MINISTRY OF TRANSPORT

RAILWAY ACCIDENTS

REPORT ON THE COLLISION
which occurred on
10th January 1951 at
ALLOA JUNCTION
in the
SCOTTISH REGION
BRITISH RAILWAYS

LONDON : HIS MAJESTY'S STATIONERY OFFICE
1951

SIXPENCE NET

MINISTRY OF TRANSPORT,
Berkeley Square House,
London, W.1.
4th June, 1951.

SIR,

I have the honour to report for the information of the Minister of Transport, in accordance with the Order dated 10th January, 1951, the result of my Inquiry into the collision which occurred between a passenger train and a stationary light engine at 8.40 a.m. on 10th January, 1951, at Alloa Junction on the main line from Stirling to Glasgow in the Scottish Region.

I regret to state that one passenger was killed, one has since died as a result of his injuries, and fourteen others were injured. Of the injured, nine were detained in hospital and six returned to their homes after receiving treatment.

The train was the 7.0 a.m. Up Express Passenger from Perth to Glasgow. It consisted of six bogie vehicles, weighing 175 tons, and was hauled by a left-hand drive Class 5, 4–6–0 Engine No. 44786, weighing 126 tons in working order. The engine was fitted with a steam brake, acting on coupled and tender wheels, and vacuum brakes were in operation on the coaches, the last four of which were fitted with direct acting valves. The combined brake power of engine and coaches was 221 tons, or 73% of their total weight.

The light engine, No. 45482, was of a similar class and type to the train engine. The brake power was 81 tons.

Considerable damage was done to both engines, and telescoping occurred between the first and second coaches of the train, demolishing the rear two compartments of the first and the leading three compartments of the second.

It was daylight, visibility was good, but a heavy snow storm had just ceased, and the rails were wet.

On account of the distance of the scene of the accident from a road, and the difficulty of road communication through the snow, ambulances were not called to the site, but the injured were tended in nearby cottages by railway staff and also by passengers, including some medical students. They were then taken by a passenger train to Stirling, which they reached at 9.58 a.m., one hour and eighteen minutes after the collision, and where doctors and ambulances were awaiting them in the station.

DESCRIPTION

The Line.

Alloa Junction is situated between Plean Junction to the north and Larbert to the south, and is the point where the branch line from Alloa joins the main line. Both lines are double track, and the sections are controlled by Tyer's (Caledonian Pattern) 2-position block instruments.

From Plean to Alloa Junction is a distance of 1 mile 1474 yards, and there is a falling gradient of 1 in 135 for almost the whole way, changing to 1 in 230 a short distance before Alloa Junction signalbox is reached. The line is straight for the greater part of the way, but 600 yards before Alloa Junction, it assumes a right-hand curve of about 175 chains radius, which continues for 460 yards, after which the line straightens again through the junction. The sighting distance of the Alloa Junction Up Distant signal is over 800 yards, and that of the Up Home signal is about 500 yards; in the case of the Home signal, this distance may occasionally be somewhat reduced on account of smoke and steam, if another engine is standing on the Down line in the vicinity of the Down Starting signal. A footbridge and a level crossing traverse the line about 600 yards north of Alloa Junction signalbox.

The following is a table of relevant distances measured from the point of collision :—

Plean Junction Starting signal	1 mile 1,450 yards North
Up Distant signal	1,585 ,, ,,
Footbridge	600 ,, ,,
Down Starting Signal	311 ,, ,,
Point of collision	— — —
Up Home signal	24 yards South
Alloa Junction signalbox	54 ,, ,,
Junction points with Alloa branch	197 ,, ,,

The Accident.

In the early morning of 10th January, there was a heavy snowstorm, which started about 12.30 a.m. and continued until daylight. At 5.04 a.m. the Up Distant signal for Alloa Junction was found to be defective, as a telegraph pole had fallen across the wire, holding the signal in the " off " position. The Alloa Junction signalman informed the Plean signalman by telephone, and instructed him to caution all trains. As the Plean signalbox is about 20 feet above the track, and on the Down side, Up trains were warned by a sub-ganger, who stood on the cess side of the Up line, and transmitted the signalman's instructions.

At about 7.0 a.m. more telegraph poles fell, and all block and telephone communication between the two boxes failed completely : Time-Interval working under Block Regulation 25 was then instituted through the section, and the sub-ganger thereafter informed enginemen accordingly. He made no further mention, however, of the failed Distant signal.

After the block failure, two coupled light engines and two trains were despatched from Plean in this way ; then the light engine involved in the collision was permitted into the section at 8.22 a.m., followed by the 7.0 a.m. train from Perth at 8.38 a.m.

The light engine reached Alloa Junction at 8.30 a.m., and was held at the Home signal to allow a passenger train from the branch line to precede it. The driver of the 7.0 a.m. from Perth, which followed the light engine, proceeded normally into the section, knowing that he was working under the Time-Interval system. After about half-a-mile, he sighted the Up Distant signal in the " off " position, and opened his regulator further ; on reaching the signal, his engine exploded a detonator and he saw the flagman, who had been posted there by the Alloa Junction signalman, showing a yellow flag. The driver then realised that the signal had failed, and closing the regulator, allowed the train to coast, with a slight brake application, under the footbridge and towards the Home signal. Because another train was standing at the Starting signal on the Down line, emitting smoke and steam, neither the driver nor the fireman saw the Up Home signal, or the light engine standing at it, until they were about 100 yards away. The driver then made an emergency brake application, but there was no possibility of avoiding the accident, and the train ran into the tender of the light engine at a speed between 20 and 30 m.p.h. The crew of the light engine were fortunately unhurt as they saw the passenger train in time to jump clear. The result of the impact was that the light engine, having its brakes still applied, was impelled forward for 93 yards, with the train engine embedded in its tender, and considerable damage was done to both engines. The buffers of the leading end of the second coach overrode those of the first, and telescoping occurred, which demolished the rear two compartments of the first and the leading three compartments of the second coach. The screw coupling between these two vehicles having broken, the first coach continued with the engine, and the remainder of the train came to rest after travelling a further 53 yards beyond the point of impact. Except for the leading pair of bogie wheels of the train engine, no derailment occurred.

Evidence

Signalman J. Graham was on duty in Alloa Junction signalbox from midnight on 9th January until 6.0 a.m. the following day.

He said that the snowstorm started soon after midnight and, by 12.45 a.m., he experienced difficulty in moving his points, so that he was obliged to call out a man for snow duties. At 5.04 a.m. he found that the Up Distant signal had failed in the " off " position, and he asked the signalman at Plean to stop all trains and tell them to treat the signal as at "Caution". It was still snowing heavily at 6.0 a.m. when Graham went off duty.

Signalman J. Brown, on taking over from Graham, was told by him that both the Up and Down Distant signals were out of order and that all trains were being cautioned. About 7.0 a.m. block and telephone communication with Plean failed completely and Brown sent a message by a light engine which was proceeding to Plean, informing the signalman there of the circumstances. Soon after 8.0 a.m., a platelayer arrived at Alloa Junction and, coming into the signalbox, was immediately told by Brown to go to the Up Distant signal with flags and detonators, and to caution all traffic. About 8.30 a.m., light engine No. 45482 arrived from Plean at the Home signal, but Brown was unable to draw it within the protection of the signal on account of another train which was coming from the Alloa branch at the time. A few minutes later, when this train had just cleared the junction points, Brown looked towards Plean and saw the 7.0 a.m. from Perth coming through the bridge 600 yards away. He said he knew at once that there was going to be an accident and there was nothing he could do to prevent it ; the train was "coming in far too hard to stop" and it was "really travelling". Brown was reluctant to give an estimate of the speed but, when pressed, he said he thought that it was at least 35 m.p.h. on impact. He described how the collision pushed the light engine, which was standing with its brakes applied, past his box and foul of the Alloa branch, a total distance of 93 yards. Brown at once signalled "Obstruction Danger" and, after telephoning to Larbert for doctors and ambulances, went on to the lineside to assist with the injured. Some time later, the signalman at Larbert telephoned that he could not get through to anybody, so Brown, having confirmed that the Down line was clear of obstruction, brought up the 7.15 a.m. passenger train from Larbert in order that the injured passengers could be taken to Stirling.

Finally, when he was again questioned about the speed of the 7.0 a.m. train, he said "I think he was shut off, but he was really coming in. There is no other train comes in being prepared to stop at the Home signal as he was coming in. They come in very cautiously".

Lengthman R. Young said that he travelled to Alloa Junction on the 5.55 a.m. train from Perth and was instructed by Signalman Brown as described above. On his way to the Up Distant signal, and when he was just through the bridge, he saw the light engine, No. 45482, approaching on the Up line, so he put down a detonator and exhibited a yellow flag. He then continued towards the signal and, on the way, came across a telegraph pole which had fallen across the wires ; he tried to move the pole but it was too heavy, so he went on to the signal in order to carry out his instructions of cautioning trains. Soon after he arrived, the 7.0 a.m. train passed him at "a fairly good speed" and exploded a detonator, and Young, who was exhibiting a yellow flag, thought he saw the driver acknowledge the caution by a wave of his hand. He did not notice anything unusual about the train or its speed as it went by, but he repeated that "it was a fairly good speed".

Relief Signalman H. Morris was on duty at Plean Junction signalbox from 10.0 p.m. the previous evening until 7.30 a.m. on the morning of the occurrence ; his normal period of duty ended at 6 a.m., but on this occasion his relief was unable to reach him earlier because of the snowstorm. About 11.45 p.m., it started snowing, and by 12.30 a.m. the following morning, it was falling very heavily ; Morris therefore sent for a platelayer to take up snow duties, and Sub-Ganger Forsyth arrived at 1.30 a.m. When Morris was informed that the Alloa Junction Up Distant signal had failed, he cautioned subsequent trains by stopping them at the Plean Junction Home signal, drawing off the signal, and stopping them again opposite the box by means of a hand signal. Then Sub-Ganger Forsyth, standing beside the Up line, told the drivers that the Up Distant was defective and in the clear position, and that they were to treat it as at "Caution". The reason for using Forsyth to transmit this information to trainmen was that the signalbox was situated at some height above ground level and on the far side of the line. Morris was quite certain that Forsyth understood the message, and that he gave it to the driver of every train.

About 7.0 a.m. all block and telegraph communication with Alloa Junction failed. Morris said that he then instructed Forsyth to advise drivers and guards that there was no communication between Plean and Alloa Junctions, that they were to proceed cautiously through the section, and also that the Distant signal at Alloa Junction was standing in the clear position but that it was to be treated as a caution signal. Two light engines coupled, were warned in this way before he handed over to his relief, Signalman Young. Morris said that he informed Young fully of the conditions before leaving.

Relief Signalman C. Young took over duty at Plean Junction signalbox at 7.30 a.m. He said that Morris, in handing over, told him that all communications with Alloa Junction were cut, that Time-Interval working was in operation, and that Forsyth was passing on the signalman's instructions to train crews from the ground. Young then himself repeated these instructions to Forsyth. He made no mention at this time of the failed Distant signal, because he said that he had not been told about it by Morris, and only realised that it had failed when he noticed the entry in the Train Register Book about 1½ hours after the accident. He did not tell drivers to pull forward and stop again so that the guards could be similarly informed and, in fact, only one train did stop in this way, but he shouted to the others as they passed the signalbox, and he thought they all understood. During his period in the signalbox Young passed four trains and light engines into the section under Regulation 25 up to, and including, at 8.22 a.m., the light engine involved in the collision, and at 8.38 a.m., the train which collided with it.

Sub-Ganger D. Forsyth, having been called out for snow duties at 12.45 a.m., went to Plean Junction and arranged to work under Signalman Morris' instructions. Soon after 5.0 a.m. Morris asked him to go down to the lineside and warn all Up trains that the Alloa Junction Up Distant had failed in the " off " position, and that it was to be treated as a signal at "Caution". He did this with four trains, Forsyth said that about 7.0 a.m., Morris told him to inform drivers about the Distant signal, as described above, and also that all communications with Alloa Junction had failed, that they were to pass the Starting signal at Danger, and to proceed through the section with caution. He only had occasion to do this with a pair of coupled light engines before Morris handed over his duties to Signalman Young at 7.30 a.m. Forsyth said that Young then gave him the same message for drivers as Morris had given him, including the information about the failed Distant signal, and had added that he, Young, would inform guards from the signalbox. Forsyth gave this message accordingly to two trains before also giving it to the light engine and the train involved in the collision.

In his evidence, Forsyth first of all said that he was certain that he mentioned the Distant signal to all drivers, but later he said that he was a little confused and could not be certain.

Driver D. Chapman was in charge of the light engine, No. 45482. He said that, before starting at 8.22 a.m. from Plean to Alloa Junction, he was told by Forsyth that there was no communication with Alloa Junction, that he was to pass the Starting signal at Danger and proceed through the section with great caution ; nothing was said about the Alloa Junction Up Distant signal. He was a little surprised to see this signal in the " off " position, but did not take it as an indication that the section was clear ahead of him. When he reached the overbridge the engine exploded a detonator, and he saw a yellow flag displayed by Lengthman Young, who was at that time on his way to the Distant signal. Chapman continued slowly forward, and, stopping at the Home signal, sent his fireman to carry out Rule 55, and also to inform the signalman

of the position of the Distant signal. Soon after the fireman returned, Guard Younger, who was also in the cab of the engine, suddenly gave a warning shout ; Chapman and his fireman at once looked back and, seeing a train approaching about 100 yards away, jumped, one from each side of the engine, followed by the guard. Chapman said that he had applied the steam brake on the engine but not the hand brake.

The whole incident occurred in a moment, and he could not say how fast the train was travelling, but it was not much more than 100 yards away when he first saw it, and he realised at once that it was moving too fast to be able to stop in time. The collision took place immediately after he jumped and, having picked himself up, he then went to the assistance of the injured and gave what other help he could. Some minutes later, when he was standing at about the middle of the train, Chapman saw another coming round the bend 600 yards to the rear, and he said that, as he did not know whether it was under control or not, he shouted "Everybody jump, there is another train coming". A few people then left the train hurriedly, including a man and a woman, who were seen to kick out the window of their compartment in a corridor coach, and jump out. There was, however, no need for Chapman to have called out, for the train stopped some distance behind the 7.0 a.m. train.

Fireman Arnott and Guard Younger corroborated Driver Chapman's evidence.

Driver J. Christie, who was in charge of the 7.0 a.m. passenger train from Perth, had been on duty three hours and forty minutes at the time of the accident. He said that when he was stopped at Plean signal-box by a red flag, he was informed by Forsyth, who was standing on the lineside, that there was a complete block failure, that he was to pass the Starting signal at "Danger", and proceed cautiously through the section. Christie realised from this that he was to proceed under Regulation 25, but nothing was said to him about the failed Distant signal. He then moved slowly forward so that the Guard could be given the same information, and, crossing to the right-hand side of his engine, he received a wave from the signalman in the box to proceed into the section. He noticed that the Distant signal was in the " off " position as he approached it and, to use his own words he "gave her a little bit of steam then and speeded her up to round about 30 m.p.h." He did not see the flagman at the signal until his engine exploded a detonator, but he then waved to indicate that he understood that the signal was defective, and, as he passed under the bridge, he gradually applied the brake.

Soon after this, Christie saw the Home signal at Danger, and, at the same moment, caught sight of the light engine standing at it. He immediately made an emergency brake application and put his engine in reverse, but he did not have time to open the sanders. He said that his wheels then locked on the rails, which he described as greasy, and he collided with the light engine at a speed which he estimated to be about 5 m.p.h.

Christie denied that the sight of the Distant signal in the " off " position misled him into thinking that he had a clear run through the junction. He said that was the last thing in his mind, for he fully realised that he was proceeding through the section under Regulation 25, and that he was not supposed to take notice of any signal while doing so. He did not think that the snow covered landscape, or the deadening by the snow of the usual sounds, had caused him to misjudge the speed of his train, but he maintained that it was the greasy state of the rails which deceived him ; he came fully prepared to stop at the Home signal, and would have been able to do so if the rails had not been so bad. He admitted, however, that he had made an error of judgment, and that as a result, the train was not properly under control at the time. Christie added that he had known the line, both as driver and fireman, for a number of years and was well acquainted with it.

Fireman T. Smith said that, on passing the Distant signal they were travelling at between 25 and 30 m.p.h. and he did not catch sight of the Home signal at all until he was about 100 yards from it, on account of the steam coming from an engine standing on the Down line. He thought that their speed on hitting the light engine was about 15 m.p.h.

W. Keay was the guard of the 7.0 a.m. train. At Plean, he noticed that they passed the Starting signal at Danger, and gathered that the driver had been instructed accordingly, but did not know the reason. He looked out of his window on the signalbox side, but did not see the signalman or receive any instructions from him. On passing the Distant signal, when the speed of the train was between 25 and 30 m.p.h., Keay felt a brake application. He thought that the brakes were then released a little, but a heavy application was made after passing through the bridge. He said that this braking, which seemed to take effect, continued up to the collision.

After the collision, Keay went forward to see what had occurred, and then returned to protect his train. He had almost reached the underbridge, a quarter of a mile in rear, when the following train passed him, but he succeeded in warning the driver by means of a detonator, and by whistling. This train eventually came to a stand a few yards short of his own, and he then handed over the protection of the line to the guard, and returned to help with the injured.

T. Johnstone was the driver of the 7.32 a.m. passenger train from Stirling which followed the 7.0 a.m. train into the section, leaving Plean at 8.47 a.m. Having been warned in the same way as the previous train, he drew forward and stopped to allow the guard to be similarly instructed. He said that, approaching the Distant signal and seeing it in the " off " position, he thought it was strange as he was working on the Time-Interval system, but he noticed the flagman standing there, and concluded that it must have failed.

He passed the signal at about 15 m.p.h., and applied his brakes as he did so. The fireman then called out to him that there was an obstruction ahead, and he stopped 84 yards from the rear of the 7.0 a.m. train. After a short pause, he then drew slowly forward a few more yards. Johnstone said that visibility at the time was clear, the rail was good, and he found no difficulty in braking.

J. Pert, who was the guard of the 7.32 a.m. train, said that he was instructed by the signalman at Plean, by means of a megaphone, that the block had failed and that they were proceeding under caution. When his train stopped in the section, soon after passing through the overbridge, Pert met Keay, the guard of the 7.0 a.m. train, who asked him to take over the protection of the train.

Conclusion

The accident occurred because Driver Christie, although cautioned at Plean, and fully aware that he was proceeding through the section under the Time-Interval system, did not have his train under proper control, and was travelling too fast when he approached Alloa Junction. His speed at the moment of colliding with the light engine was, in my opinion, certainly not less than 20 m.p.h., and was probably nearer to 30 m.p.h.

This serious error of judgment was brought about mainly because Christie was not fully alert and was not paying proper attention to his driving. As a result, I think, he undoubtedly allowed himself to be misled by the failed Distant signal, and it is also possible that the altered driving conditions, due to the recent snowstorm, may have further contributed to his mistake.

Christie was not informed when he entered the section about the Distant signal which had failed in the clear position. In his evidence he said that when he sighted this signal he opened the regulator of the engine, and it is reasonably certain, therefore, that he unthinkingly took it for granted that the road was clear through the junction ahead. In view of Rule 127 (xxiii), and his knowledge that he was working under Block Regulation 25, there was no justification whatever for doing so, but he was not alert at the time, and I think his action was probably mechanical ; on the falling gradient, this must have appreciaiy increased the speed of the train and the severity of the collision. Christie realised his mistake about the Distant signal in ample time and distance to bring his train under proper control, whatever speed he may have attained, but he made no attempt to do so until he was little more than 100 yards from the light engine and the Home signal. It is clear, therefore, that he had no idea how fast he was travelling.

Christie did not try to evade his responsibility, and spoke in a straightforward manner ; he was convinced, however, that his failure was mainly caused by a greasy rail condition. I consider this to be unlikely, as the snow had ceased and other drivers experienced no difficulty in braking ; in any case, I am certain that he was travelling too fast to stop in time, whatever the condition of the rail.

Driver Christie is 61 years of age and has had 32 years service with the railway as a driver and fireman. He has a clear record.

Although Signalman Morris at Plean thought that he had mentioned the failed Distant signal when he handed over his duties to Signalman Young, the latter apparently did not hear him. This was unfortunate, It is true that all communication had failed previously, so that Regulation 25 was already in operation, and, under Rule 127 (xxiii), drivers are specifically instructed not to observe signals in these circumstances ; nevertheless, I consider that Driver Christie should also have been warned about the signal, at the same time that he was told about Regulation 25, so that he would then have been in possession of all the known information.

It will be noted that the evidence of the witnesses concerned with the passing of messages at Plean was, in places, contradictory. This was not, I think, because there was any intention to mislead, but because the witnesses themselves had no precise remembrance of what was actually said and done. This should not have been so. To revert suddenly from the positive safeguards of Absolute Block working to the comparative hazards of the earliest and simplest form of control, the Time-Interval system, was a serious matter which called for the exercise of the greatest care and precision in execution. The two signalmen at Plean would, therefore, have been wiser to have left the signalbox and given their instructions personally to both drivers and guards, thus making sure that the correct information was passed.

Remarks

Although not directly responsible for the accident, the somewhat loose method of passing messages and giving information which was employed in this particular case, gives rise to the general question of whether a more rigid and formal procedure should not be introduced when changing from absolute Block to Time-Interval working.

It is common knowledge how easily verbal messages can be misunderstood by their recipients, and how frequently they are distorted when sent through the medium of a third person. I suggest for consideration, therefore, the institution of a printed Order which the signalman must give, or arrange to be given, to both driver and guard before the train enters the section. This arrangement, if adopted, would be no more than already exists in the Order forms which are required for "Wrong Line" working, or the written orders which are necessary for passenger trains on permissive lines, and the conditions of Time-Interval working are certainly no less important than either of these contingencies.

I have the honour to be,

Sir,

Your obedient Servant,

R. J. WALKER,

Colonel.

The Secretary,
Ministry of Transport.