

Railway Accident Investigation Unit Ireland



Annual Report
2022

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. It is not the purpose of an investigation to attribute blame or liability.

In May 2022, the RAIU published the report into the Luas pantograph collision with railway bridge, Beresford Place (which occurred on the 11th June 2021); this investigation focused on the cause for the collision and also on how the incident was managed by Transdev Dublin Light Rail (TDLR).

In July 2022, the RAIU published the report into the near miss of a train with an Iarnród Éireann (IÉ) near Gormanston Station (which occurred on the 21st July 2021) and focused on the process for IÉ staff walking or working safely on a running line.

The final report published by the RAIU in 2022 was trend investigation into Signals Passed At Stop (SPAS) on the LUAS network; the investigation identified thirty-six SPAS incidents during the period January 2019 to 30th June 2021 and focused on the reason drivers pass signals at stop and how best to prevent a reoccurrence.

The three reports resulted in a total of twenty-one safety recommendation being made.

A total of 261 safety recommendations have been issued since the appointment of a Chief Investigator for the RAIU in 2007 to the end of 2022.

The Commission for Railway Regulation (CRR) monitors the implementation of safety recommendations and has advised that of the 240 safety recommendations issued: 168 have been closed out as having been addressed (64%); further evidence has been requested by the CRR for thirty recommendations (12%); and sixty-three recommendations remain open or in progress (24%). Although rail and tram travel statistically remains a safe means of travel and good progress has been made in closing out safety recommendations, continued cooperation from the industry is still required.

In addition to the published investigation reports, two investigations, commenced in 2021, continued to be investigated through 2022, namely the collision between an IÉ train and rail equipment between Newbridge and Kildare (27th August 2021) and a dangerous occurrence involving a Double Signal Passed at Danger (SPAD) at Clontarf Road Station, 7th December 2021.

In 2022, fifty-four preliminary examination reports (PERs) were completed by the RAIU, thirty-seven originated from IÉ, sixteen from TDLR and one from a heritage railway. 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 three in full investigations being commenced, namely: the collision of an Road Rail Vehicle (RRV) Dumper with a member of IÉ infrastructure maintenance staff, Tivoli, Cork (6th July 2022); IÉ self-detrainment of passengers from DART trains, between Shankill and Bray (24th July 2022) and Luas tram current return circuit failure at Connolly Stop, 25th October 2022. All three investigation are progressing and are on schedule for publication in 2023.

In November 2022, the RAIU were subject to of a peer review by a panel of investigators from other national investigation bodies (NIBs). The scope of the peer review includes a review of the RAIU's organisation, investigation activities and processes, training, resources, and report preparation and publication. Four findings, as a result of the peer review, were issued in December 2022 and related to the report structure, refresher training for long serving members of staff, the establishment of a Memorandum of Understanding between the RAIU and An Garda Síochána; and the requirement to nominate a Deputy Chief Investigator.

Finally, during 2022, the RAIU had to plan for the upcoming retirement of two Senior Investigators, which required the recruitment of two new Senior Investigators.

David Murton
Chief Investigator

27th September 2023

Contents

Introduction to the RAIU.....	2
Legal Basis.....	2
The RAIU's role and aim.....	2
Organisation.....	3
Organisation Flow.....	3
The Commission for Railway Regulation (CRR).....	3
European Union (EU) Agency for Railways.....	3
Memorandums of Understandings (MoUs) & co-operating bodies.....	3
Peer Review of the RAIU.....	4
Investigation Activities.....	6
Notification of incidents and accidents to the RAIU.....	6
2022 Preliminary Examination Reports.....	7
1 st January 2022 to 31 st December 2022.....	7
Categorisation of Preliminary Examination Reports.....	14
2022 Full Investigations.....	19
Full investigations commenced & continued in 2022.....	19
Full Investigations published in 2022.....	29
2022 Monthly Bulk Notifications.....	38
IÉ 2022 Monthly Bulk Notifications.....	38
TDLR 2022 Monthly Bulk Notifications.....	39
2022 Urgent Safety Advice Notice / Safety Advice Notice.....	41
Tracking Safety Recommendations.....	43
Monitoring of RAIU safety recommendations.....	43
Status of RAIU safety recommendations.....	44
Status of individual RAIU safety recommendations.....	45
Table 1 – RAIU safety recommendations made in 2022.....	46
Table 2 – RAIU safety recommendations closed in 2022.....	48
Table 3 – RAIU safety recommendations with FER status in 2022.....	50
Table 4 – RAIU safety recommendations Open/ In Progress in 2022.....	54
Table 5 – RAIU safety recommendations closed prior to 2022.....	58
Appendix 1 – Railway Organisations.....	69
Appendix 2 – Notification (Immediate & Monthly Bulk).....	70
Immediate notification.....	70
Monthly bulk notifications.....	71
Appendix 3 – Classification of occurrences & investigations by the RAIU & other bodies.....	72

Appendix 3 – Abbreviations	74
Appendix 4 – Definitions	77

General Information & Non-Investigation Activities



Introduction to the RAIU

Legal Basis

The RAIU is an independent investigation unit within the Department of Transport (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 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 Iarnród Éireann (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 2022, the RAIU comprised of a Chief Investigator, three Senior Investigators and an administrator.

Two of the three Senior Investigators are due to retire in 2023/4, as a result, two Senior Investigators were recruited in 2022 and due to commence in January 2023.

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 2022 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.

Memorandums of Understandings (MoUs) & co-operating bodies

The RAIU continues to participate in Memorandums of Understanding 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 volunteered 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 the RAIU's Chief Investigator has been a panel member in many of these peer reviews.

In November 2022, the RAIU were subject to of a peer review. The scope of the peer review covers:

- Organisation – In relation to the structure of the NIB and whether if it is capable of meeting its obligations to investigate accidents and incidents required by the legislation and regulations under which it operates;
- Activity – To establish the number and type of accidents, incidents and field deployments in order to identify if the NIB's resources are adequate to meet its obligations;
- Training – To determine if individuals involved in investigations have and maintain the required competences and that sufficient financial provision is available to provide the necessary training;
- Resources – To identify, after considering any standing arrangements, if equipment, infrastructure and manpower is sufficient for the NIB to meet their obligations;
- Investigation process – To determine if processes are in place to enable the NIB to conduct an efficient and timely investigations;
- Report preparation and publication – To determine if there are adequate processes and procedures for event notification, event classification, report drafting and publication for the NIB to meet their obligations;
- Handling Safety Recommendations – To determine if there are processes and procedures in place to ensure the consistent drafting and issuing of safety recommendations;
- Health and Safety – To provide guidance to NIBs to assist them in establishing adequate Health & Safety measures to protect investigators working at accident sites;
- Good and best practice – To highlight good/ best practice in the NIB.

The findings of the report were issued in December 2022. Four area of improvement were identified as:

- The report structure used by NIB should be assessed in order to follow up more closely the report structure set out by the annex to the 2020/572 regulation (it should be noted that this has not been adopted, in full, by any NIB to date);
- The NIB should consider the need for refresher training of investigators in order to maintain their competence (this was specific for two investigators who have been in the roles for over thirteen years);
- Accelerate the process of concluding of creating an Memorandum of Understanding, that defines the on-site working arrangements, between the RAIU and An Garda Síochána;
- 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.

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.

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.

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 2022, the RAIU compiled fifty-four PERs as outlined in the following pages.

2022 Preliminary Examination Reports

1st January 2022 to 31st December 2022

Reporting Railway Body*	Date of occurrence	Location of Occurrence	Classification of Occurrence	Classification subset	Summary	Fatalities/ Injuries
IÉ-IM	10 January 2022	South of Donabate Station, Dublin	Serious Accident	To persons due to rolling stock in motion	A male accessed the railway from behind housed equipment and was struck and fatally injured by a train.	1 Fatality due to apparent self-harm
TDLR	21 January 2022	Red Cow Depot, Dublin	Accident	Collision	During the shunting movement of dead Tram 3003, maintenance staff lost radio communications, resulting in one of the maintenance technicians failing to hear an instruction to stop live tram 3024, with Tram 3003 being pushed into and colliding with a buffer stop, resulting in minor damage to Tram 3003.	0
IÉ-RU	28 January 2022	Donabate, Dublin	Serious Accident	To persons due to rolling stock in motion	A male, walked onto to railway line and was facing the direction of an approaching train, when he was struck an fatally injured.	1 Fatality due to apparent self-harm
IÉ-RU	07 February 2022	Inchicore Works, Dublin	Accident	Derailment	A decommissioned DART unit that had been sitting in sidings for several years derailed as it was being moved from the siding. The was no damage.	0
IÉ-IM	10 February 2022	Down Road, Cork Line	Accident	Collision	While one RRV Dumper was off-tracking it was struck by another RRV Dumper.	0
IÉ-IM	16 February 2022	Newry, Northern Ireland	Accident	Collision	A train struck a hand tool which was left in the five-foot, causing minor damage to the train.	0
IÉ-IM	16 February 2022	Killester, Dublin	Accident	To persons due to rolling stock in motion	A male, who was located near Killester platform, walked out in front of an approaching train and was struck and injured.	1 Injury due to apparent self-harm
TDLR	06 March 2022	Saggart, Dublin	Accident	Derailment	When Tram 3009 completed a movement from Saggart to Belgard, the driver changed ends, however, the points had not reset and the signal remained at stop. The driver did not look at the signal, proceeded over the points and derailed. There was no damage to the tram.	0
IÉ-RU	10 March 2022	Dublin to Waterford Line	Accident	Derailment	An RRV Dumper was side tipping spoil when it derailed and overturned.	0
IÉ-RU	14 March 2022	Dublin Port	Accident	Collision	During a shunting movement involving the propelling of twelve laden and one empty Tara Mines Wagons by Locomotive 082, the rear wagon struck the buffer stop at Dublin Port. After striking the buffer stop, the rear wagon continued moving along the track before derailling, damaging the buffer stop and wagon. The driver applied the brake but advised of Low Rail Adhesion.	0

Railway Body	Date of occurrence	Location of occurrence	Classification of occurrence	Classification subset	Summary	Fatalities/ Injuries
IÉ-IM	05 April 2022	Inchicore, Dublin	Accident	Derailment	As an RRV Dumper was travelling towards a worksite, one of the front wheels became detached when travelling over HN704B points and derailed, the points were undamaged.	0
TDLR	08 April 2022	Kylemore, Dublin	Accident	Collision	A Traffic Supervisor authorised a Test Tram to depart the Red Cow, crossover at Blackhorse, and return to the Red Cow. At Kylemore, which was under isolation, the Test Tram struck the Isolation Signage and Earthing Straps before entering the isolated section. The pantograph of the Test Tram bridged the live section to the isolated section resulting in the Kylemore to Suir Road electrical section becoming live before tripping out. There was damage to the signage and earth straps. The driver or maintenance staff were uninjured.	0
IÉ-RU	13 April 2022	Sutton Level Crossing, XQ002	Accident	Collision (Level Crossing)	A truck carrying a JCB collided with the Over Head Line Equipment (OHLE) at Sutton Level Crossing LX XQ002 and failed to stop. The collision damaged the OHLE and a level crossing barrier.	0
IÉ-RU	15 April 2022	Woodbrook (Bray), Wicklow	Accident	Collision	While operating on site, one RRV Dumper reversed into another RRV Dumper.	0
IÉ-IM	27 April 2022	Roscrea, Tipperary	Accident	Collision	During a runaround movement at Roscrea Station involving a materials train, ID W260, the side of Locomotive 086 collided with the rail panels which were on the rear wagon of the train, that were fouling the line. The train was stationary on the main line through the station and Locomotive 086 was moving on the loop line. Locomotive 086 had been incorrectly permitted to enter the T3 possession while the materials train was on the mainline.	0
TDLR	11 May 2022	Cookstown Interchange, Dublin	Incident	Traffic Operations & Management	Tram 3013 passed a stop signal at the Cookstown inbound Interchange on a conflicting route with an outbound Belgard to Saggart tram. The driver of Tram 3013 did not observe that the signal was displaying a stop aspect and continued through the interchange.	0
IÉ-RU	18 May 2022	Thurles, Tipperary	Accident	Derailment	An RRV Dumper was side casting ballast along the cess when the rail wheel raised above the rail and derailed.	0
IÉ-RU	19 May 2022	Thurles, Tipperary	Accident	Derailment	An RRV Dumper was side casting ballast along the cess when the rail wheel raised above the rail and derailed.	0
IÉ-RU	30 May 2022	Harmonstown Station, Dublin	Serious Accident	To persons due to rolling stock in motion	A male jumped in front of a train approaching Harmonstown Station and was fatally injured.	1 Fatality due to apparent self-harm

Railway Body	Date of occurrence	Location of occurrence	Classification of occurrence	Classification subset	Summary	Fatalities/ Injuries
TDLR	31 May 2022	Sandyford Depot, Dublin	Accident	Collision	TDLR Fleet Maintenance were in the process of moving Tram 5005 around the workshop at Sandyford Depot. When exiting Workshop 3 the pantograph contacted a gantry crane. The crane had not been located in its normal home position and the warning light to warn the driver of its position was not properly positioned or working.	0
IÉ-IM	09 June 2022	Inchicore Works, Dublin	Accident	Derailment	During a traction shunting movement of Locomotive 079 towards the Spray Paint Facility at Inchicore Works, the two lead wheel sets of the lead bogie of Locomotive 079 became derailed.	0
IÉ-RU	16 June 2022	Inchicore, Dublin	Accident	Derailment	An RRV (jeep) was carrying out weed spraying. The Engineering Supervisor asked the Person in Charge of Possession (PICOP) to request 703 points to be put in reverse; however, the points should have been left in normal for the movement. As a result the RRV derailed when it travelled over the points.	0
IÉ-IM	20 June 2022	Malahide, Dublin	Incident	Traffic Operations & Management	A train (Train E700) departed from Malahide Station at approximately 23:44 hrs. Two minutes later, at approximately 23:46 hrs there was a power outage in the OHLE between Malahide and Portmarnock Stations. Train E700 stopped as there was no power available. The OHLE did not take the reset. At approximately 00:00 hrs, the driver of Train E700 contacted the Signaller to report that a door had been pulled open and he could see two men walking back along the track towards Malahide Station. At this time there were no trains moving in the area due to the OHLE power outage. Staff made their way to the train from Malahide Station and commenced detrainment passengers from the failed train and walked them back to Malahide station. This self-detrainment forms part of the investigation into the self-detrainments between Shankill and Bray on the 24 th July 2022, see pages 20 and 21.	0
TDLR	27 June 2022	Red Cow Depot, Dublin	Incident	Rolling Stock	The driver of Tram 2030 reported that there was smoke coming from one of the tram's bogies, the tram was removed from service and taken into the depot for inspection. It was found that a number of the retaining grub screws on the wheel were fractured; with the remaining screws unable to hold the assembly together. The design of the wheel prevented the tyre from separating, preventing catastrophic failure.	0
IÉ-RU	28 June 2022	Grand Canal Dock	Incident	Rolling Stock	The driver of Intercity Railcar 22262 reported that while completing train dispatch he saw that the blue door interlock light (DIL) was illuminated, the door was locked while in service. IÉ-RU found that during a modification a was incorrectly placed resulting in the set showing an illuminated blue DIL with the door open.	0

Railway Body	Date of occurrence	Location of occurrence	Classification of occurrence	Classification subset	Summary	Fatalities/ Injuries
TDLR	28 June 2022	Queen Street / Benburb Street	Accident	Collision	As Tram 3002 travelled through the junction with a proceed signal when it was struck by a motor vehicle which breached a red light.	0
IÉ-IM	06 July 2022	Tivoli, Cork	Accident	To person due to rolling stock in motion	An RRV was moving forward on request from the PIC when it struck a member of IÉ-IM engineering staff who was walking in the five foot. The staff member suffered minor injuries to his nose, arms and ribs. The RAIU commenced a full investigation into this accident which is outlined on pages 18 and 19.	1 Injury
IÉ-IM	12 July 2022	Monasterevin Station, Kildare	Serious Accident	To person due to rolling stock in motion	As a train was approaching Monasterevin Station a male jumped from the platform onto the track in front of the train, was struck and fatally injured.	1 Fatality due to apparent self-harm
TDLR	13 July 2022	Benburb Street / Temple Street West Junction	Accident	Collision	As Tram 3002 travelled through the junction with a proceed signal when it was struck by a motor vehicle which breached a red light. Driver of car sustained neck injuries.	1 Injury
TDLR	21 July 2022	Capel Street / Mary Abbey Junction	Accident	Collision	Tram 3023 passed a stop aspect and travelling into the junction. A motor vehicle, had a green light, entered the swept path of Tram 3023, and made contact with the tram.	0
IÉ-RU	24 July 2022	Bray, Wicklow	Incident	Traffic Management & Operations	During hot weather, and while travelling to the Bray Air Display, three delayed trains which were stopped at signals, began self-detraining, with an estimated 2,000 passengers self-detraining. The RAIU commenced an investigation into the incident which is further outlined in pages 20 and 21.	17 treated by the national ambulance service.
IÉ-RU	25 July 2022	Portarlinton, Laois	Accident	Derailment	A locomotive and wagons were moving materials along the sidings to the Down running loop at Portarlinton Station, the siding and adjacent running lines were under a possession. As the locomotive was propelling the wagons along the siding the leading bogie of the front wagon derailed at trap points which were not correctly set for the movement, there was some damage to eight railway sleepers and the front wagon bogie wheels.	0
Diffin Light Rail	12 August 2022	Oakfield Estate, Donegal	Accident	Collision	While one passenger train was disembarking passengers at the station, another passenger train (which was waiting to disembark passengers) moved up the station at a speed of two miles per hour (mph) and struck the other train. One female complained of neck pain.	1 Injury
IÉ-RU	18 August 2022	Inchicore, Dublin	Accident	Derailment	During a shunting movement in Inchicore Yard three wheels of a bogey set on Locomotive 082 became derailed. On inspection it was found that track condition was the cause of the derailment.	0

Railway Body	Date of occurrence	Location of occurrence	Classification of occurrence	Classification subset	Summary	Fatalities/Injuries
IÉ-IM	22 August 2022	Limerick Junction, Tipperary	Incident	Traffic Management & Operations	At approximately 11.35 hrs the passenger service from Cork to Heuston (Train A211) passed Signal LJ353 at danger in Limerick Junction the signal previous was at amber. Single Line Working (SLW) was in operation between Thurles and Limerick Junction and the signal was at red to facilitate a special passenger train (Train B230) that was in the SLW and was to be routed into Limerick Junction Platform 1. Train A211 passed the signal at danger by 170 m while Train B230 was in the section at an estimated distance of four miles and it did not exceed the signal overlap. The SPAD risk ranking was calculated to be 20 (high).	0
IÉ-RU	25 August 2022	Cork	Accident	Collision	During a T3 possession there was a collision between an RRV Dumper and an RRV Excavator. The RRV Excavator stopped to let the PIC off and RRV Dumper collided with it.	1 Injury to RRV operator
IÉ-IM	12 September 2022	Heuston Station, Dublin	Incident	Traffic Operations & Management (and subsequent accident (derailment)).	At approximately 05:38 hrs, Train C200, the 05:40 hrs empty train service from Heuston to Newbridge passed signal HN291s at Danger without authority and subsequently derailed at trap points 739A. The Driver of Train C200 had contacted the Signaller at Heuston SER to request the route from No. 4 carriage siding Heuston to Newbridge however the Signaller cleared the route from No. 5 carriage siding. The Driver did not identify that the signal was cleared for the wrong route and passed signal HN291(s) at Danger without authority.	0
IÉ-IM	13 September 2022	Derrycoosh, Mayo	Serious Accident	To persons due to rolling stock in motion	A passenger service from Westport to Dublin Heuston struck and fatally injured a male person who jumped into the path of the oncoming train.	0
IÉ-IM	14 September 2022	Gormanston Station, Meath	Serious Accident	To persons due to rolling stock in motion	Two males exited a local service onto the Up platform at Gormanston before alighting onto the railway line to walk to the Down platform. At the same time, a non-stop passenger service passed through the station, and struck and fatally injured one male. The other male was taken to hospital suffering from shock.	1 Fatality due to trespass
IÉ-IM	14 September 2022	Red Cow, Dublin	Incident	Energy	High Speed Circuit Breaker (HSCB) tripped at 01:07 hrs in Red Cow Electrical Sub-Station (ESS) and it inter-tripped between Kylemore Red Cow and Kingswood. On attendance by technicians, the technicians found smoke in the ESS, fire alarm was activated, and technicians advised Luas Network Management Centre (LMNC) to ensure sections between Kylemore Red Cow and Kingswood remain de-energised. The smoke stopped bellowing as soon as the section was de-energised, and the ventilation system cleared the remaining smoke. It was found that a HSCB tripped as a result of overcurrent.	1 Fatality due to apparent self-harm

Railway Body	Date of occurrence	Location of occurrence	Classification of occurrence	Classification subset	Summary	Fatalities/ Injuries
TDLR	16 September 2022	Mayor / Lower Guild Street Junction, Dublin	Accident	Collision	A van was executing a right hand turn from behind a city bound tram when it travelled into the path of another tram (which was travelling under a proceed aspect) travelling in the opposite direction. A female passenger who was travelling in the van struck her head on the windscreen and was conveyed to hospital with minor injuries.	1 Injury to van passenger
TDLR	18 September 2022	Broombridge, Dublin	Serious Accident	To persons due to rolling stock in motion	A male exited a tram at Broombridge and started to walk along the track in the direction of Cabra, at some stage the male lay down on the track. As the male on the track, he was struck by Tram 5038 which was the last tram travelling from the city centre towards Broombridge.	1 Fatality due to trespass
TDLR	21 September 2022	Abbey Street, Dublin	Accident	Collision	As Tram 4009 was transferring from the Red Cow Depot to Broombridge Depot for scheduled maintenance, it was moving across points adjacent to the Abbey Theatre when the second bogie derailed across a separate set of points. There were no passengers on board.	0
IÉ-IM	28 September 2022	Birdhill to Roscrea, Tipperary	Accident	Derailment	An RRV Excavator with forks attached derailed while placing a pallet of fishplates in the cess after unloading the pallet from trailer. As the RRV swivelled to place the pallet in the cess the front two wheels came off the rails causing minor damage to a set of mechanical points.	0
IÉ-IM	18 October 2022	Ballybrophy, Laois	Accident	Collision	Three RRV Dumpers were moving spoil. The first loaded RRV Dumper moved a short distance to facilitate the other RRVs to load up the spoil. Once the second RRV Dumper had been loaded it started to move along the track but was unable to stop and struck the first RRV Dumper. The third RRV Dumper subsequently loaded with spoil and collided with the second RRV Dumper. There were no reported injuries and the RRV Dumpers had minor damage.	0
TDLR	25 October 2022	Connolly, Dublin	Incident	Rolling Stock	A tram driver leaving Connolly Stop observed what he thought was a hose sticking out from a side skirt on Tram 3012 and reported the incident to LNMC. Tram 3012 was allowed to remain in passenger service to the Red Cow where it was removed from service. On examination at the Red Cow Depot the hose was identified as electrical current return circuit cable that had failed. Damage to the axle box was also observed. A bogie swap was arranged to facilitate a strip out of the offending wheelset. The RAIU are conducting a full investigation into the incident, see page 23.	0
IÉ-IM	26 October 2022	Glasnevin, Dublin	Accident	Derailment	An RRV Excavator suffered a burst pipe, which resulted in a movement back to the off tracking point. The movement required the RRV to pass over points GL174 in a trailing position, this movement left the points in a gaping position and the subsequent return journey resulted in a derailment of the RRV.	0

Railway Body	Date of occurrence	Location of occurrence	Classification of occurrence	Classification subset	Summary	Fatalities/ Injuries
IÉ-IM	18 November 2022	Roscommon to Castlerea	Accident	Derailment	An RRV Excavator engaged in vegetation control derailed on a plain section of track when the excavator arm was fully extended.	0
IÉ-IM	02 November 2022	Howth Junction Station	Accident	To persons due to rolling stock in motion	A passenger service from Connolly to Drogheda struck and injured a male person at Howth Junction Station after he stepped off the platform onto the line in the path of the oncoming train, the man was taken to hospital by the emergency services.	1 Injury due to apparent self-harm
IÉ-IM	23 November 2022	Grand Canal Dock, Dublin	Incident	Traffic Operations & Management	A driver reported an abnormal CAWS downgrade, however, on investigation, the driver was mistaken.	0
IÉ-IM	30 November 2022	Kiltarten, Galway	Accident	To persons due to rolling stock in motion	A Chief Civil Engineers (CCE) member of staff acting as PICOP was seriously injured when he fell against a hedge cutter attachment that was connected to a RRV Tractor.	1 Serious Injury in the workplace
TDLR	12 December 2022	Sandyford Depot, Dublin	Incident	Infrastructure	Six trams were parked withing the same current circuit with the heating systems on creating an overload of the OHLE and the HSCB opening, resulting in smoke protruding from the OHLE.	0
TDLR	16 December 2022	Broombridge Stop, Dublin	Accident	To persons due to rolling stock in motion	As Tram 5014 was approaching the Broombridge Stop, a teenage girl pushed another teenage girl against the moving tram. The leg of the teenage girl that was pushed went between the platform edge and Tram 5014. The tram came to a stop and the teenage girl was unable to free her leg from the platform edge. Dublin Fire Brigade arrived on the scene and using specialised equipment freed the teenage girl's leg.	1 Injury
IÉ-IM	24 December 2022	Connolly Station, Dublin	Incident	Rolling stock	Driver D818 was preparing his train for service. As the train on the platform compromised of two 29000 DMUs (eight cars in total) Driver D818 had to split the sets as the scheduled service was for a four car set. Having attempted to uncouple, the coupler integrity light remained illuminated and Driver D818 contacted Drogheda CME who requested the service to operate as an eight car set. Having completed all platform duties the train departed as an eight car set on time but divided into two four car sets when leaving the platform. The brakes applied on both portions of the train and both sets came to a stop.	0

* Note, IÉ-RU and IÉ-IM operate a rotational oncall meaning that although IÉ-IM may report an incident, they incident maybe is an IÉ-RU incident and vice versa.

Categorisation of Preliminary Examination Reports

1st January 2022 to 31st December 2022

The following is a compilation of the categories of PERs for 2022, note that these are generally incidents that are immediately reported to the RAIU after occurrence.

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

Workplace accidents

There were two workplace accidents to person due to rolling stock in motion:

- Collision of an RRV Dumper with a member of IÉ infrastructure maintenance staff;
- IÉ member of staff falling into a hedge-cutter and sustaining serious injuries.

Apparent self-harm serious accident and accidents

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 2022, there were six serious accidents (fatalities) and two accidents (non-fatal accident) 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 over a ten year period.

No.	Year	2022	2021	2020	2019	2018	2017	2016	2015	2014	2013
Serious Accident		6	5	6	2	9	6	3	2	6	4
Accident		2	0	1	2	1	3	4	1	1	2
Total		8	5	7*	4	10	9	7	3	7	6

*There was one additional case of intended self-harm on the IÉ network, however, the train came to a stop.

TDLR did not have any occurrences of apparent self-harm in 2022 and are relatively uncommon. In the previous five years there have been five occurrences (one incident in 2021 (injury), three in 2019 (one fatal, two injuries) and one in 2017 (injury)).

Trespass & anti-social behaviour serious accidents and accidents

IÉ Network

There was one fatality as a result of trespass on the IÉ network in 2022, with the previous five years indicating that that numbers remain low.

Type & Year	2022	2021	2020	2019	2018	2017
Serious Accident	1	1	1	2	0	1
Accident	0	0	0	1	1	1

Luas network

There are instances of intentional trespass (where people intend to access the railway) and inadvertent trespass (where people unintentionally walk onto the railway without looking for approaching trams).

There was one fatality as a result of intentional trespass on the Luas network in 2022. The numbers for the five previous years indicate very low numbers in relation to occurrences related to deliberate trespass.

Type & Year	2022	2021	2020	2019	2018	2017
Serious Accident	1	0	1	1	0	0
Accident	0	0	0	1	0	0

In terms of inadvertent trespass, these people unintentionally place themselves in positions of danger, by not looking for approaching trams e.g. people wearing earphones, or stepping off paths, etc. The numbers for the previous five years are low, with the highest number in 2019.

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

In addition, there was one incident of anti-social behaviour at a Luas stop which resulted in a teenager's leg being trapped between the tram and the platform.

RRV accidents on the IÉ network

In terms of RRV occurrences in 2022, there have been thirteen, which accounts for almost a quarter of occurrences reported to the RAIU in 2022. The incidents are as follows:

- Accident due to rolling stock in motion (as outlined above);
- Seven RRV derailments;
- Four collisions involving RRVs colliding with each other;
- One rolling stock incident involving a wheel detachment.

IÉ-IM have been notifying the RAIU of RRV occurrences since 2018. Below are the numbers outlined below. The numbers from 2022 have almost doubled from 2021, this may be as a result of previous underreporting of RRV occurrences.

Incident type & year	2022	2021	2020	2019	2018	Total
To persons due to rolling stock in motion	1	1	0	0	0	2
Collisions	4	1	3	1	5	14
Derailment	7	5	2	4	0	18
Rolling stock	1	0	0	0	0	1
Total	13	7	5	5	5	35

The RAIU previously carried out a trend investigation into RRV incidents and accidents which was published at the end of 2019, resulting in twenty safety recommendations. As of the end of 2022, ten safety recommendations remain open, seven are closed and three have an Further Evidence Required (FER) status.

The RAIU will continue assess RRV accidents and incidents on an individual basis and conduct a full investigation when warranted, an investigation will be commenced e.g. the RAIU conducted a full investigation into the Collision of an RRV Dumper with a member of IÉ infrastructure maintenance staff, Tivoli, Cork, 6th July 2022.

Other occurrences on the IÉ network

In terms of the other occurrences on the IÉ network in 2022, these included:

- Five traffic operations and managements incidents (two self-detrainments, two SPADs and one incident where the driver mistook a CAWS downgrade);
- Four collisions (hand tool left on the line, buffer, materials train (during a possession) and a collision between a van and the OHLE at a level crossing);
- Four derailments (in depots and sidings);
- Two rolling stock incidents (wrongside door failure and a train divide).

Other occurrences on the Luas network

In terms of other occurrences on the Luas network in 2022, the notified occurrences are as follows:

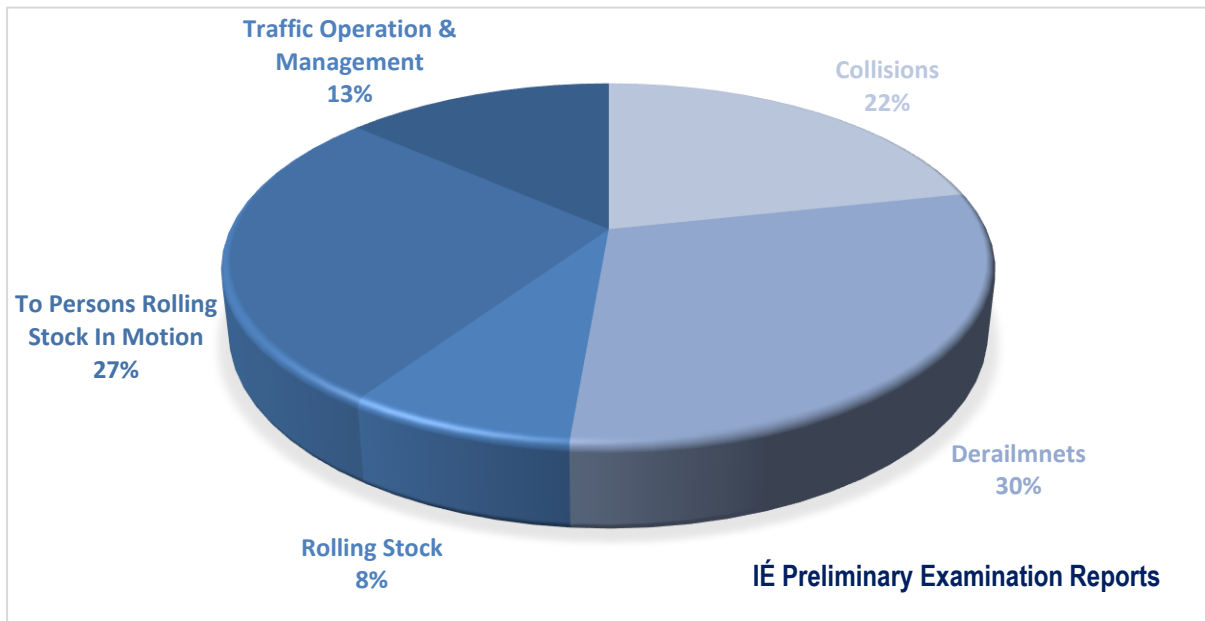
- Six collisions (three road traffic collisions (RTCs) and collisions with isolation signage and a buffer stop and a pantograph collision with depot infrastructure);
- Two derailments (points not set for the movement);
- Two rolling stock incidents (wheel failure and current return failure);
- Two traffic operations and management incidents (signals passed at stop);
- One energy incident (HSCB);
- One infrastructure incidents (OHLE pole).

Accident on Diffin Light Rail

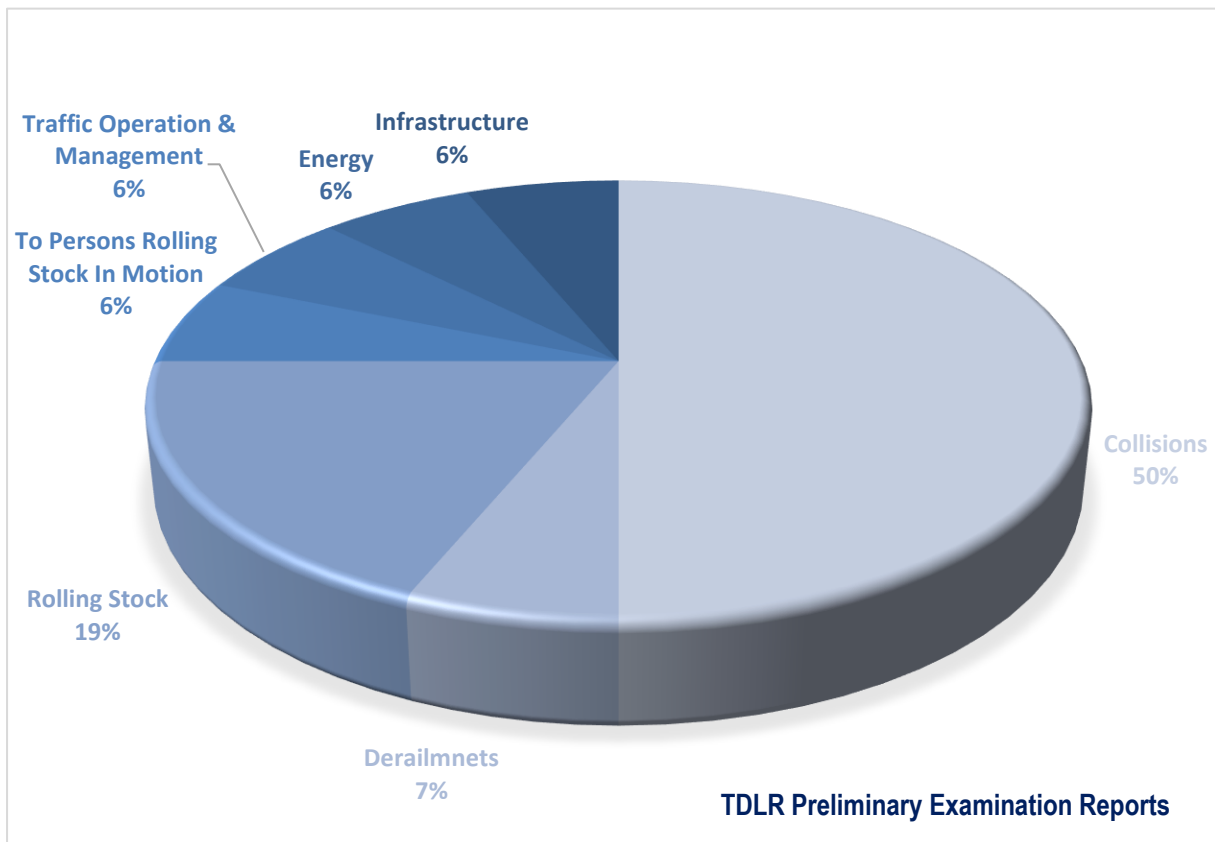
There was one other accident on the rail network in 2022, on the Diffin Light Railway, where there was a slow speed train on train collision. The RAIU carried out a preliminary examination into the accident, and it was found that through actions taken by Diffin Light Railway in the immediate aftermath, no further investigation was warranted by the RAIU.

Summary of PERs

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



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



2022 Full Investigations

Full investigations commenced & continued in 2022

Three full investigations into reported occurrences were commenced in 2022:

- Collision of an RRV Dumper with a member of IÉ infrastructure maintenance staff, Tivoli, Cork, 6th July 2022;
- IÉ self-detrainment of passengers from DART trains, between Shankill and Bray, 24th July 2022;
- TDLR Luas tram current return circuit failure at Connolly Stop, 25th October 2022.

Two investigations continued through 2022:

- Collision with track equipment between Newbridge and Kildare, 27th August 2021;
- Dangerous occurrence involving a Double SPAD at Clontarf Road Station, 7th December 2021.

Collision of an RRV Dumper with a member of IÉ infrastructure maintenance staff, Tivoli, Cork, 6th July 2022



On the 6th July 2022, engineering works was being undertaken in a T3 Possession on the Cork-Cobh-Midleton lines, including track panel relaying and steel bridge repairs between Woodhill and Tivoli. There were thirteen items of hired plant and machinery in the worksite, including six RRV Dumpers, which were used for drawing stone from a lineside stockpile at Tivoli access point on the Cobh side of the Up Line. On completion of the loading movement the RRV Operators (RRVOs) awaited directions from the Person In Charge(PIC)-RRV to tip the stone over the course of the track relaying works.

Two RRV Dumpers, located on the Up Line, were laden with stone ballast with the buckets facing Cobh. The RRVOs configured the driving positions and directional lights of the RRV Dumpers for the reversing movement.

Engineer 1, who was on site supervising the works, was coming to the end of his shift and was giving an update briefing to Engineer 2 who had arrived on site for the late shift. After discussing an unforeseen issue in relation to soft ground conditions, Engineer 1 agreed to remain on site in order to discuss the matter further with their Regional Manager, who had arranged to visit the site. Engineer 1 decided to make a number of work-related phone calls on his company issued mobile phone and moved to a position of safety, walking from the Down Side to the Up Side cess, close to the leading RRV Dumper.

While on the Down Side, Engineer 2 requested the PIC-RRV to move the two stone laden RRV Dumpers a short distance along the Up Line towards Cobh to allow the placement of track panels on the Down Line. The PIC-RRV walked towards the leading RRV Dumper observing that the line ahead was clear before shouting and indicating by hand due to the noisy environment to the leading RRVO to move in the direction of Cobh.

The RRVO checked his reversing camera monitor located at 90° to his driving position on his right-hand side before looking through the rear windscreen over the RRV Dumper bucket laden with stone, before slowly moving forward.

At approximately the same time Engineer 1 (located on the Up Side cess) decided to return to Engineer 2 (located on the Down Side). Engineer 1 walked a few metres in the cess, before the terrain got difficult, and crossed into the five foot a few metres ahead of the leading RRV Dumper.

Engineer 1 continued to walk for a few metres in the five foot, in the direction of Cobh on the Up Line, before feeling something striking his back. Engineer 1 turned around and realised it was the RRV Dumper and instinctively decide to “go to ground” and lay as flat as possible in the five foot, knowing the RRV Dumper was going to travel over him. The RRV Dumper had travelled approximately twelve metres from its stationary position at this time.

The RRV Dumper slowly travelled over Engineer 1, with Engineer 1 sustaining a cut to his nose and minor abrasions to his arm.

The RRVO was unaware that he had struck and travelled over Engineer 1 until he was alerted by another member of staff. The RRVO then brought the RRV Dumper to a stop, clear of Engineer 1.

All work on site was stopped and medical attention was given by staff on site before an ambulance crew attended the scene and advised Engineer 1 that he did not have to attend the hospital.

ÍÉ self-detrainment of passengers from DART trains, between Shankill and Bray, 24th July 2022



On Sunday 24th July, the weather conditions were sunny and hot. It was the day of the 2022 Bray Air Display and the 2022 All-Ireland Senior Football Championship Final in Croke Park, with both events drawing thousands of people.

A door fault on a DART train during the morning resulted in delays to services and increased dwell times. This resulted in large numbers of passengers accumulating on the platforms, many with small children and buggies. When boarding, passengers were reluctant to move down the carriage away from the entrance doors due to the heat.

ÍÉ staff and crowd control plans were in place at major stations on the DART line including Bray. Passengers accumulating at unmanned stations were left frustrated due to a lack of information and trains arriving already close to capacity. As DART trains are driver only and with no station staff ÍÉ-RU had no way of implementing processes and procedures to manage the overcrowding on trains.

With services getting busier, the standby DART train was brought into service; it was the 13:45 hrs Connolly to Bray service (Train E268), which departed Connolly Station late. It was followed by the 13:05 hrs Howth to Greystones service (Train E103) which also departed Connolly Station late. Train E103 was followed by the 13:25 hrs Malahide to Bray service (Train E208) which also departed Connolly Station late.

All trains arriving into Bray Station were stopping on Platform 2. It was taking approximately eight minutes to detrain passengers and clear the train from Platform 2 to allow the next train to stop on Platform 2.

At 14:47 hrs, the 12:46 hrs service from Malahide to Bray (Train E206) arrived at Platform 2 at Bray, and passengers began alighting from the train. The next train scheduled to stop on Platform 2 was Train E268.

On Train E268's approach to Bray Station, Signal BR28 (located 500 m from Bray Station) was red as Train E206 was still detraining on Platform 2.

The air conditioning was off on Train E268 (unknown to Driver E268), and as the windows were sealed (by design) there was no forced or passive ventilation on the train, leading to increasingly uncomfortable conditions for passengers, with reports of some passengers suffering from heat exhaustion.

The driver (Driver E268) did not make any passenger announcements using the passenger address system. After being stopped for five minutes and thirty-two seconds, one of the passengers (Pax 1) who was travelling with young children and an older person, opened a passenger door by means of the emergency opening device, and passengers began self-detraining.

Within a minute of the door being opened, Driver E268 saw passengers on the line and made an emergency call to the Controlling Signalman.

At this stage the 14:43 hrs Bray to Malahide (Train E804) had departed Bray Station and the Controlling Signalman instructed the driver of Train E804 (Driver E804) to stop as a result of passengers on the railway line and placed the relevant signals at danger.

As Train E268 was stopped, this resulted in Trains E103 and E208 also being stopped at Signals BR26 and BR26 (between Shankill and Bray), respectively. These trains did not have air conditioning; and, as they were stationary there was no forced ventilation; there was also insufficient passive ventilation through the opened windows due to crowding, resulting in increasingly uncomfortable conditions for these passengers.

Passengers on delayed Trains E103 and E208 were aware that passengers had begun self-detraining from Train E268 through messaging, calls and social media (including IE's Twitter account). The drivers of the two trains (Driver E103 and Driver E208) did make announcements, however, passengers on these trains also began self-detraining.

At this stage, the drivers of all trains made announcements for passengers to remain on the trains, however, passengers continued to self-detrain.

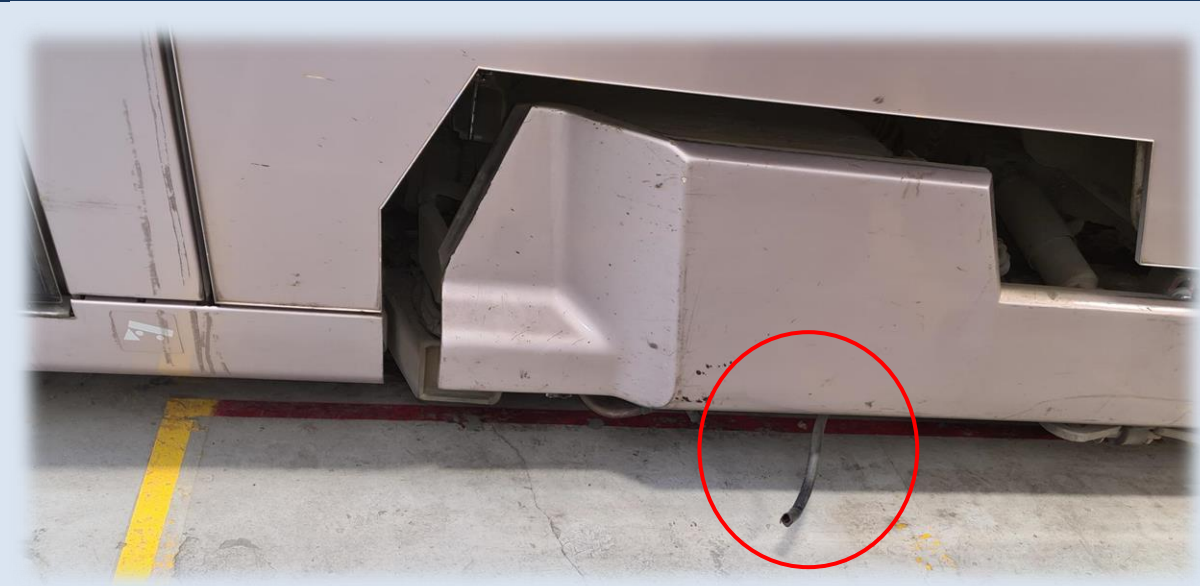
Train E804, travelling away from Bray, was subject to a controlled detrainment.

It was also reported that passengers alighted from the platforms at Dalkey, Killiney and Shankill Stations and started walking on the railway line, towards Bray.

Up to approximately 2,000 passengers, detrained (self-detrained and controlled detrained) or alighted from station platforms.

The RAIU decided to conduct a full investigation due to the risk of passengers on the line being struck by trains and the welfare of passengers on stranded trains.

TDLR Luas tram current return circuit failure at Connolly Stop, 25th October 2022



At approximately 08:08 hrs on the 25th October 2022, a tram driver leaving Connolly Stop observed what he thought was a hose sticking out from a side skirt on Tram 3012 and reported the incident to LNMC.

LNMC contacted the driver of Tram 3012 and allowed the tram to remain in passenger service to the Red Cow Stop where it was removed from service.

On examination at the Red Cow Depot the hose was identified as a live electrical Current Return Cable that had severed. Further examination revealed a failed Earth Shunt Cable and overheating of the Axle End Assembly on the adjacent axle.

The RAIU decided to conduct a full investigation due to the risk of elecotion of passengers due to a live cable protruding from underneath a tram in service.



At 23:00 hrs on the 26th August 2021 a work detail incorporating: three IÉ-IM CCE members of staff (Engineering Supervisor (ES), PIC and General Operative (GO)) and eight contracted staff, met for a safety briefing at a works compound adjacent to the old Curragh Station, County Kildare.

The work scheduled by the CCE Infrastructure Department was to replace a defective 9 m section of rail. The work crew were briefed by the ES on their duties for the night and given site safety information including that the work would be under an Absolute Possession (T3 Possession).

After the briefing, the ES and GO, followed by the contractors, drove to the access point close to the intended work site. They waited a few minutes until the ES confirmed the last timetabled train passed the worksite (although there was an unscheduled train to pass which was unknown to the ES), and then the ES stated that they were “good-to-go”. The T3 Possession had not been prepared or granted at this stage i.e. the line should not have been accessed and no work should have commenced.

When the work detail arrived at the site of the defective rail, the GO started to loosen the bolts which fix the rail to the concrete sleeper, while one of the contracted welders started digging the ballast out from around where the clamp was to be placed (the clamp is part of holding gear equipment that is clamped to the rail during the works).

The two other contracted welders started to attach the clamp to the Down Leg of the Up Line. The contractor that was digging the ballast, turned to put down his shovel, when he saw the lights of an approaching train and shouted “train on” and all staff quickly moved to a position of safety.

The train (Train J283), an unscheduled empty train was travelling from Limerick Junction to Heuston Station, approached the worksite and struck the clamp which was clamped onto the rail. The driver of Train J283, Driver J283, brought the train to a stop and contacted the Mainline Signaller to report the collision and near-miss with staff.



At approximately 15:59 hrs on 7th December 2021 the 15:31 hrs IÉ DART passenger service from Malahide to Bray (Train E120) was stopped at Clontarf Road Station Up Platform. The signal to the rear, Signal DN295 was displaying a Red Aspect to protect Train E120.

Around the same time, the 15:40 hrs DART passenger service from Howth to Bray (Train E240) was approaching Signal DN287 at Clontarf Road Station.

The train's speedometer and On Train Data Recorder (OTDR) showed the train was travelling at 79 kilometres per hour (km/h); the permitted line speed for the section is 75 km/h and reduces to 30 km/h on approach to Clontarf Road Up Platform. The OTDR shows the train braking system initiated an Automatic Train Protection (ATP) penalty brake as the train was travelling at a speed (79 k/h) greater than the target speed (30 km/h). The ATP brake application, in trying to reduce the train speed, resulted in the train's Wheel Slip Protection (WSP) system activating to prevent the wheels from locking up and sliding on the degraded railhead caused by Storm Barra.

At 16:01 hrs Train E120 departed Clontarf Road Station with a planned stop at the Crew Ramp at Fairview Depot for a change of driver (the driver of E120 who brought the train to the Crew Ramp will be known as Driver E120a for the remainder of this report and the replacement driver will be known as Driver E120b). When Train E120 departed Clontarf Road Station the aspect of Signal DN295 situated at the south end of Clontarf Road Station Up Platform changed from green to red to protect Train E120 as it stopped at the Crew Ramp, Fairview.

At 16:03 hrs Train E240 passed Signal DN287 situated at the north end of Clontarf Road Station at danger without authority (known as a Signal Passed at Danger (SPAD)) and continue travelling through Clontarf Road Station.

The driver of Train E240 (Driver E240), could see Train E120 ahead and phoned the Central Signalman at Centralised Traffic Control (CTC) to advise that he felt the train was sliding and was going to run into Train E120.

The Central Signalman contacted Driver E120b to enquire if the train was moving and on receipt of conformation requested Driver E120b to continue moving; had Train E120 not commenced moving, Train E240 would likely have collided with the rear of Train E120.

Train E240 passed Signal DN295 at danger without authority and came to a stop before the Crew Ramp at Fairview. Driver E240 contacted the Central Signalman to advise that his train had come to a stop.

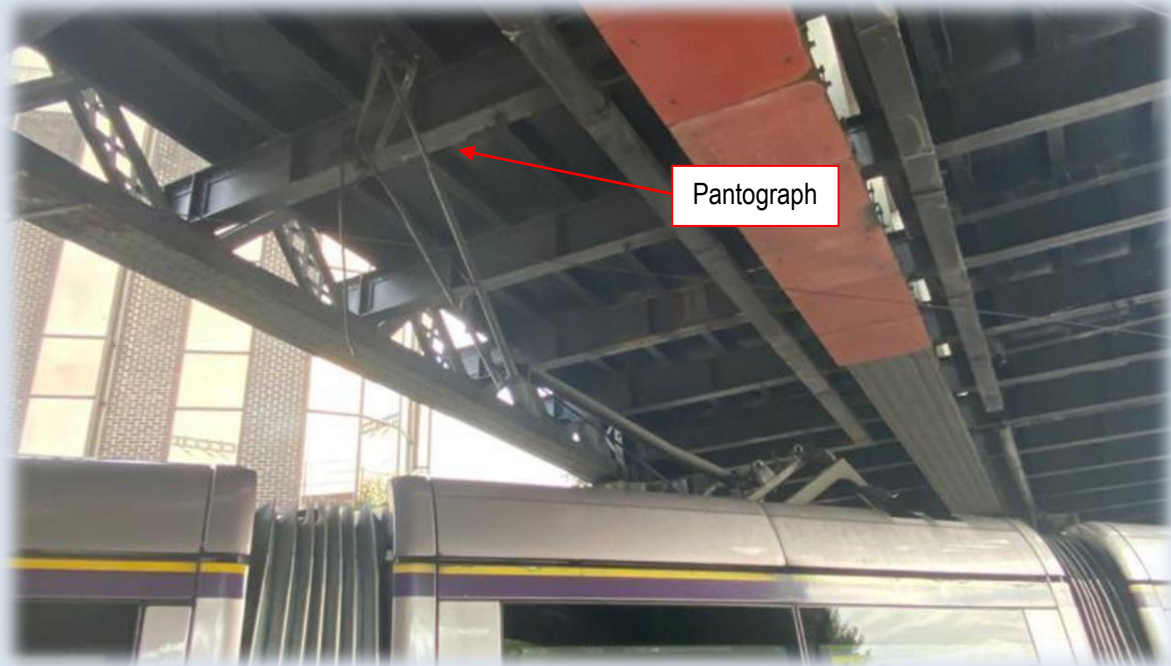
Full Investigations published in 2022

1st January 2022 to 31st December 2022

The RAIU published three investigation reports in 2022, which resulted in a total of twenty-one new safety recommendations, the investigations are as follows:

- Luas pantograph collision with railway bridge, Beresford Place, 11th June 2021, RAIU Investigation Report No: 2022 – R001, published: 4th May 2022;
- Near miss with an Iarnród Éireann CCE Worker near Gormanston Station, 21st July 2021, RAIU Report No: 2022 – R002, published: 08/07/2022;
- Trend investigation into Signals Passed At Stop on the LUAS network, RAIU Report No: 2022 – R003, published: 21st October 2022.

Of the twenty-one new safety recommendations, eight were related to the occurrences and thirteen were as a result of additional observations.



At approximately 01:16 hrs on the 11th June 2021 the Parafil termination failed on the cross-span between a pole and the Strong Registration Arm attached to the Luas network Overhead Contact System (OCS) on the Outbound line, cess side, close to Beresford Place IÉ railway bridge; causing the Strong Registration Arm to hang down over the tram line. This results in the contact wire losing stagger and striking the negative copper strip on the insulated plates located under the railway bridge resulting in a dead-short and tripping (stopping the electrical flow) the electrical power in the O'Connell to Spencer Dock section. There were no trams in the section, the last outbound tram to pass the section was Tram 3026 at approximately 01:00 hrs.

LNMC were alerted to the ESS trip-out and contacted Infrastructure Maintenance who arrived at O'Connell ESS at 01:25 hrs and reset both Traction and HSCBs with no issues; the Infrastructure Maintenance staff did not inspect the OCS as it was not required under any TDLR internal documents.

At 04:35 hrs, Sweep Tram 3016 (a tram used to check the line is free from obstacles / obstructions prior to passenger service) departed the Red Cow travelling inbound to the Point Depot, travelling at a maximum speed of 25 km/h.

At 05:12 hrs, on Sweep Tram 3016's approach to Beresford Place railway bridge, and the location of the partially detached Strong Registration Arm, the pantograph of Tram 3016 loses contact with the contact wire and strikes with the cross-span assembly. The force of impact on the cross-span assembly causes the Strong Registration Arm to become detached from the contact wire and becomes entangled on the pantograph, contacting both the foot of the pantograph and roof of the tram; causing a dead-short and trips the power in the O'Connell to Spencer Dock electrical section.

Sweep Tram 3016 continues forward, pulling down the feeder cable; with the pantograph colliding with and damaging the insulated plates under the railway bridge.

Sweep Tram 3016 comes to a stop approximately 30 m from the first impact with the cross-span assembly (approximately seven seconds). Driver 3016 contacts LNMC and reports hearing a loud bang and loss of power.

In this accident, there are two distinct events, namely the failure of the Kevlar parafil and the Infrastructure Maintenance response to the trip-out at 01:16 hrs, and as such the causal, contributing and systemic factors (where identified) are separated.

In terms of the failure of the Kevlar Parafil terminations, the mechanism of failure is likely the result of the failure of the core fibres (which cannot be visually inspected) deteriorating over period of time as a result of in-service stresses (paragraph 119). At the time of the accident, there was a programme in place for the replacement of the Kevlar parafil for 6 mm diameter stainless steel wire rope with inline discreet insulators, however, the replacement had not yet been undertaken at the location of the accident. Causal factors are:

- CaF-01 – The planned inspections of the OCS cannot identify the deterioration of the Kevlar parafil fibres at the terminations.
- CaF-02 – The Kevlar parafil rope had not been replaced with 6 mm diameter stainless steel wire rope with inline discreet insulators, an ongoing Luas network maintenance project, at the time of the accident.
- CaF-03 – No ground level survey of the electrical section was carried out after the notification of the first trip-out; this inspection would have identified the partially detached Strong Registration Arm.

No contributing or systemic factors were identified in terms of the failure of the Parafil rope.

In terms of the response to the initial trip-out, Infrastructure Maintenance did attend the relevant ESS and reset the circuit breakers, however, they did not conduct a ground level inspection prior to handing back the track. No causal or contributing factors were identified, however the systemic factor is as follows:

- SF-01 – TDLR/ S2M did not have any documentation in relation to the requirement to carry out a ground level visual inspection of a section after an electric trip-out, at the time of the accident.

Due to a number of actions already taken by TDLR no safety recommendations are warranted as a result of the accident. The actions taken include the Parafil replacement project, which is ongoing, whereby the existing Kevlar Parafils are being replaced with 6 mm diameter stainless steel wire rope with inline discreet insulators. In addition, TDLR now require a full ground level survey of the electrical section to be taken in the event of a trip-out.

Near miss with an Iarnród Éireann CCE Worker near Gormanston Station, 21st July 2021



On the morning of Wednesday 21st July an IÉ CCE Department employee (CCE Worker) was performing the role of Track Safety Co-ordinator (TSC) for a group of construction staff upgrading a retaining wall adjacent to a track access point at the northern end of Gormanston Station, County Meath; the worksite was away from the railway line in a position of safety.

The weather that morning was hot and sunny and the CCE Worker decided to go onto the railway line to place two temperature gauges on the track to check the track temperature; a task that was not requested to be carried out by any member of management.

At the same time, the 09:30 hours (hrs) Northern Ireland Railways (NIR) Enterprise Service from Connolly Station Dublin to Belfast Lanyon Place (Train A124), was approaching Gormanston, travelling non-stop through to its first scheduled stop, Drogheda. Train A124 was travelling at 88 mph (142 km/h).

At approximately 10:04 hrs the CCE Worker went back onto the railway line, into the five foot, to collect the temperature gauges, when he looked towards Gormanston Station and saw Train A124 approaching, he cleared line four seconds before Train A124 travelled past him.

Causal factors associated with the incident are:

- CaF-01 – The CCE Worker made a decision to carry out track inspection, by his own volition, without the request from his manager; possibly because it had been habituated in the previous days due to the hot weather conditions;
- CaF-02 – The CCE Worker did not ensure that he could adhere to the requirements of CCE-RA-15050 and the IÉ Rule Book prior to accessing the track; possibly due to a lack of concentration;
- CaF-03 – The CCE Worker did not look or listen for trains prior to accessing the track the final time; as he was likely distracted by the noise from the improvement works.

Contributing factors to the incident are:

- CoF-01 – The CCE Worker is a long-term employee, and his experience and confidence may have meant that he momentarily lost concentration and wasn't as alert as he should have been on the day of the incident.

Systemic factors associated with the incident are:

- SF-01 – CCE did not have a risk assessment for rail temperature monitoring, indicating how, when and where, monitoring should occur;
- SF-02 – CCE documentation does not require any pre-planning documentation for CCE Departmental staff, to be completed prior to going on or near the line, with checklists to manage risks that might be encountered; or, which would highlight to CCE Department staff that it is unsafe to go on or near the track without a proper Safety System of Work (SSOW).
- SF-03 – Despite the IÉ Rule Book being robust in its protection of staff going on or near the line, the current CCE-RA-15050 of document does not reflect this robustness in ensuring that the risks associated with CCE staff members working on their own are captured and managed.

As a result of the incident, the RAIU made the following safety recommendation:

- Safety Recommendation 2022002-01 – The IÉ-IM CCE Department should develop a formalised process, through their Safety Management System (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.

Trend investigation into Signals Passed At Stop on the LUAS network



In February 2020, the RAIU received the monthly occurrence notifications from TDLR in relation to incidents and accidents on the Luas network in January 2020; here it was notified that there had been a signal passed at Stop (SPAS) at Cookstown Interchange, County Dublin, with a conflicting movement (see Closed Circuit Television (CCTV) still above), taken from the tram that passed the signal at Stop). The RAIU expanded the investigation, to a trend investigation into all SPAS events in the 2019, 2020 and the first six months of 2021; a total of thirty-six SPAS incidents.

The RAIU identified three causal factors which were applicable to some of the SPAS incidents, namely:

- CaF-01 – Drivers did not input the Ready To Start (RTS) request for the call for a Proceed aspect;
- CaF-02 – Drivers, on seeing a Stop signal, did not apply the emergency brake, which may have prevented the tram passing the signal;
- CaF-03 – There is no Driver Reminder Appliance (DRA), or similar, in the driving cab for the avoidance of Start Against Signal (SAS) SPAS incidents.

In terms of contributing factors, as to why there are SPAS incidents, the RAIU found the following factors:

- CoF-01 – There appears to be a link between the occurrence of a SPAS and the Line Signalling System (LSS) and depot locations. This may be the result of more complex movements which involve approval from LNMC, in particular in Sandyford Depot; and being the locations where drivers take their meal breaks;
- CoF-02 – Drivers did not check signals prior to taking traction from a stationary position, resulting in SAS SPAS incidents;
- CoF-03 – Drivers checked the Points Position Indicator (PPI)/ Points instead of the signal aspect;
- CoF-04 – Drivers did not input the service files into the Automatic Vehicle Location System (AVLS) correctly or were inputting while the tram is in motion; resulting in distraction and automatic proceeds not being given, which further resulted in an incorrect expectation of a Proceed aspect;

- CoF-05 – Drivers had an incorrect expectation of signals upgrading to proceed on approach as a result of:
 - Normally having a proceed at certain locations;
 - Inputting an RTS request and assuming the signal has upgraded (but hasn't);
 - Reading road traffic signals in error;
 - Looking at the movements of other trams.
- CoF-06 – Drivers operating in degraded mode.
- CoF-07 – Drivers being distracted, preoccupied or losing situational awareness as a result of personal issues, pedestrians, in-cab distractions (AVLS, sun glare), and forgetting signals.

Systemic factors to the SPAS incidents were:

- SF-01 – Driver training is deficient in terms of the:
 - Minimum activity criteria related to the LSS Locations;
 - Training criterion for depot movements;
 - Understanding of the importance of RTS requests, emergency brake applications and
 - the correct input of the AVLS.
- SF-02 – The Tramway Safety Instruction (TSI) Manual is not robust enough in terms of some of the movements to be carried out around depots and LSS locations; and the application of emergency brake.
- SF-03 – There were number of instances of driving rule breaks in terms of non-application of the emergency brake and inputting of the AVLS.

The RAIU made eight additional observations:

- AO-01 – TDLR do not refer to the “Stop” aspect as a “Stop” aspect and instead it is referred to as a “Do not Proceed” aspect in the TSI Manual, internal investigation reports, Traffic Event Database (TED) recordings, etc. In addition, it does not refer to the “Stop, unless too close to Stop Safely” aspect as a “Stop” aspect, instead it is referred to as a “cluster” in investigation reports, TED recordings and a safety notice. Also, the “Stop, single dot, contact CCR for instruction” aspect is not referred to as a “Stop” aspect, but instead as a “Single dot aspect”.
- AO-02 – TDLR do not have a formalised Signal Sighting Committee (SSC); where the positioning of the signal can be examined to see if it was contributory to a SPAS event and where this is the case changes to the asset or its operational context would reduce the likelihood of a further accident or incident occurring, the SSC should recommend what retrospective action is appropriate.
- AO-03 – Drivers are regularly not applying the emergency brake and making a normal braking application on the approach to a Stop aspect, resulting in trams passing the signals; this is mainly as a result of drivers being concerned about possible injuries to passengers as a result of emergency brake applications. The RAIU consider that drivers are over-reliant on the line-of-sight principles rather than obeying the controlling signals. The TSI Manual does not specifically state that drivers should apply the emergency brake to prevent SPAS incidents.

- AO-04 – TDLR do not currently score any of the SPAS events in terms of severity (they are currently classified by type only), therefore there is no means of calculating the likelihood of an accident, its potential consequences or as an indication to the variations of SPAS risk over time.
- AO-05 – Presently, suspected SPAS incidents can only be detected at LSS locations; resulting in a reliance on driver self-reporting SPAS incidents.
- AO-06 – Presently, LNMC can see a suspected SPAS event at LSS locations through a visual representation on the LSS mimic; however, there is no audible alarm;
- AO-07 – After a SPAS event, drivers are coached/ re-trained and permitted back to full driving duties, without support (e.g. additional monitoring for a fixed period of time) within days of the incident.
- AO-08 – The current internal investigation process produces generic reports which do not capture the trends around SPAS incidents, in particular, at multi-SPAS signals; or other specific conditions which may prevent the re-occurrence of a similar SPAS incident.

As a result of these findings, the RAIU have made fifteen safety recommendations:

- Safety Recommendation 2022003-01 – Transport Infrastructure Ireland (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 as low as reasonably practicable (ALARP). Analysis should include an appraisal of available systems and the effect they may have on mitigating sub-standard driver performance.
- Safety Recommendation 2022003-02 – 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.
- Safety Recommendation 2022003-03 – 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.
- Safety Recommendation 2022003-04 – 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.
- Safety Recommendation 2022003-05 – 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.
- Safety Recommendation 2022003-06 – 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.

- Safety Recommendation 2022003-07 – 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.
- Safety Recommendation 2022003-08 – 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.
- Safety Recommendation 2022003-09 – 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.
- Safety Recommendation 2022003-10 – 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.
- Safety Recommendation 2022003-11 – 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.
- Safety Recommendation 2022003-12 – 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.
- Safety Recommendation 2022003-13 – TII should evaluate if it is possible to introduce an audible alarm for suspected SPAS incidents at LNMC.
- Safety Recommendation 2022003-14 – 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.
- Safety Recommendation 2022003-15 – 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.

2022 Monthly Bulk Notifications

IÉ 2022 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		3	1		1	1			1		1	9
2.04 Fires, smoke or explosions on rolling stock not requiring the evacuation of passengers							1			1			2
2.05 Collisions with large objects or large animals	2	3	3	3	3	4		5	7	16	9	5	60
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	2		1	7
Other occurrences Involving collisions with smaller objects e.g. branches or debris on line.	3	4		2	4	3			2	3	1	1	23
Total	6	8	6	6	8	8	2	6	10	23	10	8	101

The majority of occurrences related to collisions with objects or animals, this number continues to increase year-on-year.

In terms of SPADs, ten were reported in 2022, this is significantly higher than the four reported in 2021 and eight in 2020. The RAIU will continue to 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 Double Signal Passed at Danger (SPAD) at Clontarf Road Station, 7th December 2021".

TDLR 2022 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					1				1	1			3
2.02 Unintentional divisions of rolling stock released for service													
2.03 SPASs with no risk of conflicting movements		3	2	2	3		5	1	2	3	3	1	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	1				1								2
2.06 Non railway vehicles damaging or fouling a railway line	2		1		1	2	1		2		1		10
2.07 Collisions between light rail vehicles and road vehicles	3	3		2		4	4		4	3	2	4	29
2.08 Any other occurrence where an investigation remit has been issued internally				1									1
Other occurrences Involving brushed contact with pedestrians.	3	4	2	2	3	3	2	4	4	6	5	7	45
Other occurrences Involving brushed contact with cyclists/ scooters.	1				3			1	4	1	1	1	12
Other occurrences Involving anti-social behaviour e.g. scutting.			1			1				2			4
Other occurrences Any other occurrences			2	1	1	2	1	4			1	1	13
Total	10	10	8	8	13	12	13	10	16	17	13	14	144

The overall figure has increased from 129 in 2021 to 144 in 2022.

The 2022 figures show a 50% increase in the number of SPAS incidents. It should be noted that the RAIU published “Trend investigation into Signals Passed At Stop on the LUAS network” on the 21st October 2022, and made fifteen safety recommendations in relation to SPAS occurrences. As of the end of 2022, the safety recommendations remain at “Open” status as TDLR begin actioning the safety recommendations.

2022 Urgent Safety Advice Notice / Safety Advice Notice

1st January 2022 to 31st December 2022

The RAIU did not issue any one Urgent Safety Advice Notice (USAN) or Safety Advice Notices (SAN) in 2022.

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 CRR¹. 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.

¹ Formerly the Railway Safety Commission (RSC); the name was changed on the 29th February 2016 under Statutory Instrument (S.I.) No. 69 of 2016, Change of name of the Railway Safety Commission to Commission for Railway Regulation (Appointed Day) Order 2016.

Status of RAIU safety recommendations

RAIU Safety Recommendations in numbers

The CRR, as the National Safety Authority (NSA) for Ireland, holds meetings with the relevant stakeholders to monitor the progress of safety recommendations.

As of the 31st December 2022, the RAIU have made 240 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 2022 is illustrated below, note that 61% of the 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	
2008	1	7	0	0	0	7	100%
2009	5	13	0	0	0	13	100%
2010	6	26	1	0	0	25	96%
2011	7	17	0	0	0	17	100%
2012	3	13	0	0	0	13	100%
2013	4	9	0	0	0	9	100%
2014	6	28	1	0	1	26	93%
2015	2	4	0	0	1	3	75%
2016	3	17	5	0	2	10	59%
2017	2	9	1	0	2	6	66%
2018	2	8	1	0	1	6	75%
2019	5	36	11	0	5	20	56%
2020	4	18	5	0	8	5	28%
2021	8	35	17	0	10	8	23%
2022	3	21	21	0	0	0	0%
Totals	61	261	63	0	30	168	64%

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 2022
Table 2	RAIU safety recommendations closed in 2022
Table 3	RAIU safety recommendations with FER status in 2022
Table 4	RAIU safety recommendations Open/ In Progress in 2022
Table 5	RAIU safety recommendations closed prior to 2022

Table 1 – RAIU safety recommendations made in 2022

The below recommendations are recommendations made in 2022. The status of all recommendations is that they are open.

Report/USAN/SAN	Recommendation
Near miss with an IÉ CCE Worker near Gormanston Station, 21st July 2021 (RAIU Report No: 2022 – R002, published: 08/07/2022).	<p>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:</p> <ul style="list-style-type: none"> • 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.
Trend investigation into Signals Passed At Stop on the LUAS network (RAIU Report No: 2022 – R003, published: 21/10/2022).	<p>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.</p> <p>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.</p> <p>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.</p> <p>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.</p> <p>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.</p> <p>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.</p> <p>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.</p> <p>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.</p> <p>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:</p> <ul style="list-style-type: none"> • 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.

Report/USAN/SAN	Recommendation
<p>Trend investigation into Signals Passed At Stop on the LUAS network (RAIU Report No: 2022 – R003, published: 21/10/2022).</p>	<p>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.</p>
	<p>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.</p>
	<p>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.</p>
	<p>TII should evaluate if it is possible to introduce an audible alarm for suspected SPAS incidents at LNMC.</p>
	<p>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.</p>
	<p>TDLR should develop their internal investigation processes, to develop a: o Training and competency management system for internal investigators; o Manual, or similar, outlining internal investigation processes.</p>
<p>Light blue indicates recommendations associated with IÉ-IM & IÉ-RU; dark blue indicates recommendations associated with TDLR; pink indicates a recommendation associated with TII.</p>	

Table 2 – RAIU safety recommendations closed in 2022

This section identifies the safety recommendations closed in 2022 (in order of occurrence date, oldest first).

Report/USAN/SAN	Recommendation
Laois Traincare Depot Derailment, 20 th January 2010 (published 19/01/11)	IÉ should ensure that the SSC is informed when train drivers report difficulties viewing a signal and the Signal Sighting Committee should verify that the reported difficulties are addressed effectively.
Road vehicle struck at level crossing XM096, County Roscommon, 2 nd September 2010 (published 04/10/11)	IÉ should review how it determines the safe crossing time for user worked level crossings to ensure the safe crossing time allows adequate time for movements and includes a safety margin, over and above the crossing time.
Fog signal activation in Dart driving cab, Bray, on the 6 th March 2012 (published 19/09/2013)	IÉ should ensure that their procurement and quality control processes verify that goods received are of the correct specification as those ordered.
Trend Investigation: Possession incidents on the Iarnród Éireann network (published 27/01/14)	IÉ-IM should undertake a review of possession incidents that have occurred over the last four years to ensure that reports are completed & recommendations are identified and addressed.
Operating irregularity during SLW between Dundalk and Newry, 23 rd March 2013 (published 28/04/14)	IÉ should review their training, assessment and competency of Signalmen and Pilotmen in relation to SLW with Pilotman to ensure they are confident in performing their respective duties during SLW and are familiar with the routes covered.
Structural failure of a platform canopy at Kent Station, Cork, 18 th December 2013 (published 07/11/14)	IÉ-IM should identify all cast-iron structures on the network. From this, a risk-based approach should be taken in relation to the inspection of these assets, during routine inspections, in terms of any risks associated with cast-iron. IÉ-IM should review the structural and annual inspection regimes for Building & Facilities to ensure all assets are inspected in accordance with the prescribed standards and any associated documentation is completed appropriately.
Vehicle struck by train at Corraun level crossing, XX024, Co. Mayo, 12 th February 2014 (published 30/04/15)	IÉ should consider options to upgrade the crossing to minimise direct action by the users.
Near miss at Knockcroghery Level Crossing, XM065, Co. Roscommon, 31 st January 2017 (published 20 th December 2017)	The IÉ-IM SET Department should develop a formalised risk assessment process for the positioning of CCTV cameras and associated design works.
Derailment of DART passenger service, at Points DL115, Dun Laoghaire, 13 th September 2017 (published 15/08/2018)	IÉ-IM should review the drawing and specification requirements for points scotches and ensure only scotches manufactured to the required drawing and specification are made available to points operators.
Collision of an ICR with a buffer stop at Laois Train Care Depot, 17 th July 2018 (published 25 th June 2019)	IÉ-RU CME should review their SSOW & Operating Instructions (OI) and associated documents related to the identification, communication and prevention of movement of defective vehicles to ensure relevant staff are made aware of identified defects and that the defective vehicles are adequately labelled and tagged; and these processes and staff responsibilities are fully understood by all CME staff working on trains. IÉ-RU CME should review its training and competency of CME Drivers and Limited Shunters ensuring the stabling and movement of vehicles (defective or otherwise) are adequately addressed.
Collision of an ICR with a buffer stop at Laois Train Care Depot, 17 th July 2018 (published 25 th June 2019)	IÉ-RU CME should determine who has overall responsibilities for the movement of trains within the confines of LTCD, including who is allocated the role of Designated Person Responsible for Protection, and clearly brief these responsibilities in the CME Training Course and the SSOW & OI.

Report/USAN/SAN	Recommendation
<p>Road Rail Vehicle occurrences on Iarnród Éireann Network from 2015 to 2018 (published 8th October 2019)</p>	<p>IÉ-IM are to engage with the RRV contractors in relation to updated CCE Plant and Machinery Standards; and give clear guidelines on when these new requirements come into full effect.</p> <p>IÉ-IM should include, in their post-occurrence procedures, a requirement to verify the performance of RRVs (including braking performance) involved in accident, incidents or dangerous occurrences (near misses) to ensure the requirements of the CCE Plant and Machinery Standards are met in full; this should involve the completion of a full post-occurrence examination of the RRV by the contractor. A requirement that RRVs involved in accidents, incidents or dangerous occurrences (near misses) are not permitted back onto the IÉ network until the post-occurrence procedures have been completed and the RRV is confirmed fit and safe for use.</p> <p>IÉ-IM should update their CCE Plant and Machinery Standards to include requirements for RRV contractors to provide RRV information: at the acceptance stage; and, at later dates where modifications are made to RRVs. Where this information is not provided, and the requirements of the updated CCE Plant and Machinery are not met, the RRVs involved should not be allowed to operate on the IÉ network.</p> <p>IÉ-IM should review the ways in which it promotes a positive safety culture that encourages contractors to report accidents, incidents and dangerous occurrences (near misses); this can be achieved through RRVO workshops and the absence of disciplinary procedures on the reporting of occurrences.</p> <p>IÉ-IM should make changes to the IÉ Rule Book to ensure that all relevant requirements set out in their CCE Plant and Machinery Standards related to RRVs are incorporated into the IÉ Rule Book.</p> <p>IÉ-IM should brief Signalmen on RRVs operations during possessions (i.e. accessing and egressing worksites and well as travelling to worksites training in terms of RRVs operating in possessions) to ensure points are set correctly for the RRV movements. Training material for Signalmen on the roles of RRVs should be updated to reflect this.</p>
<p>Collision between a car and a train at Kilnageer, Level Crossing (XM240), Mayo, 29th April 2020 (published 18/02/2021)</p>	<p>The CRR should review and update Section 5, Level Crossings, of their Guidelines for the Design of Railway Infrastructure and Rolling Stock, to ensure that guidance/reference on the Decision Support System (DSS) is included.</p>
<p>Chassis Plate Fracture on General Motors Class 201, Locomotive 224, 7th July 2020 (published 01/07/2021)</p>	<p>IÉ-RU CME should review all weld repairs carried out to structures of all rolling stock to assess the risk posed by such weld repairs and mitigate against the failure mode.</p> <p>IÉ-RU CME should develop a procedure for evaluating maintenance advice received from OEMs or other railway organisations to determine applicability to IÉ fleets and assess any associated risks.</p>
<p>Luas isolation irregularity, Kylemore to Suir Road, 5th January 2021 (published 16/12/2021)</p>	<p>TII, in conjunction with TDLR, should consider fitting Section Insulators with diodes to prevent the passage of current from an energised section into a de-energised section when bridged by a pantograph.</p>
<p>* Light blue indicates recommendations associated with IÉ; pink indicates a recommendation associated with TII & TDLR; lilac indicates a recommendation associated with the CRR.</p>	

Table 3 – RAIU safety recommendations with FER status in 2022

This section identifies the safety recommendations where the CRR has reviewed a submission (or further submission) but considers that further evidence is necessary to close the safety recommendation, as of the end of 2022.

Report	Recommendation
Trend Investigation: Possession incidents on the Iarnród Éireann network (published 27/01/14)	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.
Vehicle struck by train at Corraun level crossing, XX024, Co. Mayo, 12 th February 2014 (published 30/04/15)	IÉ should carry out a full review of known misused user worked level crossings on public and private roads and either upgrade the level crossing or introduce measures to minimise their misuse.
Investigation into SPADs on the IÉ network from January 2012 to July 2015 (published 11/04/2016)	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.
Dangerous occurrence between Ballybrophy and Portlaoise, 12 th September 2015 (published 6 th September 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.
Near miss at Knockcroghery Level Crossing, XM065, Co. Roscommon, 31 st January 2017 (published 20 th December 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.
	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.
Derailment of DART passenger service, at Points DL115, Dun Laoghaire, 13 th September 2017 (published 15 th August 2018)	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.
Wrongside Door Failure at Ashtown Station, 12 th August 2018 (published 25 th June 2019)	IÉ-RU CME should review their scheduled maintenance examinations, for multiple-unit fleets, with a view to developing a means to check the connection is correct on the electrical head.
Vehicle struck by train at Cartron level crossing, XM220, Co. Mayo, 17 th August 2018 (published 3 rd September 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.

Report	Recommendation
<p>Road Rail Vehicle occurrences on Iarnród Éireann Network from 2015 to 2018 (published 8th October 2019)</p>	<p>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:</p> <ul style="list-style-type: none"> • 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 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 RRVs and RRVCs can communicate while on-tracking, travelling on the railway and at worksites; • Installing of data recorders on RRVs; • 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. <p>IÉ-IM should conduct a thorough review of their suite of SMS documentation and CCE 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.</p> <p>IÉ-IM should ensure appropriate procedures are in place for Drugs & Alcohol screening for IÉ-IM and contractor staff post RRV occurrence.</p>
<p>Passenger trap-and-drag occurrence on Luas tram at Heuston Stop, 26th March 2019 (published 04/03/2020)</p>	<p>TDLR, as part of the update to the SMS 018 Competence Assessment, should formally include the assessments that should be conducted every quarter.</p> <p>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.</p> <p>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.</p> <p>TDLR should update their Work Instructions (WIs) 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 Irish Standard (I.S.) EN 14752 should be used, as appropriate.</p>

Report	Recommendation
<p>Passenger trap-and-drag occurrence on Luas tram at Heuston Stop, 26th March 2019 (published 04/03/2020)</p>	<p>TDLR should update their Chain of Care Procedure mandating that drivers are subject to appropriate developmental supports (such as assessment, monitoring and supervision) 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.</p>
<p>Near miss with an Iarnród Éireann Patrol Ganger near Woodlawn, Galway, 4th June 2019 (published 27/05/2020)</p>	<p>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.</p> <p>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 anti-collision devices) for use by patrol gangers, with the objective of warning patrol gangers of oncoming trains.</p>
<p>Near miss with an Iarnród Éireann SET Worker at Rush and Lusk Station, 20th June 2019 (published 27/05/2020)</p>	<p>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:</p> <ul style="list-style-type: none"> • 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.
<p>Collision between a Bord na Móna (BnM) Flat Wagon and Kilcolgan Level Crossing Gates, Offaly, 8th June 2020 (published 18/02/2021)</p>	<p>BnM should identify locations where derailing points are vulnerable to unauthorised movements and provide a means of securing the derailing points at these locations.</p> <p>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.</p> <p>The Engineering Department of BnM should carry out the technical evaluation into the efficacy of the derailing points, etc. identified in BnM internal investigation report into the collision between a BnM locomotive and the gates of Endrim Gates on the 21st September 2017.</p> <p>BnM should update their Specification for Crossings to include the requirements of the DoT's Traffic Signs Manual; based on this BnM should update the signage on the approaches to all BnM level crossings.</p>
<p>Overhead Line detachment, Pearse Station, 1st October 2020 (published 22/09/2021)</p>	<p>IÉ-RU CME 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.</p> <p>IÉ-RU CME to include requirements to check pantograph maintenance activities in the Compliance Coordinators documentation records / check sheets.</p>
<p>Luas Overhead Line Failure, Stillorgan, 2nd November 2020 (published 27/10/2021)</p>	<p>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.</p> <p>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.</p>

Report	Recommendation
Luas Overhead Line Failure, Stillorgan, 2 nd November 2020 (published 27/10/2021)	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.
Luas isolation irregularity, Kylemore to Suir Road, 5th January 2021 (published 16/12/2021)	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.
Light blue indicates recommendations associated with IÉ, IÉ-IM, IÉ-RU; dark blue indicates recommendations associated with TDLR; green indicates recommendations associated with BnM.	

Table 4 – RAIU safety recommendations Open/ In Progress in 2022

This section identifies the safety recommendations where feedback or evidence from the Railway Organisation is pending; or actions have not yet been completed.

Report	Safety recommendation
Malahide Viaduct Collapse on the Dublin to Belfast Line, on the 21 st August 2009 (published 16/08/10)	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.
Tram fire on approach to Busáras Luas Stop on the 7 th November 2013 (published 28/08/14)	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.
SPADs on the IÉ network from January 2012 to July 2015 (published 11/04/2016)	<p>IÉ-IM must introduce an adequate train protection systems 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.</p> <p>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 train protection system introduced on the network.</p> <p>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.</p> <p>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.</p>
Operational incidents at Ardrahan on the 23 rd October 2015 & Spa on the 28 th November 2015 (published 20/10/16)	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.
Diffin Light Rail (DLR) Passenger Fall, Co. Donegal on the 17 th December 2016 (published 7/11/2017)	DLR should review the physical and procedural safeguards for the operation of their trains, to prevent small children whose feet do not touch the ground in a seated position, from falling from open carriages.
Derailment of DART passenger service, at Points DL115, Dun Laoghaire, 13 th September 2017 (published 15/08/2018)	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.
Vehicle struck by train at Cartron level crossing, XM220, Co. Mayo, 17 th August 2018 (published 3 rd September 2019)	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.

Report	Safety recommendation
<p>Road Rail Vehicle occurrences on Iarnród Éireann Network from 2015 to 2018 (published 8th October 2019)</p>	<p>The DoT should review the Railway Safety Act 2005 and current amendments to make clear the classification of RRVs; consultation should be sought with the Commission for Railway Regulation (CRR); and relevant stakeholders where appropriate.</p>
	<p>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.</p>
	<p>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.</p>
	<p>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.</p>
	<p>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.</p>
	<p>IÉ-IM should update their CCE Plant and Machinery Standards to ensure that RRV contractors are either provided with, or required to identify, the hazards associated with track gradient, rail contamination (or other low adhesion conditions) and RRV orientation and position on track through:</p> <ul style="list-style-type: none"> • Assessing documentation on the site-specific hazards associated with RRV and ensuring these are addressed in contractor's safety documentation; • Setting requirements in relation to the spacing between RRVs when travelling in convoy (e.g. 100 m) and putting in place a regime to ensure these requirements are met; • Training RRVCs/RRVOs on the risks associated with track gradient, rail contamination and RRV orientation and guidance on how to manage these risks in a braking emergency.
	<p>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.</p>
	<p>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.</p>
	<p>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:</p> <ul style="list-style-type: none"> • 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 at all times); • The allocation of RRVCs per quantity RRVs (i.e. how many RRVCs per RRVs).
	<p>IÉ-IM should review and update the training requirements of RRVCs with a view to incorporating:</p> <ul style="list-style-type: none"> • 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.

Report	Safety recommendation
<p>Passenger trap-and-drag occurrence on Luas tram at Heuston Stop, 26th March 2019 (published 04/03/2020)</p>	<p>TDLR should update their suite of document 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.</p> <p>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.</p>
<p>Collision between an IÉ passenger train and rail-mounted maintenance equipment, Rosslare, Wexford, 11th January 2020 (published 16/12/2020)</p>	<p>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.</p> <p>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.</p> <p>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.</p>
<p>Collision between a car and a train at Kilnageer, Level Crossing (XM240), Mayo, 29th April 2020 (published 18/02/2021)</p>	<p>The RSA should update the "Rules of the Road" to include guidance on the DSS.</p> <p>IÉ-IM should update the 'The SAFE use of Unattended Railway Level Crossings' booklet to include guidance on the DSS.</p> <p>IÉ-RU should put systems in place to ensure ICR train horns meet the current standards for sound pressure levels.</p>
<p>USAN003 Luas isolation irregularity incident, between Kylemore to Suir Road, on the 5th January 2021 (published 01/03/2021)</p>	<p>TDLR should urgently undertake a review of their safety critical communications for all modes of communication, while the review was being undertaken, TDLR should:</p> <ul style="list-style-type: none"> • 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.
<p>Person entrapped in lowered CCTV level crossing, Ashfield, Offaly, 24th May 2020 (published 21/05/2021)</p>	<p>IÉ-IM Signalling, Electrical and Telecommunications (SET) 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</p> <p>IÉ-IM SET 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.</p> <p>IÉ-IM CCE should examine the feasibility of installing signage inside the barriers of CCTV level crossings warning MOPs what actions to take in the event of becoming trapped.</p> <p>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 may be trapped within the confines of a level crossing.</p> <p>IÉ-IM should introduce measures to deter pedestrians from using unauthorised routes onto CCTV LCs.</p>

Report	Safety recommendation
Person entrapped in lowered CCTV level crossing, Ashfield, Offaly, 24th May 2020 (published 21/05/2021)	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.
Chassis Plate Fracture on General Motors Class 201, Locomotive 224, 7th July 2020 (published 01/07/2021)	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.
Overhead Line detachment, Pearse Station, 1st October 2020 (published 22/09/2021)	IÉ-RU CME should carry out, in conjunction with the OEM, a condition assessment to determine the correct period for the overhaul of the IÉ-RU pantographs.
	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.
	IÉ-IM SET 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.
	TDLR should include the electrical resistance measuring of vehicle earth bonding in the planned preventative maintenance regime for all trams.
Luas Overhead Line Failure, Stillorgan, 2 nd November 2020 (published 27 th October 2021).	TDLR should investigate the reason for the build-up of Cupric Oxide on the OCS wire and include: <ul style="list-style-type: none"> • 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.
	TDLR should include the electrical resistance measuring of vehicle earth bonding in the planned preventative maintenance regime for all trams;
Luas isolation irregularity, Kylemore to Suir Road, 5th January 2021 (published 16/12/2021)	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).
Light blue – IÉ-RU / IÉ-IM; dark blue – TDLR; pink – 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.	

Table 5 – RAIU safety recommendations closed prior to 2022

This section identifies the safety recommendations closed prior to 2022 (in order of occurrence date or in the case of trend investigations, the publication date):

Report	Safety Recommendation	Year Closed
Collision at Level Crossing XN104 between Ballybrophy and Killonan, 28 th June 2007 (published 18/06/08)	IE to review the various sources of information relevant to level crossings & develop a standard, or suite of standards, consolidating information on civil engineering specifications; signage specifications; visibility of approaching trains; & inspection and maintenance. Ensuring effective & compliance.	2015
	IE to develop a robust system that identifies current landowners who have crossings on their property and records the delivery of information to them. This should include the distribution of information to known contractors and should consider timely reminders coming up to the silage season.	2010
	IE to develop and implement a vegetation management programme that addresses vegetation management on a risk basis, prioritising high risk areas.	2015
	IE to ensure that a system is put in place for effective implementation of existing standards and manage the timely introduction of new and revised standards, this should include departmental instructions.	2014
	IE to review the standards relating to on-board data recorders, ensuring that correct operation, accuracy and post incident downloads are effectively addressed.	2010
	IE to review the "Monitoring the Speed of Trains" standard, including assessing the effectiveness of monitoring by means of signal cabin train registers.	2010
	The CRR to review and Issue 'Guidelines for the Design of Railway Infrastructure and Rolling Stock'.	2010
Report into the derailment of a Tara Mines freight train at Skerries, 10 th January 2008 (published 06/04/09)	IE should put in place a risk-based process to ensure ongoing review of the suitability of the temperature settings of the Hot Axle Box Detectors.	2010
	IE are to identify the necessary maintenance requirements for all Class D bearings, including producing detailed maintenance procedures taking into account their operational conditions and allowing for traceability of safety critical components, with assistance being sought from the Original Equipment Manufacturer where appropriate.	2010
Fatality at Level Crossing XX032 between Ballina and Manulla Junction, 28 th February 2008 (published 02/03/09)	The CRR should carry out a review of the suitability of this type of level crossing on public roads. This review should include, but not be limited to. Factors such as continual misuse, signage, user mobility, environmental and human factors.	2013
	IE should, taking into account the close proximity of the three level crossings, close or upgrade some or all of these crossings.	2013
	IE must identify crossings that are regularly misused and take proactive action to manage the increased risk created by this misuse.	2015
	IE are to put in place procedures that will capture and manage near miss reports.	2010
Near miss at Ballymurray level crossing, 14 th June 2008 between Athlone and Westport (published 11/05/09)	IE should ensure all safety critical staff have undertaken safety critical communications training and that their ongoing competency management systems specifically monitors the quality of safety critical communications.	2010
	IE should put in place safe work methods for the maintenance of Automatic Half Barriers (AHBs), these methods should include risk assessments for any hazards identified in the maintenance of AHBs.	2010

Report	Safety Recommendations	Closed
Collision between a train and a road vehicle at level crossing XN125, Cappadine, on the Ballybrophy to Killonan line, 31 st of July 2008 (published 29/07/09)	IE should assess the risks relating to road users' behaviour in identifying a safe stopping position at User Worked Level Crossings and based on the outcome of this risk assessment, IE should introduce measures to allow safe use of this type of level crossing.	2013
	IE should carry out risk assessments on level crossings that fail to meet the viewing distances specified in the CRR guidance and implement appropriate measures in order to meet this guidance as a minimum.	2013
Collision of a train with the gates of level crossing XH066, Bridgetown, on the Limerick Junction to Rosslare Strand line, 2 nd December 2008. (published 01/12/09)	IE should review the training and competency management of gatekeepers and signalling maintenance personnel.	2010
	IE should review the design of signal indicators to ensure their design encourages correct interpretation.	2010
	The CRR should audit IE's training and competency management system to verify its effectiveness.	2010
Collision of a Locomotive with Passenger Carriages at Plunkett Station in Waterford on the Limerick to Rosslare Line, 29 th March 2009 (published 04/03/10)	IE should review their systems for training and competency management of signalmen ensuring working as a relief signalman is taken into account.	2010
	IE should ensure procedures are put in place for the operation and maintenance of the MU-2-B1 valves.	2010
Derailment of an on-track machine at Limerick Junction Station on the Dublin to Cork Line, 3 rd July 2009 (published 10/06/10)	IE should put in place a formalised process to ensure that life expired points are removed from service, where this is not possible a risk assessment should be carried out and appropriate controls should be implemented to manage the risks identified.	2017
	IE should ensure On Track Machine maintenance personnel are trained and competent to examine the wheelsets.	2010
Malahide Viaduct Collapse on the Dublin to Belfast Line, on the 21 st August 2009 (published 16/08/10)	IE should put appropriate interface processes in place to ensure that when designated track patrolling staff (who report to two or more divisional areas) are absent from their patrolling duties, that appropriate relief track patrolling staff are assigned to perform these patrolling duties.	2011
	IE should amend the Track Patrolling Standard, I-PWY-1307, to remove the requirement for track patrollers to carry out annual checks for scour.	2010
	IE should formalise their "Civil Engineering and Earthworks Structures: Guidance Notes on Inspections Standard", I-STR-6515, which should include guidance for inspectors on conducting inspections and identifying structural defects. On formalising this document IE should re-issue, in the appropriate format, to all relevant personnel.	2010
	IE should introduce a verification process to ensure that all requirements of their Structural Inspections Standard, I-STR-6510, are carried out in full.	2013
	IE should ensure that a system is put in place for effective implementation of existing standards and to manage the timely introduction of new and revised standards.	2013
	IE should ensure that a programme of structural inspections is started immediately in accordance with their Standard for Structural Inspection, I-STR-6510, and ensure that adequate resources are available to undertake these inspections.	2010
	IE should carry out inspections for all bridges subject to the passage of water for their vulnerability to scour, and where possible identify the bridge foundations. A risk-based management system should then be adopted for the routine examination of these vulnerable structures.	2013

Report	Safety Recommendations	Closed
Malahide Viaduct Collapse on the Dublin to Belfast Line, on the 21 st August 2009 (published 16/08/10)	IE should develop a documented risk-based approach for flood and scour risk to railway structures through: Monitoring of scour risk at sites through scour depth estimation, debris and hydraulic loading checks, and visual and underwater examination; Provision of physical scour / flood protection for structures at high risk; Imposing of line closures during periods of high water levels where effective physical protection is not in place.	2013
	IE should adopt a formal process for conducting structural inspections in the case of a report of a structural defect from a member of the public.	2015
	IE should introduce a training, assessment and competency management system in relation to the training of structural inspectors, which includes a mentoring scheme for engineers to gain the appropriate training and experience required to carry out inspections.	2012
	IE should review their network for historic maintenance regimes and record this information in their information asset management system (IAMS). For any future maintenance regimes introduced on the network, IE should also record this information in IAMS.	2015
	IE should incorporate into their existing standards the requirement for the input of asset information into the technical database system upon completion of structural inspections.	2010
	IE should carry out an audit of their filed and archived documents, in relation to structural assets, and input this information into their information asset management system.	2015
	The CRR should review their process for the closing of recommendations made to IE by independent bodies, ensuring that they have the required evidence to close these recommendations. Based on this process the CRR should also confirm that all previously closed recommendations satisfy this new process.	2016
Irregular operation of Automatic Half Barriers at Ferns Lock, County Kildare, on the Dublin to Sligo Line, 2 nd September 2009 (published 26/08/10)	IE should review the competencies of all signalmen to ensure that when signalmen are assigned relief duties, they have the required training and experience to perform these duties appropriately.	2014
Derailment of empty train due to collision with landslip debris outside Wicklow Station, 16 th November 2009 (published 15/11/10)	IE should review their vegetation management processes to ensure that vegetation covering substantial earthworks structures is adequately maintained to facilitate the monitoring and inspection of earthwork structures by patrol gangers and other inspection staff.	2013
	IE should review the effectiveness of their standards in relation to conducting earthworks inspections during periods of heavy rainfall, ensuring that earthworks vulnerable to failure are inspected during these periods by appropriately trained patrol gangers or inspectors.	2013
	IE should review their Standard for Track Patrolling, I-PWY-1307, for its effectiveness in identifying any third party activities that occur inside and outside the railway boundaries that could affect safety and where any deficiencies are found, IE should develop an alternative process for the identification of these third party activities.	2010
	IE should review their structures list & ensure that all earthworks are identified and included on this list. Upon updating this list, a programme for the inspection of earthworks is to be developed & adopted at the frequency requirements set out by the Structural Inspections Standard, I-STR-6510.	2015
	IE and the CRR should review their process for the issuing of guidance documents, to ensure that the third parties affected by these guidance documents are made aware of their existence.	2017

Report	Safety Recommendations	Closed
Derailment of empty train due to collision with landslip debris outside Wicklow Station, 16 th November 2009 (published 15/11/10)	IÉ should review the effectiveness of their Structural Inspections Standard, I-STR-6510, with consideration for the possibility of more thorough inspections being carried out on cuttings to establish the topography & geotechnical properties of cuttings; & from this information identify any cuttings that are vulnerable to failure.	2015
Laois Traincare Depot Derailment, 20 th January 2010 (published 19/01/11)	IÉ should ensure that the risks relating to use of spring assisted manual points are identified and that appropriate control measures are implemented based on the risks identified.	2013
Secondary suspension failure on a train at Connolly Station, 7 th May 2010 (published 05/05/11)	IÉ should ensure all work in rolling stock maintenance depots is carried out in accordance with its control process.	2017
	IÉ should review its process of managing the hazard log in relation to the Class 29000s to ensure the adequacy of this process and verify that implementation of closure arguments in the hazard log is effective.	2017
	IÉ should evaluate the risks relating to failure of the centre pivot pin to perform its function due to over-inflation of the secondary suspension and determine if any design modifications are required to avoid future failures.	2016
Tram derailment at The Point stop, Luas Red Line, 13 th May 2010 (published 11/05/11)	TDLR should introduce a communication protocol between normal and emergency for given situations where a clear understanding between a tram driver and Central Control Room are required.	2019
Person struck at level crossing XE039, County Clare, 27 th June 2010 (published 11/07/11)	IÉ should ensure that risk assessments are produced for all user worked level crossings to identify all hazards specific to particular level crossings.	2018
	IÉ should review their documentation on the measurement of viewing distances at existing user worked level crossings to ensure that the viewing distances provide sufficient views of approaching trains to allow level crossing users cross safely.	2017
	IÉ should review their procedures for the management of accidents to ensure that communication with the emergency services is clear and provides the necessary information to locate an accident site without undue delay and access it by the most appropriate point.	2018
Road vehicle struck at level crossing XM096, County Roscommon, 2 nd September 2010 (published 04/10/11)	IÉ should put in place a formal process for identifying and communicating with known users of user worked Level Crossings.	2014
	IÉ should review the effectiveness of its signage at user worked level crossings, and amend it where appropriate, taking into account the information provided in the level crossing user booklet. The review should include the information on the use of railway signals, what to do in case of difficulty when crossing the railway and ensuring the signage is illustrated in a clear and concise manner, taking into account current best practice and statutory requirements.	2017
	IÉ should update its risk management system to ensure that interim control measures are put in place where longer term controls to address risks require time to implement.	2014
	IÉ should review its use of disused rail as fencing at user worked LCs to ensure it cannot potentially increase the severity of a collision and where this is the case, replace the disused rail with appropriate fencing.	2014

Report	Safety Recommendation	Closed
Car Strike at Knockaphunta Level Crossing (XM250), County Mayo, 24 th October 2010 (published 19/10/11)	IÉ should upgrade the Level Crossing to ensure that the operation of the Level Crossing is not reliant on any direct action by the level crossing user.	2019
Car Strike at Morrough Level Crossing XG 173, 14 th February 2011 (published 08/02/12)	IÉ should liaise with local authorities where private road level crossings can be accessed from a public road to ensure there is advance warning to road users.	2016
	IÉ should ensure that they adopt their own standards in relation to design changes to any plant, equipment, infrastructure or operations that has the potential to affect safety.	2018
	The CRR should ensure that they adopt a formal approach to submissions made by IÉ in relation to design changes to any PEIO that has the potential to affect safety.	2012
	IÉ should review the suitability of the signage at user worked crossings on public and private roads, ensuring that human factors issues are identified and addressed.	2020
Gate Strike at Buttevant Level Crossing (XC 219), County Cork, 2 nd July 2010 (published 27/06/11)	IÉ should identify similar manned level crossings where human error could result in the level crossing gates being opened to road traffic when a train is approaching; where such level crossings exist, IÉ should implement engineered safeguards; where appropriate.	2017
	IÉ should review its risk management process for manned level crossings to ensure that risks are appropriately identified, assessed and managed to ensure that existing level crossing equipment is compliant with criteria set out in IÉ's signalling standards, where appropriate.	2013
Fog signal activation in Dart driving cab, Bray, on the 6 th March 2012 (published 19/09/2013)	IÉ should introduce appropriate procedures and standards for the safe issue, storage and transportation of fog signals.	2017
	IÉ drivers (and other staff) should receive adequate training in the safe handling of fog signals.	2017
Tractor struck train at level crossing XE020, 20 th June 2012 (published 17/06/2013)	IÉ should close, move or alter the level crossing in order to meet the required viewing distances in IÉ's technical standard CCE-TMS-380 Technical Standard for the Management of User Worked Level Crossings.	2017
	IÉ should review their systems of managing level crossings that fail to meet the viewing distances in IÉ technical standard CCE-TMS 380 Technical Standard for the Management of User Worked Level Crossings to ensure that any mitigation measure that is introduced is effective at reducing the risk to level crossing users.	2016
	IÉ should audit their Level Crossing Risk Matrix (LCRM) system, to ensure it correctly identifies high risk level crossings; and identifies appropriate risk mitigation measures for individual level crossings.	2017
	IÉ staff who may be required to contact the emergency services should have the appropriate information readily available to them in order to give clear instructions to the emergency services in order that they can attend accident sites in a prompt manner. This information should then be updated in IÉ's Rule Book.	2017

Report	Safety Recommendation	Closed
Bearing failure on a train at Connolly Station, 18 th October 2011 (published 26 th September 2012)	IE should put in place provisions to assist train drivers with the task of identifying if there is a fault present with an axlebox.	2013
	IE should ensure the competency management system for signalmen includes the assessment of Hot Axle Box Detector (HABD) related functions they perform.	2014
	IE should put in place formal procedures governing the role of Fleet Technical Services staff in relation to Hot Axle Box Detectors.	2016
	IE should ensure that a robust system is put in place for the competency assessment of safety critical rolling stock maintenance staff.	2014
	IE should update its competency management system for train drivers to include assessment of their competency in relation to their tasks following a HABD alarm.	2014
Runaway locomotive at Portlaoise Loop, 29 th November 2012 (published 19/09/13)	IE should review their Vehicle Maintenance Instructions (VMIs) for locomotives to ensure that there are adequate braking tests at appropriate intervals.	2016
	IE should adopt a quality control system, for the introduction of new maintenance procedures for locomotives.	2014
	IE should review their system for introducing new train drivers' manuals, to ensure that train drivers are fully trained and assessed in all aspects of these manuals.	2018
	IE should review their competency management system for train drivers to ensure that all driving tasks are routinely assessed.	2016
Trend Investigation: Possession incidents on the Iarnród Éireann network (published 27/01/14)	IE IM should develop a formal possession planning meeting framework that is consistent through the IE network.	2014
	IE IM should review the application of Back-to-Back possessions and implement actions to eliminate any informal practices that do not comply with IE Rule Book.	2014
	IE IM should establish a possession planning procedure that ensures protection arrangements are based on the work to be delivered and are verified by a suitable member of staff and formally communicated to all relevant personnel.	2014
	IE-IM should review the current process for late changes to possessions to ensure changes to possession arrangements are verified by a suitable member of staff and formally communicated to all relevant personnel.	2017
Operating irregularity during SLW between Dundalk and Newry, 23 rd March 2013 (published 28/04/14)	IE should review the signalling infrastructure cross -border with a view to commissioning the bi-directional signalling.	2014
	IE should review current communication procedures with regard to the updated communication equipment now available.	2018
DART wrongside door failure, Salthill & Monkstown Station, 10 th August 2013 (published 30/07/14)	The CME (IE RU) should review and modify their design for the EMU autocouplers to ensure a more robust coupler circuit that will provide assurance that both coupler electrical heads have connected correctly and that coupler circuits are continuous throughout the train consist. Any modification made should be documented in Rolling Stock Design Standards.	2014
	The CME (IE RU) should introduce a visual indicator on the driving console to indicate to the driver that coupling has been completed successfully (or a visual or audible indication that coupling has failed).	2015
	DART Operations (IE RU) should update the applicable EMU Drivers' Manuals to include specific guidance on the requirement for the examination of couplers. The update should also include guidance on associated testing of coupler integrity and guidance on any indications in the driving cab that would assist the driver in detecting any coupler failure.	2016

Report	Safety Recommendation	Closed
DART wrongside door failure, Salthill & Monkstown Station, 10 th August 2013 (published 30/07/14)	The CME (IÉ RU) should review and modify the processes set out in their SMS for closing recommendations to ensure recommendations from investigations are recorded, monitored and closed. When these processes have been established, they should be audited (by a party external to the CME) at predefined intervals to ensure compliance.	2015
USAN 001 DART Wrongside Door Failure, Salthill & Monkstown Station, 18 th August 2013 (issued on the 19/08/2013)	IÉ should put in place mitigation measures to prevent the wrong side failure of the door interlocking equipment on the Dart trains (USAN001a issued on the 19/08/2013).	2013
	IÉ should put in place a system to manage the risks associated with the wrong side failure of the door interlocking equipment on the DART trains (USAN001b issued on the 19/08/2013).	2013
Tram fire on approach to Busáras Luas Stop on the 7 th November 2013 (published 28/08/14)	TDLR should ensure that Alstom, as the contracted Vehicle Maintenance Contractor, review maintenance instructions to ensure separation is maintained between hydraulic circuit and the traction cables at installation and during operation.	2015
	TDLR should ensure that Alstom, as the contracted VMC, add the interaction between the braking hoses and traction cables and the potential event of a flash fire to the hazard log of the 401 Type Tram and implement all identified mitigation actions.	2015
	TDLR should ensure that Alstom, as the contracted VMC, review the performance requirements for the isolation protection system in the MIC bogie to ensure that it meets the requirements of the 401 hazard log or revise the 401 hazard log accordingly.	2015
	TDLR should ensure that Alstom, as the contracted VMC, review the requirements for traction cables in the MIC bogie and produce and implement a suitable specification for this component. Installation procedures should also be reviewed to ensure that the free length requirements of these components are fulfilled.	2017
	TDLR should ensure that Alstom, review the defect priority matrix with regards to damage to traction cable insulation and fretting between these components and hydraulic hoses. In addition to this, maintenance procedures should be introduced to specify actions for the repair of traction cables.	2015
	TDLR should ensure that Alstom, review their incident / accident investigation process to ensure that investigations are of sufficient depth and produce clear recommendations.	2015
Structural failure of a platform canopy at Kent Station, 18 th December 2013 (published 07/11/14)	IÉ-IM should establish a formalised procedure for managing the risk associated with the adverse effects of high winds.	2015
Rock fall at Plunkett Station, Waterford, 31 st December 2013 (published 18/12/14)	IÉ-IM CCE should complete a thorough review of CCE-STR-STD-2100 in relation to the application of condition ratings on assets to ensure that condition ratings are a true reflection of the condition of the asset; and that the appropriate inspection frequency is applied.	2015
	IÉ IM CCE should complete a thorough review of the Cuttings, Embankments and Coastal/River Defences Inspection Card set out in CCE-STR-STD-2100 to ensure that Structures Inspectors have the correct means to complete the card without the requirement for alterations to templates or defined terms. The process of approval of these Inspection Cards should also be reviewed to ensure that they are reviewed and approved by the STSE.	2015
	IÉ-IM CCE should complete thorough reviews of CCE-STR-STD-2100 and CCE-STR-GDN-2802 in terms of maintenance requirements to ensure consistency throughout both documents.	2016

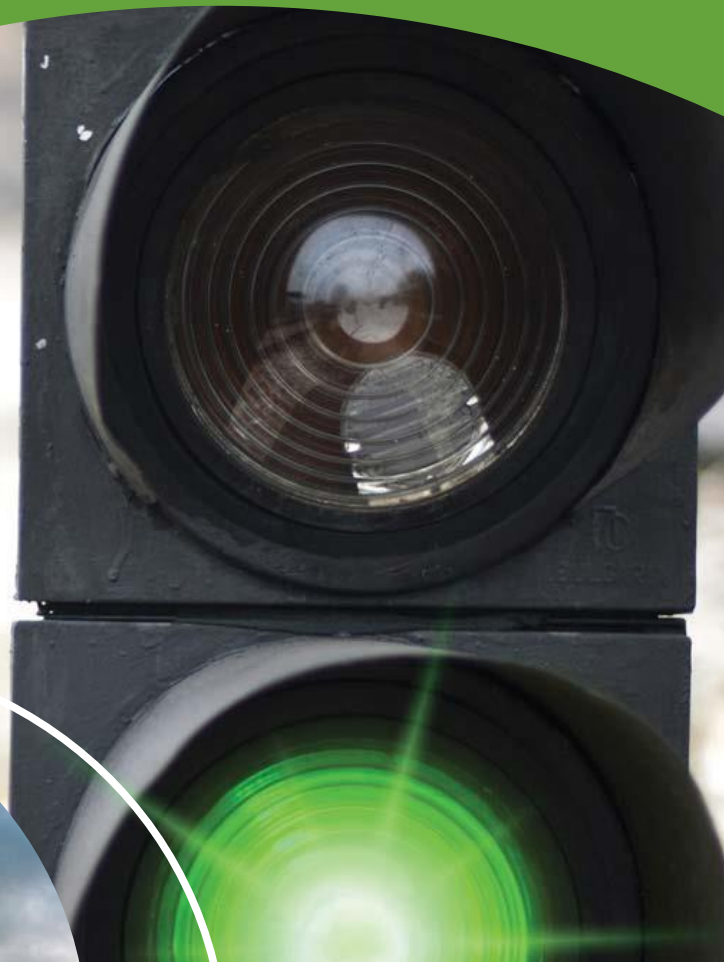
Report	Safety Recommendation	Closed
Rock fall at Plunkett Station, Waterford, 31 st December 2013 (published 18/12/14)	IÉ-IM CCE should fully adopt the compliance verification process and ensure the process includes an effective means of reviewing the quality of documents completed by staff.	2015
	IÉ-IM CCE should review its Competence Management System in terms of both: its identification and tracking of mandated refresher training for Structures Inspectors competence; and its annual review of Structures Inspectors inspection work.	2015
Vehicle struck by train at Corraun level crossing, XX024, Co. Mayo, 12 th February 2014 (published 30/04/15)	IÉ should ensure that where a Decision Line is present at a level crossing, that the purpose of this Decision Line is appropriately conveyed to the level crossing users.	2016
Car strikes train at Level Crossing XM 250, Knockaphunta, Co. Mayo, 8 th June 2014 (published 04/06/15)	The CRR, RSA and IÉ in consultation with any relevant stakeholders should agree a common policy in connection with instructions and warnings related to user worked level crossings.	2018
Investigation into SPADs on the IÉ network from January 2012 to July 2015 (published 11/04/2016)	IÉ-IM should review the functionality of signals in the Connolly area so that the instances of abnormal upgrades or downgrades.	2017
	IÉ-RU should commission an independent review, in terms of human factors, to determine why there is a prevalence for the occurrence of SPADs: at certain times of the day; at certain times of drivers shifts; and for drivers with three-five years driving experience.	2017
	IÉ-RU should introduce a near miss reporting system, whereby, drivers may report near misses without the fear of sanctions being imposed.	2017
	IÉ-IM should review the Traffic Regulator's Manual with a view to introducing guidance for Traffic Regulator's in terms of the management of train delays and the switching of crossing points.	2018
	IÉ-RU and IÉ-IM should carry out a review of the interfaces between different operational staff (i.e. drivers, LCCOs, signalmen and EOs) so that all operational staff can adequately manage train operations during degraded situations. Part of this review should focus on the safety critical communications between operational staff.	2019
	IÉ-IM, should review their procedures for the placement of speed boards and brief relevant staff to be vigilant in the placement of lineside signage with respect to the potential for obscuring of signals or otherwise unintentionally providing distractions to drivers, especially in the case where there are fixed colour light signals, or they have potential to cause SOY SPADs.	2017
	IÉ-IM & IÉ-RU should review the current system of reporting SPAD events so that reports are consistent and published within a set period of time.	2016
	IÉ-IM should review the procedures applicable to signalmen, Level Crossing Keeper, LCCO and level crossing emergency operators with particular emphasis on the actions to be taken by each when a fault is detected at a level crossing. This review should consider circumstances where a train may already have entered the affected section of line, and circumstances where the signal may be missing or extinguished.	2020
Dangerous occurrence between Ballybrophy and Portlaoise, 12 th September 2015 (published 6 th September 2016)	IÉ-IM should review the Site Safety Briefing procedure to ensure all personnel have made themselves aware of the information contained in the relevant Weekly Circular.	2018

Report	Safety Recommendation	Closed
Diffin Light Rail Passenger Fall, Co. Donegal 17 th December 2016 (published 7 th November 2017)	DLR should review their risk assessment process to ensure that all reasonably foreseeable risks associated with the operation of trains are identified and suitable control measures identified.	2018
	DLR should review the DLR SMS, in its totality, and ensure that there are internal monitoring procedures that mandates the periodic checking of application of SMS processes and practises.	2018
	DLR should review their responsibilities under the Safety and Welfare at Work Regulations as to dedicated First Aid areas.	2018
Near miss at Knockcroghery Level Crossing, XM065, Co. Roscommon, 31 st January 2017 (published 20 th December 2017)	IÉ-IM should review the human factors and non-technical skills training for Level Crossing Control Operatives (LCCOs), and introduce further training, where applicable. In addition, IÉ-RU should finalise the Professional Support Handbook for Level Crossing Control Operators; to provide guidance for LCCOs in the areas of human factors and non-technical skills.	2019
	IÉ-IM should review and update the Level Crossing Control Centre (LCCC) Instructions, to make them more user friendly for LCCOs.	2019
Derailment of DART passenger service, at Points DL115, Dun Laoghaire, 13 th September 2017 (published 15/08/18)	IÉ-IM should update the relevant sections of the General Appendix and other associated documentation to specify where the points clip should be fitted.	2019
	IÉ-IM should conduct a full review of IMO-SMS-031, 'Competence Management – Persons required to conduct IM operating duties and associated documentation, to identify deficiencies in training, continuous assessment and the recording of performance of duties to ensure that persons carrying out these duties are competent to do so.	2020
USAN 002 Collision of an ICR with a buffer stop at Laois Train Care Depot, 17 th July 2018 (issued on the 17/08/2018)	IÉ should advise all relevant staff that a positive brake cylinder gauge reading in the cab of an ICR is not an indication that a brake is present.	2020
Collision of an ICR with a buffer stop at Laois Train Care Depot, 17 th July 2018 (published 25 th June 2019)	IÉ-RU CME should expand the requirements of preparation instructions for rail vehicles to ensure that on completion of these tests the brake status of a train can be fully established; this should include checking the status of circuit breakers and brake isolations.	2020
	IÉ-RU CME should develop a formal procedure for the examination of vehicles prior to moving a train which has been left unattended with no direct handover.	2020
Wrongside Door Failure at Ashtown Station, 12 th August 2018 (published 25/06/19)	IÉ-IM should re-brief Traffic Regulators on the importance of adhering to the Traffic Regulators' Manual in relation to the recording of all telephone conversations within the controlled environment.	2019
Vehicle struck by train at Cartron level crossing, XM220, Co. Mayo, 17 th August 2018 (published 3 rd September 2019)	IÉ-IM should consider options to upgrade LC XM220 to minimise the requirement of direct action by the users.	2020
Passenger trap-and-drag occurrence on Luas tram at Heuston Stop, 26 th March 2019 (published 04/03/2020)	TII should conduct a risk-based review on whether CCTV platform monitors should be installed at high-use tram stops.	2020
	TDLR and TII should develop new labels, for the application on tram doors, which warn passengers of the dangers of closing doors.	2020
	TDLR should update their drugs and alcohol policy to include explicit requirements that testing is conducted post incident/accident where the actions of a driver may have contributed to the incident/accident. TDLR should also develop a system whereby a decision not to test an individual is documented with clear justification for the decision provided.	2020

Report	Safety Recommendation	Closed
Near miss with an Iarnród Éireann SET Worker at Rush and Lusk Station, 20 th June 2019 (published 27/05/2020)	IÉ-IM should brief all staff of their requirements, under the IÉ Rule Book, to wear their high visibility clothing correctly.	2020
SAN 001 Collision of an ICR with a fixed buffer stop at Laois Train Care Depot, 6 th July 2019 (issued 02/10/19)	IÉ-IM should review the selection of fixed buffer stops at locations at LTCD for their suitability and efficacy in protecting staff and infrastructure.	2020
	IÉ-IM should conduct review of their current specification for fixed buffer stops and their associated design forms to ensure they are fit-for-purpose; and fixed buffer stops are only selected where appropriate. Based on this review, IÉ-IM should commence a programme of inspections for fixed buffer stop at all locations on the IÉ network to ensure their suitability and effectiveness at protecting passenger, staff, track and infrastructure.	2020
Road Rail Vehicle occurrences on Iarnród Éireann Network from 2015 to 2018 (published 8 th October 2019)	The CRR and IÉ-IM should review their processes of closing out findings from CRR audits; with a view to identifying opportunities to close out findings, such as updates to the IÉ Rule Book.	2020
Collision between a Bord na Móna (BnM) Flat Wagon and Kilcolgan Level Crossing Gates, Offaly, 8 th June 2020, RAIU Investigation Report No: 2021 – R002, published: 18 th February 2021).	BnM should review and update its Procedure for Rerailing Wagons / Rail Stock to ensure that there are clear instructions in relation to how to: visually check the lifting chains; rerailed; and safety secure rerailed stock.	2021
	BnM should develop a training, assessment and continuous assessment programme related to the Procedures for Rerailing Wagons / Rail Stock.	2021
Overhead Line detachment, Pearse Station, 1 st October 2020 (RAIU Investigation Report No: 2021 – R005, published 22 nd September 2021).	IÉ-RU CME to include requirements to check Class 8100 EMU Forward Facing CCTV (FFCCTV) maintenance activities in the Compliance Coordinators documentation records / check sheets.	2021
	IÉ-RU CME to review and develop a maintenance strategy for the 8100 EMU OTDRs to ensure that the correct information is recorded.	2021

* Light blue – IÉ-RU / IÉ-IM; dark blue – TDLR; pink – 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;
- Nine heritage & minor railway systems (of which three are currently not operational).

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. There are ten organisations that act as RU and IM for a railway network and two organisations that act solely as RUs; there are currently no organisations that act solely as an IM.

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. Rhomborg Sersa operate as an RU on IÉ's rail system; they operate and maintain On Track Machines (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 in 2022 included:

- Diffin 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;
- Lullymore Heritage & Discovery Park Limited, Rathangan, Co Kildare;
- Cavan & Leitrim Railway, Dromod, Co Leitrim.

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*. <i>Exceptions: Serious injury/fatality due to assault or fatality due to natural causes.</i>
1.02	<i>Level crossing accidents</i> 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. <i>Exceptions: Weather related occurrences.</i>
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. <i>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.</i>
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. <i>Inclusion for IÉ: All SPADs, the monthly notification should include the Risk Ranking for all Category A SPADs.</i>
2.04	Fires, smoke or explosions on rolling stock not requiring the evacuation of passengers.
2.05	Collisions with large objects** or large animals***. <i>Exceptions: Where the intent was vandalism or criminal damage.</i>
2.06	Non railway vehicles damaging or fouling a railway line. <i>Exceptions: Where the intent was vandalism or criminal damage.</i>
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 (\geq €150,000);
- Equal to or greater than €2,000,000 (\geq €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 3 – 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
CCE	Chief Civil Engineer
CCTV	Closed Circuit Television
CF	Contributory Factor
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
DLR	Diffin 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
IE	Iarnród Éireann
IE-IM	Iarnród Éireann Infrastructure Manager

IE-RU	Iarnród Éireann Railway Undertaking
IM	Infrastructure Manager
km/h	kilometres per hour
LCCO	Level Crossing Control Operative
LME	Light Maintenance Equipment
LNMC	Luas Network Management Central
LSS	Line Signalling System
LTCD	Laois Train Car Depot
m	metre
MCB	Main Circuit Breaker
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
OCS	Overhead Contact System
OEM	Original Equipment Manufacturer
OHLE	Overhead Light 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
PPI	Points Position Indicator
RAIU	Railway Accident Investigation Unit
RC	Root cause
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
TDLR	Transdev Dublin Light Rail
TED	Traffic Event Database
TII	Transport Infrastructure Ireland
TRV	Track Recording Vehicle
TSC	Track Safety Co-ordinator
TSI	Tramway Safety Instruction
UF	Underlying Factor
USAN	Urgent Advice Safety Notice
WI	Work Instruction
WSP	Wheel Slip Protection

Appendix 4 – 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.
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.
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
Serious Accident	Any train collision or derailment of trains, resulting in the death of at least one person or serious injuries to five or more persons or extensive damage to rolling stock, the infrastructure or the environment, and any other similar accident with an obvious impact on railway safety regulation or the management of safety. For heavy rail, the EU Agency for Railways divides serious accidents into the following categories: collisions, derailments, level-crossing accidents, accidents to persons caused by rolling stock in motion, fires and others.
Systemic Factor	Any causal or contributing factor of an organisational, managerial, societal or regulatory nature that is likely to affect similar and related occurrences in the future, including, in particular the regulatory framework conditions, the design and application of the safety management system, skills of the staff, procedures and maintenance.

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