MINISTRY OF TRANSPORT

RAILWAY ACCIDENTS

REPORT ON THE COLLISION which occurred on 9th June 1951 at STOBCROSS in the SCOTTISH REGION BRITISH RAILWAYS

LONDON : HIS MAJESTY'S STATIONERY OFFICE
1951

TWO SHILLINGS NET

SCOTTISH REGION
BRITISH RAILWAYS

MINISTRY OF TRANSPORT,
Berkeley Square House,
London, W.1.
28th August, 1951.

SIR,

I have the honour to report for the information of the Minister of Transport, in accordance with the Order of 11th June, 1951, the result of my Inquiry into the collision between two passenger trains which occurred at 2.59 p.m. on Saturday, 9th June, 1951, at Stobcross on the low level line through Glasgow Central, in the Scottish Region, British Railways.

The 1.30 p.m. train from Renfrew to Balloch was standing in the tunnel at the Stobcross home signal with the brakes off, when it was run into from the rear by the 2.18 p.m. train from Glenboig to Maryhill, which was travelling at about 30 m.p.h. under clear signals. The signalman at Stobcross did not lower the signals for the first train which he had forgotten, and he gave Train out of Section and accepted the 2.18 p.m. train. Two independent failures in an electrical locking circuit enabled him to do this.

The 1.30 p.m. train (excursion special No. 158) was occupied by some 550 passengers, including about 300 children, but, fortunately, the rear portion, which was badly damaged, was only lightly filled and there were no passengers in the last two coaches. The passenger coaches on the 2.18 p.m. train were empty. Fourteen passengers and three railway servants, including the engine crew of the second train, sustained slight injuries or shock.

There was no delay in organising the relief arrangements. The front portion of train No. 158 was drawn forward to Stobcross station and the few passengers from the rear coaches were escorted there on foot. Owing to the confined space in the tunnel cranes could not be used, and it was not possible to clear the wreckage and re-open the lines for traffic until 2.30 p.m. on 10th June. In the meantime trains were diverted to other routes.

The weather was clear and dry, and there was little smoke in the tunnel in which visibility was fair.

DESCRIPTION

The trains.

2. The stationary excursion train consisted of ten non-corridor vehicles and it was drawn by a tender engine of the 2F class, 0–6–0 type, driven from the left hand side. The total weight of the train including the engine and tender, was 354 tons. It was marshalled from front to rear as follows :—

Number	*Original owning Railway*	*Type*	*Weight*
20368	L.M.S.	Brake Third	27 tons
19049	,,	Composite	26 tons
10094	,,	First	27 tons
15508	C.R.	Third	29 tons
15791	G. & S. W.	,,	29 tons
15506	C.R.	,,	29 tons
15530	,,	,,	29 tons
15781	G. & S. W.	,,	25 tons
10057	L.M.S.	First	27 tons
20810	,,	Brake Third	29 tons
		Total weight	277 tons

All the vehicles had steel underframes except the two G. & S.W. vehicles on which the solebars only were of steel, the remaining members being of timber. The bodies of all the coaches were of timber with the exception of the rear brakevan which had external steel panelling on timber framing. The buffers were of the shock absorbing type, except on the G. & S.W. and C.R. vehicles. All the vehicles were fitted with electric light, but the C.R. and G & S.W. vehicles had no through electrie couplings.

3. The 2.18 p.m. train comprised three non-corridor coaches, weighing 87 tons ; it was drawn by a Class III, 2–6–2 type tank engine, weighing 71 tons, which was driven from the right hand side as running bunker leading. The coaches were comparatively modern ex-L.M.S. vehicles baving steel underframes and steel panelling on timber body frames ; all had shock absorbing buffers.

4. The engine of the 2.18 p.m. train forced itself into the trailing brake compartment of coach No. 20810. The leading buffer beam of the engine was bent backwards and the buffers were broken off. As a result, the buffer beam became an inclined plane on which the engine lifted itself on to the underframe of the coach, and the radial wheels were forced backwards between the driving and rear coupled wheels which

were derailed. The main frames of the engine were buckled and it sustained other heavy damage. From marks on the arch of the tunnel it appeared that the roofs of the engine cab and the brake van had come into contact with it.

The impact drove the excursion train forwards some 20 yards. The brake compartment of vehicle No. 20810 was wrecked, but a tail lamp was found still on its bracket. Coach No. 10057 was telescoped into the light G. & S.W. coach No. 15781, wrecking the leading three compartments of the former and rear four compartments of the latter. The timber underframe members of No. 15781 were smashed and the body, which was displaced from the bogies, was severely damaged. The roof of vehicle No. 15530 sustained damage and its leading draw hook was broken.

5. The shock of the collision was thus absorbed by the coaches of the stationary train, and those of the 2.18 p.m. train were undamaged. The nature and extent of the wreckage suggested that the collision took place at about 30 m.p.h.

The line.

6. As is shown in the diagram, the low level line through Glasgow Central runs roughly East (Up) and West (Down). It begins at Strathclyde Junction and serves Dalmarnock, and it has stations at Glasgow Cross, Glasgow Central, Anderston Cross and Stobcross Junction. The lines serving the docks and a goods yard join the main lines at Stobcross East Junction, and at Stobcross West Junction the main line bifurcates, one section going in a northerly direction to Kelvin Bridge, Kirklee and Maryhill, and the other westwards to Partick Central and Balloch. Between Dalmarnock and Kirklee and from Stobcross towards Partick Central, the lines are mainly in tunnel.

The section of the line directly concerned in this accident is the Down line from Glasgow Central to Stobcross, about one mile in length, details of part of which are shown in the diagram. Anderston Cross is about midway but at the time of the accident the station and the box were closed. Except at Anderston Cross Station and again near Stobcross, the line is in tunnel. The gradients are not heavy, and from Anderston Cross onwards the Down line curves to the left and then, when approaching Stobcross East Junction, it becomes straight. The impact occurred on a rising grade of 1 in 304 towards the end of a 20-chain curve. The greater part of the excursion train was standing on the straight line beyond the curve.

7. The normal passenger traffic on this section of line is about 95 trains daily, with morning and evening peaks during which as many as 14 trains are run in an hour, and it consists mainly of workmen's trains to and from the shipyards and docks. On Saturdays fewer regular passenger trains are run and the peaks are less intense, but on occasions, as on the day of the accident, excursion trains bring the total to roughly the same figure. In addition, Stobcross deals with about 10 Goods trains and light engines daily. Passenger trains are timed at about 25 m.p.h. from start to stop.

The signalling.

8. Stobcross signalbox is situated roughly midway between the east and west junctions and it is equipped with a 49-lever mechanical frame. The location of the relevant signals controlled therefrom is shown in the diagram. There are two Down main home signals which are No. 35 "Home 1", and No. 34 "Home 2"; the latter is a semaphore with intensified lighting, while the former, which is just inside the mouth of the tunnel, is of the sliding face tunnel type. Signal No. 48 leads to the goods yard.

9. Trains are block signalled by Tyer's 3-position ex-Caledonian Railway block instruments, modified to provide lock and block conditions. As Anderston Cross box was closed, block working was between Glasgow Central and Stobcross. The controls are such that the Down starting signal lever at Glasgow Central is released only after Line Clear has been obtained from Stobcross and it can only be reversed once for each Line Clear obtained; when pulled it is backlocked until both the block instruments have been placed at Train on Line by the signalman at Stobcross. There is sequential locking between the home and starting signals.

The block instruments are locked at Train on Line until a treadle 20 yards ahead of the Stobcross home signal No. 34 has been operated by the train with the lever of that signal pulled. When both these conditions obtain, the signalman at Stobcross can replace both this block instrument and the block instrument at Glasgow Central to normal (Line Blocked) by depressing a plunger on the side of his block instrument. Another Line Clear cannot be given by the signalman at Stobcross until the home signal lever No. 35 has been put back to normal.

Similar controls are provided between Glasgow Cross and Glasgow Central signalboxes. Thus, providing the locking arrangements operate correctly, the signalmen at Glasgow Central and Stobcross must lower the signals for each train and replace them to "On" after it; also, the signals for a train to leave Glasgow Central cannot be lowered until the preceding train has arrived at Stobcross and has operated the treadle. A push button is, however, provided at Stobcross to release the block instruments from Train on Line in the event of the failure of the treadle to operate, but it can be used only after the glass and paper seal covering the button have been broken. It does not require the co-operation of the signalmen in either of the adjacent boxes.

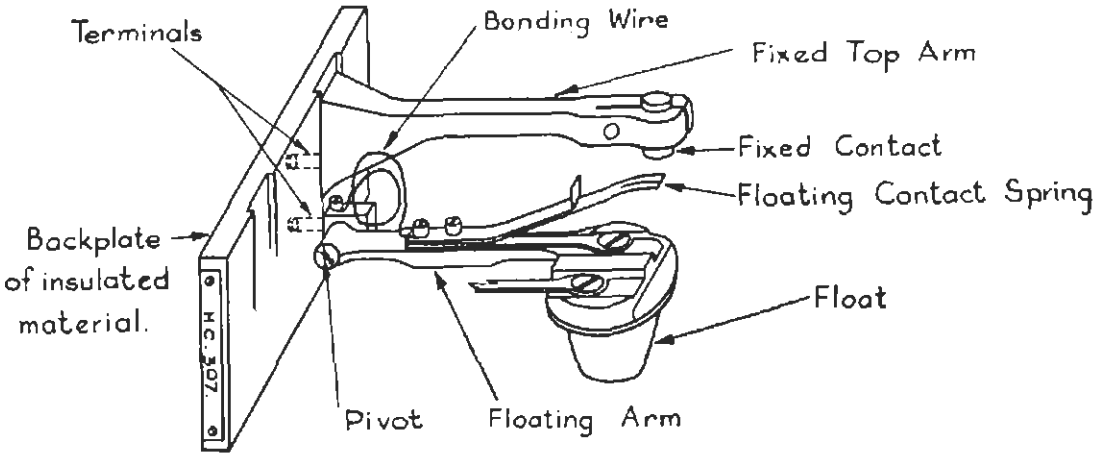
10. When the signalman at Stobcross depresses a front plunger to put the block instrument in his box at Train on Line, the instrument at Glasgow Central is placed in the corresponding position electrically

and it is only released from that position when the instrument at Stobcross is replaced to normal. A latching contact in the block instrument at Stobcross is operated mechanically by the plunger and it locks the instrument at Train on Line. The latch is released by the energisation of a disc coil when an electrical circuit through the treadle and a contact switch below the bome signal lever No. 34 is completed, and this should occur only when the treadle is operated, and when the lever is pulled. The treadle and the contact switch are connected in series, and it is therefore necessary for a danger side failure to take place in both to enable the Stobcross block instrument to be freed from Train on Line before the train operates the treadle and without the home signal having been lowered. An inspection after the accident revealed that two such danger side failures had in fact occurred.

11. The treadle concerned was of the mercurial rail contact insulated type, and was manufactured by Siemens and General Electric Railway Signal Company. It had been reconditioned in the London Midland Region Signal Workshops at Crewe in 1950 and it was sent to the Scottish Region in July of that year. It was kept in the Stores until it was issued to the lineman on 22nd February 1951 and was fitted in the line at Stobcross on 9th March.

When a vehicle passes over a treadle of this type, the rail depresses a plunger which bears on a diaphragm covering a reservoir filled with mercury. The mercury is forced through a hole into a float cup and lifts a float which rests in it. The float is part of the contact unit of the treadle which lies in a contact chamber. The back plate of the unit encloses the end of the chamber on the top of which is a metal cover. Over the contact chamber and the terminals is a watertight cover.

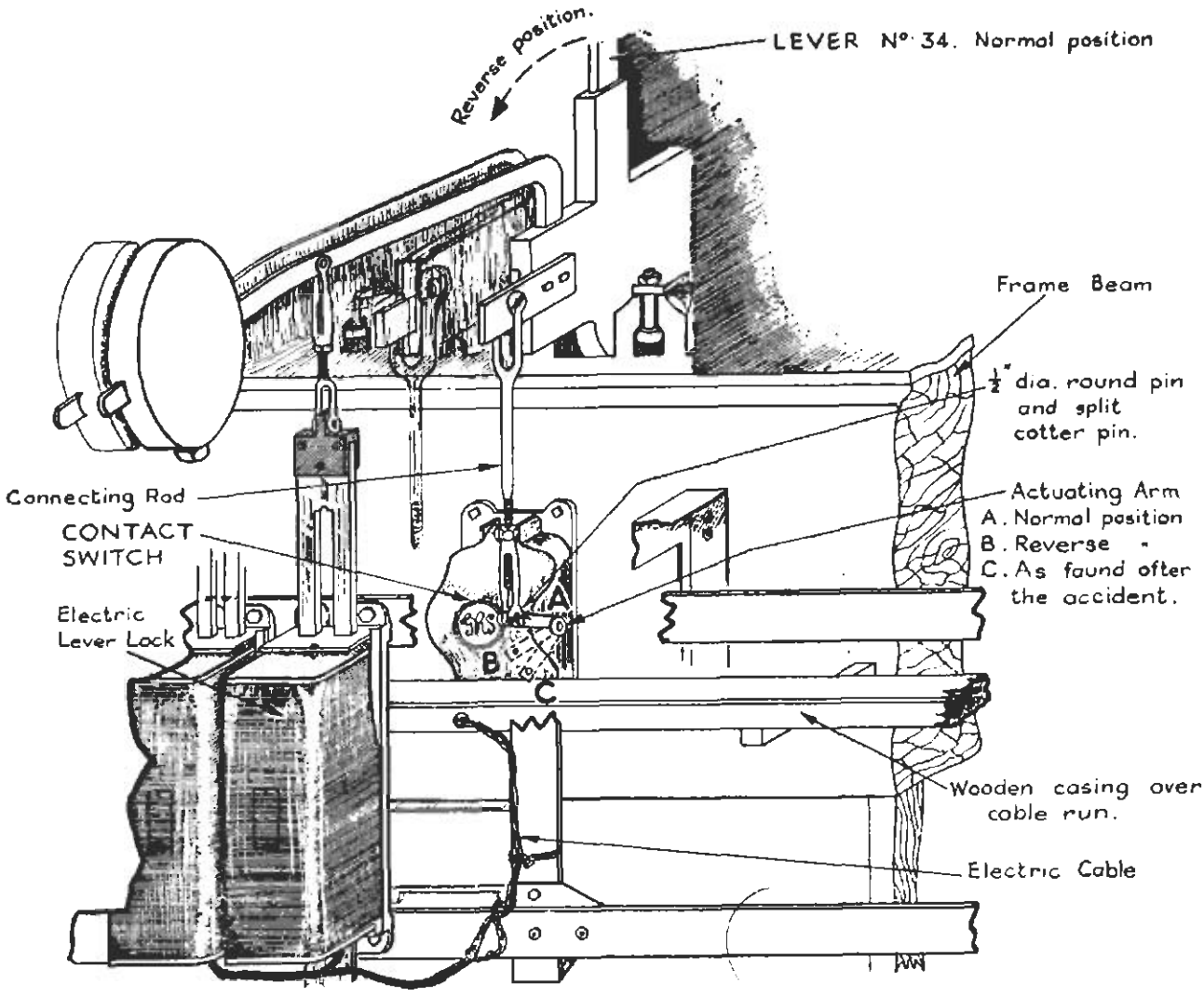
The following sketch illustrates part of the contact unit :—



In this unit a contact spring on a floating arm attached to the float is placed centrally below a fixed top arm. The floating contact spring is connected to a terminal on the back plate by means of an uninsulated and coiled stainless steel bonding wire. The fixed and floating arms are of metal and are varnished. In the particular unit in use it was found that the bonding wire, which should have a horizontal clearance of 3/16 inch from the fixed top arm, had become displaced and was making intermittent contact with it. The varnish of the top arm was chafed. As a result, the circuit through the treadle occasionally remained closed for long periods after the passage of trains.

12. The contact switch under the lever of home signal No. 34, illustrated on page 4, is of the rotary type and it was manufactured by the General Railway Signalling Company. The actuating arm of the switch is connected by a rod to the tail of the lever. The connecting rod and the arm are held in position by means of a ½-inch turned round pin which is secured by a split cotter pin. The circuit is broken when the lever is normal and the arm is in the raised position (A) and "made up" when the lever is pulled and the arm in the lowered position (B) which is about 20° below the horizontal. If the switch arm becomes disconnected, it should fall to a greater angle to the horizontal, and the circuit again should be broken. In the switch in question, the actuating arm was found disconnected (in position C) but the wooden casing of a cable run below the arm had prevented it from falling sufficiently for the circuit to be broken. A round pin of the correct size was found on the earth and ash floor of the box below the switch, and a complete split cotter pin about a foot away from it. The round pin and the split pin were not rusted and they appeared to be those which had joined the actuating arm of the switch and the connecting rod, and to have become recently displaced. The split pin was ⅛ inch diameter. One of its jaws was straight while the other was only slightly opened, and the pin could be placed without difficulty in the hole of the round pin. The correct size of split pin for the round pin is 5/32 inch diameter.

The following sketch illustrates the contact switch :—



Rules.

13. In order to prevent Down trains being stopped unnecessarily in the tunnel short of the station platform, the signalman at Stobcross, as at certain other stations in the tunnel sections, is exempted from the provisions of Rule 39 (*a*) by the following signalbox instruction :—

"*Rule* 39—*Working of Home Signals.*

When the ' Is line clear ' signal for a train on the Down Main line has not been acknowledged by the Box in advance and the Down Starting signal is at danger the Down Main line Home signal may be taken off for the train to draw to the Starting signal as soon as the ' Train Entering Section ' signal for the train has been received from the box in rear".

The intention of this instruction is that the levers of home signals No. 34 and No. 35 should both be pulled on the receipt of "Train Entering Section".

Drivers are exempted from carrying out the provisions of Rule 55 at home signal No. 35.

EVIDENCE

Evidence of the Train Crews.

14. Excursion train No. 158 left Renfrew 30 minutes late and ran through Glasgow Central at 2.47 p.m., 40 minutes late. One additional coach had been attached and some of the rear four vehicles were off the platforms at certain stations ; as a result, the last two were empty and there were only a few passengers in the third and fourth coaches from the rear.

15. H. Kerr, the driver of Train No. 158, saw that the Stobcross home signal No. 35 was at danger ; he therefore stopped the train at it, and said that he blew the engine whistle immediately. As nothing happened for two or three minutes, he sent the fireman forward to the box. He knew that he was exempt from carrying out Rule 55 at that signal, but he said that it was unusual to be stopped there and he "did not like the idea of standing in the tunnel". He had released the brakes in readiness to starting again without delay, and he then stood watching the signal. Suddenly he was thrown to the footplate. He picked himself up quickly, but before doing so he "remembered hearing a clatter like a dummy dropping",

and he thought it was the signal coming "off". He was certain that it had not been lowered before he was thrown down. He shouted to the fireman, who had not yet reached the box, to tell the signalman there had been an accident, and then he ran to the box himself. The signalman said "Can you not come, you have the road".

Kerr then went back to see what assistance he could render, thinking that the guard was probably disabled, but found him putting on the lights in the front portion of the train. He noticed that the draw hook of the seventh coach was broken and he arranged to take the leading six coaches into the station.

16. Fireman A. McRitchie confirmed the driver's statement and said that in walking to the box he passed the home signal (No. 35), which was at Danger. He had got about three quarters of the way to the box, a distance of about 200 yards, when he heard the crash. He carried on and the signalman came down the box steps to meet him ; after asking him what train he was from, the signalman said "you can pull into the station", from which remark McRitchie concluded that the signal had been lowered.

17. Goods Guard D. Reilly, who had been passed for working passenger trains and knew the line well, was riding in the brake compartment of the last vehicle of train No. 158. Reilly stated that he became apprehensive when the train had stopped in the tunnel at the Stobcross home signal for three or four minutes, and he therefore got down and started to walk to the rear to place detonators on the line. He had gone only about one coach length when he heard the 2.18 p.m. train approaching. He could do nothing to prevent a collision and so he flattened himself against the tunnel wall, and he had a narrow escape. He estimated the speed of the 2.18 p.m. train at 25–30 m.p.h.

Reilly admitted that he had forgotten to put on all the lights of the train before he left Renfrew, but he said that the last four coaches, which he could control from the rear brake, were lighted. In fact, however, the lights were on in only the last two empty coaches. He realised his error during the journey, but to put on the lights would have caused further delay to the train, which he wished to avoid. After the accident he lighted all the coaches. He ascertained that there were no serious injuries among the passengers and he accompanied the front six coaches of the train when they were drawn into Stobcross. He then went back into the tunnel to help in escorting the remaining few passengers from the rear coaches. Reilly said that there was no panic among the passengers.

18. Driver C. Murdoch, of the 2.18 p.m. train, who knew the line well, said that the starting signal was "off" when he ran into Glasgow Central. The train left that station at 2.55 p.m., 3 minutes late. The signals at Anderston Cross were at Clear, but the Stobcross distant was at Caution. Murdoch said that he made a slight brake application after running through Anderston Cross in preparation for a stop at the Stobcross home signal. Both he and Fireman C. Mowat stated that the atmosphere in the tunnel was only slightly hazy. They did not, however, see the tail lamp of train No. 158, and they did not know the train was on the line ahead of them until they hit it. Murdoch said that this was on account of the curvature of the line in the tunnel, while Mowat recalled that he was watching the water gauge glass at the time. Murdoch estimated the speed of the train was 15 m.p.h. when the collision occurred. Guard J. Geatons, however, thought that it was about 30 m.p.h. Although injured, Murdoch got down from the engine to see what assistance he could render ; he found a District Relief Porter who had been thrown out of the rear brake of the excursion train by the impact, and attended to him.

Evidence of Signalmen.

19. The signalmen concerned were :—

Glasgow Central :	H. Corker
	J. McHugh
Stobcross :	T. McCarron

The entries concerning the two trains involved and the previous train (Special No. 161), which were made in the Glasgow Central, Stobcross and Partick Central train registers, are summarised below :

	Accepted from rear	*TES received*	*Train departed or passed*	*TOS sent*	*Accepted in advance*	*TOS received*	*Routing Code*
Glasgow Central							
Train 161	2.37	2.40	2.43	2.45	2.42	2.47	2
Train 158	2.45	2.45	2.47	2.50	2.47	2.53	2
2.18 p.m. train ..	2.50	2.52	2.55	2.56	2.53	—	1
Stobcross							
Train 161	2.41	2.45	2.48	2.48	2.45	—	2
2.18 p.m. train ..	2.51	2.57	—	—	—	—	–
(6) Beats (Obstruction Danger) sent to Partick 2.55 p.m. and Anderston Cross at 2.54 p.m.							
Partick Central (box opened at 2.39 p.m.)							
Train 161	2.44	2.48	2.50	2.50	2.48	2.51	–
6 Beats received from Stobcross at 3.5 p.m.							

NOTES : (i) There were no entries in the Stobcross register for train No. 158 ;

(ii) The routing code indicates that the train is for the Maryhill direction (1 beat) or Partick direction (2 beats) ;

(iii) There is a column in the train registers for the time of the Train Entering Section block signal to the box in advance, but it is not generally used.

20. Signalman Corker worked in Glasgow Green and Glasgow Central signalboxes and, according to the roster, he was in the latter box from 1.0 p.m. to 3.0 p.m. on the day of the accident ; he had worked there for about six months. He said that as soon as he received Train out of Section from Stobcross for Train No. 161 at 2.47 p.m. he offered Train No. 158 ; it was accepted and ran through the station without stopping, although its speed was checked. He recorded the time of its passage as 2.47 p.m. He gave Train Entering Section at the same time and his block instrument was placed at Train on Line by the signalman at Stobcross. He booked Train Out of Section for Train No. 158 as being received at 2.53 p.m. and he said that he immediately offered the 2.18 p.m. train which was accepted. When giving Train Entering Section to Stobcross immediately afterwards he said that he also gave the routing signal of one beat. He denied having given this routing signal before asking Line Clear for the 2.18 p.m. train, and said that it had not occurred to him that the signalman at Stobcross was slow in sending Train out of Section for Train No. 158. He admitted, however, that it was the usual procedure, if a Train out of Section block signal was overdue as he agreed it was in this case, to send the routing signal for the train following as a reminder.

Corker was questioned closely about any telephone conversation there may have been with the signalman at Stobcross ; his replies were, however, so contradictory that it was impossible to elicit from him whether there had been any conversation, and if there was one, which train it was about and when it took place. It seems, however, from other evidence that there had been some conversation in which either he or McHugh had spoken. It was very clear that Corker did not know the special train programme, although he said that he had read the weekly notices when coming on duty, having been on rest the previous day.

21. Signalman McHugh arrived in Glasgow Central box at about 2.52 p.m. to take over duty from Corker at 3.0 p.m. He said the 2.18 p.m. train was just arriving in the platform and that he saw the Down line block instrument was normal. He pointed this out to Corker who offered the train to Stobcross, obtained Line Clear and lowered the starting signal. He could not remember whether Corker had sent any routing signal, either before or after the Line Clear enquiry. He said that Corker had told him that he had not received Train out of Section for train No. 158, but he did not question that, in spite of the fact that the block instrument was at Line Blocked. McHugh also said that he could not remember any telephone conversation between the signalman at Stobcross and himself or Corker.

22. Signalman McCarron joined the railway service in 1905 ; he had been a signalman for 41 years and had worked at Stobcross for 26 years. He reached the retirement age of 65 on 25th March 1951, but he had been asked to remain at work until October, 1951, to cover the seasonal traffic, to which he had willingly agreed. He came on duty at 8.0 a.m. on the day of the accident after going off duty at 4.0 p.m. the previous day. He had his usual rest day the previous Monday.

McCarron said that soon after giving Train out of Section for Special No. 161 (he could not remember the time as he had forgotten to record it) he gave Line Clear to Glasgow Central for Train No. 158. He again forgot to enter that block signal in the train register and also Train Entering Section for that train which he received soon afterwards, but he placed the block instrument at Train on Line. He did not, however, offer the train forward to Partick Central. He could not understand why he had omitted to make the entries for this train and to offer it forward, but he thought that it might have been on account of the Control ringing up about the opening of Partick Central box. That box was, however, opened at 2.39 p.m. so that conversation must have been held very much earlier. McCarron understood the signalbox instruction regarding Rule 39 (*see* paragraph 13), and looked on it as an order, provided conditions permit, to clear the home signals as soon as Train Entering Section is received, rather than as an authorisation to do so. He said that normally he did this but that on this occasion he omitted to lower the signals for train No. 158.

McCarron said that he then received the routing signal from Glasgow Central for a train to Maryhill. He saw that the block instrument showed Train on Line and thought that he had forgotten to give Train out of Section for train No. 158, which he assumed must have passed. He therefore operated the side plunger which released the block instrument and the indication changed to Normal. He was then offered the 2.18 p.m. train from Glasgow Central and he accepted it immediately. Shortly afterwards he received Train Entering Section, and he pegged Train on Line. He did not, however, offer the train forward. Then he saw a fireman coming towards the box from the tunnel, and he lowered the home signal. McCarron heard the noise of the crash faintly, but he did not know what it was. He thought that the fireman was from the 2.18 p.m. train, but asked him who he was for confirmation, and he went down to the foot of the steps to meet him. He said that he had not heard any engine whistle.

McCarron recalled that he had spoken to the signalman at Glasgow Central at that time about certain Up trains and that he had asked him also about a Down train that had been block signalled (Train No. 158), and received the reply "I don't know, I am just newly in". He said that the signalman at Glasgow Central had not spoken to him about Train No. 158, nor about the 2.18 p.m. train.

McCarron could not account for his lapses. He was certain that if he had found the plunger latched when he cleared the block for train No. 158 he would have remembered that the train had not passed. He was sure that he would not have broken the seal and used the button to release the instrument from Train on Line. He said that he had received the weekly train notices and had extracted the special trains to pass Stobcross. It seemed, however, that he was somewhat uncertain about these trains, although this may have been because some of them were running out of course.

He said he felt in good health and that he was not tired or overstrained by the work which, on that day, was no heavier than usual ; there was nothing to distract his attention from his duties. He had no worries nor anything else on his mind. The last time he had received medical treatment was in 1945 when he had an operation for a hernia. Afterwards he was medically examined by the Railway Medical Officer before resuming duty. That and the medical examination he received on joining the service, were he said, the only examinations he had undergone up to the time of the aecident.

Evidence of Traffic Supervisory Staff.

23. Mr. J. Parker, Station Master, Stobcross was also in charge of Anderston Cross and Kelvin Bridge. Stobcross station was closed, and he was at Kelvin Bridge in connection with some special trains when he heard about the accident from McCarron at about 3.5 p.m., and he reached there at about 3.20 p.m. By that time the front portion of train No. 158 was at the platform and the injured passengers were receiving attention. Ambulances had already arrived on advice from McCarron to the Control. Mr. Parker said that he saw Lineman Whyte, who was preparing lamps, and who told him that there were still some passengers in the tunnel, so he proceeded there and helped to escort them to the station. Afterwards he talked to McCarron who told him what had occurred. He said "McCarron was not over-excited ; I would not say he was normal, but he was quite cool". He knew McCarron well, and said that he was a regular and conscientious signalman, and, he believed, a teetotaller, and he knew of nothing that may have been troubling or worrying him.

Mr. Parker said that he checked the train register books in Stobcross signalbox regularly and that he had noticed nothing unusual about McCarron's work recently. Omissions of block signal times, such as Train out of Section, were points that he would take up, but he had not noticed any. It was, however, subsequently found that during the previous three weeks McCarron had made as many as 43 such omissions. A comparison of the train registers at Stobcross and adjacent stations also revealed that he had, during that period, omitted to record all block signals for a Down passenger train and a Down Light Engine, the latter at about 9.30 a.m. on the day of the accident ; also that on 29th May, within a period of about 20 minutes, he made incorrect entries concerning two trains, one of which did not run at all.

24. Mr. McD. Taylor, District Signalmen's Inspector, also knew McCarron well and considered him a reliable man ; he knew of no reason to account for his failure. Mr. Taylor was required to check the train registers, but he had been on holiday and had not done so after 23rd April.

Evidence of Signal and Telecommunication Staff.

25. Lineman A. Whyte, who is 38 years of age, has been in railway service since 1937 ; he was promoted to lineman in April 1947, and has been at Stobcross for 3½ years. His section is from Stobcross to Dalmarnock a distance of 9½ miles of double track, and he has eight signalboxes under his charge.

Whyte said that he was at Stobcross on 9th June and heard of the accident at about 3.0 p.m. He first went to the signalbox and was told by McCarron what had happened. He examined the releases and found them intact and the block instrument showed Train on Line on the Down line. He tried the side plunger but it was locked. The lever of signal No. 35 was reversed but he was not certain about lever No. 34. He then took a lamp and went into the tunnel, where he found the guard and helped him to put on the train lights. Afterwards he returned to the station, which he arranged to have opened, and prepared more lamps which he took into the tunnel with the ambulance men who had by that time arrived.

With the help of Assistant Lineman Crossan, Whyte fitted the reconditioned treadle in the line at Stobcross on 9th March, 1951. Whyte said that he had to remove the watertight cover, but he did not open the contact chamber. After fitting, he tested the circuit with an ammeter and a primary cell and there was no reading. He also checked in the box that the treadle was being operated correctly by trains. He examined it again on 6th May, when he opened the cover of the contact chamber to see whether any rust had formed. Before doing so he again tested the circuit with the same results as on 9th March. He said that there was no need to use a screw driver or any other instrument on the contacts, and that he did not do so. He did not think that he made a further electrical test after closing the chamber cover. The treadle was not touched again before the accident.

Whyte said that he made the usual short circuit test on the block instrument concerned on Saturday afternoon shortly after the accident. When lever No. 34 was pulled, the side plunger could not be depressed and consequently the block instrument remained "latched up", thus proving to him that the circuit through the treadle was at that time not completed. On the following morning, however, a test train was run over the treadle and Mr. Baldwin, Assistant Signal and Telecommunications Engineer, Scottish Region, made an electrical test on it, which gave a leakage reading on an ammeter of one ampere for 10–15 minutes. The chamber of the treadle was then opened and the contact unit was found in the condition described in paragraph 11.

Whyte could not explain how the bonding wire had become displaced as he was certain that he had not touched it ; he suggested that it might have been received in that condition. He said that in that case he might not have noticed the defect as the negative circuit tests had not caused him to look for any fault, and he had not been instructed to watch specially for any displacement of the wire.

Whyte stated that he had installed a number of treadles. He did not think that he had ever been supervised when doing so, and he had not received any instructions, written or verbal, regarding their installation and maintenance. He had never seen the manufacturer's instruction booklet No. 56 on this particular treadle. He said that all the reconditioned treadles he had fitted were received filled with mercury, and that it was not his custom to remove the contact unit to check the mercury level before installation, neither was he in the habit of checking it about a week after installation, as laid down in the booklet. He showed me a printed notice attached to new treadles of a similar type received filled with mercury, part of which reads—"Do NOT remove inner contact-box unless absolutely necessary".

Continuing his evidence, Whyte said that on Sunday morning he examined, again in Mr. Baldwin's presence, the electrical locking under the frame and found the actuating arm of the contact switch disconnected and lying on the wooden casing.

He said that he was required to examine all the split pins in lever frames about every three weeks, and that he had last done so at Stobcross on about 17th May. The split pins on lever No. 34 were particularly difficult to examine, especially if the lever was pulled, because of the electric lever locks, but he had felt them and he was certain that they were all in position. When asked if he would have noticed if a split pin was not fully opened he replied "We may miss it once but I don't think we would miss it twice". He recalled that he "serviced" the switch in January, 1951, but he had not disconnected the arm nor taken out the split pin, and he could not account for it having fallen out. He thought that the pins could not have been on the floor of the box for long because, although they were oiled, they would have rusted. He said that except for the difficulty in examining certain split pins, the maintenance of the frame at Stobcross was not difficult.

26. W. Crossan, Assistant Lineman, Stobcross, made a statement regarding the installation of the treadle, similar to that made by Whyte. Other linemen, who had worked at Stobcross in a relieving capacity after 9th March, said that they had not had occasion to test the treadle, nor to open the covers. Evidence was also given that, while in the Stores, the treadle covers were not removed.

27. District Inspector (Telegraph) J. McCulloch was not on duty on the day of the accident. He read about it in the papers on Saturday evening but did not telephone to find out what had happened as he assumed the cause was "something other than electrical"; nor did he go to Stobcross until just after 9.0 a.m. on Sunday. He was then sent by Mr. Baldwin to Glasgow Central to check certain controls between that box and Stobcross.

Regarding the treadle, Mr. McCulloch did not see it installed and said that he did not test the circuit through it when he next visited Stobcross on 2nd April. He had not seen the contact unit, with its defect, before my Inquiry. When shown it, he could not explain how the bonding wire had become displaced.

Mr. McCulloch said that he did not think that he had ever seen Lineman Whyte install a treadle before the accident. He had not issued any special instructions to linemen generally about the installation and maintenance of treadles. He stated that he would expect linemen, when installing a treadle, to remove the contact chamber lid to see that it was filled with mercury. When asked, however, whether this was necessary if the lineman knew that the treadle was filled, he replied "I don't think so. I think he had got a card saying he does not require to check it". But he said that they should, within about a fortnight of installation, remove the contact unit and check the mercury level, and that, thereafter, they should examine the treadle every month or two.

Mr. McCulloch stated that he undertook a detailed examination of the frame in Stobcross box in January 1951, when, among other things, he saw or felt all the split cotter pins. As a result of this examination he submitted a certificate to the Area Assistant, that everything was in order. Later, on 2nd April, he made a superficial examination of the frame and again found no defect. He could not explain how the pin had fallen out and said that he had never known it happen before. He said that if he had noticed a split pin in use of the size found on the floor after the accident, he would have told the lineman to change it. He also could not account for the fact that a further six undersized split pins were found in similar positions on other levers in the same frame.

28. Mr. E. O'Hare, Area Assistant, Glasgow, said that clear instructions had been given to all Inspectors that they should be present when complicated circuits are installed; also that they must test simple circuits, such as the circuits in question through the treadle, the lever switch and the disc coil in the block instrument, as soon as possible after installation. He would have expected Mr. McCulloch to test this circuit within 4–5 days; if, however, that was impracticable for any special reason, the test should certainly have been made when the Inspector was at Stobcross on 2nd April.

CONCLUSIONS

29. The direct cause of this accident was the action of Signalman McCarron. I think that he received a reminder from Glasgow Central about the 2.18 p.m. train and that when he saw that the block instrument was at Train on Line, he entirely forgot the excursion train, having made no entries for it in the train register, and thought that he had omitted to give Train out of Section for the previous train, Special No. 161, which had passed. I accept his statement that he did not hear the engine whistle of the excursion train, but there is no reason to doubt that it was given. It seems probable that McCarron did not know what train he had accepted when the excursion train was offered (it was running 40 minutes late), and he tried, unsuccessfully, to find out from Glasgow Central on the telephone. But whether that is the case or not, McCarron should

certainly have known that there was *a train* in the block section, and he should not have released the block instrument and given Line Clear for the 2.18 p.m. train. The fact that he was able to place the block instrument to normal is the subject of later comment.

McCarron had omitted, within half-an-hour, (*a*) to record five block signals including two concerning the excursion train, (*b*) to offer forward that train and the 2.18 p.m. train, normally done immediately or soon after Train Entering Section is received from the box in rear, and (*c*) to lower the signals for the excursion train. It appears that he was also slow in lowering the signals for the 2.18 p.m. train and that he did not do so until he saw the fireman of the excursion train coming towards the box from the tunnel. The times he recorded for the Obstruction Danger block signals to Partick Central and Anderston Cross (*see* paragraph 19) were quite wrong.

McCarron, a signalman with a good record of service, gave his evidence in a straightforward manner and made no attempt to excuse himself, and he could not give any explanation of his omissions. Neither could Mr. Parker nor Mr. Thomson, who both spoke highly of McCarron, account for his failure.

30. Arrangements were therefore made for McCarron to be medically examined. In his detailed Report, Dr. T. Sharp, Assistant Medical Officer, Scottish Region, said that McCarron was in good health except regarding the pulse and condition of the heart. On these he reported :—

> "*Pulse:* Fast, regular, very high pressure, and of ' water-hammer ' type. Blood pressure, 220/30. Retinal arteries show arteriosclerotic changes.
>
> *Heart:* Borders difficult to define due to his obesity. A soft diastolic murmur is audible accompanying the second sound. It is localised to the inner border of the second right costal cartilage and the breast bone".

Dr. Sharp also reported generally on his opinion of McCarron as follows :—

> "This is a case in which a simple break took place in the continuity of thought and action, not amounting to a break in the continuity of consciousness.
>
> It is not beyond the bounds of possibility that he may have had such slight lapses before, but circumstances and events may not have brought them to light.
>
> On the other hand, this may have been the first attack and others may well follow at more frequent intervals and of greater severity. Indeed the degree of cardiovascular degeneration and the type of heart lesion, from which he suffers, would render him liable to such attacks.
>
> Cerebral symptoms in such cases are due to anaemia of the brain from failure of the heart to maintain an adequate supply of blood to that organ. His lapse could, therefore, be explained on that basis.
>
> In the absence of petit mal or organic disease of the central nervous system, or psychic types of fits of amnesia, the defects in the cerebral circulation provide a satisfactory explanation of the occurrence.
>
> His present state of health would, in my opinion, preclude extension of his period of service with the Executive".

In commenting on the case, Dr. Sharp said that if he had been aware of McCarron's condition, he would have recommended his removal from the signalbox, and this opinion was confirmed by Dr. H. H. Cavendish-Fuller, Chief Medical Officer of the Railway Executive. It would not therefore be right to blame McCarron for his failure, which was almost certainly attributable to his medical condition. That may also account for his other lapses, referred to in paragraph 23.

31. Dr. Sharp confirmed that the last medical examination that McCarron had undergone was after his operation in 1945. He thought that McCarron's present condition would probably not have manifested itself then.

It was explained to me that the practice in the Scottish Region is for ex-L.N.E.R. signalmen to be sent for physical examination and sight testing at the ages of 60 and 63. Ex-L.M. & S.R. signalmen are sent for sight testing only at the ages of 60, 62 and 64. All signalmen are required to undergo a general medical examination before re-employment after the retiring age of 65. The practice of sending the staff of the Glasgow Operating District for periodical examinations lapsed during the war and is only just being revived. They are, however, normally sent for examination when they are to be re-employed after the retiring age, and McCarron (an ex-L.M. & S.R. man) was the only one of 20 such signalmen who was not sent for examination.

32. Signalman Corker of Glasgow Central, was not a satisfactory witness. Although he denied it, I feel sure that he realised that Train out of Section for the excursion train was overdue and that he sent the routing signal for the 2.18 p.m. train as a reminder. He seemed quite ignorant of what special trains were running and he did not go out of his way to give information to McCarron about the trains as they passed. I think, however, that it was Signalman McHugh who answered the telephone when McCarron enquired about the excursion train.

33. Mr. Parker, Station Master Stobcross, was not as thorough in checking the train register as he should have been, although he could not have discovered the complete omission of trains, nor the incorrect entries,

without comparing the registers of Stobcross box with those of adjacent signalboxes. The railway authorities have already taken notice of this aspect of the case.

34. It was possible for the block instrument to be released from Train on Line with a train in the block section because of two simultaneous danger side failures in the signalling equipment.

It has not been possible to establish exactly when the defect started in the treadle. I have seen that treadles, after being overhauled in the workshops in Crewe, are tested most carefully before being sent to the Regions, and I consider it very unlikely that the treadle was despatched in a defective condition, as suggested by Lineman Whyte. I accept his statement that he did not open the cover of the contact chamber when he installed the treadle, and I can only conclude that the bonding wire was displaced by him when he subsequently examined the contact chamber in May. If that was the case, the fault was not present when Mr. McCulloch should have tested the circuit.

The intermittent nature of the fault was due possibly to vibration set up by trains and overhead traffic on the made up ground verging on the docks, and it would account for the negative readings when the original electrical leakage tests were made.

Regarding the failure of the contact switch, I have no doubt that the split cotter pin found on the floor of the box was that from the round pin which held the switch arm to the connecting rod, and it is probable that it had fallen out only a short time before the accident. Neither Inspector McCulloch nor Lineman Whyte had noticed that the jaws of the pin were not properly opened, nor that it was too small. Mr. McCulloch had also overlooked six other undersized pins which were found in use in the same frame after the accident. I was informed that, following the accident at Glasgow Cross in 1949, special instructions regarding the maintenance of the signalling and electrical equipment on the low level lines were issued. Among other things, inspectors were required to check all split pins carefully. In spite of that Mr. McCulloch signed a certificate after his detailed examination in January 1951, that the frame in the Stobcross box was in good order.

35. These two failures reflect most adversely on the maintenance work on this section of the line by the Signal and Telegraph Staff concerned. I find it difficult to excuse Inspector McCulloch for his neglect in connection with the lever switch failure, and I do not think that it is expecting too much of him to have noticed that the position of the timber cased cable run prevented a disconnected switch arm from falling sufficiently to break the circuit. Furthermore, he gave no guidance to linemen, particularly recently appointed men like Whyte, on matters such as the installation and maintenance of treadles, regarding which there is evidently some divergence of views among the staff.

Mr. McCulloch's indifference to important matters of maintenance generally is the more regrettable because Lieut.-Col. Wilson, in his Report on the above mentioned accident at Glasgow Cross, found it necessary to criticise him for lax supervision, as a result of which he was reprimanded.

It is satisfactory to record that Lineman Whyte, whose previous record had been clear, acted with promptitude and initiative after the accident. He immediately went into the tunnel with a light, returned to Stobcross and arranged for the station to be opened, and then went back into the tunnel with more lights. Mr. McCulloch, on the other hand, appeared to take little interest in the accident. Although he read about it in the papers on Saturday evening he did not even telephone to enquire the cause.

36. The accident could not have been prevented by any member of the crews of either train. The circumstances were, however, made the more unpleasant for the passengers in the excursion train by the negligence of Guard Reilly in allowing the train to run on this long tunnel section with all the occupied coaches unlighted.

Remarks and Recommendations

37. This accident is remarkable, because it was caused by three simultaneous failures—one of the human element and two of separate pieces of electrical apparatus. It was very fortunate that the rear two coaches of the excursion train were empty and that the next two coaches were only sparsely occupied. If they had been filled as was the front portion, the casualties must have been heavy and, happening in a tunnel, the whole accident would have been much more severe.

38. The human failure was by a signalman whose state of health was such that he should not have been permitted to work in a signalbox. He was just over the retiring age but he had not been medically examined before being re-employed, as was required. This was, I am glad to say, an isolated omission and suitable notice has been taken of it.

The signalman's unsatisfactory condition must, however, have obtained for some years. It would therefore seem that, in order to safeguard the public, men such as signalmen, the nature of whose duties requires sustained attention and quick decisions, should all undergo a thorough physical medical examination periodically during their service after reaching a certain age. This is already done in the case of men who served with certain of the former railway companies, and I recommend that it should now become the established practice for the whole of British Railways.

39. The two failures of electrical equipment are attributable to nothing but bad maintenance. The instructions issued after the accident at Glasgow Cross have therefore been repeated and amplified, and it is to be hoped that this will have the desired result.

The fault in the treadle was unusual and I can find no occasion on which it has previously occurred. The latest type of contact unit has a bakelite hood over the bonding wires, which prevents any possibility of contact between them and the fixed arms. I am informed by the General Manager of Siemens & General Electric Railway Signal Company Ltd. that this device was incorporated as an improvement when the contact unit was re-designed to suit the more exacting requirement of the Southern Region, and that it was not the result of any previous occurrence of this nature. Instructions have been issued by the Railway Executive that until the new type of contact unit can be fitted, the bonding wires in all the existing units are to be covered with insulating material.

40. The lock and block arrangements, although old fashioned, have undoubtedly done much to ensure the safety of movement on this busy underground section of line. They did not, however, prevent this accident nor the accident at Glasgow Cross in 1949, nor again another serious accident at Stobeross in 1939. The circumstances in each case were different, but the Glasgow Cross and the previous Stobeross accidents might have been averted if there had been colour light signalling, and the present accident would certainly not have occurred if there had been continuous track circuiting. It has been recognised that the signalling arrangements on this busy section of the line, with its long smoky tunnels, require to be modernised, and a comprehensive scheme for the provision of colour light signalling and continuous track circuiting had been prepared before this accident occurred. I am informed that it is planned to start the work in 1953, but in view of the peculiarities of the section and the very difficult working conditions on it, I recommend the scheme should be put in hand with the least possible delay.

I have the honour to be,
Sir,
Your obedient Servant,
D. McMULLEN,
Colonel.

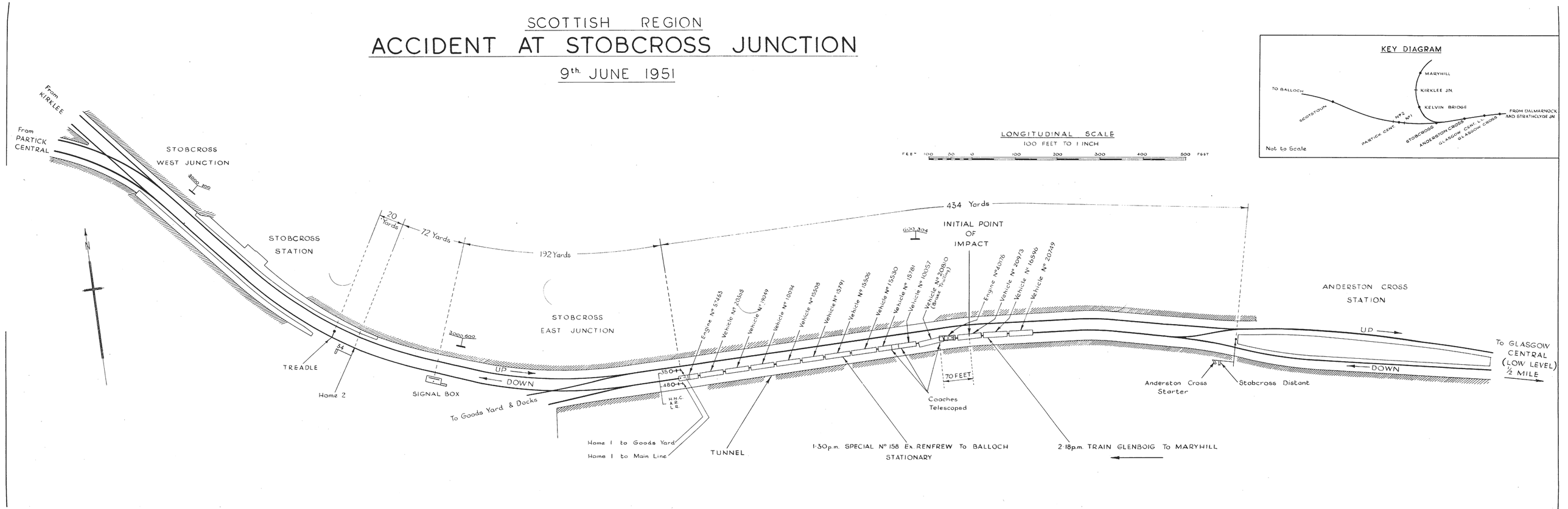
The Secretary,
Ministry of Transport.

12050 Wt1114/2250 K6 11/51.

SCOTTISH REGION

ACCIDENT AT STOBCROSS JUNCTION

9th. JUNE 1951



LONGITUDINAL SCALE

100 FEET TO 1 INCH

FEET 100 50 0 100 200 300 400 500 FEET

KEY DIAGRAM