



Rail Accident Investigation Branch

Rail Accident Report



**Train driver struck by a train near West
Worthing Middle Siding, West Sussex,
1 February 2022**

Report 02/2023
February 2023

This investigation was carried out in accordance with:

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

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Any enquiries about this publication should be sent to:

RAIB	Email: enquiries@raib.gov.uk
The Wharf	Telephone: 01332 253300
Stores Road	Website: www.gov.uk/raib
Derby UK	
DE21 4BA	

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Preface

The purpose of a Rail Accident Investigation Branch (RAIB) investigation is to improve railway safety by preventing future railway accidents or by mitigating their consequences. It is not the purpose of such an investigation to establish blame or liability. Accordingly, it is inappropriate that RAIB reports should be used to assign fault or blame, or determine liability, since neither the investigation nor the reporting process has been undertaken for that purpose.

RAIB's findings are based on its own evaluation of the evidence that was available at the time of the investigation and are intended to explain what happened, and why, in a fair and unbiased manner.

Where RAIB has described a factor as being linked to cause and the term is unqualified, this means that RAIB has satisfied itself that the evidence supports both the presence of the factor and its direct relevance to the causation of the accident or incident that is being investigated. However, where RAIB is less confident about the existence of a factor, or its role in the causation of the accident or incident, RAIB will qualify its findings by use of words such as 'probable' or 'possible', as appropriate. Where there is more than one potential explanation RAIB may describe one factor as being 'more' or 'less' likely than the other.

In some cases factors are described as 'underlying'. Such factors are also relevant to the causation of the accident or incident but are associated with the underlying management arrangements or organisational issues (such as working culture). Where necessary, words such as 'probable' or 'possible' can also be used to qualify 'underlying factor'.

Use of the word 'probable' means that, although it is considered highly likely that the factor applied, some small element of uncertainty remains. Use of the word 'possible' means that, although there is some evidence that supports this factor, there remains a more significant degree of uncertainty.

An 'observation' is a safety issue discovered as part of the investigation that is not considered to be causal or underlying to the accident or incident being investigated, but does deserve scrutiny because of a perceived potential for safety learning.

The above terms are intended to assist readers' interpretation of the report, and to provide suitable explanations where uncertainty remains. The report should therefore be interpreted as the view of RAIB, expressed with the sole purpose of improving railway safety.

Any information about casualties is based on figures provided to RAIB from various sources. Considerations of personal privacy may mean that not all of the actual effects of the event are recorded in the report. RAIB recognises that sudden unexpected events can have both short- and long-term consequences for the physical and/or mental health of people who were involved, both directly and indirectly, in what happened.

RAIB's investigation (including its scope, methods, conclusions and recommendations) is independent of any inquest or fatal accident inquiry, and all other investigations, including those carried out by the safety authority, police or railway industry.

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Train driver struck by a train near West Worthing Middle Siding, West Sussex, 1 February 2022

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Summary

At around 20:33 hrs on Tuesday 1 February 2022, a passenger train travelling at approximately 33 mph (53 km/h) struck a train driver who had previously exited the cab of a train, which was stationary in West Worthing Middle Siding. The driver suffered injuries that were immediately fatal. It was dark at the time of the accident, and the crew in the moving train were initially unaware that they had struck a person.

When the stationary train in the middle siding did not leave at its scheduled departure time, the signaller attempted to contact the driver. When the signaller could not get a response, he instructed the next train on an adjacent line to stop alongside the stationary train and to contact the driver. The driver of this third train found the driver who had been struck.

RAIB determined that, before leaving the stationary train in the middle siding, the driver did not tell the train's guard or the signaller that he intended to do so. He also did not request that trains on the adjacent lines be stopped. RAIB has not been able to establish why the driver left the cab of his train. However, in considering only those factors relating to railway safety, RAIB has concluded that the driver was unlikely to have accidentally fallen out of the cab or left it intentionally for a work-related reason and that he most probably exited the train for a personal reason. This may have been to urinate or to smoke a cigarette, possibly in the belief that it was safe for him to be outside of his train.

The driver then entered the path of the approaching train. He may have done this inadvertently after a loss of balance or while trying to regain his feet following a fall from the cab access steps or a loss of footing on ballast. He may also have slipped or tripped on a wooden board that had been left detached on the track for many years.

RAIB has made three recommendations. The first recommendation, made to Govia Thameslink Railway, requires that on-train staff have adequate access to toilets across all of their routes. The second recommendation is made to the Department for Transport, in conjunction with the Rail Safety and Standards Board, and relates to reviewing standards to ensure the mandatory fitment of forward-facing CCTV equipment to new trains. The third recommendation is made to the Rail Safety and Standards Board, in conjunction with operators of trains, and encourages consideration of fitment of forward-facing CCTV equipment to existing trains.

RAIB has also identified four learning points. The first reminds traincrew to arrange appropriate protection before leaving their cabs. The second highlights the importance of wearing suitable personal protective equipment. The third learning point prompts infrastructure managers to take timely action to remove tripping hazards. The final learning point reminds employers of train drivers to assure themselves that the correct protective equipment is being worn by their staff.

Introduction

Definitions

- 1 Metric units are used in this report, except when it is normal railway practice to give speeds and locations in imperial units. Where appropriate the equivalent metric value is also given.
- 2 The report contains abbreviations which are explained in appendix A. Sources of evidence used in the investigation are listed in appendix B and additional information related to the investigation is shown in appendix C.

The accident

Summary of the accident

- 3 At around 20:33 hrs on Tuesday 1 February 2022, a moving train struck and killed the driver of another train that was stationary in a siding, around 250 metres to the west of West Worthing station, West Sussex (figure 1). The train which struck the driver was travelling from Littlehampton to East Croydon at around 33 mph (53 km/h) when the accident occurred. The driver of the stationary train had previously exited from his train's cab and descended to track level.



Figure 1: Extract from Ordnance Survey map showing location of accident at West Worthing.

Location

- 4 West Worthing is located on Network Rail's West Coastway line. This line runs between Brighton and Hove (to the east) and Southampton, Portsmouth, and Bognor Regis (to the west). Signalling in this area is controlled by a signaller at Lancing, located approximately 3 miles (5 km) from West Worthing station (figure 2).

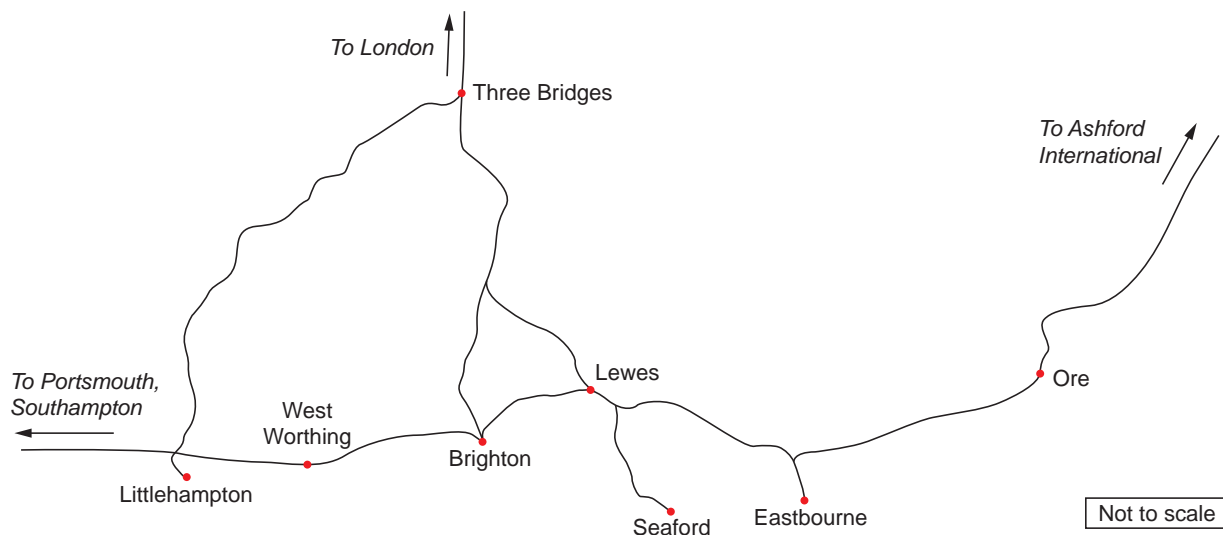


Figure 2: Simplified route map of the south-coast Govia Thameslink Railway (GTR)'s Southern rail network. Not to scale and not all destinations are shown for clarity.

- 5 At this location, there are three railway lines regularly used by trains (figure 3). These are:
- The down Brighton line, used by trains travelling west towards Littlehampton.
 - West Worthing Middle Siding (figure 4), where the stationary train had terminated after arriving from Brighton, pending its return to West Worthing station.
 - The up Brighton line, carrying trains east towards West Worthing, Brighton and London. This is the line on which the train which struck the driver was travelling.

The maximum permitted speed on the down and up Brighton lines is 70 mph (113 km/h) and the maximum permitted speed in the middle siding is 15 mph (24 km/h). There is no authorised walking route at this location because there is no need for drivers to access the track during normal operations.

- 6 To the north of these lines are four railway sidings. These are:
- The up Brighton Siding, situated adjacent to the up Brighton line. This siding is no longer in use and its conductor rail is no longer energised with traction current.
 - Three 'shed' sidings which, while no longer used in normal operations, still have their conductor rails energised, are connected to the signalling system, and can be used by trains.

Organisations involved

- 7 Network Rail owns, manages, and maintains the railway infrastructure at West Worthing. It employs the signaller who was on duty at Lancing signal box when the accident occurred.
- 8 Govia Thameslink Railway (GTR), trading as Southern, operated the trains involved. GTR is the employer of the drivers of all the trains involved in the accident.
- 9 All parties freely co-operated with the investigation.

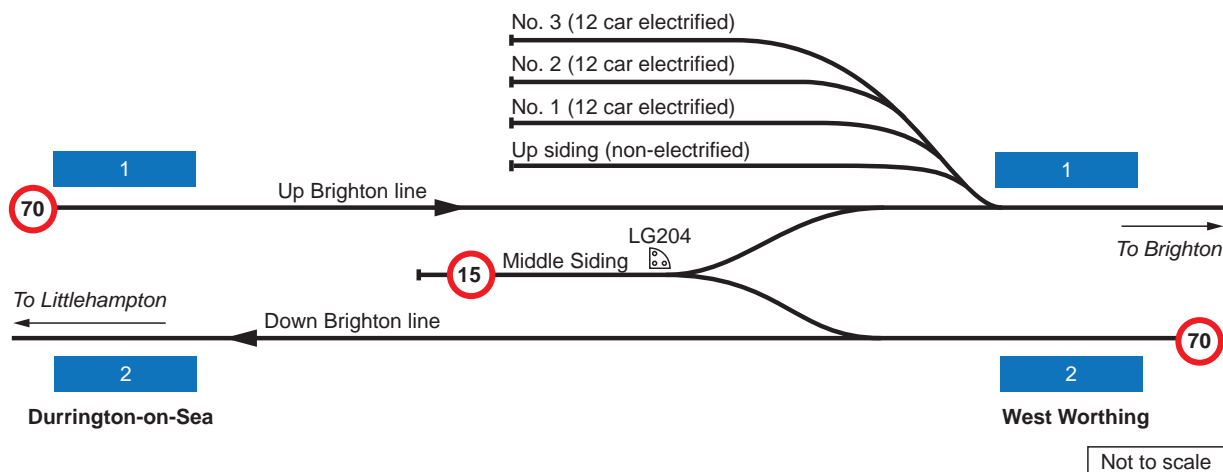


Figure 3: Track layout (not to scale and not all features shown).



Figure 4: Photo showing the middle siding to the right of the image, the up Brighton to the left, and signal LG204 at the top.

Trains involved

- 10 The train which was stationary in the middle siding, train reporting number 5U57, was a three-car class 313 electric multiple unit (EMU). Class 313 units were manufactured between 1976 and 1977. They started operating on the West Coastway line from December 2010 as part of a strategy to release newer class 377 units to serve London.¹ The unit was fitted with saloon, forward and rear-facing closed-circuit television (FFCCTV / RFCCTV) and an on-train data recorder (OTDR).² Class 313 trains have internal doors between the driving cab and the passenger saloon and connecting corridors between vehicles, meaning that there is no requirement for a driver to leave the train while changing between the cabs at each end. There are no onboard toilets on class 313 units. The train was crewed by a driver and a guard at the time of the accident. Post-accident examination of the train by GTR identified that some faults were present on the train (see paragraph 57).
- 11 The train which struck the driver, train reporting number 1H63, was the 20:13 hrs service from Littlehampton to East Croydon. The train was a four-car class 377 EMU. Early versions of the class 377 units, including the train involved in the accident, were not fitted with FFCCTV or RFCCTV during manufacture, and this train had not had these systems retrofitted since it had entered service. This train was fitted with an OTDR and had onboard toilets. The normal crewing requirements for this train are a driver and an onboard supervisor. However, on the night of the accident there was a second driver in the cab of the train who was learning the Preston Park to Littlehampton route. No defects relevant to the accident were found on this train when it was later examined by GTR.

Rail equipment/systems involved

- 12 Traction power at this location is supplied by a third rail system which is normally electrically live at 750 volts (direct current). Current collection shoes³ on trains draw power from this conductor rail.
- 13 The conductor rail at West Worthing Middle Siding is partially protected by conductor rail boarding. This boarding consists of long wooden planks (a non-conducting material) which are fixed alongside the conductor rail (figure 4) to reduce the risk of someone accidentally coming into contact with it, for example, when stepping over the rails. Following the accident, a length of this boarding was found detached and on the ground below the open cab door (see paragraph 98).
- 14 All the trains involved in the accident were fitted with Global System for Mobile communication - Railway (GSM-R) radios. GSM-R radios allow drivers to use a handset in the driving cab to contact the signaller without leaving the train. The system also allows signallers to call the handsets in train driving cabs and for railway staff to make emergency calls. All calls made through the GSM-R system are logged and recorded.

¹ Class 377s are fitted with selective door operation, meaning they can stop at platforms which cannot accommodate the entire train and only open some of the doors. This makes them suited for service in London.

² An OTDR (sometimes referred to as the 'black-box') records commands to the train's controls and other data such as speed and inputs from lineside signalling equipment.

³ A metal shoe suspended from an insulated beam on a train's bogies, slightly above rail level. Its purpose is to run on the railhead of the conductor rail and pass traction current to the train. * (All definitions marked with an asterisk have been taken from Ellis's British Railway Engineering Encyclopaedia © Iain Ellis. www.iainellis.com).

Staff involved

- 15 The driver of stationary train 5U57, who died in the accident, was Michal Olesiak. He qualified as a train driver in March 2018. Before becoming a train driver, he was a station dispatcher at Brighton for around four years. The driver's last practical driving assessment was on the morning of the accident, and he was last examined on Rule Book knowledge in May 2021. There were no concerns recorded about his competency to safely drive trains at the time of the accident. The driver was familiar with this train and route. He qualified to drive this type of train over this route in 2018 and had driven over this route regularly since then. Earlier on the day of the accident, he had driven in and out of West Worthing Middle Siding on the same train without any issues.
- 16 The driver of the passing train, 1H63, qualified as a train driver in 2005. The other driver on train 1H63 at the time of the accident was in the driving cab to learn the route between Preston Park and Littlehampton. The way in which train 1H63 was driven did not contribute towards the accident.
- 17 The signaller was first employed by Network Rail in 2018 as a crossing keeper. He went to signalling school in July 2019 and qualified to operate Lancing signal box in December 2019.

External circumstances

- 18 On the night of the accident, weather data from Worthing (1 mile / 1.6 km away from the accident site) showed that the sun set at around 16:53 hrs and that it was dark by the time the accident occurred. The middle siding is not artificially lit by external lighting, with the only lighting available being that cast through the saloon windows from the train's internal lighting, which does not spread far from the sides of a train. The headlights of passing trains also partially illuminate the siding.⁴ West Worthing and Durrington-on-Sea stations are therefore the main visual markers present at the accident location, due to the light from these stations. The dark environment at the location at the time of the accident may have played a part in the accident (see paragraph 87).
- 19 Worthing weather data showed that, at 20:55 hrs, the temperature was 10.3 degrees Celsius and that conditions were dry, with a 7.3 mph (11.7 km/h) westerly wind gusting up to 15 mph (24 km/h), a light to moderate breeze. The location where the accident occurred is generally quiet and RAIB did not identify any nearby noise sources which could have masked the sound of an approaching train.

⁴ It is not usually possible to stop a train within the distance that can be seen to be clear because, unlike road vehicles, trains do not operate on a line-of-sight basis unless specifically instructed to travel at caution or if they are instructed to examine the line.

The sequence of events

Events preceding the accident

- 20 On the morning of 1 February 2022, the driver arrived for his booked shift at Brighton depot shortly after his scheduled booking on time of 11:50 hrs. He spoke there with a resource manager, before leaving to travel by train from Brighton to Eastbourne where, on arrival, he was scheduled to drive the 13:09 hrs service to Brighton. The driver was accompanied from Brighton by a competency development manager who was due to carry out a scheduled driving assessment.
- 21 On arrival at Eastbourne, the driver was informed that the 13:09 hrs service had been cancelled due to a defective train and that he was instead to drive an out-of-service train back to Brighton. On arrival at Brighton at 13:44 hrs, the competency development manager confirmed the driving assessment had been satisfactory and then left. Between approximately 14:01 hrs and 16:45 hrs the driver drove a passenger train on a return journey between Brighton and Ore.
- 22 The driver took his scheduled break between 16:54 and 17:39 hrs. Between approximately 18:20 and 19:43 hrs the driver drove a return journey between Brighton and West Worthing, including a reversing movement in West Worthing Middle Siding. At 19:51 hrs the driver departed Brighton station, on the same train, to complete a second return journey to West Worthing.
- 23 On arrival at West Worthing at 20:22 hrs the train terminated, and the guard made sure all passengers had disembarked. The train was then driven out of passenger service (with only the driver and guard onboard) into the middle siding, arriving at approximately 20:25 hrs.
- 24 Examination of the driver's phone showed that he received messages throughout the day relating to personal issues (see paragraph 43). However, there is no evidence that he was using his phone while driving trains.

Events during the accident

- 25 There was no external CCTV covering the location of the accident, and the train that struck the driver (1H63) was not fitted with FFCCTV (paragraph 11). The lack of ambient light also restricted what could be seen by the crew on train 1H63 (paragraph 18). The record of events during the accident therefore relies on analysis of CCTV images and OTDR records from the stationary train (5U57), and the available witness evidence.
- 26 Saloon CCTV images from train 5U57 capture the driver walking through the train to change ends to the West Worthing/Brighton end driving cab between 20:25:25 and 20:26:04 hrs.⁵ The guard and the driver spoke briefly as they passed by each other. Witness evidence indicated that the driver did not seem his usual self at this time.
- 27 ODTR records show that the driver activated the West Worthing/Brighton end driving cab at 20:26:19 hrs. At 20:27:15 hrs, 56 seconds later, the OTDR recorded that the headlights were switched on. FFCCTV images capture the headlights illuminating the track ahead of the stationary train.

⁵ The times given in this section have been synced to the clock of the FFCCTV equipment onboard the cab of train 5U57 that faced the buffer stops.

- 28 At 20:32:34 hrs, 5 minutes and 19 seconds after the headlights were switched on, the OTDR recorded 'traction interlock lost'. Post-accident testing suggests that this indicated that the external cab door had been opened, giving access to the outside of the train. The driver did not tell the guard that he intended to leave the train, and no calls were made by the driver to the signaller or to the route control centre indicating that there was a need for him to do so.
- 29 Approximately 50 seconds after the OTDR recorded the cab door being opened, the train driver was struck by train 1H63, as it passed by on the adjacent up Brighton line.
- 30 The driver and route learner on train 1H63 were aware of striking a "black object" in the darkness as they passed West Worthing Middle Siding. They discussed the collision and concluded that because the "black object" moved low down in front of the train (from right to left in the direction of travel) that they had probably hit an animal, such as a dog or a deer.

Events following the accident

- 31 Train 1H63 made its scheduled stop at West Worthing station approximately 44 seconds later, where the driver and route learner examined the front of the train. As they could not see any signs of damage, and because they believed the train had struck an animal, they decided the collision did not need to be reported. They rejoined their train to continue the journey towards East Croydon.
- 32 At approximately 20:41 hrs, and after train 1H63 had departed from West Worthing station, the signaller set the route and cleared the signal for train 5U57 to leave the middle siding and move into the station. A few minutes later the signaller became aware that the train had not moved as expected. The signaller made three calls (at 20:43, 20:44 and 20:46 hrs) using the GSM-R system to speak with the driver to find out if there was a problem, but on each occasion there was no answer. At 20:47 hrs, the signaller reported the loss of contact with the driver to the Network Rail Sussex route control centre at Three Bridges.
- 33 At 20:49 hrs, the signaller contacted the driver of train 1N35, who was then at Durrington-on-Sea on the up Brighton line and asked that the train be stopped alongside train 5U57 in the middle siding to establish contact with the driver. Simultaneously, the route control centre contacted the guard on board train 5U57 and asked him to contact the driver.
- 34 At 20:53:50 hrs, the driver of train 1N35 contacted the signaller to report that he had stopped alongside the train in the middle siding, sounded his horn to draw the driver's attention, but had noticed that the cab door was open and that there was nobody inside the driving cab (figure 5). During this call, the headlights of another train approaching on the down Brighton line illuminated the area and the driver of train 1N35 noticed a person lying on the track ahead of his train. He requested an emergency switch-off of the electrical supply to the conductor rail.
- 35 Following this request for an emergency switch-off, the signaller contacted a train, which was then at a stand in the platform at Goring-by-Sea, to stop it from leaving the station and therefore potentially becoming stranded (this is discussed further in paragraph 132). The signaller then contacted the electrical control operator (ECO) to request an emergency switch-off of electrical traction power to the conductor rail. This was granted at 20:58 hrs.

- 36 The driver of train 1N35 then obtained permission from the signaller to check on the person on the track ahead of him. At 21:06:49 hrs the driver of train 1N35 reported that he believed the person on the track was a member of railway staff and that they were deceased. The emergency services were called. British Transport Police and South East Coast Ambulance Service arrived at the scene at approximately 21:30 hrs.



Figure 5: Photo showing stationary train to the left and examining train on the right (image courtesy of British Transport Police).

- 37 Following the accident, the driving cab of train 5U57 in the middle siding was found set up ready to depart. The exterior door to the driving cab was open. The driver's bag, found in the driving cab, contained a high-visibility vest and torch. These are items which a driver would normally have taken with them if going trackside during the hours of darkness.
- 38 The involvement of train 1H63 in the accident was confirmed following a review of the trains which had passed the middle siding during the relevant time period (see paragraph 40). An examination of train 1H63 showed that there was minor exterior damage and marking, situated low down on the right-hand (non-driver's) side of the train. This damage was on the side furthest from the platform at West Worthing and would not have been easily observed by the crew of the train when it was first examined in the station (paragraph 31).

Analysis

Identification of the immediate cause

39 The driver of train 5U57 was in the path of train 1H63 as it passed the middle siding.

40 Train 1H63 was the only train which passed the middle siding on the up Brighton line in the period after the OTDR on stationary train 5U57 recorded the cab door opening, and the discovery of the driver. The drivers on board train 1H63 were aware of a collision as they passed the middle siding and subsequent DNA analysis showed evidence of contact between train 1H63 and the driver of train 5U57.

Identification of causal factors

- 41 The drivers in the cab of train 1H63 were aware that they had struck a dark object, which was low down and travelling from right to left in front of them (paragraph 30). This witness evidence, combined with the damage and marks later found on train 1H63 (paragraph 31), indicates that the driver of 5U57 was not standing up when he was struck. RAIB has concluded that he was probably in a crouched or bent over position and moving into the path of the train when the collision occurred.
- 42 Since the crew of train 1H63 saw very little in the darkness, and without FFCCTV evidence from that train, RAIB cannot determine with certainty how the driver came to be in the path of train 1H63. The purpose of an RAIB investigation is to improve the safety of railways and to prevent further accidents from occurring. RAIB achieves this by identifying the factors which may have caused an accident, or that may have made its outcome worse and making recommendations accordingly. RAIB does not investigate the possibility of other types of incident and has not done so in this case.
- 43 In considering these factors, it should be noted that examination of the driver's personal phone indicates that it was not being used for a call at the time of the accident. It does, however, suggest that the driver was experiencing significant issues in his personal life. Personal issues may serve as a distraction from work, increasing the risk of errors. They can also create stress in individuals which can potentially affect that person's judgement, including their perception of risk. There is no evidence to suggest that GTR was aware of the issues in the driver's personal life or of any effect they may have had on him at work.
- 44 Post-mortem toxicology analysis found no substances present that might have affected the driver's actions or judgement during the night of 1 February 2022.

- 45 In considering only those factors relating to railway safety, RAIB has determined the following potential reasons why the driver came to be in the path of train 1H63 as it passed the middle siding on the up Brighton line:
- a. The driver may have fallen from the cab of train 5U57 and accessed the track outside the train unintentionally; this is considered unlikely (paragraph 46).
 - b. The driver exited the cab of train 5U57 and intentionally accessed the track outside the train for a work-related reason (this is considered unlikely) or for a personal reason (this is considered probable) (paragraph 53).
 - c. The driver may have believed that it was safe for him to be outside of the train (paragraph 73).
 - d. After accessing the track, the driver entered the path of train 1H63 as it passed the middle siding (paragraph 85).

Each of these factors is now considered in turn.

[The driver fell from the cab doorway](#)

46 The driver may have fallen from the cab of train 5U57 and accessed the track outside the train unintentionally; this is considered unlikely.

- 47 It is possible that the driver accidentally fell from the doorway after opening the cab door (paragraph 28) and that he therefore came to be on the track unintentionally. This would constitute a fall of approximately 1.3 metres, measured from cab floor level. Measurements taken on site by RAIB show that there was approximately 2 metres of clearance between a train standing in the middle siding and one passing on the up Brighton line.
- 48 For this fall to result in the driver directly landing on the adjacent up Brighton line, he would have needed to have fallen with a horizontal speed of around 5.6 m/s (12 mph or 19 km/h, the equivalent of a fast running speed) in order to cross the distance involved. RAIB has therefore discounted the possibility that the driver fell directly from the doorway onto the adjacent line.
- 49 However, a fall from the cab would have resulted in the driver landing in the six-foot (the space between the two lines). It is possible that the driver could then have inadvertently moved towards the up Brighton line as a result of trying to regain his feet or due to a loss of balance following a fall (see paragraphs 98 to 107).
- 50 The driver could have intentionally opened the cab door for a number of reasons, including to admit fresh air or to smoke a cigarette (although this was not permitted in train cabs, see paragraph 70). However, it is not clear why the driver would have needed to open the door given the large window adjacent to the driving position was found to be open following the accident.
- 51 In addition, RAIB could not identify any reason why the driver would have fallen from the cab doorway, once the door had been opened. Post-mortem toxicology analysis found no substances present that might have affected the driver's actions (paragraph 44). Furthermore, although a medical episode resulting in a fall cannot be entirely discounted, a review by RAIB of the relevant records identified no pre-existing condition which could have resulted in a loss of balance.
- 52 RAIB therefore considers it unlikely that the driver fell from the cab doorway.

The driver exited the train for a work-related or personal reason

53 The driver exited the cab of train 5U57 and intentionally accessed the track outside the train for a work-related or personal reason.

- 54 RAIB has considered two scenarios which could have led to the driver deciding to leave the train. These are:
- a. The driver left the train for a work-related reason; this is considered unlikely (paragraph 55).
 - b. The driver left the train for a personal reason; this is considered probable (paragraph 64).

Each of these factors is now considered in turn.

Leaving the cab for a work-related reason

55 The driver left the train for a work-related reason; this is considered unlikely.

- 56 There are several reasons why a train driver may need to leave their train in the course of their duties. These include investigating a fault, examining the train after it has struck something, using a signal post telephone or checking the train's exterior lighting when changing to another driving cab.
- 57 Post-accident examination of the train from the middle siding identified two issues with the condition of the train which may have prompted an investigation by the driver from the track:
- There was a leak to the inter-car main reservoir hose which supplies air under pressure to the train's braking and suspension systems. This may have caused a hissing noise that might have been noticed by the driver and provided a reason for him to leave his cab to investigate. This hissing noise was not noted by the guard, and in normal circumstances a driver would speak to the fleet controller before investigating a fault of this nature. Furthermore, the driver drove the same unit on his previous trip to the middle siding and did not take action relating to this fault at that time. This may indicate that the fault was not present on the first trip or that the driver was either not aware of it or not concerned by it.
 - Following the accident, the screen wash bottle was found to be empty at the West Worthing cab end. Although it is possible that the driver may have tried to climb on the front of the train to clean the window in the absence of a functioning windscreen wash system, photographs from the accident scene do not show dirt on the windscreen which would obstruct the driver's view. In addition, the driver was not captured on his train's FFCCTV attempting to clean the windscreen, and no materials suitable for cleaning the windscreen were recovered from the accident site.
- 58 RAIB also considered the possibility that the driver left the cab to use the signal post telephone located immediately ahead of him at the middle siding's exit signal. However, data logs show that the train's GSM-R radio had correctly connected to the system and that it was working when the signaller tried to call the driver immediately after the accident. The GSM-R radio was also checked on site, in the presence of British Transport Police, and no faults were found. This meant that there was no obvious reason for the driver to use a signal post telephone.

- 59 On a class 313 unit there is no internal proving panel to show a driver whether the headlights are illuminated (and that the taillights have extinguished) after changing cab ends. FFCCTV images from the train in the middle siding showed that the headlights turned on and illuminated the track in front of the train. However, on a class 313 train there is no way to establish if the taillights have extinguished from within the train. While not documented in GTR's procedures, witness evidence obtained by RAIB showed that it would be considered irregular for a driver to leave the cab to carry out checks on these lights where no authorised walking route or platform was available.
- 60 In locations where drivers need to exit their train outside of a depot or platform, they are trained to first call the signaller to make sure it is safe to go on or near the line. The signaller can then arrange the necessary safeguards needed to eliminate the risk of a driver being struck, such as stopping other trains on adjacent lines. There is no evidence that the driver of train 5U57 called the signaller or the route control centre to report a need to examine the outside of the train or that he made any safety arrangements with the signaller before he exited the train. Additionally, before leaving the train, the driver did not tell the guard he was doing so, or why (paragraph 28).
- 61 Multiple witnesses familiar with railway operations at the middle siding indicated that it would be unusual for a driver to be on or near the line at this location without first contacting the signaller and arranging for trains to be stopped on the adjacent line and informing the route control centre. GTR has consulted its records and has found no history of previous incidents involving other drivers going onto the line without first informing the signaller at either this or any other location covered by their services.
- 62 Module G1 of the Rule Book⁶ requires railway staff to wear '*clean high-visibility clothing of an approved type*' when on the operational railway. Site evidence showed that the driver of train 5U57 was not wearing a high visibility vest when he was struck (paragraph 37). He may have forgotten this vest because he was distracted by personal issues (paragraph 43) or because he did not want to be seen while outside of the train. During the hours of darkness, drivers would also be expected to use a torch to light their way when walking or to use to examine their train. In this case, the driver's torch and spare batteries were found in his bag in the driving cab.
- 63 There were some potential work-related reasons for the driver to have descended from his cab and to have been on the line as train 1H63 passed. However, RAIB considers that the nature of the tasks, the absence of the high visibility vest and torch, the lack of prior notification from the driver of a problem with the train, and the lack of any message from the driver that he intended to go on the line, suggest that it is unlikely that he was on the line for any of the potential work-related reasons listed.

⁶ GERT8000 Rule Book Module G1 'General safety responsibilities and personal track safety for non-track workers'. The Rule Book and Railway Group Standards are available from the website of the Rail Safety and Standards Board (RSSB) <https://www.rssb.co.uk/en/standards>.

Leaving the cab for a personal reason

64 The driver left the train for a personal reason; this is considered probable.

65 RAIB considers that it is probable, though not certain, that the driver descended to the track from the cab for a personal reason. While a number of possible reasons exist for the driver leaving the cab, RAIB considers the two most credible reasons for him being outside were that he needed to go to the toilet or because he wanted to smoke a cigarette.

Physical needs

66 It is possible that the driver had left the train because he needed to urinate. Class 313 trains are not fitted with onboard toilets (paragraph 10). At the time of the accident, it had been over two hours since the driver's last opportunity to use the toilet at Brighton station, without otherwise taking an emergency physical needs break and delaying the train. While there was a staff toilet at Brighton station, which was available for the driver to use during the last turnaround between 19:43 and 19:51 hrs, there would have been insufficient time to use that toilet during the time allocated to turn the train around (see paragraph 113). This would therefore have constituted an emergency physical needs break. A staff toilet was also available at West Worthing station, although the driver may not have known this (see paragraph 121).

67 After the accident, an empty two-litre water bottle was found in the driver's bag. While it remains uncertain when this water was drunk, if the driver consumed this amount of water in the time since his last break between 16:54 and 17:29 hrs (paragraph 22), this may have prompted a need for him to urinate. If the driver was unaware of the staff toilet on the down platform at West Worthing station (see paragraph 121) and had sought to avoid taking an emergency physical needs break during his shift, then the middle siding would have afforded the driver a potential opportunity to urinate without delaying the train.

68 There is a history of drivers needing to urinate at this location (see paragraph 117). GTR had published a number of notices to drivers between 2015 and the date of the accident requesting that they stop throwing bottles of urine from their train cabs at this location (see appendix C). This indicates that this location was regarded by drivers as a place where they could urinate if they needed to do so urgently.

69 If the driver did need to urinate at this time, he may have not wanted to do so in the bottle that was found in the driving cab because he knew he could be disciplined for it, in the light of the previous notices from GTR. For these reasons, the driver may have decided to exit the train to find a place on the track where he could urinate without being seen. This may have been near to the train or in the sidings, which would have necessitated crossing the up Brighton line, which was open to trains.

Smoking

- 70 Cigarettes and a lighter were found with the driver following the accident. Witness evidence indicates that the driver was trying to stop smoking and had limited himself to two to three cigarettes in the evening. The driver was almost certainly under some personal stress on the day of the accident (paragraph 43) and this may have increased his desire to have a cigarette. Smoking on trains, including in driving cabs, is not permitted under relevant legislation⁷ and GTR's company policy, so it is possible that the driver may have taken the opportunity to smoke a cigarette away from the train before the return journey to Brighton.
- 71 RAIB examined the location of the accident during a reconstruction overnight on 4 to 5 July 2022 and did not see any smoking materials discarded on the track. Witness evidence from a member of railway staff who was very familiar with the location showed that it would be regarded as exceptionally unusual for a driver to get out of a train to smoke in the sidings north of the up Brighton line.
- 72 GTR's smoking policy does not make specific provision for train drivers to smoke cigarettes but states '*Employees who are smokers may still smoke if they wish to do so but this must be away from offices or station entrances/exits during their lunchtime hour or Personal Need Breaks (PNB)*'. The driver's last opportunity to smoke in accordance with this policy would have been during his last physical needs break, over two hours previously (paragraph 66).

Driver's belief

73 The driver may have believed that it was safe for him to be outside of the train.

- 74 At locations like the middle siding, it is necessary for drivers to contact the signaller and make safety arrangements before getting out of the train (paragraph 60). GSM-R radio records show that the driver had not called the signaller at Lancing signal box before the accident to make such arrangements. RAIB considers that there are two scenarios which may explain why the driver believed that it was safe to be on the line in the absence of such a call. These are:
- a. The driver incorrectly believed that he had arranged for trains on the adjacent up Brighton line to be stopped; this is considered unlikely (paragraph 75).
 - b. The driver knew trains would continue to run on the adjacent up Brighton line but possibly believed that he did not need to arrange for them to be stopped to ensure his safety when outside the train (paragraph 77).

Each of these factors is now considered in turn.

⁷ The Health Act 2006.

Arranging for trains to be stopped

75 The driver incorrectly believed that he had arranged for trains on the adjacent up Brighton line to be stopped; this is considered unlikely.

76 Post-mortem examination toxicology analysis found no substances that might have affected the driver's judgement or actions (paragraph 44). However, the driver was experiencing issues in his personal life (paragraph 43) and this may have caused him to be distracted and may have affected his decision-making. This could have led to the driver intending to, but forgetting, to call the signaller to arrange for trains to be stopped on the up Brighton line, or incorrectly believing he had made such arrangements when he had not done so.

Trains still running

77 The driver knew trains would continue to run on the adjacent up Brighton line but possibly believed that he did not need to arrange for them to be stopped to ensure his safety when outside the train.

78 It is possible that the driver accessed the track knowing that trains would continue to run on the adjacent up Brighton line but believed that these trains did not represent a risk to him. This may have been because he accessed the track intending to remain in a position of safety relative to the up Brighton line (and therefore believed that he did not need protection) or because he believed that he had adequate sighting of approaching trains to enable him to get to a position of safety should a train approach.

Position of safety

79 Railway Rule Book Module G1 requires that for a line speed of 70 mph (113 km/h) a position of safety must be at least 1.25 metres from any line on which a train can approach. There was approximately 2 metres of clearance between a train standing in the middle siding and one passing on the up Brighton line (paragraph 47). This means that, while drivers would normally arrange for trains on the adjacent up Brighton line to be stopped before going on to the line, there was, in theory, enough distance for drivers to stand safely at this location if they remained very close to the side of their trains. This would not account for the need to climb down from the cab or activities requiring greater clearances, such as examining a train, so it was unlikely to have constituted a position of safety in reality. Nevertheless, this 2 metre gap may have led the driver to conclude it was safe to be at track level, as long as he stayed close to his own train.

80 The exit signal for the middle siding, signal LG204 (located approximately 25 metres ahead of the train), has an associated signal post telephone connected to Lancing signal box. This telephone is not marked as having 'limited clearance'⁸ because it is positioned approximately 1.55 metres from the adjacent up Brighton line and is therefore considered to be in a position of safety relative to that line. While the driver had no need to use this signal post telephone (paragraph 58), the absence of a limited clearance sign on the telephone may also have contributed to the driver believing that standing next to his train constituted a position of safety.

⁸ A limited clearance sign is placed on telephones which cannot be used safely by train drivers with trains running on the adjacent line.

Sighting of trains

- 81 It is also possible that the driver did not request signal protection from the signaller because he was leaving the cab for a personal reason (paragraph 64). The driver may have concluded that sufficient sighting distance was available along the up Brighton line to enable him to reach a position of safety or cross the line (paragraph 78) should a train approach.
- 82 An RAIB site visit, undertaken during the hours of darkness, showed that it is possible to clearly identify, from the open cab door, a train approaching on the up Brighton line from at least 760 metres away and to identify a train possibly approaching, but with less certainty, up to 860 metres away. At the maximum permitted speed of 70 mph (113 km/h) this would give a sighting time of 24 or 27 seconds respectively.
- 83 However, trains timetabled to stop at West Worthing station, such as the train which struck the driver, are typically travelling much slower, only accelerating to around 36 mph (58 km/h) after leaving Durrington-on-Sea station before starting to brake for West Worthing station, which is located approximately 0.8 miles (1.3 km) further along the line. This increases the sighting time to over 50 seconds. This may have led the driver to believe that he had sufficient sighting distance to return to a position of safety (such as going back into the cab or standing directly next to the train, paragraph 78) should a train approach.
- 84 A sighting time of over 50 seconds would also mean that train 1H63 would have been clearly visible from the West Worthing end of train 5U57 when the cab door was opened by the driver (paragraph 29).

The driver came to be in the path of train 1H63

85 After accessing the track, the driver entered the path of train 1H63 as it passed the middle siding.

- 86 There is no clear evidence as to why the driver of train 5U57 came to be in the path of train 1H63. The drivers in the cab of train 1H63 did not see anyone on the track as they approached the middle siding and were unaware that they had struck a person (paragraph 30). For this reason, no warning horn was sounded by the driver of train 1H63 as it approached the siding. The driver of 1H63 also did not apply the train's brakes during the approach.

Visibility

87 The driver of train 1H63 did not see the driver of train 5U57 and was therefore unable to warn him of the approach of the train or to take action to try and avoid a collision.

- 88 A reconstruction undertaken by RAIB showed that a mannequin wearing dark clothing similar to that worn by the driver of train 5U57 on the night of the accident became clearly visible to traincrew, who had been briefed to look for it, from around 47 metres away. This would represent the equivalent of approximately three seconds of available sighting time to the drivers aboard train 1H63 on the night of the accident. The drivers on train 1H63 would not have been expecting to see anyone near to the middle siding and this suggests that the driver of train 5U57 was unlikely to have been clearly visible to them as their train approached.

- 89 When the test was repeated with the same mannequin but this time wearing an approved type of railway high visibility vest on top of the dark clothing, traincrew were able to see it from approximately 90 metres away, or the equivalent of approximately six seconds of sighting time for the drivers on train 1H63. This may have given the crew on board train 1H63 greater opportunity to identify that a person was on or near the line and allowed the driver to sound the train's warning horn, alerting the driver of train 5U57 that their train was approaching.
- 90 Even if the driver of train 5U57 had been wearing an approved type of railway high visibility vest, analysis undertaken by RAIB shows that the increased sighting time would probably not have been sufficient to allow the driver of train 1H63 to stop the train using the emergency brake and therefore avoid the collision.

The driver's position when struck

91 The driver of train 5U57 was not standing and was moving into the path of the train when he was struck.

- 92 RAIB has concluded from the available evidence that the driver was probably in a crouched or bent over position and moving into the path of the train when this occurred (paragraph 41).
- 93 Toxicology results showed that the driver was not subject to the effect of drink or drugs when the accident occurred (paragraph 44). While RAIB cannot totally discount the possibility that the driver, after descending to track level, suffered a medical episode which caused a loss of balance or consciousness, a review of the relevant medical records identified no pre-existing conditions which could have resulted in such an event (paragraph 51).
- 94 As the evidence suggests that the driver was not standing when he was struck, RAIB has considered why this was the case and why he was apparently moving towards the train immediately before being struck. The reasons considered by RAIB, within the scope of its investigation, relate to a loss of balance. They are listed below and may have worked in combination with each other:
- a. Having made the decision to leave the cab, the driver fell while descending from the train (paragraph 95).
 - b. Once he reached the track, the driver slipped or tripped over the detached conductor rail board (paragraph 98).
 - c. Once he reached the track, the driver slipped or tripped on the track ballast (paragraph 106).

Each of these factors is now considered in turn.

A fall while descending to the track

- 95 Class 313 units have a footstep at the base of the cab doorway, which allows access to the cab from platform height. When descending to track level, drivers will face the train and step off this footstep and on to a short ladder below. This is made up of three rungs, or steps which have a non-slip surface. Drivers use handrails built into either side of the cab door for support as they descend (figure 6).
- 96 Post-accident, both the cab access steps and the handrails adjacent to the doorway were examined. They were found to be free of faults and the steps were found to have their non-slip surfaces intact.



Figure 6: Image showing showing the driver's steps and handrails on train 5U57.

- 97 While no faults were found with the handrails and steps, it remains possible that the driver slipped and/or fell backwards from the footstep or cab access steps while descending from the train. Although the driver would have lacked the horizontal speed to land directly on the up Brighton line (paragraph 48) a fall backwards from the train while descending would have placed him in the six-foot. It is possible that the driver then inadvertently moved towards the up Brighton line as a result of trying to regain his feet or due to a loss of balance (see paragraphs 98 to 107).

The detached conductor rail board

- 98 After the accident, it was observed that a section of conductor rail board, 4.08 metres long, was detached from its fixing points and was laying on the ground directly under the driver's open door. This board had numerous scuff marks and some boot prints on its surface (figure 4).
- 99 RAIB engaged a forensic science laboratory to look for evidence that the driver's shoes had contacted the detached conductor rail board. The laboratory concluded that there was no positive evidence of contact, but that the absence of evidence does not mean that such contact did not occur.

100 During the RAIB site visit and reconstruction, the detached conductor rail board was placed back into the position from which it was recovered after the accident. It was found that, when climbing down the steps from the driving cab door, the board was contacted by the boot of the person climbing down on four out of five occasions. It is therefore possible that when climbing down from the driving cab, or having climbed down, the driver's foot came into contact with the detached board. This may then have caused him to lose his balance and stumble into the path of the approaching train (figure 7).



Figure 7: Still from RAIB reconstruction video showing how the detached conductor rail board can present a tripping hazard.

101 West Worthing station ceased to be a location where train crews regularly changed over in 1995. Witness evidence suggested that the conductor rail boarding may have been installed before this time due to the volume of foot traffic generated by use of the signal post telephone at this location and the use of now out-dated methods of work which involved drivers routinely accessing the track.

102 Network Rail explained that under the current standard⁹ there are listed criteria for when conductor rail boards must be fitted. Because the middle siding does not meet the criteria described within the standard, there is no requirement to fit conductor rail boarding at this location. This supports the idea that the conductor rail boarding was originally installed to protect train drivers from coming into contact with the conductor rail at this location when the area historically saw more foot traffic.

⁹ NR/GN/ELP/27020 'Design and installation of steel conductor rail and associated equipment for d.c. electrified lines', issue 2, April 2006.

103 RAIB obtained video evidence from Network Rail's Automated Intelligent Video Review (AIVR) inspection trains that captured the location of the accident on eight occasions between June 2020 and December 2021 (figure 8). All of the footage showed the detached conductor rail board in approximately the same location that it was found on the night of the accident. Public domain video evidence uploaded to YouTube in 2016, containing a forward-facing view of the route from Barnham to Brighton, also shows the detached conductor rail board in what appears to be the same position as it was found on the night of the accident (figure 9).

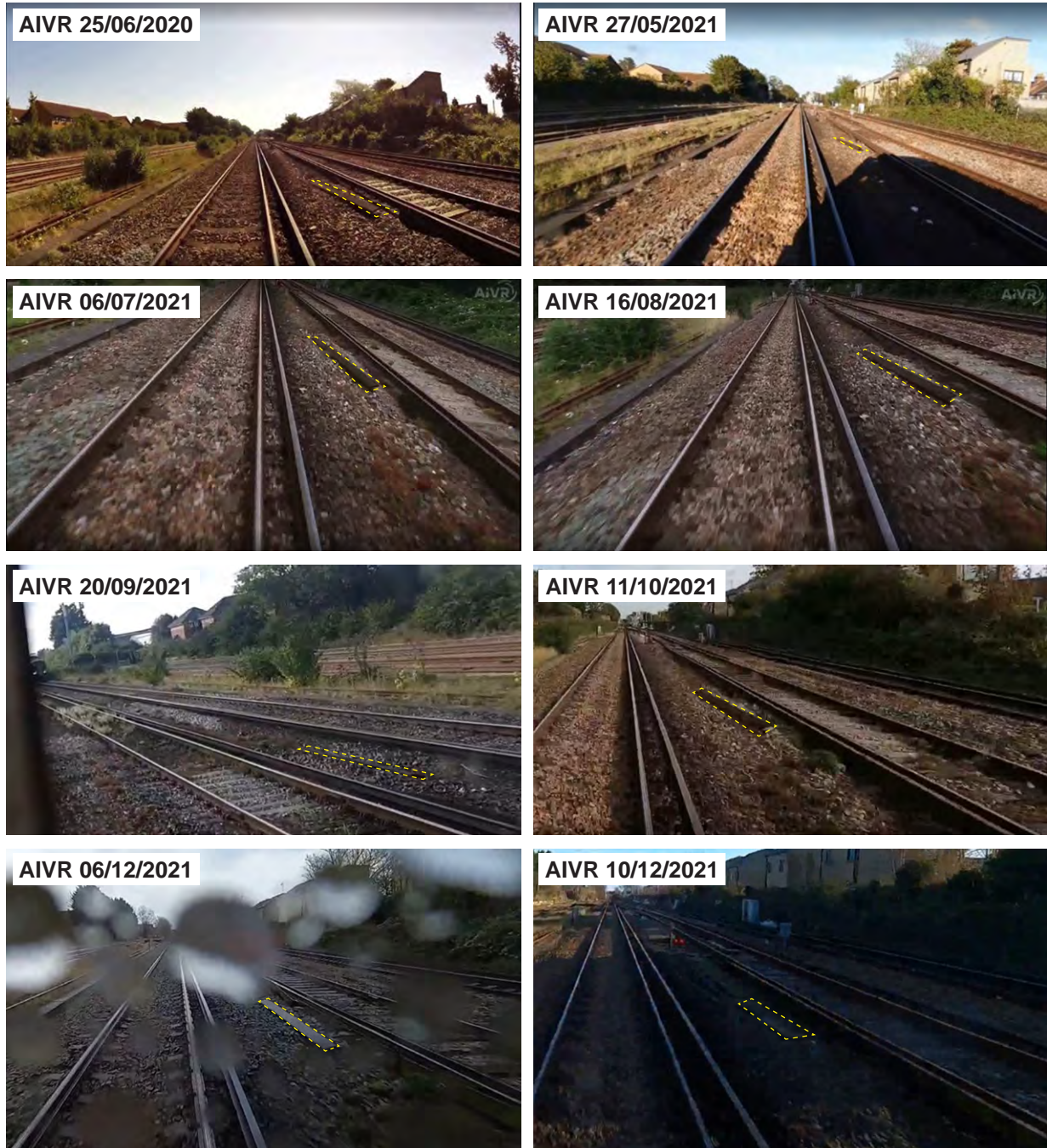


Figure 8: Pictures of the detached conductor rail board taken from videos recorded by the AIVR train.



Figure 9: Still image of the detached conductor rail board taken from a video uploaded to YouTube 27/10/2016 (courtesy of Paul Hubbard).

104 In accordance with Network Rail standards, the conductor rail in this location is subject to an annual inspection. Before the accident, the last time this section of conductor rail was inspected was on 5 May 2021. No faults with the conductor rail boarding were recorded as part of this inspection, probably because this location is not required to have conductor rail boarding installed under the latest standards. This is also likely to have been the reason that no faults were raised in relation to the detached board and why it was allowed to remain detached, but on the track, for a period of at least six years before the accident occurring.

105 Network Rail has a safety reporting system known as 'Close Call'. Employees and contractors can use this system to report hazards that they encounter in the course of their work (a similar reporting mechanism exists for traincrew). This detached conductor rail board was never reported to the close call team. If it had been reported, then it is probable that a fault record would have been generated which would have led to its reattachment or removal.

A slip, trip or fall while on the track

106 Walking on or near the line can be hazardous. There are multiple reasons which may cause someone to slip, trip or fall even in the absence of detached conductor rail boarding. Hazards include uneven ground, slippery sleepers, lineside equipment and cabling. It remains possible that the driver slipped or tripped due to one of these other causes, rather than a detached conductor rail board, and that this caused him to lose his balance.

107 RSSB reported that the largest proportion of mainline workforce specified injuries¹⁰ for those on or about the running line were due to slips, trips and falls in the reporting period 2021/2022.¹¹ The number of people injured by a slip, trip or fall while trackside had risen for a second year in a row. The same report also notes that the greatest proportion of risk to staff working on or about the running line is from slips, trips and falls.

Identification of underlying factors

Govia Thameslink Railway's management of on-train staff welfare

108 GTR did not effectively manage toilet provision for traincrew working trains which were not fitted with onboard toilets.

109 Class 313 trains were introduced on the Brighton to West Worthing route from December 2010 to release class 377 trains to serve London (paragraph 10). Class 377 units have onboard toilets whereas class 313 units do not.

Welfare facility provision

110 GTR did not adequately mitigate the potential hazard created by a reduction in availability of welfare facilities when the class 377 trains were replaced with class 313 trains.

- 111 For a shift length of between 6 and 9.5 hours, such as the shift worked by the driver of train 5U57 on the night of the accident, an agreement between GTR and ASLEF mandates that drivers have either one 30-minute or two 20-minute scheduled physical needs breaks during the shift. There are agreed restrictions that these breaks cannot be at the start or end of the shift.
- 112 Outside of a scheduled break, provision for access to toilets during train planning is managed by compliance with the union agreement that states a continuous block of work will not exceed 4 hours, unless there is more than a 10-minute gap between arriving and departing at a location (turnaround time) where a toilet is available. Additional turnaround time is given at some London locations due to the distance of the toilets from the platforms.
- 113 Under GTR's traincrew work planning rules, no additional time was required to be scheduled at Brighton station where the standard turnaround time is eight minutes. RAIB identified that it is around a 6 minute and 55 second round trip to walk to the staff toilet in the driver's mess room, meaning a driver could not use these toilets and get back to their train, configure it and be ready to depart in eight minutes. The public toilets at Brighton station are located by the station entrance and are around a 3 minute and 50 second round trip from a train's cab. Although closer to the train than the staff toilet in the driver's mess room, this still leaves very little time for a driver to use these toilets without risking a late departure of their train.

¹⁰ Reporting of Injuries, Diseases and Dangerous Occurrences Regulations 2013 (RIDDOR) specify certain types of injuries which must be reported to the regulator.

¹¹ Rail Safety and Standards Board Annual Health and Safety Report 2021/22. Available at: <https://www.rssb.co.uk/safety-and-health/risk-and-safety-intelligence/annual-health-and-safety-report>

- 114 When the class 377 trains (fitted with onboard toilets) were replaced with class 313 trains (without onboard toilets) no additional provision was made in terms of traincrew welfare facilities. This may have been because the risk assessment completed at the time did not recognise the change in the availability of welfare facilities as a hazard.
- 115 Although no risk assessment was undertaken relating to the availability of welfare facilities, GTR had recognised that traincrew may need to use the toilet during the course of their duties and had included in its company rules the provision for traincrew to take an emergency physical needs break to use a toilet urgently (regardless of whether the train was fitted with toilets). Witness evidence from traincrew suggested that GTR drivers were aware that they were permitted to request an emergency physical needs break and understood that they would not be penalised by GTR for needing to use the toilet unexpectedly.
- 116 However, at the time of the accident GTR had not configured, as a separate item in its performance software, a record of delays caused by emergency physical needs breaks. This meant that it did not fully understand the effectiveness of its traincrew welfare arrangements. Following the accident, GTR reconfigured its software to display information relating to emergency physical needs breaks. The resulting data showed that in reporting year 2020-21 there was an average of 10 emergency physical needs breaks per four-week reporting period, and that in 2021-22 year this dropped to nine per period. The number of breaks then rose to 13 per period for the 2022-23 year up to reporting period 8 of 2022-23, the latest data available.

Prior evidence of lack of welfare facilities

117 GTR had not taken effective action to address the lack of available toilets for drivers on the Brighton to West Worthing route even though they were aware that drivers had needed to urinate at the middle siding for a number of years before the accident.

- 118 RAIB found that a series of notices were published by GTR between 2015 and 2020/21 regarding a large quantity of bottles of urine which were being deposited on the track at the middle siding, probably by GTR drivers (paragraph 68 and appendix C). Network Rail raised concerns with GTR about the biological hazard these bottles presented to track workers.
- 119 Over the years the tone of the notices issued by GTR became stronger, culminating in senior managers threatening to install CCTV cameras and take disciplinary action against drivers found to be urinating in bottles and discarding them on the track at the siding.
- 120 There is no evidence that GTR sought to understand the underlying reasons why drivers needed to urinate in bottles in the middle siding until a notice was published announcing the opening of a toilet for traincrew use at West Worthing station on the down Brighton platform. This notice was not dated and was not managed through GTR's document control process.

121 Witnesses stated that this notice was produced in either May 2020 or May 2021. It was placed on noticeboards at Brighton depot and in the pigeonholes of drivers who signed this route. Some drivers at Brighton depot stated they were aware of the toilets at West Worthing station, while others stated they were not aware, indicating that the notice and the way it was managed by GTR were not completely effective. Because there was no requirement for drivers to confirm that they had received and understood the notice, and the uncertainty about when it was issued, RAIB has been unable to determine if the driver of train 5U57 was aware of the 2020/21 notice and presence of the toilet at West Worthing station.

Observations

Risk Assessment

122 No formal risk assessment was carried out to understand the hazards associated with a reduction of access to welfare facilities when replacing the class 377 trains.

123 Before the accident, GTR had not undertaken any risk assessment that considered welfare facilities for traincrew, as required by relevant legislation.¹²

124 When the class 377 trains were replaced with class 313 trains, a risk assessment to identify any potential hazards was carried out. This did not identify the risks arising from replacing rolling stock fitted with toilets with rolling stock which was not fitted with toilets as a hazard. As a consequence, GTR did not understand the risks that could have arisen from this situation and had not identified suitable measures to control the risk.

125 The risk involved in traincrew needing unplanned access to welfare facilities was generally understood to be mitigated by drivers being able to request an emergency physical needs break, but this risk was not formally mitigated.

The driver's shoes

126 At the time of the accident, the driver was wearing a type of safety footwear which was not specified by GTR for staff requiring access to the track.

127 At the time of the accident, the driver was wearing a composite trainer style safety shoe designed to conform to protection level S1P under standard EN ISO 20345:2011 'Personal protective equipment — Safety footwear', issued in July 2014. Examination of the shoes worn by the driver showed that their soles included cleats (a protruding tread pattern) and had the non-standard marking 'SLIP RESISTANT'.

128 GTR informed RAIB that an S1P shoe would only be offered to those staff in grades which did not require access to the track, such as those working on platforms, and that drivers were instead required to wear safety shoes to protection level S3. While both S1P and S3 shoes are required to be slip resistant, an S3 shoe is required to have an outsole with cleats that have at least 2.5 mm of depth. Although resistance to slipping is dependent on the surface type and contaminants present, shoes with deep cleats may provide increased grip, particularly on soft surfaces.

¹² Regulation 3 of The Management of Health and Safety at Work Regulations 1999.



Figure 10: Image showing sole of shoe of the same type as that worn by the driver at the time of the accident.

- 129 RAIB examined a new S1P shoe of a comparable type to those being worn by the driver at the time of the accident (figure 10). This examination found that the cleats on the shoe were deep enough to meet the requirements of the S3 level of protection. For this reason, RAIB has concluded that, although the driver was wearing shoes of a type not specified by GTR for work on track when the accident occurred, this was not a factor in the accident.
- 130 GTR manages compliance with PPE requirements through initial driver training and on-going competence management. This process is intended to ensure that drivers understand the requirement to wear the correct personal protective equipment (PPE).
- 131 The driver completed a scheduled driving assessment on the morning of the accident (paragraph 20). While driving assessments normally include a check that the correct uniform and PPE is being worn or is available the competency development manager did not notice that the driver was not wearing the required S3 shoes. However, it would have required a very detailed examination of the driver's shoes to identify the difference between the S1P shoes that he was wearing and the required S3 type.

Post-accident actions

132 The signaller did not immediately arrange for the electrical power to the conductor rail to be switched off when this was requested by the driver of train 1N35.

- 133 When the driver of the examining train 1N35 realised that there was a person on the track ahead of his train, he called the signaller and made a request for an emergency switch-off of the traction power to the conductor rail (paragraph 34). Module DC of the Rule Book,¹³ states that the signaller should immediately contact the ECO when being made aware of ‘an incident or other emergency requiring, or likely to require, the electricity supply to be turned off’. However, before calling the ECO at Brighton to action this request, the signaller first instructed train 1H65 to remain in the platform at Goring-by-Sea, approximately 1.5 miles (2.5 km) from the accident site.
- 134 The reason for this Rule Book instruction is to potentially save the life of someone who is in contact with the live conductor rail and to enable their rescue. The signaller believed that their decision to instruct train 1H65 to remain in the platform at Goring-by-Sea was the correct course of action, as allowing this train to depart meant it may have subsequently been stopped outside of a station because of the accident. Stopping trains outside of stations for extended periods of time gives rise to the risk that passengers will self-evacuate onto the track and be in danger of being struck by other trains or electrocuted by the conductor rail. RAIB has issued publications on self-evacuation incidents before, for example:
- Self-detrainment of passengers onto lines that were still open to traffic and electrically live at Lewisham, 2 March 2018, [RAIB report 02/2019](#).
 - Passengers self-evacuating at North Pole Junction, 15 July 2019, [RAIB safety digest 09/2019](#).
- 135 Witness evidence was that Network Rail does not train its signallers to prioritise the movement of trains over contacting the ECO to request an emergency switch-off of traction current. However, further witness evidence suggests that signallers can feel pressure to make sure trains are not stranded outside stations. The signaller’s actions had no bearing on this accident because the driver had suffered immediately-fatal injuries when he was struck by the train.

Provision of FFCCTV

136 The train which struck the driver was not fitted with FFCCTV.

- 137 While RAIB was able to construct elements of the sequence of events using its examination of the accident site, witness evidence, reconstructions and electronic data from the OTDR and signalling systems, there was no FFCCTV evidence to use. If FFCCTV had been available, the images from train 1H63 would probably have provided better evidence of what happened in the final seconds before the driver of train 5U57 was struck by the train.

¹³ GERT8000 Rule Book Module DC, ‘DC electrified lines’. The Rule Book and Railway Group Standards are available from the website of the Rail Safety and Standards Board <https://www.rssb.co.uk/en/standards>.

138 The class 377 trains operated by GTR's Southern brand were constructed in batches between 2001 and 2014. Although some of the newer batches of class 377 were fitted with FFCCTV at manufacture, the unit which formed train 1H63 was from the first batch (entering service in 2002 and 2003) which did not have this technology installed when it was built. FFCCTV systems were widely available and started to be fitted to some passenger trains in Great Britain from the late 1990s onwards.

Summary of conclusions

Immediate cause

139 The driver of train 5U57 was in the path of train 1H63 as it passed the middle siding (paragraph 39).

Causal factors

140 The causal factors were:

- a. The driver may have fallen from the cab of train 5U57 and accessed the track outside the train unintentionally; this is considered unlikely (paragraph 46, no recommendation).
- b. The driver exited the cab of train 5U57 and accessed the track outside the train for a work-related (this is considered unlikely) or personal reason (this is considered probable) (paragraph 53). This causal factor arose due to either of the following:
 - i. The driver left the train for a work-related reason; this is considered unlikely (paragraph 55, no recommendation).
 - ii. The driver left the cab for a personal reason; this is considered probable (paragraph 64, **Recommendation 1**).
- c. The driver may have believed that it was safe for him to be outside of the train (paragraph 73). This causal factor arose due to a combination of the following:
 - i. The driver incorrectly believed that he had arranged for trains on the adjacent up Brighton line to be stopped; this is considered unlikely (paragraph 75, **Learning point 1**).
 - ii. The driver knew trains would continue to run on the adjacent up Brighton line but possibly believed that he did not need to arrange for them to be stopped to ensure his safety when outside of the train (paragraph 77, **Learning point 1**).
- d. After accessing the track, the driver entered the path of train 1H63 as it passed the middle siding (paragraph 85, **Recommendations 2 and 3**). This causal factor arose due to one or a combination of the following:
 - i. The driver of train 1H63 did not see the driver of train 5U57 and was therefore unable to warn him of the approach of the train or to take action to try and avoid a collision (paragraph 87, no recommendation).
 - ii. The driver of train 5U57 was not standing and was moving into the path of the train when he was struck (paragraph 91, **Learning point 3**).

Underlying factors

141 GTR did not effectively manage toilet provision for traincrew working trains which were not fitted with onboard toilets (paragraph 108, **Recommendation 1**).

Additional observations

142 Although not linked to the cause of the accident on 1 February 2022, RAIB observes that:

- a) No formal risk assessment was carried out to understand the hazards associated with a reduction of access to welfare facilities when replacing the class 377 trains (paragraph 122, **Recommendation 1**).
- b) At the time of the accident, the driver was wearing a type of safety footwear which was not specified by GTR for staff requiring access to the track (paragraph 126, **Learning points 2 and 4**).
- c) The signaller did not immediately arrange for the electrical power to the conductor rail to be switched off when this was requested by the driver of train 1N35 (paragraph 132, no recommendation).
- d) The train which struck the driver was not fitted with FFCCTV (paragraph 136, **Recommendations 2 and 3**).

Actions reported as already taken relevant to this report

Toilet provision for traincrew on class 313 units

143 The Rail Safety and Standards Board published a research report into the provision of toilets for traincrew on their website in March 2022. This report, titled 'Report into the provision and accessibility of toilet facilities for employees on the railway' stated that:

'There are potential health and safety risks arising from a lack of access to appropriate toilet facilities. Examples include leaving locomotives for emergency relief, isolation and security issues, adverse weather and working without optimal hydration (thus avoiding the need to use toilet facilities), resulting in fatigue, anxiety and distraction.'

This report goes on to note that:

'Only 3 of the 11 drivers said they had not used a bag or bottle in the cab for an emergency comfort break. However, one of the three admitted to urinating from a cab and one of using the side of the tracks.'

144 In addition to the research report, RSSB published a guidance paper in April 2022 titled 'Guidance on the provision of employee toilet facilities on Great Britain's railways' which the Office of Rail and Road (ORR) has commended to all duty holders. This guidance explores the risks around inadequate welfare facilities, explores a range of welfare provision options available to duty holders, and provides a template risk assessment for managing the risks associated with inadequate welfare provision.

145 Before this guidance was issued, there have been long-standing legal duties for employers to ensure suitable and sufficient welfare facilities are in place. These include the Health and Safety at Work etc. Act 1974, section 2 'General duties of employers to their employees' subsection 2(2) (e), which states:

'The provision and maintenance of a working environment for his employees that is, so far as is reasonably practicable, safe, without risks to health, and adequate as regards facilities and arrangements for their welfare at work.'

ORR has confirmed to RAIB that this duty applies to employers of train drivers.

146 On 17 May 2022, GTR was served with an improvement notice by ORR. Improvement notices are issued when ORR believes it needs to require organisations, or people, to make improvements, rather than just giving them safety advice. The improvement notice stated that:

'They [GTR] have failed to provide adequate welfare facilities and arrangements for Driver's and Conductor's [Guards] operating Class 313 trains, between Brighton Station and West Worthing Station. This includes toilets and the adequate time to access them. Therefore, as an employer they have failed to ensure so far as is reasonably practicable, the welfare of their employees whilst they are at work.'

147 In response to this improvement notice GTR developed a plan to improve access to welfare facilities on the Brighton to West Worthing route. This plan included:

- Reviewing the timetable to ensure that there are adequate toilet break opportunities during turnarounds. In the September 2022 timetable change, GTR reduced class 313 units reversing in West Worthing Middle Siding to one train a day and ensured that there was opportunity for additional toilet breaks in the schedule. In the December 2022 timetable update no class 313 units were scheduled to reverse in the middle siding.
- Explaining to drivers that they should remain hydrated and use the toilets when required.
- Providing internal communications to drivers briefing them that there is a safety risk involved in driving distracted while needing the toilet and that they will not be penalised for delaying a train by taking an emergency toilet break if they need one.
- Providing more information on the location and access requirements to toilets away from crew change places. GTR also conducted a survey and discovered that some toilet facilities away from the main crew relief locations are not always known to traincrew. They have completed an information pack for the Brighton to West Worthing route with information about welfare facilities on route.
- Reconfiguring existing performance data to show that emergency physical needs breaks are being taken (paragraph 116).

148 ORR considered that GTR had complied with the improvement notice by 31 October 2022.

Forward-facing CCTV

149 Since the accident, Porterbrook Leasing, the rolling stock leasing company that owns the class 377s operated by GTR, has continued its funding for a modernisation programme. Of the 304 Electrostar trains currently leased to GTR, 270 are within the scope of this programme which includes installation of FFCCTV (the Electrostar trains are a combination of class 377 and class 387 units).

150 This programme started in June 2020 and is scheduled for completion by early 2025. By November 2022, 75 trains had been upgraded, which represents the entire class 377 4-series fleet.

Background to RAIB's recommendations

FFCCTV

- 151 The non-fitment of FFCCTV has made understanding the sequence of events leading up to incidents and accidents more difficult during a number of other RAIB investigations. These include:
- Track worker struck by a train at Stoats Nest Junction, near Purley 6 November 2018, [RAIB report 07/2019](#).
 - Serious operational irregularity at Bagillt user worked crossing, Flintshire, involving an abnormally heavy road vehicle 17 August 2018, [RAIB report 11/2019](#).
 - Near miss between a train and a level crossing user at Dock Lane, Melton, Suffolk 14 June 2016, [RAIB report 08/2017](#).
 - Collision between a train and a fallen bridge parapet at Froxfield, Wiltshire 22 February 2015, [RAIB report 02/2016](#).
 - Accident involving a pantograph and the overhead line near Littleport, Cambridgeshire 5 January 2012, [RAIB report 06/2013](#).
- 152 RAIB has also previously investigated accidents where CCTV footage, including FFCCTV, has not been available due to inadequate maintenance. These include the overturning of a tram at Sandilands junction, Croydon, 9 November 2016 [RAIB Report 18/2017](#).
- 153 New train specifications usually refer to the 'Key Train Requirements document' (current version 6, dated November 2020). This guidance document is designed to assist those responsible for setting specifications for new build and refurbished trains. The ownership of this document is currently transitioning from the Rail Delivery Group and Rail Partners to RSSB.
- 154 Although it is not mandatory to comply with the Key Train Requirements document, the Department for Transport may use the document when assessing the suitability of a tender for trains which it is procuring.
- 155 The Key Train Requirements document currently states that '*CCTV cameras shall be fitted in accordance with RIS-2712-RST*'. While Rail Industry Standard RIS-2712-RST¹⁴ provides standards for FFCCTV systems in areas such as camera type, image quality and field of view, it does not mandate that they should be fitted.

¹⁴ RIS-2712-RST 'On-Train Camera Monitoring Systems', version 1.1, March 2022.

Fitment of toilets on new build trains

156 The Key Train Requirements document says that:

'Typical passenger numbers, journey times and the availability of toilets at stations and other locations nearby should be considered when assessing the requirement for on-train toilets.'

'Whilst the provision of toilets on trains is now very much the accepted norm, it should not be automatically assumed that this is appropriate for all types of train operating all types of services. As an example, passenger capacity on metro-type services is frequently a critical factor in train design and the installation of toilets inevitably occupies a significant amount of space. It is therefore common practice worldwide not to provide toilets where this type of train is operating intensive services with frequent stops into and across large conurbations.'

157 As an example of this, an assessment by Transport for London, published on its website in response to a request under the Freedom of Information Act 2000, estimated that the fitment of toilets on the class 345 Elizabeth line trains would displace around 600 passengers an hour from the line.

158 RAIB has not made a recommendation mandating the fitment of toilets to new rolling stock for the reasons highlighted in the Key Train Requirements document. However, RAIB has made a recommendation (paragraph 160) about the provision of adequate toilet and washing facilities for traincrew, where trains are operated without onboard toilets.

Management of lineside tripping hazards

159 During this investigation, RAIB identified that the detached conductor rail board had been presenting a tripping hazard for a number of years before the accident. Throughout this period, there were numerous inspections which should have detected the detached conductor rail board and led to the generation of a fault report. No faults were raised in relation to this detached conductor rail board, probably because under the modern standard it is no longer required in this location. However, as existing Network Rail procedures already cover the inspection of lineside assets and the removal of hazards, no recommendation has been made in relation to the non-removal of the conductor rail board.

Recommendations and learning points

Recommendations

160 The following recommendations are made:¹⁵

- 1 *The intent of this recommendation is to ensure that traincrew working for Govia Thameslink Railway have adequate access to toilet and washing facilities.*

Govia Thameslink Railway should undertake a review of the toilet and washing facilities which exist over all the routes it operates. It should implement any measures identified as being necessary to control the risks identified and ensure that there are sufficient toilet and washing facilities available, that traincrew know where these facilities are, and that they have time to use them without an unreasonable wait.

This recommendation may apply to other train operators, including those operating passenger, freight, and engineering trains without onboard toilet facilities (paragraphs 140b.ii and 141).

- 2 *The intent of this recommendation is that new rolling stock will be fitted with on-train closed-circuit television systems that include effective forward-facing closed-circuit television, in order to facilitate the investigation of incidents and accidents.*

The Department for Transport, working in conjunction with Rail Safety and Standards Board, should review standards and guidance, so that all new trains are fitted with effective forward-facing CCTV systems (paragraph 140d).

- 3 *The intent of this recommendation is to increase the availability of CCTV systems on existing rolling stock, in order to facilitate the investigation of incidents and accidents.*

The Rail Safety and Standards Board, working in conjunction with train and freight operating companies and rolling stock owners, should review the costs and benefits of retrofitting effective forward-facing CCTV to existing rolling stock not already fitted with such systems (paragraph 140d).

¹⁵ 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, recommendations 1 and 3 are addressed to the Office of Rail and Road and recommendation 2 is addressed to the Department for Transport, to enable them to carry out their 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 200 to 203) can be found on RAIB's website www.gov.uk/raib.

Learning points

161 RAIB has identified the following important learning points:¹⁶

- 1 Traincrew should make sure that appropriate protection has been arranged when needing to alight from their train to go on or near the line (paragraphs 140c.i and 140c.ii).
- 2 Traincrew should use personal protective equipment that meets the standards and requirements set by employers and operating rules (paragraph 142b).
- 3 Infrastructure managers should identify tripping hazards as a result of damaged or unnecessary trackside equipment and take timely action to remove the risk they present (paragraph 140d.ii).
- 4 Employers of train drivers should assure themselves that train drivers are wearing the correct personal protective equipment, including the required safety footwear (paragraph 142b).

¹⁶ ‘Learning points’ are intended to disseminate safety learning that is not covered by a recommendation. They are included in a report when RAIB wishes to reinforce the importance of compliance with existing safety arrangements (where RAIB has not identified management issues that justify a recommendation) and the consequences of failing to do so. They also record good practice and actions already taken by industry bodies that may have a wider application.

Appendices

Appendix A - Glossary of abbreviations and acronyms

AIVR	Automated Intelligent Video Review
ASLEF	Associated Society of Locomotive Engineers and Firemen
CCTV	Closed-circuit television
DNA	Deoxyribonucleic acid.
ECO	Electrical control operator
EMU	Electrical multiple unit
FFCCTV	Forward-facing closed-circuit television
GSM-R	Global System for Mobile Communications – Railway
GTR	Govia Thameslink Railway
ORR	Office of Rail and Road
OTDR	On-train data recorder
PNB	Physical needs break/Personal needs break
PPE	Personal protective equipment
RAIB	Rail Accident Investigation Branch
RFCCTV	Rear-facing closed-circuit television
RSSB	Rail Safety and Standards Board

Appendix B - Investigation details

RAIB used the following sources of evidence in this investigation:

- information provided by witnesses
- information taken from trains' OTDR
- CCTV recordings from the train in the middle siding
- site photographs
- weather reports
- voice communications between drivers and the signaller
- train running information
- industry control logs
- staff competency and training records
- Rule Book modules and GTR company standards
- photographs and documents describing the defects to the trains
- DNA profiling
- electronic data taken from the driver's personal mobile phone
- data obtained during an RAIB reconstruction
- items such as the driver's footwear and the conductor rail board
- statements from the British Transport Police and ORR
- a review of previous RAIB investigations that had relevance to this accident.

Appendix C - Notices issued by Southern

The following notices were issued by Southern between 2015 and 2020/21 relating to bottles of urine discarded in the middle siding at West Worthing (paragraph 118).

GOOD NEWS...

The track at West Worthing sidings have now been cleared of all the urine in bottles, which is good news.

We take Health & Safety seriously and this includes the Health & Safety of our Network Rail colleagues that clean the track.

I can now confirm that a toilet facility has now been made available on the Portsmouth Platform and is accessed by using a BR1 Key.

Please ensure that when and if you require to use these facilities, you advise your OBS before you arrive at West Worthing, and also ensure you advise the Signaller that you are taking a quick PNB.

We do not want to see a return of bottles in the picture.

Please use the facilities and if there is any issues with supplies or cleanliness please Let your RM know asap.



STOP!

Many notices have been produced about this particular issue and have fallen on deaf ears!

We take Health & Safety seriously and this includes the Health & Safety of our Network Rail colleagues that clean the track.

Toilet Stops have been agreed With ASLEF for a number of Years and yet this problem still persists.

I shouldn't have to resort to asking or telling other adults to please stop this and if you are desperate for the loo to use the one on the station.

If you have a medical condition that requires you to have immediate access to a toilet please speak to your Manager

Network Rail are considering the installation of a camera, I don't believe this action is necessary..... do you?



Reference Number	
Notice to be Posted	Weeks
Date Posted	
Date of transfer	
Notice transferred to Case number	
Date of withdrawal	

GTR Notice: GTR S&E
GTR/S&E/DC(I)/205
Issue Date: 19th October 2018

Great Northern **GX** SOUTH EASTERN ThamesLink/

SPECIAL NOTICE

Environmental Issue
Urine Bottles being discarded in Turn Back Locations

It has been brought to our attention that some members of train crew have deposited bottles containing urine on the tracks at some Turnback locations.



This is completely unacceptable and must cease forthwith.

Not only is this placing other railway colleagues at risk, it simply does not fit with the behaviours we would expect from professional members of our staff. Anyone who is identified as being responsible for this behaviour will be subject to disciplinary action. If you really feel the need to fill a bottle, then please dispose of it appropriately later in your duty.

Issued by: GTR Safety & Environment Author: Operational Safety Team
GTR Notice No: GTR/S&E/DC(I)/205 Approver: Operational Safety Team


Reference Number	
Notice to be Posted	Weeks
Date Posted	
Date of transfer	
Notice transferred to Case number	
Date of withdrawal	

GTR Notice: GTR S&E
GTR/S&E/DC(I)/167
Issue Date: 4 September 2018

SPECIAL NOTICE

West Worthing Sidings – Bottles of Urine

It has been brought to our attention that some members of train crew have deposited bottles containing urine, and other litter, onto the ballast in the area of West Worthing Middle Road, whilst turning terminating trains.



This is completely unacceptable and must cease forthwith.

Not only is this placing other railway colleagues at risk, it simply does not fit with the behaviours we would expect from professional members of our staff. Anyone who is identified as being responsible for this behaviour will be subject to disciplinary action. If you really feel the need to fill a bottle, then please dispose of it appropriately later in your duty.

Issued by: GTR Safety & Environment Author: Operational Safety Team
GTR Notice No: GTR/S&E/DC(I)/167 Approver: Operational Safety Team

Reference Number	
Notice to be Posted	Weeks
Date Posted	
Date of transfer	
Notice transferred to Case number	
Date of withdrawal	

GTR Notice: GTR S&E
GTR/S&E/DC(I)/012
Issue Date: 2 February 2017

SPECIAL NOTICE

West Worthing Sidings – Bottles of Urine

It has been brought to our attention that some members of train crew have deposited bottles containing urine, and other litter, onto the ballast in the area of West Worthing Middle Road, whilst turning terminating trains.



This is completely unacceptable and must cease forthwith.

Not only is this placing other railway colleagues at risk, it simply does not fit with the behaviours we would expect from professional members of our staff. Anyone who is identified as being responsible for this behaviour will be subject to disciplinary action. If you really feel the need to fill a bottle, then please dispose of it appropriately later in your duty.


Issued by: GTR Safety & Environment Author: Operational Safety Team
GTR Notice No: GTR/S&E/DC(I)/012 Approver: Operational Safety Team

Reference Number	
Notice to be Posted	Weeks
Date Posted	
Date of transfer	
Notice transferred to Case number	
Date of withdrawal	

GTR Notice: GTR S&E
GTR/S&E/DC(I)/034a
Issue Date: 26 October 2015

SPECIAL NOTICE

West Worthing Sidings – Bottles of Urine



This is completely unacceptable and must cease forthwith.

Not only is this placing other railway colleagues at risk, it simply does not fit with the behaviours we would expect from professional members of our staff. Anyone who is identified as being responsible for this behaviour will be subject to disciplinary action. If you really feel the need to fill a bottle, then please dispose of it appropriately later in your duty.

Issued by: Safety & Environment Author: Operational Safety Team
GTR Notice No: GTR/S&E/DC(I)/034a Approver: Operational Safety Team

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Any enquiries about this publication should be sent to:

RAIB	Email: enquiries@raib.gov.uk
The Wharf	Telephone: 01332 253300
Stores Road	Website: www.gov.uk/raib
Derby UK	
DE21 4BA	