

LANCASHIRE & YORKSHIRE RAILWAY.

Ministry of Transport,
Public Safety & General Purposes Department,
7, Whitehall Gardens,
S.W. 1.
12th August, 1920.

SIR,

I have the honour to report, for the information of the Minister of Transport, in accordance with the Order of the 19th July, the result of my Inquiry into the cause of the collision between two passenger trains, which occurred at about 2.20 p.m. on the 17th July, at Lostock Junction on the Lancashire & Yorkshire Railway.

In this case the 2.2 p.m. down train from Bolton to Preston was crossing the up fast line, when the 1.50 p.m. up train from Wigan to Bolton struck it. The two engines collided, with the result that the two front compartments of the second coach of the Bolton train were crushed together by the rear end of the first coach. I regret to report that two passengers were killed, and that two more subsequently died of injuries received. Ten passengers were seriously enough injured to be detained in hospital, and in addition 135 complained of minor injuries or the effects of shock. Three enginemen also were unable to report for duty on account of slight injuries.

The Bolton train comprised a radial tank engine, No. 730 (type 2-4-2) with the following stock:—

No. 2266	8-wheeled bogie	third-class coach.
No. 554	" "	" "
No. 966	" "	" "
No. 432	" "	" "
No. 199	" "	" "
No. 1465	" "	third-class brake.
No. 331	" "	composite coach.
No. 1466	" "	third-class brake.
No. 25	4-wheeled	milk truck.

The engine and coaching stock weighed 55 tons, 19 cwt., and 192 tons, 12 cwt., respectively. The total length of the train was 499 feet 4 inches.

The Wigan train was drawn by engine No. 1260 of similar type, and included the undermentioned:—

No. 1190	8-wheeled bogie	third-class coach.
No. 2340	" "	third-class brake.
No. 952	" "	composite coach.
No. 532	" "	third-class coach.
No. 2339	" "	third-class brake.

The weight of the coaches was 119 tons, 7 cwt., and the overall length of the train 314 ft.

Both trains were fitted with the vacuum automatic continuous brake working blocks upon the four-coupled engine wheels, and upon all the wheels of the coaching stock.

The leading axle wheels of engine No. 1260 and the front bogie of coach No. 1190, were derailed. The main frames of both engines were badly buckled, and the buffers and buffer beams bent. One compartment of coach No. 1190, four of No. 2266, and two of No. 554 were crushed in, or broken up. Particulars of damage to engine and coaching stock are given in the Appendix.

Description.

At Lostock Junction the Company's double line branches from Preston (west) and Wigan (south-west) unite. East of the Junction, there are four passenger lines, known from north to south respectively as up slow, up fast, down fast and down slow.

Lostock Station lies west of the Junction, and has separate up and down platforms for Preston and Wigan trains. A road bridge crosses over the station and the four platforms. There is a footbridge known as Jubilee Bridge crossing over the railway lines, east of the signal-box.

The down slow and fast lines form an end-on trailing junction with the down Wigan line, and there are facing points (No. 53) on the down fast, which lie normally for the Wigan direction, but which, when reversed, lead by a through crossing over the up Wigan line on to the down (Preston) platform line. The up Wigan and up Preston lines form a trailing end-on junction with the up fast line, and these trailing points (No. 54) lie normally for the Preston road. There are, in addition, facing crossovers between the up and down pairs of lines east of the signal-box; as well as a facing connection on the up Preston line (west of the signal-box) leading to the up slow line.

Lostock Junction signal-box, which controls the station and junction yard, is placed immediately north of the up slow line, and approximately opposite the junction points. The signal-boxes on each side of Lostock Junction are:—Lostock Lane, $1\frac{3}{4}$ miles distant towards Preston; Lostock Sidings South, $\frac{3}{4}$ mile towards Wigan; and Deane Clough, $1\frac{3}{4}$ miles distant towards Bolton.

Measured from Lostock Junction signal-box, the approximate distances to the under-mentioned signals, points, etc., are as follows:—

From Wigan up outer distant signal	1,346 yards S.W.
From Wigan up inner distant signals	1,078 " "
West end of up platform Lostock Station	411 " "
Road bridge over railway	271 " "
East end up platform Lostock Station	211 " "
From Wigan up outer home signals (Nos. 85 & 76)	185 " "
Point of collision	92 " "
Facing points on down fast line (No. 53)	25 " "
Trailing points up Wigan and Preston lines	6 " F.
From Bolton down fast and slow home signals Nos. 2 & 5	152 " "
Jubilee footbridge	384 " "
From Bolton down distant signals	949 " "

The alignment of the railway east and west of Lostock Junction is on an easy curve southward. The point of collision is on a gradient falling from west to east, at 1 in 347, and is approached from Wigan through Lostock Station on a falling gradient of 1 in 103, and from Bolton on a rising gradient of 1 in 568.

Conclusion.

This accident, with its regrettable list of casualties, was due to the failure of an engine-man, after receiving a right-away hand signal from the guard, to observe the position of the fixed signal. The liability of human failure in this respect has been evidenced in the past by such cases as Haverhill, etc.

II. At the Inquiry, Bain, the signalman at Lostock Junction, stated that he did not accept the 1.50 p.m. from Wigan, though first offered from Lostock Sidings South at 2.10 p.m., until offered a second time at 2.16 p.m.; because the junction was occupied with fast trains from Manchester and Bolton in the direction of Preston. At 2.9 p.m. he had signalled a light engine off the up Wigan line towards Bolton, and had replaced the signal (No. 85) at danger at 2.10 p.m. The 1.50 p.m. entered his section from Lostock Sidings at 2.17, and came to rest at the station platform at 2.18 p.m. He had accepted the 2.2 p.m. from Bolton on the down fast line at 2.15 p.m. with all signals at danger, and the facing points (No. 53) lying for the down Wigan road. When the Wigan train had stopped at the platform, the Bolton train was approaching, and was about 400 yards distant. He then reversed No. 53 points, and lowered No. 2 down fast line signal for the Bolton train to pass forward to the down Preston platform. Bain was watching the train pass, and had placed his signal at danger behind it, when he saw steam or smoke rising from the engine of the Wigan train. He suddenly realised that the latter was starting away from the platform. He had not then replaced the facing points (No. 53), which are interlocked with the signals (Nos. 85 and 76) controlling movements from the up Wigan platform. He rushed to the window of the signal box, and shouted to the engineman of the Bolton train. Fortunately

he succeeded in immediately attracting the attention of fireman Dewhurst, and the train was rapidly brought to a standstill just as the engine reached the centre of the crossing. Bain thought the engine of the Wigan train was in steam when the collision took place.

Bain's evidence was confirmed in all particulars by Fielding, who was telegraph clerk and train booker in Lostock Junction signal box.

Preston, driver of the Bolton train confirmed Bain's evidence that the down fast distant signal was at danger when he passed it, and that the home signal was lowered when he was in the neighbourhood of Jubilee Bridge. He noticed the Wigan train standing at the station, but did not actually see it start. His engine was running chimney first, and he was passing the junction signal box at a speed of about 25 miles an hour, when his fireman (Dewhurst), from the right of the footplate, drew his attention to the signalman, who was calling to him to stop. He applied the continuous brake fully, sounded the alarm whistle, and looking out of his cab, saw that a collision was inevitable. He thought that his train had actually come to rest before the collision occurred. The two engines were almost in line at the moment of collision, the buffers of the Bolton being slightly to the right (north) of those of the Wigan engine.

Wright, who drove the engine of the Wigan train from the left (platform side) of the footplate, stated that as he approached Lostock Junction Station, the up outer home signal for the fast line was "off," and he ran well up to the signal before stopping the train at the platform. He thought it possible that a few feet length of the smoke box may actually have passed the signal post. He would have stopped the engine further away from the signal if he had not seen it was clear as he approached the station. While station duties were being performed he had some trouble with the left-hand injector, and the fireman was similarly engaged with the right-hand injector. He looked out of the cab, and saw the guard give "right-away" with a green flag. He looked up at the signal, thought it was in the clear position, and started the train. He was looking forward through the glass, to observe the inner home signals, when he saw the Bolton train approaching on the down fast line. He immediately applied the continuous brake and closed the regulator, completing both actions before the collision took place. His continuous brake was in good order, with 20 inches of vacuum. He estimated the speed of the train was 4 miles an hour when the collision took place.

Brown, fireman with driver Wright, saw the distant signal for Lostock Junction was at danger when they passed, but did not observe the up outer home signals as they entered the station; nor did he see what position these signals were in when the driver started. He confirmed Wright's evidence in respect of the trouble experienced with the injectors, but was firing as the train started, and shortly afterwards heard his driver shout, "look out," just before the collision. The first coach of the train was alongside the platform, whilst the train stood in the station.

Unsworth was guard of the Wigan train, and rode in the brake compartment of the last coach. The train was about half full, and there was an exchange of forty or fifty passengers at Lostock Station. After getting on to the platform, he walked forward about two coach lengths to obtain the assistance of one of the porters to get a large dog kennel out of his brake compartment. When this had been done, work at the station was completed, so he stepped on to the footboard of the brake-van, and was closing the doors, when one of the platform staff gave him the "right-away." He signalled the driver with a green flag, and the train started at once. As he stood on the platform opposite the brake compartment he could not see the fixed signals at the east end of the platform, because his view was interfered with by the road overbridge. The train moved forward, and had attained a speed of about 12 miles an hour when the collision took place. In his opinion, all the coaches were alongside the platform when the train came to rest. So far as he was aware, the vacuum brake did not take effect before the collision.

Mr. Moore, assistant electrical engineer, who joined the 1.50 p.m. Wigan train at Lostock Junction, gave evidence that he was waiting on the road bridge, and saw the train approach the station. He noticed that as it approached, and after it came to rest at the platform, the outer home signals were at danger. He saw the signals were still at danger after he had entered the train. He got into a compartment in one of the centre coaches of the train which was standing at the platform partly under the road overbridge.

Porter Brindle, and leading porter Russell, gave evidence that engines usually stopped opposite the porters' room, but were unable to define the position occupied on this particular occasion.

III. The weight of evidence proves beyond doubt that the up outer home signals for the Wigan line were at danger when Wright approached the station, and also when the train moved away from the platform.

With regard to the position occupied by Wright's engine, whilst the Wigan train stood at the platform, there is some confliction of evidence. By his own account, part of the smoke box was possibly beyond the signal post. If this were so, the first coach of the train, could not have stood alongside the platform, but between the top of the platform ramp, and the signal post. This is at variance with the evidence of fireman Brown and Mr. Moore. In accordance with their statements, the cab of Wright's engine must have been from 65 to 40 feet distant from the signal post. The information given by porters Brindle and Russell that engines with trains of this character usually stop opposite the porters' room would make the position of the engine cab still further (about 100 feet) from the signal post. The up platform is long enough to accommodate easily, trains of greater length than that concerned. Giving full credit to Wright's statement that he ran the engine further forward than usual, it appears probable that the engine footplate could not have been less than forty or fifty feet away from the signal post.

At this close range, it is possible that Wright could not see the semaphore arm of the fast line signal through his glass, on account of its height (about 30 feet) above the level of his eye. But he could have seen the arm by leaning outside the framing of his cab, a position which he had to occupy in order to see the guard's "right-away" signal.

The material damage caused by the collision confirms guard Unsworth's estimate of speed of 12 miles an hour, rather than that of Wright's of 4 miles an hour.

It has been suggested that signalman Bain acted irregularly in accepting the Wigan train after he had accepted the Bolton train. This is not the case. It was his duty in such circumstances to keep the signals for both roads at danger, with the facing points in front of the Bolton train, set for the down Wigan line, until one or other of the trains had come to a stand at the signal. As soon as the Wigan train had stopped at the station, it was legitimate to shift the facing points (No. 53), and lower the proper signal for the Bolton train to pass over the crossing. No blame therefore attaches to Bain in respect of irregular action.

It is clear also that guard Unsworth could not see the position of the signal from his position on the platform, and in accordance with accepted practice acted correctly in giving "right-away," to indicate that station duties were completed. General Rule 172 (a) clearly prescribes the responsibility of the driver for observing the fixed signal.

IV. My conclusion, therefore, is that it was Wright's duty to observe the position of the semaphore arm of the up outer home signal before starting from the station, after he had received "right-away" from the guard; also that it was possible for him to see the signal, and that he must have failed to observe it. His pre-occupation with the condition of the injector may in this case have caused momentary forgetfulness of his duty in this respect. I find that the responsibility for the collision rests with him. He had been nearly ten hours on duty, a longer period than is now common. I am glad to report that he bears an excellent character as engine driver, and in September 1907 received a reward for promptitude in preventing a collision.

There are two possible alternatives to safeguard the failure of an engineman in similar circumstances to those under consideration:

- (a) The insertion of worked facing trap points immediately in advance of the signals.
- (b) The provision of an automatic train control device at the signals to apply the continuous brakes when they are passed in the danger position.

But since there is fast non-stop, as well as slow stopping, traffic on the Wigan line, the latter alternative would alone prove suitable at Lostock Junction. The general question of the desirability of the adoption of a system of Automatic Train Control is likely to be shortly under consideration.

V. This case calls for some remarks on the height of signal arms and lights. Those immediately concerned in this case are 39 feet 6 inches, and 37 feet 10 inches, respectively, above rail level for fast and slow lines. They are elevated to these heights in order that they may be visible over the top of the road overbridge to an approaching engineman at some distance from the station. A long view of signals is sometimes an advantage in the case of heavy goods, and fast non-stopping trains, especially when there is a heavy rising,

gradient. Speed is not checked so seriously, with the result that time is sometimes saved and there is also less likelihood, in the case of heavy trains, of engines stalling, and consequent delay.

Practice in the past on railways generally was to provide a long view by considerable elevation of signals. In misty weather the advantage of elevated signals is largely lost; but the serious disadvantage in the practice is that in foggy weather the high signal is frequently out of sight even at short range. Repeating arms and lights have then to be provided at a lower level. This arrangement is expensive in first cost and maintenance. It is also of doubtful service, at all events on comparatively level or falling gradients, if there is sufficient interval, having regard to gradient, weight of trains, and authorised speed, between the distant signal and the stop signal in advance.

I think, therefore, as a general rule, it is better practice to place running signal arms and lights at no greater height than is sufficient to ensure a good view by enginemen of from two to four hundred yards. When there are special reasons for raising signal arms much above 20 ft., it may become necessary to provide repeating arms and lights, not only to meet weather conditions, but to enable enginemen standing within short range of signal posts to readily observe the signals. In the case of the up outer home signals from Wigan at Lostock Junction, if the conditions are such that it is necessary to retain the arms and lights at their present heights, repeaters should be provided.

VI. There are a few further points of interest to which I wish to refer:—

(a) The practice of this and other Companies, as illustrated in the case of both these trains, is to lock up the first two compartments of the front coach, when there is no brake-van, or brake compartment, immediately behind the engine. The precaution was justified on this occasion, as the front compartments of coach No. 1190 were telescoped by the trailing end of engine No. 1260. The number of serious casualties, and possibly of fatalities, would have been greater if these compartments had been occupied.

(b) The coaching stock was lighted by gas with the exception of one electrically lighted (No. 966). There was no fire in the wreckage, although gas fittings, etc., were displaced in various coaches.

(c) Salvage tools, fire extinguishing appliances and first-aid requisites are carried almost universally upon express non-stop trains, but not upon slow short-distance trains like those here concerned. In this case tools were available firstly from the two engines, and secondly within a few minutes from a platelayers hut adjoining the signal-box. They appear to have been sufficient for the purpose of extricating passengers from the debris of the broken carriages. Ambulances and first aid requisites were also quickly available from Lostock and adjoining centres.

I have the honour to be,

Sir,

Your obedient Servant,

J. W. PRINGLE.

The Director General,
Public Safety & General Purposes Department,
Ministry of Transport.
7, Whitehall Gardens, S.W.

APPENDIX.

PARTICULARS OF DAMAGE TO ENGINES 1260 & 730.

Engine No. 1260.—Buffers and buffer beams damaged; main frames, platforms and angle irons badly bent; vacuum train pipes, steam chest and cylinder covers broken; heating pipes and cylinder cocks and rods broken; life guards (front and back), fall plate and coal bunker damaged.

Engine No. 730.—Main frames, front buffers and buffer beam, platforms and angle irons badly bent; heating pipes, cylinder cover, and fall plate broken; cylinder cocks and rods and vacuum train pipes broken; life guards damaged.

DAMAGE TO STOCK.

1.50 p.m. train, Wigan to Bolton.

Bogie Third No. 1190.—Derailed; one compartment demolished; two bottom sides, two sole bars, two diagonals, two headstocks, one top footboard, two short footboards, one sole bar plate, one axlebox, one bogie head-stock, one iron train pipe, one iron vacuum pipe, two longitudinals, one iron steam pipe, four diagonal irons, and two buffer rods broken; all brakework, all step board and knee irons bent.

Bogie Third Van No. 2340.—Six centre casting bolts, one end opal light, one view glass, and one truss bar broken; one door plate bent; gas fittings displaced; centre casting out of position.

Bogie Compo No. 952.—Four centre casting bolts and two buffer casings broken; two steel headstocks bent; centre casting displaced; bogie shifted about 6 inches, and gas fittings displaced.

Bogie Third No. 532.—Gas fittings displaced and body shifted.

Bogie Third Van No. 2339.—Three centre casting bolts broken and two centre castings require placing in position.

2.2 p.m. train, Bolton to Preston.

Bogie Third No. 2266.—Four compartments demolished; one headstock, two bottom footboards, and one buffer rod broken, and two buffer rods bent.

Bogie Third No. 534.—Two leading compartments demolished; one middle bearer, two headstocks, one bottom footboard, one bottom side, and four centre casting bolts broken; two buffer rods and pull rods bent; body badly shifted, and leading bogie shifted.

Bogie Third No. 966.—Two electric cell boxes and one centre casting broken; electric fittings shaken and bogie badly shifted.

Bogie Third No. 492.—Three centre casting bolts broken and gas fittings displaced.

Bogie Third No. 199.—One headstock broken and one diagonal knee bent.

Bogie Third Van No. 1465.—One buffer casing and one end opal light broken; steel headstock bent and gas fittings displaced.

Bogie Compo. No. 331.—Two buffer castings broken; two steel headstocks bent and gas fittings displaced.

Bogie Third Van No. 1466.—One opal light broken and gas fittings displaced.