

Railway Accident Investigation Unit Ireland



Annual Report
2020

Summary

The purpose of the Railway Accident Investigation Unit (RAIU) is to independently investigate occurrences 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 2020, fifty (PERs) were completed by the RAIU based on reports of incidents, accidents and serious accidents from Transdev (Luas), Iarnród Éireann Infrastructure Manager (IÉ-IM), IÉ Railway Undertaking (IÉ-RU) and Bord Na Móna. The reports included occurrences of: rolling stock faults; Road Rail Vehicle (RRV) occurrences; apparent self-harm occurrences; energy faults; derailments in depots and sidings; tram road traffic collisions; fire; and, level crossing incidents.

Of the fifty PERs in 2020, nine full investigations were commenced (this included an incident that occurred in 2019 but the RAIU only became aware of the incident in 2020). The investigations are as follows:

- Near miss with an IÉ Patrol Ganger near Woodlawn, Galway, 4th June 2019;
- Trend investigation into Signals Passed at Stop (SPASs) on the Luas Network;
- Collision between an IÉ passenger train and rail-mounted maintenance equipment, Rosslare, Wexford, 11th January 2020;
- Collision between a car and a train at Kilnageer Level Crossing (XM240), Mayo, 29th April 2020;
- Person entrapped in lowered CCTV level crossing, Ashfield, Offaly, 24th May 2020;
- Collision between a Bord na Móna Flat Wagon and Kilcolgan Level Crossing Gates, Offaly, 8th June 2020;
- Chassis Plate Fracture on General Motors Class 201, Locomotive 224, 7th July 2020;
- Overhead Line detachment, Pearse Station, 1st October 2020;
- Luas Overhead Line Failure, Stillorgan, 2nd November 2020.

The RAIU published four investigation reports (resulting in eighteen safety recommendations) in 2020, namely:

- Passenger trap-and-drag occurrence on Luas tram at Heuston Stop, 26th March 2019;
- Near miss with an IÉ Patrol Ganger near Woodlawn, Galway, 4th June 2019;
- Near miss collision between a train and an IÉ-IM staff member, at Rush and Lusk Station, 20th June 2019;
- Collision between an IÉ passenger train and rail-mounted maintenance equipment, Rosslare, Wexford, 11th January 2020.

As of the end of 2020, the RAIU have issued a total of 205 safety recommendations from investigation reports, Urgent Safety Advice Notices (USAN) and one Safety Advice Notice (SAN), since the appointment of a Chief Investigator for the RAIU in 2007.

The Commission for Railway Regulation (CRR) monitors the implementation of safety recommendations and has advised that of the 205 RAIU safety recommendations issued to date: 133 have been closed out as having been addressed (65%); further evidence has been requested by the CRR for thirty-two recommendations (16%); and, forty recommendations remain open or in progress (19%).

The COVID-19 pandemic did not affect the operational activities of the RAIU.

David Murton
Chief Investigator

29th September 2021

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General Information & Non-Investigation Activities



The Organisation

The Organisation

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 comprises of a Chief Investigator, three Senior Investigators and an administrator.

The RAIU's remit

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.

There are ten railway systems within the RAIU's remit, these are:

- The Iarnród Éireann (IÉ) national heavy rail network;
- The Luas light rail system in Dublin operated by Transdev;
- The Bord Na Móna (BnM) industrial railway;
- Nine heritage & minor railway systems (of which four are currently not operational).

For further information on these organisations see Appendix 1.

Non-investigation Activities

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 European Union (EU) Agency for Railways. To this end, the RAIU participated in the 2020 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.

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.

On the 31st October 2020, S.I. No. 476/2020 - European Union (Railway Safety) Regulations 2020, came into operation; and on the same date S.I. No. 430/2020 - European Union (Railway Safety) (Reporting and Investigation of Serious Accidents, Accidents and Incidents) Regulations 2020 also came into operation.

Investigation Activities



RAIU

Investigation Activities

Notification of incidents and accidents to the RAIU

Introduction

The RAIU must be notified of incidents and accidents, either through immediate notification; monthly bulk notifications; or, the reporting after the death of an individual within 30 days of an accident.

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	Level crossing accidents involving rolling stock.
1.03	Collisions between rolling stock causing damage or blocking a running line with harmful consequences**.
1.04	Collisions of rolling stock with arrestor mechanisms/buffer stops with harmful consequences.
1.05	Derailments of rolling stock.
1.06	Fires, smoke or explosions on rolling stock requiring the evacuation of passengers from a train or a station.
1.07	The release or combustion of dangerous goods being carried on rolling stock.
1.08	Occurrences leading to the closure of a railway line for more than 6 hours. <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	Signals Passed At Danger (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 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.

2020 Preliminary Examination Reports (Immediate Notifications)

Summary of Preliminary Examination Reports during 2020

1st January 2020 to 31st December 2020

The following outlines the fifty PERs undertaken by the RAIU into occurrences on the railways in 2020. A PER is created upon the notification of an occurrence from a railway organisation, normally through immediate notification (or in a small number of cases, through monthly bulk notifications).

For the definitions and classification of occurrences & the investigation of occurrences by the RAIU and other bodies, see Appendix 2.

Railway Body	Date of occurrence	Location of Occurrence	Classification of Occurrence	Classification subset	Summary	Fatalities/ Injuries
Transdev	2 January 2020	Mary's Abbey / Capel Street, Dublin	Accident	Collision	Tram 4002 entered Mary's Abbey / Capel Street Junction inbound on a proceed signal. At the same time a Garda car entered the junction breaching the red light and as a result, the Garda car made contact with the front of the tram. There were approximately fifty passengers on board Tram 4002 and there were no reports of injuries. There was damage to a panel on the tram.	0
Transdev	3 January 2020	Cookstown Interchange, Dublin	Incident	Control – Command & Signalling	The driver of Tram 3007 passed a Stop signal at the Cookstown Interchange on a conflicting route from Tallaght to The Point. Tram 3007 was crossing the interchange towards Saggart at the time and was required to select Ready to Start (RTS) as the auto-route will not be granted due to a route conflict with the interchange to Saggart; however, Tram 3007 proceeded past the Stop signal and only came to a stop when another tram (Tram 3025) came into view as it crossed the interchange. The driver of Tram 3007 was unaware he had passed a signal at Stop and continued on his journey to the Point.	0
IÉ-RU	8 January 2020	Laois Train Care Depot, Portlaoise, Laois	Accident	Collision	An Intercity Railcar (ICR), ICR 22313, was moved in the depot while an underframe door was open and struck the depot access steps, damaging the door.	0
IÉ-IM	11 January 2020	Rosslare, Wexford	Accident	Collision	While moving lineside signage at a level crossing, using rail-mounted maintenance equipment (RMME), the RMME was left on the track and was struck by passenger train, Train A602, the 09:33 hours (hrs) Connolly to Rosslare Europort service. The driver of the train brought the train to a stop, the RMME was stuck between the two wheelsets on the leading bogie and needed the intervention of permanent way staff to remove it.	0

Railway Body	Date of occurrence	Location of occurrence	Classification of occurrence	Classification subset	Summary	Fatalities/ Injuries
IÉ-RU	19 January 2020	Confey Station, Leixlip, Kildare	Accident	Fire	The driver of Train D905, the 11:10 hrs Dublin Connolly to Maynooth passenger service, saw a large amount of smoke coming from the underframe of Diesel Multiple Unit (DMU) 29308, and noted that the brake was stuck on. The passengers were detrained before the brake was isolated and the train ran empty to Maynooth for Chief Mechanical Engineer's (CME) attention. On arrival in Maynooth sidings report of smoke and driver used fire extinguisher to extinguish the fire. On inspection of DMU 29308, the smoke was found to be the result of brake actuators.	0
IÉ-RU	20 January 2020	Navan Road Parkway, Dublin	Accident	Fire	Whilst operating Train P679, 20:40 hrs Maynooth to Connolly passenger service, the driver was contacted by the signalman, telling him that there was a report of flames from the underframe of the rear carriage, DMU 29103. The driver stopped the train at Navan Road Parkway where the driver saw smoke (but no flames); and was advised by the CME to isolate the brakes on DMU 29103. On CME examination of DMU 29103 there was no obvious faults, the set was trialled and returned to service without further issue.	0
Transdev	22 January 2020	Jervis, Dublin	Incident	Others (To persons due to rolling stock in motion)	As the doors of Tram 3002 were closing prior to departing Jervis inbound, a female with an infant in a buggy ran towards the closing doors and placed her hand between the closing doors. The tram doors closed on her hand, trapping it, and the driver having received no door indication in the cab moved off from the platform. The female let go of the buggy and was moved along the platform by the tram before her fingers freed from the doors, and she fell onto the platform beside the tram. A member of Luas security established that the individual was not injured. Tram 3002 was inspected by Transdev Fleet Maintenance who confirmed that the tram doors were operating within their specification.	0
Transdev	31 January 2020	Suir Road, Dublin	Accident	Collision	As a tram (Tram 3001) was passing through the Suir Road junction a van collided with the side of Tram 3001, the van had disregarded a road traffic stop signal at the junction with Dolphin Road.	0
IÉ-IM	3 February 2020	Woodenbridge, Wicklow	Accident	Other	A car, travelling on a bend on the road, left the road, travelled down the embankment and onto the railway corridor. The passenger was trapped in the car and was freed by emergency services. He is reported to have broken his ankle. There were no train movements on the line, as the location was under possession. Concrete barriers have since been erected at the bend to prevent future incursions.	1 Minor Injury

Railway Body	Date of occurrence	Location of occurrence	Classification of occurrence	Classification subset	Summary	Fatalities/ Injuries
IÉ-RU	23 February 2020	Howth Junction, Dublin	Incident	Rolling Stock	The 20:15 hrs Pearse to Drogheda passenger service (Train D825) was having door issues at Howth Junction, when it was detained and taken out of service. However, as the doors remained partially opened two passengers boarded the train, without the driver noticing. The train proceeded to Drogheda, with the doors still partially opened. The driver was notified of the passengers, by Centralised Traffic Control (CTC), who saw social media postings from the passengers, who commented when the train did not stop at their destination; the train was stopped at Gormanston and the passengers re-directed to another service, without any injuries.	0
IÉ-RU	25 February 2020	Connolly Station, Dublin	Incident	Rolling Stock	While the 07:10 hrs Dundalk to Pearse passenger service (Train P605), was stopped at Platform 5, Connolly Station, passengers alighted and boarded the train, including a wheelchair passenger who was located at a doorway. The driver pressed the door close button in the cab and obtained the blue light interlocking signal and the driver commenced to leave the station. However, at the door where the wheel chair was located the door was prevented from closing as part of the chair was obstructing it, the door made several motions back and forth to close and when the passenger moved the chair back it closed. On report to IÉ-IM the set was removed from service and an examination found that the fault was a miss wired micro-switch adjacent to the door where the wheelchair had been located.	0
IÉ-IM	25 February 2020	Mullingar, Westmeath	Serious Accident	To persons due to rolling stock in motion	A male accessed the track at Level Crossing XS003 (Culleenmore), Mullingar, stood in the five foot, and was subsequently struck and fatally injured by train the 17:10 hrs Connolly to Sligo passenger service (Train A912).	1 Fatality due to apparent self-harm
IÉ-IM	1 March 2020	Knockcroghery, Roscommon	Accident	Level Crossing	As the 09:40 hrs Athlone to Westport passenger service (Train A800), passed the proceed aspect of protecting signal of Knockcroghery Level Crossing (XM065), the driver saw a car crash through the entrance barriers for the crossing and reversing off the crossing before leaving the scene. The train driver brought the train to a stop before the crossing. There were no injuries or damage to the train.	0
IÉ-RU	12 March 2020	Broombridge, Dublin	Incident	Fire	At Broombridge Station, smoke was detected on the underside of DMU 29412, the 19:41 hrs Pearse to Maynooth passenger service (Train D923). The fire was extinguished, and the passengers were detained. On examination, the insulation on the starter motor cable was worn away from contact with the engine exhaust, causing the fire.	0

Railway Body	Date of occurrence	Location of occurrence	Classification of occurrence	Classification subset	Summary	Fatalities/ Injuries
IÉ-IM	17 March 2020	Cratloe, Clare	Serious Accident	Level Crossing	At approximately 02:55 hrs, a young man, approached Cratloe Level Crossing at speed, crashing into the level crossing, and the car went on fire. The young man was fatality injured. The track and the road intersect at a tight angle, forming an X, there is a Y-junction in one of the roads. When crossing, road vehicles must travel at slow speed. The user was a familiar user.	1 Fatality due to road traffic collision
Transdev	30 March 2020	Benburb Street / Queen's Street, Dublin	Accident	Collision	As a Luas tram, Tram 3001, was crossing the Red Line Benburb Street / Queen's Street Junction (A29 Inbound) on a proceed signal a truck entered the junction and collided with Tram 3001. Two bogies of Tram 3001 derailed and struck the adjacent building. There were three passengers on board the tram and no passenger injuries were reported; the tram driver was taken to hospital and treated for shock.	1 Minor Injury shock
IÉ-IM	04 April 2020	Boyne Viaduct, Drogheda, Louth	Serious Accident	To persons due to rolling stock in motion	The driver of the 19:05 hrs Enterprise service from Belfast to Connolly (Train A149) saw an orange jacket on the line as the train was approaching the Boyne viaduct and applied the brakes. The driver reported the occurrence to CTC and the train guard went back to investigate, finding a deceased male. The deceased had been struck by part of the bogie as he lay in the cess adjacent to the rail; and was identified as an IÉ-RU employee. At Drogheda, the deceased waited for the passing trains to clear before walking off the platform and across the Boyne viaduct towards his home; this route has been reported as normal for the employee.	1 Fatality due to trespass
Transdev	12 April 2020	Ballyogan Woods, Dublin	Serious Accident	To persons due to rolling stock in motion	As a Green Line Luas tram, Tram 3020, was returning to the Sandyford Depot, the tram struck a male who was lying within the swept path of the segregated section of the track between Ballyogan Wood and Ballyogan Avenue. The person was lying in the hedging that separates the tramway from the dedicated footpath that runs parallel to the tracks; the injured party was removed from the scene, by ambulance, and died two days later.	1 Fatality due to trespass
IÉ-IM	19 April 2020	Oranmore, Galway	Serious Accident	To persons due to rolling stock in motion	A male deliberately accessed the track via Frenchfort Level Crossing (XG162) and made his way towards Oranmore Level Crossing (XG 165). As the 19:00 hrs passenger service from Ennis to Galway (Train A796) approached the level crossing, the driver could clearly see the male lying on the track and made no attempt to move as it approached, he was struck by the train and was fatality injured.	1 Fatality due to apparent self-harm
IÉ-IM	29 April 2020	Kilnageer, Mayo	Accident	Level Crossing	As the 13:10 hrs Westport to Heuston passenger service (Train A809) approached unattended gate Level Crossing XN240 it collided with a car. There were no reported injuries.	0

Railway Body	Date of occurrence	Location of occurrence	Classification of occurrence	Classification subset	Summary	Fatalities/ Injuries
IÉ-IM	17 May 2020	Inchicore Works, Dublin	Accident	Derailment	As Locomotive 221 was performing a shunting manoeuvre in a siding adjacent at the Ramps Workshop, it passed over hand points, HP48, and derailed. Inspection of the points found a small void under the points which allowed the blade of the points open slightly resulting in the derailment.	0
IÉ-IM	24 May 2020	Ashfield, Offaly	Incident	Traffic Operations Management (Level Crossing)	CCTV Level Crossing XA068 was cleared by the Level Crossing Control Operative (LCCO) for the passage of the 11:00 hrs passenger service from Galway to Heuston (Train A703) while a member of the public remained in the confines of the level crossing. When the LCCO was contacted by the trapped member of the public, the LCCO did not cancel the train movement and allowed the train to travel through the level crossing with the member of the public still within the confines.	0
Transdev	27 May 2020	Red Cow Depot, Dublin	Accident	Collision	As a Luas tram, Tram 4001, was being driven in the Red Cow Depot, the driver heard a loud noise and the tram lost power and came to a stop. The driver investigated and found the stay-wires were pulled away from the Overhead Contact System (OCS).	0
IÉ-IM	07 June 2020	Dromod (Leitrim) – Longford	Incident	Others (To persons due to rolling stock in motion)	As the 09:05 hrs passenger service from Sligo to Connolly (Train A901), was approaching the 79 ¼ Mile Post, the driver saw a female on the line, walking towards the train, and applied the emergency brake. The train came to a stop a number of metres short of the person who was uninjured.	0
BnM	08 June 2020	Lemonaghan, Offaly	Accident	Collision	As ballast stone was being unloaded from a BnM flat wagon in the Lemonaghan works location, the flat wagon closest to the Locomotive derailed. The flat wagon was uncoupled from the Locomotive to facilitate the rerailing. When the flat wagon was rerailed it started to move away from the Locomotive and travelled 2 km along the track before colliding with both Kilcolgan level crossing gates (X15:06). Prior to striking the level crossing the flat wagon crossed over a derailment switch (used to protect the crossing) which was not set in the derailment position.	0
IÉ-IM	14 June 2020	Ennis, Clare	Incident	Traffic Operations Management (SPAD)	As the 12:28 hrs passenger service from Limerick to Galway (Train A792) approached Ennis Station, it passed Signal GL421 at danger and continued onto the platform. When contacted by the controlling signalman the driver was unaware that he had been involved in a “Signal Passed at Danger” (SPAD) incident. The SPAD risk ranking was 15 (low risk).	0

Railway Body	Date of occurrence	Location of occurrence	Classification of occurrence	Classification subset	Summary	Fatalities/ Injuries
IÉ-IM	15 June 2020	Nenagh, Tipperary	Incident	Infrastructure	As a Patrol Ganger was performing a routine track walk inspection, he identified a buckled rail close to the 28 MP between Nenagh and Cloughjordan, the line was closed in excess of six hours to effect repairs. On further examination it was found that engineering works had taken place within a possession between Birdhill and Roscrea which involved slewing track, subsequently a misalignment occurred in the track close to the 28 MP between Nenagh and Cloughjordan. The section of line was still subject to a possession and was extended to repairs were completed.	0
IÉ-IM	26 June 2020	Portarlinton, Laois	Serious Accident	To persons due to rolling stock in motion	As the 07:00 hrs Cork to Heuston passenger service (Train A205) was non-stop passing through Portarlinton Station a person alighted from the platform and placed themselves in front of the train and was fatally injured.	1 Fatality due to apparent self-harm
IÉ-IM	06 July 2020	Harmonstown, Dublin	Serious Accident	To persons due to rolling stock in motion	As the 18:02 hrs passenger service from Drogheda to Dublin (Train P622) approached Harmonstown Station, a person jumped from the platform onto the track and was struck and fatally injured by the train in an act of apparent self-harm.	1 Fatality due to apparent self-harm
IÉ-RU	07 July 2020	Heuston Station, Dublin	Incident	Rolling Stock	Class 201 Locomotive No. 224 failed in service at Limerick Junction with a coolant pipe leak on the 6 th July while working a MK4 set to Dublin. The train was recovered to Heuston that evening. Whilst in the sidings at Heuston Station on the 7 th July, a driver assigned to remove the locomotive to Inchicore observed the body of locomotive of sagging. On inspection a main frame crack was observed at approximately the mid-point of the locomotive, in the chassis plate.	0
IÉ-IM	17 July 2020	Lisduff, 72 ½ mile post Dublin to Cork Line	Accident	Derailment	A T3 possession was in place from Ballybrophy to Thurles on both the Up and Down Lines. A Tamper was working on the Up line on the Cork side of Lisduff and a Road Rail Vehicle (RRV) was operating on the Down line. RRV Dumpers were also travelling from the work site to Lisduff crossing over 748 points in the normal position. When the Tamper finished its work and returned from the Up Road across 748 points to the siding in Lisduff. 748 points the points were now in reverse. The Dumpers were returning to Lisduff on the Down Line and the lead Dumper ran through 748 points and derailed the first axle.	0

Railway Body	Date of occurrence	Location of occurrence	Classification of occurrence	Classification subset	Summary	Fatalities/ Injuries
Transdev	24 July 2020	Various locations, Dublin	Incident	Traffic Operations Management	The RAIU noted an increase in the number of incidents involving door openings on non-platform sides on the Luas. It transpired that on the 16 th March, the beginning of Covid-10 pandemic there was an instruction issued to drivers in relation to the door opening process. The normal process is a 'Driver Authorisation, Passenger Open' principle, but to avoid touching of door buttons, a 'Driver Authorisation, Driver Open' principle was applied. However, this saw an increase in door opening on non-platform sides. On the 24 th July this instruction was revoked, and the incidents stopped.	0
IÉ-IM	18 September 2020	North Wall, Dublin	Accident	Derailment	As an On-Track Machine (OTM), No. 790, entered North Wall Depot and travelling along Road No.4, it derailed at hand-points HP49. The leading bogie came to rest in the ballast, the likely cause of the incident was gauge spread.	0
IÉ-RU	29 September 2020	Rush & Lusk, Dublin	Accident	Fire (Rolling Stock)	As the 06.30 hrs Dundalk to Bray passenger service (Train P603) was stopped in Rusk & Lusk Station, the driver noticed a small fire on the underframe of the train (29000 Class DMU). The driver extinguished the fire and detrained passengers, and the train was removed from service. On inspection, it was found that there was an issue with the brake pipe pressure transducer on 29210. When the normal brakes were applied, instead of normal braking, the full service brake was applied. This occurred for every normal brake application causing overheating and eventually a small fire. The brake pipe pressure transducer was replaced; and checks will be carried out on the remainder of the fleet during routine inspections.	0
IÉ-IM	30 September 2020	Sallins Station, Kildare	Accident	Collision	RRVs were operating in convoy when the fourth RRV collided with the third RRV close to the off-tracking point.	0

Railway Body	Date of occurrence	Location of occurrence	Classification of occurrence	Classification subset	Summary	Fatalities/ Injuries
IÉ-IM / IÉ-RU	01 October 2020	Pearse Station, Dublin	Accident	Rolling Stock	As the 12:04 hrs DART passenger service from Greystones to Howth (Train E920) was coming to a stop in Pearse Station, a pantograph lost contact with the Contact Wire of the Overhead Line Equipment (OHLE). The Pantograph Head and Upper Arm lowered rapidly resulting in the Pantograph Lower Arm extending to its maximum reach and contacting the OHLE. This action caused the Pantograph Lower Arm to flip, driving the Upper Arm and Pantograph Head on to the roof of the train resulting a short circuit and a large flashover. The short circuit caused a loss of power to the OHLE in the section. Train E920 coasted before been brought to a stop, on Platform 1, by the driver. The DART electrification system is fitted with an Auto Reclose function which allows a high speed circuit breaker to automatically reclose after a tripping event provided a successful Line Test has been passed. After the pantograph failure, and following a successful Line Test, the Auto Reclose restored power to the OHLE causing a second short circuit. This resulted in the Catenary Wire from the OHLE breaking and falling onto Platform 1. While the Catenary Wire was on Platform 1 a second Auto Reclose resulted in power been restored to the fallen Catenary Wire. The Catenary Wire remained live on Platform 1 for approximately forty-six seconds before the Electrical Control Operator (ECO) isolated the section. There were two passengers on Platform 1 at the time but not in the vicinity of the fallen Catenary Wire. Passengers were detained on the train until confirmation of an isolation had taken place. There were no reports of injuries.	0
IÉ-IM	13 October 2020	Castleknock Station, Dublin	Serious Accident	To persons due to rolling stock in motion	As the 9:05 hrs Sligo to Connolly passenger service (Train A905) travelled through Castleknock Station, the train struck and fatally injured a male who placed himself in front of the train as it approached.	1 Fatality due to apparent self-harm
IÉ-IM	15 October 2020	Between the 74 ½ and 74 ¼ MP, near Longford	Serious Accident	To persons due to rolling stock in motion	As the 11:05 hrs Sligo to Connolly passenger service (Train A907) departed Longford Station, a person came out from a ditch and lay across the rail and was struck and fatally injured by the train.	1 Fatality due to apparent self-harm
IÉ-IM	28 October 2020	Edermine, Wexford	Incident	Traffic Operations Management (Level Crossing)	During a T3 possession between Enniscorthy and Wexford, RRVs were engaged in hedge cutting near Level Crossing XR140 (Edermine). The Engineering Supervisor contacted the LCCO to advise that the RRVs were working around the crossing and would need to go over and back. Three RRVs were then seen to cross over while the barriers were up. The incorrect traffic management procedures were in place at the time.	0

Railway Body	Date of occurrence	Location of occurrence	Classification of occurrence	Classification subset	Summary	Fatalities/ Injuries
Transdev	29 October 2020	Leopardstown , Dublin	Accident	To persons due to rolling stock in motion	A person, walking a dog, entered onto a segregated area of tramway and was struck by a Luas between Ballyogan Wood and Leopardstown on the Green Line. The person sustained a broken leg and was taken to hospital for treatment.	1 Injury due to trespass
IÉ-IM	31 October 2020	Bagnalstown, Carlow	Accident	Collision	As the deferred 18:35 hrs Heuston to Waterford (Train A514) was travelling towards Bagnalstown, it struck an RMME. The RMME was being used to move equipment for a planned possession (that had not yet been granted).	0
Transdev	02 November 2020	Milltown, Dublin	Accident	Collision	A bus struck the Milltown Viaduct (underbridge) on the Luas Green Line.	0
Transdev	02 November	Stillorgan, Dublin	Incident	Energy	Luas Service 65 (operated by Tram 5010) from Brides Glen to Broombridge served Stillorgan inbound platform before moving forward to Signal B11. The driver of Tram 5010 (Driver 5010) noticed the Main Circuit Breaker (MCB) had opened in the driving cab (the MCB opened due to its failure to detect 750 volts (V) Direct Current from the OCS). The loss of 750V DC was the result of the OCS breaking and short circuiting against the roof of Tram 5010. Driver 5010 also noticed the OCS was sagging and advised the Traffic Supervisor at the Luas Network Management Central (LNMC). The Traffic Supervisor instructed Driver 5010 not to open the passenger doors and to keep all passengers inside the tram until otherwise advised. The Supervisory Control And Data Acquisition (SCADA) system indicated that the section in the area of Stillorgan was de-energised. The Traffic Supervisor identified other trams operating in the vicinity of Stillorgan and requested they stop; which they did. Shortly afterwards, the Traffic Supervisor then began to attempt to reform service and requested that Service 88, Brides Glen to Parnell, (operated by Tram 5003) continue to Sandymount Stop and stop there. As Tram 5003 passed the Insulated Overlap (two OCS contact wires from two electrical sections which provide a continuous supply of power to the tram when the tram passes from one section to the next and also allows for de-energising of one section at a time) it re-energises the section at Stillorgan where Tram 5010 was located. The re-energising of the section at Stillorgan resulted in a second short circuit between the OCS wire and the roof of Tram 5010.	0

Railway Body	Date of occurrence	Location of occurrence	Classification of occurrence	Classification subset	Summary	Fatalities/ Injuries
IÉ-RU	02 November 2020	Killester, Dublin	Incident	Rolling Stock	As the 19:00 hrs Dublin to Belfast Enterprise departed Connolly, the Train Manager noticed that the door at the end of the last carriage leading to the generator wagon was not secured. The train was brought to a stop and the door was secured and the carriage was locked off. It was reported that there were two passengers in the carriage at the time, they advised Northern Ireland Railways (NIR) that they did not see anyone tamper with the door. It was established that there is normally a "dummy door" fitted in the walkway to obscure the door and prevent any passengers accidentally accessing the area, on this occasion the "dummy door" had not been fitted as required.	0
Transdev	03 November 2020	Suir Road, Dublin	Accident	To persons due to rolling stock in motion	A cyclist made contact with inbound tram, Tram 3019 (Type 401), on the Suir Road; the cyclist sustained minor injuries in the accident and was treated at the scene.	1 Injury to cyclist
IÉ-IM	05 November 2020	Hazelhatch, Dublin	Accident	Derailment	An RRV excavator, carrying out hedge cutting, derailed on a straight section of track near Hazelhatch, damaging an axle counter. A follow up site visit identified severe flange wear on all rail wheels.	0
IÉ-IM	11 November 2020	Enniscorthy, Wexford	Accident	Collision	An RRV dumper collided with a RRV excavator after completing removal of vegetation, near Enniscorthy. The RRV Operator (RRVO) saw the slow/stop indicator illuminated on the RRV excavator ahead and applied the brakes, but the RRV dumper did not stop in time and collided with the grab of the RRV excavator that was securing the vegetation on a rail trailer. The RRV dumper driver complained of low rail condition.	0
IÉ-IM	30 November 2020	Bray, Wicklow	Accident	Collision	As an RRV Dumper truck was manoeuvring at level crossing XR011 in preparation to on-track, the RRVO misjudged or momentarily lost control and contacted the skip of an RRV that was on the line ahead, damaging the windscreen of RRV.	0
BnM	06 December 2020	Derryhaun, Longford	Accident	Collision	When BnM rolling stock passed through Derryhaun level crossing (05-23) on the R392 between Lanesboro and Ballymahon, the trailing locomotive driver returned to the level crossing gates. He then saw a car approaching from the Ballymahon direction; the driver of the car made no attempt to slow down and collided with the gates. The locomotive driver returned to the locomotive to inform the leading locomotive driver and to notify the emergency services and when he returned to the level crossing gated the car had left the scene.	0

Railway Body	Date of occurrence	Location of occurrence	Classification of occurrence	Classification subset	Summary	Fatalities/ Injuries
IÉ-IM	12 December 2020	Ballybrophy – Killonan Junction, Limerick	Incident	Traffic Operations Management	A car stopped at the lowered north exit barrier of level crossing XN165. The rear of the vehicle was approximately 10 m from the running line. The crossing keeper cleared the level crossing and called the signals for the approaching train, despite knowing that the car was trapped in the barriers. The crossing keeper went to the vehicle and advised the driver to remain stationary where he was. The train subsequently passed through without incident.	0

Categorisation of Preliminary Examination Reports during 2020

1st January 2020 to 31st December 2020

The following is a compilation of the categories of PERs for 2020.

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

In general, the RAIU do not conduct a full investigation into occurrences related to apparent self-harm or trespass occurrences, as a full investigation is not likely to result in any safety recommendations to prevent similar occurrences in the future. The break-down of these types of occurrences on the IÉ and Luas network is as follows:

- IÉ – Six fatalities as a result of apparent self-harm;
- IÉ – One attempted apparent self-harm (no injury);
- IÉ – One fatality as a result of trespassing;
- Transdev – One fatality as a result of trespassing;
- Transdev – One injury as a result of trespassing.

Other occurrences related “to persons, due to rolling stock in motion”, include:

- Transdev – One cyclist struck by a tram as a result of the cyclist not looking for oncoming trams;
- Transdev – One “trap and drag” incident where a female passenger had her hand struck in the tram doors and the tram began to move.

Other occurrences where there were no live train or railway infrastructure movements are as follows:

- IÉ – One fatality as a result of a car crash at a level crossing (no train or level crossing movements at the time);
- IÉ – One injury as a result of a car leaving the road and entering onto the railway.

Accidents & incidents on the IÉ network:

Excluding the above, the compilation of accidents for IÉ-IM and IÉ-RU in 2020:

- Five RRV accidents – two derailments & three collisions (IÉ-IM);
- Four instances of smoke and/ or fires (IÉ-RU);
- Four level crossing incidents related to traffic operations management (IÉ-IM);
- Three incidents related to doors (IÉ-RU / NIR);
- Three collisions, one as a result of depot manoeuvring, two as a result of RMMEs left on line (IÉ-IM);
- Two derailments in depots/yards (one of which was an OTM) (IÉ-IM & IÉ-RU);
- One collision at a level crossing (IÉ-RU);
- One SPAD (IÉ-IM);
- One buckled rail (IÉ-IM);
- One locomotive underframe failure (IÉ-RU);
- One pantograph failure / energisation of OHLE (IÉ-RU/ IÉ-IM).

Accidents & incidents on the Luas network

Compilation of accidents for Transdev in 2020:

- Three collisions with road vehicles;
- One OCS failure;
- One collision with OCS;
- One bridge strike;
- One SPAD;
- One review of door opening incidents.

Accident on the Bord na Móna network

There were two reported incidents on the BnM network:

- One car strike at a level crossing;
- One collision of a BnM Flat Wagon with level crossing gates.

2020 Full Investigations

Summary of full investigations commenced in 2020

1st January 2020 to 31st December 2020

From the fifty PERs, nine full investigations into reported occurrences were commenced in 2020:

- Near miss with an IÉ Patrol Ganger near Woodlawn, Galway, 4th June 2019 (Note: The RAIU were not notified on this incident until February 2020, and a full investigation commenced on notification). The report into this investigation was completed in 2020 and as such is outlined in the next section of this report;
- Collision between an IÉ passenger train and rail-mounted maintenance equipment, Rosslare, Wexford, 11th January 2020. The report into this investigation was completed in 2020 and as such is outlined in the next section of this report;
- Collision between a car and a train at IÉ Kilnageer Level Crossing (XM240), Mayo, 29th April 2020;
- Person entrapped in lowered IÉ CCTV level crossing, Ashfield, Offaly, 24th May 2020;
- Collision between a Bord na Móna Flat Wagon and Kilcolgan Level Crossing Gates, Offaly, 8th June 2020;
- IÉ Chassis Plate Fracture on General Motors Class 201, Locomotive 224, 7th July 2020;
- IÉ Overhead Line detachment, Pearse Station, 1st October 2020;
- Luas Overhead Line Failure, Stillorgan, 2nd November 2020;
- Trend Investigation into Signals Passed at Stop (SPASs) on the Luas Network.

Collision between a car and a train at IÉ Kilnageer Level Crossing (XM240), Mayo, 29th April 2020



At approximately 13:40 hrs on the 29th April 2020, the 13:10 hrs passenger service from Westport to Dublin (Train A809) was approaching Kilnageer Level Crossing (LC) XM240, located approximately six kilometres (km) from Castlebar, County Mayo. At the same time a car approached LC XM240 with the gates open (left open by a previous user) and began travelling through LC XM240. When the driver of Train A809 saw the car, he made a full-service brake application; however, the train could not stop in time and struck the car.



At approximately 12:13 hrs on the 24th May 2020, a Level Crossing Control Operative (LCCO), located at Athlone Local Control Centre (ALCC) cleared Closed-Circuit Television (CCTV) Level Crossing (LC) XA068, located in Ashfield, Offaly for the passage of the 11:00 hrs passenger service from Galway to Heuston (Train A703) while a member of the public (MOP) was inside the barriers of the level crossing.

The MOP had requested assistance from LCCO using the telephone provided at the level crossing. LCCO advised the MOP that they would raise the barriers and instructed the MOP to stand beside some level crossing equipment (clear of the tracks, but within the confines of the level crossing). LCCO did not raise the barriers and allowed Train A703 to pass through LC XA068. The MOP was uninjured as a result of this incident.

Collision between a Bord na Móna Flat Wagon and Kilcolgan Level Crossing Gates, Offaly, 8th June 2020



At approximately 13:15 hrs on the 8th June 2020 a Bord na Móna (BnM) double rake system travelled through Kilcolgan Level Crossing, closing and opening the derailing points to allow passage through the crossing. At some stage after the passage of the double rake through Kilcolgan Level Crossing, the derailing points were placed in the closed position (possibly by trespassers).

Approximately two kilometres away, works were being undertaken at BnM Worksite 610A, Lemonaghan, in preparation for track renewal work. The works included the transport and unloading of ballast at Worksite 610A by means of a Locomotive, a Flat Wagon and an Excavator. During the ballast unloading, ballast fell from the Flat Wagon onto the track; which in turn resulted in the Flat Wagon derailing during a shunting manoeuvre. The Locomotive was uncoupled from the Flat Wagon to facilitate the rerailing and a lifting chain was placed around the excavator bucket and the Flat Wagon coupling. The Flat Wagon was then lifted, aligned with the track and lowered onto the rail. The chain was removed from the Flat Wagon coupling and the Flat Wagon rolled away towards Kilcolgan Level Crossing.

On approach to Kilcolgan Level Crossing, the Flat Wagon passed over the derailing points (in the closed position) allowing the Flat Wagon to continue towards the gates. The Flat Wagon collided with the first gate at Kilcolgan Level Crossing forcing the gate across local road, L70075, before colliding with the second gate forcing it open away from the road. The Flat Wagon came to a stop approximately 50 metre (m) past Kilcolgan Level Crossing.

IÉ Chassis Plate Fracture on General Motors Class 201, Locomotive 224, 7th July 2020



On 6th July 2020, the 14:25 hrs Cork Kent to Dublin Heuston passenger service operated with Locomotive 224 at the rear. Locomotive 224 experienced a coolant leak and electrical fault that caused the locomotive to shut down while approaching Limerick Junction. The train was deemed a failure and hauled to Heuston Station, Dublin.

On the 7th July 2020, while Locomotive 224 was at Heuston Station awaiting transfer to Inchicore Works, a driver observed the body of Locomotive 224 was sagging near the centre point and reported it to his supervisor who in turn alerted the relevant parties. On inspection, by the CME Department's maintenance staff a main frame crack was identified. Locomotive 224 was then shunted to Inchicore Works for a more thorough examination.

IE Overhead Line detachment, Pearse Station, 1st October 2020

12:55:44.865 (BST)



At approximately 12:55 hrs on Thursday 1st October 2020, the 12:04 hrs IE DART service from Greystones to Howth (Train E920) was coming to a stop in Pearse Station when the second pantograph (Pantograph 396) of the train set (Unit 8128) lost contact with the Contact Wire of the Overhead Line Equipment (OHLE). The Pantograph Head and Upper Arm lowered rapidly resulting in the Pantograph Lower Arm extending to its maximum reach and contacting the OHLE. This action caused the Pantograph Lower Arm to flip, driving the Upper Arm and Pantograph Head on to the roof of the train resulting a short circuit and a large flashover. The short circuit caused a loss of power to the OHLE in the section. Train E920 coasted before being brought to a stop, on Platform 1, by the driver (Driver E920).

Driver E920, having heard the noise from the flashover, stepped onto Platform 1 to check the train and after observing the OHLE vibrating, returned to the cab and pressed the "Pan Down" button. This resulted in the lead and rear pantographs lowering but the Lower Arm of the Pantograph 396 did not lower (which was later determined to be as a result of the failure of the pantograph chains).

The DART electrification system is fitted with an Auto Reclose function which allows a high speed circuit breaker to automatically reclose after a tripping event provided a successful Line Test has been passed. After the pantograph failure, and following a successful Line Test, the Auto Reclose restored power to the OHLE causing a second short circuit. This resulted in the Catenary Wire from the OHLE breaking and falling onto Platform 1. While the Catenary Wire was on Platform 1 a second Auto Reclose resulted in power been restored to the fallen Catenary Wire. The Catenary Wire remained live on Platform 1 for approximately forty-six seconds before the Electrical Control Operator (ECO) isolated the section. There were two passengers on Platform 1 at the time but not in the vicinity of the fallen Catenary Wire.

Passengers were detained on the train until confirmation of an isolation had taken place. There were no reports of injuries.

Luas Overhead Line Failure, Stillorgan, 2nd November 2020



On 2nd November 2020 the 14:31 hrs Luas Service 65 (operated by Tram 5010) from Brides Glen to Broombridge served Stillorgan inbound platform before moving forward to Signal B11. The driver of Tram 5010 (Driver 5010) noticed the Main Circuit Breaker (MCB) had opened in the driving cab (the MCB opened due to its failure to detect 750 volts (V) Direct Current from the Overhead Contact System (OCS)). The loss of 750V DC was the result of the OCS Electrical Supply System, High Speed Circuit Breaker (ESS HSCB) L1 Sandyford opening automatically due to the OCS breaking and short circuiting against the roof of Tram 5010. Driver 5010 also noticed the OCS was sagging and advised the Traffic Supervisor at the LNMC.

The Traffic Supervisor viewed the images from the Close Circuit Television (CCTV) cameras located at the Stillorgan Stop and saw the OCS had broken and was lying across the top of Tram 5010, the outbound track and platform. The Traffic Supervisor instructed Driver 5010 not to open the passenger doors and to keep all passengers inside the tram until otherwise advised. The Supervisory Control And Data Acquisition (SCADA) system indicated that the section in the area of Stillorgan was de-energised.

The Traffic Supervisor identified other trams operating in the vicinity of Stillorgan and requested they stop; which they did. Shortly afterwards, the Traffic Supervisor then began to attempt to reform service and requested that Service 88, Brides Glen to Parnell, (operated by Tram 5003) continue to Sandyford Stop and stop there. At approximately 14:37 hrs, Tram 5003 passed the Insulated Overlap (two OCS contact wires from two electrical sections which provide a continuous supply of power to the tram when the tram passes from one section to the next and also allows for de-energising of one section at a time) between Sandyford and Central Park. As a pantograph head of Tram 5003 traverses the Insulated Overlap, the pantograph bridges both contact wires and electrically connects the two sections together, re-energising the section at Stillorgan where Tram 5010 was located. The re-energising of the section at Stillorgan resulted in a second short circuit between the OCS wire and the roof of Tram 5010. The second short circuit resulted in HSCB L2 (L2 signifies out of City Centre) Sandyford and HSCB L1 (L1 signifies in to the City) Glencairn also tripping out due to overcurrent.

Trend Investigation into Signals Passed at Stop (SPASs) on the Luas Network



In February 2020, the RAIU received the monthly occurrence notifications from Transdev in relation to incidents and accidents on the Luas network in January; here it was notified that there had been a signal passed at Stop (SPAS) at Cookstown Interchange, County Dublin, on the 3rd January 2020.

On Friday 3rd January 2020, the driver of Tram 3007 (Driver 3007), departed Cookstown Inbound Platform travelling to Belgard Stop. At approximately 15:08 hrs, Driver 3007 approached and passed Tram Signal S-2e at the Cookstown LSS area, when it was displaying a “Stop” aspect. At the same time, Tram 3025, travelling Outbound towards Saggart, entered Cookstown LSS on a “Proceed” aspect. On seeing Tram 3025, Driver 3007 stopped Tram 3007, and waited for Tram 3025 to pass before continuing his journey.

On review of SPAS history on the Luas network, the investigation was expanded to carry out a trend investigation into SPAS incidents on the Luas network.

Full Investigations Published in 2020

1st January 2020 to 31st December 2020

The RAIU published four investigation reports in 2020, which resulted in a total of eighteen new safety recommendations, the investigations are as follows:

- Passenger trap-and-drag occurrence on Luas tram at Heuston Stop, 26th March 2019;
- Near miss with an Iarnród Éireann Patrol Ganger near Woodlawn, Galway, 4th June 2019;
- Near-miss collision between a train and an IÉ-IM staff member, at Rush and Lusk Station, 20th June 2019;
- Collision between an IÉ passenger train and rail-mounted maintenance equipment, Rosslare, Wexford, 11th January 2020.

Passenger trap-and-drag occurrence on Luas tram at Heuston Stop, 26th March 2019



On the 26th March 2019, at approximately 14:22 hrs, a male passenger attempted to board inbound Luas tram, Tram 3011, at Heuston Stop. The passenger placed his hand between the door leaf and the door pillar of the rear most entrance door as the door was closing. The passenger's hand became trapped in the door seals. The door obstacle detection system did not detect the presence of the hand as it was less than 10 millimetres (mm); the door operation mechanism allows 10 mm obstacle detection to facilitate door closing.

The tram departed Heuston Stop nineteen seconds after the doors were closed with the passenger's hand trapped in the door. Two security staff came to the passenger's assistance, with one of the security staff communicating with the driver by radio.

The tram began to move, with the passenger's hand still trapped and the passenger walked along the platform with his hand trapped in the door seal for five seconds before the security staff assisted in freeing the passenger's hand from the door. The tram came to a stop four seconds after the passenger had freed his hand.

The immediate cause of the passenger hand being trapped in the door of Tram 3011 was the passenger placed his hand in the door opening, as he attempted to board the tram, during the door closing sequence.

Contributory factors (CoF) associated with the incident were:

- CF-01 – The Driver did not conduct an adequate visual check, using rear view monitors and mirrors during or after the door closing sequence; this, in part, may be as a result of deficiencies in the mirrors (absent from Heuston Stop) and ineffective in-cab monitors (older black and white monitors);
- CF-02 – There were no labels warning the passenger of the risk of attempting to board or exit a tram while the doors are closing;

- CF-03 – STT1 did not follow the instructions in the Transdev Radio Protocol which requires emergency calls to commence by saying “This is an Emergency call” twice.

The underlying cause (UC) associated with the incident was:

- UC-01 – There appears to be an over-reliance on the part of the drivers in relation to the Traction Control Management System (TCMS) Console for confirmation of the doors being closed and locked; this is in part, as a result of drivers not fully understanding that obstacle detection is removed for the last 10 mm of door travel to allow the doors to close.

The root cause (RC) associated with the incident was:

- RC-01 – The Transdev Dublin Light Rail Ltd (Transdev) suite of documents (SM 017 Driver Training Plan, SM 018 Competency Assessment, SM 019 Competence Assessment, Tramway Safety Instruction (TSI) Manual, etc) do not sufficiently warn the driver against the over-reliance of the tram’s doors closed and locked indications as an assurance that the door is free from obstacles. Therefore, a thorough final visual door 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 is essential.

The RAIU made seven recommendations related to the incident and three related to additional observations:

- Safety Recommendation 2020001-01 – Transdev 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;
- Safety Recommendation 2020001-02 – Transport Infrastructure Ireland (TII) should conduct a riskbased review on whether CCTV platform monitors should be installed at high-use tram stops;
- Safety Recommendation 2020001-03 – 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;
- Safety Recommendation 2020001-04 – Transdev and TII should develop new labels, for the application on tram doors, which warn passengers of the dangers of closing doors;
- Safety Recommendation 2020001-05 – Transdev, as part of the update to the SMS 018 Competence Assessment, should formally include the assessments that should be conducted every quarter;
- Safety Recommendation 2020001-06 – Transdev 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;
- Safety Recommendation 2020001-07 – Transdev 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;

- Safety Recommendation 2020001-08 – Transdev 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;
- Safety Recommendation 2020001-09 – Transdev 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. Transdev should also develop a system whereby a decision not to test an individual is documented with clear justification for the decision provided;
- Safety Recommendation 2020001-10 – Transdev 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.

Near miss with an Iarnród Éireann Patrol Ganger near Woodlawn, Galway, 4th June 2019



At approximately 10:04 hrs on the 4th June 2019, the 09:30 hrs passenger service from Galway to Heuston train departed Woodlawn Station. On route to Ballinasloe Station, on a curved section of track, the driver saw a person in high visibility clothing walking on the line in the five foot with his back to the oncoming train. The driver placed the train brake in the emergency position and sounded the train horn to warn of the train's approach. The person identified was an IÉ-IM Patrol Ganger who then stepped off the

track into the cess, approximately four seconds before the train passed. The driver brought the train to a stop and reported the incident. The weather at the time of the incident was raining with high gusts.

The immediate cause of the incident was that Patrol Ganger was in a position of danger as the requirements of the IÉ Rule Book could not be met in full for his patrol length. Contributory factors to the incident were:

- CF-01 – The location of the incident did not have the required sighting distances available for a patrol ganger to conduct the inspection within the parameters set out in the IÉ Rule Book;
- CF-02 – The Patrol Ganger was walking in the same direction as the oncoming train;
- CF-03 – There was adverse weather conditions at the time of the incident, which may have affected the Patrol Ganger's ability to hear the train.

Underlying causes to the incident were:

- UC-01 – The IÉ-IM Chief Civil Engineer's (CCE) Department Risk Assessment and Section B, Part Two of the IÉ Rule Book are not practical in the provision of protection to patrol gangers at locations with inadequate sighting distances;
- UC-02 – There appears that IÉ-IM have, over a long period of time, accepted a certain element of risk in relation to track patrolling given that known dangers are not being adequately mitigated by patrol gangers or their managers.

A root cause associated with the incident is:

- RC-01 – The mitigation measures set out in CCE-SMS-006, Hazards and Risk Assessments, is not robust in the protection of patrol gangers, given that the mitigation measures are not practical for the routine patrolling task.

As a result of this incident, the RAIU made two safety recommendations:

- Safety Recommendation 202002-01 – 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;
- Safety Recommendation 202002-02 – 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.

Near-miss collision between a train and an IÉ-IM staff member, at Rush and Lusk Station, 20th June 2019



At approximately 09:50:31 hrs, on the 20th June 2019, a member of IÉ-IM's SET Department's staff (to be referred to as SET Worker) accessed the railway line at Rusk and Lusk Station and began walking on the railway line (Up Line). The SET Worker was accessing the railway line to inspect electrical equipment associated with a nearby SET location case.

Seven seconds later the SET Worker sees the 08:00 hrs Belfast to Connolly passenger train approaching on the Up Line and starts to walk towards the other railway line (not occupied by the train, the Down Line). At 09:50:42 hrs, while standing in the middle of the Down Line, he raises his hand above his head to acknowledge the presence of the train, he is not in a position of safety. Two seconds later (09:50:44 hrs) the SET Worker walks across to the Down Platform and leans his elbow down on the platform and raises his other hand to acknowledge the train for a second time, he is not in a position of safety.

As the SET Worker watches the Belfast to Connolly train pass (09:50:46 hrs), the SET Worker sees the 09:29 hrs Pearse to Drogheda passenger train approaching on the Down Line. The SET Worker walks, at pace, towards the ramp of the Platform and begins to climb up on the ramp of the Down Line Platform, he stumbles during the climb. At 09:50:53 hrs the SET Worker clears the track, although he is not in a position of safety. One second later, at 09:50:54 hrs, the train travels past the SET Worker. At 09:50:56, the SET Worker is more than 1.5 metres from the track, in a position of safety; he does not suffer any injuries as a result of the incident.

The immediate cause of the incident was that the SET Worker placed himself in a position of danger by not adhering to the requirements set out in the IÉ Rule Book or the SET Risk Assessment to carry out the task; a task which could have been conducted without walking on the track. Contributory factor to the incident was:

- CF-01 – The SET Worker made a last-minute decision to conduct the inspection from track level without first considering his safety;
- CF-02 – There was no consideration taken at the pre-planning of the inspection of how the inspection was going to be conducted;
- CF-03 – The SET Worker may have lost situational awareness, momentarily, due to normally working at night and had an incorrect expectation that it was safe to access the track; this may have been exacerbated due to the fact that he had not intended to walk onto the track.

The underlying factor to the incident was:

- UF-01 – There is no formal documentation, for SET Department 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 SET Department staff that it is unsafe to go on or near the track without a proper SSOW.

The root cause associated with the incident was:

- RC-01 – Despite the IÉ Rule Book being robust in its protection of staff going on or near the line, the current SET Safety Management System (SMS) suite of documents does not reflect this robustness in ensuring that the risks associated with SET staff members working on their own are captured and managed.

As a result of the incident, the RAIU made two safety recommendations (one of which is related to an additional observation:

- Safety Recommendation 2020003-01 – The IÉ-IM SET Department should develop a formalised process, through their SMS suite of documents, for IÉ-IM SET staff walking/ working alone, which should be completed prior to any member of SET staff going on or near the line; at a minimum consideration should be given to:
 - Whether it is necessary to go on or near the line to conduct the walk / work;
 - What local knowledge is required to walk /work safely;
 - Whether all the requirements of the IÉ Rule Book / SSOW can be met;
 - What special protection arrangements are required either at night or during the day.
- Safety Recommendation 2020003-02 – IÉ-IM should brief all staff of their requirements, under the IÉ Rule Book, to wear their high visibility clothing correctly.

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



On 11th January 2020, T3 Possessions were granted between the 112 Mile Post (MP) 880 yards and the 112 MP 1320 yards (Rosslare Strand to Rosslare Europort) for IÉ-IM CCE Department in relation to the Rosslare Coastal Erosion Project.

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

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

On arrival at level crossing (adjacent to Hayesland compound), APWI and another permanent way worker carried one pole each to the welder, leaving the RMME on the track. As APWI was explaining the requirements to the welder his mobile phone rang and he took the call. On completion of the call, the PICOP/ES asked the APWI if the line was clear for the possession to be handed back; the APWI responded that it was clear; intending to remove the RMME. The APWI continued his conversation with the welder, forgetting to remove the RMME. The PICOP/ES phoned the Signaller, without physically checking the line, and handed back the possession, as safe, for the passage of trains.

At approximately 10:52 hrs, as the driver of the 08:05 hrs Connolly to Rosslare Europort passenger service (Train A602) approached the level crossing; he saw the RMME on the track and applied the emergency brakes. However, the train collided with the RMME.

When the train stopped, the driver informed the relevant staff. The RMME was wedged between the two wheelsets on the leading bogie and required the intervention of permanent way staff to remove the RMME. On removal, the driver inspected the train for damage and after a conversation with the CME maintenance staff, the train was cleared to continue its journey to Rosslare Europort, twenty-six minutes late.

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

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

Contributory factors include:

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

Systemic factors include:

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

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

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

The RAIU make the following safety recommendations:

- Safety Recommendation 202004-01 – IÉ-IM should classify and define RMMEs, Trolleys, LMEs and other commonly used plant or equipment on the railway and ensure appropriate safety procedures are in place for their use. IÉ-IM should also assess the need for any associated training and competency related to these changes and if considered necessary prepare training and competency assessment material;
- Safety Recommendation 202004-02 – IÉ-IM CCE should ensure that, once defined and classified, change management systems are put in place to ensure RMMEs, Trolleys, LMEs, etc are not altered for other uses, without first having been safety validated in line with company processes;

- Safety Recommendation 202004-03 – IÉ-IM should update their Mobile Gang Work Instructions, I-PWY-1490, (Ganger's Handbook) to ensure that all routine light maintenance activities are included. Systems, e.g., training, should be put in place to ensure that relevant staff can undertake dynamic risk assessments should non-routine activities need to be undertaken that are not described in the Ganger's Handbook.;
- Safety Recommendation 202004-04 – IÉ-IM clearly define the role of the PWI/APWI and update the relevant documentation accordingly.

2020 Monthly Bulk Notifications

IÉ 2020 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				1				1					2
2.02 Unintentional divisions of rolling stock released for service													
2.03 SPADs with no risk of conflicting movements		1	1	1				1	1		1	2	8
2.04 Fires, smoke or explosions on rolling stock not requiring the evacuation of passengers	2								1		1	2	6
2.05 Collisions with large objects or large animals	6	4	1	5	5	1	2	10	9	7	6	2	58
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			3	1	2	2	1	1	2	1	3	2	18
Total	8	5	5	8	7	3	3	13	13	8	11	8	92

The figures show that the majority of incidents are related to collisions with objects or animals.

Transdev 2020 Monthly Bulk Notifications

The monthly bulk notifications (not including immediate notifications) for Transdev 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 SPADs with no risk of conflicting movements	3	1	2	1	2	1	1		1	3			15
2.04 Fires, smoke or explosions on rolling stock not requiring the evacuation of passengers													
2.05 Collisions with large objects or large animals													
2.06 Non railway vehicles damaging or fouling a railway line											1		1
2.07 Collisions between light rail vehicles and road vehicles	7	2	1	1			1				1	1	14
2.08 Any other occurrence where an investigation remit has been issued internally													
Other occurrences Involving brushed contact with vehicles, pedestrians & cyclists; and scuttling.	6	8	7	4	1	2		3	3	1	2	2	39
Other occurrences Involving wrongside door openings, trap-and-drag occurrences	2		2	3	2	2	4		1				16
Other occurrences Any other occurrences						1	1		1				3
Total	18	11	12	9	6	6	7	4	6	4	5	3	91

The figures show that the majority of incident involve collisions/contacts with road vehicles, cyclists and pedestrians.

2020 Urgent Safety Advice Notice / Safety Advice Notice

1st January 2020 to 31st December 2020

The RAIU did not issue an Urgent Safety Advice Notices or Safety Advise Notices in 2020.

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 2020, the RAIU have made 205 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 2020 is illustrated below.

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	2	15	88%
2012	3	13	0	0	0	13	100%
2013	4	9	0	0	1	8	89%
2014	6	28	1	0	5	22	79%
2015	2	4	0	0	2	2	50%
2016	3	17	6	0	2	9	53%
2017	2	9	2	0	2	5	56%
2018	2	8	3	0	2	3	38%
2019	5	36	18	0	11	7	19%
2020	4	18	9	0	5	4	22%
Totals	50	205	40	0	32	133	65%

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 closed in 2020
Table 2	RAIU safety recommendations with 'FER' status in 2020
Table 3	RAIU safety recommendations 'Submitted' in 2020
Table 4	RAIU safety recommendations "Open/ In Progress" in 2020
Table 5	RAIU safety recommendations closed prior to 2020

Table 1 – RAIU safety recommendations closed in 2020

This section identifies the safety recommendations closed in 2020 (in order of occurrence date, oldest first).

Report/USAN/SAN	Recommendation
Car Strike at Morrough Level Crossing XG 173, 14 th February 2011 (published 08/02/12)	IE 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.
Investigation into SPADs on the IE network from January 2012 to July 2015 (published 11/04/2016)	IE-IM should review the procedures applicable to signaller, 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.
Derailment of DART passenger service, at Points DL115, Dun Laoghaire, 13 th September 2017 (published 15 th August 2018)	IE-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.
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)	IE 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.
Collision of an ICR with a buffer stop at Laois Train Care Depot, 17 th July 2018 (published 25 th June 2019)	IE-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.
	IE-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.
Vehicle struck by train at Cartron level crossing, XM220, Co. Mayo, 17 th August 2018 (published 3 rd September 2019)	IE-IM should consider options to upgrade LC XM220 to minimise the requirement of direct action by the users.
Road Rail Vehicle occurrences on Iarnród Éireann Network from 2015 to 2018 (published 8 th October 2019)	The CRR and IE-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 IE Rule Book.
SAN 001 Collision of an ICR with a fixed buffer stop at Laois Train Care Depot, 6 th July 2019 (issued 02/10/19)	IE-IM should review the selection of fixed buffer stops at locations at LTCD for their suitability and efficacy in protecting staff and infrastructure.
	IE-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, IE-IM should commence a programme of inspections for fixed buffer stop at all locations on the IE network to ensure their suitability and effectiveness at protecting passenger, staff, track and infrastructure.
Passenger trap-and-drag occurrence on Luas tram at Heuston Stop, 26 th March 2019 (published 04/03/2020)	Transport Infrastructure Ireland (TII) should conduct a risk-based review on whether CCTV platform monitors should be installed at high-use tram stops. XXX
	Transdev and TII should develop new labels, for the application on tram doors, which warn passengers of the dangers of closing doors.
	Transdev 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. Transdev should also develop a system whereby a decision not to test an individual is documented with clear justification for the decision provided.

Report/USAN/SAN	Recommendation
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.
* Light blue indicates recommendations associated with IÉ; 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 Transdev.	

Table 2 – RAIU safety recommendations with ‘FER’ status in 2020

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 2020.

Report	Recommendation
Laois Traincare Depot Derailment, 20 th January 2010 (published 19/01/11)	IE should ensure that the Signal Sighting Committee 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)	IE 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)	IE 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)	IE-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. IE-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 Single Line Working (SLW) between Dundalk and Newry, 23 rd March 2013 (published 28/04/14)	IE 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)	IE-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. IE-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)	IE should consider options to upgrade the crossing to minimise direct action by the users. IE 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 IE network from January 2012 to July 2015 (published 11/04/2016)	IE-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)	IE-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 develop a formalised risk assessment process for the positioning of CCTV cameras and associated design works. IE-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.

Report	Recommendation
Derailment of DART passenger service, at Points DL115, Dun Laoghaire, 13 th September 2017 (published 15 th August 2018)	IE-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. IE-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.
Wrongside Door Failure at Ashtown Station, 12 th August 2018 (published 25 th June 2019)	IE-RU CME should review VMI Z1C29A0001 'Examination of 29000 class vehicle after an incident / accident' to develop a more thorough and robust VMI that is commensurate with the safety risk of faults occurring after rolling stock has been involved in an incident or accident. IE-RU CME should review VMIs associated with the examination of rolling stock after an incident / accident, for all rolling stock fleets, to develop a more thorough and robust VMI that is commensurate with the safety risk of faults occurring after rolling stock has been involved in an incident or accident. IE-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.
Collision of an ICR with a buffer stop at Laois Train Care Depot, 17 th July 2018 (published 25 th June 2019)	IE-RU CME should review their SSOW & 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. IE-RU CME should review the suite of LTCD documents that relate to the management of moving trains within LTCD to ensure they are consistent and adequately reference any existing supporting documentation (e.g. ICR Hauling Assisting Instructions). IE-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. IE-RU CME should re-brief staff on the correct procedure for disembarking from a moving train. IE-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.
Vehicle struck by train at Cartron level crossing, XM220, Co. Mayo, 17 th August 2018 (published 3 rd September 2019)	IE-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.
Road Rail Vehicle occurrences on Iarnród Éireann Network from 2015 to 2018 (published 8 th October 2019)	IE-IM should ensure appropriate procedures are in place for Drugs & Alcohol screening for IE-IM and contractor staff post RRV occurrence. IE-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.
Passenger trap-and-drag occurrence on Luas tram at Heuston Stop, 26 th March 2019 (published 04/03/2020)	Transdev 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.

Report	Recommendation
Passenger trap-and-drag occurrence on Luas tram at Heuston Stop, 26th March 2019 (published 04/03/2020)	Transdev 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. Transdev 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. Transdev 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.
Near miss with an Iarnród Éireann SET Worker at Rush and Lusk Station, 20th June 2019 (published 27/05/2020)	The IÉ-IM SET Department should develop a formalised process, through their SMS suite of documents, for IÉ-IM SET staff walking/ working alone, which should be completed prior to any member of SET staff going on or near the line; at a minimum consideration should be given to: • Whether it is necessary to go on or near the line to conduct the walk / work; • What local knowledge is required to walk /work safely; • Whether all the requirements of the IÉ Rule Book / SSOW can be met; • What special protection arrangements are required either at night or during the day.
Light blue – IÉ-IM/ IÉ-RU	

Table 3 – RAIU safety recommendations ‘Submitted’ in 2020

As of 2020, safety recommendations were either closed, open or further evidence was requested and as such, there were no recommendations with the status “submitted”.

Table 4 – RAIU safety recommendations “Open/ In Progress” in 2020

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)	Transdev 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)	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.
	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.
	IÉ RU should review the culture within the company so that actions taken after SPAD's supports learning within the driver grades should errors occur, and that the DD&SS is used for redeveloping competence in driving skills and supporting the drivers in returning to driving duties, after a SPAD event.
	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.
Operational incidents at Ardrahan on the 23 rd October 2015 & Spa on the 28 th November 2015 (published 20/10/16)	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.
	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. Northern Ireland Railways (NIR) have also closed this recommendation. Although this recommendation was closed for IÉ-RU, it remains open against the Railway Preservations Society of Ireland (RPSI) & 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 th November 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.
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.

Report	Safety recommendation
Derailment of DART passenger service, at Points DL115, Dun Laoghaire, 13 th September 2017 (published 15 th August 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.
	IÉ-RU should review their suite of documents which reference major customer disruptions and emergencies and address any deficiencies in relation to the management of passengers on trains and uncontrolled impromptu evacuations. These documents should then be briefed to staff who have roles in relation to customer disruptions and emergencies to ensure they are aware of their responsibilities.
	IÉ-RU should brief the relevant staff on the requirements of the IÉ Rule Book (Section M 3.1.2) which states that where emergency detonator protection is not needed, drivers must place a Track Circuit Operating Device on the line(s) concerned to supplement the signal protection.
Vehicle struck by train at Cartron level crossing, XM220, Co. Mayo, 17th August 2018 (published 3 rd September 2019)	DTTAS** 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.
Road Rail Vehicle occurrences on Iarnród Éireann Network from 2015 to 2018 (published 8 th October 2019)	The DTTAS** 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.
	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.
	IÉ-IM should review and improve its current Chief Civil Engineer (CCE) Plant and Machinery Standards; attention should be given to best international practice in RRVs; and, as a minimum, the following should be considered for inclusion:
	•Applying the requirements set out in the EN 15746/ I.S. EN 15746 standards such as controls & indicators, visibility from the cab, warning systems & communications between work positions, etc. Where, due to a technical impossibility, the design specifications of EN 15746 cannot be met in full, control measures to address these deficiencies should be clearly identified, risks assessed, and suitable controls implemented; •The installing of an appropriate emergency warning system, which, when activated in emergency, can produce a suitably loud audible alarm and/or visual alarm. In cases, where this is not possible, as a result of a technical impossibility, control measures to address this deficiency should be clearly identified, risk assessed, and suitable controls implemented; •Installing Wheel Slip Prevention and/or sanders on RRVs; •Installing of Anti-Collision Devices 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.
	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.
	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.

Report	Safety recommendation
Road Rail Vehicle occurrences on Iarnród Éireann Network from 2015 to 2018 (published 8 th October 2019)	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.
	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.
	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.
	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.
	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.
	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.
	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: • 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.
	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.
	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.
	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.

Report	Safety recommendation
Road Rail Vehicle occurrences on Iarnród Éireann Network from 2015 to 2018 (published 8 th October 2019)	IÉ-IM should clearly define, document and explain the role and function of the RRVC in the management of RRVs in Section Q of the IÉ Rule Book and/or relevant CCE Plant and Machinery Standards. This should include: • Location of RRVC when on-tracking, during work, and off-tracking; • The sighting requirements of RRVs (i.e. an RRVC should be able to see RRVs in their control at all times); • The allocation of RRVCs per quantity RRVs (i.e. how many RRVs per RRVs). IÉ-IM should review and update the training requirements of RRVs with a view to incorporating: • Basic infrastructure training (e.g. points); • Training in communications with relevant staff; • Practical RRV training to ensure they have confidence in accepting pre-operations checklists from RRVs as set out in the IÉ Rule Book.
Passenger trap-and-drag occurrence on Luas tram at Heuston Stop, 26 th March 2019 (published 04/03/2020)	Transdev 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. 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. XXX Transdev, as part of the update to the SMS 018 Competence Assessment, should formally include the assessments that should be conducted every quarter.
Near miss with an Iarnród Éireann Patrol Ganger near Woodlawn, Galway, 4 th June 2019 (published 27/05/2020)	IÉ-IM should review its track inspection methods to see if technological/ mechanised systems and/ or other safety measures could be implemented to eliminate/ minimise track worker exposure to railway hazards whilst undertaking the task of track patrolling. 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.
Collision between an IÉ passenger train and rail-mounted maintenance equipment, Rosslare, Wexford, 11th January 2020 (published 16/12/2020)	IÉ-IM should classify and define RMMEs, Trolleys, LMEs and other commonly used plant or equipment on the railway and ensure appropriate safety procedures are in place for their use. IÉ-IM should also assess the need for any associated training and competency related to these changes and if considered necessary prepare training and competency assessment material. 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. IÉ-IM should update their Mobile Gang Work Instructions, I-PWY-1490, (Ganger's Handbook) to ensure that all routine light maintenance activities are included. Systems, e.g., training, should be put in place to ensure that relevant staff can undertake dynamic risk assessments should non-routine activities need to be undertaken that are not described in the Ganger's Handbook. IÉ-IM clearly define the role of the PWI/APWI and update the relevant documentation accordingly.
* Light blue – IÉ-IM/ IÉ-RU; lilac – IÉ-IM & the CRR; orange - DTTAS; pink – DLR **DTTAS is now the DoT	

Table 5 – RAIU safety recommendations closed prior to 2020

This section identifies the safety recommendations closed prior to 2020:

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)	Veolia (now Transdev) 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)	IE 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)	IE 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
	IE 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 IE in relation to design changes to any PEIO that has the potential to affect safety.	2012
Gate Strike at Buttevant Level Crossing (XC 219), County Cork, 2 nd July 2010 (published 27/06/11)	IE 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, IE should implement engineered safeguards; where appropriate.	2017
	IE 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 IE's signalling standards, where appropriate.	2013
Fog signal activation in Dart driving cab, Bray, on the 6 th March 2012 (published 19/09/2013)	IE should introduce appropriate procedures and standards for the safe issue, storage and transportation of fog signals.	2017
	IE 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)	IE should close, move or alter the level crossing in order to meet the required viewing distances in IE's technical standard CCE-TMS-380 Technical Standard for the Management of User Worked Level Crossings.	2017
	IE should review their systems of managing level crossings that fail to meet the viewing distances in IE 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
	IE 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
	IE 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 IE's Rule Book.	2017
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

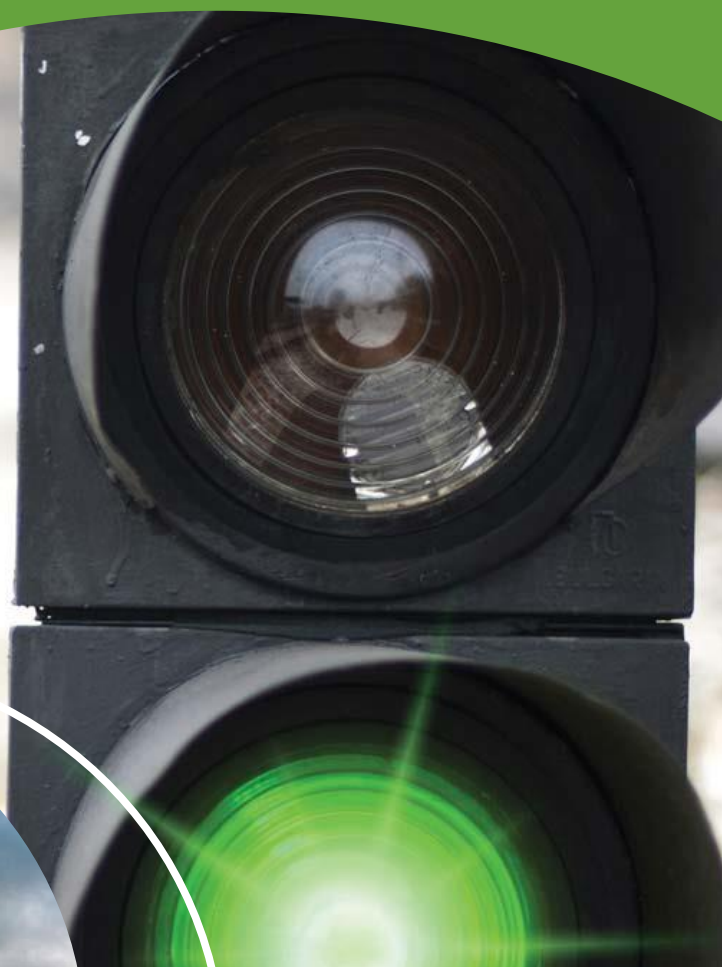
Report	Safety Recommendation	Closed
Runaway locomotive at Portlaoise Loop, 29 th November 2012 (published 19/09/13)	IE should review their Vehicle Maintenance Instructions (VMIs) for locomotives to ensure that there are adequate braking tests at appropriate intervals.	2016
	IE should adopt a quality 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
	The CME (IE 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)	IE 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
	IE 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

Report	Safety Recommendation	Closed
Tram fire on approach to Busáras Luas Stop on the 7 th November 2013 (published 28/08/14)	Transdev 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
	Transdev 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
	Transdev 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
	Transdev 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
	Transdev 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
	Transdev 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)	ÍÉ-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)	ÍÉ-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
	ÍÉ 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
	ÍÉ-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
	ÍÉ-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
	ÍÉ-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)	ÍÉ 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

Report	Safety Recommendation	Closed
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
Dangerous occurrence between Ballybrophy and Portlaoise, 12 th September 2015 (published 6 th September 2016)	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 Site Safety Briefing procedure to ensure all personnel have made themselves aware of the information contained in the relevant Weekly Circular.	2018
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

Report	Safety Recommendation	Closed
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
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
* Light blue – IÉ-RU / IÉ-IM; dark blue – Transdev; pink - DLR		

Appendices



Appendix 1 – Railway Organisations

There are ten railway systems within the RAIU's remit, these are:

- The Iarnród Éireann (IÉ) national heavy rail network;
- The Luas light rail system in Dublin;
- The Bord Na Móna industrial railway;
- Nine heritage & minor railway systems (of which four 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 a safety management system (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. Rhomberg 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. Transdev Transport is the RU that operates passenger services, the passenger stops and the Central Control Room. Transdev 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 2020 included: Cavan & Leitrim Railway; Diffin Railway; Fintown Railway; Irish Steam Preservation Society; Lartigue Monorailway; Waterford and Suir Valley Railway;. Each of these acts as the RU and IM for their system.

Appendix 2 – 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 Department of Transport, Tourism and Sport. 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
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
DTTAS	Department of Transport, Tourism & Sport
ECO	Electrical Control Operator
EMU	Electrical Multiple Unit
ES	Engineering Supervisor
EU	European Union
FER	Further Evidence Requested
hrs	hours
HSA	Health & Safety Authority
ICR	InterCity Railcar
IE	Iarnród Éireann
IM	Infrastructure Manager
km/h	Kilometres per hour
LCCO	Level Crossing Control Operative
LME	Light Maintenance Equipment
LNMC	Luas Network Management Central
LTCD	Laois Train Car Depot
m	metre
MCB	Main Circuit Breaker

mm	millimetre
MOP	Member of Public
MP	Mile Post
NIB	National Investigation Body
NIR	Northern Ireland Railways
NSA	National Safety Authority
OCS	Overhead Contact System
OHLE	Overhead Light Equipment
PEIO	Plant, Equipment, Infrastructure & Operations
PER	Preliminary Investigation Report
PICOP	Person in Charge of Possession
RAIU	Railway Accident Investigation Unit
RC	Root cause
RMME	Rail Mounted Maintenance Equipment
RRV	Road Rail Vehicle
RRVO	Road Rail Vehicle Operator
RTS	Ready to Start
RU	Railway Undertaking
SAN	Safety Advice Notice
SCADA	Supervisory Control And Data Acquisition
SET	Signalling, Electrical and Telecommunications
SMS	Safety Management System
SF	Systemic Factor
SPAD	Signal Passed at Danger
SPAS	Signal Passed at Stop
TII	Transport Infrastructure Ireland
TRV	Track Recording Vehicle
UF	Underlying Factor
USAN	Urgent Advice Safety Notice
WI	Work Instruction

Appendix 4 – Definitions

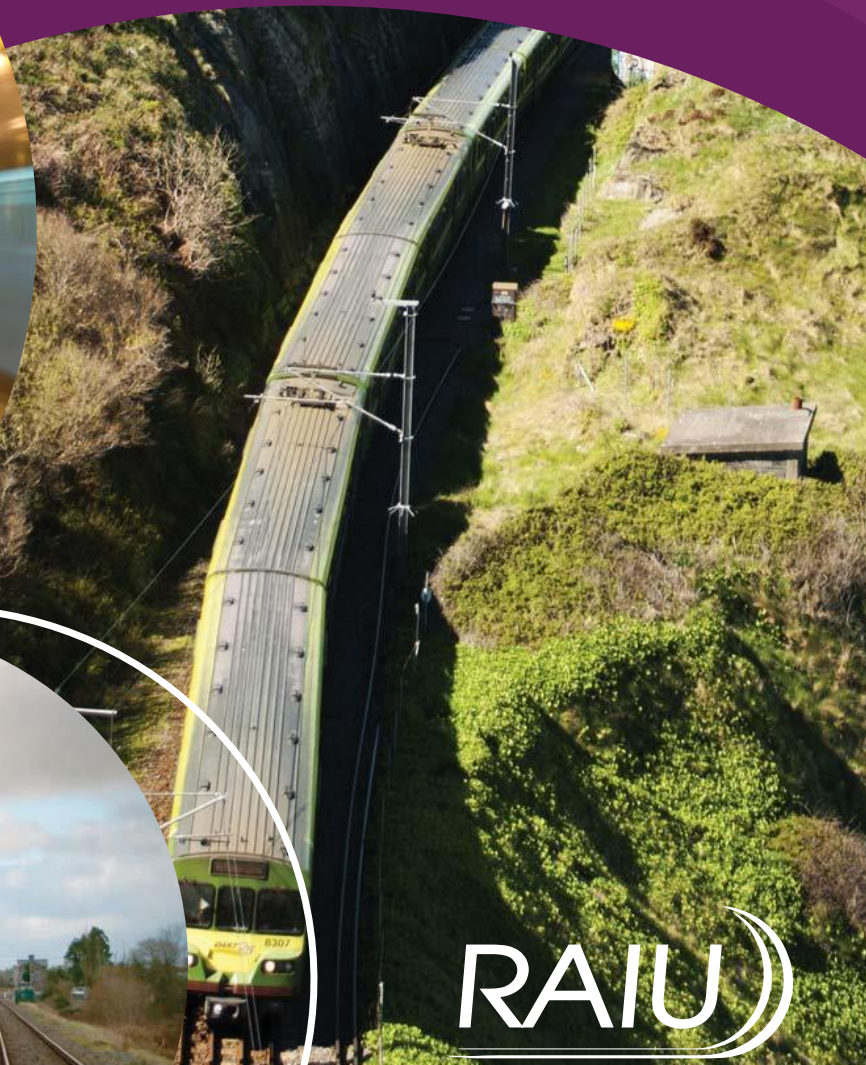
Accident	An unwanted or unintended sudden event or a specific chain of such events which have harmful consequences. For heavy rail, the EU Agency for Railways divides accidents into the following categories: collisions, derailments, level-crossing accidents, accidents to persons caused by rolling stock 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.

Address: Second Floor, 2 Leeson Lane, Dublin 2.

Telephone: +353 1 604 1050

Email: info@raiu.ie

Website: www.raiu.ie



RAIU