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C O N T E N T S .

Dhananjayrao Gadgil Lib



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1. Report by the Hon. Mr. Justice Thom on the Cause  
of the Railway Accident near Bihta on the East  
Indian Railway on the 17th July 1937. pp.639-692.  
(Govt. of India Gazette, April 9, 1938.)  
2754 Y:4370BX415.2.114E 68
2. "Those XB Engines"- Seven Articles published in the  
Servant of India, July-Sept.1939. pp.371-458.  
DSI:84.2.114 65
3. Pacific Locomotive Committee Report, 1939. pp.190 and  
(Chairman: Lt.Col.A.H.L.Mount.) 28 maps.  
62 DSI:84.2.114 69
4. dto Govt. India's Press Note on the above, pp. 10.  
dated June 20, 1939.  
DSI:84.2.114 206 69

## RAILWAY DEPARTMENT.

(RAILWAY BOARD.)

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## RESOLUTION.

*New Delhi, the 7th April 1938.*

No. 7043-T.(II).—In continuation of their Notification No. 7043-T.(II), dated 14th September 1937, published in the *Gazette of India*, dated 18th September 1937, the Government of India have now received the Report by the Hon'ble Mr. Justice Thom, Kt., D.S.O., M.C., on the cause of the railway accident near Bihta on the East Indian Railway on the 17th July 1937 and hereby publish it for general information. After consideration of the terms of this report, the Government of India propose to take the following immediate action:—

- (a) to direct the East Indian Railway Administration, without admitting negligence and as a special case, to consider and settle reasonable claims for compensation for any injury arising directly out of the accident; and
- (b) to proceed to the appointment of an expert independent committee to enquire into the design, the purchase and the continued purchase of XB engines as recommended in paragraph 182 of Mr. Justice Thom's report.

2. The Government of India wish it to be known that the Railway Board, in view of the conclusions reached by Mr. Justice Thom in regard to the running of XB locomotives, have already issued instructions to Railway Administrations regulating the speed limits to be observed by these locomotives under certain conditions, pending receipt of the Report of the Expert Committee referred to above.

3. All other questions arising from the Report including that of the responsibility, if any, of the Railway Administration for the accident are under the consideration of Government.

B. L. CAMERON,  
*Secretary, Railway Board.*

**REPORT BY THE HON'BLE SIR JOHN THOM ON THE  
CAUSE OF THE RAILWAY ACCIDENT NEAR BIHTA  
ON THE EAST INDIAN RAILWAY ON THE 17TH  
JULY, 1937.**

Having been appointed to enquire into and determine the cause of the Railway accident which took place near Bihta on the East Indian Railway on the 17th July, 1937, having inspected the locus of the accident, having heard the evidence adduced by parties and the arguments of Counsel and having considered the same I have to report as follows *videlicet* :

2. On the 17th July, 1937, between 3-50 A.M. and 4 A.M., No. 18 Down Punjab Express derailed whilst crossing Bridge No. 191 about 500 yards west of the signal cabin at Bihta Station.

3. The train consisted of an engine (XB Class No. 1916) and tender and ten bogies including two brake-vans and one Indian dining car.

4. The engine and tender of the train derailed to the left or north of the down line, ploughed through the track for a distance of 200 feet and finally capsized on the bank at the side of the track. On the derailment of the engine, the course taken by the following coaches has been graphically described by the Senior Government Inspector, Mr. H. A. Joscelyne, in his report on the accident to the Railway Board:—

“ . . . . The engine after travelling several rail lengths ploughing up the track capsized. The first coach an Inter class derailed to the left also and pulled up standing behind the engine. The fore end of the second coach derailed to the left and as it did so its rear end was pushed out to the right, by the following coaches, taking with it the fore end of the third coach. The train thus proceeded to fold up concertina fashion. The second coach pushed out to the right until it had fouled and destroyed the up track. The third coach did not follow it far but its rear was pushed to the left taking with it the fore end of the fourth coach. These two coaches having overbalanced over the bridge parapet immediately canted up till their ends over the track passed over the roof of the second coach and by force of impetus travelled almost sideways until the third coach, after rolling completely over, came to rest with its end on the roof of the first coach with the fourth coach flat against it. These two coaches thus formed an archway through which the fifth coach running straight, passed and smashed into the rear of the first vehicle. With this last movement the whole of the train came to rest. The sixth vehicle remained intact but was derailed, also the seventh vehicle. Both these coaches were entirely derailed at the fore end and partially in the rear. The remaining three coaches were not derailed”.

5. The train carried four hundred and fifty passengers, the majority of whom were in the leading coaches. One hundred and seven were killed in the accident, one hundred and seventeen were injured and detained in hospital and a number sustained injuries which did not necessitate their detention. The track at the point

of derailment was torn up and completely destroyed. To the west of the point of derailment, for a distance of 845 feet in all including 300 feet behind the last coach of the train, the track was distorted. The distortion started at a point 653 feet to the east of the down warner signal which is 432 yards west of the point where the engine derailed. It first took the shape of three distinct waves: thereafter the track was slewed off to the left until the bridge was reached. From this point for several rail lengths, as already indicated, the track was completely destroyed.

6. At first sabotage was suspected. This theory was, however, soon definitely rejected: A careful examination of the track at the site of the accident and of the material evidence convinced the Railway Authorities and the Police that there had been no tampering with the track or the rails prior to the accident.

7. The Senior Government Inspector early in August 1937 submitted his report on the accident to the Railway Board. His conclusions are embodied in paragraphs 46 and 47 of his report. He states:—

“46. From the above I am confident that the following describes what took place. Engine XB 1916 has a strong proclivity for violent hunting at high speeds. The train topped the rise at the Sone bridge at a speed considerably higher than the permissible limit, ahead of time, and then increased in speed on the long steep down grade. The track being 88½ lb. on D. O. plate sleepers was stiff enough to hold the side thrust of the engine in check and to prevent hunting. A few seconds after passing the down warner signal of Bihta station the engine ran on to the wooden sleeper track on a new bank. This being weaker than the D. O. plate sleeper track immediately responded and gave way to the side thrust of the engine which at once sensed its freedom and started hunting violently from side to side. The distortion of the track is for several inches either side and this, with the normal play of the engine, must have allowed a side lashing of at least 6 inches. As long as the engine was on the wooden track, which yielded to its hunting motion, the engine kept the rails, but the time came when it had to run back on to the D. O. plate sleeper track. This, on an open bank with the extra resistance of the D. O. plate sleepers, would have been bad enough, but the transition point is on the pucca bridge where the D. O. sleeper was rigidly held both horizontally and vertically and unable either to depress or to give to either side. The engine was too much out of hand to steady into a straight course so suddenly, something had to give way.

The engine jumped the rails.”

“47. I find that the accident was due to derailment of XB class Engine No. 1916 caused by hunting while running at an excessive speed over track that was not sufficiently strong to withstand the strain thrown on to it.”

8. The Railway Administration did not agree with the conclusions of the Senior Government Inspector. The Agent, the Chief Engineer, the Chief Mechanical Engineer and the Chief

Operating Superintendent submitted notes on the Senior Government Inspector's report. After a fuller consideration of the entire evidence available and after carrying out an experiment which took the form of a derailment of a train of similar composition and weight to the 18 Down at Jamalpur, the Agent, early in October, 1937, submitted his final conclusions to the Railway Board. These conclusions are embodied in paragraph 179 of his note.

"179. After examining all the evidence and considering all the circumstances my opinion is:—

- (a) That the fact that the track became distorted was the primary cause of the accident.
- (b) That the distortion was caused by an XB class engine hunting which started as the result of a lurch due to a low joint. The condition of the joint was aggravated by two engines having passed over at speed a short time previously.
- (c) That if it had not been for the coincidence that the track at the point where the engine started to hunt was on new wooden sleepers on a bank which had been completed a few months previously, the hunting would not have had the effect of distorting the track in the manner which occurred.
- (d) That the driver apparently did not realize at the outset, possibly due to lack of experience of this class of engine, that the engine had started to hunt and he only realized this when the hunting became violent and the engine was beyond control when it was too late for him to take effective action.
- (e) That the serious consequences of the accident were mainly due to particular features in the design of the tender of the engine, with respect to the position of the spring hangers relative to the track, and the effect they must have on it whenever a tender of this design derails.'

9. The report of the Senior Government Inspector, the notes of the Agent, the Chief Engineer, the Chief Mechanical Engineer and the Chief Operating Superintendent are printed in a volume which has been referred to throughout the Enquiry as the Paper Book.

10. At the Enquiry the Senior Government Inspector gave evidence and maintained the conclusions of his report:—

- (1) that the engine was being driven at an excessive rate of speed;
- (2) that the engine was hunting and
- (3) that the track though sufficiently strong for normal traffic was unable to withstand the strain imposed upon it by an XB engine running at a speed of over 45 miles per hour and hunting.

11. It was maintained for the Railway Company on the other hand:—

- (1) that the speed of the engine was not excessive,
- (2) that the engine was not hunting sufficiently violently to distort a track of normal strength and
- (3) that not only was the track weak but prior to the arrival of the 18 Down it had been distorted by two earlier trains, the 6 Down and the Imperial Mail, and that

the accident was due to this prior distortion which started the engine of the 18 Down lurching, and to the inherent weakness of the track.

12. There is no dispute that the engine derailed as a result of track distortion. Further there is no dispute that the major part if not the whole of the distortion was done by the engine of the 18 Down. As to whether the engine was running at the time of the accident at an excessive rate of speed and as to whether the distortion was the result of the hunting movement of the engine and not of weakness of the track, there was disagreement. These questions must be decided on a consideration of the evidence.

13. Firstly as to speed. What was the speed of the 18 Down on approaching Bihta on the early morning of July 17, 1937?

14. In April, 1934, the Railway Administration decided to impose upon all XB engines a restriction of 45 miles per hour on tracks laid with 85 and 88½ lb. rails during the Monsoon period, *i.e.*, from 1st June until the 31st October. This restriction was imposed for good and sufficient reasons. Experience had taught the Administration that it was dangerous to allow XB engines to run at a speed in excess of 45 miles per hour during the Monsoon period. Hereinafter it will be necessary to refer at length to the circumstances under which this restriction was imposed. For the present purpose it is sufficient to say that the restriction came into force on the 1st June 1934 and that it has never been removed.

15. According to the instructions which are published in the Working Time Table and of which every driver was well aware, XB No. 1916, the engine of the 18 Down, should not have been travelling at the time of the accident at a speed in excess of 45 miles per hour. What is the evidence?

16. The driver of the train Brinkhurst, who with his two firemen had a remarkable escape, deposed that at the time of the accident the train was travelling at 42 miles per hour. He admitted that this figure was approximate and that the speed of the train might have been 47 miles per hour. On this point, however, as on other matters his evidence is utterly unreliable. When he was examined on the 18th and on the 26th July, 1937, by the Senior Government Inspector he said at one point that the speed was between 40 to 42 miles per hour and later that it was between 25 to 30 miles per hour. He stated further that prior to the derailment he had applied the vacuum brake. It is clear, however, from the evidence that he did not, and at the Enquiry it was not maintained on behalf of the Railway Company that the brake had been applied. After the accident the position of the brake handle showed that no attempt had been made by the driver to apply the brake. When the train derailed, however, the vacuum chamber was smashed with the result that the brake did operate and probably at the last moment checked the speed of the rear coaches. In estimating the speed of the train at the time of the accident therefore little assistance is afforded by the evidence of the driver.

17. The cabin registers, however, afford reliable data from which the speed of the train can be calculated.

18. The register of the cabin at Arrah shows that the train left Arrah to time (3-44 A.M.). Between Arrah and the site of the accident there are two signal cabins the first at Kulhuria 6½ miles from Arrah and the second at Koilwar 2¾ miles from Kulhuria. About 500 yards from the site of the accident is the signal cabin of Bihta Station. The timing of the train after leaving Arrah is

shown in the following table which was prepared by the Senior Government Inspector from the cabin registers of Arrah, Kulhuria, Koilwar and Bihta :—

Miles.		Train entering section received.	Train out of section given.	Train entering section given.	Train out of section received.
		Hours.	Hours.	Hours.	Hours.
	Arrah . . . . .	..	..	3·34	3·44
6½ . . . . .	Kulhuria . . . . .	3·34	3·44	3·44	3·47
2½ . . . . .	Koilwar . . . . .	3·42	3·45	3·45	Nil.
4½ . . . . .	Site of accident.				
½ . . . . .	Bihta . . . . .	3·47	Nil.	..	..

19. It will be seen from the above table that the clocks of Arrah, Kulhuria and Bihta synchronized, and that the clock in the cabin at Koilwar was two minutes behind. The registers further show that the train reached Koilwar one minute ahead of time 3-47. The booked time was 3-48. It is further clear that the distance between Kulhuria and Koilwar, namely,  $2\frac{3}{4}$  miles was covered in three minutes, *i.e.*, at a speed of 47·5 miles per hour. Between Kulhuria and Koilwar the grade of the track rises 1 in 300 for a little over a mile and 1 in 500 for about  $\frac{3}{4}$  of a mile. From Koilwar to the site of the accident the track is on the down grade. The driver has deposed that before reaching the down warner west of Bihta he shut off steam. This he explained was in accordance with his usual practice as the line curves at Bihta station and the home signal is not visible at any great distance. The shutting off of the steam short of the down warner, however, would not have any appreciable effect upon the speed of the train at the site of the accident. This point is not disputed. From the above facts it would be reasonable to infer that when the train reached the site of the accident it was travelling at more than 47·5 miles per hour.

20. It was suggested that the cabin registers are deceptive inasmuch as in recording the time the switch-men do not take into account fractions of a minute. So far as the calculation of the speed of the train between Arrah and Koilwar is concerned, however, this fact is of little importance. If a fraction of a minute is not to be counted, and if it was not counted at Arrah, Kulhuria and Koilwar the result of the calculation is not affected. The cabin registers clearly show that the train was running at 47·5 miles per hour at least when it reached Koilwar. Considering the time taken to reach a speed of 45 miles per hour from stand still—approximately 6 minutes and the distance covered in attaining that speed being approximately 3 miles—the speed at Koilwar was probably more than 47·5 miles per hour. After leaving Koilwar the train was running on the down grade. The site of the accident is  $4\frac{3}{4}$  miles from Koilwar: what was the speed at the time of the accident? To answer this question it is necessary to determine the time of the accident.

21. The train did not reach Bihta, therefore there is no entry in the cabin register in the appropriate column "Train out of section given". The switch-man in the cabin at Bihta, however, has given evidence on this point. He deposed that the accident occurred at 3-52 A.M.

22. The evidence of Sheopujan Ram, the switch-man, upon this point is clear and definite and he remained unshaken throughout his examination and cross-examination. He stated in evidence that shortly before the 18 Down was due he was engaged with the switch levers in connection with the shunting of the Arrah shuttle. After he stopped these operations he heard the noise of the 18 Down approaching. He looked at his clock: it was then 3-52 A.M. At

that moment he looked out of the cabin window and he saw the train had stopped. In answer to a question he said "I found that my train was standing. It was not coming". The witness further stated that when he saw that the train had stopped he informed the General Assistant on duty at Bihta. This statement has not been contradicted. The witness also stated that one of the firemen of the 18 Down came to his cabin and reported the accident at 3-55 and that the driver of the train came to the cabin at 4 A.M. The witness was visited at 4-45 by the Signal Engineer Mr. Woods. He stated that he told Mr. Woods that the accident occurred at 3-52.

23. Although his evidence is that the accident occurred at 3-52 there is an entry in the register "Derailment 3-55". The switch-man has explained this entry. He has deposed that the entry was made when the fireman of the 18 Down came to his cabin and reported the accident. There is an element of suspicion about this entry. To begin with it is unlikely that the signal-man would note the time when the fireman came to his cabin. Furthermore, the entry itself has the appearance of having been made at a subsequent date. The witness was asked during the course of his evidence to write the word 'derailment' and in doing so he did not spell the word as it was spelt in the register. The witness admitted that he had never used the word 'derailment' before and that the fireman of the 18 Down had not used that word when reporting the accident. He stoutly denied, however, that he had made the entry at the instigation of anyone. Taking all the circumstances into consideration I am inclined to the view that the entry "Derailment 3-55" was made not when the fireman reported the accident but some considerable time later and that in fact the switch-man had not observed the time when the fireman arrived. The view taken by the Senior Government Inspector is that the time 3-55 was a "bad guess". Be that as it may, the switch-man consistently maintained throughout that at 3-52 when he looked out of the cabin window the 18 Down had stopped. At 4-45, *i.e.*, within two hours of the accident he informed Mr. Woods, the Signal Engineer, that the accident had occurred at 3-52. Before the Senior Government Inspector and Mr. Smith, the Chief Engineer, on the 18th July, 1937, he stated that he first saw the train at 3-52 and that the train was then standing. At the Enquiry he gave evidence to the same effect.

24. Mr. Kanchi Prosad, Executive Engineer, East Indian Railway, Dinapore, also gave evidence upon this point. He was a passenger on the 18 Down at the time of the accident. In the course of his evidence he described how the train suddenly came to rest. He thought that the signals were against the train but was unable to see the down warner signal as something was blocking his vision. He then got down out of the train between the up and down track but could see nothing and returned to his compartment. Whilst there he observed a gentleman, who was travelling in a second class compartment endeavouring to leave the train. This gentleman asked Mr. Kanchi Prosad to help him. Thereafter he took out his torch, left the train on the north side and went forward to see what had happened. It was then that he first looked at his watch. The time was then 3-55. It is difficult to come to any definite conclusion as to the time of the accident from the evidence of this witness. It is clear, however, that before looking at his watch when it was 3-55 he had had time to climb down from his compartment on to the space between the up and down track, return to his compartment, endeavour to help a gentleman to leave the second class compartment and then again get down from his



own compartment on the north side of the train. It is not unreasonable to assume that all this would take three minutes at least. The fact is, however, that Mr. Kanchi Prosad did not look at his watch the moment the train came to a stop. His evidence, therefore, is not so conclusive as the evidence of the switch-man in the cabin at Bihta. It must be remarked further that when Mr. Kanchi Prosad made his statement before the Senior Government Inspector on the 18th July he did not state the time of the accident.

25. According to Brinkhurst the driver of the train the accident occurred at 3-55. Brinkhurst's evidence is very unreliable as already remarked. Furthermore, he admits that he did not look at his watch until 3-58. By 3-58 he had time to pull himself together, get down from the foot-plate and have a look round. His evidence as to the time of the accident is of little value.

26. According to the evidence of Carr, the Guard of the train, the accident occurred at 3-53. He stated that he looked at his watch coming into Bihta Station when he passed the warner signal. It was then 3-53. He made the entry of 3-53 in the guard's journal sometime after the accident. The entries in this journal and the evidence of Carr show that the distance between Kulhuria and Koilwar was covered in three minutes, and that the train travelled from Koilwar to the site of the accident in five minutes. Five minutes is the time also which according to the cabin registers and the evidence of the Bihta switch-man the train took to travel this distance.

27. It was suggested in the course of argument that implicit reliance should not be placed upon the entries in the cabin registers. It was contended that the switch-men are in many cases illiterate and are liable to make mistakes in reading and recording the time. It was further maintained that the joint train journal is much more reliable than either the cabin register or the guard's journal.

28. There is little force in such contentions. The cabin register is a register which is intended to be maintained with meticulous accuracy. Special provision is made therefor in the General Rules applicable to Indian State Railways. Rule 353 is in the following terms:—

“353. *Train Register book.*—(a) A Train Register book shall be kept by the Station Master or under his orders.

(b) The person who keeps the said book, shall enter therein, immediately after acknowledgment, all signals received or sent on the instruments, and the times of receipt and despatch.

(c) The times entered in the book shall be the actual times, except that any fraction of a minute shall be counted as one minute.

(d) All entries in the book shall be made in ink.

(e) No erasure shall be made in the book; but if any entry is found to be incorrect, a line shall be drawn lightly through it, so that it may be read at any time, and the correct entry shall be made above it.

(f) The person who keeps the book shall be responsible for all entries made therein and for correctly filling in each column thereof.”

There are no such provisions relating to the joint train journal. Be it noted further that the entries made in the cabin register are

made at the moment the time is noted and not after a lapse of an interval. In the case of the joint train journal on the other hand, the entries are made at the end of the journey and not infrequently after consultation between the driver and the guard. Further it is to be observed that there can be no incentive on the part of the switch-man to make a false entry in the register and there can be little or no chance of collusion between the switch-men in the various cabins. So far as the joint train journal is concerned on the other hand, there is clearly a possibility of collusion between the guard and the driver, and there may be occasions when it is to the interest of the driver to insist upon an incorrect entry being made in the journal. There can be no question whatever that the cabin registers afford the most reliable evidence as to the times at which a train passes various points on the line.

29. In regard to the argument that the switch-men are very often illiterate and may easily fall into error in observing and recording the times in their register, it is only necessary to say that they are men of considerable experience. One of their main functions is to observe and record the times at which trains enter and leave their sections. It may be assumed that in the discharge of this simple function they have attained a high degree of skill and accuracy, and that they are most unlikely to make a mistake in reading the time on the clock in their cabin. As the Senior Government Inspector has pointed out in the course of his evidence the Station Masters and switch-men, whose duty it is to record the times in the cabin register, generally perform their duties accurately and conscientiously.

30. The guard's journal may not be so reliable as the cabin registers. On the other hand, as in the case of the cabin register the times entered in the journal are observed and generally noted at the moment the train passes a certain point and not after the lapse of an interval.

31. In the case of the 18 Down as already indicated there is one minute of difference between the guard's journal and the evidence of the switch-man in the cabin at Bihta. According to the latter the accident occurred at 3-52, and according to the guard's journal at 3-53. In either case the train travelled from Koilwar to the site of the accident ( $4\frac{3}{4}$  miles) in five minutes. It would appear, therefore, that at the time of the accident the train was travelling at 57 miles per hour. But as the Senior Government Inspector has pointed out in his second note to the Railway Board and in his evidence, it is impossible to determine with absolute accuracy the speed at which the train was travelling, inasmuch as in recording the time in the cabin register fractions of a minute are not taken into consideration. The train may have been travelling at 57 miles per hour or over. On the other hand it may have been travelling at 51 miles per hour. Upon a consideration of all the facts and circumstances, my finding is that at the time of the accident the train was travelling somewhere in the region of 55 miles per hour.

32. It would not be reasonable in the circumstances to hold that the driver of the train was culpably negligent in that he was driving at an excessive rate of speed. On the section of the line where the accident occurred he was entitled to drive at a speed of 45 miles per hour. It is a matter of general admission that without a speedometer it is impossible for a driver to regulate his speed exactly. Some witnesses have deposed that it is impossible for a driver to determine within five miles an hour what the exact speed is. One witness has said that it is impossible to determine the

speed within seven miles an hour and another within ten miles an hour. There can be no question that it would be quite unreasonable to expect a driver, especially at night time, to maintain an exact speed of 45 miles per hour. He might be travelling at 50 miles per hour or over and yet under the impression that he is well within the restricted speed.

33. Be that as it may, there can be no doubt that on the morning of the 17th July, 1937, at the time of the accident, the 18 Down was being driven at an excessive rate of speed. The speed was over 50 miles an hour. At a speed of 45 miles per hour there was little or no margin of safety—a point which will be referred to later in another connection.

34. Now it is a matter of agreement that at certain speeds engines of the XB class may start to hunt. For each engine, it has been stated, there is a critical range of speed. The speed at which an engine hunts differs in the case of each engine. One engine may commence hunting at 45 miles an hour, another at 52 miles an hour and another at 55 miles per hour.

35. This leads to the consideration of the next important question. Was the engine of the 18 Down hunting when it approached the site of the accident on the 17th July, 1937?

36. In considering this matter it may be convenient at the outset to discuss briefly the meaning of the term "hunting".

The simplest definition of hunting has been given by the Senior Government Inspector in his report on the accident to the Railway Board. In paragraph 39 of his report he observes:

".....It is well known that every engine hunts to a more or less degree. Hunting is a horizontal side to side movement of a locomotive round a vertical axis, *i.e.*, it is not a parallel side to side but a definite nosing movement. There is no sway. This movement is considered generally to correspond to a critical range of speed different in each locomotive, usually at the higher speeds. It may develop at a moment's notice and die out equally suddenly. If very violent, there is obviously a side to side thrust thrown on to the rails. If the fastenings are weak the rails are inclined to spread the gauge. If the track is not strong enough it will become distorted.

The XB class of locomotives is notorious for its tendency to hunt. Other engines may hunt as frequently but not so dangerously. This class is a heavy engine built for high speeds. The critical hunting speed is believed to vary in the range between 45 miles per hour and 60 miles per hour."

37. The hunting motion of an engine, it would appear therefore, is a pivoting motion. The engine when hunting pivots round a vertical axis and it is generally accepted, that axis runs through the centre of gravity of the engine in the region of the fixed wheel base.

38. A very simple description of an engine hunting and of the effect of such a motion on a track which whilst not strong enough to stand up to the forces imposed upon it by the engine, is not so weak as to give way to a major distortion, has been given by Mr. I. K. Smith, the Chief Engineer of the East Indian Railway,

in his note on the Senior Government Inspector's report. In the course of his note he observes :—

“In none of the files have I seen any account by an eye-witness of one of these X class engines at work damaging the road, and it would appear that I alone have had that experience.

It may therefore be of some interest and perhaps importance if I relate what I saw taking place and reported to the Chief Engineer.

I happened to be carrying out an inspection of the Howrah-Burdwan Chord with Mr. Mair on 23rd October, 1933.

4 Down Mail overtook us at mile 39/16 running fast behind XC 1967. The bogie was running very steadily with very little nosing or hunting. But the engine was swinging violently about the drivers and hind truck wheels. Lurching or swaying was not noticeable. As the engine approached this movement seemed to get worse and I thought we were about to witness a derailment of the Mail. The brakes were applied shortly afterwards and the train slowed up appreciably and then went on.

Before the train had passed I examined the road ahead with a powerful pair of field glasses and the alignment was good. After the passage of the train the deformation of the track was obvious to the naked eye—and on measurement it was found to be about one inch in the shape of alternate swings to right and left for a distance of about 1000/1200 feet. Subsequent examination of the wooden sleepers shewed that the chairs had been forced out from  $\frac{1}{4}$  to  $\frac{5}{11}$  inch, and this was due in my opinion to the extremely severe action of the drivers and trailing wheels. The bank was water-logged and ballast was short.”

It will be noted that Mr. Smith at the time did not regard the motion of the engine which he saw as a hunting motion. It was accepted, however, during the course of the Enquiry by the mechanical engineers that what Mr. Smith observed was an engine hunting whilst running at speed.

39. It will be necessary at a later stage to discuss more fully the subject of hunting. For the present, however, in considering the evidence on the question of the behaviour of XB No. 1916 at the time of the accident, the above definition and description will suffice.

40. The evidence of driver Brinkhurst, the one person who was in the best position to say whether or not his engine was hunting prior to the accident is unfortunately unsatisfactory. He deposed that as the engine approached Bridge No. 191, the engine suddenly “dipped and swerved to the right” and then he “felt the engine leaning over to the left hand side.” He further stated that after the first dip it was “all over” in about four seconds. He denied that prior to leaving the rails the engine was hunting.

41. Now, as to the cause of the accident. Brinkhurst made or is alleged to have made four statements. The first was to a passenger on the train—a Mr. Tullis—who spoke to him shortly after the accident. According to Mr. Tullis' evidence Brinkhurst replied to a question as to the cause of the accident that it was

“possibly track alignment.” This statement to Mr. Tullis is very vague and indefinite and does not cast any light upon the real cause of the accident.

42. The next statement which Brinkhurst was alleged to have made was to Mr. C. J. Hall, the Superintendent of Power at Dinapore. Mr. Hall met Brinkhurst not long after the accident. He asked Brinkhurst what had happened. Brinkhurst, according to Mr. Hall, replied “just a dip and a lurch and it was over”.

43. About the same time or shortly thereafter, Brinkhurst was alleged to have made a statement to Mr. Evans, the Divisional Superintendent at Dinapore. Mr. Evans deposed that he asked Brinkhurst if his engine was hunting and that Brinkhurst had replied in the negative. Brinkhurst, according to Mr. Evans, further stated that he had “had no warning of what was going to happen: that the engine went down with a lurch and went off.”

44. The evidence of this witness is most unsatisfactory, and I do not accept it.

45. In his written report upon the cause of the accident Brinkhurst stated that his engine started hunting very badly just before the accident. When on the 18th July, *i.e.*, a day after the accident, he gave evidence before the Senior Government Inspector, he commenced by stating that his engine started to hunt violently. Later, on the same day, Mr. Evans gave evidence himself before the Senior Government Inspector and he made no mention of Brinkhurst's having told him that the engine had not been hunting. A week later, however, when the Senior Government Inspector was taking further evidence Mr. Evans requested to be permitted to make a statement. He was allowed to do so and he stated that he had asked Brinkhurst on the morning of the 17th “if he had no previous warning” and that Brinkhurst had replied “that he had not and that his engine was not hunting.” In his evidence at the Enquiry Mr. Evans deposed that when Brinkhurst was making his statement he had informed the Senior Government Inspector that Brinkhurst was telling a story entirely different from what he had given him on the morning of July 17. There is no doubt, however, that when Mr. Evans during the course of Brinkhurst's examination by the Senior Government Inspector informed the latter that Brinkhurst had changed his story, he made no mention of hunting. The Senior Government Inspector was clear upon this point in his evidence. As aforementioned, Mr. Evans gave evidence before the Senior Government Inspector on July 18, after Brinkhurst had made his statement, and despite the fact that the question of hunting had been prominently raised, as will hereafter appear, during the course of that statement Mr. Evans did not say that Brinkhurst had told him that his engine had not hunted. If Brinkhurst had told Mr. Evans that his engine had not been hunting it is inconceivable that the latter would not at once, in the circumstances, have informed the Senior Government Inspector. He did not do so. Brinkhurst himself denies that he told Mr. Evans that his engine was not hunting before the accident. Mr. Evans came forward with the story that Brinkhurst said that his engine was not hunting, a week after Brinkhurst had given evidence. Having seen and heard this witness, and having considered all the facts and circumstances, I am satisfied that his testimony that Brinkhurst told him that his engine was not hunting should not be accepted.

46. Brinkhurst's fourth statement on the cause of the accident was a written one. It was made in response to an enquiry from

his Shed Foreman, Jhajha, on the night of the 17th July. This statement is in the following terms :—

“Regarding the accident to 18 Down on date. After I had passed the Outer Signal at Bihta my engine got a very heavy lurch and started hunting very badly.

At that time I was running with steam shut off. As its a habit of mine when running through Bihta.

The hunting was so bad we could not keep our footing on the engine and due to this being excessive the engine left the rails which caused it to turn on its side.

The train was running to time at a speed of 40 to 42 miles an hour, the accident occurred at about 3-58 and at 4-5 I went to the Cabin to give the necessary information.”

It will be observed that in this letter Brinkhurst does not state that his engine dipped. He does state, however, that his engine started hunting very badly. The letter contains his first considered statement as to the cause of the accident. It is therefore a document of the utmost importance. The letter was written by Brinkhurst's wife to Brinkhurst's dictation. If his engine had not been hunting prior to the accident, there is no reason whatever why he should have said it was. He had nothing to gain by alleging falsely that his engine started hunting. On the face of it the statement appears to be honest and straightforward.

47. Brinkhurst's next statement was before the Senior Government Inspector on the 18th July. At the outset of his statement he deposed :—

“I was the driver of 18 Down on the 17th July and as I passed the Down Outer Signal at Bihta my engine gave a heavy lurch and started swaying and lurching very badly.”

It will be noticed that in this record of his statement there is no reference to hunting. The record, however, is not accurate. What actually happened at the Enquiry may best be described in the Senior Government Inspector's own words. In his second note to the Railway Board in paragraph 51 thereof he observes :—

“51. I have stated before that Driver Brinkhurst wished to please and (in paragraph 29 of my report) that he had been driven off using the word ‘hunting’ in his evidence. I must now explain this fully. In his original written statement Brinkhurst opens with ‘After I had passed the outer signal at Bihta my engine got a very heavy lurch and started hunting badly.’ The next morning in his verbal statement to me, in the presence of the civil and railway officers, he opened with exactly the same words “as I passed Down Outer Signal at Bihta my engine gave a heavy lurch and started hunting badly.” He had no sooner uttered the word “hunting” than the Chief Mechanical Engineer stood up and protested against this word being used by the driver, as it would be misleading, telling the driver that he (in the Chief Mechanical Engineer's opinion) did not know what “hunting” really is. It was a minute before I could end the interruption and persuade the Chief Mechanical Engineer that such definition could come later, but at the moment the witness must make his

statement exactly as he chose and in his own words. The damage, however, had been done and Brinkhurst had realised that he must not use the word "hunting" as it was objected to by his Chief. I know perfectly well that this action of the Chief Mechanical Engineer was unpremeditated and in no way intentional, but the contretemps is to be regretted. I am sure that Brinkhurst would have completed his verbal statement exactly as he had written it. He at once corrected himself, by repeating his opening sentence, but substituting the words 'swaying and lurching' for 'hunting' and this was then recorded. Thereafter he is careful always to use the word 'lurching'."

48. After this incident, which no doubt was regrettable it was not unreasonable to assume that it had become known amongst the drivers and others in the service of the Railway Company, that the Administration did not regard the use of the word 'hunting' with approval.

49. In his evidence at the Enquiry, Brinkhurst went back upon his statement in the letter of July 17, to his Shed Foreman, and on his statement to the Senior Government Inspector. He stated that when he dictated the aforementioned letter to his wife, and when he made his statement before the Senior Government Inspector he was ill and much upset. So far as his statement before the Senior Government Inspector is concerned, this explanation is not supported by the latter. The Senior Government Inspector deposed that Brinkhurst was calm and composed when he gave his statement on July 18. So far as his statement in the letter to the Shed Foreman is concerned, that the engine *was* hunting, his explanation that when he dictated the letter he was ill cannot be accepted as a satisfactory one. If Brinkhurst was, in fact, upset as he explained when he dictated the letter, it is highly unlikely that he would have invented an entirely false story. There was no reason whatever for him to state that his engine started hunting very badly if, in fact, it did not.

50. In all the circumstances, I should be prepared to accept Brinkhurst's statement that the engine was hunting prior to the accident. There is other evidence, however, which in my judgment puts the matter beyond doubt.

51. Engine XB No. 1916 was one of a batch of engines which arrived in this country in the year 1928. Its history from the time of its erection in Jamalpur Shops in March, 1928, down to June, 1937, is to be found at page 128 of the Paper Book in an annexure to the second note of the Senior Government Inspector to the Railway Board. From this statement it appears that the engine was no more satisfactory than other engines of the same class which arrived in this country about the same time. On the East Indian Railway these engines proved a source of constant trouble. They were designed for fast passenger services but had to be taken off these services because of *inter alia* their hunting proclivity and their tendency to distort track. This will be a matter for consideration later on. At this juncture we are concerned with the history of the particular engine, XB No. 1916, during the period immediately preceding July 17, 1937.

52. In May, 1936, the engine was sent to the Jamalpur Shops for special repairs. It appears that it had cracked its main frame at both leading horn block back corner rivet holes. In May, 1937

it was again sent to the Jamalpur Shops for a number of repairs. Again it appears that it had cracked its main frame.

53. On June 23, 1937, it was received back in the shed at Jhajha. On June 27, 1937, it did its first trip after coming back from the shops. It took the 16 Down to Howrah and returned with the 41 Up. The driver on this occasion was the witness J. Martin. At the end of the trip the engine was not booked for hunting. Its second trip was on June 30, with the 42 Down. It returned on July 1, with the 15 Up. The driver was the witness J. Martin. On this occasion the driver made the following entry in the engine's repair book:—

“Engine bogie control springs to be examined: engine hunting very bad.

Both trailing, driving and right leading boxes running at very high heat due to the above cause; engine riding very rough.”

Following this report the bogie control springs were examined and changed.

54. The engine's third trip was on July 9, with the 42 Down. It returned to Jhajha on July 10, with the 15 Up. The driver on this occasion was T. L. Martin. At the end of the trip he made the following entry in the shed repair book:—

“Bogie control springs need examining: engine hunting badly.”

Following this report the bogie control springs were examined and changed.

55. The engine's fourth trip was on July 13, with the 41 Up. It returned to Jhajha on July 14, with the 14 Down. The driver on this occasion was the witness T. C. Wilson. At the end of the trip he made the following entry in the shed repair book:—

“Engine hunting very bad: control springs to be examined. Engine both trailing bogie boxes running very high heat.”

Following this report the bogie control springs were again examined and changed. One of the springs was found to have stuck owing to dirt in the housing. It was admitted, however, that this could have had no effect on the working of the spring.

56. On its fifth and last trip XB No. 1916 took the 13 Up to Moghal Serai. Brinkhurst was the driver. He has deposed that on the journey to Moghal Serai his engine did not hunt. This may be true but his evidence, as already observed, is unreliable. In the circumstances, if his engine had been hunting on the journey to Moghal Serai there was a very strong incentive on his part to deny it. The engine did not reach Jhajha on the return journey as it was involved in the accident at Bihta in the early morning of July 17. Until Brinkhurst was drawn up by the Chief Mechanical Engineer, Mr. Trimming, whilst making his statement before the Senior Government Inspector, he had maintained that the engine was hunting at the time of the accident.

57. It will thus be seen that after coming out of the Shops at the end of June, 1937, XB No. 1916 did five trips including the one with the 13 Up, on July 16, and the 18 Down on July 17. On one of these trips the driver returned the engine as “hunting badly.” On two of these trips the driver returned the engine as “hunting very bad,” and on its final trip Brinkhurst stated in his first report on the accident the engine “hunted very badly.”

58. Driver J. Martin and driver T. L. Martin were inclined in their evidence at the Enquiry to make light of the behaviour of the



engine and to explain away the entries that the engine had hunted "badly" and "very bad". The attitude of these two witnesses is not surprising, in view of the outburst of the Chief Mechanical Engineer when Brinkhurst had used the term "hunting" in the course of his statement, and in view of the further fact that the Deputy Chief Mechanical Engineer, Mr. Jones had made an attempt to induce them to go back on the bookings for hunting in the repair book. This intervention of Mr. Jones is another incident to which, at this stage, it is necessary to refer.

59. Mr. Jones, the Deputy Chief Mechanical Engineer, visited Jhajha shed on August 12, and interviewed, amongst others, Drivers J. and T. L. Martin and Wilson. He took from the drivers statements which are printed as an annexure to his evidence at page 636 of the notes of evidence. To Mr. Jones, as it appears from the annexure, driver J. Martin stated:—

"I had no trouble going down, but on the return trip she was hunting very badly, it was a job to stand on the foot plate."

Driver J. Martin was then asked the following question by Mr. Jones:—

"On examination of 1916 after the accident it was found that the control springs were O.K. and that the side play on the boxes, except the RD was perfect the RD being only 7/64" slack, the condition of these parts has always been considered the main factor affecting hunting, this having also been definitely proved by experiment. When an engine is new from shops her axle boxes may be a little tight in the horns or her spring compensating gear be a bit stiff which will naturally result in rough riding. Are you quite sure that your experience on 15 Up was hunting and not rough riding due to these causes?"

to which driver Martin replied:—

"I think the trouble was both hunting and rough riding. She has always been a rough riding engine".

On the same occasion driver T. L. Martin informed Mr. Jones that on the return trip

"the engine started swaying very badly just after passing the HWH end cabin at Pandwa, and she then did the same again after leaving Swintola when running down the bank after passing Coparan. On arrival at JAJ. I booked the engine hunting, control springs to change".

Mr. Jones then asked driver T. L. Martin the same question he put to driver J. Martin above quoted. Driver T. L. Martin's answer was:—

"No I am quite sure it was hunting."

To Mr. Jones driver T. Wilson stated:—

"Hunting is a sideways motion that some engines develop after they attain a certain speed, with the XB engines between 40 and 45 miles per hour. The effect is a sway when the fore-end goes to the right the rear end goes to the left and *vice versa*."

He further stated that he worked:

"41 Up from JAJ to MGS on the 13th July, 1937. with engine No. 1916XB and returned with 14 Down on 14th. The engine rode very badly on the Up trip and was hunting badly whenever I got a speed on

and I had to reduce speed in consequence to steady her up.”

Asked why he did not book the engine for hunting at Moghal Serai he replied that he did not do so because the repairs were a heavy home station job.” He stated also:—

“On the down trip with 14 Down it was just the same so I booked the control springs for changing: hunting badly on arrival at JAJ.”

60. In his evidence at the Enquiry driver Wilson stated that both on the outward and the home journey on the 13th and 14th July the engine hunted the whole way.

61. It is clear from the questions which were put to the drivers on the 12th August by the Deputy Chief Mechanical Engineer—a very senior officer—that he was trying to persuade them to say that, despite the fact that they had booked the engine for hunting, the engine in fact did not hunt. He failed, but as one of the witnesses stated at the Enquiry he gave the drivers the impression that he did not believe them. This may to a certain extent have accounted for the fact that during the Enquiry the drivers J. and T. L. Martin were inclined to minimize the importance of the bookings. In view of the fact that these drivers were almost certain to be called upon to give evidence at an Enquiry, Judicial or otherwise, it is most unfortunate that the Deputy Chief Mechanical Engineer should have interviewed them and adopted towards them the over-bearing attitude, which his questions to them clearly indicate he assumed.

62. Be that as it may, in evidence at the Enquiry the drivers clearly and definitely stated that the engine hunted on the occasions above referred to. If their evidence be accepted it is established that during the last three trips, prior to the one in which it was involved in the accident, *i.e.*, on three occasions within a fortnight, the engine hunted sufficiently violently for the drivers to report the fact. If the hunting motion which they had experienced had been slight—and it is stated that every engine hunts to a certain extent—it may be assumed that the engine would not have been booked for hunting.

63. It was contended on behalf of the Railway Company that the bookings in the shed repair book of the 1st July, 11th July and the 14th July should not be accepted at their face value. Mr. Jones the Deputy Chief Mechanical Engineer bluntly deposed that the entries were false and made by the drivers for the purpose of avoiding further trips on that particular engine. He failed absolutely, however, to establish this point and in cross-examination he was utterly confused. Furthermore, no other witness supported him. It is not, therefore, necessary to refer to his testimony on this point.

64. Mr. Trimming, the Chief Mechanical Engineer, and Mr. Case, an Expert attached to the Central Standards Office, maintained that whatever might have been the hunting tendencies of XB engines when they first arrived in this Country in 1928, their defects had since been remedied and generally they were not more liable than any other class of engine to hunt violently and, in particular, the mechanical condition of engine XB No. 1916 on the 17th July 1937 was such that it could safely be predicated, in the light of present scientific knowledge, that it would not have hunted violently at a speed below 60 miles per hour. It was further maintained on behalf of the Railway Administration that after the accident there were no signs or marks on the engine to indicate that it had been hunting. It was also

contended that there was no evidence of track distortion to support the testimony of the drivers, who had booked the engine for hunting, and that so far as the bookings above referred to were concerned, the drivers whilst no doubt honest were mistaken, that they acted, in reporting that the engine hunted "badly" or "very badly", according to their lights.

65. The last suggestion may be disposed of briefly. The bookings above referred to by the three drivers constitute a very difficult obstacle for the mechanical experts to negotiate. Driver J. Martin has 27 years' service, driver T. L. Martin has 26 years' service and driver Wilson has 27½ years' service. Now there appears to be general agreement upon the point that all engines hunt. The Chief Mechanical Engineer and Mr. Case of the Central Standards Office are emphatic upon this point. The suggestion, therefore, that these drivers, who are men of long experience and who spend practically every day of their lives on the foot-plate, do not know when an engine is hunting "badly" or "very badly" is quite unacceptable. It may indeed be safely assumed that drivers of long experience will not report an engine for hunting badly without sufficient cause.

66. I am satisfied that when the drivers J. and T. L. Martin and Wilson booked the engine XB 1916 for hunting they were acting honestly. I am satisfied, furthermore, that they were quite familiar with the hunting movement of an engine and were in a position to say from their long experience whether an engine was hunting badly or not. Further I have no hesitation, after having seen and heard the witnesses and having considered all the facts and circumstances upon this point, in rejecting the suggestion by Mr. Jones that the bookings for hunting were false. In the absence of the most definite and conclusive evidence to the contrary, therefore, I should be constrained to hold that XB 1916 did hunt badly in July, 1937 and in particular on the morning of July 17.

67. The contention that owing to improvements and certain devices which have been adopted, XB engines no longer hunt at speeds under 60 miles per hour, that the condition of XB 1916 on July 17 was such that it could not have hunted at speeds below 60 miles per hour, and the further contention that there were no marks on the engine to show that it had been hunting or evidence of track distortion to support the bookings for hunting aforementioned—these contentions raise important questions which now fall to be considered.

68. It is appropriate and convenient at this stage to make some reference to the XB class engines generally.

69. These engines were designed in this Country about 1926. They were manufactured in England and began to arrive in India early in 1928. They belong to what is known as the Pacific Type of engine. The engines are constructed with four front bogie wheels, six driving wheels and two rear bogie wheels. They were designed for fast passenger traffic. In all, there are 99 XB engines in India working on five different Railways. There are 38 on the East Indian Railway and of these 38, 21 worked from Jhajha shed in July 1937.

70. The history of XB engines from the time they arrived in India until the accident at Bihta on the 17th July 1937, is given in Exhibit 172. It is clear from this history that these engines at the outset proved far from satisfactory. This was admitted by

learned counsel for the Railway Company. In his opening address at the Enquiry he observed:—

“I may mention, in passing, my Lord, that my instructions are that in the earlier stages of running this type of engine in 1928 their behaviour was so extraordinary and unforeseen that the engineers sat down to rebalance them”.

It is quite unnecessary to discuss in detail the evidence in regard to the earlier behaviour of XB engines. The facts admit of no dispute. It is clearly established that when they were first put on the line they evinced a tendency to excessive hunting which caused the Railway Administration the greatest concern. The history of these engines set forth in Exhibit 172 speaks for itself. Whatever the cause they oscillated or hunted to an excessive degree and distorted the track. The distortions were not confined to 88½ lb. rails. The first recorded case of track distortion by an XB engine occurred on the 26th June 1928. The track distorted consisted of 90 lb. flat footed rails. Further, on the 8th February 1929 one of these engines was involved in an accident at Talandoo. The train drawn by an XB engine distorted the track: a following train drawn by an XB engine derailed as a result of the distortion. In consequence of this accident, and of the unsatisfactory behaviour of XB class engines generally, they were withdrawn on June 12, 1929, from the fast passenger services for which they were intended. They were withdrawn because they were considered unsafe for such services—a fact which was admitted by the Deputy Chief Mechanical Engineer, Jamalpur. Between June 1929 and April 1931, under instructions from the Central Standards Office, certain modifications and improvements in the engines were effected. Some of these modifications and improvements are referred to by the Chief Mechanical Engineer in his note on the Senior Government Inspector's report. He observes:—

“Various modifications and trials were carried out with a view to limiting lateral play. Stop plates of varying thicknesses were introduced between the control spring housings and the frames: washers were put behind and in the housings to increase the initial compression of the springs; the 50 cwt. control springs were changed in favour of 70 cwt. springs, and then again in favour of 90 cwt. springs”.

The Chief Mechanical Engineer further notes that in the case of the last ten engines, the design was slightly altered, the hind truck wheels being moved back a distance of one foot six inches. (This improvement was not effected on XB 1916.) It is further in evidence that improved Cartezzi slides were introduced for the purpose of controlling the lateral movement in the rear of the engine.

71. From April 1931 onwards XB class engines were gradually re-introduced into fast services on the East Indian Railway. Even as modified and improved however these engines failed to give complete satisfaction and continued to be a source of anxiety and trouble to the Engineers. It is perfectly plain that the mechanical engineers had not succeeded in entirely eliminating the hunting tendencies of the engines. XB engines continued to hunt and distort the track. The evidence upon this point is overwhelming, and will be referred to later on, in another connection. Suffice

it to say at present that the shed repair books of XB engines show that XB engines were not infrequently booked for hunting. A number of these repair books have been exhibited. Early in the Enquiry Counsel for the Government called upon the Railway Company to produce the repair books of a number of XB and other types of engines for a continuous period of six months. When the Enquiry had almost concluded a large number of repair books were produced. These were not, however, for one continuous period of six months nor all for the same periods nor for all engines. So far as bookings for hunting are concerned therefore these books do not afford the material for a general comparison of XB class engines with other engines. That XB engines continued after 1931 to be booked for hunting however is not in doubt. Further there is abundant oral testimony to the effect that XB engines hunt more than other classes of engines.

72. A list of track distortions attributable to XB engines has been drawn up by the Railway Administration. It is Exhibit 191. This document shows that track distortions by XB engines continued after the modifications and improvements above referred to were effected.

73. Further, an XB engine was involved in an accident at Ganjkhawaja near Moghal Serai on October 26, 1933. On that occasion a train derailed as a result of distortion of the track by its engine—XB 1909. The track was distorted by this engine for a distance of 1,500 feet.

74. It may be noted here that accidents and track distortions were not confined to the East Indian Railway although it appears that XB engines have given more trouble on this Railway than other Railways in India. But from Exhibit 172 it is clear that XB engines have also been a source of trouble to these other Railways.

75. Following the accident at Ganjkhawaja, the East Indian Railway imposed a restriction of 45 miles per hour on XB class engines during the Monsoons on 85 and 88½ lb. rails. At present the East Indian Railway have over 700 miles of 88½ lb. rail track. The restriction came into force on June 1, 1934 and it has not been removed. It is further clear from the evidence that the Railway Administration considered it necessary to keep an observation on these engines even on 90 lb. rails. It may be noted in this connection that following four cases of track distortion in the month of January, 1934, XB engines were taken off Mail services. They have never been re-introduced to these services.

76. The evidence placed before me, during the course of the Enquiry, leaves me in no doubt whatever that XB class engines, so far as the East Indian Railway is concerned, have proved a failure. They have not been found suitable for the services for which they were designed—fast passenger service—they have not proved a success on that section of the line which they could be used most economically, namely, between Moghal Serai and Howrah. They have throughout given the Civil Engineers the greatest anxiety. This is abundantly clear from the evidence of Mr. Smith, the Chief Engineer, Mr. Howe, the Deputy Chief Engineer and Mr. Hall, the Superintendent of Power at Dinapore. They have been unpopular with the Operating Department, and in this connection a reference may be made to the note of the Chief Operating Superintendent on the Senior Government Inspector's report; and to the evidence of Mr. Hall. Further they were frequently regarded with disfavour by the Mechanical Department. They were

considered by some a source of grave danger. This is clear from two letters, one of March 7, 1936 (Exhibit 227) and the other of October 15, 1936 (Exhibit 187) from the Divisional Superintendent at Dinapore to the Chief Operating Superintendent. Reference will later be made to these two letters.

77. In view of the evidence above referred to and all the facts which are not in dispute it is impossible to justify the contention that by 1937, XB engines had been so improved by one device or another, that they were incapable of excessive hunting at speeds under 60 miles per hour.

78. There is nothing in this evidence, in my judgment, which would warrant a Court in rejecting the direct evidence of the witnesses who have deposed that XB engine No. 1916 had a tendency to hunt and did, in fact, hunt "badly" or "very badly" at comparatively low rates of speed.

79. The contention that the mechanical condition of XB No. 1916 was such that it could not possibly have hunted violently at a speed under 60 miles per hour must also fail. The argument which was preferred on behalf of the Railway Administration was that the engine was good as new; it had just returned from the shops; the bogie control springs were in order and correct as to weight and resistance; and the lateral clearances on the axle boxes were not excessive. In these circumstances it was argued it was not possible for the engine to begin to hunt violently at a speed of under 60 miles per hour. So far as the bogie control springs are concerned, there is no doubt that they were in order. As already indicated, the engine was booked three times for hunting in July 1937. After each booking the control springs were changed. The springs which were removed were taken back to the Jamalpur Shops and tested. They were found in every respect satisfactory. Further after the accident at Bihta on the 17th July, the bogie control springs were removed and tested and found in order. These facts, however, do not justify the contention that the mechanical condition of the engine was such that it could not hunt excessively at speeds under 60 miles per hour. In this connection it is necessary only to refer to the evidence of Mr. Hall, Superintendent of Power, Dinapore, and Mr. Gelson—a Special Officer attached to the Central Standards Office—in regard to certain experiments with XB engines which were carried out in August 1937. These experiments were carried out with four XB engines: XB Nos. 1920, 1937, 1938 and 1924.

80. XB No. 1920 was an engine which had been reported for hunting. It was found by Mr. Hall and Mr. Gelson to have a tendency to hunt at speeds of over 40 miles per hour. According to Mr. Gelson its most violent hunting commenced at a speed of 55 miles per hour. An attempt was made by altering and manipulating the bogie control springs to eliminate the hunting tendency in this engine. Also, by altering and manipulating the bogie control springs an attempt was made to induce one of the other engines to hunt. The front bogie of XB 1920 was attached to XB 1924. Every attempt, however, to eliminate the hunting tendency of XB 1920 and induce a hunting tendency in the other engine completely failed. It is not necessary further to refer to the evidence in regard to these experiments. It is clear from the results of the experiments that it is impossible to draw any definite conclusion as to whether a particular engine will hunt in consequence of the condition of the bogie control springs or of the bogie slide.

81. The clearances in the axle boxes of XB 1916 were not excessive. This point was specially emphasized by Mr. Case of the Central Standards Office. It is significant, however, that in the first memorandum of his evidence which he prepared for the Court, there was no particular reference to the lateral clearances of the engine though the question of its lateral clearances was specifically mentioned by the Chief Mechanical Engineer, Mr. Trimming, in his note on the Senior Government Inspector's report. Excessive clearances, it is well recognised, allow a freer lateral play of the engine frame. Mr. Case, however, in his evidence in January of this year was induced to emphasize the importance of the question of lateral clearances as a result of certain further experiments which had been carried out by Mr. Gelson with XB engine No. 1920. It appears that the clearances in the axle boxes of XB 1920 were excessive. By reducing these clearances, and by introducing a type of what was called synthetic damping on the bogie slide it was found apparently that the hunting tendency of the engine could be controlled. As to the results of the final experiments with XB 1920, however, there was no direct evidence, and it would be quite unreasonable to draw therefrom the definite conclusion that an engine that had no excessive lateral clearances could not hunt violently at speeds under 60 miles per hour. In fact there is evidence which establishes that engines with stiff clearances do hunt. When the XB type of engines arrived in India and were first put on the line, and the clearances of the engines might reasonably be inferred to be stiff, these engines did hunt. Furthermore, when the engines were re-introduced to fast passenger services as aforementioned after test, it was found in certain instances shortly thereafter they did distort the track. The shed repair books show also that they continued on occasions to hunt.

82. The fact that no marks indicative of hunting were found on the bogie slides or stop plates of XB No. 1916 after the accident is of little significance. No one has suggested that every time an engine hunts violently the stop plates or bogie slides are damaged or marked. It may well be that if an engine is permitted to hunt violently for long periods on a stiff track such damage or markings would result. It cannot be, and indeed was not, maintained at the Enquiry, however, that when the motion is checked, *e.g.*, by application of the brake or by the track giving way, as it did at Bihta, and the impulse of the forces against the stop plates therefore diminished, evidence of the fact that the engine had been hunting would be found on the plates or slide. Indeed, if the evidence of Mr. Jones, the Deputy Chief Mechanical Engineer be accepted, there would be no such evidence. He deposed that engine drivers when they wanted to get rid of an engine would book it for hunting for the simple reason that whether or not the engine hunted cannot be checked by an examination of the engine.

83. That there were no reports of track distortion after the bookings of XB No. 1916 for hunting by the drivers J. and T. L. Martin and Wilson is of no importance. Engines do not distort the track every time they hunt. That has never been suggested. Further the evidence is to the effect that drivers apply the brake when hunting becomes violent.

84. It was contended further on behalf of the Railway Company that the flange forces, *i.e.*, the side thrust on the rails by XB No. 1916 could not have been such as to distort a normal track even when laid with wooden sleepers. Such a track it was contended would stand up to a flange force of over 15 tons. This contention was based upon the results of recent experiments carried out by

Mr. Gelson on the instructions of the Central Standards Office. These experiments were carried out with engine XB No. 1920 which, it will be remembered, was an engine which admittedly hunted violently. The stresses imposed upon the rails by this engine were recorded by an instrument of American invention which, it is alleged, had been improved by a Mr. Blackwood in this Country. By means of this instrument the flange forces exerted by XB No. 1920 were recorded on graphs. No definite conclusion, however, can be based upon the results of Mr. Gelson's experiments. Mr. Gelson has himself admitted that the results of these experiments are not conclusive and the Senior Government Inspector stated in the course of his evidence that no final or general conclusion could be based on the results of such experiments with one locomotive. In regard to the graphs that were produced by Mr. Gelson, he pointed out that they show that when engine XB No. 1920 was travelling with a comparatively steady movement from side to side, the thrust on the rails was negligible—from 2 to 4 cwt., but that when the side to side movement appeared to be double the side thrust rose to 5 tons. "Apparently," the Senior Government Inspector said, "if 1920 moved half an inch more, the load might easily have run to 10 to 15 tons."

85. In this connection reference may be made to an article by Dr. Arthur N. Talbot, Chairman of the Joint Committee on Stresses in Railroad Track of the American Railway Engineering Association and the American Society of Civil Engineers, an Engineer of world wide repute, in the Monthly Bulletin of the International Railway Congress Association for the month of November 1937. In the course of this article on "The relation between the track and rolling stock," he observes under the heading "Lateral Oscillation":—

".....Electric locomotives as well as steam locomotives are subject to transverse oscillatory or vibratory movements, front and back (the periodicity of the vibration depending upon the dimensions and design of the locomotive and not upon speed). This pendulum-like oscillation may be started by roughnesses in the track (slight roughness or variability if the speed is high), by going on or coming from a curve, or by some action of the locomotive itself. It is well established that a transverse or lateral pressure of a wheel on a rail results in an increase in vertical pressure or load applied to a rail by one wheel and in a decrease in the load applied by the other wheel on the same axle. Lateral pressures on the rail observed in tests, due to these oscillations on straight track, have been extremely large, almost unbelievably great, high enough to move highest-grade track laterally well out of the line."

86. I am satisfied upon a consideration of the entire evidence on the subject of flange forces that this evidence does not justify the conclusion that XB No. 1916 was incapable at speeds under 60 miles per hour for exerting a side thrust on the rails sufficient in force to distort a track capable of normal resistance.

87. The theory of the mechanical engineers, who gave evidence to the effect that the mechanical condition of engine XB No. 1916 was such that it could not hunt sufficiently violently to distort a normal track, besides being based to a certain extent on experiments which were limited in scope and inconclusive in results, is open to the further criticism, that the cause of hunting



is not known. The problem of the hunting engine is one which is engaging the attention of engineers the world over. At the Enquiry, however the Civil Engineers and the Mechanical Engineers, with one exception, admitted that the actual cause of hunting was unknown. One witness declared that he did know the cause, but when invited to define it he was singularly unsuccessful. Indeed, it is clear that what he was attempting to define was the hunting motion and not the cause of hunting.

88. Now, the evidence has established that an engine may run smoothly for hundreds of miles and then suddenly start to hunt. There is no question for example that, as above observed, some of the XB engines which were taken off the fast services in 1929, improved and tested to ascertain if their hunting tendencies had been eliminated and re-introduced to these services, thereafter on occasions did hunt and did distort the track.

89. It is known that irregularities in the track, *e.g.*, low joints or soft patches, may start an engine hunting; but it is not every low joint or soft patch which will do so. Further such a low joint or soft patch may start one engine hunting and not another. It may be that hunting is the result of a synchronization of the forces of the engine itself with impulses generated as a result of the elasticity of the track. Some Engineers are inclined to this view. It has been further suggested that the hunting of a locomotive is comparable to the vibratory motion which will suddenly develop and as suddenly die out in stationary machinery, *e.g.*, as in the case of turbines or marine engines.

90. It is a matter of general admission that the hunting motion has a definite period—one complete movement occupying roughly one second. The Chief expert witness describes hunting as a harmonic motion. The same witness, however, candidly admitted that an engine might start to hunt as a result of abnormality in the track or abnormality in the engine itself and, further, that the only method of ascertaining whether an engine was inclined to hunt was to take it out and run it.

91. On the fifty-sixth day of the proceedings, for the first time a request was made by Counsel for the Railway Company at the conclusion of his address that I should direct that engine XB No. 1916 should be taken out and tested. I did not consider it, however, reasonable or expedient to grant this request. The Railway Company are at liberty to test the engine at any time. The engine, however, was damaged in the accident and has been repaired in the shops at Jamalpur. A test with the engine in its present condition would be of very little value in determining how the engine could have behaved or did, in fact, behave in July 1937. Such repairs as were effected, it is reasonable to assume, may have had the effect of eliminating, temporarily at least, the hunting tendency of the engine. The Senior Government Inspector expressed the view that the repairs effected on the engine in the shops six weeks before the accident had restored, in some way or other, its hunting proclivity. This view it is true was not accepted by the Mechanical Engineers, but even they have a lot to learn about hunting and if hunting does consist in a harmonic movement resulting from a synchronization of forces it cannot be maintained that the Senior Government Inspector's theory is unreasonable from a scientific point of view.

92. Be that as it may, it is impossible to reproduce the exact conditions of engine and track that obtained at the time of the accident. Even if engine XB No. 1916 does not hunt today that fact, in view of all the evidence could not be taken as proof that it did not hunt in July, 1937.

93. The behaviour of XB engines on other Railways in India is equally irrelevant. So far as the East Indian Railway is concerned they have proved most unsatisfactory. As aforementioned, at the time of the Enquiry a list of accidents and track distortions in which XB engines were involved on other Railways was exhibited. From this list it is apparent that these engines have given trouble on these Railways also. It was stated however that now the engines were being run by these Companies at high speeds and without untoward results. This may or may not be so; it is irrelevant to the issue I have to decide.

94. The claim that the Pacific Type of engine is being run by Railway Companies on fast services all over the world is equally unhelpful. No doubt the claim is justified. The design of the engine in each case, however, is different though the number and the distribution of the wheels is the same. It cannot be disputed that there is a close connection between the design of the engine and its tendency to hunt.

95. In regard to much of the evidence of Experts tendered on behalf of the Railway Company, it may be observed that such evidence though often of great value must be considered with caution. Not infrequently in disputes in which scientific questions are raised, the attempt is made to demolish a case based upon evidence of fact as to what has occurred with a deluge of expert evidence on what could or could not occur. But where there is direct and satisfactory evidence that certain events have occurred, attempts to prove that they could not have occurred, by the testimony of experts whose opinions are in a sense theoretical and often based on inferences and deductions from premises which are doubtful and not upon direct observation, and frequently proceeding upon assumptions which are not admitted, are generally unsuccessful. This is almost inevitable when the cause or causes of the phenomena in question are not fully understood or are in dispute. The problem of hunting is by general admission still a live issue. There is no general agreement amongst engineers as to the cause of hunting.

96. I have considered and reconsidered the expert evidence on hunting generally, and in relation to XB 1916 in particular, produced on behalf of the Railway Company at the Enquiry. As to the weight and effect of that evidence in the light of all the circumstances I am left in no doubt whatever.

97. There is evidence, reliable and definite, that even after the improvement and modification of XB engines their tendency to violent hunting, at least so far as the East Indian Railway is concerned, was not entirely and permanently eliminated or controlled. Four experienced engine drivers, including Brinkhurst—the driver of the 18 Down—have stated that XB No. 1916 did in fact hunt badly or very badly in July 1937. As will hereinafter appear on July 17, 1937, XB No. 1916 distorted a portion of track conclusively proved to be up to standard and sufficiently strong for normal traffic. Against this, there is the testimony of certain mechanical engineers which in many respects is inconclusive, often speculative, and not always consistent, that the engine could not possibly have hunted violently at speeds under 60 miles per hour. I have no difficulty, after full consideration, in accepting the evidence of the engine drivers of long experience who had no particular reason or incentive to give false testimony.

98. I am satisfied in the circumstances that there can be but one conclusion—that engine XB No. 1916 had a tendency to hunt

violently and I find that in fact it was hunting violently on approaching Bihta on July 17, 1937.

99. So far, the engine of the 18 Down, its speed and behaviour at the time of the accident have been under discussion. The track, its nature and condition in July, 1937, its distortion by the engine and certain other connected matters now fall to be considered.

100. The Senior Government Inspector in his report to the Railway Board has given a clear, concise and substantially accurate description of the site of the accident under the heading "Description of the locality". He observes:—

"The accident occurred at mile 355 on the main line. This is within the spill area of the Sone river which passes through the lower Sone bridge near Koilwar, nearly four miles away. There are several bridges on this length the next nearest to the site of the accident being one of 200' opening 3000' away. This locality is subject to flood during the monsoons and the bank was breached approximately at site of the accident in 1934. At the actual site of the derailment is a bridge 10 spans of 8'. The construction of this bridge is of reinforced concrete slabs. The overall length is 113'. Its height from bottom of slab to floor level is 9'-4" and from rail level to floor level 12'-5". Soil of the locality and bank is sand. The bank is not high varying from 5'-6" to 6'-0". It is 29' below the level of the bank formation at the Sone bridge from which there is a heavy falling gradient, this being 1 in 300 for about  $1\frac{1}{2}$  miles, 1 in 500 for about  $\frac{3}{4}$  mile, then level for almost  $1\frac{1}{4}$  miles and a final fall of 1 in 3,000 for over  $\frac{1}{2}$  mile. It was at the end of this gradient that the train derailed. There is an almost similar rise to the Sone bridge from the opposite or west side.

The alignment is perfectly straight the two tracks are spaced at 15'-6" centres. The rails are 88½ lb. Bull-headed section. The sleepers are for a short length of 866' of wood to which the rails are chaired and single spiked.

These sleepers are laid at 15 per 36' rail length. The majority are perfectly new and dated 1936, a few, 64 in number over a length of 150', are dated 1929. Their condition is however generally sound and good. The road is otherwise of D. O. plates which are laid at 14 per rail length. The reason for this short length of wooden sleepers in a D. O. plate road is that this last season owing to the annual trouble with floods, what is called a submerged flood opening has been provided. For nearly 600' the bank was cut away and a flooring of pitching stone in concrete laid, with guide bunds at each end, the bank was then replaced and the track laid over it. This section could thus be cut with safety, were a breach to threaten in the monsoons, and be used as an Irish bridge. It was constructed and completed in April last. Owing to the replaced bank being new it was considered advisable to lay the track with wooden sleepers, these giving a much better bearing than D. O. plates. The whole track is fully and sufficiently ballasted.

Bridge No. 191 on which the derailment occurred is, as has been stated, a reinforced concrete slab bridge. It has good parapets at each side and is filled right across with ballast into which the up and down tracks are bedded. The wooden sleeper track over the submerged flood opening, the nearest point of which is 188' distant, extends up to 20' over the bridge from the west end. There is then the change to metal plates again.

101. The track on the new bank above referred to was laid with  $88\frac{1}{2}$  lb. rails (*i.e.*,  $88\frac{1}{2}$  lb. per yard of rail) of Bull-headed section. To the west of the submerged opening the sleepering consists of D. and O. (Denham and Olphert) plates—a type of metal sleepering. At the site of the submerged opening the rails are laid on wooden sleepers. On Bridge No. 191, immediately to the east of the submerged opening for a short distance there is wooden sleepering: thereafter the sleepering consists of D. and O. plates.

102. It is not in dispute that the track which had been newly laid on wooden sleepers offered less lateral resistance to side thrust than the track on D. and O. plates to the west of the submerged opening and on the wooden sleepers and D. and O. plates on the bridge, and to the east thereof. To this matter it will be necessary to revert later.

103. The Senior Government Inspector has stated that the new bank was completed in April 1937. In fact it was completed on March 12, 1937 when it was opened for double line working at a restricted speed of 10 miles an hour. On March 22, the restriction was relaxed and traffic permitted at 20 miles an hour. From March 29, the new track was thrown open to traffic at the maximum permissible speed, *i.e.*, up to 60 miles an hour. From June 1, until October 31, however, XB engines were restricted to 45 miles an hour as on other sections of the track laid with  $88\frac{1}{2}$  lb. rails.

104. It is clearly established that the construction of the new bank was carried out in a careful, efficient and satisfactory manner. Although the track on the new bank was new it was fully and sufficiently ballasted. From March 29, 1937, traffic had been running over it at unrestricted speeds apparently with safety. No trouble was experienced and there were no reports of the track having distorted.

105. After the accident, the track was examined by the Chief Engineer, the Deputy Chief Engineer, the Senior Superintendent, Way and Works, Dinapore, the Assistant Superintendent, Way and Works, Dinapore, the Permanent Way Inspector, Dinapore and the Senior Government Inspector. Further, after the accident the site was visited by amongst others the Agent of the Railway Company, the Chief Mechanical Engineer, the Superintendent of Power, Dinapore, and the Divisional Superintendent, Dinapore.

106. There is no manner of doubt that immediately after the accident the track was most thoroughly, carefully and meticulously examined. Nothing was discovered to suggest that the track was not up to standard or that it was incapable of bearing the strain of ordinary traffic. There is general agreement no doubt that there was an element of weakness in the track which was laid on new hard wooden sleepers which do not grip the ballast so firmly as the old or soft wooden sleepers. The evidence of the Engineers who carried out the examination, however, puts beyond all doubt the fact that on July 17, 1937, the track at the

site of the accident was quite strong enough for ordinary traffic. Doubtless the type of sleeping made distortion easier, but as the Senior Government Inspector observed in the course of his evidence it is not the practice of engineers "to cater for unusual activities of locomotives". There is nothing in the evidence to justify the conclusion that the track at the site of the accident would have been distorted by an engine running steadily or by an XB engine running at 45 miles per hour or under.

107. The theory advanced on behalf of the Railway Company that the accident resulted from some defect in the track is based upon a report and the evidence of the driver of the 6 Down Mail which passed Bhita at speed about 9 P.M. on the night of July 16, and on the evidence of a passenger on that train and of a passenger on the Imperial Mail which passed Bihta at about mid-night. In view of the importance attached by the Railway Company to what has been referred to throughout as the "lurch of the 6 Down" it is necessary to refer to this incident in some detail.

108. The driver of the 6 Down Mail which arrived at Dinapore shortly after 9 P.M. reported to Mr. Bowder, the Shunter ("Night Incharge") at the Station that between Koilwar and Bhita the line was defective. Mr. Bowder stated before the Senior Government Inspector on July 18, that:—

"On arrival of 6 Down Mail, the driver informed me after examining his engine that the Down Line between Koilwar and Bihta was defective and his engine had jerked. He asked me to inform the Controller immediately on my return back to office after the departure of the train. After the train started, he also informed me something about mileage, but I could not understand the correct mileage from him."

Mr. Bowder gave evidence to the same effect at the Enquiry. He is supported by the driver Nawab Husain as to the report that was made to him by the latter.

109. Mr. Bowder reported the matter to the Control at Dinapore with the object of having a caution order imposed at Arrah. Although the officer in charge of the Control received Mr. Bowder's report he failed to take action and, in fact, no caution order was imposed. It will be necessary to return to this matter at a later stage.

110. On the morning of July, 17, after the driver of the 6 Down had reached Jhajha he was called on to give a report by the Running Shed Foreman there. The letter of the Running Shed Foreman and the reply of Nawab Husain are printed as Exhibit 55. Nawab Husain's statement is as follows:—

"Sir, regarding the above I beg to state that on arrival at DNR with 6 Down Mail, when I was attending loco. requirement of my engine, Night Assistant Mr. Bowder came to supervise as usual. I informed him that line between KWR and BTA appeared to be defective because I had a jerk. And Postal was running behind me. I told him to advise Controller to have caution order T-500 issued. He replied that he would do so."

This statement was written about 9 A.M.

111. At about 1 P.M. Nawab Husain made a further statement to the Police in which he said:—

"Yesterday on July 16, 1937, I left Moghal Serai at 18-28 with 6 Down Mail for Jhajha. My engine was No.

1147 HPS. The fireman was Ramzan and the Jack, Ibrahim. When I reached the bridge near Koilwar and Bihta I felt a lurch, *i.e.*, got a jerk from right to left,"

Before the Senior Government Inspector Nawab Husain stated:—

"I told the Foreman that between Koilwar and Bhita, near to Bhita the road was bad. The Foreman and I checked round the engine. He said there was nothing wrong with it. The Foreman would not let me go to the Station Master to report. He told me 'you go and I will make a report and shall have a caution order issued'."

Later he stated that the lurch occurred "beyond the Down Outer Signal at Bhita". At the Enquiry he gave evidence to the same effect. It will be noted that in his first statement to Mr. Bowder and in his second statement to the Running Shed Foreman, Nawab Husain made no mention of the Down Warner Signal. He states merely that he had experienced a jerk between Koilwar and Bhita.

112. Now Nawab Husain is a driver of 23 years' service and has many times driven trains both by night and by day between Koilwar and Bhita. If he experienced a lurch or jerk between the Down Warner and Bhita Station, there is no question that Nawab Husain would have informed Mr. Bowder at Dinapore of this fact. A driver of his experience would undoubtedly have fixed the place where he experienced the jerk or lurch by reference to the Warner signal and Bhita station. He would have referred to the Warner signal, further, in his statement to the Shed Foreman. His first amplification of his experience is in his report made to the Police about 1 P.M. on July 17. In that statement he refers to the jerk having been experienced "at a bridge" near Koilwar and Bhita. Long before 1 P.M. on July 17, news of the accident of the 18 Down had reached Jhajha. The fact that Nawab Husain had made a report to Mr. Bowder at Dinapore was also known. There was a natural inclination, in all the circumstances, to connect the defect in the line, which Nawab Husain had reported, with the accident. There was reason as will appear later for those in charge of the Shed at Jhajha to suggest that the accident was the result of defect in the track. Those in charge of the Shed at Jhajha were responsible for XB No. 1916 being allotted to haul the 18 Down. No doubt they knew that if it turned out that the accident was caused not by a defect in the track but by the behaviour of the engine there would be trouble. It will be recollected that the engine had been during the previous fortnight booked thrice for hunting. Further, as will later appear an XB engine in ordinary course should not under instructions of the Operating Department have been allotted to the 18 Down. By the early morning of the 17th the Shed officials had been informed that the accident had occurred between the Down Warner and Bhita Station. In this connection it may be noted that the two firemen of the 6 Down are alleged to have signed statements to the effect that they had felt a jerk between the Down Outer and Home Signal at Bhita. These firemen are illiterate; they did not write the statements themselves; the statements appear to be in the handwriting of the Running Shed Foreman. One of the firemen, Ramzan, gave evidence at the Enquiry. He deposed that he made no statement to the Running Shed Foreman. He remembers, he states, being asked by

the driver to put his signature to a document but he did not remember whether or not the contents were read to him. No reliance therefore can be placed upon the statements alleged to have been signed by the firemen.

113. Nawab Husain first mentioned the Down Warner Signal when endeavouring to fix the spot where he had experienced the jerk before the Senior Government Inspector on July 18. By that time he had been to the site of the accident and no doubt he was aware that he was expected to say that he had experienced the jerk between the Down Warner and Bihta Station. His demeanour in the witness-box was not impressive and I place no reliance upon his testimony. The statements which he made to Mr. Bowder and to the Running Shed Foreman, however, are of the utmost importance. No reference is made in these statements to the Down Warner Signal. If he had experienced the jerk shortly after passing the Down Warner Signal, that is, actually within the station limits, he would certainly have said so in his first report at Dinapore. That he did not do so affords strong presumptive evidence that he had experienced the jerk at a different point on the track altogether. It is true that no defect in the track was discovered between Koilwar and the site of the accident, but it was a matter of admission that drivers not infrequently experience jerks or lurches when, in fact, there is no defect in the track. This is clear from the evidence of the Chief Engineer.

114. A passenger on the 6 Down Mr. Alakh Narain Prasad, in answer to a question at the Enquiry stated:—

“When I passed the distance signal of Bihta station towards the west, just after that I felt a severe jerk, as if the compartment was going to be capsized”.

No reliance can be placed upon the testimony of this witness.

In cross-examination he stated that he had informed the Police of his experience about Noon on July 17, but had to admit later, however, that he made no statement to the Police until July 25. He made this admission when he was confronted with the statement he had signed. He could not have made an honest mistake about the date of his interview with the Police. The news of the disaster had reached Patna by the early morning of the 17th. He must have known perfectly well that he had not made a statement to the Police that morning. Having seen and heard this witness I have no hesitation in rejecting his evidence. He may have experienced a jerk on some part of the journey—this would not be unusual—and without reason have connected it with the accident of which he heard later in the day on July 17. But I do not regard him as a truthful witness.

115. The Imperial Mail passed through Bihta shortly before mid-night on July 16. The driver of the train, Burby, deposed that he did not find anything wrong with the track near Bihta. A passenger in the train Mr. Justice Madan stated on July 18 before the Senior Government Inspector that he experienced nothing that struck him as unusual with the train journey. Another passenger on the Imperial Mail, however, Mr. Jafar Imam, deposed that he had experienced something unusual. Before the Senior Government Inspector he stated that shortly after passing Koilwar he felt a severe jerk “much severer than what one feels when a train runs over points”. He further stated:—

“I had forgotten all about this incident until I was told of the serious accident which the train following mine had met with. As a matter of fact it was only when

I was told by some of my friends that there might have been an attempt made to wreck the Imperial Mail that I was reminded about my experience near Bihta”.

At the Enquiry he deposed that shortly after passing the bridge at Koilwar he had experienced a jerk. “Soon after passing the bridge”, he said—

“I felt a movement from the left to the right and then straight on again; it was a distinct movement. Within a short time of that—I should say it may be a minute or two, I am not definite; it is very difficult to say the exact time—I thought I was passing a station and my impression was that it was Bihta, as it was the first impression of passing a station that I had after passing the Koilwar Bridge.”

In cross-examination he stated that after the jerk, he felt the train was running over some points. When asked how long after the jerk this occurred he replied it was very difficult to say: he thought it was a minute or two: it might even have been four minutes. Upon such evidence it would be unsafe to base any definite conclusion.

116. The evidence given by Nawab Husain, Mr. Alakh Narain Prasad and Ramzan, one of the firemen of the 6 Down is of little value. I am satisfied that no reliance should be placed upon their testimony. Mr. Jafar Imam's statement is too indefinite to justify any conclusion as to the exact point on the line at which he experienced the jerk which he describes.

117. The fact that Nawab Husain in his first report to Mr. Bowder at Dinapore, and in his second report to the Running Shed Foreman at Jhajha made no reference to the Down Warner Signal would, in my judgment, justify the conclusion that the lurch of the 6 Down did not occur between the Signal and Bihta station and, further, that if this lurch was occasioned by a defect in the track that defect was nowhere near the site of the accident and quite unconnected with the accident. The matter, however, is put beyond all doubt by certain other evidence which is definite and conclusive.

118. The suggestion of the Railway Company is that there was some abnormality, *e.g.*, a low joint, a slack or a soft patch which caused the engine of the 6 Down to lurch, that the abnormality was made worse by the 6 Down and by the Imperial Mail which followed three hours later, and the condition of the track at the point of the abnormality was such that at the time when the 18 Down arrived the engine XB No. 1916 was thrown into a violent lurching movement which resulted in distortion of the track, and finally in the train leaving the rails. This is an attractive theory but it cannot be accepted; for there was, in fact, no such abnormality. Upon this the evidence is absolutely conclusive.

119. If there had been such an abnormality it must necessarily have been just short of the first point of distortion. The Civil Engineers and the Senior Government Inspector are definite and in complete agreement upon this point. Mr. Case of the Central Standards Office gave evidence to the same effect. The Agent was emphatic on the point. In the course of his second note on the Senior Government Inspector's report to the Railway Board he observes:—

“173. Further, if a low joint existed, and caused a serious lurch in an engine, it would tend to become worse as each succeeding engine and train passed over it. It



is also impossible that if such a joint existed the track might be slightly distorted by each succeeding train or at least its normal state of efficiency reduced.

174. If the above visualisation is correct, as already explained the position of *this joint must have been somewhere beyond the point where the first distortion of the track was noticed, that is at some point just short of where the new bank had been constructed a few months previously on account of the submerged flood opening . . . .*"

120. Now as already mentioned the track at this point was most thoroughly examined by at least seven Senior Officials including the Senior Government Inspector. The spot was visited by amongst many others the Agent and the Chief Mechanical Engineer. If there had been any abnormality just short of the first point of distortion, or between the first point of distortion and the Down Warner Signal it would most certainly have been discovered. About this I am completely satisfied after full consideration of the entire evidence on the point—there can be no question whatever. No abnormality was discovered. There was none. No fact has been more definitely established by the evidence. There was no low joint, slack or soft patch or other irregularity which would account for the lurch of the 6 Down or the jerk experienced by the passenger on the Imperial Mail and which would have thrown the engine of the 18 Down into a violent lurching motion.

121. The position in regard to what has been called "the lurch of the 6 Down" therefore is as follows:—Excluding the Fireman whose evidence is of no value three witnesses have given evidence as to having experienced a lurch. The evidence of two, Nawab Hussain the driver of the 6 Down and Mr. Alakh Narain Prasad, the passenger on the 6 Down is utterly unreliable. The evidence of the third witness, Mr. Jafar Imam, a passenger on the Imperial Mail is quite inconclusive. As against this there is the evidence of the driver of the Imperial Mail, who deposed that he had experienced nothing unusual between Koilwar and Bihta and of Mr. Justice Madan who stated before the Senior Government Inspector that his journey between Koilwar and Bihta in the Imperial Mail was perfectly smooth and, further, the evidence of a large number of Senior Railway Officials that there was, in fact, no abnormality such as could have caused the 6 Down to lurch or thrown the 18 Down into a violent lurching movement. There is the further fact that in his first two reports the driver of the 6 Down in attempting to locate the position of the supposed defect in the track made no mention of the down warner signal. In this state of the evidence one conclusion only is possible, *viz.*, that there was no defect in the track between the Down Warner Signal and the point at which the engine of the 18 Down began to distort the track. I am satisfied that had it not been for the report of the driver of the 6 Down at Dinapore on the night of July 16 that he had experienced some trouble between Koilwar and Bihta no suggestion would have been made that the track was defective. The fact that he did make such a report on the night prior to the accident is a mere coincidence—a remarkable coincidence no doubt. But the arm of coincidence is long.

122. It was suggested on behalf of the Railway Company that the nature of the distortion establishes that the track at the site of the accident was not sufficiently strong to withstand ordinary lateral stresses. This contention was based largely on the fact that there had been a similar distortion of the line in another accident at Dhanari on July 21, 1936. On that occasion a SGS class

engine distorted track laid with 75 lb. rail. The engine, on the section of the track where the accident occurred, was restricted to a speed of 35 miles an hour. The finding of the Senior Government Inspector on the accident was that the engine at the time of the accident was being driven at an excessive rate of speed, namely, 40 miles per hour. The distortion of the track, as in the case of the Bihta accident, first took the form of three distinct waves which were followed by a long slew to the left.

123. No doubt the facts disclose in several important respects marked similarities in the two accidents. But it was a matter of admission that it was impossible to draw any definite conclusion from the form and the length of the waves of the distortion. Once a track gives way before a heavy engine running at speed it is impossible to predict what form the distortion will take. Further, in the case of the Dhanari accident the sleepers of the track which was of the old Fowler Box type was admittedly weak. This was not so at Bihta. There is absolutely no evidence to show that the track was weak. On the contrary, there is overwhelming evidence that the track was up to normal strength and capable of carrying ordinary traffic as, in fact, it had done since March 29. The new bank was well consolidated. Up to the date of the accident the rainfall appears to have been somewhat below normal and no weakness was found either in the bank or the track after a most thorough examination.

124. The attempt of the Mechanical Engineers to attribute the accident to weakness in the track has completely failed. The contention that track distortion of which there have been many instances on the East Indian Railway since the introduction of XB engines is due to the track weakness alone cannot be sustained. It was the duty, of those who were responsible, to design an engine suitable for the track as it was in 1926. On the East Indian Railway in that year there were well over 1,000 miles of track laid with 88½ lb. rails. Prior to 1928 when XB engines began to arrive little or no trouble had been experienced in the shape of track distortions. After the XB engines were put on the line many cases of track distortions were reported. There was an accident due to track distortion at Talandoo in 1929. Thereafter for two years the XB engines were removed from fast passenger services. During these two years there does not appear to have been any trouble with the track. After the introduction of the XB engines to fast passenger services in 1931 cases of track distortion again began to occur. From 1928 until 1937 the engines were blamed for this trouble. For 10 years the Railway Administration have regarded XB engines responsible for track distortions. They have not regarded the track as weak and unsatisfactory. No doubt the track is not perfect nor uniformly strong but it has proved satisfactory for all other classes of engines at speeds up to 60 miles an hour and for all ordinary traffic. In these circumstances, it is quite unreasonable to hold, on the basis of certain experiments carried out since the accident, the results of which are inconclusive, that track distortion must be attributed to track weakness and not to the oscillatory movements of XB engines which have been proved by the most definite and conclusive evidence to have a tendency to hunt oftener and more violently than any other class of engine.

125. I am satisfied on the evidence that not only was the track up to normal standard but that there was no particular abnormality east of the Down Warner Signal which could have thrown the engine of the 18 Down into a lurching movement or which was connected in any way with the accident.

126. It may be convenient at this stage to refer briefly to my conclusions and again to the testimony of the driver Brinkhurst. The evidence clearly establishes that on approaching Bihta the 18 Down was being driven at an excessive rate of speed—well over 50 miles per hour. The engine which on the three preceding trips had shown a marked tendency to hunt violently was hunting as Driver Brinkhurst stated “very badly”. When the engine reached the new bank at the submerged opening the track gave way. Brinkhurst alleged in his first statement to the Shed Foreman that before the engine started hunting it “got a very heavy lurch”. Later he stated that his engine dipped and lurched. It is somewhat difficult to square this statement with the facts. There is general agreement that the moment the track gave way the period of the hunting motion would be broken and the hunting would resolve itself into a lurching movement. It is further suggested that probably Brinkhurst would be unaware that his engine was distorting the track and that from the point at which the track was slewed off to the left until the point at which the derailment took place was reached, the engine may have been running comparatively steadily. This, however, is a matter of speculation. There is no doubt that Brinkhurst’s story is a confused one. In the circumstances this is not surprising. When he dictated his explanation of what occurred, to his wife, no doubt he was recording his sensations at the time of the accident. That he felt a dip and a lurch there is no doubt. Equally certain it is that at one point the engine was hunting “very badly”. The lurch and the dip may have been experienced where the track first gave way. On the other hand, it may have occurred when the engine left the rails. It is impossible to say definitely. The probability is, however, that it occurred when the engine derailed. This is the view of the Senior Government Inspector. I do not, however, regard the point as of great importance. I am satisfied that Brinkhurst would never have informed the Running Shed Foreman at Jhajha, and stated before the Senior Government Inspector as he did before he was interrupted by the Chief Mechanical Engineer, that his engine had hunted “very badly” if, in fact, it had not.

127. As to where the engine started hunting the evidence is somewhat inconclusive. Mr. I. K. Smith the Chief Engineer deposed that he had observed a very slight distortion of the track from a point near the Down Warner Signal and that this distortion was continuous right up to the point where the first visible distortion occurred 653 feet east of the Signal. The Chief Engineer’s evidence on this point supports the theory that the engine was hunting violently before it reached the new bank. Unfortunately Mr. Smith made no record of what he observed at the time. Probably he did not appreciate its significance. The distortion in fact appears to have been very slight. The Senior Government Inspector who had discussed the matter with Mr. Smith was not inclined to attach much importance to the point. Be that as it may there is no question on the evidence that somewhere west of the commencement of the visible distortion—probably near the Down Warner Signal—the engine of the 18 Down which was running at the time at an excessive rate of speed developed a violent hunting motion. When the engine reached the new bank the track there was not strong enough to withstand the side thrust of the engine. The track gave way. The engine continued to distort the track for a distance of 623 feet. As the Senior Government Inspector has observed in the course of his report to the Railway Board as long as the engine was on the wooden track on the new bank which yielded, the engine kept the rails. When it reached the bridge,

however, where the track was held firmly in position it was too much out of hand to swing back into a straight course: derailment was inevitable. The derailment was due to distortion. The distortion was caused by a heavy XB class engine running at an excessive rate of speed and hunting violently.

128. The actual physical cause of the accident having been determined there remains the question of negligence. Is the accident in which the 18 Down was involved on July 17, 1937 in any way attributable to negligence on the part of the Railway Company?

129. Two matters may at the outset be disposed of briefly:— The maintenance of the track at the site of the accident and the failure to issue a caution order.

130. In regard to the construction of the new bank at the submerged opening no question of negligence arises. As already remarked the new bank was efficiently and satisfactorily constructed. Further, so far as the maintenance of the new track is concerned, the evidence does not justify a finding of negligence. It is true that the instructions in regard to the observation to be kept on the new track were somewhat vague and indefinite. The Assistant Superintendent, Way and Works, Dinapore, declared that he informed the Permanent Way Inspector to keep an eye on the bank. Even if this be true the instruction, in the circumstances was quite inadequate. The Permanent Way Inspector, however, denies having received any such instructions. There is no doubt that some extra watch was kept on the bank, but the evidence on this point is somewhat indefinite. The matter, however, is not of great importance, inasmuch as the track on examination after the accident was found to be satisfactory. The examination discovered nothing which could have accounted for the accident. Moreover, since March 29, 1937, traffic had been running regularly over the new bank and there had been no trouble.

131. In this connection one further point may be mentioned. The track on the new bank was thrown open to traffic at unrestricted speeds, on March 29. The Senior Government Inspector, Mr. Joscelyne and Mr. Robey, retired Senior Government Inspector, deposed that in their opinion the new bank should not have been thrown open to traffic at unrestricted speeds before it had gone through its first monsoon. The Civil Engineers, however, are not agreed on this question. There does not appear to be any general rule or practice in regard to the opening up of track on newly constructed banks to traffic at unrestricted speeds.

132. It cannot be said therefore that the evidence establishes that there was any negligence either in the construction of the new bank or in the maintenance of the track or in the throwing of the track open to traffic at unrestricted speeds.

133. So far as the failure to issue a caution order is concerned, there can be no question that there was negligence. The Control at Dinapore were informed by Mr. Bowder of the report of the driver of the 6 Down. It was not contended that a caution order need not have been issued. It is not, therefore, necessary to discuss the evidence on this point in any detail. The Deputy Controller at Dinapore, who was in charge on the night of the 16th admitted receiving information that the driver of the 6 Down had reported the track to be defective. He admitted further that it was his duty to have directed the issue of a caution order at Arrah. He deposed that he instructed the Assistant Section Controller to give the necessary direction to the Station Master at Arrah. The Assistant Section Controller denies receiving any such instruction.

Having seen and heard the witnesses I accept the latter's testimony. There is no reason why the Assistant Section Controller should not have carried out an instruction from the Deputy Controller to inform Arrah that a caution order should be issued. He had only to lift the receiver of his telephone and speak to the Station Master at Arrah. The Deputy Controller was in the same room as the Assistant Section Controller. He admitted that he was responsible for ensuring that a caution order was issued and that it was his duty to satisfy himself that his instructions in regard to the order were carried out. There is no question that under the Railway Company's rules he is the official who is responsible. He failed to discharge his responsibility. A caution order was not, in fact, issued. The Deputy Controller was guilty not merely of an error of judgment but of gross dereliction of duty. Had a caution order been imposed there would have been no accident. It has to be borne in mind, however, in this connection that whatever caused the 6 Down to lurch had nothing to do with the accident.

134. The main charge of negligence preferred against the Railway Company has now to be considered. It was contended that the XB 1916 ought not, in the circumstances, to have been allotted to haul the 18 Down on the night of July 16-17, 1937.

135. It will be recalled that XB No. 1916 was allotted at Jhajha shed on the early morning of July 16 to haul the 13 Up to Moghal Serai. The Shed authorities knew that the engine which took the 13 Up to Moghal Serai would return with the 18 Down. The official who actually selected XB No. 1916 for the trip was an acting Assistant Running Shed Foreman, Mr. Jordon. He deposed that he put on XB No. 1916 to the 13 Up because it was the only spare engine available. Admittedly an HPS engine and not an XB engine should have been attached to the 13 Up. It appears, however, that on the morning of July 16, no HPS engine was available. It is necessary to explain that engines were allotted to trains in accordance with what is known as the "Link" system, for which the Operating Department of the Railway Company are responsible. Under this system certain types of engines were allotted to certain classes of trains. Although XB engines were originally designed for fast passenger and mail services they were not allotted to these services. Under the Link system during the monsoon period they were restricted over a large section of the track to a speed of 45 miles per hour. It would have been contrary to the instructions of the Operating Department as embodied in the Link system to have attached an XB engine to the Imperial Mail.

136. Now under the Link system in force in July 1937, the engine allotted to haul the 13 Up to Moghal Serai was the engine allotted to haul the 18 Down to Jhajha, on its return journey. But the 18 Down had a booked speed, according to the Time Table of over 45 miles per hour. Under the Link system an engine of the HPS class was in the ordinary course allotted to haul the 13 Up. As already mentioned, however, on the early morning of July 16, no HPS engine was available. In this connection it must be observed in passing that by general admission the power position in July 1937 in Jhajha Shed was highly unsatisfactory. The evidence points to the conclusion that there was something radically wrong. So many engines were out of action or under repairs that the Shed authorities were frequently unable to provide the appropriate engine under the Link system. By July 10, it was clear to the Shed authorities that there were insufficient non-XB engines to work the non-XB links. This was the situation on

July 16, 1937. No HPS engine being available for the 13 Up an XB engine had to be attached to that train. XB No. 1916 being the only spare engine available was allotted. The Assistant Running Shed Foreman Mr. Jordon deposed that he saw nothing wrong in this. Under the Link system he said an XB engine was allotted to the 17 UP—a train which had a booked speed of over 45 miles an hour: its booked speed in fact was the same as the booked speed of the 18 Down. It is not surprising therefore that in deciding to allot XB No. 1916 to haul the 13 Up the Assistant Running Shed Foreman was influenced by the fact that the 17 Up was on an XB link. Indeed, Counsel for the Railway Company in his opening address observed on this point:—

“.....An XB regularly drew the corresponding train to the 18 Down namely 17 Up. Therefore when it was a question of an XB returning to Jhajha, and going down the line, it was attached to bring back 18 Down to that place, which was the sister train of that to which this type of engine is normally allotted. It is thus difficult to see why an engine appropriate to draw the sister train 17 Up may not properly draw 18 Down.”

137. There can be no question that the Operating Department were negligent in the manner in which the Time Table and the Link system were drawn up. The 17 Up ought not to have been put on an XB link. The booked speed of the train was over 45 miles per hour. Likewise the 18 Down. The evidence definitely established that to keep the booked timings both these trains had to exceed the speed limit of 45 miles per hour. It is manifest therefore that XB No. 1916 should not, apart altogether from its mechanical condition, have been sent out with the 13 Up. As the Senior Government Inspector in his second note to the Railway Board observed:—

“A breach of the rules was involved. There is not the slightest doubt that the engine was attached to a train, not on its own run, and that the train was booked at a speed higher than the permissible limit of the engine. Nor that the engine had been exceeding that limit constantly during its run.....It is definitely a rule laid down for observance. Rule G. R. I. 89 of the General Rules was infringed.”

It was contended that it might be necessary in exceptional circumstances to attach an XB engine even to a Mail train during the monsoon period, *e.g.* if it were absolutely impossible to procure a non XB engine at a certain stage of the journey and if the only other alternative was not to run the Mail. In such circumstances, however, it would be only reasonable to remind the driver of the train that he was not expected to run according to Time Table timings.

138. It was contended on behalf of the Railway Company that it was the duty of the drivers to observe the speed restrictions and where there was a conflict between the speed restriction and the Time Table to observe the former. It was further contended that in the Time Table extra time was allowed at the end of the journey—twenty minutes to the 17 Up at Moghal Serai and ten minutes to the 18 Down at Dinapore.

139. So far as this latter point is concerned, it may be observed that the extra time is allowed in respect of what are known as "temporary engineering restrictions." It was maintained on behalf of the Railway Company that in July 1937 an extra ten minutes was available to the 18 Down and that there was no necessity for the train to exceed the speed limit of 45 miles per hour between Arrah and Dinapore. According to the working timetable, the 18 Down was due in Dinapore at 4-19. This allowed ten minutes in respect of temporary engineering restrictions. If for example owing to some engineering work on the line the 18 Down was delayed at any point on its journey, ten minutes were available to balance lost time.

140. It appears, however, that the 45 miles per hour restriction is not a temporary engineering restriction at all. At the Enquiry there was conflicting evidence upon this point. Under the Railway rules permanent restrictions must be shown in the Working Time Table. The 45 miles per hour restriction is shown in the Working Time Table. Temporary engineering restrictions, it would be reasonable to conclude, are restrictions imposed because of temporary work on the track: for example work in connection with the repair of the track or in the construction of a bridge or new bank. The 45 miles per hour restriction, however, is a restriction of an entirely different nature, and I am satisfied, after a full consideration of the evidence, that the Railway Company have failed to establish that this restriction is a temporary engineering restriction. The extra ten minutes in respect of engineering restrictions were not available in my opinion to the 18 Down in July 1937. It is unnecessary however, to labour this point. The Divisional Superintendent at Dinapore appears to have had no doubt on the matter. He had issued instructions to all drivers that the extra time of ten minutes on the journey from Moghal Serai to Dinapore and twenty minutes on the journey from Dinapore to Moghal Serai were not available to drivers during the monsoon period when there was no engineering work being carried out on the line. This is clear from the Circular Letter dated April 10, 1937 (Exhibit 177). In the course of this letter it is intimated:—

"Guards and drivers of mail, express and passenger trains must clearly understand that they are *NOT* to consider the extra time allowance as a part of the running time for trains on these sections. The actual running time which each train is allowed is shown in the statement above. The extra time allowance is to cover the time lost on account of engineering restrictions only."

The result of this letter was that on the Dinapore Division the drivers did not consider themselves entitled to make use of the extra time allowance in respect of temporary engineering restrictions. Although the 18 Down was booked to arrive at Dinapore at 4.19 Brinkhurst the driver stated in his evidence that he was aiming to reach Dinapore at 4.9.

141. It is true that the Operating Department did not agree with the Divisional Superintendent's interpretation of the rules. Even if the Chief Operating Superintendent be right in his interpretation of the rules, namely, that the extra time was available to Mail and Passenger trains, the instructions from his department were sufficiently vague and indefinite to mislead so experienced an officer as the Divisional Superintendent of Dinapore. In my judgment, however, as I have already indicated the Divisional

Superintendent was right. The 45 miles per hour restriction on XB engines during the monsoon period is in no sense of the term a "temporary engineering restriction."

142. It was contended further for the Railway Company that it was the duty of the drivers to observe the 45 miles per hour restriction under all circumstances even though in doing so they had to run late. It was argued that there was no need to observe the timings so far as passing through stations were concerned, and so far as stopping stations were concerned if it was necessary to run late, it was their duty to do so. By general admission, however, there is a natural inclination on the part of the engine drivers so far as possible to run to time. It is further a matter of admission that it is impossible for the drivers to gauge the speed of the train exactly. Not only do drivers, apart altogether from restrictions, endeavour to keep the Time Table timings, but so far as the East Indian Railway Company is concerned, they were encouraged and instructed to do so by the Operating Department. It was suggested during the course of the Enquiry that drivers were "goaded on" to run their trains to time. In my opinion the expression is justified. On December 4, 1935, Mr. D. M. S. Robertson, the Chief Operating Superintendent, issued the following letter to Divisional Superintendents on the East Indian Railway:—

"It is much to be regretted that although I wrote a demi-official letter on this subject on the 13th November followed by another note, the running of the second half of November is not better than the first half.

I never remember a time when our trains ran worse than they are now doing; not a day has passed without a number of trains running very late and of course upsetting all others in process. The reasons given for the late running do not appear to be adequate at all. It is noticed that there has been a lot of lost time by drivers and for the rest the causes are miscellaneous. At the slow speed that our trains travel at, there can be no good reason for this loss of time by drivers or for their inability to make up time when time is lost by other causes. Whenever I travel on a train myself and I call upon the driver to accelerate, they are always perfectly well able to do so.

If there are any adjustments in time you require I shall be glad if you will let me know it at once, but I must point out that these adjustments must not be in the sense that the train is to be slowed down, they can only be by giving more time on certain sections and quickening the train on others.

If it is not already done, I suggest that it would be a good thing to keep an account of the running by different drivers on different trains. It will very soon be ascertained who are the men who habitually lose time or who habitually fail to make up any time. The failure to make up time when a train is late should be looked upon as just a big crime as losing time.....

The views of some Divisional Superintendents on what constitutes "quite satisfactory" running are not the same as mine. I call absolute punctuality 'quite satisfactory' and nothing else.



I have under consideration publication of the results of operation on different Divisions in which train punctuality will form a special feature with the object of creating a spirit of competition between the staff of different divisions so as to obtain improved results.

You will hear more in due course."

The Chief Operating Superintendent did carry out his policy of publishing the results of operation on different Divisions. In the East Indian Railway Gazette from time to time Divisions were specially mentioned if their records, so far as punctuality was concerned, were good. Engine drivers were specially mentioned in despatches. For example, in one of the issues of the Gazette there is the following notice:—

"Punctuality of trains—Drivers L. G. Carter of Moradabad Division made up a total of 658 minutes during the month of September 1936. His best performance was on the 13th September, when he left Moradabad 23 minutes late with 5 Up mail and arrived at Saharanpur to time."

Again—

"The following Drivers of the Moradabad Division made up time during the month of October, 1936, as noted against each:—

	Minutes.
L. G. Carter . . . . .	499
C. F. Edrey . . . . .	585
Le Maistre . . . . .	545

The Chief Operating Superintendent is very pleased to note these good performances and hopes that their examples will be followed by other drivers."

Similar notices appeared in the Gazette from time to time. It would appear, therefore, that so far as the Operating Department was concerned, punctuality was all important. The speed restriction though imposed in the interest of safety did not receive the same consideration and, as already shown, in the Link system an engine under a restriction of 45 miles per hour was allotted to a train the booked speed of which was over 45 miles per hour. The documentary evidence also shows that this train, the 17 Up, ran to time on several occasions and that it exceeded the speed limit of 45 miles per hour. Further as was admitted by Mr. Asad Mohammad Ali, Superintendent Movement, East Indian Railway, the policy decided upon by the Company was that Mail trains should be run at a speed of 50 to 52 miles per hour and Expresses at about 48 miles per hour. In this connection it may be recalled that according to the evidence it is impossible for the driver of a train to determine within five miles (or even more) an hour what the speed of his train is. But he was made aware of the view of the Chief Operating Superintendent that to lose time or to fail to make up time were "crimes".

143. To the charge that the policy of the Operating Department resulted in the disregarding of the 45 miles per hour restriction the answer of the Railway Company that that restriction

overrules all other considerations and must be punctiliously observed is quite inadequate. The policy of the Operating Department as above referred to was a direct encouragement to engine drivers to disregard the restriction.

144. In the course of his second note to the Railway Board, the Senior Government Inspector referring to the question of speed restriction observes:—

“An engine with a speed limit of 45 miles per hour must not be put on to any train the average speed of which on any section is booked at higher than 40 miles per hour.”

The 18 Down is constantly booked at over 45 miles per hour.”

This proposition was not accepted on behalf of the Railway Company. The Agent maintained that the 45 miles per hour restriction was a restriction imposed by the Railway Company itself, and not by the Railway Board, and if this restriction were exceeded by a driver by, say five miles per hour, there would be no infringement of a binding regulation. In this respect it was maintained that the 45 miles per hour restriction differed from the 60 miles per hour restriction imposed by the Railway Board. This latter restriction, it was admitted, was absolute. A speed of one mile an hour over 60 miles per hour would be an infringement of that restriction. It is clear from the evidence, however, that there is no substance in the contention of the Railway Company. The distinction which it was attempted to draw between the two restrictions, is not borne out by the evidence.

145. The contention that the 45 miles per hour restriction on XB engines was a restriction imposed by the Railway Company and could be removed by the Company at will, was advanced by the Agent alone. The view was not supported by any other evidence. Mr. Asad Mohammad Ali, who gave evidence on behalf of the Operating Department and Mr. Trimming, the Chief Mechanical Engineer admitted that the 45 miles per hour restriction was absolutely binding upon the Railway Company.

146. The restriction was imposed after the accident at Ganjkhawaja in 1933. It came into operation for the first time on June 1, 1934. After the Ganjkhawaja accident the then Senior Government Inspector, Mr. Sleight, recommended that a restriction of 50 miles per hour be imposed upon XB engines. This recommendation was not accepted by the Railway Company and as a result there followed certain correspondence between the Railway Company and the Railway Board. In the end the Railway Board decided to leave the matter to the Railway Company. The Railway Board expressed its confidence that the Railway Company would take necessary precautions. The matter was finally decided by the Chief Engineer. In his letter to the Agent of January 11, 1934, (Exhibit 194), he observed:—

“So far as I am concerned the matter is already settled. It will definitely be necessary to impose a restriction of speed of 45 miles per hour over 85 and 88½ lb. bull-headed rails on XB and XC class engines during the monsoon and in revising the Time Table it should be assumed that this restriction will be imposed on the 1st June 1934. I suggest that no time should be lost in making arrangements for this.”

Now rule 89 of the General Rules for Indian State Railways enjoins:—

“(a) Every train shall be run on each section of the Railway within the limits of speed sanctioned for that section by approved special instructions. The sectional speed sanctioned shall be shown in the Working Time Table, a copy of which shall be supplied on issue to the Senior Government Inspector.”

In rule 1 “approved special instructions” is defined as follows:—

“Approved special instructions means special instructions approved of or prescribed by the Senior Government Inspector.”

147. The circumstances under which the 45 miles per hour restriction was imposed, the correspondence between the Railway Board and the Railway Company and between the Railway Company and the Chief Engineer—which have been produced and exhibited—and the evidence of Mr. Asad Mohammad Ali and the Chief Mechanical Engineer, clearly establish that the restriction is a binding restriction which cannot be removed without the sanction of the Senior Government Inspector. If during the monsoon period XB engines were run at a speed of over 45 miles an hour there was therefore an infringement of the rules referred to by the Senior Government Inspector.

148. It was contended that in fixing the restriction at 45 miles an hour a sufficient margin of safety had been allowed and that when the decision to impose the restriction was taken the Railway Administration had in view the fact that it was impossible for engine drivers accurately to estimate their speeds and that they might, when endeavouring to observe that restriction, run their engines even up to 50 miles per hour. This contention must fail. There is no evidence to show that when the Chief Engineer intimated that so far as he was concerned “the matter is already settled, it will definitely be necessary to impose a restriction of speed of 45 miles per hour over 85 and 88½ lb. bullheaded rails on XB and XC class engines during the monsoon,” he had made any allowance for the possibility of drivers exceeding a speed of 45 miles an hour. It may be taken that when he fixed the maximum speed at 45 miles per hour he meant 45 miles per hour and no more. It was for the Operating Department in drawing up their Time Table and in arranging the Link system to take into consideration the fact that it is impossible for a driver accurately to estimate his speed and to arrange the timings so that an engine with a speed limit of 45 miles per hour should not be put on to any train the average speed of which on any section was booked at higher than 40 miles per hour.

149. It is unnecessary to discuss this matter in greater detail, but it may be noted that the view expressed by the Agent of the Railway Company at the Enquiry is quite inconsistent with the view expressed by him when considering the policy to be adopted by the Railway Company following the representations made by the Railway Board after the Dhanari accident in July 1936 and another accident between Hapur and Gulaothi in August 1936. In a minute dated March 9, 1937 (Exhibit 182), the Agent observes:—

“Here again it is a question of the SGS running at a higher speed than was permissible for this class of engine on the branch in question, although I note the booked speed did not actually exceed the permissible speed.

I agree that as a time-table speed of 39 miles per hour was fixed it was impossible for drivers to keep within the maximum permissible speed laid down, *viz.*, 40 miles per hour if they were to run and keep time according to the time-table; on any occasion they were a little late it meant exceeding the speed limit without doubt.

The error therefore was definitely in preparing the time-table which allowed no margin between maximum booked speed and maximum permissible speed. Speaking very broadly, I should say that it is necessary to allow a margin of at least 12 per cent. between maximum booked speed and maximum permissible speed in preparing time-tables."

150. The restriction of 40 miles an hour imposed on SGS class engines between Hapur and Gulaothi was a restriction exactly similar to the restriction of 45 miles per hour on XB class engines. In March 1937 the Agent of the Railway Company expressed his view, as is clear from the minute above quoted, that a margin should be allowed between the maximum booked speed and the maximum permissible speed. In the minute he mentions 12 per cent. as a reasonable margin. Later, however, as he mentioned in his evidence, he took a view that a 10 per cent. margin was sufficient; but that a margin was necessary he appears to have been in no doubt in March 1937. It is difficult to appreciate the reasons for his change of view at the time of the Enquiry.

151. It is abundantly clear from the evidence that a margin should have been allowed by the Operating Department between the maximum booked speed and the maximum permissible speed of XB engines. In drawing up the Time Table and arranging the Link system they failed to make allowances for such a margin. Under the Time Table arrangements and Link system in operation in July 1937, an XB class engine was attached to a train the booked speed of which was over 45 miles per hour. In other words, not only did the Operating Department fail to allow any margin, but they booked a train to which an XB engine had been allotted to run at a higher speed than 45 miles per hour. In drawing up the Time Table and arranging the Link system the Operating Department were clearly guilty of negligence, and it is impossible to maintain in all the circumstances that that negligence in no way contributed to the accident. The fact that the 17 Up which was booked at a speed higher than 45 miles per hour was, under the Link system, on an XB link, and that that train was the sister train of the 18 Down did, as has already been observed, influence the running shed foreman in taking the decision to allot XB No. 1916 to take the 13 Up and return with the 18 Down.

152. So much for the policy of the Railway Company in regard to the speed of XB class engines generally.

153. Apart altogether, however, from the fact that the 18 Down had a booked speed of over 45 miles per hour and was not on an XB link the engine XB No. 1916 should not have been sent out with the 13 Up on July 16, 1937. On this point there is absolutely no dispute. The Chief Mechanical Engineer and the Deputy Chief Mechanical Engineer are both in agreement on this point. The engine had been booked three times within a fortnight for hunting. It had continued, as the booking show, to hunt even after the bogie control springs had been changed. In these

circumstances, the engine should have been reported to the Superintendent of Power, Dinapore. It certainly should not have been allowed out with the 13 Up on July 16. In the course of his note on the Senior Government Inspector's report the Chief Mechanical Engineer observes:—

“It is unfortunate that when the second and third bookings were made the Foreman of Jhajha Shed was at Jamalpur on a conducted tour. He was relieved by the Foreman from Mokameh, who was a junior man and who had displayed lack of judgment in dealing with the three consecutive bookings of this kind, irrespective of the fact whether these bookings were warranted or not.”

154. There is no doubt whatever that the allotting of XB No. 1916 to haul the 13 Up and the 18 Down on July 16, 1937 was, in the circumstances, an act of negligence and, further, that that negligence is directly connected with the accident at Bihta. The responsibility, however, does not rest with the Running Shed Foreman at Jhajha. It lies further up. The Shed authorities knew no better. When engines were booked for hunting the practice in the Shed was to change the bogie control springs. There were no instructions that any other repairs should be attempted or that a report should be made to the Superintendent of Power or to the Power Inspector when engines continued to hunt after the springs had been changed. The Railway Administration therefore must in the circumstances accept responsibility for the engine XB No. 1916 leaving Jhajha Shed on July 16, 1937.

155. As has been indicated, the power position in Jhajha Shed in July 1937 was lamentable. XB No. 1916 was the only spare engine available and there was no reason, so far as the Foreman knew, why that engine should not have been sent with the 13 Up. The Shed authorities should not have been left, as they were, with no guiding instructions as to how they should have acted in an emergency such as that with which they were faced on July 16, 1937. The Shed authorities did not know the danger; the Railway Administration knew or ought to have known, and definite instructions ought to have issued to the Shed for guidance.

156. I have indicated that the Railway Administration must be fixed with the knowledge that XB engines are dangerous. Why? They had full and ample warning and steps should have been taken to ensure that constant and vigilant watch should have been kept on the behaviour of those engines. The history of XB engines from the time they arrived in India is embodied as aforementioned in Exhibit 172. This history and the other evidence adduced at the Enquiry clearly show that XB engines have all along been a constant source of anxiety to the East Indian Railway Company. Even after 1931 by which time the engines had been modified and improved they continued to hunt and distort the track. They were specially severe on track laid with 88½ lb. rails. The Chief Mechanical Engineer in his note on the Senior Government Inspector's report to the Railway Board observes:—

“The history of XB engines on 88½ lb. track makes it necessary to consider whether these engines should be allowed to run on this track, and if so at what speeds.”

“.....There can be little doubt that this class of engine does not suit this type of track, or, conversely, this type of track is unsuitable for this class of engine.

The 88½ lb. track is being removed as quickly as possible. In the interim a policy is required. There appears to be no choice. 'Safety first' must take precedence over 'speed'."

As already indicated there were over 1,000 miles of track laid with 88½ lb. rails on the East Indian Railway in 1926 when XB engines were designed. There are still over 700 miles of this track.

157. Not only did the XB engines distort the track but they were involved in accidents—accidents which resulted from track distortion. There was the accident at Talandoo in 1929: there was the accident near Moghal Serai in 1933. In his report on the latter accident the Government Inspector of the day observed:—

"The engine of the train is one of the batch which has been built to the latest design for XB engines. So far it has had a good record but recently this engine along with other XB class engines, has been distorting the track (also 88½ lb. B. H. rails) on the Howrah-Burdwan Chord. The cause of XB class engines distorting the track is due to the way in which a lurching or hunting action is set up when this class of engine travels at about 55 miles per hour. This action has been and still is under investigation. An alteration has been made in the original design of the control springs of the engine bogie and also in the position of the radial truck; further, before an XB engine is put into service it has to undergo certain trials and the effect which the engine has on the track is recorded. Yet, in spite of all these precautions, the fact remains that this class of engine still is particularly severe on the track and readily discovers any weakness in the track.

".....As the track laid with 88½ lb. B. H. rails is hardly able to withstand the lurching of the engine, even if the track is maintained to a 100 per cent. standard of efficiency, there is therefore no factor of safety, and it is quite possible for other accidents to occur under similar circumstances. I therefore advise immediate attention on the recommendations which I am making in the next paragraph."

*"Recommendations—*

(a) *XB class engines.*—The possibility of reducing the lurching tendency of these engines to be further investigated and, in the meantime, it might be advisable not to put any more of this type of engine into service.

(b) *Speed restrictions.*—I understand that the 90 lb. F. F. road is standing up to the XB engine, but it is the track with B. H. rails which gets distorted. This is to be expected for, besides the 90 lb. being a slightly heavier section, it has, in comparison with the 88½ lb. B. H. rails, about 2½ times greater resistance to distortion. I consider that the speed of XB engines should be restricted to 50 miles per hour on track laid with B. H. rails of sections of 85 lb. and over (and, of course, further restricted on rails of lighter section); also that special observations be made of the way in which the 90 lb. track is able to stand up to the lurching of XB class engines so that

the necessary information may be obtained as to which type of track (particularly in regard to the type of sleeper) is the most suitable to adopt in order to resist the disturbance set up by heavy locomotives now in use on fast trains."

158. Some of the witnesses who gave evidence on behalf of the Railway Company were disinclined to agree with the observation that even if the track were maintained at a 100 per cent. standard of efficiency there was no safety. Nevertheless the attention of the Railway Administration was pointedly drawn to the danger of XB engines running at speed over track laid with 88½ lb. rails, and it will be recalled that in the course of his evidence the Chief Engineer admitted that the 45 miles per hour restriction, left practically no margin of safety.

159. The shed repair books disclose that XB engines even after they had been improved and modified continued to hunt.

160. There is abundant evidence that XB engines continued also to distort the track.

161. A list of track distortions by XB engines was exhibited during the course of the Enquiry (Exhibit 191). This exhibit shows 64 cases of track distortion, and there is no doubt that in practically every instance the distortion was done by an XB class engine. Apparently there was an instruction that cases of track distortion should be reported to the Chief Engineer's Department. Reports of track distortion were sent in down to about the beginning of 1934. Thereafter the reports ceased. After the accident at Bihta the Railway Administration decided to investigate the matter. The Superintendent, Way and Works, Lucknow, was instructed to conduct an enquiry into track distortion by X class engines on the three Lower Divisions of the East Indian Railway. On September 20, 1937, he submitted his report. This report is Exhibit 243. It appears from the report that the Superintendent, Way and Works, Lucknow, trolled from Howrah to Moghal Sarai *via* the Howrah-Burdwan Chord and the Grand Chord and from Moghal Sarai to Howrah *via* the Main Line and from Asansol to Burdwan. "During this tour" he states:—

"Every Permanent Way Inspector, Assistant Permanent Way Inspector, Head Mistry and Main Line Mate employed on the sections referred to were questioned and all "positive" statements recorded. In several cases, where it was found that the mates were new to the section, the keymen and gangman were questioned and much useful information obtained.

It will, therefore, be appreciated that every possible source of information was thoroughly investigated, and where a column in the statement of distortions attached has been left blank, it is for the reason that the records have been destroyed, or the defects rectified and no report made."

162. During the course of his investigation, the Superintendent, Way and Works, Lucknow, discovered that there had been a number of cases of track distortion which had not been reported to headquarters in accordance with instructions. He observed:—

"Unfortunately, certain Inspectors inferred from paragraphs 1 and 2 of the above-mentioned letter" (this letter is the Chief Engineer's letter dated August 18, 1931 referred to earlier in the report) "that

defective track was suggested as the cause of distortion and for that reason refrained from reporting such cases as occurred on their section, preferring to adjust the defects and remain quiet rather than risk disciplinary action for an occurrence for the cause of which they were not responsible. In fact in one case, after a very serious accident had occurred due to distortion of the track, the Permanent Way Inspector, fearing that he might be held responsible, endeavoured to straighten the track prior to the arrival of two Administrative Officers of the Engineering Department."

163. About 20 cases of distortion were discovered during the course of his investigation which had not been reported. In recording his conclusions the Superintendent, Way and Works observes :—

"In certain cases it has not been possible to fix the exact train that did the damage, but from the unanimous opinion of the Engineers, Inspectors, Mistries and Mates that on those sections of the line from which XB class engines have been removed, no further trouble is being experienced, it can, without doubt, be assumed that the distortion of the track was done by that class of engine."

164. It is unnecessary to refer further to the evidence of track distortion. The evidence is overwhelming and establishes beyond all doubt that XB engines have continued to distort the track from 1928 when they were first run on the East Indian Railway down to the present day.

165. Now an engine which distorts the track is a dangerous engine. Distortion may lead to derailment. The accidents at Talandoo in 1929 and at Ganjkhawaja in 1933 were due to track distortion. The continued reports of track distortion and the continued bookings of XB engines for hunting ought to have been a sufficient warning to the Railway Company that XB engines were dangerous engines. A special watch ought to have been directed on the behaviour of these engines and definite instructions in regard to the use of these engines should have been issued to the Shed authorities. If the Shed authorities had had appropriate instructions, engine XB No. 1916 would not have been sent out with the 13 Up on July 16, 1937.

166. Apart from reports of track distortion and bookings for hunting, however, the Railway Company were most definitely and pointedly warned of the danger attendant on the running of XB engines. The Agent admitted that a large number of letters of complaint about XB engines had been received from subordinate officials. One such letter and a copy of another were produced at the Enquiry. It is necessary to refer briefly to the circumstances under which these documents were exhibited.

167. During the course of the Enquiry Counsel, who had been appointed by the Government of India and by the Government of Bihar received certain information about a letter alleged to have been sent to the Railway head-quarters in which XB engines were described as "positively dangerous". Acting upon this information Counsel cross-examined the Superintendent of Power, Dinapore, the Chief Mechanical Engineer and the Agent, with a view to discovering whether or not such a letter existed. For the Railway Company it was stoutly denied that there was any such letter in existence. Ultimately, Counsel for the Government of India disclosed that he had been informed about the letter by



a Mr. L. M. Banerji, a retired Railway Magistrate. Counsel stated that Mr. Banerji had informed him that he had actually seen a letter in which XB engines were described as positively dangerous. Later, however, Counsel stated that his information was not sufficiently definite to justify his pursuing the matter further. The matter was accordingly allowed to be dropped. Afterwards, however, Counsel for the Railway Company filed two letters, one from the Agent to Mr. Banerji and a reply from Mr. Banerji to the Agent. In the reply Mr. Banerji stated that he had not informed Counsel for the Government of India that he had seen a letter in which XB engines were described as "positively dangerous". In these circumstances, Counsel for the Government of India and Counsel for the Bihar Government elected to go into the witness-box, and I summoned Mr. Banerji himself to give evidence. I am satisfied that Mr. Banerji did inform Counsel that he had seen a letter in which XB engines were described as positively dangerous. Whether in fact he had seen such a letter is a question open to doubt. Mr. Banerji was a most unsatisfactory witness. The evidence as to the existence of such a letter is inconclusive.

168. The Railway Authorities, as already observed, denied that any such letter existed. They did, however, produce a letter which has already been referred to, of October 15, 1936, from Mr. A. B. Turner, the Divisional Superintendent, Dinapore to Mr. D. M. S. Robertson, Chief Operating Superintendent. This letter is quoted in *ex tenso* below. It contains the following paragraph:—

"I do not wish you to think I am writing an alarming letter such as was sent in last February, regarding the XB class engines running out of Jhajha, but I am gradually coming to the opinion that I cannot force out much better results or even maintain the results attained in train running under the present conditions."

169. The Railway Company were unable to produce a letter of an alarming nature sent from the Divisional Superintendent's Office, Dinapore, to the Chief Operating Superintendent, in February, 1936. Mr. Turner, the Divisional Superintendent, and Mr. D. M. S. Robertson, the Chief Operating Superintendent had left India. I directed the Agent to communicate with these gentlemen and ask them if they could throw any light on the "alarming letter" of February 1936. The Agent did communicate with these gentlemen. He communicated with Mr. Turner without delay. His communication with Mr. Robertson, however, was delayed for more than a month. The explanation given by the Agent in an affidavit of his delay in getting in touch with Mr. Robertson is highly unsatisfactory. Unfortunately, further, in writing Mr. Turner and Mr. Robertson, the Agent suggested that probably the "alarming letter" might be a letter relating to the mechanical defects of XB engines. In other words, he suggested the answer which these gentlemen should give and both these gentlemen did give the answer which was expected of them. Their letters in reply to the Agent are utterly worthless as evidence. The Agent when writing Mr. Robertson and Mr. Turner had in view a letter of March 7, 1936, from Mr. B. G. Smith, the then Divisional Superintendent, Dinapore, to the Chief Operating Superintendent, which refers to the mechanical condition of XB engines in Jhajha shed.

170. It was contended for the Railway Company that this was the alarming letter which was referred to in Mr. Turner's letter of October 15, 1936. It is to be noted, however, that Mr. Turner's

letter of October 15, 1936, relates mainly to the danger of XB engines running at speed over 88½ lb. rails and not to the mechanical defects of XB engines. But the evidence upon this matter does not justify any definite conclusion.

171. The letter of Mr. B. G. Smith to the Chief Operating Superintendent—a copy of which only was produced (Exhibit 277),—is in the following terms:—

“I am asking Hall to let me have a brief note which I will send on to you in cases of more serious failures in future. As your reason for asking for this is to enable you to apply early remedies to anything of an epidemic nature, I feel that I should draw your attention to the fact that the XB class engines working the Jhajha mail and express links are in a deplorable condition and appear to be rapidly disintegrating. Every day without exception one or more of these engines has something really seriously wrong with it, and they are constantly giving trouble on the road. Some of these have come out of shops after periodical overhaul and have broken down badly in a very short period and have either had to undergo what is practically intermediate repairs in the shed or, in some cases, have had to go back to Jamalpur. The drivers are getting nervous of their engines and several men nearing the age of retirement are making enquiries with a view to going away as the strain is beginning to tell on them and they feel it would be unwise to continue longer than is absolutely necessary. The enclosed list of repairs to engines at Jhajha during the last three months will give you some idea of what is happening. Actually, this matter requires very serious attention as I explained to you at the Divisional Superintendents' meeting at Lucknow, and, in my opinion we are clearly asking too much of these engines. They are obviously of a faulty design and unfit for the heavy work they are put on.

I am afraid you will get a very large number of reports from Hall on this subject, as actually every one of these engines is liable to break down at any moment, and so far there is not a single part of the engine which has not given trouble except the boilers. Up to date no boiler has burst.

Yours sincerely.”

172. Mr. Turner's letter to the Chief Operating Superintendent of October 15, 1936 (Exhibit 187) is as follows:—

“I thank you very much for the ‘graph’ forwarded to me under cover of your unnumbered demi-official letter of the 12th instant.

This diagram of ‘percentage of trains not losing time’ looks to me like your office copy. Will you please let me know if you require it back again

The red line showing Dinapore Division from 72 per cent. in April rising at an angle of exactly 45 degrees to 96 per cent. in August is certainly very pleasing, but as a Divisional Superintendent, I am beginning to get definitely worried, not only in my own mind, but from all sides it is coming at me, that the speed of

many trains over this division is somewhat excessive.

Where we have certain restrictions we try to get drivers to observe them and when anyone of importance is on the train, they appear to be observed.

The considerable coaching stock axle-loads and our XB type engines hammering along at the maximum permissible speed, usually trying to make up time, and over a track on the main line section with 88½ lb. rails (some portion as low as 85 lb.) and in many places recently ballasted with ashes, etc., where breaches or slips have taken place, is not a very reassuring state of affairs.

I do not wish you to think I am writing an alarming letter such as was sent in last February, regarding the XB class engines running out of Jhajha but I am gradually coming to the opinion that I cannot force out much better results or even maintain the results attained in train running under the present conditions.

As you may know I have had special staff running with 4 Down Mail for some days now, and on this section there is a speed restriction coming out of Moghal Serai, a slow down, stop and start again at Sone East Bank and the restriction at Palmerganj due to the big breaches there not yet being fully consolidated. The remarks of those who have been on the engines of this train are that the travelling was very rough, and the drivers, to their credit are going all out, yet the track here is laid with 90 lb. rails. The booked speed Moghal Serai to Gaya is over 48 miles per hour and with these mentioned checks which absorb at least 12 minutes the speed becomes 52 miles per hour booked, which means that drivers making up time must exceed 60 miles per hour.

On the main line section the XB class engines on No. 2 link at Jhajha (which includes 41 Up Parcels Express) are limited to 45 miles an hour during the monsoon period. I have personally checked the running speeds here and find that the drivers keep fairly close to this maximum speed limit, but once or twice slightly exceed it, but I cannot hold them to blame, as our engines are not fitted with speedometers. Yet on this section there has been very great difficulty in maintaining the track.

The bridge rebuilding programme will be starting very shortly again on the main line and I cannot see that sufficient time has been given to meet this in the new time-table if trains are to run to time. For example, the running time for 5 Up Jhajha to Moghal Serai is 318 minutes but in the April time-table it was 331 minutes and in the October time-table of last year was 334 minutes.

I do not wish to be pessimistic, but it does appear to me that we are at least working right up to our factor of safety in our Mail and Express train speeds today on this division at least.

Your sincerely,

A. B. TURNER."

173. It appears that action was taken on Mr. Smith's letter of March 7. An official of the locomotive department—Mr. Davies was sent to investigate the position of XB engines in the various sheds. His reports have been produced (Exhibits 439 and 440). Mr. Davies took the view that Mr. Smith's report as to the condition of the engines was somewhat exaggerated. It is clear, however, from the reports that the sheds were experiencing a great deal of trouble with XB engines. On one of the reports Mr. D. M. S. Robertson, the Chief Operating Superintendent noted:—

“It is apparent that no advantage has so far been gained by the purchase of these large and expensive engines.”

174. On Mr. Turner's letter no action whatever was taken. This is, indeed, amazing, in view of the terms of that letter. In the opinion of the Senior Government Inspector, the Chief Operating Superintendent on receipt of Mr. Turner's letter ought immediately to have laid it before his colleagues on the Administration. He did not do so. His failure to do so amounted to gross negligence. In his letter to the Agent he states that no action was necessary because the monsoon period was coming to an end and XB engines had been taken off fast trains and put on slower trains of the Jhajha route. This explanation is quite unsatisfactory and it will be recalled that in the Time Table which was issued by the Chief Operating Superintendent's Department in April 1937 XB engines were allotted to a train, the 17 Up, under the link system the maximum booked speed of which was over 45 miles per hour—the speed limit imposed upon XB engines. This fact influenced the shed authorities in allotting engine XB 1916 to the 13 Up and the 18 Down on July 16, 1937, and Counsel for the Railway Company in his opening address contended that since the 17 Up was on an XB link it was quite reasonable to allot an XB engine to the 18 Down the booked speed of both trains being the same. Furthermore Mr. D. M. S. Robertson, the Chief Operating Superintendent had communicated to all drivers on the East Indian Railway that he regarded the losing of time or the failure to make up time in order to run punctually as a “crime”.

175. From the facts above set-forth the conclusion that the Railway Company have been guilty of gross negligence is inevitable. The Company has undoubtedly a good record. Its standard of efficiency has been high. This is clear from the figures which were given by the Agent at the Enquiry. Millions of passengers every year are carried millions of miles with comparatively little loss of life. Loss of life in the year 1936-37 was two and in 1935-36 *nil*. In view of this record the persistent ineptitude, fumbling and lack of grasp which have characterized the Company's handling of the problem of the XB engines is the more remarkable. The experience which the Railway Company had of XB engines upon their track should have been a sufficient warning to the Company to take decisive action long before 1937. If such action had been taken there would have been no accident at Bihta.

176. It would appear that although there was available in the various departments of the Railway Administration information as to the behaviour of, and possibility of resulting danger from, XB engines, this information does not seem to have been focussed. But the Railway Company's attention was directly drawn to the apparent lack of co-ordination of the activities and policy of the various departments by the Railway Board in their letter of

January 8, 1937, to the Agent of the Company (Exhibit 198). The letter is in the following terms:—

“I am directed to refer to correspondence resting with your letters No. 203/36/Accdt. of the 4th November, 1936, and 239/36/Accdt. of the 1st December, 1936, in connection with the Senior Government Inspector's reports on the following accidents:

- (i) derailment of 2 ACB Passenger train between Bahjoi and Dhanari on the 21st July, 1936, and
- (ii) derailment of No. 4 Down KM Passenger train between Hapur and Gulaothi on the 26th August 1936, and to say that the Board observe that in both these cases, you have agreed with the Senior Government Inspector's view that SG and SGS class engines are unsuitable for the grade of track on the sections in question and have taken action to stop their running.

2. I am further to say that it appears to the Board that these cases indicate some degree of laxity in, or an absence of, effective inter-departmental collaboration, in so far that the responsibility for these accidents would seem to rest with all or some of the following:—

- (a) the Time Table Branch of your Operating Department for timing the trains in question at a higher speed than was justified having regard to the type of engine that was being used on the sections concerned;
- (b) the Power Branch for not having arranged for a lighter type of engine to work these trains;
- (c) the Engineering Branch for not having advised those concerned of the unsuitability of the track for certain types of engines when running at high speed.

3. I am therefore to request that the failure to ensure inter-departmental collaboration may be looked into, with a view to suitable action being taken to prevent a recurrence of such accidents.

Yours faithfully,

FRANK D'SOUZA.”

177. This letter was considered by the Railway Administration early in March 1937, as would appear from the Agent's minute (Exhibit 182). The view expressed by the Agent was:—

“It would probably be advisable that after the detailed work in preparation of the time-table has been done in the Operating Department a co-ordinating committee, consisting of two Deputies from the Operating Department, one from each of the Engineering and Mechanical Departments, should finally review it before it issues to vet it with respect to matters of speed and the suitability of engines it is proposed to employ.”

178. The matter was further discussed at another meeting of the Railway Administration on May 17, 1937 and it was decided that it was unnecessary to set up a co-ordinating committee of

Deputies. Certain principles were agreed to, however, and it was considered that it would be sufficient if the Heads of departments undertook to observe these principles. Despite this decision, however, as already noted under the link system drawn up by the Operating department an XB engine was allotted to a train the booked speed of which, according to the Time Table for the period April-October 1937, was over the restricted speed of 45 miles per hour. It would appear, therefore, that the Railway Administration did not take effective action after the very definite warning conveyed in the letter of the Railway Board of January 8, 1937 above referred to.

179. I am satisfied after a full consideration of the entire evidence that the Railway Administration have been guilty of negligence. It was suggested in the course of argument that the Railway Administration in relation to the matters under discussion had acted throughout in a manner consistent with ordinary railway working. I am unable to accept this contention. The law upon the matter is perfectly clear. It demands from the Railway Company, as indeed from every other concern which has a duty to make due provision for the safety of the Public, that care, caution and circumspection which a prudent man of business would exercise in the direction of his own affairs. The Railway Company, in my judgment, have clearly failed in the discharge of their functions to exercise that ordinary care upon which the law insists.

180. It is no part of my task to allocate responsibility. There can be no question, however, that the officer in charge of the Control at Dinapore in failing to take the necessary steps to have a caution order issued on the receipt of the report of the driver of the 6 Down was guilty of negligence. The facts would further indicate that the Operating Department have been guilty of negligence. Unfortunately, the Head of the Operating Department did not appear at the Enquiry to give evidence. After the accident he was permitted to go on leave preparatory to retirement. In his evidence the Agent explained that he had permitted Mr. Robertson to go because of certain commitments the latter had undertaken; he had contracted to deposit his provident fund in a London Bank by a certain date and, further, he had rented a house in Switzerland for the Winter. Such considerations, however, were in the circumstances small and petty. An accident had occurred in which 107 persons were killed and 117 were injured. The Chief Operating Superintendent's Department was deeply involved. The Chief Engineer and the Deputy Chief Engineer were also due to retire. They preferred to remain and give evidence at the Enquiry. It is unfortunate that Mr. D. M. S. Robertson was permitted to leave the Country. It is regrettable that he elected to desert his colleagues.

181. I consider it my duty in all the circumstances to make one recommendation. XB class engines have been a source of danger to the Public since they were introduced into this Country in the year 1928. As Counsel for the Railway Company declared in his opening address his instructions were:—

“ . . . That in the earlier stages of running this type of engine in 1928 their behaviour was so extraordinary and unforeseen that the engineers sat down to re-balance them.”

182. From the evidence it is abundantly clear that the engines have been even as modified and improved far from satisfactory. The Superintendent of Power, Dinapore, admitted in evidence that

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he wished they were "dead and buried". The Chief Operating Superintendent noted his view that their purchase was not justified. The Divisional Superintendent of Dinapore in March 1936 in his letter Exhibit 277 declared that they were obviously faulty in design. They have continued to hunt and to distort the track; they have been involved on the East Indian Railway in three accidents; they have been involved in accidents and given trouble on other Railways. In these circumstances, I am of the opinion that in the interests of the public the design, the purchase and the continued purchase of these engines should be the subject of a thorough, searching and independent enquiry.

183. I now record my conclusions.

I find:—

- (1) That the derailment of the 18 Down near Bihta on July 17, 1937 resulted from distortion of the track which was caused by XB class engine No. 1916 running at excessive speed and hunting, and
- (2) That the accident is directly attributable to negligence on the part of the Railway Company, and the Railway Company are accordingly liable in damages to those who were injured and the dependants of those who were killed in the accident.

J. G. THOM.

ALLAHABAD,  
March 16, 1938.