DEPARTMENT OF THE ENVIRONMENT

RAILWAY ACCIDENT

Report on the Derailment and subsequent Collision that occurred on 31st December 1969 near Roade Junction

IN THE
LONDON MIDLAND REGION
BRITISH RAILWAYS

LONDON: HER MAJESTY'S STATIONERY OFFICE
1971

DEPARTMENT OF THE ENVIRONMENT,
ST. CHRISTOPHER HOUSE,
SOUTHWARK STREET,
LONDON S.E.1.
29th June 1971.

SIR,

I have the honour to report for the information of the Secretary of State, in accordance with the Order dated 1st January 1970, the result of my Inquiry into the derailment of a goods train and its subsequent collision with a passenger train at about 11.35 on 31st December 1969, near Roade Junction in the London Midland Region, British Railways.

The goods train derailed was the 10.12 Class 8 from Willesden to Northampton consisting of 49 wagons and 2 brake vans and hauled by an electric locomotive. The cause of the derailment was the failure of a main bearing spring on an empty 16-ton mineral wagon. Broken portions of the spring, which had fractured from fatigue, were found near MP 55, from where the wagon ran for about 2 miles before becoming derailed. It then ran a further 2½ miles with one pair of wheels derailed until, passing over the connections at Roade Junction it turned on its side, though remaining coupled at each end. This was observed by the guard who attracted the attention of the driver by applying his van brake. Before the train could be brought to a stand, however, a general derailment occurred blocking all 4 lines which at this point are in a deep, steep-sided, cutting.

At that moment there was passing on the adjacent line the 10.34 4-coach electric multiple-unit passenger train from Coventry to Euston via Northampton. It was travelling at between 70 and 75 mph and came into glancing contact with two of the derailed goods wagons. This caused the passenger train to become derailed towards the cess, the leading coach rolling onto its side and the second leaning towards the cutting side. About 80 yards south of the point of collision, the leading coach came into contact with a mast supporting an overhead electrification structure, which crushed in the front of the driver's cab and I regret to report that the driver sustained fatal injuries. Nine passengers were taken to hospital but none was detained. The emergency services were called out promptly and the first ambulance was on the site by 11.39.

Considerable damage was done to the track and to the overhead line equipment and severance of signalling power and control cables caused failure of signal lights and loss of indications in the area of the accident. Repair work was hampered by the difficulties of access to the site and by the extremely cold weather, but the Down Fast line was restored with electric traction and a 50 mph temporary speed restriction at 18.47 on 1st January and the Up Fast similarly at 05.05 on 2nd January. The Slow lines were brought back into full use with electric traction at 15.40 on Monday 5th January, though during Saturday opportunity was taken to move some freight traffic, diesel hauled, over the Down Slow line.

During the period of complete blockage some main line trains were diverted to St. Pancras, others to Paddington, and some terminated at Crewe or Rugby. The surburban service was terminated at Wolverton with a connecting bus service to Northampton.

The circumstances of this accident were almost identical with those of another that occurred 2 miles north of Roade on 18th April 1967 which was the subject of an Inquiry by Colonel W. P. Reed.

The weather on the day of the accident was very cold, with a light covering of snow on the ground.

DESCRIPTION

The Site

1. The west coast main line of the London Midland Region is four-tracked from Euston to Roade Junction, a distance of 59¾ miles, with the Up and Down Fast lines on the West of the Up and Down slow lines. At Roade there are right and left hand double crossovers between the Fast and Slow lines, and ground frame operated emergency trailing crossovers between the Up and Down Fast lines and the Up and Down Slow lines to the north and south of the junction respectively. Immediately to the north of the junctions, the line enters the steep-sided Roade cutting, about 1¼ miles in length. Towards the north end of the cutting, near milepost 61, the Fast and Slow lines diverge, the former to form the Main line to Rugby via Weedon and Kilsby tunnel, the latter to form the loop via Northampton.

2. The track in the Down Slow line to the south of Roade Junction, in the area in which the initial derailment occurred, is of 113 lb continuously welded rail on concrete sleepers, on a straight alignment and on a rising gradient of 1 in 410. Between the point of derailment and Roade Junction, a distance of about 2½ miles, the line is gently curved with the gradient steepening to 1 in 330 near MP 58. Beyond Roade Junction the track in the Down Northampton line is 109 lb FB rail in 60 ft lengths on timber sleepers with Pandrol fastenings. Close to the point of collision near MP 60¼, the gradient on the Northampton lines changes to 1 in 200, falling, whilst that on the Main lines continues to rise to a summit near MP 60¾. The line speed limit on the Slow lines south of Roade and on the Northampton lines north of the junction is 75 mph. The Up and Down Northampton lines in the area of the collision are at the standard 11 ft 2 in centres.

3. All lines are electrified on 25Kv overhead system and in the area of the accident the overhead line equipment is carried on structures spanning all 4 tracks, some mounted on steel masts and others on brackets fixed to the retaining walls of the cutting. The current supply in the area is controlled from Willesden Electrical Control Room.

4. The lines in the area are worked on the track circuit block system with 4-aspect colour light signals and lie within the control area of Rugby signalbox.

The Trains

5. The goods train was the 10.12 from Willesden to Northampton (8 B 73) hauled by a Class 86 electric locomotive. It comprised 49 wagons and 2 brake vans marshalled as follows: attached to the locomotive, 11 loaded engineer's ballast wagons with vacuum brakes connected to act as a fitted head, 20 empty 16-ton mineral wagons, a spare brake van, 18 empty high-sided goods wagons and finally the train brake van. The estimated gross weight of the train excluding the locomotive was 716 tons and its maximum permitted speed was 45 mph.

6. The passenger train was formed of a single 4-car electric multiple-unit set of type AM 10, and comprised, in the direction of travel, a battery driving trailer weighing 36¾ tons, a motor coach weighing 56¼ tons, a trailer weighing 31¼ tons and a driving trailer composite weighing 33¾ tons. The train was fitted with disc brakes with a total brake force amounting to 63% of the total train weight of 158 tons. It had an overall length of 265 ft and was buckeye-coupled throughout. The driving cab on this type of stock is the full width of the vehicle and 5 ft 8 in in depth; it is not provided with outside doors, but is entered from a transverse passage immediately behind it. The guard's compartment, which was not provided with look-out arrangements, was located at the rear end of the second coach.

The Course of the Accident and the Damage Caused

7. The first sign of the derailment on the Down Slow line was at 57 miles 1186 yards where there was a clear flange mark along the top of the left-hand rail. From this point there was intermittent damage to the rail fastenings apparently caused by a single pair of derailed wheels running close to the rail fastenings over a distance of just under 2 miles, as far as the trailing crossover between the Up and Down Slow lines at Roade Junction, where the lead curve had deflected the offside leading wheel of the derailed wagon, running in the four foot, towards the left hand rail causing the wagon, an empty 16-ton mineral wagon marshalled 18th in the train, to roll over on to its right side in the direction of running. Comparatively little damage was done to the point and crossing work through the Junction but to the north of the Junction there was increasing damage to the track and sleepers apparently caused by the axleboxes of the wagon travelling on its side dragging in the four foot. There were also flange marks indicating that another vehicle had been running with a pair of wheels derailed towards the Up Northampton line.

8. At a point just to the north of Overbridge No. 209 it appeared that the leading end of the overturned wagon had dug itself into the track and the trailing end had been forced out foul of the adjacent Up Northampton line, together with the leading end of the following wagon. These two wagons were almost immediately hit by the leading vehicle of the passenger train which, as a result, became derailed towards the cess, travelling about 100 yards and demolishing the stanchion of an overhead electric structure before coming to rest on its left hand side. The bogies had been completely removed from this vehicle by the force of the collision and the second vehicle rode up over the displaced bogies, coming to rest with the leading end up in the air but still coupled to the leading vehicle and leaning towards the cutting side. The rear two vehicles of the passenger train were also completely derailed but came to a stand in an upright position. The damage to the leading end of the passenger train indicated that the contact with the derailed mineral wagons had been in the nature of a glancing blow rather than a full collision and that the major damage to the upper front portion of the cab had occurred as a result of contact with the overhead line structure.

9. The electric locomotive of the goods train came to a stand about 600 yards beyond the point of collision with seventeen vehicles still attached, the last being derailed to the right in the direction of travel. Approximately 375 yards in rear of this vehicle close to the rear end of the derailed passenger train there was a pile of wreckage consisting of 14 mineral wagons spread across all four running lines. That this heap had developed after the passage of the passenger train was shown by the fact that at least 4 wagons lay foul of the Up Northampton line yet none showed signs of contact with the passenger train. In fact only 2 of the derailed wagons showed signs of collision damage. These were unfitted 16-ton mineral wagons Nos. B 109785 and B 271403. The bodies and underframes of both wagons had been broken into pieces. Some of these pieces were spread along the 6-foot between the Up and Down Northampton lines others were in the cess and under the vehicles of the passenger train. Their wheelsets were dispersed amongst the other wreckage.

10. The spare brake van, marshalled 32nd in the goods train was not derailed and came to a stand opposite the rear end of the passenger train with its leading end jammed up against the heap of mineral wagons. Behind it, of the high-sided goods wagons, 8 were derailed but they remained mostly upright and in line except for one which was on its side on the Up Fast line. The last 10 wagons of the goods train and the rear brake van were undamaged and not derailed.

11. Apart from the intermittent damage to the track over the 2½ miles between the point of derailment and the scene of the collision there was very severe damage to the Up and Down Northampton lines in the area of the collision and lesser damage to the track in the Up Fast line. Damage to the overhead electrical equipment was consequent on the impact of the derailed EMU on the Up side support mast of portal structure No. G 60/10, spanning all 4 tracks, which was completely demolished.

12. Damage to signal cables in the area caused failure of signals and loss of indication as shown on the diagram attached to this report.

13. The rostered driver of the goods train was *Driver D. Williams*. He was accompanied in the cab by a driver/instructor and two trainees and did not drive the train himself. During the journey he stood on the right hand side of the cab, behind the secondman's seat. Shortly after passing Roade he felt a distinct tug and thought that it was the guard applying his handbrake in readiness for the falling gradient towards Northampton. This would be normal at this point, but then there was a second tug which was most unusual, so he lowered the window and looked back along the right hand side of the train. His view back was impeded by the driving snow in the cutting swirling alongside the train and he thought he saw a wagon sheet flapping, but on watching again he saw an actual wagon buffer swing out of line. He immediately turned towards Driver Hunter who was at the controls and called to him to apply the emergency brake. Driver Williams did not recall seeing the passenger train pass by on the adjacent line and, in retrospect, thought it must have come by whilst he was turned towards Driver Hunter telling him to stop. As soon as the train came to a stand Williams went forward with Hunter to protect the Up lines. The Northampton lines at this point are on a lower level than the Main lines and after helping Hunter climb up to the Main lines he went on himself to protect the Up Northampton line.

14. *Driver/Instructor J. A. Kempster* was in charge of the training on AC locomotives of two trainee drivers. Driver Roberts had driven the train as far as Cheddington where Driver Hunter had taken over. Driver Kempster said that Hunter handled the train well, with the speed rising from about 40 mph at Wolverton to about 43 or 44 mph at Castlethorpe. After passing over the junctions at Roade, Kempster was about to instruct Hunter in the use of the rheostatic brake when he felt a tug as though the guard had applied his handbrake, but he thought it was a bit premature. Then it happened again and he dropped the window in the nearside door and looked back along the train. About one third back along the train he saw a flurry of snow and further back a permanent way man running with his hand up. He concluded that there was something amiss with the train and thinking it best to bring it to a stand gradually, instructed Driver Hunter accordingly. At this moment he saw the approaching passenger train and almost at the same time Driver Williams shouted out most emphatically to stop. Driver Hunter applied the automatic brake and Driver Kempster leant over his shoulder and applied the straight air brake as well.

15. As soon as the train came to a stand Driver Kempster grabbed the track circuit operating clips, gave them to Driver Roberts and told him to protect the Up Fast line. The rear of the locomotive had stopped exactly opposite Signal RY 12 on the Up Fast line and as soon as Roberts had put the clips on Kempster told him to get on to the signalman to block all lines and call out the emergency services. He then went back to see what he could do to help the passengers, getting out the first aid and emergency equipment from the brake compartment of the EMU. He then went back to Signal RY 221 to report more fully on the accident.

16. *Driver M. C. Hunter* who was under instruction at the controls of the locomotive confirmed Driver Kempster's evidence and told me that the speed was about 43 to 44 mph over the junctions at Roade and that just after that he had started to reduce power to ensure the train did not go over its speed when it came to the falling gradient. The initial tug from the rear of the train had occurred somewhere near the first of three overbridges spanning the cutting (O.B. No. 207, just short of MP 60) and that the second tug had occurred near the next overbridge (O.B. No. 208).

17. In charge of the goods train was *Guard D. E. Stewart*. He described how he had examined the train prior to its departure from Willesden. He had seen nothing out of order on the train in the course of his examination, during which he tightened all the screw couplings and put all the Instanter couplings in the short position. Stewart described the journey as uneventful as far as Roade where, whilst sitting looking forward on the near side of his van he saw more snow than usual being stirred up ahead. He could see nothing wrong on the near side, but when he went across and looked forward on the off side just as the train was passing over the junction area he saw a wagon roll over on its side. He went immediately to his handbrake and made a fierce application and then released it and applied again as hard as he possibly could. He thought the pause between these two applications was only a matter of seconds. He then waited on the rear platform of his van until he heard the crash and as he looked forward he could see the wagons piling up ahead. He just hung on until the rear part of the train stopped. Climbing down with care from his van to avoid the wires hanging down all round it, he found the signal post telephone for Signal RY 222 on the Down Northampton line had been destroyed so he went across to the telephone at RY 221 on the Down Fast line but failed to get a reply from the signalman. He then saw a woman at the lineside and asked her to call 999 before he set out to protect the lines in rear.

18. *Assistant Permanent Way Supervisor H. L. C. Blood*, was in charge of a gang engaged in minor maintenance in the area of Roade Junction. As the goods train came past, he was standing adjacent to the Up Slow line just south of Overbridge No. 205, a footbridge at the south end of the site of the former station. He heard a grating sound as the train approached and saw a wagon on its side. It seemed to be resting evenly on the rails with its upper side towards him and still coupled to the adjacent wagons, both of which were on the rails. As soon as the brake van had passed, Mr. Blood crossed the line behind it and ran to the signalpost telephone at Signal RY 10 on the Up Fast line just north of the footbridge. He had just gained contact with the signalman when the telephone went dead. He did not hear the sound of the collision but a few moments later a lookout man came running towards him and told him what had happened. He then went across the Fast lines to the telephone at Roade No. 3 ground frame, controlling the emergency crossover between the Fast lines, and asked the signalman to call out ambulances and the fire brigade.

19. *Labourer L. McKevitt* was in the wide centre space between the Fast and Slow lines near MP 60 when the goods train came past. He was standing with his back to the train but turned towards it when he

heard ballast being churned up. He saw a wagon on its side with all 4 wheels towards him. The axle boxes were between the rails dragging on the sleepers and the wheels were still spinning round. He was sure that the wagon behind the one on its side was properly on the rails, but was not so sure about the wagon in front. It was not derailed towards him, but might have been derailed to the right. As the brake van came past, the guard signalled to use the telephone and, whilst the lookout man ran to the nearest telephone, Mr. McKevitt saw, over the top of the goods train, the pantograph of the approaching passenger train sparking in the hard frost. Almost at once there was a flash and a loud bang and he saw an overhead gantry fall down across the line.

20. *Master Leslie Ashby*, a schoolboy aged 15 years, was train watching in the neighbourhood of the footbridge at Roade (Overbridge No. 205). He saw the goods train approaching and took a photograph of it. He then heard a scraping noise and saw a wagon in the centre section of the train skidding along on its side with its wheels away from him. He thought that when he first saw them, the wagons in front and behind the one on its side were on the rails but as he watched the train going away from him towards Underbridge No. 207 it seemed to him that the trailing wheels of the wagon in front were derailed to the right. From where he was standing the train passed out of his sight before he heard the sound of the collision.

21. *Carriage and Wagon Examiner A. E. Day* who was on duty at Brent Sidings, Willesden on the morning of 31st December, examined the three groups of wagons that made up the goods train. There were 12 engineer's ballast wagons, 20 empty 16-ton mineral wagons and a brake van from Acton Lane power station, and 18 empty high-side goods wagons with a brake van that had come in from Chelsea. He examined all these wagons between 06.30 and 08.00 and was satisfied that they were all fit to go forward. It was his habit to pay particular attention to wagons coming from Acton Lane power station because they were unloaded on a tippler and he was well aware of the need to look closely for broken springs but pointed out that, when a mineral wagon was empty, it was not always possible to detect a broken spring by loss of camber, but only when the broken plates had actually started to move out of the buckle.

22. On duty in Rugby signalbox at the time of the accident were *Area Controller B. L. Carritt* and *Signalman E. G. Hopkins*. The first intimation they had of the accident was an indication of signal power supply failure both north and south of Roade Junction at 11.35 and almost at the same time someone called the signalman on the telephone from Signal RY 10 but only had time to say "That train . . . ." before the telephone went dead. Shortly afterwards someone came on the telephone from Signal RY 221 to say that all lines were blocked and to ask for the emergency services. Fortunately there were no other trains in the area at the time, the last train on the Up Fast line, the 09.30 from Manchester to Euston, having passed into the Bletchley control area a minute or two earlier.

23. *Mr. P. Rees, Divisional Civil Engineer*, stated that the track in the Down Slow line where the derailment occurred was generally in very good condition. Though there were some minor irregularities, they were all within the permitted tolerances and he was satisfied that the track was safe to carry traffic at the permitted speed. The initial derailment had been to the left and for the distance of about 2 miles that the wagon ran derailed only minor damage was caused to fastenings and a small proportion of the concrete sleepers. When it reached the trailing crossover the wheels had struck the lead curve and Mr. Rees thought that this had pulled the wheels over to the left causing the wagon to roll on to its side. He thought that it was for this reason that very little damage was caused to the junction layout. Again, beyond the junction the track damage was not serious until the area of general derailment and collision was reached.

24. A careful examination of the derailed train was made by *Mr. G. W. Acty, Assistant Divisional Carriage and Wagon Engineer*, who reached the scene of the accident at 13.45. He described to me the general situation he found, then went on to explain how he had identified the first vehicle to become derailed. Of the 4 loose wheelsets dispersed among the other wreckage, one pair, DD 20274, were very badly bruised and had apparently run derailed for a considerable distance. This wheelset also bore marks on the outside of the tread where it had been in heavy contact with something which also suggested that it had been under the wagon that had turned on its side and, moreover, the journal end was burred over consistent with its having been scraping on concrete sleepers. A second wheelset bore the closely related number DD 20271 and he was satisfied that these also belonged to the wagon first derailed. The other two loose wheelsets, marked DH 65121A and DH 65131 1957, he concluded had come from one wagon.

25. Mr. Acty then examined the wreckage which included parts of two very badly damaged wagons. Both were unfitted 16-ton mineral wagons to the same general design, but of different ages and varying in a number of detail points of design. One, No. B 109785, was built by Metro-Cammel in 1951. It had a riveted type body and bracket type bearing spring stops. One complete bearing spring of the slotted nib type was still attached and another lay adjacent in the wreckage. At the other two corners, the No. 1 plates were still in position and the underside of the solebar between the bearing spring shoes was in each case badly bent upwards. Both the No. 1 plates bore clear impressions that the No. 2 plates had been of the slotted nib type.

26. The other wagon, B 271403, was built in 1957 and had a welded type body and tubular type side spring stops. At two corners complete bearing springs were still attached, both of which were of the plain nibbed type. Four loose bearing spring buckles were found amongst the other wreckage as were a number of plates of both the plain nib and slotted nib types.

27. Mr. Acty found portions of the riveted wagon body trapped between the driver's cab of the E.M.U. and the cutting side and further pieces of both the riveted and welded bodies on the bank side near the

damaged overhead structure. Lying under the motor coach was the end angle capping of the welded steel body and a piece of solebar and headstock including the drawbar and buffer housing, complete with the buffer, from B 109785. The actual collision appeared to have occurred between the leading offside corner of the E.M.U. and the derailed wagons as a glancing blow rather than a full collision. The damage to the upper front part of the cab of the E.M.U. was more likely to have been caused by contact with the overhead line structure that was demolished.

28. During a search along the Down Slow line, Mr. Acty found the top of an axlebox and part of a wagon number plate with a portion of the figure "5" on it in the area of the junction. Some 2 miles further back, near MP 57¾, and about 240 yards north of the point of initial derailment, he found an axlebox pad and a complete axlebox bottom in the "six foot" between the Up and Down Slow lines.

29. As a result of a further search south of the point of initial derailment, the following broken wagon spring parts were found:

Near MP 55¾—Half a No. 2 Plate in the "four foot" of the Down Slow line.

Half a No. 3 Plate and half a No. 4 Plate in the "six foot" of the Up and Down Slow lines.

Near MP 54½—The other half of the No. 2 Plate in the "four foot" of the Up Slow line.

The line was searched back as far as Bletchley, but nothing further was found.

All these broken spring plates were of the slotted nib type and Mr. Acty had deduced that they had come from Wagon B 109785 which he had concluded was the first wagon derailed. He was satisfied that the failure of the bearing spring, occurring prior to the derailment, was a sufficient reason in itself for the derailment.

30. *Mr. J. Noden, Chief Mechanical & Electrical Engineer's Department*, agreed with Mr. Acty's deduction that the wagon which caused the accident was B 109785 and said that, owing to the condition of the wagon after the accident, they had not been able to determine where and when it had last been repaired. It had been built in 1951 and its springs, and in particular the one that had broken, were manufactured in 1951, as indicated by the date stamped on the buckle. This was an indication that the springs had never been debuckled since 1951 and that they were almost certainly the original springs fitted when the wagon was new.

31. Mr. Noden described the normal repair routine for a wagon of this class. They normally go in workshops for repair on a 3-yearly cycle, though they are not lifted at every repair. If lifting is required, however, and the wagon's springs are over 10 years old, they are removed from the wagon and debuckled. The individual plates are examined for cracks and other defects before being re-assembled and load-tested. The buckle is then redated accordingly. This routine was introduced as a result of the similar accident near Roade in 1967.

32. In the case of the present wagon, Mr. Noden thought from the extent of the tyre wear that it had probably not been lifted since before the present instructions were introduced, when only a visual examination of the springs was called for. He felt sure, therefore, that the springs on this wagon had not been looked at in workshops for something over 2½ years.

Subsequent Tests

33. The recovered parts of the broken main bearing spring from wagon No. B 109785 were examined by the Metallurgy Section of the British Railways Research Department at Derby. Matching of the worn and rusted areas on the broken plates confirmed that all the recovered parts were from the same spring and enabled the parts to be re-assembled. The fracture faces of Nos. 2, 3 and 4 plates all appeared similar, with the exit burr of the punched rivet hole on the tension side of each plate. Small areas of fatigue were found at the burrs on each plate, whilst the remainder of the fracture faces consisted of an overload type of fracture produced by a single loading event. The rivet head left in the buckle had broken in a ductile manner, the fracture face being clean; this fracture had probably occurred during the derailment. The absence of excessive wear on the recovered plates and on the buckle indicated that plates 5 and 6, which were not found after the accident, could not have been missing very long.

34. The metallurgist's report concluded that,

i. The spring plates were made from steel conforming to BR Specification No. 147 for grade B, oil-hardening carbon spring steel.

ii. The plates had not been correctly heat treated, resulting in a pearlite miscrostructure and low hardness values for plates 1 and 2.

iii. The exit burrs round the centre rivet hole were on the tension side of the plates instead of on the compression side, as now laid down in BR Specification No. 148, and small areas of fatigue had initiated from these burrs.

iv. The size and cleanness of three of these fatigue areas and evidence from examination on the scanning electron microscope indicated that the fatigue was of a high stress type which occurred fairly rapidly over a short period of time immediately prior to the spring failure.

35. At my request, a braking test was carried out to determine the distance that the front portion of the train would have travelled after the brake application which was made at about the moment the passenger train passed on the adjacent line. The test train consisted of Class 86 locomotive No. 3169, the 11 part-loaded

ballast wagons which formed the front section of the original train with their vacuum brakes coupled to the locomotive, 6 empty 16-ton mineral wagons and a brake van, equivalent to the front portion of the train involved in the accident. The test train was driven by Driver Hunter, accompanied by Driver/Instructor Kempster. Two runs were made over the section of track where the accident occurred at a speed of 42 mph and the brake was applied at the same point as on the day of the accident. On the first run the stopping distance was 1080 ft and on the second, 1020 ft. These distances must be compared with the separation of 1123 feet measured between the front portion and the heap of derailed wagons after the accident.

Conclusions and Remarks

36. The immediate cause of this accident was the derailment of the 18th wagon of the freight train, an empty 16-ton mineral wagon, as a result of a broken main bearing spring. I consider it most probable that plates 2, 3 and 4 of the broken spring, which were found on the line on the approach to the point of initial derailment, were already broken before the train set out from Willesden, for there seems no reason for them to have fractured whilst the wagon was running empty. It is more likely that the fracture occurred during the previous laden journey or while being unloaded on the tippler at Acton Lane Power Station. In either case it is quite possible that the broken plates had not moved perceptibly in the buckle by the time the wagon was inspected before its departure from Willesden and that they were then shaken out of the buckle by the lateral oscillation of the wagon whilst running empty at about 45 mph. Once the broken plates had worked their way out of the buckle the derailment of the wagon was an inevitable consequence and the point at which it occurred of no particular significance.

37. From the point of initial derailment as far as Roade Junction, whilst the wagon was running with one pair of wheels derailed, it would not have been easy for the train crew to detect it. That the guard saw it as soon as he did, with loose snow swirling along the train, was very commendable and his actions and those of the other railwaymen were prompt and correct. It was most unfortunate that the passenger train was passing at the critical moment and so came into collision with the derailed wagons. In my view the general derailment was initiated by the derailed wagon, at that time running on its side, becoming jammed in some way and twisting towards the Up Northampton line, and not as a result of the emergency brake application made by Driver Hunter. The stopping distance recorded in the later tests indicate that the train was almost certainly already divided when the brake application was made. None of the trainmen involved therefore bear any responsibility for this accident: the train was being correctly driven within its permitted maximum speed and the guard and the enginemen were properly vigilant.

38. The circumstances of this accident are closely similar to those of the derailment and subsequent collision that occurred on 18th April 1967 between Roade Junction and Northampton, about 2½ miles further to the north. On that occasion the broken spring, which had also been manufactured in 1951, had displayed fatigue cracks on the tension side in the exit burr at the rivet holes, as in the present case. At the time when these springs were manufactured, the specification did not call for the edge of the rivet hole to be radiused or hot punched from the tension side to obviate the formation of sharp edges from which fatigue cracks could develop. A modification to the specification calling for the rivet holes to be radiused was introduced in July 1955 and another permitting hot punching from the tension side in September 1956.

39. Subsequent to the 1967 derailment, the British Railways Board issued instructions that the springs on all unfitted mineral wagons, if manufactured more than 10 years before the date that they come under notice, were to be exchanged for reconditioned or new springs, and that all springs manufactured before 1956 were to be scrapped when removed from wagons at workshops repairs or elsewhere. Furthermore the Board put in hand a policy of scrapping such wagons built before 1955. I asked for a progress report on the implementation of these policies and I was informed that the total number of 16-ton mineral wagons in service had been reduced by scrapping from 244,129 at 18th November 1967 to 137,427 at 31st December 1969; that approximately 28,000 wagons with springs over 10 years old had been fitted with new or reconditioned springs up to 31st December 1969; that of the total remaining in traffic at the latter date the proportion built before 1955 was 36% and that it was expected that all of these would be withdrawn by the end of 1972.

40. Despite these policies, the total number of wagon derailments caused by broken or faulty springs continued to increase, the total of 60 for 1969 being twice that for 1968 and three times that for 1967. During 1970, however, the rate of spring renewal was stepped up and by the end of the year a total of 216,000 new or reconditioned springs had been fitted and the rising trend in derailments caused by defective springs reversed, the total for the year being 22% lower than for 1969. This represents a significant improvement and confirms that the measures adopted by the British Railways Board to counter the problem of derailments caused by broken wagon springs are now taking effect.

I have the honour to be,

Sir,

Your obedient Servant,

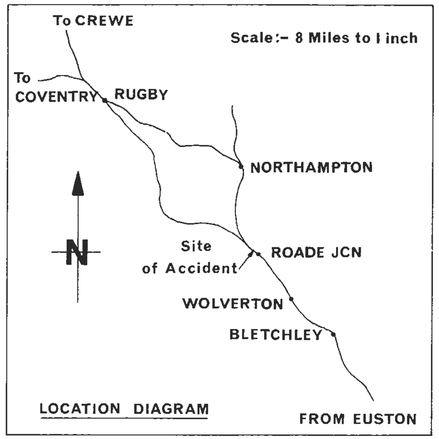
I. K. A. McNAUGHTON,
Lieutenant Colonel.

The Permanent Secretary,
Department of the Environment.

Dd. 503110 K7 10/71 Ed (8723)

DERAILMENT AND COLLISION AT ROADE (LONDON MIDLAND REGION)

-31 DECEMBER 1969



APPROX SCALE:- 6" to 1 mile