



Rail Accident Investigation Branch

Rail Accident Report



**Near miss involving railway staff and a train
between Bishop's Stortford and Stansted
Mountfitchet, Essex
20 January 2008**

This investigation was carried out in accordance with:

- the Railway Safety Directive 2004/49/EC;
- the Railways and Transport Safety Act 2003; and
- the Railways (Accident Investigation and Reporting) Regulations 2005.

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Near miss involving railway staff and a train between Bishop's Stortford and Stansted Mountfitchet, Essex, 20 January 2008

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Introduction

- 1 The sole purpose of a Rail Accident Investigation Branch (RAIB) investigation is to prevent future accidents and incidents and improve railway safety.
- 2 The RAIB does not establish blame, liability or carry out prosecutions.
- 3 Access was freely given by 'one' Railway and Network Rail to their staff, data and records in connection with the investigation.
- 4 On 27 February 2008, 'one' Railway was rebranded and is now operated by London Eastern Railway (LER) and known as National Express East Anglia.
- 5 Appendices at the rear of this report contain the following glossaries:
 - acronyms and abbreviations are explained in Appendix A; and
 - technical terms (shown in *italics* the first time they appear in the report) are explained in Appendix B.

Summary of the report

Key facts about the incident

- 6 At about 16:21 hrs on Sunday 20 January 2008 the driver of train 1B78, the 14:25 hrs from London Liverpool Street to Stansted Airport, who was standing alongside his train while two fitters made repairs to it, had to take rapid evasive action to avoid being struck by another train travelling at speed on the adjacent line.
- 7 The driver threw himself to the ground as the train passed. No-one was hurt in the incident, and there was no damage to trains or infrastructure.
- 8 The train which was being repaired subsequently completed its journey.

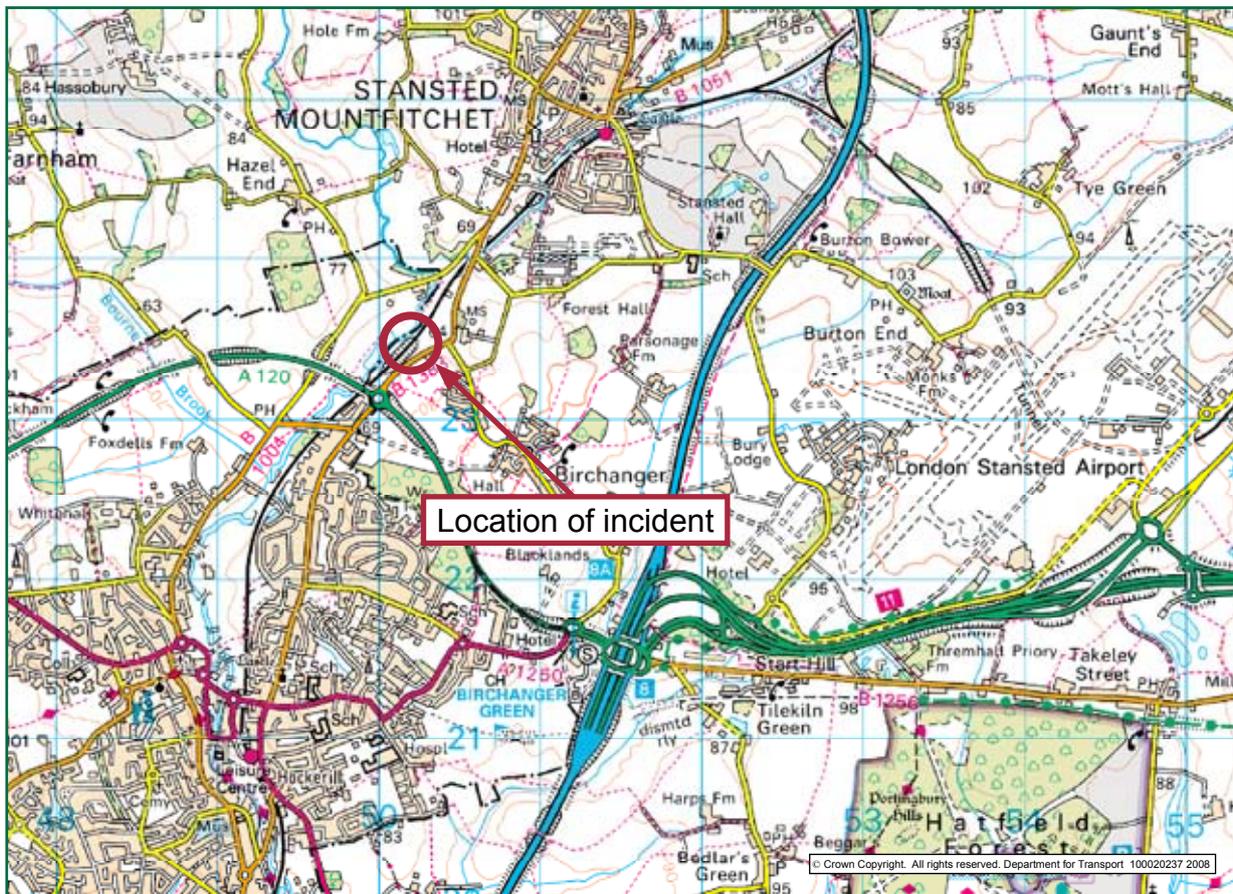


Figure 1: Extract from Ordnance Survey map showing location of incident

Immediate cause, causal and contributory factors, observations

- 9 The immediate cause of the incident was that the driver of train 1B78 had not made arrangements for his own protection before going on the line when train 2H43 passed him at 70 mph (112 km/h).
- 10 Causal factors were:
 - the driver of train 1B78 did not inform the signaller or request a blockage of the up line before getting out of his cab;
 - the signaller was unaware that the driver had left his cab and was in the six-foot. He therefore did not take any action to caution trains past train 1B78 or block the up line;
 - the driver of train 1B78 assumed that all trains on the up line were being cautioned past his failed train; and
 - the fitters did not make arrangements for their own protection as required by the Rule Book.
- 11 The following factors were contributory:
 - the lack of experience of the driver of train 1B78 in degraded working and emergency situations;
 - the driver of train 1B78 and the signaller did not reach a clear understanding on the arrangements in place for the protection of staff, owing to a poor standard of communication; and
 - the competence management arrangements for the fitter acting as designated person took no account of the limited experience which he had actually had of carrying out the role (paragraph 123, Recommendation 5).
- 12 The investigation also observed that:
 - it was not the practice in Liverpool Street IECC to provide written records of the arrangements that had been agreed between the driver and the signaller; and
 - the fitters were unaware of the exact location of the failed train.

Recommendations

- 13 Recommendations can be found in paragraph 144. They relate to the following areas:
 - improvements to the quality of safety critical communications in the Anglia area;
 - evaluation of the quality of communications between drivers and signallers, and improvements in the arrangements that apply when drivers need to go on the track;
 - changes to the way in which staff, who have to make arrangements for protection while working on trains on running lines, are trained and managed;
 - review of the documents used in signal boxes for recording unusual incidents; and
 - provision of information to staff working on failed trains about trackside hazards.

The Incident

Summary of the incident

- 14 On 20 January 2008, train 1B78, the 14:25 hrs from London Liverpool Street to Stansted Airport (Figure 1), struck a wooden pallet that had been placed on the line by vandals. A valve on the underside of the train was damaged, and the brakes were automatically applied and could not be released. The train came to a stop about a mile and a half north of Bishop's Stortford station (Figure 2).
- 15 While arrangements were being made to recover the failed train, train 2H43 (the 15:32 hrs Cambridge to London), passed it on the adjacent *up line* at a speed of 70 mph (112 km/h). Train 2H43 almost struck the driver of the failed train, who was standing alongside the third coach. The driver escaped by lying down on the ballast in the *six-foot* between the two running lines.
- 16 At the time of the near miss, two fitters were also at the failed train. One was between the third and fourth coaches and the other was sitting underneath the *solebar* of the failed train facing towards the *down line cess* area.
- 17 None of the staff concerned were physically injured although all were shaken by the event.

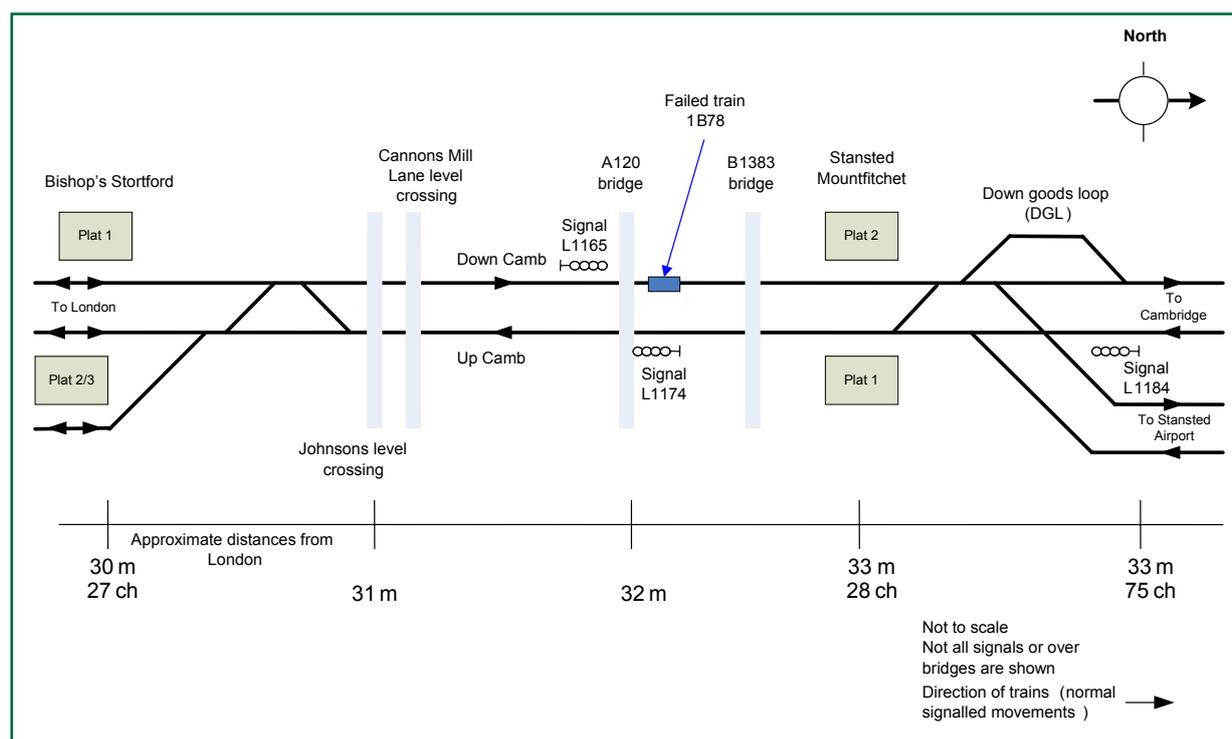


Figure 2: Track and signalling layout of area between Bishop's Stortford and Stansted Mountfitchet

The parties involved

- 18 The track and signalling are owned and maintained by Network Rail.
- 19 Both the failed train and the train involved in the near miss were operated by 'one' Railway.
- 20 The signaller was employed by Network Rail at London Liverpool Street *Integrated Electronic Control Centre* (IECC).

- 21 Both train drivers were employed by 'one' Railway and based at Cambridge depot.
- 22 Both fitters were employed by 'one' Railway and based at Ilford depot.

Location

- 23 Bishop's Stortford and Stansted Mountfitchet stations are on the main line route that runs between London Liverpool Street, Stansted Airport and Cambridge.
- 24 The incident occurred approximately mid-way between Bishop's Stortford and Stansted Mountfitchet stations. See Figures 2 and 3.
- 25 At this point, the railway consists of up and down lines (known as the Cambridge lines). The two lines are the normal six feet (1.8 m) apart.
- 26 The position of the failed train in relation to the curvature of the line is shown in Figure 3.

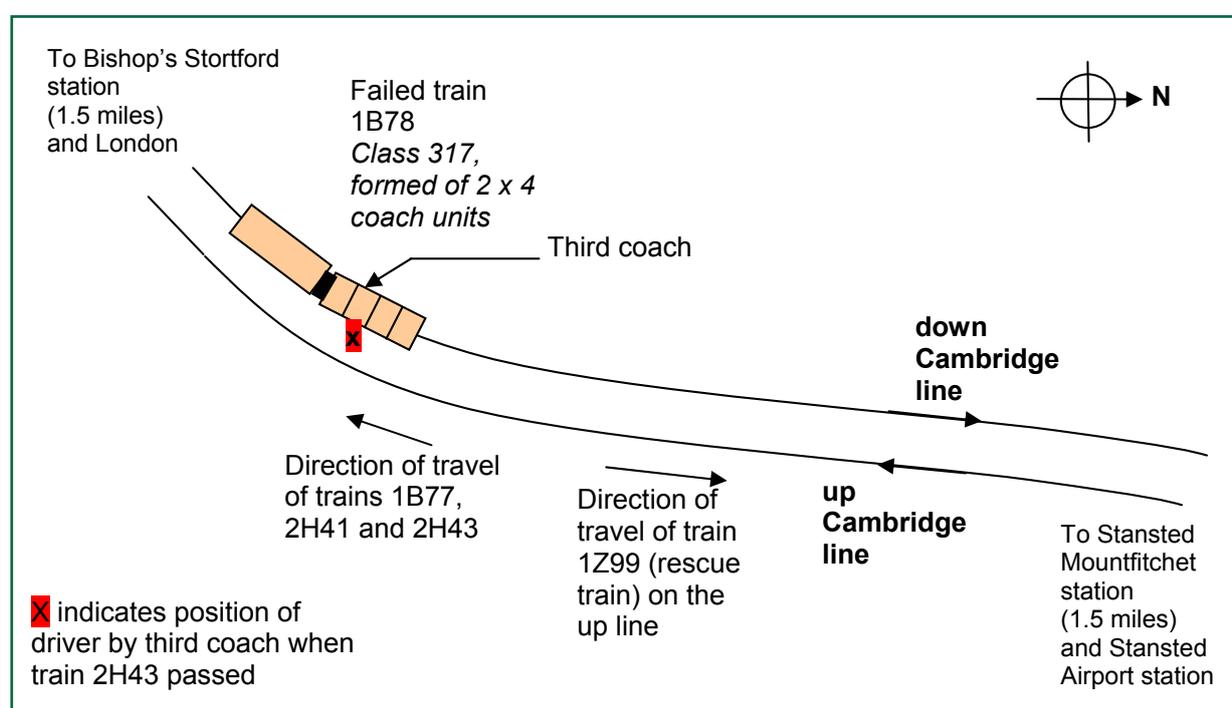


Figure 3: Plan of failed train 1B78 on the down Cambridge line

- 27 Just north of the platforms at Stansted Mountfitchet is a junction which allows trains to be routed into a down goods loop. Further north of the goods loop is the junction to Stansted airport.
- 28 The permitted speed on both the up and down lines between Bishop's Stortford and Stansted Mountfitchet is 70 mph (112 km/h).

External circumstances

- 29 At the time of the incident the weather was dry and visibility was good, although daylight was beginning to fade. The weather had no effect on the incident.

Trains involved

- 30 Train 1B78 consisted of two four coach class 317 electric multiple units coupled together: 317 887 (the failed unit) and 317 708.
- 31 Train 2H43 consisted of a single four coach class 317 electric multiple unit (317 654).

Sequence of events

- 32 The sequence of events before, during and after the incident has been reconstructed using information from the forward facing Closed Circuit Television (CCTV) fitted to the trains, IECC voice tapes and witness evidence, and is detailed in Appendix C. The following paragraphs summarise the key events.
- 33 At 15:04:02 hrs on 20 January 2008, the driver of train 1B78 used the cab radio to call the signaller at Harlow workstation at Liverpool Street IECC, and stated that his train had come to a stop due to an automatic brake application caused by a loss of air pressure. The driver then used a mobile telephone to contact 'one' Railway's Fleet Help Desk, and explained the problem. He was told that he should examine the train to try to identify the source of the air leak. He got down from his train on the cess side and identified that air was leaking from the third coach, but could not see exactly where the leak was. The driver returned to the cab and at 15:11 hrs he asked the signaller to block the up line to trains so that he could go into the six-foot to examine that side of his train. The signaller blocked the up line and confirmed to the driver that he had done so.
- 34 The driver examined the six-foot side of the train and found a pipe which appeared to have been damaged, from which air was escaping. He reported this to the Fleet Help Desk and was told that fitters would be sent to help and that he should wait for them. At 15:23:58 hrs, the driver called the signaller to report he had now finished inspecting his train from the six-foot and was awaiting the fitters. The signaller confirmed that the up line was now open for the passage of trains.
- 35 Two 'one' railway mobile fitters (known as 'trouble fitters' because their work involves in-service repairs to defective trains), based at Ilford depot, had been travelling by road to Bishops Stortford to carry out repairs on trains in the sidings there. The Service Delivery Manager at Ilford instructed them to divert to 1B78 on the main line. At 15:32:50 hrs, the 'one' fitters arrived at Bishop's Stortford station. They had a conversation with the driver of a train standing in platform one, who told them that trains on the down line were at a standstill because of a failure, that 1B78 was the failed train and that it was standing just out of sight around the bend to the north. Following this they walked off platform one towards the failed train. They did not make any contact with the signaller. In fact, 1B78 was about one and a half miles away from Bishops Stortford station (Figure 2).
- 36 As the fitters walked north towards the failed train, two other trains passed them going south, both travelling at about 10 mph. The first of these stopped and the driver told the fitters that he had removed the remains of a wooden pallet and a skateboard from the railway, and that this was probably what had caused the damage to the train they were walking towards.

- 37 Trains from London were being terminated at Bishop's Stortford and sent back south while the down line was blocked by 1B78. Shortly before 16:00 hrs Network Rail agreed with 'one' railway that one of these trains would be used as a rescue train. After detraining passengers at Bishops Stortford it would run north on the up line to Stansted Mountfitchet, then reverse via the down goods loop and run south on the down line to attach to the front of the failed train. The rescue train was given the reporting number 1Z99.
- 38 At approximately 15:59 hrs, the fitters arrived at the failed train. The driver of train 1B78 descended from his cab, and informed the fitters that there was no block on the up line. The driver asked the fitters if they required a block on the up line and they stated that no block was required at this time. At 16:00:30 hrs, the driver of train 1B78 called the signaller to say that the fitters had arrived at his train and were 'lineside'. During the conversation the signaller confirmed that he would instruct the driver of train 1Z99 (the rescue train), which had been sent to tow train 1B78 clear, to pass train 1B78 cautiously at slow speed because people might be working on it. The driver of train 1B78 then got down from the cab again and informed the fitters that a rescue train was coming past *wrong road*. The fitters then went immediately under the third coach to investigate the fault.
- 39 At 16:02:20 hrs, the signaller used the radio system to call the driver of train 2H43, which was waiting at signal L1184 (which was one mile north of Stansted Mountfitchet station on the up line). He explained the rescue train's movements, and instructed the driver to wait for the signal to change aspect. See Figure 2.
- 40 The rescue train passed the location of the failed train heading north at 16:08 hrs, stopping alongside the failed train for a brief conversation between the two drivers.
- 41 At 16:09 hrs, the driver of train 1B78 climbed down from his cab into the six-foot and walked back towards the fitters at the third coach. At that moment, one of the fitters was underneath the train between the third and fourth coach and the other fitter was sitting on the down line six-foot rail sleeper ends, underneath the failed train and facing towards it.
- 42 At 16:18:16 hrs, after the rescue train had entered the down goods loop, the signaller set the route from L1184 through to Bishop's Stortford on the up line. Signal L1184 then changed from red to yellow and then to a green aspect. At 16:18:26 hrs, train 2H43 moved forward and passed through Stansted Mountfitchet and accelerated to line speed.
- 43 At 16:20:47, the driver of train 2H43 saw the driver of train 1B78 standing in the six-foot, by the third coach of his failed train, and another person underneath the failed train. Train 2H43 was now travelling at 70 mph (112 km/h). The driver of train 2H43 applied his emergency brake and sounded his horn and the train passed the driver of train 1B78, who lay down on top of the ballast to avoid being struck. See Figure 4.
- 44 At approximately 16:22 hrs, both drivers reported the near miss to the signaller.

Consequences of the incident

- 45 No one was injured as a consequence of the incident although both drivers and both fitters were shaken by the event.
- 46 After the incident, in accordance with Network Rail's normal practice following an allegation of an operational irregularity, the signaller was removed from Harlow workstation until the shift signalling manager had listened to the voice recordings covering the period of the incident and assessed his suitability to return to work.



Figure 4: View from the driving cab of 2H43 at the time of the incident

- 47 The shift signalling manager listened to the voice recordings immediately, and decided that the signaller was not to be 'for cause' alcohol and drug screened, because he felt that the actions of the signaller had no bearing on the near miss. The signaller wrote out a report on the incident and left duty at 18:00 hrs.
- 48 When the driver of train 1B78 arrived back at Bishop's Stortford station, having driven his train to Stansted Airport, and another train back, he was relieved and 'for cause' drug and alcohol screened, by contractors to 'one' Railway, at about 20:00 hrs. The results were negative.
- 49 Railway Group Standard GE/RT8070 issue 1 'Drugs and Alcohol', which was current at the time of the incident, required that 'for cause' testing shall be initiated when there were '...reasonable grounds to suspect that safety has been compromised through the consumption of drugs or alcohol', which was not the case in this incident, and also that staff whose actions or omissions may have contributed to an accident which meets the criteria for investigation by a Formal Inquiry to be tested for drugs and alcohol, and not to be permitted to resume work until the results of the tests are known to be negative. This incident did not meet those criteria. In addition, Formal Inquiries are no longer held (Railway Group Standard GO/RT3473, in force at the time of the incident and since superseded by GO/RT3119, describes the industry's investigation process). GE/RT8070 has since been updated to reflect this change (paragraph 143).
- 50 When both fitters returned to Bishop's Stortford station, via Stansted Airport, they were 'for cause' drug and alcohol screened by 'one' Railway's contractors. The results for both were negative.

The Investigation

Investigation process

- 51 The incident was not notified to the RAIB. This was an incident which, in slightly different circumstances (ie if the driver of 1B78 had not taken evasive action) might have led to a death or serious injury. It was reportable to RAIB under schedule 1(9) of the Railways (Accident Investigation and Reporting) Regulations 2005, but was not identified as such by Network Rail or 'one' Railway staff on duty at the time.
- 52 The RAIB initiated a preliminary examination of the incident after reading of the incident in Network Rail's National Operations Centre log on the following day, and subsequently commenced a full investigation.

Sources of evidence

- 53 The main sources of evidence used in this investigation were:
- witness interviews;
 - discussions with managers, supervisors and trainers;
 - voice recordings from London Liverpool Street IECC;
 - CCTV images from the forward facing camera on train 2H43; and
 - observations made during cab rides between Bishop's Stortford and Stansted Mountfitchet.

Additional Information

Background

Rules applicable

54 The railway Rule Book (Railway Group Standard GE/RT8000) is made up of a number of modules. Each module is applicable to a certain area of railway activity and extracts or summaries from the modules relevant to this incident as they were in February 2008 are included in the following paragraphs.

Module G1 – General safety responsibilities

55 Module G1 includes instructions to all staff in general safety responsibilities including how to send and receive messages involving safety.

56 Section 11.1 states:

‘Messages that concern the safe operation of the railway must always be properly understood. You must carry out these instructions when giving or receiving such messages.’

57 Section 11.2 states:

‘One person must always take lead responsibility. The person with lead responsibility must:

- read back the message to check understanding, or
- prompt the other to read back the message to check understanding
- correct errors in the read back until the message is fully understood
- make sure numbers, codes or time are stated and repeated back in full (for example, signal and point identifiers, telephone numbers or train descriptions)
- not allow any movement, authority or give permission until absolutely certain a clear understanding has been reached.’

58 Section 11.2 also states that a signaller has lead responsibility with anyone he or she is communicating with (except an electrical control operator).

Module TS1 – Signalling general instructions

59 Module TS1 includes instructions to signallers when managing incidents.

60 Section 1.3.1 states:

‘You must...make an appropriate entry in the train register of any unusual incident and other items shown in the Rule Book and train signalling regulations, and sign this entry and record the time.’

61 Section 13.1.1 states:

‘You must carry out this regulation when:

- personnel need to work on the outside of a train stopped on a running line because of failure or other incident
- train crew need to walk alongside their train and ask you to block a line for their personal safety
- a *designated person* (DP) needs to walk with fitters to a train stopped on a running line because of failure or other incident.’

62 Section 13.1.2 states:

‘You must ask the person requesting protection the exact location and line on which trains are to be stopped, or remain stopped.

Unless you have already stopped trains on the line concerned, you must agree with the person requesting protection a suitable time for this to be done.’

You must be sure you understand the exact location and the line concerned.
You must not allow the activity to start if there is any doubt.

63 Section 13.1.3.2 states:

‘When the line to be blocked is clear of trains and signal protection has been provided, you must make an entry in the Train Register as follows:

‘Passage of trains stopped online between signal No.....
and signal No.....’

You must read this entry to the person requesting trains to be stopped and if that person confirms the entry is correct, you must complete the Train Register entry with the following:

‘.....(name) of(employer) confirms details
at(time)’.

64 Section 13.1.3.3 states:

‘You must:

- give an assurance to the person concerned that normal operation will not start again until that person tells you that it is safe to do so
- remind that person about any other lines that remain open for normal working
- give that person permission for the activity to start.’

65 Section 13.1.4.1 states:

‘When the person who asked for the line to be blocked confirms that the activity is completed and signal protection is no longer required, you must make an entry in the Train Register as follows:

‘Confirmation received from(name) of
(employer) that normal running of trains may resume on line
between signal No.....and signal No..... at (time)’.

Module TW1 – Preparation and movement of trains: General

66 This module is applicable to train drivers. Section 15 details those instructions relevant to the driver of train 1B78.

67 Section 15.2 states:

‘You must ask the signaller to stop trains on any adjacent line which could put your personal safety in danger if:

- you need to work on the outside of your train after your train has stopped on a running line because of a failure or other exceptional incident; and
- you must do this before you start work.’

68 Section 15.2 continues:

‘You must also ask the signaller to stop trains on any adjacent line if you have to walk alongside your train and this could put your personal safety in danger. You may have to wait for a suitable time for the passage of trains to be stopped. To arrange for trains to be stopped, you must:

- ask the signaller to stop the passage of trains on the lines concerned
- get an assurance from the signaller that this has been done
- reach a clear understanding about which lines have been blocked
- reach a clear understanding about which lines remain open to traffic
- ask the signaller to read back to you the entry made in the Train Register.’

69 Section 15.2 also states:

‘You must not start work or start walking until you are satisfied that trains will not pass on any adjacent line which could put your personal safety in danger. If you are satisfied that the Train Register entry is correct, you must confirm you understand the arrangements and repeat to the signaller:

- your name and your employer
- the location where you are speaking from
- the time.’

70 Section 15.2 concludes by stating:

‘When you have finished work on the outside of the train or finished walking alongside your train, you must tell the signaller that the normal passage of trains can be resumed.’

Module T10 – Protecting personnel when working on rail vehicles and in sidings

71 This module is applicable to persons carrying out the duties of a DP, a person working on a rail vehicle, or a rolling stock technician (or fitter).

72 Section 7 details the steps to be taken when two or more people are required to walk on or near the line to reach a failed train. These include:

- before walking to the failed train:
 - contacting the signaller
 - when the signaller has stopped the passage of trains, asking the signaller to read back his entry made in the Train Register; and
- when arrived at the failed train:
 - informing the signaller
 - arranging for trains to be stopped if necessary.

- 73 Section 8 details the steps to be taken when working on the side of vehicles that are less than 3 metres from the adjacent running line. These include:
- if the vehicle cannot be moved, the appointment of a *controller of site safety* (COSS); and
 - if a COSS is not available:
 - contacting the signaller and reaching a clear understanding as to which lines have been blocked
 - not starting work until the signaller has confirmed that the passage of trains has been stopped.

The staff involved and their actions, competence and fitness

Signaller

- 74 The signaller had eleven years experience and had worked at Liverpool Street IECC for just over four years. He was operating Harlow IECC *workstation* which controlled an area including Bishop's Stortford and Stansted Mountfitchet.
- 75 The signaller had been trained by his employer to undertake his duties and had been assessed as competent to operate the Harlow IECC workstation.
- 76 On 16 March 2007 the signaller had been issued with certificates of competency, following an examination to confirm his understanding of the applicable rules. The certificates covered Modules TS1, T10 and G1.11, the operation of signalling, level crossing or other operating equipment.
- 77 The signaller had no disciplinary or performance issues relevant to this incident.
- 78 His shift pattern in the week before the incident was:
- Sunday 13 January – day off
 - Monday 14 January – day off
 - Tuesday 15 January – 18:00 hrs to 06:00 hrs
 - Wednesday 16 January – 18:00 hrs to 06:00 hrs
 - Thursday 17 January – 22:00 hrs to 06:00 hrs
 - Friday 18 January – booked off for change from night to day shifts
 - Saturday 19 January – 06:00 hrs to 14:00 hrs
- 79 The signaller began his duty on 20 January 2008 at 06:00 hrs and was to have worked a twelve hour shift.

80 The conversation at 16:00:30 hrs between the signaller and the driver of train 1B78 (paragraph 36) was recorded at Liverpool Street IECC, and is reproduced below.

Signaller: *“Hello one bravo seven eight at lima one one six seven, this is Harlow workstation signaller*

1B78: *Hello mate, this is one bravo seven eight. Fitters have arrived mate*

Signaller: *Have they, ok, right, well your rescue train is just leaving Stortford now*

1B78: *Right cos they’re lineside at the moment so whether you want to caution him past there mate*

Signaller: *Right I’ll have a word with him and let him know that they are lineside and um obviously go at caution. He thinks he’s gonna pick em up anyway*

1B78: *Oh right*

Signaller: *Alright, so I’ll have a word*

1B78: *Alright mate, cheers*

Signaller: *Thank you drive*

1B78: *Cheers, out*

Signaller: *Out”*

81 This conversation between the driver of train 1B78 and the signaller is representative in style of all the conversations that they had before the near miss occurred, in particular the misuse of terms such as ‘lineside’ which have a specific meaning in the Rule Book, and the failure to repeat the message back to confirm that it has been understood .

82 The signaller was not made aware that the driver had re-entered the six-foot area after the passage of the rescue train.

Train drivers

Driver of train 1B78

83 The driver of train 1B78 had been a fully qualified driver for one year, and had been trained and assessed as competent by his employer. He had been trained and assessed as competent in *Personal Track Safety* (PTS) rules. This PTS training had been undertaken by ‘one’ Railway.

84 He had last completed his competence assessment for rules (which included Modules TW1 and G1.11) on 18 April 2007 and had been accompanied in the driving cab by his driver manager on 16 January 2008 as part of his ongoing assessment of competence, following which he was considered to be performing satisfactorily. He had been involved in no previous incidents.

85 The driver’s shift pattern in the week before the incident was:

- Sunday 13 January – rostered off
- Monday 14 January – rostered off
- Tuesday 15 January – rostered off
- Wednesday 16 January – 06:01 hrs to 13:53 hrs
- Thursday 17 January – 06:06 hrs to 14:30 hrs

- Friday 18 January – 06:26 hrs to 15:19 hrs
- Saturday 19 January – 07:31 hrs to 15:31 hrs

86 The driver began his duty at 12:17 hrs on 20 January and travelled from Cambridge depot to London Liverpool Street as a passenger to enable him to drive train 1B78, the 14:25 hrs from London Liverpool Street to Stansted Airport.

Driver of train 2H43

87 Train 2H43 was being driven at 70 mph (112 km/h), the maximum permitted speed on the up line, at the time of the near miss.

88 As soon as the driver of train 2H43 saw the driver of train 1B78 in the six-foot, he sounded his horn twice and applied the emergency brake. As soon as his train had come to a complete stop, he contacted the signaller via his cab radio to report the near miss.

89 There is no evidence that the actions of the driver of train 2H43 caused or contributed to the incident.

The fitters

90 The two fitters (referred to as fitter A and fitter B) had the following experience:

- fitter A: four years experience as a ‘trouble fitter’. He was the more senior of the two and was also the DP; and
- fitter B: two years experience as a fitter.

91 Both fitters were trained to work on rail vehicles outside depots and had been assessed as competent. Fitter A had been trained and assessed as competent in *personal track safety* (PTS) rules on 14 March 2006. This PTS training had been undertaken by ‘one’ Railway. He had also been trained to act as a DP in accordance with module T10 of the Rule Book and assessed as competent on 11 October 2006. His PTS and Designated Person certificates were current.

92 Fitter B had also been trained and assessed as competent in PTS rules on 8 November 2006. This PTS training had been undertaken by ‘one’ Railway. His PTS certificate was current.

Previous occurrences of a similar character

93 A similar incident occurred at Bletchley station on 2 January 2006. A train had stopped on the down fast line at the station to be examined by its driver and a Mobile Operations Manager. The signaller did not block the up fast line as requested and a near miss occurred between the driver, the Mobile Operations Manager (who were both walking in the six-foot alongside the stopped train) and a train travelling on the up fast at 105 mph.

94 This incident was caused by poor quality communications. The investigation into this near miss was jointly undertaken by Network Rail and Virgin Trains.

Analysis

Identification of the immediate cause

95 The immediate cause of the incident was that the driver of train 1B78 had not made arrangements for his own protection before going on the line when train 2H43 passed him at 70 mph (112 km/h).

Actions of the staff involved

The driver of 1B78

- 96 Although the driver of the failed train requested, and was granted, a block of the up line for his initial inspection of the third coach from the six-foot (in accordance with the Rule Book module TW1 section 15), the driver neither informed the signaller nor requested a blockage of the line before getting out of his cab on three further occasions that afternoon.
- 97 Before the near miss occurred, the driver had gone in the six-foot (without informing the signaller) to talk to the fitters at the third coach. Although the driver had spoken to the signaller on a previous occasion he had requested only that the rescue train be cautioned past, '... as the fitters are lineside'. The fact that the driver did not inform the signaller or request a blockage of the up line before getting out of his cab was a causal factor in the incident.
- 98 Before the fitters arrived, the driver of train 1B78 had seen two trains pass him on the up line. Both of these had been travelling at reduced speed. The slow speed of these two trains, combined with the rescue train travelling at extreme caution, influenced the driver into thinking that all trains were being cautioned past him. The driver's observation of three trains passing at slow speed and his subsequent belief that all trains were being cautioned was a probable causal factor.
- 99 The driver of train 1B78 also believed he had reached a clear understanding with the signaller on where exactly the fitters were and how they should be protected. Although the fitters did not speak to the signaller themselves, the driver (who acted as the third party in the communications with the signaller) assumed that the signaller understood his message. In fact, the rules do not permit drivers to arrange protection for anyone other than themselves, and the fitter who was acting as DP should have arranged protection for himself and his colleague.
- 100 The content of the communications between the driver and the signaller was not sufficient to enable them to reach a clear understanding about the actions necessary to protect staff who needed to be on the six-foot side of train 1B78. Critically, the driver of train 1B78 (in his conversations with the signaller) did not make clear his wish that all trains should continue to be cautioned. Cautioning of trains in these circumstances was not in accordance with the rule book (modules T10 and TW1), which requires the adjacent line to be blocked if people are working on the outside of a train (paragraphs 67 and 73). This was a causal factor in the incident.

- 101 All communications were generally of a poor standard. In particular, communications between the driver and the signaller were not repeated back. This is discussed in paragraphs 80 to 82. The driver of train 1B78 had been driving for just over a year. He had not had any previous incidents or been involved in a near miss or a train failure on the running line before, so he had not previously been placed in a position where he might be responsible for the arrangements for protecting himself and other people on the track alongside a failed train. His lack of experience of degraded working and emergency situations was a contributory factor.
- 102 The potential for fatigue arising from the above work pattern has been assessed using the Health and Safety Executive (HSE) Fatigue and Risk Index Calculator (version 2.2) available from www.hse.gov.uk. The output from the Fatigue Index (FI) is a measure of the probability of high levels of sleepiness. This is expressed as a value between 0 and 100. An FI index of 20.7 corresponds to the average work shift and rest pattern, assuming typical values for the job type and breaks factor.
- 103 The driver's FI value has been calculated as 6.0 (paragraph 102). This value was based on his work shift and rest day pattern and indicates that the driver had not been exposed to a work pattern likely to cause abnormal fatigue. There is no evidence that the driver experienced fatigue that contributed to the incident.

Compliance with applicable rules

- 104 The driver of train 1B78 applied Rule Book Module TW1 when he first requested a blockage of the up line (paragraph 33) although he did not ask the signaller to read back the entry in the Train Register.
- 105 The driver did not comply with Module TW1 when he left his cab and went into the six-foot on subsequent occasions (paragraphs 41 and 98). In particular, he did not;
- ask the signaller to stop trains on the adjacent line;
 - get an assurance from the signaller that this had been done;
 - reach a clear understanding about which lines had been blocked;
 - ask the signaller to read back the entry in the Train Register; and
 - provide the information required in Section 15.2.

The signaller

- 106 The signaller blocked the up line when initially requested to by the driver of train 1B78 in accordance with the Rule Book module TS1 section 13.
- 107 Although the signaller had a further conversation with the driver of train 1B78 before the near miss (as reproduced in paragraph 80) which resulted in the further cautioning of the rescue train, the signaller was unaware that the driver subsequently left his cab and walked along the six-foot. That the signaller was not made aware that the driver had left his cab to go into the six-foot was a causal factor.
- 108 The signaller's FI value has been calculated as 20.6. This value was based on his work shift and rest day pattern and indicates that the signaller had not been exposed to a work pattern likely to cause abnormal fatigue. The RAIB has no evidence that fatigue of the signaller contributed to the incident.

Compliance with applicable rules

- 109 The signaller made no entry in the Train Register in respect of the incident. This is contrary to the Rule Book Module TS1 Section 1. In particular, the signaller made no entry in the Train Register (or in any other document) to record when the driver of train 1B78 initially requested a blockage of the up line at 15:11:19 hrs (contrary to the Rule Book Module TS1 Sections 1 and 13). The reasons for this are discussed further in paragraphs 124 to 128.
- 110 The Rule Book (module G1 section 11) required the signaller to lead the conversations he had with the driver of train 1B78, and in particular to check that messages were correctly understood (paragraphs 57 and 58). He did not do this, as shown in the conversation quoted in paragraph 80, where he responds to a suggestion from the driver about cautioning the rescue train, rather than instructing the driver to tell the fitters to contact him directly to make proper arrangements for their protection.

Communications between driver and signaller

- 111 The quality of the communications was sub-standard. In particular:
- the incorrect use of railway terminology, including the use of the word, ‘lineside’¹ when referring to persons being adjacent to the train;
 - there was no repeating of messages to confirm understanding;
 - the conversations initially began correctly but rapidly became informal;
 - the conversations were quick and the clarity of the messages was poor; and
 - the signaller did not take the lead (as required by the Rule Book Module G1 section 11.2).
- 112 The sub-standard communication between the driver of train 1B78 and the signaller was a contributory factor in this incident.
- 113 Since mid-2007, Network Rail has been leading Communication Review Groups (CRGs) across the country, where operational managers meet representatives of train operators to review recordings of signaller/driver conversations. A standardised scoring system is used and the communication performance of both signaller and driver is discussed. Post-meeting feedback is given to each individual. The results of the Anglia Route CRGs for the period up to July 2008 found that communications by Liverpool Street IECC signallers were significantly worse than the national benchmark, with 48% being scored ‘poor’ or ‘very poor’. There is no evidence of any specific action being taken to follow up these results, although the amount of monitoring being carried out in the Anglia Route has been increased. Communications involving ‘one’ and National Express East Anglia drivers were closer to the national benchmark, with 34% being ‘poor’ or ‘very poor’.
- 114 In considering appropriate means of improving safety for drivers in this situation, the RAIB has discussed possible changes to the existing arrangements with stakeholders. It is possible that this incident, and the incident at Bletchley (paragraph 93), could have been prevented if both parties had recorded the details of the protection arrangements on a suitable form. Over a number of years, forms have been found to facilitate quality communications, particularly in the case of track workers making arrangements with signallers for their protection. However, drivers have to go onto the track only rarely, and so they would not be likely to become practised in the use of forms. For this reason, it is more likely that improvements in the quality of communications would be beneficial to safety.

¹ ‘Lineside’ is defined in the Rule Book as, ‘You are on the lineside if you are within the railway boundary but greater than 3 metres away from the nearest running rail and you can be seen by the driver of an approaching train.’

The fitters

- 115 The fitters were unaware of the exact location of the failed train. They undertake the majority of their work either at depots or in sidings away from the running lines. Outside of the depot environment, it is more common for them to attend to problems on trains that are at platforms and they estimated that they walk to or attend a failed train that has stopped between stations less than once a year. They were lacking information that could have assisted them in locating the failed train.
- 116 The fitters were not issued with, and the company van did not have, a *Sectional Appendix*, a Network Rail *Hazard Directory* or any other source of geographical information on the railway infrastructure. Better information may have helped them to ascertain the best access point to reach the failed train and to identify any potential route hazards.
- 117 The fitters had spoken to the driver of a train standing in Bishop's Stortford station when they arrived there. They were told that the train they were to repair was some distance to the north, and trains on the down line were at a standstill until the failed train could be moved. On the basis of this information they decided to walk along the cess to reach the failed train, but did not make any arrangements for their own protection.
- 118 Although the driver of train 1B78 initially advised them that there was no block on the up line he subsequently told them that the rescue train was to be cautioned. From this time onwards the fitters assumed that all trains were being cautioned. The action of the driver in walking in the six-foot was further evidence to them that the up line was under some type of protection.
- 119 The fitters initially told the driver that they would not need the up line blocked. However, they subsequently worked on the train from the six-foot side, and should therefore have arranged for the adjacent line to be blocked to trains.

Compliance with applicable rules

- 120 Fitter A, who was acting as the Designated Person, did not contact the signaller before walking towards the failed train (paragraph 35) or when he and his colleague arrived at the failed train (paragraph 36). This was contrary to the requirements of the Rule Book Module T10, which specifically requires people working on vehicles on running lines to take action to put protection arrangements in place.
- 121 If the fitters had complied with the requirements of the Rule Book module T10, the up line would have been blocked to trains while they were working and the incident would not have occurred. This was a causal factor in the incident.

Competence management

- 122 The arrangements that 'one' railway had in place for training and assessing the competence of fitter A to act as a DP are described in paragraph 91. These arrangements did not take into account the number of times the fitter actually acted as a DP in between the two-yearly refresher training sessions. The company had no record of the occasions on which their staff used the DP process, or whether they were using it to work on trains in depots, sidings or on a running line.
- 123 The absence of such records meant that it was not possible for 'one' railway or its successor company to know how often its fitters were using their competence as DPs. The frequency and nature of the refresher training was not based on risk, and could not take into account the experience, or lack of it, that the person might have acquired since they were last trained. Fitter A worked on trains on running lines less than once a year, and so his experience of acting as a DP and working with a signaller to put protection in place was extremely limited. This was a contributory factor in the accident.

Observations

Documents used in the IECC

- 124 At London Liverpool Street IECC, no entry was made in the Train Register as required by Rule Book Module TS1, section 13, when the driver of train 1B78 initially requested a blockage of the up line or at any other stage during the incident.
- 125 The Train Register (an example is shown at Appendix D) is laid out for use in signal boxes using Absolute Block signalling. It is not designed for use in IECCs and the printed format is neither useful nor relevant to the signallers. This does not encourage the use of the document for recording requests and arrangements for line blockages. The Network Rail Occurrence Book (shown at Appendix E) provides a more suitable format for this purpose.
- 126 Signallers at the IECC mainly use the Train Register for signing on and off duty.
- 127 The operational management at Liverpool Street IECC do not have a written policy within the IECC about the use of the Train Register, *Occurrence Book* or *reminder sheets*.
- 128 The IECC practice was not to record blockages of the line in the Train Register except under Rule Book module T3 (engineering work in a *possession*). This absence of a procedure for making written records is likely to have encouraged short informal conversations rather than the careful exchange of safety critical information.

Rescue of the failed train

- 129 It is likely that the failed train could have been rescued from the rear (contrary to the advice given to the driver by 'one' Railway helpdesk) and 'pushed' forward into the down goods loop at Stansted Mountfitchet. Had this been understood, this would have speeded up the recovery of the failed train and avoided the need for a wrong-direction move.

Drug and alcohol testing

- 130 The driver of 1B78 and the fitters were not tested for drugs and alcohol until several hours after the incident. Although the incident did not meet the railway industry's criteria for staff involved in it to be tested, it would have been good practice for them to have been relieved of duty and tested for drugs and alcohol as soon as possible after the incident.
- 131 The signaller was not tested for drugs and alcohol. The shift signalling manager decided that this was not necessary after listening to the voice recordings of the phone conversations that took place before the incident.
- 132 The manager's decision that drug and alcohol testing was not necessary was made in the context of pressure caused by a lack of resources following an earlier incident the same day in the IECC. The RAIB believes that the manager should have detected the poor quality of the communications shown by the recordings, and taken this into account when considering whether the signaller's actions had contributed to the incident.

Conclusions

Immediate cause

133 The immediate cause of the incident was that the driver of train 1B78 had not made arrangements for his own protection before going on the line when train 2H43 passed by him at 70 mph (112 km/h).

Causal factors

134 Causal factors were:

- the driver of train 1B78 did not inform the signaller or request a blockage of the up line before getting out of his cab (paragraph 97);
- the signaller was unaware that the driver had left his cab and was in the six-foot. He therefore did not take any action to block the up line (paragraph 107);
- the driver of train 1B78 assumed that all trains on the up line were being cautioned past his failed train (paragraph 98); and
- The fitters did not make arrangements for their own protection as required by the Rule Book (paragraph 121, Recommendation 3).

Contributory factors

135 The following factors were contributory:

- the lack of experience of the driver of train 1B78 in degraded working and emergency situations (paragraph 101);
- the driver of train 1B78 and the signaller did not reach a clear understanding on the arrangements in place for the protection of staff, owing to a poor standard of communication (paragraphs 101, 112 and 114, Recommendations 1 and 2); and
- the competence management arrangements for the fitter acting as designated person took no account of the limited experience which he had actually had of carrying out the role (paragraph 123, Recommendation 3).

Additional observations

136 It was not the practice in Liverpool Street IECC to provide written records of the arrangements that had been agreed between the driver and the signaller (paragraph 128, Recommendation 4).

137 The fitters were unaware of the exact location of the failed train. (paragraph 116, Recommendation 5).

Actions reported as already taken or in progress relevant to this report

- 138 'one' Railway compiled a presentation to both its depot staff at Ilford and Norwich who undertake Designated Person duties. This described the near miss, and actions to be taken when staff are obliged to attend a failed train.
- 139 'one' Railway has also written to, and briefed, all staff, including train drivers, using an Operational Bulletin dated January 2008 (Ref: no. OB/08/01). This describes the near miss and reiterates the actions to be taken by drivers and other staff undertaking Designated Person duties.
- 140 Network Rail Anglia Route has produced a 'Report of a Preliminary Investigation into near miss with 2H43 and train personnel', SMIS ref: QSE/2008/JAN723 version 1.3. The report details four local actions:
- the signaller to be briefed on safety critical voice communication protocols and the role of the signaller during a train failure and the need to take lead responsibility;
 - the driver of 1B78 to be re-briefed on the importance of making assumptions about protection arrangements/ cautioning of trains;
 - the fitters need to be re-briefed on the importance of liaising directly with the signaller to agree protection arrangements and the requirement of T10 with regard to the duties of the Designated Person; and
 - the Local Operations Manager needs to re-brief the Signallers on Rule Book Module T10 specifically on protection arrangements for Designated Person's walking and working.'
- 141 National Express East Anglia has produced a report 'Investigation into the circumstances of the Near Miss involving traincrew, country side of Cannons Mill Lane LC involving trains 1B78 and 2H43', dated 25 March 2008 ref: 25.03.08 Version 3, final. The report details three recommendations:
- 'better co-operation post incident between fleet and operations department (the fitters did not attend the 72 hr review);
 - attendance of involved staff; and
 - the driver of 1B78 to attend the current in-house communication course as soon as possible and to be specifically monitored for communication protocol during Formal Driving Assessments.'
- 142 Network Rail has an ongoing programme to launch a specific Communication Competence programme during 2009, with the intention of improving the competence of all staff who have to make safety critical communications.
- 143 RSSB has revised GE/RT8070, and issued a new Guidance Note (GE/GN8570 'Guidance on the management of drugs and alcohol') which reflects the current arrangements for accident investigation.

Recommendations

144 The following safety recommendations are made²:

Recommendations to address causal and contributory factors

- 1 Network Rail and London Eastern Railway (National Express East Anglia) should carry out an exercise to improve the quality of safety critical communications between drivers and signallers. This should be monitored by the Communications Review Group system (paragraph 134).
- 2 Network Rail, with the train operating companies, should evaluate the quality of communications between drivers and signallers when drivers have to go onto the track. This assessment should include the adequacy of the arrangements, and Network Rail should make any necessary improvements to the process. The Communications Review Group system may provide an appropriate means of gathering data for use in this evaluation (paragraph 135).
- 3 London Eastern Railway (National Express East Anglia) should review the competence management arrangements for fitters acting as designated persons against recognised good practice (such as the ORR Railway Safety Publication 1 'Developing and Maintaining Staff Competence'), so that the occasions on which this qualification is used are recorded and used to inform the choice of recertification interval and nature of refresher training (paragraph 135).

Recommendations to address other matters observed during the investigation

- 4 Network Rail should devise and implement a more suitable method for recording occurrences at signal boxes and signalling centres which are not normally required to record the passage of each train (paragraph 136).
- 5 London Eastern Railway (National Express East Anglia) should introduce arrangements to provide all staff undertaking Designated Person duties with suitable and sufficient information to enable them to identify and plan safe access to locations where they may have work (paragraph 137).

² Those identified in the recommendations, have a general and ongoing obligation to comply with health and safety legislation and need to take these recommendations into account in ensuring the safety of their employees and others.

Additionally, for the purposes of regulation 12(1) of the Railways (Accident Investigation and Reporting) Regulations 2005, these recommendations are addressed to ORR (HMRI) to enable it to carry out its duties under regulation 12(2) to:

- (a) ensure that recommendations are duly considered and where appropriate acted upon; and
- (b) report back to RAIB details of any implementation measures, or the reasons why no implementation measures are being taken.

Copies of both the regulations and the accompanying guidance notes (paragraphs 167 to 171) can be found on RAIB's web site at www.RAIB.gov.uk.

Appendices

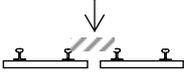
Appendix A - Glossary of abbreviations and acronyms

COSS	Controller Of Site Safety
CCTV	Closed Circuit Television
CRG	Communications Review Group
DP	Designated Person
FI	Fatigue Index
HSE	Health and Safety Executive
IECC	Integrated Electronic Control Centre
PTS	Personal Track Safety
RAIB	Rail Accident Investigation Branch
RSSB	Railway Safety & Standards Board

Appendix B - Glossary of terms

All definitions marked with an asterisk, thus (*), have been taken from Ellis' British Railway Engineering Encyclopaedia © Iain Ellis. www.iainellis.com

Cess	The part of the track bed outside the ballast shoulder that is deliberately maintained lower than the sleeper bottom to aid drainage.*	
Controller of site safety	A person holding a safety critical qualification demonstrating the holder's competency to arrange a safe system of work.*	
Designated person	A person nominated to undertake certain duties as detailed in the Rule Book. For example, in the Rule Book Module T10, a Designated Person is a person who is responsible for arranging protection as shown in the module and can be defined as a DP in local instructions.	
Down line	Lines normally used by trains in the direction of Cambridge and Stansted airport (northbound).	
Electric multiple unit	A train consisting of one or more vehicles (semi-permanently coupled together) with a driving cab at both ends, whose motive power is electricity.*	
'For cause' screened	All those directly involved with an accident or incident should be 'for cause' screened for the presence of alcohol or drugs in line with either Railway Group Standard GE/RT/8070 or current industry good practice.	
Hazard directory	A database maintained by Network Rail (NR) which contains details of the health, safety and environmental hazards known to exist on Network Rail Controlled Infrastructure.*	
Integrated Electronic Control Centre (IECC)	A type of Signal Box that controls the points and signals for a whole route or a large geographical area by electronic means. The Signallers' interface is normally a Visual Display Unit, keyboard and pointing device. Automatic Route Setting is a feature of such installations.*	
Occurrence book	A book used by signallers to record any occurrences that may have happened during their shift.	
Personal track safety (PTS)	The minimum training and certification required before being allowed on or near the line. The course introduces basic concepts of safety and emergency action.*	
Possession	A period of time during which one or more tracks are blocked to trains to permit work to be safely carried out on or near the line.*	
Reminder sheets	These sheets are used by signallers to record (and as a reminder of) when certain sidings or lines are blocked by engineering trains.	
Sectional appendix	The publication produced by each Network Rail Route containing key operational data such as details of Running Lines, train speeds and directions. Location information is given in miles and chains.*	

Six-foot	The term for the space between two adjacent tracks, irrespective of the distance involved.*	
Solebar	The longitudinal structural members forming the spine of a rail vehicle, located below the car body. The solebar is supported by the bogies or other running gear.*	
Train Register	The book in which a signaller records movements of trains, visitors and completion of other regular duties. They are also used to record details of disconnections, possessions and other irregularities.*	
Up line	Lines normally used by trains in the direction of London (southbound).	
Workstation (IECC)	Part of the IECC from which a signaller would operate the area he was controlling. The workstation would comprise of several VDUs, a keyboard, a pointing device and a voice communication system(s).	
Wrong road	A rail vehicle or train movement made in the wrong direction, i.e. a direction opposite to that which trains normally run on the line concerned, not controlled by signals.*	

Appendix C - Detailed sequence of events of near miss

<i>TIME</i> <i>hrs:mins:secs</i>	<i>Event</i>
15:04:02	The driver of train 1B78 called the signaller at Harlow workstation at Liverpool IECC and stated he had come to a stop due to an automatic brake application. The driver also spoke to a member of staff at 'one' Trains fleet helpdesk who advised him to inspect his train. The driver got down from his train on the cess side and identified an air leak at the third coach back, the PMOS coach.
15:11:19	The driver of train 1B78 requested a blockage of the line from the signaller (so that he could go onto the six-foot side of the train). The signaller blocked the up Cambridge line and confirmed to the driver that he had done so.
15:23:58	The driver of train 1B78 called the signaller. He had now finished inspecting his train from the six-foot and was awaiting the fitters. The signaller confirmed that the up Cambridge line was now open. The driver advised that if he required assistance, it would have to come from the front of his train.
15:26:14	The signaller instructed the driver of train 1B77 (travelling on the up Cambridge line) to slow down and look for obstructions on the down line (the conversation occurred as train 1B77 was passing train 1B78). The driver advised that at the next bridge there was a pallet on the down line. The signaller requested the driver to stop and remove the obstruction.
15:32:50	The driver of train 1B80 (which was stationary at platform 1 at Bishop's Stortford) called the signaller and stated that "one" fitters were leaving platform 1. The fitters had not made any contact with the signaller.
15:36:51	The driver of train 1B77 confirmed that the line was now clear (as far as Bishop's Stortford) and had passed two fitters walking towards train 1B78.
15:37:26	The signaller called the driver of train 2H41 and reported that the down line was now clear and to obey signals as normal (train 2H41 was travelling slowly on cautionary signals as train 1B77 was travelling in the signal section ahead).
15:38:44	The signaller called the driver of train 1B78 and told the driver that the train that had just gone past him (2H41) was the last train and the rescue train would now come wrong road past him i.e. travelling in the down direction on the up line.
15:57:13	The signaller spoke to the driver of train 1Z99 (the rescue train) at Bishop's Stortford and authorised him to drive to Stansted Mountfitchet (wrong direction on the up Cambridge line). He told the driver to proceed at caution and pick up the fitters who were trackside. A mobile operations manager was also travelling with the driver.
15:59	The fitters arrived at the failed train and the driver climbed down on the cess side to meet them at the PMOS coach to discuss the failure. The driver of train 1B78 informed the fitters that there was no block on the up Cambridge line. The driver asked the fitters if they required a block on the up Cambridge line and they stated that no block was required at this time. The driver of train 1B78 informed the fitters that a train was coming past 'wrong road'. The fitters went immediately under the PMOS coach to investigate the fault.

<i>TIME</i> <i>hrs:mins:secs</i>	<i>Event</i>
16:00:30	The driver of train 1B78 called the signaller to say that the fitters had arrived and that they were lineside. The signaller confirmed he would caution train 1Z99.
16:01	The driver of train 1B78 climbed down from his cab into the six-foot and walked back towards the fitters at the PMOS coach. The driver informed the fitters that the rescue train would pass by at caution. The train driver returned to his cab.
16:01:20	The signaller called the driver of train 1Z99. He told the driver that the fitters were at site and lineside. The signaller cautioned the driver.
16:02:20	The signaller called the driver of train 2H43, who was waiting at signal L1184 (which was one mile north of Stansted Mountfitchet station on the up Cambridge line) and explained train 1Z99 movements and to wait for the signal to change aspect. See Figure 2.
16:07	Train 1Z99 stopped when it reached the fitters at failed train 1B78 and the driver of train 1Z99 and the fitters held a short conversation. Train 1Z99 then moved slowly forwards.
16:08	Train 1Z99 stopped when it was level with the cab of the failed train 1B78 and the drivers of the two trains held a short conversation. Train 1Z99 continued forward towards Stansted Mountfitchet station.
16:09	The driver of train 1B78 climbed down from his cab into the six-foot and walked back towards the fitters at the PMOS coach. One fitter was now between the third and fourth coach and the other fitter was sitting on the six-foot rail sleeper ends, underneath the solebar of the failed train and facing towards the train.
16:16:[18 to 49]	Train 1Z99 crossed from the up Cambridge (wrong direction) to the down goods loop (DGL) at Stansted Mountfitchet.
16:18:00	The Mobile Operations Manager that was travelling on train 1Z99 called the signaller to confirm that train 1Z99 had arrived into the DGL at Stansted Mountfitchet. The signaller stated to the Mobile Operations Manager he could now let train 2H43 go on the up Cambridge line.
16:18:16	The signaller set the route from L1184 through to Bishop's Stortford on the up Cambridge line. Signal L1184 changed from red to yellow and then to green aspect.
16:18:26	Train 2H43 moved forward.
16:19:37	Train 2H43 passed through Stansted Mountfitchet and accelerated to line speed.
16:20:47	The driver of train 2H43 saw the driver of train 1B78 standing in the six-foot by the third coach of his failed train and another person underneath the failed train. Train 2H43 was now travelling at 70 mph (112 km/h). The driver of train 2H43 applied his emergency brake and sounded his horn.
16:20:48	The driving cab of train 2H43 was now level with the driving cab of train 1B78 (the driver of train 1B78 started to crouch down).
16:20:50	The driving cab of train 2H43 passed the driver in six-foot (the driver was now lying on the ballast). See Figure 4.

<i>TIME</i> <i>hrs:mins:secs</i>	<i>Event</i>
16:21:14	Train 2H43 came to a stop adjacent to signal L1165.
16:21:37	The driver of train 1B78 called the signaller to report a train coming past at line speed and that the fitters were still 'working down there'.
16:22:37	The driver of train 2H43 called the signaller to say he had come to a stop and to report the near miss.
16:27:10	The driver of train 1B78 called the signaller to state that the problem now appeared to be fixed and that the fitters were in his cab. The driver also spoke to the IECC shift manager.
16:30:01	The driver of train 1B78 stated that the fitters had now got out of his cab and gone back to the third coach (to the fault). He also stated that the brakes had applied again. The IECC shift manager told the driver to obey signals. The driver repeated that the fitters were back lineside again. The shift manager then confirmed that no trains would pass his failed train until he contacted the signaller again.
16:31	The signaller was removed from Harlow workstation. The signaller was not 'for cause' screened.
16:35:20	Train 2H43 continued forward at slow speed.
16:40:15	Train 2H43 arrived at Bishop's Stortford Station, platform 3.
16:49:58	The driver of train 1B78 called the signaller to state that the problem was fixed, the train was now on the move and everyone was off the track. Both fitters rode with the driver in his cab.
17:00	Train 1B78 arrived at Stansted airport station. The train was then split into two 4 coach trains. The damaged portion of the train was isolated from the overhead line (the pantograph was lowered).
n/a	The driver of train 1B78 drove the working portion of his train back to Bishop's Stortford where he was relieved and 'for cause' screened. The two fitters were also 'for cause' screened at Bishop's Stortford station.

Appendix D - Extract from the IECC Train Register of 20 January

Harlow Signal Box

SATUR day 13 day of JANUARY 2008

B.R. 24047

UP

Description of Train	BEAR SECTION								Line	ADVANCE SECTION								Remarks
	In Line Clear		Train approaching Signal received	Train entering Section received	Train out of Section sent	Train description received	Train arrived	Train departed or passed		In Line Clear		Train approaching Signal sent	Train entering Section sent	Train out of Section received	Train description sent			
	Accepted under—	Offered but not accepted								Accepted under—	Offered but not accepted							
202h	DODDLES BLOCK WORKING THROUGH STROSSER AIRPORT TUNNAGE																	
	FROM L1197 ON DOWN AND L1336/1202 ON UP ROAD.																	
	on Day 2.17																	
	SUNDAY 21ST JAN 2008																	
0500	OFF DUTY																	
	on Duty 0705																	
	EMERGENCY ALARM TEST AT 1041 HRS A-1-0																	
	SEE Duty 1256																	
	MED. RELIEF 1256 HRS																	
	OFF DUTY 1315 HRS																	
	on Duty 13.15 LWR																	
	on Duty 1335																	
	— MONDAY 21ST OF JAN 2008 —																	

Appendix E - Extract from an IECC Occurrence Book (not used by Harlow workstation)

Date	Details and Time of Incident, Occurrence and Shift Change over
4/8/07 04/08/07	[redacted] off 1541h [redacted] on duty 1541h
[redacted]	[redacted] on duty 1631h [redacted] off 2017h
05.08.2007	[redacted] on duty 2017h [redacted] off duty 2.0740
2	[redacted] on Duty 0740h [redacted] ON 0850
5-8-7	[redacted] ON DUTY 1415. [redacted] OFF 1415 - 1511
11	[redacted] OFF DUTY 1511
2	1650 L259/L261 BLANK ON SCREEN
2	1712 DRIVER 2W44 REPORTED PERSON WALKING ON THE TEMPLE MING LINES TOWARDS STRATFORD STATION CAUTION IMPROVED CONTROL ADVISED
2	1725 CAUTION LIFTED NO REPORTS
2	[redacted] OFF 1728
5/8/7	[redacted] on 1728h MONDAY 6TH AUGUST 2007
11	[redacted] on duty 0625 h
11	[redacted] PAINT REF L259 IN ORDER BY [redacted] SAT AT 0752 h
11	[redacted] off 0808 h
11	[redacted] 0808 h m/p [redacted] 0848 h [redacted] on duty 0848 h
6/8/07	[redacted] EMA TESTED TO 4/000 M OR 1082

20 FEB 2008

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