RAIB

Rail Accident Investigation Branch

Rail Accident Report

Collision between mobile elevating work platforms at Rochford, Essex 25 January 2020

Report 08/2020
September 2020

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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Collision between mobile elevating work platforms at Rochford, Essex, 25 January 2020

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Summary

At around 10:57 hrs on Saturday 25 January 2020, a mobile elevating work platform (MEWP) collided with a stationary machine of the same type on which two people were installing overhead line equipment. They both suffered minor injuries. The machine operator in charge of the MEWP had lost focus while driving the machine, and was alerted by other members of staff shouting at him to stop. At that point the machine was travelling too fast to stop before striking the stationary MEWP. The machine operator had driven away from the machine controller, who was responsible for the MEWP's movements, without permission, and drove the machine at around 10 mph (16 km/h), while using the on-board CCTV screen to view the route ahead. These actions were contrary to the applicable operating rules.

Other causal factors were ineffective supervision of the machine operator and confusion among staff about who was in charge of the safe movement of on-track plant on the site. Cultural factors on the site led to poor working relationships between machine operators and controllers and an excessive focus on 'getting the job done', rather than compliance with rules and operating standards. Network Rail's assurance processes had not identified these issues.

RAIB has made five recommendations, each addressed to Network Rail. The first is to review and clarify the roles and responsibilities of staff working in possessions and work sites to avoid duplication of responsibilities and confusion arising between roles. The second recommendation is that Network Rail should undertake a review of the way that the Sentinel scheme is managed, in respect of incident investigations and how training providers and primary sponsors assess the English language skills of staff who undertake safety critical duties.

The third recommendation is addressed to Network Rail (Anglia), to review its reporting and response process for accidents and incidents, and the fourth recommendation seeks a review of the equipment currently used to alert staff to a dangerous situation within a possession or work site. The fifth recommendation is to commission an independent review of the internal culture and working practices of Network Rail's Overhead Condition Renewals business unit. The investigation also identified five learning points.

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 acronyms. These 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 10:57 hrs on Saturday 25 January 2020, a mobile elevating work platform (MEWP), which was travelling on a section of the railway that was closed for engineering work to take place (known as a possession), collided with a stationary MEWP on which two people were working. The accident occurred near Rochford station, Essex (figures 1 and 2).

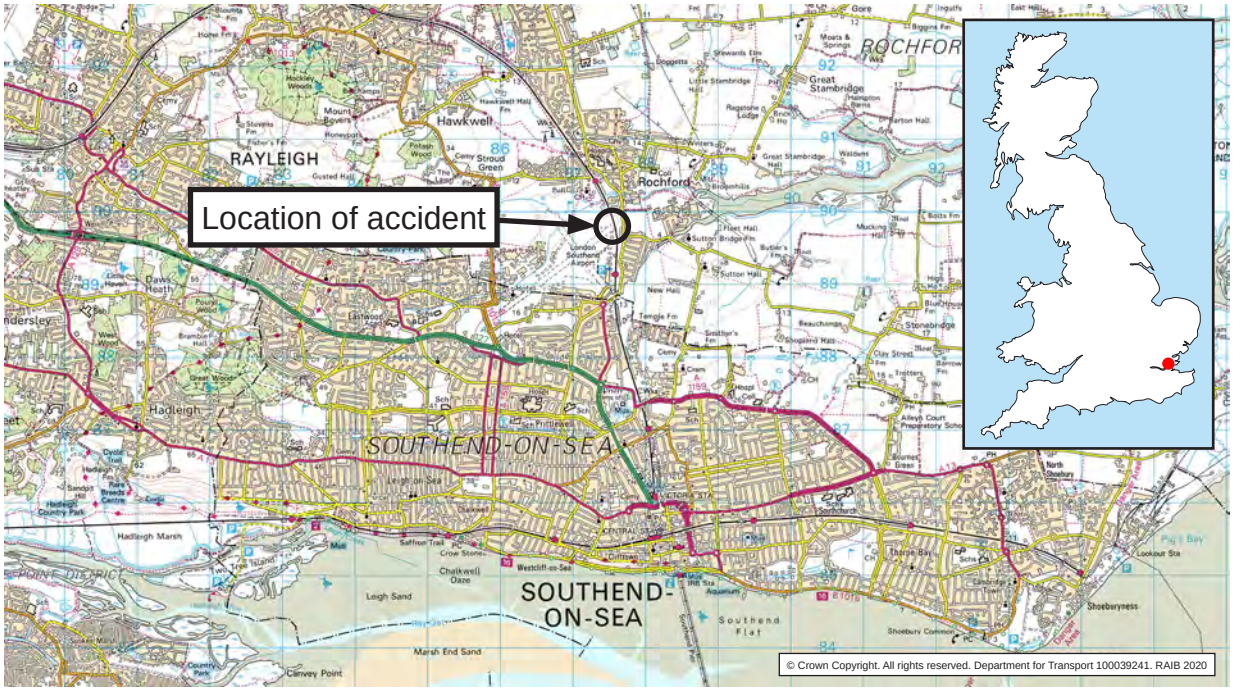

Figure 1: Extract from Ordnance Survey map showing location of accident

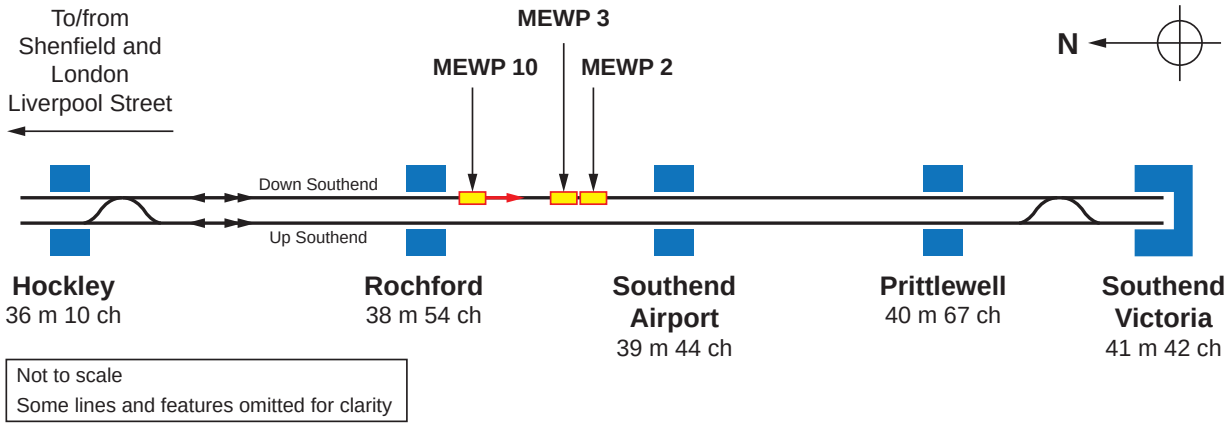

Figure 2: Layout of the track and location of the MEWPs involved in the accident

4 The machine operator and linesman who were working at height in the stationary MEWP both suffered minor injuries (bruising and shock).

Context

Location

5 Rochford station is located at 38 miles 54 chains[1] on the line from London Liverpool Street to Southend Victoria. Engineering work, requiring a possession, had started on Saturday 25 January at 02:00 hrs. It was due to finish on Monday 27 January at 04:00 hrs. The possession covered both the up and down Southend lines, from Shenfield to Southend. Within the possession were four separate work sites, referred to as work sites A to D.

6 The accident occurred within work site D, which extended from Rayleigh (33 miles 3 chains) to Southend (41 miles 42 chains). In this area, work was in progress to replace 1400 metres of overhead line wire and associated equipment.

7 The accident occurred on the down line (the line normally used by trains travelling towards Southend), about 350 metres south from Rochford station, on a gentle right-hand curve. The track at this location is level (figure 3).

Figure 3: MEWP 10 after its collision with MEWP 3. MEWP 2 is not shown as it had moved away to continue its work (image courtesy of Network Rail).

[1] A unit of length equal to 66 feet or 22 yards (around 20 metres). There are 80 chains in one mile.

Organisations involved

Network Rail (Anglia)

8 Network Rail owns, operates and maintains the railway infrastructure. At the time of the accident, the Infrastructure Projects department of Network Rail's Anglia route, acting as Principal Contractor, had contracted with a Network Rail business unit, Overhead Condition Renewals (referred to as OCR for the remainder of this report), to manage and complete the work.

Network Rail Overhead Condition Renewals (OCR)

9 OCR was established in 2007 after Network Rail purchased contracting companies that had been undertaking overhead line equipment (OLE) work as part of the West Coast Main Line renewals project.

10 In September 2008, OCR became part of Network Rail's national programme for OLE work, delivering new electrification projects, renewals, maintenance support and emergency support to all routes and capital projects. Although part of the company, OCR was still required to bid for Network Rail work.

11 OCR employed the machine operators for each of the MEWPs, and an on-track plant operations scheme (see paragraphs 55 to 56 and 91 to 101) representative (referred to as the POS representative for the remainder of the report). OCR also employed the four site supervisors (one of whom also had the role of person in charge), who were managing the teams working in the various sites of work within work site D. The OCR staff were all based at its Chadwell Heath depot.

12 OCR utilises Network Rail's national framework contract with TES Rail Ltd, Vital Human Resources Ltd, McGinley, Coyle Rail and with other self-employed contractors to supply labour to support the planning of the work, and provide staff for safety critical roles, such as controllers of site safety (COSS), and the maintenance work (linesmen).

13 All these organisations freely co-operated with the investigation.

Rail equipment/systems involved

14 The work that was planned in work site D required nine on-track machines. Of these, eight were Skyrailer 440 MEWPs. When working on rails the Skyrailer 440 (figures 4 and 5) has four-wheel drive with independently driven wheels and a hydrostatic braking system. This is supplemented with drum service and parking brakes that are also applied when the emergency brake is deployed. The eight MEWPs were intended to work in four pairs of two, working back to back at each OLE stanchion. The remaining machine was a Giga crane.

15 Because of problems with documentation one MEWP could not be used, and the crane was found to be faulty when it was being put on the track. This left seven MEWPs available for the work, with one of these, MEWP 10, working on its own.

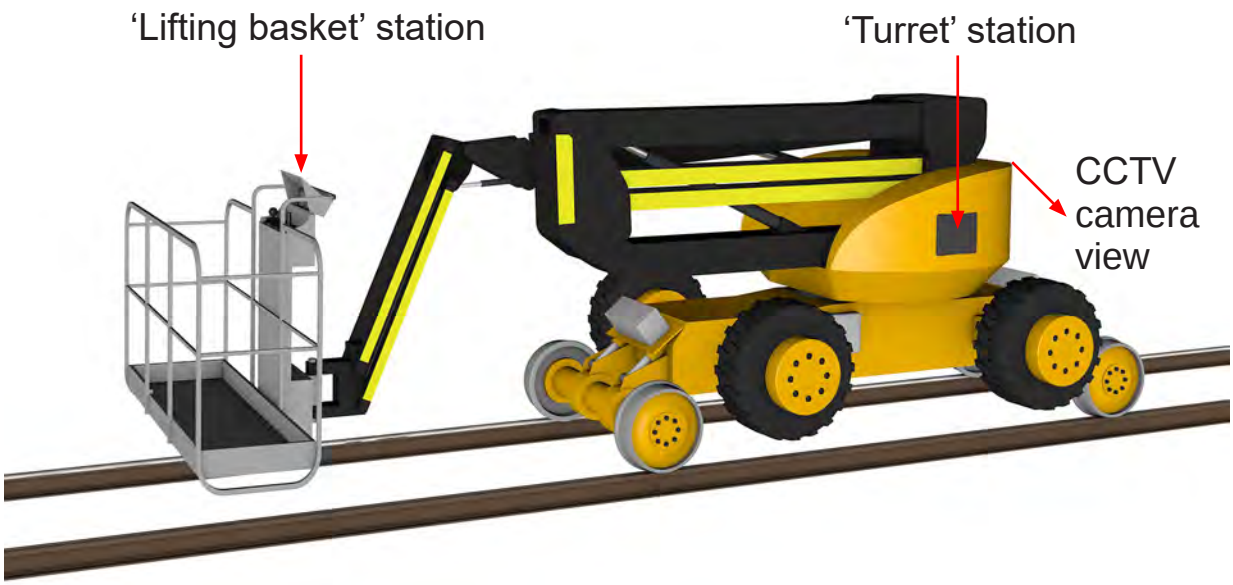

Figure 4: The Skyrailer 440 machine

Figure 5: Skyrailer MEWP 10 involved in the accident

Staff involved

Person in Charge

16 The person in charge (PiC) started on the railway in 1997 working on overhead line renewals projects. In 2008 he was employed by OCR. He became a site supervisor in 2011. As a site supervisor he had been involved in the planning of the work and reviewing the safe system of work documentation. On the day of the accident he was undertaking the role of PiC, rostered on a 08:00 hrs to 20:00 hrs shift, in conjunction with managing the work of two MEWPs working in the Southend Victoria area.

Site supervisor (MEWP 10)

17 The site supervisor for MEWP 10 started as a linesman in the rail industry in 2013. He had completed POS representative training in 2018, and in August 2019 he was made a site supervisor. On the day of the accident he was rostered on a 08:00 hrs to 20:00 hrs shift.

Machine operator (MEWP 10)

18 The machine operator for MEWP 10 joined OCR in January 2014 as an overhead linesman. He held competences allowing him to operate the engineering plant, including working at height, and work as a machine operator. From mid-October 2019 the machine operator was absent from work, initially because of a minor injury and then for a period of jury service. When he returned to work on 20 January 2020, he initially worked in the depot. Following a rest day on Friday 24 January, his first duty on site was on the following day when he was rostered for a 08:00 hrs to 20:00 hrs shift.

Plant operating scheme representative (POS representative)

19 The POS representative started work for a labour supply agency on the railway in 2007, and joined OCR in 2014, working as a linesman, and became a POS representative in 2019. During the week his role was as a linesman, only undertaking the POS representative role at the weekends.

Controller of site safety and machine controller for MEWP 10 (MCCOSS)

20 The COSS / machine controller for MEWP 10 (referred to as MCCOSS) started on the railway in 2009 undertaking several labouring roles through his primary sponsor, McGinleys, and other secondary agencies. He gained various qualifications, including lookout, COSS (2013), machine controller (2015) and engineering supervisor (ES). From 2015, his main source of employment was as a COSS while also performing the role of a machine controller.

The engineering supervisor (ES)

21 The engineering supervisor (ES) started employment on the railway in 1990 working for several different labour suppliers. Since 2015 he had been supplied for ES work undertaken by Network Rail OCR.

External circumstances

22 The weather at the time of the accident was cloudy but dry. Although the position of the sun was low, there were no reports that sunlight glare was a factor in the accident. The temperature was 4 to 5 Celsius, with a south westerly wind of 15 to 17 km/h (9 to 11 mph) resulting in a potential wind chill factor temperature of zero to 1 Celsius. It was reported that the cold had affected the actions of the operator of MEWP 10 (see paragraph 71).

The sequence of events

Events preceding the accident

23 The possession and electrical isolation of the OLE were scheduled to start at 02:15 hrs on Saturday 25 January 2020, but due to a delay in the arrival of the de-wiring train the possession was not granted until 03:28 hrs. The de-wiring train then came through the site removing the overhead wire on the up line. Six of the seven remaining MEWPs (paragraph 15) were then on-tracked and travelled to the various sites of work, and work commenced.

24 At around 08:00 hrs, a shift changeover occurred. Around 09:30 hrs MEWP 10 was on-tracked onto the down line at the access point for work site D. During the on-tracking process the machine operator had difficulty in co-ordinating the movement of the MEWP to allow the deployment of the rail wheels, and the basket collided with the overhead line equipment. A site supervisor assisted the machine operator, and the MEWP was eventually on-tracked and a satisfactory brake test was performed.

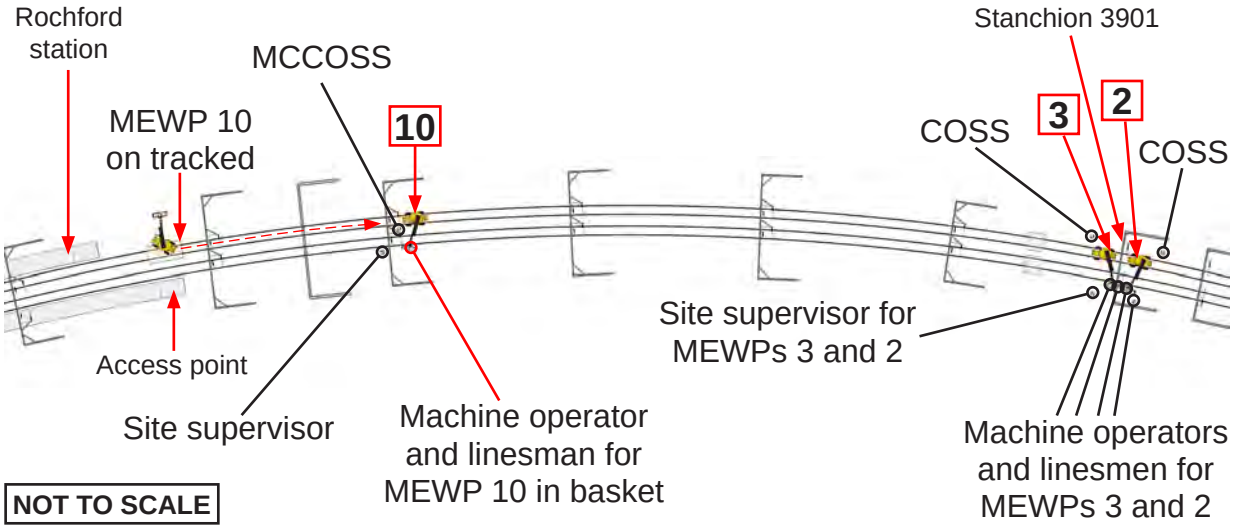

Figure 6a: Sites of work and locations of MEWPs 10, 3 and 2 with associated positions of the staff

25 The COSS briefing and the pre-work checklist for MEWP 10 were completed by MCCOSS. The associated paperwork was signed by the machine operator and endorsed by the POS representative. MEWP 10 then travelled a short distance from the access point towards Southend and commenced work (figure 6a).

26 At approximately 10:09 hrs, the machine operator working on MEWP 2 reported to his site supervisor that there was a fault with the platform sensor on the machine. The supervisor asked for the on-site fitter. The fitter arrived at the access point, and the site supervisor instructed the machine operator of the nearest machine, MEWP 10, to convey the fitter to the location where MEWPs 3 and 2 were working. The machine operator drove MEWP 10, with the fitter on board, for around 310 metres, travelling at a speed of 7 mph (12 km/h), until it had reached a point close to MEWP 2 (figure 6b).

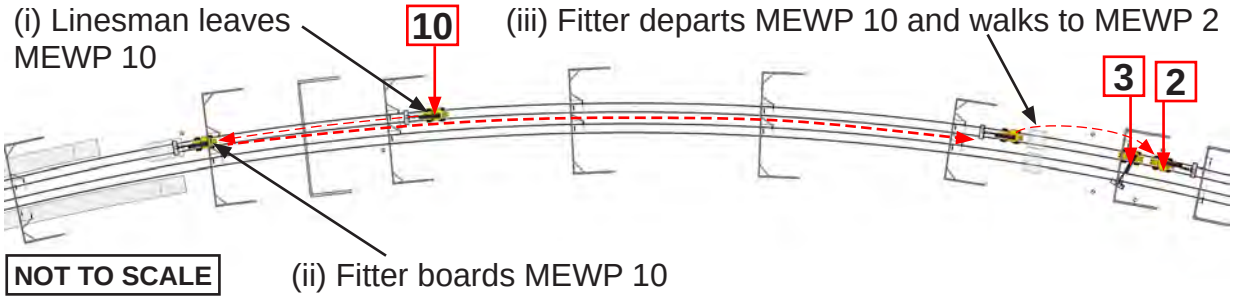

Figure 6b: Route taken by MEWP 10 to the access point to uplift and convey the on-site fitter to the site of work to attend to the fault on MEWP 2

27 The fitter alighted, and at 10:21 hrs MEWP 10 returned to its site of work, again travelling at 7 mph (12 km/h).

Events during the accident

28 At approximately 10:50 hrs, the site supervisor for MEWP 10 told the machine operator and linesman to set up the machine for lifting OLE equipment. This task required two slings, which could not be found in the machine's basket. The machine operator, in company with the linesman, took MEWP 10 back to the access point, travelling at a speed of 6.4 mph (10 km/h). The machine operator and linesman then went separate ways to look for the slings. MCCOSS was aware that the site supervisor had made the request, but he decided to remain at the site of work (figure 6c).

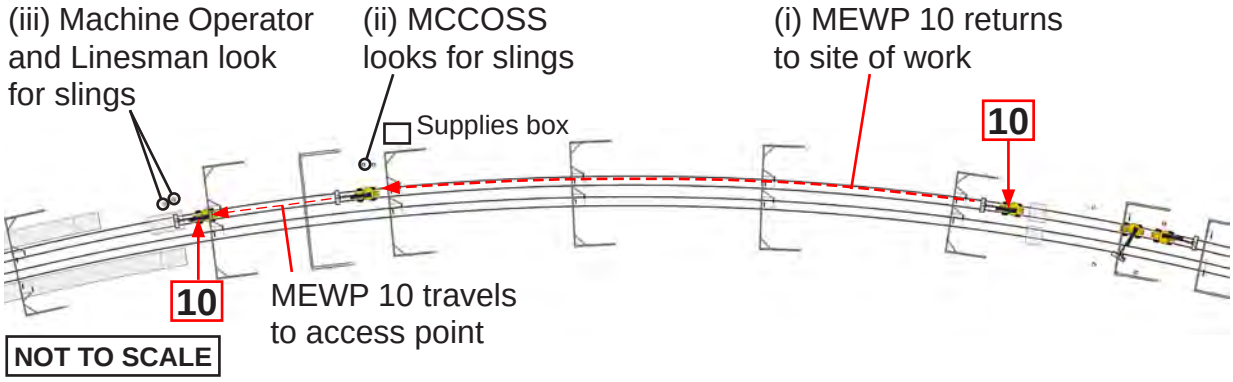

Figure 6c: Route of MEWP 10 back to its original site of work and onward travel to the access point

29 MCCOSS also looked for the slings in a supplies box located next to the down line, and at the same time, the site supervisor walked back to the access point. The machine operator told the site supervisor that as he could not find the slings, he would go and enquire if the staff working on MEWP 3 and MEWP 2 had spare slings, while the linesman continued looking around the site (figure 6d).

30 At 10:53 hrs, MEWP 10 travelled back to its site of work, a distance of approximately 120 metres, travelling at 10 mph (16 km/h). MEWP 10 was then stationary for between three and four minutes while the operator and MCCOSS looked for the slings (figure 6d).

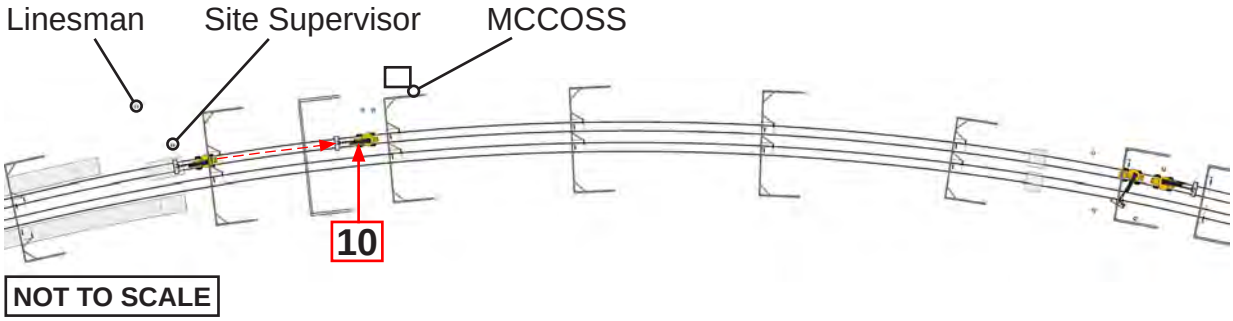

Figure 6d: Route of MEWP 10 back to its site of work

31 Around 10:56 hrs, the machine operator drove MEWP 10 away from its site of work to travel to the location of MEWP 3 and MEWP 2. The machine operator did not seek authority from MCCOSS, who was still looking for the missing slings. The horn was not sounded, and MCCOSS only became aware of the movement of MEWP 10 as the machine operator moved away from the site of work. MCCOSS has stated that, on hearing MEWP 10 moving off, he shouted several times at the machine operator to stop, and started to run after the MEWP, but he could not keep up (figure 6e) as it was now travelling at 10 mph (16 km/h).

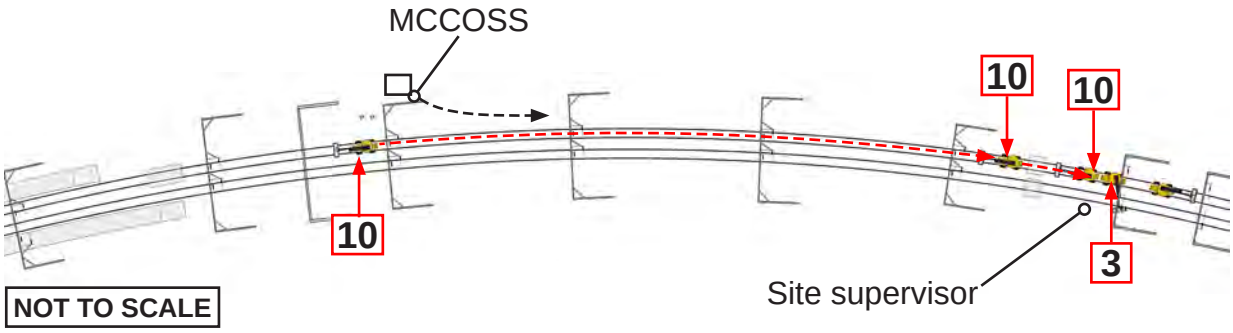

Figure 6e: Route of MEWP 10 as it approached MEWP 3

32 The on-site fitter, who was still working on a platform sensor fault on MEWP 2, became aware of the high-pitched engine noise from the approaching MEWP 10. He commented to those around him that MEWP 10 was travelling quickly. The fitter reported that he could see the machine operator was positioned centrally within the basket and had his head lowered (figures 6e and 6f). The COSS / machine controller for MEWP 2 heard the fitter's comment and turned to look towards the approaching MEWP 10. Realising that MEWP 10 was showing no signs of braking, he shouted a warning to his colleagues on and around MEWP 3.

33 The machine controller for MEWP 3, who was wearing communications headphones, was alerted by the shouting and turned to look at his colleague near MEWP 2. On realising his colleague was warning him about the oncoming MEWP 10, he turned round and saw it approaching around 15 to 20 metres away. Believing a collision was unavoidable, he shouted 'stop, stop' to the machine operator on MEWP 10, and also to alert the machine operator and linesman working above him in the basket of his own machine.

34 At this time, the site supervisor for MEWPs 3 and 2, who was standing next to the up line managing the work, also became aware of what was happening and shouted at the machine operator on MEWP 10.

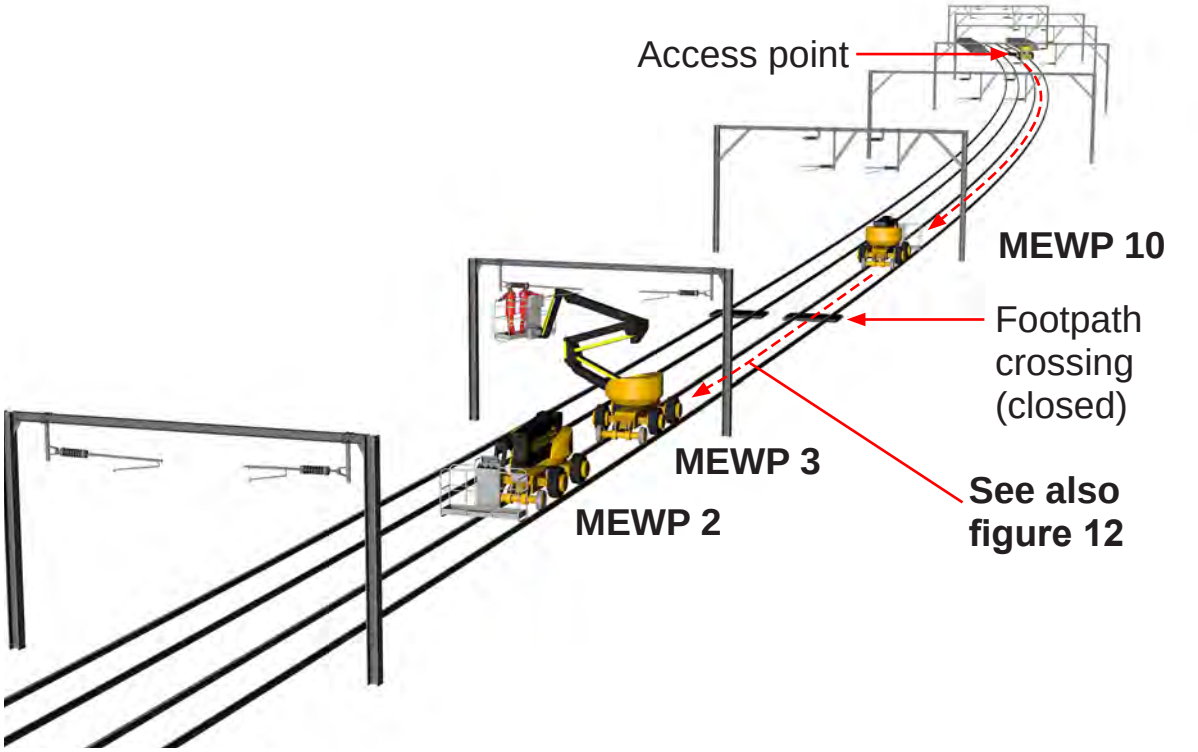

Figure 6f: Route of MEWP 10 to the collision with MEWP 3 (see also figure 12)

35 At 10:57 hrs, MEWP 10 collided with MEWP 3. Just before impact, the machine operator applied the brakes by releasing the MEWP's speed controller (figures 7 and 8). This produced a slight reduction in the speed of the MEWP before the collision, from 10 mph (16 km/h) to 9 mph (14 km/h). The machine operator of MEWP 3 (wearing headphones) and the linesman, who were working in the basket, did not hear any warnings (figure 6f).

Events following the accident

36 The impact resulted in both the people in the basket of MEWP 3 being thrown against its metal framework. They were wearing the required safety harnesses, and this probably prevented a far more serious accident from occurring.

37 The MEWP 10 machine operator reversed his machine clear of MEWP 3, allowing the now injured machine operator of MEWP 3 to bring the basket of the machine down to ground level. He and the linesman were taken to hospital by a member of staff, where they were treated for minor injuries and released around 16:00 hrs.

38 The site supervisor for MEWPs 3 and 2 asked the operator of MEWP 10 what had happened. The operator, who was uninjured, said that the brakes on his machine had not worked effectively. The site supervisor took charge of the scene and called the PiC at 11:10 hrs, informing him of the accident. The PiC was managing two MEWPs working near Southend airport station. He did not believe he was in a position to manage the accident site (see paragraph 86) and asked the site supervisor to manage the situation. The POS representative, who was located within work site D near to the airport, did not see or hear the collision and was not made aware of the accident.

39 At 11:30 hrs, the site supervisor for MEWPs 2 and 3 contacted the engineering supervisor for work site D, who was in a local supermarket. The engineering supervisor said that he did not know what action needed to be taken, having never managed an accident before, and asked the site supervisor (who also had no training or competence in accident investigation) to manage the situation. The engineering supervisor said he would inform the person in charge of the possession (PICOP) and call the incident control at Romford route operations centre, which he did at 11:42 hrs.

40 At 12:10 hrs, the route control manager (RCM) at Romford contacted Network Rail's national operations centre, who subsequently reported the accident to RAIB.

41 At 12:50 hrs, the RCM contacted a Network Rail (Anglia operations) on-call manager and requested she attend the accident site to co-ordinate activities and recover any perishable evidence. At 12.59 hrs the RCM also contacted a Network Rail (Anglia maintenance) on-call manager to request him to also attend the site to support the operations manager, who had not deployed to an accident site before.

42 At 13:37 hrs, the RCM, who had not heard from any of the on-call managers or the site supervisor, contacted the local mobile operations manager (MOM) to ask him to attend site. The RCM informed the MOM that drugs and alcohol screening had been arranged for the staff involved (including the injured operator and linesman who were still in hospital) and that MEWPs 10 and 3 needed to be secured and quarantined for RAIB.

43 At 14:16 hrs the on-call maintenance manager arrived at the scene and contacted the incident controller at the route operations centre, to report that he was awaiting the arrival of the on-call operations manager who would lead the accident investigation on site. He also reported that he could not go into the possession to support the MOM (who had just arrived on site at 14:21 hrs) as he had been asked to deploy at a time when he had no personal protective equipment (PPE) in his possession.

44 At 14:59 hrs the on-call operations manager arrived on site, but could not go onto the railway as she had also deployed without any PPE. The MOM was therefore requested to go on site, recover the available evidence and quarantine the two MEWPs.

45 At 15:04 hrs RAIB contacted the on-call operations manager to confirm the types of evidence that should be gathered (measurements relating to the location of the MEWPs involved, and swabs of the rails and wheels) on behalf of RAIB. However, RAIB subsequently discovered that this evidence had not been collected.

Background information

Mobile elevating work platform (MEWP)

46 A mobile elevating work platform, commonly referred to as a MEWP, is a vehicle with a platform (known as a basket) attached to a central jib which can elevate the basket to give access to structures and equipment. The Skyrailer 440 (figure 4) is capable of operating on both road and rail, and is fitted with rail wheels which are directly driven and braked, independently of the road wheels. The basket, which can turn through 180 degrees, incorporates a control console (figure 7) with two monitors. The left-hand monitor (A) shows the machine configuration and the speedometer, and the other (B) is a CCTV monitor showing images from a camera on the front of the MEWP (see figure 4). The console has three joysticks which control the horizontal slewing of the basket (C), the height of the basket (D), and the forward and reverse movement of the machine, including braking (G). The joystick controlling the speed and braking has a button which must be depressed while holding the joystick to allow movement to take place. The operator must also have their foot inserted in the 'deadmans' control (figure 8) while the joystick is being used. Releasing the joystick or removing pressure on the footplate will initiate a hydrostatic brake application. Emergency braking can be applied by pushing the red plunger (figure 7, E).

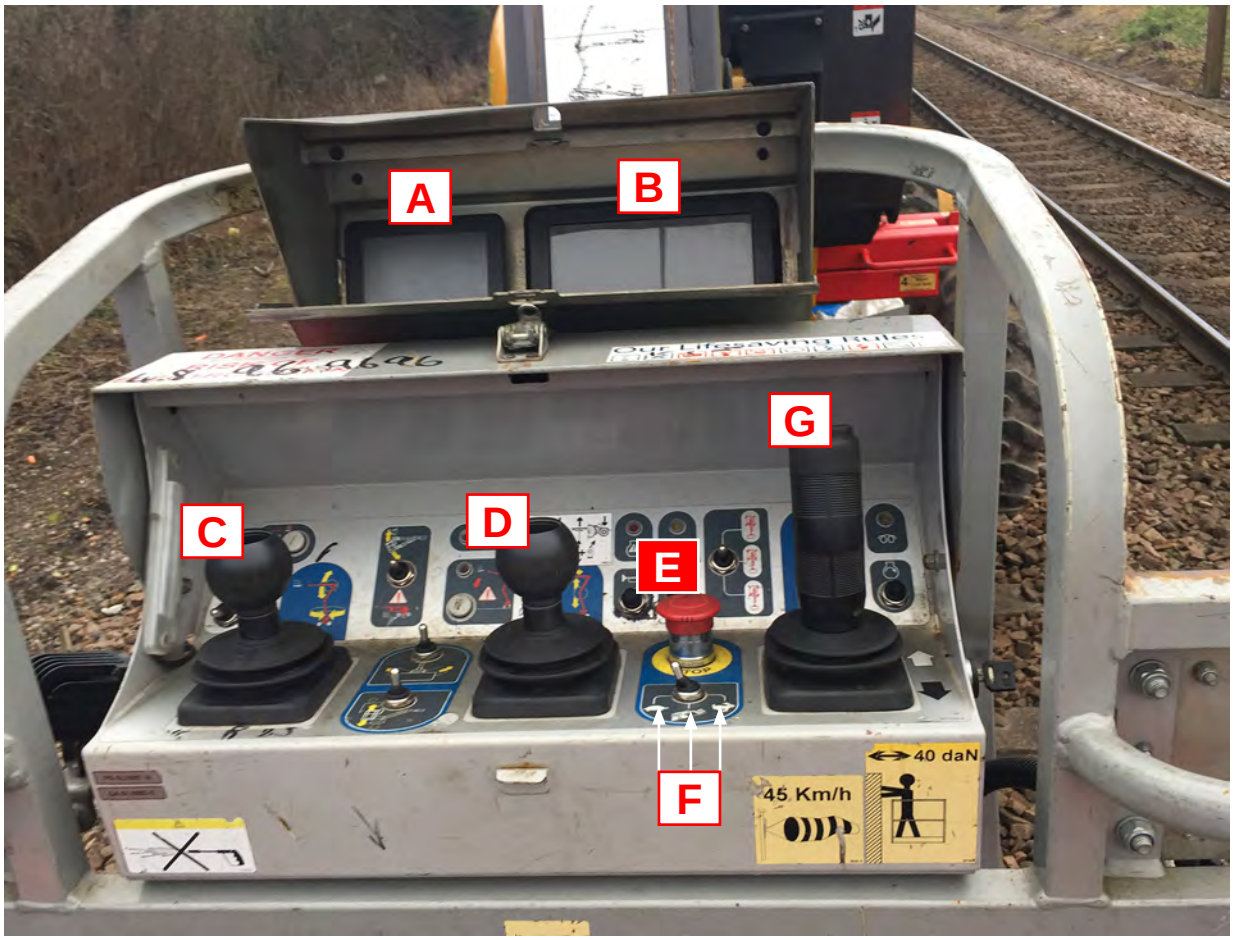

Figure 7: The control console on MEWP 10 after the accident

47 The speed ranges in which the MEWP can be operated are selected by a three-position switch (F). 'Tortoise' or 'work' mode (left position) has a maximum speed of 5 mph (8 km/h). The centre position is the on-tracking or low loading mode. 'Hare' or 'travel' mode (right position) allows the machine to travel at a maximum speed of 10 mph (16 km/h). The basket must be in the lowered central position to allow the machine operator to use the machine in 'hare' mode.

48 These authorised operating speeds are shown on the engineering conformance certificate (ECC) and engineering acceptance certificate (EAC) for the machine, which are issued by a Vehicle Acceptance Body in accordance with rail industry standard RIS-1530-PLT, and are referenced in the Rule Book.

49 The CCTV monitor (A) is intended to allow a machine operator to have maximum visibility of staff who may be working close to the machine when it is travelling at slow speed or manoeuvring. The CCTV screen may be used for visibility ahead when necessary (when the machine is travelling with the basket at the rear) if authorised by the machine controller and if this is shown in the method statement for the work (see paragraph 64).

Figure 8: The control console and 'deadmans' foot control on MEWP 10

50 The MEWPs being used within the possession at Rochford were intended to be operating in pairs, with the baskets working 'back to back' to allow both teams of operators and linesmen to remove and install overhead line equipment at each stanchion. Each machine was supervised by a machine controller, with one site supervisor managing each pair of teams.

Movement of road-rail vehicles and on-track plant within possessions and work sites

51 Standards and guidance on the use and movement of on-track plant (including road-rail vehicles in rail mode) are made up of the following documents:

- Network Rail standard NR/L2/RMVP/0200 'Infrastructure Plant Manual' defines the requirements and guidance when using plant for the installation, renewal and maintenance of Network Rail's infrastructure. The purpose of the document is to implement effective management control and supervision of on-track plant operations, and among other things, to mitigate the risk of collision and injury through uncontrolled movement. NR/L2/RMVP/0200 includes modules P500 'Competence and fitness', P521 'Plant operations scheme' (see paragraphs 55 to 56 and 91 to 101), and P100 'Reporting and investigation of plant related events'. Standard NR/L2/CTM/025 defines the competence and training required for the operation of on-track plant.
- The Mechanical and Electrical Engineers' networking group, on which Network Rail is represented, produced document M&EE - COP0001, issue 8, dated July 2019. This is a code of practice for the management of competence of plant operators, which defines the elements of competence that need to be managed.

52 The Rule Book, Handbook 12, defines the role of the Engineering Supervisor (ES). Section 4.1 states that the ES must agree the following with each COSS:

a. the limits of their site of work

b. the nature of the work

c. the safe system of work they will use.

Section 4.3 states that if all lines are blocked to trains, and movements of on-track plant are to take place, the movements will be '*made at no greater than 5 mph (10 km/h)*' [sic]. This is roughly walking pace.

53 Section 6.1 'Train movements' states that only an ES can authorise a movement within the work site, and they must instruct the machine controller of each item of plant to make each rail movement, giving the exact location the movement is to proceed to, and checking that the machine controller clearly understands this.[2] During the investigation, RAIB explored the scope of this section with RSSB, the body which manages the Rule Book. Its view, which was shared by the site staff who gave evidence to RAIB, was that section 6.1 applies to movements of plant to and from the site of work, and that movements in connection with the actual carrying out of work are the responsibility of the machine controller and do not need to be individually authorised by the ES (but see paragraph 74 regarding a possible lack of clarity).

54 Handbook 15 defines the role of the machine controller and machine operator for on-track plant. It also states (section 7.1) that the machine controller can only authorise movements of on-track plant after they have obtained permission to do so from the ES.

[2] Handbook 12 'Duties of the engineering supervisor or safe work leader' defines an engineering train as including a light locomotive (this includes on-track machines but does not include on-track plant) or a road-rail vehicle in rail mode.

The on-track plant operations scheme (POS)

55 Between January and June 2014, 134 accidents and incidents were reported involving on-track plant on Network Rail's infrastructure. As a result, Network Rail launched the on-track plant operations scheme (POS). The first phase of the scheme was introduced in 2014 and was only applicable to contractors, with the second phase of the scheme, which is defined in Network Rail standard NR/L2/RMVP/0200/Module P521, being fully implemented in December 2015. The scheme was intended to *'contribute to the control of the following risks:*

- *risk of runaway, uncontrolled movement and collisions by on–track plant (OTP) with infrastructure, workforce or other vehicles*
- *risk of personal injury within a work site: slips, trips and falls, or being struck by on-track plant*
- *risk of implementing ineffective management control and supervision of on-track plant operations.'*

56 This standard states that organisations (POS providers) wishing to operate on-track plant on Network Rail infrastructure must be able to demonstrate that they have the required safety and competence management systems in place. They must provide '*an adequate number*' of persons (the POS representative) to act for them on site. The role and responsibilities of the POS representative are defined in the standard (see also paragraphs 91 to 101, 132 to 133 and 140 to 157).

Analysis

Identification of the immediate cause

57 **MEWP 10 did not stop before it collided with the stationary MEWP on the same line.**

58 RAIB's investigation gathered electronic data from the tracker device on MEWP 10 and electronic communications evidence, as well as witness and documentary evidence relating to the movement of the machine. Analysis of this evidence was supported by tests using MEWPs 10 and 3. From the evidence available, RAIB has concluded that the braking system on MEWP 10 was working effectively at the time of the accident and would have stopped the machine within the braking distance required by Railway Industry Standard RIS 1530, which is 18 metres when travelling at the machine's maximum speed of 10 mph (16 km/h) on dry, level track. Ineffective brakes were therefore highly unlikely to be a factor in the collision.

Identification of causal factors

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

a. The machine operator drove the MEWP above walking pace while using the CCTV screen to provide his forward view (paragraphs 60 to 67)

b. The machine operator lost awareness while driving the machine towards the stationary MEWP (paragraphs 68 to 72)

c. The machine controller was unable to effectively supervise the machine operator or the safe movement of MEWP 10 (paragraphs 73 to 80)

d. The site organisation was not conducive to safe management, because the number of supervisory roles on site, and a lack of clarity about roles and responsibilities, led to confusion among staff about who was in charge of the safe movement of on-track plant (paragraphs 82 to 103).

Each of these factors is now considered in turn.

The actions of the machine operator

60 **The machine operator drove the MEWP above walking pace while using the CCTV screen to provide his forward view.**

61 Unless permission for a higher speed has been given by the ES or safe work leader (SWL), the Rule Book[3] requires that the speed of on-track plant is restricted to 5 mph (10 km/h) [sic]. Movements above this speed must be authorised by a ES or SWL within a work site, or the PICOP when moving within a possession but outside a work site. The machine operator must always be able to stop within a distance that can be seen to be clear of any obstruction.

62 The machine operator was fully aware he was operating the MEWP at a speed that was above walking pace, as this was something he had done before, and seen others do, without being challenged.

[3] Handbook 15 section 7.4 and Handbook 12 section 4.3.

63 Although the start of the possession had been slightly delayed and the shift handover had been problematic, the RAIB understands that at the time of the accident the work was still on schedule. However, it is possible that the machine operator may still have felt under time pressure to get the job done (see paragraphs 104 and 105). He was aware that people were waiting for him to return with the slings so that the work could continue.

64 A CCTV monitoring system was available on MEWP 10. However, the Rule Book[4] sets out these conditions for the use of CCTV while travelling:

- its use has been documented in the safe system of work and method statement
- it has been authorised by the engineering supervisor and the machine controller
- the speed must not exceed 10 mph (15 km/h) and it gives a clear view ahead
- the engineering certificate allows it to be used.

65 The engineering certificate for MEWP 10 allowed 'reverse' movements (with the platform at the rear) to use the on-board CCTV or be controlled by ground staff (a machine controller). In either case the maximum permitted speed was that achievable in 'work' mode, shown as 5 mph (8 km/h).

66 The machine operator stated that he knew that he should have been looking ahead when he set off towards MEWP 3, but the cold weather resulted in him using the machine's central jib to shield his face from the wind, and looking at the CCTV monitor to view the route ahead. However, the wide-angle view provided by the CCTV screen (paragraphs 46 to 49) is different from the operator's own eye level view (figure 9). Such images can give the machine operator the impression that obstacles are more distant than is actually the case. A MEWP does not become prominent in the image on the screen until it is 10 to 15 metres away (see figures 11 and 12). During tests it was also observed that the reflection of hi-visibility PPE clothing could be seen to hinder and obscure the quality of the image on the CCTV screen. The witness evidence gathered by RAIB does not support the possibility that reflection on the screen was a causal factor.

67 The machine operator had previously conveyed the fitter to the same location (paragraph 26), at a slower speed, around 7 mph (11 km/h). The experience of this journey may have provided the operator with some reassurance that it was reasonable to rely on the CCTV, as he was confident in his mental model of where the site of work ahead of him was. However, it is possible that on the second journey, travelling at the higher speed of 10 mph (16 km/h), he misjudged the time and distance to the stationary MEWP 3 (a difference of between 8 and 11 seconds), and this misjudgement may have led to his not stopping short of MEWP 3. Witness evidence, combined with the evidence of marks found on the railhead (figure 12) and electronic data from MEWP 10, show that it is highly probable the machine operator only reacted to the presence of the machine ahead of him when he became aware of the shouts from the machine controller and site supervisor for MEWP 3.

[4] Handbook 15 section 7.9.

Figure 9: The view from the basket and eye level view from the machine operator's perspective on MEWP (10)

Figure 10: Images taken from MEWP 10, 107 metres from stationary MEWP 3, showing the view from the basket (left), CCTV monitor view (middle) and eye level view (right) from the machine operator's perspective on MEWP 10

Figure 11: Images taken from MEWP 10, 15 metres from stationary MEWP 3, showing the view from the machine operator's eye level (left), CCTV monitor view (middle) and machine operator eye level view (right) from MEWP 10

Figure 12: image showing the location of the railhead markings and impact point (inset image courtesy of Network Rail)

68 The machine operator lost awareness while driving the machine towards the stationary MEWP.

69 The machine operator stated that when he became '*aware of his surroundings*' and the close proximity of MEWP 3, he released the forward pressure on the joystick (but could not recall if he completely let go of it), and may also have removed his foot from the footplate control (figure 8), both of which would have applied the hydrostatic brakes.

70 This suggests that before he was alerted by the shouts of people on the ground, the machine operator was not fully focused on the driving task. RAIB reviewed the available evidence to establish possible reasons for this.

71 It is probable that the machine operator lost focus on the driving task because of a misperception of the time and distance involved, arising from his recent previous journey to the stationary MEWP. On that occasion he drove more slowly. This may have resulted in a false sense of reassurance, so that he believed that the stationary MEWPs ahead were further away than they actually were (paragraph 67) which may have been compounded by the image shown on the CCTV display (paragraph 66). This may have led to a state of mental 'underload' and a lack of stimulation resulting in the machine operator's attention to the driving task being diminished. It is also possible that the cold weather affected his ability to focus on the task.

72 RAIB found no evidence that fatigue had affected the machine operator's concentration levels or decision making, or that the machine operator had been distracted by using his personal or work phone to make or receive a call around the time of the accident. However, RAIB cannot rule out the possibility that the operator was distracted by an electronic device.

73 **The machine controller was unable to effectively supervise the machine operator or the safe movement of MEWP 10.**

74 The Rule Book, Handbook 15, defines the role of the machine controller and on-track plant machine operator, and sets out the conditions for the movements of on-track plant. According to section 7, the ES is responsible for authorising the movement of engineering trains or on-track plant (in rail mode) entering a work site or within a work site (paragraph 53 explains how this is interpreted in practice). At Rochford, the ES was not present at the site of work at the time MEWP 10 was on-tracked, so he could not communicate with MCCOSS (see paragraph 88).

75 Section 6 of Handbook 15 states that a machine controller must be with on-track plant when it is on-tracking and working in rail mode. Section 5 says that as part of the briefing process the machine controller must tell the machine operator:

a. *the speed restrictions that apply; and*

b. *Other items relating to the horn, limits of the work site or any other hazards such as gradients, overhead obstructions and any other site activities that the machine operator must be aware of.*

76 Documentary and witness evidence shows that MCCOSS gave the required briefings at the access point before on-tracking, and completed the necessary checklist before work started. A local condition associated with the close proximity of Southend airport,[5] and the use of the horn before the start of any movements, were also highlighted to the machine operator, who signed the document to confirm he had understood the briefing.

77 During the on-tracking process the machine operator had problems with co-ordinating the controls and movement of the MEWP, resulting in a site supervisor assisting the operator. MCCOSS did not speak to the machine operator about this apparent lack of competence. MCCOSS had not been made aware that it was the machine operator's first operational day since returning from his extended leave, which was a possible explanation for his on-tracking difficulties.

[5] MEWP lights had to be extinguished during aircraft landing and take-off.

78 In the period before the accident the operation and control of the machine was not in accordance with the rules and standards that applied. Examples of non-compliant machine operation prior to the accident were:

a. A machine controller must be with an item of on-track plant when it is being put on or off the track, being set up, or working in rail mode.[6] Movements of on-track plant must be controlled by the machine controller, either by communicating face to face, by using a radio or by using hand signals.[7] At the Rochford work site, the safe system of work documents and the briefing given by MCCOSS stated that movements within the work site would be controlled using a radio system, with headphones which were required to be worn at all times when working on the railway. However, witness evidence shows that it was common practice for both the machine operators and controllers to remove their headphones during pauses in the work. Despite the provision of sterile wipes this behaviour seems to have developed because they believed the equipment was both uncomfortable and unhygienic. When MCCOSS attempted to use the radio to instruct the machine operator of MEWP 10 to stop (paragraph 31), he observed the operator had removed his headphones.

b. The machine operator did not sound the horn (as required by the Rule Book[8]) on the two occasions he travelled unsupervised in the work site to and from the location of MEWP 3. Although MCCOSS had observed the operator's behaviour, he did not challenge the machine operator or speak to the site supervisor.

c. MCCOSS was aware that the site supervisor had asked the operator and his linesman to set up the next phase of work, preparing the lift for the overhead line equipment to be fitted, and had instructed them to go back to the access point to find the required slings. However, MCCOSS was unaware that while the machine operator was at the access point he and the site supervisor had agreed that the operator would travel to the location of MEWP 3 to see if the staff had the slings. When the machine operator returned from the access point MCCOSS did not speak to the machine operator, as he was still looking in a supplies box. On hearing MEWP 10 moving away, MCCOSS shouted to the machine operator to stop, as he did not know why the MEWP was moving without his authority. MCCOSS believed that the machine operator was then close enough to hear this instruction, but chose to disregard it.

79 MCCOSS was aware of the Rule Book requirements relating to his role and responsibilities. However, prior to the accident he did not challenge the machine operator's behaviour when these incidents of non-compliance occurred. He did not feel he had the authority to challenge the behaviour of the machine operator, or site supervisor issuing instructions on the movement of the MEWP, as he believed the site supervisor was in charge.

[6] Rule Book Handbook 15 section 6.1.

[7] Rule Book Handbook 15 section 9.

[8] Rule Book Handbook 15 section 7.2.

80 In relation to the role of the POS representative, MCCOSS stated he had received a briefing on the role when it was introduced. However, witness evidence shows that MCCOSS (and other witnesses) misunderstood the role of the POS representative, believing the POS representative was in charge of the safe movement of the on-track plant in the work site (see paragraphs 93 to 101). This lack of understanding, combined with the number of supervisory roles on the work site, including the machine controllers, the POS representative and the site supervisors, led to MCCOSS and other agency staff being confused and lacking confidence in their role (see paragraphs 106 to 110). These factors led to a breakdown in communication between MCCOSS and the machine operator, and resulted in the site supervisor effectively taking the 'lead' from MCCOSS and making decisions on both the management of the work and the safe movement of MEWP 10.

81 RAIB has also observed that the prevalent culture that existed on the work site contributed to a lack of supervision (see paragraph 102).

Management of the possession

82 **The site organisation was not conducive to safe management, because the number of supervisory roles on site, and a lack of clarity about roles and responsibilities, led to confusion among staff about who was in charge of the safe movement of on-track plant.**

83 The hierarchy of supervision in engineering possessions is described in Rule Book Handbook 11 'Duties of the PICOP', Handbook 12 'Duties of the ES or SWL' and Handbook 9 'IWA or COSS setting up safe systems of work within possessions'. These rules describe the ES or SWL as being responsible for the arrangements for work inside work sites,[9] where they must agree with each COSS the limits of their site of work, the nature of the work, and the safe system of work they will use.[10] The COSS must not allow work to start until they have signed the work-site certificate held by the ES, recording this agreement.[11] The structure laid down in these rules does not include roles for site supervisors or POS representatives. In addition to the Rule Book, Network Rail company standard NR/L2/OHS/019 issue 9 'Safety of people at work on or near the line' (standard 019) establishes the role of the person in charge (PiC) responsible for delivering work on site, who will control each work group that is on or near the line, and will '*normally be the team leader (or equivalent)*'.

84 The following paragraphs describe how the local planning and management structure of the work site resulted in confusion amongst staff as to who was in charge of the sites of work.

The person in charge (PiC)

85 The site supervisor who had been allocated the role of the PiC had been involved in the planning and checking of the safe system of work, as required by standard 019. As the PiC he had overall accountability for supervising and overseeing the work to make sure the planned controls were put in place to keep persons safe from site activities and trains (including on-track plant).

[9] Rule Book Handbook 11, section 6.

[10] Rule Book Handbook 12, section 4.

[11] Rule Book Handbook 9, section 3.

86 OCR rostered the PiC in a dual role as a site supervisor looking after two MEWPs, as well as the progress of the whole team's work. This practice is permitted by standard 019 and witness and documentary evidence show that this did not affect the safety briefings and documentation at the start of the work. The intention of standard 019, as explained by Network Rail to RAIB during a previous investigation, is that the PiC should only be supervising one work group.[12] As the machine controllers were not undertaking the role of PiC for the various sites of work, it is difficult to see how the appointed PiC could have undertaken his responsibilities for overall oversight and supervision of the work, supervising the safety of the work site and managing the site risks when also supervising the local work of two MEWPs. When the accident occurred, the PiC felt under pressure as he was now short of staff and machines to complete the work. As such, he did not feel he could relinquish his role supervising the remaining work. Rather than contacting the POS representative, the PiC asked the site supervisor to manage the situation and the accident scene, allowing him to continue his own work. Although the PiC had no further involvement in the accident, RAIB believes that OCR's decision to allocate the PiC in a dual role affected his ability to effectively monitor the work activities, and to manage the personnel, risks from the site activity and the movements under his control.

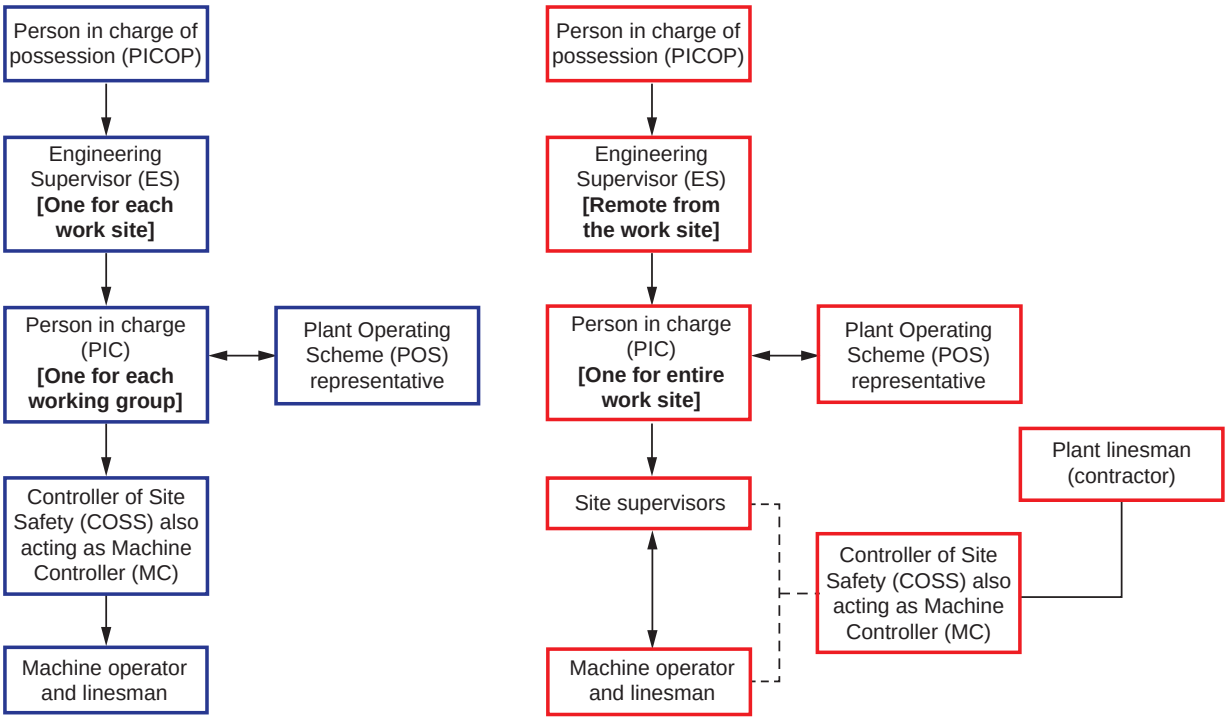

Figure 13: The standard structure of a possession (left) and the structure at Rochford (right)

[12] RAIB report 20/2018.

The engineering supervisor

87 When the ES arrived at the work site he met with the site supervisors, plant linesman, POS representative and the machine controllers, and briefed them regarding the limits of the work site. The ES believed that, since all these individuals were involved in the management of the work site and movements of the on-track plant, his role had diminished, and he then felt surplus to requirements. At the time of the accident he was away from the site, buying food. At no point during the work was he contacted for permission for on-track plant to operate at a speed above walking pace within the work site (paragraphs 60 to 72). When he was contacted after the accident he did not feel confident or competent enough to take charge, as he had no previous experience of dealing with an accident, and asked the site supervisor to manage the situation.

88 RAIB consulted RSSB to understand and clarify the areas of responsibility, as defined in standards and railway rules, between the ES, machine controller and POS representative. The role of the ES in relation to the control of movements is considered to apply only to movements in and out of the work site or movements involving machines travelling through or between a number of sites of work (paragraphs 52 and 53). The role of POS representative does not appear in the Rule Book.

Site supervisors

89 Site supervisors reported that they had worked with machine controllers who lacked competence and non-technical skills and were generally considered to be either incompetent with no knowledge of the job in hand or had poor English language communication skills (see paragraphs 146 to 155). As the nature of possession work is sporadic and the working relationship between full-time and agency workers infrequent, OCR supervisors reported that there was little or no opportunity for the two workforces to form the basis of an effective business relationship or develop a 'team' approach when working together within a site of work. The culture that had developed may have led to site supervisors bypassing the machine controller when managing the work in hand or when issuing instructions to machine operators. Machine operators may have witnessed this behaviour, and this may have also led them to communicate directly with site supervisors rather than working with their machine controller.

The plant linesman (contractor)

90 At the time of the accident the plant linesman was at the access point. His core responsibilities were to brief the machine controllers and machine operators and allocate the staff to the respective on-track plant machines they would be working on. He had been appointed as a supervisor by OCR in 2018, but his role was downgraded to a plant linesman, a role specific to OCR, later that year. However, he continued to be seen as the 'supervisor' and a point of contact when machine operators and controllers arrived on site (figure 13). The role of the plant linesman appears to have duplicated some aspects of the role and responsibilities of the POS representative, and witness evidence shows this added to the confusion among machine controllers as to who was in charge.

The POS representative

91 The Plant Operations Scheme (POS) is described in Network Rail standard NR/L2/RMVP/0200/ Module P521. Rules of the scheme are in section 3 of this document (rules not relevant to operations on site are omitted):

> ***3 The on-track plant operation scheme rules***
>
> *OTP operations on NRMI[13] and Network Rail projects shall be carried out by an approved POS provider. POS providers are approved by the POS review panel. To gain approval a POS provider shall demonstrate to the POS review panel that they have:*
>
> 1. *a fully documented management system and framework for the safe delivery of OTP operations;*
> 2. *a competence management system for assuring the competence and fitness of their employees and contracted staff involved in the operation, maintenance and supervision of OTP operations in accordance with the Sentinel scheme rules;*
> 3. *adequate processes to enable effective communication and co-ordination on site;*
> 4. *an adequate number of POS representatives present on each site to act as the point of contact. POS representatives shall be employees of the POS provider and not be engaged in any other concurrent safety critical duties on site;*
> 5. *Not applicable*
> 6. *arrangements in place to respond to emergencies while undertaking OTP operations;*
> 7. *Not applicable*
> 8. *Not applicable*
> 9. *adequate arrangements for the operational control, preparation, development, communication and implementation of the safe system of work for OTP operations.*
> 10. *Not applicable*
>
> *Note: In the above rules, the term adequate is a risk based assessment that determines suitable and sufficient means to eliminate risk involved in an operation, or to reduce the risk to an acceptable level if elimination is not possible.*

92 The role of the POS representative is described in section 4 of the standard:

> ***4.3 On-track plant operations scheme representative***
>
> *POS providers shall nominate at least one POS representative on each site where OTP is being utilised. The person(s) fulfilling this role shall be:*
>
> *a) trained, and assessed as competent in the POS provider's management systems for delivery of the OTP plan and arrangements made by the POS provider;*

[13] Network Rail managed infrastructure

b) the single point of contact for the Safe Work Leader (SWL) or Person In Charge (PiC) for OTP operations;

c) assist in the planning of OTP operations and the documenting of these in the OTP plan; and

d) an employee of the POS provider.

A POS representative shall not be engaged in, or be responsible for any other site safety critical duties except as a machine controller (MC) or crane controller (CC), when only a single item of OTP is in use and they hold the corresponding competence.

This requirement excluded site supervisors from undertaking the role of a POS representative.

93 Evidence from Network Rail's on-track engineering specialist and the safety regulator, the Office of Rail and Road (ORR), indicates that these bodies originally envisaged that the role of the POS representative would be to simply act as a conduit between the plant provider and Network Rail. This would ensure the process of safety briefing and on-tracking of the machines was efficient and effective, thus reducing any potential delays. The investigation found that in practice the role of the POS representative had developed beyond this (see paragraph 95).

94 Network Rail standard NR/L2/RMVP/0200/ Module P521 (issue: 3 December 2018) section 5.11.3, 'Control and supervision', states that the POS provider must have arrangements for carrying out the following functions. In practice, these have been delegated to the POS representative:

- pre-use checks;
- setting up of on-track plant;
- on-track plant movements (as required by Rule Book Module GE/RT8000/HB15);
- reports of faults or defects on the on-track plant; and
- exclusion zones and full duplex (radio / headset equipment) communications.

95 Witness evidence indicated that the duties of the POS representative, as interpreted by OCR, had resulted in a linesman being allocated to the role. Although site supervisors had been trained in POS representative duties they were not allowed to undertake the role (paragraph 92) due to their involvement in the management of the work. The duties of the POS representative role had evolved into the endorsement of the machine controller's checklist and briefing documents after the on-tracking process had been completed, as well as supervision and monitoring of both the movement of on-track plant within the site of work, and maintaining safe exclusion zones. All of these tasks appear to duplicate the responsibilities of the machine controller.

96 No guidance or definition is provided on where the responsibilities of the POS representative and the machine controller start and end. The responsibilities of the POS representative therefore appear to cross over from the co-ordination of resources and plant and the endorsement of pre-use checklists to the supervision of the movement of MEWPs within the work site. The rule book is clear that this is the responsibility of a machine controller, but with no clear demarcation being provided in Network Rail's standard and guidance documents, the POS representative's responsibilities appear to have resulted in confusion. Witness evidence shows that staff believed that the POS representative was in charge.

97 Witness evidence also showed that this confusion had been identified by the workforce at Rochford, who commonly referred to the role of the POS representative as the 'MC (machine controller) police' or the 'shadow MC'. The confusion was exacerbated by the involvement of the site supervisors in managing the progress of the work and issuing instructions to staff, including the machine operator. The number of people involved in the management of the work and movement of the on-track plant led to both OCR staff and machine controllers being unclear as to who was in actually in charge. This also led to OCR staff believing there was little or no benefit in having a machine controller on site.

98 The POS representative on the day shift at Rochford was a linesman and a relatively junior member of staff. During the investigation, Network Rail's on-track plant and engineering specialist told RAIB that the company's expectation was that a POS representative should supervise the on-track plant activities and if necessary challenge or stop any unsafe event or behaviour they encountered while they were on the railway. It was normal practice within OCR for linesmen to be appointed as POS representatives for weekend work, in which role they often found themselves expected to oversee the work of supervisors to whom they reported during the week.

99 Other POS representatives interviewed by RAIB in connection with this accident and the others referred to this report (see paragraphs 131 to 157) also felt it was unrealistic to expect someone at their level to have the confidence to stop work or raise a safety issue with their 'weekday' supervisor. The POS representatives also felt they lacked any form of authority or independence, and if they stopped work which resulted in a delay occurring they would suffer repercussions (paragraph 106).

100 Witness and documentary evidence shows that in 2019 OCR staff had requested guidance or clarification on the plant operations scheme and their responsibilities, but there is no evidence that advice had been offered or shared by Network Rail to resolve the confusion about the responsibilities of the POS representative. The perception that the POS representative's duties duplicated those of a machine controller led to general confusion among staff.

Number of POS representatives

101 Network Rail's lead engineering specialist on the POS scheme expressed the opinion that OCR had misinterpreted the scheme and should have used more than one POS representative, and the PiC should not have been undertaking two roles. RAIB has concluded that the plant operating scheme has been interpreted in different ways and that there is confusion regarding it within the industry, and among staff working on site.

Machine controllers and operators

102 Some of the COSS / machine controllers supplied by McGinley's had misinterpreted the roles of the site supervisor and/or POS representatives, believing both were in charge of the work, including the movement of the MEWPs within their site of work. This incorrect understanding may have evolved due to the culture that had developed within the work sites. Witness evidence indicates that machine controllers felt they were frequently ignored by the machine operators, and staff were bypassing them when communicating with the site supervisor (figure 13). This affected their confidence and ability to challenge the actions of a machine operator or site supervisors when they observed an unsafe movement or other unsafe behaviour by operators.

103 The confusion about responsibilities meant that some OCR machine operators believed that contracted machine controllers had no real role. As a result of this, a lack of respect towards the role of machine controller had developed (see paragraph 107). RAIB was told of cases in which machine controllers were referred to as 'shadows' who added no value to 'getting the job done'.

Identification of underlying factors

104 **It is probable that there was a culture in OCR that valued 'getting the job done' over rule compliance and safety.**

105 Multiple witnesses reported that staff in OCR had a mindset of working for a 'contractor' and this had not altered after the unit was incorporated into Network Rail in 2008. Witness evidence showed that some staff had also misinterpreted Network Rail's business strategy of 'putting passengers first' as justification for placing service delivery, or 'getting the job done', over safety. They believed that any pause in work could have an impact on OCR's reputation that could result in financial penalties for the business unit, leading to contract staff being made redundant or not offered work in the future.

106 Other witnesses reported that MEWPs travelling at speeds above walking pace without the machine controller being present had become common. Witness evidence also indicated that the perception of time pressure had cascaded down to staff supplied by labour agencies, and that a culture of non-compliant behaviour was seen as an acceptable risk, even though this led to a consequent degradation in the safe management of work sites. Witness evidence suggests that this led to a general feeling among OCR staff that if they raised safety issues which could lead to work within a possession being stopped, even for a short period, they would be identified as the source and criticised. Witness evidence suggested that both OCR staff and contractors were not confident in challenging unsafe behaviour or reporting close call incidents.

107 **A culture of disrespect existed towards contractors undertaking the role of the machine controller within OCR work sites.**

108 The investigation highlighted several factors which led to a culture of disrespect between some OCR and agency staff. Although MCCOSS, the machine controller for MEWP 10, had a good standard of spoken English, some OCR staff reported they often had to work with agency staff, including those undertaking COSS / machine controller duties, who displayed poor standards of competence and had trouble making themselves understood in English, and this problem was compounded when using radios. During the investigation, RAIB became aware of an incident in which the competence and poor language skills of a COSS and machine controllers had been a factor (see paragraphs 146 to 155).

109 Some agency machine controllers reported that the attitude towards them and the role they were performing was disrespectful. Several agency workers expressed frustration about the cultural environment, which they said had affected their confidence and their ability do their job properly.

110 Other factors which affected the working relationship between full-time OCR and agency workers were as follows:

- Many agency staff have other jobs during the week, outside railway engineering, and work at weekends through labour agencies is often worked as overtime in such roles as a machine controller.
- The role of a machine controller often appears to be passive, such as observing the safety and movement of the on-track plant.
- Some agency staff have little or no knowledge of the purpose of the work within the possession.
- There were reportedly racial and cultural tensions between the predominantly white OCR full-time employees, and predominantly black agency-supplied machine controllers.
- There is very little interaction between the full-time staff and agency workers. As such there is no opportunity to forge a ‘team’ relationship to increase trust.

111 These factors affected the attitude and behaviour of OCR staff towards contractors, leading to a culture within OCR in which staff believed that machine controllers, when supplied by labour agencies, provided no additional business or safety benefit to OCR (see also paragraphs 140 to 145).

112 **Network Rail appears to have been unaware of the poor working relationships and culture and the extent of non-compliance on several OCR sites, and its management assurance process had not identified these issues.**

113 In July 2016 ORR presented its concerns to Network Rail senior management regarding the effectiveness of Network Rail’s assurance regime (NR/L2/ASR/036) and its ability to support delivery of repeatable consistent compliance with safety critical elements of standards and processes, particularly at an operational level.

114 The ORR audit highlighted the following deficiencies in the Network Rail process:

- Network Rail’s Business Assurance Committees were focused on matters other than safety, which led to priority issues being overlooked during their front-line assurance checks.

- Level 1 assurance checks are undertaken on front line operations, and the 'tactical level' review of the resulting data by the local manager was dominated by compliance with the process of 'ticking the box' and a focus on getting checks done, rather than recognising the purpose and value of the checks and gathering purposeful data that could be used.

115 Following this Network Rail put in place work aimed at improving its overall assurance processes and its level 1 tactical assurance at Route level. This led to an audit of the Anglia Route (including OCR) between April and October 2019 which reported the following:

- Inspections of the POS scheme and possession set up checks in accordance with Network Rail (NR) assurance standard NR/L2/ASR/036 were being correctly completed by the operations delivery manager.
- The requirements of the plant operations scheme were being carried out by Network Rail's on-track plant managers who had surpassed the requirements set out in the assurance process. The quality of the inspections was found to be thorough and comprehensive and captured more information than was required.
- Competence management in respect of annual competence checks in the form of 'one to one' interviews with staff (including OCR) were being correctly completed.
- Plant operations scheme site monitoring checks were being completed by the Anglia route-based staff. A mixture of announced and unannounced inspections on site to monitor the safe delivery of works utilising on-track plant were being used, with the emphasis being on unannounced. Approximately 2% of shifts were monitored, with the OCR on-track plant specialist undertaking one site visit per month.

116 The Network Rail audit appeared to have been focused on lift plans (which are necessary for all lifting operations, and form a large part of work with OLE). Although the operational irregularities and unsafe behaviours described in this report could have been identified by assurance checks, it is also possible that some of the factors and culture described in the previous sections of this report led to some staff being unwilling to discuss their concerns. As such, the issues identified by this investigation were not identified during the audit and RAIB has found no evidence that Network Rail's senior managers were aware of them (see also paragraph 144).

117 This issue of Network Rail's assurance process will be dealt with more comprehensively in RAIB's forthcoming report into the double fatality at Margam on 3 July 2019 (including associated recommendations).

Factors associated with the response to the accident

118 **Network Rail's incident management and on-site investigation was inadequate and resulted in a lack of co-ordination and loss of evidence.**

119 The site supervisor who had been tasked by the PiC to manage the accident had no formal training in accident investigation and was unaware that the accident should be reported to the POS representative. He subsequently contacted the ES who did not feel competent to deal with the accident, but agreed to contact the route operations centre (ROC).

120 Although OCR is a business unit within Network Rail, when the Rochford accident occurred, the accident was deemed to have been in a 'contractor' site, as OCR is not part of Network Rail (Anglia) infrastructure projects or its maintenance delivery unit. This led to confusion within the Romford ROC as to whose responsibility it was to attend and investigate the accident, resulting in the RCM deploying two on-call managers (one from operations and the other from maintenance) to attend the site. The voice recordings show that the operations manager questioned why the RCM had decided to deploy Network Rail staff to a 'contractor accident' but agreed she would attend. The maintenance manager, who was also on-call, agreed to deploy, but advised the RCM he was currently engaged in a social event. RAIB has not been able to identify why both on-call managers arrived without any personal protective equipment (PPE), and so were not adequately prepared to go onto the railway. This subsequently led to a mobile operations manager being asked to recover the evidence from the site.

121 The incident controller within the ROC had problems completing the accident reporting form, as mandatory drop-down menus on the form inhibited his ability to record the full facts of the accident. Witness evidence and analysis of the voice recordings showed that there had been a lack of leadership and management on site, which resulted in poor co-ordination, and meant that the RCM did not have an accurate picture of what had occurred. The machine operator's allegation against the MEWP's braking performance was not properly established until 15:00 hrs, some four hours after the accident occurred. Although RAIB requested evidence of any wheel and railhead contamination to be collected to support its preliminary examination and enable the allegations of brake failure to be analysed, the lack of co-ordination and communication that occurred resulted in this evidence not being collected. MEWPs 10 and 3 were later moved to the OCR depot in Crewe without the authority of RAIB.

Observations

122 **OCR's processes did not require a 'return to work' meeting after a long-term absence that was not sickness-related.**

123 The operator had not had any experience of operating on-track plant since October 2019 (12 weeks before the accident). On his return to work he completed a sickness form (for a minor hand injury). However, the Network Rail OCR competence management process did not require a 'return to work' meeting for his extended leave for jury service, because it was seen as a non sickness-related absence. OCR did not recognise that there was any operational risk arising from the operator's competence or preparedness for safety critical work before the accident. The operator had not raised any issue with his supervisor after the accident. He felt that with hindsight he may have been 'operationally rusty' and this may have been the reason he had some difficulties with on-tracking his MEWP. Therefore, there was no opportunity to discuss the potential risk from the operator's long-term absence with his site supervisor. The PiC, POS representative, site supervisor and machine controller were unaware that it was the machine operator's first day at work for three months. Had the process resulted in a discussion about the operator's lack of recent experience, staff tasked with supervising the machine operator might have been more vigilant about his actions when on site.

124 **There is no method or equipment for alerting other staff to a safety incident involving the movement of on-track plant.**

125 The events at Rochford showed that there was no equipment (such as a lookout's horn or whistle) for a machine controller to use to alert other staff to dangerous behaviour or a safety event. Although machine operators may have their headphones on, and linesmen and other staff in the work site may be accustomed to the sound of a MEWP horn, RAIB believes the opportunity for a machine controller to use an audible warning to alert people to a dangerous situation on site should be considered by the rail industry.

126 **Network Rail's management of the Sentinel scheme and Sentinel investigations is currently inadequate. This has resulted in unsuitable individuals continuing to work in safety-critical roles, and Sentinel related recommendations not being progressed in a timely manner.**

127 The Sentinel scheme is run by the Sentinel Board, on which Network Rail sits. The Sentinel rules are, through a letter of instruction, one of Network Rail's standards. They place obligations on sponsors of workers, including Network Rail and its contractors. The Sentinel scheme is administered by Network Rail and is intended to record the competence and fitness of employees and contractors who work on Network Rail managed infrastructure, and it is used by sponsors as part of their competence management arrangements. Records of each person's training, certification and medical fitness are held on a central database. Qualified staff are issued with an identity card which features codes enabling it to be scanned to give access to the database. They are required to carry this card with them whenever they are at work and present the card for checking on request. This enables persons in charge of work, such as COSSs, to verify that individuals have relevant competencies, such as Personal Track Safety (PTS) and other current certification to enable them to work. The system can also be used to record when people start and finish work, and thereby enable monitoring of hours worked for fatigue management and other purposes. Under the Sentinel scheme primary and secondary sponsors also have a responsibility to investigate incidents and accidents involving sponsored staff, and share information with Network Rail's Sentinel team. On conclusion of an investigation sponsors may propose recommendations which may affect an individual's Sentinel registration (see paragraphs 131 to 157).

128 The National Skills Academy for Rail (NSAR) is an independent not-for-profit organisation that is responsible for quality assurance checks on the delivery, compliance and premises of companies that provide track safety training, and the assessors who are employed to accredit individuals undergoing training courses for Sentinel competences. Although NSAR is functionally independent of Network Rail, it works to various Network Rail standards related to track safety and Sentinel, including NR/L2/CTM/021 'Competence and Training in Track Safety', NR/L2/CTM/202 'Quality Assurance in Training and Assessment' and NR/L2/OHS/050 'Sentinel Scheme Rules'. Network Rail and NSAR meet regularly to discuss Sentinel scheme rules, and incidents involving Sentinel processes and training.

129 Network Rail's Sentinel administration team employs two members of staff to undertake liaison with sponsors (including Network Rail itself) regarding investigations of incidents involving Sentinel competencies. This level of resource has impaired the Sentinel team's ability to properly manage the engagement of sponsors who may have been tasked with investigating these incidents. Evidence gathered from an incident at Lewes (see paragraphs 137 to 139), other investigations by Network Rail and by RAIB, also shows that actions and recommendations relating to staff competencies from previous investigations had not been progressed due to a lack of resources.

130 The investigation also identified that there is no formal process for liaison between the Sentinel team and the POS review panel, creating the potential for a lack of co-ordination and communication when dealing with an incident involving on-track plant or the role of a POS representative. The incidents and accidents that have been reviewed demonstrate that Network Rail's management of the Sentinel scheme in respect of the engagement process between Network Rail and primary sponsors is currently inadequate. This has resulted in unsuitable individuals (see paragraph 146) continuing to work in safety-critical roles, and Sentinel-related recommendations not being progressed in a timely manner.

Other occurrences of a similar character

131 The following investigations into previous accidents and incidents have identified factors similar to those seen at Rochford:

Ermine Road, Tottenham, London, 12 August 2017 (Network Rail internal investigation)

132 While an OCR team working at Ermine Road was on a rest break, a linesman who was working as a machine operator decided to move a Skyrailer MEWP without a machine controller being present. The linesman, having begun to move the machine, was unable to stop it before colliding with an unmanned MEWP, damaging both machines. At the time of the incident there was one POS representative, who was at another work site within the possession and was not made aware of the incident.

133 Actions taken by Network Rail included the linesman's machine operator competence being withdrawn. A safety bulletin was disseminated to all employees of OCR and the labour supplier involved, regarding the requirement to report all accidents immediately. Network Rail also recommended OCR provide its contractors with information as to who was allocated as the POS representative on site and that the POS representative should be involved in the planning process. Action was taken by OCR in December 2017.

South Hampstead, London, 11 March 2018 (RAIB report 20/2019)

134 At around 00:35 hrs, a group of track workers narrowly avoided being struck by a train while placing trolleys on the track alongside South Hampstead station. The train was travelling 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.

135 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 and the track workers did not have a 'Person in Charge' with local knowledge and competence to manage all the risks associated with the work, including the danger from moving trains. The investigation identified that a number of unofficial working practices were 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. The arrangement between Network Rail and the contractor led to a belief that 'on site where the work is being undertaken' meant the person in charge only needed to be within the work site, which stretched for a distance of over three miles. The lack of clarity of those involved in planning and delivering the work resulted in a method of working that did not match the intention of standard 019.

136 RAIB made a number of recommendations to Network Rail, to review how standard 019 had been implemented and to clarify the responsibilities and operation of the PiC within Network Rail and its contractors. Network Rail has since reported that it has completed an audit of the standard in connection with this incident and is taking action to implement actions arising from it.

Lewes, Sussex, 29 November 2018 (Network Rail internal investigation)

137 Work was taking place at Lewes station. While helping to unload materials from a flatbed vehicle a member of staff was struck by a pneumatic drill. As he collapsed to the ground his hard hat came off and he sustained a serious head injury. The facts of the incident only came to the attention of Network Rail some six months later, in April 2019, and Network Rail identified that the incident had been knowingly misreported by the principal contractor. Network Rail then began an investigation, which was completed in January 2020 and identified that the member of staff who was injured should not have been on site, because he did not have current sponsorship for the Sentinel scheme. His Sentinel sponsorship history also showed he had been sponsored by fifteen different organisations over the course of a year. It was also identified that other staff had been sponsored by as many as sixty secondary sponsors over a twelve-month period.

138 Network Rail recommended that its Head of Corporate Workforce Safety should undertake a detailed review of any risk which might arise if individuals change sub-sponsor numerous times, and whether that risk was being managed actively and effectively by the Sentinel team. The intention of the recommendation was to evaluate whether an individual changing sub-sponsors numerous times each year was a risk and if it was, how the risk was being mitigated or managed.

139 Network Rail also recommended that the Head of Corporate Workforce Safety should engage with the Sentinel team to undertake a review of the English language capabilities of individuals provided by the labour supplying agencies. If necessary, changes should be made to contractual requirements, with the intention of improving compliance with current track safety requirements to speak and read English. Due to resource issues and the time taken by the investigation, no action had been taken in respect of the above recommendations at the time of the Rochford accident.

Kensal Green, London, 25 December 2019 (Network Rail internal investigation)

140 Work was taking place, within a planned possession, to replace overhead line equipment (OLE). After completing the work, the overhead line project team travelled towards Kensal Green access point, in the on-track plant. While the machines were in transit a member of staff noticed a defective piece of OLE, which needed to be replaced. The machine operator positioned the MEWP under the defect to replace the component. The machine operator was unaware that the section of OLE was still electrically live. When he reached towards the OLE to remove the defective part, he received an electric shock and sustained serious injury.

141 Network Rail's internal investigation identified that the roles and responsibilities involved in the management of the possession were not clearly defined, with safety critical staff carrying out dual roles, resulting in them being unable to undertake their primary role effectively. The number of roles on site was not conducive to a clear and understandable structure, resulting in confusion as to who was doing what, and who was actually in charge. The confusion surrounding the number of apparent management roles was also found to have affected the co-ordination of the response to the accident.

142 The division of responsibility for on-tracking procedures, between the POS representative and machine controllers, was found to be inadequate, with confusion surrounding the roles and responsibilities.

143 The investigation identified that there were tensions between full-time employees and agency workers, and a culture of racial prejudice among members of staff at various levels of the workforce towards contractors supplied by labour agencies, including those undertaking the role of machine controller. The investigation concluded that this had had an impact on the safety of the site, and the behaviour and attitudes had affected and undermined the ability of machine controllers to discharge their duties safely.

144 Network Rail has proposed the following recommendations:

- undertake an assurance audit that will focus on the culture that exists across the rail industry and how the culture is influenced by Network Rail's current assurance processes. The objective of this is to understand the level of operational discipline, risk awareness and risk management to identify if Network Rail's assurance activities have sufficient depth and clarity to highlight where change is necessary, and to influence future behaviour within Network Rail.

- undertake a review of standard NR/OHS/L3/019 to identify if it is currently fit for purpose in keeping people on or near the line safe, and provide clear guidance on how work should be planned and undertaken by those undertaking supervisory roles, such as a PiC.
- to evaluate and test how embedded Network Rail's equality, diversity and inclusion policy and procedures are within the company (including its contractors and labour suppliers), to understand if the policy is being applied on site and to identify how attitudes, beliefs and behaviours of staff affect Network Rail's work, to understand what action is necessary to change the present culture.

145 Network Rail is currently finalising the investigation report, and therefore RAIB is unable to report progress on the recommendations at the time of writing this report.

Manor Park, 22 February 2020

146 Four weeks after the Rochford accident, on Saturday/Sunday 22-23 February 2020 there was an accident in a possession between Manor Park and Shenfield, Essex. Work included the replacement of overhead line wire and associated equipment. This work required two road-rail vehicles with elevating baskets working back to back. Keltbray (site supervisor, POS representative and machine operators) and an agency (COSS / machine controllers) supplied the labour. These members of staff were supported by a lineside track team incorporating a COSS and three trackmen.

147 While the work was taking place, the machine operator for the forward road-rail vehicle asked the COSS of the lineside team and a trackman to transfer parts from the rear vehicle. Both staff then entered the area between the two vehicles (figure 14), believing that the machine controllers for both vehicles were aware of what was happening. At the same time the machine operator in the elevated basket of the rear vehicle told his machine controller that he needed to move his vehicle forward to gain a safer working position. The machine controller stated that he checked the zone between the vehicles before this movement took place and saw no-one. The machine operator then moved the vehicle forward at the same time as sounding the horn, unaware that the COSS was still between the two machines. The COSS was crushed by the movement.

148 The accident was seen by others, and the rear vehicle was reversed allowing the COSS to walk out of the gap. The incident was not immediately reported to Network Rail control and although the attendance of an ambulance was considered it was cancelled as the COSS reported he was uninjured. A supervisor later attended the site of work and decided to call an ambulance. The COSS was taken to hospital where he spent four days in intensive care with internal injuries. The accident occurred because of a lack of supervision and miscommunication between the machine operators, machine controllers and the COSS. It was also identified that the injured COSS had not briefed his own team correctly and that he had lost his safe system of work pack. The POS representative (one of four on site) and site supervisor were not in the immediate vicinity of the two machines when the accident occurred.

Figure 14: Image showing where the COSS was injured at Manor Park

149 Due to the number of similarities to the accident at Rochford, RAIB decided to consider the accident at Manor Park during the Rochford investigation.

150 A review of the competence management of the injured COSS identified that his COSS and machine controller competences had been temporarily withdrawn in 2014, 2015 and 2016 as a result of incidents and subsequent investigations. They were reinstated on each occasion by his sponsor. The sponsor's recommendations were not referred to Network Rail for a Sentinel outcome to be updated on the database. In September 2019 he had been involved in another incident. On that occasion he was acting as a COSS and machine controller for an on-track plant machine which was involved in an incident during which the track was damaged when a machine ran through a set of points which were not correctly set for the movement. When the COSS/ MC was questioned by the formal investigation panel, the panel were so concerned about his competence that it recommended that his COSS, machine controller and points operator competencies were immediately suspended while he undertook retraining, including subsequent mentored site visits. This was subsequently actioned.

151 On 14 November 2019 the COSS's primary sponsor de-sponsored him, as it was reported he had used abusive and threatening language towards their staff while the investigation had been taking place. On the same day he was re-sponsored by another labour supply company, who immediately sent him for retraining. Following satisfactory completion of this course, one mentored exercise was completed, and his COSS probationer marker was removed from the Sentinel database, but further mentoring exercises were required to be completed within the next four months

152 On 6 January 2020, the COSS left that employment and was de-sponsored. He moved to another sponsor on 13 January 2020. Upon registering with this company, the COSS did not tell them that he was still under mentorship and, although his involvement in previous incidents was on record, the sponsor did not scrutinise the Sentinel records or question the COSS to understand if any training or development was required. Over the next few weeks, the COSS worked on several occasions with no incidents or issues being reported.

153 On 16 February 2020, the COSS was hired for overhead line renewal work taking place in the Wellingborough area. Before the work commenced, a safety briefing was provided by a safe work leader (SWL) who asked the COSS to repeat key elements of his briefing back to him to ensure he had fully understood. The SWL was unhappy about the COSS's inability to understand and relay the basic instructions that had been briefed to him, and felt that his oral English language skills also appeared to be insufficient for him to carry out the safety critical role. The SWL requested the COSS be removed from site, and reported the incident to his control room. The COSS did not report the matter to his sponsoring company.

154 The company carrying out the overhead line work was made aware of the incident. The safety manager asked another manager to speak to the labour supplier about what had happened, with a recommendation that they advise the Network Rail Sentinel team. This manager later went on sick leave and forgot to report the matter, and the company had no formal process to identify that the action had not been completed. Therefore, the COSS's sponsor and the Sentinel investigations team were not made aware of the incident. The COSS was then supplied for the work at Manor Park on 22 February 2020.

155 As a result of the accident at Manor Park (and information which then emerged regarding the incident at Wellingborough) the COSS's competences were again temporarily suspended. His sponsor has since reported that it has now de-sponsored the COSS because of abusive and threatening behaviour towards staff tasked with the internal investigation into the accident.

Shenfield 14 March 2020 (Network Rail internal investigation)

156 While preparing to start overhead renewal work at Shenfield station a road-rail vehicle collided with a stationary MEWP. The machine operator was driving the vehicle from the basket (in the stowed position, similar to Rochford). The machine operator decided to move his machine without speaking to or gaining authorisation from his machine controller. The incident was not reported to Network Rail's national operations centre or RAIB.

157 When questioned about the incident, the machine operator could not explain why he had intentionally disregarded the rule book requirements. He reported he had simply not seen the stationary MEWP ahead of him as it was in the blind spot of the machine he had been operating. At the time of writing this report, RAIB is awaiting the actions and recommendations from Network Rail's local investigation.

Summary of conclusions

Immediate cause

158 MEWP 10 did not stop before it collided with the stationary MEWP on the same line (paragraph 57).

Causal factors

159 The causal factors were:

a. The machine operator drove the MEWP above walking pace while using the CCTV screen to promote his forward view (paragraph 60, **Recommendations 1 and 4,** see paragraphs 170(a) to (g), 171(a) and (b) and **Learning points 1 and 3**).

b. The machine operator lost awareness while driving the machine towards the stationary MEWP (paragraph 68, **Recommendations 1 and 4**, see paragraphs 170(b) to (g), 171(a) and (b) and **Learning points 1 and 3**).

c. The machine controller was unable to effectively supervise the machine operator or the safe movement of MEWP 10 (paragraph 73, **Recommendations 1 and 5**, see paragraphs 170(b), (c), (f), and (g), and **Learning points 1 and 3**).

d. The site organisation was not conducive to safe management, because the number of supervisory roles on site, and a lack of clarity about roles and responsibilities, led to confusion among staff about who was in charge of the safe movement of on-track plant (paragraph 82, **Recommendations 1 and 5,** see paragraphs 170(a) to (c),(f) and (g) and 171(b).

Underlying factors

160 The underlying factors were:

a. It is probable that there was a culture in OCR that valued ‘getting the job done’ over rule compliance and safety (paragraph 104, **Recommendations 1 and 5,** see paragraphs 170(f), 171(a) and (b)).

b. A culture of disrespect existed towards contractors undertaking the role of the machine controller within OCR work sites (paragraph 107, **Recommendations 1 and 5, Learning point 2**).

c. Network Rail appears to have been unaware of the poor working relationships and the culture of non-compliance on several OCR sites, and its self-assurance process had not identified these issues (paragraph 112, **Recommendations 1 and 5,** see paragraphs 170(b), (f) and (g), 171(b).

Factors associated with the response

161 Network Rail's incident management and on-site investigation was inadequate and resulted in a lack of co-ordination and loss of evidence (paragraph 118, **Recommendation 3, Learning point 4**).

Additional observations

162 Although not linked to the accident on 25 January 2020, RAIB observes that:

a. OCR's processes did not require a 'return to work' meeting for long term non-sickness related absence (paragraph 122, see paragraph 170(d) and **Learning point 5**).

b. There is no method or equipment to alert other staff to a safety incident involving the movement of on-track plant (paragraph 124, **Recommendation 4**).

c. Network Rail's management of the Sentinel scheme in respect of the engagement process between Network Rail and primary sponsors is currently inadequate. This has resulted in unsuitable individuals continuing to work in safety-critical roles, and safety recommendations not being progressed in a timely manner (paragraph 126, **Recommendation 2**).

Previous RAIB recommendations relevant to this investigation

163 The following recommendation was made by RAIB and has relevance to this investigation.

Collision at Cholmondeston, Cheshire, 19 September 2018 (RAIB report 08/2019), Recommendation 1

164 A road-rail ballast distributor, that was travelling (in reverse) on the line between Chester and Crewe, collided with a small on-track personnel carrier, near Cholmondeston in Cheshire. Two track workers who were in the rear of the personnel carrier were injured, one of them suffering life-changing injuries.

165 Recommendation 1 is relevant to the Rochford accident in that it was intended to prevent those operating and controlling road-rail vehicles from adopting unofficial operating methods during travelling. The recommendation read as follows:

RSSB, in consultation with the industry, and involving due industry process, should review the effectiveness and practicality of the engineering and procedural controls permitted by RIS-1530-PLT to manage the travelling of road-rail vehicles safely, taking into account reasonably foreseeable misuse by machine operators and machine controllers, and make changes to the standard, as necessary. This review should include consideration of the following:

- *requirements for visibility of the line ahead, taking into account that road-rail vehicles generally spend as much time travelling in reverse as they do forwards (this will be particularly applicable for conversions of unidirectional road vehicles); and*
- *requirements for managing speed - in particular whether use of a speedometer is an acceptable means of managing speed where the machine's capability is much greater than its permitted maximum.*

166 As a result of the Cholmondeston accident, RAIB recommendations and feedback from the safety regulator (ORR) on other previous incidents and safety issues, Network Rail formed a machine controller competence working group with the Mechanical and Electrical Engineers network group to review the role of the machine controller and the competences that this role requires. This project was intended to look, from first principles, at the role and responsibilities of the machine controller, and to improve training which was considered to be out of date.

167 The working group met on seven occasions in 2018 and 2019. In March 2019 a paper (with analysis and recommendations) was submitted to Network Rail's competence development group (CDG). Key areas that were identified by the group were included within the report, although these areas were considered to be 'out of scope' by the CDG, as the remit and focus of the project was to improve the training package. These out of scope areas related to the following:

- **Behaviours and non-technical skills:** Machine controllers are required to react correctly to business pressure and have the confidence and ability to say no. The reaction of a machine controller in an emergency was seen as important. A recommendation was made for psychometric testing to be included as a pre-requisite for entry to machine controller training.
- **Human factors**: The group identified that behaviours, responsibilities, and staff interactions are a fundamental part of delivering safe on-track plant operations. It recommended that the CDG should consider taking a 'holistic approach' to reviewing all the on-site competencies including the role of the POS representative, and within this work package, expertise should be used to understand how machine controllers are trained to interact competently, thus promoting safe practice. The working group believed that the current machine controller training package would only contribute 10 to 15% of the total improvement in safe practice that could be achieved with the full implementation of the training process recommended by the working group.
- **Safety Central**: The group recommended safety lessons from on-track plant incidents and accidents should be published on Network Rail's safety database to allow Network Rail teams to discuss and digest the lessons learnt. The case studies should be updated as any investigation progresses to ensure that staff have a full understanding of the incident and subsequent findings to reinforce the training.

168 RAIB explained to Network Rail's working group that the 'out of scope' areas were relevant to the causal factors surrounding the events at Rochford. As a result, Network Rail is now reviewing the original submission.

169 In June 2020, ORR reported that RSSB has now developed a plan for making changes to RIS-1530-PLT 'Rail Industry Standard for Technical Requirements for On-Track Plant and their Associated Equipment and Trolleys', and options for on-track plant working in 'travelling mode' (above walking pace). After reviewing the information provided by RSSB, ORR has concluded that the recommendation is ongoing with a planned completion date of 1 June 2022.

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

170 Network Rail has taken the following actions as a result of its internal investigation into the Rochford accident:

a. Recommended a review of the role of a POS representative within the planning process (in progress).

b. Recommended a re-brief of the relevant sections of the Plant Manual (NR/PLANT/0200 modules P500 and P521) to OCR staff and its contractors to remind them of the mandated requirements of the document (completed).

c. Issued a national safety alert about the accident at Manor Park on 6 March 2020.

d. Issued a briefing instruction to remind all Sentinel sponsors of their obligations under the Sentinel scheme (see also https://info.railsentinel.co.uk/2020/03/27/sentinel-scheme-rules/).

e. Reviewed and amended the OCR return to work policy to include non-sickness absence from work (this has been completed locally but may be applicable to other Network Rail routes and other contractors).

f. Carried out tests on the MEWPs involved in the collision to confirm braking and control equipment was working correctly (completed).

g. Recommended that OCR should undertake diversity and inclusion refresher training to remind OCR employees that contracting staff are onsite because they are deemed to be competent, and the need for respect to be given to the authority of the machine controller in the role they are carrying out (in progress).

h. The Machine Controllers Competence Working Group has submitted proposals to administer and change the training of the machine controller (in progress).

i. Analysis of the Sentinel and Sentinel Investigations data looking at the number of times individuals change sponsorship (primary sponsor) has been completed. A report is expected in September 2020. English language aptitude testing undertaken by primary sponsors and training providers has been reviewed, and led to changes within a new version of the Sentinel scheme rules (in progress with publication planned for November 2020).

171 OCR has taken the following actions:

a. The machine operator's competence was temporarily suspended in order for him to undergo refresher training for the MEWP (including Skyrailer specific) competency (completed).

b. The requirements of the Rule Book (Handbook 15) were re-briefed to OCR staff with emphasis on the authorisation and process for the safe movements of on-track plant (completed).

Recommendations and learning points

Recommendations

172 The following recommendations are made:[14]

1 *The intent of this recommendation is to reduce the risk of confusion arising among staff responsible for operating and controlling the movement of on-track plant, and leading to the adoption of unofficial systems of work.*

Network Rail, in consultation with RSSB, the M&EE networking group, the Machine Controller Competence Working Group and the Plant Operations Scheme Review Panel, should review and clarify the roles and responsibilities of those responsible for plant operations and movements in possessions and work sites, with the objective of identifying ways of avoiding the duplication of responsibilities and minimising the possibility of confusion between roles. This should involve consideration of:

- the relevant rules and standards that apply to the control of plant movements, particularly Handbooks 12 and 15;
- the roles of engineering supervisor, person in charge/safe work leader, site supervisor, POS representative and machine controller; and
- the factors affecting the working relationship between staff from different employers working on the same site, in particular the extent of understanding and appreciation of each person's role.

The implementation of any changes resulting from this review should be co-ordinated to avoid confusion between existing and revised rules and working arrangements (paragraphs 159(a) to 159(d)), and 160(a) to 160(c)).

[14] 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.

2 *The intent of this recommendation is to improve the operation of the Sentinel scheme so that the scheme's ability to influence safe behaviours is more effectively managed.*

Network Rail, in co-operation with other participating organisations (including the National Skills Academy for Rail), should undertake a review of the way that the Sentinel scheme is managed to identify any improvements that are necessary, with particular attention to the following areas:

a. resources, organisation and processes for managing engagement with primary sponsors in respect of investigation of incidents in which staff competence is an issue; and

b. review how the Sentinel scheme oversees and manages the way in which training providers and primary sponsors assess the English language skills of safety critical staff whose task requires effective communication when working on the railway infrastructure.

Network Rail should then establish a programme to implement any areas of improvement identified during the review (paragraph 162(c)).

3 *The intent of this recommendation is to improve Network Rail Anglia Route's process for capturing the facts of an incident or accident, so that a clear picture of the event is quickly obtained, and evidence is properly managed by those tasked with investigating the event.*

Network Rail Anglia Route should revise its reporting and response process for accidents and incidents, so that all relevant information that is needed to enable an effective and co-ordinated response is captured. This review should include the management of the competence and suitability of staff who are on-call and required to attend site following incidents (paragraph 161).

This recommendation may also apply to other Network Rail routes.

4 *The intent of this recommendation is to improve the methods of alerting staff within a possession or work site to potentially dangerous acts or situations.*

Network Rail, in conjunction with its contractors, RSSB and other stakeholders, should review the means of warning currently used to alert staff to a dangerous situation on or near the track, and consider whether suitable equipment should be issued to those in all relevant roles (paragraphs 159(a) and 159(b) and 160(b).

5 *The intent of this recommendation is to improve the safety culture within OCR, and its internal and external (contractor / agency) working relationships.*

In parallel to the findings and any actions taken in response to recommendation 1, Network Rail should commission an independent review of OCR internal culture and working practices, with the aim of identifying effective measures to promote compliance with rules and company standards and establishing good working relationships and mutual respect between all grades of staff working on site (paragraphs 159(c) and 159(d) and 160(a) to 160(c)).

Learning points

173 This accident highlights the importance of the following learning points:[15]

1 The machine operator and linesman were both wearing the required safety harnesses, and this probably prevented a fall from height when the vehicles collided.

2 Machine operators and machine controllers building an effective working relationship on site so that the movement and operation of the machine is safely controlled in accordance with the requirements of the Rule Book.

3 Machine operators and machine controllers recognising when visibility of the line ahead is compromised by the design of the OTP being used. They should follow the requirements of both the railway Rule Book and the operational limitations for the specific machine.

4 Network Rail on-call managers who are deployed to an accident, being adequately trained and in possession of the necessary equipment and PPE to enable them to undertake their role, including the recovery of evidence that may be requested by investigators.

5 Employers being aware that all extended absences from work, including those that are not related to sickness, can affect the performance of safety critical staff. Members of staff returning to work should be spoken to, to ensure their wellbeing and operational responsibilities are adequately risk assessed and any action or development that is necessary is recorded and implemented by those responsible for managing the competence management and welfare of members of staff.

[15] '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

CCTV	Closed circuit television
CDG	Competence development group
COSS	Controller of site safety
EAC	Engineering acceptance certificate
ECC	Engineering conformance certificate
ES	Engineering supervisor
MC	Machine controller
MCCOSS	The individual appointed as machine controller for MEWP 10
MEWP	Mobile elevating work platform
MOM	Mobile operations manager
NRMI	Network Rail managed infrastructure
OCR	Overhead Condition Renewals (a Network Rail company)
OLE	Overhead line equipment
ORR	Office of Rail and Road
PiC	Person in charge
POS	Plant Operations Scheme
PTS	Personal track safety
RAIB	Rail Accident Investigation Branch
RCM	Route control manager
ROC	Route operations centre
RSSB	Rail Safety & Standards Board
SWL	Safe Work Leader

Appendix B - Investigation details

RAIB used the following sources of evidence in this investigation:

- information provided by witnesses
- tests on the machines involved in the accident
- information taken from the MEWP telematic data
- mobile communication data
- site photographs and post scene measurements
- Sentinel records
- training and competence records
- drugs and alcohol screening
- Network Rail standards and guidance documents
- Rule Book modules
- Network Rail internal investigation reports
- weather reports and observations at the site
- a review of previous RAIB investigations that had relevance to this accident.

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