



Rail Accident Investigation Branch

Rail Accident Report



**Near miss with track workers and trolleys at
South Hampstead, London
11 March 2018**

Report 20/2018
December 2018

This investigation was carried out in accordance with:

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

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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.

The 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 the RAIB has described a factor as being linked to cause and the term is unqualified, this means that the RAIB has satisfied itself that the evidence supports both the presence of the factor and its direct relevance to the causation of the accident. However, where the RAIB is less confident about the existence of a factor, or its role in the causation of the accident, the RAIB will qualify its findings by use of the words 'probable' or 'possible', as appropriate. Where there is more than one potential explanation the 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 but are associated with the underlying management arrangements or organisational issues (such as working culture). Where necessary, the words '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 event 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 the RAIB, expressed with the sole purpose of improving railway safety.

The 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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Near miss with track workers and trolleys at South Hampstead, London, 11 March 2018

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Summary

At around 00:35 hrs on 11 March 2018, a group of track workers narrowly avoided being struck by a train while placing trolleys on the track alongside South Hampstead station, north London. The train was travelling at 49 mph (79 km/h) towards London Euston station when the driver saw the group, sounded his horn and applied the brake. Three other members of the work group, who were around 100 metres away from the staff placing the trolleys on the track, saw the train seconds earlier and shouted a warning to their colleagues who managed to remove the trolleys and get clear around two seconds before the train passed. One member of the group received a minor injury and many were distressed.

The incident occurred because the track workers had placed the trolleys on a line which was still open to train movements, instead of on the intended adjacent line that was blocked. The RAIB investigation found that the safety arrangements that had been established were ineffective. The work group did not have anyone designated as the ‘Person in Charge’, an individual who has sufficient knowledge and competence, and is specifically appointed to manage all the risks associated with the work, including the danger from moving trains. There were also a number of unofficial working practices being used by the workgroup and the person asked to take charge of safety for the work group believed the open fast lines were the blocked slow lines.

As a result of its investigation the RAIB has made six recommendations to Network Rail. These relate to:

- clarifying to staff the exact responsibilities of a ‘Person in Charge’;
- making sure that managers are aware of their responsibilities;
- improving location information that staff are provided with when working on or near the track;
- signage at the access point at South Hampstead;
- undertaking an audit of how Network Rail standard NR/L2/OHS/019 Issue 9 has been implemented across the network in order to determine how the standard has been interpreted and understood, and areas of good and bad practice; and
- reviewing how the changes from issue 8 to issue 9 of NR/L2/OHS/019 were managed, in order to identify any areas for improvement in the management of change.

The RAIB has also identified one learning point; that those in charge of safety should be careful to check safety critical information when challenged by others in their team.

Introduction

Key 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 acronyms. These are explained in Appendix A. Sources of evidence used in the investigation are listed in Appendix B.

The incident

Summary of the incident

- 3 At around 00:35 hrs on 11 March 2018, a group of track workers narrowly avoided being struck by a passenger train while they were placing trolleys on the track in preparation for planned work. The incident occurred on the West Coast Main Line, directly alongside South Hampstead station in north London (figure 1).

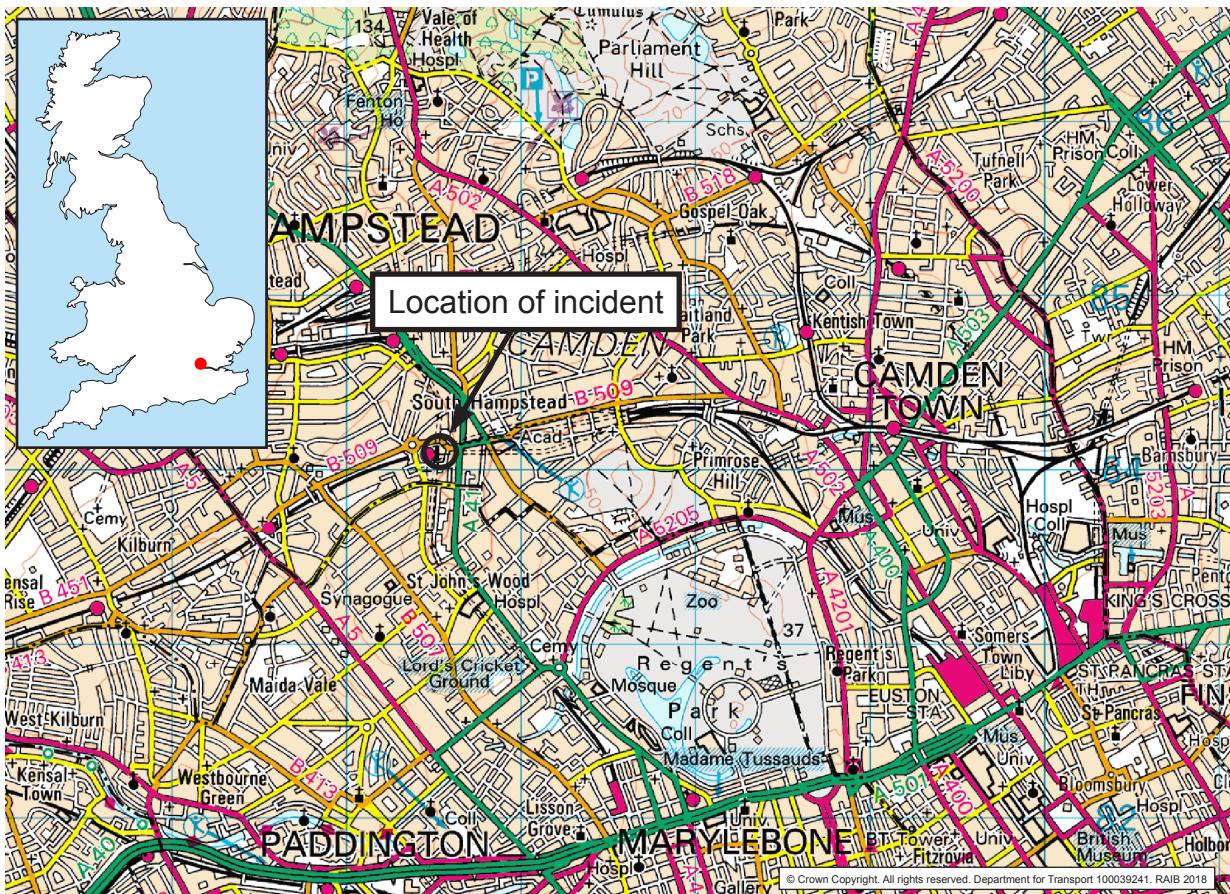


Figure 1: Extract from Ordnance Survey map showing the location of the incident

- 4 The train driver reported that he saw the group of track workers on the line ahead of him. He sounded the horn, and after realising they were on his line, applied the train's brakes. The driver saw that the staff had managed to get clear and came to a stop inside Primrose Hill tunnel.
- 5 Three members of the group were approximately 100 metres west of the main group of 22 track workers (figure 2) who were moving equipment between the access point and the track. The western group saw the train a few seconds earlier and shouted a warning to some of their colleagues who were on the track. This warning and the sounding of the train's horn gave the staff placing the trolleys on the line sufficient time to get themselves and the trolleys off the track around two seconds before the train passed them.

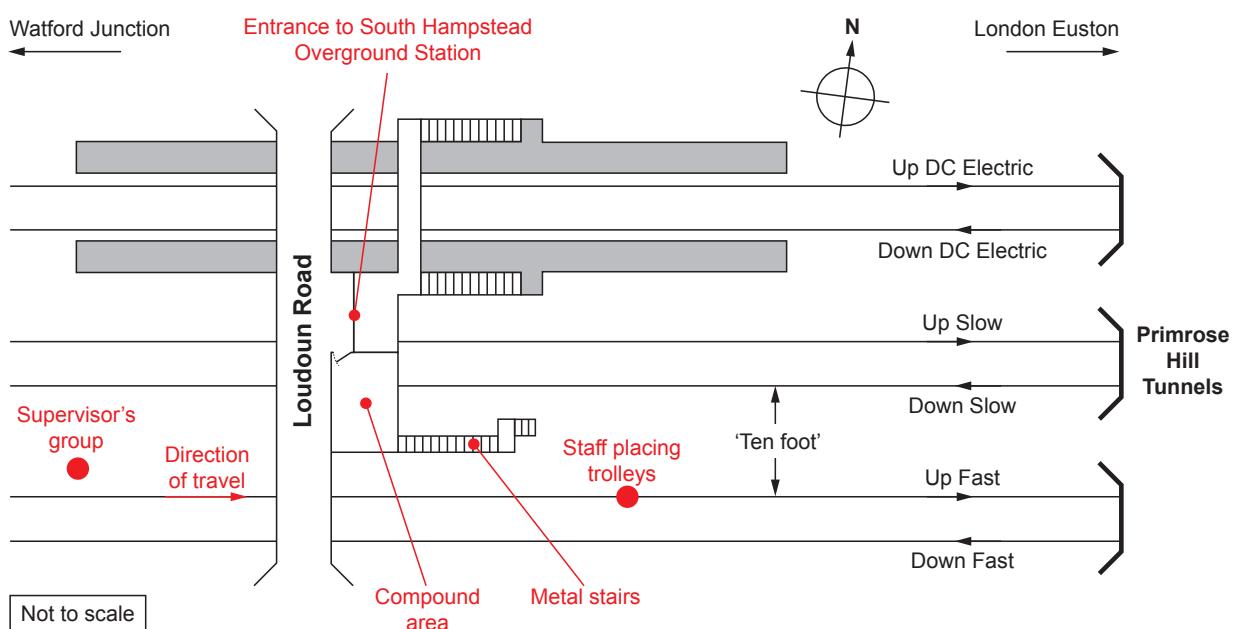


Figure 2: Schematic showing the lines at South Hampstead and the location of the work group at the time of the incident

- 6 One member of staff suffered a minor leg injury and was taken to a local hospital as a precaution. Many of those involved were left shaken by the incident.

Location

- 7 The incident occurred on the West Coast Main Line (WCML), on the up fast line, approximately 2 miles 38 chains (4 km) from London Euston station. The location is directly adjacent to South Hampstead station on the London Overground network.
- 8 The station entrance is on Loudoun Road and on a single carriageway bridge over the railway. The railway sits in a cutting approximately 7 metres lower than the road level.
- 9 There are a total of six running lines in the area (figure 2). In order from northernmost to southernmost they are: the up and down DC electric lines, which are mainly used by London Overground trains; the up and down slow lines; and the up and down fast lines. The up fast line, on which the train was approaching, has a line speed of 80 mph (129 km/h) at the location of the incident reducing to 55 mph (89 km/h) just before the portal of Primrose Hill tunnel, approximately 100 metres to the east.
- 10 Directly alongside the station entrance is an access point, entered through a pedestrian gate into a raised compound area above the down slow line (figure 3). A flight of metal stairs leads from the compound to track level. When descending the stairs, the fast lines are to the right, the slow lines to the left. There is a wide space (known as a 'ten-foot') between the fast and slow lines at the bottom of the stairs (figure 4).



Figure 3: View of the compound area from Loudoun Road. (Inset: view of the entrance to the compound, alongside South Hampstead station.)



Figure 4: View of the access point stairs from the ten-foot

Organisations involved

- 11 Network Rail owns, operates and maintains all of the lines at South Hampstead. Cable pulling work at the time of the incident was being undertaken by Network Rail's London North Western (LNW) route Works Delivery (Signals) team. It employed the Person in Charge¹ (PiC), responsible manager, planner² and works delivery manager.
- 12 M. J. Quinn Integrated Services Limited was contracted to deliver cable pulling workers to Network Rail. It employed the supervisor³ and seven other staff in the work group.
- 13 Premier People Recruitment (PPR) was the agency which supplied M. J. Quinn with the three staff qualified to act as Controllers of Site Safety⁴ (COSSs) and fourteen other staff in the work group.
- 14 West Midlands Trains Limited was the operator of the train involved and employed the driver.
- 15 All organisations freely co-operated with the investigation.

The train involved

- 16 Train 2Y30 was the 22:14 hrs West Midlands Trains service from Birmingham New Street to London Euston. It consisted of two class 350 electric multiple units⁵ comprising, in total, eight coaches.

Staff involved

- 17 The supervisor of the work group was employed by M. J. Quinn as the manager of its London Underground and Docklands Light Railway projects. On the night of the incident, he was coordinating the work activities on site. He did not hold a COSS or SWL⁶ competence.
- 18 COSS 1 was supplied by PPR. He had held a COSS competence for around four years and also held SWL level 1 competence. The night of the incident was the second time he had worked with M. J. Quinn on this project.

¹ A Person in Charge (PiC) is defined by Network Rail standard NR/L2/OHS/019 Issue 9 as someone involved in the planning and who is on site where the work is being undertaken and has the overall accountability of supervising and overseeing works.

² A planner is a person who is responsible for planning the work and creating the safe work pack.

³ A supervisor's role is generally focussed around the delivery of the work, and does not include any safety responsibility under NR/L2/OHS/019 issue 9, unless also acting as the PIC.

⁴ A Controller of Site Safety (COSS) is a person certified as competent to establish and maintain a safe system of work on site.

⁵ An Electric Multiple Unit is a train consisting of one or more vehicles semi-permanently coupled together, operated as a single unit and powered by electricity supplied through overhead line equipment or conductor rails.

⁶ A Safe Work Leader (SWL) is a competence introduced by Network Rail which combines responsibility for managing the work activities and responsibility for implementing and maintaining the SSoW. A SWL must hold a valid, current COSS competency.

- 19 COSS 2 was supplied by PPR. It was originally intended he would act as a 'Site Warden'⁷, but on the night he was asked to undertake COSS duties. He gained a personal track safety⁸ (PTS) competence in July 2017, and COSS competence in December 2017. He had worked on the cable pulling contract with M. J. Quinn a total of 14 times prior to the incident, primarily as a Site Warden and as a COSS on at least 2 occasions.
- 20 COSS 3 was supplied by PPR. He had held COSS competence since September 2017.
- 21 The rest of the work group consisted of 21 staff, seven of whom worked directly for M. J. Quinn and the remaining 14 were supplied by PPR. Seven members of the group had only recently obtained their PTS certification; which was a green square on their Sentinel⁹ card, and a requirement to wear a blue hard hat. All of the work group held the appropriate PTS certification which allowed them to work on electrified Network Rail infrastructure.
- 22 The planner, responsible manager, PiC and works delivery manager were employed by Network Rail. They were all experienced in their roles.

External circumstances

- 23 The incident happened on a cold, dry and clear night. There is no evidence that the weather conditions at the time played a part in the incident.

⁷ A site warden is appointed by a COSS to ensure staff stay in a safe area and do not approach open lines.

⁸ Personal Track Safety is a competence required by all staff who work on or near the line on Network Rail infrastructure.

⁹ Sentinel is a competency control system utilised by Network Rail. All staff working on or near the line are required to possess a photographic identification card which can be scanned with a mobile phone application to retrieve details of the staff member's relevant railway competencies.

Background Information

- 24 When work is to take place on or near the line¹⁰, a safe system of work (SSoW) must be established to protect staff from the movement of trains. Network Rail's procedure for planning, verifying, authorising and implementing a SSoW is detailed in its business process document NR/L2/OHS/019, 'Safety of people working on or near the line'. This standard is a key document in Network Rail's initiative to improve the safety of staff working on or near the line, called 'Planning and Delivery of Safe Work' (PDSW).
- 25 The latest version of NR/L2/OHS/019, issue 9, was written in late 2016 and published on 4 March 2017. When published, it was stated that it must be complied with by 3 July 2017, although this was later revised to 23 September 2017. A trial of the revised standard was undertaken at Romford delivery unit, in the Anglia route, between 6 March and 28 April 2017.
- 26 Network Rail staff can access the standard through its company intranet. Third parties access the standard through a subscription to an online standards repository. Supplementary information, such as guidance notes, briefing presentations and frequently asked questions (FAQs) is available on the PDSW section of Network Rail's publically available Safety Central website¹¹.
- 27 NR/L2/OHS/019 issue 9 introduced three key concepts: the provision of a Person in Charge (PiC); the involvement of the PiC in the planning process; and the safe work pack including risk assessments of the tasks being done. As well as the core standard, issue 9 included four supplementary modules, with the planned SSoW determining which module(s) to apply.
- 28 A PiC is accountable for their own safety, and that of all people in their work group. This includes the risk of being struck by trains and the hazards and risk associated with the task or location. As a minimum, a PiC of a group must hold a COSS or SWL competence. If required, a PiC can delegate their COSS duties to a suitably competent COSS, but this must be decided during the planning process.
- 29 The responsible manager is required to appoint a competent planner and a capable PiC. The responsible manager must provide the planner and PiC with the necessary resources to undertake their duties, must check that the PiC is familiar with the location of work, and that the PiC understands the nature and risks of the work being delivered.
- 30 Unless the work is in response to an incident, a planner should produce a SSoW in advance of the works being undertaken. The details of the arrangements for the works, as well as information on how to manage task and site risks, are compiled into a safe work pack (SWP). According to NR/L2/OHS/019 Issue 9, the planner should collaborate with the allocated PiC to create the SWP. Planners within Network Rail use the computer based safe system of work planning system (SSoWPS) to plan the SSoW, ready for inclusion in the SWP.

¹⁰ Someone is on or near the line if they are on the railway line itself, or they are within 3 metres of a railway line and not separated from it by a permanent fence or structure.

¹¹ <https://safety.networkrail.co.uk/>

- 31 Standard NR/L2/OHS/019 issue 9 requires planners to select a SSoW from a hierarchy of safe systems of work. This hierarchy details various methods of working using protection¹² or warning¹³ systems ordered by increasing level of risk. Planners should consider the various options in the standard and are required to select the safest method that is practicable to implement. Where a safer method of work is not used, a justified reason should be given and stated within the SWP. The process of selecting the appropriate level SSoW is a function of the SSOWPS software.
- 32 The minimum contents of a SWP are detailed in table A.1 of NR/L2/OHS/019 issue 9. A copy of this table is reproduced in Appendix C.
- 33 Once a SWP has been created by the planner, it should be passed to the PiC to verify. This requires the PiC to check all of the information in the SWP and sign the front sheet to confirm that the SWP is correct. Any changes required are fed back to the planner, who amends the SWP and passes it back to the PiC. If the PiC plans to delegate his/her COSS duties, the PiC must get the COSS to check the SSoW arrangements. If they are correct the COSS endorses this by signing the front sheet. This must be done before the PiC can sign the SWP off as verified.
- 34 After being verified, the SWP is sent to the responsible manager to authorise. By authorising the SWP, the responsible manager confirms agreement with the SSoW selected (paragraph 31), that the SSoW is suitable for the location and that the task risks are adequately controlled. They are also signing to confirm that the work is understood by the PiC and that there is suitable competence in the team to undertake the work.
- 35 An authorised SWP is sent by the planner to the PiC, ready for use on site. Immediately before using the SWP, the PiC should check it one final time and ensure that it is still suitable for the site conditions, and then accept it by signing the relevant section at the end of the SWP.
- 36 The PiC retains responsibility for safe work on site, and NR/L2/OHS/019 issue 9 states that a PiC:

... shall not allow work to commence or continue when:

 - a) *an adequate safe system of work cannot be established or maintained; or*
 - b) *new significant risks have been identified and controls are no longer effective.'*

¹² Protection systems (formerly known as Green Zone working) protect staff from being struck by a train by either stopping train movements altogether or by providing separation between staff and train movements.

¹³ Warning systems (formerly known as Red Zone working) provide a warning of an approaching train to staff, such that they can reach a position of safety at least ten seconds before the train passes.

The sequence of events

Events preceding the incident

- 37 In 2017, LNW Works Delivery (Signals) were allocated a project to install axle counters¹⁴ on the lines on the approaches to London Euston station. As part of this project, a significant number of new cables needed to be installed along the railway. Works Delivery did not have the resources required to undertake this in-house, so in October 2017 Works Delivery (Signals) contracted the cable pulling tasks to M. J. Quinn.
- 38 During January and February 2018, the M. J. Quinn project manager and Network Rail planning team exchanged several emails discussing how they would implement the requirements of NR/L2/OHS/019 Issue 9, in particular the obligation for a PiC to verify the SWP, and to be on site during the work. The result of these discussions was agreement that:
 - (a) The various work groups working in the same possession¹⁵ could all use the same SWP, as the SSoW arrangements for each work group were common to all work groups in the possession. Each copy of the SWP would then have specific Task Brief Sheets appended as required.
 - (b) A Network Rail PiC would verify one SWP and sign the front sheet, which would then be authorised and signed by the responsible manager.
 - (c) If the M. J. Quinn project manager received the SWP prior to the weekend of the work, he would forward a copy on to the COSSs and/or give them a printed copy so they could familiarise themselves with the SWP.
 - (d) The signed copy of the SWP would be held by the PiC on site. COSSs working in the possession and using the same SWP would get a brief by the PiC, receive an unsigned copy of the SWP, and they could view the signed SWP if they wished to.
 - (e) The Network Rail PiC would be in the worksite¹⁶, although not necessarily with the work group.
- 39 On 1 March 2018, the Network Rail planner created the SWP for the work to be undertaken on the weekend of the incident. The work was planned to take place as part of a possession, in a 3.2 mile (5.1 km) long worksite. He planned the SSoW requirements for the various tasks being undertaken by utilising the SSoWPS system. This SWP was to be used by all work groups in the worksite, and stated the authorised access point as Lawfords Yard (South), about 0.75 miles (1.2 km) west of the South Hampstead access point.

¹⁴ Axle counters are track mounted items of train detection equipment that help determine whether a track section is clear or occupied.

¹⁵ A possession is a period of time during which one or more lines are blocked to trains to allow engineering work to be safely undertaken. It is controlled by a Person in Charge of Possession (PICOP).

¹⁶ A worksite is an area within a possession under the control of an Engineering Supervisor (ES). There can be multiple worksites in a possession, and each is clearly defined using marker boards placed on the track.

- 40 On 9 March 2018, the responsible manager authorised the SWP prior to it being sent to the PiC for verification. This was contrary to the process set out in standard NR/L2/OHS/019 module 2, ‘Planning and working in a possession’, which requires the responsible manager to authorise a SWP after the PiC has verified it.
- 41 On 9 March 2018, the planner sent the pre-authorised SWP to a Network Rail PiC for verification. The planner did not realise that the PiC he sent the pack to was not due to work that weekend. When he was informed of this, he sent it to a different PiC who was due to work, who then verified the SWP and returned a signed copy to the planner.
- 42 A copy of the SWP which had been authorised by the responsible manager, but not yet verified by the PiC was sent to the M. J. Quinn project manager for information at 08:42 hrs on 9 March 2018, pending a further signed copy being sent once the SWP had been verified by the PiC. The M. J. Quinn project manager forwarded this email to COSS 1 and COSS 3 by email at 17:23 hrs. The project manager received the verified SWP from the PiC at 15:02 hrs, but there is no evidence that he forwarded this on to the COSSs.
- 43 At approximately 21:00 hrs on 10 March 2018, the staff from M. J. Quinn and PPR began to arrive at South Hampstead station to access the track. This was not the access point specified in the SWP (paragraph 39). The staff unloaded tools and equipment from their vehicles into the street-level compound area. COSS 2 was booked as a site warden, but due to the separation of the open fast lines from the blocked slow lines¹⁷ at the site of work, it was decided that a site warden was no longer needed, and so he was asked to undertake a COSS role instead. The RAIB has no clear evidence to indicate who made this decision or who asked COSS 2 to carry out these duties.
- 44 The three COSSs requested the SWP paperwork from the M. J. Quinn supervisor, but he did not have any copies. He provided them with the details of the Network Rail Engineering Supervisor¹⁸ (ES). The COSSs drove to Euston depot to sign into the ES’s worksite, while the rest of the staff continued unloading materials into the compound area.
- 45 The ES briefed the COSSs on the particulars of the worksite, including the detail that the fast lines were still open, and the slow lines were blocked. He informed them that he would call them later in the shift, once the fast lines were blocked. COSS 1 asked the ES for the printed SWP, but he had no spare copies and refused the COSSs access to the worksite until they could provide a SWP. The COSS called the Network Rail PiC who was elsewhere in the worksite, who provided the contact details for the Network Rail works delivery manager.
- 46 Meanwhile, at 23:20 hrs, the train left Northampton station travelling towards London.

¹⁷ Where there is at least 3 metres (10 feet) between any open lines and the site of work, a site warden is not required.

¹⁸ The Engineering Supervisor (ES) manages the safe execution of works in a worksite. All COSSs and SWLs must be signed in with the ES when working within the limits of their worksite.

- 47 The COSSs met the works delivery manager on London Euston station concourse at around 23:30 hrs. He had a single spare, unsigned copy of the SWP which he provided to the COSSs to share between them. Because it was not signed he was challenged by one of the COSSs, so he then signed the SWP front sheet as the responsible manager, thereby authorising the use of the SWP.
- 48 The three COSSs arrived back at South Hampstead station at around midnight. COSS 1 briefed the whole group on the details of the safe system of work. COSS 1 informed the group that the fast lines were still open, but witnesses do not recall him specifically indicating which lines were which. All of the members of the work group, except the other two COSSs, signed the form to confirm they had received and understood the SSoW briefing. A separate brief, detailing the work to be undertaken was given by the supervisor, and all the staff signed a task briefing sheet to confirm they understood the task.
- 49 At around 00:20 hrs, the supervisor, COSS 2 and three members of the workgroup descended the steps into the ten-foot to undertake an initial survey of the planned work. When the supervisor sought to access cable drums positioned near the slow lines, COSS 2 incorrectly informed the supervisor that these were the fast lines, and the slow lines were the other side of the ten-foot.
- 50 The supervisor challenged COSS 2 about which lines were the fast lines, but COSS 2 was adamant that he was correct, and the exchange became heated. However, believing the COSS to have the greater knowledge of the identity of the lines, the supervisor accepted the COSS's judgement.
- 51 The supervisor and two members of staff then walked approximately 100 metres away from Euston in the ten-foot to continue their survey, while COSS 2 remained at the bottom of the stairs. Meanwhile, the rest of the work group began bringing trolleys and equipment down the stairs (figures 2 and 4).

Events during the incident

- 52 At around 00:30 hrs, the train was approaching the site of work on the up fast line, and began to reduce speed for the speed restriction at Primrose Hill tunnel. At the same time, the work group began placing two halves of a trolley onto the up fast line, while being observed by COSS 2, who believed this to be one of the blocked slow lines.
- 53 At 00:31 hrs, the supervisor and the two staff with him saw the approaching train. Although they could not initially identify which line it was on, after a few seconds they realised it was on the line that the work group were placing the trolleys on, and they began shouting to warn their colleagues 100 metres further up the line.
- 54 The train driver saw the supervisor and two staff alongside the line ahead, and then the main work group. He initially sounded the horn continuously for six seconds and then applied full service braking. Forward facing CCTV on the train shows that it passed the supervisor's group five seconds before it reached the main work group.
- 55 The main work group on the track heard the warning from the supervisor and the train horn and managed to remove the two trolley halves and move clear with approximately two seconds to spare. At least two members of the work group were on the up fast line as the train approached.

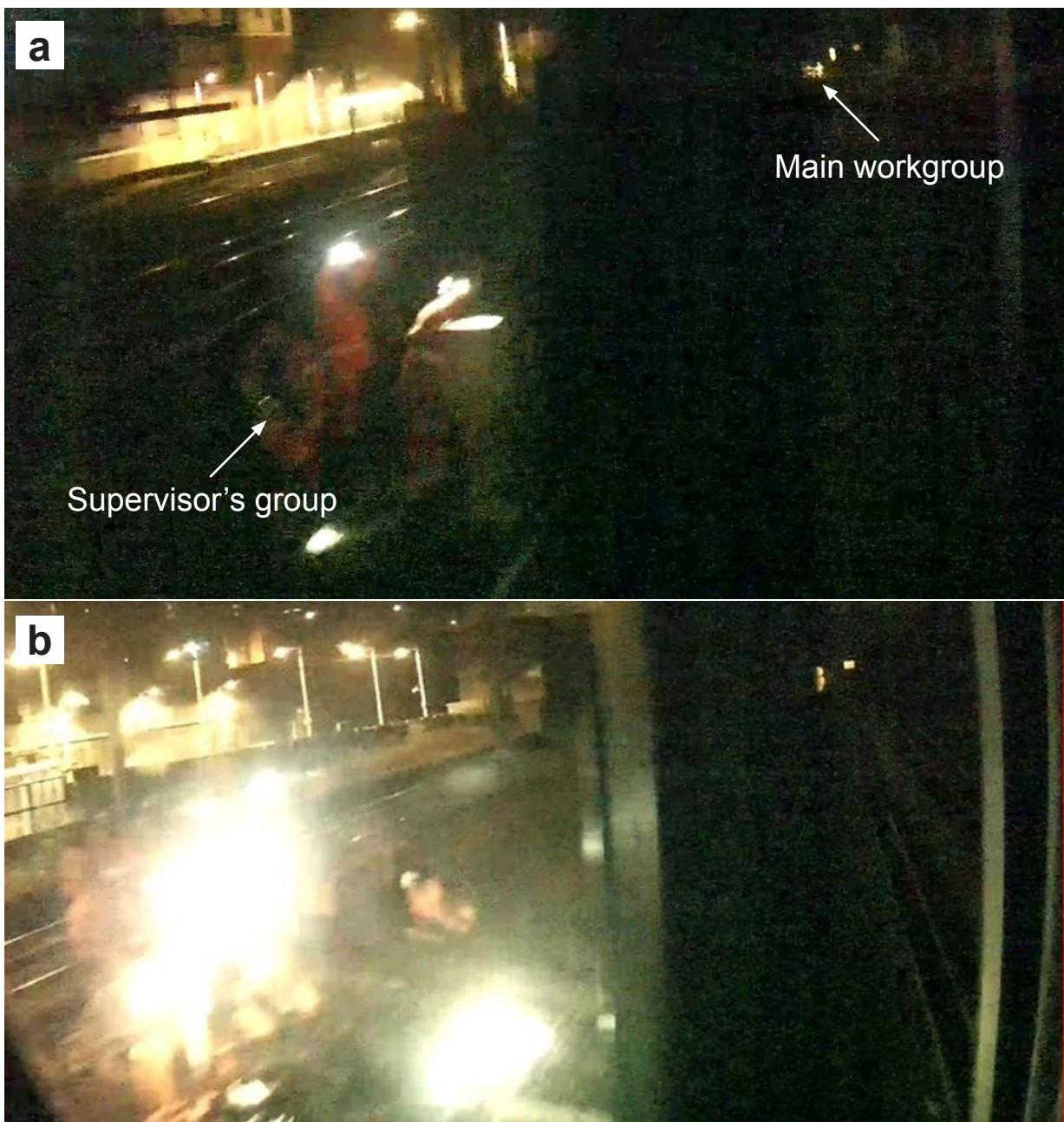


Figure 5: Forward Facing CCTV image taken a) five seconds before the train reached the main work group and as it was passing the supervisor and two staff; and b) as the train passed the main work group

- 56 The train came to a stop inside Primrose Hill tunnel, where the driver reported the near miss to the signaller. The driver stated that he was fit to continue and so the signaller asked him to continue to London Euston station.

Events following the incident

- 57 The signaller advised Network Rail's LNW route control office of the incident and a Mobile Operations Manager¹⁹ (MOM) was sent to site.

¹⁹ A Mobile Operations Manager is an on-call manager who offers Network Rail's first line response to incidents.

- 58 The supervisor and the two workers with him ran back to the area at the bottom of the stairs. The members of the work group involved were badly shaken and upset by the incident. One member of the group injured his ankle when he jumped clear of the approaching train. He was taken to hospital by another member of the group as a precaution, but was able to return to work on the following shift.
- 59 COSS 1 came down the stairs and began to argue with COSS 2. The supervisor intervened and sent them and COSS 3 to separate vehicles to record their statements. The rest of the group made their way back to the compound area, and some of those who had not been directly involved were sent back to track level to recover the equipment.
- 60 The supervisor reported the near miss to the M. J. Quinn's project manager and the Network Rail works delivery manager. The works delivery manager and the MOM arrived on site shortly afterwards. All of the staff involved in the incident were asked to write a statement of what they remembered. The three COSSs were escorted to Stonebridge Park depot to undertake testing for drugs and alcohol. The results were negative (clear) for each COSS.

Key facts and analysis

Identification of the immediate cause

- 61 The track workers and trolleys were on the up fast line while it was still open to traffic.

Identification of causal factors

- 62 The accident occurred due to a combination of the following causal factors:
- a) the safety arrangements on site were not effective (paragraph 63); and
 - b) the COSS appointed on the night of work (COSS 2) believed that the open fast lines were the blocked slow lines (paragraph 72).

Each of these factors is now considered in turn.

The Safety Arrangements on Site

- 63 The safety arrangements on site were not effective.

- 64 This causal factor probably arose due to a combination of the following:
- a) there was no ‘Person in Charge’ for the work group (paragraph 65); and
 - b) the work group had adopted a number of unofficial working practices (paragraph 71).

Each of these factors is now considered in turn.

The Person in Charge

- 65 Network Rail standard NR/L2/OHS/019 issue 9 requires that each work group that is on or near the line is under the control of a PiC, who has been involved in the planning process, and has verified and accepted the SWP (paragraphs 33 and 35). If a capable person had been involved in the planning of the work, and then present on site to act in the role of PiC, this incident would have been much less likely to occur. This is because the PiC is required to take overall responsibility for managing the risks associated with the task, including protection from trains.
- 66 M. J. Quinn and Network Rail had developed a working arrangement in which Network Rail provided a PiC for all work groups that were using the same SWP (paragraph 38). This arrangement allowed M. J. Quinn to utilise COSSs from a contingent labour supplier, who had no need to have been involved in the planning process. The M. J. Quinn project manager had sought clarification on the role of the PiC from the Network Rail planning team, who had advised him that the Network Rail PiC could have multiple COSSs working under him, each with a copy of the same SWP. Both the planning team and the project manager believed that this arrangement satisfied the requirements of NR/L2/OHS/019 issue 9, which defines a PiC as ‘a person who is involved in planning and who is on site where the work is being undertaken and has overall accountability of supervising and overseeing works’. There was a belief that ‘on site where the work is being undertaken’ meant the PiC only needed to be within the worksite, which in this case stretched for a distance of over three miles. The SWP was sent to COSS 1 and COSS 3 (paragraph 42) via email on the previous day.

- 67 Neither the planning team nor the project manager had fully understood the role of the PiC as defined by standard NR/L2/OHS/019 issue 9 and had interpreted the standard differently to the authors of the standard's intent (paragraph 83).
- 68 The Network Rail staff involved had received a half day briefing on the changes from Issue 8 to Issue 9 of standard NR/L2/OHS/019 (paragraph 27). Witness evidence from this briefing indicated that although the principles were generally understood, there were numerous questions about the implementation of the standard, some of which could not be answered at the time by those delivering the briefing.
- 69 The M. J. Quinn project manager joined the organisation in January 2018 and was not initially aware of the requirements of NR/L2/OHS/019 issue 9. He was advised on the changes from Issue 8 of the standard by M. J. Quinn's manager responsible for safety. Documentary evidence shows that he sought further clarification from the Network Rail planning team and works delivery supervisor.
- 70 PPR stated to the RAIB that it supplies rulebook updates, Network Rail briefings and alerts, Sentinel Scheme Rules and/or relevant standards changes, to its track workers by post or email. There was no process in place to undertake face-to-face briefings with its workers due to the practicalities of dealing with a contingent labour force, who work remote from an office or depot. PPR has stated that it monitors the performance of its track workers, including compliance with safety procedures, by means of feedback received from the companies that hire its workers. The importance of adequately monitoring the safety performance of agency workers has been previously highlighted in the RAIB's report into the fatal accident involving a track worker at Saxilby on 4 December 2012 (paragraph 105).

Unofficial working practices of the group

- 71 The work group had adopted several unofficial working practices prior to the incident, which contributed to the ineffective safety arrangements on site:
 - a) Several staff on site referred to COSS 1 as the 'Lead COSS' in their statements, with the other two COSSs seen to be acting as his assistants. There is no role or competence called a 'Lead COSS' in the railway rule book or Network Rail procedures, and each COSS should have taken charge of their own work group.
 - b) All the staff received a mass SSoW brief from COSS 1, rather than each COSS taking charge and giving a separate brief to their own sub groups.
 - c) The decision to ask COSS 2 to undertake COSS duties on the night without prior planning or provision of a SWP for him.
 - d) The supervisor and two workers moved away from the rest of the group without the supervision of a COSS.
 - e) The work group were not using the authorised access point specified in the SWP (paragraph 43).

The actions of COSS 2

- 72 The COSS appointed on the night of work (COSS 2) believed the open fast lines were the blocked slow lines.
- 73 This causal factor probably arose due to a combination of the following:
- the COSS was not sufficiently familiar with the location (paragraph 74);
 - the staff on site had no immediate visual indication of which line was which (paragraph 76); and
 - the COSS did not effectively check the identity of the lines when he was challenged about which line was which (paragraph 78).

Each of these is now considered in turn.

Unfamiliarity with the location

- 74 COSS 2 had worked on this project with M. J. Quinn on fourteen previous occasions. On the majority of these shifts he had undertaken the role of a Site Warden, which required him to watch his work group and warn anyone that got close to an open line. He had worked at the South Hampstead site around five times before. On one of these occasions he had undertaken COSS duties, but on that occasion all lines were blocked to traffic. Evidence suggest that none of these previous shifts had involved a scenario where COSS 2 had needed to differentiate between the fast and slow lines, or where there were serious consequence in getting them mixed up.
- 75 Because COSS 2 was only asked to undertake COSS duties on the night (paragraph 43), he had no prior sight of the SWP. Anybody undertaking COSS duties should receive a copy of the SWP at least one shift beforehand, in order to allow them time to read, check and familiarise themselves with its content. COSS 2 did not have his own copy of the SWP because the three COSSs had only one SWP between them (paragraph 47). If COSS 2 had seen the SWP before he was asked to COSS, it is possible that he would have been more familiar with the layout of lines at the site. If he had had his own copy of the SWP, he could have referred to it if he was unsure about an aspect of the site layout.

Lack of visual indication at the access point

- 76 The staff on site had no visual indication of which lines were which. The RAIB investigation into a collision at Acton West ([RAIB report 15/2009](#)) recommended that Network Rail should provide track layout information at all access points (paragraph 103). Many Network Rail access points now include a sign which shows key information about the access, includes a diagram identifying the lines at the site and indicates where the reader is in relation to those lines (figure 6). If this signage had been available at South Hampstead, it is probable that the COSS and supervisor would have used it check the identity of the lines.



Figure 6: Example of Network Rail access point signage

77 There was no access point signage because this access point did not appear in the National Hazard Directory. This document contains details of hazards on the railway infrastructure, as well as the locations of authorised access points. The South Hampstead access point was well known and frequently used by local staff, and provided the only access to equipment rooms near the Primrose Hill tunnels. Network Rail has reported to the RAIB that the omission of this access point from the National Hazard Directory was due to an oversight that it was unaware of.

Checking the identity of the lines

- 78 The COSS did not effectively check the identity of the lines when he was challenged about which line was which.
- 79 The supervisor reported that he had challenged COSS 2 about which line was which at least three times. He reported that with each of these exchanges, COSS 2 became more insistent and vehement. The certainty in the COSS's mind that he knew which line was which, the authority his position gave him, and the assertiveness of the COSS meant that the supervisor believed he must be mistaken, and that COSS 2 was probably correct. As the COSS did not possess a copy of the SWP (paragraph 75), neither the supervisor nor the COSS had a method of checking the safety arrangements.

- 80 Some members of the work group stated to the RAIB that during their training, they were taught that the COSS is the ultimate authority for safety on site, and in this regard they should treat him as 'God'. Therefore, other members of the group were also reluctant to challenge COSS 2.
- 81 All the staff involved had been briefed on their respective company's 'Worksafe' procedures. These procedures empower all staff to stop unsafe work, and assures them that their management will support them if they stop work on safety grounds. The PPR staff had been supplied with a copy of its 'Worksafe' procedure as part of the paperwork supplied when they initially joined the company, which they were required to sign to confirm their understanding of the procedure. None of the group working under COSS 2 chose to invoke the 'Worksafe' procedure. The RAIB has previously noted a reluctance to invoke this procedure even in circumstances when track workers believe they are in an unsafe situation ([RAIB Report 11/2018](#), learning point 1)

Identification of underlying factors

Clarity of NR/L2/OHS/019 issue 9

- 82 **Network Rail's introduction of the Person in Charge role in NR/L2/OHS/019 issue 9 did not make the responsibilities of the role sufficiently clear.**
- 83 Because of the varied nature of Network Rail's business, standard NR/L2/OHS/019 issue 9 was deliberately written with some operational flexibility. Network Rail envisaged that this would allow for the same standard to be used for all work on or near the line, whether that was major project work or day-to-day maintenance. However, the RAIB found that the standard, as written, was not explicit about the following important aspects of a PiC's responsibilities which have been reported to the RAIB by Network Rail:
- the same PiC who is involved in the planning process should verify the SWP and deliver the work on site (unless there is an unforeseen absence or the SWP is for cyclical work);
 - the PiC should only be supervising one work group; and
 - when delegating COSS duties, the COSS who is nominated during the planning process (paragraph 33) should endorse the SWP before it is verified by the PiC and deliver COSS duties on site.
- The lack of clarity about these matters led those involved in planning and delivering the work at South Hampstead to develop a method of working that did not match the intention of NR/L2/OHS/019 issue 9 (paragraph 38).
- 84 Network Rail has reported to the RAIB that during the development and roll out of the standard, over one thousand comments and queries were received. A list of frequently asked questions (FAQs) and guidance documents were produced (paragraph 26) to support the roll-out of the standard. However, witness evidence indicates that some staff were unaware of the existence of these documents, or the Safety Central website where they are stored.

- 85 The RAIB considers that without the clarification offered by the FAQ and guidance documents, it is possible to establish a working practice for multiple work groups involved in a possession, that meets the written requirements of standard NR/L2/OHS/019 issue 9, but does not meet Network Rail's declared intention of the standard. This situation indicates that there are lessons to be learned in the development and roll out of safety critical processes.

Observations

The responsibilities of a responsible manager

- 86 During the course of this investigation, the RAIB noted that the duties of the responsible manager were not fully understood by some of the people acting in this role for the project. In particular, it was not fully appreciated that when a responsible manager signs a SWP, they are confirming that the work content is understood by the PiC (paragraph 27). NR/L2/OHS/019 issue 9 also requires the responsible manager to check that the PiC is familiar with the location, type of work and safe system of work.
- 87 On the night of the incident, the works delivery manager signed off the SWP as the responsible manager, but was not the person named in the pack (paragraph 47). COSS 1 questioned the works delivery manager about this, but because of the works delivery manager's seniority within Network Rail, COSS 1 believed that he was sufficiently senior to sign off the SWP. The SWP was also not signed as being verified by the Network Rail PiC, so the COSS had no assurance that the pack had been checked. NR/L2/OHS/019 issue 9 states that the responsible manager cannot be the PiC, and cannot both verify and authorise the SWP.
- 88 There was also a working practice established that the responsible manager for Works Delivery authorised the SWP prior to it being verified by the PiC (paragraph 40). This practice was in contravention of NR/L2/OHS/019 issue 9; the flow charts contained in the appendices of the standard clearly show that the SWP must be verified prior to being authorised.

Quality of location information in safe work packs

- 89 The only maps included in the safe work pack were extracts from the sectional appendix. The sectional appendix is a controlled document that contains track layout and location information about running lines, line speeds, stations and other relevant details. It is primarily a document designed to be used by staff such as train drivers, but is also frequently used by track workers and planning staff. While it does contain useful information, it does not include some details that are critical for planning work on or near the line, such as access point locations, curve radii, point numbers or signal numbers. The line diagrams in the sectional appendix are schematics and are not drawn to scale.

- 90 The site of work at South Hampstead is detailed in the LNW (South) route sectional appendix, and sits on the page break between pages MD101-003-LNW(S)2 and MD101-004-LNW(S)2 (see Appendix D). The sectional appendix does not contain information that would have assisted the staff on site to better orientate themselves relative to the running lines, such as the access point location or signal numbers. The DC lines and the station at South Hampstead are detailed separately on page MD120-001-LNW(S)2, which is also included in Appendix D.
- 91 The contents of a SWP are prescribed in Appendix A of NR/L2/OHS/019 issue 9 (an extract is included in Appendix C). This list specifies extracts from the sectional appendix, which will indicate line identity, speed and direction of trains to the planner and PiC/COSS. The list also states that the SWP should include 'signalling or track diagrams where used'. Track diagrams were not included in the SWP for the work undertaken at South Hampstead, although some were available for this area. However, unlike the sectional appendix, these track diagrams are not controlled documents, and so the information in them cannot be relied upon and must be checked during the planning process. Even if these had been used, the access point would not have been shown as it was not included in the National Hazard Directory (see paragraph 77).
- 92 COSS 2 had no prior sight of the SWP and did not have his own copy of the SWP (paragraph 75 explains why this was). Therefore, even if more informative track diagrams had been included in the SWP, it is likely that he would not have been able to readily refer to them.

Previous occurrences of a similar character

- 93 Two previous accidents involving trolleys placed on the line in which a causal factor was the COSS becoming confused as to which line was which, are summarised below.

[Collision between a passenger train and trolleys near Clapham, North Yorkshire, 25 August 2017 \(RAIB Safety Digest 16/2017\)](#)

- 94 At 09:24 hrs on 25 August 2017 a passenger train collided with three engineering trolleys on the Settle Junction to Carnforth line between Giggleswick and Clapham, in North Yorkshire. The train was travelling from Leeds to Morecambe on the down line at a speed to 34 mph (55 km/h). Prior to the collision Network Rail staff had been working on both lines between Settle Junction and Carnforth, moving and positioning sleepers in the cess of the down line, ready for overnight track maintenance work. The collision occurred because the COSS handed back the down line to the protection controller believing the trolleys were on the up line. The collision caused damage to the train, trolleys, sleepers and track. No staff, passengers or crew were injured.

[Passenger train collision with trolley at Bridgeway User Worked Crossing, near Shrewsbury, 16 January 2014 \(RAIB report 25/2014\)](#)

- 95 At around 23:58 hrs on Thursday 16 January 2014, a passenger train travelling between Crewe and Shrewsbury struck a welder's trolley that had been placed on the line at Bridgeway user worked crossing. The train was travelling at about 85 mph (137 km/h) at the point of collision. A track worker, who was on the trolley loading it with tools, jumped clear when he became aware of the approaching train a few seconds before impact. He suffered minor injuries. The train sustained significant damage to its front and to underframe equipment, including the fuel tank, and the trolley was destroyed. Neither the train driver, conductor, nor the one passenger on board the train were injured.
- 96 The accident occurred because the trolley was placed on a line that had not been blocked to normal train operations. The COSS had blocked the opposite line on the advice of the welder, who had been misled by the presentation of information in the paperwork describing the safety arrangements for the job. Although, the welder later realised that the work was actually on the line that had not been blocked, he still placed his trolley on that line believing that no train would approach because of engineering work taking place elsewhere in the area. The COSS was not directly supervising the workers when the trolley was placed on the line.

Summary of conclusions

Immediate cause

97 The track workers and trolleys were on the up fast line while it was still open to traffic.

Causal factors

98 The causal factors were:

- a) The safety arrangements on site were not effective (paragraph 63, **Recommendation 1**). This causal factor probably arose due to a combination of the following:
 - i. There was no 'Person in Charge' for the work group (paragraph 65, **Recommendation 1**).
 - ii. The work group had adopted a number of unofficial working practices (paragraph 71, **Recommendation 1**).
- b) The COSS appointed on the night of work believed that the open fast lines were the blocked slow lines (paragraph 72). This causal factor probably arose due to a combination of the following:
 - i. The COSS was not sufficiently familiar with the location (paragraph 74, **Recommendation 1**).
 - ii. The staff on site had no immediate visual indication of which line was which (paragraph 76, **Recommendations 3 and 4**).
 - iii. The COSS did not effectively check the identity of the lines when he was challenged about which line was which (paragraph 78, **Learning point 1**).

Underlying factor

99 Network Rail's introduction of the Person in Charge role in NR/L2/OHS/019 issue 9 did not make the responsibilities of the role sufficiently clear (paragraph 82, **Recommendations 1, 5 and 6**).

Additional observations

100 Although not linked to the cause of the incident, the RAIB observes that:

- a) the 'Responsible Manager' had not fully understood his responsibilities under standard NR/L2/OHS/019 (paragraph 86, **Recommendation 2**); and
- b) the only location information included in the safe work pack was extracts from the sectional appendix that did not clearly show the site at the access point, and would not have assisted the staff on site to orientate themselves relative to the running lines (paragraph 89, **Recommendation 3**).

Previous RAIB recommendations relevant to this investigation

101 The RAIB has previously carried out several investigations into accidents and incidents involving track workers. The following recommendations made by the RAIB as a result of its previous investigations, have relevance to this investigation.

[Class Investigation into accidents and near misses involving trains and track workers outside possessions, RAIB report 07/2017, recommendations 2 and 4](#)

102 While the incident at South Hampstead involved staff who were supposed to be working in a possession, they had inadvertently moved onto the up fast line and were therefore outside the limits of the possession. The class investigation ([RAIB report 07/2017](#)) investigated a number of accidents and near miss incidents involving staff working on Network Rail infrastructure outside of possessions. Recommendations 2 and 4 of RAIB report 07/2017 are relevant to this investigation; in relation to the COSS not checking the identity of the lines when he was challenged (paragraph 78), and the provision of adequate site location information (paragraph 89), respectively.

Recommendation 2

Network Rail should review the effectiveness of its existing arrangements for developing the leadership, people management and risk perception abilities of staff who lead work on the track, as well as the ability of other staff to effectively challenge unsafe decisions. This review should take account of any proposed revisions to the arrangements for the safety of people working on or near the line. A time-bound plan should be prepared for any improvements to the training in non-technical skills identified by the review.

The RAIB has been informed by the Office of Rail and Road (ORR) that Network Rail has implemented this recommendation.

Recommendation 4

Network Rail should implement arrangements to make its databases of photographic and video information (such as its RouteView system) more easily available to planning staff and leaders of work groups.

The RAIB has been informed by the ORR that Network Rail has implemented this recommendation.

[Collision between a passenger train and two rail-mounted grinding machines at Acton West, 24 June 2008. RAIB report 15/2009, recommendation 3](#)

103 [RAIB report 15/2009](#) highlighted the need for track layout information at access points. Recommendation 3 is relevant.

Recommendation 3

Network Rail should develop and implement a programme for the provision of track layout information signage at all railway access points, showing mileages, line names and directions and other key items of local railway information, as appropriate.

The ORR has reported to the RAIB that this recommendation has been implemented. Network Rail undertook a cost benefit analysis that showed that it was not cost effective to retrofit signs at all access points; however, it would be cost effective to fit such signs at new-build access points.

[Track worker struck by a train at Bulwell, 6 August 2012. RAIB report 20/2013, recommendation 4](#)

104 [RAIB report 20/2013](#) observed that the responsible manager was unaware of the responsibilities that had been placed on him when the role was introduced in issue 8 of NR/L2/OHS/019. Recommendation 4 of the report is relevant to the observation in this investigation that the responsible manager had not fully understood his responsibilities under the standard (paragraph 86).

Recommendation 4

Network Rail should establish if the requirement within NR/L2/OHS/019 issue 8 for non-cyclic safe systems of work to be approved by the responsible manager has been effectively implemented. In doing this it should specifically consider:

- *how the requirement was promulgated throughout its organisation;*
- *the briefing and training of responsible managers; and*
- *other barriers to implementation. It should develop a plan to implement any appropriate changes identified.*

The RAIB has been informed by the ORR that Network Rail has addressed this recommendation by the introduction of issue 9 of NR/L2/OHS/019. However, this investigation has shown that there are still issues with Responsible Managers not understanding their duties (paragraph 86).

Fatal accident involving a track worker at Saxilby, 4 December 2012. RAIB report 21/2013, v2 August 2014, recommendation 2

105 [RAIB report 21/2013](#) highlighted some of the safety issues that can arise from the management of agency staff (paragraph 70).

Recommendation 2

Network Rail, in consultation with all Sentinel sponsor organisations, should develop and implement arrangements to more effectively manage the risk arising from the use of agency staff undertaking work on and around the track. In developing the arrangements, Network Rail should, as a minimum, define improvements in respect of the following issues:

- a) *the requirement for the performance, attitudes and behaviour of agency staff to be regularly monitored;*
- b) *the actions to be taken when deficiencies are identified, in particular the possible mechanisms to remedy the deficiency, reasonable timescales within which the deficiencies should be addressed, and the interim measures that can be applied pending resolution;*
- c) *the process for temporary suspension of the relevant certification within the Sentinel system and for the prompt reinstatement (to include guidance to contractors and agencies on their responsibilities for updating the status of affected agency staff) on Sentinel; and*
- d) *the arrangements for employers to share information in respect of the individuals involved in multiple investigations.*

The RAIB was informed by the ORR in October 2014 that Network Rail was introducing new contingent labour contracts and had agreed a code of contract with all agency suppliers to demonstrate they had effective competence and behavioural management processes in place. ORR reported that the implementation of this recommendation was ongoing and that it was seeking further information from Network Rail, with a target date of April 2015.

Actions reported that address factors which otherwise would have resulted in a RAIB recommendation

106 Following the near miss incident on 11 March 2018, both Network Rail LNW Works Delivery (Signals) and M. J. Quinn have made improvements to their working arrangements to better comply with the requirements of NR/L2/OHS/019 issue 9 as follows:

- LNW Works Delivery (Signals) has rebriefed its safety critical staff on the principles of NR/L2/OHS/019 issue 9. SWPs produced by its planners are now only being supplied to its own staff, and are being supplied individually to PiCs, instead of utilising a site wide SWP.
- M. J. Quinn now undertakes the planning process and SWP production for its own work. It reports that it has employed permanent staff to undertake the duties of a planner and a PiC and collaborate on the production of the SWP. The SWPs that it produces include aerial photographs of the access points with the lines identified, and schematics of the track layout in the area in which the work is to done. M. J. Quinn has also reported to RAIB that all of its safety critical staff have been rebriefed on the principles of NR/L2/OHS/019 issue 9.

Other reported actions

107 On 23 March 2018, the programme manager for LNW Works Delivery (Signals) reissued a revised department-specific document titled 'Principles of 019 Application' to his staff. The original document was issued in July 2017 to summarise key points from NR/L2/OHS/019 Issue 9 in LNW Works Delivery (Signals). The revised version of this document sought to clarify areas of confusion that had been highlighted by the incident on 11 March 2018. It now also includes a requirement for all LNW Works Delivery (Signals) projects to plan how NR/L2/OHS/019 would be applied in all aspects of project delivery.

Recommendations and learning point

Recommendations

108 The following recommendations are made²⁰:

- 1 *The intent of this recommendation is that there is complete clarity about the responsibilities and operation of the ‘Person in Charge’ (PiC) role defined in Network Rail standard NR/L2/OHS/019 Issue 9.*
Network Rail should:
 - a) revise its standard for managing the safety of people at work on or near the line (currently standard NR/L2/OHS/019 issue 9) to clarify the following aspects of the ‘Person in Charge’ (PiC) role:
 - i. a PiC should be allocated to each separate work group, and remain with that work group for the duration of the work;
 - ii. the same PiC should be involved in both the planning process and delivery of the work (excluding exceptions stated in the standard);
 - iii. when the COSS duties of a PiC are delegated to someone else, that individual should be appointed during the planning process, endorse the safe work pack and deliver COSS duties on site.
 - b) provide suitable guidance to support the understanding and implementation of the standard, and maintain access to such documentation for relevant staff and contractors.
 - c) brief out the changes arising from a) and b) above to relevant staff and contractors.
- 2 *The intent of this recommendation is that all those who act in the role of Responsible Manager, as defined in standard NR/L2/OHS/019 Issue 9, are fully briefed on their responsibilities under the standard.*
Network Rail should verify that all of its staff who currently act in the role of Responsible Manager, as defined in standard NR/L2/OHS/019 Issue 9, are fully aware of their responsibilities with respect to signing off safe work packs and, where this is not the case, take action to address this lack of understanding.

²⁰ 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 (ORR) 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.

- 3 *The intent of this recommendation is that staff in charge of safety on site have good quality location information to minimise the risk of accidents arising from confusion about which lines are open to traffic.*

Network Rail should review and improve the quality of the location information provided in its safe work packs, to help staff better identify running lines, access points and other relevant geographical features. The review should include consideration of supplementing the current minimum information specified in Appendix A of standard NR/L2/OHS/019 with detailed track diagrams, local street maps, ground level and/or aerial photographs (eg from RouteView) etc, using a risk-based approach.

- 4 *The intent of this recommendation is that the access point at South Hampstead station is recognised in the hazard directory and has appropriate information signage.*

Network Rail should:

- amend its National Hazard Directory to include the access point alongside South Hampstead station; and
- provide access point signage to clearly identify each running line to staff using the access point.

- 5 *The intent of this recommendation is that Network Rail reviews how standard NR/L2/OHS/019 Issue 9 is being applied across its network and takes appropriate actions based on what it finds.*

Network Rail should carry out a detailed audit of how standard NR/L2/OHS/019 Issue 9 has been implemented across the network, including in its supply chain. The purpose of this audit is to determine how the standard has been interpreted and understood, and areas of good and bad practice. Network Rail should take appropriate actions to address any issues found.

- 6 *The intent of this recommendation is to understand how the revision of safety critical business processes can be improved.*

Network Rail should undertake a review of how the change of NR/L2/OHS/019 from issue 8 to issue 9 was managed, in order to identify any areas for improvement in the management of change.

Learning point

109 The RAIB has identified the following key learning point²¹:

- 1 Those in charge of safety on site should be open to challenge from members of their team in the interests of safety and be prepared to check safety critical information if challenged (paragraph 98).

²¹ ‘Learning points’ are intended to disseminate safety learning that is not covered by a recommendation. They are included in a report when the RAIB wishes to reinforce the importance of compliance with existing safety arrangements (where the 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

COSS	Controller of Site Safety
ES	Engineering Supervisor
LNW	London North Western route
MOM	Mobile Operations Manager
ORR	Office of Rail and Road
PDSW	Planning and Delivery of Safe Work
PiC	Person in Charge
PICOP	Person in Charge of Possession
PPR	Premier People Recruitment Limited
PTS	Personal Track Safety
RAIB	Rail Accident Investigation Branch
SSoW	Safe System of Work
SSoWPS	Safe System of Work Planning System
SWL	Safe Work Leader
SWP	Safe Work Pack
TBS	Task Briefing Sheet
WCML	West Coast Main Line

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 (OTDR);
- forward facing closed circuit television (FFCCTV) recordings taken from the train involved;
- site photographs and measurements;
- weather reports and observations at the site;
- site and planning paperwork;
- training and competence records;
- Network Rail standards and briefing documents relating to the planning, accepting, verifying, authorising and implementing of safe systems of work;
- responses to questions put to Network Rail, M. J. Quinn Integrated Services Limited and Premier People Recruitment; and
- a review of previous RAIB investigations that had relevance to this accident.

Appendix C - NR/L2/OHS/019 Issue 9 Table A.1 (from Appendix A)

Appendix A Contents of a Safe Work Pack

The SWP contents should include the contents shown in table A.1 as a minimum where it is applicable.

This information may be extracted from other documents.

Only include extracts that are relevant to the SWP.

	Safe Work Pack minimum contents	Comment
Task / Site Risk Controls	<input type="checkbox"/> SWP Validation Sheet	
	<input type="checkbox"/> task risk information and controls required	e.g. TRCSs, relevant extracts from a WPP and associated TBSs
	<input type="checkbox"/> site (location) risk information and controls required	e.g. ALO, runaway risk
	<input type="checkbox"/> Permits, where applicable	such as lifting plans, electrical, isolation, hot works, confined spaces
	<input type="checkbox"/> welfare arrangements and their location	
	<input type="checkbox"/> part completed RT9909 Record of arrangements	
	<input type="checkbox"/> part completed RT3181 form(s)	where blockage(s) of the line are part of the safe system of work
	<input type="checkbox"/> possession arrangements details, including protection/warning arrangements	
	<input type="checkbox"/> safe access and egress information including walking to and from site	
Operational Risk Controls	<input type="checkbox"/> Sectional Appendix extracts	showing the relevant running lines, track layout and work location for the entire mileage for which the work group will be on or near the line;
	<input type="checkbox"/> National Hazard Directory extracts	that are relevant to the work and location (these may be included on the RT9909 form);
	<input type="checkbox"/> signalling or track diagrams where used	
	<input type="checkbox"/> emergency arrangements	

Table A.1 – SWP minimum contents

Appendix D - Sectional Appendix Extracts

The red circle indicates the location of the access point.

LOR	Seq.	Line of Route Description	ELR	Route	Last Updated
MD101	003	Euston to Armitage Junction (Exclusive)	LEC1	LNW South	07/04/2018
Location		Mileage M Ch	Running lines & speed restrictions		Signalling & Remarks
					TCB Wembley Mainline SCC (WM) Camden Panel AC: Rugby ECR DC: Rugby ECR
Camden Junction South	1 10				Axle Counter area on all lines from Camden Jn at 1m 50ch to Kensal Green Tunnels (Ind) at 4m 64ch.
Camden Jn (Down DC line)	1 27 *	To Camden Road West Jn MD145 seq 001			Traffic Lockout Devices (LOD(T)) provided: Line A 1m 06ch to 0m 39ch Line B 1m 06ch to 0m 39ch Line D 1m 51ch to 1m 25ch Line E 1m 25ch to 1m 51ch Down Fast 1m 51ch to 2m 28ch Down Slow 1m 51ch to 2m 28ch Up Fast 2m 28ch to 1m 51ch Up Slow 2m 28ch to 1m 51ch
Camden Jn (Up DC line)	1 36				1m 30ch. Change of line designation C to DS. US to B.
Camden Jn	1 40				1m 51ch. Change of line designation E to DF. UF to D or A.
Camden Jn	1 51 *				TASS fitted: DF line from 2m 28ch UF line to 2m 60ch
Camden Jn	1 52 *				DE - Down DC Electric UE - Up DC Electric
Primrose Hill Tunnels Fast Lines (1081 metres/1182 yards) Slow lines (1070 metres/1170 yards)	1 54 *				
	2 27 *				
	2 30 *				
		MD120 seq 001	US 75 DS 75 UF 80 DF 80		

LOR	Seq.	Line of Route Description	ELR	Route	Last Updated
MD101	004	Euston to Armitage Junction (Exclusive)	LEC1	LNW South	07/04/2018
Location		Mileage M Ch	Running lines & speed restrictions		Signalling & Remarks
					TCB Wembley Mainline SCC (WM) Camden Panel AC: Rugby ECR
Kensal Green Tunnels (293 metres/320 yards)	3 00 *				Axle Counter area on Kilburn U&DGL, Fast and Slow lines from Camden Jn at 1m 50ch to Kensal Green Tunnels (Ind) at 4m 64ch.
QUEEN'S PARK	3 40 *	To Kilburn U&DGL			PF is authorised on Kilburn Up & Down Goods Loop 104 SLU/666 metres/728 yards.
	3 43 *	US 75 DS 75 UF 80 DF 80			TASS fitted: DF line throughout UF line throughout
	3 55				Platform Lengths: 5 - 194 metres 6 - 194 metres
	4 33 *				Wembley Mainline SCC (WM) Willesden Panel
	4 45 to 4 59				PF is authorised on TMD Loop 14 SLU/93 metres/102 yards
Willesden TMD	4 60 *				Willesden TMD has ELR: WZS
West London Jn (Willesden) (Willesden Euro Terminal)	5 01 *	To Mitre Bridge Jn MD166 seq 003			S&DS - Stabling and Departure siding S&AS - Stabling and Arrival siding UWL - Up West London DWL - Down West London UWR - Up Willesden Relief DWR - Down Willesden Relief
	5 23	UWL DWL			
		UWR DWR			
		To Wembley Central. MD166 seq 003			
		To Acton Wells Jn MD167 seq 000			

LOR	Seq.	Line of Route Description	ELR	Route	Last Updated
MD120	001	Camden Junction to Watford Junction (DC Lines)	CWJ	LNW South	19/09/2015
Location	Mileage M Ch	Running lines & speed restrictions			
Camden Jn (Down DC line) Camden Jn (Up DC line) South Hampstead Tunnels Down line: 1km 328 metres/1452 yards Up line: 1km 156 metres/1264 yards	1 36 1 40 1 49	To Camden Road West Jn. MD145 seq 001	Continued on MD101 seq 003 US DS	TCB Wembley Mainline SCC (WM) Camden Panel DC: Rugby ECR	GSM-R 
Camden Jn (North London lines)	1 50		15 UNL US DS DNL 30 ①	Axle counter area South Hampstead tunnels to South Hampstead. DNL - Down North London DC Electric UNL - Up North London DC Electric Line Lockouts provided on all lines through South Hampstead Tunnels.	
SOUTH HAMPSTEAD	2 27 *		① 30 *	Instructions for the DC Electric lines are given in the General Instructions of this Sectional Appendix. Platform Lengths: South Hampstead Down - 123 metres Up - 123 metres	
CSR change	2 33		45 ① 45 ①	Wembley Mainline SCC (WS) Suburban Workstation	
KILBURN HIGH ROAD	2 40		UP DC ELECTRIC	① Speeds shown apply to EMUs fitted with tripcock apparatus and LUL trains.	
	3 01		DOWN DC ELECTRIC 20 UP DN 45 ①	Class 1, 2 and 5 trains (other than EMUs fitted with tripcock apparatus and LUL trains) and light locomotives are subject to a maximum permissible speed of 25mph between Camden Jn and Harrow & Wealdstone, except where a lower speed is indicated.	
				Class 3, 4, 6, 7 and 8 trains are subject to a maximum speed of 15mph between Camden Jn and Harrow & Wealdstone, except where a lower speed is indicated.	
				Platform Lengths: Kilburn High Road Down - 164 metres Up - 145 metres	

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