MINISTRY OF TRANSPORT

RAILWAY ACCIDENT

Report on the Collision that occurred on 11th July 1967 at Winwick Junction

IN THE
LONDON MIDLAND REGION
BRITISH RAILWAYS

LONDON: HER MAJESTY'S STATIONERY OFFICE
1968

MINISTRY OF TRANSPORT,
ST. CHRISTOPHER HOUSE,
SOUTHWARK STREET,
LONDON, S.E.1.

27th March, 1968.

Sir,

I have the honour to report for the information of the Minister of Transport, in accordance with the Order dated 14th July 1967, the result of my Inquiry into the collision that occurred at about 10.50 on Tuesday, 11th July 1967 at Winwick Junction, on the Euston-Carlisle main line in the London Midland Region of British Railways.

In fine sunny weather, the 10.11 two-car diesel multiple-unit passenger train from Chester to Manchester Exchange, running on the Down Fast line between Winwick Quay and Winwick Junction, came into collision with the rear end of the 02.00 Class 5 freight train from Margam to Carlisle when the latter was standing at the Winwick Junction Down Fast Home signal. The passenger train had passed the Down Fast Home signal at Winwick Quay, an upper quadrant semaphore which was the section signal for the section between Winwick Quay and Winwick Junction, in a position which the driver read as Clear, though the signal lever stood normal in the frame and the train had not been accepted by the signalman at Winwick Junction.

The signal arm was standing in a position some 17 degrees above the horizontal because neglected wear in the balance lever casting at the foot of the bracket signalpost had allowed the counterbalance lever to lodge on the weight of an adjacent lever, and the signalman had not looked out to satisfy himself that the signal had returned to the Danger position, as required by the Rules.

Owing to the curvature of the line and to an intervening overbridge, the driver of the passenger train had only a restricted view of the line ahead and, despite an emergency brake application, was unable to avoid colliding with the rear of the freight train at a speed of about 20 m.p.h. As a result of the collision the brakevan and three out of the last five wagons of the freight train were derailed. The passenger train was not derailed but the leading vehicle sustained severe damage to the front buffer beam and minor internal damage.

The driver of the passenger train and 19 passengers suffered minor injuries and were quickly taken to local hospitals in ambulances which turned out promptly in response to calls for the emergency services. Only one person was detained in hospital, the remainder being discharged after treatment.

Only minor damage was caused to the track and after the damaged vehicle had been rerailed and removed normal working was resumed at 15.43 the same afternoon.

DESCRIPTION

Layout and Signals

1. Winwick Junction lies on the Euston to Carlisle main line about 3½ miles north of Warrington and 185½ miles from London. Between Warrington and Winwick Junction the line is four-tracked with Down Slow and Up Goods lines flanking Up Main and Down Fast lines. At Winwick Junction the Slow and Goods lines merge with the Main and Fast lines to become the double track main line which swings away to the North-east passing under the Liverpool to Manchester line towards Wigan and a double track branch continues northwards to join the Liverpool to Manchester line in a triangular junction at Earlestown.

2. Between Warrington and Winwick Junction there are intermediate signalboxes at Dallam Branch Sidings and Winwick Quay, the distance between the latter signalbox and Winwick Junction being 1 mile 297 yards. To the north of Winwick Quay the line is on a gentle left hand curve of 115 chains radius for a distance of ¾ mile, until just beyond overbridge No. 26, where it reverses to a right hand curve of 98 chains radius, flattening to 141 chains towards Winwick Junction. The gradient in the Down direction between Winwick Quay and Winwick Junction is rising at 1 in 639. The line speed limit is 90 m.p.h.

3. The line is worked on the absolute block system using ex-L. & N.W.R. combined type double needle block instruments. The Down Fast and Slow Home signals at both Winwick Quay and Winwick Junction are of the upper quadrant semaphore type mounted on bracket posts situated on the left of the line. The Distant signals for these Home signals are of the colour light type, those for Winwick Quay being combined with the Dallam Branch Sidings Down Starting signals and those for Winwick Junction, which are splitting distants, being mounted on a bracket post on the left of the line 1178 yards in rear of the Home signals and 500 yards on the approach side of overbridge No. 26. AWS is provided at the Distant signals which are replaced by occupation of berth track circuits, 200 yards long, in rear of the appropriate Home signals. Standard Class "C" controls are provided, including control of the block instrument line clear indication by Home signal lever normal, holding of the train-on-line indication by occupation of the berth track circuit of the Home signal and release of the section signal for one pull only on receipt of line clear from the signalbox in advance.

4. The country alongside the line is flat and the sighting of signals is good except for the obstruction to view caused by overbridge No. 26. The Winwick Quay Down Home signals are visible for a distance of 1110 yards and shortly after they come into sight the Winwick Junction Colour Light Distant signals can also be clearly distinguished.

5. The Winwick Junction Down Home signals first come into sight at a distance of 1478 yards when they can be seen over the western ramped approach to Bridge No. 26. They remain in sight over a distance of just over 200 yards and then become obscured by the bridge, until they again become visible through the bridge at a distance of 740 yards.

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The trains

6. The passenger train was formed of a two-car diesel multiple-unit set. The leading vehicle, No. 51194, was a motor second brake of tare weight 32 tons powered by two 150 HP engines mounted under the floor and driving the inner axles of the bogies through standard mechanical transmissions. The second vehicle, No. 56358, was a driving trailer composite of tare weight 25 tons. Both vehicles were of all-steel construction, built in 1958; they were gangwayed together and fitted with spring buffers, screw couplings, and vacuum brakes with cast iron blocks which were operative on all wheels. They had received their last routine examination at Chester on 7th July, when everything was found to be in order.

7. On the day of the collision the set was working the 10.11 stopping passenger train from Chester to Manchester Exchange. It had left Warrington on time at 10.42 conveying 130 passengers and its next booked stop was at Earlestown at 10.52.

8. The freight train was the 02.00 Class 5 from Margam to Carlisle. It consisted of 37 wagons and a brakevan equal to 50 BWU. The vacuum brake was connected on the leading 13 wagons. It was hauled by Class 5, 4–6–0 steam locomotive No. 45061.

The effects of the collision

9. The actual point of collision was 80 yards past the 185¼ mile post and 360 yards short of the Down Fast Home signal at Winwick Junction. Slight damage was sustained by the brakevan and the 33rd to 37th vehicles of the freight train. The 34th vehicle, a covered goods van, was derailed all wheels and the 35th and 36th vehicles and the brakevan derailed one pair of wheels only. After rerailing, the damaged vehicles were taken forward by the train as far as Bamfurlong where they were detached for transhipment.

10. The main damage to the passenger train was to the front buffer beam and leading ends of the solebars of the power car where it came into contact with the robust and ballasted 20-ton brakevan of the freight train. The quarter-inch plate glass transverse partition behind the driver's seat was shattered and the gangway door in the brake compartment dislodged from its runners. In the trailer car the frames of several rearward facing seats in the second class saloon were displaced or deformed and one window was broken. Neither vehicle was derailed and the damage was generally consistent with an impact speed not over 20 m.p.h.

11. The damage to the track in the Down Fast line, which was continuously welded 109 lb FB rail on concrete sleepers, was small, 7 sleepers being broken and a number of fastenings requiring renewal.

Evidence

12. The driver of the freight train was *Driver J. Stansfield*, stationed at Crewe. He described his journey and said that he had not been checked between Warrington and Winwick Junction and that both Distant and Home signals at Winwick Quay had been off. At Winwick Junction the Home signal was at Danger and he stopped his train some 40 yards short of the signal. It came off after about 3 minutes, but when Stansfield opened the regulator the train failed to start immediately, so he closed the regulator and opened the cylinder cocks. Just as he was making a further attempt to get his train moving he felt the impact of the collision coming through the train from the rear.

13. *Passed Fireman J. Edwards* confirmed his driver's evidence and both were satisfied that the Winwick Quay Down Fast Home signal was fully in the Clear position when they passed it.

14. In charge of the freight train was *Goods Guard W. Bulman* of Carlisle. He described how the train came to a stand at Winwick Junction signals with his van some 100 yards past the overbridge. He was cleaning the van windows when he suddenly became aware of the approach of the DMU. When he first saw it, it was only about 40 yards away. He thought the wheels were skidding and he realized it was not going to stop, he jumped down from his brakevan and stood clear, thus escaping injury.

15. The driver of the passenger train was *Driver E. L. Griffiths*, stationed at Birkenhead. He told me he had a normal journey without signal checks from Chester to Warrington but from there he had a series of checks. He whistled for the signal at the end of the platform at Warrington which then changed from a red to a yellow aspect. The next signal, Warrington No. 4 Down Fast Home signal was showing a red aspect, but changed to yellow as the train approached. At Dallam Branch Sidings, the next signalbox, the Down Fast Home signal was at green but the Starting signal, also the Distant for Winwick Quay, was at yellow.

16. Griffiths said he was running at about 40 m.p.h. approaching Winwick Quay. He got a good and distant view of the upper quadrant Down Fast Home signal and when he first saw it, it was in the Clear position. I questioned Driver Griffiths closely about the actual position of the signal arm and he was insistant that it had been in a good "off" position. I showed him a sketch of an upper quadrant signal with the arm at 15° above the horizontal and he was certain that the signal was better than that and that had it been at the angle shown in the sketch he would have been very doubtful of it.

17. Driver Griffiths then described the collision. After passing Winwick Quay signalbox he increased speed slightly since he was expecting a clear road at Winwick Junction, although the Distant signals remained at Caution as he approached them. He realized that there was a freight train ahead as he had seen the smoke and steam from a long way off, but he thought it was on the Slow line and that the signalman at Winwick Junction was waiting for it to come to a stand before letting him across on to the branch. After passing the Distant signals Griffiths shut off power and let the train coast until, as he ran under Bridge No. 26 at perhaps 35 m.p.h., he saw the right-hand signal off, whereupon he prepared to stop to tell the signalman he wanted the other route. At this stage he was aware of the freight train ahead, but, on account of the change in curvature of the line he still thought it was on the Slow line until, suddenly, he realized the brakevan was

ahead of him on the same line at a distance he estimated at 80 yards. He made an immediate emergency brake application, closed the throttle, shouted to his passengers to hold tight and sounded his two-tone horn to warn the guard in the van ahead. When the collision occurred he broke the glass partition behind him with the back of his head.

18. *Goods Guard M. J. Cochrane* was in charge of the passenger train. He estimated the speed of the train as about 30 m.p.h. when the brakes were applied before the collision. When the impact occurred he was knocked over by the gangway sliding door which became dislodged from its runners, but he was not hurt and immediately took the necessary steps to ensure that his train was protected. In doing this he was assisted by *Mr. E. R. France, Assistant Station Manager* at Mold Junction, who was travelling as a passenger. Mr. France was travelling in the first class saloon of the trailer car in a position from which he could see the speedometer in the rear driving cab and he recalled that the speed of the train shortly before the collision was 44 m.p.h.

19. On duty in Winwick Quay signalbox was *Signalman W. Hall.* He described how he had signalled the freight train in the usual way and after it had passed he had accepted the passenger train from Dallam Branch. He heard the train approaching while he was speaking on the telephone and expected it to come to a stand at his signals. When he realized the train was not stopping, it was already too late for him to reach the detonator placer or make a hand danger signal so he sent the "Train Running Away" signal to Winwick Junction. On looking out he saw the Down Fast Home signal in a partly raised position, although the lever stood normal in the frame and he realized that he had not looked out as he restored the signal after the passage of the freight train to see that it returned to the Danger position. Signalman Hall described the position of the arm as one which he would expect a driver to accept as Clear.

20. I asked Hall, who had worked for five years at Winwick Quay, whether he had ever known this signal to stick in the Clear position before and he told me that it had once done so, some three years previously. He could not remember whether he had reported the incident.

21. I also interviewed *Signalman J. E. Hewitt* who had worked for about 3½ years at Winwick Quay, and asked him the same question. He could not recall any occasion on which there had been any fault on the Down Fast Home signal but he told me that, some 3 months previously the Down Slow Home signal, mounted on the same post, had stuck in the Clear position. It had returned to the Danger position after he had gone out and pulled the wire and he had made a verbal report to the lineman.

22. The lineman in charge of the signalling equipment at Winwick Quay was *Technician A. K. Bailey*, also responsible for Nos 2, 4 and 5 Signalboxes at Warrington and Dallam Branch Sidings. He had been stationed in the Warrington area for 3½ years. He was responsible for inspecting each semaphore installation monthly, but could not remember the occasion referred to by Signalman Hewitt when the Down Slow Home signal was reported for sticking in the off position.

23. Bailey described the routine for the inspection of a semaphore signal which included checking the pins, oiling the balance weight casting, checking the wires to the arms and verifying the aspects. He told me that he had never had any specific guidance on what degree of wear in a balance weight casting or on the pins could be tolerated, but that when he observed indications of balance weights striking one another or lever arms striking one another or a lever arm striking a weight he reported it to the local inspector.

24. He said that he had probably inspected the Down Home signals at Winwick Quay three times in the last 3 months but he had not noticed any signs of wear, and that the maintenance of this particular signal had given him no trouble. His last visit to Winwick Quay for maintenance purposes was made on 12th June 1967.

25. The Signal and Telecommunications Supervisor in charge of the area was *Inspector J. A. Robertson*, who had been stationed at Warrington since 1955. I asked him how he supervised the technicians working under him and how often he got round his area to look at the standard of work being carried out. He told me that he had not inspected the signals at Winwick Quay during the previous 12 months, and that other aspects of his work kept him from supervising maintenance work as often as he would like. He had actually been in the signalbox more recently whilst walking through to Winwick Junction but on that occasion he had not looked at the individual signals.

26. As far as Technician Bailey's work was concerned, Inspector Robertson described himself as reasonably satisfied and he said that he relied on Bailey to draw his attention to anything that required renewal or repair. If Technician Bailey had reported that a balance weight casting was badly worn he would have gone to look at it to determine what repairs were necessary but on this occasion his attention had not been drawn to the need for any repairs.

27. Immediately after the accident Inspector Robertson visited Winwick Quay in company with *Relief Signals and Telecommunications Inspector N. B. Smith* who happened to be in the Warrington area when news of the collision was received. They reached the signalbox at 11.46 and asked Signalman Hall what had happened. He told them that the Down Fast Home signal had stuck in the off position. They tested the action of the signal several times and found that when the lever was replaced in a normal manner in the frame the signal returned correctly to the danger position, but if the lever was put back very slowly the arm lodged in an intermediate position. In examining the signalpost they found that the balance lever of the Down Fast Home signal was lodging on an adjacent weight and that it could do this because the balance weight casting was badly worn, allowing the lever to develop an excessive lateral movement. Inspector Smith then told me that they obtained a gauge, measured the lift of the signal arm in the lodged position, and found it to be 17 degrees above the horizontal. He considered that this would have been a very doubtful signal by day and that in the dark it would certainly have shown a red light.

28. I asked Inspector Smith how long, in his estimation, this degree of wear in the balanceweight casting would have taken to develop. He thought it was the result of normal wear and tear and would have taken a considerable time to reach its present condition. He would have expected it to have been reported long before it got as bad as it did and had not previously seen one in a condition as bad as this. He completed an inspection of the rest of the signalling apparatus at Winwick Quay and found a casting on another signal that was slightly worn and a worn pin on the Up signal that required renewal. This had been done at once.

Tests and Observations

29. On the day of the collision a full check was made of the interlocking and block controls at both Winwick Quay and Winwick Junction and all was found in order. There was no possibility of the passenger train having been irregularly accepted and having passed the Down Fast Home signal at Winwick Junction in the full clear position.

30. I examined the balance lever casting mounted with the levers in it exactly as it had been removed from the signalpost. It is shown in the drawing attached to this Report. The lever controlling the Down Fast Home signal was the outermost of the four levers in the casting and it was fitted with a 7 in. diameter weight located approximately 15in. from the fulcrum. The remaining levers were each fitted with a 10in. diameter weight at the outer end of the lever. Wear between the bush of the outermost lever and the fulcrum pin was such that it was possible to move the outer end of the lever almost 2 inches laterally from its normal position towards the signalpost. When in this position it could be made to lodge without difficulty on the head of the locking bolt of the adjacent balance weight. Score marks on both lever and bolthead indicated that they had been in frequent contact with one another. At the fulcrum each lever incorporates a bush $2\frac{3}{4}$ in. long with a 1 in. diameter hole through which passes the steel fulcrum pin. A grease nipple is provided for lubrication, but in this instance, though the casting showed some traces of old dirty oil, it did not appear to have been recently lubricated.

31. I also noticed that all the balance weights were assembled with the locking bolts on top instead of beneath, as shown on the relevant British Railways standard arrangement drawings, and I was told that this was done throughout the area because it had been found by experience that the weights were easier to adjust and maintain with the bolts on top. It was apparent that, provided all the weights on any particular signal were the same way up and in line, there was no increased risk of malfunction because each balance weight is tapered on the side away from the bolt, but in this particular instance the lever would have been somewhat less likely to lodge on the tapered side of the weight than on the head of the locking bolt.

32. I also observed the approach to the point of collision from a propelled saloon on the Down Fast line and saw how the reverse curvature immediately to the north of overbridge No. 26 makes it very difficult to see on which line a train ahead is standing. In my view, the driver of the passenger train would not have realized that the freight train ahead was on the same line until he was some 80 yards beyond the bridge, and only 200 yards short of the point of collision. The speed of the train at this time was about 40 m.p.h., based on Mr. France's observation of the speedometer in the rear cab, at which speed its estimated minimum stopping distance was 210 yards, measured from the point at which the brake application became effective, and a distance of 150 yards would have been covered before the speed was reduced to the estimated impact speed of 20 m.p.h. It is thus apparent that Driver Griffith's estimate of 80 yards as the distance at which he became aware that the brake van ahead was on the same line was a considerable underestimate and that in fact he made his brake application when at least twice this distance from the point of collision.

Conclusions and Remarks

33. The prime cause of this collision lay in the failure of Signalman Hall at Winwick Quay to watch the Down Fast Home signal as he restored the lever to normal in frame after the passage of the freight train, to satisfy himself that the arm dropped fully to the Danger position, as required by the provisions of Rule 65 of the British Railways Rule Book. The signal was located only 40 yards from the signalbox and clearly visible from it, and this visual check should have been carried out automatically by the signalman every time he operated the lever.

34. The signal failed to return to the Danger position, becoming lodged in an intermediate position, because wear in the balance lever casting at the foot of the signalpost had allowed such lateral play to develop in the movement of the balance weight lever of the Down Fast Home signal that it was able to fall foul of and become held up by an adjacent weight. Such a degree of wear could only have developed over a long period of use and the balance weight casting should have been renewed long before it reached the condition in which it was found after the accident.

35. I have no doubt, therefore, that the accident would not have occurred if the maintenance of the signal equipment at Winwick Quay had been properly carried out and conscientiously supervised. I am satisfied that the state of wear of the balance weight casting had not been reached suddenly and that, if Technician Bailey had looked at it closely during any of his last three monthly inspections he would have realised that it needed attention as a matter of urgency. For this state of affairs, however, Technician Bailey was, in my view, no more to blame than his supervisor, Inspector Robertson. The latter, who had not looked at the installation at Winwick Quay for over 12 months, professed himself to be "reasonably satisfied" with Technician Bailey's work. In this he was clearly mistaken; if he had carried out his own duties more conscientiously, he would have realised that the standard of Bailey's work left much to be desired.

36. The position in which the arm of the Down Fast Home signal at Winwick Quay became lodged, and in which it was accepted as "off" by Driver Griffiths, was about 17 degrees above the horizontal, a position in which, if it had been dark at the time, the signal would have undoubtedly been displaying a red light. The full Clear position for an upper quadrant semaphore signal is 50 degrees above the horizontal and, in my view, an arm standing at an angle which was barely one third of this should have been regarded as doubtful by the driver, who should have taken appropriate action under Rule 82 of the Rule Book which requires him to treat an imperfectly exhibited signal as a Danger signal and report it to the signalman at the nearest signalbox. Driver Griffiths, however, had no doubts in his mind about this signal and I can only assume that he was not unaccustomed to encountering semaphore arms which, as a result of poor maintenance or bad adjustment, are displaying something less than a good, clear "off". Nevertheless, the Rules are quite explicit with regard to the driver's responsibility for reporting imperfectly exhibited signals, and Driver Griffiths must therefore bear a share of the responsibility for this collision. With regard to his speed of reaction, once he became aware of the train ahead on the same line, I am satisfied that he was keeping a proper lookout ahead and did all that was possible to avoid a collision.

37. The circumstances of this accident, contributed to in greater or less degree by the negligence of four members of the staff, draw attention once again to the continuing need for conscientious attention to detail by everybody concerned with the day-to-day running of the railway, without which a high standard of safety cannot be maintained.

I have the honour to be,

Sir,

Your obedient Servant,

I. K. A. McNaughton

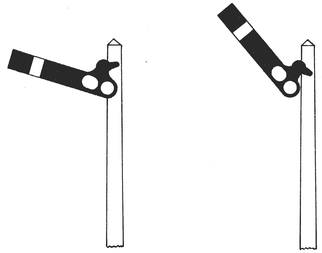
Lieutenant-Colonel.

The Secretary
Ministry of Transport

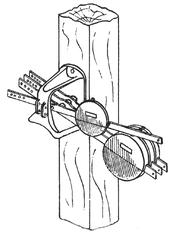
(103861) Dd. 138630 K.9 5/68 Hw.

COLLISION AT WINWICK JUNCTION – 11TH JULY 1967

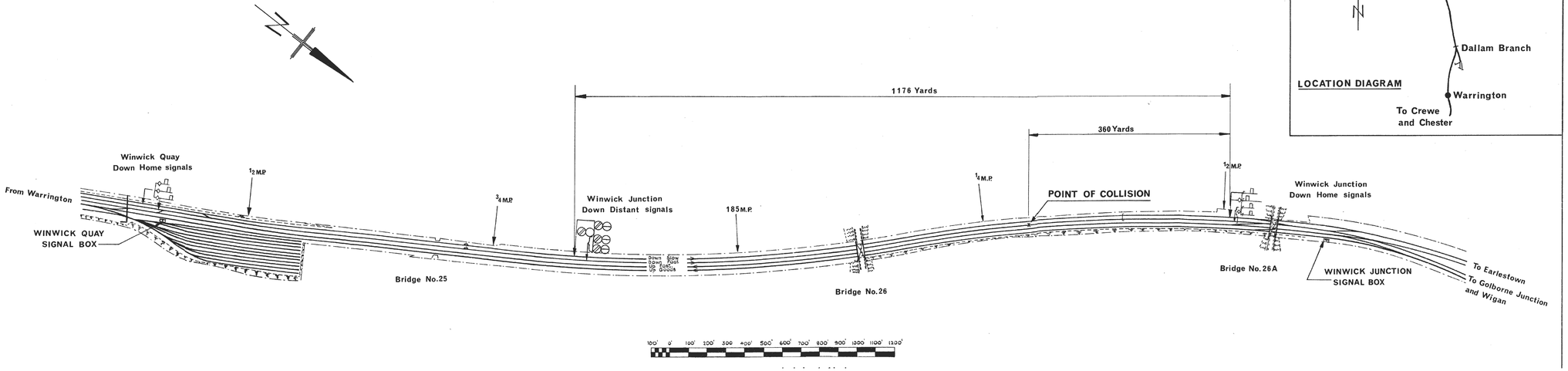
DIAGRAM OF LINE FROM WINWICK QUAY TO WINWICK JUNCTION SHOWING SIGNALS ON DOWN LINE

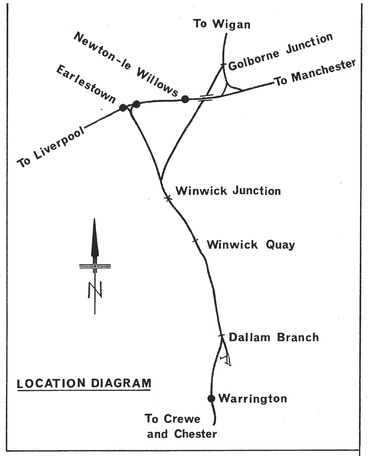


Upper quadrant semaphore signal with arm at
(i) 17° (ii) 50°
above horizontal



Detail of balance lever assembly at foot of signal post. Showing lever of Down Fast Home Signal lodged on adjacent weight.





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