



MINISTRY OF TRANSPORT

RAILWAY ACCIDENTS

REPORT ON THE COLLISION

which occurred on the
9th August, 1947, near

DONCASTER

on the

London & North Eastern Railway

LONDON: HIS MAJESTY'S STATIONERY OFFICE

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Berkeley Square House,
Berkeley Square,
London, W.1.

6th December, 1947.

SIR,

We have the honour to report for the information of the Minister of Transport, in accordance with the Order of 11th August, 1947, the result of our Inquiry into the circumstances of the serious accident which occurred at 4.41 p.m. on Saturday, 9th August, 1947, between Bridge Junction and Balby Junction Signal Boxes, about $\frac{3}{4}$ mile south of Doncaster, on the East Coast main line of the London and North Eastern Railway.

No. 958 Down Express Passenger Train, 1.25 p.m. King's Cross to Leeds, was improperly allowed to enter the occupied section ahead of Balby Junction under clear signals, and collided at a speed of about 40 m.p.h. with the rear of No. 956 Down Express Passenger train, 1.10 p.m. King's Cross to Leeds, which had stopped at Bridge Junction Home signal and was just moving forward when the accident occurred.

Each train was heavily loaded and carried approximately 700 passengers, a number standing in the corridors. It is regretted that 18 passengers lost their lives, including a Railway Servant and three who died after admission to hospital. Altogether 118 passengers were injured or subsequently complained of shock, 51 of whom were detained in hospital. In addition, the Driver and Train Attendant of the 1.25 p.m. train suffered injuries.

Medical attention was forthcoming at once. Two Doctors who were passengers rendered immediate first aid, whilst within a few minutes local doctors, first aid workers and ambulances were on the scene. The first casualty was admitted to Doncaster Infirmary by 5.12 p.m. and the last by 6.30 p.m. The staff at this Hospital worked untiringly, long into the night, whilst local inhabitants, doctors, ambulance workers, National Fire Service, Police, and other helpers rendered every assistance.

Uninjured passengers for Sheffield left at 5.45 p.m.; those for Leeds continued their journey in the first 8 coaches of the 1.10 p.m. train and left at 5.55 p.m. A bus was provided to take some from the scene of the accident to Doncaster station.

Train No. 956 was hauled by Engine No. 50, A.3 Class, 4-6-2 type, left-hand drive with 8-wheeled tender, and consisted of 14 coaches including two restaurant cars, a Pullman, and parcels van, all with steel under-frames and wooden bodies, except the third vehicle, the Pullman, which was of all-steel construction. Seating accommodation for 470 passengers was available. Buckeye couplings were in use throughout, except between the tender and first coach. The weight of the engine and tender in working order was 152 tons 11 cwt. and of the empty coaches 477 tons 16 cwt., giving a total loaded weight of about 700 tons; the overall length was 940 feet. The vacuum brake operated blocks on all wheels, except those on the engine bogie and rear truck; the percentage brake power of the train (unloaded) was 74.6.

Train No. 958 was drawn by Engine No. 936, V.2 Class, 2-6-2 type, left-hand drive with six-wheeled tender, and consisted of 12 coaches all with wood bodies on steel under-frames, except the third and fourth vehicles, which were a twin articulated set of all-steel construction. Seating accommodation for 629 passengers was available. All the coaches were fitted with Buckeye couplings. The weight of the engine and tender in working order was 145 tons 2 cwt., and of the empty coaches 360 tons 5 cwt., giving a total loaded weight of about 570 tons; the overall length was 765 feet. The vacuum brake operated throughout except on the leading and trailing wheels of the engine; the percentage brake power of the train (unloaded) was 74.1.

Examination of the wreckage showed that practically the whole shock was absorbed by the last three coaches of the leading train which were destroyed; the majority of the casualties occurred therein. The fourth coach from the rear was also overturned; its underframe was bent, its bogies were torn away, and the panelling and some windows on one side were broken. Of the remaining 10 coaches, the 9th and 10th were locked together with the rear bogie of the latter derailed, and the first 8 were intact.

The engine of the 1.25 p.m. train was heavily damaged at the front end and the buffer beam was badly buckled. The engine and tender fell over on the left-hand side and came to rest nearly 90 yards beyond the point of collision, with a carriage bogie entangled in the pony wheels and an underframe bent round the smoke box. The first two vehicles of this train were derailed all wheels but remained upright; the bogies and underframes were slightly twisted and racked, whilst the bodywork suffered minor damage and some windows were broken. The next two coaches were the twin set, of which only the leading pair of wheels were off the road; the remaining 8 vehicles were unaffected.

The permanent way of the Down Main was destroyed for 100 yards and of the Down Goods for 60 yards, whilst the Up Main was forced out of alignment for about 100 yards. These lines and the Down Coal line were blocked, but fortunately the Down Transfer and the two Up Goods roads remained available; there was little delay in resuming passenger traffic, and block working over these Goods lines was introduced by 5.10 p.m. The derailed vehicles were rerailed by 8 a.m. on Sunday, 10th August; the Down Main was reopened for traffic at 4.15 p.m. and the Up Main at 5.50 p.m. on the same day.

The weather was fine and hot; visibility was perfect and the rail was dry.

DESCRIPTION

The East Coast Main Line from London runs from South to North, and for about 3 miles south of Doncaster passes through a series of closely spaced junctions leading to extensive groups of sidings on either side of the line. The southernmost signal box concerned is Red Bank, about $1\frac{1}{2}$ miles south of Doncaster. Particulars of relevant boxes, Down Main signals, etc., are illustrated in the accompanying diagram, and the following is a summary of distances from the point of collision :—

Red Bank Down Main Home signal (slotted from Decoy No. 1 in rear) with Balby Junction auto Outer Distant below.	1,364	yards	South.
Red Bank Box.	1,202	"	"
Red Bank Down Main Starter with Balby Junction auto Inner Distant below.	851	"	"
Balby Junction Down Main Home with Bridge Junction auto Distant below.	277	"	"
Balby Junction Box.	177	"	"
Front of Engine of 1.25 p.m. train on its side.	88	"	North.
Sand Bank Box.	128	"	"
Bridge Junction Down Main Home four-aspect colour-light No. 67.	323	"	"
Bridge Junction Box.	456	"	"
South Yorkshire Down Main Home No. 36 with Doncaster South Distant below.	783	"	"
South Yorkshire Box.	852	"	"
Doncaster South Box.	1,122	"	"

The gradient of the Down line is practically level to a point quarter mile north of Red Bank box, where it changes to 1 in 264 rising past Balby Junction and Bridge Junction to South Yorkshire box ; thence it is level into Doncaster.

The line is straight from 1 mile south of Red Bank box to a point 1,100 yards south of Balby Junction, where it enters an 80 ch. right-hand curve which ends about 200 yards north of Bridge Junction box. A cutting on the Up side commences opposite Balby Junction Down Home semaphore, and continues round the curve to a point about 90 yards in rear of Bridge Junction Down Home colour-light.

Visibility from Balby Junction box and from the footplate is restricted by the curvature round this cutting, but there was a clear view from the box of the Down main line for 305 yards up to Sand Bank box, 128 yards beyond the point of collision. The rear of the 1.10 p.m. train would have been seen initially from the right-hand side of the footplate of the 1.25 p.m. train, when the engine passed Balby Junction Down Home, 277 yards in rear ; on the left-hand side, however, the driver would not have been able to see the train in front of him until he reached the box 100 yards further ahead, say, 180 yards only from the obstruction.

SIGNALLING

The signalling at Doncaster has long been due for modernisation, and work on a comprehensive remodelling scheme was begun before the war, but, like many other important projects, had to be postponed. It was, however, restarted in 1946 and is due for completion at the end of 1947. Bridge Junction Down Main Home was changed to a four-aspect colour light on 8th September, 1946, and it was arranged to convert Balby Junction Down Main Home similarly on 14th September, 1947. Since the method of working of Bridge Junction and Balby Junction Down Main signals has a bearing on the cause of the accident, a brief description and history of the changes which have taken place in connection with the re-signalling is desirable. Prior to March, 1944, the relevant signals were of standard semaphore type, mechanically operated by separate levers in the respective signal box frames.

At Bridge Junction, the Down Main signals were the Home No. 67 and the Distant No. 68. A berth track circuit "H," 200 yards in length, existed in rear of the Home, which when occupied held the block instrument needle in the "Train on Line" position, and if not in that position, placed it and maintained it there. The control was such that before a train on the Down Main could be accepted from Balby Junction, the Distant arm was proved at "Caution," and the Home arm at "Danger," with the lever normal in the frame.

At Balby Junction, the Down Main signals were the Home No. 2 and the Distant No. 1. The Home was not controlled in any way, nor was there any control on the Down Main block instrument.

There were mechanical indicators in both boxes to show when the signalman in the box ahead had pulled the lever controlling his Distant. Special instructions were in force which forbade the signalman from lowering his Distant and Home when the indicator showed "On" until the approaching train had passed his Distant signal ; then, provided he had obtained "Line Clear" from the box in advance, he was permitted to lower his Home to allow the train to go forward. The complete instruction is given in the Appendix.

In order, however, to utilise the lever for other purposes, Bridge Junction Distant was changed from mechanical to automatic operation in March, 1944, and was controlled by the working of Home signal lever No. 67 ; also, to ensure that the Distant was replaced for each train, the control was taken through Track Circuit H, so that once the circuit had been occupied the Distant could not be cleared until Home signal lever No. 67 had been replaced and pulled again. This also had the effect of preventing the Distant signal from being lowered behind a train brought to a stand or nearly to a stand at the Home.

At the same time, the mechanical indicator in Balby Junction box was replaced by an electric one, but, unlike the former which clanged when moved and thus attracted the signalman's attention, the new device when first installed was visual only. However, as the result of representations made by the signalmen concerned, a low-toned bell was added in April, 1946.

On 28th April, 1946, Balby Down Main Distant, carried under Red Bank Down Main Home, was changed from mechanical to automatic operation, and an additional automatic inner Distant was installed under Red Bank Starter. Both these Distants were worked by the Down Main Home lever No. 2 in Balby Junction box and were controlled electrically by Bridge Junction Down Main Distant "OFF." But the safeguards provided (as already mentioned) in the case of Bridge Junction Distant did not exist due to the absence of any track circuiting in the rear of Balby Junction Home signal.

On 8th September, 1946, Bridge Junction Home No. 67 was changed to a four-aspect colour light as a first instalment of the resignalling. The controls were such that when the track circuit ahead was occupied, the signal returned to "Danger" and could not be cleared until lever No. 67 had been replaced and pulled again. Bridge Junction Distant (semaphore) was thus controlled by the aspect of the colour light Home so that it only cleared when the Home changed to G or YY, or in certain circumstances to Y depending on conditions ahead. The old control through track circuit H was removed as redundant, and in consequence a situation was created whereby the Distant indicator could change to "Slot Off" and the bell could ring in Balby Junction box whenever Bridge Junction Home was cleared as indicated above, even though a train was standing on track circuit H at the time.

The arrangements at Bridge Junction and Balby Junction introduced in March 1944, and April 1946, respectively, were in accordance with diagrams prepared in 1939 and issued in January, 1944, prior to the adoption on 8th March 1945, of the Company's latest instructions applicable to New Works. These latter laid down that power-worked Distant signals could be automatically operated provided:—

- (a) The signal returns to Caution *immediately* it is passed by a train as required by Rule 68(a).
- (b) A switch is provided to cut out automatic operation when necessary.
- (c) Lever control is retained in the case of signal boxes situated close together and coupled for Distant signal indicator working."

Trains are booked at Bridge Junction and Red Bank, the boxes ahead and in rear respectively of Balby Junction, where booking has not been carried out for the past 24 years.

REPORT AND EVIDENCE

1. Driver H. Mason was in charge of the 1.10 p.m. Express. He stated that on approaching Red Bank he observed both Balby Junction Distants "On" and made a brake application. Balby Junction Home was "Off" and he passed the box at 10 to 15 m.p.h., coming to a stand at Bridge Junction colour light Home. He stayed there for two or three minutes and then the signal changed first to Y and later to YY. He had difficulty in re-starting owing to the long heavy train, the rising gradient and sharp curvature. He had to reverse twice and had just commenced to move forward when he felt the collision. He estimated that he had been detained at the signal for altogether 4 or 5 minutes. Guard G. T. Wells who was travelling in the 7th vehicle, generally confirmed Mason's evidence as regard this period of time. He also noticed the colour light signal change to yellow, but was not sure whether it was to Y or YY.

2. Driver R. Foster, who was in charge of the 1.25 p.m. Express, was injured and suffered badly from shock. He took over at Grantham and had a good run without any checks. He said that when approaching Red Bank box, he could see the signals from a distance of 1½ to 2 miles. He observed that Red Bank Home and Starting signals, with Balby Junction Distants under them, were all clear. Shortly afterwards he saw that Balby Junction Home with Bridge Junction Distant under it were also clear. That being the case, Foster was anticipating a clear run into Doncaster, but as he was usually routed into No. 8 Western platform via the Down Passenger Independent No. 2 line, he closed the regulator and commenced to apply the brake just after passing Red Bank box, so as to bring his train under control preparatory to being diverted at South Yorkshire box through the facing junction, over which there was a speed restriction of 10 m.p.h. He estimated that speed when passing Red Bank box was 40 to 45 m.p.h., and after his brake application, he was coasting when he reached Balby Junction box, travelling at about 30 m.p.h. Somewhere near here his Fireman shouted to him to stop, whereupon he made a full brake application but did not have time to reverse before the collision took place. Foster was on the left hand side of the footplate, and was unable to see the rear of the 1.10 p.m. train round the right hand curve.

3. Fireman R. B. Huffingley escaped unhurt. He was a good witness and his account was that on approaching Decoy No. 1 box (700 yards in rear of Red Bank) he noticed Foster close the regulator preparatory to the stop at Doncaster. From his position on the right-hand side of the footplate, he observed that the Balby Junction Inner Distant and Bridge Junction Distant signals were clear; he then crossed the footplate to close the tender feed on the left-hand side, returning to his own side just as the engine was passing Balby Junction Box. He looked out of the window, saw a train ahead, and immediately shouted to Foster; but before the brakes could take effect the collision occurred at a speed of about 40 m.p.h.

Guard J. Gilmore was travelling in the 10th coach and could throw little light upon the accident because he was talking to the Train Attendant at the time. He stated, however, that he felt an application of the brake just before the collision.

4. Signalman W. Sampson of Red Bank Box, stated that the last train on the Up road prior to the accident passed his box at 4.32 p.m. ; on the Down line, the train ahead of the 1.10 p.m. Express passed at 4.31 p.m., when he gave "Out-of-Section" for it to Decoy No. 1 and at the same time accepted the Express. At about 4.32 p.m. he offered the train to Signalman McKone at Balby Junction, who accepted it at once. It passed his box at about 4.34 p.m. at a speed of 50 m.p.h., and, according to his register, "Out-of-Section" was received from Balby Junction at 4.36 p.m. At 4.35 p.m., he accepted the 1.25 p.m. Express and when Balby Junction cleared the block he at once offered this train forward to McKone, who accepted it without delay at the same time, 4.36 p.m. The second Express passed his box 4 minutes later at about 4.40 p.m., also travelling at the normal speed; 50 m.p.h., for fast trains stopping at Doncaster. Sampson did not notice the position of the Balby Junction Distant but from the way the train was travelling, he assumed they were clear. Traffic during the day had been heavy but not excessive for a Saturday.

5. Signalman H. S. Taylor of Bridge Junction explained how McKone offered the 1.10 p.m. Express at 4.33 p.m., but he could not accept it till 4.34 p.m. ; Taylor offered it three times to South Yorkshire Junction, before he received "Line Clear" at 4.38 p.m. He then cleared his Down Main Home No. 67 at which the Express had been standing for over 2 minutes. He was quite certain about this, because he noticed the occupation of track circuit H and had also seen the engine through the overbridge when the train came to a stand. He was not perturbed about the delay, however, because it was a common occurrence for trains to be detained at this junction, particularly on a Saturday. The train appeared to have difficulty in starting, which was not unusual due to gradient and curvature, and Taylor did not realise that anything was amiss until the receipt of the "Obstruction Danger" signal from Balby Junction at 4.41 p.m. He was not offered the 1.25 p.m. Express and when he spoke to McKone on the telephone a few minutes later, at about 4.50 p.m., he was told that the coaches of the 1.10 p.m. were obstructing the Up line. He asked whether anything had hit the Express and McKone definitely said "No" and made no reference to the second train.

6. Signal Telegraph Inspector W. C. McCarthy, accompanied by Inspector Jackson, arrived at Bridge Junction box at about 8.30 p.m. McCarthy tested the block instruments and controls in this box whilst one of his men went to Balby Junction and carried out similar tests there. The Down Main block instrument needle in Bridge Junction box was locked at the "Train-on-Line" position by the occupation of track circuit H, and the corresponding non-pegging instrument in Balby Junction box was showing the same indication. McCarthy tested all the controls on the Home and Distant signals and found them in order.

7. Signalman F. E. Buckett of South Yorkshire Junction box explained how the acceptance of the 1.10 p.m. Express was delayed on account of other movements, the last of which was the passage of the 4.35 p.m. Up train to Sheffield from Doncaster Up platform, across the Down Main to the South Yorkshire branch. This train was accepted at 4.36 p.m. immediately after a rake of empty coaches had been cleared to Garden Sidings on the Down side of the line between Bridge Junction and South Yorkshire Junction. Buckett could not clear the block till 4.38 p.m., when he immediately accepted the 1.10 p.m. Express. He obtained "Line Clear" from Doncaster South, lowered his Home signal and pulled his Distant Indicator lever, after having seen the indicator for Doncaster South Distant change to "Slot Off." The effect of this was to allow the aspect of Bridge Junction colour light signal No. 67 to change from Y to YY soon after 4.38 p.m. This caused the Distant indicator in Balby Junction box to change to "Slot Off" and the bell to ring.

8. Signalman J. W. McKone came on duty at Balby Junction box at 2 p.m. Although trains are not booked at this box, he remembered accepting the 1.10 p.m. Express. After it had passed his box, he transmitted the "Out-of-Section" signal to Signalman Sampson at Red Bank, who immediately offered him the 1.25 p.m. Express. He accepted the latter train but did not offer it forward to Bridge Junction, nor did he look along the Down line and see the rear coaches of the 1.10 p.m. train which were clearly in sight. He said that shortly afterwards he went to the telephone to answer a call on the Hump Yard circuit and as he picked up the receiver the Bridge Junction Distant indicator bell rang ; he thereupon turned round (with the telephone in his left hand) and pulled over his Down Main Home Signal lever No. 2. He demonstrated this action to us in the box. The result was that he simultaneously lowered four signals, namely his Home with the Bridge Junction Distant below it, as well as his Inner and Outer Distant.

• He affirmed that no sooner had he lowered these signals than the express came in sight and passed his box at normal speed ; but this was contradicted by Driver Foster's statement regarding his view of Balby Junction Distant, and there is no doubt, from the evidence of Signalmen Taylor and Buckett, that the bell must have rung in Balby Junction box soon after 4.38 p.m., when McKone lowered these signals, perhaps 3 minutes before the train passed the box and the collision occurred. He contended, however, that he did not lower the Home until the train had passed the Outer Distant at Caution.

McKone also stated that a moment or two after he lowered these signals he heard the noise of the collision and thought the 1.25 p.m. express had become derailed. His account was that he saw the pile of broken and derailed vehicles and did not realise till perhaps 15 minutes afterwards that a collision had taken place. The 1.10 p.m. express had "gone clean out of my mind." But he did not leave this impression on Signalman Taylor's mind when they spoke after the transmission of the "Obstruction Danger" signal, and Taylor felt sure that McKone referred to the 1.10 p.m. and not to the 1.25 p.m. train.

McKone explained that prior to Bridge Junction Signal No. 67 being converted to a colour light, the occupation of track circuit H cut out the electric indicator in his box, but when the new signal was brought into use in September, 1946, this did not prevent the bell ringing. He found this confusing, because he accepted the ringing of the bell, as he had accepted the clanging of the old mechanical slot indicator, as an indication that he had permission to lower his Home Signal. It was on account of the ringing of the bell on this occasion that he lowered his signal; he would never have done so without this indication. He admitted that he did not look at his block instrument nor along the Down line; nor had he obtained "Line Clear."

McKone added that it was his practice to set the Junction from Down Main to Down Goods as soon as a train passed and after clearing the block, so that he could accept another immediately it was offered. In order to do this, he had first to reverse the clearance bar lever No. 31, then unlock the Down Main facing points, next reverse crossover lever No. 20, then pull lock bar lever No. 23 and finally relock the facing points. Having accepted the train with the road set in this position, he had to reverse it again—another five lever movements—before he could lower his signals for the train's approach. McKone emphasised that he did this 30 or 40 times in a turn of duty (that is to say, an additional 300 to 400 lever movements for acceptance purposes alone). In spite of considerable pressure he contended that he made this a regular practice and only forgot to do it on the occasion of this accident.

McKone was unable to give any adequate explanation for his failure to observe the stationary train, which had been standing for so long within his sight. He stated that he was watching a train on one of the Goods lines opposite the box and was expecting the driver to speak to him. He went to the window and looked out several times, but took no steps to attract the driver's attention. He said he had no worries and nothing to distract him, though on re-examination he referred to the box as stuffy. The door, however, was open all the time, and he also opened the window on several occasions.

9. Signalman K. T. Bird described conditions of work at Balby Junction box where he had been employed since May, 1946. He said it was not an easy box to work because there was no booking, except of trains on the Down Independent Goods line; hence he had to rely largely on memory. His chief difficulty was in connection with the working of trains on the Down Main because on many occasions Bridge Junction was unable to accept them immediately. Sometimes a doubt would arise in his mind as to whether he had offered the train forward, and on these occasions he would speak to the Bridge Junction signalman and ask for confirmation. Bird explained how on hearing the indicator bell ring, he would automatically go to No. 2 lever. This bell now rang even when a train was standing at Bridge Junction, and in order to protect himself he always placed a collar on No. 2 lever whenever a train was held in the section ahead. He stated that the visibility in the Doncaster direction was not good, but he could see trains as far as Sand Bank box. His practice was to transmit the "Out-of-Section" signal and clear the block as soon as he saw the tail lamp passing this point. When visibility was bad, however, or when a train was stopped in the section ahead, he did not act until he had received "Out-of-Section" from Bridge Junction. On rare occasions he set the road from the Down Main to the Down Goods for acceptance purposes, but he did this only when requested to do so by the Red Bank signalman, to enable the latter to clear his junction.

10. Yard Master E. S. Gellatly stated that he had made exhaustive inquiries about the telephone call which McKone alleged he received on the Hump Yard circuit. It is one of seven telephones connected by an omnibus line, and as far as Gellatly could ascertain, no one had rung up McKone, though it was possible that he mistook the ringing of another code for his own. Altogether, there were five circuits connected to Balby Junction box and in consequence the bell rang many times during the day, though only a limited number of the calls were for that box.

11. Mr. W. G. Northfield, who retired from the appointment of District Inspector, Doncaster in July, 1947, after 33 years' service as a signalman and 16 years as an Inspector, gave a detailed description of the signalling arrangements and of correct practice to be followed at Balby Junction box. He explained the method of working and confirmed that the changing of the indicator was the signalman's authority for lowering his Distant signal, provided the train had been accepted. He agreed that signalmen were inclined to rely on the ringing of the indicator bell to advise them that the line ahead was clear, but he was emphatic on the need for correct Block working. He had had no complaints that the bell in Balby Junction box sometimes rang with a train still in the section ahead; in fact, he did not realise that any alterations had been made to the controls on Bridge Junction Distant. He ridiculed McKone's statement as regards setting the road Down Main to Down Goods for acceptance purposes, and pointed out that delays and difficulties would occur if this was made a general practice.

CONCLUSION

12. The sequence of events leading up to this accident are clear. The 1.10 p.m. Express, running over 10 minutes late, passed Balby Junction box at slow speed and was brought to a stand at Bridge Junction Down Main Home signal at about 4.36 p.m. Two or three minutes later, soon after 4.38 p.m., the signal aspect changed from red to yellow, and in a few seconds to double yellow. This caused the indicator bell to ring in Balby Junction box where Signalman McKone (who had already improperly accepted the 1.25 p.m. Express, which was on time) immediately pulled his Down Main Home lever No. 2 and thus lowered his Home signal and Bridge Junction Distant under it, as well as Balby Junction Inner and Outer Distant. The 1.25 p.m. Express was then some 2 miles from Red Bank box, and indications for a clear run through to Doncaster were thus displayed.

The collision occurred two or three minutes later, the 1.10 p.m. train having been detained owing to difficulty in starting, for which Driver Mason was in no way responsible, having regard to the conditions of curvature and gradient. Although Driver Foster thought his speed on passing Balby Junction was only 30 m.p.h., the damage to his engine and the rear coaches of the leading train was more consistent with 40 m.p.h. (Fireman Huffingley's estimate) particularly as Driver Mason was just moving forward. We do not consider that Foster or Huffingley could have taken earlier action to avoid the collision, having regard to the restricted range of vision round Balby curve.

13. Very serious responsibility rests upon Signalman McKone for accepting the following Express and for lowering his signals for it to enter the section to Bridge Junction *before* obtaining "Line Clear" for the train from Signalman Taylor, or even receiving "Out-of-Section" from him for the preceding train. It was in McKone's favour that he frankly admitted his failure, but his explanations in mitigation were evasive and inconsistent with other evidence and practice.

It might be said that McKone's lapse could be attributed in part to clearing the block prematurely for the first train, and that this was his initial blunder; but he could not in fact account satisfactorily for his actions during more than 5 minutes, namely, from the time this train passed his box soon after 4.35 p.m. till the collision occurred at about 4.41 p.m. He watched the train pass at 10 to 15 m.p.h. (at abnormally slow speed if he was *not* expecting it to be stopped or at least checked at Bridge Junction box); but he did not notice during the long interval thereafter that it had actually stopped, although its last six coaches were clearly visible from his box.

He affirmed that he went to his cabin window several times to see whether the driver of a goods train opposite wished to speak to him; but the driver took no notice, nor did McKone attract his attention. Though the weather was hot this does not appear to have contributed to his failure, and he said he had nothing on his mind. Nor was he operating under great pressure and had no other movements at the time to distract his attention. The last train on the Up road had passed at about 4.31 p.m. and the previous train on the Down road at 4.32 p.m. His transmission of the "Out-of-Section" signal for the first Express and his thoughtless acceptance of the second Express had taken place at about 4.36 p.m.

We do not accept his explanation and consider it was an afterthought that he had forgotten to adopt what he alleged was his normal practice, namely, the setting of the facing junction Down Main to Down Goods, after the passage of a train, in order to be ready to accept another immediately. A total of 10 lever movements are required for the setting and re-setting of this junction, and if his statement was correct that he used this junction for acceptance purposes on 30 to 40 occasions during a turn of duty, there would have been considerable interference with traffic on the goods line, with consequent complaints, none of which have been received.

As regards McKone's operation of lever No. 2 and the lowering of his signals for the second Express, his evidence and demonstration in the box were to the effect that, in thinking there was a telephone call for him when the bell rang, he lifted the receiver (on the back wall of the box), but at the same moment (soon after 4.38 p.m.) the Distant signal indicator bell sounded; with his back to the block instrument and without even looking at it, still less at the standing train, he stretched out his right arm and pulled the lever while still holding the telephone receiver in his left hand.

Although, as already mentioned, intensive enquiries proved fruitless in finding anyone who had in fact telephoned to McKone at about this time, his statement cannot be entirely discounted because he may have mistakenly tried to answer a call intended for another box. There may also be some substance in his suggestion that the ringing of the indicator bell confused him, because (since the installation of the colour-light Home at Bridge Junction in September, 1946) the bell rang even when a train was standing at this signal. But we cannot accept this as excusing a fundamental breakdown in block working, and the very fact that McKone thought there was some ambiguity as regards the functioning of the bell (and particularly as he had not drawn attention to it) justified greater care, and the application, for instance, of a lever collar, as explained by Signalman Bird.

Indeed, this does not seem to be a case of an inexperienced signalman being misled into making a foolish mistake. On the contrary, we find it very difficult to understand how McKone, after such long service, should have been so careless and so lacking in sense of responsibility as to act in the way he admitted he had done. In perfect weather he had every opportunity of observing the first Express standing only 177 yards from his box, and perhaps he had 3 minutes in which to retrieve his error and reverse his signals to "Danger" in the face of the second train. Having regard to the nature of his lapse and his unreliable evidence, we feel that he has proved himself no longer fit to hold such a responsible position as that of a Main Line signalman. He has been a signalman for 21 years and had served at Balby Junction for the last seven. He has a clear record.

14. The Company's instructions regarding mechanical indicator working given in the Appendix make it quite clear that when the indicator shows "On" the Distant signal must remain at "Caution", and the Home may be cleared only after an approaching train has passed the Distant, always provided "Line Clear" has been obtained from the box ahead. These instructions were also applied to the electrical indicator working when it was brought into use in March, 1944. The normal practice at Balby Junction was for the Signalman to offer a down train to Bridge Junction as soon as he had accepted it from Red Bank, or, if the section ahead was occupied, as soon as he received "Out-of-Section".

Consequently, in normal circumstances, the Signalman obtained "Line Clear" before the indicator changed to "Off", and he waited for the clang of the mechanical slot or the ring of the electric bell to advise him of the change, so that he might lower his signals; hence it became an automatic reaction for the Signalman to go to No. 2 lever as soon as the indicator bell rang. This arrangement worked satisfactorily so long as the Balby Junction indicator only changed to "Off" if the section ahead was clear. This condition prevailed when Bridge Junction automatic Distant was first installed in 1944, because the electrical control was taken through track circuit H.

But as soon as Bridge Junction Home signal was converted to a colour light the situation changed, because then control of its Distant was no longer influenced by the occupation of this track circuit, but depended on the aspect of the Home, which, as previously pointed out, was controlled by conditions ahead. Hence it became possible for the indicator in Balby Junction box to change to "Off" behind a train standing at Bridge Junction Home. As Signalman Bird pointed out, however, he prevented himself from making a mistake by using a lever collar until he had obtained "Line Clear". Signalman McKone, on the other hand, did not always take this precaution, and having overlooked the presence of the 1.10 p.m. train in the section ahead, although well within his view, he incorrectly reacted to the ringing of the indicator bell and improperly lowered his signals.

REMARKS

15. The accident would not have occurred had the modernisation of the signalling at Doncaster, postponed on account of the war, been completed, or even if Balby Junction Down Main Home lever No. 2 had been controlled by the block instrument at "Line Clear". The ringing of the Distant signal indicator bell in this box, which contributed to McKone's failure, was due to the unusual arrangement of the electrical control which had been introduced during the transitional stage of the resignalling, when Bridge Junction Home No. 67 had been converted to a colour light before Balby Junction Home No. 2 was similarly changed. We understand that thorough investigation has been made, and that this was an isolated case, no other similar arrangement being in use elsewhere on the system.

As a result of discussion with the Company's Officers after the Inquiry, with a view to preventive action being taken as quickly as possible, the following modifications were completed at Balby Junction box by the week-end of 24th August, 1947:—

- (i) A "Line Clear" release was provided on Home signal lever No. 2.
- (ii) The Outer and Inner electrically operated Distant signals were re-coupled to lever No. 1, so that they no longer worked automatically. (This was in accordance with the Company's later practice.)
- (iii) Track circuit H, when occupied, was made to control Bridge Junction Distant at "Caution", so that the indicator in Balby Junction box did not change to "Off" and the bell did not ring.

On 14th September, 1947, Balby Junction Home No. 2 was converted to a four-aspect colour light in accordance with the phasing of the Doncaster re-modelling, and track circuit H was extended back to this signal, while controls similar to those on Bridge Junction Home No. 67 were applied.

Having regard to the action thus taken, we have no other recommendations to make. We would observe, however, that the circumstances of this case illustrate the necessity for exercising the closest co-operation and care when consideration is being given by the Departments concerned to alterations in arrangements and controls during a change-over from mechanical to electric signalling. The possible effect on operation of the change in question was clearly not foreseen at Doncaster.

We have the honour to be, Sir,

Your obedient servants,

A. H. L. MOUNT,
Lieut.-Colonel.

C. A. LANGLEY,
Brigadier.

The Secretary,
Ministry of Transport.

APPENDIX

L.N.E.R. INSTRUCTIONS.

Mechanical Indicators Working In Connection With, Or In Place Of, Distant Signals.

When the indicator in your box working in connection with, or in place of the Distant Signal of the box in advance shows "On" you must not lower the Distant, Home and Starting Signals (where the latter are provided) applicable to trains going towards the box from which such indicator is worked until the approaching train has passed your Distant Signal; then, if you have obtained permission in accordance with the Block Regulations for the train to proceed to the box in advance, and if all other Regulations have been complied with, you may lower the Home and Starting Signals (where the latter are provided) to allow it to go forward.

In cases where two or more Distant Signals are worked from the box in advance, you must, before lowering your Distant Signal, take care that the Signalman at the box in advance has lowered the Distant Signal applicable to the Line upon which the train is approaching and upon which it is required to proceed.

DONCASTER DIAGRAM

NOT TO SCALE

RELEVANT TRACKS
AND SIGNALS
ONLY SHEWN

