



MINISTRY OF TRANSPORT

RAILWAY ACCIDENT

REPORT ON THE COLLISION

which occurred on

23rd January 1963

near

SEVEN KINGS STATION

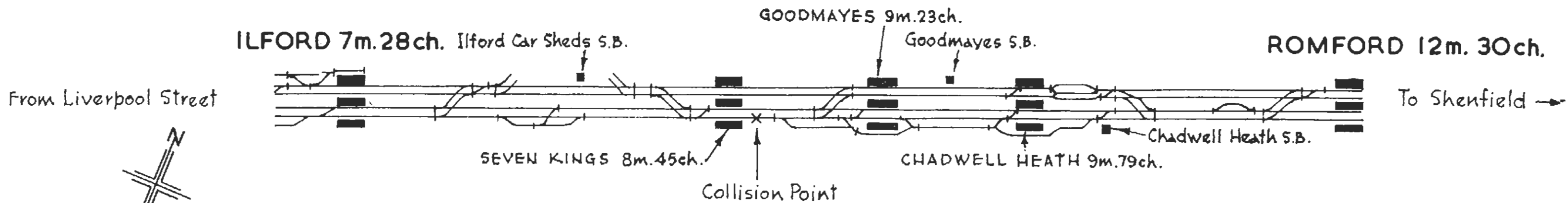
in the

EASTERN REGION  
BRITISH RAILWAYS

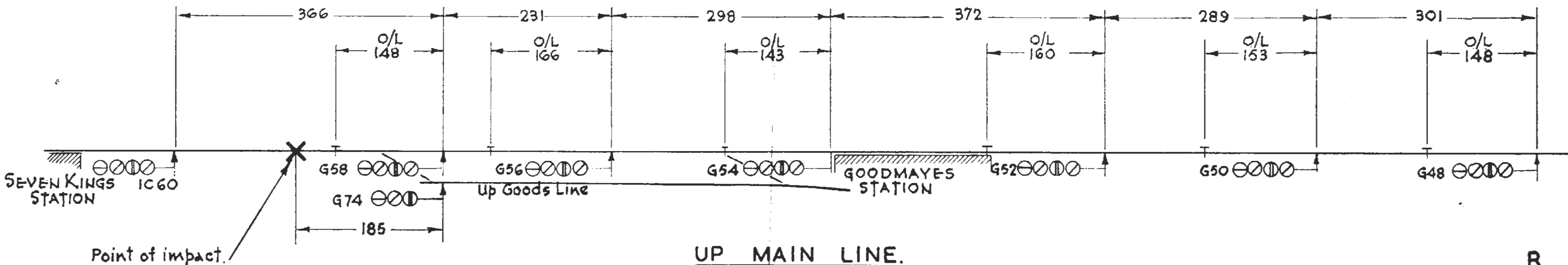
LONDON: HER MAJESTY'S STATIONERY OFFICE  
1963

ONE SHILLING NET

# COLLISION NEAR SEVEN KINGS STATION.



KEY DIAGRAM.



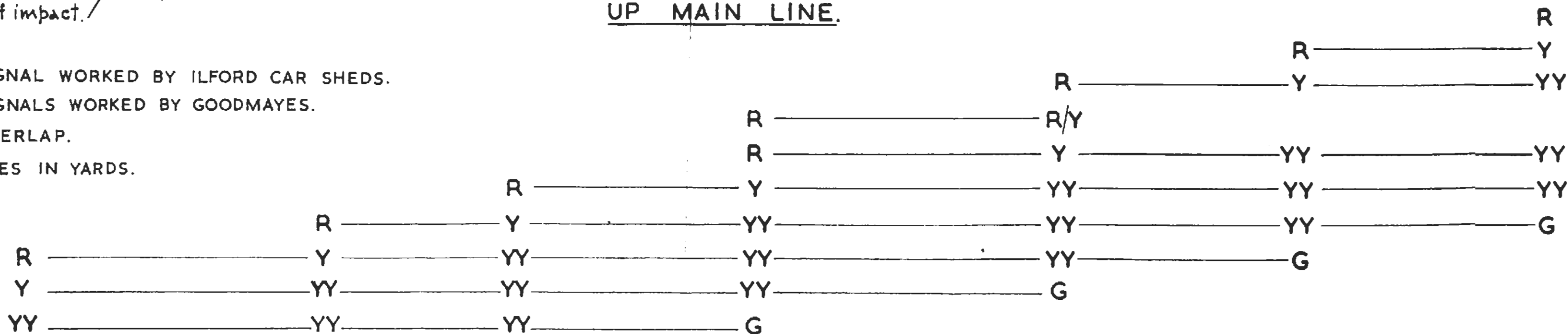
UP MAIN LINE.

IC DENOTES SIGNAL WORKED BY ILFORD CAR SHEDS.

G DENOTES SIGNALS WORKED BY GOODMAYES.

O/L " OVERLAP.

ALL DISTANCES IN YARDS.



SIGNAL SEQUENCE DIAGRAM.

SIR,

I have the honour to report for the information of the Minister of Transport, in accordance with the Order dated 25th January 1963, the result of my Inquiry into the overtaking collision between two passenger trains that happened at about 12.54 p.m. on Wednesday the 23rd January near Seven Kings Station in the Eastern Region, British Railways.

The 7-coach Up express passenger train from Parkeston Quay to Liverpool Street (the Scandinavian Boat train) overran the signal at Danger in rear of the 12.2 p.m. electric train from Southend (Victoria) to Liverpool Street which had been stopped at the Home signal for Seven Kings station, and collided at fairly slow speed with that train. Six passengers in the electric train and one in the Boat train were slightly injured, but the guard of the latter train received more serious injuries, fortunately not fatal. Rescue and recovery arrangements were made promptly and the lines were re-opened for traffic at 4.45 p.m.

An examination of the Boat train after the collision revealed a blockage in the vacuum pipe at the leading end of the third coach which had prevented the brake working on the third to seventh coaches and had been to some extent the cause of the train failing to stop when the driver attempted to brake it in the usual manner.

The day was fine with a slight haze, but very cold with the temperature at about 15—20° F; the ground was snow covered.

#### DESCRIPTION

##### *The Site and Signalling*

1. The collision took place on the Up Main line between Goodmayes station,  $9\frac{1}{4}$  miles from Liverpool Street station, and Seven Kings station,  $\frac{3}{4}$  mile towards London. The railway runs east to west in the area with the Up and Down main lines to the south of the Up and Down electric lines. There is an additional Up Goods line to the south of the main lines which joins the Up Main about half-way between the two stations. In the Up direction the lines are on an easy right-handed curve on the approach to the point of the accident, about 340 yards from the end of the platform at Seven Kings, and the gradient is falling at 1 in 400. The route is electrified on the overhead system. The speed limit is 60 m.p.h. in the area of the accident.

2. The signals are three and four aspect multi-unit colour lights linked with continuous track circuits which control the signal sequences. The ones for the main lines are capable of working automatically and are generally so worked. Block instruments are not used and trains are described from box to box.

3. The relevant Up Main line signals, which are all 4-aspect, are shown on the diagram on the facing page. Working back from Seven Kings they are I.C.60, 170 yards from the end of the platform: G.58, 366 yards from I.C.60: G.56, 231 yards from G.58: G.54, 298 yards in rear of G.56 and at the starting end of Goodmayes Up main platform: G.52, 372 yards from G.54: G.50, 289 yards from G.52: and G.48, 301 yards from G.50. The outlet signal from the Up Goods line to the Up Main is G.74, level with signal G.58. Signal overlaps are very short, varying between 166 yards and 143 yards. The overlap ahead of signal G.58 is 148 yards. The signals with a prefix G are worked from Goodmayes box, on the country side of that station; I.C.60 is worked from Ilford Car Sheds box on the London side of Seven Kings.

4. Because of the close spacing of signals in relation to the line speed, the aspect sequences include consecutive double Yellows as will be seen from the diagram: for example when G.58 is at Red with G.56 at Yellow, the three preceding signals G.54, G.52 and G.50, all show double yellow. This arrangement is freely used on this stretch of line, and train drivers can thus run with double yellow aspects for considerable distances if they are following another train, without knowing whether there are four, three or two signals between them and the signal at Red immediately in rear of the train in front.

##### *The Trains*

5. The 12.2 p.m. electric train, which was standing at signal I.C.60 at Red when the collision happened, comprised two four-car sets of suburban stock with a total length of 177 yards and weighing 300 tons. There were in all six trailer coaches and two motor coaches; these latter were positioned respectively third and sixth in the train. The coaches were of all-steel construction. Buck-eye couplings were in use between all coaches.

6. The Scandinavian Boat train consisted of seven coaches weighing 230 tons drawn by a type 3, Co-Co, diesel-electric locomotive of 1750 h.p., weighing 102 tons. The length over buffers was 170 yards. The brake on the engine was of the compressed air type, applied either through the combination valve worked by the handle of the vacuum brake for the train, or by a separate handle. The vacuum brake system on three coaches was equipped with the direct admission valve, which reduces the delay in brake application. The designed braking percentage on the engine was 82 and on the seven coaches 78. The brake power on the engine and first two coaches was 40% of the total weight of the train of 332 tons. The engine was screw coupled to the first coach, and buck-eye couplings were in use between coaches.

## REPORT

### *The Accident*

7. The 12.2 p.m. electric train had been stopped at signal I.C.60 at Danger a few minutes before the collision, and the driver was actually at the signal telephone speaking to the signalman at Ilford Car Sheds box when the collision happened. As this train was 177 yards long and the distance between I.C.60 and the signal in rear, G.58, is 366 yards, the tail of the train was approximately 180 to 185 yards ahead of G.58.

8. The Scandinavian Boat train, travelling, so the driver said, at moderate speed passed G.48 signal at Green, the next three signals at double Yellow, G.56 at Yellow and G.58 at Red, and collided at about 10-15 m.p.h. with the electric train which was pushed forward 20 yards, becoming separated by about 8 ft. between the second and third coaches. There was no dispute about the signal aspects but the driver maintained that the brakes did not respond properly when he applied them though he had had no difficulty earlier on the run, and that this was the cause of his overrunning signal G.58 and colliding with the electric train.

9. The shock of the collision caused minor damage throughout the electric train to drawgear, underframes, and to a number of bogies, and the buck-eye coupling between the second coach and the heavier motor coach behind it parted. The driving cab at the rear of the train was crushed, the headstock of that coach was damaged, and a few windows in the last but one coach were broken. There was little displacement of seats.

10. The front end of the locomotive of the Boat train suffered appreciable damage. The buffer beam was torn from the frame at either end and forced inwards approximately 7 inches, the right-hand buffer stock was fractured at the base and the left-hand buffer head was torn from the stock and forced upwards, a number of pipes and fittings were damaged, and there was some displacement to the exhaust and ventilation fan. Slight distortion of the main frames took place.

11. The buck-eye couplers at the trailing end of the third coach and the leading end of the fourth coach of the Boat train fractured. On the third coach the fork end of the coupler which carries the draw pin and support pin had broken through the draw pin hole. The coupler on the fourth coach had split across the main body and the draw pin and support pin were badly bent. Both couplers were examined metallurgically; the one on the third coach was found to be of sound metal, the other had minor flaws though these were not such as to seriously affect its strength. Expert opinion was to the effect that the fracture of the couplers was primarily due to the amount of impact in relation to the strength of the couplers rather than to any fault, and that the low temperature, which causes some deterioration in the properties of steel associated with toughness, may have conduced to the fracture. The couplers had been supplied in 1949 and 1955 respectively; in 1961 the acceptance standards for couplers were made substantially higher to ensure a greater toughness in the castings.

12. A number of seats and tables were displaced throughout the Boat train but there were no broken windows or distorted bodywork except at the rear of the third coach and the front of the fourth where the bodies had collided after the coupling gave way. The brake gear on these two vehicles was also damaged.

There was no derailment and no damage to overhead equipment.

### *Evidence*

13. The arrival of the electric train at signal I.C.60 was recorded as 12.53 p.m. in Ilford Car Sheds box. The signal was at Red because a set of empty electric coaches which had been accepted from Goodmayes just before the electric train had not cleared the section. The approach of the Boat train did not appear on the describer in the signalbox since it records trains only as they approach the first control signal, I.C.60, at which the electric train was standing. After being told of the accident the signalman took appropriate action to protect the lines.

14. *Signalman W. Baalam* in Goodmayes box said that the signal switches on his control panel had been restored to the automatic working position after the empty stock train had passed, but that the electric train had been brought nearly to a stand at signal G.52 opposite his box, until the empty stock train cleared the section ahead. He did not watch the Boat train pass though he noted its movement on the train describer, as he was watching *District Inspector A. Yeowell* who was instructing another signalman on the panel. Inspector Yeowell also did not pay particular attention to the passing of the Boat train; after the accident he went at once to the site to organise relief and recovery arrangements.

15. *Signalman F. Disney* at Chadwell Heath box, about 1 mile on the country side of Goodmayes, saw the Southend train pass, and the Boat train 3½ minutes later. He estimated that the Boat train was travelling at a good speed, between 60 and 70 m.p.h., which was usual at this point.

16. *Driver W. Clark* of the electric train said he received the usual sequence of double Yellows followed by a yellow aspect at G.58 before he stopped his train at I.C.60 at Red. He came to a stand about half a coach length (ten yards) on the approach side of the signal, and went immediately to the signalpost telephone to speak to the signalman, as he had heard before starting from Southend that there were signal failures on the route and he thought that I.C.60 might be at Red on that account. He had left the power brake only slightly applied but he screwed on the handbrake before getting down from the cab. As he was speaking to the signalman he heard the thud of the collision and saw his train move

forward past the signal by rather more than half a coach length and stop suddenly, with a separation taking place between the second and third coaches. He told the signalman what had happened and then collected detonators from his cab to protect the Down Main line; he saw however that the station staff from Seven Kings were doing this so he returned to his train to lower the pantograph and to make both parts of the train secure.

17. *Guard W. P. Moss* of the electric train was travelling in the sixth coach; he said that he heard two hoots from the horn of the Boat train just before the collision which threw him off his seat. He was not hurt and did not think that the collision was heavy. He walked back on the cess side of the track and met the driver of the Boat train and also a railwayman from the train who said that he would go at once to report the accident and arrange protection. Moss then went through his train to see to the injured. I asked him why he had not got down from his train in the first instance on the six foot side to check whether the Down line had been obstructed, as he was required to do by the rules, and he admitted that he had overlooked this important duty.

18. *Driver A. B. Hilton* of the Up Scandinavian Boat train said that his first trip on that day with the diesel-electric locomotive had been on the Down Scandinavian Boat train leaving Liverpool Street at 8.30 a.m. The brake had worked properly during that trip, but there had been trouble with the steam heating and he had stopped fairly quickly at one point so that the fireman could work on the heating cock to thaw it. At Parkeston Quay his engine was uncoupled from the Down train and after a short time backed on to the Up train, Hilton having changed from No. 1 end to No. 2 end. He said that before coupling up to the Up train his fireman had managed to thaw the steam heating cock at that end so that heat could be given to the train. Hilton made the usual brake test of 21 ins. of vacuum after coupling up and also tested the engine air brake from No. 2 end and found it satisfactory.

19. The train was booked to leave Parkeston Quay at 12.30 p.m. but it runs as a special for steamer passengers and it left three-quarters of an hour early at 11.45 a.m. as all passengers had taken their seats. Hilton said that there was nothing unusual about the journey until the failure of the brakes before the collision. He had made one stop at the Manningtree junction signal, about 10 miles from Parkeston Quay, and the brakes had responded normally. Thereafter he had run at the usual speed with a check at Shenfield, 10 miles before Chadwell Heath, until approaching Goodmayes where the signals were at double Yellow. He was braking the train on the vacuum brake handle as is the custom, and he began to realise as the train approached signal G.56 at Yellow that there was not a proper response to the brake application. He then made an emergency application, and though he felt that the brake was applied on the engine, the train behind seemed to be pushing it forward. The train thereafter ran at reducing speed past signal G.58 at Red into the electric train. He thought that his speed through Goodmayes was between 20 and 25 m.p.h., and affirmed that he had been noting the speed on the speedometer.

20. After the collision Hilton sent his fireman back to protect the rear of the train, and went forward himself to see if the Down line was obstructed. He then helped the passengers on the electric train.

21. I questioned Driver Hilton as to his interpretation of the double yellow signal aspects on this route, and did not receive any clear reply as to the degree of caution which he applied to them. When I asked him "How many double Yellows in succession do you sometimes expect to get" he replied "Three to four, Sir. They keep coming off on double Yellow"; and to the next question about the degree of caution which he ascribed to them, he said "Caution signal, yes. Well they are to us when we run on the main line; we run under yellow signals and, as I say, they keep coming off as we are approaching". He was positive enough about the single yellow aspect saying "You know the next signal is going to be red".

22. The evidence of *Passed Fireman G. W. Buckle* of the Boat train confirmed generally that of his driver. At Parkeston Quay he coupled up to the train and was sure that he took the vacuum hose of the end coach off the dummy to do so. He said that the driver did not comment on the brakes at any time and that they did not converse except on matters connected with their work. Buckle thought that their speed approaching Goodmayes was about 5 m.p.h. higher than Driver Hilton's estimate of 20 to 25 m.p.h. and he remembered a succession of three double Yellows before a Yellow and finally a Red at I.C.60. He heard the sound of air when the brake was applied and, like Driver Hilton, noted the lack of response in the train to the application. He thought speed at collision was about 10 m.p.h.

23. *Guard R. J. Collins* of the Boat train was still in hospital when I took his evidence. He had begun duty on the day of the accident by working the 6.30 a.m. train from Colchester to Harwich and the Boat train was his second trip. His position was at the extreme end of the train and he said it was very cold as there was little or no heat in his radiator. He had noted his vacuum gauge reading 20 ins. before the journey began. Collins' recollection of the journey was somewhat uncertain, but he remembered that shortly before the accident he had moved from his van to the 2nd Class vestibule compartment in the front part of the coach to get warm and had just sat down when the shock of the collision threw him forward against the table rupturing his spicen. He did not notice any brake application immediately before the collision though earlier he had seen his vacuum gauge drop when the brake was applied during the journey. Collins was able to move after a little time and got down from the train to place detonators a short distance behind it before he collapsed.

24. *Travelling Ticket Collector F. J. Thompson* was in the first coach of the Boat train when the collision occurred. He did not remember any brake application until the collision happened, nor did he hear any sound of the engine horn. He thought that he would have felt a heavy brake application before the collision if there had been one.

25. *Shunter F. Arden* said that the stock which formed the Up Scandinavian Boat train on the day of the accident had come to Parkeston Quay two days earlier on the Monday morning. The third coach from the London end had been marked defective at Parkeston Quay and another coach had been brought down from London on the Monday evening. It was placed in a siding with other empty stock to be steam heated until it was substituted for the defective coach on the Wednesday. Arden said that the vacuum hoses were off their dummies while it was standing and he did not look inside them to see if they were clear when he coupled up the coach in the train; this he would not normally do. When I told him that a sheet of newspaper crumpled into a wad had been found inside the vacuum hose at the London end of this coach he could suggest no reason for it having been put there.

26. *Shunter D. Bird* was working with Arden in coupling the replacement coach in the Boat train. He also did not look in the hose at the front end of the coach when he coupled it to the one in front.

27. *Signal Inspector A. J. Walton* said that he made complete tests of the signalling after the accident and found it to be in order in all respects.

#### *Brake Examination*

28. After the accident the engine and stock of the Boat train were subjected to a detailed brake examination. No fault was found with the brake on the engine which was examined in Stratford Works, but the brake application tests on the stock, after repairs to the vacuum hose pipe between the third and fourth coaches which had been damaged when the buck-eye coupling broke, showed that the brake was not working properly. With a locomotive attached at the London end, vacuum could be created readily but the time taken for it to be destroyed when the brake valve was opened, as successive coaches were connected to the engine, was as follows:—

1st Coach	—	3 secs.
2nd Coach	—	4 secs.
3rd Coach	—	16 secs.
4th Coach	—	20 secs.
5th Coach	—	26 secs.
6th Coach	—	32 secs.
7th Coach	—	33 secs.

29. When the engine was coupled to the rear of the train, vacuum again could be created readily but it was destroyed throughout the seven coaches of the train in eight seconds when the brake valve was opened. Tests for comparison on other coaches in Stratford Carriage Sidings gave times for destruction of vacuum of eight seconds when five of the seven coaches were fitted with DA valves, nine seconds when three coaches were fitted, and 12 seconds with none fitted.

30. These tests indicated a blockage in the vacuum pipe at the leading end of the third coach, No. GE 1130, and when the flexible hose was examined a wad of crumpled newspaper comprising most of one sheet of a pictorial newspaper dated the 21st January was found wedged in the end of the pipe against the cruciform grid which is about 4 inches inside the open end. Further examination of the vacuum pipe in this and the coaches in rear revealed more fragments of this sheet which, when pieced together, totalled more than 9/10ths of the complete sheet. It is reasonable to assume that when vacuum was created at the London end of the train the wad was loosened and sucked clear of the grid and air passed it to extraction; when vacuum was quickly destroyed on the engine by a full twist of the brake handle the wad was forced back against the grid to plug the vacuum hose pipe. With the engine at the country end the creation of vacuum, which is not such a forcible process as is destruction, did not suck the wad so firmly against the grid and air was able to pass to extraction. The destruction of vacuum from this end simply freed the wad from the grid.

#### *Braking Trials*

31. Braking trials were made past signal G.56 with a train of similar composition to the Boat train, in which only the first two coaches were vacuum braked, in order to ascertain the stopping distances at various speeds. These two coaches were equipped with the DA valve as had been the first two coaches of the Boat train. The stopping distances were as follows:—

85 yards from	20	m.p.h.
176 yards from	30½	m.p.h.
363 yards from	41	m.p.h.

Calculations showed that the stopping distance from 41 m.p.h. if the train had been fully braked would have been 252 yards. It may be noted that signal G.58 which was passed at Red is 231 yards ahead of G.56, and the rear of the electric train was about 185 yards ahead of G.58.

#### *History of Coach No. GE 1130*

32. This coach had been standing spare in Thornton Fields yard for nearly a month before 21st January when it was attached at the country end of the stock of a fitted freight train which was sent to Liverpool Street to form the 3.36 p.m. train to Parkeston Quay. Evidence taken from shunters, guards and drivers concerned with the movement of the stock provided no clue on when or why the wad of newspaper had been placed in the hosepipe, and there was no suggestion that the brakes on the train had not been in good order during its journey from Thornton Fields to Liverpool Street station and then to Parkeston Quay. It was stated however that spare carriages often stand with the hose hanging down and

not on their dummies, and there was a suggestion that men might use a wad of newspaper to seal the hose pipe if it was difficult to place on the dummy, though all of the men concerned in the movement of the coach on that day said that they did not do this. It is to be noted however that the weather had been bitterly cold, and a hanging hose pipe frozen hard would have been difficult to bend to place on the dummy.

33. At Parkeston Quay on the evening of 21st January the coach was moved from the head of the freight train to a siding where it remained until the morning of the 23rd January when it was incorporated in the Boat train. The men concerned in this movement denied having placed paper in the hose pipes; none of them had looked inside the hose pipe before connecting up the vacuum. One of them remembered, however, that the pipe at the London end had been hanging down.

#### *The Running of the Train*

34. An examination of the box to box timings showed nothing exceptional in the running of the train. It had kept to the booked timings for the first 30 miles from Parkeston Quay to Witham, about 29½ miles from the scene of the accident and had thenceforward run rather slower than the booked timings, losing 5 minutes on a booked timing of 7 minutes for the 8½ miles between Witham and Chelmsford, and 4 minutes on a booked timing of 18 minutes from Chelmsford to Chadwell Heath, a distance of 19½ miles. The last 1½ miles from Chadwell Heath box to the collision were apparently run in 2 minutes, basing the times on different clocks and not a very precise estimate of the time when the collision actually took place.

#### *Medical Test for Colour Vision*

35. When Driver Hilton was medically examined for colour vision after the accident he found some difficulty in identifying green, and on occasions declared a green indication to be yellow. He did not have any difficulty in identifying correctly the red aspect. This colour defect was still present at two later examinations. Hilton who was nearly 59 years of age at the time of the accident had been previously tested at the age of 55. His eyesight then was good and colour vision normal.

#### CONCLUSION

36. I am satisfied that the obstruction in the train pipe, which was found during the tests after the accident, was present when the train was formed at Parkeston Quay and that it interfered with the operation of the brake. I cannot say however to what extent it prevented the brakes of the last 5 coaches being applied when Driver Hilton applied the brakes on the approach to the scene of the accident. Even if it effectively sealed the vacuum pipe on that occasion it is difficult to appreciate why Driver Hilton still did not stop his train before the collision, if he had been driving at the speeds which he stated. I think it probable therefore that he was driving at a higher speed, and there was no reason why he should not have done so, on the approach to signal G.56 at Yellow and failed to appreciate quickly enough that the train was not responding as usual to the brake application. I think it fair to say that drivers' reactions when applying the brake tend to follow a pattern set by experience and that they are not necessarily on the alert to detect immediately any deviation from normal in the response from the train. Even so I think Driver Hilton cannot be excused entirely from responsibility for this accident. I could accept that he might have overrun signal G.58 in the circumstances, but he ought to have been able to stop his train before colliding with the one in front if he had been quicker to realise that the train was not responding to his brake application as it should have done.

37. The extent to which Driver Hilton's reactions may have been influenced by his colour vision defect, or by the imprecise meaning of the consecutive double Yellows in the signal sequences, can only be conjectured. I draw attention to some of the possible consequences in my Remarks and Recommendations.

38. So far as the blockage in the vacuum pipe is concerned I am reasonably sure that the newspaper, which was dated 21st January, was placed in the hose on that day either at Thornton Fields or at Parkeston Quay, though there is no direct evidence to suggest at which of the two places this took place. The most likely reason for the act would have been to block the pipe in order to create vacuum, instead of placing the pipe on the dummy. As I have said the extreme cold could have made it difficult to bend the pipe. The Eastern Region have taken steps to draw the attention of staff to the dangers of this practice.

#### REMARKS AND RECOMMENDATIONS

39. It would not have been possible to put the wad of newspaper in the flexible hose if the cruciform grid had been close to the outer end. I suggest that the metal coupling in the end of the hose, of which the grid is a part, be redesigned so that the grid is near the end, leaving only sufficient clearance for the hose to be fitted on the dummy.

40. A defect in colour vision of the kind shown by Driver Hilton when examined after the accident, sometimes mistaking green for yellow, may not seem to be dangerous, but it must tend, in the course of time, to make a man less responsive to the caution indication of a yellow aspect seen at a distance when he has found from experience that he may identify it as green when he approaches it more closely. There is no direct evidence to show that Driver Hilton was so influenced in his driving, but I think it of importance to record the implication of a colour vision defect of this nature, particularly as suggestions were made to me that it was safe rather than otherwise. Furthermore I have been advised

that a man with such a colour vision defect might also on occasions mistake yellow for green. Such a mistake could be directly dangerous.

41. It is essential that the engine driver must be able to identify clearly all the colours used in railway signalling, and his colour vision is therefore tested periodically. I understand that drivers are medically examined at five-yearly intervals up to the age of 60, including colour vision testing, and annually thereafter. It may perhaps be an appropriate subject for medical research to consider whether the scope and frequency of the present test for footplate men is adequate to detect any deterioration in colour vision before it prejudices safety.

42. Consecutive double Yellows leading up to a yellow aspect before a red one are a departure from the logical application of colour light signalling in the United Kingdom. They are included in the signalling sequences in closely signalled areas to give a warning indication at braking distance to the drivers of high speed trains, but the effect must be to create some uncertainty in the driver's mind about the condition of the line ahead, especially if, on straight track, he is able to see more than one double Yellow at any time. Where the signal controls are applied in strict sequence, the double yellow indication need mean one thing only to the driver, that the next signal is then at Yellow and the one ahead of that at Red. It is true that even with the logical sequence of aspects a driver may be "running on double Yellows" if his train is running at the same speed as the one ahead, which the signals are protecting, but he is still aware as he sees each signal at double Yellow that the next but one signal is at Red. On a stretch of line such as this, where strict aspect sequence is not observed, the double Yellow can mean to a driver that the next signal is at Yellow or that there are one or more double Yellows ahead before a yellow aspect followed by a red one.

43. The undesirability of repeating the double yellow aspect in the signal sequence was discussed with the Railway Executive in 1948 and it was pressed strongly by the then Chief Inspecting Officer, Sir Alan Mount, that in the standard colour light sequence a double yellow should always be followed by a yellow "and that any departure therefrom should be permitted only under quite exceptional conditions where it was considered that a series of closely spaced cautionary signals could not be avoided". This outlook was accepted by the Railway Executive, but examples of line where consecutive double yellow sequences were to be used were quoted, including the length of line where this accident happened. The present signalling on this line had already been planned and was being installed at that time, and the sequences were accepted at the inspection in 1949.

44. I am glad to record, however, that in signalling schemes planned since the agreement of 1948 the strict signal sequence principle has been followed fairly closely and that the consecutive double yellow sequence has, on the whole, been sparingly used.

I have the honour to be,

Sir,

Your obedient Servant,

W. P. REED,

*Colonel.*

The Secretary,  
Ministry of Transport.

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