MINISTRY OF TRANSPORT

RAILWAY ACCIDENT

Report on the Accident that occurred on 4th July 1969 at Willesden

IN THE

LONDON MIDLAND REGION

BRITISH RAILWAYS

LONDON: HER MAJESTY'S STATIONERY OFFICE

1970

MINISTRY OF TRANSPORT,
ST. CHRISTOPHER HOUSE,
SOUTHWARK STREET,
LONDON, S.E.1.
8th January 1970.

SIR,

I have the honour to report for the information of the Minister of Transport, in accordance with the Order dated 14th July 1969, the result of my Inquiry into the accident that occurred at 23.06 on 4th July 1969, involving an empty parcels train on the Up Goods Loop and an 8-coach electric multiple-unit passenger train on the Up Slow line at Willesden in the London Midland Region, British Railways.

On a warm clear evening as the electric hauled empty parcels train was leaving the Up Carriage line from Willesden carriage sidings, the driver, routed into a short goods loop where he was to await the passing of a passenger train before joining the Up Slow line to Euston, passed at Danger the loop exit signal which had been intermittently in view for about 150 yds and fully in view for a further 300 yds. The locomotive hit the buffer stops at the end of the loop at about 25 m.p.h., bursting them apart and throwing one half of them on to the Up Slow line. It then hit the vertical stanchion of a portal frame carrying the overhead equipment of the Main lines, before coming to rest leaning towards and dangerously near to the top of the retaining wall at the foot of which the Watford to Euston "DC" electric lines run in a cutting some 12 ft below. After destroying the buffers, the parcels train also cut some signal and power supply cables and the compressed air main to an area on the Euston side of the obstructions, with the result that some signals failed and the signalman in Willesden Power signalbox was unable to control the signals and points in that area.

Some 30 to 40 seconds later an 8-coach electric multiple-unit train travelling under clear signals on the Up Slow line at about 70 m.p.h., hit the half buffer, and the damaged cross girder of the portal frame which was partly supported by the catenary wires, and was derailed, coming to rest after travelling a further 190 yds with the front 6 coaches off the track. The half buffer was thrown clear on the left of the track, but the cross girder was dragged some 40 yds, and the other end of it was also sheared from its vertical stanchion, and both the cross girder and the stanchion were left foul of the Up and Down Fast lines and Down Slow line.

Although local telephone connections to the G.P.O. had been cut, the emergency services were called by the Deputy Chief Controller at Euston, and the first ambulance arrived at 23.12. Almost immediately after the accident, however, help arrived from the Willesden Feightliner Terminal and Acton Depot close by, and the police also assisted in the care of passengers. There were about 20 passengers on the e.m.u. train and only one was slightly injured by flying segments of safety glass. The driver, however, was taken to hospital, but was later released. The driver of the parcels train and his guard, who had been travelling in the cab with him, were also taken to hospital, but only the driver was detained overnight.

The accident caused heavy dislocation to traffic. Over 50 Up passenger and parcels trains were terminated beyond Willesden or cancelled on 5th July alone, and the remainder which were worked over the goods lines were delayed. Electric power was restored to the Down Fast line at 08.45 on 6th July, and the Up Fast at 09.15 that day, but power was not restored to the Up and Down Slow lines until 07.45 on 7th July. An accident very similar to this one had occurred at this site on 30th October 1966.

DESCRIPTION

The Track

1. Figure 1 of the plan at the back of this report shows that at the site of the accident, the Main lines to Euston run East and West with the Slow lines on the north of the Fast lines. The 300 yards long Up Goods loop lies to the north of the Up Slow line. A few yards to its north and in a vertical sided cutting lie the DC third and fourth rail electrified lines, and to the north of these lie the City Lines which pass over the DC lines and connect with the Slow lines under a railway bridge and Acton Lane Road bridge. Finally, there is a siding entered from the Up City line just east of the railway bridge. Figure 2 shows diagrammatically the layout of the exit from the carriage sidings on the Up side of the Main lines, the Up departure line known as the Up Carriage line, and two crossovers over the Down City line the first leading to the Up Slow line, and the second leading to the Up Goods Loop. Trap points are provided at the exits to the goods loop with bent rail buffer stops 160 ft beyond the loop exit signal WN 102.

2. There is a rising gradient of 1 in 943 and 1 in 550 on the Up Carriage line, and this continues over the first 100 yds of the Up Goods Loop, but the remaining 200 yds of the Loop falls slightly at 1 in 3,300. All these lines, except the DC lines are electrified on the 25 kV overhead system.

The Signalling

3. At the time of the accident the first colour light signal on the Up Carriage line was a 3-aspect signal WN 65 269 yds before 3-aspect signal WN 79 controlling the exit from the sidings. WN 79 carried a position light subsidiary signal with a stencil type indicator reading SDG to the Up City siding, and a large theatre type route indicator reading "C" to the Up City line, "G" to the Up Goods Loop, or "S" to the Up Slow line. Neither signal WN 65 nor WN 79 were approach controlled. On leaving the Up Carriage line

the first signal to come into view was WN 98 on the Up Fast line and then WN 96 on the Up Slow line. Both signals were carried on a gantry 220 yds east of the second bridge. A driver got his first view of the goods loop exit signal, WN 102, from a point some 28 yds past signal WN 79, but because of interruptions of his view by the stanchions carrying the overhead-line equipment, signal WN 102 could be seen for only 33 yds after which it was lost to view for 5 or 6 yds, partially in view for some 34 yds, and finally fully in view for the remaining 317 yds as the locomotive cab negotiated the crossover leading into the loop itself.

4. Willesden Power signalbox is situated beside the Up City siding 27 yds east of the gantry carrying signals WN 98 and WN 96, and about half way along the Up Goods loop. The main entrance to the signalbox faces away from the railway but can be approached through a car park, via steps leading from the side of the railway.

5. The Siemens General Electric "Entrance-Exit Combined" type console, which was installed in 1965, is on the second floor, and is divided into two sections called the North and South Panels (south being the Euston end) and controlled by two signalmen who work with their backs to the railway. There is no direct window on to the lines, but corner windows can be approached round the ends of screens designed to keep direct light off the panel.

6. The south signalman controls the railway from the boundary with Euston Power signalbox, the last signal of which on the Down Fast line (EN 209) is situated $4\frac{1}{4}$ miles from the Willesden signalbox. The first Willesden signal on this line is automatic signal WN 221, and this is followed, in the direction of travel, by a Repeater WNR 181, two controlled signals WN 181 and WN 163 and a further automatic signal WN 218. The remaining signals are:—

Replaceable Automatic signal	WN 215	1,155 yds from WN 218
Controlled signal	WN 146	733 yds from WN 215
Controlled signal	WN 112	1,024 yds from WN 146 and some 500 yards from the signalbox.

(WN 215 controls the entrance to Kensal Green tunnel.)

Similar signals are provided on the Down Slow line, except that the signal opposite WN 215 is a controlled signal.

7. At the top of the panel lie switches for the manual control of points, each having a lamp which flashes when the points are lying other than for the set route. The south signalman has a panel of lamps on the end of his main panel which flash indicating that a signal filament has failed. There are four rows of eight lamps and the fifth lamp in the third row flashes if any filament or complete lamp failure occurs in the group of signals numbered 109, 112, 121, and 123. Below this panel lie the Fast and Slow line emergency bells to Euston, and telephones with connections to the GPO lines.

8. The 650-volt 50 cps power supply to the signalling in the area on the Euston side of the site of the accident is carried by a cable lying in the same concrete conduit as the signal control and telephone cables, and the point motor compressed air supply pipe, which runs beside the Up Goods Loop and then beside the Up Slow line as indicated in Figure 1. The power cable is a spur supplied from a point on the ring main near the signalbox, and it delivers power to groups of signals through junction boxes. The other end of the spur is connected to a fused switch in Willesden South relay room which lies about midway between signals WN 146 and WN 112 beside the Down Fast line. This switch was provided for emergency use only and was open at the time of the accident. BR Type automatic warning system equipment (AWS) is fitted to all main line signals, but there was none on the Up Carriage line or on signal WN 102 on the Up Goods Loop.

The Trains and Damage caused by the Accident

9. The empty parcels train was the 5G78, 22.59 from Willesden carriage sidings to Euston. It consisted of 6 empty bogie parcels vehicles weighing $191\frac{1}{2}$ tons, and was hauled by Class 85 electric locomotive No. 3084 weighing 80 tons which was fitted with the Westinghouse two-position pedal-operated driver's safety device. The calculated braking curve for such a train shows that, on level track, it can be stopped when normally braked in 233 yds from 30 m.p.h., in 167 yds from 25 m.p.h., and in 67 yds from 15 m.p.h. It was 412 ft long overall. The impact with the buffer stops and overhead line equipment stanchion badly crushed the front of the driver's cab, particularly on the offside which hit the stanchion. The driver's controller and desk were forced forward, the locomotive's underframe was twisted and the left-side buffer was torn from its mounting. The leading bogie of the first parcels vehicle was also damaged and the locomotive and this vehicle being beyond the destroyed buffer stops were derailed as was the leading bogie of the second vehicle. The locomotive and both these vehicles came to rest leaning towards the near (cess) side.

10. The passenger train was the 2A86, 22.13 from Bletchley to Euston consisting of two 4-coach AM10 Class Electric multiple-units, each consisting of a brake driving trailer leading, followed by a motor coach, a trailer coach, and a driving trailer in the rear. The train which was 530 ft overall wighed 322 tons. The leading cab's offside driving windows and part of the roof were badly damaged and the destination indicator was ripped from its mounting. Offside windows were also broken in the partition behind the driver's cab and at the forward end of the first passenger compartment and in the first interior partition in this com-

partment; and there was an overhead line insulator complete with its pulley on the floor in the central gangway near this last partition. Underfloor equipment was damaged and there was external damage to the front 6 coaches which were all derailed and both pantographs on the train were badly damaged. Trials with AM10 Class units have shown that on level track they can stop in 650 yds under emergency braking from 70 m.p.h., and in 720 yds when normally braked from that speed.

11. The overhead line equipment portal frame which was destroyed was structure GO/5/161 but, in addition, the overhead line equipment over the double junction as well as that over the loop line was destroyed. About 150 yds of the concrete troughing was damaged from a point near the destroyed buffers, and there was considerable damage, not only to the signal power-supply cable and signal control and indication cables, but also to the point motor compressed air main which was fractured in 9 places.

Evidence

12. *Permanent Way Supervisor J. R. Smith* of Willesden was at South Hampstead carrying out maintenance work when, at about 23.15, he received a telephone call from Willesden Power signalbox that there had been an accident. On reaching the site at about 23.50, and after discussing with the Assistant Area Manager the need for hand signalmen, he went to examine the track. He told me that he could see that the stretcher bar of points 369A leading from the Up Slow to the Up Fast line had been run over and badly bent pulling in both switches, breaking the left hand blade and badly bending the right hand blade. He saw the cross girder of overhead line structure GO/5/161 suspended from the overhead wires at the end nearest the Up Slow line at a height so that he could just walk under it, where it was against the 7th car of the electric multiple-unit train, and he saw that the other end had been torn from the top of the mast on the Down Fast cess and had been swung round as shown on the plan at the back of the Report and was lying on top of the Down Fast track. The mast was bent and twisted and was also lying over this track and the six foot. In examining the Up Slow line he found the first mark of a derailed wheel opposite the buffers before coming to the damaged switch blade, and in his opinion the buffer stop had caused the initial derailment of train 2A86.

13. *S. and T. Inspector C. H. Humphrey of Willesden* arrived at the site at 00.15, when he proceeded to check the signalling equipment involved. He saw that signal WN 102 reading from the Up Loop to the Up Slow line was displaying a good Red aspect by its primary filament, and that the trap points No. 368A at the end of the loop were in the normal position, fitting well and not damaged. The trailing end of these points No. 368B in the Slow line was also undamaged, but he noticed the damage to No. 369A facing points as described by Supervisor Smith.

14. He saw that signal WN 96 immediately approaching the site on the Up Slow line, and signal WN 79 at the exit from the Up Carriage line and signal WN 65 preceding it were also showing Red aspects. He tested the lamp voltage in WN 79 and found it exact, but it was not possible to carry out any further checks at that time and he was not able to check the route indicator. He told me that in examining points 368A he saw that the track circuit interrupter there had been run-over and broken and that this would have been the first thing to replace signal WN 96 to Danger.

15. I visited the site on the afternoon of 7th July and tested the route indicator at signal WN 79, and found that two of the lamps had failed as indicated in figure 3. On the night of 16th July I again visited the site and found one of the lamps, the left hand one, still failed. Mr. Humphrey told me that signal lamps are checked monthly and had last been checked on 17th June. When questioned about the failure of the two lamps he said that they had not been reported prior to the accident, but that on being told about them he had given instructions that they should be replaced, and had been told that this had been carried out. He added however that he did not think the absence of the two particular lamps affected the outline of the letter "G".

16. *Mr. J. W. Woolvett, Divisional Maintenance Engineer*, produced extracts from the log for the 4th July of the Electric Control Room at Willesden, which show that in the minute following 23.05 eleven oil circuit breakers tripped on fault and were left open, and at 23.06 the Area Controller Willesden reported an accident in the vicinity of Willesden Power signalbox. They also show that a further circuit breaker was opened at 23.07 to complete the emergency isolation between Euston and Headstone Lane.

17. *Area Controller C. Thomas, Willesden*, arrived at Willesden signalbox to take over his turn of duty at 22.45. The situation immediately before the accident was that a light engine was standing at WN 97 on the Down Slow line; the 22.13 Bletchley passenger train was approaching on the Up Slow line with all signals at Green; and the empty parcels train was proceeding from the Up Carriage line being regulated to follow the Bletchley train. At approximately 23.08 he was distracted by a vivid flash and he went to the south corner window and saw that the parcels train was partly derailed with the locomotive leaning to the near side and that the passenger train was at a stand. He said that on looking at the panel all track circuits at the south end of the panel showed occupied, and a considerable number of points were flashing indicating "out of correspondence" from which he interpreted that the signalling equipment had been damaged by the mishap. He then returned to his desk and advised the electric control room and asked for emergency isolations, and then spoke to the signalmen at Euston, Watford and Queen's Park 3 signalboxes (in that order) asking them to hold back traffic. He then spoke to the Deputy Chief Controller in Euston Control office and gave him the details of the accident although he admitted that he did not specifically request the ambulance and

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other emergency services to be alerted. He told me that he had completed these calls between 23.20 and 23.25 when the guard of the passenger train came into the box and said that ambulances had arrived and that staff from the Freightliner Depot and Acton Lane Depot were dealing with passengers.

18. On being questioned as to the exact time of the first flash from the overhead line equipment Thomas said that he had not looked at the clock until after he had done two or three jobs which had taken him 3 or 4 minutes. In giving his evidence Thomas spoke as a signalman (he had been one for over 15 years) but he agreed that he had not gone over to the panel to examine it closely, and he could not definitely say which signals were indicated as being alight and which signal lamps were out. He admitted that it was his responsibility to call ambulances.

19. *Signalman C. A. Tompkins, Willesden,* said that he took over the South panel at 21.40. At 23.00 he had set up a route for the electric multiple-unit passenger train over the Up Slow line as it was leaving Harrow and he saw the signals clear properly for it. As it approached he received a description from Willesden high level sidings shunting groundframe for empty parcels train 5G78 and he set the route from WN 65 to WN 79 signal on the Up Carriage line. As the passenger train was passing WN 35 signal at Brent, he saw the parcels train occupy the track circuit at WN 65 and to avoid stopping it there he set the route from WN 79 to WN 102 on the Up Goods Loop, and he saw signal WN 79 change to the "off" indication as he did so.

20. He told me that all the windows in the signalbox were open and he could hear the trains passing and had the impression that a passenger train was slowing down. On going towards the window, however, he saw the empty parcels train accelerating on the loop and the passenger train running normally and almost immediately there was a terriffic flash and he thought that the parcels train had "pulled down the wires". He then saw its tail lamp some distance up the loop and knew that it must have gone through the buffers. He hurried back to his panel and called out to Area Controller Thomas what he had seen. He went on to say: "A number of track circuits were showing occupied, point indications were flashing, and signal post telephone indications were illuminated. I operated the emergency replacement button for signal WN 215 for an express which was approaching on the Down Fast from Euston. I should get a Red aspect in the signal when I operate the emergency buttons but on this occasion there was no indication at all. I then saw that the next signal on the Down Fast WN 146 was already showing a Red indication."

21. He then ran downstairs and out on to the track, and Technician Norman followed him towards the rear of the empty stock train. He went about 4 vehicles up the train and met the guard of the train bleeding and in a dazed condition. He said that he could see the overhead line equipment lying across the Up and Down Slow lines, but it was too dark to see the Up and Down Fast lines, and he did not see any obstructions over the line. As he could see the locomotive leaning towards and hanging over the DC lines he brought the guard back with him towards the signalbox, but before doing so he asked Technician Norman to check that the ambulance was called. He stopped at WN 101 signal on the Down City line to halt DC line trains but the telephone was dead, so he returned to the signalbox.

22. On getting back to his panel, he first spoke to the Area Controller in Euston signalbox about stopping traffic on the DC lines, and then saw that the Down express train (IS29) had stopped at WN 215 signal. The light engine was still standing at WN 97 signal, and he could see that the North panel signalman had stopped an Up express (IM46) in the Watford area, and a parcels train (4G08) on the Up Slow line (following the electric multiple-unit train) at signal WN 35. At about this time the driver of the Down Fast express telephoned from WN 215 signal to say that the signal was Red, and Tompkins estimated this to be within some 8 minutes of the accident.

23. On being questioned on the order in which he had replaced signals, and on their aspects on the Down Fast line, he said that he had first made sure that the signals nearest Euston (WN 181 and WN 163) were at Danger, had then replaced signal WN 215 to Danger ahead of the express but had received no indication, and had then seen that WN 146 and WN 112 were both showing Red; but on being interviewed on 16th July, and faced with the electrical evidence, he agreed that signal WN 112 and other signals in that area were probably showing no indication at all.

24. *Station Supervisor R. H. Cadwell,* Broad Street, arrived at Willesden Junction station at 23.01, where he had to change trains on his way home. At precisely 23.06 (he always checked his watch with the station clocks at Willesden) while on his way from the High Level station to the Low Level station he heard a bang and 30 to 40 seconds later, a second bang from the direction of the accident where he saw a cloud of dust. He went along the DC lines and above them he saw the derailed electric locomotive and parcels vehicles. He climbed the bank by which time it was 23.10, and found passengers alighting from the passenger train, but as there was still some arcing from the pantograph above one of the coaches he advised them to stay in the train until advised to leave by railway staff. On his way to the rear of the passenger train on its near side he met the guard (Guard Gladen) and asked him if he felt all right and Gladen said that he was going back to protect. On his way he did not see any structures down.

25. *Driver A. C. Weeds, Willesden,* booked on duty at 16.30 on 4th July having booked off duty at 00.30 that morning. He was rostered to work a turn involving walking to Willesden carriage sidings to prepare an electric locomotive and work a set of empty stock to Euston. He then relieved the driver of AL5 electric locomotive No. 3084, which had hauled the Up Pullman from Liverpool and which was standing in platform 6, at 20.15, and after the Pullman stock had been cleared used the engine to work another set of empty

coaches from Euston to Willesden carriage sidings, whence he was to work single manned the 22.59 empty parcels stock train 5G78 back to Euston.

26. He said that the windscreens of the locomotive were dirty, and because no windscreen washer was fitted he fetched some water, and with the help of Guard Shaw who had joined him, he flicked water onto the outside of the windows while the guard worked the wipers from inside the cab. He said that when they had finished the windscreen was smeary and not as clean as it should have been, but he added that it was all right and that he had worked with worse before. The alternative was to have taken the locomotive to the washing plant which he thought was unnecessary.

27. After carrying out the brake test he allowed the guard to rejoin him in the cab, and they left the sidings on time. It was a warm night and he drove with his side window open. They were chatting as they approached signal WN 65, which was showing a Green aspect. He had worked the same train the previous night (3rd July) also with Guard Shaw and on that occasion had been given an "S" route indication at signal WN 79 signalling him directly onto the Up Slow line; and on 4th July he had handled his train from signal WN 65 in exactly the same way. He said he had about 20–25 per cent power on the controller because he did not want to pick up speed too quickly over the 15 m.p.h. crossover, and when he judged that he was clear of it he notched up as he had done on the previous night, and he was still accelerating when as he put it "the Goods loop signal (WN 102) came into my eye". He admitted that he was then right on top of the Red signal when he regained full concentration. He said "From somewhere before signal 65 until the time I passed 102 at Danger I was not conscious of it. I was fully physically conscious but I was not absolutely with it doing the job. I did not read signal 79 absolutely consciously, and I do not think I read signal 96 (on the Up Slow line) consciously. But I do feel that it is possible that the Green one in 96 may have given me the OK, having previously made the mistake at 65. This is my feeling. I do not say that I read any signals before 102 or after 65 with full consciousness". He said that Guard Shaw had not repeated any signal aspects to him either.

28. He said that when they passed signal 102 they were not talking, but earlier he had been talking to the guard, who was sitting in the secondman's seat, about whether tobacco was good for the health or bad. On being questioned he agreed that signal WN 79 had been at Yellow and that the route indicator had been showing "G" but at the time it had not registered. He could not remember if any of the lamps in the route indicator were out, but he was satisfied that it was showing a Good "G" and had shown a good "S" the previous night (one failed lamp was common to both letters). When asked if the sounding of the automatic warning system horn in his cab as he was entering the Goods Loop and passing signal WN 96 on his off side, would have brought him to his senses, he replied that it certainly would have, and that he could easily have stopped in time had he been given such a warning. (It is not agreed policy to provide AWS on such loops.)

29. Driver Weeds, a single man, had joined the railway as a cleaner in 1949, and became a fireman at the end of 1954. He was promoted driver on 11th December 1961 and told me that he had been driving between Willesden and Euston all of that time, and knew the route very well indeed. During the previous 28 days he had first been rostered on normal day work which had ended at 12.10 on Saturday, 7th June. He next started a turn of late duty at 19.18 on 8th June for 6 days, which was followed by a rest day on 14th June, and a further 4 days of early day work. He was off duty on the 20th and 21st June and began a late night shift at 22.45 on 22nd June for 2 days, followed by a rest day and a further 4 days of late night shift. He had a further rest day on 29th June and then changed to the early night shift at 16.00 on 2nd July, which was his shift at the time of the accident.

30. He told me that he had his normal sleep after booking off at 00.30 that morning and was in good health physically. He had however had rather an upsetting week and had been irritable for the last two days. He had been upset because he had become involved in a personal problem concerning friends of his and it had caused him some concern. He had cooked himself a meal at mid day and had not drunk anything nor taken any pills. He described himself as an easy-going person rather than a worrier. He said that he had only worked with Guard Shaw once before and that was on the evening prior to the accident. His only recollection after the accident was that a colleague driver who lives close by was supporting him and telling him that the line had been protected.

31. *Passenger Guard J. Shaw*, told me that he joined Driver Weeds in the sidings at about 10.35 and found him washing the locomotive windows, at which he helped by operating the cab wipers. He carried out a brake test and got 21 inches of vacuum on the gauge, and then returned to the driving cab because, he said, he was under the impression that he was expected to perform the duties of secondman when working from Willesden sidings. (I have been assured that there were no special instructions to this effect, and that Shaw should have been travelling in the brake van on the train). He said that when they left the sidings the secondman's window was still covered with what appeared to be a dirty yellow film, although the driver's window was cleaner.

32. He told me that they left at 22.57, 2 minutes before booked time and he thought they got Yellows at signal WN 65 and WN 79, and at the latter the route indicator read "G". He could not remember what aspect the signals on the Up Fast and Slow lines were showing, nor could he remember if he and the driver had been talking. He was also quite definite that he had not seen signal WN 102, and suggested that this could have been because of the dirt.

33. He said that after the accident, the driver told him to get out, but as he could not open the offside cab door he climbed out through the driver's side window. He then went back to the brake van in the leading vehicle to collect his detonators. He had left his lamp in the locomotive and he had forgotten to collect his track circuit operating clip from the brake van, but he was very dazed as a result of the accident and was bleeding from a cut over one eye. The next thing that he remembered was meeting Signalman Tompkins.

34. He had been a guard for 30 years and a passenger guard for 3 years. Although he had been instructed in the use of track circuit operating clips he said that he had never put one on a line even in training. He said that the only time he had worked with Driver Weeds before was on the previous night, and on that occasion he had also travelled in the driver's cab.

35. *Driver R. M. Kiloh, Euston*, was driving the 22.13 electric multiple-unit Bletchley to Euston train which was scheduled to call at all stations, and left Harrow on time. He was travelling on the Up Slow line at about 72 m.p.h. when he passed signal WN 58 showing a Green aspect and was looking for WN 96. He told me that WN 96, being beyond the overbridges, is not sighted quite so early as are the other signals in the open, and his first sighting of it was when the railway started to bend to avoid the buttress of the bridge, when it was at Red. He thinks he stood up either to see the signal or on seeing it, and then made a full emergency application of the brake, and let the driver's safety device go. He also got the automatic warning system horn for this signal and cancelled it thinking that the signal might have been replaced in error or by failure. He then remembers something hitting the glass in front of him and instinctively putting up his hands to protect his face. They then hit something really hard which seemed to be on the nearside, and he was thrown to the floor and braced himself until the train came to a stand.

36. He said that he pushed the destination indicator from him, and in a dazed condition got out of the nearside door because the train was tilted that way. He heard somebody he took to be a passenger asking if he was all right and then realized that he had to protect the train, and took a track circuit operating clip from his cab and put it down on the Down Slow line. He then told me that, leaving his detonators in the cab, he made his way back along the nearside of his train to find his guard, by which time several passengers were on the track and "railwaymen seemed to appear from everywhere". He checked with the guard on the question of protection, but he (the guard) had already been assured that the traction current had been cut off, and by this time ambulances had arrived.

37. *Passenger Guard A. G. Gladen, Euston*, had booked on duty at Euston at 17.20, and had worked two trains to Bletchley and back to Euston, and was on his third return journey at the time of the accident. He said that they left Harrow at 23.00 on time and he had just sorted the mail in the brake van of the 6th coach for unloading at Euston and was on his way back to his compartment when he felt an emergency brake application and was thrown on to the mailbags. After some jolting and rolling the train stopped and he got up, gathered his detonators and lamp and tried to get out of his offside door. He found this impossible because an overhead line equipment gantry was hanging right outside the van door so he got out of a nearside door and went forward to meet his driver who told him that he had placed a track circuit operating clip on the Down Slow line. He then went back to protect his rear and on the way met a man who told him that he was a signalman and that all lines were protected. At the back of his train he had to step over overhead wires which were lying across the rails, and he told me that opposite the door through which he had first tried to get out he had seen wires all over the place. Before reaching the next signal in rear, however, he came to the signalbox and went up to make sure that the lines were protected.

38. There had been about 20 passengers on the train but when he got back they had all been cleared by an Inspector from Acton Lane sidings. He then met his driver again and shortly afterwards the police, and he asked them to look after the security and clearance of his mailbags, after which he was taken to Euston station by road. He admitted that he did not take his track circuit operating clip with him because he had forgotten it in his hurry. Gladen was nearly 62 years old, and in 46 years railway service this was his first accident.

39. *Driver B. Morgan, Cambridge Street*, was travelling in the front coach of the electric multiple-unit train on a left side seat facing forwards. There were only two other passengers in the coach in front of him and they were a young couple who were travelling with their backs to the direction of travel on the other side. Just after coming under the bridges at Willesden he saw a lot of flashing which he did not think came from his train but from something in front on the left hand side and he then felt a severe brake application, which was followed by a bang at the front and segments of safety glass showering in when he dived to the floor for protection. After coming to a halt the lights in the coach stayed on and he found the door beside him open and someone on the outside helped him down. He told me that he did not see the overhead line equipment insulator and pulley wheel which had broken the four windows, and he did not think that the young couple, over whose heads it must have passed, were injured.

40. *Driver N. Nelson, Stratford* (*Eastern Region*), was the driver of the light engine which was standing at signal WN 79 throughout the period of the accident. After the passenger train had passed him he saw a flash and noticed the overhead equipment swaying, so he telephoned the signalman and was told to stay where he was in case he was needed. He saw that signal WN 96 on the Up Slow line was at Danger, and that the overhead line equipment on this line had been damaged. Later he telephoned again and was told of the derailment. He did not notice the aspects of either of the Fast line signals on the gantry, neither did he notice that the overhead line equipment on the Fast lines was damaged. He stayed at the signal until 01.20

41. *Mr. L. R. Insley, Divisional Signal and Telecommunications Engineer*, had a study made of the probable signal aspects and indications immediately after the accident, as a result of the damage that his technicians had found in the conduit referred to, and which are shown in figure 2. In his opinion signals WN 112 (Down Fast), WN 109 (Down Slow), WN 123 (Up Fast) and WN 121 (Up Slow) would have been showing no indication. As a result signals WN 146 and WN 145 (Down Fast and Slow) would have been replaced to Danger, as well as Signals WN 98 and WN 96 (Up Fast and Slow). Signal WN 96 however had already been replaced to Danger by the destruction of the track circuit interrupter at points 368A. It was also his opinion that all track circuits on all four lines from a point beyond signals WN 112 and WN 109 (in a Down direction) up to the scene of the accident would have been indicated in Willesden Power signalbox as being occupied.

Evidence as to the Weather

42. In view of the possibility that a sudden onset of hot weather had contributed to Driver Weeds' lack of concentration, I asked the London Weather Centre to provide the maximum and 22.00 temperatures for the four days prior to the accident. On the 4th July the maximum had been 26·3° C (79·3° F) and at 22.00 BST it had been 20·8° C (69·4° F) and temperatures during the previous three days had been very similar.

The Previous Accident

43. On 30th October 1966, General Manager, London Midland Region, reported an accident which had occurred on the Up Goods Loop at 19.28, on 30th September 1966. The accident involved the 19.18 empty passenger coaching stock train of 10 coaches of 342½ tons hauled by electric locomotive E3011. It was dark at the time, and rain was falling and there was a slight mist. After passing signal WN 79 the driver saw ahead signal WN 96, at Green, and mistakenly accepted this as applicable to his train and did not realise his error until he had hit the buffer stops at the end of the loop, having passed signal WN 102 at danger. The train demolished the concrete stop block which was at that time provided, and brought down overhead structure G/105/161, coming to rest with the locomotive and two coaches derailed in the earth beyond the stop block. At this time the 18.55 parcels train from Hemel Hempstead to Euston composed of two vehicles hauled by electric locomotive E3171 was approaching on the Up Slow line and struck the displaced overhead structure, severely damaging the locomotive. Responsibility for the accident was placed solely with the driver of the empty coaching stock train for not maintaining a proper look out.

Conclusions and Discussion

44. The cause of the accident was that Driver Weeds drove his train past signal WN 102 at Danger. That he did so was, by his own admission, the result of his lack of concentration at his driving task. He gave his evidence openly and honestly, and made it quite clear that from the time he passed signal WN 79 until he was a few yards short of signal WN 102 he allowed himself to lose concentration. He was also at fault in allowing his guard to remain in the driving cab with him, when he should have been travelling in the brake van in the train. Guard Shaw although he claimed that he was supposed to be acting as secondman and was sitting in the secondman's seat in the driver's cab, was paying little attention to the signalling and did not even notice the aspect of signal WN 96 showing a Green aspect which passed his cab on the offside only a few feet from his cab window.

45. The signalling was well up to the standard required for the exit from a siding. Because of the heavy traffic carried, two three-aspect colour light signals had been provided in place of ground position light subsidiary signals, and this last section of the line should therefore be taken to be of the same signalling standard as a Goods line. At the time of the accident two lamps in the route indicator had failed, but I am satisfied that Weeds nevertheless received a reasonable "G" indicating that he was routed into the Goods loop, and was not misled by this indicator.

46. That signal WN 96 on the Up Slow line comes strongly into view shortly after passing the Up carriage line exit signal WN 79, when signal WN 102 at the exit from the loop is partly hidden by stanchions, is more likely to have contributed to Weeds' error. He had already made up his mind that he was routed via signal WN 96 and was not therefore looking for WN 102 even when it came clearly in view and he had passed, on the wrong side, WN 96.

On the protection of the line

47. By their quick decision to protect all the main lines, Area Controller Thomas and his signalman prevented what might have been a more serious accident involving the express train on the Down Fast line. I am satisfied that Tompkins had done all that he could have done to protect the obstructions on this line, but I believe that when he left the signal box to go down to the trains, he thought that both signals WN 112 and WN 146 were at Danger, and that signal WN 215 had failed; whereas signal WN 112 had in fact failed and WN 215 was at Danger and it was only this signal's indications to the signalbox which had failed.

48. Driver Weeds and his guard were too shocked to play much part in the protection of the lines. Driver Kiloh in the passenger train however, although he was dazed by the collision, was the only man to place a track circuit operating clip quickly on a line, but contrary to British Railways Rule Book 1950 Rules 178(a) and (d), he failed to follow this up by going to meet his guard along the offside of his train and thus failed to see the cross-girders obstructing both Fast lines. His guard having seen the obstruction blocking his offside brake van door chose to go forward to meet his driver also on the nearside, and contrary to the

same rule when they met, said nothing of the obstruction. He also omitted to place a track circuit operating clip on the Up Fast line.

49. On his way back to protect his rear Guard Gladen came opposite the signalbox before coming to the first signal, but it must then have taken him a full minute to cross the City lines and the siding and go round to the signalbox door and up to the second floor operating room, a time that could, in my view, have been better spent going the 40 or 50 yds to signals WN 96 and WN 98 to ensure that they were displaying danger aspects, placing detonators at those signals, and then communicating with the signalman by means of the signalpost telephone as is required by Rule 179(j) as amplified by the London Midland Region, and Rule 180(b).

50. Driver Nelson of the light engine, when he saw the flash and the overhead line equipment swaying telephoned immediately, and obeyed his instructions to await further orders.

51. The track circuits on the Fast lines may have been "dropped" by contact with the overhead line equipment, but it is possible that the panel indications were due to cable faults at the scene of the accident. The protective arrangements inherent in multiple aspect signalling when coupled with the automatic warning system are extremely good. If a track circuit is operated by an obstruction, signals in its rear are immediately put to Danger and Caution aspects and, at each, audible warnings are given in the driver's cab of any approaching train. If a signal's power is cut off, the signals preceding it are automatically put to Danger and Caution in the same way, and audible warnings are given at the failed signal as well as at the preceding signals. The train crews concerned in this accident appear to have assumed that because of the many railwaymen present so soon after the accident, further protective measures were unnecessary. There is one situation that is however very dangerous, and that is when a route has been set up by a signalman, and that route is obstructed without the track circuits being operated and the signalman does not put the signals back to danger. The situation can only be guarded against by the train crews promptly carrying out the appropriate protection rules which do cover this aspect. The train crews involved cannot immediately have known what action the signalman had taken, yet only one man used his track circuit operating clip, and the remainder left them in their cabs or guards vans. I am however concerned at their lack of immediate response, not because their failure endangered the situation which the signalmen happily had under control, but as a matter of training and safety in the future.

On passing Signals at Danger

52. The number of accidents due to drivers passing signals at danger appears to be diminishing. The average number for the years 1966 to 1968 was a little over 18 accidents per year, whereas that for 1959 to 1961 was 48 per year. Nevertheless such accidents are always potentially dangerous. Loss of concentration has been a common cause of many of these accidents and there are several factors which are known to contribute to it. The fact that Driver Weeds had been talking to his guard on a subject not connected with his driving task was, I consider, the main factor which led to his loss of concentration. I do not think that worry over his friends' problems was a significant factor as his mind was probably concentrated on the subject of the conversation.

Recommendations

53. In view of the fact that there have been two almost identical accidents at this busy exit line, several modifications to the carriage line exit signal WN 79 were discussed. Firstly an approach control applied only when the signal reads to WN 102 on the goods loop was considered, holding WN 79 at danger until it was closely approached by a train. Secondly it was suggested that the letter "G" in the route indicator, which can be confused with the letter "C" (to the City line) and "S" (to the Up Slow line) should be replaced by the letter "L" reading to the loop. Thirdly, the provision of AWS at signal WN 79 was discussed. However, I am glad to be able to report that it has been decided that the goods loop shall be removed completely, which of all the solutions is the best.

54. The value of the track circuit operating clip should, in my view, be stressed even more than at present during initial and periodical training of train crews. All trainmen should place clips on a line at least once during this training, not because it is difficult, but so that when faced with the need to put down a clip in emergency, they will at least have done so once before and will know what is involved.

55. It is the British Railways Board's policy to fit windscreen washers to all new main line locomotives, and all Class 86 locomotives have been so equipped. In my view they should be fitted to all other main line locomotives also, including the Class 85, one of which was involved in this accident.

I have the honour to be,

Sir,

Your obedient Servant,

A. G. TOWNSEND-ROSE
Lieutenant-Colonel

The Secretary,
Ministry of Transport.

(133299) Dd. 500143 K9 3/70 Hw.

COLLISION AT WILLESDEN ON 4th JULY, 1969

FIG. 1
GENERAL PLAN SHOWING SITE OF COLLISIONS

FIG. 2
SIGNALLING PLAN
NOT TO SCALE

PROBABLE EFFECT OF CABLE DAMAGE (SEE PARAGRAPH 41).
FI = POINTS FLASHING OUT OF CORRESPONDENCE.
NO LIGHT = SIGNAL LIGHTS PROBABLY EXTINGUISHED.
RED = SIGNAL PROBABLY RED.

FIG. 3. (PARAGRAPH 15 REFERS).
WN 79 SIGNAL ROUTE INDICATION

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