MINISTRY OF TRANSPORT

RAILWAY ACCIDENT

Report on the Derailment and consequent Collision that occurred on 28th October 1964 at Henwick Hall

IN THE

NORTH EASTERN REGION

BRITISH RAILWAYS

LONDON: HER MAJESTY'S STATIONERY OFFICE
1965

ONE SHILLING NET

MINISTRY OF TRANSPORT,
ST. CHRISTOPHER HOUSE,
SOUTHWARK STREET,
LONDON, S.E.1.

30*th July*, 1965.

SIR,

I have the honour to report for the information of the Minister of Transport, in accordance with the Order dated 2nd November 1964, the result of my Inquiry into the derailment of an Up goods train and the consequent collision with a Down Express passenger train that occurred at about 16.45 hrs on 28th October, 1964, near Henwick Hall signalbox on the East Coast Main line in the North Eastern Region, British Railways.

The goods train was the 03.17 hrs Class 7 train from Millerhill to Ollerton, conveying empty oil tank wagons. Whilst running at about 20 m.p.h. on the Up Main line, it became divided between the 37th and 38th vehicles and again between the 44th and 45th vehicles, the leading wheels of the latter becoming derailed towards the Down Main line. Both the divisions and the subsequent derailment were caused by the defective condition of the oil tank wagons concerned.

The Express passenger train was the 14.00 hrs "Heart of Midlothian" from King's Cross to Edinburgh comprising eleven coaches hauled by a diesel-electric locomotive. It was travelling at about 55 m.p.h. when the driver saw the derailed wagon of the approaching goods train move foul of the Down Main line a short distance ahead. Despite an emergency brake application the engine struck the derailed tank wagon a glancing blow at about 45 m.p.h.; it was damaged but not derailed. Four coaches of the train were derailed and some damage was done to all except the last three coaches. The train came to a standstill 230 yards beyond the point of impact with all vehicles upright and in line. Only 2 passengers received minor injuries.

The emergency services were quickly on the scene and arrangements were promptly made to convey passengers and luggage by bus to Selby and York from where they continued their interrupted journeys by train. The last bus left the scene of the accident at 18.50 hrs.

Breakdown cranes from York and Doncaster were used to clear the lines, and after repairs, the Up line was re-opened to traffic at 07.45 hrs and the Down line at 11.45 hrs on the following morning. Traffic was diverted via the Askern Branch during the time the lines were blocked.

The weather was dull, but dry and clear. Dusk was just falling when the accident occurred.

DESCRIPTION

Site and Signalling

1. In the Up direction from Selby the East Coast Main line is double track, worked on the Absolute Block System with semaphore signalling. The signalboxes, which are closely spaced, are Selby South, Selby Canal, Brayton, and Henwick Hall, the latter being 2 miles south of Selby. All the stop signals between Selby and Henwick Hall carry slotted distant arms below them. The next signalbox south of Henwick Hall is Temple Hirst, at a distance of almost 2½ miles.

2. There is a falling gradient of 1 in 1440 approaching Henwick Hall in the Up direction which levels out for almost a mile beyond the signalbox. The line is straight and the maximum permissible speed is 90 m.p.h.

3. The track in the Up Main line both north and south of Henwick Hall consisted of continuously welded F.B. rail on concrete sleepers laid in 1959, but just south of Henwick Hall signalbox there were five 60 ft. lengths of fishplated track on concrete sleepers also laid in 1959, followed by several lengths on timber sleepers where some connections had been removed about a fortnight before the accident.

The Trains

4. The goods train, which was hauled by a British Railways-Sulzer type 4 diesel electric locomotive, had been formed from two smaller trains of empty crude oil tank wagons and consisted of 53 vehicles, marshalled as follows:—

1 Fitted open wagon
2 Fitted vans
21 Unfitted oil tank wagons
2 Fitted vans
1 Brake van
23 Unfitted oil tank wagons
2 Fitted vans
1 Brake van

5. The total weight of the train was 667 tons and its overall length was 1238 feet including the locomotive. All the oil tank wagons were the property of Shell-Mex and B.P. Ltd., or their associated companies, and were working in regular block trains between oil wells at Gainsborough and Tuxford and a refinery at Pumpherston in Scotland. They included both "One-Star" and "Unstarred" wagons, which are permitted to run at 50 m.p.h. and 45 m.p.h. respectively when empty. The train was running as Class 7 with a small fitted head and was thus restricted to 40 m.p.h.

6. The express, which was carrying 220 passengers, consisted of 9 standard all-steel coaches and 2 of the latest integral design, all fitted with buckeye couplings. It was hauled by a 3300 HP Type 5 "Deltic" diesel locomotive weighing 99 tons 18 cwt. The length of the train, including the locomotive, was 799 feet and its available brake power was 78.7% of its total weight of 487 tons.

The results of the derailment and collision

7. After the accident, the leading portion of the goods train, consisting of the locomotive and 37 wagons, was brought to a stand by signals at Temple Hirst, the driver being unaware that anything untoward had occurred. The rear coupling of the 37th wagon, Shell Mex and BP Tank No. A 2800, was found broken, only a portion of the gedge link remaining with the wagon.

8. The next 7 wagons of the goods train, the 38th to 44th inclusive, came to rest undamaged about 20 yards south of the point of collision. On the leading wagon of this portion, Shell Mex and BP tank No. A 3429, were found the bottom and centre link of the broken coupling from No. A 2800, with the remaining portion of the gedge link lying close at hand between the rails. The rearmost wagon of this portion, the 44th, was Shell Mex and BP tank No. A 1337 and its rear buffers showed clear marks indicating that the next wagon to the rear, whilst the buffers were in contact, had risen and moved towards the 6-foot rail a sufficient distance to bring its leading wheels into derailment. This wagon, the 45th, was Oakbank Oil Co. tank No. 349 and it displayed clear evidence that it was the vehicle with which the locomotive of the express had come into contact, traces of the yellow marker paint from the nose of the locomotive being visible on the end of the tank itself. It was turned end for end and severely damaged by the impact, one pair of wheels being ripped off. The next four wagons were derailed by the collision and displaying a varying amount of impact damage. During rerailing operations it was discovered that the rear axle of the 48th wagon, Shell Mex and BP tank No. A 6983, was broken between the wheels. The last tank wagon on the train, the 50th vehicle, was not derailed nor were the two wagons and the brake van which were behind it, but they had been forced back about 10 yards by the collision.

9. Of the express train, the 2nd, 4th, 5th and 6th vehicles had been partly derailed towards the Down cess although the locomotive remained on the line. Minor damage extended along the right-hand side of the whole train except the last 3 coaches, being caused partly by intermittent contact with the tank-end crosshead of the 47th wagon of the oil train and partly by the end-over-end rotation of the leading pair of wheels of the 45th wagon which had been ripped off when the wagon was first hit by the locomotive of the express. The express came to a stand with the locomotive 230 yards beyond the point of collision, with the coaches upright and in line. All the buckeye couplers remained coupled, though there was some damage to pivot and support pins in the leading portion of the train.

Evidence

10. *Driver K. Young* was in charge of the locomotive of the goods train but his fireman was driving under his instruction. He described the running of the train from Selby onwards and said that they were travelling at about 20 m.p.h. with each stop signal being cleared as they approached it and the distant arms remaining at caution and that he could remember no particular snatches or jerks when they passed Henwick Hall. After the train had been brought to a stand at Temple Hirst, Young had walked back and found only 37 wagons attached to the locomotive with half a broken gedge link hanging from the last vehicle, which was Shell Mex and BP tank No. A 2800.

11. *Passed Fireman F. T. Charman* was actually at the controls of the British Railways-Sulzer Type 4 locomotive of the goods train. He explained that he was passed to drive the similar English Electric Type 4 locomotive and that he found no difference in handling between the two classes. He also described the running of the train between Selby and Temple Hirst and thought that his speed had dropped to 10 or 15 m.p.h. before the signals at Henwick Hall were cleared. When he applied power there had been a slight check and surge, but he had not regarded it as anything out of the ordinary and had been surprised to find on arrival at Temple Hirst that the train had become divided. He had looked back down the train as they pulled away from Henwick Hall, but had not seen anything in the half light of dusk.

12. *Goods Guard G. H. Evans* was in charge of the goods train, which he had taken over at York. He had walked round the train, which was heavier than usual, being made up of two small trains joined together, and had seen nothing amiss. He described the journey as far as Henwick Hall, where he had observed the distant signals at Caution, as quite normal. He estimated the speed of the train as 25-30 m.p.h. as they passed Henwick Hall when there was a sudden bump and his van came to an abrupt stop, throwing him forward against the door. This had not been preceded by a snatch or jerk. He had at once looked out on the off-side and had seen one tank wagon derailed and foul of the Down main line. He thought it was at an angle of 30 to 40 degrees to the line of the train. At the same moment he realised a train on the Down line was approaching rapidly and only about 100 yards away, so he quickly jumped down on the near side a few seconds before the collision occurred, thus escaping injury.

13. *Driver L. Distance* was in charge of the "Deltic" diesel locomotive of the express. He said that his train had reached a speed of about 80 m.p.h. between Doncaster and Temple Hirst, where he normally shut off power to reduce speed for permanent speed restriction through Selby. On this occasion the train had passed Doncaster 4 minutes early and he had reduced speed sooner than usual to avoid being held up by the train ahead. Thus he was running at about 55-60 m.p.h. when he suddenly became aware of a cloud of dust towards the rear of the oil tank train on the Up line and one wagon had seemed to come out from the middle of the train into the path of the express. He was only aware of a single division in the tank train, immediately ahead of the derailed wagon. He made a full brake application at once, and the brakes had taken hold of the train before the collision occurred.

14. *Fireman D. Vitty* of the express generally confirmed his driver's evidence. He thought that their speed was about 50 m.p.h. before braking and about 45 m.p.h. on impact and estimated the lapse of time between first becoming aware of the obstruction and the actual collision as being about 6 seconds. As far as he could remember the derailed tank wagon was almost at right angles to the line of the track and tilted up at the leading end.

15. *Signalman J. K. Cockerill* was on duty in Henwick Hall signalbox, which stands on the Up side of the line. He saw the goods train go by quite normally at a speed he estimated at between 20 and 25 m.p.h., but when it had passed he saw a cloud of dust and ran down on to the track to get a better view. He saw at once that one tank was derailed towards the Down Main line and foul of it and he saw Ganger Tate standing in the middle of the track waving his arms. He ran back to his cabin as quickly as possible to put his signals to danger and had just done so when the collision occurred. Cockerill estimated that only 20 seconds passed between his seeing the cloud of dust and hearing the impact.

16. *Ganger E. Tate* was in charge of the length which includes the scene of the accident. When the goods train passed Henwick Hall he was in the permanent way cabin which stands on the Down side of his line about 130 yards south of the signalbox. He heard a bumping noise and ran out to see a single tank wagon derailed and foul of the Down line along which he could see a train approaching. He ran along the Down line waving his arms, but there was nothing he could do to avert the collision.

17. Tate went on to identify the actual point of derailment as being about 120 yards south of the signalbox on the short section of fishplated track on concrete sleepers which had not been disturbed during the removal of the connections and which was in his view in good order for speeds of up to the maximum of 90 m.p.h. permitted over this stretch, and a subsequent careful examination of the track leading up to the point of derailment revealed no defects which could reasonably be held to have contributed to the derailment.

18. Tate's evidence was corroborated by *Lengthman D. Clark* who was with him at the time, and was also an eyewitness of the collision. He described the derailed tank wagon as resting with its buffer over the 6-foot rail of the Down line.

19. *Carriage and Wagon Examiner K. Rowling* had examined the oil tank train at York before its departure. He had spent about 30 minutes going round the train and had found nothing amiss other than a dropped hand brake lever which he restored. He confirmed that he kept an eye open for stretched couplings and that when he saw one on a privately owned tank wagon he would put a green "For repairs" label on it, but he had not seen any on this occasion.

20. *Chargeman Wagon Repairer A. Shaw* was present when the derailed and damaged tank wagons were being cleared from the track by the York breakdown crane. Before one of the derailed tank wagons, Shell Mex and BP No. A 6983, was lifted he had seen no evidence of a fracture on the trailing axle, which was in position and seemed sound, but as the crane took the weight of the wagon the wheels lifted and then dropped as the fracture became apparent. In his opinion the final break did not occur until that moment and had certainly not contributed to the derailment.

Detailed Examination of the Tank Wagons

21. A very careful examination of the tank wagon train was carried out by *Senior Carriage and Wagon Inspector E. A. Appleby* of the Chief Mechanical and Electrical Engineer's Department of the North Eastern Region. He identified those vehicles that displayed defects that could have been contributory to the accident. Details of these vehicles, in the order in which they were marshalled in the train, are given in the accompanying table, and the nature and possible results of the various defects are discussed below—

Particulars of Defective Tank Wagons in Freight Train

Position in Train	37	38	44	45	48
Wagon No.	A 2800	A 3429	A 1337	349	A 6983
Owner	Shell Mex & BP Ltd.	Shell Mex & BP Ltd.	Shell Mex & BP Ltd.	Oakbank Oil Co.	Shell Mex & BP Ltd.
Capacity	14 tons	14 tons	14 tons	14 tons	14 tons
Star Classification	One	One	One	—	One
Date of Registration	1917	1925	1921	1903	1924
Wheelbase	9′ 6″	10′ 6″	10′ 6″	10′ 6″	10′ 6″
Axleboxes	Solid	Divided	Divided	Solid	Divided
Tare Weight	10 t. 5 cwt.	9 t. 12 cwt.	9 t. 3 cwt.	9 t. 3 cwt.	9 t. 11 cwt.
Date of last General Repair	May 1960	—	—	Dec. 1962	May 1963

All the above wagons had steel riveted underframes 18 feet over headstocks designed for 1 ft. 6 ins. side buffer projection, standard rigid drawbars and 3-link couplings, fixed side bearing springs 3 ft. 6ins. long, and side lever hand brakes with push-type brake gear. Wagon No. A 1337 was fitted with self-contained buffers, the remainder with shoe-type side buffers and laminated buffing and draw springs.

Shell Mex and BP No. A 2800 (*marshalled 37th*)

22. A division of the train occurred between this wagon and the following one, and it was established that the gedge link of its trailing coupling had broken. The broken portions of the coupling were recovered and submitted to a detailed laboratory examination.

23. The coupling was found to be of wrought iron, each link being scarf welded. The gedge link had failed initially at a fault in the weld which had reduced the strength of the coupling at this point. Both crowns of the link had been severely reduced by wear, indicating an appreciable service life before failure. Link-to-link contact had reduced the sectional thickness to $1\frac{1}{32}$ inches from the original $1\frac{1}{2}$ inches. Slot to link contact at the other end had resulted in deep grooving of the link crown to accord with the slot contour, reducing the crown section generally to an approximate minimum of $1\frac{7}{32}$ inches and, in one position, to a value a little below the standard specified minimum of $1\frac{3}{16}$ inches.

24. Metallurgical tests showed that the iron from which the link was made was of only moderate quality, and chemical analysis revealed the presence of mild steel in the iron, which was assessed as of a quality inferior to that specified in British Railways Specification 131—Wrought Iron Three Link Couplings. There were no visible markings from which the age and origin of this coupling could be determined.

25. Apart from the broken coupling, this wagon appeared to be in good order throughout, but, after I had seen the condition of the axleboxes and bearings from Oakbank Oil Co. No. 349, described below, I asked for the axleboxes to be removed from No. A 2800 for purposes of comparison as these were of the same type as those on No. 349. The condition of both sets of axleboxes is discussed and compared in paragraphs 32 to 37 below.

Shell Mex and BP No. A 3249 (*marshalled 38th*)

26. The only defect discovered on this wagon was a slackness of $\frac{3}{16}$ inch in the drawgear due to the poor condition of the volute spring in the drawbar cradle. The effect of this slackness would have been to increase somewhat the fierceness of the snatch when power was applied and thus increase the shock load on the coupling between this wagon and the one ahead, though not to such an extent as could be held to cause the breakage of a coupling in good order.

Shell Mex and BP No. A 1337 (*marshalled 44th*)

27. This vehicle was the rearmost of the group of seven which came to a stand just ahead of the point of collision. It was generally in good condition but the rear buffers showed distinct new score marks where relative movement had occurred between them and the buffers of the vehicle in rear at a time when the buffers were compressed. On the right hand buffer face there was a definite score mark leading upwards and outwards from the centre of the buffer for a distance of $5\frac{1}{2}$ inches and then coming down again diagonally towards the six-foot side of the rail. Where this mark reached the edge of the buffer face, the latter was bent back about $\frac{1}{8}$ inch. On the left hand buffer face there was a similar mark leading from the centre of the buffer face in a downward and inward direction.

28. As noted in paragraph 21 above this wagon was fitted with self-contained buffers and those at its trailing end were not a pair, having dimensions as follows:—

	Left Side	*Right Side*
Projection	1 ft. $5\frac{7}{8}$ inches	1 ft. $5\frac{3}{4}$ inches
Outer casing	$12\frac{5}{16}$ inches	$11\frac{3}{4}$ inches
Stroke	$4\frac{7}{16}$ inches	5 inches
Diameter of head	12 inches	13 inches

The effect of the difference in stroke would be to cause an asymmetric thrust between this wagon and the one in rear when buffered up closely.

Oakbank Oil Co. No. 349 (*marshalled 45th*)

29. This vehicle, which was the first to become derailed, was extensively damaged by the collision and numerous components torn off and broken. All components were recovered, however, within the limits of the area of the collision, including all axlebox parts, bearings and liners, indicating that the wagon was complete up to the moment of collision.

30. The left-hand leading buffer face showed a mating score mark to that on the wagon ahead but on the right-hand leading buffer, which had been directly hit by the diesel locomotive of the express, any similar marks had been obliterated.

31. The four bearing springs were recovered undamaged and it was found that there was a difference in free camber of $\frac{1}{2}$ inch at the leading end whereas the maximum difference permitted on an empty tank wagon is $\frac{1}{4}$ inch. It was not possible to establish the actual weight distribution due to the damage, but there must have been some degree of unbalance in the wagon. It was also noted that the spring shoes on this wagon were bolted to the solebars whereas the regulations covering the repair and rebuilding of privately-owned wagons specify riveting.

32. The axleboxes of this wagon were of the oil lubricated solid type used on some privately-owned wagons built prior to the 1923 specification, size 9 by 4½ inches and marked C. Roberts 116 DL. This type of axlebox is fitted with a white-metalled brass bearing located by lugs lying in recesses cast in the side of the box; the vertical load is transmitted from the top of the box through a cast iron liner 3 inches in depth. Though all the axleboxes were broken and the contents scattered it was possible to mate the bearings with the boxes from which they came by comparing the wear and markings, but it was not possible to establish with certainty from which corner of the wagon each box had come.

33. All four brass bearings displayed excessive wear on the locating lugs indicating that the bearings had been moving axially with respect to the axleboxes. When new the centre lug of the bearing is 2½ inches long and ⅝ inch deep and the locating recess in which it lies is $\frac{1}{16}$ inch longer. In every case the shoulders of the locating recess had been rounded off by wear to a radius averaging between $\frac{1}{16}$ and ⅛ inches and the average axial play between the bearing and the axlebox had reached over ¾ inch. When, in addition to this, the ⅛ inch end play of the bearings on the journals and the ⅛ inch play due to wear between the axleboxes and axleguards are taken into account, the possible axial movement of each wheelset with respect to the wagon underframe was something over 1 inch.

34. The designed area of contact between the end of the lug and the recess is approximately ½ inch horizontally and ⅜ inch vertically, provided that the axlebox liner is of the designed depth of 3 inches. In this case, however, two out of four of the liners were only 2$\frac{13}{16}$ inches deep thus reducing the area of contact between the centre lug of the bearing and the end of the locating recess to only ½ inch by $\frac{3}{16}$ inch, and in effect reducing by 50% its resistance to wear.

35. From the repair history of this wagon, which was made available by the owners, it was determined that the axleboxes had not been renewed at the last general repair in December 1962, but that four new axleboxes had been fitted in December 1961, and had thus been almost 3 years in service at the time of the accident. Two of the bearings had been replaced in June 1963 and two as recently as June 1964.

36. In view of the very considerable wear and deterioration that had occurred over this comparatively short time, I requested that the axleboxes from Shell Mex and BP wagon No. A 2800, which were of the same type, should be removed for examination to see whether they exhibited any similar evidence of rapid wear.

37. Of these four axleboxes, two of which had been renewed in 1959 and two in 1960, the two from the leading end of the wagon were badly worn and in a very similar condition to those of No. 349 described in paragraph 33 above and the bearings also showed equivalent wear. At the trailing end, however, both axleboxes were in good condition and one of the bearings was in a virtually new condition. The other bearing, however, was of dimensions 9 x 4¼ inches instead of 9 x 4½ inches and had, as a result, been running with the brass matrix resting on the shoulders of the journal with no contact between the white metal and the crown of the journal and hence there was a considerable risk of its running hot and scoring the journal. According to the owner's repair records, these two bearings had been renewed only 28 days before the accident.

Shell Mex and BP No. A 6983 (*marshalled* 48*th*)

38. This wagon was derailed and damaged as a result of the collision and was found during rerailing operations to have a broken axle. The trailing axle was broken 8¾ inches inside the left wheel boss at a point where the axle diameter was 5$\frac{15}{16}$ inches. Approximately one-third of the cross-section was an old creeping fatigue fracture, the remaining two-thirds being a new clean break. There was no indication of fretting between the two broken portions and neither portion of the axle had been in contact with the track.

39. A metallurgical examination of the axle was carried out and it was found that the fracture originated from the manufacturer's date stamping on the axle which had led to a fatigue crack arising from the notch effect. According to its markings, the axle had been in service since 1941. The steel of which the axle was made was found to be of satisfactory quality.

40. I asked the representative of the owners of this wagon, Shell Mex and BP Ltd., whether it was their policy to carry out ultrasonic tests of tank wagon axles, although such tests are not actually required by the British Railways Board in respect of goods wagons. I was told that such tests were carried out whenever practicable, and that about 1000 of their wagons had been tested so far, but that many of the wagon repair contractors did not possess the necessary equipment. In fact the axles of No. 6983 had been ultrasonically tested in August 1960 and as far as their records showed had not been changed since that date.

41. Much of the information given in the preceding paragraphs was supplied by the owners of the tank wagons concerned, who sent representatives to my Inquiry and who, at my request, supplied full details of the histories and repair records of the vehicles mentioned above. In particular they were able to give me figures for the mileage run by individual wagons employed in the regular crude oil traffic between Tuxford and Pumpherston, a distance of 520 miles for each round trip. Oakbank Oil Co. No. 349 had actually completed 64 journeys since its last general repair in December 1962, representing a total mileage of 33,280, despite having been out of service on seven occasions for casual repairs. Other wagons in the same traffic had run up to 24,000 miles per year, of which 50% was under load. These figures should be considered in comparison with the average annual mileage under load run by goods wagons owned by the British Railways Board, as calculated from data published in the Board's Annual Report, which was 2,700 miles in 1964, with of course, a lower proportion of empty mileage than in the case of privately-owned tank wagons.

Conclusions

42. I am satisfied that this accident was not caused by the manner in which the goods train was being handled or the condition of the track and that the basic cause was the condition of some of the privately-owned tank wagons of which it was composed, the actual sequence of events being initiated by the failure of a defective coupling. None of the individual defects, however, was sufficiently serious in itself to have given rise to a risk of derailment, with the exception of the flawed axle on A 6983; I have no doubt, however, that the final breakage of this axle occurred as a result of the collision and that it did not contribute to this accident, though it must be regarded as fortunate that it broke when it did and not subsequently in traffic, when another and more serious accident might have occurred. The flaw was of such dimensions that the residual life of the axle would probably have been only a matter of months, whereas the wagon was not due for its next general repair until May 1970.

43. It is difficult to be certain of the sequence of events leading up to the collision, because although there were several eyewitnesses to the latter, no individual claimed to have actually observed the derailment, other than the driver of the express, who though not far away was at an angle at which he could not have seen whether the initial division of the tank wagon train preceded or followed the derailment. Certainly there was nothing he could have done to avert the collision.

44. It seems clear, however, from the marks on the buffers of the wagons concerned, that the 45th wagon, Oakbank Oil Co. No. 349, was buffered up closely to the wagon ahead at the moment when it lifted and became derailed and thus, since the train was, according to all accounts, accelerating at the time, the division behind the 37th wagon, Shell Mex and BP No. A 2800, must have already occurred, thus releasing the tension in the rear part of the train and allowing it to buffer up sharply.

45. The worn and defective condition of the wrought iron coupling on No. A 2800 was such as to account for the division in the course of normal working, only a slight and unavoidable snatch, possibly accentuated by the condition of the drawgear of the wagon behind, being sufficient to cause the coupling to part. The division of a goods train through a coupling failure should not, however, lead to a derailment in the rear portion of the train and here there seems little doubt that the actual condition of the springs and axleboxes of No. 349 was primarily responsible, possibly contributed to by the asymmetric thrust from the buffers on the trailing end of the wagon in front which were not a pair.

46. None of these faults was of a kind that could reasonably have been expected to be noticed by the carriage and wagon examiner who had examined the train at York and thus no responsibility for the accident can rest on him, or upon the guard of the train.

47. All the wagons involved were within their proper repair periods and had been inspected and oiled at the prescribed intervals but there were a number of minor defects and irregularities on some of the wagons involved, such as the fitting of buffers that were not a pair, the use of an axlebox bearing and liners of the wrong sizes, the bolting instead of riveting of spring shoes, and the fitting of bearing springs of differing camber, that indicated that the supervision given during repairs is not always adequate and the inspection before such wagons are re-admitted to traffic after undergoing repairs is not as carefully carried out as it should be.

48. These minor faults, however, cannot be regarded as the real cause of this accident though they may have contributed to it. In my opinion the real cause is that, under present day conditions, privately-owned tank wagons are covering greater annual mileages at higher average speeds than in the past and that the rate of deterioration and wear during normal traffic, particularly of wagons built to the earlier specifications, is far out of proportion to the seven-year general repair period at present laid down. In particular, such major components as axleboxes should be expected to outlast the normal general repair period without replacement.

Remarks and Recommendations

49. In view of the serious results that could arise from an accident involving tank wagons laden with inflammable, corrosive or toxic products it seems reasonable that such wagons should receive a special degree of care and attention both in regard to maintenance and inspection to reduce to a minimum the risk of an accident. At the present time, wagons such as those involved in this accident, some of them over 60 years old, are covering annual mileages at least five times as great as those run by the average goods wagon. They are only required to be generally repaired at 7-year intervals and there is no requirement for their axles to receive ultrasonic tests to locate slowly developing fatigue flaws before total failure occurs. During recent months a number of other derailments have been reported by the British Railways Board in which the cause was the defective condition of a privately-owned tank wagon, including two further instances of broken axles. Fortunately no other trains were involved and no personal injuries resulted.

50. I recommend, therefore, that urgent consideration should be given by the British Railways Board to the following points, in consultation with the owners of the wagons concerned:—

(a) The suitability in general of wagons built to the earlier specifications for present day operating conditions with particular regard to the type of axleboxes, buffings and drawgear fitted; also to the replacement of wrought iron couplings, where they are still fitted, by flashbutt welded steel couplings in accordance with B.R. Specification No. 130.

(b) A reassessment of the general repair period for privately-owned wagons having regard to the annual mileages covered.

(c) The possibility of introducing compulsory ultrasonic testing of tank wagon axles.

51. In order to prevent the readmittance to traffic after repairs of privately-owned wagons with the irregularities noted in paragraph 47 above, the inspection procedure should be more stringent than in the past, and I have been assured by the British Railways Board that, since the date of this accident, the attention of the Regions has been drawn to the importance of ensuring that privately-owned wagons are repaired in accordance with the regulations.

52. In conclusion I should like to record my appreciation for the helpful co-operation received both at my Inquiry and subsequently from Shell Mex and BP Ltd. in respect of information regarding their tank wagons involved in this accident and from Messrs. Youngs Paraffin Light and Mineral Oil Co. Ltd. in respect of Oakbank Oil Co. wagon No. 349 of which they were the owners.

I have the honour to be,

Sir,

Your obedient Servant,

I. K. A. McNAUGHTON,
Lieutenant-Colonel.

The Secretary,
Ministry of Transport

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