



MINISTRY OF TRANSPORT & CIVIL AVIATION

RAILWAY ACCIDENTS

REPORT ON THE COLLISION

which occurred on
23rd December 1955

near

WOKING

in the

**SOUTHERN REGION
BRITISH RAILWAYS**

LONDON: HER MAJESTY'S STATIONERY OFFICE
1956

TWO SHILLINGS NET

22nd June, 1956.

SIR,

I have the honour to report for the information of the Minister of Transport and Civil Aviation, in accordance with the Order dated 28th December 1955, the result of my Inquiry into the collision which occurred at about 8.29 p.m. on the 23rd December 1955, on the four-track electrified main line near Woking, in the Southern Region, British Railways.

The 7.50 p.m., multiple unit, electric passenger train from Waterloo to Portsmouth had been standing for a few minutes at the Woking Down Through home signal, when it was struck at the rear by the 7.54 p.m. steam passenger train from Waterloo to Basingstoke. The speed of the collision was low and the main damage was confined to the front end of the locomotive and the rear coach of the electric train. The driving compartment at the trailing end of this coach and the unoccupied guard's compartment next to it were crushed, and the rear bogie was detached towards the adjacent Up Through line. An Up passenger train from Bournemouth which had started from Woking on this line as the collision happened, scraped past the derailed bogie and was disabled by it, but was not derailed. The accident caused a short circuit on the Down Through line and the circuit breakers for this line at Woking and Byfleet substations were tripped immediately. Damage to the track was slight and there were no serious casualties; 21 passengers and a guard sustained minor injuries.

Although the Up and Down Local tracks were not obstructed by the collision, traffic was stopped and the electrical pressure removed from all lines in order to facilitate the movement of passengers to Woking Station. These two lines were re-opened for traffic at about 10.15 p.m. and normal working on all lines was in operation before 8 a.m. on the following day.

The night was fine and clear, though dark.

DESCRIPTION

The line

1. The general arrangement of the line and relevant signals is indicated on the attached drawings. The main line to the South West is straight and on a slight rising gradient from West Weybridge through West Byfleet to Woking. The line is in cutting for about $\frac{3}{4}$ mile from West Byfleet signal box towards Woking with a road overbridge about midway along this cutting, and thenceforward on bank. From left to right when facing away from London the tracks are the Down Local, Down Through, Up Through and Up Local. All the tracks are electrified on the third rail system.

The signalling

2. There is a central, electric power, signal box at Woking with complete track circuiting, and the signals there are 4-aspect colour lights with junction indicators for diverging movements. The West Byfleet signals are manually worked semaphores. The block section between these two stations is divided in the Down direction by the Maybury Intermediate Block signals, worked from West Byfleet box. These signals are the last semaphores approaching the Woking colour light area, and in accordance with the standard practice in the Southern Region the stop signals are provided with colour light "approach" aspects (G & Y) below the semaphore arms; if the semaphore arm is at danger, neither of the colour light aspects below it is lit, but if the arm is "off" the yellow aspect is shown when the signal next ahead, the Woking Down Home, is at red, and the green aspect when that signal is at yellow or green. The Maybury Distant signals are simple semaphores. The stop and distant signal lights are repeated in the West Byfleet signal box as also are the semaphore arms. One lever for each road works the stop and distant signal together for each line, the arms being motor operated.

3. As will be seen from the drawing the two semaphore stop arms are mounted on a bracket above a single post, with the approach colour lights just below them. The semaphore signal lights are electric but their intensity is equivalent to that of a well trimmed oil lamp, and is much less than that of the approach colour lights.

4. There are continuous track circuits on the Down lines from the West Byfleet Advanced Starting signals to Woking; the first ones extend 440 yards beyond the Maybury Intermediate signals and are repeated both in Byfleet box and on the Woking box illuminated diagram; the remainder concern Woking only.

5. The Sykes Lock and Block system is in operation on this section of the line, and a brief description of this system is given in the Appendix. There is rotation locking between the West Byfleet Home, Starting and Advanced Starting signals, so that one cannot be pulled a second time until the one ahead has been pulled and replaced, and the Advanced Starting signal can only be cleared when the Maybury Intermediate signal is "on" and the lever normal and the intervening track circuit is clear. Further, the Maybury signals cannot be pulled until the Woking signalman has "plunged" to accept a train, and the plunger cannot be operated unless the Woking Down Home signal for the line concerned is at red and the track circuit between the Maybury Intermediate signal and a point 440 yards ahead of the Woking Down Home signal is clear. A release which requires the co-operation of the signalmen at both boxes is provided for this plunger; this release will not work unless (a) the track circuit is clear, (b) the instrument at West Byfleet box is locked, and (c) the Maybury Intermediate signal lever in West Byfleet box is normal in the frame. No Block Register is kept in the West Byfleet box, but the movement of trains is recorded at Woking.

The trains

6. The electric train comprised three units of four coaches each and weighed 542 tons ; its total length was 793 ft. Each unit of this stock has a motor coach at either end with two trailer coaches in between, and all the coaches are of vestibule or corridor type. The coaches had been built in 1937 and 1938 with steel body panels on hard wood framing.

7. The Waterloo to Basingstoke train consisted of 8 corridor coaches weighing 257 tons, drawn by a "Remembrance" Class engine, with 4-6-0 wheel arrangement, weighing 130 tons with an 8-wheeled tender. The driver's position was on the left. The power of the vacuum brake on this train was approximately 73% of its total weight of 387 tons. The coaches had been built between 1930 and 1936 and they were of similar construction to the coaches of the electric train. The total length of the train was 552 ft.

REPORT

8. Motorman G. E. T. Peters was driving the electric train. He said that the start from Waterloo had been slow but that he had a clear run on the Down Through line after Hampton Court with all signals off until he saw the Maybury Distant signal at caution, and a yellow approach light under the Maybury Intermediate signal, before he was stopped at the Woking Home. The Maybury Intermediate signal for the Local line was at danger when he passed it but he could not see the green light for his track as the glare of the yellow colour light immediately below overpowered it.

9. Peters said that the train had been standing for about three minutes and he had released the brakes before the collision occurred, jerking the train forward ; the air brakes became applied immediately and the train stopped again very quickly. He did not have a clear recollection of the Up train from Bournemouth passing him and thought it must have done so almost immediately after the collision, and before he got out of his cab a few moments later to telephone to Woking signal box for ambulances and to ask for the electrical pressure to be removed from the lines. He then walked towards the rear of the train and found that it had become divided between the 9th and 10th coaches by the impact. (This had caused the automatic application of the brake.) He said that he spoke to Driver Hopkins of the Basingstoke train who told him that the Maybury signal had been off for his train.

10. Guard J. H. Bishop was travelling in the brake van in the eighth coach. He confirmed in general the evidence of Motorman Peters except that he said that the Maybury Through Distant signal had been at clear ; he was also able to see the green light of the Through line stop signal semaphore above the yellow colour light. He was thrown to the floor by the collision but was able to carry out his emergency duties.

11. Driver J. Hopkins of the 7.54 p.m. train to Basingstoke said that he received a number of signal checks during the first part of the journey from Waterloo, which he had left three minutes late, but he had a clear run from Esher onwards ; all the signals were off at West Byfleet and he said that the Maybury Distant signals for both lines were in the clear position. He also said that he then saw the Maybury Intermediate signals for both lines at green with yellow approach lights beneath, and also the Woking Through Home signal ahead at red. He closed the regulator in preparation for stopping, but had not yet begun to brake as his speed was only moderate, when he saw the tail lamp of the Portsmouth train about 12 coach lengths ahead (250 yards). He made a full application of the brake, reversed the engine and applied sand, and had reduced the speed to a walking pace before the collision.

12. Driver Hopkins, who knew this line well, though he travelled over it only about once in every three weeks, added that his train was always routed on the Through line and that he usually got a good run into Woking ; he was sure that he could not have overlooked the red light of the Through signal and have confused it with the Local line signal with its brilliant yellow aspect.

13. Neither he nor the fireman was hurt, and Hopkins was about to get down on the off side of the engine after having seen that the track on the near side was unobstructed, when he heard the noise as the approaching Up train from Bournemouth scraped past an obstacle ahead of him which proved to be the derailed rear bogie of the Portsmouth train. After the Up train had passed he got down and walked along the track to the rear of the train to meet his guard, and arranged for him to protect the line towards Byfleet. He did not, however, look towards the Maybury signals about 550 yards in rear, to see whether the white back light for the Through line one was visible. He then walked through the train to attend to the passengers.

14. Fireman R. Knight said that he only saw one of the Maybury stop signals from the right hand side of the cab as he was stooping to manipulate the water feed regulator and his view upwards over the boiler was restricted. He was fairly sure, however, that the yellow approach light and the green light above it on the signal which he saw were for the Through line. He was attending to the fire when the engine passed the Maybury Distant but he said he had seen both of these signals in the clear position beforehand.

15. Guard F. M. Bungay was travelling in the last coach of the Basingstoke train. He said that he began to write in his journal after he had seen the West Byfleet Starting signal and did not look out again for signals until the train had passed the Maybury Intermediates. He was watching the Woking Home signal, which was at red, through the side "look-out" when he felt the brakes being applied just before the collision. The sudden stop caused him to lurch forward and his face was hurt by bumping against the edge of the "look-out". He soon recovered himself and then carried out his duties of protecting the Down line. He went about $\frac{3}{4}$ mile towards Byfleet before placing detonators, passing the Maybury stop signals, but he said that he did not look at the signals either to see the back lights as he walked towards them or to note their aspect after he had passed.

16. Driver W. J. Whitfield who was in charge of the Up train from Bournemouth said that he left Woking at 8.29 p.m. under clear signals ; after a minute or two he felt a heavy bump and the engine rolled ; he brought the train cautiously to a stop, and then saw the Up Advanced Starting signal about 240 yards ahead go to red. After checking the damage to his engine he left his fireman to throw out the fire and went forward to protect the Down lines. Before he had gone very far, however, he met the guard of the Basingstoke train who had already carried out this duty, so he returned to attend to his train.

17. Signalman R. W. Stroud said that he had worked at West Byfleet box for about two years ; his duty that day was from 1.30 p.m. to 10.30 p.m. All the instruments in the box were working normally and he was satisfied from the indications of the light repeaters and the arm repeaters that the Maybury Intermediate signals were in proper order.

18. He accepted the electric train on the Down Through line in the normal way from Byfleet Junction, the next box towards London, and offered it forward. It was accepted from Woking but he was told that it would be held in the section for a little time. After the train passed he replaced the signals, gave "Train out of Section", and then accepted the Basingstoke train on this line. In due course he pulled the Home and Starting signal levers at West Byfleet for it after the electric train had passed the Maybury Distant and Intermediate signals and he had replaced them at danger.

19. At about this time Stroud had accepted a Down freight train on the adjacent Local line and had obtained "Line Clear" for it from Woking. He cleared the Maybury Intermediate signals for the Local line at about the same time as the Basingstoke train was passing his box on the Through line. He had not offered the Basingstoke train to Woking as he had not received "Train Out of Section" for the electric train ahead, but he suddenly heard the click of the track circuit indicator for "B" track and saw that it registered clear. This indicated that the Basingstoke train had travelled beyond the Maybury Intermediate signal and he immediately sent the bell code for "Vehicles Running Away on Right Line" to Woking, and then replaced his Down Local signals in time to stop the freight train. Stroud then sent "Obstruction Danger" to Woking for the Up Through line on which he had accepted the Bournemouth train, and he received "Obstruction Danger" from Woking for the Down lines at about the same time. There is an "Occurrence Book" in West Byfleet box in which these emergency messages were recorded as having been passed at 8.30 p.m., 8.31 p.m., and again at 8.31 p.m. The Train Register at Woking, in which the incidents relating to this collision were recorded, confirms these times to within a minute. This Register was carefully maintained.

20. Station Master J. H. Russell at West Byfleet arrived in the signal box at 8.37 p.m. in response to an urgent message from Stroud. He was told that the Basingstoke train had run by the Maybury Intermediate Down Through signal and had collided with the electric train between it and the Woking Home signal. Mr. Russell said that he then checked the position of the levers in the frame and found them all properly in the normal position except for No. 24, a facing point bolt lever which is maintained in the reversed position ; he also noted that lever collars had been placed on all necessary levers. A van train was standing at the Home signal on the Down Through line and the freight train had stopped on the Down Local line after over-running the Starting signal which had been put to danger as the train approached it. He was told by Stroud of the action taken and of the emergency bell signals which had been sent ; he asked him if he was certain that the signal had been passed at danger, and he received the reply "Yes, certain". Mr. Russell thought Stroud seemed calm and confident.

21. Signalman G. H. Hunt was in charge of the Down lines in Woking signal box. He said that all the apparatus was working normally that night. He received "Train Entering Section" from West Byfleet for the electric train at 8.22 p.m., and expected it to arrive at the Down Through Home signal at about 8.25 p.m., to wait a few minutes for a path into Woking. The presence of this train at the signal was indicated on the illuminated diagram in the box by track circuit BM. He had not been offered the Basingstoke train as he had not given "Train Out of Section" for the electric train, and had in fact told the West Byfleet signalman at about 8.25 p.m. that the electric train would be delayed at the Home signal. He said that he saw track circuit BL (called "B" track in West Byfleet box) show occupied on his diagram and assumed that the Basingstoke train was approaching the Maybury signals. He then said :—

"I was watching the diagram when I suddenly saw 'BL' track show clear and I was just going to send 'Obstruction Danger' for the Down Through to West Byfleet, as I realised that the 7.54 p.m. Waterloo to Basingstoke had probably over-run Maybury Intermediate signal, when I received 'Vehicles Running Away on Right Line' signal from West Byfleet on the Down Through line.

At 8.31 p.m. I sent 'Obstruction Danger' to West Byfleet for the Down Local and told him on the telephone to accept it for the Down Through also.

Very soon after this the Motorman of the 7.50 p.m. rang me from signal No. 119 (Woking Down Home) and told me that a train had collided with the rear of the 7.50 p.m. I tried to get the Station Inspector on the telephone but the Station Master came on the 'phone and I told him what had happened and then rang the Electrical Control to get the current off the Down Local line as I assumed from the conversation it was already off the Down Through."

22. Signalman Hunt said there was no undue pressure in the signal box that evening or any unusual working until the accident happened.

23. The evidence of Signalman R. E. Russell who was in charge of the Up lines in Woking box confirmed that of Hunt and Stroud. The Up train on the Through line had already passed the Starting signal when he heard the "Vehicles Running Away on Right Line" bell code given by Stroud to Hunt, but he promptly restored the Advanced Starter to danger.

24. Mr. S. Winnifrith, the Station Master at Woking, was still at the station when the accident happened. He gave a clear and detailed account of the arrangements made to remove the electrical pressure from the tracks, to attend to the injured and dispose of passengers, and to clear the damaged stock and restore train services.

25. Signal Department Lineman E. A. Goodwin arrived at Woking signal box at 8.40 p.m. in response to a telephone call from the signalman. He found the Down Through plunging instrument at "Train On" and noted from the illuminated diagram that "BM" track was showing occupied and "BL" track clear.

26. District Signal Inspector E. A. Farenden arrived at Woking Signal box 20 minutes later and checked the lineman's report ; he then went with Sub-Inspector G. H. Staples to look at signals between Woking and West Byfleet. They reached the Maybury Intermediates at about 9.22 p.m. and found that the arms of both signals were at danger with the semaphore lamps alight ; there were no lights in the approach colour light

signals below the semaphore arms. Mr. Farenden then returned to Woking box and Sub-Inspector Staples went on to examine the Maybury Distant signals which he found in good order and properly at caution, and then on to West Byfleet box. He checked that the arm and light repeaters of the Maybury signals were giving a correct indication, and that the Down Through instrument above the lever for the Maybury Intermediate signal was standing at "locked". He tested the locking of this lever by attempting to pull it, and then disconnected the block wires to enable Mr. Farenden to carry out insulation tests at Woking.

27. Further evidence by Mr. Farenden and Chief Lineman W. J. S. Hallett dealt with the insulation tests made on the block wires that night, and the tests carried out the next day on the circuits and mechanism of the Maybury signals and of the other signals and equipment at West Byfleet. These were satisfactory in all respects.

CONCLUSION

28. The evidence of Driver Hopkins that the Maybury signals were in the clear position when he passed them is not well corroborated, but on such occasions conclusive confirmatory evidence as to the aspect of a signal at the time of the occurrence is seldom available. The evidence is, however, substantial that there was no fault in the signal equipment, and there was every indication that the signalmen at West Byfleet and Woking had performed their duties properly. As has been explained, the interlocking of the signals with the block made it impossible for the Maybury Through line signals to be cleared a second time while the electric train was in the section, unless there had been a fault in the equipment. If these signals had not been restored to danger after the passage of the electric train the West Byfleet Home and Starting signals could not have been cleared because of the locking between them and the Maybury signals. If the West Byfleet signals also had been left "off" after the passage of the electric train the signalman could not have accepted the Basingstoke train from Byfleet Junction, and the starting signal at that box could not have been cleared.

29. I am satisfied that there were no irregularities in the signalling of the two trains, and I conclude that the Maybury Intermediate Distant signals for the Down Through line were properly at danger and caution respectively when the Basingstoke train ran past them.

30. Driver Hopkins has had long service with the Railway and his record is very good ; I can only assume that, despite his evidence to the contrary, he missed the Maybury Distant signal and overlooked the semaphore red light of the Through line Intermediate signal when he saw the brilliant yellow aspect under the Local line signal, which he must have misread as applying to the Through line.

31. It is part of a guard's duties to look out for signals when approaching important junctions and stations where the train is booked to stop ; Guard Bungay should have watched for this signal, but he failed to do so.

REMARKS

32. It is possible that if the tail lamp on the Portsmouth train had been brighter, Driver Hopkins might have picked it out sooner from the other lights of Woking Station and thus have stopped his train in time to avoid the collision. More conspicuous tail lamps are in use in a number of countries and they are undoubtedly most valuable on lines where passenger trains are allowed to work under the Permissive Block. In this country though, where Absolute Block working for passenger trains is statutory, the safety of train working depends primarily on proper signalling procedure and the proper observance of signals. The main purpose of the tail lamp has been to indicate to the signalmen that a train is complete, and for this the present pattern is satisfactory. Nevertheless the tail lamp does serve as the final "stop" indication on rare occasions, and the British Transport Commission have been considering the provision of more powerful tail lamps for some little time ; trials of two types are at present in progress.

33. A collision occurred at this place in closely similar circumstances on 10th November 1945. The Maybury Intermediate Local line signal was at clear with a yellow approach colour light beneath it, and it was concluded that the driver mistook this signal for the Through line signal which was at danger. At that time, however, the semaphore signals had oil lamps, and the red light of the Through line signal was hardly visible as it was badly sooted and very dim.

34. I made a number of journeys on a locomotive by night in clear weather between West Byfleet and Woking to examine the visibility of the Maybury Intermediate Down Through signal at danger when the Down Local signal was clear with a yellow approach colour light beneath, and I noted that the yellow light tended to overpower the dimmer semaphore signal red light close by. I was assured by most of the drivers to whom I spoke that they had no serious problem in picking out the red light of the Through line semaphore signal in these circumstances, but there is no doubt that this could be difficult under adverse weather conditions.

35. The amount of light which should be provided in the semaphore signal lamp at locations such as this has been carefully considered in the past by the Railway, but the view has been held that the normal intensity should be maintained. I suggest, however, that this matter might be considered further and the disparity between the amount of light shown by the semaphore signal lamp and the approach colour light reduced. I think also that if the approach lights under the Local line signal were to the left of the post instead of to the right as at present, the additional distance of about 3 ft. between these lights and the Through line signal might make a big reduction in the overpowering effect of the yellow aspect. Unless there are serious technical difficulties I recommend that a trial be made with this alteration.

36. This accident would probably have been prevented by the British Railways system of Automatic Train Control to which the Minister's provisional approval has recently been given ; the development of this equipment has so far been concentrated on the type required for steam lines, but modifications to adapt it for use on electrified lines are under trial.

I have the honour to be,

Sir,

Your obedient Servant,

W. P. REED,

Colonel.

The Secretary,
Ministry of Transport and Civil Aviation.

DESCRIPTION OF THE SYKES LOCK AND BLOCK SYSTEM OF SIGNALLING
(As applied on the Western Section of the Southern Region)

The object of this system is to ensure that the signal cannot be given for a train to enter a Section of line between two Block Signal Boxes while another train is in that Section. This is accomplished by interlocking the signals with the "Block" so that a signalman is not able to lower the signal controlling the entrance to the Block Section ahead until that signal has been electrically released by the signalman at the signal box in advance, who cannot so release the signal until the preceding train has passed his own signal controlling the entrance to the Section ahead or other signal at such box and that signal has been replaced at danger, nor where a treadle is provided, until the train has reached it.

Each signal lever is connected, generally by means of rodding, to a Sykes instrument, which has a slot indicator showing "locked" or "free". Each home signal instrument has, in addition, a second slot indicator showing blank or "train-on". When the signalman is offered a train from the box in the rear, if he is in a position to accept he pushes in a plunger which is part of his home signal instrument. This action frees the starting signal of the box in the rear and changes the lower indicator of his own home signal instrument from blank to "train-on". The plunger becomes locked. The upper indicator of this same instrument indicates "free" as the line is clear to the starting or other signal. When the home signal lever is reversed, the upper indicator changes from "free" to "locked" and remains in this position until the starting or other signal lever has been pulled and replaced following the operation of a treadle or track circuit in advance of that signal. When the train has passed the home signal, the replacement of the home signal lever changes the lower indicator from "train-on" to blank, but the plunger remains locked until the upper indicator changes to "free" on the replacement of the starting or other signal lever.

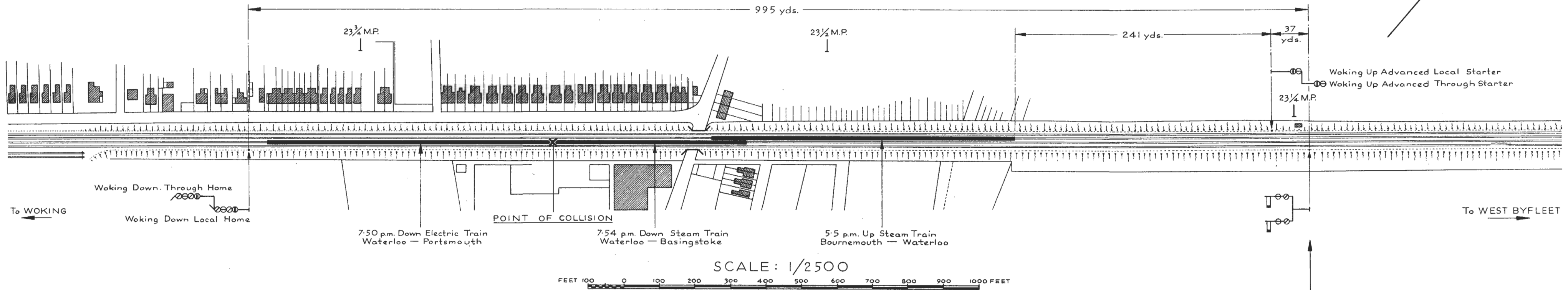
The instrument associated with the starting signal normally shows "locked", and in this position the instrument rod is raised and the signal lever locked. The rod is held in this position by means of a permanent magnet and detent in the instrument. When it is required to send a train into the block section, the appropriate bell signal is sent to the box in advance. If the signalman at that box is in a position to accept the train he pushes in the plunger. This action completes an electric circuit which, by means of a coil winding in the instrument of the starting signal of the signal box in rear, neutralises the effect of the permanent magnet and so allows the lock rod to drop. This frees the starting signal lever and gives the "free" indication in the instrument. The starting signal lever is then pulled. This action changes the indication in the instrument from "free" to "locked" and the starting signal becomes backlocked. The lever cannot be fully replaced until a treadle or track circuit ahead of the signal has been actuated by a train. This actuation closes a contact which completes the circuit to release the backlock on the lever of the starting signal and changes the indication in the instrument from "locked" to "free". When the starting signal lever is replaced, the instrument becomes relocked and cannot be freed until a second release is given by the signalman at the box in advance.

The effect, therefore, of this rotation locking is that each train should pass through the block section, and beyond the starting or other signal, before a second train can be accepted.

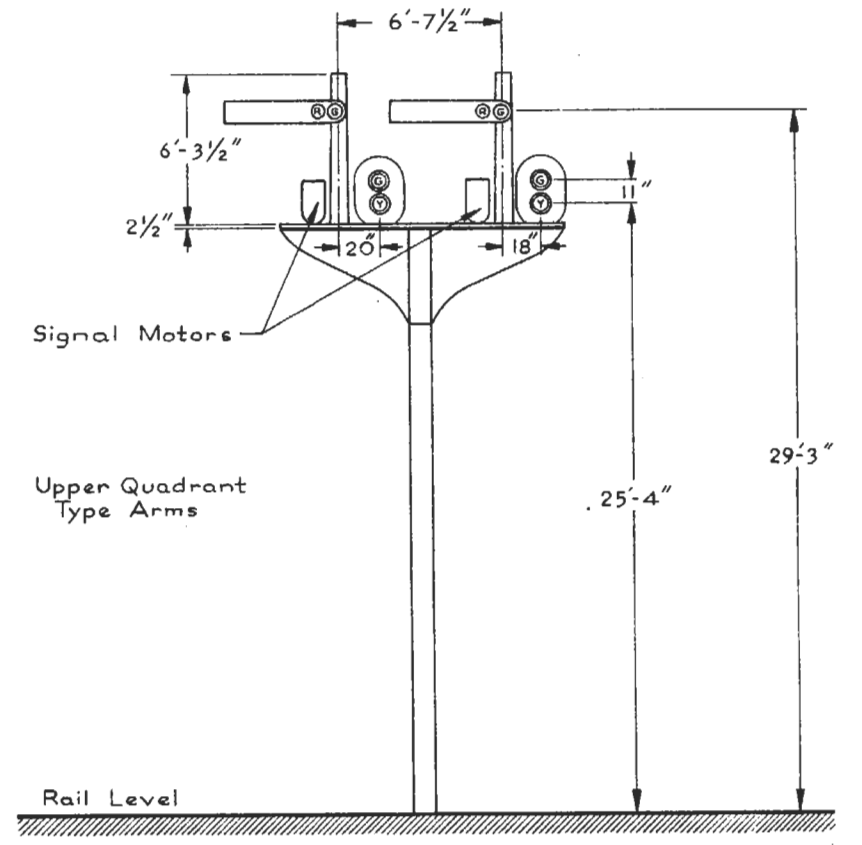
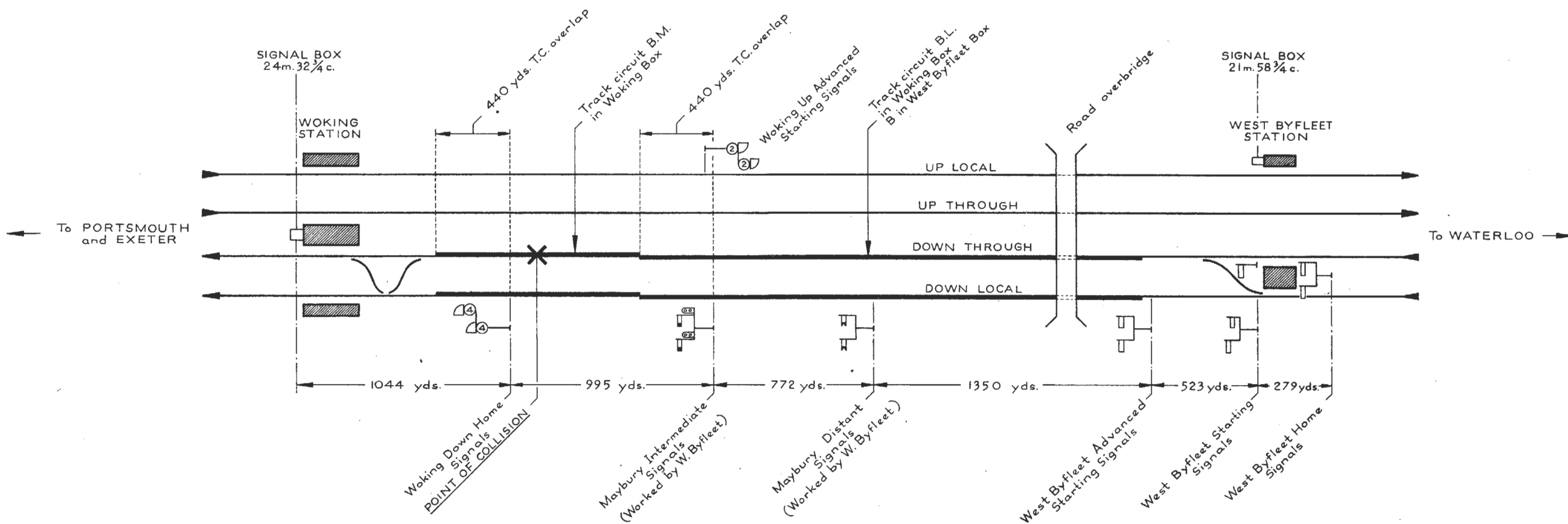
In addition to the locking between the plunger and the signals, a block indicator, electrically controlled from the box in advance, is mounted over the starting signal instrument. This indicator takes the form of a miniature semaphore arm which is normally in the horizontal position. The arm is lowered when the plunger at the box in advance is operated to accept a train and is raised again when the "Train entering Section" is acknowledged, by turning over a switch hook which is associated with the plunger. This switch hook then prevents the plunger from being operated as well as maintaining the indicator at the box in rear in the horizontal position. In order to provide for the cancellation of a train, which, after acceptance, does not, in fact, proceed through the section, a key or co-acting release is provided to enable the signalman to re-set the mechanism and to operate his plunger a second time. This key can also be used to release the backlocks on starting signal levers in the event of treadle failures, but cannot be used to release the front locks of section signal instruments.

COLLISION AT WOKING ON 23rd. DECEMBER, 1955

PLAN



DIAGRAM



MAYBURY INTERMEDIATE SIGNALS