RAILWAY ACCIDENTS

REPORT ON THE COLLISION
which occurred on
19th November 1949 at
LIME STREET STATION,
LIVERPOOL
in the
LONDON MIDLAND REGION
BRITISH RAILWAYS

LONDON: HIS MAJESTY'S STATIONERY OFFICE
1950
SIXPENCE NET
I have the honour to report for the information of the Minister of Transport, in accordance with the Order of 21st November 1949, the result of my Inquiry into the buffer-stop collision which occurred at 2.26 a.m. on Saturday 19th November 1949, at Liverpool, Lime Street Station, in the London Midland Region.

The 2.0 a.m. empty stock train, consisting of 14 coaches and a gas tank, hauled by an 0-6-2 tank engine, left Downhill Sidings, Edge Hill, with the vacuum pipe unconnected between the first and second coaches; it got out of control on the steep descending gradient and collided with the hydraulic buffers at the end of No. 6 platform at a speed of about 40 m.p.h.

The engine destroyed the buffers and the timber booking office on the concourse directly beyond them. The leading coach, which was torn from its bogies, swept away the bunker, cab and left-hand tank of the engine and was hurled 60 feet across the station concourse into the wall of the hotel. The second coach followed the first and landed on its side on the concourse, the third coach was thrown on to No. 6 platform and the fourth was derailed; the next four vehicles were buffer locked but they and the remainder of the train were virtually undamaged. A bookstall and a sweet kiosk were also demolished and a hole was driven in the hotel wall.

The enginemen and guard jumped from the train as it was entering the station; the driver sustained a fractured ankle and broken finger and was detained in hospital, but the others received only minor injuries. Two clerks in the booking office also had fortunate escapes and were only shaken.

The "popping" of the engine whistle, sounded by the driver when the train got out of control, was heard by the Inspector on duty at the station and he took prompt steps to summon assistance. The Station Police Officers also acted quickly and were in time to disperse the few people on the concourse. The City Fire Brigade and ambulances responded immediately to the 999 call sent out by a Railway Telegraph Clerk and arrived within four minutes of the accident. First aid was promptly rendered to the injured men who were soon on their way to hospital. The Station staff, City Fire Service, Police and Ambulance staffs are to be commended for the exemplary way in which the situation was handled.

Station working was re-arranged and there were only slight delays to trains. The damaged stock was removed by 7.0 p.m. on the same day and necessary repairs to the permanent way and concourse were completed by 11.35 p.m. on the following day, when normal working was resumed.

It was a dark night with slight mist in places and the rail was greasy.

Description of Site.

1. The approach to Lime Street from Edge Hill, 1\frac{1}{2} miles away, is down a gradient of 1 in 93 in a deep rock cutting, which is spanned by numerous bridges and short tunnels. There are four tracks, which fan out at the entrance of the station to serve 11 platforms. The general layout, gradients, relevant signals, etc., are shown on the accompanying sketch.

Downhill Sidings are situated at the London end of Edge Hill Station on the Down side of the line and consist of two groups; the lower one, in which the 2.0 a.m. train was marshalled contains eight double ended sidings and is mainly on a falling gradient varying from 1 in 73 to 1 in 123, which changes to a rising gradient of 1 in 331 on the gathering road leading to the exit at the Lime Street end. Access to the Down Goods line is controlled by Edge Hill No. 12 box and thence to the Main lines by Edge Hill No. 2 box. There is a speed restriction of 30 m.p.h. down the steep incline between Edge Hill and Lime Street.

Description of Train.

2. The train was hauled by an 0-6-2 side tank engine of obsolescent type, travelling chimney first; its weight in working order was 44 tons. Maximum boiler pressure was 160 lbs. per sq. inch, and the vacuum brake, in which the vacuum was maintained by a large ejector and a crosshead pump, operated on all coupled wheels.
3. The stock was marshalled in the following order from the Lime Street end and was intended for use with the Saturday morning trains as indicated:

<table>
<thead>
<tr>
<th>Vehicle Type</th>
<th>Number</th>
<th>Destination</th>
</tr>
</thead>
<tbody>
<tr>
<td>2nd, 3rd Third Open.</td>
<td>TO 27147, 27310</td>
<td>Lime Street.</td>
</tr>
<tr>
<td>4th, 5th Third Open.</td>
<td>TO 9411, 7751</td>
<td>for 7.50 a.m.</td>
</tr>
<tr>
<td>8th, 9th Third Open.</td>
<td>TO 9430, 8032</td>
<td>5 set</td>
</tr>
<tr>
<td>10th, 11th Corr. Compo.</td>
<td>CK 4144</td>
<td>7751. 3 set</td>
</tr>
<tr>
<td>12th Gas Tank.</td>
<td>157210</td>
<td>for Redbank.</td>
</tr>
</tbody>
</table>

Total weight 429½ tons.

The total weight of the engine and train was 473 tons, and the overall length was 916 feet.

All coaches had steel underframes; ten of the bodies were of composite and four of all timber construction. The gas tank had a wooden underframe. Shock absorbing buffers were fitted on all vehicles except on the first and on the gas tank, and the vacuum brake could be operated on all wheels.

The brake power percentage of the full weight of the train under various conditions would have been as follows:

- Brake working on engine only: 2%
- Brake working on engine and first coach only: 7%
- Brake working on engine and all vehicles: 85%

**Empty Stock Working.**

4. Empty carriage stock is stabled and empty trains are made up in the Downhill Sidings, Edge Hill, where the staff work in three shifts and consist of the following:

- First shift 7.0 a.m. to 3.0 p.m. — 1 Inspector, 3 Shunters.
- Second shift 3.0 p.m. to 11.0 p.m. — 1 Inspector, 3 Shunters.
- Third shift 11.0 p.m. to 7.0 a.m. — 1 Inspector, 2 Shunters.

During the first two shifts, two shunters work at the “top” (London) end of the yard and one at the “bottom” (Lime Street) end. During the third shift both shunters work at the “top” end, but they are assisted by the Carriage Shop shunter, who usually reports for orders at the “bottom” end at about midnight.

The details of the stock in each siding are recorded in a log book and it has been the custom to accept the entries referring to a particular train as evidence that the stock in question was correctly made up. It has also been the practice for the shunters at the “bottom end” of the yard to be responsible for checking trains before departure. This applied to the day shifts only and during the third shift, when there was no “bottom end” shunter, one of the others was supposed to do this work. There were no written instructions, however, and occasionally complaints were received from guards that the trains were not correctly coupled.

Local instructions regarding use of the vacuum brake between Edge Hill and Lime Street are printed in the Sectional Appendix to the Working Time Table and are as follows:

"The vacuum brake on all empty stock trains between Edge Hill and Lime Street must be coupled up throughout the train and connected to the engine before leaving Edge Hill, and the regulations respecting the working of the vacuum brake must be complied with. Trains consisting of mixed passenger and goods stock must have the brake pipes coupled up."

The regulations regarding working and testing the vacuum brake are given in the Appendix to this report.
5. The initial marshalling of the train in Downhill No. 7 siding began during the third shift on Thursday night, when Temporary Inspector T. W. Smith instructed Shunter H. Collard, who was the Carriage Shop shunter, to move the train across to No. 7 siding and to replace it by a BG van. Collard did this early on Friday morning and coupled the van to the leading coach but he did not connect the vacuum pipe because he thought the BG was only required in No. 7 siding for holding the other vehicles stationary on the gradient. This omission remained unnoticed during subsequent marshalling operations and when the train was ready to leave at 2.0 a.m. on Saturday morning, Guard F. S. Barton failed to test the brake. Consequently, when the train finally started on its journey to Lime Street, the vacuum was working only on the engine and leading coach and the available brake power was 7% instead of 85% of the weight of the train, thus the brake had little retarding effect when Driver J. W. Timmins applied it on the 1 in 93 descending gradient near Lime Street No. 1 Home signal and he was powerless to control the train, which gathered speed until it crashed into No. 6 Platform buffers at about 40 m.p.h.

6. Timmins said he had been a driver since 1920 and he was very familiar with the arrangements for working trains between Edge Hill and Lime Street. He came on duty at 7.10 p.m. on Friday evening and took over the shunting an hour later. He worked an empty stock train from Downhill Sidings to Lime Street and had no difficulty in controlling it. He reached the station at about midnight and then returned with the light engine to Downhill Sidings, where he was booked to take down the 2.0 a.m. train. After backing on to the empty stock, he had some initial difficulty in creating sufficient vacuum because of low boiler pressure, but later he obtained 21 inches in both the train pipe and reservoir. Some time before they started a shunter came along and asked him to draw ahead, but as the train did not move at first, Timmins sent Fireman R. Smith back to take off the brakes. After his return, the train still did not move until the shunter apparently took off a hand brake in a rear coach. Timmins said he had little difficulty in stopping, although he remarked to his fireman that he had a poor brake. He pointed out, in explanation, that he lost vacuum in the engine reservoir whenever he closed the large ejector and that the brakes on this class of engine were always poor.

Shortly after he had completed this initial movement, the guard arrived and told him that he could start, adding “You are right away, Jack, when you have got your vacuum”. Timmins said he had no trouble in starting this time and he had a clear run out to the main line. Edge Hill No. 2 Down Fast Starter was showing Double Yellow and shortly afterwards Lime Street Down Fast No. 1 came into view showing Green, which indicated that the line was clear to the buffer stops. Consequently Timmins had no need to check the train and did not apply the brake until he was near the Home No. 1 signal, by which time he was travelling at about 30 m.p.h. He then made a full brake application, but as this did not appear to have any retarding effect, he began “popping” with the engine whistle to attract the guard’s attention. He reversed his engine and opened the sanders, but still without effect; the train continued to gather speed, passing Lime Street signal box at about 50 m.p.h. Just as he was reaching the platform he jumped from the cab and landed on the ballast in front of the platform ramp.

7. Fireman Smith, who was an experienced man with 27 years’ service, generally confirmed his driver’s evidence. He said that on arrival in No. 7 siding just after 1.0 a.m., he coupled up, connected the vacuum pipe to the leading coach, changed his lamps and then returned to the footplate. A shunter arrived a few minutes later and asked them to pull down a few yards, but when the driver tried to create a vacuum, he could only get 10 inches because the steam pressure was only 90 lbs. per sq. inch. The train would not move and they concluded that some of the brakes must still be on. Timmins told him to “Go back and pull the cords”; Smith pulled the cord of the first coach and heard the intake of air to the cylinder when the brakes dropped off; he then tried the next four or five coaches and in each case the brake blocks were swinging freely. By the time he got back to the footplate his driver had blown up the fire and had been able to create the full vacuum of 21 inches. They tried to move the train again but failed at the first attempt; a moment or so later, however, it seemed as if someone released a hand brake in a rear coach and they were able to draw down. Smith said they moved about a coach length and then ran a considerable distance—about 1½ coach lengths—before stopping. The driver remarked on the poor strength of the brake, but neither of them was alarmed.

Smith, in describing the journey to Lime Street, confirmed his driver’s description of the signal aspects and said that after passing Lime Street Home No. 1, Timmins applied the brake but it had no effect. The speed of the train was increasing so Smith screwed down the hand brake and opened the sanders. The driver was whistling continuously and when they passed the Inspector’s cabin at the entrance to the station Smith waved to attract his attention. Timmins then jumped off the cab and Smith followed him when the engine was only one or two coach lengths from the buffer stops.

8. Goods Guard Barton said he had often worked trains to and from Downhill Sidings and had taken many of them into Lime Street. On the night of the accident he came on duty at 10.10 p.m. and after carrying out his initial duties he had his food in the Guard’s Room at Edge Hill. He then walked across to No. 7 siding and went round the 2.0 a.m. train. He got in to each brake van in turn to examine the hand brakes; the one in the van in front of the gas tank was on and he took it off. He admitted, however, that he did not test the vacuum in the last or any of the vans, but he thought the gauge was showing 20 inches. When asked why he did not carry out this elementary duty, Barton replied “To be quite honest the train is usually ready and I took it for granted it was all right”. He added that when he got back to the engine he told the driver “You are right away now".
After the train started, Barton, who was travelling in the sixth coach, did not notice anything unusual until they were near Lime Street Home No. 2 when he heard the driver's whistle and realised the train was gathering speed. He applied the vacuum brake but found it was useless. He screwed down the hand brake but the speed continued to increase and he therefore jumped from his coach as soon as it reached the platform.

9. Immediately after the accident all except the three destroyed coaches were examined by the Carriage and Wagon staff, who found brakes off, brake blocks cold and cylinder pistons down, except on the last coach where the hand brake had apparently been put on after the train stopped; gauges in the brakevans were all at zero.

Whilst the wreckage was being cleared from the concourse, the vacuum pipe at the trailing end of the leading coach was found on the stopper with the pin in. The stopper had been severed from the headstock, but the flexible part of the vacuum pipe was still attached to the main train pipe of the leading vehicle. This discovery made it clear that the vacuum brake had been operating on the leading coach only and an examination of the wheels showed a certain amount of scoring which was indicative of some skidding.

10. As already stated, investigation into the marshalling arrangements revealed that the leading B.G. No. 32584 was coupled to the leading T.O. No. 27147 early on Friday morning when Temporary Inspector Smith was on duty. The hose pipes were not, however, connected by Shunter Collard because he said he was told by Inspector Smith that the van was required for brake power only. Inspector G. Sullivan, who took charge during the next shift (7.0 a.m. to 3.0 p.m. Friday) decided to help the afternoon shift by making up part of the 2.0 a.m. train. He noticed from the log book that a B.G. and 4 T.O's. were already standing in No. 7 siding, so he instructed his shunter to remove other loose stock and place a B.C.K. on top of the T.O's. At the end of the shift Sullivan recorded in the log book “B.G., 4 T.O., B.C.K. (7.50 a.m.) —6 vans” in No. 7 siding.

Acting Inspector G. Duffin next took charge at 3.0 p.m. and added more stock, so that the record in the log book at the end of this shift was “B.G., 2 T.O. 8 for 7.50 a.m.—Redbank Tank”. Both Inspectors Sullivan and Duffin said they would have expected to find the B.G. at the bottom end of the siding properly coupled, with hose pipes connected, but neither of them had the train examined because it was not due for despach during their shifts.

11. Temporary Inspector Smith returned to duty at 11.0 p.m. on Friday and when he examined the log book, he noted that there were 11 coaches and a gas tank ready for the 2.0 a.m. stock train. Early on Saturday morning he was asked by the Lime Street Inspector to add a 3-set to the train and he instructed Shunter A. Roberts to place these additional vehicles at the “top” end. When this was done the last coach was standing foul of No. 9 siding, so Inspector Smith told Shunter J. Sefton to draw the train ahead. Smith did not give any special instructions regarding the examination of the train to either of his two “top” end shunters, Roberts and Sefton, or to Collard, the Carriage Shop shunter, who again reported for duty that night. Smith did not appear to be clear regarding responsibility for checking the train. He explained that he would have expected Sefton to do this when he was told to draw the train ahead, but he would have expected Collard to check the train if this movement had not taken place. He also took the entries in the log book as an indication that the 12 vehicles were properly coupled up and vacuum pipes connected.

12. Shunter Sefton said that on Inspector Smith’s instructions he walked along No. 7 siding and told the driver to draw down a coach length. As he walked back he saw all the brakes were off except the hand brake in the van just in front of the gas tank. Sefton released the brake so that the train could draw ahead and after the movement was completed he screwed it on again. He did not examine the train to see that the hose pipes were connected nor did he look at the vacuum gauge in the van which he entered. He explained that he accepted the entry in the log book as an indication that the train had been properly made up and in any case he considered it was Shunter Collard’s duty and not his to examine the train. Collard, on the other hand, said he was shunting in No. 9 siding and had nothing to do with the 2.0 a.m. train that night.

CONCLUSION.

13. There is no doubt that the 2.0 a.m. train left Downhill Sidings with the vacuum operating on the leading coach only. Available brake power, equivalent to 7% of the weight of the train, was quite insufficient to hold it on the 1 in 93 gradient and was not even sufficient to prevent further acceleration until the train reached a speed of at least 40 m.p.h. Primary responsibility resists on Guard Barton whose negligence in failing to test the vacuum before starting was inexcusable. Regulations on the subject are clear and it is vital that guards should be meticulous in carrying out this fundamental duty, on which the safety of trains so largely depend. Barton, who is 35 years of age, has 20 years’ railway service and a clear record.

14. In spite of his adverse comment on the brake, which was probably due to the difficulty experienced in stopping after the first shunting movement, Driver Timmins does not appear to have been at all apprehensive and he made no attempt to test the brake until he was travelling at the maximum permissible speed down the severe falling gradient to Lime Street. His initial difficulty in creating vacuum when boiler pressure was low probably misled him into thinking that the hose pipes were connected throughout the train and no doubt he was lulled into a false sense of security by the guard’s assurance that they were ready to start.
The Regulations, however, rightly lay down that drivers must test brakes in good time when approaching steep falling gradients and Timmins should have done this on leaving the sidings. He should then have noticed the lack of power and with the aid of the guard’s application of the hand brake he should have been able to stop the train before it got out of control. Timmins, who is 56 years old, has been in the railway service for 30 years and has a good record.

15. The initial omission to connect the hose pipes between the first two coaches, though of no consequence with loose stock, remained unnoticed for over 24 hours, during which time the train was progressively marshalled by two other inspectors. When Inspector Smith returned for his next tour of duty he was responsible for despatching the train and he should have instructed his staff to check it; he did not however appear to be clear regarding his responsibilities in this direction.

REMARKS

16. The failure of the shunting staff to couple up and check the train properly before its departure from Downhill Sidings, seems to have been the outcome of regrettably slack methods of working, in which custom rather than rule prevailed, and clear instructions, defining the responsibility of all concerned, appear to be required. This accident, however, would not have occurred but for the coincidence of a much more serious failure on the part of two experienced members of the train crew to comply with the Vacuum Brake Regulations.

17. Neglect by a guard to test the vacuum after the engine has been attached to the train is, I am glad to say, very unusual and the need for strict compliance with this important safety regulation on all occasions needs no emphasis. The running test of the brake is also of special importance for empty stock movements into Lime Street Station and it seems desirable that drivers should be reminded that after leaving Downhill Sidings there is only a short distance available in which to make this test before reaching the steep descending gradient.

I have the honour to be,

Sir,

Your obedient Servant,

C. A. LANGLEY,

Brigadier.

The Secretary,

Ministry of Transport.

APPENDIX

EXTRACT FROM RULE 129:

"Every Guard MUST . . .

(iv) Satisfy himself before starting his train at the commencement of the journey that:

- - - - - - - - - -

(b) all couplings between the vehicles are properly connected.

(c) the continuous brake, where provided, is in working order, and all hand-brakes are taken off".

EXTRACT FROM L.M.R. GENERAL APPENDIX TO THE WORKING TIME TABLES.

REGULATIONS FOR WORKING THE VACUUM BRAKE


- - - - - - - - - -

(b) When the engine has been attached to the train, . . . . . . , the guard or the rear guard where there is more than one guard must see that the required vacuum is registered on the gauge in the rear van and then open the brake valve in this brakevan. If there is an inrush of air he will know that the hosepipes are properly coupled up between this van and the engine. If no inrush takes place, he must inform the driver and also take steps to ascertain the defect, and have it remedied.

If there are vehicles behind the rear brakevan the guard must himself see that the brake pipes are properly coupled up and the rear hosepipe of the last fitted or piped vehicle is on the stop plug."
The guard must see that not less than 17 inches of vacuum is registered on the gauge in his van before giving the driver the signal to start.

(c) The driver must, before starting, satisfy himself that the gauge on the engine indicates the required vacuum.

The driver must accept the signal to start given by the guard, not only as an indication that the train is ready to proceed, but also as an assurance that the hosepipes are properly connected throughout the train and that the gauge in the rear van indicates the required vacuum.

6. Testing brake when running.

In addition to tests laid down in Regulation 3, drivers must also test the brake in good time before reaching their full braking distance when approaching:

(i) Steep falling gradients.
(ii) A terminus.

The speed of the train must be reduced by the test and drivers must enter such stations, or a dead-end bay at any station, at a speed which will enable them to stop the train at the proper place.

Unless the vacuum brake is working properly when thus tested, the driver must whistle for the guard’s hand brake, stop the train, and inform the guard that the vacuum brake is out of order, and that the hand brakes must be relied upon for controlling the train. Special care must then be taken to regulate the speed of the train.

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