Railway Accident Investigation Unit

Ireland

Annual Report

2024

RAIU

Railway Accident Investigation Unit

Summary

The Railway Accident Investigation Unit (RAIU) is an independent investigation unit within the Department of Transport and is concerned with the investigation of accidents and incidents on Irish railways with a view to establishing their cause/s and make safety recommendations to prevent their reoccurrence or otherwise improve railway safety.

In 2024, the RAIU published three investigation reports and one urgent safety advice notice (USAN). The first two reports published were related to broken rails on the Iarnród Éireann (IÉ) Network which both occurred in February 2023; these investigations resulted in eight safety recommendations. In September 2024, the RAIU were notified of a road rail vehicle (RRV) excavator striking a member of staff, whilst unhooking a trailer from the RRV excavator; the accident warranted the issuance of a USAN which issued four safety recommendations. In December 2024, the RAIU published its third investigation report into the collision between a car and a train at Level Crossing XM190, County Mayo, which occurred 9th September 2023; this investigation resulted in two safety recommendations related to the warning signs, in advance of and at the level crossing for user worked level crossings. In total, fourteen safety recommendations were made in 2024.

A total of 317 safety recommendations have been issued since the establishment of the RAIU in 2007 to the end of 2024.

The Commission for Railway Regulation (CRR) monitors the implementation of safety recommendations and has advised that of the 317 safety recommendations issued: 182 have been closed out as having been addressed; evidence has been submitted for nineteen recommendations, further evidence has been requested by the CRR for thirty recommendations; and eighty-six recommendations remain open or in progress.

In 2024, sixty-six preliminary examination reports (PERs) were completed by the RAIU. The main themes across the PERs using the European Union Agency for Railways categories were: Derailments; Collisions; Rolling Stock; Traffic Operation and Management; and, To Persons Rolling Stock in Motion. The PERs resulted in the commencement of seven full investigations, three related to RRVs, two related to traffic operations, one related to rolling stock and one trend investigation into n

In October 2024, the Chief Investigator proposed a recruitment succession plan to the Department of Transport (DoT) to ensure RAIU is adequately resourced in the coming years.

David Murton
Chief Investigator

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General Information & Non-Investigation Activities

Introduction to the RAIU

Legal Basis

The RAIU is an independent investigation unit within the DoT 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 (EU) 2016/798 enshrined in the European Union (Railway Safety) (Reporting and Investigation of Serious Accidents, Accidents and Incidents) Regulations 2020; and, where relevant, by the application of the Railway Safety (Reporting and Investigation of Serious Accidents, Accidents and Incidents Involving Certain Railways) Act 2020.

The RAIU's role and aim

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 safety regulation or the management of safety.

During an investigation (full investigation or PER), if the RAIU make some early findings on safety issues that require immediate action, the RAIU will issue an USAN or Safety Advice Notice (SAN) outlining the associated safety recommendation(s).

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.

The following railway systems within the RAIU's remit:

- The IÉ national heavy rail network;
- The Luas light rail system in Dublin operated by TDLR;
- The Bord Na Móna (BnM) industrial railway;
- Seven operational heritage & minor railway systems.

For further information on these organisations see Appendix 1.

Organisation

In the early part of 2024, the RAIU comprised of a Chief Investigator, four Senior Investigators and an administrator. With one Senior Investigator retiring in 2024, the RAIU comprised of one Chief Investigator and three Senior Investigators.

Organisation Flow

The Commission for Railway Regulation (CRR)

In accordance with the European Union (Railway Safety) (Reporting and Investigation of Serious Accidents, Accidents and Incidents) Regulations 2020), recommendations are addressed to the national safety authority, the CRR. The recommendation is directed to the party identified in each recommendation.

European Union (EU) Agency for Railways

As part of its role as an NIB, the RAIU actively participates in the development of accident investigation processes and procedures through the work of EU Agency for Railways. To this end, the RAIU participated in the 2024 NIB plenary meetings and provided input on the direction of NIB related work.

The RAIU is also a member of the EU Agency for Railways taskforce set up to develop a system of peer review of the NIBs. In addition, the Chief Investigator chairs a task force dealing with the dissemination of accident investigation learning and investigation techniques.

Memorandums of Understandings (MoUs) & co-operating bodies

The RAIU continues to participate in Memorandums of Understanding (MoU) with the Transportation Safety Board of Canada, the Rail Accident Investigation Branch of the United Kingdom and with the Irish Health and Safety Authority (HSA).

The RAIU also continued to work with both An Garda Síochána and the Coroner's Society of Ireland.

Peer Review of the RAIU

Since 2018, European and other NIBs have volunteering for peer review by other NIBs, with the support of the EU Agency for Railways, in accordance with Article 38(2) of Regulation (EU) 2016/796, whereby NIBs were required to establish a programme of peer reviews where all NIBs were encouraged to participate so as to monitor their effectiveness and independence. Since its inception members of RAIU staff have contributed to many of these peer reviews.

In November 2022, the RAIU were subject to a peer review; its scope covered: organisation; investigation activities and processes; staff training; resources; handling safety recommendations. The findings of the report were issued in December 2022. Four areas of improvement were identified as; three of these were addressed in 2023 with one outstanding, namely: “Accelerate the process of concluding of creating an Memorandum of Understanding (MoU), that defines the on-site working arrangements, between the RAIU and An Garda Síochána”. Work on progressing the MoU continued through 2024.

Of note, one of the other areas of improvement identified was that the “NIB should take steps to include in the contingency planning some arrangements in place about who will act as Chief Investigator in case that the Chief Investigator would be ill or unavailable”. At the start of 2023, a Deputy Chief Investigator was nominated; and in the last quarter of 2024, with the Chief Investigator unavailable, the Deputy Chief Investigator was the Acting Chief Investigator for the RAIU.

Investigation Activities

Investigation Activities

Notification of incidents and accidents to the RAIU

The RAIU must be notified of railway incidents and accidents, either through immediate notification; monthly bulk notifications (see Appendix 2 for schedules); or the reporting after the death of an individual within thirty days of an accident. The RAIU also receive the daily incident reports (DIRs) from IÉ.

In terms of immediate notification of an incident or accident (and in some instances a monthly bulk notification), the on-call investigator will carry out a preliminary examination and create a PER.

In 2024, the RAIU continued reviewing the DIRs from IÉ; in some instances, a preliminary examination was conducted as a result of information received in the DIRs and a PER created.

PERs include information on who and when reported the occurrence; details of the occurrence (including the relevant asset information, times, locations and relevant parties); the categorisation of the occurrence (see Appendix 3); and the RAIU decision on whether a full investigation is warranted.

In 2024, the RAIU compiled sixty-six PERs.

IÉ Notifications

IÉ 2024 Daily Incident Reports

IÉ circulate the DIRs, for the previous day, to the RAIU every morning. The RAIU review and log these occurrences.

In 2024, IÉ reported 7,859 incidents through the DIRs, of these, 804 incidents were related to anti-social behaviour and another 850 were related to trespass occurrences onto the railway line/ premises. A further 123 incidents of passenger illness, injury and emotional distress not involving moving trains were also recorded.

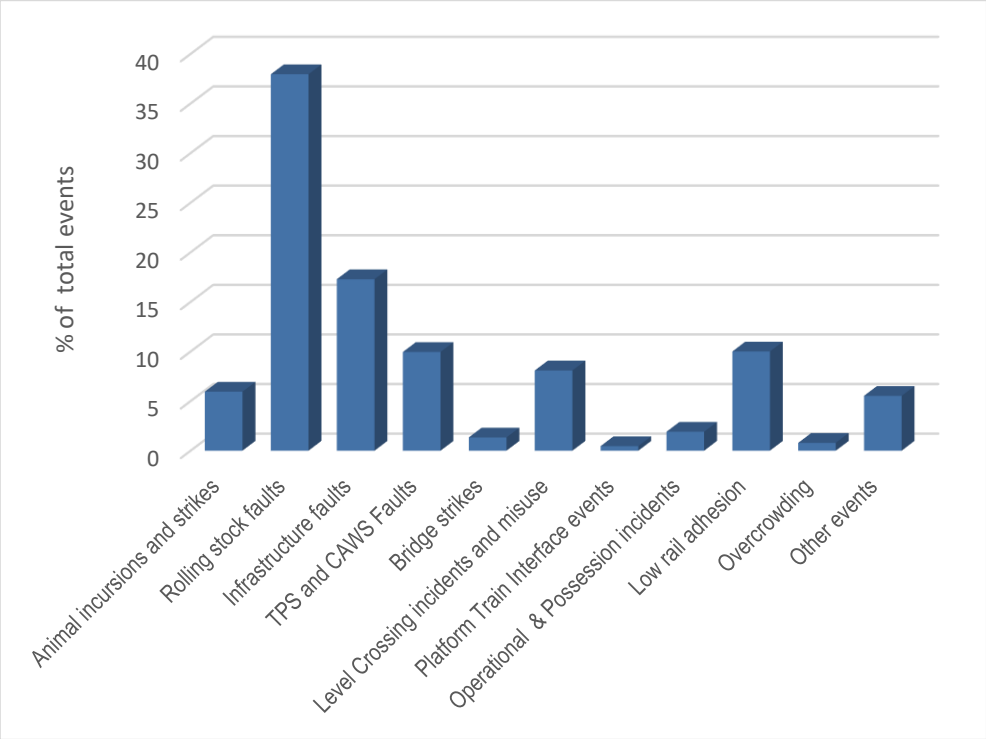
Excluding the anti-social behaviour and trespass incidents and the passenger illness, injuries and emotional distress events (not involving moving trains) there are 6,082 incidents. Starting with the largest, the RAIU have categorised the incidents as follows:

- 2,308 (38%) rolling stock faults – these can range from minor issues such as faulty air conditioning to more serious incidents such as underframe fires or wheelset damage);
- 1,051 (17%) Infrastructure faults and issues – these range from minor infrastructure faults such as reports of poor drainage to broken rails and failing structures to broken rails and signalling equipment failures and objects on the line;
- 608 (10%) Low Rail Adhesion (LRA) events – these events are reported events where low adhesion affects traction or braking and could have had an impact on safety in different circumstances, but no operational incident occurred. Note: incidents with an actual safety incident outcome are categorised elsewhere under operational incidents;
- 605 (10%) Train Protection System (TPS) and Continuous Automatic Warning System (CAWS) faults – these can range from reports of momentary loss of CAWS code to total failures of the system with almost all system events involve “right side” or “fail to safe”. These systems are shared between train and infrastructure and the cause is not immediately apparent at the time of recording in the logs;
- 492 (8%) Level crossing incidents – these include minor non-compliance events such as level crossing gates left open at user worked unattended level crossings through to damage to crossing barriers, near miss events and collisions between trains and road vehicles;
- 362 (6%) animal incursions – these include all reported animal incursions and collisions with animals, ranging from small animals such as dogs through to deer and cattle at the higher risk end;
- 336 (6%) other occurrences – these are a wide range of incidents which do not meet the other RAIU categories. These range from events of limited direct safety consequence e.g. late hand back of engineering possessions through to staff injuries in the workplace;
- 116 (2%) operational and possession incidents (2%) – these range from events with limited safety impact such as “fail to call events” by passenger trains to incidents such as higher consequence events such as near misses with staff;

- 81 (1%) bridge strikes – these range from contact with sacrificial beams or minor contact with the bridge deck, arch or parapet to serious damage resulting in line closure;
- 48 (1%) overcrowding events – these range from discomfort due to limited seat availability through to platform closures for safety reasons;
- 28 (<1%) platform train interface (PTI) events– injuries and mishaps to passengers boarding and alighting from trains not in motion, ranging from staff rendering assistance through to passengers requiring hospital attention.

The above figures are presented in the bar chart below:

2024 DIR incidents by RAIU category



IÉ 2024 Preliminary Examination Reports

PERs from 1st January 2024 to 31st December 2024

Date of occurrence	Location of Occurrence	Classification of Occurrence	Classification subset	Summary	Fatalities/ Injuries
11 January 2024	Mosney, Meath	Serious Accident	To persons due to rolling stock in motion	A male accessed the railway from an embankment and placed themselves in a position of danger before being struck by a train and fatally injured.	**1 Fatality** due to apparent self-harm
09 February 2024	Carrick-on-Suir, Tipperary	Incident	Traffic Operations & Management	An RRV passed through Level Crossing XL143, without obtaining permission from the level crossing control operative (LCCO) in Mallow, resulting in a Signal Passed at Danger (SPAD) without authority.	0
09 February 2024	Phoenix Park Tunnel, Dublin	Incident	Infrastructure	Persistent rain resulted in an embankment slip near overbridge (OB) 004. As an empty Intercity Railcar (ICR) approached, the driver saw the earth and stopped the train.	0
10 February 2024	Donabate Station, Dublin	Serious Accident	To persons due to rolling stock in motion	A person intentionally stepped off the station platform and placed themselves in a position of danger before being struck by a train and fatally injured.	**1 Fatality** due to apparent self-harm
15 February 2024	Raheny Station, Dublin	Accident	To persons due to rolling stock in motion	A person intentionally stepped off the station platform and placed themselves in a position of danger before being struck by a train and injured.	**1 Injury** due to apparent self-harm
03 March 2024	M3 Parkway, Dublin	Incident	Rolling Stock	As a train was dispatching from M3 Parkway, a door interlock light remained illuminated whilst a door was open. The cause was found to be incorrect labelling of wires during maintenance.	0
05 March 2024	Clongriffin, Dublin	Serious Accident	To persons due to rolling stock in motion	A person intentionally stepped off the station platform and placed themselves in a position of danger before being struck by a train and fatally injured.	**1 Fatality** due to apparent self-harm
08 March 2024	Athenry, Galway	Accident	Collision	An RRV dumper, whilst travelling in a worksite, failed to stop and struck an RRV excavator, the Person in Charge- RRV (PIC-RRV) sustained minor injuries. The RAIU have commenced a full investigation into this accident (see page 37 and 38 for further information).	**1 Injury** to PIC-RRV
28 March 2024	Lisduff, Laois	Incident	Traffic Operations & Management	On activation of a Hot Axle Box Detector (HABD) alarm, a signalman granted signal protection for the driver to carry out the necessary checks, resulting in the driver exiting the train; however, another train was also in the section, but came to a stop as a result of an abnormal CAWS downgrade. The RAIU are conducting a full investigation into the incident (see pages 39 and 40 for further information).	0
22 April 2024	Bray Head, Wicklow	Incident	Rolling Stock	Gorse fires were reported at Bray Head after the passage of a steam hauled charter train. The fire caused damage to the overhead line equipment (OHLE) and signalling cables. It was determined that there was a gap in the locomotive spark arrestor, may have allowed sparks to land on the gorse which likely caused the lineside fire.	0

Date of occurrence	Location of occurrence	Classification of occurrence	Classification subset	Summary	Fatalities/ Injuries
01 May 2024	Clontarf, Dublin	Incident	Traffic Operations & Management	A CTC signalman granted signal protection to a Person In Charge of the Possession (PICOP) to allow possession protection to be placed for a T3 Possession, however, there was a train in the section, approaching the location of the Handsignalman; the Handsignalman saw the approaching train and remained in a place of safety. The RAIU are conducting a full investigation (see pages 41 and 42 for further information).	0
30 May 2024	Sutton, Dublin	Accident	Others	A vehicle collided with barriers at LC XQ002, striking and dislodging the barriers and damaging the associated infrastructure. The vehicle continued through the crossing and collided with a stationary road vehicle before veering into a wall and coming to a stop. The vehicle was being pursued by An Garda Síochána at the time. A DART train approaching, stopped short of the level crossing.	0
30 May 2024	Charleville, Cork	Accident	Derailment	A PIC-RRV instructed a RRV Operator (RRVO) to on-track and left the location. The RRVO on-tracked and proceeded to the worksite. During the movement, the RRV travelled over points that were not set of the movement and derailed.	0
30 May 2024	Howth, Dublin	Accident	To persons due to rolling stock in motion	A person intentionally stepped off the station platform and placed themselves in a position of danger before being struck by a train and injured.	**1 Injury** due to apparent self-harm
06 June 2024	Clondalkin, Dublin	Accident	Fire	On a report of smoke from a train, the train driver saw smoke coming from the location of the bogie. The driver applied the fire extinguisher and the fire was extinguished. The passengers were detrained to Clondalkin Station with the assistance of the fire brigade. On inspection it was found that there was an air leak in the piston of the brake calliper which caused the brake pads to engage on the brake disc causing the disc to overheat and cause the fire.	0
10 June 2024	Thurles, Tipperary	Accident	Collision	Four RRVs were travelling in convoy when the third RRV collided with the fourth RRV, resulting in a broken windscreen to the fourth RRV.	0
12 June 2024	Ballycollin, Offaly	Accident	Derailment	During the installation of strail units into the five foot for enabling works, an RRV excavator derailed and toppled down an embankment with the RRVO receiving injuries to his hand. The RAIU are conducting a full investigation into the accident (see page 41).	**1 Injury** to RRVO
19 June 2024	Killester, Dublin	Serious Accident	To persons due to rolling stock in motion	A person intentionally placed themselves in a position of danger before being struck by a train and injured.	**1 Fatality** due to apparent self-harm
19 June 2024	Woodlawn, Galway	Accident	Derailment	Two RRV excavators were travelling in convoy when the clam shell bucket became unsecured, feel into the five foot, with the RRV's leading wheel striking the attachment and derailing the RRV.	0
01 July 2024	Leixlip, Kildare	Serious Accident	To persons due to rolling stock in motion	A person intentionally walked down the station platform ramp and placed themselves in a position of danger before being struck by a train and fatally injured.	**1 Fatality** due to apparent self-harm
28 July 2024	Inchicore Works, Dublin	Accident	Derailment	A ballast wagon derailed as it transversed a set of hand points, on inspection, the track geometry in the location was found to be poor.	0

Date of occurrence	Location of occurrence	Classification of occurrence	Classification subset	Summary	Fatalities/ Injuries
13 August 2024	Keelogues, Mayo	Incident	Traffic Operations & Management	Signalling, Electrical and Telecommunications (SET) staff were working at LC XX011. LC XX011 remained in "local" control as the SET staff, once finished working, did not inform the LCCO that they were finished. As a freight train from Ballina to Waterford was approaching Signal XX011US, it was displaying a red signal, as the signal was not cleared by the LCCO, due to no alert initiating in the Level Crossing Control Centre (LCCC). The driver of the freight service did not obey the red signal and passed Signal XX011US at danger, without authority, by a length of the locomotive and two wagons, but not onto the level crossing. The SPAD has a risk ranking of sixteen (medium). The RAIU are conducting a full investigation into the incident (see page 44 for further information).	0
20 August 2024	Inchicore Works, Dublin	Accident	Derailment	During a shunt movement in Inchicore Works, a locomotive derailed (one axle only) on handpoints in the vicinity of the paint shop, the track geometry in the location was found to be poor.	0
04 September 2024	Ballinasloe, Galway	Accident	To person due to rolling stock in motion	A person walked off the platform at Ballinasloe Station and passed LC XG125, where they lay down on the railway line as a train approached, and was struck and seriously injured by the train.	**1 Injury** due to apparent self-harm
10 September 2024	North Esk, Cork	Accident	To person due to rolling stock in motion	As a PIC-RRV was uncoupling a trailer from an RRV excavator, the RRV excavator made a movement, without the instruction of a PIC-RRV and struck the PIC-RRV, causing injurie to his leg.	**1 Injury** to PIC-RRV
11 September 2024	Longwood, Meath	Serious Accident	To person due to rolling stock in motion	A person reportedly ran in front of a train and was fatally injured on the Mullingar to Enfield section of line.	**1 Fatality** due to apparent self-harm
14 September 2024	Thurles, Tipperary	Accident	Derailment	During RRV side casting ballast works, an RRV Dumper off-tracked from the Up Line and on-tracked onto the Down Line. After the on-tracking had been completed the steering locking pin had not been replaced, as is required, and during the next side casting undertaken by the RRV, the front rail wheels of the RRV to derailed.	0
20 September 2024	Inchicore Works, Dublin	Accident	Derailment	During driver training, the leading axle of the rear bogie of a locomotive derailed as the movement traversed handpoints the track geometry in the location was found to be poor.	0
27 September 2024	Ballysadare, Sligo	Serious Accident	To person due to rolling stock in motion	A person intentionally placed themselves in a position of danger and was struck by a train and fatally injured near Ballysadare.	**1 Fatality** due to apparent self-harm
30 September 2024	Newbridge Station, Kildare	Serious Accident	To person due to rolling stock in motion	A person intentionally placed themselves in a position of danger and was struck by a train and fatally injured near Newbridge Station.	**1 Fatality** due to apparent self-harm
11 October 2024	Killiney, Dublin	Incident	Others	There was a reported near miss between a train a SET members of staff near Killiney Station, the near miss could not be verified due to conflicting statement, however, the RAIU are conducting a full investigation, based on a number of reported near misses with members of staff (see page 46 for further information).	0

Date of occurrence	Location of occurrence	Classification of occurrence	Classification subset	Summary	Fatalities/ Injuries
16 October 2024	Glenageary, Dublin	Serious Accident	To person due to rolling stock in motion	A person deliberately accessed the line from Glenageary Station and placed themselves in a position of danger, before being struck by a train and fatally injured.	**1 Fatality** due to apparent self-harm
21 October 2024	Lavistown, Kilkenny	Incident	Others	A driver reported that the barriers at LC XW090 at Lavistown were raised slightly as he passed through. After the train passed through the level crossing without incident, the lineside train signals did not return to red/danger. Athlone LCCC were alerted but they had no indication of any irregularity; but placed the level crossing into "local" control. Due to the season, there appears that there was a build-up of leaves on the line resulting in railhead contamination, the rail heads were cleaned.	0
21 October 2024	Ashtown Station, Dublin	Accident	To persons due to rolling stock in motion	A person deliberately accessed the railway line from the platform ramp and placed themselves in a position of danger and was struck and injured by a train.	**1 Injury** due to apparent self-harm
03 November 2024	Moherevan, Leitrim	Incident	Infrastructure	A driver contacted the Signalman Centralised Traffic Control (CTC) to reported that they had stopped the train near Signal SLR808 and there was a crack in the rail between 89 ¼ and 89 MP at Moherevan. It was discovered there were issued with the rail tensors during thermit welding at that location on the 10th October 2024.	0
03 November 2024	Hazelhatch, Dublin	Serious Accident	To persons due to rolling stock in motion	A person deliberately accessed the railway line from the platform ramp and placed themselves in a position of danger and was struck by a train and fatality injured.	**1 Fatality** due to apparent self-harm
11 November 2024	Greystones, Wicklow	Incident	Others	There had been planned SET works taking place at Greystones involving the replacement of transformers for the Greystones to Arklow interlocking and the Gorey to Rosslare interlocking. After this work was completed the Gorey to Rosslare was rebooted and returned to service however when the Greystones to Arklow interlocking was rebooted issues arose which led to the Rosslare Line Signalman being unable to operate the signalling system. This resulted in the cessation of train services south of Greystones for a period of just over six hours.	0
12 November 2024	Belvelly Viaduct, Cork	Accident	Derailment	During a T3 possession between Cork, Cobh and Midleton an RRV excavator (travelling with an RRVO and PIC-RRV was passing over Underbridge Cork (UBC) 422 at Belvelly when its front rail wheel struck a metal upright that forms part of the structure of UBC 422 and derailed.	0
23 November 2024	Sarsfield Road, Dublin	Incident	Others	A passenger on a train operated an emergency door release while the train was in motion, resulting in the application of an emergency brake; once stopped, the passenger exited the train onto the railway.	0

Date of occurrence	Location of occurrence	Classification of occurrence	Classification subset	Summary	Fatalities/ Injuries
25 November 2024	Lisduff	Accident	Others (Rolling Stock)	IÉ-RU reported that class 22000 ICR Diesel Multiple Unit (DMU) vehicle 22646 (unit 22046) was missing the cardan shaft between the powerpack and bogie final drive. The gearbox had also suffered major damage along with underframe equipment on other vehicles. On further investigation it was identified that it was likely that the cardan shaft had become detached the previous day when in service when multiple faults had become apparent on another powerpack, which it was subsequently identified had suffered impact damage. The defective vehicle had the relevant powerpack isolated three days previously which inhibited alarms to the driver from the transmission. The RAIU are conducting a full investigation into the accident (see page 47 for further information).	0
26 November 2024	Killarney, Kerry	Serious Accident	To persons due to rolling stock in motion	A person deliberately accessed the railway line from the platform ramp and placed themselves in a position of danger and was struck and injured by a train.	**1 Fatality** due to apparent self-harm
09 December 2024	Dromkeen, Limerick,	Incident	Infrastructure	A signalman saw that a track section remained occupied after the passage of a train and reported to SET, who found a broken rail, the weld had been dropped two nights previous.	0
10 December 2024	Boyle, Roscommon	Incident	Traffic Operations & Management	A driver became distracted by a few circumstances on their approach to Boyle Station and failed to apply the DRA after stopping at the station, despite seeing that the signal ahead of them was at danger. On departing the station, the driver failed to locate the signal and passed the signal at danger. The driver was contacted by the signalman and the train stopped.	0
24 December 2024	Newbridge Station, Kildare	Accident	Fires	At 14:40 hrs the driver of Newbridge to Grand Canal Dock passenger service (Train P412) reported a fire coming from the engine of ICR 22226 stabled in the Bay Platform of Newbridge Station waiting to come into service. Services were suspended, fire services attended and the fire was extinguished.	0

Categorisation of IÉ-IM & IÉ-RU Preliminary Examination Reports

Introduction

In 2024, the RAIU completed forty-four PERs in relation to occurrences reported by IÉ-IM and IÉ-RU.

The following is a compilation of the categories of PERs related IÉ-IM and IÉ-RU occurrences.

Serious accidents and accidents to persons due to rolling stock in motion

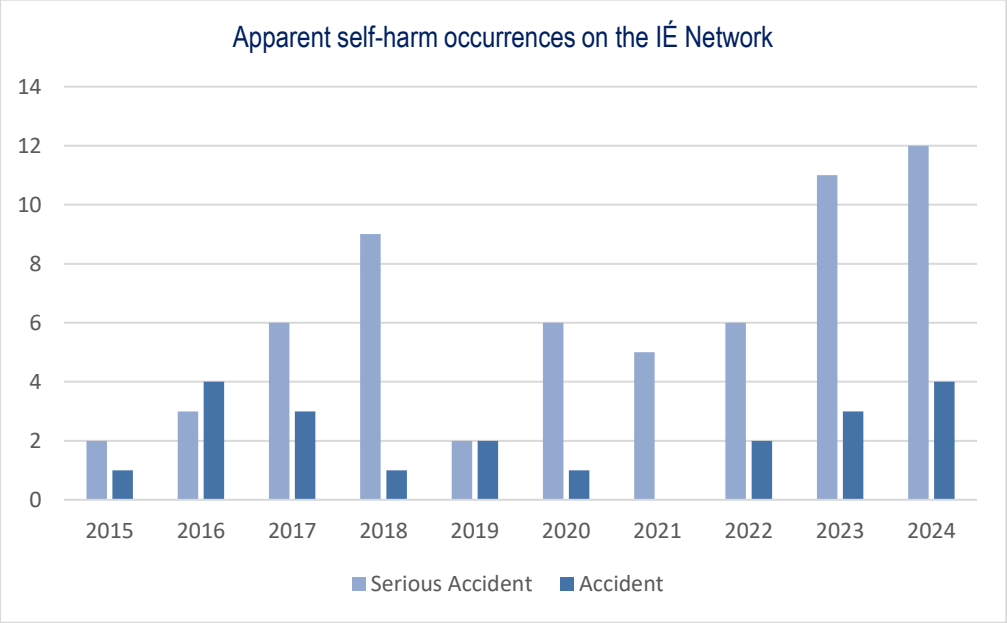
Workplace accidents

There was a single workplace accident to person due to rolling stock in motion in 2024 involving a person becoming trapped during a coupling operation at North Esk. There were also a number of near misses between staff and trains.

Apparent self-harm serious accident and accidents on the IÉ Network

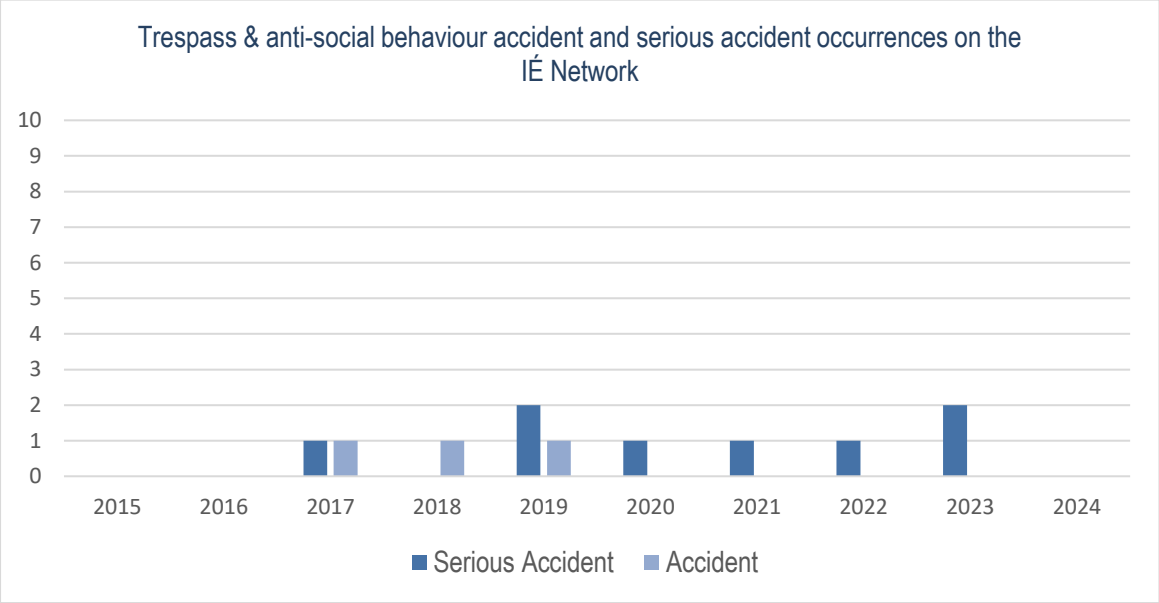
In general, the RAIU do not conduct a full investigation into occurrences related to apparent self-harm as a full investigation is unlikely to result in any safety recommendations to prevent similar occurrences in the future.

In 2024, there were twelve reported serious accidents (fatalities) and four accidents (non-fatal) as a result of apparent self-harm occurrences on the IÉ network. The figures below indicate no significant downward trend in the number of self-harm occurrences in 2024 and the previous ten-year period.



Trespass onto the IÉ Network

There were no reported fatalities as a result of trespass on the IÉ network in 2024, excluding events where self-harm was the motive, with the previous six years indicating low numbers. However, trespass events without accidents remained at a similar level.



Platform Train Interface

There was one other injury as a result of a platform interface occurrence, related to anti-social behaviour.

Traffic operations & management

General reporting

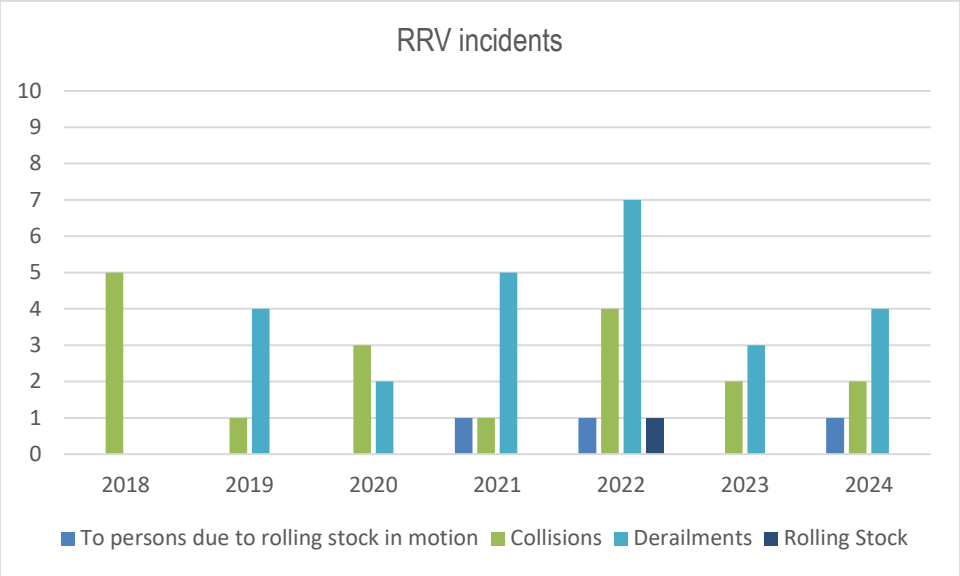
In 2024 there were five incidents related to traffic operations and management reported, these included:

- Two incidents relating to granting protection to staff on the line;
- Two SPADs;
- One incursion of an RRV onto a level crossing with the barriers open to road traffic.

RRV accidents on the IÉ network (derailments and collisions)

In terms of RRV incidents in 202, there were seven incidents, consisting of four derailments and two collisions and an entrapment incident. This represents an increase on 2023, but a reduction on occurrences from 2022, when thirteen incidents were reported.

IÉ-IM have been notifying the RAIU of RRV occurrences since 2018, see figures below.



Due to the potentially serious nature of the incidents reported, the RAIU opened investigations into the Collision between RRVs between Athenry and Galway, the excavator derailment and overturning at Ballycollin and the entrapment of a member of staff between an RRV and trailer at North Esk.

The RAIU will continue to assess RRV accidents and incidents on an individual basis and conduct a full investigation, when warranted.

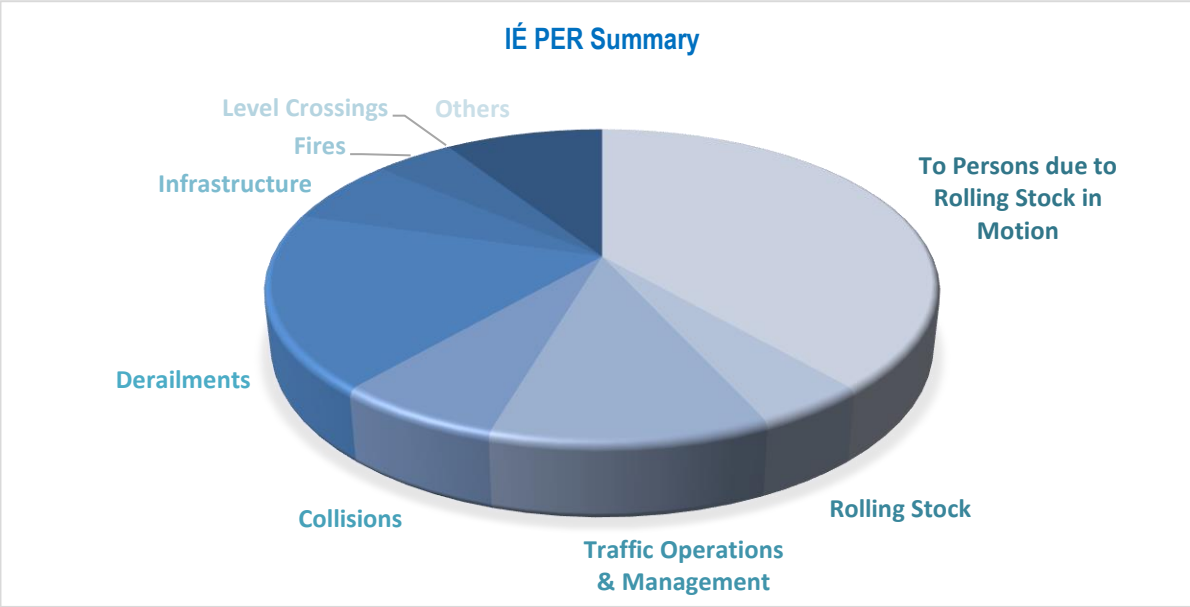
Other occurrences on the IÉ network

In terms of the other occurrences on the IÉ network in 2024, these included:

- Three infrastructure occurrences (two broken rails and one landslip/ subsidence);
- Three derailments – all in sidings;
- Two unplanned line closures over six hours;
- The detachment of a cardan shaft on an ICR railcar (which is subject to investigation by the RAU)
- Two fires on rolling stock – both on train underframes;
- Other events including a vehicle pursued by An Síochána deliberately driven on to a level crossing as train approached.

Summary of PERs

The pie chart below shows the percentages, in terms of categories, of the PERs for IÉ:



IÉ 2024 Monthly Bulk Notifications

The monthly bulk notifications (not including immediate notifications) for IÉ (IÉ-IM & IÉ-RU) are as follows:

Month / ID	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	
2.01 Unexpected failures of assets that led to an unsafe condition													
2.02 Unintentional divisions of rolling stock released for service													
2.03 SPADs with no risk of conflicting movements		1					2	3	1	1	1		9
2.04 Fires, smoke or explosions on rolling stock not requiring the evacuation of passengers	3	4	1	1	1	1	1	4		1	1	1	19
2.05 Collisions with large objects or large animals	12	4	3	14	8	14	5	4	21	23	9	22	139
2.06 Non railway vehicles damaging or fouling a railway line													
2.07 Collisions between light rail vehicles and road vehicles													
2.08 Any other occurrence where an investigation remit has been issued internally		1			1				1	1	1	2	7
Total	15	10	4	15	10	15	3	11	24	26	12	25	174

The majority of occurrences related to collisions with objects or animals, this number increasing from 2023 (which was reported to be 107 events). Within this category wild deer and trees blown on to the line in weather events account for a large proportion of the reports. Instances of fire, smoke and explosions not requiring train evacuation also increased significantly to nineteen in 2024, from eleven in 2023.

In terms of SPADs, nine were reported in 2024, representing a slight decrease from the ten reported in 2023. The RAIU will continue assess incidents of SPADs on an individual basis and where an investigation is warranted, an investigation will be commenced e.g. the investigation of “Dangerous occurrence involving a Signal Passed at Danger at Keelogues level crossing, 13th August 2024”.

TDLR Notifications

TDLR 2024 Preliminary Examination Reports

PERs from 1st January 2024 to 31st December 2024

Date of occurrence	Location of Occurrence	Classification of Occurrence	Classification subset	Summary	Fatalities/ Injuries
13 March 2024	Mayor Square, Dublin	Accident	To persons due to rolling stock in motion	A male jumped into the side of a tram at Mayor Square Stop in an apparent attempt of self-harm.	**1 Injury** due to apparent self-harm
25 March 2024	Mayor Square, Dublin	Accident	To persons due to rolling stock in motion	A cyclist breached the traffic lights at the junction of Mayor Square and Guild Street, on seeing the tram, the cyclist applied the brakes and went over the handlebars, striking the tram and suffered minor injuries.	**1 Injury**
16 April 2024	Queens/ Benburb St, Dublin	Accident	Collision	A van breached the traffic lights at the junction of Queens St and Benburb Street and collided with a tram which was travelling through the junction. The van driver, tram driver and a small number of passengers were taken to hospital with minor injuries.	**Multiple** minor injuries
23 April 2024	Chancery/ Arran St, Dublin	Accident	Collision	A car breached the traffic lights at the junction of Chancery Street and Arran Street, colliding with a tram which was travelling through the junction. The car driver was taken to hospital with injuries.	**1 Injury** to car driver
24 April 2024	Dawson Street, Dublin	Accident	To persons due to rolling stock in motion	A pedestrian stepped from the footpath at Dawson Street and into the path of an oncoming tram. The pedestrian received minor injuries but declined treatment.	**1 Injury** to pedestrian
26 April 2024	Sandyford Depot, Dublin	Accident	Others	A tram driver entered Sandyford depot, without the required permissions from LNMC; on travelling into the depot, the driver realised the route was not set for the movement resulting in a wrong directional movement. It incident was initially reported as a derailment, however, the tram did not derail.	0
25 May 2024	Kingswood, Dublin	Accident	To persons due to rolling stock in motion	As a tram was approaching Kingswood Stop, a pedestrian stepped into the path of the tram at the crossing at the end of the platform without looking and was struck by the tram, resulting in minor injuries.	**1 Injury** to pedestrian
29 May 2024	Tallaght Hospital, Dublin	Accident	Collision	A car breached the traffic lights at the junction of Cookstown Way and Tallaght Hospital, colliding with a tram which was travelling through the junction. The car left the scene of the accident.	0
03 June 2024	Broombridge, Dublin	Incident	Traffic Operations & Management	A Traffic Supervisor at Luas Network Management Centre (LNMC) allowed the movement of a tram (performing depot moves) into the de-energised section as they were unaware the breaker had opened before the tram came to a stop. It was determined that the lid of a refuse bin struck the emergency stop button earlier in the shift, causing the de-energisation of the section of track.	0
01 July 2024	Dominic/ Dorset St, Dublin	Accident	Collision	A motorcycle breached the traffic lights at the junction of Dominic Street and Dorst Street, colliding with a tram which was travelling through the junction. The motorcycle driver was taken to hospital with a suspected broken wrist.	**1 Injury** to motorcyclist

Date of occurrence	Location of occurrence	Classification of occurrence	Classification subset	Summary	Fatalities/ Injuries
20 July 2024	Ballyogan Wood, Dublin	Incident	Energy	LNMC received reports of arcing from a tram's pantograph at Central Park, followed by a similar report from Ballally. A third report of a "bang" from tram near Ballyogan Wood identified a defective Overhead Contact System (OCS) bond at that location causing arcing damage.	**2 Injuries** to tram driver and passenger
22 July 2024	Red Cow Depot, Dublin	Incident	Energy	During planned OCS maintenance works in the depot, during a tram movement a pantograph electrically bridged the live section from the shed to the isolated section being worked on through the section insulator. There were no track isolation information boards present at the entrance to the isolated section.	0
08 August 2024	Red Cow Depot, Dublin	Incident	Rolling Stock	A driver smelt burning on a tram and the tram was returned to the depot, Upon investigation in the depot it was found that the wheel fixings of one wheel on the MIC bogie had failed, leading to metal on metal contact and the burning smell. This is a result of a known design fault where controls have been introduced to mitigate the risks of derailment.	0
16 August 2024	St James's Hospital, Dublin	Accident	To person due to rolling stock in motion	TDLR authorised officers, and a member of hospital staff, came to the assistance of a pedestrian who fell outside St James's Hospital. As the tram passed through the stop, one of the authorised officers positioned themselves between the tram and the person who fell, which was within the swept path of the tram, and was struck by the tram.	0
09 October 2024	Dawson Street, Dublin	Accident	To person due to rolling stock in motion	A cyclist on Dawson Street collided with the side of a tram in motion after their front wheel became caught in the tramway rail flange groove; this caused them to fall into a tram passing on the adjacent line resulting in minor injuries.	**1 Injury** to cyclist
11 October 2024	Stillorgan, Dublin	Accident	To person due to rolling stock in motion	A cyclist collided with a tram near Stillorgan Stop, resulting in minor injuries. The cyclist stated that they were blinded by the sunlight on approach to the tram line.	**1 Injury** to cyclist
28 October 2024	Cheeverstown Dublin	Accident	Collision	A truck breached the traffic lights at Cheeverstown, colliding with a tram. A tram passenger was brought to hospital as a pre-caution.	**1 Injury** to tram passenger
07 November 2024	George's Dock, Dublin	Accident	Collision	A scooter stopped in the tramway before being struck by an approaching tram, which had a proceed signal, the scooter driver was taken to hospital for minor injuries.	**1 Injury** to scooter driver
05 December 2024	Sandyford Depot, Dublin	Incident	Rolling Stock	TDLR initially reported a crack in a steel wheel hub when a life expired tyre was removed from the wheel as planned maintenance; however, subsequent testing showed that the crack was a scratch.	0

Categorisation of TDLR Preliminary Examination Reports

Introduction

In 2024, the RAIU completed nineteen PERs in relation to occurrences reported by TDLR.

The following is a compilation of the categories of PERs related TDLR occurrences.

To Persons due to Rolling Stock in Motion

In 2024, there were no serious accidents (fatalities) related to Luas movements.

In 2024, there were seven accidents related to person due to rolling stock in motion:

- Four were related to pedestrian incursions onto the tram line in non-segregated areas;
- One was due to apparent self-harm;
- One was a pedal cyclist who collided with a tram;
- One was a pedal cyclist who collided with the side of the tram when their front wheel got caught in the tramway rail flange groove.

In relation to apparent self-harm injuries, these remain low, with five occurring in the previous six years, one being fatal.

In terms of the other occurrences, the 2024 figures are the highest numbers to date as seen in the figure below.

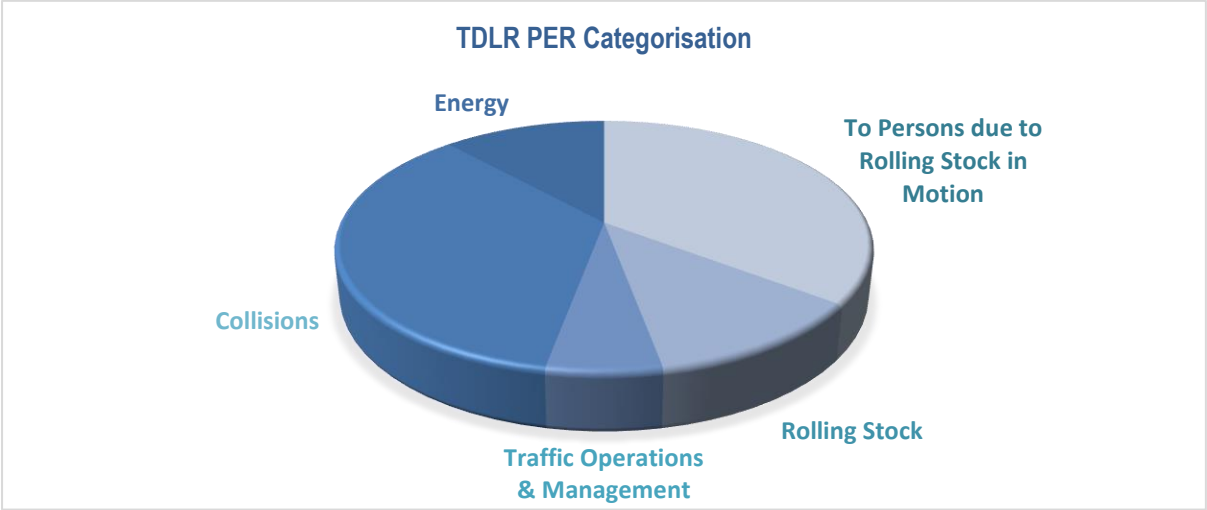
Type & Year	2024	2023	2022	2021	2020	2019	2018	2017
Serious Accident	0	0	0	0	0	1	0	0
Accident	12	4	0	2	2	5	1	3

Other occurrences on the Luas network

In terms of other occurrences on the Luas network in 2024, the notified occurrences are as follows:

- Two rolling stock occurrences (related to wheel faults);
- Six collisions (two road traffic collisions (RTCs) with cars, one RTC with a van, one RTC with a truck, one with motorcycle and one with a motorised scooter);
- One traffic operations and management incident (a tram entering a de-energised section in a depot);
- Two energy incident (defect on an overhead contact system (OCS) at a location causing arcing damage, during planned OCS maintenance in a depot during a tram movement a pantograph electrically bridging the live section to the isolated section);
- One others (Tram entering a depot without the correct route being set causing a wrong directional movement).

The pie chart below shows the percentages, in terms of categories, of the PERs for TDLR.



TDLR 2024 Monthly Bulk Notifications

The monthly bulk notifications (not including immediate notifications) for TDLR are as follows:

Month / ID	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Total
2.01 Unexpected failures of assets that led to an unsafe condition													
2.02 Unintentional divisions of rolling stock released for service													
2.03 SPADs with no risk of conflicting movements	2	2	3	3	4	1	1	2	1		3	3	25
2.04 Fires, smoke or explosions on rolling stock not requiring the evacuation of passengers													
2.05 Collisions with large objects or large animals													
2.06 Non railway vehicles damaging or fouling a railway line	1		3					1	1	4	2		12
2.07 Collisions between light rail vehicles and road vehicles	4	2	2	3	3	4	3	1		7	2	4	35
2.08 Any other occurrence where an investigation remit has been issued internally													
Other occurrences Involving contact with pedestrians.	5	4	9	2	4	4	5	5		4	4	6	52
Other occurrences Involving contact with cyclists.	3	3	2	1	1	1	1			2			14
Other occurrences involving E-scooters	1	1	1								1		4
2.13 any occurrences Involving anti-social behaviour e.g. scutting.									1				1
Other occurrences Any other occurrences (Trespass, impact with object, wrong side opening, wrong platform, de-energised zone, others).	2				10	9	5	6	16	9	4	7	68
Total	18	12	20	9	22	19	15	15	19	26	16	20	211

The total of 211, is higher than the 2023 number of 193 occurrences.

Half the occurrences (105 occurrences) related to contact with pedestrians, road vehicles, cyclists and e-scooters, this is an increase from 2023 (ninety-eight occurrences).

Notification from other railway organisations

There were three incidents notified in 2024 by other railway organisations. One incident occurred on IÉ Infrastructure (staff injury to Rhomberg Sersa staff), with the other two incidents occurring on heritage railways.

Reporting Railway Body*	Date of occurrence	Location of Occurrence	Classification of Occurrence	Classification subset	Summary	Fatalities/ Injuries
Waterford & Suir Valley Railway	11 January 2024	Kilmeaden, Waterford	Accident	To persons due to rolling stock in motion	During works to move sleepers on a flatbed wagon after Christmas services, a lookout was struck by an overhanging sleeper, which resulted in a broken ankle.	**1 Injury**
Rhomberg Sersa	15 October 2024	Ballinasloe Sidings, Galway	Accident	To persons due to rolling stock in motion	A staff member was working on an track machine (OTM), performing a training activity by simulated fault on the OTM. To check a solenoid, he climbed onto the OTM but slipped and fell off the access point through an opening (a distance of 2.3 m). He struck his head as he fell causing open wounds to his head and was hospitalised.	**1 Injury**
Connemara Railway	17 December 2024	Maam Cross, Connemara, Galway	Accident	Derailment	As the heritage train was carrying out a propelling movement, at a slow speed; the train struck a lamp bracket (which had detached from the train) causing the leading carriage to derail. The train was carrying sixteen passengers.	0

2024 Full Investigations

Full Investigations published in 2024

1st January 2024 to 31st December 2024

The RAIU published three investigation reports in 2024, which resulted in a total of ten new safety recommendations, the investigations are as follows:

- Broken rail, Newbridge, Kildare, 23rd February 2023, RAIU Investigation Report No: 2024-R001; published: 18th January 2024;
- Broken rail near Emly, County Tipperary, 22nd February 2023, RAIU Investigation Report No: 2024-R002; published: 22nd March 2024;
- Collision between a car and a train at Level Crossing XM190, Mayo, 9th September 2023, RAIU Investigation Report No: 2024-R003; published: 12th December 2024.

Broken rail, Newbridge, Kildare, 23rd February 2023

RAIU Investigation Report No: 2024-R001 **Published: 18th January 2024**

On the morning of the 23rd February 2023, a number of trains saw an abnormal CAWS downgrade on the train's in-cab display, with the drivers reporting these abnormal CAWS downgrades to the Mainline Signalman; these drivers were advised to continue and obey lineside signals which were working normally.

The IÉ-IM SET Department were advised, and an SET member of staff was dispatched to site to investigate the suspected fault. The SET staff member discovered a broken rail at 10:52 hrs and trains were stopped on the affected line immediately.

The broken rail was found to have fractured through a flash butt welded joint. The rail had been installed on the 28th January 2023 (five days earlier).

The flash butt welding of the rail had been carried out off-site at IÉ-IM's Portlaoise Rail Welding Plant where rails are joined to make longer "strings" of welded rail.

The mechanism of failure for the broken rail was slag inclusion in the welding process causing a lack of fusion in the toe of the rail foot. The lack of fusion created a cracking initiation point which propagated from that location, probably starting from when the rail was handled or manoeuvred during delivery or installation; the crack then progressed through the remainder of the rail section in a single rapid event due to rapid overload.

The RAIU identified the following possible causal factors (CaF) which may have resulted in the lack of fusion:

- CaF-01 – An interruption to the flash butt welding process;
- CaF-02 – Insufficient cleaning of the rail ends resulting in the inclusion of slag during the flash butt welding process.

The following contributory factor (CoF) was identified, in terms of the cleaning of the rail ends:

- CoF-01 – The current design of the rail end cleaner and the safety barrier restricted effective visual inspection of the rail ends; as a result, it is possible that residual contamination could have gone undetected at this stage.

A systemic factor (SF) related to the cleaning of the rail ends is as follows:

- SF-01 – This risk associated with not cleaning the rail ends adequately was not identified in any risk assessments at Portlaoise Rail Welding Plant; and as such control measures to address these risks have not been identified.

As a result, the RAIU make the following safety recommendations:

- Safety Recommendation 2024001-01 – IÉ-IM should risk assess whether the existing rail end cleaning equipment and processes adequately control the risk of weld contamination and identify improvements where required;
- Safety Recommendation 2024001-02 – IÉ-IM to investigate altering the monitoring and detection parameters of the rail welding machine to be able to identify and highlight possible anomalies in the welding process;
- Safety Recommendation 2024001-03 – IÉ-IM to revise the risk assessments for the Portlaoise Rail Welding Plant to ensure risks in the production process affecting the quality of rail welds are understood and control measures are identified.

Broken rail near Emly, County Tipperary, 22nd February 2023

RAIU Investigation Report No: 2024-R002 **Published: 22nd March 2024**

On Tuesday 21st February 2023 a T3 Possession was organised near Emly Level Crossing on the Dublin to Cork mainline to allow for a track section to undergo track maintenance.

As part of the track maintenance, stressing and welding of the rails had to be undertaken in preparation for ballast cleaning.

The stressing of the rails involved cutting both rails which was marked by an IÉ-IM staff member, the Person in Charge of Stressing (this member of IÉ-IM staff was also the Track Delivery Unit Engineer who supervised the works).

A welding contractor was engaged to carry out the welding at the site location, with a team comprising of a lead and second welder (the Welders) and a Weld Supervisor. Prior to the welding, the Welders placed clamps on either side of the first cut rail section and attached Rail Tensors to pull the rail ends together until the required welders gap was achieved. The rails were then anchored by the CCE Department staff to ensure no movement of the rails, and the rail ends were welded using the Thermit® SoW-5 welding process (to be referred to as Thermit SoW-5); the first weld was "dropped" without issue.

The Welders then placed the clamps on either side of the next cut location and attached the Rail Tensors in order to pull the rails ends together. On the first attempt when pressure was applied by the Rail Tensors the rails did not hold; on the second attempt, the Rail Tensors failed to pull the rail ends together; but, on the third attempt, the rail ends were pulled to the required welders gap. The Welders then waited to make sure the Rail Tensors held and once they were sure it was holding, the CCE staff fastened down the tension clamps to anchor the rails and the Welders dropped the weld without further issue.

The welds were inspected by the Weld Supervisor who was satisfied that there were no visible defects.

When the welds had cooled, the Ultrasonic Operator tested the rails, which passed the ultrasonic tests with no defects identified.

The T3 Possession was handed back by the PICOP at 05:00 hrs on Tuesday the 21st February 2023 and normal service resumed on the Up line. A total of twenty-four passenger service trains passed the section on Tuesday and Wednesday morning until the fault was detected.

On Wednesday 22nd February 2023, at 07:56 hrs, the Signalman at CTC saw that a track circuit (LJ789 on the Up line, near Emly Level Crossing) remained occupied after the 07:00 hrs passenger service from Cork to Heuston (Train A205) passed through the location.

The Signalman contacted the driver of Train A205 (Driver A205) to ensure the train had passed safely through the affected section of line.

At 07:57 hrs the Signalman confirmed with Mallow LCCC that there was no fault with the signalling equipment at Emly Level Crossing.

At 07:59 hrs the Signalman contacted the SET Department to report the track circuit fault. SET staff members deployed to the location, and checked a number of SET location cases near the location of the fault; before walking the track and finding a broken rail, at the 110 miles 355 yards (the location of the welded rail), at 10:35 hrs.

Just as the SET staff member had discovered the broken rail a train was approaching on the Up line. It was the 09:25 hrs passenger service from Cork to Heuston (Train A209) travelling under caution. The SET staff member stepped out to a position of safety and signalled the train to stop. Train A209 travelled over the broken rail before coming to a stop.

The SET member spoke to the driver of Train A209 (Driver A209) and told them the fault was a broken rail and the train had travelled over it. Driver A209 notified the Signalman of the broken rail and resumed their journey.

The Signalman contacted the SET staff member who confirmed that the track circuit fault was as a result of a broken rail. The Signalman took the appropriate actions and signal protection was put in place on the Up line.

The Signalman contacted the Permanent Way Inspector (PWI) who confirmed that they had been notified of the broken rail. The PWI attended the site of the broken rail, and the rail was clamped and plated. The line re-opened at 11:30 hrs with an Emergency Speed Restriction (ESR) of 10 miles per hour (mph) (16 kilometres per hour (km/h)) in place until later that night, when the repairs were undertaken. The ESR was lifted, and normal passenger service resumed at 05:30 hrs on Thursday the 23rd February 2023.

A post-incident metallurgical examination of the weld found that the weld broke rapidly from defects introduced during Thermit SoW-5. The position of the defects was within the last areas to solidify (the centre of the weld) with the appearance indicating that the defects were likely to be either a hot tear or shrinkage. However, given the difficulties encountered by the Welders with the Rail Tensors, it was more likely as a result of a hot tear.

The RAIU have identified the following possible causal factor to the defective weld:

- CaF-01 – The Rail Tensors did not operate correctly at the time of welding, resulting in the Welders encountering difficulties pulling and holding the rail ends to the required welders gap; which may have caused the Rail Tensors to release enough holding pressure to cause a hot tear in the weld.

There were no contributory factors identified.

The following was identified as a systemic factor:

- SF-01 – Technical Standard for the Stressing of Rail, CCE-TMS-323 did not include guidance on actions for welders to take once difficulties were encountered with the Rail Tensors.

Although not a factor to the incident, the RAIU make the following additional observations:

- AO-01 – There are inconsistencies throughout the suite of documents related to Thermit Welding Work Instructions I-PWY-1220 e.g. the welders gap has not been updated in all therelevant documents;
- AO-02 – CCE-TMS-323 requires that the Rail Tensors should remain in place after the weld has been dropped for thirty minutes; however, there is no guidance on how often the Person in Charge of Stressing should check the Rail Tensors within this period of time;
- AO-03 – The Continuous Welder Rail (CWR) Record Sheet (included in the appendices of CCE-TMS-323) has no sections for the Person in Charge of Stressing to recording the following:
    - Serial number or calibration/ recalibration date of the Rail Tensors being used;
    - Pressure gauges readings before, during and after Thermit SoW-5;
    - Periodic time intervals the Person in Charge of Stressing should check the pressure gauges;
- AO-04 – There is no guidance or training for the Person in Charge of Stressing in CCETMS-323 in relation to actions to be taken where difficulties are encountered with Thermit SoW-5 (including when Thermit SoW-5 can continue, be restarted or must be abandoned); and, who is responsible for this decision, the Person in Charge of Stressing or their Supervisor;
- AO-05 – At the time of the discovery of the broken rail, the welding contractor was not carrying out recalibration test of the Rail Tensors' pressure gauges, this may have been as a result, in part, of IÉ-IM not:
    - Stating the required frequency for recalibration in CCE-TMS-323;
    - Undertaking checks of the welding contractor's rail stressing equipment;
- AO-06 – The metallurgical examination of the weld identified copious amounts of luting sand in the weld (although noting that this did not contribute to the weld break). The RAIU determined was likely to be as a result of disturbance to the weld set-up during Thermit SoW-5 due to the issues with the Rail Tensors.

As a result of the RAIU investigation, the RAIU make the following safety recommendation:

- Safety Recommendation 2024002-01 – IÉ-IM CCE to update CCE-TMS-323, to include a more robust guidance for welders, in relation to recognising when there may be issues with the Rail Tensors; and what actions are to be taken when difficulties arise with the Rail Tensors.

The RAIU make the following safety recommendations as a result of additional observations:

- Safety Recommendation 2024002-02 – IÉ-IM CCE should review the current suite of documents related to welding to ensure consistency across the relevant documents;
- Safety Recommendation 2024002-03 – IÉ-IM CCE should develop systems for the management and certification of rail stressing equipment (including contractor's rail stressing equipment), to ensure equipment is regularly serviced and recalibrated at a nominated frequency. These updated requirements should be reflected in the relevant documents;
- Safety Recommendation 2024002-04 – IÉ-IM CCE should review and update the CWR Record Sheet to include sections for recording the serial number and calibration/ recalibration date of the Rail Tensors being used, the pressure gauge readings and the frequency of these checks on the pressure gauges. On completion, ensure staff are briefed on the changes, and changes should be incorporated into future training programmes for a Person in Charge of Stressing;
- Safety Recommendation 2024002-05 – IÉ-IM CCE should update CCE-TMS-323 to include guidance for the Person in Charge of Stressing, in relation to actions to be taken when difficulties are encountered with Thermit SoW-5 (including when Thermit SoW-5 can continue, be restarted or must be abandoned; and, who is responsible for this decision, the Person in Charge of Stressing or their Supervisor). On completion of the update, Persons in Charge of Stressing should be briefed and the training programme for the role revised with the new guidance.

Collision between a car and a train at Level Crossing XM190, Mayo, 9th September 2023

RAIU Investigation Report No: 2024-R003 **Published: 12/12/2024**

At approximately 15:15 hrs on Saturday the 9th September 2023, the IÉ 12:45 hrs Heuston to Westport passenger service (Train A804) was approaching Prendergast's Level Crossing (LC), asset number XM190 (to be referred to as LC XM190), located between Ballyhaunis and Claremorris (County Mayo), at a speed of 70 mph (110 km/h). The train driver (Driver A804) sounded the horn at the whistle board associated with LC XM190 on their approach.

LC XM190 is an Occupational Public (OP) user worked unattended level crossing (UWLC) meaning it is guarded by metal gates across a public road; whereby a member of the public, the "user", will have to open and shut the gates to cross the railway and continue on the road.

At the same time as Train A804 was approaching LC XM190 a car was also approaching LC XM190 from the up side (right hand side from the perspective of Driver A804). The car was travelling on a rural local road L65516 which links national road, N60, with another local road, L5551, and onto the N17. The speed limit for the local road is 80 km/h. The driver of the car (Car Driver) had taken a wrong turn at Claremorris and their satellite navigation system had diverted them onto these local roads which routed them over LC XM190 to continue on their journey.

On the approach to LC XM190 there are three "Level Crossing with No Flashing Red Signal (with Barriers or Gates)" advance warning signs (Sign W121) located at 100 m, 200 m and 300 m in advance of LC XM190. In addition, there is a "Warning Railway Crossing Ahead Stop before you Cross the Railway" sign, a mandatory Stop Sign (Sign RUS 027), and a "Warning Trains" sign mounted on poles at LC XM190.

The gates at LC XM190 were left open to road traffic by a previous unknown user of LC XM190.

When Driver A804 saw the car approaching LC XM190 they sounded the train horn again. Driver A804 could see that the car was travelling "a bit fast" and made a full service brake application and continued to sound the horn.

On realising the car was not going to stop, Driver A804 made an emergency brake application.

As Train A804 slowed, Driver A804 saw that the car was also slowing while arriving onto LC XM190, with the car coming to a "standstill" on the railway line.

There was insufficient time to bring Train A804 to a stop before reaching LC XM190 and Train A804 collided with the car (at the time of the collision the coupler was in the extended position as a result of issues with retracting couplers on the ICR Fleet).

The car sustained substantial damage on impact and was propelled approximately 31 m into an adjacent field landing on the passenger side.

The front of Train A804 came to a stop 310 m past the centre of LC XM190.

Driver A804 contacted the Mayo Line Signalman requesting emergency service and followed all other post-accident procedures correctly.

The two occupants of the car sustained injuries (the passenger sustained life-changing injuries) and were treated at the scene before been airlifted to hospital for treatment.

The RAIU have identified the following causal factors relating to the collision of Train A804 with a car at LC XM190, as follows:

- CaF-01 – The gates at LC XM190 were left open by a previous user;
- CaF-02 – The Car Driver was unfamiliar with OP Type level crossings and as a result the Car Driver did not:
    - React to the three advance warning signs (Sign W 121) on approach to LC XM190 by slowing the car;
    - Obey the instructions listed in the "Danger Live Railway Crossing" sign at LC XM190;
    - Stop at the Stop Sign or Stop Line to look for approaching trains as required by Road Safety Authority's (RSA) Rules of the Road.

The following may have been a contributory factor to the damage and injuries sustained to the car occupants and car:

- CoF-01 – The coupler was in the extended position (as a result of issues related to retracting the coupler). Had the coupler been retracted, it may have reduced the rate of rotation of the car from the initial impact and may have reduced the damage sustained by the car and the subsequent injuries to the car occupants. However, it cannot be determined, what damage the car would have sustained had the coupler been retracted (i.e. there could have been worse damage; and in addition, there could have been other unintended unwanted consequences).

The RAIU have identified the following likely systemic factor to the accident:

- SF-01 – SF-01 - Sign W 121 does not portray clear meaning that the user is approaching a UWLC, a hazard (i.e. live railway) and does not indicate the severity of not adhering to the warning (i.e. being struck by a train).

At the time of the accident, a Decision Support System (DSS), which provides information for users on the approach of trains, was present at LC XM190 but had not been commissioned as a result of difficulty in getting electricity to the location.

In addition, prior to and after the accident, the Department of Transport and relevant stakeholders were undergoing a pilot programme in relation to advance warning sign, Sign W121, and additional traffic calming measures at OP Type level crossings.

A new sign is currently being trialled at two OP Type level crossings. This new sign, Sign W126, depicts a train striking a car, with a "collision" element, clearly illustrating the hazard (i.e. live railway) and the severity of the hazard if the sign is not adhered to the warning (i.e. being struck by a train). Initial feedback, from level crossing users, is in favour of the proposed new sign, Sign W126 (see pictorial on right).

This RAIU investigation has resulted in the following safety recommendations:

- Safety Recommendation 2024003-01 – The Department of Transport should continue to trial the new design sign (Sign W126), in consultation with the relevant stakeholders, with a view to replacing Sign W121. The RAIU maintain that the advance warning signs on the approaches to OP Type level crossings should portray the hazard (i.e. the road user is approaching a live railway) and indicate the severity of not adhering to the warning (i.e. possible collision with a train);
- Safety Recommendation 2024003-02 – IÉ-IM should replace their "Warning Trains" sign, located at OP Type level crossings, to the new proposed advance warning sign (Sign W126), once included in the Traffic Signs Manual.

IÉ-IM and IÉ-RU have taken a number of actions as a result of the accident (or previous RAIU safety recommendations), which has resulted in the absence of some safety recommendations.

Full investigations commenced in 2024

Eight full investigations into reported occurrences were commenced in 2024:

- IÉ collision between two RRVs, on the Athenry to Galway line, on the 8th March 2024;
- IÉ operational irregularity at the 70¾ Mile Post (MP), near Ballybrophy, on the Cork mainline, on the 28th March 2024;
- IÉ possession irregularity at Clontarf, on the 1st May 2024;
- IÉ derailment of a RRV (excavator), near Ballycollin, Co. Offaly, on the 12th June 2024;
- IÉ SPAD without authority near Keelogues level crossing, Co. Mayo, on the 13th August 2024;
- IÉ collision between a RRV and a member of IÉ staff, North Esk, Co. Cork, on the 10th September 2024;
- IÉ reported near miss with staff, near Killiney Station, 11th October 2024 (note: this will form the basis of a trend investigation into near misses with staff on the IÉ network);
- IÉ cardan shaft detachment from an ICR, between Templemore and Ballybrophy, 24th November 2024.

IÉ collision between two road rail vehicles, on the Athenry to Galway line, on the 8th March 2024

At approximately 23:23 hrs on the 7th March 2024, a T3 Possession was granted between Athenry and Galway (on the Dublin (Heuston) to Galway line) on the IÉ Network. This was a planned T3 Possession for ballasting and side filling works in preparation for ballast cleaning. This was the second week of works that had commenced on the 27th February 2024.

The ballast was being stockpiled near 119 MP, while the side filling was taking place in Galway Yard in a worksite between 126 miles 300 yards and 126 miles 650 yards.

One RRV Excavator (RRV1) and two RRV Dumpers (RRV2 and RRV3) and one tracked excavator were being utilised for the ballasting works. The work involved moving ballast from the access point at Over Bridge Galway (OBG) 159 near 116 ¼ MP to 119 MP.

Two members of the of IÉ-IM staff and two members of the contracted staff arrived at Overbridge Galway (OBG) 159 at approximately 22:00 hrs; these were RRV Operator 1 (RRVO1) who was operating RRV1 and another member of staff operating the tracked excavator. As a result of a road traffic collision while travelling to work on the night, the two RRVOs (RRVO2 and RRVO3) for the RRV Dumpers (RRV2 and RRV3) were delayed in getting to the site. The Track Safety Co-ordinator (TSC) was also the PIC-RRV for RRV1, gave a safety briefing to the Engineering Supervisor (ES), RRVO1 and the operator of the tracked excavator.

The PICOP gave permission to the ES to set up their worksite. The ES set up worksite marker boards at 119 ¼ MP and 116 ¼ MP. A decision was made that RRVO1 would load the RRV2 and RRV3 (Dumpers) with ballast and on-track them.

The ES who was also acting as the PIC-RRV instructed RRVO1 to on-track RRV1 and then on-track RRV2 and RRV3 behind RRV1 in a skip-to-skip formation (the skips of the dumpers were facing each other); RRV2, the middle RRV would be reversing for the first movement.

Soon after RRVO2 and RRVO3 arrived at OBG 159 accompanied by another employee from the contractor. PIC-RRV checked that RRVO2 and RRVO3 were uninjured and were able to work before giving them a safety briefing.

PIC-RRV accompanied RRVO2 in RRV2, sitting on the right-hand seat behind RRVO2. Due to the noisy environment in the cabs of the RRV2 and RRV3 ear protection was worn.

RRV2 started the journey (in reverse) towards 119 MP at a speed that averaged 13 mph (21 km/h), faster than the IÉ Rule Book requirement of 5 mph (8 km/h) in a worksite (the length of the work site was 4.8 kilometres (km)). In addition, as the reversing sirens were off, a person should have been walking with the dumper, in a position of safety, to warn persons of its approach in accordance with the risks assessment for RRV dumpers. RRV3 followed (driving forward) soon after, maintaining a distance of 100 m from RRV2.

RRVO2 used the Close Circuit Television (CCTV) monitor (camera monitor) located to the right-hand side in front of RRVO2 as they reversed towards 119 MP. RRVO2 looked over their shoulder to do a physical check to see if the line ahead was clear.

As RRV2 approached the 119 MP, RRVO1 could see the lights of RRV2. As RRV2 got closer RRVO1 realised that RRVO2 was not slowing down to come to a stop. RRVO1 hadn't time to sound the horn or flash their lights as they were attempting to slew the RRV1 away release the hand brake and attempt to move away from RRV2.

RRVO1 was unable to gain enough speed to move away from RRV2 and RRV2 collided with RRV1 (RRV3 was not involved in the collision). Both RRVs stopped and the RRVOs exited from the RRVs uninjured; the PIC-RRV (who sustained a slight injury to their hip) exited RRV2 and spoke to the RRVO1 and RRVO2. There was some damage to RRV1 and RRV2.

IÉ operational irregularity at the 70¾ MP, near Ballybrophy, on the Cork mainline, 28th March 2024

At 14:00 hrs on the 28th March 2024, the 13:00 hrs Dublin Heuston to Cork passenger service (Train A214) travelling on the Down line between Ballybrophy and Lisduff, County Laois, activated a HABD at the 68 ½ MP. The Controlling Signalman and Communications Signalman on the Mainline CTC Workstation heard the alarm and responded.

The Controlling Signalman immediately contacted the driver of Train A214 (Driver A214) via the train radio and instructed them to stop. Drivers are required to inspect their train on receipt of a HABD activation; to do this Driver A214 then requested signal protection to allow them to safely examine Train A214.

At 14:01 hrs, during this call, the Controlling Signalman looked at the Mainline CTC Workstation screen to see if signal protection could be granted and saw that the 12:25 hrs Cork Kent to Dublin Heuston passenger service (Train A215) was approaching on the Up line and advised Driver A214 that signal protection could not be given. The Controlling Signalman instructed Driver A214 to contact Mainline CTC again once Train A215 had passed by Train A214. Driver A214 then left the main section of the driving cab to obtain a Track Circuit Operating Device (T-COD) from inside the locomotive.

At 14:04 hrs, Driver A214 contacted Mainline CTC again with the Communications Signalman answering the call. Driver A214 questioned if Train A215 had already passed their train, Train A214, using the phrase “Did that train pass Lisduff yet? The one on the Up road?” (meaning the Up line).

During this call, the Communications Signalman incorrectly thought that Train A215 had passed Train A214 and in parallel was told that signal protection had been put in place on the last controlled stop signal behind Train A215 by the Controlling Signalman. The Communications Signalman granted signal protection to Driver A214.

At 14:06 hrs, Driver A214 alighted from the driving cab and placed the T-COD on the Up line. Immediately afterwards, Train A215 received an abnormal CAWS downgrade on the train's in-cab display.

On receiving the abnormal CAWS downgrade Driver A215 initiated a brake application and stopped approximately thirty seconds later near to the 70 ¾ MP. Driver A215 then contacted Mainline CTC and reported the abnormal CAWS downgrade to the Communications Signalman. Driver A215 reported that they could see a green aspect ahead (Signal CLX UD).

Believing that Train A215 had passed Train A214 and seeing the next signal on the display was showing a green aspect (Signal BYR489), the Communications Signalman advised Driver A215 that the relevant signal ahead was showing a proceed aspect and that they had authority to proceed. Driver A215 then questioned this instruction as they could see Train A214 stopped ahead and a person on the Up line.

At this point it became apparent to the Communications and Controlling Signalman that Train A215 was on the same section of line for which signal protection had been granted to Driver A214.

IÉ possession irregularity at Clontarf, on the 1st May 2024

At approximately 21:42 hrs on the 1st May 2024 an IÉ Signalman signed on-duty for a night shift on the Central Workstation of CTC, located at Connolly Station, Dublin. The Signalman had qualified only two months earlier and was on only their second night shift working alone.

At approximately 23:30 hrs a signalling fault at Lansdowne Road occurred which resulted in delays and late running to the last services returning to the depots and stabling locations. Services only resumed at 00:28 hrs when the points were secured.

On the night, four T3 Possessions were planned to be taken that night in the Central Workstation area under the control of the Signalman for maintenance and enhancement works. Each T3 Possession is under the control of a PICOP.

One of the T3 Possessions (Possession Plan Reference Number (PPRN) MH/CF/1)) was between Clontarf Road and Malahide on the Dublin to Belfast mainline; and the PPRN provided details of the protecting signals and possession limits.

At 00:51 hrs, the PICOP for this T3 Possessions contacted the Signalman to start the process of taking the T3 Possession. The Signalman saw that a passenger train (Train F015) was enroute to Howth Station (within the possession limits) and therefore could not provide signal protection and agreed to contact the PICOP later.

Train F015 departed Howth Station, empty, for Fairview Depot at 01:00 hrs.

At 01:08 hrs the Signalman started the process of the first step in granting signal protection for the T3 Possession. The Signalman then contacted the PICOP to advise this was in place and permit the PICOP to place the detonator protection but did not see the presence of Train F015 in the section.

At 01:10 hrs, when the PICOP called the Handsignalman, positioned at Clontarf Road, to tell them to place the detonator protection. As they were talking, the Handsignal saw Train F015 approaching the location where they were to place the detonator protection; and told the PICOP. The Handsignalman remained in a place of safety and the PICOP took no immediate actions in notifying the Signalman.

Train F015 passed from the area under signal protection and into Fairview Depot with the driver of Train F015 being unaware of the incident.

IÉ derailment of a road rail vehicle (excavator), near Ballycollin, Co. Offaly, on the 12th June 2024

On the 12th June 2024, works was being carried out at Underbridge Athlone (UBA) 23 in relation to the erection of a new walkway and handrails onto the bridge. To faciliate the works, a tracked negative mobile elevated working platform (MEWP) was required to lift the Bridge Gang personnel while the works were being undertaken. For the MEWP to have a level platform, Strails (heavy duty panels that are inserted inside the five-foot) were required to be inserted, using an RRV Excavator, operated by an RRVO.

The PIC-RRV was not aware that the RRVO had no experience in the installation of Strails and the RRVO was having difficulty with both the controls on the RRV Excavator and inserting the Strails. After the third Strail had been placed between the rails, one of the corners of a Strail was protruding above the rail head. The PIC-RRV asked the RRVO to push down the corner with the grapple and as the RRVO pushed down on the corner of the Strail the front rail gear on the RRV Excavator lifted off the rail. The RRVO tried to let the rail gear down but due to the cant (120 mm) the rail gear slid off the rails on the lower side of the of the track causing the RRV Excavator to slew to the lower side, loose balance and topple over the steep embankment into the field below.

The RRVO had difficulty exiting the RRV Excavator until they switched off the engine. They exited the RRV Excavator and climbed up the steep embankment to the track. They were assisted by the RRV-PIC back to UBA 22 (access point to the work location) where medical attention was administered to the RRVO for an injury to their hand. They were taken to the hospital in Tullamore where they received further treatment.

IÉ SPAD without authority near Keelogues level crossing, Co. Mayo, 13th August 2024

On the 13th August 2024, SET staff were working at LC XX011.

LC XX011 remained in "local" control as the SET staff, once finished working, did not inform the LCCO that they were finished; although noting that they did inform the Controlling Signalman.

As the 11:10 hrs XPO Logistics liner freight service from Ballina to Waterford (Train K520) was approaching Signal XX011US, it was displaying a red signal.

LC XX011US was still in "local" control, there was no alert in the LCCC. Had the LCCO been alerted that the works were complete, the level crossing would have been taken out of "local" control, allowing the LCCO to clear the signal, Signal XX011US, which would then display a proceed.

The driver of Train K520 (Driver K520) did not obey the red signal and passed Signal XX011US at danger, without authority by a length of the locomotive and two wagons. Train K520 did not travel onto the level crossing. The SPAD has a risk ranking of sixteen (medium risk).

IÉ collision between a RRV and a member of IÉ staff, North Esk, Co. Cork, 10th September 2024

On the 10th September 2024, during a T3 Possession on the Cork to Cobh and Midleton Lines, an IÉ-IM member of staff from the CCE Department was undertaking the role of PIC-RRV.

At approximately 02:50 hrs the PIC-RRV was unhooking the draw bar from the Rail Trailer and clearing some scrap pallet timber from the Rail Trailer.

The PIC-RRV did not give an instruction to the RRVO of the RRV Excavator to off-track.

The RRVO was in the process of raising its rail wheels allowing the road wheels back to ground level (off-tracking) when the RRV moved forward striking the PIC-RRV from behind; the forward momentum of the RRV Excavator carried the PIC-RRV forward until coming into contact with the stationary Rail Trailer.

The PIC-RRV suffered minor cuts to their legs and sought medical attention the next day.

It should be noted that the accident was reported internally on the 10th September, however, the seriousness of the occurrence was not identified until the 12th September when the CCTV footage was obtained. IÉ-IM then notified the RAIU.

The RAIU issued an USAN in the immediate aftermath of the accident, see further details under the USAN, see pages 48 and 49 for further information on the USAN, including the safety recommendations issued.

IÉ reported near miss with staff, near Killiney Station, 11th October 2024
(note: this will form the basis of a trend investigation into near misses with staff on the IÉ network).

On the 11th October 2024, two members of IÉ-IM staff from the SET Department were carrying a routine patrol surveying the OHLE. At the time, both lines were open to traffic and a Safe System of Work (SSOW), using lookout protection was in place. Whilst working near Killiney Station, the staff moved to a place of safety for a passing Down direction train. As the train passed them, a second train approached on the Up line. As it did so one member of staff allegedly moved from the place of safety causing the driver to sound a series of warnings on the horn. The other member of staff guided the first back into a place of safety.

As the RAIU indentified that a number of report near miss events had occurred with members of staff working on running lines open to traffic, a trend investigation has been opened.

IÉ cardan shaft detachment from an ICR, between Templemore and Ballybrophy, 24th November 2024

At approximately 19:20 hrs on Sunday 24th November 2024, a warning was received in the cab for a wheel slip protection fault followed by a powerpack fault on an adjacent cab (Class 22000 ICR DMU vehicle 22646); the faults were managed individually, and the train continued on its journey.

The following morning at Laois Traincare Depot (LTCD), an examination identified that the cardan shaft from car 22646 was missing.

It was later established that the cardan shaft had separated from the train on the Sunday night at the time the warning were received on the train for the wheel slip and powerpack faults.

2024 Urgent Safety Advice Notice / Safety Advice Notice

1st January 2024 to 31st December 2024

The RAIU issued one USAN in 2024.

IÉ collision between a RRV and a member of IÉ staff, North Esk, Co. Cork, 10th September 2024

RAIU USAN No: USAN 004 **Issued: 3rd October 2024**

On the 10th September 2024, during a T3 Possession on the Cork to Cobh and Midleton Lines, an IÉ-IM member of staff from the CCE Department was undertaking the role of PIC-RRV.

At approximately 02:50 hrs the PIC-RRV was unhooking the draw bar from the Rail Trailer and clearing some scrap pallet timber from the Rail Trailer.

The PIC-RRV did not give an instruction to the RRVO of the RRV Excavator to off-track.

The RRVO was in the process of raising its rail wheels allowing the road wheels back to ground level (off-tracking) when the RRV moved forward striking the PIC-RRV from behind; the forward momentum of the RRV Excavator carried the PIC-RRV forward until coming into contact with the stationary Rail Trailer.

The PIC-RRV suffered minor cuts to their legs and sought medical attention the next day.

The safety issued was determined to be that there was a dearth of instructions and training documentation related to the coupling and uncoupling of trailers to and from towings RRVs.

The RAIU made four safety recommendations as a result of the accident:

- IÉ-IM should review the IÉ Rule Book Section Q Part 1 and consider the inclusion for the coupling and un-coupling Trailers to/ from towing RRVs. The review should consider at a minimum, for coupling and uncoupling Trailers:
    - The RRVO is responsible for the coupling/uncoupling procedures;
    - Only trained and assessed competent RRVOs are allowed to undertake the coupling/ uncoupling procedures for Trailers;
    - The RRVO must have been given permission from an PIC-RRV prior to undertaking coupling/ uncoupling procedures for Trailers;
    - A PIC-RRV must be present and verify that the RRVO is carrying out the procedures correctly.
- The RRV Contractors, supported by IÉ-IM, must develop procedures for the safe coupling and uncoupling of Trailers to and from towing RRVs this should include a process to remove the need for a ground operative to be in between an RRV and a trailer during the coupling/uncoupling process;
- IÉ-IM, based on the procedures produced, should determine what mandatory procedures should be included in the IÉ Rule Book e.g. a functional brake text must be carried out for the coupling procedures;
- RRVO Training Instructors should update the RRVO training for RRVOs for the operation, coupling and uncoupling of Trailers to/ from towing RRVs. This should include as a minimum:
    - Procedures for the safe coupling and uncoupling Trailers;
    - The different braking mechanisms associated with Trailers;
    - How to carry out a function brake test;
    - How to release the braking pressure;
    - The IÉ Rule Book rules of coupling and uncoupling Trailers;
    - Practical training in relation to the above.

  When RRVOs have received this training, this should be recorded by their employer and on a new RRV Competency Card, to ensure only competent RRVOs are allowed to undertake the coupling and uncoupling procedures for Trailers and that RRV Competency Cards can be inspected on site.

Tracking Safety Recommendations

RAIU

Railway Accident Investigation Unit

Tracking Safety Recommendations

Monitoring of RAIU safety recommendations

In accordance with the Railway Safety Act 2005 (Government of Ireland, 2005a) and the European Railway Safety Directive (European Union, 2020), recommendations are **addressed** to the national safety authority, the CRR. The recommendation is **directed** to the party identified in each recommendation. The CRR also **monitors** the RAIU safety recommendations from USANs and SANs.

The CRR safety recommendation statuses are open/in progress, submitted, further evidence requested and closed; and are defined below.

Status	Description
Open/ In Progress	Feedback/evidence from the Railway Organisation is pending; or actions have not yet been completed.
Submitted	The Railway Organisation has made a submission to the CRR advising that it has taken measures to affect the recommendation and the CRR is considering whether to close the recommendation.
Further Evidence Requested	The CRR has reviewed a submission (or further submission) but considers that further evidence is necessary to close the safety recommendation.
Closed	The CRR has reviewed a submission (or further submission) and is satisfied that the safety recommendation has been addressed.

Status of RAIU safety recommendations

RAIU Safety Recommendations in numbers

The CRR, holds meetings with the relevant stakeholders to monitor the progress of safety recommendations.

As of the 31st December 2024, the RAIU have made 317 recommendations from investigation reports, USANs and SANs. All recommendations were accepted by their addressee and implementer.

The status of the recommendations as of the end of 2024 is illustrated on the following page, note that 57% of the safety recommendation have been addressed and are closed.

Year	No. of Reports/ U/SANs	Number of Recommendations	Status of Recommendations				Percentage Closed
			Open/ In Progress	Submitted	FER	Closed	
*	22	63	0	0	0	63	100%
2010	6	26	1	0	0	25	96%
2014	6	28	0	0	2	26	92%
2016	3	17	5	0	2	10	58%
2017	2	9	0	0	1	8	89%
2018	2	8	1	0	1	6	75%
2019	5	36	6	3	6	21	58%
2020	4	18	4	1	7	6	33%
2021	8	35	8	6	9	12	34%
2022	3	16	8	7	1	0	0%
2023	5	47	39	2	1	5	11%
2024	4	14	14	0	0	0	0%
Totals	70	317	86	19	30	182	57%

* All recommendations from 2007, 2008, 2009, 2011, 2012, 2013 and 2015 are closed in full.

Status of individual RAIU safety recommendations

In terms of the individual safety recommendations, the safety recommendations are compiled in the following tables:

Table	Title
Table 1	RAIU safety recommendations made in 2024
Table 2	RAIU safety recommendations closed in 2024
Table 3	All RAIU Safety Recommendations with an Open, FER or submitted status

Table 1 – RAIU safety recommendations made in 2024

The below are safety recommendation made in 2024, there was no change in status to these safety recommendations in 2024.

Report/USAN/SAN	Recommendation
Broken rail, Newbridge, Kildare, 23rd February 2023 (RAIU Investigation Report No: 2024-R001, published: 18th January 2024)	Safety Recommendation 2024001-01 – IÉ-IM should risk assess whether the existing rail end cleaning equipment and processes adequately control the risk of weld contamination and identify improvements where required.
	IÉ-IM to investigate altering the monitoring and detection parameters of the rail welding machine to be able to identify and highlight possible anomalies in the welding process.
	IÉ-IM to revise the risk assessments for the Portlaoise Rail Welding Plant to ensure risks in the production process affecting the quality of rail welds are understood and control measures are identified.
Broken Rail near Emly, County Tipperary, 22nd February 2023 (RAIU Investigation Report No: 2024-R002, published: 22nd March 2024)	IÉ-IM CCE to update CCE-TMS-323, to include a more robust guidance for welders, in relation to recognising when there may be issues with the Rail Tensors; and what actions are to be taken when difficulties arise with the Rail Tensors.
	IÉ-IM CCE should review the current suite of documents related to welding to ensure consistency across the relevant documents.
	IÉ-IM CCE should develop systems for the management and certification of rail stressing equipment (including contractor's rail stressing equipment), to ensure equipment is regularly serviced and recalibrated at a nominated frequency. These updated requirements should be reflected in the relevant documents.
	IÉ-IM CCE should review and update the CWR Record Sheet to include sections for recording the serial number and calibration/ recalibration date of the Rail Tensors being used, the pressure gauge readings and the frequency of these checks on the pressure gauges. On completion, ensure staff are briefed on the changes, and changes should be incorporated into future training programmes for a Person in Charge of Stressing.
	IÉ-IM CCE should update CCE-TMS-323 to include guidance for the Person in Charge of Stressing, in relation to actions to be taken when difficulties are encountered with Thermit SoW-5 (including when Thermit SoW-5 can continue, be restarted or must be abandoned; and who is responsible for this decision, the Person in Charge of Stressing or their Supervisor). On completion of the update, Persons in Charge of Stressing should be briefed and the training programme for the role revised with the new guidance.
IÉ collision between a road rail vehicle and a member of IÉ staff, North Esk, Co. Cork (USAN 004, published on the 10/09/2024)	IÉ-IM should review the IÉ Rule Book Section Q Part 1 and consider the inclusion for the coupling and un-coupling Trailers to/ from towing RRVs. The review should consider at a minimum, for coupling and uncoupling Trailers: • The RRVO is responsible for the coupling/uncoupling procedures; • Only trained and assessed competent RRVOs are allowed to undertake the coupling/ uncoupling procedures for Trailers; • The RRVO must have been given permission from a PIC-RRV prior to undertaking coupling/ uncoupling procedures for Trailers; • A PIC-RRV must be present and verify that the RRVO is carrying out the procedures correctly.
	The RRV Contractors, supported by IÉ-IM, must develop procedures for the safe coupling and uncoupling of Trailers to and from towing RRVs this should include a process to remove the need for a ground operative to be in between an RRV and a trailer during the coupling/uncoupling process.
	IÉ-IM, based on the procedures produced, should determine what mandatory procedures should be included in the IÉ Rule Book e.g. a functional brake text must be carried out for the coupling procedures.

Report/USAN/SAN	Recommendation
IÉ collision between a road rail vehicle and a member of IÉ staff, North Esk, Co. Cork (USAN 004, published on the 10/09/2024)	RRVO Training Instructors should update the RRVO training for RRVOs for the operation, coupling and uncoupling of Trailers to/ from towing RRVs. This should include as a minimum: • Procedures for the safe coupling and uncoupling Trailers; • The different braking mechanisms associated with Trailers; • How to carry out a function brake test; • How to release the braking pressure; • The IÉ Rule Book rules of coupling and uncoupling Trailers; • Practical training in relation to the above. When RRVOs have received this training, this should be recorded by their employer and on a new RRV Competency Card, to ensure only competent RRVOs are allowed to undertake the coupling and uncoupling procedures for Trailers and that RRV Competency Cards can be inspected on site
Collision between a car and a train at Level Crossing XM190, Mayo, 9th September 2023 (RAIU Investigation Report No: 2024-R003, published:12/12/2024)	The Department of Transport should continue to trial the new design sign (Sign W126), in consultation with the relevant stakeholders, with a view to replacing Sign W121. The RAIU maintain that the advance warning signs on the approaches to OP Type level crossings should portray the hazard (i.e. the road user is approaching a live railway) and indicate the severity of not adhering to the warning (i.e. possible collision with a train).
	IÉ-IM should replace their "Warning Trains" sign, located at OP Type level crossings, to the new proposed advance warning sign (Sign W126), once included in the Traffic Signs Manual.

Table 2 –RAIU safety recommendations closed in 2024

This section identifies any changes to the status of RAIU safety recommendations in 2024.

Report/USAN/SAN	Recommendation
Passenger trap-and-drag occurrence on Luas tram at Heuston Stop, 26th March 2019	TDLR should brief drivers on the operation of the door mechanism and specifically explain the removal of obstacle detection for the final 10 mm of door travel; this briefing should then be incorporated into their suite of training and competence management documents.
IÉ overhead Line detachment, Pearse Station, 1st October 2020	
Luas Overhead Line Failure, Stillorgan, 2nd November 2020 (published 2021)	TDLR, along with S2M, should conduct a full review of their inspection processes for OCS wires to ensure pre-cursors, likely location and faults with the OCS are referenced.
	TDLR should put a process in place that all trams involved in serious incidents have the OTDR downloaded as soon as possible to prevent overwriting of the data.
Dangerous occurrence involving a Double SPAD at Clontarf Road Station, 7th December 2021	IÉ-RU CME should consider retrofitting all EMU fleets with a Remote Diagnostic System, whereby a rule can be introduced so that DTEs are immediately notified of ATP penalty brake applications (2023001-04).
	IÉ-RU Ops should update its competency assessment processes to ensure that the assessments carried out, are the most beneficial, in terms of identifying driver discrepancies (2023001-11).
	IÉ-RU Ops should brief all drivers on the importance of making an open call in an emergency situation rather that calling the Signalmen direct (2023001-12).
Failure of a Current Return Cable on Luas Tram, Connolly Stop, 25th October 2022	TDLR should consider updating the Wheel Turning Certificate to provide a space for the torque wrench registration number conformation of test and torque value achieved when reattaching the Current return and Earth Shunt cables with a space for sign off (2023004-04).
Light blue indicates recommendations associated with IÉ; dark blue indicates recommendations associated with TDLR	

Table 3 – All RAIU Safety Recommendations with an Open, FER or submitted status

This section includes all RAIU safety recommendations with a status of open, FER or submitted, safety recommendations that have been closed, in full, prior to 2024 are not included.

Report	Safety Recommendation	Status
Malahide Viaduct Collapse on the Dublin to Belfast Line, on the 21st August 2009 (published 2010)	The CRR, in conjunction with IÉ, should develop an action plan in order to close all outstanding recommendations in the AD Little Review (2006) and the International Risk Management Services Reviews (1998, 2000, and 2001). This action plan should include defined timescales for the implementation and closure of all these recommendations.	Open
Trend Investigation: Possession incidents on the IÉ Network (published 2014)	IÉ-IM should monitor and review entries into Section "Engineering works requiring absolute possessions – Section T Part III" of the Weekly Circular to ensure that the information published in this document is accurate and credible.	FER
Tram fire on approach to Busáras Luas Stop on the 7th November 2013 (published 2014)	TDLR should undertake a review of higher ignition temperature hydraulic oils to identify if they would be feasible in the braking circuit and add a safety benefit.	FER
Investigation into SPADs on the IÉ network from January 2012 to July 2015 (published 2016)	IÉ-IM must introduce an adequate TPSs on all of the IÉ network for the protection of trains; this system should be robust and to an acceptable standard within Europe; and have the appropriate ATP and speed supervision functionality.	Open
	IÉ-IM should review the functionality of the ATP's running release to ensure that the train protection function in relation to passing a signal at danger is appropriately maintained where drivers are approaching signals displaying red aspects. If this is not feasible with the current equipment it should be included any new TPS introduced on the network.	Open
	IÉ-IM should identify high risk signals and, where the technology exists, introduce a mechanism to monitor the approach speed to these signals; to ensure that near misses are identified and managed.	Open
	IÉ-IM should review their training and competency management for Traffic Regulators so that they have the appropriate skill set in terms of identifying potential risks associated with the regulating of trains.	FER
	IÉ-IM should identify all locations where safety critical communications are not recorded and develop a programme of works for the introduction of recording safety critical communications at these locations.	Open
Dangerous occurrence between Ballybrophy and Portlaoise, 12th September 2015 (published 2016)	IÉ-IM should review the method of allocation and accountability for general operatives detailed for work sites, to ensure that there are sufficient personnel on site to perform the required duties.	FER
Operational incidents at Ardrahan on the 23rd October 2015 & Spa on the 28th November 2015 (published 2016)	IÉ-RU should review all traction fleets that do not have sanding capabilities and fit suitable systems to minimise the risk of low adhesion incidents. NIR have also closed this recommendation. Although this recommendation was closed for IÉ-RU, it remains open against the Railway Preservations Society of Ireland & other maintenance railway organisations operating on the IÉ network.	Open

Report	Safety Recommendation	Status
Near miss at Knockcroghery Level Crossing, XM065, Co. Roscommon, 31st January 2017 (published 2017)	The SET Department should review the camera position at LC XM065, and other similar CCTV level crossings, to ensure that the LCCOs have optimum, unobstructed, views of level crossings.	FER
	IÉ-IM should identify CCTV level crossings with obstructed views and issue interim instructions to LCCOs to fully raise the barriers where there is a possibility of any obstructions on level crossings.	FER
Derailment of DART passenger service, at Points DL115, Dun Laoghaire, 13th September 2017 (published 2018)	IÉ-IM and IÉ-RU should evaluate the current training, assessment and monitoring of Safety Critical Communications to ensure that communications are carried out to the requirements set out in IÉ Rule Book, and safety critical communications standards IMO-SMS-033 and OPS-SMS-8.1.	Open
	IÉ-IM should agree and implement a consistent wording in the Rule Book, General Appendix, training material and oral instructions in relation to the points operator's instructions; and ensure that the importance of the task order is highlighted in the training for points operators	FER
Vehicle struck by train at Cartron level crossing, XM220, Co. Mayo, 17th August 2018 (published 2019)	IÉ-IM should carry out a full review of known misused user worked level crossings on public and private roads and should develop a programme to either close or upgrade the level crossings to minimise misuse; where possible, level crossings with the highest risks should be addressed first.	FER
	DoT should review, in consultation with the relevant stakeholders, their current advance warning signage (W 121) with a view changing the signage to make it clear to road users that they are approaching a user operated level crossing. They should also consider the introduction of other traffic calming measures in efforts to encourage safe road user behaviour. Care should be taken not to inadvertently introduce new risks as a result of their proposed measures.	Open
Road Rail Vehicle occurrences on Iarnród Éireann Network from 2015 to 2018 (published 8th October 2019)	DoT should review the Railway Safety Act 2005 and current amendments to make clear the classification of RRVs; consultation should be sought with the CRR; and relevant stakeholders where appropriate.	Open
	The CRR & IÉ-IM should review the requirements prescribed in the Railway Safety Act (and current amendments) to ensure they are satisfied that all the requirements of the Railway Safety Act (and current amendments) are met in terms of RRVs being classified as rolling stock.	Open
	IÉ-IM should review and improve its current CCE Plant and Machinery Standards; attention should be given to best international practice in RRVs; and, as a minimum, the following should be considered for inclusion: • Applying the requirements set out in the EN 15746/ I.S. EN 15746 standards such as controls & indicators, visibility from the cab, warning systems & communications between work positions, etc. Where, due to a technical impossibility, the design specifications of EN 15746 cannot be met in full, control measures to address these deficiencies should be clearly identified, risks assessed, and suitable controls implemented; • The installing of an appropriate emergency warning system, which, when activated in emergency, can produce a suitably loud audible alarm and/or visual alarm. In cases, where this is not possible, as a result of a technical impossibility, control measures to address this deficiency should be clearly identified, risk assessed, and suitable controls implemented; • Installing Wheel Slip Prevention and/or sanders on RRVs; • Installing of Anti-Collision Devices (ACDs) on RRVs for the prevention of collisions with other RRVs, rolling stock, infrastructure and staff (through the provision of portable ACDs fitted to staff) on the IÉ network. In cases, where this is not possible, as a result of a technical impossibility, control measures to address this deficiency should be clearly identified, risk assessed, and suitable controls implemented; • Introducing an appropriate means of communication between work positions, whereby the RRVOs and RRVCs can communicate while on-tracking, travelling on the railway and at worksites; • Installing of data recorders on RRVs;	FER

	• The suitability of the current braking system on Type 9B RRVs where an indirect rail wheel braking system is in place; consideration should be given for the requirement to have all RRVs fitted with direct rail wheel braking systems.	
	In relation to existing RRVs, IÉ-IM should assess the operation of existing RRVs to satisfy itself, on the basis of a risk assessment, that there are adequate technical and operational controls to prevent loss of control of RRV occurrences in the future.	**Submitted**
	IÉ-IM must develop a suitable RRVO training course which must incorporate both theory and practical elements for the operation of RRVs; there should be an assessment on completion of this initial training. When a person passes this initial training, they must complete and log supervised hours of RRV operation; and present for a final through assessment. This process should be risk assessed to determine the: number of days training; practical training requirements; number of supervised hours; and final assessment requirements.	**Open**
	IÉ-IM should develop a competency management system for the management of RRVOs competencies; this system should also include instructions related to re-training and monitoring of RRVOs after they have been involved in an accident.	**FER**
	IÉ-IM should conduct a thorough review of their suite of SMS documentation and plant and machinery standards, related to RRV contractors, to identify deficiencies in terms of the management of contractors and their plant. Where deficiencies are identified, IÉ-IM should develop new systems for the management of plant on site, and, for their safety tour and compliance verification processes to ensure contractors regularly inspect and maintain their plant in good condition; rather than the continued issuance of corrective action notices.	**FER**
	IÉ-IM should ensure appropriate procedures are in place for D&A screening for IÉ-IM and contractor staff post RRV occurrence.	**FER**
	IÉ-IM should conduct an audit on RRV contractor's safety documents with a view to identifying deficiencies in terms of safety and ensuring the appropriate safety documentation is produced for the works; IÉ-IM should support and offer guidance to the RRV contractors in terms of the identification of hazards and methods of working on a railway network.	**Open**
	IÉ-IM should update their CCE Plant and Machinery Standards to include the requirements set out in Section Q 2018 of the IÉ Rule Book related to the collection of pre-operation checklists by the RRVCs from the RRVOs; and ensure these requirements are enforced through compliance verification activities.	**Submitted**
	IÉ-IM should clearly define, document and explain the role and function of the RRVC in the management of RRVs in Section Q of the IÉ Rule Book and/or relevant CCE Plant and Machinery Standards. This should include: • Location of RRVC when on-tracking, during work, and off-tracking; • The sighting requirements of RRVCs (i.e. an RRVC should be able to see RRVs in their control at all times); • The allocation of RRVCs per quantity RRVs (i.e. how many RRVs per RRVs).	**FER**
	IÉ-IM should review and update the training requirements of RRVCs with a view to incorporating: • Basic infrastructure training (e.g. points); • Training in communications with relevant staff; • Practical RRV training to ensure they have confidence in accepting pre-operations checklists from RRVOs as set out in the IÉ Rule Book.	**Submitted**

Report	Safety Recommendation	Status
Passenger trap-and-drag occurrence on Luas tram at Heuston Stop, 26th March 2019 (published 2020)	TDLR should update their suite of documents for driver training (SM 017 Driver Training Plan), operations (TSI Manual) and competence assessment (SM 018 & SM 019 Competence Assessment) to include a requirement for drivers to conduct a thorough final visual check (using CCTV and mirrors) after obtaining doors closed and locked indications and before moving the tram to confirm that nothing is trapped in the doors.	FER
	TII should conduct a risk-based review on whether the tram fleet operating on the Red Line should be upgraded with coloured rear view monitors.	Open
	TDLR, as part of the update to the SMS 018 Competence Assessment, should formally include the assessments that should be conducted every quarter.	FER
	TDLR should develop and implement an induction training and competency assessment program for security staff, which should include training and assessment in the use of safety critical communications.	Submitted
	TDLR should update their Work Instructions to ensure that appropriate testing is conducted for sensitivity of obstacle detection, door impact for closing forces and obstacle removal forces; the requirements set out in I.S. EN 14752 should be used, as appropriate.	FER
	TDLR should update their Chain of Care Procedure mandating that drivers are subject to appropriate developmental supports post incident/accident. Depending on the type of incident/accident, and whether the actions of the driver contributed to the incident/accident, specified periods of time of continuing developmental supports should be set.	FER
Near miss with an Iarnród Éireann Patrol Ganger near Woodlawn, Galway, 4th June 2019 (published 2020)	IÉ-IM should review its track inspection methods to see if technological/ mechanised systems and/ or other safety measures could be implemented to eliminate/ minimise track worker exposure to railway hazards whilst undertaking the task of track patrolling.	FER
	IÉ-IM should, through their risk assessment process, conduct a review of the patrol lengths, with the objective of identifying all patrol lengths with associated risks, and introducing adequate mitigation measures to eliminate these risks. Consideration should be given to the introduction of technologies (such as ACDs) for use by patrol gangers, with the objective of warning patrol gangers of oncoming trains.	FER
Near miss with an Iarnród Éireann SET Worker at Rush and Lusk Station, 20th June 2019 (published 2020)	The IÉ-IM SET Department should develop a formalised process, through their SMS suite of documents, for IÉ-IM SET staff walking/ working alone, which should be completed prior to any member of SET staff going on or near the line; at a minimum consideration should be given to: • Whether it is necessary to go on or near the line to conduct the walk / work; • What local knowledge is required to walk /work safely; • Whether all the requirements of the IÉ Rule Book / SSOW can be met; • What special protection arrangements are required either at night or during the day.	FER
Collision between an IÉ passenger train and rail-mounted maintenance equipment, Rosslare, Wexford, 11th January 2020 (published 2020)	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.	Open
	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.	Open
	IÉ-IM should update their Mobile Gang WIs, 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.	Open

Report	Safety Recommendation	Status
Collision between a car and a train at Kilnageer, Level Crossing (XM240), Mayo, 29th April 2020 (published 2021)	The RSA should update the "Rules of the Road" to include guidance on the DSS.	**Open**
	IÉ-IM should update the 'The SAFE use of Unattended Railway Level Crossings' booklet to include guidance on the DSS.	**FER**
	IÉ-RU should put systems in place to ensure ICR train horns meet the current standards for sound pressure levels.	**FER**
Collision between a Bord na Móna (BnM) Flat Wagon and Kilcolgan Level Crossing Gates, Offaly, 8th June 2020 (published 2021)	BnM should identify locations where derailing points are vulnerable to unauthorised movements and provide a means of securing the derailing points at these locations.	**FER**
	BnM should review its level crossing Risk Register updating where necessary to sufficiently capture all reasonably foreseeable risks. In addition, BnM should consider adding a requirement within its Rail Safety Case Document that requires regularised Risk Management Workshops at which risks, mitigation measures, etc, are reviewed and updated when necessary.	**FER**
	The Engineering Department of BnM should carry out the technical evaluation into the efficacy of the derailing points, etc. identified in Bord na Móna internal investigation report into the collision between a BnM locomotive and the gates of Endrim Gates on the 21st September 2017.	**FER**
	BnM should update their Specification for Crossings to include the requirements of the Department of Transport's Traffic Signs Manual; based on this BnM should update the signage on the approaches to all BnM level crossings.	**FER**
USAN 003 Luas isolation irregularity incident, between Kylemore to Suir Road, on the 5th January 2021 (issued 2021)	TDLR should urgently undertake a review of their safety critical communications for all modes of communication, while the review was being undertaken, TDLR should: • Develop and publish a concise standard for safety critical communications for all modes of communication; • Implement a robust competency management programme for initial and refresher training based on the requirements of this new standard; • Continuously assess safety critical communications to ensure that staff are adhering to safety critical communications set out in the new standard.	**Submitted**
Person entrapped in lowered CCTV level crossing, Ashfield, Offaly, 24th May 2020 (published 2021)	IÉ-IM SETDepartment should, using a risk-based approach, consider the suitability of the "Signal Controls" functions for Mid-Section CCTV Crossings; should they be deemed to have an unacceptable level of risk, they should be removed from the LCCO's console.	**Open**
	IÉ-IM SET Department should, consider introducing a time delay between the "Crossing Clear" buttons to prevent the LCCO pressing the second Crossing Clear button until the first Crossing Clear button times out. This time can be spent checking the confines of the level crossing for vehicles, pedestrians or other obstructions.	**Open**
	IÉ-IM CCE Department should examine the feasibility of installing signage inside the barriers of CCTV level crossings warning member of the public (MOP) what actions to take in the event of becoming trapped.	**Open**
	IÉ-IM should develop a means to make MOPs more visible should they become trapped inside level crossing barriers and position themselves adjacent to level crossing furniture or other infrastructure; where this cannot be achieved consideration should be given to examining possible initiatives or technologies that could be introduced to provide aid and assistance to LCCOs in identifying persons/obstacles that maybe trapped within the confines of a level crossing.	**Open**
	IÉ-IM should introduce measures to deter pedestrians from using unauthorised routes onto CCTV Level Crossings.	**Open**
	IÉ-IM should conduct a focussed review on the instances of MOP entrapment at Sydney Parade (LC XR004) and Serpentine Avenue (LC XR002) with a view of identifying any actions that can be taken to prevent the re-occurrence of MOP entrapments.	**Open**

Report	Safety Recommendation	Status
Chassis Plate Fracture on General Motors Class 201, Locomotive 224, 7th July 2020 (published 2021)	IÉ-RU CME and IÉ-IM CCE should carry out a risk assessment on the implications of the increased axle load of a 201 Locomotive.	**FER**
Overhead Line detachment, Pearse Station, 1st October 2020 (published 2021)	IÉ-RU CME Department should in conjunction with the OEM develop a maintenance regime for the pantographs, taking into consideration the operational conditions and traceability of safety critical components.	**FER**
	IÉ-RU and IÉ-IM should review the current Engineering Change Request and Safety Approval of Changes documents, to ensure that the appropriate stakeholders are consulted, and the correct processes followed.	**Submitted**
	IÉ-IM SET Department, should evaluate the auto-reclose function of the OHLE control system on the DART network to ensure the safe operation in the event of failures which could expose staff and passengers to live OHLE.	**Open**
Luas Overhead Line Failure, Stillorgan, 2nd November 2020 (published 2021)	TDLR should conduct a full review and update of their dewirement/incident management documents, to ensure that dewirement incidents are fully addressed; in particular in relation to zone identification for de-energised sections of track in the event of an incident. These documents should then be fully briefed to the Traffic Supervisors.	**FER**
	TDLR should include the electrical resistance measuring of vehicle earth bonding in the planned preventative maintenance regime for all trams.	**Submitted**
	TDLR should investigate the reason for the build-up of Cupric Oxide on the OCS wire. The investigation should include but not limited to: • Impact of longer trams, and congestion of trams in electrical sections; • Electrical resistance monitoring of tram to identify if high current demand is an issue; • Consequence of trams working in degraded mode on current demand; • The pantograph carbon bands and OCS interface.	**Submitted**
Luas isolation irregularity, Kylemore to Suir Road, 5th January 2021 (published 2021)	TDLR should consider increasing the visibility of the Isolation Signage (through illuminating); as well as providing a means to secure the Isolation Signage (to prevent the signage being removed by unauthorised persons).	**Submitted**
	TDLR should review and update the suite of documents related to earthing, switching, possessions and isolations to ensure that the documents are consistent in terms of the actions to be taken, referencing and terminology.	**FER**
Near miss with an IÉ CCE Worker near Gormanston Station, 21st July 2021 (RAIU Report No: 2022 – R002, published 2022)	The IÉ – IM CCE Department should develop a formalised process, through their SMS suite of documents, for IÉ-IM CCE staff walking/ working alone, which should be completed prior to any member of CCE staff going on or near the line; at a minimum consideration should be given to: • Whether it is necessary to go on or near the line to conduct the walk / work; • What local knowledge is required to walk /work safely; • Whether all the requirements of the IÉ Rule Book / SSOW can be met; • What special protection arrangements are required either at night or during the day.	**Submitted**

Report	Safety Recommendation	Status
Trend investigation into Signals Passed At Stop on the LUAS network (RAIU Report No: 2022 – R003, published 2022)	TII should determine if in-cab technological and/or mechanised systems could be introduced to assist drivers with the prevention of SAS SPAS incidents, taking into account requirements for ensuring safety risk is ALARP. Analysis should include an appraisal of available systems and the effect they may have on mitigating sub-standard driver performance.	**Open**
	TDLR should enhance the TSI Manual operating instructions for all depot and LSS locations based off site-specific risk assessments for the different locations. These enhancements should include step-by-step guidance on how trams are moved at these locations; this should include how verbal permissions are granted by LNMC.	**Submitted**
	TII should review the technical specification of the onboard AVLS console to see if it is possible to limit the inputting of the AVLS service files to when the tram is stationary; and if so, implement this change.	**Open**
	TDLR should, with the assistance of a qualified human factors expert, review the timings and locations of SPAS incidents to establish reasons as to why drivers are involved in SPAS incidents at certain times and locations	**Open**
	TDLR should, with the assistance of a qualified human factors expert, introduce training in relation to error prevention techniques as a tool for drivers to manage distraction, pre-occupation and incorrect expectation.	**Open**
	TDLR should review its current training regime with a view to increasing training and competency assessment of drivers, in particular in terms of driving in depots and LSS locations and in degraded mode.	**Submitted**
	TII should, as part of the increased driver training and competency assessment, consider the introduction of a driver training simulator which would assist in driving training in depots, LSS locations and in degraded mode.	**Open**
	TDLR should ensure that tram signals are referenced correctly in the TDLR suite of documents, this in turn should reinforce, to the drivers, which signals are Stop signals.	**Submitted**
	TDLR should establish a formalised SSC, to include stakeholders from the relevant internal and external departments (e.g. TII and local authorities) to ensure that: • In the event of a SPAS event an SSC is convened, where appropriate, to determine if any immediate actions can be taken at the signal location which may prevent a SPAS re-occurrence; • Any changes to signalling sequencing (including the introduction of new signals) are carried out as per the relevant SMS procedure to ensure that risks are not inadvertently introduced at signals; • Multi-SPAS signals are reviewed to see if there are any trend to the SPAS incidents; • Previous recommendations, related to SPAS events, from internal investigations have been addressed.	**FER**
	TDLR should update the TSI Manual and training and competency management suite of documents to include clear instructions on when emergency brake applications should be made in relation to the prevention of SPAS incidents; these instructions should be properly communicated to the drivers.	**Submitted**
	TDLR should introduced a SPAS risk scoring process for high-risk SPAS events on the Luas network, to ensure that the severity of a SPAS can be measured (best-practice should be applied if available). This scoring process can be used to assess if risks associated with the SPAS conform to TDLR risk acceptance criteria and are ALARP. The scoring process will also ensure that correct system interventions are applied, where required.	**Submitted**
	TII should research if technological and/or mechanised systems could be implemented for the entire Luas network to ensure SPAS events are immediately detected, taking into account requirements for ensuring safety risk is ALARP. Analysis should include appraisal of available systems, including systems that report detection of SPAS events to LNMC and to the driver in the cab.	**Open**

Report	Safety Recommendation	Status
Trend investigation into Signals Passed At Stop on the LUAS network (RAIU Report No: 2022 – R003, published 2022)	TII should evaluate if it is possible to introduce an audible alarm for suspected SPAS incidents at LNMC.	**Open**
	TDLR to review and strengthen the current process for the management of drivers post SPAS incident, to ensure drivers skill are further developed (through adequate re-training) and they are supported (through increased monitoring) post SPAS incident.	**Submitted**
	TDLR should develop their internal investigation processes, to develop a: • Training and competency management system for internal investigators; • Manual, or similar, outlining internal investigation processes.	**Open**
Dangerous occurrence involving a Double SPAD at Clontarf Road Station, 7th December 2021 (RAIU Report 2023-R001, published 2023)	The Head of Health & Safety IÉ-RU should arrange for the development and issue of a guidance document for drivers outlining the understanding of the ATP equipment and the driving technique required. New training, monitoring and assessment material should be developed from this guidance.	**Open**
	The Head of Health & Safety IÉ-RU should arrange for the development of a briefing for DTEs on analysis of driving trends by use of the OTDR.	**Submitted**
	IÉ-RU CME should upgrade the OTDRs on the 8500 EMU fleet to the most up-to-date version, to ensure that digital signals are recorded for ATP penalty brake applications.	**Open**
	IÉ-RU CME should consider retrofitting all EMU fleets with a Remote Diagnostic System, whereby a rule can be introduced so that DTEs are immediately notified of ATP penalty brake applications.	**Submitted**
	IÉ-IM SET should undertake a review of I-SIG-2145, Calculation of Signal Spacing Distance, to consider if the risk approaches identified in the standard are effective in relation to the calculation of the spacing of signal distances, in particular, in relation to sharp speed decreases on the approach to signals and consideration should be given to incorrect driving techniques (i.e. driving into the bonds). A review of the use of derogations should also be undertaken.	**Open**
	IÉ-IM SET should put systems in place to ensure that the train simulator staff are provided with updated signal layout schematics as and when required e.g. altered signal positions.	**FER**
	IÉ-RU CME should update its commissioning documents, to ensure that maintenance tasks commence after installation	**Open**
	IÉ-RU CME should review the 8500 EMU sanding improvement plan (2016) against current standards with a view to updating and implementing the sanding improvements to current standards.	**Open**
	IÉ-RU Ops should update the OTDR Download Assessment Form for DART drivers with only tasks pertinent to DART drivers; allowing DTEs to carry out comprehensive assessments of the DART drivers' driving techniques.	**Open**
Collision with track equipment between Newbridge and Kildare, 27th August 2021 (RAIU Report No. 2023-R002, published 2023)	IÉ-IM should consider developing a system, whereby Signalmen must provide a Unique Possession Authority Number, or similar, when authorising T3 Possessions to the PICOP; this number or safeguard should be provided to all staff prior to entering a T3 Possession.	**Open**
	IÉ-IM should review the current system of supervising and monitoring T3 Possessions, in terms of possession arrangements (e.g. Authority Number) and safety documentation (e.g. method statements); this review should identify improvements in terms of managing T3 Possessions. At a minimum, IÉ-IM should: • Expedite an increase in the supervision and monitoring of T3 Possessions by Engineering Department staff through updating CCE-SMS-001, specifically increasing monitoring prior to possessions being granted (while the IÉ-IM review and updating of supervision and monitoring of T3 Possessions is being undertaken); • Revise the current process of monitoring possessions through Safety Tours, CCESMS-008, to ensure the requirements of all guidelines are recorded in the Safety Tour Form; • Once the Safety Tours, CCE-SMS-008, documentation has been reviewed and updated, verify that the Safety Tours are being carried out correctly, and in full accordance with the guidelines, through an auditing process.	**Open**

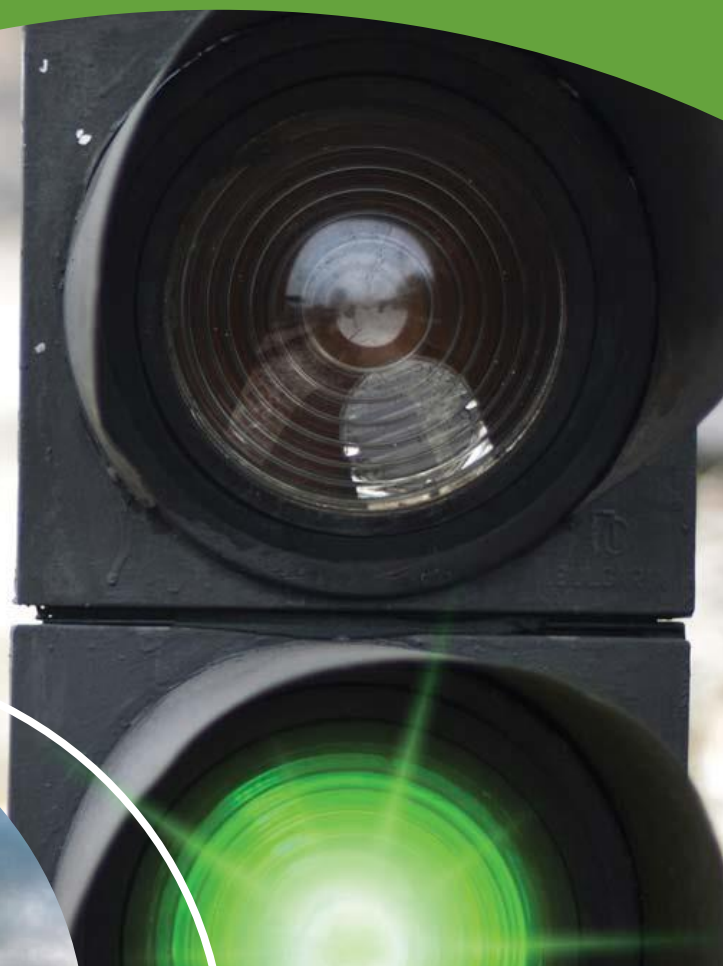
Report	Safety Recommendation	Status
Collision with track equipment between Newbridge and Kildare, 27th August 2021 (RAIU Report No. 2023-R002, published 2023)	IÉ-IM should promote a positive culture between staff, at different grades, to ensure ground level staff (including contractors) feel confident to challenge more senior staff in terms of safety. This can be achieved through staff briefing days, safety campaigns and development of a means for staff to provide feedback on supervision activities.	**Open**
	IÉ-IM should introduce processes to ensure that information submitted to the RAIU is correct and submitted within the requested timeframes.	**Open**
	The IÉ CCE Department (Engineering Department Division 3) should ensure the requirements of CCE-TMS-422 (2022) are met in full.	**Submitted**
	IÉ-IM should conduct a full review on the reporting of accidents by IÉ-IM staff and contractors, consideration should be given to: • Reviewing CCE-SMS-007 and CCE-SMS-005 to identify any areas where improvements can be made related to the reporting of safety related occurrences; where areas of concern are identified these should be addressed; • Enhance and promote its confidential reporting system to ensure all staff (with a particular emphasis on contracted staff) can report issues related to safety and welfare; • Promote a positive culture, associated with the reporting of occurrences, in an effort to eliminate on-site authority gradients whereby staff cannot challenge supervisors.	**Open**
	The CCE Department review and update CCE-SMS-001 and CCE-SMS-008 with a view to addressing the monitoring and supervision of works, in terms of quality of works that affects track safety, which are carried out under internal method statements (and contractor) method statements.	**Open**
Collision of an RRV Dumper with a member of Iarnród Éireann infrastructure maintenance staff, Tivoli, Cork, 6th July 2022 (RAIU Report No. 2023-R003, published 2023)	IÉ-IM PTS Certification training should include training on the head lights and tail lights for trains ("white lights" are coming towards you, or "red lights" are travelling away from you); and, specifically, for RRV Dumper, explain the configurable directional lights and the requirement to have red lights displayed at both ends when stationary.	**Open**
	IÉ-IM CCE should re-examine the risk assessment related to RRV movements, where previous control measures cannot be implemented (i.e. RRV engines cannot be switched off), alternatives should be considered.	**Open**
	IÉ-IM should produce and circulate a policy document for the use of mobile phones and all handheld electronic devices for the acceptable, safe and secure use and management of these devices when working on the railway.	**Open**
Failure of a Current Return Cable on a Luas Tram, Connolly Stop, 25th of October 2022 (RAIU Report No. 2023-R004, published 2023)	TDLR should develop supporting guidance documentation to WI-00814, Preparation before and after wheel turning, to include information on possible defects e.g. photographs of unacceptable levels of corrosion on the Current Return and Earth Shunt cable Lugs.	**Open**
	TDLR should consider updating LNMC Manual Document (TDLR-OP-M-0001) to include guidance for Traffic Supervisors in relation to actions to be taken in the case of failed cables and hoses.	**Open**
	TDLR should consider updating WI-00814, Preparation before and after wheel turning to include the recording of the testing and serial number of the torque wrench into TDLR-FRM-ENG-023 Citadis 401 Wheel Turning Certificate Issue A November 2020.	**Open**
	TDLR should consider updating the Wheel Turning Certificate to provide a space for the torque wrench registration number conformation of test and torque value achieved when reattaching the Current return and Earth Shunt cables with a space for sign off.	**Open**
	For instances where rolling stock is withdrawal from service as a result of damage; TDLR should develop notification procedures to identify where immediate notification to the RAIU is required.	**Open**

Report	Safety Recommendation	Status
Self-detrainment of passengers between Shankill & Bray, 24th of July 2022 (RAIU Report No. 2023-R005, published 2023)	IÉ-RU Head of Health & Safety, in conjunction with the CME Department, should develop Traction Manual for the entire 8500 Class DART fleet; this should include guidance on the air conditioning. Once complete, this should be briefed to drivers to ensure drivers fully understand how the air conditioning operates.	**Open**
	IÉ-RU Head of Health & Safety should include a check that the heating, ventilation and air conditioning systems are operational in the train preparation instructions.	**Open**
	IÉ-RU should update its Passenger Comfort Risk Register to adequately address the issues related to crowding on trains (with special consideration given to crowding during adverse weather conditions). Based on this, IÉ-RU should develop an operational SMS document for the management of crowding on trains.	**Open**
	IÉ-RU should conduct a full review of how crowding at outlying stations is managed during major events, including reviews to local crowd control plans, PTI and train dispatch documentation; to ensure that the relevant stations are staffed appropriately to adequately manage the passenger flows.	**Open**
	IÉ-RU should review its planning and management processes for large events; considerations should be given to: • How and what information is provided to passengers prior to the event (such as information in relation to predicted scale of passengers using the trains and likely conditions for their journey in order to manage passengers' expectations); • How passengers' expectations are managed for the duration of the event (such as using real time information and making this freely available through passenger announcements at stations and on the IÉ App and social media accounts).	**Open**
	IÉ-RU should review its Ontrain Customer Communications Booklet and Professional Driving Handbook, and provide drivers with additional training, to enhance driver communications with passengers. The documentation and training should consider best practice and, at a minimum, the following requirements: • An initial announcement to be made within a specified short period of time, even if the reason for the delay is not known at that point; • A further announcement to be made as soon as further information is available about the cause and likely consequences of the delay; • Further announcements, at specified intervals, should be made whenever new facts suitable for informing and/or reassuring passengers become available; • In critical conditions, announcements should be made to dissuade passengers from detraining, these should include making announcements highlighting the risks involved with detraining and their safest option is to remain on the train.	**Open**
	IÉ-IM should carry out a review to determine the suitability of direct messaging (visually and/or verbally) from CTC directly onto trains, consideration should be given as to whether it would improve onboard passenger communications.	**Open**
	IÉ-RU should consider developing processes, in the case of emergency situations, to provide information through social media channels; these communications must be customer-friendly in order to encourage passengers to follow any directions given.	**Open**
	IÉ-IM should develop suitable instructions and guidance for operational staff at CTC to help them determine when a train should be considered as stranded (consideration should be given to the proximity of the stranded train to a station); the timeframe within which this needs to be declared and the actions that then need to be taken must be set out. Where appropriate, these instructions and guidance should be included in the IÉ Rule Book and relevant associated documentation.	**Open**
	IÉ-IM should develop suitable instructions and guidance for operational staff at CTC to help them determine when a train should be considered as stranded (consideration should be given to the proximity of the stranded train to a station); the timeframe within which this needs to be declared and the actions that then need to be taken must be set out. Where appropriate, these instructions and guidance should be included in the IÉ Rule Book and relevant associated documentation.	**Open**

Report	Safety Recommendation	Status
Self-detrainment of passengers between Shankill & Bray, 24th of July 2022 (RAIU Report No. 2023-R005, published 2023)	IÉ-IM, and IÉ-RU, should review and formalise its processes for the attendance and allocation of staff requirements at CTC for major events, to determine what members of staff need to be present.	**Open**
	IÉ-RU and IÉ-IM should carry out an incident simulation in terms of a scenario involving an incident with the potential for self-detrainment. As part of this simulation, the relevant stakeholders (An Garda Síochána, Dublin Fire Brigade, etc.) should be invited to participate. Any lessons learnt such be adopted into the relevant guidance documents.	**Open**
	IÉ-RU should review its high level emergency preparedness, crowd control plans, risk assessments, train evacuation briefing notes and all other relevant document to include guidance on self-detrainments. Once complete, they should be circulated to the relevant departments and stations, for briefing.	**Open**
	IÉ-RU CME should carry out an assessment on the quality of the public address systems on EMUs against good practice standards and address any deficits.	**Open**
	IÉ-RU Health & Safety should ensure that train preparation instructions should include a check that public address systems are working prior to trains entering service.	**Open**
	IÉ-IM & IÉ-RU should review the suite of documents in relation to the planning of large events to ensure that all key personnel are involved in the planning of events.	**Open**
	IÉ-IM should update the IÉ Rule Book to include instructions for drivers in the event of self-detrainment and/ or stranded trains; these requirements should then be incorporated into the relevant associated documents.	**Open**
	IÉ-IM should develop procedures for the evacuation of passengers over trespass guards, these should then be included in the Train Evacuation Briefing Notes and other relevant documents which reference evacuations.	**Open**
	IÉ should engage with the relevant parties of An Garda Síochána to ensure that there is a shared understanding at CTC of when and how instructions from An Garda Síochána should be complied with. This can be practiced through IÉ-RU incident simulations where An Garda Síochána are in attendance.	**Open**
	IÉ-IM and IÉ-RU should develop a system whereby internal recommendations as a result of safety related incidents are logged with an allocated timeframe, and the actions taken verified, and the status recorded.	**Open**
Broken rail, Newbridge, Kildare, 23rd February 2023 (RAIU Investigation Report No: 2024-R001, published: 18th January 2024)	Safety Recommendation 2024001-01 – IÉ-IM should risk assess whether the existing rail end cleaning equipment and processes adequately control the risk of weld contamination and identify improvements where required.	**Open**
	IÉ-IM to investigate altering the monitoring and detection parameters of the rail welding machine to be able to identify and highlight possible anomalies in the welding process.	**Open**
	IÉ-IM to revise the risk assessments for the Portlaoise Rail Welding Plant to ensure risks in the production process affecting the quality of rail welds are understood and control measures are identified.	**Open**
Broken Rail near Emly, County Tipperary, 22nd February 2023 (RAIU Investigation Report No: 2024-R002, published: 22nd March 2024)	IÉ-IM CCE to update CCE-TMS-323, to include a more robust guidance for welders, in relation to recognising when there may be issues with the Rail Tensors; and what actions are to be taken when difficulties arise with the Rail Tensors	**Open**
	IÉ-IM CCE should review the current suite of documents related to welding to ensure consistency across the relevant documents.	**Open**
	IÉ-IM CCE should develop systems for the management and certification of rail stressing equipment (including contractor's rail stressing equipment), to ensure equipment is regularly serviced and recalibrated at a nominated frequency. These updated requirements should be reflected in the relevant documents.	**Open**

Report	Safety Recommendation	Status
Broken Rail near Emly, County Tipperary, 22nd February 2023 (RAIU Investigation Report No: 2024-R002, published: 22nd March 2024)	IÉ-IM CCE should review and update the CWR Record Sheet to include sections for recording the serial number and calibration/ recalibration date of the Rail Tensors being used, the pressure gauge readings and the frequency of these checks on the pressure gauges. On completion, ensure staff are briefed on the changes, and changes should be incorporated into future training programmes for a Person in Charge of Stressing.	**Open**
	IÉ-IM CCE should update CCE-TMS-323 to include guidance for the Person in Charge of Stressing, in relation to actions to be taken when difficulties are encountered with Thermit SoW-5 (including when Thermit SoW-5 can continue, be restarted or must be abandoned; and, who is responsible for this decision, the Person in Charge of Stressing or their Supervisor). On completion of the update, Persons in Charge of Stressing should be briefed and the training programme for the role revised with the new guidance.	**Open**
Collision between a car and a train at Level Crossing XM190, Mayo, 9th September 2023 (RAIU Investigation Report No: 2024-R003, published:12/12/2024)	The Department of Transport should continue to trial the new design sign (Sign W126), in consultation with the relevant stakeholders, with a view to replacing Sign W121. The RAIU maintain that the advance warning signs on the approaches to OP Type level crossings should portray the hazard (i.e. the road user is approaching a live railway) and indicate the severity of not adhering to the warning (i.e. possible collision with a train).	**Open**
	IÉ-IM should replace their "Warning Trains" sign, located at OP Type level crossings, to the new proposed advance warning sign (Sign W126), once included in the Traffic Signs Manual.	**Open**
Light blue – IÉ-RU / IÉ-IM; dark blue – TDLR; yellow – DLR; lilac indicates a joint recommendation between IÉ-IM & the CRR; orange indicates a recommendation associated with TII; pink indicates a recommendation associated with TII and TDLR.		

Appendices



Appendix 1 – Railway Organisations

The following railway systems are within the RAIU's remit:

- IÉ, the national heavy rail network;
- The Luas light rail system in Dublin;
- The Bord Na Móna industrial railway;
- Seven operational heritage & minor railway systems.

For each of these railway systems there are entities identified as Railway Undertakings (RUs) and Infrastructure Managers (IMs). RUs are defined as organisations that provide the transport of goods and/or passengers by rail on the basis that the undertaking must ensure traction, including undertakings that provide traction only; which operate under an SMS approved by the CRR through the issue of a safety certificate. IMs are defined as organisations that establish and maintain railway infrastructure, including the management of infrastructure control and safety systems; which operate under a SMS approved by the CRR through the issue of a safety authorisation.

The national heavy rail system is owned by IÉ, within IÉ there are separate IM and RU Business Divisions. The heavy rail system is interoperable with the heavy rail system in Northern Ireland and cross border services are operated by IÉ in conjunction with Translink, the RU in Northern Ireland. These operations are carried out under IÉ's Safety Case and Translink is classified as a guest operator. A heritage RU, The Railway Preservation Society of Ireland, also operates steam trains on the heavy rail system several times a year. Rhomberg Sersa operate as an RU on IÉ's rail system; they operate and maintain OTMs on behalf of IÉ.

The Luas light rail system is owned by the Railway Procurement Agency. TDLR is the RU that operates passenger services, the passenger stops and the Central Control Room. TDLR is also the IM responsible for the maintenance of the infrastructure.

The Bord Na Móna industrial railway is owned and operated by Bord Na Móna, acting as the RU and IM for the transport of peat on its network. As this is an industrial railway and does not carry passengers it only falls within the RAIU's remit where the railway interfaces with the public, such as at level crossings and bridges.

The operational heritage railway & minor systems are:

- Difflin Lake Railway, Oakfield, Raphoe, Co Donegal;
- Finntown & Glenties Railway, Co Donegal;
- Listowel Lartigue Monorail, Co Kerry;
- Waterford & Suir Valley Railway;
- Irish Steam Preservation Society, Stradbally, Co Laois;
- Cavan & Leitrim Railway, Dromod, Co Leitrim;
- Connemara Railway, Co. Galway.

Appendix 2 – Notification (Immediate & Monthly Bulk)

Immediate notification

The schedule of immediate notifications is as follows:

ID	Schedule of immediate notification occurrences
1.01	Occurrences relating to rolling stock in motion resulting in one or more fatalities or serious injuries. *Exceptions: Serious injury/fatality due to assault or fatality due to natural causes.*
1.02	*Level crossing accidents* involving rolling stock.
1.03	Collisions between rolling stock causing damage or blocking a running line with harmful consequences.
1.04	Collisions of rolling stock with arrestor mechanisms/buffer stops with harmful consequences.
1.05	Derailments of rolling stock.
1.06	Fires, smoke or explosions on rolling stock requiring the evacuation of passengers from a train or a station.
1.07	The release or combustion of dangerous goods being carried on rolling stock.
1.08	Occurrences leading to the closure of a railway line for more than 6 hours. *Exceptions: Weather related occurrences.*
1.09	Any occurrences that lead to extensive damage.
1.10	Wrong side failures of safety critical equipment that led to an unsafe condition requiring withdrawal from service.
1.11	Unintentional divisions of rolling stock where passengers had access to a gangway.
1.12	SPADs resulting in rolling stock exceeding the signal overlap and involving conflicting movements. *Inclusion for IÉ: All High Risk Category A SPADs (Risk Ranking between 20 – 28) should be reported to the RAIU when the SPAD Risk Ranking has been established.*
1.13	Occurrences that under slightly different conditions may have led to a fatality, serious injury or extensive damage.
1.14	Occurrences related to passenger trap-and-drag t in doors when rolling stock is in motion.
1.15	Occurrences of axle bearing failures in service.

Monthly bulk notifications

The schedule for monthly bulk notifications is as follows:

ID	Description
2.01	Unexpected failures of assets that led to an unsafe condition.
2.02	Unintentional divisions of rolling stock released for service.
2.03	SPADs with no risk of conflicting movements. *Inclusion for IÉ: All SPADs, the monthly notification should include the Risk Ranking for all Category A SPADs.*
2.04	Fires, smoke or explosions on rolling stock not requiring the evacuation of passengers.
2.05	Collisions with large objects or large animals. *Exceptions: Where the intent was vandalism or criminal damage.*
2.06	Non railway vehicles damaging or fouling a railway line. *Exceptions: Where the intent was vandalism or criminal damage.*
2.07	Collisions between light rail vehicles and road vehicles.
2.08	Any other occurrence where an investigation remit has been issued internally.

Appendix 3 – Classification of occurrences & investigations by the RAIU & other bodies

Classification of occurrences

Occurrences fall into one of three types as defined in European Union (Railway Safety) (Reporting and Investigation of Serious Accidents, Accidents and Incidents) Regulations 2020 (S.I. 430 of 2020):

- Accident – An unwanted or unintended sudden event or a specific chain of such events which have harmful consequences including collisions, derailments, level crossing accidents, accidents to persons caused by rolling stock in motion, fires and others;
- 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;
- Incident – Any occurrence, other than an accident or serious accident, associated with the operation of trains and affecting the safety of operation.

For clarity, the meaning of the following terms should be noted:

- Harmful consequences – Injury to persons and/or damage to equipment;
- Serious injury – Any injury requiring hospitalisation for over 24 hours.

RAIU investigation of occurrences

The RAIU have investigators on call, twenty-four hours a day, seven days a week, who are notified of reportable occurrences by the RUs in accordance with European Union (Railway Safety) (Reporting and Investigation of Serious Accidents, Accidents and Incidents) Regulations 2020 (S.I. 430 of 2020). Based on the nature of the occurrence and the legal requirements, a decision is made on whether or not an investigation is required. In accordance with the Railway Safety Directive, the RAIU must investigate serious accidents; accidents and incidents are investigated depending on the potential for safety lessons to be learnt.

Where notified occurrences warrant further investigation to determine whether or not an investigation is warranted a preliminary examination is carried out and one of the following three determinations is made:

- No further investigation – no safety improvements are likely to be identified that could have prevented the occurrence or otherwise improve railway safety;
- Full investigation – there is clear evidence that the occurrence could have been prevented or the severity of the outcome could have been mitigated through the actions of those parties involved either directly or indirectly in the installation, operation and maintenance of the railway;
- Full investigation (Trend) – 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.

Investigations are classified as one of three types under the Railway Safety Directive (2016/798):

- Article 20(1) – Investigations into serious accidents on the IÉ network, the objective of which is possible improvement of railway safety and the prevention of accidents;
- Article 20(2) – Investigation into accidents and incidents, which under slightly different conditions might have led to serious accidents;
- Article 22(6) – Investigations into railway accidents and incidents under national legislation, this includes all investigations relating to the Luas light rail system, the Bord Na Móna industrial railway and the heritage railways.

For each investigation, the level of damage to rolling stock, track, other installations or environment is identified and classified based on the European common safety indicators as follows:

- None;
- Less than €150,000 (<€150,000);
- Equal to or greater than €150,000 (≥€150,000);
- Equal to or greater than €2,000,000 (≥€2,000,000).

The RAIU, as soon as practicable but not later than 2 months after receipt of the notification, decide whether or not to start an investigation concerning the accident or incident European Union (Railway Safety) (Reporting and Investigation of Serious Accidents, Accidents and Incidents) Regulations 2020. The RAIU advise the relevant railway undertaking of the decision. In accordance with S.I. No. 430/2020 - European Union (Railway Safety) (Reporting and Investigation of Serious Accidents, Accidents and Incidents) Regulations 2020, the RAIU also notify the ERA within seven days of a decision to carry out a full investigation into an occurrence on the IÉ network.

Investigations by other bodies

The CRR, An Garda Síochána, the Health and Safety Authority and other organisations may carry out investigations in parallel with an RAIU investigation. The RAIU will share its own technical information with these Investigation Bodies; however, the investigations are carried out independently. Based on its investigation, the RAIU produce a report that is provided to all relevant parties, including the Railway Undertaking, the CRR and the DoT. Reports relating to the IÉ network are also provided to ERA. All investigation reports are made available in the public domain once they have been published.

In accordance with the Railway Safety Act 2005 (53(6)), a railway undertaking shall in an expeditious manner carry out an investigation and shall, as soon as practicable but in any event not later than 6 months after the date of the incident, prepare a report on its findings.

Appendix 4 – Abbreviations

ALCC	Athlone Local Control Centre
AO	Additional Observation
APWI	Acting Permanent Way Inspector
ATP	Automatic Train Protection
AVLS	Automatic Vehicle Location System
BnM	Bord na Móna
CaF	Causal Factor
CAWS	Continuous Automatic Warning System
CCE	Chief Civil Engineer
CCTV	Closed Circuit Television
CME	Chief Mechanical Engineer
CoF	Contributing Factor
CRR	Commission of Railway Regulation
CTC	Centralised Traffic Control
DART	Dublin Area Rapid Transit
DIL	Door Interlock Light
DIR	Daily Incident Reports
DLR	Difflin Light Rail
DMU	Diesel Multiple Unit
DoT	Department of Transport
DRA	Driver Reminder Appliance
DSS	Driver Support System
ECO	Electrical Control Operator
EMU	Electrical Multiple Unit
ES	Engineering Supervisor
ESS	Electrical Sub-Station
EU	European Union
FER	Further Evidence Requested
FFCCTV	Forward facing CCTV
GO	General Operative
hrs	hours
HSA	Health & Safety Authority
HSCB	High Speed Circuit Breaker
ICR	InterCity Railcar
IÉ	Iarnród Éireann

IÉ-IM	Iarnród Éireann Infrastructure Manager
IÉ-RU	Iarnród Éireann Railway Undertaking
IM	Infrastructure Manager
km/h	kilometres per hour
LCCO	Level Crossing Control Operator
LME	Light Maintenance Equipment
LNMC	Luas Network Management Central
LRA	Low Rail Adhesion
LSS	Line Signalling System
LTCD	Laois Traincare Depot
m	metre
MCB	Main Circuit Breaker
MEWP	Mobile Elevated Working Platform
mm	millimetre
MOP	Member of Public
MoU	Memorandum of Understanding
MP	Mile Post
mph	miles per hour
NIB	National Investigation Body
NIR	Northern Ireland Railways
NSA	National Safety Authority
OBG	Overbridge Galway
OCS	Overhead Contact System
OEM	Original Equipment Manufacturer
OHLE	Overhead Line Equipment
OI	Operating Instruction
OTDR	On train/tram data recorder
OTM	On track machinery
PEIO	Plant, Equipment, Infrastructure & Operations
PER	Preliminary Investigation Report
PICOP	Person in Charge of Possession
PIC-RRV	Person in Charge Road Rail Vehicle
PPI	Points Position Indicator
PPRN	Possession Plan Reference Number
PTI	Platform Train Interface
RAIU	Railway Accident Investigation Unit

RMME	Rail Mounted Maintenance Equipment
RRV	Road Rail Vehicle
RRVO	Road Rail Vehicle Operator
RTC	Road Traffic Collision
RTS	Ready to Start
RU	Railway Undertaking
SAN	Safety Advice Notice
SAS	Start Against Signal
SCADA	Supervisory Control And Data Acquisition
SET	Signalling, Electrical and Telecommunications
SI	Statutory Instrument
SLW	Single Line Working
SMS	Safety Management System
SF	Systemic Factor
SPAD	Signal Passed at Danger
SPAS	Signal Passed at Stop
SSC	Signal Sighting Committee
SSOW	Safe System of Work
T-COD	Track Circuit Operating Device
TDLR	Transdev Dublin Light Rail
TED	Traffic Event Database
TGA	Traction Gel Applicators
TII	Transport Infrastructure Ireland
TPS	Train Protection System
TRV	Track Recording Vehicle
TSC	Track Safety Co-ordinator
TSI	Tramway Safety Instruction
UBA	Underbridge Athlone
UF	Underlying Factor
USAN	Urgent Advice Safety Notice
WI	Work Instruction
WSP	Wheel Slip Protection

Appendix 5 – Definitions

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.
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.
Cardan Shaft	A shaft with a universal joint at each end, which transmits torque and rotation between two misaligned components of a transmission system.
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.
Control, Command & Signalling	Control-command and signalling on-board subsystems of vehicles which are (or are intended to be) operated on and control-command and signalling trackside subsystems of the rail network.
Derailing points	A set of points used to derail a rail vehicle.
Hot tear	Caused by rail movement before the weld has set. The hot tear occurs as the weld contracts when solidifying. Causes include: thermal contractions, inadequate welding temperature and improper solidification.
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
Rail Tensors	Hydraulic devices for extending CWR during stressing. A set of tensors refers to sufficient equipment to tension both rails at the same time. Tensors shall be operated only by persons suitably trained and certificated.
Rake	In the case of BnM vehicles, a rake is a locomotive with sixteen flat wagons.
Road Rail Vehicle	A dual mode vehicle than can operate both on rail tracks and road mostly used for rail infrastructure maintenance.
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.
Signal Passed at Danger	Signal passed at danger where not in accordance with the governing safety rules, this includes signals passed at stop.
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	Absolute possession no operational train movements. Engineering trains On Track Machinery/ RRV movements are permitted. Planned Engineering Work.

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