



**A report of a train accident
that occurred on 22 August 1990
at Hyde North Junction
in the London Midland Region
of British Railways**



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The Permanent Under Secretary of State
Department of Transport

HM Railway Inspectorate
Health and Safety Executive
Baynards House
1 Chepstow Place
Westbourne Grove
London W2 4TF

15 November 1991

Sir

I report for the information of the Secretary of State for Transport, in accordance with the Direction dated 21 September 1990, the result of my Inquiry into the accident which occurred on 22 August 1990, at Hyde North Junction in the London Midland Region of British Railways.

At approximately 09.50 two diesel multiple unit passenger trains collided head-on at low speed at Hyde North Junction. Of the 42 passengers on the trains, 28 required hospital treatment for minor injuries and all except one, who was kept in hospital overnight, were released after treatment.

At the time of the accident there was a fine drizzle but visibility was good.

A COOKSEY
HM Deputy Chief Inspecting Officer of Railways

DESCRIPTION

Site of the accident

1 Hyde North Junction lies some 6 miles from Manchester Piccadilly between Guide Bridge and Flowery Field Stations on the former Great Central Railway line to Sheffield which now terminates at Glossop. At Hyde North Junction the line to Sheffield via Romiley diverges from the Glossop line. Both the Glossop and Romiley lines are double track railways. The Glossop line is electrified on the 25 kV overhead catenary system.

2 Hyde North Junction is of the type known as a 'single lead' junction, that is, the two tracks of the Romiley line converge into a single line at the junction and this single line connects through a single lead into the Down Main line of the Glossop line. There is a crossover between the Down Main line and the Up Main line of the Glossop line. To the Manchester side of the crossover there is a connection in the Up Main line to the Up and Down Loop line.

3 The maximum permissible speed on the Down Main and Up Main lines of the Glossop line through the Junction is 60 mile/h. There is a permanent speed restriction of 25 mile/h over the crossover and the connection to the Romiley line. At the point of collision the line falls towards the junction at gradient of 1 in 90.

4 Hyde North Station lies on the Romiley line where the line curves to the left on the approach to Hyde North Junction. It consists of single sided platforms either side of the double track line.

The signalling

5 Hyde North Junction is controlled from Guide Bridge signal box. All of the lines are track circuited and the signals consist of a mixture of 2, 3 and 4 aspect colour light types. The signals are all equipped with the Automatic Warning System (AWS). Some banner repeater signals are also provided. Trains are signalled over the Glossop line between Dinting and Guide Bridge signal boxes on the Absolute Block System. Operation over the Romiley line is by Track Circuit Block Regulation between Romiley Junction and Guide Bridge signal boxes.

6 Figure 1 depicts the layout in the area of Hyde North Junction and indicates the positions of the relevant signals.

The trains

7 The two trains involved were the 09.33 from Rose Hill to Manchester Piccadilly (2H57) and the 09.36 from Manchester Piccadilly to Sheffield (2E06). Train 2H57

consisted of a 2-car Class 108 diesel multiple unit. The leading vehicle was a driving motor brake second No 51913 and the trailing vehicle was a driving trailer car No 54497. Train 2E06 was a 3-car diesel multiple unit. The leading vehicle was a Class 108 driving motor brake second No 51418, the centre vehicle a Class 101 trailer car No 59688, and the trailing vehicle a Class 108 driving motor brake second No 53977. Train 2H57 was 36.98 m long and weighed 52.00 tonnes; train 2E06 was 55.47 m long and weighed 84.50 tonnes.

8 Cars Nos 51418, 51913 and 54497 were three of a batch of vehicles built at the Derby Works then of British Railways and introduced into service in 1960. Car No 53977 was also built at the Derby Works and introduced into service in 1959. Car No 59688 was built by the Metropolitan-Cammell company and introduced in 1959. All of the vehicles had been refurbished.

EVIDENCE

Regulation of the trains

9 *Signalman F Blinston* was on duty at Guide Bridge signal box at the time of the accident. He had been a signalman at Guide Bridge since 1982 and was there when the area was re-signalled. On the morning of the accident he had been on duty from 06.40. At 09.45 a Manchester Piccadilly to Sheffield passenger train (2E06) passed the signal box. After the passage of a Hadfield to Manchester passenger train over Hyde North Junction he set the route for train 2E06. He told me that he observed the white route lights on the signal panel illuminate indicating the correct route was set and Signal No 862 was 'off'. The train from Hadfield passed the signal box at 09.49 and Mr Blinston believed that the train (2E06) must have arrived at the Junction at 09.46 or 09.47 at the latest.

10 Mr Blinston said that he was aware of the train from Rose Hill (2H57) approaching on the Branch line but that the normal sequence of operation was to run the train from Hadfield to Manchester first, then the Manchester to Sheffield train because it was a fast train, and finally the train from Rose Hill which would run behind the train from Hadfield towards Manchester. He told me that that was the sequence he intended to operate. He had not changed his mind and cancelled a route he had previously set for the Rose Hill to Manchester train from the Branch line in order to reset the route for the Manchester to Sheffield train.

11 Mr Blinston became aware that something was wrong at 09.51 when he noticed the indicator lights for 1006 points were showing 'out-of-correspondence' on the signal panel. Also he saw that only one track circuit section of track at the junction was showing occupied.

12 Also on duty in Guide Bridge signal box was *Mr P Gatenby*. He was responsible for recording the details and times of trains signalled. Although not qualified as a signalman he understood sufficient of the way in which the signal panel was operated to be able to confirm the evidence given by the signalman. In particular he was able to confirm that a route from the branch line had not been set and then cancelled.

Driving of the trains

13 The driver of the Manchester to Sheffield train (2E06) was *Mr P Hallatt* and the conductor (guard) was *Mr J Hall*. Immediately before the accident both men were in the driving cab of the train. Mr Hallatt told me that the train had departed from Manchester on time and the journey had been uneventful with all signals cleared for the passage of the train as far as Guide Bridge. The first scheduled station stop for the train was at Hyde Central and the train ran through Guide Bridge without stopping.

14 Mr Hallatt said that on the approach he saw Signal No 862 displaying a yellow aspect with the junction indicator illuminated indicating the route was set for the Romiley line. The signal then changed aspect to green. He had reduced the speed of the train for the 40 mile/h speed restriction through Guide Bridge station and he allowed the train to coast towards the signal and the junction.

15 Mr Hallatt told me that the signal was still displaying a green aspect as the train passed it. As the train continued round the curve towards the junction he saw another train coming towards him probably two to three hundred yards away. He made an emergency brake application and released the Driver's Safety Device. He said he got the guard out of the cab and followed him out. By the time the collision occurred they had reached perhaps the second set of seats in the passenger compartment and he thought that the train had almost stopped.

16 Mr Hall told me that he entered the driving cab to tell the driver that there were two passengers who had got onto the wrong train at Manchester. He said that after he closed the cab partition door he looked and saw a signal (No 862) displaying a green aspect. He had just started to speak to the driver when the driver shouted to him and he saw the other train coming towards them. He re-opened the door and had taken about three paces into the front carriage when the impact threw him over backwards.

17 The driver of the Rose Hill to Manchester train (2H57) was *Mr G J Livingstone* and the conductor (guard) was *Mr A J Rayworth*. Mr Rayworth told me that on the approach to Hyde North Station the banner repeater signal was in the horizontal position indicating

that the signal at the end of the station platform was showing a red aspect. The train was running on time. He could not recollect any passengers alighting from the train but a gentleman and three children did board the train. He indicated to the driver that the train was ready to start by sounding two on the 'buzzer' and the train departed.

18 Mr Rayworth kept his head out of the window in the brake van door and just as the train cleared the platform he saw the other train approaching on the single line. He was thrown forward by the collision, hitting his face. He went to check on the passengers and the driver. Some passengers had received minor injuries. The driver had already left the train to telephone and so Mr Rayworth went to place detonators to protect the train.

19 Mr Rayworth had not left the brake van while the train was at Hyde North Station and he admitted he was unable to see Signal No 865 from his position in the brake van and did not observe what aspect it was displaying when the train departed.

20 The lawyer representing Mr Livingstone read out at my Inquiry a statement on behalf of Mr Livingstone. That statement is reproduced below:

"On the day of the collision on Wednesday, 22nd August 1990, I left my home in Stoke and caught a train to work in Manchester at about 3.30 am. I began my shift at 4 am and was due to finish at noon. I had completed two journeys prior to the collision. I had gone from Stockport to New Mills and from New Mills to Manchester, and then I had gone from Manchester to Rose Hill and returned. I was on my way back from Rose Hill to Manchester when the collision occurred.

As far as the journey from Rose Hill to the point of the accident is concerned, we left Rose Hill on time. We stopped at Romiley and we then had green signals all the way to the distant at Hyde North, which was at yellow. As I approached R865, the aspect was on yellow. I stopped at the platform. Whilst running into the platform I observed the last carriage of the Hadfield train travelling towards Manchester on the down main. The signal 865 at the end of Hyde North platform was at this time showing red. I brought the train to stand three or four yards from the signal. The 865 signal is positioned to the right-hand side of the down branch and I watched the signal all the time whilst the train was on the platform. After about one to one and a half minutes the signal changed to a single yellow, and a few seconds later I received two on the bell from the guard Mr Rayworth for the train to depart. I then selected second gear and the train was travelling at approximately 20 miles per hour.

As I approached the points of 1006 I saw the other train, that is the Manchester to Sheffield train, coming towards

me. I made a full brake application. I did not leave the cab. I got the cab door open as I intended to shout a warning. However, it was then that the trains collided. The trains were almost at a standstill when the collision occurred."

21 Mr Livingstone agreed to answer questions on this statement. He said that the bar of the banner repeater signal was in the horizontal position. He told me that he saw the aspect of Signal No 865 change to yellow. When I asked him if the signal aspect remained yellow he replied that *"I did not see it for very long. I got the bell almost immediately it changed to yellow; we went. I did not look at it [the signal] after getting the bell, because I am fairly new; I was watching selecting the gears properly because I have had a number of occasions while I was training putting it into second gear instead of first."*

Actions following the collision

22 Mr W Woolley, the Assistant Performance and Safety Manager for British Rail's Manchester South Area, on being informed of the accident immediately made his way from Manchester to Hyde. On reaching Hyde he first made sure that the site of the collision had been properly protected by both signals and detonators. He then walked from Hyde Station towards the site of the accident. He saw that points No 1006 had been run through in the trailing direction, that is, pushed across by the passage of the wheels of the train from Rose Hill. He also noted that crossover points No 1008 were set for a move from Signal No 862 onto the Up Branch line.

23 Mr Woolley spoke first to Driver Livingstone and Guard Rayworth from the Rose Hill to Manchester train. Both told him that when the train came to a stand at Hyde Station Signal No 865 was showing a red aspect but that it cleared to a single yellow aspect. Driver Hallett and Guard Hall of the Manchester to Sheffield train said that as they approached Signal No 862 it was showing a yellow aspect which cleared to a green aspect with the position indicator for the Up Branch line.

Damage to the trains

24 Mr D Hopkins, an Engineering Assistant at British Rail's Longsight Maintenance Depot had inspected the two trains at the scene of the accident. When he arrived at site the 2-car unit (2H57) had already been moved back to Hyde Station platform. From his initial inspection there appeared little damage. There was deformation of the buffer beams and seats inside the vehicles were damaged.

25 The 3-car unit was more severely damaged and was still at the place where the collision had occurred. The driving cab floor of the leading power car had 'crumbled' and the driver's control desk had been

pushed back. There was severe deformation of the leading buffer beam and one of the sole bars had been bent and split. The No 2 bogie bolster was deformed and longitudinal members torn. The intermediate vehicle had not suffered any noticeable damage but there was damage to the buffer beams and sole bars of the trailing power car.

26 Both trains were removed from site and taken to the Longsight Depot, where their braking systems were examined and tested. The brake equipment was tested in situ on the trains in accordance with the instructions laid down by the Director of Mechanical and Electrical Engineering for the British Railways Board. Mr Hopkins said that the test revealed no defects which would affect the operation of the brakes of either train. One brake cylinder on the intermediate vehicle of the 3-car unit had failed on all three of the slow leak tests but had operated correctly during the other tests. Mr Hopkins told me that the problems with this particular cylinder would not have significantly impaired the braking performance of the train.

27 Mr P J Hodgson, a Structures Engineer in the Mechanical and Electrical Engineers Department, outlined to my Inquiry the assessments made by himself and colleagues of the damage sustained by the rolling stock. The damage at the joints between headstocks and the sole bars and also the distortion immediately behind the headstocks of the longitudinals leading back towards the first transverse members indicated that the forces involved were somewhat above the rated force for those vehicles.

28 The 2-car unit and the outer cars of the 3-car unit were Class 108 vehicles and should have been capable of withstanding an end load force of 80 tonnes. From his experience Mr Hodgson estimated the damage was consistent with a momentary impact force of over a hundred tonnes possibly up to 150 tonnes. The less severely damaged intermediate vehicle of the 3-car unit was of an all-steel construction and he had not been able to discover the end load strengths to which that vehicle had been designed. He had concluded, based on his experience rather than on calculation, that the collision had taken place at a closing speed of around 5 miles/h and certainly at not more than 10 miles/h.

29 Mr Hodgson had also examined the damage caused to the seats in the trains. The seats were supported by seven-eighths of an inch diameter tubing with walls of 18 gauge thickness. These tubes had torn in tension and buckled in compression. The tubes themselves showed no signs of corrosion but there were obvious signs of corrosion to the attachment strip on the floor of the vehicle. The seat frames were secured to the attachment strip by self-tapping screws of something less than a quarter of an inch diameter. He considered the attachment strip and the fixing screws were not in the

best of condition and that the age of the vehicle was a factor.

Performance of the signalling system

30 *Mr A Ward*, the Signalling Engineer (Maintenance) for the Warrington Area, was acting as the Area Signalling Engineer at Manchester at the time of the accident. The signalling at Hyde came within the jurisdiction of the engineer at Manchester. On being advised of the collision and of signal aspects said by the train crews to have been displayed he contacted signalling testing staff to go to the site and he made his way to site himself. He had advised the testing staff to note whatever was relevant but not to disturb or touch anything other than essential disconnections of signals on site to protect the incident.

31 *Mr D Dunbabin*, a Senior Technical Officer, was part of the signalling testing team. He had undertaken the examination and testing of the equipment in the lineside location cabinet at Hyde North. It was in that cabinet that the equipment which controlled Signal No 865 was housed. During the conduct of a wire count to check the physical wiring against the circuit diagrams an anomaly was found. The anomaly was that a number of wires had incorrect identification beads on them. Mr Dunbabin explained that each wire was traced and the connections found to be correct but the wires were wrongly numbered.

32 Mr Dunbabin told me that the incorrectly numbered wires all involved connections to the AWS and not to the signal aspects. He confirmed that there was nothing which would have caused the signalling equipment to operate falsely and nothing had been changed in the location cabinet during the examination and testing.

33 *Mr B G Newns*, a Principal Technical Officer, took charge of the examination and testing of the signalling system at Guide Bridge signal box and relay room. When he saw the signal panel in the signal box the indications were showing all the signals to be displaying a red aspect, the track circuit where the collision had taken place was showing occupied, and the white route lights from Signal No 862 towards the Romiley line were illuminated. He noted that an earth fault detector alarm indication was showing on the panel.

34 Mr Newns explained that the white lights indicated which route the signalman had selected by the operation of the buttons on the panel and were illuminated when the route had been set by the interlocking. As the train passed along the line the white lights would go out and the red lights would be illuminated for the section of line occupied by the train. Unless the signalman cancelled the route, as the train progressed the red lights would go out and be replaced by the white lights showing the route was still set.

35 From his observation of the indications displayed on the panel Mr Newns said that although he could not be certain there was "an extremely good chance" that the route had been set for the Manchester to Sheffield train. During the subsequent testing the panel and the indications it displayed had "always behaved as it should do".

37 On his arrival the relay room was secure and he had unlocked it. A colleague checked that no incorrect feeds from the interlocking were present on the cables leading to the lineside signals. A visual examination of the relays was made and the positions of the contacts recorded. All of the relevant interlocking for the junction and its approaches was tested. A wire count had confirmed that all the wire connections were according to the wiring diagrams. Each wire in turn was examined and it was confirmed that the wires were in good condition and firmly crimped in to the connector.

38 In addition to the work in the relay room and the signal box all of the lineside cabling was examined and no signs of damage were found. The cable was removed and physically inspected for damage although it had passed the electrical tests. Mr Newns said that despite all of his efforts he had been unable to make the signalling malfunction.

39 *Mr J H Davies*, the Signal Technical Services Engineer, told me that, independently from the site testing team, he had carried out a check on the signalling design. His examination of the signalling control tables had discovered that a section of 1330 track circuit, 1330c, had been omitted from the controls of Signal No 862. However, when he checked the wiring diagrams, against which the site testing was taking place, he found that track circuit 1330c had been correctly included in the controls of Signal No 862.

40 Mr Davies found that at some time after the installation of the signalling amendments had been made to it. He explained that the interlocking was designed to work in such a way that as the signal clears it locks the route; that is the signal aspect is fed from the relay room by the same relay that imposes the route locking. In the case at Hyde it was arranged so that the route locking was imposed by a repeat from the signal; when the signal was cleared it in turn held the interlocking.

41 As a result, if a route was set and immediately cancelled it was possible that the signal would momentarily show a proceed aspect without actually locking the route. If the cancellation of route did not immediately follow the setting of the route the route would be locked. Mr Davies estimated the change of aspect would last for a twentieth of a second.

42 Other railway officers had attempted to demonstrate the effect Mr Davies had concluded could occur from his

study of the signalling design. They had been able both to demonstrate and take a video film of Signal No 865 flickering from red to yellow to red aspects. The video film was shown at my Inquiry and Mr Davies confirmed the flicker was the effect he had anticipated.

43 *Mr I C Buchanan*, the London Midland Regional Signal and Telecommunication Engineer, explained to me the significance of the apparent discrepancies in the signalling installation discovered by the testing which was undertaken after the accident. He believed that the incorrect labelling of the wiring in the location cabinet at Hyde North and associated with the operation of the AWS for Signal No 865 had probably existed from the original installation of the equipment. He was satisfied that it could not have caused a false signal aspect to be displayed.

44 The earth fault detector alarm showing on the signalling panel was caused by a high resistance path on an outgoing circuit. This high resistance path was not associated with the circuits feeding to Signal No 865. The design of the signal circuits was such that four separate earth failures would have to occur coincidentally before a leakage path to the signal could be created. The testing of each of the lines going out to Signal No 865 confirmed that there were no false feeds on these lines.

45 Although there was a discrepancy in the control tables for Signal No 862 in that track circuit 1330 sub-section C was not included it was in fact included in the installation. He was satisfied that the actual controls were correct and the omission was a typing error.

46 Mr Buchanan explained that to avoid creating a risk to a train by the signalman changing his mind approach locking circuitry was provided. To safeguard a movement across the junction once a route had been set where it was possible for the driver of an approaching train to have seen a proceed signal aspect the route would be held for three minutes if the signalman attempted to cancel the route. In the specific case at Guide Bridge there was a very narrow time slot of a fraction of a second in which it was possible to cancel the route with a proceed signal being displayed. Outside that narrow time slot the signalling would lock up and the 3-minute delay would operate.

Driver training and supervision

47 *Mr R M Evans*, the Training and Development Manager for the British Railways Board's Director of Operations, outlined to me the arrangements for training drivers. With the introduction of the 'Train Crew Agreement' in October 1988 a revised training schedule for drivers (Schedule 2) was introduced. The total training period was shorter than that which had applied previously. At the same time a new selection process

was introduced for train crew and particularly for drivers.

48 Five train crew selection centres were established in different parts of the country. At these centres trained assessors applied a variety of selection tests and techniques which had been developed in conjunction with the Netherlands Railways who had some 50 years of experience in applying assessment techniques. The applicant to become a driver would spend a day at the selection centre undergoing a variety of tests designed firstly to ensure that the person was capable of absorbing the information and knowledge required during the training period and which would have to be applied afterwards. Secondly, the person also had certain key aptitudes which have been identified as important in the role of the driver.

49 The aptitudes required for a driver included speed of reaction, concentration or vigilance and the ability to identify key elements in a rapidly changing situation. One of the tests was designed to establish that the person had the ability to concentrate over a sustained period of time and to measure the decay of concentration over a time span. On completion of the assessment a report was sent to the local train crew manager who had put forward the candidate.

50 The report would place the candidate in one of four categories. The first category was 'suitable', the second 'suitable but with reservations', the third 'very serious reservations about suitability', and the fourth 'unsuitable'. The normal procedure was for anyone categorised as three or four not to be selected for training as a driver. Any reservations under the second category would be specified and the local manager, who had the final decision on whether a person should go forward, had the opportunity to discuss the report with the assessor. This information from the assessment centre was not normally made available to the staff of the training centre.

51 In response to a question as to whether there was a 'feedback' to the selection centres on those people who had been through the selection process Mr Evans said that bearing in mind the selection centres were introduced in October 1988 and the training period was still fairly long there had been only limited feedback. Part of the work of the staff of the selection centres was to monitor and evaluate their work. If something appeared to have gone wrong the selection centre would hear of it and review the particular case.

52 Mr Livingstone had been assessed by the Manchester Selection Centre one month after the centre had opened. Mr Livingstone's assessment was reviewed following the accident but to Mr Evans' knowledge there had been no review following an earlier incident because Mr Livingstone had only just finished his training.

53 *Mr D Robertson* told me that as the Regional Training and Train Crew Manager for the London Midland Region he was responsible for all training of train crew and also for setting the train crew establishments for each Area and each individual depot. The training programme used on the Region was specified by the British Railways Board. There was some freedom to make adjustments to the Board's programme to meet the individual needs of the Region but the content of the training courses was not varied.

54 He carried out regular audits of the training schools by having meetings with the senior instructors, the Chief Traction Inspector and the Trains Inspectorate. His audits were to ensure that the training was kept at the level set by the standard and that the content of the school courses conformed to the laid down formula from the British Railways Board. However, he did not carry out any of the examinations of the trainees himself. He told me that conducting the examinations was the role of the Traction Inspectorate and Trains Inspectorate at Area level.

55 *Mr Robertson* said that he did not see the advice from the assessment centres which went directly to the Area from which the individual came. Regularly he would call for the assessment papers if there was a query such as why a person had not been selected. If the individual had gone through an assessment and passed, *Mr Robertson* then took on from there the requirement for training as and when the need arose. He would not call for the assessment papers unless there was a query.

56 Following an incident where a driver's capabilities had been questioned *Mr Robertson* would become involved. He could call on the Area to carry out a further rules examination or have the individual removed from 'footplate' duties if the need arose until the examination had taken place.

57 *Mr Robertson* agreed that the training schools had a good pass record but confirmed that he did not place pressure on anyone to pass drivers who were not suitable. He was not aware of any such pressures and he would not countenance such pressure being applied.

58 *Mr T M Blaxill* was the senior instructor in charge of the train crew training centre at Crewe. The purpose of the training centre was to train the various grades of staff who form the train crew. The training schedules used for the different grades of staff were identified by numbers; Schedule 1 for Train (wo)men, Schedule 2 for Drivers and Schedule 3 for Conductors.

59 The form of Schedule 2 had been slightly modified since *Mr Livingstone* had been on the course. At that time the trainee would attend the training centre for one week on the principles of route learning and then four

weeks of traction training. The trainee then spent two weeks with a driving instructor at his/her own depot followed by four weeks with a 'minder driver'. The trainee then returned to the training centre for two weeks on rules. The trainee then spent two weeks with a driving instructor. There were examinations at the end of the traction training, at the end of the two weeks of rules and finally a practical examination at the end of the course.

60 *Mr Blaxill* said that he had been involved in *Mr Livingstone's* rules training. Although *Mr Livingstone* had at the first attempt failed the first examination on traction he had subsequently passed. He had passed his rules examination. *Mr Blaxill* told me that *Mr Livingstone* gave the appearance of not concentrating and perhaps he was a little lax in his ways; but when questioned the answers were forthcoming although perhaps a little bit slow, which he recognised could be the man's thinking time rather than that he did not know the answer.

61 In giving evidence *Mr Blaxill* referred to hearing that *Mr Livingstone* had passed his rules examination through the "proverbial grapevine" but he had received no particular feedback about his performance. He told me that basically there was no return flow of information other than through occasional conversation with the Area Inspectorate. There was no formal liaison but if he was concerned about an individual he would get in touch with the Area to ask that they should monitor that person. He had done so on not more than three or four occasions since August 1988.

62 *Mr Blaxill* told me that since *Mr Livingstone* had been on the training course the Schedule 2 course had been restructured and the revised form was that the potential driver attend the course for one week for the principles of route learning followed by four weeks of rules training. That is followed by an examination in rules. The trainee then receives four weeks of traction training before returning to his/her home depot for two weeks with a driving instructor. Following an examination by an Area Inspector the trainee is authorised to drive with a 'minder driver' for a period of eight weeks. The final two weeks before the third examination, which was a practical handling examination, were spent with a driving inspector.

63 *Mr Blaxill* explained that the training course prepares the trainee with the theory and the practical training and experience is obtained with the Area. The training centre was not involved in that part of the practical training undertaken by the driving instructors. That was entirely up to the Areas and the training programme they used.

64 *Mr J O'Callahan*, one of the traction instructors at the train crew training centre at Crewe, had trained *Mr Livingstone*. The training course was a theoretical

course and not a practical one. He explained to me that the technique taught for starting away from a station depended on the type of traction unit. The theory taught included the rules and the need to observe the signal as well as the instructions regarding the control of the unit. This included the selection of right direction of travel with the master controller and when initially starting off not to use too much power; to use the power gently and ease the controller forward as speed was maintained.

65 Mr O'Callahan said that the type of diesel multiple unit involved in the accident was a little different to drive from the more modern units but was not a hard unit to drive. In the courses he had taken only two trainees had failed to pass out. He had never withdrawn a driver from a course but if he thought an individual was not carrying out his duties correctly he would report it to the senior instructor.

66 Mr A Cheetham was the Chief Traction Inspector for the Manchester Area. He became a traction inspector at the end of 1982 and was appointed Chief Traction Inspector in April 1989. He told me he became involved with Mr Livingstone when he failed Part 1 of Schedule 2. He had been examined by one of the Area Inspectors and Mr Cheetham had re-tested him and had been satisfied. He placed Mr Livingstone at about the middle of the range of drivers on that particular examination. The examination was for the type of traction unit he was driving on the day of the accident and consisted of both an oral examination and a test on a DMU to assess if he was fit to go out with a 'minder driver'. He was expected to be able to drive the train in a safe manner but not in an expert way.

67 Mr Cheetham explained that, although Mr Livingstone's training at the training centre had been for Class 14X and Class 15X DMU, he had received a further week of training on Class 108 DMU because the 'link' to which he was allocated includes some duties involving Class 108 DMU.

68 Once the trainee started to drive under the supervision of a 'minder driver' he would not specifically be seen by one of the traction inspectors. However, if an inspector happened to join a train being driven by a trainee with a 'minder driver' present, the inspector would assess the performance of the trainee. The trainee himself keeps a log book and the log book would be signed by the Inspector.

69 Mr Cheetham explained to me that he understood the purpose of a potential driver having to complete 40 turns of duty travelling in the front driving cab of a train was to enable the person to become used to travelling at the front of the train.

70 Mr Cheetham was instructed to re-examine Mr Livingstone in his knowledge of the rules in August 1990

following an incident when he had passed a signal at Danger. The re-examination had consisted of a full Schedule 2 rules examination. Mr Livingstone had answered all Mr Cheetham's questions on the rules "reasonably well". Mr Cheetham said he had formed no link in his own mind between the first time he had re-examined Mr Livingstone on traction and the second occasion which had involved his knowledge of the rules.

DISCUSSION

71 Following the accident the signalling equipment was subjected to extensive testing undertaken by staff from the Railway Signal Engineers Department and observed by staff from the Regional Operations Manager's Office. Much of the testing was recorded on video film. This proved to be most useful to British Railways' own investigation and to my Inquiry.

72 The testing of the signalling system disclosed a number of aspects which were unsatisfactory. The error in the control tables for Signal No 862 appears to have been discovered at the time the signalling was installed because the wiring diagram and the actual installation were correct. Nevertheless, the control tables should also have been corrected.

73 The incorrectly labelled wires in the location cabinet were simply that; the electrical connections were correct and the operation of the AWS magnet for signal No 865 was also correct. The existence of the 'high resistance' on some of the signalling circuits was undesirable but, for the reasons given by Mr Buchanan, was not critical to the safe operation of the signalling.

74 The 'flicker' of the aspect of Signal No 865 from red to single yellow to red caused by setting the route and then cancelling it as the aspect clears and before the interlocking relay had time to operate warrants further consideration. Two questions need to be considered, namely, did a flicker occur and, if it did, could it have confused the driver?

75 Mr Blinston, the signaller on duty, was certain that he had not changed his mind on the order in which he intended to signal the trains and he had not attempted to cancel the route he had set for the Rose Hill to Manchester train. His evidence was confirmed by Mr Gatenby who was also on duty in the Guide Bridge signal box. Accepting this evidence then a flicker would not have occurred.

76 However, if a 'flicker' had occurred it would have lasted for only a small fraction of a second. For a driver to mistake a 'flicker' for a steady proceed aspect it would require the driver to look at the signal during the period of the flicker, stop looking at it before the aspect reverted to red and perhaps most significantly not look at it again. Clearly such a combination of events is

extremely unlikely and for a driver to observe the signal for only such a limited period is improbable.

77 The evidence given by Mr Livingstone was limited because of the concern of his legal advisers that in giving evidence he would prejudice his defence against any possible prosecution. In his prepared statement he claimed that he had seen Signal No 865 change to display a proceed aspect.

78 The British Railways Board Rules specifically require the driver of the train to observe that a proceed aspect is being displayed by a signal such as Signal No 865 before departing from a station. Mr Livingstone in answering some questions from me following his prepared statement said that he had not looked at Signal No 865 before starting the train away from Hyde North Station. His reason for not doing so was because the actions necessary to start the train and in particular ensuring he engaged the right driving gear required his whole concentration.

79 In my opinion any driver who is so deficient in his train handling skills - or so lacking confidence in his ability - that he is unable to undertake properly the other essential aspects of his duty is completely unacceptable. I believe that there were indicators available that Mr Livingstone did not have the necessary skills. Therefore, I have attempted to decide how this situation was allowed to develop.

80 The indicators I believe should have been recognised were:

- Mr Livingstone had experienced difficulties during training (he did not pass the traction part of his training at the first attempt);
- having been trained initially on more modern diesel multiple units he then had to have a local conversion course to enable him to drive the older types of unit employed on the turns of duty to which he was allocated;
- shortly before the accident he had been involved in another incident when he had driven a train past a signal at Danger.

81 After the previous incident Mr Livingstone was re-examined in his knowledge of the Rules because his actions after passing the signal at Danger had not been in accordance with the Rules. The reasons for him having passed the signal at Danger apparently were not established. If they had been and if they had been linked with the other factors Mr Livingstone's difficulties should have been recognised.

82 The fact that the whole of Mr Livingstone's performance was not clearly known highlights what I

believe is a deficiency in the driver selection and training process. The various witnesses, who gave evidence to me on Mr Livingstone's training and his subsequent supervision as a trainee and then as newly qualified driver, all told me of their individual parts in the process. However, their work was, in general, conducted within closed boundaries and without a full exchange of information.

83 In theory the various pieces of information on the selection and training of individual trainee drivers are all available to the Area Manager. This is logical in that it is the Area Manager who is responsible for the supervision of train crew. However this arrangement deprives the trainers of vital information about the trainees. Also the present arrangements do not provide for reporting back the effectiveness of the selection process or the various parts of the training.

84 The British Railways Board's Rules also require the train guard to check any signal is showing a proceed aspect before giving the signal to the driver for the train to depart. This Rule is intended to provide an extra safeguard against a lapse by the driver. Mr Rayworth however admitted he had not looked at the aspect being displayed by Signal No 865. It would not have been easy for him to do so because the signal was located on the opposite side of the train from the platform.

85 Signal No 865 is positioned to give the best sighting of it to the driver of a train approaching it at the permitted line speed and not stopping at Hyde North Station. It is also clearly visible to the driver of the train stopped at the station but it cannot be conveniently seen by the train guard. In such circumstances it is usual to provide on the platform an illuminated indicator which displays the word 'off' when the signal displays a proceed aspect. An 'off indicator' was not provided at the time of the accident but one has now been installed.

CONCLUSION

86 I am satisfied by the testing of the signalling system, which was undertaken by the railway engineers, following the accident, that no defect existed which could have caused the accident. Therefore, I conclude that the accident was caused by Driver Livingstone starting the Rose Hill to Manchester Piccadilly train away from Hyde North Station past Signal No 865 at Danger.

REMARKS AND RECOMMENDATIONS

87 I am satisfied that accidents such as this one, which was caused by a signal being passed at Danger, could be prevented by a suitable Automatic Train Protection (ATP) system. Recommendations that the British Railways Board should install an ATP system were made in the published reports into the Clapham, Purley and Bellgrove accidents.

88 The British Railways Board has already indicated its intention to develop a suitable ATP system and has begun the installation of two pilot systems. Therefore, *I recommend* that this work be completed, the evaluation made, the specification for the ATP system confirmed and installation of ATP commenced as quickly as possible.

89 Having concluded that the accident was caused by a failure of the driver to obey a signal, I am satisfied that he had no deliberate intention of doing so. I have formed the opinion that his lapse stems from his basic lack of ability as a driver. His inadequacies as a driver I believe in turn stem directly from the training he had received.

90 Many drivers trained on a similar basis have proved to be perfectly adequate and, therefore, the basic concepts employed in the training scheme must be reasonable. Whether the overall time or the sequence of the individual parts of the training and the times allocated to them is adequate is clearly a matter for some debate. The ASLEF representative at my Inquiry eloquently expressed his union's concerns that the training of new drivers was being attempted in too short a period of time.

91 Many of British Railways' drivers are due to retire over a short period of time and it is essential the British Railways Board not only have an effective training system but one which is reasonably concentrated in time. *I recommend* that the British Railways Board should undertake a comprehensive review of their driver training systems. This review should consider the content of the course and the time allocated to the various aspects. In addition consideration needs to be given to proper communication between the various parts of the selection and training process: it is essential, if the work is to be undertaken effectively, that there should be adequate reports back to them on the performance of the trainee and newly qualified drivers.

92 Also I believe that it is important that the local supervisors become more closely integrated into the training process and a more positive link needs to be forged between them and the training schools. Clearly, the use of more experienced drivers to provide help and advice to less experienced drivers being introduced by British Railways will provide a significant contribution.

93 The correct observance of signals, even after the installation of ATP, is of fundamental importance. Therefore, *I recommend* that the British Railways Board should continue to give high priority to the current management effort in respect of Signals Passed at Danger (SPAD).

94 Although the structural damage caused to the trains was not extensive, the difference in damage between the outer vehicles with the alloy underframes

and the all steel centre vehicle was noticeable. The outer vehicles' design and strength of 80 tonnes compares poorly with the 150 tonne design end strength of modern multiple-unit trains. The displacement of the seats indicated not only was the seat construction inferior to modern seats but that the fabric of the vehicles was life expired.

95 In my opinion there is little that can be done to strengthen or improve the condition of these vehicles. British Railways have embarked on a programme of replacing rolling stock of the type and age involved in this accident. *I recommend* that the replacement of this elderly rolling stock should be completed as quickly as is practicable but I recognise that to withdraw the existing units prior to the new replacement rolling stock being available would cause unnecessary inconvenience to many passengers.

96 I have previously expressed concern* that signals which could have been involved or are possibly the cause of an accident have been disconnected before the testing of the signalling system. I do not consider the temporary disconnection of Signals Nos 862 and 865 in anyway invalidates the conclusions reached following the subsequent testing of the signalling system that there was no fault with the signalling. However, in other circumstances, it is possible that evidence of some types of failure could be lost.

97 I do not criticise individual members of staff for implementing the laid down instructions. Clearly the logic of protecting the railway in this way if there is any doubt about the integrity of the signalling cannot be disputed. However, *I recommend* that the instructions should be amended to allow it to be done at a sufficient distance from the scene of an accident so as not to interfere with any evidence which may be important in any subsequent investigation.

* Report on the collision that occurred on 4th March 1989 at Purley ISBN 0 11 550996 8

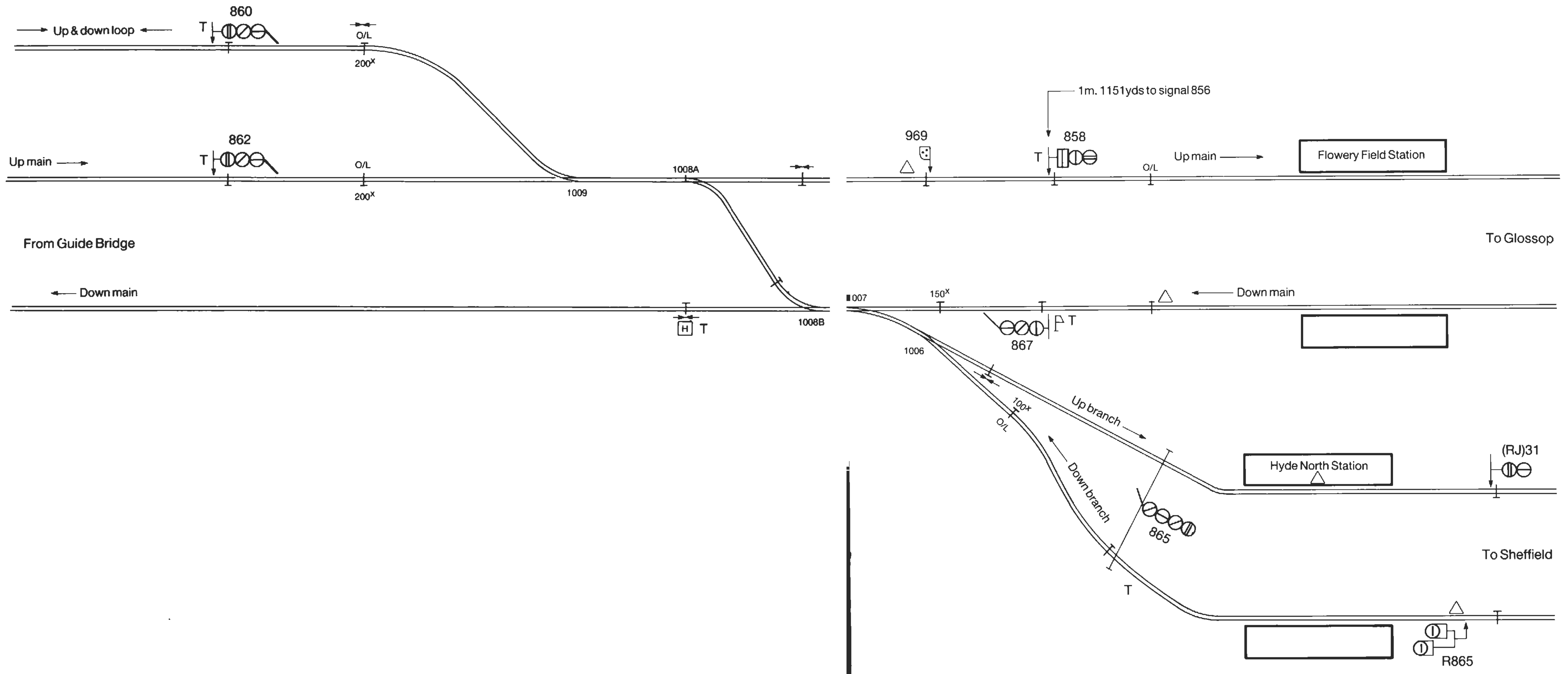


Figure 1 Layout of the area around Hyde North Junction on 22 August 1990

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