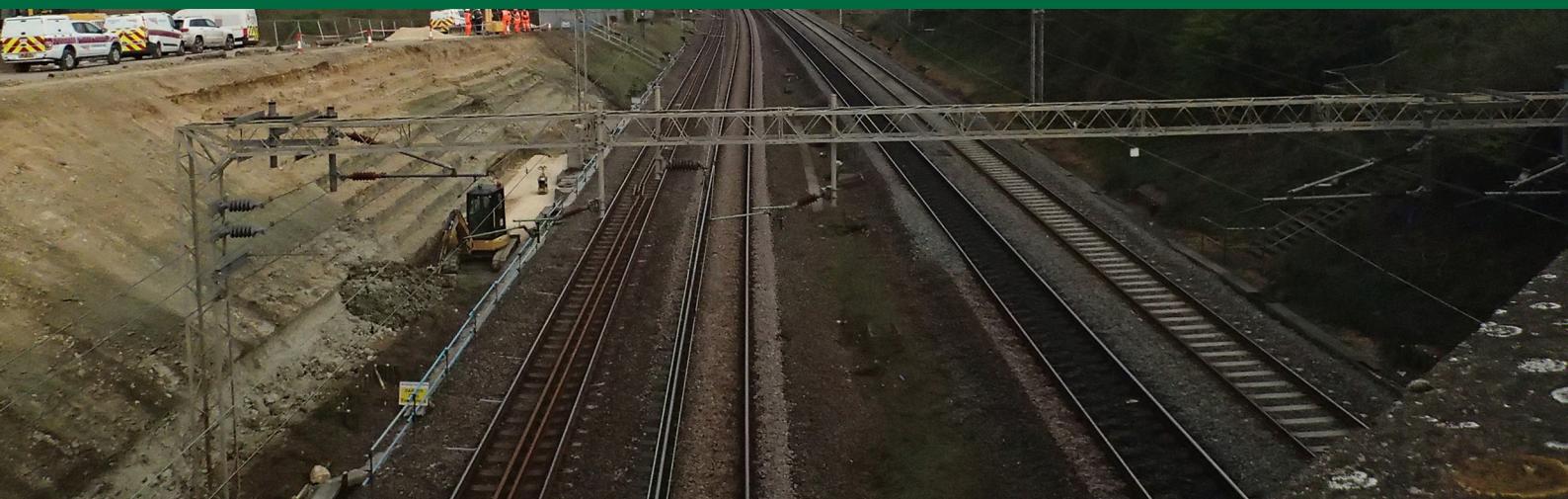




Rail Accident Investigation Branch

Rail Accident Report



**Track worker struck by train near Roade,
Northamptonshire
8 April 2020**

Report 03/2021
June 2021

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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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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Track worker struck by train near Roade, Northamptonshire, 8 April 2020

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Summary

At around 10:52 hrs on Wednesday 8 April 2020, a passenger train, travelling at 90 mph (145 km/h), struck and fatally injured a track worker on the West Coast main line near the village of Roade, Northamptonshire.

The accident happened because the track worker, who was the person in charge of the work with responsibilities as Controller of Site Safety, was walking along a line that was open to traffic and did not look towards the approaching train on hearing its warning horn. He had gone back onto the track after handing back a blockage of the line, which had been taken to isolate the overhead line equipment, a task which, it was later appreciated, did not need to be done every day. It is not possible to determine with certainty why the track worker decided to walk on the track with no protection, but it is probable he had a purpose in mind and that he believed that no trains were due on the line he was walking along. There is also witness evidence suggesting that he had become habituated to warnings from approaching trains.

RAIB's investigation found several factors which possibly led to this situation. The performance monitoring and appraisal arrangements for the track worker were inadequate and did not identify and address issues with compliance with rules, standards and procedures. The system of work in place for the site was inadequate for the work being undertaken and did not specify adequate arrangements to encourage compliance with safety rules, possibly affecting the behaviour of the track worker and others during the project. None of the assurance arrangements in place identified any non-compliant behaviours or the inadequate system of work.

RAIB has made two recommendations to AmcoGiffen relating to monitoring and developing the ongoing competence and performance of its staff, and ensuring compliance with its management procedures on new sites of work. One recommendation has been made to Network Rail relating to minimising the need for access to the track when taking isolations of electrical contact systems.

RAIB identified two learning points, relating to track workers only accessing the track when they are protected by safe systems of work, and independent review of safe system of work plans.

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 and technical terms which are explained in Appendix A. Sources of evidence used in the investigation are listed in Appendix B.

The accident

Summary of the accident

- 3 At around 10:52 hrs on Wednesday 8 April 2020, a track worker was struck and fatally injured by a passenger train on the West Coast main line near the village of Roade, Northamptonshire.

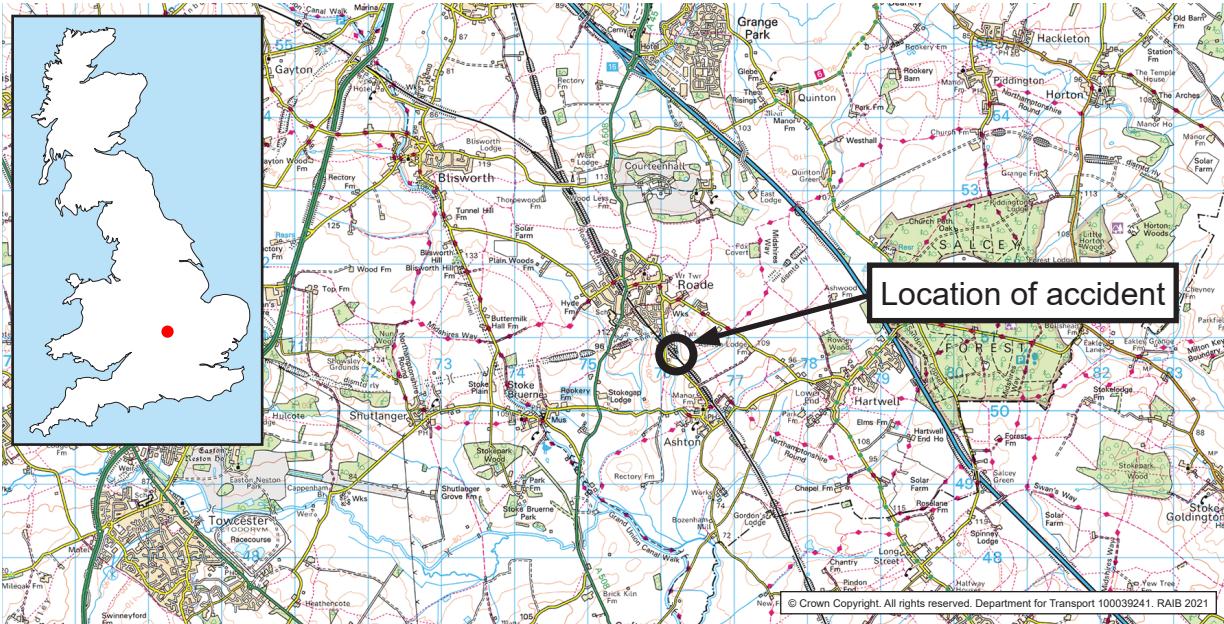


Figure 1: Extract from Ordnance Survey map showing location of accident

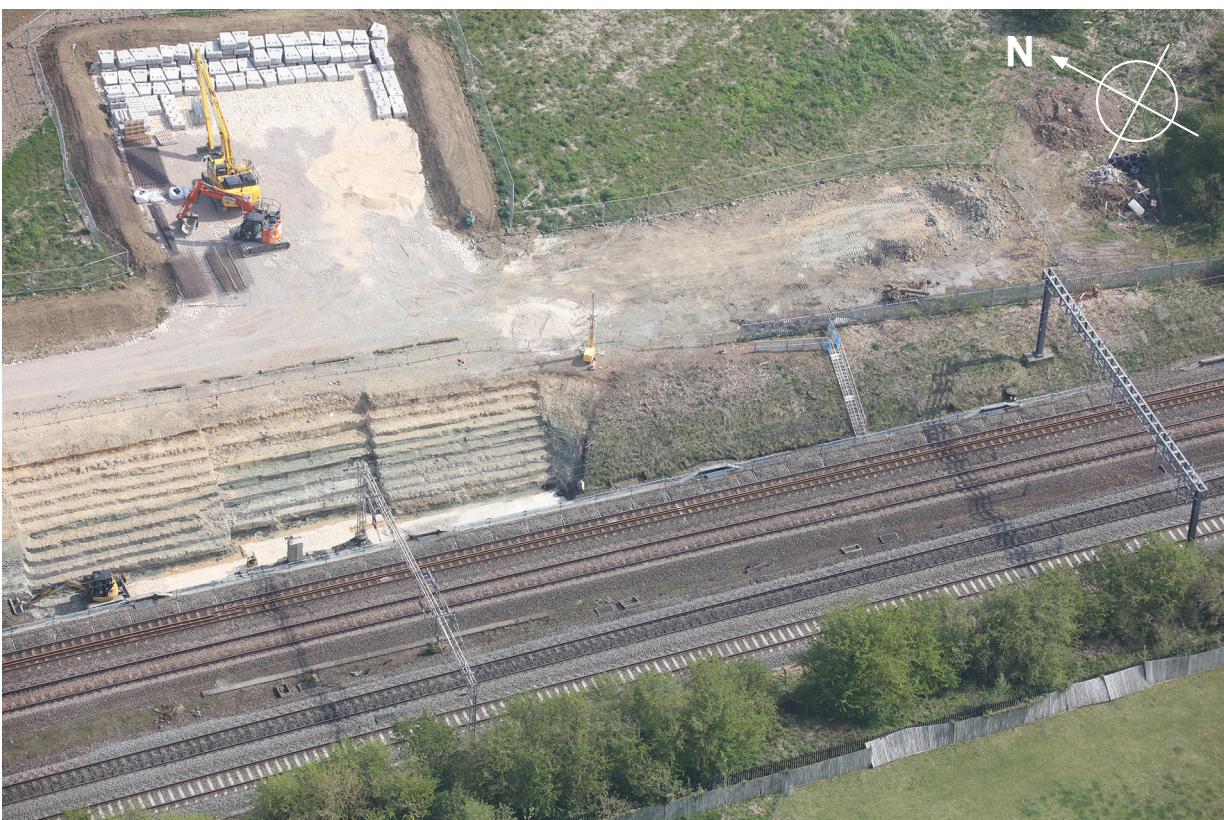


Figure 2: Aerial view of location

Context

Location

- 4 The West Coast main line at Roade is a four-track railway running generally south-east to north-west. The four tracks are the up and down fast lines, on the west side, and the up and down Northampton lines. North of Roade, the up and down Northampton lines pass through Northampton station and the fast lines bypass it, heading towards Rugby. Descriptions in this report refer to north (down lines) and south (up lines) reflecting the general direction of the route.
- 5 The accident occurred on the up Northampton line, approximately 100 metres south of overbridge 204 which is located at 59 miles and 700 yds,¹ and takes Ashton Road over the railway between the villages of Ashton and Roade.
- 6 Either side of overbridge 204, the railway runs through a cutting which extends for approximately 200 metres on the south-eastern side of the bridge. Travelling south, as the train involved was, the track curves to the left, restricting the view of the line ahead. Overbridge 204 further reduces this view as the structure is closer to the track than the cutting slope. People working on the track south of the bridge have a similarly restricted view of trains approaching from the north (from the direction of Northampton).
- 7 All four lines are electrified with 25 kV overhead line equipment (OHLE). The maximum permitted speed on the up and down Northampton lines is 90 mph (145 km/h). The signalling is controlled from Rugby signalling control centre (SCC), and the electrical control room, also located at Rugby, monitors and controls the OHLE.
- 8 At Roade the OHLE includes two pairs of wires in addition to those that supply traction current to trains: these are suspended from the masts which support the OHLE gantries (see figure 5). These two wires are part of the Auto Transformer Feeder (ATF). The ATF enhances the system's ability to maintain contact wire voltage at times of high traction current demand. Energisation of the ATF system is not necessary for the contact wire to be live and for electric trains to run. Although designed to be normally live, the ATF system was de-energised at the time of the accident and had been so since 2016. This was because, for some time, lineside vegetation had been encroaching onto the OHLE, and on previous occasions it had made contact with the ATF system wires, causing the OHLE system to trip. There is no visual indication at the site of whether the ATF system is energised or not.

The project at Roade

- 9 The eastern side of the cutting at Roade had been identified as requiring work to improve its condition, because of features that posed a safety risk to the railway. These included a steep slope which was showing signs of soil creep, toe bulging (movement of material at the base of the cutting) and rabbit burrow damage. The work involved removing excess material from the slopes either side of the overbridge, and the installation of interlocking pre-cast concrete blocks to stabilise the slopes. The site was divided into two areas of work, one either side of the overbridge.

¹ From a datum at London Euston.

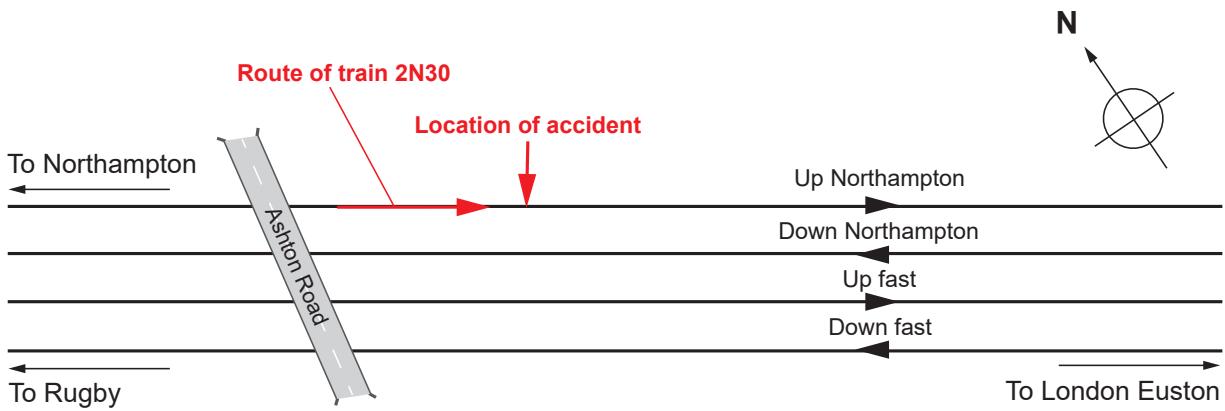


Figure 3: Track layout

- 10 Although originally considered for implementation in 2014/15, work did not begin on site until early January 2020.

Organisations involved

- 11 Network Rail owns, operates and maintains the railway infrastructure at Roade, including the OHLE. Network Rail's North West and Central (NW&C) region Capital Delivery team represented Network Rail as client and principal designer for the project.
- 12 AmcoGiffen was formed by the merger of two companies and is the trading name of Amalgamated Construction Ltd and Giffen Group Ltd. Amalgamated Construction Ltd was appointed by Network Rail as the principal contractor for the project. Both companies hold licences under Network Rail's Principal Contractor Licensing scheme.
- 13 ISS Labour Ltd (ISS) was subcontracted by AmcoGiffen to provide staff to undertake the arrangements for isolations of the OHLE, including earthing the ATF system wires.
- 14 West Midlands Trains operated the train involved and employed the driver.
- 15 Network Rail, AmcoGiffen, ISS and West Midlands Trains freely co-operated with the investigation.

Train involved

- 16 The train, reporting number 2N30, was the 10:45 hrs West Midlands Trains service from Northampton to London Euston. It comprised three four-car class 350 electrical multiple units.
- 17 West Midlands Trains subsequently inspected the train and found no defects with its horn, lights or brakes. RAIB found no evidence that the condition or operation of the train contributed to the accident.

Staff involved

- 18 The track worker involved was aged 51 and was a permanent employee of AmcoGiffen, having worked for it since December 2013. Records provided to RAIB show that he had worked in the rail industry in various track maintenance and civil engineering roles at least as far back as 2004. Between November 2005 and autumn 2011 he worked outside the railway industry.

- 19 As well as being certified as competent in Personal Track Safety, the track worker was certified as competent to perform various safety critical roles including Controller of Site Safety (COSS), Protection Controller, Safe Work Leader, Engineering Supervisor, Individual Working Alone and Lookout. He is believed to have first qualified as a COSS in 2005, or possibly earlier.
- 20 On the day of the accident, he was the Person in Charge (PIC) for the work south of the overbridge that could affect, or be affected by, the running of trains. This role required him to be involved in the planning of the work and have the overall accountability for supervising and overseeing its safe implementation. The PIC is required to ensure that planned controls are suitable and put in place to keep people safe from trains, the work activity and other site risks. Consequently, the PIC must be certified as competent to act as a COSS.
- 21 At the time of the accident, the train driver had 40 years of experience of driving trains. He began his shift at 09:32 hrs. When the accident occurred he was driving his first train of the day.

External circumstances

- 22 The weather was warm, dry, with good visibility and minimal wind and so is not considered to have influenced events on the day. However, there would have been some noise from civil engineering plant associated with the work being undertaken (see paragraph 24).
- 23 The accident happened two weeks into the first national lockdown imposed in response to the coronavirus (COVID-19) pandemic in the UK.

The sequence of events

Events preceding the accident

- 24 When planning the work, AmcoGiffen recognised that there was a risk of excavators coming into close proximity to the OHLE. To mitigate this risk, it stipulated that the excavators should be positioned a minimum distance away from the railway and that the ATF wires be isolated while work was taking place (see paragraph 61 for an explanation of why this was considered necessary).
- 25 Isolations of OHLE equipment are implemented using the process defined in Network Rail Standard NR/L3/ELP/29987. In summary, once the arrangements are agreed between the staff taking the isolation and the Electrical Control Operator (ECO), the ECO will ensure that the relevant section is de-energised and issue a permit (referred to as form B) to the ‘nominated person’, authorising them to conduct a test to confirm this and undertake the work. The permit is retained by the nominated person for the duration of the work. At Roade, part of this process required portable earthing straps to be applied between the ATF wires at three Designated Earthing Points (DEPs) located on structures adjacent to the site of work. Figure 4 shows the locations of the DEPs used at Roade. The rule book requires this earthing activity to be done when the adjacent line is blocked to traffic.



Figure 4: Designated Earthing Point locations

- 26 AmcoGiffen initially planned to take isolations of the ATF system and apply earthing straps on Monday mornings and remove them on Friday afternoons, which would have greatly reduced the need to access the track for this purpose. However, after the project got underway, on occasions Network Rail requested that isolations be given up at the end of each working day, to allow other isolations to be implemented overnight in connection with other work. This resulted in project staff needing to access the track to put up and take down portable earths at the beginning and end of the day of the accident.
- 27 AmcoGiffen's documentation indicated that its plan was to protect staff from trains by implementing a fenced² safe system of work. It had begun to install temporary safety fencing 1.25 metres from the nearest rail, but due to the proximity of cable troughing and other obstructions, the fence was not complete. Four gaps were left in the length of fence between the overbridge and a set of temporary steps which had been installed south of the work site to create a safe access to the cutting. An alternative 'separated'³ safe system of work was planned to be implemented for the work at the site, until such time that the fencing was completed.
- 28 AmcoGiffen has a policy of not undertaking any work under 'warning'⁴ arrangements. This means that all work requiring staff to be 'on or near the line'⁵ has to be done under 'protection' arrangements, such as line blockages, possessions⁶ or fenced/separated working.
- 29 Shortly after the works began a number of unforeseen issues arose. These included the discovery of a foul sewer that ran along the crest of the eastern cutting and difficulties with gaining agreement to access neighbouring land. At the time of the accident, AmcoGiffen had cleared away trees and removed excess material from the slope. Once these trees were removed, rock outcrops were revealed on the southern site, which required removing. Following this a terraced profile, known as 'benching' was excavated across the slope in preparation for the pre-cast blocks. On the day of the accident, wet concrete was being deposited at the base of the slope using the bucket of the long-reach excavator.
- 30 The track worker, acting as PIC and COSS, arranged the line blockages that morning. These were required for two staff from ISS, one of whom was acting as the 'nominated person', to earth the ATF system. The line blockages were arranged with signallers at Rugby SCC using a mobile telephone. On the day of the accident, the line blockages were not planned until the afternoon, as local track maintenance staff had a standing arrangement to take line blockages on Wednesday mornings. However, the project supervisor asked the track worker to make the request early, in the interests of getting on with the work.

² A system of protection from moving trains by using a fence or other physical barrier.

³ A system of protection from moving trains using a minimum allowable distance of persons from lines which are open to train movements.

⁴ A system of work that involves a group working on or near a railway line that remains open to traffic, with warnings provided to enable them to move clear as trains approach.

⁵ An area that is on the railway line itself or within 3 metres of a railway line and not separated from it by a permanent fence or structure.

⁶ A temporary closure of a line to trains to allow engineering work to take place in safety. On the request of those seeking protection, signallers place signals at danger to prevent trains approaching.

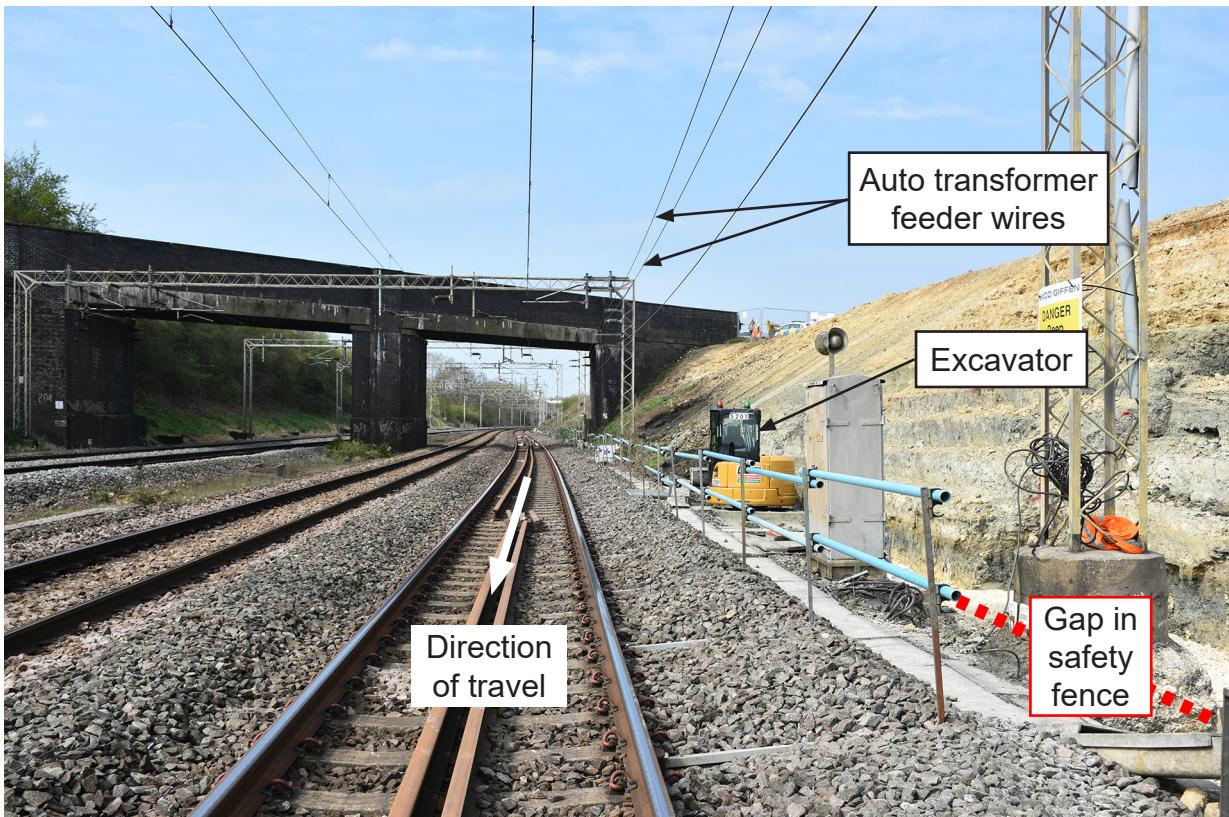


Figure 5: Image showing site looking north including safety fence and overhead line equipment

- 31 At 08:48 hrs, the track worker telephoned the signaller to ask him to block the line to enable the isolation staff to access the track. Knowing that local Network Rail track maintenance staff had already arranged access, the signaller agreed to try and help. At 09:26 hrs the signaller telephoned the track worker to grant him a line blockage of the up Northampton line. Protecting signals were held at danger and an Engineers Possession Reminder deployed in Rugby SCC. CCTV evidence indicates that the track worker had already accessed the track with the two ISS staff and was near to the southernmost DEP at the time. Having attached the earthing straps, all three walked along the railway heading north to the middle (intermediate) DEP which was located a few metres north of overbridge 204. CCTV from the site shows them walking past the site at 09:31 hrs.
- 32 Once the straps were attached to the middle DEP, the track worker continued north along the railway to the northernmost DEP, at Roade yard. The isolation staff walked back south under overbridge 204 and left the railway by using the access steps. They then drove to Roade yard in separate vans (as a precaution against COVID-19 transmission). At 09:48 hrs, while they were en route, the signaller called the track worker and asked him to give the line blockage back as a train was due. The track worker gave up the line blockage and waited for the signaller to contact him to grant a further line blockage to complete the work.

- 33 At 10:36 hrs, the signaller granted the track worker a second line blockage and he and the isolation staff went on to the track to attach the earths to the northern DEP. Once this was complete, the isolation staff returned to their vehicles, which were parked nearby. The track worker walked southwards alone, towards and under overbridge 204, along the up Northampton line, arriving at the cutting slope at 10:46 hrs. He then spoke briefly to two staff working with a small excavator at the northern end of the site, and in the course of this conversation, he told them that the isolation was now in place and to expect the next train in about fifteen minutes.
- 34 Although other COSS qualified staff were present on site, the SWP only specified the need for one COSS for the work south of overbridge 204, and the track worker fulfilled this role. Despite this, the three staff at the bottom of the slope had been working, and the small and long-reach excavators had been in use, close to the railway, during his absence. This work required a person acting as a COSS to be present.

Events during the accident

- 35 Site CCTV shows that after speaking with the two staff, the track worker continued walking south to the southern end of the cutting, a distance of about 30 metres. He used a gap in the safety fence to move from the track to the project work site. At 10:48 hrs he received a phone call from the signaller asking for the line blockage to be handed back once more. At this time, the track worker was standing just behind (on the non-railway side of) the line of safety fencing, on or around the lid of the cable troughing that ran parallel with the railway. He confirmed with the signaller that the line was safe for the passage of trains, that he was in a position of safety and that he would remain so. He correctly noted the time of 10:49 hrs for handing back the line on his safe work pack (SWP).
- 36 At 10:49:51 hrs the track worker stepped out of view of the site CCTV. His actions and precise whereabouts are unknown until 10:51:36 hrs when he came into view of the forward-facing CCTV camera on train 2N30. At this point he was walking along the four-foot⁷ of the up Northampton line, with his back to the train, which had left Northampton on time at 10:45 hrs and was travelling at around 90 mph (145 km/h).
- 37 The train driver sounded the train's horn briefly, for the first time at 10:51:36 hrs and again one second later, before sounding it continuously for around four seconds from 10:51:40 hrs. Witnesses reported seeing the track worker raise his right arm in acknowledgment of the train horn. At 10:51:43 hrs the front of the train passed under overbridge 204 and the track worker's raised right arm can be seen on the forward-facing CCTV. The track worker can be seen walking at a shallow angle towards his left, stepping over the left-hand rail before being struck. CCTV and witnesses confirm that he did not turn to look in the direction of the train. No other trains were in the vicinity at the time.

⁷ The space between the two rails of a railway line.

- 38 At the time of the accident the Rule Book, Module TW1 section 45.3 (issue 14), stated that drivers should give a series of short, urgent danger warnings to anyone who is on, or dangerously near the line, who does not acknowledge their warning by raising one arm above the head, or appear to move clear out of the way of the train. However, the track worker's clear acknowledgement meant that the driver did not perceive his presence as an emergency until it was too late to make any material difference.
- 39 The position of the track worker at the point he was struck and his gradual movement to his left strongly suggest that he was walking towards a gap in the safety fencing near to the access steps.
- 40 Analysis of the on-train data recorder shows that the driver began to brake around two seconds before reaching the track worker, and that the train was still travelling at 90 mph (145 km/h) when it struck him.

Events following the accident

- 41 The driver braked the train to a halt, and before it stopped he began a Railway Emergency Call to report the incident to the signaller. Staff on site also reported the incident to the signaller. As a result, the emergency services were alerted and attended the scene. Network Rail and AmcoGiffen also sent staff to the scene.
- 42 The signaller stopped other trains from approaching the site to make it safe for the emergency responders.
- 43 Witnesses on site stated that the track worker seemed his usual self on the day of the accident, and were clear that they had no reason to believe that he was in any way impaired. However, in situations like this, post-mortem toxicology samples are often taken in order to assess whether a person may have been affected by any substance. On this occasion no toxicology samples were taken, so no analysis was possible.

Analysis

Identification of the immediate cause

- 44 The track worker was walking on a line that was open to traffic and did not look towards the approaching train on hearing its warning horn.**
- 45 The immediate cause of this accident is clearly evidenced by footage from the train's forward-facing CCTV (figure 6).

Identification of causal factors

- 46 The accident occurred due to a combination of the following causal factors:
- the track worker went back on the track having just handed back a line blockage (paragraph 48)
 - the track worker probably believed that a train would not arrive so soon on the track he was walking along (paragraph 63)
 - it had previously been evident that the track worker did not always work in a way that was consistent with rules, standards and procedures. This occasional non-compliant behaviour had not been identified and addressed (paragraph 69).
- 47 Furthermore, the documented system of work in place did not encourage safe behaviours on site (paragraph 97). It is possible that this was a causal factor.
Each of these factors is now considered in turn.

Factors influencing the track worker's decision to go back on the track

- 48 The track worker went back on the track having just handed back a line blockage.**
- 49 The recording of the conversation between the track worker and the signaller shows a clear mutual understanding of the status of the line: that it was open to traffic.
- 50 Although it is not possible to say with certainty why the track worker went back on the track, it is possible that this causal factor arose because either:
- the track worker went back on the line with some purpose in mind (paragraph 53); or
 - the track worker felt unable to leave the work site without going onto the track because staff and work were temporarily obstructing the designated route (paragraph 56).
- 51 However, whatever the reason, going back onto the track was more likely to have occurred because the track worker had ready access to it, having just been onto the line to undertake a task that subsequently was found to be unnecessary (see paragraph 60).

- 52 RAIB has been unable to discount some sort of internal distraction contributing to the track worker's decision to access the track. He was living with some situations in his personal life that had the potential to be distracting, and may have been preoccupied with these. Although there is no evidence of a recent change in these situations, the cumulative effect cannot be discounted. More specifically, a few minutes before the accident he had mentioned his involvement in a very serious railway accident some years previously, which witnesses reported him saying that he found difficult to talk about. However, witness evidence was that prior to the accident he seemed his usual self.

Possible reasons for accessing the track

- 53 The track worker went back on the line with some purpose in mind.**
- 54 Witnesses, both on site and involved with the management of the project, were unable to identify a task that would require the track worker to go back onto the track. However, several witnesses reported that he was in the habit of taking photographs of the work with his mobile phone. These were frequently shared with colleagues via a social media app to keep them updated about the progress of the project.
- 55 The track worker's mobile phone was recovered from the scene by British Transport Police. It was badly damaged, and RAIB arranged for it to be examined but, despite significant efforts to replace damaged components, no useful information was recovered.
- 56 The track worker felt unable to leave the work site without going onto the track because staff and work were temporarily obstructing the designated route.**
- 57 At the time of the accident wet concrete was being delivered to the cutting toe using a long-reach excavator bucket (paragraph 29), which could reach the troughing that was being used as the walkway, due to the limitations on space between the bottom of the slope and the fencing. Two staff were levelling out the concrete while a third was acting as banksman for the excavator. The site CCTV shows two of them standing on the troughing lids as the train approached and evidence is that at least one remained there for the period that the track worker was out of view, obstructing the track worker's route to the access steps (paragraph 36). This, or the risk from the excavator bucket may have influenced the track worker's decision.
- 58 Witnesses reported that they had a 'thumbs up' policy where staff wishing to go near plant that was operating would attract the attention of the operator or controller by hand signals to get them to briefly suspend work. However, RAIB has not identified any evidence to suggest that the track worker invoked this before going back on the track.
- 59 He may also have been influenced by the risk of catching or transmitting COVID-19, if he were to go too close to the other staff; something that witnesses stated he was mindful of.

Isolating the ATF system

- 60 The track worker had ready access to the track, having just been onto the line to undertake a task that subsequently was found to be unnecessary.
- 61 AmcoGiffen subcontracted the isolation and earthing of the ATF system to ISS. The track worker, in his role as COSS/PIC, was required to take line blockages in support of the work and ensure the safety of the staff involved. He had overseen ISS staff implementing these isolations several times in the weeks leading up to the accident.



Figure 6: Image from the forward-facing CCTV of train 2N30, immediately before the accident

- 62 The ATF system had in fact been continuously de-energised since 2016 (paragraph 8). However, this did not negate the need to earth it, because it was possible for current to be induced in it from the traction current flowing through the other parts of the OHLE. However, there was no operational or safety reason to install and remove the earths each day, and they could have been left permanently in place. AmcoGiffen, ISS and key members of Network Rail's project team were unaware that the ATF system had been de-energised for the previous four years.

The track worker's expectations of the arrival of trains

- 63 The track worker probably believed a train would not arrive so soon on the track he was walking along.
- 64 The track worker had been working at the site since January 2020 and had previously taken numerous line blockages in connection with isolations of the ATF system and other work. It is possible that he had got used to the times at which trains passed through the site.

- 65 However, on Monday 6 April 2020 (two days before the accident), West Midlands Trains introduced an amended timetable in response to the reduced demand for rail travel caused by the COVID-19 pandemic. The result was that although there were still two half-hourly services from Northampton to London Euston, they departed ten minutes earlier than the previous week, at a quarter past and a quarter to the hour.
- 66 The effect of this was that the second train in the hour leaving Northampton could be expected to pass through Roade at nine minutes to the hour rather than around one minute past it. The track worker had taken twelve line blockages under the new timetable and so had experienced trains passing the site at the revised time. However, on around half of those occasions he had given up the line blockages as opposed to being asked to do so by the signaller. This meant that he experienced around six occasions where he was asked to give back the line earlier than he may have been used to.
- 67 Despite this exposure to the new timetable, witness evidence indicates that at 10:46 hrs the track worker commented on how the next train would be in 'fifteen minutes', indicating that he was expecting it to arrive around 11:01 hrs, a time consistent with the previous timetable.
- 68 On the day of the accident the interval between handing back the line and the train arriving was around two minutes. RAIB considered whether this interval between hand back and arrival was unusually short, and so could have been a factor. However, analysis of signalling data showed that intervals of around two or three minutes were not uncommon, and therefore it was unlikely to have contributed.

Safety behaviour and management

- 69 **It had previously been evident that the track worker did not always work in a way that was consistent with rules, standards and procedures. This occasional non-compliant behaviour had not been identified and addressed.**
- 70 This causal factor arose due to a combination of the following:
- Evidence suggests that the track worker did not always follow rules, standards and procedures, and had become habituated to warnings from approaching trains (paragraph 71)
 - The track worker's apparent diminished perception of the risk from trains had not been identified and corrected (paragraph 75).

Each of these factors is now considered in turn.

The track worker

- 71 Evidence suggests that the track worker did not always follow rules, standards and procedures, and had become habituated to warnings from approaching trains.
- 72 Although the track worker could be proactive with respect to identifying safety improvements on site, there is evidence that he sometimes deviated from rules, standards and procedures. There is evidence of this at the Roade site and previous sites where he had worked. For example, PICs are responsible for verifying and accepting SWPs and returning any necessary amendments back to the planner. However, at Roade, the track worker, acting as PIC, was verifying and accepting generic SWPs, which covered several unrelated tasks, without confirming or challenging their applicability to the specific work being undertaken and the locations (other responsibilities associated with the preparation and acceptance of SWPs are discussed in paragraphs 98 to 105). He had allowed work to continue 'on or near the line' when he, as PIC and COSS, was elsewhere for extended periods (paragraph 34). Also, the SWPs were not being returned to the planner (see paragraph 103).
- 73 There is also evidence that he had become habituated to warnings from approaching trains. Witnesses reported that he had a habit of walking in the four-foot, possibly because he believed this to be safer than walking through the work site with its associated trip hazards, and when challenged he did not acknowledge the risks associated with it. Similarly, witness evidence suggests that he had been challenged by colleagues for not looking towards trains when acknowledging them, and he was not averse to walking along the railway when it was open to traffic, without any formal protection (paragraph 31).
- 74 RAIB has been unable to determine the reasons for this behaviour and the track worker's apparent habituation to the risk from approaching trains. However, it is possible that the deviation from rules, standards and procedures was driven by his enthusiasm to maintain progress on site, something that witnesses reported he took pride in doing. This may have been exacerbated on this site because the project was running late due to a number of unforeseen technical challenges (paragraph 29).

Safety management

- 75 The track worker's apparent diminished perception of the risk from trains had not been identified and corrected.
- 76 This causal factor arose because:
- AmcoGiffen had not identified the track worker's deviation from rules, standards and procedures prior to him starting work at the Roade site (paragraph 77)
 - AmcoGiffen did not identify the track worker's deviation from rules, standards and procedures, and non-compliances when he was working at the Roade site (paragraph 79)
 - Network Rail was unaware of the deficiencies in AmcoGiffen's management of site safety at Roade (paragraph 87).

Each of these factors is now considered in turn.

AmcoGiffen safety assurance arrangements

- 77 AmcoGiffen had not identified the track worker's deviation from rules, standards and procedures prior to him starting work at the Roade site.
- 78 AmcoGiffen did not identify the track worker's deviation from rules, standards and procedures, possibly because it did not have any formal performance monitoring and appraisal arrangements for identifying and monitoring development needs, and their implementation, for operational staff over a continuous, extended period (paragraph 106). It reported that it used a close call system for raising concerns and taking immediate action, and that no close calls were raised relating to the track worker on the Roade site.
- 79 AmcoGiffen did not identify the track worker's deviation from rules, standards and procedures, and non-compliances when he was working at the Roade site.
- 80 AmcoGiffen's process for ensuring that work is undertaken safely is defined in its document HS47 'Health, Safety, Quality and Environment Inspections'. This requires AmcoGiffen to undertake a series of site inspections against a checklist defined in a Safety, Health and Environment (SHE) booklet. Inspections are to be undertaken at each site by health and safety advisors, site managers and, at any sites under their control, by project managers, contract managers, regional directors and the managing director.
- 81 The checklist is intended to be used as a prompt for the person conducting the check to consider 38 areas (although not all areas will be applicable at every site). These range from arrangements relating to site security and housekeeping to specific risks arising from hazards and activities. The same checklist and report pad is used by anyone conducting inspections, regardless of seniority or role. The checklist drives a focus on site conditions and arrangements rather than behaviours or actions of individuals. None of the areas listed are railway specific.
- 82 HS47 requires the site manager to undertake weekly checks and the Health and Safety department to undertake monthly checks. The project manager and senior management of a project are required to undertake monthly and quarterly checks respectively. However, these checks can be undertaken at any of the multiple sites under their control.
- 83 Between the start of the site phase of the project in early January and the accident, only six site managers' inspections of the site at Roade had been undertaken, instead of the required 13. The Health and Safety department site representative had undertaken monthly checks as required. The contracts manager inspected the site on 10 March 2020. No railway-related or behavioural issues were raised in any of the inspections.
- 84 In addition to the management checks, HS47 also requires what AmcoGiffen refers to as Representative of Employees Safety (ROES) checks. These are normally undertaken monthly by nominated staff and their purpose is to allow staff to raise concerns that they do not feel comfortable raising directly with management. AmcoGiffen explained that these are voluntary roles and such checks are only undertaken on sites to which ROES are appointed. However, even though two of the staff working on the Roade site were trained, no ROES checks were planned or undertaken on the site.

- 85 AmcoGiffen has an auditing process (Q04) which is intended to identify any non-compliances with implementation of its management systems. This process did not identify the non-compliance with HS47 (nor AmcoGiffen's non-compliance with its process relating to the preparation and review of SWPs, HS66 (see paragraph 97)). However, AmcoGiffen explained that it operates many sites, making it necessary for it to adopt a 'sampling' approach to auditing, and the Roade site had not been selected.
- 86 RAIB recognises that safety inspections will not always identify poor safety behaviour. This can be because at the time of an inspection there is no such behaviour to detect, individuals change their behaviour, or because the inspection focuses on other areas.

Network Rail's safety assurance arrangements

- 87 Network Rail was unaware of the deficiencies in AmcoGiffen's management of site safety at Roade.**
- 88 Network Rail requires principal contractors to be certified under its Principal Contractor Licensing scheme, which is defined by Network Rail standard NR/L2/INI/CP0070. Contractors must meet the pre-requisites of the Railway Industry Supplier Qualifications Scheme (RISQS) that is run by RSSB, on behalf of the rail industry. This mandates an audit against Industry Minimum Requirements as a condition of qualification. Additionally, licensed principal contractors are required to have ISO 9001 (quality) and Occupational Health and Safety Assessment Series (British Standards) (OHSAS) 18001 (health and safety) registered management systems. These requirements together are intended to offer a degree of assurance about the principal contractor's management and assurance systems.
- 89 Audits under RISQS are undertaken by a third-party organisation on behalf of RSSB. Contractors are also required to demonstrate compliance with the Network Rail Sentinel Scheme rules and pass an audit to confirm adequate management systems and competence for the production, review and acceptance of SWPs. Amalgamated Construction Ltd and Giffen Group passed audits in March 2019 and September 2019 respectively, encompassing the Industry Minimum Requirements, Sentinel Scheme rules and Safe Work Planning.
- 90 Although the RISQS required audit of the arrangements for managing formal safety competence of staff, it was only with the introduction of Network Rail Standard NR/L2/SCO/302 'Supplier Qualification Requirements' in September 2020 that there was a specific requirement for the general ongoing coaching and appraisal of staff. This may explain why AmcoGiffen was able to satisfy the requirements of the Industry Minimum Requirements audit, without having such a process in place (paragraph 77).
- 91 Network Rail's management assurance processes are set out in company standard NR/L2/ASR/036 and are intended to provide assurance, at every level of the organisation, that risk management systems are operating as intended. Network Rail has three levels of assurance:
 - Level 1: 'Local (route) management controls' including compliance monitoring, inspections, management reviews and self-assurance.

- Level 2: ‘Corporate oversight’ including engineering verification, deep dive reviews, and functional and management system audits, conducted by persons independent from those with the responsibility for implementing the risk controls.
 - Level 3: ‘Independent challenge and assurance of risk control policies’ consisting of audits undertaken by Network Rail’s internal audit team with the findings reported to the Network Rail board. These audits can also be informed by activities undertaken by external bodies such as Office of Rail and Road (ORR).
- 92 Where work is undertaken by contractors, the main Level 1 activities are expected to be delivered by the principal contractors.
- 93 Network Rail has arrangements in place to fulfil its Level 2 and Level 3 assurance responsibilities. However, audits at these levels would be unlikely to identify issues with behaviours on individual sites.
- 94 Network Rail also had Workforce Health Safety and Environment Advisors who undertook inspections of Capital Delivery activities. They are given flexibility in what they inspect and use their experience to judge safety issues. However, Network Rail has stated that because two of three Workforce Health Safety and Environment Advisors in Network Rail NW&C Capital Delivery were on secondment, the impact of COVID-19 on mobility of staff, and demands elsewhere there was insufficient resource to undertake any checks at the Roade site.
- 95 Following the accident at Roade, a subsequent narrowly avoided accident and an increase in reported close calls, Network Rail NW&C Capital Delivery commissioned an independent review of its workforce safety assurance regime. This concluded that the assurance system was reactive and did not give Network Rail sufficient visibility of contractor assurance activities, and that Capital Delivery got little benefit from the Principal Contractor Licensing arrangements. The review recommended that Network Rail improve the Capital Delivery audit regime in two respects: firstly, to enhance the impact of its assurance activities and secondly, to re-establish its assurance relationships with its principal contractors. RAIB’s investigation found evidence supporting many of the detailed findings from this review.
- 96 Network Rail’s overall assurance process is analysed in more detail in RAIB’s report into the accident at Margam on 3 July 2019 in which two track workers were struck by a train and fatally injured.^{8, 9}

Safe work packs in use at Roade

- 97 The documented system of work in place did not encourage safe behaviours on site. This is a possible causal factor.**
- 98 Network Rail’s standard NR/L2/OHS/019 ‘Safety of people at work on or near the line’ defines the way in which work should be planned, verified and authorised, as well as defining a hierarchy (an order of preference) for the various safe systems of work (SSOW) by which the risk from trains is controlled. Compliance with this standard is mandatory for contractors as well as Network Rail staff.

⁸ The level 1 arrangements for directly employed staff (as was the case at Margam) are different to those for contractors, however the level 2 and 3 arrangements are the same.

⁹ [RAIB report 11/2020](#).

- 99 The standard requires that SWPs be developed by a planner, in conjunction with a PIC who has been nominated by a responsible manager. The plan must be verified by that PIC before being authorised by the responsible manager. SWPs should be verified and authorised at least one shift before the work is due to take place. The PIC retains ultimate accountability for safety at a site of work and has the final decision as to whether a SWP is acceptable before it is implemented.
- 100 AmcoGiffen has a process for planning safe work on the railway (HS66 ‘Safety of people working on or near the line’) which is compliant with NR/L2/OHS/019. However, at the time of the accident the track worker was using a SWP that was inadequate, in that, for example:
- the planned SSOW was ‘separated’ requiring use of a site warden (who was not appointed or used)
 - there was no SSOW defined for the task of attaching the portable earths to the OHLE structures
 - the arrangements for access and egress did not reflect the reality of the site.
- 101 The SWP in use on the day was identical to that issued for each day for, at least, the preceding two weeks. The SWP should have been specific to the tasks to be undertaken on each day. However, the planner was not briefed on the specific tasks to be undertaken, and instead the manager told them to prepare SWPs that were vague to allow flexibility on site, to cope with the uncertainty as to what work would be done on any given day.
- 102 This approach was probably adopted to maintain progress on site, at the expense of compliance with process. The project had suffered delays and was running late as a result of unforeseen technical issues, including land access issues, unexpected site conditions (paragraph 29) and the limitations associated with the need to take daily isolations of the ATF system.
- 103 AmcoGiffen’s own process (HS66) and NR/L2/OHS/019 both require completed SWPs to be returned to the planner. This did not happen, and the planner was unaware of arrangements on site, such as the temporary steps and the use of the small excavator at the cutting toe. The responsible manager was aware of the requirement to check completed packs and was doing so but, possibly because he was involved in their creation, he did not identify any planning issues. Furthermore, AmcoGiffen’s audit regime did not identify the non-compliances against the requirements of HS66 and NR/L2/OHS/019 because there was no audit of the SWPs at Roade, due to the sampling nature of the audit regime (paragraph 85). Had AmcoGiffen audited a SWP from Roade it probably would have discovered that the SWPs were non-compliant and might have investigated why.
- 104 A good SWP sets out a clear method to manage the risks from both trains and work tasks. Clearly defined safe systems of work encourage compliance and normalise adherence to rules, making it more likely that others will challenge non-compliance.
- 105 The SWPs that were prepared for the Roade site did not clearly define the safe system of work that should be adopted for each of the tasks listed. It is possible that this led to staff becoming used to working in an informal manner and being less likely to challenge unsafe practices.

Identification of underlying factors

AmcoGiffen's performance monitoring arrangements

106 AmcoGiffen did not have any formal performance monitoring and appraisal arrangements for identifying and monitoring development needs, and their implementation, for operational staff.

- 107 AmcoGiffen had arrangements to monitor the formal safety competencies of its staff. However, it did not have any arrangements for the on-going monitoring and development of its operational staff over a continuous, extended period. Any issues that occurred were usually dealt with immediately, without reference to any previous history. Reports relating to safety performance of staff were not collated and made available to subsequent managers and supervisors. Consequently, the intelligence about an individual's behaviour and performance was informal and limited to the memory of the individuals they worked with.
- 108 The absence of formal performance monitoring and appraisal arrangements meant that managers had to rely on their personal knowledge of an individual when assessing and defining training and development needs. Managers were also responsible for the implementation of training and development, and ensuring completion, without any formal system to support them. On one occasion in 2019 when a manager identified a need for development of the track worker, and an action plan was devised, it was not followed up because the manager initiating it had left the business.

Previous occurrences of a similar character

- 109 Track worker accidents and near misses continue to feature in investigations undertaken by RAIB. Between October 2005 and March 2021, RAIB has investigated ten accidents in which track workers have been killed by being struck by trains. Three of these, resulting in four fatalities, have happened since July 2019.
- 110 RAIB investigated a fatal accident at Saxilby, Lincolnshire in 2012 which identified that the contractor involved did not have an effective performance review regime for managing the competence of people it hired for work on Network Rail infrastructure. This resulted in a recommendation regarding the management of the performance of staff. However, on that occasion it concerned the management of agency staff by contractors, and the competence of managers to assess the performance of anyone acting in key safety roles such as COSS.

Summary of conclusions

Immediate cause

111 The track worker was walking on a line that was open to traffic and did not look towards the approaching train on hearing its warning horn (paragraph 44).

Causal factors

112 The accident occurred due to a combination of the following causal factors:

- a) The track worker went back on the track having just handed back a line blockage (paragraph 48, **Learning point 1**). It is possible that this causal factor arose because either:
 - The track worker went back on the line with some purpose in mind (paragraph 53); or
 - The track worker felt unable to leave the work site without going onto the track because staff and work were temporarily obstructing the designated route (paragraph 56).
- b) However, it is more likely that the track worker went back onto the track because he had ready access to the track, having just been onto the line to undertake a task that subsequently was found to be unnecessary (paragraph 60, **Recommendation 3**).
- c) The track worker probably believed that a train would not arrive so soon on the track he was walking along (paragraph 63, no recommendation).
- d) It had previously been evident that the track worker did not always work in a way that was consistent with rules, standards and procedures. This occasional non-compliant behaviour had not been identified and addressed (paragraph 69, **Recommendation 1**). This causal factor arose due to a combination of the following:
 - Evidence suggests that the track worker did not always follow rules, standards and procedures, and had become habituated to warnings from approaching trains (paragraph 71)
 - The track worker's apparent diminished perception of the risk from trains had not been identified and corrected (paragraph 75).

113 A possible causal factor is that:

- The system of work in place did not encourage safe behaviour on site (paragraph 97, **Recommendation 2, Learning point 2**).

Underlying factor

114 AmcoGiffen did not have any formal performance monitoring and appraisal arrangements for identifying and monitoring development needs and their implementation for operational staff (paragraph 106, **Recommendation 1**). This is a possible underlying factor.

Previous RAIB recommendation that is relevant to this investigation

Accident at Margam, 3 July 2019, RAIB report 11/2020, Recommendation 7

115 This recommendation addresses one of the factors identified in this investigation (paragraph 86). So as to avoid duplication, it is not remade in this report.

Network Rail, in consultation with its main contractors and staff representatives, should commission a project to improve the way its management assurance system operates in areas directly affecting the safety of track workers. The review should include each of the following:

- a) *the identification of improved systems for collecting reliable data on how mandated processes are being applied in maintenance depots, and within track worker teams (to supplement or replace the existing Level 1 management self-assurance)*
- b) *improved mechanisms for collating, analysing, tracking, and presenting the findings of audits, investigations and other management assurance activities.*

The project should also consider ways of expanding the scope of management assurance activities to provide better intelligence on the underlying reasons for the non-compliances that are identified during audits, including consideration of the views of auditors and other relevant staff. The improved management assurance arrangements that are identified should be endorsed by the Network Rail board before implementation in accordance with a structured and validated programme for change.

This recommendation may apply to other Network Rail assurance processes.

This recommendation was made in the Margam investigation report ([RAIB report 11/2020](#)) which was published after the accident at Roade. RAIB is awaiting a response to this recommendation.

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

- 116 In February 2021 AmcoGiffen held an interactive national safety stand down with operational staff focusing specifically on safety 'on or about the line'.
- 117 Additionally, it has started a series of initiatives aimed at ensuring the safety of its staff while on the railway. These include:
 - establishing a COSS Academy to develop the skills and behaviour of staff working in that role
 - amending its existing electronic safe work pack tracker to include a formal, auditable means of including details of the reviews undertaken by the safe work planner, responsible manager and senior managers
 - developing and implementing a personal development review process for all employees, including associated training for its managers.

Recommendations and learning points

Recommendations

118 The following recommendations are made:¹⁰

- 1 *The intent of this recommendation is for all AmcoGiffen staff to maintain sufficient levels of competence.*

AmcoGiffen should develop and implement formal performance monitoring and appraisal arrangements for identifying and developing the ongoing safety performance and competence of its work force, at all grades. The procedure should include elements of proactive monitoring of staff performance and competence, identify areas of concern, define development needs and monitor their implementation. Suitable information about staff should be made available to all relevant managers across the business (paragraph 106).

- 2 *The intent of this recommendation is to ensure that AmcoGiffen assures itself that new projects and sites are operated in a safe and compliant manner.*

AmcoGiffen should review the management arrangements and resources that are intended to ensure that work is planned, undertaken and reviewed in compliance with its safety management systems, particularly in the early stages of establishing new projects and sites of work. It should implement any changes identified as being necessary to provide adequate assurance of compliance (paragraph 97).

- 3 *The intent of this recommendation is to minimise the need for personnel to access the track.*

Network Rail should review and amend the Electrical Safety Delivery programme to confirm that it takes account of the learning from the Roade investigation. In particular, it should consider ways of minimising the need for personnel to access the track, such as remotely operated earthing devices, and improved co-ordination and visibility of key information when planning and taking isolations of electrical traction supply and contact systems (paragraph 60).

¹⁰ Those identified in the recommendations have a general and ongoing obligation to comply with health and safety legislation, and need to take these recommendations into account in ensuring the safety of their employees and others.

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

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

Copies of both the regulations and the accompanying guidance notes (paragraphs 200 to 203) can be found on RAIB's website www.gov.uk/raib.

Learning points

119 RAIB has identified the following learning points:¹¹

- 1 Track workers should only access the track when they are protected by a suitable and sufficient safe system of work that is specific to the task they are undertaking (paragraph 48).
- 2 It is important that meaningful independent reviews of safe system of work plans are undertaken by a competent person to check that they are specific, suitable and sufficient for the task intended (paragraph 97).

¹¹ ‘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

ATF	Auto Transformer Feeder
COSS	Controller of Site Safety
DEP	Designated Earthing Point
ISS	ISS Labour Ltd
OHLE	Overhead line equipment
OHSAS	Occupational Health and Safety Assessment Series (British Standards)
NW&C	North West and Central
PIC	Person in Charge
RISQS	Railway Industry Supplier Qualifications Scheme
SCC	Signalling Control Centre
SSOW	Safe System of Work
SWP	Safe Work Pack also known as a Safe System of Work Pack

Appendix B - Investigation details

The RAIB used the following sources of evidence in this investigation:

- information provided by witnesses
- information taken from the train's on-train data recorder
- closed-circuit television (CCTV) recordings taken from the train involved, other trains in the area at the time and security cameras at the scene of the accident
- site photographs and measurements including aerial photographs
- weather reports and observations at the site
- analysis of mobile telephone call and message data
- audio recordings of conversations with staff at Rugby SCC and the site of work
- Safe work documentation used on site, Construction Phase Plans, Work Package Plans
- Staff competence records and training records
- signalling data
- a report commissioned by Network Rail into assurance within NW&C Capital Delivery
- a review of previous RAIB investigations that had relevance to this accident.

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