

CAMBRIAN RAILWAYS.

Board of Trade, Railway Department,

28, Abingdon Street,

Old Palace Yard, S.W. 1.

23rd April, 1918.

Sir,

I have the honour to report, for the information of the Board of Trade, in compliance with the Order of the 22nd January, the result of the inquiry, commenced by Colonel Druitt and completed by myself, into the causes of the collision which occurred on the 18th January, 1918, between two goods trains at Parkhall, near Oswestry, on the Cambrian Railways.

In this case No. 2 up goods train from Oswestry collided with No. 101 down goods train from Wrexham on the single line between Oswestry and Ellesmere Junction. I regret to report that the fireman (T. H. Dyke) of the Wrexham train was killed, and the driver of that train, as well as the driver and fireman of the Oswestry train, were severely injured. The guard of the Oswestry train also received slight injuries. Both engines and about 14 wagons were very badly damaged.

The Oswestry train consisted of a 6-wheels-coupled goods engine with 6-wheeled tender, fitted with the vacuum brake on all wheels, and 9 loaded wagons, 13 empties and a brake van.

The Wrexham train comprised a similar engine and 12 loaded wagons, 33 empties and a brake van.

The collision occurred about 1.55 a.m. on a dark night. Snow had been falling some hours previously, but at the time it was thawing.

Description.

The collision took place 63 chains from Oswestry, on a gradient of 1 in 108 falling towards Ellesmere. The alignment of the railway at the place is curved, and the view to engine drivers approaching from opposite directions is obstructed.

The single line between Oswestry North and Ellesmere Junction signal boxes—7 miles 27 chains in length—is worked by day by means of Tyers electric tablet instruments. The type of instrument originally supplied in June, 1892, was No. 4A, but these were replaced about five years ago by No. 6. There is one intermediate passing place and tablet station at Whittington, which is 1 mile 72 chains from Oswestry North. The electrical circuit of these instruments depends upon a single wire with earthed return. At night time, the Whittington tablet instruments are switched out, and the whole line is worked as a single section by means of McKenzie & Holland's long-section tablet instruments (Dutton and Nevile's patent), applied to the Tyers instruments. A separate line wire is used for long-section working, also with earthed return.

The principal features on the face of these long-section instruments are:—

1. A small window at the top, on which various indications are shown: viz., "Clear," "Tablet out from" on red disc, and "Tablet out to" on green disc.

2. Below is a current indicator showing the passage of electric currents, sent or received on the line wire.

3. A tapper key or plunger for transmitting currents along the line wire to the instrument at the other end of the section.

4. An upper drawer with lid for replacing tablets, the normal position of which is pulled out.

5. A long narrow window to enable the signalman to see how many tablets there are in the instrument.

6. A lower drawer with lid, normally closed, from which tablets can be taken out when required for use.

The long-section instruments at Oswestry North and Ellesmere were brought into permanent use in February, 1904, after extended trials lasting for two years.

The object of electric tablet train signalling is to prevent more than one train being between any two tablet stations at the same time, and also to permit of a train being started from either end of the section when not already in occupation by a train. This is accomplished by providing that every train carries a tablet, one tablet only being obtainable from the tablet instruments for any section at the same time.

If signalman A wishes to obtain a tablet for a train to go to B, he has to transmit the proper bell signal to B, by depressing the tapper key or pressing in the plunger. If B accepts the train, he repeats the bell signal and thereby transmits a positive current to A which releases the lock on the lower drawer of A's instrument, and enables A to obtain the necessary tablet for the train to proceed to B. Neither A nor B can obtain another tablet until the one in use has been handed to B, and he has replaced it in the upper slide, and pushed home the drawer. When this has been done B is enabled to transmit a negative current to A, which allows A to push home his lower drawer. By transmission of a positive current from A, the lock on B's upper drawer is released and is then pulled out by B. The cycle of operations is completed by B transmitting a positive current to A, which causes a "clear" indication to appear in the top window in A's instrument.

The short-section tablet instruments are electrically interlocked, so that it is normally impossible to obtain a long-section tablet at either end until all the short-section tablets have been returned to the instruments. Various operations have also to be performed at the intermediate signal-box, which include setting the road for through running and lowering the semaphore signals, all of which must be locked in position before a long-section tablet can be issued. Similarly, before any intermediate short-section station can release its points and signal levers, or tablets be obtained for short-section working, all the long-section tablets must be returned to their instruments.

The tablets of the long-section instruments (square) are different in size and shape from those of the short-section instruments (round).

Conclusion.

I. There has been, I think, no previous case of a head-on collision, on a single line worked by the Electric Tablet or Staff, forming the subject of Board of Trade inquiry. It is the more a matter for regret that the evidence of the signalmen concerned in this case—Edwards at Oswestry North, and Evans at Ellesmere Junction—directly conflicts on all material points. Both men have long service and bear good characters. Edwards had been employed at Oswestry for 22 years, and Evans at Ellesmere Junction for 15 years. Their statements appear to be equally worthy of credit, and there is no circumstantial or other evidence to support the story of one against the other.

The short-section tablet instruments were switched out at Oswestry North, Whittington and Ellesmere Junction in the normal manner about 10.26 p.m. on the 17th January, after the last passenger train had passed. A long section tablet was obtained as usual by Edwards at 10.32 p.m. for an up goods train, which passed Ellesmere at 11.0 p.m. The next tablet was obtained under proper code signals by Evans for a down goods train at 12.30 a.m. This train cleared Oswestry at 1.8 a.m. So far there is no discrepancy in the signalmen's accounts, and the train registers, with a small variation in actual timings, agree.

Evans alleges that at 1.29 a.m. he sent Edwards the usual code signals for permission to withdraw a tablet for another down goods train (from Wrexham), that the signals were acknowledged, and a tablet (No. 9) obtained by him in the usual way, which the fireman of the Wrexham train received. The withdrawal of this tablet altered the indicator at Ellesmere from "Clear" to "Tablet out to." The next beat on the bell key which Evans gave, should have altered the indicator of the instrument at Oswestry from "Clear" to "Tablet out from."

Edwards, on the other hand, denies all knowledge of these operations, and asserts that he was not aware that a tablet had been withdrawn at Ellesmere. The registers of the two signalmen show no erasures, or signs of having been tampered with. That at Ellesmere has all the entries for the down Wrexham train, whilst the Oswestry book has none.

Edwards declares that at 1.49 a.m.—the indicator of his instrument showing “clear”—he wished to despatch an up goods train to Ellesmere, and sent the code signal (4 pause 1 bells) asking for permission to withdraw a tablet. Evans states that he received the “call attention” signal (one bell) at 1.49 a.m. from Oswestry and acknowledged it. After a moment’s delay he called Edwards on the telephone, and asked: “Has the goods arrived?” He received the reply: “Yes, it has.” Edwards on this point says that his reply to the question was, “Yes, long ago,” as he thought the inquiry was made in respect of the down goods train which was cleared at 1.8 a.m. Evans denies that he heard the words “Long ago.”

Evans left the telephone and alleges that he then received from Oswestry, and responded to, the proper code signals for clearing his instrument—such as would be given by the replacement of a tablet at Oswestry—and that his instrument went to “clear.” Also that he subsequently received the signals for withdrawing a tablet at Oswestry, and gave permission in the manner prescribed. Edwards asserts that he went through none of the operations for replacing a tablet, that his indicator at the time showed “clear,” and not “Tablet out from,” that he merely repeated the code signal for permission to withdraw tablet, and having received it in the usual manner, was able to obtain a tablet (No: 21) from his lower slide—notwithstanding the fact that a tablet from Ellesmere to Oswestry was still in possession of the enginemmen of the down (Wrexham) train. The fireman of the up goods received the tablet from Edwards. The latter put the train into section at 1.51 a.m. and received the proper acknowledgment. The registers of both signalmen contain the proper entries for this up train.

The head-on collision between the two trains took place about three minutes later. The up goods was running down the falling gradient (1 in 108) at a speed of about 20 miles an hour, and the driver (Williams) when he saw the down train before him had only time to close his regulator, apply the vacuum brake and jump off his engine. The down goods was moving at a speed of 15 to 18 miles an hour, and driver Sockett had no time either to shut off steam or apply his brake before the collision occurred.

The evidence of the two drivers, who examined the tablets handed to them by their firemen, of fireman Lewis, and of guards Davies and Jones proves that a long section tablet for the section Ellesmere-Oswestry was on each of the engines, and the cause of the accident was clearly the fact that two tablets for the section were out at the same time.

News of the collision was given to Edwards by guard Davies of the up train, who returned to Oswestry after the collision, and appears to have arrived at the North signal-box about 2.10 a.m. Edwards told Evans on the telephone what had happened, and received the reply: “Good God! hadn’t you cleared it?” Edwards answered: “Certainly not; I know nothing about the goods.” Evans contradicted this statement. By his account about 2.2 a.m.—that is, before Davies could have told Edwards what had happened—Edwards asked him, “Where is the Wrexham goods?” He answered: “It is there,” and received the retort: “No, it isn’t.” A few minutes later he was again called up by Edwards, and was then told of the collision.

After hearing the news from Davies, Edwards left his post, and went to the scene of the accident. He arrived there before any other employee of the Company, possibly about 2.20 a.m. He got on the engine step and asked driver Williams: “You have your tablets?” and received the reply: “Yes, and the other enginemman.” Edwards stayed at the scene only two minutes, and was on his way back to Oswestry when he met station-inspector Pugh and others, and turned back with them.

This conduct on the part of Edwards appears to require explanation. He had no authority to leave his post, and at first sight it is strange he should have thought it necessary to find out whether driver Williams had a tablet, when he had himself handed one to Williams’ fireman. His action was certainly undisciplined, but it is not clear that it was necessarily proof of a guilty conscience.

II. The fact that two tablets for a section were out together can only be accounted for either:—

- (a) by some fault in design or maintenance of the long tablet instruments, or
- (b) by serious irregularity on the part of one or both of the signalmen.

(a) The Railway Company asked Mr. J. Sayers, Telegraph Superintendent of the Midland Railway, to examine the instruments and investigate the case generally from the technical point of view, and I have had the advantage of seeing his report. Mr. Sayers was unable to find any definite fault in the electrical circuits or instruments, or to point definitely to any incorrect method of working, which would have led to two tablets being out together. He also holds the opinion that the maintenance of the lines and instruments by Messrs. Saunders, the Company's contractors for maintenance, was adequate.

But he criticises the design of the permanent polarising magnet in the instruments as being too weak to act as a controlling magnet. With a relay not truly polarised, and the relay tongue inclining to one direction, the effect of a current from the opposite end of the section, whatever its polarity, might be to attract the tongue to the side to which it was inclined. The effect of a negative current thus sent for operating bell signals would then be similar to that of a positive current, and give a release for a tablet. But it is not clear how, if the signalmen were operating their instruments properly, and observing the indications, this defect would account for all the circumstances of this case.

The only complaint made by the signalmen, and reported to the linesman, has been that after the withdrawal of a tablet the despatch of a bell-signal is immediately repeated on the same instrument. Mr. Sayers points out that this is caused by the galvanometer coils and needle being too close to the relay coil and tongue, but that this contact is always in the direction of safety.

(b) There are possibilities for irregular electrical working due:—

1. To the fact that phonopore telephones are superimposed on the long section tablet wire.
2. To a temporary contact between the telegraph circuit wire and the tablet wire.

(1) The phonopore instrument at Ellesmere Junction is locked up, but that at Oswestry North is merely secured by a thumb screw. At Oswestry it would be possible for the signalman by joining the phonopore terminals Carbon to Line, and Zinc to Earth, to operate his own tablet instrument relay so as to obtain a tablet; but the phonopore battery is too weak to clear the tablet instrument, or ring bells at Ellesmere.

(2) There is a telegraph speaking instrument in Ellesmere Junction signal-box, but not in Oswestry North. The telegraph wire leading to Wrexham is immediately over the tablet wire at Ellesmere. Owing to snow which had some hours previously fallen at Oswestry, contacts between wires were known to have taken place in the neighbourhood—in one instance between telegraph and tablet wires, and it is not impossible that a similar contact occurred near Ellesmere. It would then be possible for the signalman at Ellesmere Junction to obtain current of necessary polarity, by working his telegraph speaking handle, to free the locks and ring the bells of the tablet instruments at both ends of the section. But the position of the telegraph instrument is too far from the tablet instrument to allow the signalman to use the telegraph handle, and pull out his tablet slide, at the same moment. It would be necessary for him to pin or wedge the speaker handle in the required position.

Mr. Sayers points out that, owing to the tablet circuit being "earthed," contact of the wires mentioned would cause difficulty by interfering with the receipt of bell signals. This, by mutual consent, and to avoid the necessity for calling the linesman or adopt pilot working, might lead to the use of the telegraph instrument for obtaining and restoring tablets, reliance being placed on the train register book as a record for the position of trains in the section, and upon the telephone for communication.

(3) There are further possibilities in the way of actual manipulation of the electric locking in the tablet instruments. These presuppose the possession by the signalmen either of a key or other means of opening the instruments, or of some device for surreptitiously freeing the locking without actually opening the instruments. There is no evidence that the signalmen had such a device, whilst keys (of the lever type) for opening the instruments are authorised only for the use of the linesman and telegraph inspector.

III. As regards the alternative (b) referred to in Section II, it is impossible, with the evidence available, to point to any definite explanation for the accident. Indeed, the

very nature of the possibilities, and the isolated position of the signalmen concerned, negatives the likelihood of detecting any actual irregularity that may have taken place. Even if the faulty design of the instruments, to which Mr. Sayers draws attention, had a direct influence in this case, and presuming that the contact referred to between telegraph and tablet wires actually existed at Ellesmere, I do not see how any combination arising from such conditions can reconcile the statements made by the two signalmen, or clear both of them from suspicion of having failed to observe the indications given by their instruments, and to work the traffic in accordance with the regulations.

The conversation which took place between the two men at 1.49 calls for remark. The slipshod nature of Evans' inquiry: "Has the goods arrived?" instead of: "Has the Wrexham goods arrived?" is the first point for notice; and it indicates the necessity for greater verbal accuracy in making enquiries on the telephone. There can be no doubt that, whatever action had preceded this inquiry, the addition of the word "Wrexham" would have prevented the accident. The second point for note is that the inquiry was initiated 18 minutes after the down Wrexham train had passed Ellesmere Junction. It was a heavy train (46 vehicles) and, if Evans had given a moment's thought to the matter, could not have been expected to have reached Oswestry in so short a time. The ready answer that it had arrived, even though he may not have heard the actual words "Long ago," ought to have given him cause for further inquiry. The third point that calls for explanation is why Edwards should have taken the inquiry made at 1.49 as applicable to a goods train which he had cleared 40 minutes earlier, and for which he had received due acknowledgment.

IV. My conclusion on the whole case—which, I admit, is one of the most difficult I have had to deal with—is that there is no evidence sufficient to prove what actually happened; but, having regard to the fact that the statements of the two signalmen, Evans and Edwards, directly conflict on all material points, I hold the opinion that one or both of these men had something to conceal which was not to their separate or mutual advantage, and that consequently one or both of them were not working the traffic in accordance with the regulations for the Electric Tablet system. It is possible that the faulty design of the instruments and a temporary wire contact at Ellesmere may have been factors in the case; but if the instruments were not providing the usual indications and locking, it was the duty of the men to call the linesman, or to put pilot working in force. I am unable, therefore, to free them from responsibility in connection with the accident.

V. With regard to the action which it is necessary for the Company to take:—

(a) The phonopore telephone circuits should be taken off the tablet wires, and placed on the telegraph instrument wires. This, I understand, the Company are prepared to do.

(b) In view of the defects pointed out by Mr. Sayers in the design of the permanent polarising magnet, and in the proximity of the galvanometer coils and needle to the relay coils and tongue, new long section tablet instruments are desirable.

(c) The attention of signalmen should be drawn to the liability to misunderstanding that may arise owing to insufficient accuracy in wording telephone inquiries, especially as regards the arrival or position of trains.

Mr. Sayers has drawn attention to the advisability of using metallic circuits, instead of earthed returns, for tablet instruments. Earthed returns are in common use on railways in the United Kingdom and have so far been accepted as adequately meeting requirements. Where, as in this particular case, two wires for short and long tablet working exist, the adoption of complete metallic circuits only involves fresh arrangements for switching from long to short, and vice versa. Where they do not exist, the expense of adding a second wire is great, and the alteration in principle will affect a large number of railways. The question, as to whether the additional security which will naturally be afforded by metallic returns is worth the expense involved, is one for consideration by technical experts, and I suggest it should be considered by a committee of the Railway Clearing House.

I have, etc.,

J. W. PRINGLE.

The Assistant Secretary,
Railway Department,
Board of Trade.