DEPARTMENT OF TRANSPORT

RAILWAY ACCIDENT

Report on the Collision that occurred on 9th March 1986 at Chinley

IN THE
LONDON MIDLAND REGION
OF BRITISH RAILWAYS

LONDON: HER MAJESTY'S STATIONERY OFFICE

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RAILWAY INSPECTORATE
DEPARTMENT OF TRANSPORT
2 MARSHAM STREET
LONDON SW1P 3EB

11th September 1986

SIR,

I have the honour to report for the information of the Secretary of State, in accordance with the Direction dated 12th March 1986, the result of my Inquiry into the head-on collision between a passenger train and two stationary coupled locomotives which occurred at 1918 hours on 9th March at Chinley some 17 miles east of Manchester on the Hope Valley line in the London Midland Region of British Railways.

The locomotives were standing at a signal waiting for a route to be set from the Up line across the Down Passenger line onto a goods line to Buxton. Approaching on the Down line was a locomotive-hauled train of four coaches which was then stopped at a signal which could not be cleared because a track-circuit failure ahead of it was locking a set of points onto a loop line to Buxton. The young signalman went to the points in his car and pumped them over but made serious errors so that these points were not locked, and more importantly two other sets of points in the route ahead were wrongly set and also not locked. He authorised the driver of the passenger train to proceed when, by his own actions, the crossover onto the other line was set to direct the passenger train into the collision. His actions displayed a complete lack of understanding of the functions of the signalling panel and the relay interlocking it controlled and a lack of knowledge of the action that is required to be taken in the case of equipment failure.

The driver of the coupled locomotives must be highly commended for his bravery in remaining at his controls, releasing the locomotives' brakes and putting the locomotives into reverse when faced with the approach of the other train only a few hundred yards away at some 30 mile/h. This action probably saved his own life and that of his Driver's Assistant, as well as those of passengers in the other train but I regret that the driver of the passenger train was killed when his cab was totally destroyed in the collision. The action taken by the Driver's Assistant was also commendable.

The emergency services were promptly called and were quickly on the scene. Thirty two passengers out of some 116 on the train were taken to hospital but all were discharged except for four: three of these were discharged after one or two days and one after nine days.

The accident occurred on a very dark evening and there had been a slight drizzle but visibility was nevertheless quite good.

DESCRIPTION

The Trains

1. Waiting at a signal on the Up Main line just west of Chinley Junction were two coupled diesel locomotives, Class 45014 leading and Class 47334 trailing. A Class 45 locomotive is of the 1C–C1 axle arrangement and weighs 135 ton 7 cwt. A Class 47/3 locomotive is of the C–C wheel arrangement and weighs 111 ton 18 cwt. Screw coupled together they weighed 247 ton 5 cwt and were 131 ft 6 in long overall. The passenger train, 1M42, the 1833 Sheffield to Manchester Piccadilly, consisted of four MK 1 coaches hauled by a Class 31 locomotive No 31436. The total train weight was 246 ton 3 cwt (almost exactly that of the two coupled locomotives) and the train was 321 ft 3 in long overall. The total train brake force was 157 ton of which 49 ton was of the locomotive alone. Neither the Class 45 locomotive, nor the Class 31 locomotive hauling the passenger train was fitted with a high-intensity head light.

The Site and Signalling

2. As shown on the plan at the back of the report, Chinley Junction lies on the Sheffield to Manchester (via Hope Valley) line. The Hope Valley extends from Totley Tunnel in the East to Cowburn Tunnel in the West and it is signalled by a number of signal boxes equipped with small mechanical lever frames working semaphore signals on the Absolute Block system. The last two such boxes are at Earles Sidings at 165M 440 yds and Edale at 169M 506 yds. Cowburn Tunnel, which is over 2 miles long, has its western portal at 172M 968 yds, Chinley Signal Box being some 1¾ miles to the west at 174M 100 yds.

3. Chinley Signal Box stands to the south of the line at the north west corner of the triangular junction it controls. The junction is formed by the Main lines to the north, and a single Up and Down Chord line diverging to the south at East Junction which is some 600 yds east of the signal box; the other side of the

triangle is the single Down and Up Goods line which connects with the Main lines at the signal box. The two single lines pass over high viaducts until they join and then divide again at Chinley South Junction to form the Up and Down Goods lines to Buxton. There are two crossovers between the Up and Down Main lines. These are No 355 trailing crossover at East Junction, and No 350 just to the west of the signal box.

4. The area controlled by Chinley Signal Box is fully track-circuited and the box contains a small "One Control Switch" (OCS) signalling panel working colour light signals. Track Circuit Block Regulations apply to New Mills S.B. towards Manchester and Absolute Block Regulations apply to Edale SB on the Main line, and when that box is closed to Earles Sidings SB, and to Peak Forest South SB on the Buxton Goods lines.

5. The Chinley panel is worked by the signalman with his back to the lines. At the foot of the panel there are route switches, one for each of the twelve routes which can be set. In addition, on the panel itself there is a row of eight 'three position' points switches above which Normal or Reverse point indications are shown. In addition to the signal-aspect indication given on the panel itself, track circuits which are 'occupied' are indicated by a row of red lights, but there is no indication by means of white lights that a route has been set and locked, as is normal in major panel signal boxes. All points are driven by clamp-lock machines; a pump handle for their manual operation is kept in the signal box.

6. Approaching from the Sheffield direction a driver sees the Chinley colour-light Down Distant signal some way inside the tunnel and the gradient is falling, first at 1 in 150, then at the tunnel mouth at 1 in 100 and after passing East Junction at 1 in 90. The lines curve left-handed, and then right-handed to East Junction and then sharply right-handed in cutting until the single goods line and Chinley Signal Box (CY) are reached. The two lines are then spaced well apart and pass under separate arches of two bridges which formerly accommodated four lines. In this area the lines are once more curving left handed. To the west of the signal box the lines are on an embankment and a road runs parallel to them on their south side; this road has street lights as does a small area used by signalmen as a car park. The road connects with an underbridge and there is an externally illuminated public house beside the road on the north of the Railway not far west of the facing crossover. The first bridge lies 430m west of the signal box, the second is 161m beyond it, and Signal CY152 at which the two locomotives were standing is a further 73m beyond the second bridge.

7. A small relay interlocking is situated beneath the signal box. Two routes are involved in this accident. The first is that from Signal CY157 to CY151 (Route 157/2); this requires Points Nos 350, 351, 354, and 355 to be Normal, and all track circuits on the route to be clear. The second route is that from Signal 152 onto the Down & Up Goods line. This route requires Points Nos 350 & 351 to be reversed as well as Points No 354 reversed in order to provide 'flank protection' for the move across the Main line.

8. Operation of the 'One Control Switch' for a route sets and locks the points, checks that the necessary track circuits are clear and finally energises a route locking relay which prevents other interfering routes being set. The signal is then cleared. Without the signal being cleared however, the signalman cannot know that any of the points are locked. His instructions (see Appendix A) make it quite clear that if the signal cannot be cleared he must set each set of points using its points switch and check that he has obtained a correct indication above each switch. He must place reminder collars on the points switches used. Failing a correct indication, he must go to any facing points and clip and padlock them, and must check the lie of any trailing points. As a train enters the route he must also set the 'Route Switch' for it even though the signal will not be cleared.

The Collision and Accident Damage

9. The collision occurred about 3m west of Signal CY 152. The passenger train came to a stand 40m beyond the signal and the two locomotives came to a stand 65m further on.

10. The No 2 cab of Class 31 Locomotive No 31436, which was leading, had been completely crushed back to the bulkhead with the engine compartment, by impact with the up-lifted end of the Class 45 locomotive with which it collided. The floor and underframe had been rolled back under the vehicle. The leading (No 2) bogie had been badly buckled so that the leading axle box (No 6) was at 30° to the rest of the bogie, instead of being normal to it. The trailing axle (No 3) was derailed, as was the leading axle (No 4) of the trailing (No 1) bogie. The trailing (No 1) cab had been damaged by impact with the end of the leading coach.

11. Damage to the coaches was mainly internal; many of the tables had been torn from their fixtures and were found, in some cases, several metres away. The most serious damage however was to the leading coach. Its leading bogie had been forced back 0.5 m and the coach floor of the leading third of the vehicle had been distorted upwards. The leading buck-eye coupling pivot pin had sheared, and its support pin had been bent. The trailing buckeye pivot pin of the second coach had also sheared and its support pin was bent.

12. In marked contrast to the Class 31 locomotive, the leading (No 1) end cab of the Class 45 locomotive was intact although the leading bogie had been pushed back 0.6 m causing severe damage to the underframe, batteries and other equipment mounted there. The trailing bogie had been pushed forward 0.3 m by impact with the Class 47 locomotive in rear and the (No 2) end cab was slightly crushed. The leading cab of the Class 47 locomotive had been slightly crushed and the oil compression buffers had been driven back into the headstock until they were flush with the front of the locomotive. As for the track, one sleeper had been smashed and one 15 ft rail length had been 'crippled'; some nylon spacers and pandrol clips were broken. The major damage however was to No 351 points which had been 'run through' in the trailing direction and 'crippled'.

Evidence

13. At the time of my Inquiry Driver E. Plant, who had been in charge of the two light locomotives, was still suffering from shock, but his 19½ year-old *Driver's Assistant D. W. Millward* of Buxton was able to tell me what happened. He said that they had left Miles Platting with the Class 45 locomotive leading and the Class 47 locomotive trailing. The locomotives were screw coupled and main and reservoir air-brake pipes were coupled. The Class 47's engine was running.

14. At New Mills South Junction they were signalled onto the Up Goods Loop where they saw another Class 47 light engine pass under clear signals. Later, two Class 37 coupled locomotives were driven past the semaphore section signal at Danger after their driver had visited the signal box, and shortly afterwards a passenger train was similarly signalled. Driver Plant visited New Mills Signal Box and they then drew up to Chinley Signal CY 152 to await the passage of a passenger train behind which they were to cross over onto the Down and Up Goods line to Buxton. Driver Plant turned on the cab light and went to talk to the signalman on the signal post telephone, but there was no reply.

15. He had returned to the cab when they first saw the twin headcode marker lights of a Class 31 locomotive approaching on what they thought was the other line: they could see the lights of the passenger coaches. Plant said "here it comes, this is what we have been waiting for" when they suddenly realised that they could see the near-side coach lights instead of the offside ones and almost immediately they saw that the train was coming through their arch of the bridge and was on their line. Driver Plant had got into his driving position and had released the brakes and put the locomotives into reverse just before the collision occurred. [Driver Plant has made a short statement in which he says that at the moment of impact he believes that his two locomotives had already begun to move backwards.]

16. Millward, in the meantime, had thrown himself on the floor, and became aware that the wheels were turning and that they were running backwards. They asked each other if they were all right and then Plant applied the brakes and stopped the locomotives. the cab was then filling with smoke and they then discovered that both cab doors as well as the door into the engine compartment had been jammed in the collision. The door's drop light on the driver's side had however fallen out and both men scrambled out through it. Whilst Driver Plant went to look at the other train, Millward used the fire extinguisher he had taken from his own cab, and, later, those from other cabs, to put out a fire in the Class 45 locomotive's battery compartment. He closed down the engine on the Class 45 locomotive, ran across to Signal CY 151 on the Down line and, speaking on the signal post telephone, said to the signalman, "you have sent him down on top of us" to which the signalman replied, "has he hit you?" The signalman said that he had protected the scene of the accident by signals and that the emergency services had been called.

17. Millward then dealt with a second outbreak of fire on the Class 45 locomotive using an extinguisher from the Class 47 locomotive, before helping to cut down a fence to enable ambulances to get onto the site.

18. *Driver Edward Everett* the driver of the passenger train was regrettably killed in his cab at the moment of impact, but his guard, *Guard R. R. Keyworth* outlined the events leading up to the collision. He had joined the train with his driver at Sheffield and they departed some 4 minutes late. The train slowed for temporary 20 mile/h permanent-way restrictions between Bamford and Earles Sidings and the brakes seemed then to have been working effectively. As they came out of Cowburn Tunnel the train first slowed and then stopped at Chinley Signal CY 157. After about two minutes, vacuum was re-created (to 21in mercury) and the train then drew forward to the points at East Junction and then stopped astride the points.

19. He had been travelling in the brake compartment at the rear of the train and had been looking out up to this time, but as the train gathered speed again he closed his window and sat down. He did not hear the driver sound his horn. He thought that they were travelling at between 20 and 30 mile/h as they passed the signal box but he had no sensation at all of passing through the crossover onto the other line. There was then

an "almighty crash" and he was thrown to the floor; a spare carriage coupling fell off the wall and hit him on the foot.

20. After the accident he put on his yellow vest and, taking his lamp, went forward to the head of the train. There he saw that the cab was totally stove-in and there was no reply from the driver. On meeting Driver's Assistant Millward he agreed to put track-circuit operating clips on the opposite line and detonators in rear of his train. On his way back to the signal box he asked some motor-cyclists on the road to telephone for the emergency services. He reported to the signalman who confirmed that he had protected both lines by signals and had called for the emergency services. He then returned to his train where he helped a passenger to turn on the lights on the leading coach which had gone out. He confirmed that the street lights on the left of the railway were still illuminated and that he could see the green aspect of automatic colour-light signal CY 151 approaching Chinley Station glinting through tree branches on the left of the railway as he passed under the second of the two bridges. He described the night as being very dark but not raining.

21. I called on three passengers shortly after the accident: *Mr R. Chadwick* was in the back seat of the leading coach with his 10-year-old son kneeling on the seat beside him. He told me that they had not stopped very long after coming out of the tunnel and that they had picked up speed gradually thereafter. He was not aware of passing over the crossover onto the other line and he did not feel any application of the brakes until the collision occurred. He was thrown onto the table and demolished it and then onto the floor where some luggage fell on him.

22. *Miss D. Ludgate* had been travelling in the middle of the second coach on the right-hand side. She remembered having stopped shortly before the accident, then starting slowly and stopping again and then, she thought once more. The train then restarted quite gently but she felt nothing as it passed through the crossover onto the other line. Nor did she feel any application of the brakes before the collision, which she thought occurred at about 20 mile/h. She was thrown onto the table, which broke, and then back into her seat. *Miss D. Coram* had been travelling in the third coach. She remembered the train stopping and then restarting slowly and stopping again and then accelerating normally thereafter. She too felt nothing as they passed over the crossover onto the other line; nor did she feel any application of the brakes before the collision occurred, which she thought, had been at at least 20 mile/h.

23. I asked *Mr J. H. Lewis* of the British Rail Research Establishment Derby to give me an estimate of the probable speed of collision between the two trains. Assuming that the passenger train's brakes were applied at the time of the collision and those of the two locomotives were not applied, and taking into consideration the damage sustained by the two locomotives in collision and the distance travelled by the passenger train after it, his best estimate was about 30 mile/h. Had the two locomotives' brakes been applied the damage done would have been much more severe.

24. *Relief Signalman I. A. Holland* had been asked at mid-day to work the over-night 12-hour shift at Chinley beginning 1800 on Sunday until 0600 on Monday morning. He arrived at the box and took over at 1743. Everything was perfectly normal until, at 1830 there was a mains power failure and the auxiliary generator automatically started and provided power for the signalling. Lights in the village had gone out but the street lamps beyond his signal box remained lit. He reported the failure to the Area Operations Centre (AOC) at Manchester Piccadilly. (From this point it is simpler to record the events in the signal box in tabular form).

1831. He noted that track circuit T365 at East Junction had failed, locking Points No 354 Reverse and No 355 Normal. He reported to the AOC and called for a technician.

1835. Class 47145 locomotive arrived at Signal CY 152 to reverse at Chinley. He told the driver when he telephoned from the signal of his difficulty at East Junction and that he would signal the locomotive to stand behind Signal CY 153 on the Goods line.

1830. He noticed that two track circuits on the Up Main line Nos T350 and T352 had failed to clear behind this locomotive. Accordingly he instituted Absolute Block Working over the line under TC Block Regulation 3(3.5). He set the route by route switch for locomotive 47145 to depart onto the Down Main line with No 351 Points 'Reverse' and No 350 Points 'Normal'.

1837. He was next offered two coupled Class 37 locomotives for Buxton, and he set the Route for them from Signal CY 152 to the Down and Up Goods line. (This route required Points No 354 at East Junction to be reversed, in which position they were).

1843. The two locomotives passed his box onto the Buxton Line.

1843. He was next offered a Manchester to Cleethorpes passenger train 1E74 on the Up Main line.

1845. He offered 1E74 onto Earles Sidings. At this time he was also offered the Sheffield to Manchester train 1M42 (which was involved in the collision) from Earles Sidings but he told the signalman that it would have to stop at Signal CY 157 which he could not clear because of the failure of track-circuit T365.

1845. He had set the route for 1E74 by Route Switch No 152/1 (which requires Points No 355 Normal, which they were) and as the train passed his box he noted that track circuits T350 and T352, were showing cleared again.

1845. He sent the 'Train Entering Section' signal to Earles Sidings.

1855. He telephoned New Mills to reinstate Track-Circuit Block working.

1855. At this time, 1M42 had not yet passed Earles Sidings and Holland told the signalman there that he was going to leave his signal box to crank Points No 354 by hand. He also told the New Mills signalman what he was going to do, and asked him to tell the driver of two coupled engines, who was in New Mills signal box at the time, that when he arrived at Signal CY 152 he might be out of his box. Holland also told the Great Rocks signalman on the Buxton Line.

1856. Holland then took the points key and pump handle from its container in the signal box, went down the steps to his car and, turning left under the viaduct carrying the goods line, went up a small road to a gate adjacent to East Junction. He unlocked the lid of Points machine No 354, put the points on 'manual operation' and pumped them over fully into the Normal position. He then replaced the lever from the manual to the automatic position, and closed and locked the lid. He also checked the track locally and could see no obstruction which could have caused the track circuit to fail. He then returned to his signal box. He confirmed that he had not tried to operate the Route Switch 157/2, nor had he placed the points operating switch for Points No 354 to the Normal position. The latter switch remained on auto throughout this period.

1904. The two light engines had arrived at Signal CY 152, but when he telephoned the signalman at Earles Sidings that he was back in his box, 1M42 had still not arrived at his East Junction Signal CY 157. The Signalman gave him 'Train Out of Section' for 1E74 and also told him that 1M42 had passed Earles Sidings at 1859. For a moment he thought that he might be able to clear the two light engines onto the Buxton Line ahead of 1M42 and tried the Route Switch 152/2 for it but quickly realised that he would not be able to set this route because he had pumped Points No 354 Normal; so he replaced the switch. (This action must have reversed the crossover No 350 – Points No 351 were already reversed following the previous move off the Buxton line). Although he had not scotched the facing Points No 354 at East Junction, he claimed that the points were indicated as being Normal on his panel (They cannot have been).

25. It was soon after his conversation with the signalman at Earles Sidings that 1M42 arrived at Signal CY 157, and the driver quickly called him from the signal. Holland told him of the track-circuit failure, and that he had hand-pumped the points to the Normal position. He asked the driver to pass Signal CY 157 at Danger and to "check the points at East Junction and then he should be OK".

26. He saw the train occupy track circuit T361 (which track-locks Points Nos 350 and 351) and suddenly realised that both these points were indicated as being reversed. He immediately picked up his Bardic hand lamp, switched on the red light and opening an end window facing up the line waved the lamp towards the driver as the train approached.

27. The train continued to run past his box at, what he thought must have been about 20 mile/h. He could not see the driver and he saw no bardic lamp being used inside the cab. He heard a 'crunch' as the train ran through Points No 351 in a trailing direction and took the crossover onto the Up Line. He sent the "Obstruction Danger" bell signal to New Mills South signal box and advised the Manchester AOC what had happened. He saw track-circuit T359 on the Down line showing occupied and the Driver's Assistant telephoned him from Signal CY 151. Later he noted that track circuit T365 was indicating clear again.

28. *Mr R. M. Bell Deputy Regional S & T Engineer* put it to Signalman Holland that, because the track circuit had failed with the points in the reverse position, the locking relay was set for the points to be in reverse. Had the track-circuit failure cleared itself the points would have immediately, (in the absence of a train shunting the track circuit) reverted to their original position. Holland replied "I see". He also commented that he supposed the reason he put the points back onto 'auto' was to save him having to go back again to do it later. Mr Bell commented that it was a risky thing to do because, if the track circuit does clear the points would revert to the position corresponding with the locking relay. Holland replied "I didn't think they would have done that." When Mr Bell said that the points indication should have been flashing "Out of Correspondence" Holland replied that when he got back into the signal box he operated Points Switch No 354 to the Normal position which lit the Normal indication light. He then returned the switch to the central (automatic) position. Mr Bell then pointed out to him that, with the track circuit remaining occupied the point locking relay is locked in Reverse and cannot be moved by the points switch. Mr Bell suggested that Holland might be confusing his action prior to the accident with those after the technician had cleared the fault.

29. When I asked Signalman Holland where the Emergency Instructions and Failure List (see Appendix A) were kept in the signal box he said that they were in a drawer beneath the signalling panel. He admitted that he had not looked for them nor used them to check the route prior to the accident. (After the accident they were found hanging on a hook beneath the panel – see paragraph 32).

30. *Traction & Rolling Stock Engineer A. G. Lowe* arrived at Chinley at 2115 and examined the locomotives. He noted that the Class 31 locomotive's inner two wheelsets were derailed and he saw marks on the rails almost at the point of collision where they had become derailed. He also noted, two days later, slight evidence of a rail burn about 20 yards east of Signal CY 152. The automatic train brake controller was in the emergency position when he examined it immediately after the accident showing that the driver had made an emergency brake application before the collision occurred. The brakes on all the coaches were fully applied. It was confirmed that it would have taken about 12 seconds for the locomotive's brakes to become fully applied and the train's brakes would have taken longer.

31. *Senior Technician (S & T) R. J. Kemp* had been called out to deal with the failed track circuit T365. He went directly to East Junction where he found that the failure was caused by a bad contact on a fuse holder. After cleaning its contacts and the holder the track circuit worked correctly. He telephoned the signalman at 2025 and was then told of the accident. He confirmed that the auxiliary generator was still providing the signalling power supply when he was at Chinley.

32. *Mr M. McGuduc Assistant Area S & T Engineer* arrived at Chinley at 2345. He could not then find the Emergency Instructions (see Appx A). The signalman then on duty looked for them on the notice board in the corner of the signal box, but they were eventually found on a chip-board hanging on a hook on the right-hand side of the panel.

Training

33. *Signalman Holland's Experience.* Holland first joined the railway as a Junior Railman in June 1980 one month after his 16th birthday; his period of probation ended in September. At the age of 17 he was promoted to Leading Railman in charge of Disley Station, and later at Hazel Grove. After attending a 7 weeks course in the Manchester (Victoria) Signalling School and after spending some time in Edale signal box he became a Signalman 'A' on 24th May 1982, aged 18. Six months later he was promoted to Signalman 'B' and worked in Edale and Earles Sidings signal boxes. He became a Relief Signalman "2" on 28th November 1983. He had taken a British Rail correspondence course entitled "Safe Working of Trains" and obtained 89% in the 1984 first year exam. (This course was mainly concerned with the Absolute Block System and mechanical lever frames.)

34. At the time of the accident Holland worked as a Relief Signalman at ten signal boxes: at Buxton, Chapel-en-le-Frith, Furness Vale and Disley on the Buxton Passenger line; at Great Rocks and Peak Forest on the Buxton Goods line; and at New Mills South Junction, Chinley, Edale and Earles Sidings on the Hope Valley line. They were all mechanical lever frames except that at Chinley. He had first worked at Chinley in November 1984. He had spent about one week in the box with another signalman until he had become accustomed to it and had then been 'passed out' as being capable of working the box on his own.

35. He had had to deal with track-circuit failures at Chinley on previous occasions. He had "checked" the points manually by the switch to establish which position they were in and then called the train past the signal. He added that he had operated the points switches on previous occasions. As for the training he received in the school on this matter he replied "Yes – it has to be covered."

36. In 1982, the *Area Movements Inspector* at Buxton was *Mr R. Keighley*. He passed Holland out as a signalman and described him as "excellent". He was "interested, thorough and keen, and very intelligent, and not given to rushing." Holland was commended for the action he took in an attempt to avert an accident when some wagons ran out of a siding at Earles Sidings.

37. On the afternoon of 26 August 1986 I interviewed *Mr B. Richardson* who had served as Supervisor GP Relief at Buxton between October 1983 and February 1985, and had 'passed out' Signalman Holland at Chinley in November 1984. He told me that it would have been up to Holland to decide when he was ready to be tested by telephoning his Movements Inspector. Mr Richardson told me that the signalman under whom Holland was under instruction should have taught him how to work the panel and all the relevant emergency procedures. In passing a man out he (Richardson) would observe the man at work and then verbally test him in the relevant instructions including the setting and locking of points under failure conditions by using the points switches; and the giving of instructions to drivers. He agreed that it was a verbal test and not a practical one.

38. Supervisor Richardson had served as a signalman in the Trent and Derby Panel signal boxes between 1968 and 1981 and he had obtained his knowledge there. Although he knew the actions to be taken under failure conditions he was not very clear as to the fundamental reasons for those actions.

39. I also interviewed *Senior Movements Inspector W. O'Brien* of Manchester Piccadilly. He had served in the Royal Navy until 1948 and had become a signalman at the age of 22 serving in many signal boxes since then. He did not believe that 'about one week' was sufficient time for a signalman to become fully trained in a Panel signal box for the first time. He may be able to cope with things when the equipment was working properly but under failure conditions there was a need to take manual control and to carefully monitor the indications given on the Panel. (He remarked that young signalmen tended to 'flick switches' without taking too much notice of the indications given). Mr O'Brien thought that the lack of route setting lights at Chinley made this more difficult than at major Panel signal boxes where they were invariably provided. When I asked him to explain why the various Instructions to Signalmen for use under failure conditions were necessary he had a very clear understanding of the nature of a route relay interlocking and why it was necessary to take manual control of the Panel.

40. The *Traffic Manager* at Buxton was *Mr S. D. Cornish* who visited each box about once a month, and who had seen Holland working in signalboxes, including Chinley, on 5 or 6 occasions. He checked whether Train Registers were being properly kept and that there was no personal equipment in the box. He did not feel it to be his duty during routine signal box visits to test signalmen on the rules or the action they should take following failures. He sometimes checked that the various Rule Books Appendices and Instructions were on display in signal boxes.

41. Signalman Holland was unable to tell me when he had last had a rest day. He was planning to get married the following year and worked on most of his rest days, as there was a shortage of staff in the area. He had worked at Edale until 1400 on Saturday 8th March and he had gone out with his young lady on Saturday evening. But he was in bed by 2330 and on the Sunday morning had a 'lie in' until about 0930. At about noon he was asked to work the 12-hour shift beginning at 1800 on Sunday evening, which he accepted.

42. Following my Inquiry it was noticed that the signalman at New Mills Signal Box had made an entry in his Train Register that Holland had told him that he would be out of Chinley Signal Box from 1803 until 1826. No similar entries had been made in the Chinley register nor in those at Earles Sidings or Peak Forest. I interviewed Signalman Holland on the evening of 5th June 1986 in the presence of *Mr N Patenden the Regional Operations Officer North* to ask him why he (Holland) had left his box. He explained that he had spent Sunday at the home of his young lady in Buxton where he had had an evening meal at about 1700. He had left at about 1730 dressed informally and had driven straight to the signal box, arriving early, fearing that he might be late if he went home first to change. He admitted he had been out of his signal box between the times stated but assured me that he had told the adjacent signalmen and checked with them that there were no trains about. He had merely changed into his railway uniform and had not taken the opportunity to telephone his young lady to settle any trouble between them. It has been confirmed that his absence had not delayed any trains.

The Signalling School in Manchester

43. The school contains a lecture room with desks where students take notes. On one side of the room there is a model railway worked by a series of block instruments mounted on the wall. Students work trains, which can be controlled by the Instructor, by operating points and semaphore signals by means of model lever frames. Each student is 'separated' from his neighbour by a curtain. I noted that the toeplates over

the lever frames had been made in perspex so that students could see the locking being achieved when a signal lever is pulled and locks the points and facing point lock levers in the frame. Signalman Holland told me that they had covered Track Circuit Block Regulations on his course and they had spent about half an hour each visiting York and Preston Panel signal boxes. They had not covered failure conditions practically.

A driver's view approaching Chinley & Rule E8.1

44. Mr Bell travelled in the cabs of passenger trains after dark on 3rd April and on 8th April. On the first occasion the locomotive had no high-intensity headlight and the Chinley sodium street lamps were alight. After the darkness of Cowburn Tunnel he could barely make out the outline of the signal box because of the street lamps. (These were the conditions on the night of the accident). On 8th April, the locomotive had a high-intensity headlight and the street lamps were (fortuitously) not alight. The signal box appeared brightly lit and he believes that the driver would have had no difficulty in seeing a hand signal displayed in the window. He also had no difficulty in seeing the lie of the points in the headlight's beam. He concluded that some street lamps required shielding.

45. I also travelled on the footplate of a Class 31 locomotive before dark on 8th April in company with *Mr R. Reynolds, Regional Chief Traction Inspector*. The driver was instructed to stop at Signal CY157 and then to examine the points at East Junction after which he was told, "he should be OK". We passed the signal box and facing Points No 350 at 23 mile/h.

46. A test was carried out, at Chinley after dark on the evening of 15th April to study the visibility of hand signals exhibited in the signal box from the driving cab of a Class 31 locomotive approaching from Sheffield. The weather was damp after rain and the moon obscured by cloud. The locomotive was not fitted with a high-intensity head light, and the street lamps were alight. It was confirmed that, although the lamps stand out very clearly they do not cause any difficulty in the observance of the hand signals. In one test however the lamp was not exhibited until the locomotive had reached the trailing points No 351 of the Buxton line; initially the lamp was obscured by the left-side upright of the locomotive's windscreen and could not be seen.

47. During the tests it was noted that the handlamp (which had been used by Signalman Holland on the night of the accident) had an intermittent fault and that it was possible for the lamp to go out when the switch was at or close to the 'Red' position. It was therefore possible that the lamp was not lit when Holland used it, although he thought that it had been. (The lamp was withdrawn from use).

Conclusions

48. There is no doubt that the accident was caused by Signalman Holland's failure to 'correctly set and lock the route' using the points switches, before instructing the driver to pass Signal CY157 at Danger. There is absolutely no doubt that, had he carried out the clear and simple instructions contained in his Signal Box Instructions and summarised in the 'Failure List', the accident could not have happened.

49. Driver Everett may be criticised for exceeding 10 mile/h over a set of points as required by Rule E8.1 but the signalman had already told him that he "should be OK" after passing East Junction and the driver must have taken the signalman at his word. It may have been the glare of the street lamps that caused the driver to fail to realise that his train had taken the crossover rather than the Down line, and in the absence of a headlight on either train an emergency brake application was not made until far too late to avoid a collision at about 30 mile/h.

50. As for the warning Holland gave with his handlamp, it may have been the glare of the street lamps that caused the driver not to see it, but it is more likely that the lamp was not lit at the critical time.

51. Driver Plant's brave action in remaining at his controls and releasing the locomotives' brakes probably saved lives including his own and that of his Driver's Assistant. I strongly commend him for the action he took.

Discussion

52. It is my view that Signalman Holland's failures displayed a lack of proper training and understanding of the nature of route relay interlocking. As a soldier needs to practise the speedy correction of faults in his weapon, so that he does things correctly in the face of the enemy, so a signalman needs practical instruction on the operation of a signalling panel when faults are occurring and he may be under the pressure of events. It has been put to me that signalmen should only have to carry out the instructions given them and that their training should not include any technical appreciation at all. Such comments

conclude "a little knowledge is a dangerous thing." It is not my intention to recommend technical instruction of any kind, but I believe it to be essential that signalmen should understand the nature of the interlocking they are working and realise that when routes cannot be set by the equipment itself it is entirely up to them to apply the vital locking manually and to make sure that they have done so before authorising trains to proceed; and they should do this practically and not only in theory.

53. To pump over Points No 354 from Reverse to Normal without first setting the points switch to Normal and then to leave the points themselves on Auto instead of on Manual displays a total ignorance not only of the nature of a relay interlocking but on the basic laid-down procedures. It raises serious doubts as to the training he received. Failure also to set Points Nos 355, 351 and 350 Normal by points switch to secure the route, and failure to place reminder collars on these switches also shows his training to have been inadequate when faced with a problem whilst under stress. Had he acted in accordance with 'Appendix A' he would not have been able to move the points which led to the collision occurring, and there would have been no accident.

54. The points indication for Points No 354 must have been Reversed before Holland pumped them over, and must have been 'Out of Correspondence' after he had done so. This is in contrast to his statement "Before I pumped them across I had received an indication that they were in the Normal position." In this situation the points should have been scotched. I believe that Signalman Holland, in his haste to keep traffic moving, completely overlooked the need to check the route.

55. When I visited the Manchester Signalling School I was surprised to see that the practical facilities were totally dedicated to the use of mechanical lever frames and signals, whereas panel frames are now in existence at Ashburys, Guide Bridge and Chinley in the Manchester area. Following the accident I inspected Ashburys and Guide Bridge signal boxes with Mr McGadie. I asked the signalmen in each box what he would do if he was unable to clear a signal because of a track-circuit failure. The signalmen generally gave me incomplete answers using their common sense. They had difficulty finding the Emergency Instructions and one man completely failed to recognise the 'Failure List' for his box even when he had found it. In no case did signalmen's answers fully reflect what was in the instructions.

56. I took the opportunity on 5th June to question Holland further on his knowledge of Rule E4.9.5. and the associated Failure List appertaining to a route relay interlocking and signalling panel (see Appendix A). It was quite clear that his knowledge was still inadequate and he had little understanding of the nature of a relay interlocking and of how it worked, and why it is vitally necessary to follow the Rules laid down exactly in order to maintain safety under failure conditions. Since the accident he had been employed only on a mechanical lever frame.

Recommendations

57. My first recommendation is for better practical training facilities for men who are to work small signalling panels on their own. A panel is required having a minimum number of routes on it working in conjunction with a small relay interlocking. No line-side equipment need be provided except that one points machine should be provided to teach signalmen how to hand crank or pump them in emergency under failure conditions. There should also be a panel of switches by which the instructor can 'fail' track circuits and 'self rectify' the failure at an appropriate moment to illustrate to students what can happen if they fail to carry out the procedures correctly.

58. The British Railways Board has recognised the need for a comprehensive review of the arrangements for the initial training of signalmen and also when signalmen are 'converted' to another block system; the review will also establish proper standards as to the levels of proficiency needed on 'passing out' signalmen.

59. I also recommend that signalmen should be taught, when instructing a driver to pass a signal at Danger, to "proceed under caution under Rule E8.1, and to pass over all facing points up to the next signal ahead, at a speed of 10 mile/h". A signalman might remind a driver of the locations of facing points in the route ahead. A revision of the Rules is currently being considered.

60. All the small Panel signal boxes I visited in the Manchester area had small glass-topped tables by the panels for use by signalmen. I recommend that Emergency Instructions and Failure Lists should be placed under the glass where they can be easily found and read. A card index system is suitable for larger signal boxes worked by more than one man.

61. An inquest into the death of Driver Everett was held by the High Peak Coroner Mr R. C. Rushton at Buxton on 15th July 1986 when a verdict of 'Accidental Death' was recorded. The jury felt that the 'fail safe' system in operation at Chinley Signal Box still relies to an unacceptably high degree on human judgement and recommended that the system should be designed to avoid the possibility of human error and its disastrous results.

62. Whilst I concur with the verdict, I do not support the recommendation. The nature of the automatic route setting equipment is that it is 'fail safe', and upon this philosophy the very high level of safety on the railways has been achieved. It means that when things are working properly the signalman can hardly make a mistake. But under failure conditions the equipment may have to be operated manually and, as I have said in my report, this, the signalman failed to do properly. In my view, the reason was that he had not achieved an adequate level of training.

I have the honour to be,

Sir,

Your obedient Servant,

A G TOWNSEND-ROSE
Lieutenant Colonel

The Permanent Under Secretary of State
Department of Transport

4.12 When it is necessary to authorise a Driver to pass a signal at Danger, you must carry out the instructions under Section E, clause 4.9.5 herein except that the route switch must not be operated for the route concerned if the circumstances require such signal to be kept at Danger.

RULE BOOK Section E (As amplified in the Instructions to Signalmen at Chinley Signal Box)

4. Duties of Signalmen

4.9.5 When a signal route defect occurs, you must:-

(i) place and maintain at Danger all signals and slots which lead to or conflict with the defective signal route using reminder appliances on the route switches concerned;

(ii) set up and secure the route required by means of the individual point switches and check that the correct detection is indicated. If the correct detection is not indicated, the points concerned must be clipped or checked on site as shown in the Failure List, having first been operated by means of the pump handle if necessary; [Clamp Lock machines must now be scotched instead of being clipped and padlocked]

(iii) place reminder appliances on the individual point switches operated;

(iv) when the train has come to a stand at the signal concerned operate the route switch for the defective route even though the signal may not clear.

FAILURE LIST CHINLEY INTERLOCKING (EXTRACT)

Hand Signalling from Defective Route		Points to be Set by Individual Point Switches	If No Detection Obtained Points to be Additionally:-	
			Secured by Clip In Position Shown	Checked on site To Ensure Correctly Set
Sig No.	Route To	Normal	Normal	Normal
157	Down Main	350, 351, 354, 355	350A, 354	351, 355A

RULE BOOK Section E

8. Duties of Drivers

8.1 Passing signal at Danger

In every case when a train is required to pass a signal at Danger, the Driver must give one long blast on the horn and proceed cautiously in accordance with the Signalman's instructions, or handsignal and instructions given by the Handsignalman. The Driver must travel at low speed prepared to stop short of any train or other obstruction on the line ahead. He must not exceed a speed of 10 mph when passing over any facing points, switch diamonds or swing nose crossings and, where practicable, must satisfy himself that they are correctly set in position for the route over which the train is to run.

If, however, a train is detained at a defective stop signal in rear of the signal box and a green handsignal, held steadily, is exhibited by the Signalman, the Driver must accept this as an authority to pass the signal at Danger and proceed as far as the signal box for instructions.

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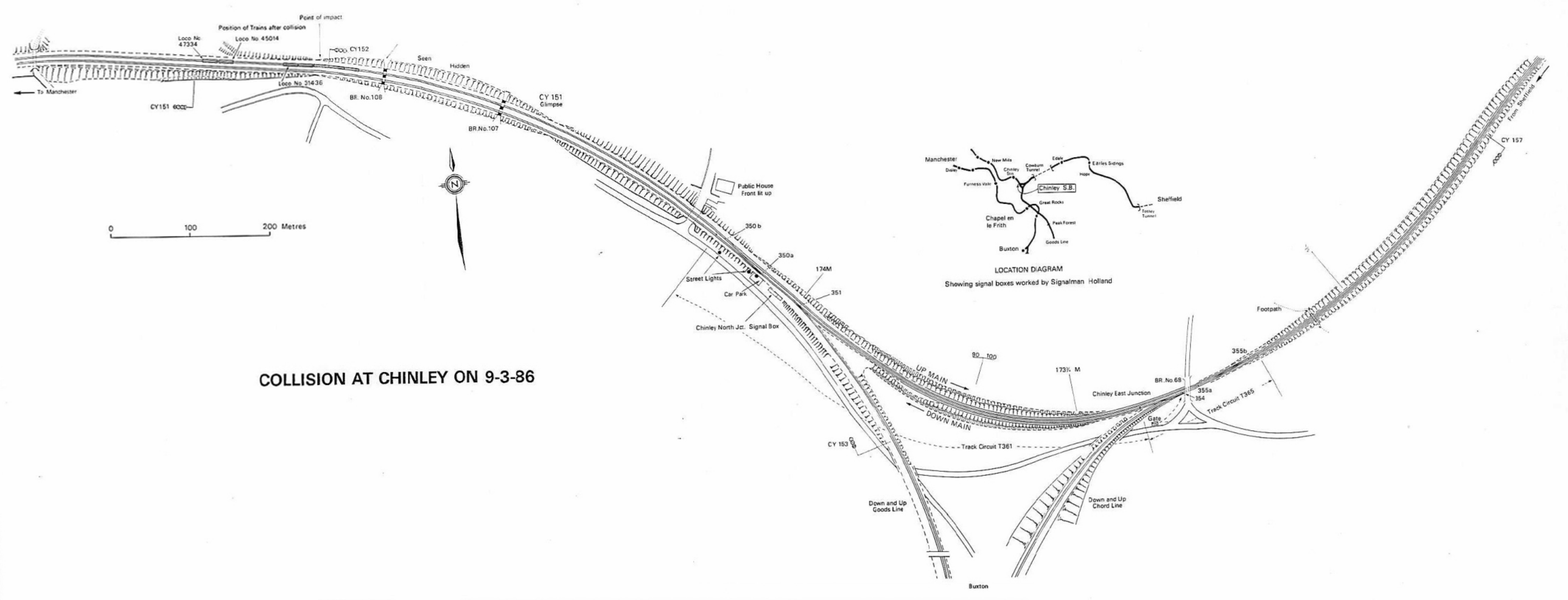

COLLISION AT CHINLEY ON 9-3-86

LOCATION DIAGRAM

Showing signal boxes worked by Signalman Holland