up like the RDSO. Indeed, its resolution could easily have been left to the resourcefulness and initiative of individual zonal Railways and, had been this done, this subject, which doubtless has vital safety-notations could surely have been successfully tackled within at the most a year or two. Thus, this is a prime example of need-less over-centralisation, that incidentally happens to be also divorced from safety-consciousness, which demands a results-oriented and time-bound approach to problem-solving.

VII. DISCUSSION

32. *As to the time of the Accident and 32 Down's speed-profile*

(a) According to all evidence [for instance, see para 16(a)] the accident occurred at 21.15 hours, and this was not disputed by anyone.

(b) According to the speed-chart recovered from 32 Down's engine [para 3(d)], 32 Down attained a maximum speed of 50 Km/h after leaving DDA and, as this was also accepted [para 20(j)] by the Driver, we may take it as having been established beyond doubt.

(c) From a consideration of the extent of damage as well as the disposition of the rolling stock of the 2 trains affected by the collision, it appeared that the speed of the offending train was 15 Km/h [para 3(f)] at the instant of impact and the Driver's own estimate [para 20(j)] corroborated this.

(d) After it departed from DDA, 32 Down's engine had travelled about 1.9 km before colliding with 2 Down. This distance may conveniently be split up into 4 distinct parts as below :

- 0.6 km until its last vehicle came on to the Main Line after clearing the trailing points completely and during which time the speed was most probably around 15 km/h;
- 1.0 km, for accelerating to 50 km/h with a trailing load of 15 coaches, and with an overall average speed of, say, 30 km/h;
- 0.25 km, (=1.9—.5—1—.15) at an average speed of 50 km/h; and, finally
- 0.15 km 32 Down's Driver spotted 2 Down from a distance of only 183.4 metres, and as some allowance has to be made for the Driver's own reaction time, the distance for this last phase of deceleration may be taken as 0.15 km at an average speed of approximately 30 km/h.

(e) The corresponding timings may now be computed as below :

| Distance (km) | Average Speed (km/h) | Time (minutes) |
|------------------|-------------------------|---------------------------------------|
| 0.6 | 15 | 2.40 |
| 1.0 | 30 | 2.00 |
| 0.15 | 50 | 0.18 |
| 0.15 | 30 | 0.30 |
| Total | | 4.88 minutes (or, say, 5 minutes). |

This duration of 5 minutes agrees with the timings for 32 Dn. mentioned in paras 3(a) for departure (21.10 hrs) ex : DDA and time of collision (21.15 hrs).

(f) 32 Down's speed-profile can accordingly be taken as logically established. The damage caused to 32 Down's coaching stock may rightly be attributed to the momentum of its rear coaches.

33. As to the condition of 32 Down's head-light

Despite the Driver's contention [para 20(d)], more reliance is placed in the Gateman's and Fireman's versions vide paras 19 and 21 (a) that the head-light was faint and dim. This can also be inferred from the GRP Havildar's evidence [para 23(a)] for, had it been otherwise and the head-light bright, he would first have seen the train and thereafter heard its approach and not the other way about as did transpire in fact. I accordingly hold that the head-light was not functioning properly and that its light-beam was dim.

34. As to the condition of 2 Down's tail-lamp

(a) On a straight reach, a tail-lamp comprising even a kerosene-oil dubber and cotton wick has, if burning properly and with a clean glass, a visibility of well in excess of half a kilometer. During the trial of 17-12-81, the visibility of the lit tail-lamp was approximately $30 + 285 = 315$ metres only, whereas in the unlit condition it could be spotted from a distance of hardly 80 m.

(b) Referring to the trial conducted on 20-2-1981, 32 Down's Driver had spotted 2 Down's rear from a distance of 183.4 metres. Furthermore, neither the Driver [paras 20(e) and 22(b)] nor his Fireman [para 21(a)] could recall any awareness of 2 Down's tail-lamp. Indeed, according to the statement of 32 Down's Driver [para 22(b)] made to the CCS soon after this accident, he became aware of 2 Down's rear only in the moon-light.

(c) As regards the post-accident condition of this tail-lamp [para 14(j)], even if its outside escaped without damage, the breakage of the wick-holder and leakage of the dubber may be attributed to their getting knocked about within the tail-lamp as the rear of the last vehicle got deformed under the impacting 32 Down. The extent of soot collected inside under the top and the substantial quantum of dirt-coating found on the inside surface of the red glass showed that 2 Down's Guard took no real care of his tail-lamp.

(d) According to the Station Master of DDA [para 15(a)], 2 Down's tail-lamp could be seen burning as it ran through DDA. Inspection of the tail-lamp [para 14(j)] also led to the surmise, that it was in use.

(e) All things considered, therefore, I conclude that, although 2 Down's tail-lamp was in fact burning at the time of the accident, the condition of its glass was so dirty that the range of visibility of its beam of red light was very poor and it certainly did not impress or alert 32 Down's Driver to its presence (and, hence, of 2 Down ahead blocking the track).

35. As to the functioning of IPS Signal No. 36802

(a) It being quite clear from paras 14(1) and (m) supra that the 'RED' aspect of this Signal was indeed found to be glowing when tested so soon after the accident, there can be no doubt that such was indeed the case at the time of the accident as well. The 32 Down Driver's uncorroborated testimony [paras 20(b), (d) & (g)] that the 'Red' aspect of this Signal was not lit is patently false; indeed, his own version given to the CCS [para 22(b)] immediately after the accident (when his recollection must have been very fresh and clear) denied any coming across a 'Red' or *extinguished* Signal. And even his Fireman had eventually to concede [para 21(c)] that he himself did not see this Signal in a blank state, but that this condition was told to him by the driver.

(b) The Signal Unit of IPS Signal No. 36802 was examined on the night of 20/2/81 in the Company of the Deputy Commissioner of Railway Safety (Signalling & Telecommunications) of the Commission's Technical Wing, the Divisional Railway Manager, the Deputy Chief Signal & Telcom Engineer, the Driver of the ill-fated 32 Down and several other witnesses, when it was observed as follows :—

(i) The Signal Unit was locked;

(ii) While none of bulbs seemed new, the lamp for the 'Red' aspect was certainly the oldest (probably the original installation), with the lamp for the 'Yellow' aspect looking fairly old and the condition of the lamp for the 'Green' aspect appearing of medium age (or, service-life); and

(iii) All the 3 aspects were tested and found to be functioning OK.

(c) All Signal Units are locked with the result that unauthorised personnel cannot gain access to the signal lenses or lamps. The lenses are moreover protected by wire-mesh guards against damage by anti-social elements. The non-appearance of the OFF/ON aspect of the Manual Stop Signals becomes at once reflected on the CTC Indication Panel in Gorakhpur, whereupon the concerned Sectional Gang is instructed to do the needful. As regards the Permissive Stop Signals, the very existence of which is not revealed on the CTC Indication Panel, it becomes the responsibility of Drivers to make a report.

(d) I, therefore, conclude that the 'RED' aspect of this Signal was certainly functioning at the time of the accident. In other words, with 2 Down having halted in the signalling section immediately ahead of it, it must be taken for granted that IPS Signal No. 36802 was displaying its 'RED' aspect at the time of the accident, as long as it was approach-lit.

(e) However, as amply brought out in paras 14(1), 27 and 28, the approach lighting aspect of this Signal was not behaving correctly, for the reason that the 111 Ohm rheostat placed in series in its circuitry was found mal-adjusted. As mentioned in para 28(e), this must have been due to some inadvertent action on the part of the field staff for CTC maintenance and might thus be regarded as an unintentional failure on the part of the Railway staff, unbeknownst to themselves and entirely through ignorance as also without any animus.

(f) The Railway's theory [para 25(c)] that the already restricted day-time visibility of colour light Signals came in the way of discovering this problem is acceptable.

36. As to the role of 32 Down's Driver

(a) According to the Driver's own estimate he became aware of 2 Down's rear from a distance of 183.4 m. This version accords well with what the eye-witnesses had told the CCS [para 22(a)] immediately after the accident that the braking of 32 Down was noticed when it was some 100-150 yards in rear of 2 Down.

(b) At that point of time, 32 Down was proceeding at a speed of 50 km/h [para 32(a)] and at that speed its braking distance [para 14(e)] would be 315 m. In other words, by the time he could espy the rear of 2 Down, his train was already on a collision-path because 2 Down was too close for 32 Down to be brought to a stop before ramming into 2 Down's rear. It is also obvious from paras 33 and 34(e) that he was greatly handicapped by the poor condition of the headlight of his own engine and of 2 Down's tail-lamp.

(c) Even though his own Guard stated [para 18(b)] that he didn't sense that the train was being braked the positions of the regulator arm, the vacuum brake lever and the reversing gear noted after the accident [para 3(f)] on 32 Down's YP engine must be regarded as proof enough that the Driver had actually made all possible efforts to bring his train under control.

(d) As regards passing IPS Signal No. 36802 at 'Danger', 2 possibilities are likely : one is the postulate expounded in para 20(i), with the deliberate PSD as the other. The Driver had denied the first possibility and insisted [para 20(g)] that he kept a sharp look-out ahead. Adverting to the analysis given in para 32(e) and giving due consideration to the feature that the IPS Signal No. 36802 would have shone 'RED' at the very instant that the Driver had passed the Up Home, it must be reckoned that the inter-Signal distance of 4000' = 1219 m would have taken 32 Down about 2½ minutes at the average speed of 30 km/h. It would certainly appear a dereliction of a Driver's duty if he were not to look ahead continuously for such a long duration as 2½ minutes.

(e) Indeed, when interrogated very soon after the accident by the CCS [para 22(b)], the Driver had mentioned that this Signal, too, was exhibiting a 'Yellow' aspect. On the premise that no one would be naive enough to willingly incriminate himself and, all things considered, I conclude that the Driver did notice the 'RED' aspect of IPS Signal No. 36802 and that he disregarded this indication deliberately.

(f) The question that logically comes up now is "what was his motive in doing so?" Pre-meditation to cause an accident can certainly be ruled out straightaway, as Shri Jai Shree Prasad did not at all appear to be a reckless person. The only feasible explanation would lie in a combination of 3 factors :

(i) that his lack of perception of the niceties of the Signalling System provided on the CTC Territory precluded any recognition on his part that:

—Having started on a 'Yellow' Starter, the next Signal could not possibly show 'Green' [para 14(b)];

—Lol That Signal displaying a 'Green' aspect could not be next one, but in all probability the further one ahead;

—The implication was that the 'Green' Signal was certainly not applicable to him and must be for 2 Down and, since Signals were approach-lit, 2 Down must as yet be in rear of that visible Signal, which could happen only if 2 Down had met with some trouble, say, ACP; and

—Were this all true, the next Signal should be displaying 'RED', whereas it just could not be seen at all—a failure that he must report to the CTC Operator upon stopping at Chainwa, the next halt.

(ii) that, consequently, the circumstance that a Signal showing its 'GREEN' aspect could be perceived in his field of vision so completely took him in [para 20(i)], that he could not properly assess the situation when another (and a nearer*) Signal sprung up all of a sudden showing 'RED'; and

(iii) that, like a few (hopefully, only a few) other Drivers, he, too tended not to get "needlessly worked up" about the 'Red' aspect of a Permissive Stop Signal, which could be passed anyhow after the lapse of one minute by day or 2 minutes by night after stopping in rear of it, provided, of course, that it did not exhibit a 'Yellow' aspect any sooner.

37. As to the competence of 32 Down's Driver :

(a) At no stage at all during the several sessions of giving evidence did the Driver seem knowledgeable about the aspects of the Permissive Stop Signals, the 'aspect control' between successive Signals, etc. Even after making allowances for some understandable nervousness at such times, he did not exhibit any capacity to comprehend the questions put to him, which only proved that he did not possess the acumen necessary to digest the information pertaining to such matters, which are, to be fair, quite sophisticated, notwithstanding his experience†.

(b) He did display, however, plenty of "native intelligence" [para 20(f)], in making every endeavour to confuse matters by throwing up innuendos doubting the structural integrity of the signalling as existing.

(c) From the 2 versions put forth [paras 20(k) and 24] on the so-called "1-day intensive training", it would certainly appear that the Railway is regrettably giving merely a "lip service" to Railway Board's directive No. 80/Safety-1/25/3 of 10-4-80, as the significance of imparting proper training does not seem to have been fully appreciated by the Railway.

(d) The accident having happened in 1981, any effort to make out a Competency Certificate after the accident may induce a not-too-alert official to write out the year as '81' (the current year, to which one is already getting "habituated" by February) and then correct it to '80', after realising this 'bloomer'. The curious coincidence in this case [para 14(i)] is that the certificate issued in favour of Shri Jai Shree Prasad did reveal this very feature of over-writing of '81' by '80' against the date of its issue. The circumstance that the AME had countersigned at a place other than the intended location also raises serious doubts as to the authenticity of this Certificate.

(e) These seemingly minor matters are being brought to light only for the purpose of highlighting the fact not sufficient care or forethought is being bestowed upon this entire matter of safety training of Drivers. These lacunae were not emphasised at the Inquiry, if only to forestall the ubiquitous rejoinder that this was but an isolated instance, after all.

*Nearer, not only because of its larger apparent size but also because a Red Signal can not succeed a 'Green' Signal under any circumstance.

†15 years on CTC Territory [para 20(c)].

38. *As to the role of 32 Down's 1st Fireman :*

(a) As per GR 122, a Fireman is expected to keep a sharp look-out ahead; he is also expected to call out the Signal aspects for the Driver's benefit. Although he could hardly be expected to incriminate himself by owning up to have seen IPS Signal No. 36802 at Danger, Shri Lalit Kumar nevertheless failed to fulfil his responsibilities as laid down in GR 122.

(b) An infraction on the part of the Railway was its alleged omission [para 21(c)] to give an opportunity to the 1st Fireman to learn the road.

39. *As to the role of 2 Down's Guard :*

(a) It was not expected of a Guard to protect his train whenever it stopped in mid-section due to ACP, unless, of course, the stoppage got unduly protracted. He ought, however, to check up on the tail-lamp of his train besides exhibiting a 'Red' signal towards the rear, the very first thing, of which Shri Santoo Prasad had no knowledge [para 17(d)] and which requirement could not accordingly be acted upon by him.

(b) As it has been established [para 34(e)] that this tail-lamp was burning, albeit that the emergent light was but faint, the Guard's failure to check up about it was of no consequence but Shri Santoo Prasad's failure to keep his tail-lamp clean did certainly contribute to this accident for, otherwise, the 32 Down's Driver could have sighted the bright red tail-lamp from afar and certainly far enough to have stopped short of the collision. Also, Shri Santoo Prasad's failure to display 'Red' Signal towards the rear was critical, because such a 'Red' Signal could have served to provide, despite the poor condition of the tail lamp, a sufficiently early warning to 32 Down's Driver for the latter to have managed to stop short of the obstruction.

(c) The cross-examination revealed that he had but scanty knowledge of the G & SR. Apart from the fact that, had he really lost it, he would certainly have reported [para 17(d)] the missing G & SR book, one would be truly hard put to think of a more unlikely item to be stolen than this book of G & SR. A more logical conclusion would be that Shri Santoo Prasad was not in the habit of carrying this item with him and it is no wonder that he should not be conversant with its revised provisions, not even to the extent that did concern his duties.

40. *As to the Railway's response to the Immediate Recommendations made :*

(a) Pursuant upon the outcome of the testing of the Approach Lighting Circuit for IPS Signal No. 36802 and the misinterpretation [para 20(i)] of the 'Green' Signal seen by the Driver, two Immediate Recommendations (as reproduced in para 46 infra) were made to not only the North Eastern Railway but also the Northeast Frontier Railway, as the latter, which falls within the jurisdiction of the North Eastern Circle, operated in part on similar CTC System.

(b) The North Eastern Railway had intimated under letter No. T/537/1/3/14 dated 5-3-81 that both these recommendations were accepted and under implementation. The Senior DSTE (CTC) subsequently deposed, while bringing to my notice the wrong calibration [para 27(b)] of the AVO-Meter used [para 3 of Annexure I(d)] for the field testing on 20-2-81, that a comprehensive check of the approach-lit aspect of all the Permissive Stop Signals on the Railway revealed the partial mal-functioning of IPS Signal No. 36802 as the single isolated instance. However, having found (upon a careful examination of the need, if any and at the present time, for the adjustable contact on the 111 Ohm rheostat) that its continuance was no longer justified, the Railway had already taken steps to remove the said adjustable contact throughout the entire CTC Territory [para 28(g)].

(c) The Northeast Frontier Railway responded vide its letter No. T/CON/SAFETY of 16-10-81 that suitable instructions for implementation of these 2 recommendations had been issued on that Railway and further that while the DA values of vital relays were being measured, the approach lighting aspect of Signals was also being closely watched for its correct performance.

41. *As to further measures to eliminate rear-end collisions :*

(a) That rear-end collisions of this type are not uncommon is shown in Annexure II(d). The matically, such collisions can be classified under 2 distinct categories :

(i) Those that occur when a slower train is sent ahead into a Block Section for a faster train to follow ;
and

(ii) Those that occur when the train that was sent ahead stops in mid-section for ACP or any other reason.

(b) Cases of the type (i) above typify not only bad judgement on the part of the CTC Operator (who controls the movement of trains on his panel) but also risk-prone thinking on the Operator's part. By proper training and patient explanation of the likely hazards, the CTC Operators can be taught to eschew such practices. Also, when senior officials peruse or examine the "Conventional Control Charts" prepared in CTC Office at Gorakhpur, they should synoptically isolate all the deficiencies (and, particularly those which have a bearing on the safety of rail transport) for the better understanding by the concerned staff so that such lapses do not recur in the future. Concurrently, staff responsible for repeated lapse of this type should be strongly disciplined.

(c) "Cascading" and "Red Lamp Protection" [paras 30(a) to (c)] would ensure to warn Drivers via the positive means of a 'Red' Signal of the danger ahead (for, even if the lamp/bulb for the 'Red' aspect of a Signal fails at a time when the next signalling section is blocked, the 'Red' aspect of the Signal next in rear would have lit up already). Similarly, recourse to double-filament lamps [para 30(d)] would greatly assist in providing the necessary information to Drivers, provided that they are in a frame of mind to heed it.

(d) As regards "cascading", the Railway Accidents Enquiry Committee (RAEC) 1978 had concluded as below, vide their Recommendation No. 164 [at page 106 of their Report, part II].

Cascading of Signals

(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.

(e) If the means for telephonic contact with the CTC Operator were available there could be no excuse for a Driver not to stop short of a permissive Stop Signal at 'ON' and elicit further relevant information. In this context the RAEC 1978 concluded as below, vide their Recommendation No. 165(i) [at page 106 of their Report Part II].

Telephones in CTC territories

(i) Railways should take steps including use of pilfer-proof fittings to ensure that all telephones at signals on CTC section are kept in good working condition.

(f) As regards the tendency on the part of some Drivers to want only pass a Permissive Stop Signal at 'Danger' several steps can be taken by the Railway :

*(i) to educate Drivers by not only emphasising or reiterating the need to stop most definitely short of such a Signal but also explaining lucidly the rationale and logic behind GR 436 which permitted them to pass this Signal after the lapse of 1 minute by day or 2 minutes by night and drilling into their minds that it is the Driver's sacred responsibility to be able to stop short of any obstruction ahead;

†(ii) to conduct "mock" drills or surprise checks to ensure that Drivers do halt short of a 'Red' Permissive Stop Signal so that defaulting Drivers are awarded condign punishment; and

** (iii) to encourage direct recruitment of adequately literate and technically qualified candidates [para 30(i)] for Drivers remembering that this category of staff, called as "Engineers" in the USA, are required abroad to possess certain minimum technical qualifications, which will have given the prospective Drivers a sufficient grounding in the matter not only of appreciation of technological features but also of logical appraisal of all the available factors for safety-effectiveness.

*Covered by the second Immediate Recommendation [para 46 infra].

†It would be prudent to decide in advance, before launching any such drive (s), on the kind of follow-up action the Administration would wish to take *uniformly* against errant Drivers; else, the whole exercise will not only prove counter-productive but also boomerang against the Railway.

**This progressive step would, of course, need effective liaison with Staff Unions in an obviously sensitive area.

(g) The alarm chain apparatus was conceived as an aid to passengers to stop trains in the case of fire or such abnormal and exceptional circumstances. Alas, at least on the regions served by this Railway, the gross misuse of this facility has reached such vast proportions that ACP has become a veritable pastime with passengers wishing to detrain anywhere and everywhere. This anti-social practice is thus found to be entirely beyond the Railway's control. From para 22(a), it can be seen that even a prestigious train like 2 Down was stopped via ACP several times before the subject accident. It is perhaps time (if not, too late, already) for the Railway and the concerned State Government(s) to meaningfully come together and plan a purposeful and stringent deterrent action to curb this menace.

(h) Lastly, the Railway must address itself to this question that, even if a Permissive Stop Signal was passed at 'Danger', should this necessarily lead to an accident? The obvious answer is in the negative, because a large number of averted collisions do also occur. Granted that all possible steps would indeed be taken by the Driver of "the offending train", once he becomes aware of the danger confronting him, the Railway must force its attention to be devoted to the elimination of any factor that tends to adversely influence the said awareness of an obstruction ahead. Hence, the paramount importance of ensuring the following :

- (i) the proper functioning of the engine headlight;
- (ii) brighter tail-lamps are introduced as speedily as possible; and
- (iii) pending (ii) above, proper cleanliness/maintenance of the existing type of tail-lamps, so that the available brightness is not impaired.

42. *As to the interminably long delay in the fitment of improved tail-lamps*

(a) It is accepted that evolution is often-times a slow process, but it is extremely doubtful if any other example illustrates the inexorable protractiveness of a developmental effort better than the RDSO's on going researches into the tail-lamp, which seem to continue for ever [para 31]. In the meantime, there is no gainsaying the fact that, over the years, quite a number of collisions, even at a conservative estimate, could have possibly been averted had a bright-red tail-lamp been showing or shining. This factor is known to one and all who may be familiar with Railway operations. Yet, astonishingly enough, there seems to be an all-pervasive reluctance in the extreme to finalise what ought to be truly a simple issue, particularly in these times of phenomenal technological growth. Can this sort of thing happen, if the Railways are in truth safety-conscious?

(b) The RAEC 1978 had the following to observe on this subject, vide para 548 at page 90 of Part II of their Report :

"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".

The last sentence forms also the verbatim text of their Recommendation No. 296, appearing at Page 113 of Part II of their Report.

(c) In this context, the Railway Board explained the present position as below, vide their O.M. No. 77/Safety (A&R)/1/26 dated 29-8-80 :

"The matter is already receiving the attention of the RDSO. For use on Mail/Express and Passenger trains, electric tail lamp of 24V auto bulb or reflector assembly, (which uses power from the train battery) has been developed by the RDSO. This would give much better visibility and is expected to give sufficient warning to the Drivers of approaching trains in time. The tail lamp developed has given a good account in preliminary trials. Further trials under various adverse conditions are being planned and it would be possible to arrive at the decision after these trials are completed.

As for goods trains, the development of a suitable tail lamp by drawing energy from the portable lead acid rechargeable battery is in progress. It may be mentioned that the development of flasher unit for tail light is also under consideration."

(d) Since further trials under various adverse conditions are being planned, it would be safe to conjecture that this entire matter is being treated with so much complacency and displaying no sense of urgency. Whereas certain Railways have no doubt gone ahead installing, as a trial measure, tail-lamps powered by the train-lighting system's DC supply, the need of the hour is for the Railway Board to straight away issue an edict ordering the Railways to take up and complete within a short time-span the installation of the improved tail-lamps of any of the types developed by the RDSO. The savings that shall accrue thereby would be commensurate several times over to any funds disbursed additionally to achieve this end.

VIII. CONCLUSIONS

43. Cause

(a) Upon a full consideration of all the factual, material and circumstantial evidence available at my disposal, I have come to the conclusion that the rear-end collision between the rear of the stationary 2 Down Avadh Tirhut Mail, which had halted in between the Intermediate Permissive Stop Signals No. 36802 and No. 36512 due to alarm chain pulling, and the following 32 Down Kanpur-Barauni Passenger at km. 367/9-10 situated in the Duraundha-Chainwa Block Section of the then Metre Gauge Siwan-Chhapra Single Line section of North Eastern Railway's Varanasi Division at 21.15 hours on 15-2-1981 was the result of the Driver of 32 Down having passed the Intermediate Permissive Stop Signal No. 36802 at 'Danger'.

(b) Accordingly, this accident is classified under the category of "Failure of Railway Staff".

44. Responsibility :

(a) Although he was handicapped by the confusion caused by the failure of the 'Red' aspect of IPS Signal No. 36802 to light up immediately as 32 Down cleared the Down Starter, the dim head-light of his engine and the dim tail-light of 2 Down, Shri Jai Shree Prasad, the Driver of the offending train, is held primarily responsible for this accident for having violated the following General Rules :

- GR 76(a), which enjoins a Driver to pay immediate attention to and obey every Signal, whether the cause for the Signal aspect being shown is known to him or not;
- GR 122, which requires a Driver to keep a good look-out while the train is in motion;
- GR 163(a) (i), which requires every Railway servant to exert in order to ensure the safety of the public;
- GR 163(b)(ii), which calls upon every Railway servant, who observes any obstruction, to take, such immediate steps as circumstances may demand, in order to prevent an accident; and
- GR 436(i), which enjoins a Driver to first bring his train to a stop in rear of the Permissive Stop Signal at 'ON', before taking further action as prescribed.

(b) Shri Lalit Kumar, the 1st Fireman of 32 Down, is similarly held responsible for contributing to this accident by having violated General Rule 122, which enjoins the Fireman also to keep a good look-out while the train is in motion, provided that he is not necessarily engaged otherwise.

(c) Shri Santoo Prasad, Guard of 2 Down is also held responsible for his contribution to this accident by failing to keep his tail-lamp in a clean condition, besides the violation of the following General Rules :

- GR 175, which enjoins every Railway servant to be acquainted with the Rules relating to his duties; and
- GR 442(i), which enjoins a Guard to immediately exhibit a 'Danger' Signal towards the rear and also check up that the tail-lamp is correctly exhibited.

(d) CVs (Curricula Vitae) of staff held responsible are in brief as under :

—Driver Shri Jai Shree Prasad—

| | | | | | | |
|---------------------|----------|----|----|----|----|-----------|
| Date of birth | .. | .. | .. | .. | .. | 1-8-1924 |
| Date of appointment | .. | .. | .. | .. | .. | 1-11-1942 |
| Promotion as Driver | 'C' | .. | .. | .. | .. | 1965 |
| " " | 'B' | .. | .. | .. | .. | 1967 |
| " " | 'A' | .. | .. | .. | .. | 1973 |
| " " | 'A'/Spl. | .. | .. | .. | .. | 1979 |

| | |
|---|----------------------------------|
| Refresher Course last attended | 1977 |
| Last P. M. E. | 31-8-1980 |
| Accident Index | 351.51 |
| Accident record during past 5 years | Nil. |
| Awards | Once, for achieving fuel economy |

—1st Fireman Shri Lalit Kumar—

| | |
|----------------------------------|------------|
| Date of birth | 28-10-1949 |
| Date of appointment | 7-9-1968. |
| Promotion to Fireman (I) | 13-2-1980 |
| Last P. M. E. | 10-9-1980 |

—Guard Shri Santoo Prasad

| | |
|---|------------|
| Date of birth | 1-3-1931 |
| Date of appointment | 14-12-1951 |
| Promotion as Guard | 1956 |
| Last Refresher Course and First Aid Course attended | 15-8-1975 |
| Last vision test | 1-5-1980. |

(e) The following infractions have been separately referred to the Railway for suitable remedial action :

- (i) Attachment of overdue POH coaches on 2 Down as well as 32 Down;
- (ii) Poor maintenance of engine head-light(s) [para 33];
- (iii) Unclean condition of the tail-lamp(s) [para 34(c)];
- (iv) The absence of emergency lighting equipment and even vacuum gauges on both 2 Down and 32Down; the absence of a fire extinguisher in 2 Down's brakevan [paras 14(k) and 17 (c)];
- (v) Non-intimation of the Accident Index of a Driver transferred to another Division for as long a period as one year [para 14 (h)];
- (vi) Lack of care in making out the Competency Certificates issued to Drivers [para 37 (d)];
- (vii) No opportunity given to the 1st Fireman to learn the road [para 38(c)];
- (viii) 32 Down Guard's inability to produce the G&SR book in contravention of GR 173 [para 39(c)]; and
- (ix) Absence of description tags for identifying the cable terminations in the Location Box for IPS Signal No. 36802.

45. *Relief Measures*—With reference to Chapter II, I was fully satisfied with the relief measures organised. The District Magistrate of Siwan rendered exemplary assistance by way of immediate arrangements for transporting the injured to the Hospital at Siwan, organisation of crowd control and arranging at mid-night the supply of gas and flame-cutting apparatus from local sources.

IX. REMARKS AND RECOMMENDATIONS

46. Two Immediate Recommendations were made as follows and I am happy to report that not only the North Eastern Railway [para 40 (b)] but also the Northeast Frontier Railway [para 40 (c)] had accepted these Recommendations and issued instructions for their implementation :

- (i) The Railway to immediately organise a rigorous check to verify the proper functioning of the approach lighting principle that any Signal shall get lit as soon as a train enters the signalling territory immediately in rear of it and the Railway to also institute a programme for periodic inspections in this regard; and

- (ii) The Railway to obtain the written acknowledgement of each and every Driver operating (or, are likely to operate) on the CTC territory that, after leaving a Station at night on a Yellow Starter, he should disregard any Green Signal sighted by him immediately ahead, as such Signal would not obviously be applicable to his train.

47. The following *short-term corrections* are recommended :

- (a) All the Railways to be instructed to quickly instal the improved tail-lamps designed by the RDSO within a short time-frame [paras 31 and 42].
- (b) The Railway to quickly complete the provision of line wire terminations, duly locked, on the posts of Permissive Stop Signals and simultaneously issue telephone hand-sets to Drivers in order to re-establish the direct communication between the Driver and the CTC Operator.
- (c) The Railway to immediately process the provision of double-filament lamps for both the Manual as well as Permissive Stop Signals on the CTC territory [paras 30 (d) and 41 (c)].
- (d) Controllers and CTC Operators to be suitably cautioned against sending slow-moving trains into the Block Section ahead of fast-moving trains running in the same-direction [para 41 (b)].
- (e) The Railway to pay particular attention to the one-day intensive training course for Drivers detailed to work in the CTC territory; detailed syllabus needs to be drawn up for a *full day's* session; simple audio-visual aids need to be developed to illustrate the Signalling concepts and Senior Staff of Signalling Department may be associated with this to explain the intricacies of the signalling system [paras 24 and 37 (c)].
- (f) The Railway to organise surprise checks on a random basis over the entire CTC territory to test the alertness of Drivers in their compliance with the provisions of GR 436 [paras 30 (f) and 41 (f) (ii)].
- (g) The Railway to consider the formation of separate night gangs for attending the night failures of CTC and Signals [para 13(c)].

48. The following *long-term corrections* are recommended :

- (a) The Railway and the concerned State Governments to get together for evolving an effective strategy by way of stringent deterrent action to curb the rampant menace of alarm chain pulling [para 41 (g)].
- (b) The Railway to plan the progressive incorporation of the 'cascading principle' and 'Red Lamp Protection' within the CTC territory [paras 30(a) to (c) and 41(c) & (d)].
- (c) In the context of the growing complexity and advances of the Signalling systems and the sophisticated controls of Diesel-electric/Electric locos, the Railways to be directed to recruit Drivers directly from literate and technically qualified personnel [paras 30(i) and 41 (f) (iii)].

Yours faithfully,

Sd/-

Commissioner of Railway Safety,
Central Circle, Bombay.

BOMBAY,

Dated, 15th December, 1981.

MINISTRY OF RAILWAY (RAILWAY BOARD)'s REMARKS AND RECOMMENDATIONS

PARA 46 :

(i) Necessary action has been taken by the Railway Administration in compliance with CRS's recommendations. Other Railways have also been advised to ensure proper working of the approach lit signals where this feature exists.

(ii) Accepted. Necessary instructions on the subject have been issued to the concerned Railways, vide Board's letter No. 81/Safety (A & R)/1/2 dated 17-8-1983.

PARA 47 :

(a) Accepted. Action to introduce the improved tail lamp designed by R.D.S.O. has been initiated by the Railway Board. Necessary instructions on the subject have been issued to all Railways vide Railway Boards' letter No. 78/Elec. 1/113/2 of 23-10-82.

(b) Necessary action has already been taken by the Railway.

(c) Double filament lamps are already in use in CTC Sections on N.E. and Southern Railways.

(d) This is accepted. Necessary instructions have been issued to the concerned Railways. A copy of the instructions issued is enclosed.

(e) Instructions already exist on the Railways vide Board's letter No. E (Trg)/80/30/2 dated 13-11-80 that Drivers/Motormen working in automatic signalling territories should be given one day's intensive course once in six months. Details of the syllabus have also been indicated therein. Railways had been asked to incorporate a subsidiary Rule under GR 260 (new GR 2.03) regarding training and issue of compulsory certificates for Drivers and Guards working in Automatic Signalling territories.

(f) Instructions have been issued by the Railway to conduct surprise checks twice a month to test the alertness of drivers in their compliance with the provisions of G.R. 436 (new G.R. 9.07).

(g) Action has been taken by the Railways to provide staff for attending to failures of signals and other CTC equipment during night hours.

PARA 48 :

(a) Instructions exist with the Zonal Railways to maintain a close liaison with the State Government to combat the activities of antisocial elements. Chief Ministers of various States are addressed from time to time by the Railway Minister for soliciting their cooperation (in form of police assistance) to curb this menace effectively. General Manager/Divisional Railway Manager have also instructions to hold periodical meetings with Officials of State Governments to evolve some effective strategy to eradicate the menace of alarm chain pulling.

As for provision of a device whereby an indication becomes available to Drivers in cases of occurrence of fire in running trains, the proposal was examined by R.D.S.O. but not found feasible.

(b) The position of power supply in North Eastern Sector is very critical and in view of this, the Railway has resorted to 'approach lighting' of signals to conserve power. It is not feasible to provide the 'cascading' arrangements simultaneously.

(c) A need for change in the methods of recruitment of Drivers and Motormen with a view of direct recruitment of technically qualified persons as Drivers from the open market has been felt and a Committee of Directors has been appointed to go into the recruitment, promotion and training methods of Drivers. After the receipt of the report the matter shall be examined further.

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