

LANCASHIRE AND YORKSHIRE RAILWAY.

Public Safety and General Purposes Department,
 Ministry of Transport,
 7, Whitehall Gardens, S.W. 1.

28th July, 1921.

SIR,

I have the honour to report for the information of the Minister of Transport, in accordance with the Order of 6th July, the result of my Inquiry into the circumstances of an accident which occurred at 10.27 a.m. on Sunday, 3rd July, at St. Lukes, Southport, on the Lancashire and Yorkshire Railway.

In this case the 9.28 a.m. steam passenger train from Preston to Southport split at the facing points near St. Lukes signal-box leading from the down east to the down west line, with the result that the engine and first two vehicles took the direction of the east line, and the remaining vehicles travelled over the junction towards the west line. The second and third vehicles of the train were derailed, all the wheels of the former and the leading bogie of the latter leaving the track. Division to the extent of six or seven yards also occurred between the second and third vehicles.

The train was at the time about half full, but there were practically no personal injuries, one passenger only complaining of shock. The three leading vehicles were damaged, one somewhat considerably.

The train was drawn by engine No. 1000, 4-4-0 type, with six-wheeled tender, weight in working order $71\frac{1}{2}$ tons, running engine first, and consisted of the following vehicles marshalled in the order shown:—

Lancashire and Yorkshire,	6-wheeled carriage truck No. 222,	
		loaded with milk.
Do.	do.	8-wheeled bogie third van No. 448.
Do.	do.	8-wheeled bogie compo. No. 857.
Do.	do.	8-wheeled bogie third van No. 1121.
Do.	do.	8-wheeled bogie third No. 409.
London and North Western,	8-wheeled bogie van No. 8244.	

The total weight of the train was 197 tons.

The train and engine were fitted throughout with the vacuum brake, working equivalent 20 inches.

Description.

St. Lukes Road signal-box is situated on a bridge north of the running roads, about three-quarters of a mile east of Chapel Street terminus at Southport. There are four running roads in the vicinity, running approximately east and west, namely, down west, up west, down east, and up east, the last-named being nearest to the signal-box. There are a number of junctions and connections in the locality, but the only one concerned in this case is a double junction between the east and west running roads, a short distance west of St. Lukes signal-box, with facing points on the down east and up west lines.

Measured from the centre of St. Lukes signal-box, the approximate distances to the points and signals concerned are as follows:—

St. Lukes down inner home, 2-arm bracket signal (32A and 32B) governing the movement past the facing through crossing from the down east to the down west line; situated between the down east and up west lines	80 yards west.
Double junction between east and west lines, facing points (No. 42) on the down east line	142 yards west.
trailing points (No. 54) on the up east line	
trailing points (No. 43) on the down west line	237 yards west.
facing points (No. 55) on the up west line	

All points and signals in this yard are power-worked on the electro-pneumatic system, the facing points being fitted with the usual bars operated by the point machines. The points and bolt lock plungers are electrically detected. The junction signals are worked on the selective principle, the signal which responds to No. 32 lever, for example, depending upon the lie of No. 42 facing points. The lie of these points is indicated to the signalman on the diagram, and the last movement in the box, which completes the pull-off circuit for the signal, is the depression of a selector push button, which proves both the route set and the detection before the arm is lowered.

Approximately opposite to No. 54 trailing points and north of the up east road are two electro-pneumatic valve boxes governing the machines operating Nos. 42 and 54 points. These boxes are erected on posts about 3 feet high, and each contains the electrically controlled needle valves and the double piston valve which admits air to one end or the other of the point machine operating cylinder. The two needle valves in question control the flow of air behind the corresponding piston of the double piston valve and are forced on to their seating by the energising of a surrounding solenoid. The process, therefore, of shifting the points is accomplished by de-energising one of these solenoids and energising the other. The outer end of the needle valve mechanism is bolted to a disc which forms the armature of the solenoid. The whole of this valve mechanism is enclosed by an iron cover secured to the box by a hasp and staple, through which is passed a loop of wire secured by a lead seal. The stands of the valve boxes are painted with numbers to correspond with the points which they control.

There is nothing in the conditions of gradient or alignment which calls for comment.

Conclusion.

When signalman Swift, on duty at St. Lukes Road box, accepted the train in question, Nos. 43 and 42 points were standing over, *i.e.*, were lying for the crossing from the down east to the down west line. Although Swift intended to send the train along the down east line, he, in accordance with his practice in the circumstances, left these points over in order to retain freedom for other possible movements. Before, however, the train arrived, he was asked by the Southport Station signalman to send the train over the west line, and the necessity for replacing the junction points to normal did not therefore arise. Swift then, having obtained acceptance on the down west line, proceeded to signal the train accordingly, and duly observed No. 32A signal arm respond to the final operation. Just after the tail of the train passed his box, Swift heard the selector push-button rise, and saw that the corresponding signal (32A) had gone to danger. Levers 32, 42 and 43 were, and remained, in the reverse position; immediately afterwards the derailment occurred.

The evidence of signal lineman Payne shows clearly the cause of the accident. From the time when he came on duty at 5 a.m. until a few minutes before the arrival of the down train concerned in the case, he had been working on the down west line in connection with the renewal of No. 95 points, a few yards east of No. 43 trailing points. He made the requisite entry in regard to the disturbance of these points in the Train Register Book at St. Lukes box as soon as it was open, *viz.*, at 7 a.m.; the line having up to this time been closed for traffic. Shortly before half-past ten he was, together with assistant-telegraph-lineman Dodge, called to the up east line, in order to try No. 54 trailing points, which had been affected by the drawing back of the rails on this line by a permanent way gang. Payne asked Dodge to examine the detectors of these points, which he proceeded to do. Dodge removed the lid of the detector box and was examining the contacts when the accident occurred. Payne, meantime, appears to have gone straight to the point valve box with the intention of shifting No. 54 points to test the detectors. Instead of doing so, however, he went up to the valve box of No. 42 facing points, removed the cover, which was unsealed, and by manipulating the needle valves, moved these facing points just as the down train was approaching, with the result that the engine struck the facing point bar, apparently at or near the top of its movement, broke the elips, and, as the points by this time had moved to their normal position, travelled straight along the down east line. Payne does not appear even then to have realised that he was operating the facing points, but, finding that No. 54 points did not respond to his manipulation of the valves, reversed the process so that No. 42 facing points were, the bar being now use-

less, moved back to the reverse position, apparently between the bogie trucks of the second vehicle of the train, the rear portion of which therefore travelled over the crossing: the derailment and division, already described, resulted.

The attention of Rimmer, the driver of the train, was called to the situation by his fireman Jackson, who saw the points move as the engine approached them, and shouted to his driver. Rimmer immediately applied the brake, and this, combined with the subsequent train division, brought the train to a stand, with the engine about 130 yards west of the facing points. Neither he nor his fireman observed the signal return to danger, nor is it probable that they could have done so since the engine had almost certainly passed the signal when the movement took place. Rimmer estimated the speed of his train at about 20 miles an hour when the brakes were applied, but it is probable that this estimate, which is considerably above that of his guard, Kenyon, is somewhat excessive, and it is unlikely that it was more than 15 miles an hour at the time.

Correct steps were taken by all concerned for the protection of the train and traffic after the accident occurred.

2. Signal-lineman James Payne had, as he was well aware, no authority to manipulate the point machines without the knowledge and concurrence of the signalman. He gave as his reason for doing so the fact that the operations of the permanent way gang on the up east line had already rendered traffic on this line impossible, and he therefore thought it quite safe to move the trailing points without reference to the signalman. Apart from this distinct breach of Regulations, however, his carelessness in moving the wrong points, when he knew, according to his own evidence, that the train was approaching on the down east line and that the two valve boxes were close to each other, was inexcusable, and he must bear the full responsibility for the accident. It is to his credit that he made no attempt to evade or divide this responsibility; he gave his evidence in a straightforward manner, and admitted that he had no reason to think that he had made the mistake owing to any lack of clearness of the marking on the valve boxes. Payne is an experienced man, and has 32 years' service with the Company, for 20 of which he has been employed in his present grading.

3. There are two points which call for comment in this case.

(a) The absence of the seal from the valve box of No. 42 points.

Although it is not certain that the absence of a seal on this valve box was necessarily a definite factor in the case, it is obvious that the liability to casual manipulation was increased thereby, and it is probable that Payne would at least have hesitated to act as he did, and that his attention might have been called to his error, had this action involved breaking a seal. Clear instructions are issued by the Company in regard to the breaking of these seals, but the arrangements for inspection of the boxes, to ensure that the seals when broken are replaced and remain intact, appear to be capable of improvement. It is most desirable that systematic inspections at sufficiently short periods should be made, and written reports rendered of the result of these inspections.

(b) The possibility of preventing irregular interference with point mechanism.

The arrangement and location of these valve boxes renders manipulation of the points from the ground, without the co-operation of the signalman, a comparatively simple process. While it is of course possible, by the addition of locks on the pneumatic valves, to make this process more complex, it is difficult to suggest any practicable device which would provide definite security against such irregular manipulation by a trained man. The Company should, however, be asked to consider the feasibility of providing at least some additional security, particularly in the case of facing points; by providing, for example, a more conspicuous differentiation by distinctive colouring of the standard, between facing and trailing point valve apparatus.

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

G. L. HALL,
Major R.E.

The Director General,
Public Safety and General Purposes Department,
Ministry of Transport.