Benjamin Lumley. 4

LONDON AND NORTH EASTERN RAILWAY

MINISTRY OF WAR TRANSPORT,
Berkeley Square House,
London, W.1

5th March, 1945

Sir,

I have the honour to report, for the information of the Minister of War Transport, in accordance with the Order dated 2nd January 1945, the result of my Inquiry into the collision which occurred at about 6.20 p.m. on 29th December 1944, at Romford, about 12 miles from Liverpool Street, in the Southern Area of the London and North Eastern Railway.

In darkness and dense fog, the 5.20 p.m. stopping passenger train from Chelmsford to Liverpool Street, running on the Up Local line, passed the Romford outer and intermediate home signals at danger and collided, at a speed of about 15 m.p.h., with the rear of the 5.52 p.m. goods train from Brentwood to Temple Mills, which was standing in the station at the inner home signal, awaiting admittance to the yard. Fogsignalmen were at their posts at the Up distants and outer homes.

I regret to report that Goods Guard A.G. Marriner was killed instantly when the body of his van was wrecked. The only casualties in the passenger train were slight injuries to the guard, R. Mayhew, and to 2 of the passengers, who went home after first aid treatment from the station staff. The local Ambulance and Civil Defence organisations responded promptly to an immediate call, but their services were not required.

The goods train comprised 22 loaded and 19 empty four-wheeled wagons, unbraked and loose coupled, and a 20-ton brakevan; it was hauled by engine No. 7945, of the J.15 0-6-0 class, weighing 68 tons in working order with tender. The total weight of the train was approximately 400 tons and the length was about 295 yards. The passenger train was formed of 8 bogie coaches, in two close-coupled sets of four, weighing 213 tons; all were of modern construction with heavy steel underframes and timber bodies. The engine, No. 8789 of the D.16 4-4-0 class, weighing 94 tons in working order, was running tender first. The Westinghouse brake was in operation on all wheels except those of the engine bogie, and the brake power was approximately 72% of the total weight of 307 tons. The total length was 168 yards.

The collision occurred about 105 yards in advance of the intermediate home signal and 80 yards short of the station platforms. The goods train was standing with the engine brake released and was pushed forward about 25 yards. The brake van and the empty wagon next to it were forced upwards on to their ends with their wheels together and practically demolished. The greater part of the shock was absorbed in this way, although there was some damage to the next 12 wagons, 3 of which were derailed; the engine and the 28 leading wagons went forward intact. Damage to the passenger train was confined to the rear end of the tender tank, apart from some broken cells in the coach batteries.

The Up Local line was blocked by the collision, and the Down Local was occupied later by the Stratford breakdown crane. The Through lines were not obstructed, but the accident occurred at the height of the evening peak and traffic was much delayed. The lines were cleared by 12.55 a.m. (30th December); there was very little damage to the permanent way and normal working was resumed at 2.10 a.m., approximately 8 hours after the accident.

The accident occurred about 1 hour and 20 minutes after sunset. The fog posts in the neighbourhood had been manned for about 7 hours and by all accounts visibility at the time was limited to a few yards. The temperature was below freezing point.

There was conflict of evidence whether a detonator was exploded at the Romford outer home by the engine of the passenger train. Both the enginemen denied having heard one, whereas the fogman stated that a detonator was exploded by the engine, and that he placed a second detonator under the train (by machine) when he realised it was not stopping. The explosion of one detonator was heard by two independent witnesses.

DESCRIPTION

1. Chelmsford, where the passenger train started its journey, is 30 miles from Liverpool Street. For the first 9 miles from Chelmsford to Shenfield the line is double; thenceforward there are 4 tracks through Brentwood, Harold Wood, Gidea Park, Romford, and other suburban stations to London. The attached line diagram shows the signalling arrangements in the section concerned from Gidea Park to Romford, and other relevant information. Gidea Park station is in cutting, which changes to a long bank at the Romford outer home signal; except for the light steel footbridge the section is devoid of features which might serve as location marks in fog. Alignment is straight, or nearly so, and the gradient falls in the Up direction at 1 in 300-367.

2. For the 7 miles from Shenfield to Gidea Park there is multi-aspect colour light signalling, with continuous track circuiting; onwards from Gidea Park there are semaphore signals with oil lights, but the continuous track circuiting is extended beyond the colour light area as far as Romford, and manual block working is dispensed with, trains being signalled by describers. Passing times are recorded at Gidea Park box, but not at Romford, where the booking is confined to traffic delays and emergency signals.

On the Up Local line the controls are such that the Gidea Park starter cannot be lowered unless track circuits C and C1 are clear, and the Romford outer home signal has been replaced behind the previous train; track circuits C, C1 and D, are indicated on the illuminated diagrams in Gidea Park and Romford boxes. There is a fog switch in Romford box which is used to extend the control of the Gidea Park starter, and so provide the equivalent of "double block" working before the arrival of the fogmen. At the time of the accident, however, all the fog posts were manned and normal working was in force; the diagram shows the track conditions on the Up Local line and the signal aspects as the passenger train started from Gidea Park and proceeded through the section.

3. The equipment of the fog post at the Up Through and Local outer home signals is described below in some detail in view of the conflict of evidence referred to above. The post is in the cess to the left of the Up Through line. Detonators are placed on the Up Through by hand and on the right hand rail of the Up Local by a Clayton type magazine machine situated in the six foot between the local lines. The machine is connected by rodding to a lever adjacent to the two mechanical repeaters, and there is a telephone to Romford signal box. The hut, which has a coal stove, is about 16 yards from the lever and repeaters; there is no outside brazier.

4. Clayton detonator machines are in extensive use on this Company's system, particularly in the London area. The main feature of the apparatus is an arm, about 18 ins. long, swinging through 180° in a horizontal plane. At the outer end of the arm there are jaws, opened by a cam and closed by a spring to grip the detonator, which is of special type with a tinplate extension "tail".

With the lever reversed, the arm is at 90° to the rail and holds the detonator thereon. To remove the detonator from the rail, the lever is pushed to the mid notch on its quadrant, swinging the arm away through 90°. When a detonator has been exploded, the lever is placed to the fully normal position, turning the arm through 180°; during the last part of this movement the jaws are opened by the cam and the exploded detonator is pushed off by a flap plate attached to the magazine, the jaws then closing, by a trip action, on the projecting tail of a fresh detonator. Reversal of the lever places the detonator on the rail. The magazine, which is detachable, holds 30 detonators, stacked one above the other. As the lowest is removed, the next lowest drops down into position, ready to be picked up by the jaws.

The machine in question was examined about 40 minutes after the accident and was found to be in working order. There were plenty of detonators in the magazine, all were less than 3 years old, and none was bent, which is an occasional cause of failure of the jaws to pick up. Nor was there any evidence that a detonator had failed to explode. A few days after the accident, I examined and tested this machine, which I was assured had had no attention in the meantime. I found it to be working correctly, apart from a defect in an auxiliary attachment which I am satisfied had no bearing on the accident.

5. The engine of the passenger train was driven from the left hand side as it was running tender first. The cab is roomy with two windows on each side, and its roof extends over the tender footplate. To obtain a good view ahead running tender first it is necessary to look out of the rearmost side window; otherwise the view is obstructed by the tender tool boxes and the coal. Neither top nor side sheets were in use.

The tender has a short wheelbase, and a detonator exploded under the rear wheels (leading as running) would be approximately 16 ft. from the footplate and 57 ft. from the centre of the leading brake compartment, in which the guard was travelling; in a clear weather trial with a similar engine at 10-15 m.p.h., I noted that the sound of a detonator was quite distinct on the footplate. I also noted that the Romford outer and intermediate home signals were well sited, with their posts immediately to the left of the Up Local line.

REPORT

6. So far as can be established, the collision occurred at 6.20 p.m. or a minute or two before, and the goods train had been standing for about 15 minutes at the Romford inner home signal, waiting an opportunity to be crossed to the Up Through line and thence into the yard. It had passed Gidea Park box at 5.51 p.m., according to the record there, and, with the Romford distant at caution, had travelled slowly through the 1½ mile section, arriving at the inner home at 6.5 p.m. as recorded in the Romford train register.

Signalman W.R. Amos was sharing the work of Romford box with Porter Signalman E.A. Cullen. Amos said that he had to hold the goods train rather longer than usual owing to traffic on the Through Lines, and that the outer and intermediate homes had been put to danger behind it. The passenger train was signalled next on the Up Local describer, and both signalmen saw track circuits C and C1 occupied by it in turn; very soon after track circuit C1 was occupied Cullen received a telephone call from the fogman at the outer home that a train had passed his signal at danger, and that he had shown a red light and "shot him". Cullen telephoned at once to the porters' room on the platform; he was answered promptly, but it was too late for the station staff to take any action. He was quite certain that the fogman, in his telephone call, made no reference to a second detonator or to having shot the train twice.

The signalmen were informed of the position a few minutes later by the station foreman, after it had been ascertained that the Through lines were not obstructed. No "Obstruction Danger" signal was sent, but the boxes on either side were warned by telephone and Down Local traffic was stopped. Steps had already been taken to protect both the Local lines with detonators.

7. The engine of the goods train was running chimney first and was driven from the right hand side by Driver C.T. Franks, with A.B. Hilton as fireman. According to Franks, the train left Brentwood in fairly clear weather with the last of the daylight; onwards from Harold Wood there was fog, but it appeared that Franks had no great difficulty in seeing the semaphore signals at Gidea Park, including the starter, which was "Off", with the Romford distant at caution below it. He passed this signal quite slowly and saw both the arms and the lights; Hilton remembered hearing the explosion of a detonator.

Franks said that the fog became a good deal thicker after he passed Gidea Park. He just saw the arm of the Romford outer home in the "Off" position as he passed it (but not the light), and Hilton, from the left hand side, saw a green light from the fogman; Hilton also said that he heard the fogman shout "Right mate" quite distinctly, or words to that effect. Thereafter Hilton faintly saw the intermediate home at "clear" and the train went forward slowly into the station and stopped at the inner home, at the far end of the platforms. Franks noted the time of his arrival as 6.5 p.m. and that the collision occurred at "about 6.20 p.m."; 6.20 p.m. was also noted in the porters' room.

8. The passenger train was the return working of the 5.30 p.m. train from Liverpool Street to Chelmsford. It is ordinarily worked by heavy tank engine, but on this occasion a tender engine had to be used owing to disorganisation of the engine workings by the fog; engine No. 8789 was chimney first on the outward journey, and with no turning facilities at Chelmsford, had to return tender first. The train left Chelmsford at 5.24 p.m. 4 minutes late; it passed Gidea Park box at 6.7 p.m. (train register) 16 minutes after the goods train, and left the station 11 minutes late at 6.10 p.m. (guard's journal) after a two-minute stop.

The enginemen were Driver J.B. Locks, and Fireman H.E. Morgan of Brentwood shed. They had booked on duty at 3.5 p.m. and had travelled passenger to Romford, where they had relieved another pair of men on the outward journey at 4.8 p.m. According to Locks, who had 1/4 years' driving experience on this route, there was fog all the way from Brentwood on the inward journey, becoming gradually thicker. At Gidea Park, he had difficulty in seeing the starting signal until the guard came forward and showed his hand lamp on the lower-co-acting arms; he then saw that the starter was "off" and that the Romford distant below it was at caution. As he started, he heard a detonator explode and the fogman shout "One off".

Leeks said that thereafter he went forward through the section at about 5 m.p.h., expecting that he might have to stop at the outer home, also that he was in no doubt as to the position of the fog post there, viz. on his own (left hand) side across the Through lines. He stated that he was looking forward all the time through the side window, and that he saw no fixed or hand signals and heard no detonator up to the time of the collision, which took him by surprise. In fact he suggested that the fog was so dense that it was impossible to see the signals or the footbridge or any land marks at all. He was listening for a detonator at the outer home, but hearing none he continued slowly forward.

This was the main trend of Driver Leek's evidence, which was confused and in some parts contradictory. For instance, he stated to the Company's Officers that he shut off steam about 200 yards after leaving Gidea Park and checked the train with the brake, as he thought he was gaining too much speed, and that thenceforward he never re-opened the regulator; whereas at my Inquiry he said that he gave steam a second time after braking nearly to a stand, and then shut off and "let her roll to Romford Station". Further he did not seem to have appreciated that he was running on a falling gradient, and it was not clear from his evidence whether he was under the impression that he was still approaching the outer home when the collision took place, or whether he thought that he must have passed it. Leeks, however, maintained throughout that he never relaxed his vigilance after leaving Gidea Park and that he distinctly heard the detonator at the Romford distant there, but none subsequently.

He also said that engine No. 8789 was in good order generally, apart from a blowing gland on his own side. He was well rested, in good health, and had never suffered from deafness, but he referred to the intense cold running without the protection of the cab.

9. Fireman H.E. Morgan also was quite sure that he heard no detonator between Gidea Park and Romford although he and Leeks were "keyed up" for the sound of one, having passed the distant at caution. According to his statement he had not fired since leaving Harold Wood; he had shut off the injector on his side soon after leaving Gidea Park and was standing towards the driver's side of the footplate looking out for the signals across the top of the tender. He was hoping to catch sight of their posts as the engine passed them, but he saw nothing; when the collision took place, he thought he was still on the country side of the outer home and was expecting to reach it any moment. Morgan had no conversation with Leeks after leaving Gidea Park. He remembered hearing a brake application quite soon after starting but he could not say whether the regulator was subsequently re-opened.

10. Guard J. Mayhew, who was travelling in the brake compartment at the leading end of the first coach, i.e. immediately behind the engine, stated that he heard the detonator exploded by the engine at the Romford distant on starting from Gidea Park. Shortly afterwards he was getting parcels and mails ready for unloading at Romford, when he heard another detonator explode with a very similar sound, which he described as "a fair bang". Both the windows were shut at the time, and he lowered the left-hand window and looked out, but he could see nothing through the dense fog; having heard no brake application, he thought that the detonator might possibly have been exploded by a train on one of the adjacent lines, although he had not noticed one. He was not necessarily expecting to be stopped at the outer home, although the distant had been at caution which, he added, was not unusual.

Mayhew said that he continued to look out on the left-hand side until he was thrown to the front of the van by the collision, the time of which he did not record. It appears that he went back promptly to protect the Up Local line, and on his return journey he had a short conversation with the fogman at the outer home. He could not recollect clearly what the latter said, but he thought it was "I shot the train", or "I shot him a second time", or "I tried to shoot him a second time", and Mayhew replied that he had heard a detonator.

Mayhew noticed that Driver Leeks had shut off steam soon after leaving Gidea Park, and he referred to the wheezing noise from the blowing gland while steam was on; he did not, however, hear the engine steaming again. The only brake application which he remembered was a slight one just before the impact, as if the driver was braking for Romford Station.

11. The fogsignalman at the Romford outer home was Lengthman J. Morris, with several years' experience of fog duties at those signals. Morris had been engaged on his ordinary duties during the morning, after a normal night's rest; he relieved the "first call" fogman at 1.40 p.m. and described the weather at that time as "fairly foggy".

Just before dusk it became "very foggy", and was gradually getting worse, for he just saw the outline of the goods train, but could see nothing of the passenger train when it passed him a few minutes later (at a distance of about 11 yards). He could not see the signals (10-12 yards) and was working by the repeaters, which he said he had not left since dusk.

Morris stated that the outer home signal was "Off" for the goods train, and that he showed a green light with his hand lamp to the engine, and shouted "All clear". He replaced the detonator on the rail directly the train had passed, as the rule requires, and the signal was put to danger a minute or two later. This was the position when he heard the passenger train approaching after an interval of about 10 minutes; he suggested that the speed was about 10-15 m.p.h., and he heard the engine steaming lightly. He was quite certain that the detonator exploded but in spite of this, and his warning shout, the train continued forward without reduction of speed; he also showed a red light, but he doubted whether the driver could have seen it through the fog.

Morris also said that, when he realised that the train was not going to stop, he recharged the arm of the machine, and placed a second detonator under the wheels, possibly under the trailing bogie of the first coach, though he could not be certain of the exact position. He was emphatic that both the detonators went off properly and was sure no other trains were passing at the time in either direction. He also stated that, when the second detonator failed to attract the attention of the trainmen, he telephoned to Romford signal box that the Chelmsford passenger train had passed his signal at danger and had exploded two detonators. As had been mentioned, Porter Signalman Cullen received this message, but denied any specific reference by Morris to a second detonator.

Morris had never experienced any failures with this Clayton machine, and was confident that it was working properly on this occasion, requiring very little effort on the lever. Soon after he took duty he verified that the magazine had been filled with 30 detonators, and that the arm was holding a detonator on the rail. He also stated that the only detonators exploded on the Up Local line during the whole of his turn, were those fired by the Chelmsford passenger train, as no other train had been stopped at the outer home. After the accident, he recounted the detonators in the magazine and found 29 there as he expected, before the arm had been recharged.

12. Ganger A. Drury, as visiting foreman, reached Morris's post at about 7.0 p.m. His first action was to examine the machine, which he found in good working order generally, with the magazine about three parts full, i.e. with 20-22 detonators. Drury was quite definite that Morris mentioned, in reply to his questions, that he had put a second detonator under the train. It did not occur to him to count the number of exploded detonators lying by the machine, of which there were several, but he looked specially to see if there had been any failures and found none.

It appears that the sound of one detonator was heard by Ganger J. Holgate from the down fog post about 350 yards on the Romford side of the outer home (see diagram). Holgate saw the goods train go by on the Up Local Line, which is next to his post; a few minutes later he heard the sound of a detonator quite distinctly and very soon after that the passenger train passed him at, he said, about 10 m.p.h. He noticed that the driver shut off steam as the train drew level with his post. Holgate said that there were no other trains in the neighbourhood of his post when the passenger train passed him; he was quite sure that he heard a detonator just before and equally sure that he heard no second explosion.

13. The train registers at Gidea Park and other boxes showed that the intervals on the Up Local line during the afternoon were not necessarily inconsistent with Morris' statement that no trains were stopped at the Romford outer home before the 5.20 p.m. from Chelmsford passed; no close check was possible, however, as no regular booking is carried out at Romford box.

It is established that no trains passed on the Up Through or on the Down Local during the time the passenger train was in the section from Gidea Park to Romford. It is probable, however, that at least one train passed in the opposite direction on the Down Through, but there appears to be no reason to doubt the statements of Lengthman Morris and Ganger Holgate that no other train was in the immediate neighbourhood when the passenger train passed the Romford outer home.

14. With regard to the average speed of the passenger train for the one mile from the start at Gidea Park to the point of the collision, the various times which have been mentioned above are not strictly comparable. I consider, however, that the elapsed time is unlikely to have been much less than 7 minutes, representing an average speed of 8-9 m.p.h.; this appears to be fairly consistent with the estimates of Lengthman Morris and Ganger Holgate, viz:- 10-15 m.p.h. and 10 m.p.h. respectively as the train passed them. The nature and extent of the damage suggested that the speed was not more than 15 m.p.h. when the collision took place.

CONCLUSION

15. The fog appears to have become particularly dense with the onset of darkness, and primarily contributed to the collision. Further, there seems to be little doubt that the visibility between Gidea Park and Romford deteriorated appreciably during the interval between the passage of the two trains concerned; it is also possible that the enginemen of the goods train may have been helped by the very last traces of daylight to locate the Romford outer and intermediate home signals, whereas the darkness was complete when the passenger train passed about 15 minutes later.

Traffic was thus being worked under adverse conditions. The full fogsignalling arrangements were, however, in operation, with the Romford distant and outer home fog post manned, and in these circumstances, the passenger train was properly admitted to the section with the standing goods train protected by the intermediate and outer homes at distances of 105 yards and 714 yards respectively. I am satisfied that these two signals were at danger when the passenger train passed them, and there is little doubt that Driver Leeks was unable to see them under the prevailing conditions of visibility.

16. Leeks' evidence, which was supported by that of Fireman Morgan, was to the effect that he heard no detonator at the outer home and thus was unable to locate that signal. On the other hand, Lengthman Morris was sure that he placed a detonator on the line immediately behind the goods train, that it was exploded by the engine of the passenger train, and that he subsequently placed another detonator under the wheels of the train, which exploded with equal force. Neither statement received independent confirmation in full, but one detonator, which I am satisfied was at the outer home, was heard by Guard Mayhew and by Ganger Holgate, both of whom appeared to be reliable witnesses.

Morris' statement that he showed a green light to the goods train and shouted was confirmed by the enginemen, who were not directly concerned in the accident. I accept their evidence as proof that Morris was alert at that time, and I find it difficult to believe that, as an experienced fogman, he would not have carried out the simple routine of placing a detonator on the line immediately behind the train without waiting for the signal to go to danger. Having regard to all the circumstances, I consider that Morris is entitled to the benefit of any doubt in this respect, and that a detonator was in fact exploded at the outer home signal by the engine of the passenger train. I am not so sure that he placed a second detonator under the train, as he stated, but it is clear that he was prompt in telephoning to the box; unfortunately the available time was too short for effective action to prevent the collision.

17. I am unable to suggest any satisfactory explanation for the apparent failure on the part of Driver Leeks (and Fireman Morgan) to hear the detonator at the outer home signal; speculation on the point is unprofitable, but I cannot disregard the possibility that neither man was in the alert and expectant state of mind which was stressed in their evidence. Apart, however, from that, Driver Leeks, whose knowledge of the road was not in question, was aware of his exact position at Gidea Park and he had observed the Romford distant at caution as he started from the station. By his own account, he realised that he might have to stop at the outer home, 1010 yards ahead, and the fact that he ran 1724 yards to the point of collision without, it appears, becoming unduly concerned as to his location, indicates serious misjudgment on his part of speed and distance, to which the effect of the falling gradient may have contributed to some extent. While his speed through the section, which I do not think rose above 15 m.p.h., does not suggest a grave want of caution, it was considerably in excess of his own estimate of 5 m.p.h.,

and it seems that he was prepared to continue forward more or less indefinitely without seeing signals until he heard the explosion of a detonator.

18. Driver J.B. Leeks thus contravened Rule 127 (xxii) - see Appendix, and must be held responsible for the collision. He is 54 years of age, with 38 years' service, and has been a driver for 24 years. His experience is therefore considerable, and his record hitherto has been satisfactory; with regard to his failure on this occasion, the difficulties under which he was working should not be overlooked, including the absence of landmarks in the section, and his exposure to the cold weather without the protection of the cab.

19. I do not consider that any blame rests with Fireman H.E. Morgan, who is 22 years of age, with only 12 months' experience in his grade.

REMARKS

20. This accident is not one which would have been prevented by Automatic Train Control of warning type at the distant signal. It has certain features in common with that which occurred near Crewe in 1937, where it was considered that the enginemen of a passenger train, running at about 20 m.p.h. in dense fog, failed to hear the explosion of a detonator, and the following quotation from my Report on that case does not seem to be inappropriate in the present instance:-

> "It is not easy to understand why, in a succession of detonator explosions, one should be heard and another missed. Nevertheless, under the trying conditions of train working in fog, when detonators are being exploded at comparatively frequent intervals, not only by the train immediately concerned, but by other trains on adjacent lines, it is possible that enginemen may, on rare occasions, fail to notice an audible signal.
>
> With semaphore signalling the safety of operation in fog depends on the detonator; on the whole the system works well in practice, and that it does so is a tribute to the vigilance of enginemen generally and to their detailed knowledge of the road."

But for the war, the semaphore signalling system between Gidea Park and Liverpool Street would have been replaced by colour lights, with continuous track circuiting, as part of the electrification scheme to Shenfield, and the work, which was deferred in 1939, will be resumed as soon as circumstances allow. On completion, multi-aspect colour light signalling will be continuous for the 20 miles of quadruple track from Liverpool Street to Shenfield, with advantage to the facility and safety of traffic operation on this densely occupied section of line, where fog is so prevalent in winter.

I have the honour to be,
Sir,
Your obedient Servant,

G.R.S. WILSON,

Major.

The Director General,
Ministry of War Transport.

APPENDIX

EXTRACT FROM RULES

Rule 127. The Driver MUST -

x x x x

(xxii) during fog or falling snow, keep a sharp look out for the Fogsignalmen, who, except as prescribed in the first paragraph of Rule 91, clause (f), will repeat the indications exhibited at the fixed signals by showing a red, yellow, or green hand signal, as the case may be, held steadily. When the fog is so dense that the fixed signals cannot be seen by the Driver on approaching them he must, in the case of a distant signal, unless he can see the Fogsignalmen's hand signal, assume that that signal is at Caution and proceed accordingly. Where a stop signal is concerned he must, unless he can see the Fogsignalman's hand signal, assume that the signal is at Danger and stop his train immediately.

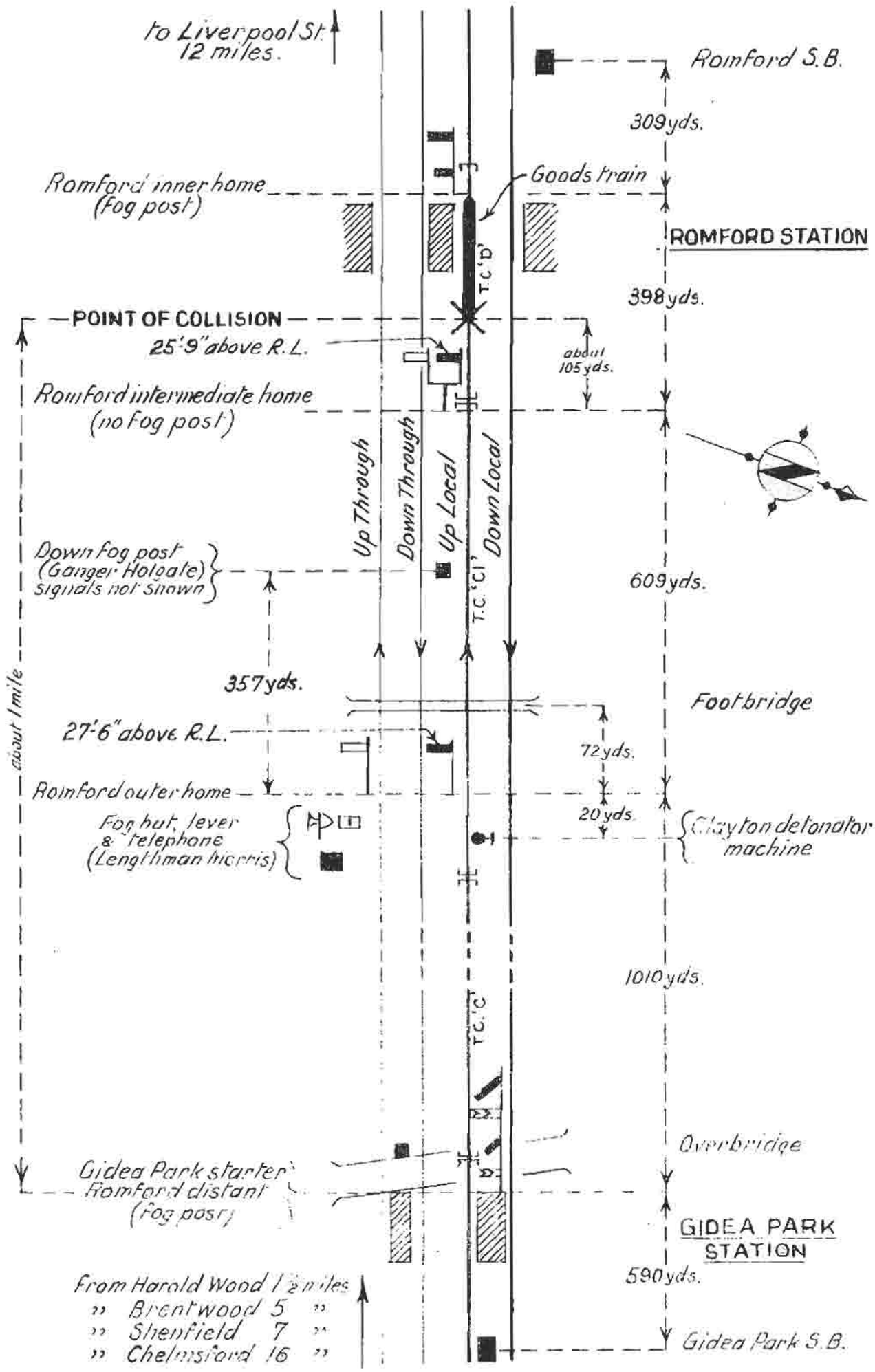
Observance of fixed or hand signals during fog or falling snow.

x x x x

L.N.E.R. (SOUTHERN AREA)

COLLISION AT ROMFORD - 29-12-44.

NOT TO SCALE



M.O.W.T.
HEADQUARTERS O.D.