



> Railway Safety Performance in Ireland 2018



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Foreword

The Commission for Railway Regulation is pleased to publish its Annual Safety Performance Report for 2018. This report supplements the CRR's Annual Report to the Minister and provides further detail on the safety performance of the railway organisations operating in Ireland.

This is the tenth year that the Annual Safety Performance Review has been issued. The CRR continuously supervise the safety performance of the principal railway organisations operating in the state. This is done through our Inspectors undertaking audits, inspections and meeting with company executives and managers, to check they are applying and improving their safety management systems.

The primary function of our railways (inc. tramways) is the transportation of people and/or freight safely. In that context passenger numbers on both the Irish Rail network and Luas Tramway saw sizeable increases in 2018. Against this backdrop, there were no passenger fatalities on our railways in 2018 and the safety performance of the Irish railway sector was broadly positive.

This safety performance review only serves to highlight the importance of continuous improvement, particularly in managing risk associated with railway operations. Organisations are encouraged to promote occurrence reporting wherein employees are expected to report occurrences, hazards and indeed near-misses, however small they may seem so that lessons may be learned. The CRR will continue to promote and encourage persons involved in any aspect of our railways to report safety concerns to their organisation and expect that railway organisations apply a 'just culture'.

Anthony Byrne Principal Inspector – Supervision & Enforcement

Executive Summary

This Annual Safety Performance report of the Commission for Railway Regulation (CRR), is prepared for stakeholders and the general public in line with Section 10 of the Railway Safety Act 2005. The data used to compile this report is provided to us periodically throughout the year by the various railway organisations. This report aggregates this data and compares year on year performance together with commentary on several safety performance indicators.

The CRR is the independent railway safety regulator in the Republic of Ireland and is responsible for overseeing the safety of all railway organisations, which in 2018, included larnród Éireann, Transdev (Luas Operator), Balfour Beatty Rail Ireland (BBRI), Bord Na Móna (where their railway interfaces with public roads), the Railway Preservation Society of Ireland (RPSI) and a number of smaller heritage railways.

The safety performance of the Irish railway sector is broadly positive, both when compared against previous years and European statistics, and against a backdrop of increasing passenger journeys and train/tram kilometres travelled.

There were no passenger fatalities in 2018, but nine people lost their lives as a result of unauthorised entry onto the railway, the same as in 2017. There were no reports of deaths at level crossings.

In larnród Éireann, 2018 saw a continued reduction in train collisions, particularly with large animals. Signals Passed At Danger (SPADs) increased in 2018 from the low of 2017. The number of such events remain low but continued focus is required and larnród Éireann have a number of initiatives in this area. Transdev performance was broadly consistent, however, there was an increase in the number of pedestrian contact events. The increase in track-kilometres by approximately 10% on 2017 due to LUAS Cross City may have contributed to this.

In comparison to other European Member States, Ireland performs well in terms of the number of accidents, and specifically in terms of level crossing accidents and derailments. Ireland had the eight highest rate of SPADs relative to train kilometres travelled.

In 2018, the RAIU concluded just 1 investigation following the derailment of a DART train on the 13th September 2017 as it approached Dun Laoghaire station. This resulted in eight new safety recommendations. The RAIU also commenced 3 investigations, following a Wrongside Door Failure at Ashtown Station, a train collision with a buffer Stop and a trend investigation into several dangerous occurrences involving Road Rail Vehicles.



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Introduction

1.1 Introduction

This is the tenth Annual Safety Performance report of the Commission for Railway Regulation (CRR), prepared for stakeholders and the general public in line with Section 10 of the Railway Safety Act 2005. This report provides background statistics and commentary on a number of safety performance indicators. Performance indicators are guided by the European Common Safety Indicators (CSI), as specified in Directive 2004/49/EC and amended by Directive 149/2009/EC and Directive 2014/88/EU. Further indicators are included in this report to reflect unique aspects and risks particular to the railway sector in Ireland.

1.2 Overview of Report

Safety trends in Ireland for all categories of train incidents are presented and discussed in Chapter 2. In Chapter 3, a brief overview of the public representations received by the CRR is presented. In Chapter 4, a comparison with other European railways shows where the national railway operator in Ireland (larnród Éireann (IÉ)) is positioned in terms of railway safety. This includes a brief overview of significant accidents that occurred in other countries in 2018. Chapter 5 concerns the Railway Accident Investigation Unit (RAIU) and recommendations made arising out of their investigations. The status of each recommendation is explained together with details of actions taken to date.

1.3 The Commission for Railway Regulation

The CRR (then the Railway Safety Commission) was established on 1st January 2006 under provision of the Railway Safety Act 2005, with responsibility for railway safety regulation. It is the National Safety Authority (NSA) and the Regulatory Body for the railway sector in the Republic of Ireland. As stated in our current Statement of Strategy we are committed to advancing railway safety, the maintenance and further development of high performing and sustainable railway systems and ensuring fair access to the Irish conventional railway network in Ireland through regulation, monitoring, encouragement and promotion.

The CRR as the NSA has responsibility for conformity assessment and issuing of safety certificates and safety authorisations for safety management systems, approving new rolling stock and infrastructure, and monitoring the industry to ensure it manages its safety risk effectively. The CRR also co-ordinates and encourages railway safety initiatives between the industry and external stakeholders. Further details on the role and function of the Commission may be found on the CRR website **www.crr.ie**.

1.4 Statistical Qualification

The CRR produces this report to provide stakeholders and the public with information about safety performance of the various Irish railway organisations. The CRR aim for this information to be timely and accurate. Any errors should be brought to the CRR's attention, and every effort will be made to correct them.

It is important to note that the figures used in this report are intended to illustrate broad trends and are not meant to be read as exact calculations. Rounding has been used and this could affect the overall data. The data used to compile this report is provided to us periodically throughout the year by the various railway organisations. This report presents aggregated data and compares year on year performance together with commentary on several safety performance indicators.

While the CRR has made every effort to ensure the accuracy of the data, it takes no responsibility for third party data presented in this report.



2.1 Introduction

The safety performance of the Railway Organisations in the Republic of Ireland is considered for the four principal railway sub-sectors that the CRR regulates, namely heavy rail, light rail, public highway interfaces with industrial rail systems, and heritage railways.

2.2 larnród Éireann

2.2.1 Operational Statistics

At the end of 2018, the larnród Éireann -Infrastructure Manager (IÉ-IM) advised the CRR that it's operational network was 1680 route-kilometres, very slightly reduced on 2017, due to the decommissioning of a small number of sidings. There were no significant changes to the network or to the operational pattern of trains.

Passenger journeys increased 5% on the 2017 figure to almost 48 million (Figure 1) reflecting the ongoing recovery in the economy, surpassing peak figures last seen in 2007 (45.51m) and showing a 30% increase in passenger journeys since the low of 2012. The trend for increased passenger journeys can be expected to continue which is of course welcomed, however, this has brought challenges for larnród Éireann – Railway Undertaking (IÉ-RU) with peak train services approaching or being at full capacity.



Figure 2 shows that although the passenger journeys have increased, overall train km were slightly reduced in 2018. However, IÉ-RU passenger train kilometres increased by approximately 1% so the reduction in train kilometres comes from other operators (e.g. BBRI, RPSI, IÉ-IM engineering trains). The difference between passenger journey growth (5%) and passenger train kilometres (1%) suggests that trains are operating nearer capacity, which further suggests a more efficient use of rolling stock. The CRR is aware that the fleet is fully deployed and there are no additional carriages available at this time to increase capacity at present.

Freight kilometres have remained stable since 2013 and continue at the same level in 2018.



Figure 2: Passenger Train-km (top) Freight Train-km (bottom) on the IÉ-IM Network

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larnród Éireann has decreased employee numbers significantly over the last 10 years (Figure 3), but this trend has plateaued over the last 6 years, with essentially consistent staff numbers since 2013. With increasing passenger numbers and a general demand for more train services it is likely that larnród Éireann will need to recruit more Train drivers over the years to come. Increasing rail traffic will necessitate increased infrastructure and rolling stock maintenance and as a result a competent workforce of sufficient number, be that inhouse or sub-contracted is critical to maintaining operational and infrastructure safety.

2.2.2 larnród Éireann Fatality and Injury Statistics

Table 1 illustrates the fatalities and lost-time injuries reported for employees and fatalities and injuries to third parties on the national railway network for the last ten years.



Figure 3: Personnel engaged in full time employment with IÉ (2009 – 2018)

Table 1: lÉ operational fatality and injury statistics by year (2009 – 2018)

Category	2009	2010	2011	2012	2013	2014	2015	2016	2017	2018	Trend
Railway opera	ations	s: pas	senge	er fata	l inju	ries					
Fatal injury to passenger due to a train accident, not at level crossing	0	0	0	0	0	0	0	0	0	0	
Fatal injury to passenger due to a train accident at level crossing	0	0	0	0	0	0	0	0	0	0	
Fatal injury to passenger travelling on a train, other than in train accident	0	0	0	0	0	0	0	0	0	0	
Fatal injury to passenger attempting to board or alight from train	0	0	0	0	0	0	0	0	0	0	
Railway infrastr	uctu	re: th	ird pa	rty fat	tal inj	uries					
Fatal injury to third party at a level crossing involving a train	0	2	0	0	0	0	0	0	0	0	\wedge
Fatal injury to third party at a level crossing not involving a train	0	0	0	0	0	0	0	0	0	0	
Fatal injury to employee at a level crossing due to train in motion	0	0	0	0	0	0	0	0	0	0	
Fatal injury to employee due to train in motion (other than at a level crossing)	0	0	0	0	0	0	0	0	0	0	
Fatal injury to employee not due to train in motion	0	0	0	0	0	0	0	0	0	0	
Railway infrast	ructu	re: er	nploy	ee fat	al inj	uries					
Fatal injury to employee at a level crossing due to train in motion	0	0	0	0	0	0	0	0	0	0	
Fatal injury to employee due to train in motion (other than at a level crossing)	0	0	0	0	0	0	0	0	0	0	
Fatal injury to employee not due to train in motion	0	0	0	0	0	0	0	0	0	0	
Railway operatio	ns: fa	tal ir	njuries	s to ot	her p	erson	s				
Fatal injury due to train in motion not at level crossing	2	0	0	0	0	0	0	0	0	0	
Fatal injury to customer or visitor, no train involved	0	0	0	0	0	0	0	0	0	0	
Fatal injury involving train in motion on railway or level crossing where trespass or suspicious death was indicated	3	8	7	5	4	6	2	5	12	9	\sim
Railway operation	ns: no	n fata	al inju	ries to	o pass	enge	rs				
Injury to passenger travelling on train due to a railway accident not at level crossing	2	0	0	0	0	0	0	0	0	0	\
Injury to passenger travelling on train due to railway accident at level crossing	0	0	0	0	0	0	0	0	0	0	
Injury to passenger attempting to board or alight from train	17	64	46	41	39	45	48	79	57	74	\sim
Injury to passenger travelling on train, other than due to a railway accident	40	28	10	27	43	18	15	31	33	46	\checkmark
Railway infrastruc	ture:	third	l party	y non	fatal i	injurie	es				
Third party at level crossing injury involving a train	0	0	1	2	0	0	0	0	0	1	$ \land $
Level crossing user injury not involving a train	1	0	2	5	3	0	1	2	6	0	
Railway infrastructu	re: no	on fat	al inju	iries to	o othe	er per	sons				
Injury to customer or visitor to premises	56	85	113	116	193	205	146	192	321	199	
Injuries to other persons including unauthorised persons	0	0	0	5	3	0	1	2	6	0	
Railway operati	ons: I	non fa	atal er	nploy	ee in	juries					
Employee lost time accident involving train movement or train accident	13	11	7	13	5	21	3	1	15	13	$\sim\sim\sim$
Employee lost time accident while working on railway not due to train in motion	31	27	22	32	39	43	32	30	30	13	$\sim \sim$
Railway infrastru	cture	: non	fatal	emplo	oyee i	njurie	S				
Employee lost time accident involving train movement or train accident	0	1	2	1	0	0	0	0	0	0	\wedge
Employee lost time accident while working on railway not due to train in motion	34	30	23	32	41	25	6	23	22	26	\sim
Employee lost time accident while working at level crossing not due to train in motion	0	0	0	1	1	2	0	3	1	1	
Entity in charge of maintenance and n	naint	tenar	nce w	orksl	nops	: non	fatal	emp	loyee	inju	ries
Employee lost time accident involving train movement or train accident	1	0	0	0	0	0	0	0	0	0	\
	21	10	18	10	14	18	13	11	10	12	$\land \land$

Employee lost time accident while working on railway not due to train in motion	21	10	18	10	14	18	13	11	10	12	\bigvee

2.2.2.1 Fatal Injuries

There were no passenger fatalities or serious injuries in 2018, but the relatively high rate of trespasser fatalities continued with nine recorded in 2018 the same as in 2017. Whenever possible the CRR refers to a coroner's verdict, to assist in classifying the circumstances surrounding a fatality.

2.2.2.2 Passenger Injuries (Customer & Visitor injuries)

As reported in our 2017 report, the data indicates that the largest proportion of incidents occur to persons during time spent at stations as opposed to time spent on trains and in 2018 this was no different. This is common across many railways due to the sedentary nature of passengers when on board a train. Injuries to persons (customers or visitors) on railway premises remain at the largest single group with slips, trips and falls being the dominant cause of these injuries. The significant increase in injuries to customers and visitors to premises seen in 2017 has reversed with numbers back to comparable levels with 2013-2016 (Figure 4). This is encouraging given the increasing passenger numbers.



Figure 4: Passenger Injury Statistics by year

2.2.2.3 Employee Injuries

Employee injuries are categorised in the first instance by the sector of the railway system in which they work, i.e., Railway Operations, Infrastructure maintenance/ projects and Entity in Charge of Maintenance (ECM)¹. There was a significant decline in Lost Time Accidents (LTA) not involving moving trains, achieving their lowest level in 10 years. However, this is balanced by a sharp increase in LTA involving trains in motion, although it is noted that a higher level was recorded in 2014 (Figure 5).



Figure 5: Employee Injury statistics by year (Railway Operations)

The injuries to employees in the railway infrastructure business rose slightly in 2018 (Figure 6), with the dip seen in 2015 appearing anomalous, while the

Entity in Charge of Maintenance (ECM) trend remains approximately level with previous years (Figure 7).



Figure 6: Employee Injury statistics by year (Railway Infrastructure)



Figure 7: Employee Injury statistics by year (Railway ECM)

2.2.3 larnród Éireann Operational Incident Statistics

2.2.3.1 Train Collisions

Train collisions can pose a significant risk to passengers, train crew, third parties, and the environment. There are several categories of train collision, e.g., collision with road vehicles, with animals, with obstacle etc. Figure 8 illustrates the trend for collisions over the last 10 years.

Figure 8 is supported by Table 2 and Figure 9 to aid understanding of the data. In figure 9 two categories, 'Total Collisions with Obstacles on the line' and 'Train Collisions with large animals', have been separated to enhance visibility of the data as in isolation is of limited benefit. The overall data shows a continued decrease in collisions in 2018.



Figure 8: Total Collisions by year

Category	2009	2010	2011	2012	2013	2014	2015	2016	2017	2018	Trend
Train collision with passenger or goods train on running line	0	0	0	0	0	0	0	0	0	0	
Train/railway vehicle collision in station or possession movement	1	0	0	1	1	1	1	1	2	1	lı
Train collision with a motor vehicle at a level crossing	0	2	1	2	1	2	0	0	3	1	1.1.1 .
Train collision with pedestrian at a level crossing	0	1	0	0	0	0	0	0	0	0	
Train collision with attended gates at a level crossing	0	1	0	0	0	0	1	0	0	0	
Train collision with road vehicle obstructing the line (not at a level crossing)	0	0	0	1	1	0	1	1	0	0	
Train collision with other obstacle on the line	10	1	7	6	7	29	1	31	25	23	
Train collision with large animal(s) on the line	20	24	35	26	29	9	29	35	23	11	
TOTAL	31	29	43	36	39	41	33	68	53	36	

Table 2: Train Collision Statistics detail by year Part 1

. ······ Other obstacle collisions linear trendline

- Train collision with other obstacle on the line —— Train collision with large animal(s) on the line ······Large animal collisions linear trendline



Figure 9: Train Collision Statistics detail by year, part 2

Table 2 shows that the 'train collision with other obstacle on the line' category was broadly in line with 2017. 2018 saw a continued decline in the number of collisions with large animals since the high of 2016. All other categories of collision either fell or remained static in 2018.

There has been some volatility in the data between 2013 and 2018, but since 2016 the trends are moving in a positive direction, i.e. collisions have been reducing. As discussed in previous reports, animals, (deer, cattle and sheep) are a major contributor to collision statistics in Ireland, but these types of collision fell in 2018. It is noted that larnród Éireann investment in fencing systems to protect against incursions to its railway during this period has possibly had the desired effect. In addition, the reduction in the number of level crossings over the last decade should also assist this trend.

2.2.3.2 Level Crossings

Level crossings are a significant risk to the railway and to any third parties who use them. The long established trend, as shown in Figure 10 and Figure 11 is a decrease in the number of level crossings; there were 1701 level crossings in 2004 vs. 934 recorded for 2018.

Figure 10 illustrates the number of level crossings on active lines. Sustained efforts by larnród Éireann have contributed greatly to reducing the risk presented by level crossings.



Figure 10: Number of level crossings by year

The breakdown of level crossings by type and year in Ireland is shown in Figure 11. Passive level crossings on public roads that require the road user to manually open and close gates remain the highest risk type of level crossing, closely followed by passive 'Field type' level crossings which are those a farmer might use if they have land on both sides of a railway. A fewer number of level crossing were closed in 2018 compared to the two previous years, nonetheless the overall figure is reducing which is welcomed. larnród Éireann are currently reviewing novel technological designs to enhance safety and operation at user-worked level crossings whilst operating within constrained budgets.

CCTV (CCTV) Attended (C,CD,CN,CX) Barrier (MB, MWB) Coccupation (O, OP, OP*, OPS) Lights and bells (LB, MWL)
 Field (F) Barrow paths and pedestrian LCs (P,BC)



Figure 11: Level Crossing by type in Ireland

2.2.3.3 Signals Passed at Danger (SPAD)

A SPAD is defined as having occurred when a train passes a stop (red) signal without authority. SPADs are a particular precursor event that the CRR monitors regularly during its supervisory meetings with IÉ-IM and IÉ-RU. The trend in recent years has been a steady decline; although data for 2018 was higher than the previous year it was still in line with the low trend of recent years (Figure 12).



Figure 12: IÉ SPADs by year

2.2.3.4 Train Derailment

Train derailments (all of which occurred in sidings) remain at low levels and total numbers are unchanged from 2016 and 2017 (Figure 13). Routine track inspection and maintenance are important activities that reduce the likelihood of derailment occurrences. Similarly, vigilance by railway employees who work in sidings together with safe systems of work that are understood by railway staff has the potential to reduce the number of occurrences of this type.

There were no derailments on running lines in 2018, with all five derailments occurring in IÉ sidings. These derailments in sidings are typically low risk, nonetheless they will be continually monitored by the CRR.

2.2.4 Iarnród Éireann Rolling Stock Incidents

larnród Éireann operates several different fleets in provision of rail services. These include:

- Intercity Diesel Multiple Unit (22000 class)
- Diesel Multiple Unit (29000, 2800, 2600 classes)
- Electrical Multiple Unit (8100, 8200, 8500 classes)
- Locomotives (201, 071 classes)
- Passenger Carriages (Mark IV and DeDietrich)
- Freight wagons (of various types)

There are a number of key safety performance indicators pertaining to rolling stock (Figure 14), specifically:

- Fire or smoke incidents
- A train dividing (parting) while in service
- Failure of Rolling Stock Axle Bearing
- Door issues



Figure 13: Train Derailments by Year

Failures with rolling stock can potentially have very serious consequences. The number of reported occurrences remained low in 2018 and all categories either fell slightly or remained level with 2017.

2.2.5 larnród Éireann Infrastructure Incidents

The lÉ-IM network currently extends to approximately 1680 route kilometres (km) or 2,400 km of operational track and includes c.4,440 bridges, c. 1,100 point-ends, c.970 level crossings, 144 stations, 3,300+ cuttings and embankments, 372 platforms and 13 tunnels. The network includes main line, Dublin suburban and commuter passenger routes, together with freight-only routes.

These assets must be inspected and maintained at varying prescribed frequencies in order to keep them fit for use. The railway network in Ireland is abundant in legacy structures such as bridges and culverts, many of which would be in excess of 100 years old. Given their age and usage these assets are vulnerable and if not maintained could fail. To minimise the chance of this thorough inspections and preventative maintenance activities are undertaken, but incidents do occur and data relating to some of these is now presented.



Figure 14: Rolling Stock Incidents by year

2.2.5.1 Broken Rails and Fishplates

IÉ-IM personnel visually inspect the track and associated assets at least once per week. Engineers and Infrastructure Managers also inspect the track a number of times each year using a dedicated Inspection Car. The rails themselves are ultrasonically tested at least every 2 years, with the vast majority tested annually. In 2018, there was just one broken rail on a passenger carrying line which is consistent with the low numbers of recent years (Figure 15). Whilst this did not result in a train accident, it is an area where IÉ-IM remains vigilant. The CRR, through its regular supervision meetings monitor larnród Éireann's management of its assets as well as through our inspections and audits.





Figure 15: Broken Rails by year

Figure 16: Cracked or Broken Fishplates on the IÉ Network, by year.

A fishplate is a special bolted connection that joins two rails together. Should one break then the rail is not continuous and could, in certain circumstances, lead to a derailment. The trend for 'Cracked or Broken Fishplates' has increased slightly in 2018, breaking the continuous overall downward direction seen since 2012 (Figure 16). The large decrease over the 10-year period may be attributed to the installation of continuous welded rail (CWR) initiated under the Railway Safety Investment Programme (1998-2013) and continued since.

2.2.5.2 Bridge Strikes

There are in excess 4400 bridges that IÉ-IM must inspect and there are two categories of railway bridge to be checked. The first is a where a road is over the railway (over bridge) and the second is where the railway is over a road (under bridge). A bridge strike is where a road vehicle strikes the parapet or roadside containment of an over bridge or where a road vehicle strikes the underside of a railway bridge over a road (under bridge). Both types of incident can, in certain circumstances, result in very severe consequences.

The total number of bridge strikes, i.e., both underbridge and over-bridge, rose in 2018 compared to 2017 (95 vs. 84 in 2017) with the majority being under-bridge strikes (Figure 17). Overall, the trend for both underand over- bridge strikes has remained relatively stable since 2009.



Figure 17: Railway Bridges struck by road vehicles

2.3 Balfour Beatty Rail Ireland

Balfour Beatty Rail Ireland Limited (BBRI) operate and maintain heavy track maintenance equipment under contract to larnród Éireann - Infrastructure. They are classified as a Railway Undertaking (RU) under the Railway Safety Act 2005 and have an approved Safety Management System (SMS).

This requires they are compliant with the same relevant law as other RUs as they conduct movements on the lÉ network. While they do not carry passengers, their activities are safety critical and have potential for significant harm if not properly controlled.

In 2018 BBRI employed 55 staff members. BRRI does not operate any passenger services and completes most of its work outside peak and daytime periods. The total train kilometres for the OTM fleet in 2018 was 99,208km, a substantial decrease on the 118,848km in 2017. This reduction in mileage is attributed to improved planning which resulted in a decrease in transiting shifts, thereby reducing the overall OTM total fleet mileage figure.

Table 3 shows the reported occurrences for BBRI in 2018, including two SPADs but no derailments.

One of the SPADs occurred as a result of a possession irregularity as the OTM was entering the possession. The second SPAD was at Dalkey in November. The CRR conducted a post incident inspection on the possession irregularity to assure compliance and support the process of learning from incidents.

Table 3: BBRI occurrences 2018

Occurrence	2017	2018
SPAD	1	2
Derailments	2	0
Minor occupational injuries	2	1
Rail infrastructure damage incidents	20	4



2.4 Transdev (Luas) Statistics

The Dublin Light Rail system, including all trams and tramway infrastructure is owned by Transport Infrastructure Ireland (TII). Transdev has been operating the Luas light rail system since it commenced operation in June 2004. Under a separate contract Alstom are responsible for the maintenance of both the trams and tramway infrastructure and this contract is overseen by Transdev on behalf of TII.

The LUAS, comprises two lines, the Red Line which is 20kms in length and has 32 Stops and the Green Line which is 24.5km in length and has 35 Stops.

There were just over 41.8 million passenger journeys in 2018 compared to 37.6 million in 2017 while tram kilometres increased from 3.91 million to 4.17 million (Figure 18). This continues the long-term trend for increasing passenger journeys, which has accelerated over the last two years. It should be noted that 2018 was the first full year of operating the Cross-City line extension which will account for a significant proportion of the 2018 increase.

2.4.1 Road Traffic Collisions

The Luas co-exists with the public and road traffic along significant sections of its alignment, most notably in Dublin city centre. The Luas operates primarily by 'line of sight'as typical of the majority of light rail systems around the world, but in contrast to heavy rail. Given that the Luas shares sections of the carriageway with road vehicles and other road users, road traffic collisions (RTCs) and collisions with pedestrians and cyclists can and do occur.



Figure 18: Luas passenger journeys & Tram-km travelled

The number of road traffic collisions has decreased slightly to 25 in 2018 from 29 in 2017 (Figure 19). The decrease was entirely on the Red line, where RTC decreased from 23 in 2017 to 17 in 2018. RTC on the Green Line increased by two to eight, with all but three

of these occurring on the new Cross City line. Despite these increases, the number of RTC per million tram kilometres fell in 2018 compared to 2017 (Figure 20) reflecting the increase in tram kilometres run.



Figure 19: Number of Road Traffic Collisions involving a tram





2.4.2 Tram / Person Contact

As well as vehicle collisions, there is also a risk of trams contacting pedestrians and cyclists, particularly at locations where the tram is operating alongside road traffic and travelling through road junctions, for example in Dublin city centre. A considerable proportion of both the Red and Green lines operate in the city where there are substantially more road vehicles and pedestrian traffic. Given this is the case there is an increased risk of collision with persons. A total of 11 such incidents occurred in 2018 (Figure 21), continuing an increasing trend from 2017. Of these, two were cyclists and nine were pedestrians with nine incidents occurring on the Red Line and two on the Green line.



Figure 21: Persons coming into contact with Tram

2.4.3 Tram Derailments

There were three derailments in 2018 (Figure 22). This increase is noted and the highest level in the last 10 years. However, all three derailments were in maintenance facilities, 1 in Sandyford Depot and 2 in the Red Cow Depot. The derailment in Sandyford was attributable to human error while the two derailments in the Red Cow, both of which happened on the same day were attributed to inclement weather. There had been persistent snow fall and the packing of the snow in the points mechanisms prevented them from moving, resulting in the derailments.

2.4.4 Tram Emergency Brake Applications

In addition to its standard disc-brakes, a tram is fitted with an electromagnetic track brake. There are occasions when a driver may need to apply this Emergency Brake (EB) to prevent a harmful incident. Therefore, the number of Emergency Brake (EB) applications of this brake which tram drivers make is a potentially useful leading safety indicator.

There were 928 EB applications in 2018 representing a 16% increase on 2017 figure and the highest figure in the last 10 years (Figure 23). The CRR investigated whether the rise in EB applications in 2017 was due to the intake of a new cohort of drivers during that year, but this could not be proven. It is noted, however, that the number of tram kilometres run has increased, but there is still an increase in EB applications when normalised against this.





Figure 22: Tram derailments

Figure 23: Emergency Brake Applications

2.5 Bord Na Móna Industrial Railway Statistics

The CRR's remit in terms of its oversight of Bord Na Móna's (BNM) industrial railway is limited to where it interfaces with public roads. These interfaces are at level crossings and where there are bridges over the industrial railway. In terms of key infrastructure statistics there are 99 level crossings and 52 underbridges. Bord Na Móna reported no derailments or level crossing incidents/accidents in 2018 (Figure 24).



Figure 24: Bord na Mona derailments and level crossing incidents/accidents

2.6 Heritage Railways

A heritage railway is defined in Irish Legislation as *'a person who only operates train services or railway infrastructure of historical or touristic interest.*' The CRR monitor the operations of ten self-contained heritage railways. They are:

- Cavan and Leitrim Railway²
- Tralee & Dingle Railway²
- Difflin Lake Railway, Oakfield Park, Raphoe
- West Clare Railway²
- Finntown & Glenties Railway
- Waterford & Suir Valley Railway (W&SVR)
- Irish Steam Preservation Society Stradbally
- Lullymore Heritage Railway
- Listowel Lartigue Monorail

The CRR mandated all heritage railways to document a Safety Management System (SMS) and have it approved by the CRR (then RSC) as of the 1st of January 2014, in line with European standards. CRR guideline 'RSC-G-022' (Issue 2), published 21st of January 2013, outlines the elements a heritage railway must include in its Safety Management System.

There were no accidents or incidents reported to the CRR in 2018 on any of the heritage railways.

2.6.1 Railway Preservation Society of Ireland (RPSI)

The RPSI is a special case of heritage railway given they are not a self-contained heritage railway. Rather they operate steam and diesel hauled heritage trains on the larnród Éireann rail network and therefore hold a Safety Certificate allowing them to operate as a Railway Undertaking (RU). As an RU under the European Railway Safety Directive they are subject to a different supervision regime that is commensurate with the risks they import onto the larnród Éireann network. As an RU the RPSI has received safety certification based on the acceptability of its Safety Management System, compliance with which is also supervised by the CRR.

The RPSI ran approximately 5413 miles (8660km) in 2018, up slightly on the 2017 figure (5161 miles), with no accidents or injuries to passengers or staff reported.

² These railways were not in possession of a Safety Management Certificate from the CRR and were reported as being non-operational in 2018

3 Public Representations

3.1 Introduction

The CRR welcomes contact from the public, passengers, railway staff and others on matters of railway safety. Facilities are available to communicate with the CRR by telephone, post, email, or via the CRR website (www.crr.ie). The contribution from the various stakeholders, including employees, passengers, and the general public is a valuable source of information and often assists us in targeting supervision activity and improving railway safety. Where issues relate to service rather than safety, the CRR directs the representation to the appropriate entity. Where the matter involves railway safety the CRR endeavours, wherever possible, to deal with the matter directly. If necessary, the CRR will undertake inspections and/or seek information from the appropriate railway company for further clarification.

3.2 2018 Data and Commentary

In 2018, the CRR received 31 direct or indirect representations relating to a range of heavy and light rail infrastructural and operational matters, 26 fewer than received in 2017 (Figure 25). Of these, 22 are related to larnród Éireann, with 12 relating to lÉ-RU, and 10 relating to IÉ-IM. Five representations were received relating to the LUAS system (six in 2017), two for Bord Na Mona (BNM; private industrial railway), one relating to a heritage railway, and one query relating to the Irish rail network in general.

All representations were investigated by the CRR and where necessary, the CRR acted to ensure that corrective action was taken by the relevant Railway Organisation. It is CRR policy that all safety related concerns are investigated. Representations are continually tracked for re-occurrence and detection of trends. If either are observed, monitoring activities are increased to determine and address underlying causes.



Figure 25: Public Representations to the CRR by year

Representations from 2018 were further analysed and broken down in to the following categories:

- Safety at Stations: Queries relating to incidents or concerns at stations
- Safety of Infrastructure: Queries relating to Railway Infrastructure such as bridges, track, level crossings or fencing
- Safety of Rolling Stock: Queries relating to Vehicles such as train performance, grab rail security or door operation
- Safety of Train Operation: Queries relating to operations such as train loading, excess train speed or shared running of trams
- Safety of Railway Working: Queries relating to operational activities on the railway such as network regulation or management control
- Request for information: A request to the CRR for information not specifically related to railway safety (note these are distinct from formal Freedom of Information requests)

The numbers of representations/complaints by category is shown in Figure 26. The distribution is not significantly different compared to 2017 in terms of category but there was a notable reduction in representations related to safety of infrastructure and rolling stock.

It is not possible to ascribe these minor changes in representations to particular reasons, and the CRR will continue to monitor the trends going forward for any major changes.



Figure 26: CRR Public Representation by category

4 | Railway Safety Trends in Europe

02

4.1 Introduction

In European terms, the CRR is defined as the National Safety Authority (NSA) for the railway network in Ireland. Each European member state has an NSA which, in accordance with the Railway Safety Directive (2004/49/ EC), must submit its annual report on 'Common Safety Indicators' of railway safety to the European Union Agency for Railways (ERA). ERA in turn analyses railway safety on a European scale and publishes its report. ERA reports do not take into account light rail (Luas) or metro systems, or self-contained heritage railway systems. As the NSAs report a year in arrears, and the ERA must validate a considerable amount of data, only data up to 2016 was available for this report. Data was extracted from the publicly available ERAIL Database that ERA maintain. This is a repository for European railway safety data, as input by National Safety Authorities. Some noteworthy statistics are presented from this database. Definitions for data categories used, where not stated, can be found in the document 'Implementation Guidance for use of Common Safety Indicators', which is produced by EUAR and is available at **http://www.era.europa.eu/**.



4.2 Network Comparisons

Comparisons are presented below to show the scale of traffic on the Irish Network in comparison to other EU Member States. Figure 27 describes the train kilometres (i.e. the number of kilometres covered by trains each year) for each country.

Ireland has a relatively small number of train-km compared to other European nations, and is the seventh smallest of the group of 29. This is as one might expect given Ireland's size and population density. Ireland's train-km grew slightly between 2015 and 2016, along with 14 other European countries while 12 countries saw a reduction in their train-km and one country remained the same. Hungary and the Channel Tunnel saw the largest increase in train-km (16% and 15% respectively) while Latvia decreased by 11%. In comparison, Ireland increased by 0.54% slightly below the overall average of 1.49%.



Figure 27: Total train-km (millions)

Figure 28 shows the total passenger kilometres travelled on each country's network between 2012-2016 in millions.

Germany (DE), France (FR) and the UK show the heaviest use of their rail network overall, with between 68 billion (UK) and 93 billion (Germany) passenger kilometres in 2016. By contrast, Ireland had almost 2 billion passenger kilometres in 2016. However, given the small size of the Irish network, this represents a usage of approximately 108 passenger kilometres for every train kilometre, compared to a European average of 81 passenger kilometres for every train kilometre, suggesting Ireland is one of the more densely used networks.



Figure 28: Total passenger-km (millions)

4.3 All accidents relative to train-km

All accidents in this instance are those which are reportable within the Common Safety Indicator framework as described in the European Union Railway Safety Directive 2004/49 (as amended). Figure 29 shows significant variation across European countries in terms of the accident rate per million train kilometres, ranging from a maximum in 2016 of 2.24 (Estonia) to a minimum of 0 (Ireland and Channel Tunnel). The small size of the Irish network means that this statistic must be viewed with caution as even a small number of accidents would have a strong effect. Nevertheless, Ireland has consistently been among the lowest accident rates over the period 2012-2016. Vigilance and continuous improvement is needed to continue this trend.



Figure 29: All accidents per million train-km

4.4 Signals passed at danger relative to train-km

Ireland had the eighth highest reported rate of SPADs in 2016 relative to million train kilometres (Figure 30).

The data improved in 2016 and again in 2017 but as discussed earlier in this report, the 2018 SPAD rate worsened somewhat. Only a small number of SPADs were categorised as serious, nonetheless there are still improvements to be made in this area.



Figure 30: Signals passed at danger per million train-km

4.5 Level-crossing accidents relative to train km

Level Crossings are a significant risk to railway safety and the density of level crossing on the Irish network is above the EU average. However, it is clear from the data presented in Figure 31 that Ireland, in comparison to other European countries, has a positive safety record in terms of level crossing accidents relative to train kilometres.



Figure 31: Level crossing accidents relative to train km

4.6 Derailments of trains relative to train km

Ireland has had no passenger derailments in the period 2012-2016, and so has one of the lowest rates across Member States (Figure 32). Whilst the Irish Network is relatively low speed and has low utilisation compared to some other member states, derailment risk still requires careful management in a challenging environment where resources have been reduced in the period under review.



Figure 32: Derailments of trains relative to train km

4.7 Percentage of tracks with Automatic Train Protection (ATP) in operation

One leading indicator of railway infrastructure safety is the percentage of railway fitted with Automatic Train Protection (ATP). ERA, in common with most professional railway organisations, considers ATP to be the most effective railway safety measure that railway infrastructure managers can implement to reduce the risk of collisions and derailment on mainline railways. ATP enforces obedience to signals and speed restrictions by speed supervision, including automatic stopping at signals. 25 Member States reported the percentage of lines equipped with such a system. This data over the period 2012-2016 is shown in Figure 33, with the most recent figure (2016) shown at the end of each bar.



Figure 33: Percentage of EU/EEA tracks with Automatic Train Protection (ATP) in operations, by country (2012-2016)

Only four countries/areas currently report full ATP protection over 100% of their network: Romania, the Netherlands, Luxembourg, and the Channel Tunnel. Ireland currently has no ATP coverage on their network, despite having previously reported 5% coverage. This drop is due to a change in the definition of ATP so that the DART-ATP system used on DART EMU rolling stock in the Dublin area no longer qualifies as ATP but rather as a Train Protection System (TPS). The Irish network also makes widespread use of a Continuous Automatic Warning System which also meets the EU definition of TPS. Other countries reporting 0% ATP include the Czech Republic, Greece, Latvia, and Croatia while the UK, Belgium, Slovenia, and Sweden have not reported their levels in recent years.

Over the last five years, eight of the countries have seen a decrease in ATP, presumably for the same reason as Ireland, four have seen an increase, and 17 have remained broadly the same (within 1-2%).

4.8 Major Accidents Worldwide

A number of major incidents on railways in other countries during 2018 reminds us that despite many indicators showing improvement in overall safety performance, potential still exists for serious accidents with catastrophic outcomes. The CRR is an active participant in a small number of fora with other National Safety Authorities in Europe and similar agencies worldwide regarding such incidents and endeavour to share learning points derived from investigations. What follows is a brief overview of recent accidents in other jurisdictions which the CRR considered noteworthy for the Irish rail industry. They high-light the importance of infrastructure inspection and timely maintenance, emergency/incident management and the supervision of train speed and driver vigilance.

Italy

On 25th January 2018, a commuter train operated by Trenord derailed in Pioltello when two of its carriages came off the track en route to Milan. The incident left 3 women dead and more than 100 people injured. The investigation into the accident later identified a broken rail on a section of jointed track on the approach to the crash scene as the cause of the derailment.

United Kingdom

On the 2nd March 2018 Nine passenger trains become stranded in the Lewisham, New Cross and St Johns area of South London during snowy weather. After a prolonged period of time without little or no communication, no heating and the inability to use toilet facilities passengers onboard five of the trains started to evacuate themselves from the trains and walk unaccompanied on live electrified lines.

No injuries were reported but the RAIBs investigation cited weak incident management controls by Network Rail as an area in need of improvement.

Turkey

The Çorlu train derailment was a fatal railway accident which occurred on the 8th of July in north western Turkey. A total of 24 passengers were killed and a further 318 were injured, including 42 severely.

The Turkish Ministry of Transport announced in a statement that the derailment occurred after the railway track slipped down from its original position due to torrential rains. It was reported that the track was intact when a scheduled train passed through that location earlier the same day but that heavy rainfall had caused a culvert under the railway to collapse thereby resulting in the track alignment to become distorted.

Taiwan

On 21st October 2018, a passenger train with 366 passengers onboard derailed in Yilan County, Taiwan, killing 18 people and injuring 187. At 16:50 local time a Puyuma express train derailed on a tight curve considered to be travelling at an excessive speed for the track geometry.

Of the eight carriages, numbers 3 through 8 toppled over and collided into each other. The front car was seen tipped over at an angle of 75 degrees, and most of the fatalities were from this carriage

Accident Investigations

5.1 Introduction

The Railway Accident Investigation Unit (RAIU) is a functionally independent organisation within the Department of Transport, Tourism & Sport (DTTAS). The RAIU undertakes 'for cause' investigations into accidents and incidents that either meet specific criteria in terms of severity or could have, in slightly different circumstances, resulted in a more serious accident or incident.

The purpose of an investigation by the RAIU is to identify improvements in railway safety by establishing, in so far as possible, the cause or causes of an accident or incident with a view to making recommendations for the avoidance of similar accidents in the future, or otherwise for the improvement of railway safety. It is not the purpose of an investigation to attribute blame or liability. The RAIU's investigations are carried out in accordance with the European Railway Safety Directive 2004/49/EC and the Railway Safety Act 2005 as amended by S.I. No.258 of 2014.

5.2 RAIU Active Investigations

The RAIU conducted 52 Preliminary Examination Reports (PER) and initiated three full investigations into railway accidents and incidents in 2018 (Table 4). They also commenced a 'Trend investigation Road Rail Vehicle Incidents between 2015 and 2018.

5.3 RAIU Investigation Reports 2018

In accordance with the Railway Safety Act 2005, the RAIU endeavours to publish an investigation report not later than 12 months after the date of the incident. In 2018, the RAIU published one investigation report which is listed in Table 5. As a result of their investigations the RAIU made a total of nine safety recommendations which are discussed in section 5.4.

Date of Incident	Details	Duty Holder
31st January 2018	Trend Investigation into Road Rail Vehicle Incidents between 2015 and 2018	IÉ-IM
17th July 2018	Collision with Buffer Stop, Portlaoise Depot,	IÉ-RU
12th August 2018	Wrongside Door Failure on 29000 DMU at Ashtown Station,	IÉ-RU
17th August 2018	Collision at Level Crossing, XM 220, Claremorris, Co Mayo,	IÉ-IM IÉ-RU

Table 4: RAIU investigations initiated in 2018

Date Report Published	Date of Incident	Title of Report	No. of recommendations made	Duty Holder
15/08/2018	13/09/2017	Derailment of a DART passenger service, at Points DL115 in Dun Laoghaire	7	IÉ-RU & IÉ-IM

Table 5: RAIU investigation reports published in 2018

5.4 RAIU Safety Recommendations 2018

The RAIU, through their accident investigations, identify whenever possible the immediate cause, contributory factors and any underlying factors. Having established these, the RAIU may make recommendations and as previously stated, seven were made in 2018. In accordance with the Railway Safety Directive the RAIU address recommendations to the safety authority (the CRR) and where needed by reason of the character of the recommendation, to other bodies or authorities in the Member State or to other Member States. Member States and their safety authorities take the necessary measures to ensure that the safety recommendations issued by the investigating bodies are duly taken into consideration, and where appropriate acted upon.

The CRR categorise the status of recommendations as being either 'Open', 'Submitted', 'FER' or 'Closed'. These are defined as follows;

Open	Feedback (Evidence) from Railway
	Organisation (or another party) is
	awaited or actions have not yet been
	completed.

Submitted A Railway Organisation (or other party) has made a submission to the CRR, advising that it has taken measures to effect the recommendation and the CRR is considering whether to close the recommendation.

FER

Further Evidence Required. 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

A summary is presented overleaf of the actions taken (at the time of writing) in relation to the one RAIU Investigation Report published in 2018 where safety recommendations were made, and the status of each recommendation.

addressed.

It should be noted that just because a safety recommendation is identified as being 'open' does not mean that no action has been taken, rather the railway organisation responsible has not yet reported that they have concluded the actions they propose to take to action the individual safety recommendation.

'FER' status safety recommendations have been reviewed by the CRR and further evidence in support of the railway organisations claim that the recommendation had been addressed is awaited.

R2018 – 001 Derailment of DART passenger service, at Points DL115, Dun Laoghaire on the 13th September 2017 (*Report Published 15th August 2018*)

Summary:

On the 13th September 2017, the DART passenger service from Howth to Bray was delayed due to a loss of points detection at Points DL115, resulting in Signal DL31 being at danger. A Points Operator was called to clip and scotch Points DL115 in the normal position. The Points Operator did not carry out the instructions set out in the lÉ Rule Book, in full, leaving a gap between the switch rail toe and the stock rail. The Points Operator advised the Controlling Signalman that the route was set and the Controlling Signalman gave the driver of Train E222 (Driver E222) permission to pass Signal DL31 at danger, over Points DL115.

At approximately 18:04 hours (hrs) the leading bogie of Train E222 derailed and came to a stop. Between 18:25 and 18:40 hrs, sixty to seventy passengers carried out an uncontrolled impromptu evacuation from the train on to the permanent way before a controlled evacuation of the passengers was arranged by larnród Éireann (lÉ).

Number of recommen	ndations made	7
Recommendation 1 (1-2018)	IÉ Infrastructure M 'Competence Mar and associated do assessment and th out these duties a	lanager (IM) should conduct a full review of IMO-SMS-031, nagement – Persons required to conduct IM operating duties' ocumentation, to identify deficiencies in training, continuous ne recording of performance of duties to ensure that persons carrying re competent to do so;
Action/s taken / in progress	26/09/18 IÉ-IM adv 16/07/19 CRR adv review Points Ope	vised the CRR that "A review of IMO-SMS-031 will be conducted" ised that a review has been undertaken and that falling out from this rator Assessments have been revised.
Status	Further evidence	e requested
Recommendation 2 (2-2018)	IÉ IM and IÉ Railwa assessment and m communications a critical communic	ay Undertaking (RU) should evaluate the current training, nonitoring of Safety Critical Communications to ensure that are carried out to the requirements set out in IÉ Rule Book, and safety ations standards IMO-SMS-033 and OPS-SMS-8.1;
Action/s taken / in progress	26/09/18 IE-IM adv Critical Communic 8/10/18 IÉ-RU adv and functions will Critical Communic	vised the CRR that "The training, assessment and monitoring of Safety cations will be evaluated." ised the CRR that "A formal review involving all relevant departments be undertaken of the training, assessment and monitoring of Safety cations"
Status	Open / In progre	SS
Recommendation 3 (3-2018)	IÉ RU should revie disruptions and er management of p These documents disruptions and er	w their suite of documents which reference major customer mergencies, and address any deficiencies in relation to the passengers on trains and uncontrolled impromptu evacuations. should then be briefed to staff who have roles in relation to customer mergencies to ensure they are aware of their responsibilities;
Action/s taken / in progress	8/10/18 lÉ-RU adv documentation w and any changes i	ised the CRR that "A formal review of the full suite of applicable ill be conducted. Relevant staff will then be briefed on the documents implemented post review."
Status	Open / In progre	SS

Recommendation 4 (4-2018)	IÉ IM should update the relevant sections of the General Appendix and other associated documentation to specify where the points clip should be fitted;
Action/s taken / in progress	26/09/18 IÉ-IM advised the CRR that "Documentation will be updated accordingly" 29/04/19 IÉ-IM submitted evidence demonstrating that they had revised and reissued Section E of the General Appendix and made this known through the issuances of a notice appended to the Weekly Circular No. 3865.
Status	Closed
Recommendation 5 (5-2018)	IÉ 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;
Action/s taken / in progress	26/09/18 IÉ-IM advised the CRR that "The Points Operator's instructions in the General Appendix and training and competence material are being reviewed and revised where appropriate." 16/07/19 Jarnród Éireann-IM have submitted evidence in support of their declaration that they have reviewed Section E of the general appendix and associated training material
Status	Submitted
Status Recommendation 6 (6-2018)	Submitted IÉ IM should review the drawing and specification requirements for points scotches and ensure only scotches manufactured to the required drawing and specification are made available to points operators;
Status Recommendation 6 (6-2018) Action/s taken / in progress	Submitted IÉ IM should review the drawing and specification requirements for points scotches and ensure only scotches manufactured to the required drawing and specification are made available to points operators; 26/09/18 IÉ-IM advised the CRR that "Review to be carried out"
Status Recommendation 6 (6-2018) Action/s taken / in progress Status	Submitted IÉ IM should review the drawing and specification requirements for points scotches and ensure only scotches manufactured to the required drawing and specification are made available to points operators; 26/09/18 IÉ-IM advised the CRR that "Review to be carried out" Open / In progress
Status Recommendation 6 (6-2018) Action/s taken / in progress Status Recommendation 7 (7-2018)	Submitted IÉ IM should review the drawing and specification requirements for points scotches and ensure only scotches manufactured to the required drawing and specification are made available to points operators; 26/09/18 IÉ-IM advised the CRR that "Review to be carried out" Open / In progress 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.
Status Recommendation 6 (6-2018) Action/s taken / in progress Status Recommendation 7 (7-2018) Action/s taken / in progress	Submitted IÉ IM should review the drawing and specification requirements for points scotches and ensure only scotches manufactured to the required drawing and specification are made available to points operators; 26/09/18 IÉ-IM advised the CRR that "Review to be carried out" Open / In progress 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. 8/10/18 IÉ-RU advised the CRR that "IÉ-RU will brief all relevant staff on the requirements of the IÉ Rule Book (Section M 3.1.2)."

5.5 RAIU Recommendations Summary

For further details on the status of RAIU Safety Recommendations please consult the CRR's Annual Report to the Minister for Transport, Tourism & Sport which is available on our website, **www.crr.ie**.

It should also be noted that many safety recommendations made by the RAIU are not 'quick fixes' and may require strategic planning, engineering design, public consultation, planning permission and/ or government funding and all of which can take many years to actually 'close' a safety recommendation.



6.1 Documents Used

CRR (2017) Annual Report 2018. Dublin: CRR ERA (2015), Common Safety Indicator Data, **https://erail.era.europa.eu/** retrieved 20.09.2018 RAIU (2017). Annual Report 2017. Dublin: RAIU

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