Railway Accident Investigation Unit Ireland

INVESTIGATION REPORT

Collision between an Iarnród Éireann passenger train and rail-mounted maintenance equipment, Rosslare, Wexford, 11th January 2020

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Report Description

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Where the report has been altered following its original publication, details on the changes will be given.

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Report structure

The report structure is taken from guidelines set out in “Commission Implementation Regulation (EU) 2020/572 of 24 April 2020 on the reporting structure to be followed for railway accident and incident investigation reports” having regard to “Directive (EU) 2016/798 of the European Parliament and of the Council of 11 May 2016 on railway safety”.

Reader guide

All dimensions and speeds in this report are given using the International System of Units (SI Units). Where the normal railway practice, in some railway organisations, is to use imperial dimensions; imperial dimensions are used, and the SI Unit is also given.

All abbreviations and technical terms (which appear in italics the first time they appear in the report) are explained in the glossary.

Descriptions and figures may be simplified in order to illustrate concepts to non-technical readers.

Preface

The RAIU is an independent investigation unit within the Department of Transport which conducts investigations into accidents and incidents on the national railway network, the Dublin Area Rapid Transit (DART) network, the LUAS light rail system, heritage and industrial railways in Ireland. Investigations are carried out in accordance with the Railway Safety Directive 2004/49/EC enshrined in the European Union (Railway Safety) (Reporting and Investigation of Serious Accidents, Accidents and Incidents) Regulations 2020.

The RAIU investigate all serious accidents. A serious accident means any train collision or derailment of trains, resulting in the death of at least one person or serious injuries to five or more persons or extensive damage to rolling stock, the infrastructure or the environment, and any other similar accident with an obvious impact on railway or tramline safety regulation or the management of safety. During an investigation, if the RAIU make some early findings on safety issues that require immediate action, the RAIU will issue an Urgent Safety Advice Notice outlining the associated safety recommendation(s); other issues may require a Safety Advice Notice.

The RAIU may investigate and report on accidents and incidents which under slightly different conditions might have led to a serious accident.

The RAIU may also carry out trend investigations where the occurrence is part of a group of related occurrences that may or may not have warranted an investigation as individual occurrences, but the apparent trend warrants investigation.

The purpose of RAIU investigations is to make safety recommendations, based on the findings of investigations, in order to prevent accidents and incidents in the future and improve railway safety. It is not the purpose of an RAIU investigation to attribute blame or liability.

Summary

On 11th January 2020, *T3 Possessions* were granted between the 112 *Mile Post* (MP) 880 yards and the 112 MP 1320 yards (Rosslare Strand to Rosslare Europort) for Iarnród Éireann's Infrastructure Manager's (IÉ-IM) Chief Civil Engineer's (CCE) Department in relation to the Rosslare Coastal Erosion Project.

The work being undertaken in the T3 Possessions included the erection of *viewing distance marker boards* (sometimes referred to as V Boards) on the north and south sides of a newly re-opened level crossing, adjacent to Hayesland IÉ-IM compound. There were four members of CCE staff, working in pairs, erecting the V Boards on the north and south sides of the level crossing. The pair working on the south side included the *Person In Charge Of Possession* (PICOP)/ *Engineering Supervisor* (PICOP/ES) and the other pair, working on the north side, included the Acting Permanent Way Inspector (APWI).

The APWI decided to transport the V Boards using a piece of wheeled rail-mounted maintenance equipment (RMME) at the level crossing. On arrival at the V Board erection location, it was discovered that the poles to hold the V Boards were too short and needed to be extended; this could be done by a welder working in Hayesland compound. Therefore, the APWI made the decision to put the V Boards back on the RMME and return to the Hayesland compound where the welder could extend the poles to the correct length.

On arrival at level crossing (adjacent to Hayesland compound), APWI and another permanent way worker carried one pole each to the welder, leaving the RMME on the track. As APWI was explaining the requirements to the welder his mobile phone rang and he took the call. On completion of the call, the PICOP/ES asked the APWI if the line was clear for the possession to be handed back; the APWI responded that it was clear; intending to remove the RMME. The APWI continued his conversation with the welder, forgetting to remove the RMME.

The PICOP/ES phoned the Signalman, without physically checking the line, and handed back the possession, as safe, for the passage of trains.

At approximately 10:52 hours (hrs), as the driver of the 08:05 hrs Connolly to Rosslare Europort passenger service (Train A602) approached the level crossing; he saw the RMME on the track and applied the emergency brakes. However, the train collided with the RMME. When the train stopped, the driver informed the relevant staff. The RMME was wedged between the two wheelsets on the leading bogie and required the intervention of permanent way staff to remove the RMME. On removal, the driver inspected the train for damage and after a conversation with the Chief Mechanical Engineer's (CME) maintenance staff, the train was cleared to continue its journey to Rosslare Europort, twenty-six minutes late.

Train A602 struck the RMME as a result of the following causal factors (CaF):

- CaF-01 – The APWI used the RMME without authorisation from the PICOP/ES as required under Section A and B of the IÉ Rule Book;
- CaF-02 – The APWI did not remove the RMME immediately after removing the V Boards;
- CaF-03 – The APWI advised the PICOP/ES that the line was clear when the RMME remained on the line;
- CaF-04 – The PICOP/ES did not ensure that the line was clear and safe for trains to pass before giving up the T3 Possession as set out in Sections B and T of the IÉ Rule Book.

Contributory factors (CoF) include:

- CoF-01 – Proper communication protocols, as set out in Section A of the IÉ Rule Book, between the APWI and the PICOP/ES, were not followed;
- CoF-02 – The Ganger's Handbook does not include any references to maintenance at level crossing or the erection of signage;
- CoF-03 – Had the roles of the APWI been supervisory, the APWI may have been more focused on the removal of the RMME rather than the work being carried out.

Systemic factors (SF) include:

- SF-01 – There is an over-reliance on the Ganger's Handbook and Site Safety Briefings to address all works that may be carried out by permanent way staff.

Although not causal, contributing or systemic, the RAIU make the following additional observation (AO):

- AO-01 – The IÉ Rule Book does not clearly classify RMMEs, (Hand) trolleys, Light Maintenance Equipment (LME) or small plant in the IÉ Rule Book or other supporting documentation.

The RAIU make the following safety recommendations:

- 202004-01 – IÉ-IM should classify and define RMMEs, Trolleys, LMEs and other commonly used plant or equipment on the railway and ensure appropriate safety procedures are in place for their use. IÉ-IM should also assess the need for any associated training and competency related to these changes and if considered necessary prepare training and competency assessment material;
- 202004-02 – IÉ-IM CCE should ensure that, once defined and classified, change management systems are put in place to ensure RMMEs, Trolleys, LMEs, etc are not altered for other uses, without first having been safety validated in line with company processes;
- 202004-03 – IÉ-IM should update their Mobile Gang Work Instructions, I-PWY-1490, (Ganger's Handbook) to ensure that all routine light maintenance activities are included. Systems, e.g., training, should be put in place to ensure that relevant staff can undertake dynamic risk assessments should non-routine activities need to be undertaken that are not described in the Ganger's Handbook.;
- 202004-04 – IÉ-IM clearly define the role of the PWI/APWI and update the relevant documentation accordingly.

Contents

RAIU Investigation

RAIU decision to investigate

1 In accordance with the Railway Safety Act 2005 and European Union (Railway Safety) (Reporting and investigation of Serious Accidents, Accidents and Incidents) Regulations 2020, the RAIU investigate *serious accidents*, the RAIU may also investigate and report on *accidents* and *incidents* which under slightly different conditions might have led to a serious accident.

2 The RAIU received a notification of Train A602 colliding with "maintenance equipment or materials" at the 112 ½ MP, Rosslare Line, in the January monthly report of incident and accidents from Iarnród Éireann (IÉ). After the RAIU conducted a Preliminary Examination Report, the RAIU's Chief Investigator (CI) made the decision to conduct a full investigation into the accident, given its impact on railway safety (*Article 20* (2) (c)), as under slightly different circumstances this accident may have led to serious accident with the potential for fatality or serious injuries due to risk of derailment as a result of the collision.

3 In terms of categorisation, the EU Agency for Railways categorisation for this occurrence is a: Collision – Accident.

4 The RAIU's CI allocated RAIU Senior Investigators, trained in accident investigation, to conduct this investigation, as appropriate. In this instance, no external parties were required to assist with the investigation.

Scope & limits of investigation

5 The RAIU have established the scope and limits of the investigation as follows:

- Establish the sequence of events leading up to the accident;
- Identify any other precursors which led to the accident;
- Establish, where applicable, contributory factors, underlying factors and root causes;
- Examine the relevant elements of the IÉ Rule Book;
- Examine the relevant risk assessments and registers;
- Review the Safety Management System (SMS) documentation in relation to RMMEs on the IÉ rail network[1];
- Review the IÉ-IM training for staff, in the use of RMMEs, on the IÉ rail network.

[1] It should be noted that the RAIU requested from IÉ-IM the classification of the equipment used on the day of the accident; IÉ-IM classified it as a RMME.

Communications & evidence collection

6 During this investigation, the RAIU collate evidence through the submission of Requests for Information (RFIs) and interviewing. Related to this investigation, the RAIU collated and logged the following evidence:

- Witness statements from parties involved in the accident;
- Competency records for the staff involved;
- Copy of the voice communications between the PICOP and the controlling Signalman.
- All IÉ/ IÉ-IM standards, instructions or mandatory procedures in relation to the placement and movement of hand RMMEs on the IÉ Network;
- All risk assessments for the use of hand RMMEs on the IÉ Network; as well as a review of control mechanisms in place at the time of the accident;
- Training documentation for staff for the use of RMMEs.

7 All relevant parties co-operated fully with the RAIU investigation; with no difficulties arising.

Other stakeholder inputs

8 No judicial authorities or emergency service were involved in this accident.

Other information relevant to the investigation process

9 In this investigation, there is no other information relevant to the investigation process.

RAIU report format

10 The RAIU report is divided into a number of key sections, namely:

- Summary of the accident & background information – which provides factual information surrounding the accident including:
  - Synopsis of the accident, which provides and abridged version of accident events;
  - External circumstances surrounding the accident or accident location (such as weather conditions or location geography);
  - Consequences of the accident, including fatalities, injuries or material damage;
  - Parties and roles associated with the accident;

  - Description of the relevant parts of infrastructure, rolling stock, signalling and communications, operations or other equipment associated with the accident; this maybe expanded in the Evidence section of the report if further detailed descriptions are required.

- Evidence – which provides further factual details on supporting information for the background information, for example, this section may include details on: SMS documentation, standards and procedures; risk assessments, etc;
- Events before, during and after the accident – which gives a proximate chain of events:
  - Leading up to the occurrence including actions taken by persons involved; the functioning of rolling stock and technical installation and the operating system;
  - During the occurrence, by describing the occurrence;
  - After the occurrence, including: consequences of the occurrence; measures taken to protect the site of the occurrence; and, the efforts of the rescue and emergency services.
- Similar occurrences – which outlines occurrences similar in nature to the occurrence subject to this report.
- Analysis – which analyses the combined findings from the above established facts which resulted in the causation of the occurrence, such as: Roles and duties; Rolling stock and technical installations; Human factors; Feedback and control mechanisms, including risk and safety management as well as monitoring processes; Trends related to similar occurrences.
- Conclusion – which includes: Concluding information from the analysis of the factual findings; Measures taken since the occurrence; Additional observations.
- Safety Recommendations – where appropriate, safety recommendations will be made with the sole aim of preventing a similar occurrence in the future; safety recommendations may also be made as a result of additional observation with the aim of prevent another type of occurrence. The absence of safety recommendation shall be explained.

Summary of the accident & background information

Synopsis of the accident

11 During signage erection work in a T3 Possession on the 11th January, approximately 1 ½ kilometres (km) from Rosslare Europort (see Figure 1 for location of accident), a RMME was used to transport V Boards from a level crossing access point to a worksite and back to a level crossing access point for pole extension at Hayesland Compound.

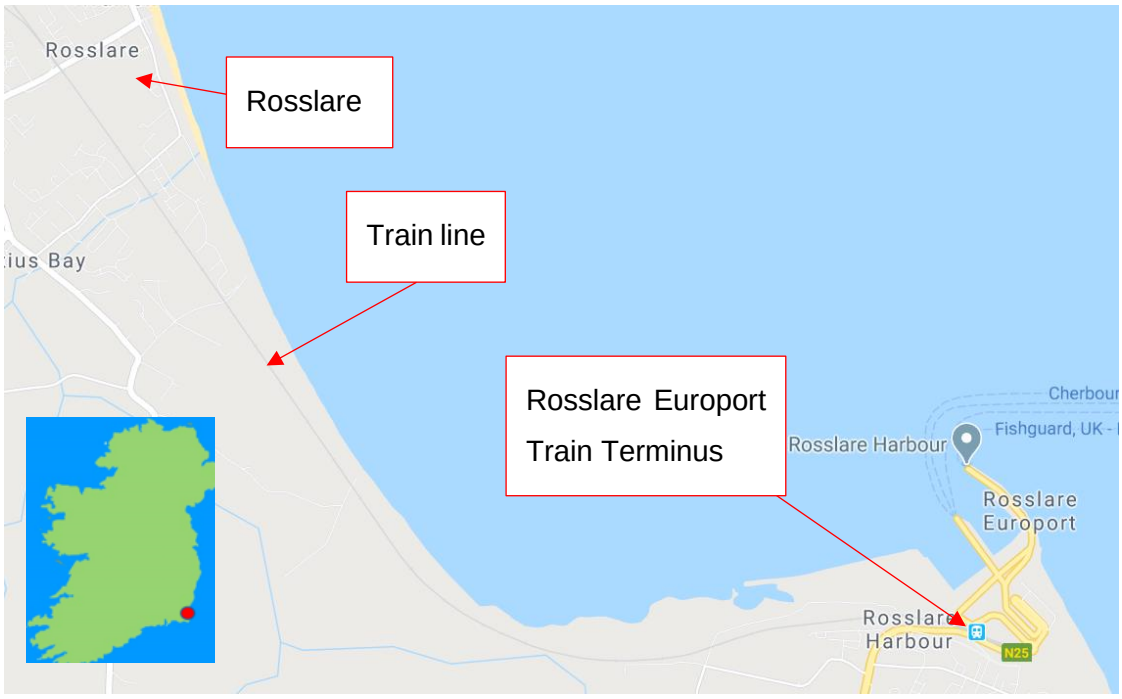


Figure 1 – Location of the accident

12 While works were being conducted on the V Board poles, the T3 Possession was handed back to allow for the passage of a passenger train; however, the RMME remained on-track at the level crossing access point.

13 At approximately 10:52 hrs, Train A602 collided with the RMME on the approach to Rosslare Europort, see Figure 2 for a photograph of the RMME after the collision.

Figure 2 – Damaged RMME

External circumstances at the accident location

Weather

14 The weather was cloudy and fine; weather data taken from the nearest Met Éireann Weather Station at Johnstown Castle, 15 km North / North West of the site, recorded that there was 7.9 millimetres (mm) of rainfall for the day, with 1 mm falling at the time of the accident. The maximum temperature was recorded at 11.2 ºC and the minimum temperature was 7.1 ºC. The mean wind speed was recorded at 15.4 knots.

15 Weather conditions were not contributory to the accident.

Work being undertaken adjacent to the accident location

16 At the location of the accident a new compound had been constructed by IÉ-IM, on land leased from a private landowner, at Hayesland to facilitate rock armour work which was part of the Rosslare Coastal Erosion Project being undertaken by IÉ-IM. The T3 Possession arranged on the day of the accident was arranged for enabling works and allowed for the erection of the V Boards.

Fatalities, injuries & material damage

Fatalities & injuries

17 There were no fatalities or injuries to staff as a result of the accident.

Material damage

18 The RMME was buckled from the collision, see Figure 2.

19 There was also minor damage to the Track Circuit Assistor (TCA) fitted to the lead bogie on InterCity Railcar (ICR) 22343, see Figure 3.

20 There was no damage to the rail infrastructure as a result of the accident.

Figure 3 – Damage to TCA on ICR 22343

Parties & roles associated with the accident

Parties involved in the accident

21 IÉ–IM is the infrastructure manager who owns and operates the railway infrastructure in Ireland and operates under a Safety Authorisation certificate issued by the Commission for Railway Regulation (CRR). The IM Safety Authorisation is issued in conformity with Commission Regulation (EU) 1169/2010; the authorisation was renewed on 24th March 2018 for a period of four years. The IÉ-IM department involved in this accident and relevant to this investigation is the:

- IÉ-IM CCE Department - responsible for the design, inspection, maintenance, and renewal of the railway's structural infrastructure, including cuttings and embankments, and the management of risks associated with these assets.

22 IÉ is also the railway undertaking (RU) who owns and operates mainline and suburban railway services in Ireland and operates under a safety certificate issued by the CRR. The RU Safety Certificate is issued in conformity with European Directive 2004/49/EC and S.I. 249 of 2015; the Safety Certificate was renewed on 23rd March 2018 for a period of five years. The IÉ-RU department involved in the incident and relevant to this in investigation is:

- IÉ-RU Operations – responsible for the operation of trains on the network. This includes the supervision of train drivers.

Roles involved in the accident

23 The roles involved in the accident, from IÉ-IM CCE Department, were the:

- PICOP/ES – Employed by IÉ for twenty-four years with his normal duty being a Patrol Ganger. On the day of the accident, he was performing the roles of PICOP and ES (these roles are clearly set out in the IÉ Rule Book). The PICOP/ES was certified and deemed competent, having last completed PICOP and ES training on the 3rd April 2019 and the 18th June 2019, respectively;
- Track Safety Co-ordinator (TSC) – Undertook the Site Safety Briefing prior to the commencement of work under the T3 Possession;
- APWI – Employed by IÉ for twenty-five years with his normal duty being a Patrol Ganger. On the day of the accident, he was performing the role of PWI, which appears to be an inspection and supervision role; however, IÉ-IM were not able to find a clear definition;
- PWW1 & PWW2 – Two permanent way workers, working within the T3 Possession.

24 The role involved in the accident, from IÉ-RU, is as follows:

- Driver A602 – Driver A602 held a current train driver's licence and was competent to drive the train on his route. Driver A602 could not have taken any further actions to prevent the train colliding with the RMME.

Infrastructure

25 The line on which the accident occurred is a bi-directional single line section of track between Bray to Rosslare Europort. Trains travelling to Rosslare are travelling in the Down direction, and trains travelling from Rosslare are travelling in the Up direction.

26 The track is plain line with flat bottom *continuously welded rail* (CWR) mounted on concrete sleepers in ballast. The maximum permitted speed from Greystones to Rosslare is 70 miles per hour (110 kilometres per hour (km/h)). No factors in relation to the condition of the track were found to have contributed to the accident.

27 To facilitate Rosslare Coastal Erosion Project, IÉ-IM re-opened Level Crossing XR102 (the level crossing will be re-closed once the works have been completed).

Figure 4 – Level Crossing XR102

28 As a result of re-opening the level crossing, IÉ-IM had to erect *viewing distance marker boards* (sometimes referred to as V Boards). The V Boards were being moved, to their locations 350 m from the level crossing, by the RMME on the day of the accident, see Figure 5.

Figure 5 – Photograph of V Boards taken, when erected, after the accident

Rolling Stock

29 The train involved in the accident was the 08:05 hrs passenger service from Dublin (Connolly) to Rosslare Europort, Train ID A602 (Train A602).

30 This service was operated by a four car 22000 Class ICR; with the train consist being 22343 (leading unit), 22443, 22543 and 22243. The total length of the train is approximately 94.8 m with a mass of 189 tonnes. The maximum permitted speed of this train is 100 mph (160 km/h).

22343 22443 22543 22243

Figure 6 – Illustration of ICR configuration on the day of the accident

31 The headlights were illuminated at full beam.

32 The speed of the train was 102 km/h (63 mph) on the approach to RMME.

33 No factors in relation to the performance of the train were found to have contributed to the accident.

Signalling and communications

34 The route between Greystones Station 17 MP and Rosslare Europort 114 MP is controlled by the Rosslare Line Signalman located in Greystone Signal Cabin. The Rosslare line is operated under the rules and regulations for trains signalled by Track Circuit Block. The line is fitted with colour light signals and train detection is achieved by axle counters.

35 The means of communication between the train drivers and the signalman on this route is through train radio.

36 No factors in relation to the condition of the signalling and communications systems were found to have contributed to the accident.

Operations

37 Trains travelling to Rosslare are travelling in the Down direction, and trains travelling from Rosslare are travelling in the Up direction.

38 The maximum permitted line speed for the section located at the incident 112 ½ MP in the Up and Down Directions is 70 mph (110 km/h) as set out in the current Working Timetable.

39 The safest means for maintenance staff to carry out their duty on or near the line (within 3 metres of the nearest rail) is under a T3 possession which is granted by the controlling signalman. When the work is completed, and the track is clear the PICOP must contact the controlling signalman and hand back the possession to allow the resumption of train movements.

40 In the case of this worksite for "Track Maintenance", the four T3 Possessions were granted (Possession Plan Reference Number RD/RT/2) for Rosslare Strand – Rosslare Europort between the 112.5 (112 ½ MP) and 113.088 miles, for the following times in order to facilitate the movement of trains:

- 08:00 hrs – 10:40 hrs;
- 11:05 hrs to 12:40 hrs;
- 13:15 hrs to 16:15 hrs;
- 16:40 hrs to 17:30 hrs.

41 This meant that the maintenance staff could work safely during these hours only and the T3 Possession would have to be handed back at the end of each time period.

42 In relation to T3 Possession stopping at 10:40 hrs, this was to facilitate the movement of Train A602 (the 08:05 hrs passenger service from Dublin (Connolly) to Rosslare Europort).

Rail Mounted Maintenance Equipment (RMME)

43 The RMME involved in the accident is manufactured by Geismar; it has four steel tapered wheels running on bearings and weighs approximately 35 kilogrammes (kg). It is mounted on the rails traversing over the *five foot*.

44 It is primarily used to support a Geismar universal power spanner but is interchangeable with other powered machinery. The universal power spanner was not in use at the time of the accident (see Figure 7 for the unit in use for its intended purpose).

Figure 7 – Geismar Universal Power Spanner mounted on rails

45 On the day of the accident, the RMME was not being used for its intended purpose, it was being used to transport the signage poles.

46 The RAIU requested information on the instructions for use of this RMME on the IÉ-IM network; IÉ-IM informed the RAIU that there were no instructions available for using the RMME as it was used on the day of the accident.

47 The RAIU also requested, from IÉ-IM, how IÉ-IM would classify the equipment used on the day of the accident; IÉ-IM classified the equipment as an RMME; it should be noted that this was classified by IÉ-IM, post-accident. In the IÉ's internal, Report of Investigation, "Collision of train A602 with a CCE trolley at 112.880 miles on the Rosslare Line 11th of January 2020", published on the 5th April 2020; they refer to the RMME as a "CCE Trolley" or a "Permanent Way Department (PWD) Trolley".

Evidence

IÉ Rule Book

Introduction

48 The relevant sections of the IÉ Rule Book in this investigation are:

- Section A: Employment and rules concerning safety, security, communications, and emergencies.
- Section B: Part One: Instructions to persons having duties on or near the line, or on trains or vehicles, or at passenger stations.
- Section S: Protection and Working of Hand Trolleys and Rail-Mounted Maintenance Equipment.
- Section T: Part Three: Arrangements for absolute possession of the line.

Section A: Employment and rules concerning safety, security, communications, and emerge*ncies*

49 In terms of Section A, Subsection 2.0: Safety and Security, Section 2.7: Using Mechanical or Electrical Plant, states that “you must not use such plant unless you are authorised to do so”.

50 In terms Section A, Subsection 3.0: Communication, the following is stated:

- Messages concerning safety must be properly understood by both parties, whether by radio, telephone or face-to-face (3.1: Basic Principles).
- Ask the person receiving the message to repeat it to you (3.1: Basic Principles).
- Give your message clearly, slowly and concisely (3.3: What to do to ensure tour message is properly understood).
- Do not assume anything to have been understood until correctly repeated to you (3.3: What to do to ensure tour message is properly understood).
- Repeat the message to enable the caller to ensure you have correctly understood it (3.4: What you must do to ensure you receive a message correctly).

Section B: Part One: Instructions to persons having duties on or near the line, or on trains or vehicles, or at passenger stations

51 Subsection 3.0: Work which may affect the safety of trains sets out a number of requirements related to maintaining safety during work.

52 Subsection 3.2: Examples of work which may affect the safety of trains, sets out examples of work affecting safety, including:

- Using a crane or other mechanical equipment which may foul or obstruct the line;
- Conveying plant or materials along or across the line.

53 Given the use of the mechanical equipment on the day of the accident; and the fact that it was used to convey materials, the following requirements apply:

- You must not start any work which may affect the safety of trains unless authorised by the Person In Charge (3.1: Before Work Starts).
- If you are the Person In Charge of any such activity, you must first ensure that the appropriate Rules and Instructions have been observed (3.1: Before Work Starts).

54 Given the intermittent nature of the work, where the line would have to be cleared for the passage of trains, the following applies:

- During the passage of trains, make sure that all tools and materials which might be struck are moved by the slipstream are well clear and at least 2 meters (6 feet 6 inches) from the nearest rail (Sub-section 3.3: Precautions you must take during work on or near the line).

55 Subsection 3.4: Instructions to Persons in Charge of a crane or other mechanical equipment which may foul the line, states that:

- Move the crane or equipment well clear of the line and secure it (3.4.2: When work is completed or stopped to enable trains to pass).
- Tell the person who arranged for the lines(s) to be blocked that it is now safe for trains to pass (3.4.2: When work is completed or stopped to enable trains to pass).

Section S: Protection and Working of Hand Trolleys and Rail-Mounted Maintenance Equipment

56 Section S applies to all hand propelled equipment which may be pushed on one or both rails; but it only applies when working outside a possession or in an emergency. Given that the work was being undertaken on the day of the accident was during a T3 Possession; protection arrangements were in place for the RMME on the day of the accident and as such no further requirements are relevant to Section S in terms of the work being undertaken on the day of the accident.

57 However, IÉ-IM have classified the Geismar unit involved in the accident, as an RMME (paragraph 47). Section S refers to RMMEs and applies to all hand propelled equipment which may be pushed on one or both rails. As a result, the RAIU reviewed the classification of equipment in Section S and it was noted Section S does not define or make any clear classification on Hand Trolleys or RMMEs; in addition, the is also reference to LMEs, which are also not defined or classified.

58 In terms of Section S and classification of equipment, the following applies:

- RMMEs – The only direct reference to an RRME is in Section 1.4: Protection of RMME, which refers to RMME "with an off-tracking capability[2]";
- (Hand) Trolleys – Section 2.2.1, infers that trolley should be equipped with brakes, as it states "make sure there are at least two people with the trolley when moving and one of them is expressly in charge of the brake";
- LME – Again, there is only one reference to LME, namely: "the operator (and anyone else specially provided for the purpose) can readily remove it from the line"; which suggests that it is small plant.

[2] The only IÉ-IM definition in relation to "off-tracking" is in relation to Road Rail Vehicles.

Section T: Part Three: Arrangements for absolute possession of the line

59 Under Section 9.0: Instructions to PICOPs, Subsection 9.7: What you must do when the possession is no longer required, includes the following statements:

- Before the possession is given up:
    - You must ensure it is safe for the possession to be given up;
    - Each ES is required to assure you when the portion of line concerned is clear and safe for trains to pass (9.7.1: Before the possession is given up).

60 Under Section 10: Instructions to ESs, includes the following statements:

- Your responsibility to ensure the work site is cleared when work is finished so that the possession may be safely given up (Subsection 10.1: Your responsibilities);
- You must check that the portion of line affected by the work is now clear and safe for trains to pass (Subsection 10.3: What you must do when work is completed).

Safety Management System Documents

CCE-SMS-001, Safety Management System

61 CCE-SMS-001, CCE Safety Management System, Version 6.0, operative since the 12th March 2018 (to be referred to as CCE-SMS-001 for the remainder of this report).

62 CCE-SMS-001 is a high-level document which sets out the: Policy, Scope & Principles; CCE Locations; Track, Structure and Building & Facilities Assets; Accountabilities and Responsibilities, Occupational Safety and Plant & Machinery Safety; Track Safety and Structures Safety; Safety Performance; and, Organisation Structure and Obligations.

63 CCE-SMS-001 also sets out the CCE Departments definitions for the following:

- Hazard – A condition, event or practice with the potential to cause an injury, damage or loss;
- Risk – The chance that harm will result from a Hazard; the combination of the severity of the Hazard with the likelihood of its happening, the probable consequence of potential harm or damage resulting from an unmanaged Hazard;
- Risk assessment – A structured assessment to identify the likelihood of a Risk event, the severity of the adverse consequences should the event come about, and the mitigating Risk control actions.

64 CCE-SMS-006, CCE Hazards and Risk Assessments, Version 4.0, operative since the 12th March 2017 (to be referred to as CCE-SMS-006 for the remainder of this report) states throughout that there is an assurance that:

- All tools, plant and machinery used by employees are suitable and safe such that it enables safe and correct methods of working and that employees are properly briefed;
- All tools, plant, machinery and facilities to be used in any maintenance activities are deployed and used in accordance with the intended purposes and in a manner consistent with safe and correct operation for the application in question;
- Contractors using equipment do so in a manner consistent with their method statement and in accordance with the intended purposes and in a manner consistent with safe operation for the application and use in question.

65 Appendix 40 of CCE-SMS-001 states that "under the Safety Health & Welfare at Work Act 2005 (Section 13) employees must comply with the following" whereby it lists twenty-three rules; of particular reference to this investigation are the following:

- Always utilise all protective clothing and equipment properly;
- Never interfere with safety measures and always refer back to the guidelines of how to do a task safely by looking it up in a Safe Systems of Work or in Risk Assessments;
- Never use /adjust / alter or repair equipment unless authorised to do so;
- Always follow the guidelines and instructions as set out in Risk Assessments and in Safe Systems of Work.

CCE-SMS-006, Hazards and Risk Assessments

General information

66 CCE-SMS-006 sets out the: Policy, Scope and Principles, Definition, Accountabilities and Responsibilities; and Implementation procedures associated with hazard and risk assessment.

67 Among those accountable and responsible for hazards and risk assessments are: Permanent Way Inspectors, who have "a responsibility for overseeing and guiding workplace activities in any CCE Location" (3.13.1, CCE-SMS-006). In terms of Accountable Line Managers, CCE-SMS-006 states that "Accountable Line Managers in the CCE Department are directly accountable for the Occupational Safety and Plant & Machinery Safety for those workplaces and fleets under their control and also for the quality of work that affects Track Safety and Structures Safety in those workplaces (1.3.2, CCE-SMS-006); and, that "Accountable Line Managers will organise their operations so that work is planned such as to ensure the availability of the required resources, competent people, appropriate equipment and adequate time.

68 CCE-SMS-006 states that "Plant & Machinery Safety accountability includes: Ensuring that all tools, plant, machinery and facilities at all CCE Locations and used by employees are suitable and safe such that it enables safe and correct methods of working and that employees are properly briefed" (stated throughout CCE-SMS-006).

69 CCE-SMS-006 also states that "Formal briefings on matters related to Occupational Safety, Plant & Machinery Safety, Track Safety and Structures Safety are conducted by Line Managers" (4.1.5, CCE-SMS-006). Also, that "The Line Manager accountable for the CCE Location is fully accountable for ensuring that any precautionary and mitigating actions for every Risk on the Risk register is properly implemented and that all of the

changes in CCE Documentation, Technical Documentation, tools, machinery, plant or the workplace are implemented, maintained and monitored (4.7.9.1, CCE-SMS-006).

Safety Control Measures

70 The RAIU requested the risk assessment and Safe System of Work / Method Statement associated with this work or this type of work.

71 There was no individual risk assessment or safe work method statement for the work; the RAIU were directed to the Mobile Gang Work Instructions, I-PWY-1490 (operative since the 12th August 2010) referred to in IÉ-IM as the "Ganger's Handbook". According to IÉ-IM "these works are classed as light maintenance activities similar to other works covered in the Ganger's Handbook and was covered under the TSC briefing".

72 The purpose of the Ganger's Handbook is that it "contains a series of instructions applicable to the tasks undertaken by Permanent Way Mobile Gangs". It provides information on works carried out on: Rails; Joints; Sleepers and Fastenings; Points and Crossings; Ballast and Formation; Track Geometry; Boundaries and Off-Track Matters; Plant and Machinery Operated by Others; Small Plant Items Operated by the Mobile Gang; Night Working, Noise, Environment; and, Facilities.

73 The RAIU reviewed the Ganger's Handbook and found no references to works at level crossings (apart from changing rails and vibrating plates and rollers) or related to changing signs, or anything that could be classed as "similar to the works" undertaken on the day of the accident.

74 The Ganger's Handbook does refer to "Power Spanner", under the "Small Plant Items Operated by the Mobile Gang" section stating that the work method is:

- Ensure all sockets/shoes/chucks required to operate the power spanner are with the machine and that they are not worn;
- Remove sockets/shoes/chucks from the power spanner when it is not being used;
- Make sure there is a trolley for every power spanner;
- Make sure the power spanner is fully fuelled;
- Inspect the power spanner to ensure it is in good working order;
- Ensure the trolley and power spanner are secured;
- Ensure that all lifts are made by four people and are planned.

75 In terms of TSC briefing, referred to be IÉ-IM (paragraph 71), this briefing was given to, and signed off, by all staff and included information on: responsibilities; protection arrangements; site limits and access and egress arrangements; hazards and risks; emergency contact details. The use of the RMME was not discussed at this briefing.

Events before, during & after the accident

Events before the accident

76 On Saturday 11th January 2020, the planned work for the day was enabled works for the rock armour coastal defence works (paragraph 16) and the erection of V Boards (paragraph 28) as a result of re-opening level crossing XR102 to facilitate the rock armour defence works.

77 The four planned T3 Possessions were on a single line (paragraph 40); with the first T3 Possession finishing at 10:40 hrs to allow for the passing of Train A602 (paragraph 42).

78 On the morning of the 11th January 2020, prior to the works being undertaken and the T3 Possession being taken, the TSC gave a Site Safety Briefing to all staff involved in the work; which was signed by all staff, there was no mention of the use of the RMME.

79 After the T3 Possession was granted, the PICOP/ES set up a worksite for the erection of four V Boards between the 112 miles 880 yards (north) and 112 miles 1320 yards (south).

80 Two V Boards were to be erected 350 m south of the level crossing and two V Boards were to be erected 350 m north of the level crossing.

81 The work was to be undertaken by the PICOP/ES, APWI, PWW1 and PWW2, who accessed the site from Level Crossing XR102.

82 The group of four started by carrying two V Boards to the south-side of the level crossing and PICOP/ES and PWW1 commenced erecting these V Boards.

83 APWI and PWW2 walked back to the compound. The decision was made by APWI to mount the RMME at LC XR102 in order to transport the other two V Boards the 350 m north of the level crossing. The APWI did not seek authorisation to use the RMME from the PICOP/ES.

84 When the V Boards were mounted on the RMME, APWI and PWW2 proceeded to V Board location. On arrival, APWI measured the poles for the V Boards and found they were too short to enable the centre of the V Board to be the specified two meters above sleeper level.

85 The APWI then made the decision to bring the V Board poles back to the compound on the RMME; as there was a welder at the compound who could extend the poles. Upon arrival back at the compound, PWW2 took one V Board and the APWI took the other V Board off the RMME and they carried them into the compound; leaving the RMME unattended, despite knowing the intermittent nature of the T3 Possession.

Events during the accident

86 The RMME was left, on the track, at LC XR102.

87 On entering the compound, the APWI received a telephone call which lasted a few seconds.

88 PICOP/ES and PWW1 had completed their work and were at the compound; on seeing APWI, PICOP/ES asked APWI if everything was okay on the line; the APWI replied that it was, knowing that the RMME was still fouling the line, however, APWI intended to remove RMME from the line imminently.

89 APWI went to talk to the welder about extending the poles for the V Boards and forgot about the RMME left on the line.

90 At 10:34 hrs, PICOP/ES contacted the Rosslare Line Signalman and cancelled the T3 Possession after informing him that the line was clear and safe for traffic; however, the PICOP/ES did not check the line prior to handing back the T3 Possession.

91 At approximately 10:52 hrs Train A602 approached the location of the compound and LC XR102 on the approach to Rosslare Europort at a speed of 102 km/h (63 mph).

92 Driver A602 saw a yellow object on the track at LC XR102 and made an initial brake application, followed by a full-service brake and then an emergency brake application when he realised, he was going to strike the object on the track.

93 On hearing the train, APWI remembered that the RMME was still on the track at LC XR102 and immediately went to LC XR102 to remove it; however, it was too late; and, Train A602 collided with the RMME.

Events after the accident

94 After Train A602 came to a stop, Driver A602 contacted the Rosslare Line Signalman and advised him that his train was stopped in the section between Rosslare Strand and Rosslare Europort after colliding with an object on the line; and that he was exiting Train A602 to see the extent of damage to Train A602.

95 Driver A602 attempted to dislodge the RMME which was lodge between the two wheelsets of the leading bogie of ICR 22343.

96 APWI walked up to assist Driver A602; and APWI and two other CCE staff members removed the RMME with a hammer.

97 Driver A602 then carried out checks on Train A602 and the only damage found was some marks apparent on the TCA underneath the front bogie (as shown in Figure 3). Following subsequent telephone calls made by Driver A602 to: the Rosslare Line Signalman; the Mainline Regulator; and, CME staff located at Laois Train Care Depot Portlaoise; Driver A602 was given permission for the train to proceed to Rosslare Europort.

98 After Train A602 moved away, APWI checked the section of track where the RMME had been struck and dragged by the train and found that there was no damage to the track as a result of the accident.

99 APWI contacted the Regional Manager South East and informed him of the accident. The Regional Manager instructed the APWI to cease work at the site and later arranged for post incident Drug and Alcohol (D&A) screening to be carried out on APWI and PICOP/ES; the screening later returned negative results for both tests.

Similar Occurrences

100 The RAIU are not aware of any previous collision involving trains and RMMEs on the IÉ Network.

Analysis

Use & classification of the RMME (Technical Installations)

101 The RMME on the day of the accident was not used as a power spanner (paragraphs 43 - 45); the proper use of a power spanner is described in the Ganger's Handbook (paragraph 74). The APWI used it in a way for which it was not designed or authorised.

102 There is a lack of clarity in relation to the classification of equipment in the IÉ Rule Book, with references to RMMEs, (Hand) Trolleys and LMEs in Section S of the IÉ Rule Book (paragraph 58). In addition, Section A of the IÉ Rule Book references mechanical or electrical plant (paragraph 104); however, there is no clarity on what this equipment is. The Ganger's Handbook does identify some "small plant items" (paragraph 74).

IÉ Rule Book – Roles, Duties & Human Factors

Roles of the APWI

103 In relation to the role of the APWI, it appears that this is a supervisory role, however, IÉ-IM were not able to provide the RAIU with clear roles and responsibilities for this role (paragraph 23). Had the APWI been undertaking a supervisory role, rather than the work (i.e. the extension of the V Board poles) he may have been more focused on the removal of the RMME from the track.

Permission for use of RMME

104 In terms of Section A, Subsection 2.7: Using Mechanical or Electrical Plant, states that "you must not use such plant unless you are authorised to do so" (paragraph 49). However, it does not appear that APWI was authorised to use the RMME by the PICOP/ES (paragraph 83).

105 Section B, Subsection 3.2 identifies "mechanical equipment" and "conveying plant or materials along the line" as examples of work which may affect the safety of trains (paragraph 52). Subsection 3.1, "Before Work Starts", requires authorisation should be sought from the PICOP (paragraph 53) for the use of mechanical equipment and the conveying of plant along the line. Again, in the case of this accident, the APWI does not appear to have sought authorisation for the use of the RMME (paragraph 83).

RMME left unattended of the line, affecting the safety of trains

106 Section B, Part One, Subsection 3.3, Pre-cautions you must take during work on or near the line, requires that during the passage of trains, all tools and materials which might be struck are moved well clear from the nearest rail (paragraph 54). In the case of this accident, the APWI chose not to immediately remove the RMME from the line, despite knowing the intermittent nature of the T3 Possession; instead, the APWI left the RMME on the line, unattended (paragraph 85).

Communications between the APWI and PICOP/ES

107 Section A, Subsection 3.0: Communications requires that messages concerning safety must be properly understood by both parties and repeated, so that they are understood correctly; it also highlights that misunderstandings can cause accidents (paragraph 50). In the case of this accident, the APWI indicated to the PICOP/ES that the line was clear, as he had intended to take the RMME off the line (paragraph 88); the repeating of the message by the APWI to the PICOP/ES may have helped the APWI in remembering to remove the RMME from the track.

Giving back the T3 Possession

108 Section B: Part One, Subsection 3.4.2: When work is completed, or stopped to enable trains to pass, requires that equipment be cleared off the line and let the person who arranged for the lines(s) to be blocked that it is now safe for trains to pass (paragraph 55). However, the PICOP/ES did not verify this through his own actions; and accepted the affirmation of the APWI.

109 Section T: Part Three: Arrangements for absolute possession of the line, outlines what PICOPs and ESs must do before a possession is “given up” (Subsection 9.7), they must ensure it is safe (for the possession to be given up) and assure the portion of line concerned is clear and safe for trains to pass, respectively (paragraph 59).

110 In addition, ESs must ensure the work site is cleared when work is finished so that the possession may be safely given up (Subsection 10.1: Your responsibilities (ES)) and it is clear and safe for trains to pass (Subsection 10.3: What you must do when work is completed (ES)), (paragraph 60). The PICOP/ES did not ensure that the worksite was cleared and that trains were safe to pass (paragraph 90).

Safety Control Mechanisms

111 The RAIU requested risk assessments in relation to the erection of the V Boards; there were no specific risk assessments; the RAIU were instead directed to the Ganger's Handbook and the TSC Briefing (paragraph 71). On reviewing the Ganger's Handbook there was no similar work, to the work carried out on the day of the accident; with no references to maintenance at level crossings (apart from track work) or signage (paragraph 73).

112 There is reference to power spanners, but not in the way it was used on the day of the accident. Any deviation from its intended purpose, therefore, should require a risk assessment.

113 The TSC Briefing did not include the use of the RMME (paragraph 75).

Conclusion

Use & classification of the RMME (Technical Installations)

114 The RMME was used in a way that it was not designed for, as the power spanner section was removed it was used as a form of hand trolley for the movement of V Boards (paragraph 101).

115 There is a dearth of documentation in relation to the classification of equipment, with the IÉ Rule Book referencing RMMEs, (Hand) Trolleys and LMEs in Section S mechanical and electrical plant in Section A; and the Ganger's Handbook identifying some "small plant items" (paragraph 102).

IÉ Rule Book – Roles, Duties & Human Factors

116 The RMME was used without authorisation as required under Section A and B or the IÉ Rule Book (paragraphs 104).

117 Instead of immediately removing the RMME from the line with the V Boards as required under Section B of the IÉ Rule Book (paragraph 106), the APWI left the RMME on the line unattended, despite knowing the T3 Possession was due to finish for the passage of trains.

118 Proper communications, as set out in Section A of the IÉ Rule Book, between the APWI and PICOP/ES were not followed with the APWI misinforming the PICOP/ES regarding the safety of the line (paragraph 107).

119 The PICOP/ES did not physically check that the line was clear as required by Section B (paragraph 108), Section T (paragraphs 109 and 110).

120 The role of the APWI does not appear to be clearly defined, by IÉ-IM in the IÉ Rule Book or other documentation (paragraph 103).

Safety Control Mechanisms

121 There was no risk assessment or safe work method statements for the works carried out on the day of the accident; information provided by IÉ-IM in relation to safe working on the day of the accident was not appropriate; and, the TSC Site Safety Briefing did not address to use of the RMME. (paragraph 111). As a result, there appears to be an over-reliance on these procedures for all works conducted by permanent way staff; in particular, with reference to the Ganger's Handbook, a document that is over ten years old.

Causal, contributing and systemic factors

122 Train A602 struck the RMME as a result of the following causal factors:

- CaF-01 – The APWI used the RMME without authorisation from the PICOP/ES as required under Section A and B of the IÉ Rule Book;
- CaF-02 – The APWI did not remove the RMME immediately after removing the V Boards;
- CaF-03 – The APWI advised the PICOP/ES that the line was clear when the RMME remained on the line;
- CaF-04 – The PICOP/ES did not ensure that the line was clear and safe for trains to pass before giving up the possession as set out in Sections B and T of the IÉ Rule Book.

123 Contributory factors include:

- CoF-01 – Proper communication protocols, as set out in Section A of the IÉ Rule Book, between the APWI and the PICOP/ES, were not followed;
- CoF-02 – The Ganger's Handbook does not include any references to maintenance at level crossing or the erection of signage;
- CoF-03 – Had the role of the APWI been supervisory, the APWI may have been more focused on the removal of the RMME rather than the work being carried out.

124 Systemic factors include:

- SF-01 – There is an over-reliance on the Ganger's Handbook and Site Safety Briefings to address all works that may be carried out by permanent way staff.

125 Although not causal, contributing or systemic, the RAIU make the following additional observation:

- AO-01 – The IÉ Rule Book does not clearly classify RMMEs, (Hand) trolleys, LMEs or small plant in the IÉ Rule Book or other supporting documentation.

Measures taken by IÉ-IM since the accident

126 The IÉ-IM Safety Department issued an Investigation Remit for the accident on the 27th January 2020; and published the Report of Investigation, "Collision of train A602 with a CCE trolley at 112.880 miles on the Rosslare Line 11th of January 2020", on the 5th April 2020. The report found that the immediate cause of the accident was:

- There was a failure to remove the trolley from the line before the T3 Possession was cancelled.

127 The causal factors were identified as:

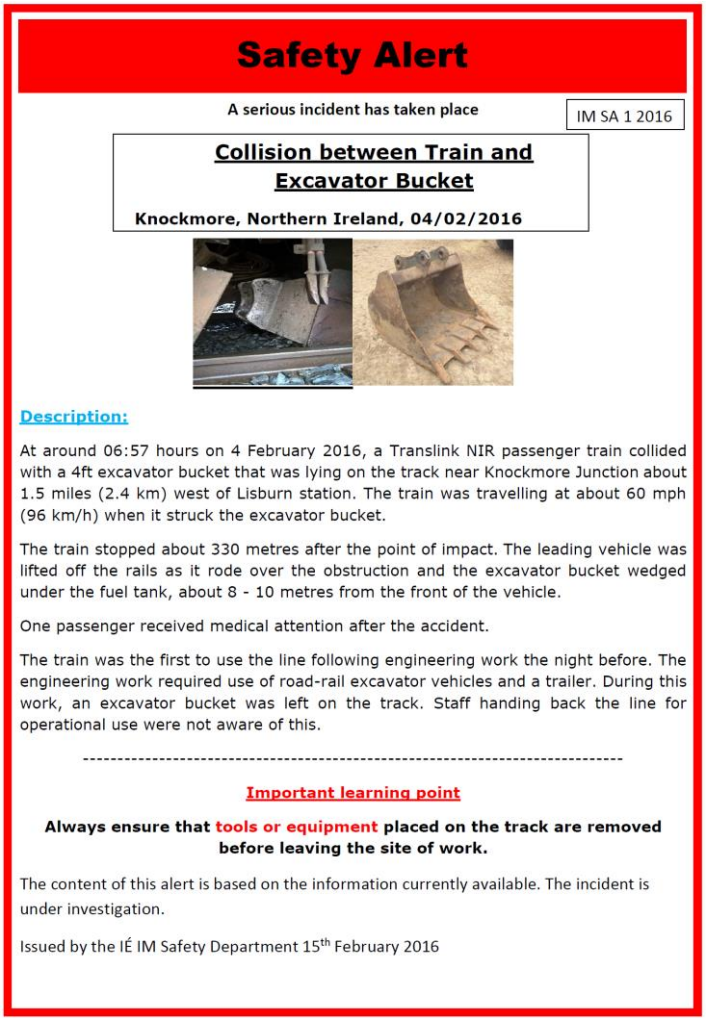
- The APWI told the PICOP/ES that the line was clear when the trolley remained on the line;
- The PICOP/ES cancelled the T3 possession indicating the line was clear and safe for traffic while the trolley remained on the line;
- The PICOP/ES in his role as ES did not inspect his worksite to ensure it was clear and safe for traffic before handing back his worksite;
- The APWI upon arrival back at the compound with the trolley may have been distracted after holding various conversations, which led him to forget to remove it from the line.

128 There were no underlying causes identified and IÉ-IM took three actions as a result of the accident:

- The APWI conducted a debrief regarding the accident with all staff on-site at the time of the occurrence highlighting the duties of ESs to inspect work sites to ensure they are clear and safe for traffic prior to handing back the work site. This took place on Monday the 13th January 2020;
- The Regional Manager South East met with both the APWI and PICOP/ES to highlight the safety issues of concern and lessons learned as a result of the accident; this included discussions on safety critical communications, the importance of avoiding distractions during handback of work sites, and the requirement for the ES to check work sites when work is complete. This meeting took place on the 15th April 2020;
- A support and development plan, as per IM-SMS-018 Development & Support System IÉ-IM Staff, has been developed for the PICOP/ES in relation to the role of ES.

129 IÉ-IM made no safety recommendations based on the above actions taken by IÉ-IM.

130 In addition to conducting an internal investigation, the IÉ-IM Safety Department re-issued a Safety Alert on the 25th May 2020. This Safety Alert was originally issued on the 15th February 2016 (Figure 8), after an accident in Knockmore, Northern Ireland on the 4th February; whereby staff working with Road-Rail Vehicles during the night left an excavator bucket on the track which was struck by a passenger train the next morning; causing significant damage to the train and requiring medical attention for one passenger. The purpose of the Safety Alert was to remind staff of the importance of "always ensuring that tools or equipment placed on the track are removed before leaving the site of Work".



Safety Alert

A serious incident has taken place

IM SA 1 2016

Collision between Train and Excavator Bucket

Knockmore, Northern Ireland, 04/02/2016

Description:

At around 06:57 hours on 4 February 2016, a Translink NIR passenger train collided with a 4ft excavator bucket that was lying on the track near Knockmore Junction about 1.5 miles (2.4 km) west of Lisburn station. The train was travelling at about 60 mph (96 km/h) when it struck the excavator bucket.

The train stopped about 330 metres after the point of impact. The leading vehicle was lifted off the rails as it rode over the obstruction and the excavator bucket wedged under the fuel tank, about 8 - 10 metres from the front of the vehicle.

One passenger received medical attention after the accident.

The train was the first to use the line following engineering work the night before. The engineering work required use of road-rail excavator vehicles and a trailer. During this work, an excavator bucket was left on the track. Staff handing back the line for operational use were not aware of this.

Important learning point

Always ensure that tools or equipment placed on the track are removed before leaving the site of work.

The content of this alert is based on the information currently available. The incident is under investigation.

Issued by the IÉ IM Safety Department 15th February 2016

Figure 8 – Safety Alert re-issued 25th May 2020

Safety Recommendations

Introduction to safety recommendation

131 In accordance with the Railway Safety Act 2005 (Government of Ireland, 2005a) and the European railway safety directive (European Union, 2004), recommendations are addressed to the national safety authority, the CRR. The recommendation is directed to the party identified in each recommendation.

Absence of safety recommendations due to measures already taken

132 IÉ-IM have briefed the APWI and PICOP/ES in relation to the importance of: safety critical communications; avoiding distractions during handback of work sites; and, the role of the ES in relation to checking work sites when work is complete (paragraph 128). In addition, these requirements are set out clearly in the IÉ Rule Book with staff being trained and competency assessed. For these reasons, the RAIU do not consider that further safety recommendations are warranted in terms of safety critical communications or the role of the ES (CaF-03, CaF-04, CoF-01).

133 IÉ-IM issued a Safety Alert to all IÉ-IM staff, reminding of them of the importance of always ensuring that tools or equipment placed on the track are removed before leaving the site of work and the possible consequences of not checking the line (paragraph 130) (CaF-02).

Safety recommendations as a result of this accident

134 In relation to the classification of RMMEs, Hand (Trolleys), LMEs and other small plant and equipment, the IÉ Rule Book and other supporting documentation does not clearly define or classify these items, examples include: RMMEs are required to have “with an off-tracking capability”; and, (Hand) Trolleys should be equipped with brakes and operated by two people. As a result, the RAIU make the following safety recommendation (CaF-01, CaF-02, AO-01):

Safety Recommendation 202004-01

IÉ-IM should classify and define RMMEs, Trolleys, LMEs and other commonly used plant or equipment on the railway and ensure appropriate safety procedures are in place for their use. IÉ-IM should also assess the need for any associated training and competency related to these changes and if considered necessary prepare training and competency assessment material.

135 The RMME used on the day of the accident was not used for its intended purpose, and instead was used to transport materials; as a result, there were no procedures in place for the use of this item on the line. As a result, the RAIU make the following safety recommendation:

Safety Recommendation 202004-02

IÉ-IM CCE should ensure that, once defined and classified, change management systems are put in place to ensure RMMEs, Trolleys, LMEs, etc are not altered for other uses, without first having been safety validated in line with company processes.

136 In terms of the Ganger's Handbook, this was document forwarded to the RAIU as "these works are classed as light maintenance activities similar to other works covered in the Ganger's Handbook and was covered under the TSC briefing". The RAIU found no similar activities, and as a result, make the following safety (CoF-01 & SF-01):

Safety Recommendation 202004-03

IÉ-IM should update their Mobile Gang Work Instructions, I-PWY-1490, (Ganger's Handbook) to ensure that all routine light maintenance activities are included. Systems, e.g., training, should be put in place to ensure that relevant staff can undertake dynamic risk assessments should non-routine activities need to be undertaken that are not described in the Ganger's Handbook.

137 The role of a PWI is not clearly defined by IÉ-IM as to his duties, as a result the RAIU make the following safety recommendation (CoF-03):

Safety Recommendation 202004-04

IÉ-IM clearly define the role of the PWI/APWI and update the relevant documentation accordingly.

Additional Information

List of abbreviations

AO	Additional Observation
APWI	Acting Permanent Way Inspector
CaF	Causal Factor
CCE	Chief Civil Engineer
CoF	Contributing Factor
CRR	Commission for Railway Regulation
CWR	Continuous Welded Rail
DMU	Diesel Multiple Unit
hr	hour
ICR	Intercity Railcar
IÉ-IM	Iarnród Éireann Infrastructure Manager
IÉ-RU	Iarnród Éireann Railway Undertaking
km	kilometre
LME	Light Mechanical Equipment
m	metre
MP	Milepost
mph	Miles per hour
PICOP	Person in Charge of Possession
PWI	Permanent Way Inspector
RAIU	Railway Accident Investigation Unit
RMME	Rail-mounted maintenance equipment
SF	Systemic Factor
SSOW	Safe System of Work
TCA	Track Circuit Assistor
TCB	Track Circuit Block
V Board	Viewing distance marker board

Glossary of terms

Accident	An unwanted or unintended sudden event or a specific chain of such events which have harmful consequences. For heavy rail, the EU Agency for Railways divides accidents into the following categories: collisions, derailments, level-crossing accidents, accidents to persons caused by rolling stock in motion, fires and others.
Article 20 of Directive (EU) 2016/798, Obligation to investigation	Article 20 (1) Member States shall ensure that an investigation is carried out by the investigating body referred to in Article 22 after any serious accident on the Union rail system. The objective of the investigation shall be to improve, where possible, railway safety and the prevention of accidents. Article 20 (2) The investigating body referred to in Article 22 may also investigate those accidents and incidents which under slightly different conditions might have led to serious accidents, including technical failures of the structural subsystems or of interoperability constituents of the Union rail system. The investigating body may decide whether or not an investigation of such an accident or incident is to be undertaken. In making its decision it shall take into account: (a) the seriousness of the accident or incident; (b) whether it forms part of a series of accidents or incidents relevant to the system as a whole; (c) its impact on railway safety; and (d) requests from infrastructure managers, railway undertakings, the national safety authority or the Member States.
Causal Factor	Any action, omission, event or condition, or a combination thereof that if corrected, eliminated, or avoided would have prevented the occurrence, in all likelihood.
Continuous Welded Rail	Sections of rail that are welded together.

Contributing Factor	Any action, omission, event or condition that affects an occurrence by increasing its likelihood, accelerating the effect in time or increasing the severity of the consequences, but the elimination of which would not have prevented the occurrence.
Down Direction	In this accident, trains travelling to Rosslare are travelling in the Down direction.
Engineering Supervisor	The engineering supervisor in charge of a work site. This person authorises all movements entering the work site and those within the work site.
Five foot	The area between the two running rails (it is 5 feet 3 inches (1,600 millimetres ((mm).
General Infrastructure	All features on or near the line as listed in CCE-TMS-361.
Hazard	CCE-SMS-001 defines a hazard as “a condition, event or practice with the potential to cause an injury, damage or loss”.
Incident	Any occurrence, other than an accident or serious accident, associated with the operation of trains and affecting the safety of operation. For heavy rail, the EU Agency for Railways divides incidents into the following categories: infrastructure; energy; control-command & signalling; rolling stock; traffic operations & management and others.
Investigation	A process conducted for the purpose of accident and incident prevention which includes the gathering and analysis of information, the drawing of conclusions, including the determination of causes and, when appropriate, the making of safety recommendations
Milepost	Marks distances.
Person in Charge of Possession	The person in charge of a possession. This person authorises all movements within the possession, except those entering and within a worksite.

Risk	CCE-SMS-001 defines risk as “the chance that harm will result from a Hazard; the combination of the severity of the Hazard with the likelihood of its happening, the probable consequence of potential harm or damage resulting from an unmanaged Hazard”.
Risk Assessment	CCE-SMS-001 defines a risk assessment as “a structured assessment to identify the likelihood of a Risk event, the severity of the adverse consequences should the event come about, and the mitigating Risk control actions”.
Safe System of Work	A set of procedures according to which work must be carried out. Safe systems of work are required where hazards cannot be eliminated, and some risk still exists. When developing your safe systems of work, consider how the work is carried out and the difficulties that might arise and expose you or your workers to risk. Then develop a set of procedures detailing how the work must be carried out to minimise or reduce the risk of accident or injury.
Serious Accident	Any train collision or derailment of trains, resulting in the death of at least one person or serious injuries to five or more persons or extensive damage to rolling stock, the infrastructure or the environment, and any other similar accident with an obvious impact on railway safety regulation or the management of safety. For heavy rail, the EU Agency for Railways divides serious accidents into the following categories: collisions, derailments, level-crossing accidents, accidents to persons caused by rolling stock in motion, fires and others.
Systemic Factor	Any causal or contributing factor of an organisational, managerial, societal or regulatory nature that is likely to affect similar and related occurrences in the future, including, in particular the regulatory framework conditions, the design and application of the safety management system, skills of the staff, procedures and maintenance.
T3 Possession	A possession taken for an agreed period without the facility to run passenger trains in the area during that period until such time as the holder of the possession decides to relinquish it

Up Direction	In this accident, trains travelling from Rosslare are travelling in the Up direction.
Viewing distance marker boards	Signage installed at preselected user worked level crossings throughout the network; where four board (two on each side of the level crossing) marked with a V are erected at each level crossing. They are installed at the minimum viewing distance as per the line speed for the particular level crossing for the benefit of Patrol Gangers, Permanent Way Inspectors, Technical & Engineering staff and Vegetation Control Contractors. The Patrol Ganger uses the vegetation boards (or signs) weekly on his patrol to ensure that all the viewing distances are compliant.

References

IÉ (2007), IÉ Rule Book.

IÉ-IM (2017), CCE Hazards and Risk Assessments, CCE-SMS-006, Version 4.0.

IÉ-IM (2018), CCE Safety Management System, CCE-SMS-001, Version 6.0.

IÉ-IM (2010), Mobile Gang Work Instructions, I-PWY-1490.

IÉ-IM (2020), Report of Investigation, Collision of train A602 with a CCE trolley at 112.880 miles on the Rosslare Line 11th of January 2020.