DEPARTMENT OF THE ENVIRONMENT

RAILWAY ACCIDENT

Report on the Accident that occurred on 26th February 1971 at Sheerness-on-Sea

IN THE
SOUTHERN REGION
BRITISH RAILWAYS

LONDON: HER MAJESTY'S STATIONERY OFFICE
1972

11p NET

RAILWAY INSPECTORATE,
DEPARTMENT OF THE ENVIRONMENT,
2 MARSHAM STREET,
LONDON, S.W.1.
14th December 1971.

Sir,

I have the honour to report for the information of the Secretary of State, in accordance with the Order dated 2nd March 1971, the result of my Inquiry into the buffer-stop collision that occurred at about 18.57 on Friday, 26th February 1971 at Sheerness-on-Sea in the Southern Region of British Railways.

The 17.16 10-coach electric multiple-unit passenger train from Victoria to Sheerness, running under clear signals, entered No. 1 platform line but failed to stop short of the sand drag at the end of the line. The leading coach demolished the buffer stops and, without its leading bogie, slid forward across the station concourse, through the booking hall and front wall of the station, coming to rest considerably damaged with the leading cab on the station forecourt. The second coach also partly rose up onto the concourse. The remainder of the train was not derailed and sustained only minor damage.

I regret to report that a lady who was standing in the booking hall was killed, and that 13 people were injured, including the driver and guard of the train and the clerk on duty in the ticket office.

The accident caused considerable damage to the station building and cut off the railway telephones. The traction current was discharged by the opening of the circuit breakers which tripped on short circuit at the moment of collision.

The emergency services were summoned promptly by the owner of the station bookstall, using a Post Office telephone which was still working, and all were on the scene by 19.04.

The accident caused the suspension of all services on the Sheerness branch until normal working was resumed at 14.40 the following day. In the meantime an emergency bus service was operated between Sittingbourne station and Sheerness-on-Sea.

It was almost dark when the accident occurred, on a clear dry evening.

DESCRIPTION

The site

1. Sheerness-on-Sea station is situated at the end of a branch line nearly 8 miles long which joins the main London–Margate–Ramsgate line in a triangular junction just on the London side of Sittinghourne. The branch, which is electrified on the conductor rail system at 750vDC, is double track for the first 3¼ miles from the junction with the main line, and thereafter single to Sheerness with a passing loop at Queenhorough. The line is worked on the Track Circuit Block System with colour light signals and is controlled from the signalbox at Sittingbourne.

2. The line speed limit over the branch is 85 miles/hour but there is a 30 miles/hour permanent speed restriction on the approach to Sheerness station on account of sharp reverse curvature. The gradient into the station is 1 in 927 falling. The station has 2 platform lines and a central siding line. No. 1 platform, on the west side, is 854 feet in length and can accommodate trains of up to 12 coaches in length.

3. The lines are provided with bent rail pattern buffer stops preceded by sand drags 20 feet in length, intended to be filled with pea gravel to a depth of 6 inches above rail level for 10 feet and then rising to a depth of 18 inches at the buffer stop. At the time of the accident however, the average depth of the gravel over the whole length of the sand drag on No. 1 platform line was 6 to 7 inches and the buffer stops themselves were 2 inches below the standard height of 3 feet 5½ inches above rail level.

4. The station buildings are of timber construction with a roofed concourse extending across the platform ends and, beyond it, the booking hall forming the public entrance to the station with the ticket office adjacent to it in the direct line beyond the buffer stops of No. 1 platform. The platforms are provided with awnings extending some 3 coach lengths from the buffer stops and, opening on to No. 1 platform, there is a range of staff accommodation.

The train

5. The 10-coach train was formed of 5 2-car outer suburban electric multiple units, classified 2-HAP, built for the Kent Coast electrification between 1958 and 1963. Each unit comprised a motor second brake close coupled to a driving trailer composite, the bodies being of all steel construction and mounted on steel underframes of British Railway standard design and capable of withstanding a buffing load of 200 tons. At the outer ends each unit was fitted with buckeye automatic couplers and vestibule gangway-type centre buffers.

The overall length of the train was 663½ feet and its tare weight was 364 tons.

6. As on all Southern Region EMU stock introduced since 1951, the train was fitted with the self-lapping electro-pneumatic brake working in conjunction with the normal Westinghouse automatic air brake

system with its normal safety features, which remain in operation whether or not the electro-pneumatic brake is in use.

The significant feature of the EP brake is that the brakes are applied simultaneously on each coach of the train by means of a solenoid-operated valve which admits air from the main reservoir pipe to the brake cylinders. It is slightly quicker acting than the Westinghouse brake, even in respect of the leading coach of the train, and this characteristic is even more marked on a long train.

7. The leading coach was a motor second brake, provided with a full width driving cab without side doors, access being obtained through a sliding door from the adjacent brake compartment. The driving position was on the left of the cab with the brake handle and power controller falling naturally under the driver's left and right hand respectively. The brake handle is applied by moving it forward away from the driver in an anti-clockwise direction and has 5 positions, as follows—

1. Running position—brakes released.
2. Full EP brake application.
3. Lap position—Westinghouse brake.
4. Service application—Westinghouse brake.
5. Emergency application—EP and Westinghouse brakes.

Between positions 1 and 2 a variable amount of EP brake can be obtained, from a very slight application, up to 50 lbs/in^2 at position 2.

The power controller handle has to be depressed to close the Driver's Safety Device (DSD) valve and power is applied by an anti-clockwise movement towards the driver. The force required to depress the DSD handle is approximately 2 lbs. The approximate time taken for the Westinghouse Brake to become effective on a 10-coach train after releasing the DSD is 2½ to 3 seconds.

The damage caused

8. The wooden construction of the station buildings offered little resistance to the leading coach of the train which, after demolishing the buffer stops, ploughed through the concourse and then carried away a 6 inch square timber post supporting the main roof girder and destroyed the partition wall between the booking hall and the ticket office, coming to rest with its leading end projecting some 12 feet outside the front wall of the station. The accident also caused a failure of the station electric lighting and cut off the railway telephones.

9. The body of the leading coach was damaged and distorted with the driving cab end partially stove in, though the driver's window was only cracked. The leading motor bogie was torn off in collision with the buffer stops and the trailing bogie of the leading coach then overrode it into the concourse area, all the underfloor equipment being destroyed or badly damaged. The leading bogie of the second vehicle ended up on the top of the motor bogie of the first coach, and there was some body damage to the leading end of the second coach. In contrast, there was little damage to the couplings throughout the train which did not show any signs of heavy impact, the only abnormality being that the centre buffer of the second coach finished up underneath the rubbing plate of the first.

10. Apart from the destruction of the buffer stops, which were of the bent rail type with 12 inch diameter interior-sprung buffers projecting 21 inches from a 14 inch by 14 inch timber beam, and the dispersal of the sand drag, there was no damage to the track, but there was slight damage to the signalling equipment including the release arrangements to the ground frame controlling the crossovers between the centre siding and the platform lines.

Evidence

11. In charge of the train was *Guard E. W. File* stationed at Ramsgate. He signed on duty at 13.38 and, in the course of his duty, worked the 15.54, formed of 6-HAP, from Maidstone East to Victoria arriving at 17.01. This train was then coupled to 4-HAP already standing in the station to form the 10-coach 17.16 to Sheerness. Guard File satisfied himself that the coupling had been carried out properly and then went to the rear of the train to check on the red indicator blinds; while he was there he completed a full brake test in conjunction with Driver Barnes of Margate who, after coupling up, had gone to the front of the train. He also recalled that he had seen Driver Rothwell, the booked driver, on his way up the platform to relieve Driver Barnes.

12. Guard File then described the journey from Victoria to Sheerness, during which he travelled in the brake compartment in the 6th coach. The train left on time, calling properly at those stations at which it was booked to stop. He had noticed Driver Rothwell looking out at each station. On account of signal checks and speed restrictions, the train had reached Queenborough, the station before Sheerness, about 4 minutes late. At this point most of the remaining passengers on this train are in the habit of getting out and moving forward into the front coaches in order to be nearer to the exit at Sheerness. They did this as usual on this particular evening and before leaving the station he saw Driver Rothwell looking back to see whether the doors of the front coach were properly closed. The train then ran normally to Sheerness, entering the platform line at what Guard File estimated as 10 or 15 miles/hour. He could not remember

hearing or feeling any signs of braking until the train came to a stop with what he described as a surge, the emergency gear in the brake compartment being thrown about and all the lights going out. He then got out and started towards the front of the train. On the way he met another guard who was to work the outward service and together they went back along the train checking whether there were any passengers in the rear portion. When he reached the end of the platform he reported the accident to the signalman at Sittingbourne using the signalpost telephone at the platform starting signal.

13. In reply to questioning, Guard File told me that he had known Driver Rothwell for some time and had never seen him in a state of mind other than alert. During this particular week he had worked with Driver Rothwell from Tuesday to Friday and his manner had seemed quite normal all the week.

14. On duty at Sheerness station on the evening of the accident was *Railman M. Gordon*, who was standing in the staff room located on No. 1 platform, about one coach length from the buffer stops. He heard the train coming in and then saw the leading coach going past the door. He at once remarked to a colleague "That train is not going to stop". He was aware of a distinct gushing or hissing noise before he saw the train actually hit the buffers. Gordon went at once to the electrification telephone to have the traction current cut off, but found the telephone dead. He then went to see whether the other members of the station staff had escaped injury. They were all right, apart from Mr. Robinson, the booking clerk, who was bruised by debris of the ticket office which had collapsed around him. Gordon then saw that the driver of the train was still in his cab and went to get him out. He found the sliding door between the brake compartment and the cab still closed and in the cab the driver was sitting on the end of his tip-up seat which was in the raised position, leaning over the control desk and rubbing his head. Gordon thought he looked badly shaken but when he asked how he was the driver replied "Not too bad". He then saw him out of the cab and to the guard's rest room where he was given a cup of tea. Gordon was not able to estimate how much time elapsed between the accident and when he spoke to the driver in the cab.

15. *Leading Railman R. Jefcoate* was standing near the barrier of No. 1 platform as the train entered the station. It seemed to him to be coming in quite normally until when it was about passing the staff mess room he realised that it was not going to stop. He shouted to warn Senior Railman Vidler, who was in the ticket collector's box, and then hustled a woman standing nearby into a brick building at the side of the concourse. Although he actually saw the front of the train start to mount the sand drag he did not recall seeing the driver or hearing the sound of a brake application.

16. *Senior Railman J. W. Vidler*, who was in charge of Sheerness-on-Sea station at the time of the accident was waiting in the ticket collector's box at the barrier of No. 1 platform as the train came in. He heard leading Railman Jefcoate's warning shout but there was nothing he could do and he stood transfixed in the box as the train crashed past him a few feet away. Almost at once all the lights went out and he went to telephone for the emergency services. However, all the station telephones were out of order. He then went back to see whether any passengers had been injured and met the Guard of the train who told him that the accident had been reported to the signalman at Sittingbourne. He then arranged for the hook switches in the station area to be opened to safeguard the area in case the traction current was still on.

17. The booking clerk on duty in the ticket office was *Mr. H. E. Robinson.* He told me he had just sold a ticket to a lady when there was a loud roar and everything seemed to pile down on top of him, when all was quiet he struggled out of the debris and told the passengers in the leading coach of the train to stay where they were until it had been established that it was safe for them to get out. After making contact with the rest of the station staff he went round to the front of the train to look for the driver. It was then perhaps 5 minutes after the accident occurred. The driver was standing in the doorway of the brake compartment with blood streaming down his face. He was mumbling something but Mr. Robinson could not understand what he was trying to say, and told him he had better come down, but he did not actually see him leave the train.

18. When the accident occurred *Driver A. E. Pepper* was sitting in the train crew rest room on Platform No. 1 with the door closed. He heard the train come into the platform and then heard what sounded to him like a release of the Driver's Safety Device. It was a distinctive noise of escaping air and it occurred whilst the train was still on the move and before the lights went out. Driver Pepper's first thought was for the passengers and he helped the station staff seeing that they were looked after. It was not until 15 or 20 minutes later that he saw Driver Rothwell, who was then walking back on the centre track to climb through a brake compartment on the train to reach the rest room.

19. Driver Pepper then told me that at about 21.00 he assisted Inspector Harris to record the position of the controls in the leading cab of the train. He recalled that the master switch was in the closed (forward) position, the reverser was forward and the controller handle in the off position. The brake handle was in the No. 2 position, representing a full EP brake application.

20. *Motive Power Supervisor E. G. Harris*, told me he reached the scene of the accident at about 21.00. He confirmed the position of the controls in the leading cab of the train, as described by Driver Pepper. In Mr. Harris' view the position in which the brake handle was found could possibly be accounted for if the driver's hand had been resting on the handle as the collision occurred. It would obviously not have been in the No. 2 pesition for a normal stop. Mr. Harris also confirmed that, from his experience, it would

have been quite easy to hear and recognise the distinctive noise made by the release of the DSD, even from inside the staff room with the door shut, as claimed by Driver Pepper.

21. *Mr. A. J. Barter, Divisional Traction Engineer*, told me that a very full examination had been made of the train after the accident. There were no signs of flashover on the motors of the leading unit which led him to conclude that the train was not under power at the time of the impact. All the defects in the braking system were clearly caused by the damage sustained in the collision, and when these had been made good he had been able to establish that the EP brakes on the whole train had been in order prior to the accident. Mr. Barter was also satisfied that the damage to the Westinghouse train pipe, below the leading coach, where the AWS pipe connection and the DSD isolating cock and relay valve had been torn away would itself have been sufficient to cause a full brake application. The DSD relay valve was not recovered after the accident, but when a substitute valve had been fitted and the pipe work replaced the DSD was entirely satisfactory when tested. Mr. Barter confirmed that the weight needed to hold down the DSD handle was 2 pounds.

22. From an examination of the damage sustained by the train, Mr. Barter assessed the speed of impact as of the order of 10 to 15 miles/hour. In his view, since the leading coach had gone through nothing very substantial, the train had largely been brought to rest by the brakes coming on automatically on the rear 9 coaches and the distance travelled after hitting the buffer stops, which was 80 feet, suggested a speed of about 12½ miles/hour.

23. The driver of the train was *Driver J. D. Rothwell* stationed at Victoria. He was 48 years of age and had been a driver for 10 years. On the day of the accident he signed on duty at 16.58 after 16 hours off duty and went to take over the 17.16 to Sheerness, arriving at the leading cab in good time. He could not remember whether he had himself carried out the brake test in conjunction with the guard, but he had tested the DSD, which was in order. On the journey, which was uneventful, he had carried out a running brake test at Newington which was satisfactory, and his stop at Queenborough, the last station before Sheerness, was quite normal. At Queenborough the starting signal was at Green. Driver Rothwell told me that he accelerated the train to about 35 miles/hour and then shut off power for the permanent speed restriction to 30 miles/hour on the curves approaching Sheerness.

24. From there it was his custom to coast all the way into the station. He remembered he had a long view of the home signal which was at Green, with an indication for No. 1 platform and he made a gentle brake application to bring the speed down to 5 or 10 miles/hour at the point where the train entered the platform. From this point it was his normal practice to let the train roll forward with the brakes barely rubbing, before making a brake application of about 20 lbs. for the final stop. However, on this occasion he could remember nothing whatever from the time the train was about one coach length into the platform until he came to and found himself leaning over the controller. As far as he could remember his right hand was still on the controller and he thought that the DSD might have remained held down by his body weight, but he could not be certain whether it was. As far as he was aware he was still alone when he came to and he found his own way out of the cab, but he was still in a daze and did not realise what had happened. One of the station staff then suggested to him that he should go and seek treatment since he was bleeding from a cut on the forehead. He also sustained bruises to the right ribs presumably when they had been in contact with the control column.

25. Driver Rothwell also told me of an incident that had occurred almost a year previously, on 28th February 1970. He was sitting on a metal chair in the driver's lobby at Holborn Viaduct station when he bent over to pick up a newspaper off the floor, tilting the chair to do so. The chair slipped and he fell to the floor hitting the right side of his head, as a result of which he was unconscious for about 8 minutes. He was detained at St. Bartholomew's Hospital for one night and was subsequently passed as fit for duty by the Railway Medical Officer, but because he had suffered a head injury he was kept off the footplate until further investigations had been made. For these he was readmitted to hospital during April. He had been allowed to resume footplate duties in July 1970, since when his health had been good.

26. I asked Driver Rothwell how he had spent his off-duty period prior to the accident. He told me that he was a bachelor, living alone, and that he had had a good night's sleep and had spent most of the day at home, reading. His hobby was ballroom dancing, which kept him fit, but since he was on late turn he had not been dancing all that week. He was taking no medicines or drugs of any kind and had drunk no alcohol during the day. He had cooked himself some steak for his lunch and drank coffee with it.

27. *Dr. T. P. Howkins, the Regional Medical Officer*, who was present at my Inquiry, explained the procedure followed after Driver Rothwell's earlier accident at Holborn Viaduct. He was detained in hospital overnight because he had a head injury and was then seen by the Railway Medical Officer and kept off driving. This was normal practice. He was then readmitted to hospital on 1st April 1970 for about 10 days, during which time a complete investigation was carried out. There were no abnormalities found, other than certain minor indications revealed by electrical tests which were compatible with concussion following a head injury, but because it was a head injury it was thought wiser to keep him off driving duty for a further period. The tests were repeated in July and the report was that there were no changes from the results given by the earlier tests. It was thought that the minor indications were entirely due to the post-concussional effect and that they might persist for some time. Since Driver Rothwell had no other symptoms

and there was no evidence of any abnormality, he was allowed to resume driving duties in July, subject to the tests being repeated occasionally. He was then re-examined in October 1970 and certified fit to continue driving with another routine check-up in 6 months time. In the meantime the Sheerness accident occurred.

28. Dr. Howkins then told me that Driver Rothwell had been admitted to the neurological unit of University College Hospital to determine the possible cause for the Sheerness accident. In his preliminary report the neurological consultant stated that in his opinion it had been perfectly reasonable to allow Driver Rothwell to continue his work as a driver after he had got over the effects of the earlier head injury. In the view of the consultant the short amnesia after the impact at Sheerness should have been accompanied by, at most, a very brief amnesia, or none at all, before the impact. Since it was clear that Driver Rothwell had no memory from a moment shortly after entering the platform line at Sheerness until he regained his senses within a few minutes of the accident occurring, he suspected that Driver Rothwell may have had some kind of change of consciousness before the impact which could account for what happened.

29. The very extensive series of tests that had been carried out on Driver Rothwell up to the date of my Inquiry, to attend which he was released from hospital, had revealed no abnormalities, but I was subsequently informed that later during the period of observation he had suffered from two further short periods of loss of memory. These occurred on 12th and 22nd March, in the latter case lasting for a period of 2 or 3 minutes.

30. Driver Rothwell was discharged from hospital on 27th March after some further tests, none of which revealed any physical cause for these lapses of memory. In the opinion of the neurological consultant, the first of what was proving to be a series of amnesic periods had occurred at the time of the accident at Sheerness, but that there was no means of telling from any aspect of Driver Rothwell's health before the accident that such a period of amnesia was going to occur.

Subsequent tests

31. In order to reach a closer estimate of the speed of impact I asked the Railway Officers to arrange for a braking trial of a similar train, with the particular object of establishing the distance travelled after the initiation of a brake application by release of the DSD at low speeds. These tests were carried out on straight and level sections on the line between Maidstone West and Paddock Wood using a train formed of 5 2-HAP units, the leading motor coach being instrumented so that its exact speed could be determined at the moment of making the brake application.

32. The results obtained, which are set out in the table below, were generally slightly better than the calculated stopping distances for this type of stock, which are based on a partially laden train and which take a pessimistic view of the variable factors. They confirm that the speed of the train at the moment the brakes were applied was probably less than 15 miles/hour.

TABLE

Speed (*m.p.h.*)	Distance to stop (feet)	Type of Brake Application
14·0	83	DSD
15·8	105	DSD
18·2	130	DSD
18·8	130	DSD
22·5	142	Emergency
23·6	200	DSD
25·5	235	EP Full Service

CONCLUSIONS AND REMARKS

33. The cause of this accident was that the driver of the train involved, having driven the train conscientiously and correctly up to the point it entered No. 1 platform line at Sheerness at a speed which was probably between 10 and 15 miles/hour, thereafter failed to stop the train short of the sand drag and buffer stops. After the impact the driver could recall nothing whatever from when the train began to enter the platform, until he came to in his cab some 5 minutes later, but from the evidence of other witnesses, there was no sign of a controlled brake application, the train coasting the length of the platform without power applied, until at or about the moment the head of the train entered the sand drag there was a sound of escaping air, as if the DSD had been released.

34. Apart from the central question of the reason for Driver Rothwell's memory gap prior to the impact, the available evidence leaves one or two aspects of this accident less than fully explained. The first of these is whether the sound heard by Railman Gordon and Driver Pepper was actually the noise of escaping air resulting from the release of the DSD, or whether the air escaped as a result of accident damage to the Westinghouse pipe or its fittings as the leading bogie ran through the sand drag and into the buffer stops.

Both men thought the sound preceded the collision and thus was caused by the release of the DSD. Even if this were so, the release could not have preceded the impact by more than 2 or 3 seconds and thus there would not have been any significant reduction in the speed of the train before impact. It can be assumed therefore that the speed of the train as it coasted along the platform and the speed at which it hit the buffer stops were to all intents and purposes the same and lay somewhere between 10 and 15 miles/hour.

35. There also remains some doubt as to how long it was before Driver Rothwell recovered consciousness after the accident. To the best of his knowledge he was alone in the cab when he came to and then found his own way to the door of the brake compartment. This tallies with the evidence given by Mr. Robinson who described how, some minutes after the collision, he saw the driver standing at the door of the brake compartment with blood running down his face, but conflicts with Railman Gordon's account of how he went into the cab, found the driver sitting on his upturned seat leaning over the controls and, after an exchange of words with him, saw him safely out of the train. If both accounts are true, it appears that Driver Rothwell, still in a daze, moved from his cab into the brake compartment, where he was seen by Mr. Robinson and then went back again to the cab where he was found a minute or two later by Railman Gordon. This suggests that Driver Rothwell did not regain full consciousness until at least 5 minutes after the impact.

36. I have no reason to doubt the genuineness of Driver Rothwell's inability to recall the events immediately prior to the collision. He was a frank and open witness, though understandably shocked and somewhat frightened at what had happened. His attitude would probably have been the same however whether the amnesia had been brought about by the shock of impact, in which he received a heavy blow on the head, or whether he suffered some form of loss of consciousness at the time his memory of events ceased prior to the accident. If the former was the case, it assumes that either Driver Rothwell was paying so little attention to his duties that he allowed the train to run straight into the buffers without attempting to stop it, which seems extremely improbable, or that he did attempt to stop the train, but was unable to do so because the brakes failed. In the latter case, apart from there being no evidence of any kind pointing towards a brake failure, one would have expected to find the brake handle after the accident in the full emergency position. However, the medical view is that the short amnesia after the impact should only have been accompanied by a very brief amnesia or none at all before the impact, whereas Driver Rothwell's actual memory of events ceased at least three-quarters of a minute and possibly longer before the impact.

37. The circumstances of the accident thus point towards the second explanation, that Driver Rothwell suffered some form of loss of consciousness at the time the train was entering the platform, as being the more likely and this is supported by Driver Rothwell's subsequent medical history though, despite extensive tests in hospital no reason for his periods of amnesia has been established. I therefore conclude that, at the time of the accident, Driver Rothwell was not in effective charge of the train, having suffered some form of change of consciousness at the time when the train was entering the platform line. When this happened it seems probable that he slumped forward over the controls, holding the DSD down with his body weight until shortly before or at the moment of impact when he was thrown with his right side against the power controller bruising his ribs and at the same time cutting his head on some object on the control desk.

38. It seems probable that the chain of events that led to this accident started with Driver Rothwell's fall at Holborn Viaduct almost a year beforehand. But since he experienced no adverse symptoms during the intervening time, nor was any significant abnormality found in his brain function, despite a full and careful series of tests carried out in hospital, there can be no grounds for any criticism of the decision on the part of the railway management to allow him to return to driving duty whilst still having periodical medical examinations. The extremely thorough and responsible manner in which his fitness to drive was monitored after he had suffered a comparatively minor head injury shows that this aspect of railway safety is treated with the importance which it so rightly deserves.

I have the honour to be,

Sir,

Your obedient Servant,

I. K. A. McNAUGHTON,

Lieutenant Colonel.

The Permanent Secretary,
Department of the Environment.

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