

LANCASHIRE AND YORKSHIRE RAILWAY.

*Board of Trade,
(Railway Department),
9th July 1870.*

SIR,

In compliance with the instructions contained in your minute of the 21st ultimo, I have the honour to report, for the information of the Board of Trade, the result of my inquiry into the circumstances which attended the accident that occurred on the 7th June last, between Hoghton and Pleasington stations, on the Lancashire and Yorkshire Railway.

Two passengers have died from the injuries they received, and about 27 other passengers were injured.

On the day in question an excursion train which consisted of an engine and tender, a guard's van with a guard, fourteen third-class carriages, with a composite carriage about the centre of these third-class carriages, then another break-van with a guard, four third-class, three composites, a first-class, two third-class carriages, and a break-van with another guard, left Cleakheaton for Blackpool at 5.7 a.m.

The train consisted of an engine and tender and twenty-eight coaches coupled (as far as I could ascertain) in the order above given.

The front guard's van and two coaches next to it, as also the guard's van at the tail of the train, and two coaches next to it, were fitted with Fay's patent breaks.

The train was seven minutes after its appointed time in leaving Cleakheaton.

The wheels are reported to have been tapped with a hammer by the carriage examiner while the train stopped at Sowerby Bridge. They were found to be sound.

The train stopped at Hebden Bridge for water, and at Accrington, where the wheels were greased. It left the latter station at 7.30 a.m., and when it had got about three quarters of a mile to the west of Pleasington station and was travelling down an incline of 1 in 200 at a speed of about 23 miles an hour, the guard who was travelling in the van at the tail of the train noticed a piece of wood fly from under one of the carriages in front of him, which carriage he believes was the eighth from the tail of the train. The ballast was also flying, and he immediately applied his break.

The attention of the guards in the front and centre vans and also that of the engine driver and fireman appears to have been attracted almost at the same time by a jerk of the train. The driver shut off steam and the fireman and guards gradually applied their breaks, and the engine and tender and twenty coaches in the front of the train, were brought to a stand about 600 yards from the place, where the guard in the hind van first noticed anything wrong.

The seven last carriages of the train had become detached from the front part of the train. The leading carriage of this lot had fallen over the bank, (which is about 10 feet high) at a spot 210 yards from the place where the first marks of a coach being off the rails were found on the sleepers. This carriage was broken to pieces, and most if not all, of the passengers that suffered, were travelling in it.

The composite carriage next behind this was prevented from falling over the bank by the couplings. The two pairs of wheels of this carriage, those of the carriage next behind it, as well as the leading pair of wheels of the fourth carriage from the tail of the train, were torn off. The break van at the tail of the train and the two carriages in front of this van remained on the rails.

The whole of the carriages in the front part of the train remained on the rails, except the last carriage of the lot, which had lost its two pairs of wheels and was dragged along the rails on its framing. Most of

the nine pairs of wheels which were torn off the carriages were found at the bottom of the bank behind the carriage that remained there broken to pieces. Amongst these, the wheels were found of the third class carriage which remained last of the carriages of the front part of the train. The tire of the near leading wheel, which had broken through one of the rivet holes, had come off the wheel and remained loose round the axle.

It appears that this tire must have broken shortly before the guard at the tail of the train noticed the piece of wood flying from under the carriage. The carriage to which it belonged, which was the eighth from the tail of the train, must have got off the rails as soon as the tire left the wheel, if not before. The axle and corresponding wheel appear to have been torn from the axle boxes by the violent jerking consequent on the carriage being off the rails, and their striking the sleepers.

They carried away the axles and eight pairs of wheels following them, as the train, in its onward course, was pulled violently over them.

The application of the guards' breaks to the three carriages at the tail of the train, together with the drag consequent on the carriages in front of them being off the rails and having their wheels and axles torn off, must have broken the couplings between the seventh and eighth carriages from the tail of the train.

The seventh carriage was probably thrown violently down the bank on the outside of the curve immediately after the couplings between it and the carriage in front of it gave way. The curve at this spot has a radius of 60 chains.

The sleepers were marked for 210 yards back from the place where the seventh carriage lay; 55 chairs were broken, and four rails were bent.

The tire that broke and caused the accident was a new tire made of Bessemer steel. It was supplied to the Lancashire and Yorkshire Railway Company by Messrs. Cammell and Company, limited, Cyclops Works, near Sheffield, in November 1869. It was rolled out of a lump of metal, so that there was no weld. It was 5 in. broad by 1½ in. thick, and was only sent out of the Lancashire and Yorkshire Railway Company's workshops on the 8th of April 1870.

It was shrunk on to the wheel and fastened to it by four wrought iron rivets of 1 in. diameter, tapering to ¾ in. diameter. The rivet holes were drilled.

The frame of the wheel to which it was fixed was made of wrought iron with a cast-iron boss.

The fracture of the broken tire was rusty when I saw it, but I was informed by the carriage and waggon superintendent of the Lancashire and Yorkshire Railway Company that the fracture was quite bright and showed no sign of a flaw or defect when first seen by him, and, as far as I could judge, I have every reason to believe such to be the case.

The metal of the tire, when tested under a 45 cwt. steam hammer, proved to be brittle, and when put in a hydraulic press, it broke (in one case without the slightest degree of bending) under a pressure of 65 tons applied at the centre of a 22-in. bearing, proving the metal to be very brittle.

I subsequently chose a tire from a large number supplied to the Lancashire and Yorkshire Railway Company by the same firm, and found it requires a pressure of 115 tons applied at the centre of a 22 in. bearing to bend it. It bent in a reverse direction under this test, and did not show any sign of fracture.

As far as I can ascertain from enquiries of the Lancashire and Yorkshire Railway Company and other railway companies, Bessemer steel tires appear to be very generally used by railway companies, and to

have given satisfaction. The number of breakages are reported to be very small.

The method of fastening the tires on to the wheels by means of rivets is not the best.

Although the drilling of a hole one inch in diameter in a tire five inches broad should not cause it to break if the metal is good, it nevertheless weakens the tire to the extent of the metal bored out; but this method of fastening has the very strong objection that if the tire does give way, it is certain to leave the wheel and thus cause an accident.

There are several methods by which tires are now fixed to the wheels which prevent their flying off in case of breakage. Amongst these, Burke's appears the best method of fastening tires to iron wheels, and Mansell's wooden wheel and tire fastening appears to be far the best hitherto introduced.

*The Secretary,
(Railway Department),
Board of Trade.*

I have, &c.
F. H. RICH.

Printed copies of this report were sent to the company on the 27th July.

LONDON AND SOUTH-WESTERN RAILWAY.

*Board of Trade
(Railway Department),
Whitehall, 15th July 1870.*

SIR,

I HAVE the honour to report, for the information of the Board of Trade, in obedience to your minute of the 5th instant, the result of my inquiry into the circumstances which attended the accident that occurred on the 30th ult. to a passenger train on the incline between St. David's and Queen Street stations, Exeter, on which occasion 10 passengers are returned as having been injured, some of them rather seriously, and one of the guards of the train was so severely shaken as to have been unable to attend to his duty since the night of the accident.

The portion of line on which this accident happened belongs to the London and South-western Railway Company. It is constructed on a very steep incline of 1 in 37, the up line commencing to rise from the St. David's station, immediately after crossing the down line of the South Devon Railway, and, in addition to this steep incline, the line is on a curve throughout, varying in radius from 20 to 32½ chains.

When this line, connecting the two railway stations, which is about half a mile in length, was opened for traffic in January 1862, catch sidings had been introduced to intercept any vehicle which might become detached from a train while in the act of ascending this steep incline, in order to prevent its running back into the St. David's station, and thus come into collision with any other train or vehicle which might be standing on or crossing the line of railway, and up to the present time it has been worked without any mishap to a passenger train.

There are four of these catch sidings in this half a mile of line, and the points leading back into that nearest to St. David's station are only 120 yards from the down line of the South Devon Railway, and 170 yards from the south-west end of the down platform, from which place the engine of a South-western up passenger train would generally start. This catch siding is about 80 yards in length.

The 7h. 40m. p.m. up passenger train from Bideford to London reached St. David's station at 10h. 17m., and left at 10h. 24m., 25 minutes late. There had been a flower show at Barnstaple on that day, and in order to accommodate the additional passenger traffic seven additional carriages and a break van behind them were taken on at Barnstaple station, making up a total number of 17 vehicles, including two break vans with two guards. An additional engine was taken on at St. David's station, for the purpose of assisting the train engine up the incline. The usual load for the class of engine employed to work this traffic does not exceed eight or nine vehicles, and I understand it has happened that the engine has been unable to take up nine vehicles, and the train has been divided while standing on the incline, and been taken up in two parts.

It is said that on this occasion the train engine began to slip almost immediately after starting, and the fireman of the leading engine came back to assist

the fireman of the train engine in sanding the rails, but the train ultimately came to a stand-still when the leading engine had got 340 or 350 yards up the incline.

The two guards state that as soon as the train stopped they put on their breaks, and a travelling inspector (Weaver), who was riding with the regular guard (Parkyn) in his van, which was the sixth vehicle from the engine, got out, went to the driver of the train engine, and asked him how many carriages should be unhooked, and the driver told him that they could take up ten. The inspector then went to the tail of the train to see if a relieving porter (Chapman), who was acting as second guard in the last van, had his break on; and finding that it was on, he told him that they were going to divide the train, and further said, "Don't take your break off, whatever you do." Chapman confirms this statement. The inspector then returned along the train, and proceeded to uncouple the tenth from the ninth carriage, and remarked while doing so, to Parkyn, "We shall see if the break holds the train," and he states that the break held the train, otherwise he could not have uncoupled the carriages, and he then lifted the coupling link off the hook, and next unhooked the side chains.

The inspector is correct in saying that he could not uncouple the carriages if the break did not hold, unless he had unscrewed the coupling altogether, instead of merely slackening it.

The inspector then told Parkyn to proceed with the front part of the train, and Parkyn gave the usual signal and the engines whistled in reply, but the inspector states that the train was not started for half a minute or more, and then one engine gave a short whistle, and he thought the drivers were about to reverse, and he showed a red light towards the engines, and Parkyn commenced to put his break on again.

The inspector states that the train was pushed back from six to eight feet, before it commenced to draw ahead, and thus forced the uncoupled carriages back, and started them down the incline and over three stones which he had placed behind three different wheels under the two leading carriages of the eight uncoupled vehicles, and he says the speed appeared to increase as the carriages ran down the incline, although he noticed fire flying from the wheels, proving the break to be still on. The acting guard, Chapman, states that he did not get out of his van at all, and did not take off his break, but strained it tighter on; that he thought the train was going back into St. David's station, and that he was knocked from one end of the van to the other, when it came in contact with the stationary buffers at the end of the catch siding, and was a good deal hurt.

Seven out of the eight vehicles which ran down the incline were damaged, two of the number to a considerable extent. Fortunately there were not, it is said, more than from 12 to 15 passengers altogether in the after part of the train.

The drivers of the two engines and their firemen deny that the engines had to be reversed, or ran back,