



> Railway Safety  
Performance  
in Ireland 2017



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# Foreword

The Commission for Railway Regulation is pleased to publish its Annual Safety Performance Report for 2017. 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.

The CRRs supervision of Ireland's railway organisations is risk based, meaning that we focus more of our resource on those organisations who have the potential to have a higher risk profile. Our Inspectors undertake audits, inspections and meet with company executives and managers, all with the purpose of checking the company's ongoing compliance with, and effectiveness of, 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 the Irish Rail network increased in 2017. The LUAS network saw a slight decrease in passenger numbers, largely attributable to the partial closure of the Red Line during the construction of Luas Cross City (LCC). That said, passenger journeys are expected to increase significantly on the LUAS network in 2018. Against this backdrop, there were no passenger fatalities on our railways in 2017 and the safety performance of the Irish railway sector was broadly positive.

There were reductions in the number of train collisions and Signals Passed at Danger (SPADs) on the Iarnród Éireann network and there were fewer tram derailments on LUAS. There were, however, increases in injuries to passengers' on-board trains and road traffic collisions with trams.

Sadly, nine people lost their lives, in 2017. In all cases these were as a result of unauthorised entry onto the railway. This regrettably is the highest number in a decade and our thoughts are with all those affected by these tragic events. The CRR views it as important that these incidents are investigated to learn from these tragic occurrences.

Our railways are complex systems with many interfaces and, it is the case that railway safety incidents will happen from time to time. Improving safety performance is not easy and requires constant vigilance and the ongoing commitment of all those who work in the industry to always act safely regardless of those competing demands that exist.

Anthony Byrne  
*Principal Inspector – Supervision & Enforcement*

# Executive Summary

This is the ninth Annual Safety Performance report of the Commission for Railway Regulation (CRR), prepared for 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 important 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, including Iarnród 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 and a number of smaller heritage railways and the authorisation of projects undertaken by Transport Infrastructure Ireland (TII) formally the Railway Procurement Agency (RPA).

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 2017, but nine people lost their lives as a result of unauthorised entry onto the railway, the highest number in a decade. There were no reports of deaths at level crossings.

In Iarnród Éireann, 2017 saw a reduction in train collisions compared to the previous year, but the statistics remain higher than at the start of the decade. A significant proportion of the collisions are with large animals that gain entry to the track. Signals Passed At Danger (SPADs) declined in 2017, achieving one of the lowest rates since 2003.

Transdev performance was broadly consistent, but a sharp increase was seen in Emergency Brake (EB) Applications. The CRR are investigating the reasons behind this increase.

There was also an increase in the number of level crossing incidents at Bord na Mona in 2017, but none of these events posed a significant risk to the public.

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

In 2017, the Railway Accident Investigation Unit (RAIU) initiated two investigations, the first into a near-miss at Knockcroghery level crossing and the second, a DART derailment in Dun Laoghaire. Two completed investigation reports were also published, resulting in nine safety recommendations being issued.



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# 1 | Introduction

## 1.1 Introduction

This is the ninth Annual Safety Performance report of the Commission for Railway Regulation (CRR), prepared for publication under Section 10 (6) of the Railway Safety Act 2005. This report provides statistics and commentary on a number of important safety performance indicators. Performance indicators are guided by the Common Safety Indicators (CSI), as specified in EU Directive 2004/49/EC<sup>1</sup>. Further indicators are included in this report to reflect unique aspects and risks particular to Irish Railways.

## 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 high-level comparison with other European railways shows where the national railway operator in Ireland (Iarnród Éireann (IÉ)) is positioned in terms of railway safety. This includes a brief overview of significant accidents that have occurred in other countries in 2017. 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. Its mission is to “advance 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. Further details may be found on the CRR website [www.crr.ie](http://www.crr.ie).

## 1.4 Statistical Qualification

The CRR publishes this report to assist public access to information about safety performance of the various Irish railway organisations. The CRR aim for this information to be timely and accurate. Every effort has been taken to ensure the accuracy of the data. Any errors should be brought to the CRR's attention, and every effort will be made to correct them.

The data contained in this report are intended to illustrate trends and rounding has been used and the presentation of data.

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<sup>1</sup> As amended by Directive 149/2009/EC and Directive 2014/88/EU

## 2 | Railway Safety Trends in Ireland

### 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,

- heavy rail,
- light rail,
- public highway interfaces with industrial rail systems,
- heritage railways.

Each Railway Organisation is mandated by law to report statistical data on railway operations and incidents to the CRR. This data is then used for assessing Railway Organisation safety performance and their management of risk.

### 2.2 Iarnród Éireann

#### 2.2.1 Operational Statistics

At the end of 2017, Iarnród Éireann – Infrastructure Manager (IÉ-IM) advised the CRR that it's IÉ operational network was 1683 route-kilometres, the same as in 2016. There were no significant changes to the network or to the operational pattern of trains.

Passenger journeys increased 6.3% on the 2016 figure to 45.5 million (Figure 1) reflecting the ongoing recovery in the economy and equivalent to the peak figures seen in 2007. The trend for increased passenger journeys can be expected to continue with continued investment in Infrastructure projects including planned new stations (e.g. Pelletstown), the recently opened

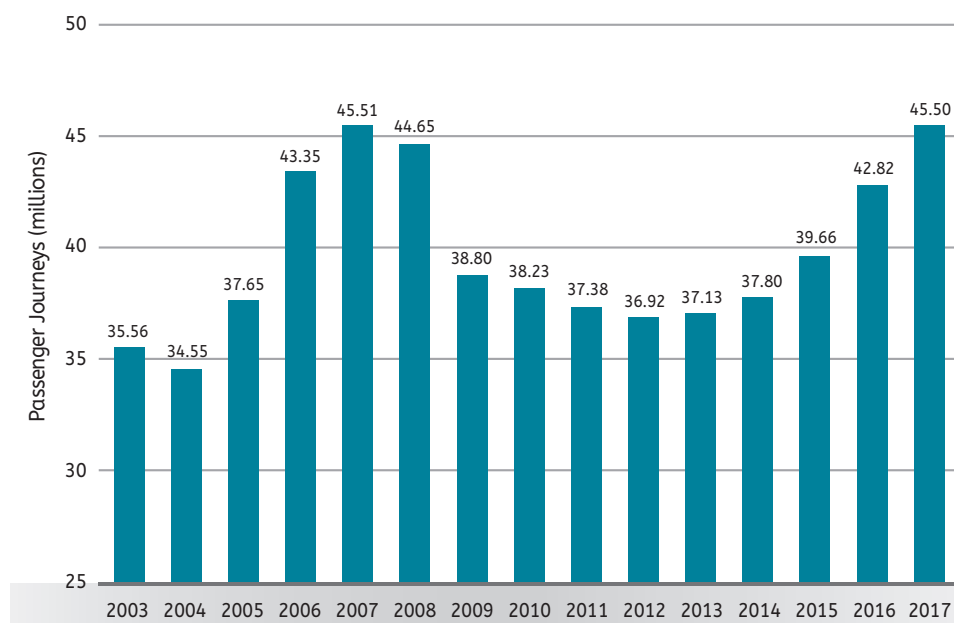


Figure 1: IÉ Passenger Journeys 2003-2017



interchange with light rail at Broombridge, city centre resignalling, and removal of temporary speed restrictions through ballast cleaning. In the longer term, the DART expansion programme will increase the frequency of services between Dublin and Drogheda, Celbridge, and Maynooth.

The long term trend for reduced freight movements is evident in Figure 2. A peak of about 5 million freight train-km was reached in 2005 but this declined rapidly afterwards following strategic operational decisions which reduced freight traffic. Since 2004, passenger-km have risen year on year, peaking in 2008. Following a significant decrease in 2009, passenger-km have been

steadily increasing ever since. Iarnród Éireann has been exploring options to expand freight services following the plateauing of freight from 2010, such as test runs of longer freight trains, but have not yet succeeded in reversing the decline.

The Train-km metric does not measure the size of a train, just that a train has run, for example during the economic downturn, 4-car sets were run in place of running half empty 8-car sets. At the time of writing, the active fleet of ICRs, DMUs and EMUs is once again fully deployed, with options being looked at to increase capacity.

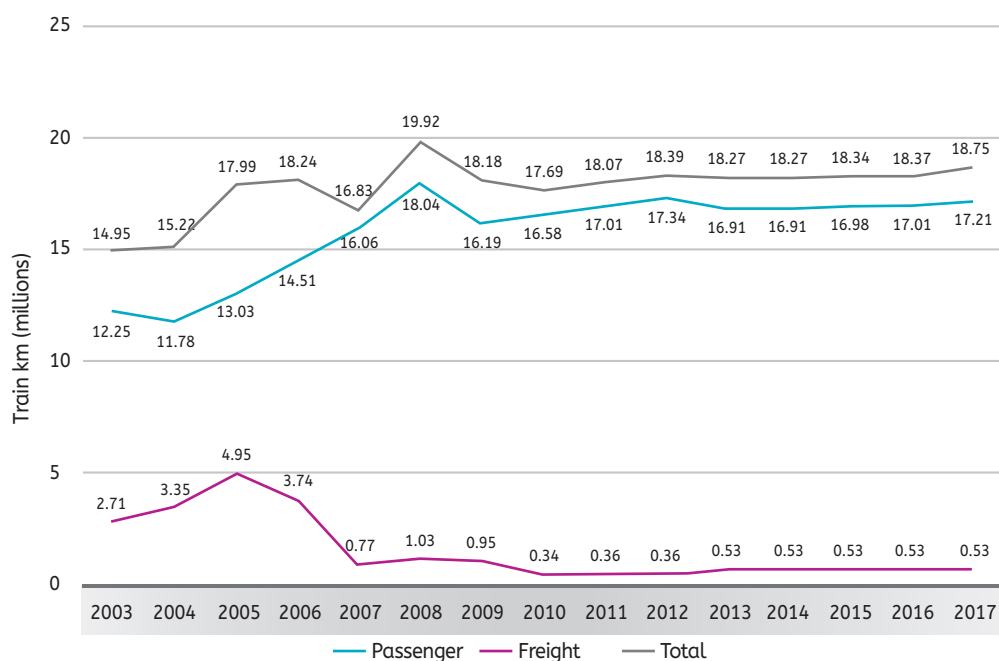


Figure 2: Train-km on the IE Network 2003-2017

Iarnród Éireann employee numbers are shown in Figure 3. As the volume of both passenger and freight traffic starts to increase again, having a critical mass of competent staff is vitally important to maintaining operational and infrastructure safety.

### 2.2.2 Iarnród 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 years 2006 to 2017.

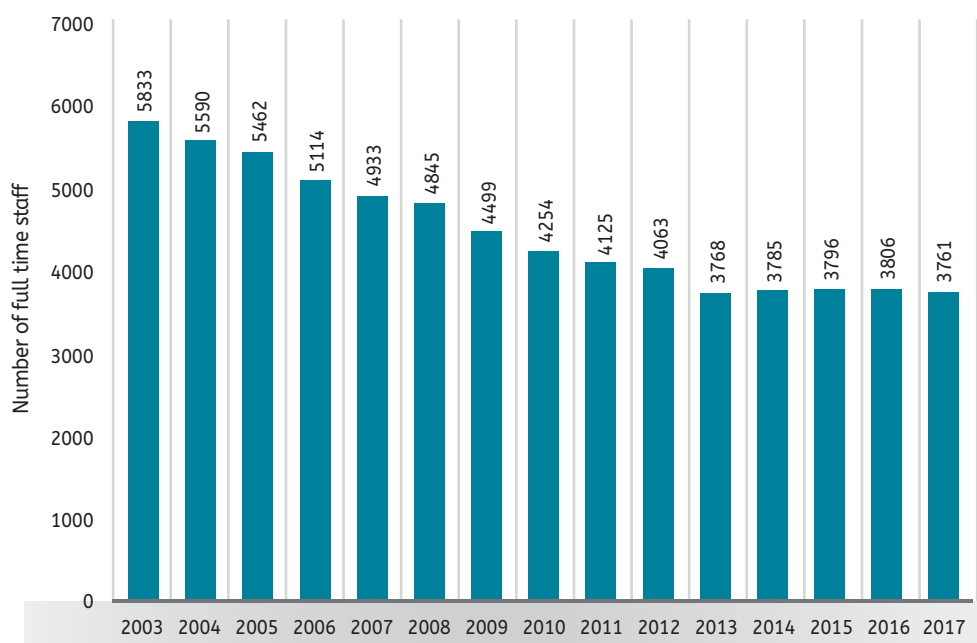


Figure 3: Personnel engaged in full time employment with IÉ

Table 1: IÉ operational fatality and injury statistics by year

Category	2006	2007	2008	2009	2010	2011	2012	2013	2014	2015	2016	2017	Trend
<b>Railway operations: passenger fatal injuries</b>													
Fatal injury to passenger due to a train accident, not at level crossing	0	0	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	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	0	0	
Fatal injury to passenger attempting to board or alight from train	0	0	0	0	0	0	0	0	0	0	0	0	
<b>Railway infrastructure: third party fatal injuries</b>													
Fatal injury to third party at a level crossing involving a train	0	1	1	0	2	0	0	0	0	0	0	0	
Fatal injury to third party at a level crossing not involving a train	0	0	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	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	0	0	
Fatal injury to employee not due to train in motion	0	0	0	0	0	0	0	0	0	0	0	0	
<b>Railway infrastructure: employee fatal injuries</b>													
Fatal injury to employee at a level crossing due to train in motion	0	0	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	0	0	
Fatal injury to employee not due to train in motion	0	0	0	0	0	0	0	0	0	0	0	0	
<b>Railway operations: fatal injuries to other persons</b>													
Fatal injury due to train in motion not at level crossing	0	1	0	0	0	0	0	0	0	0	0	0	
Fatal injury to customer or visitor, no train involved	0	1	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	7	5	8	3	8	7	5	4	6	2	5	9	
<b>Railway operations: non fatal injuries to passengers</b>													
Injury to passenger travelling on train due to a railway accident not at level crossing	0	0	0	2	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	0	0	
Injury to passenger attempting to board or alight from train	55	50	43	17	64	46	41	39	45	48	79	57	
Injury to passenger travelling on train, other than due to a railway accident	41	35	22	40	28	10	27	43	18	15	31	33	
<b>Railway infrastructure: third party non fatal injuries</b>													
Third party at level crossing injury involving a train	0	1	0	0	0	1	2	0	0	0	0	0	
Level crossing user injury not involving a train	0	1	1	1	0	2	5	1	0	0	0	0	
<b>Railway infrastructure: non fatal injuries to other persons</b>													
Injury to customer or visitor to premises	72	70	54	56	85	113	116	193	205	146	192	321	
Injuries to other persons including unauthorised persons	0	1	0	0	0	0	5	3	0	1	2	6	
<b>Railway operations: non fatal employee injuries</b>													
Employee lost time accident involving train movement or train accident	15	7	8	13	11	7	13	5	21	3	1	0	
Employee lost time accident while working on railway not due to train in motion	38	36	37	31	27	22	32	39	43	32	30	30	
<b>Railway infrastructure: non fatal employee injuries</b>													
Employee lost time accident involving train movement or train accident	0	1	1	0	1	2	1	0	0	0	0	0	
Employee lost time accident while working on railway not due to train in motion	31	42	42	34	30	23	32	41	25	6	23	22	
Employee lost time accident while working at level crossing not due to train in motion	2	4	0	0	0	0	1	1	2	0	3	1	
<b>Entity in charge of maintenance and maintenance workshops: non fatal employee injuries</b>													
Employee lost time accident involving train movement or train accident	0	0	0	1	0	0	0	0	0	0	0	0	
Employee lost time accident while working on railway not due to train in motion	30	36	27	21	10	18	10	14	18	13	11	10	

### 2.2.2.1 Fatal Injuries

There were no passenger fatalities or serious injuries in 2017. However, there were nine fatal injuries on the railway, which is the highest number over the last 12 years, and a regrettable increase on the two recorded in 2015. All of these fatalities were categorised as trespasser fatalities. The CRR refers to a coroner's verdict, when available, to assist in classifying the circumstances surrounding a fatality.

### 2.2.2.2 Passenger Injuries (Customer & Visitor injuries)

The data indicates that the largest proportion of incidents occur to persons during time spent at stations as opposed to time spent on trains. This is common across many railways due to the sedentary nature of passengers when on board a train.

Similar to other years, 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. There has been a significant increase in injuries to customers and visitors to premises in 2017, increasing from 192 in 2016 to 321 in 2017 (Figure 4). This may be a result of better reporting and recording of injuries, but is also likely related to the increase in overall passenger numbers. These incidents tend to be of a minor nature and are usually treated by first aid at the station.

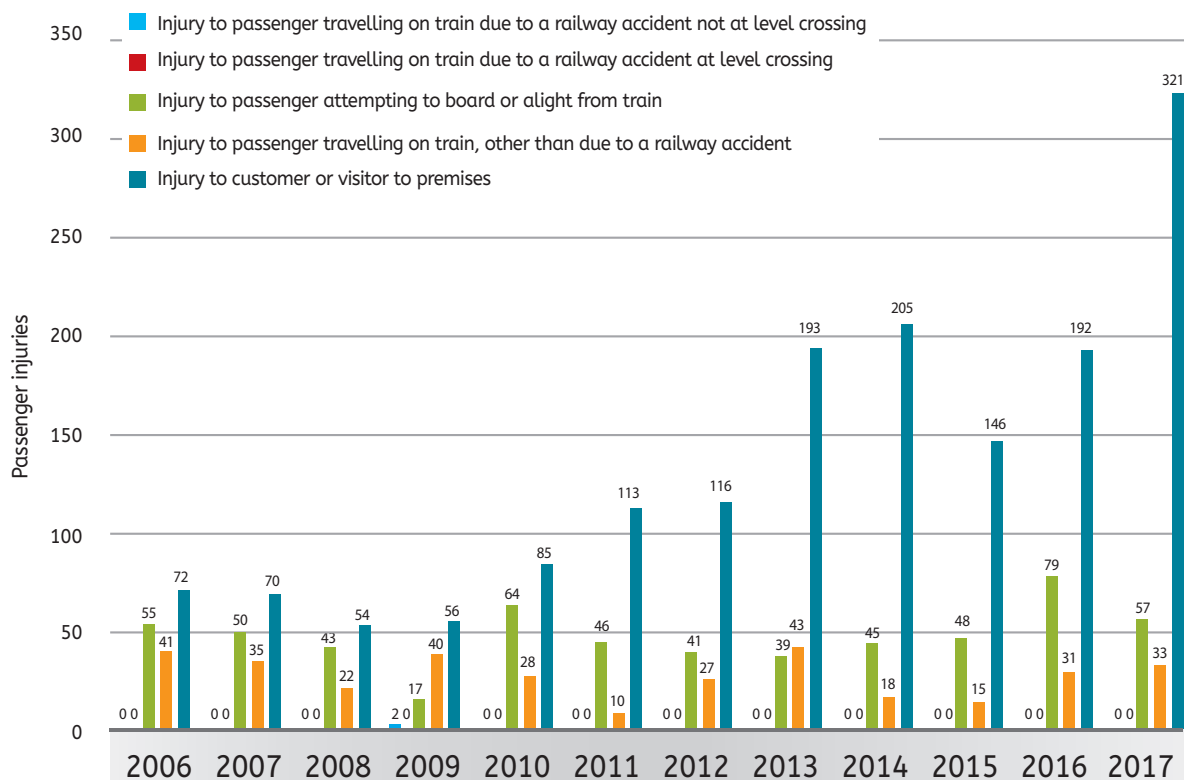


Figure 4: Passenger Injury Statistics by year



### 2.2.2.3 Employee Injuries

As in last year's report, employee accidents 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)<sup>2</sup>.

The significant rise in operational Lost Time Accidents<sup>3</sup> (LTA) involving train movements in 2014 has been reversed and 2017 achieved 0 employee LTAs involving train movements (Figure 5). The CRR notes the IÉ initiatives such as "Accident Free Depends on Me" and "Close Call" reporting which may have contributed to this improvement.

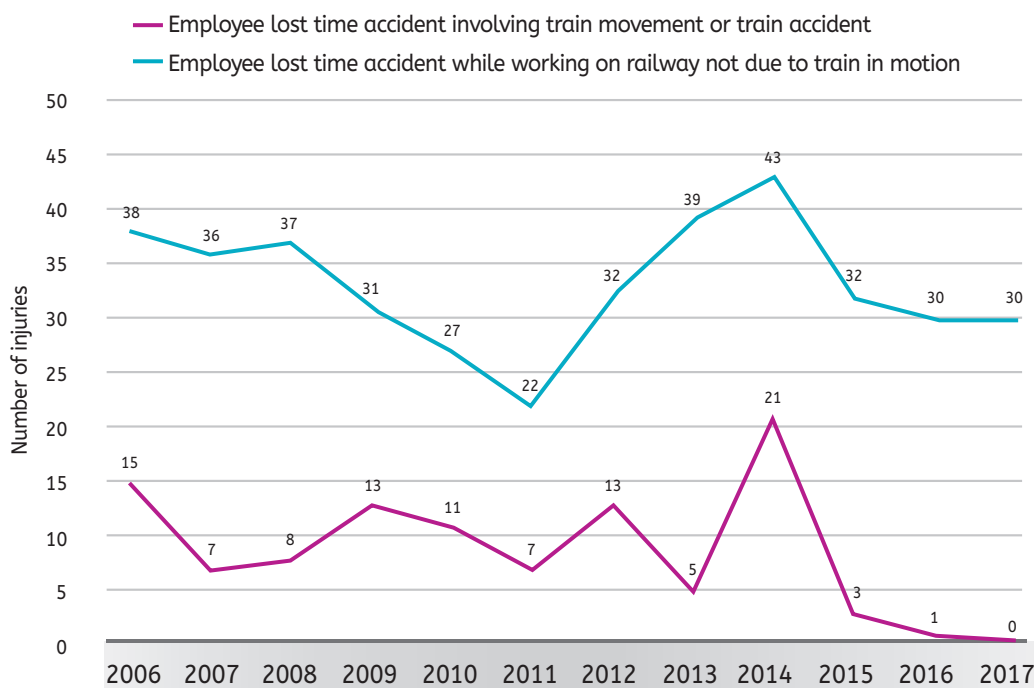


Figure 5: Employee Accident statistics by year (Railway Operations)

<sup>2</sup> ECMs are organisations that are certified to undertake maintenance of rolling stock, typically freight vehicles but also passenger trains in the case of Iarnród Éireann – Railway Undertaking.

<sup>3</sup> IÉ define LTA as any occasion when an employee misses their next shift following an accident at work as a consequence of the accident

Employee accidents in the railway infrastructure business remained level in 2017 (Figure 6), with the dip seen in 2015 appearing anomalous, while the ECM

trend continues the slow decrease seen since 2014 (Figure 7).

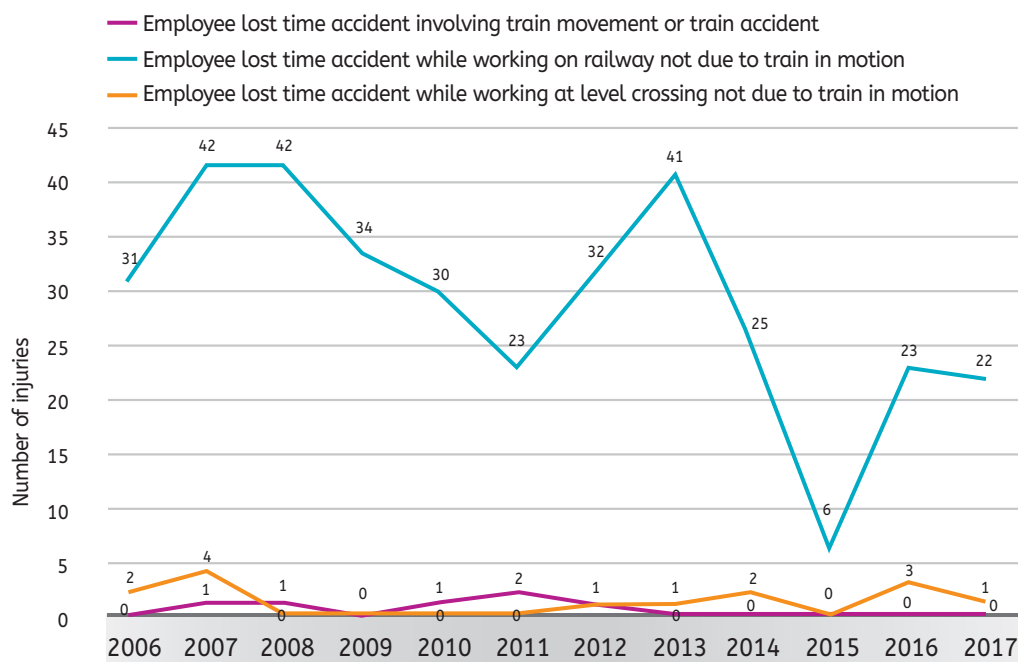


Figure 6: Employee Accident statistics by year (Railway Infrastructure)



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

### 2.2.3 Iarnród Éireann Operational Incident Statistics

#### 2.2.3.1 Train Collisions

Train collisions can pose a significant risk to passengers, train crew and third parties. They have the potential to cause significant human and environmental harm. Figure 8 illustrates the trend for collisions since 2003. Figure 8 is supported by Table 2 and Figure 9

to aid understanding of the data. Two categories, 'Total Collisions with Obstacles on the line' and 'Train Collisions with large animals', have been separated to enhance understanding of the data as in isolation it is of limited benefit. The overall data shows a decrease from the peak in 2016 that is more in line with the trend between 2003 and 2008.

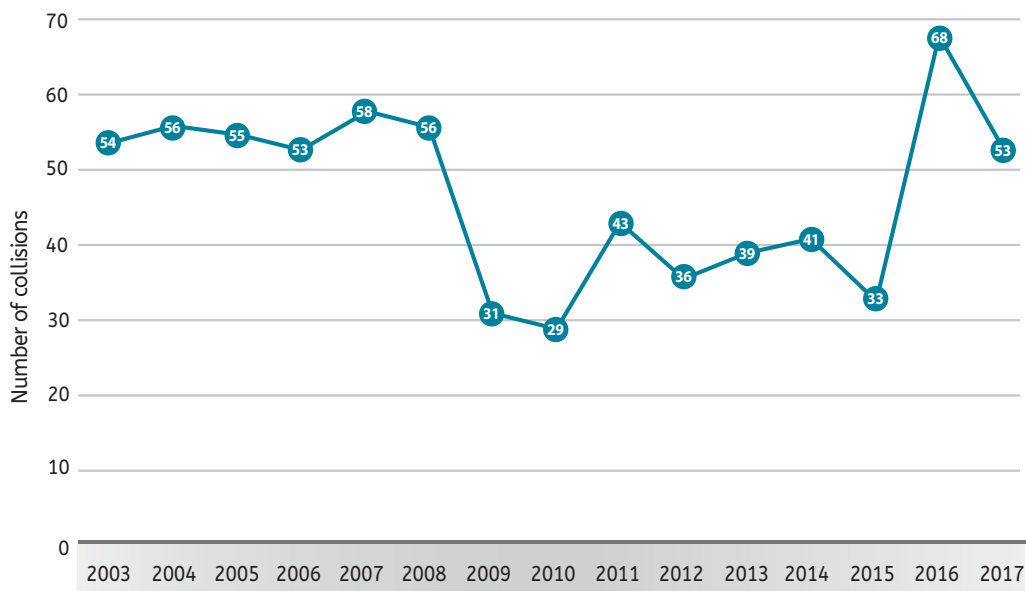


Figure 8: Total Collisions with Obstacles on the line

Category	2003	2004	2005	2006	2007	2008	2009	2010	2011	2012	2013	2014	2015	2016	2017	Trend
Train collision with passenger or goods train on running line	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	
Train/railway vehicle collision in station or possession movement	2	0	1	1	0	1	1	0	0	1	1	1	1	1	2	
Train collision with a motor vehicle at a level crossing	1	2	2	1	4	4	0	2	1	2	1	2	0	0	3	
Train collision with pedestrian at a level crossing	0	0	0	0	1	0	0	1	0	0	0	0	0	0	0	
Train collision with attended gates at a level crossing	2	4	2	2	2	1	0	1	0	0	0	0	1	0	0	
Train collision with road vehicle obstructing the line (not at a level crossing)	2	0	0	0	0	0	0	0	0	1	1	0	1	1	0	
Train collision with other obstacle on the line	4	10	8	5	9	17	10	1	7	6	7	29	1	31	25	
Train collision with large animal(s) on the line	43	40	42	43	42	33	20	24	35	26	29	9	29	35	23	
<b>TOTAL</b>	<b>54</b>	<b>56</b>	<b>55</b>	<b>53</b>	<b>58</b>	<b>56</b>	<b>31</b>	<b>29</b>	<b>43</b>	<b>36</b>	<b>39</b>	<b>41</b>	<b>33</b>	<b>68</b>	<b>53</b>	

Table 2: Train Collision Statistics detail by year Part 1

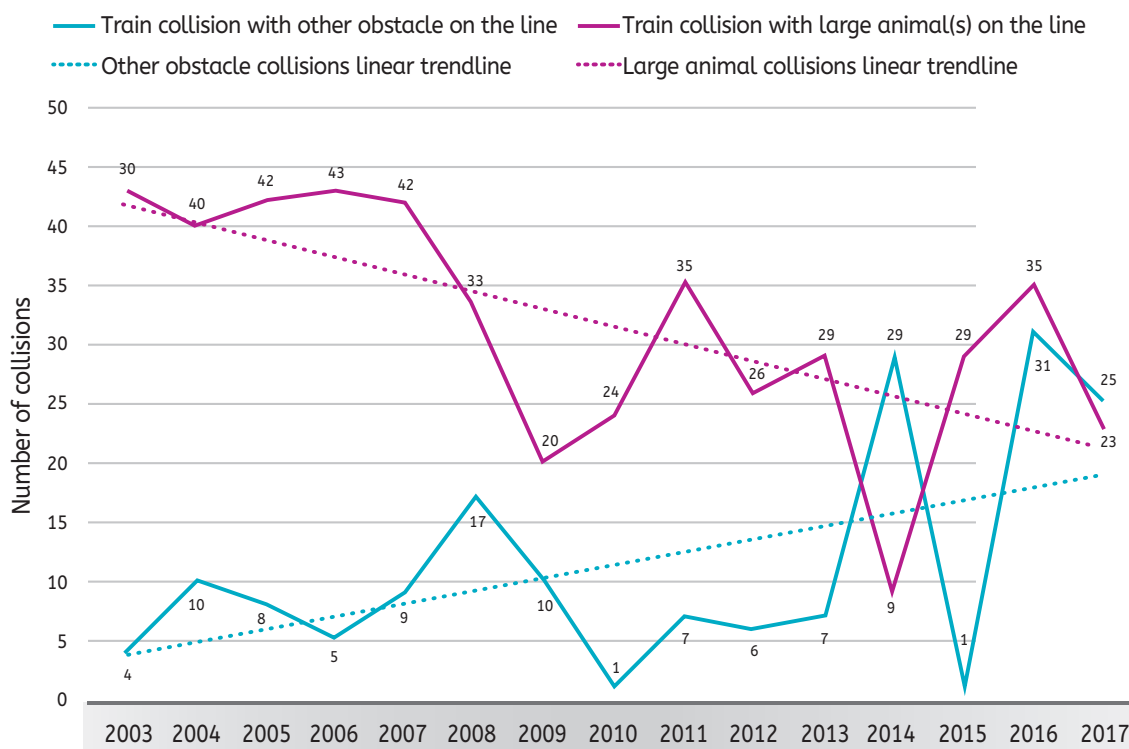


Figure 9: Train Collision Statistics detail by year, part 2



Total train collisions have decreased to 53 in 2017 from 68 in 2016 but this is largely due to a decrease in collisions with large animals. There has been some volatility in the data between 2013 and 2017, but the trends show it continues to be a cause for concern. As discussed in previous reports, animals (deer, cattle and sheep) are a major contributor to collision statistics in Ireland. Iarnród Éireann continues to invest in fencing systems to protect against incursions to its railway. In addition, the reduction in the number of level crossings over the last decade should assist this trend.

The number of train collisions with obstacles has increased significantly in recent years. Levels of anti-social behaviour account for some of this but the principal reason for the increase has been adverse weather events where trees and branches have fallen onto the railway or lean into the path of oncoming trains.

### 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 on the network. In 2004 there were 1701 level crossings compared to 945 in 2017, representing a reduction of approximately 45%.

Figure 10 illustrates the varying number of level crossings on active lines, i.e., not on closed or out of use lines. Sustained efforts by Iarnród Éireann have contributed greatly to reducing the risk presented by level crossings.

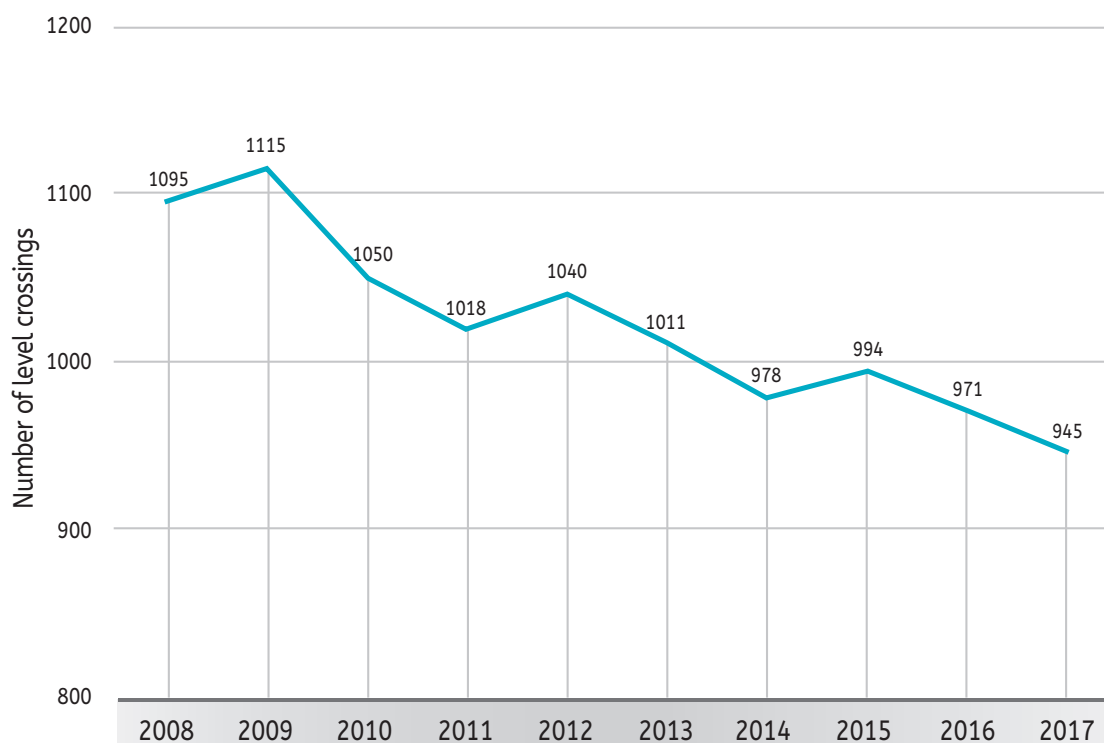


Figure 10: Number of level crossings by year

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. Recent years have seen a decline

in investment for the removal or upgrade of level crossings. Iarnród Éireann are currently reviewing novel technological designs to enhance safety and operation at user-worked level crossings.

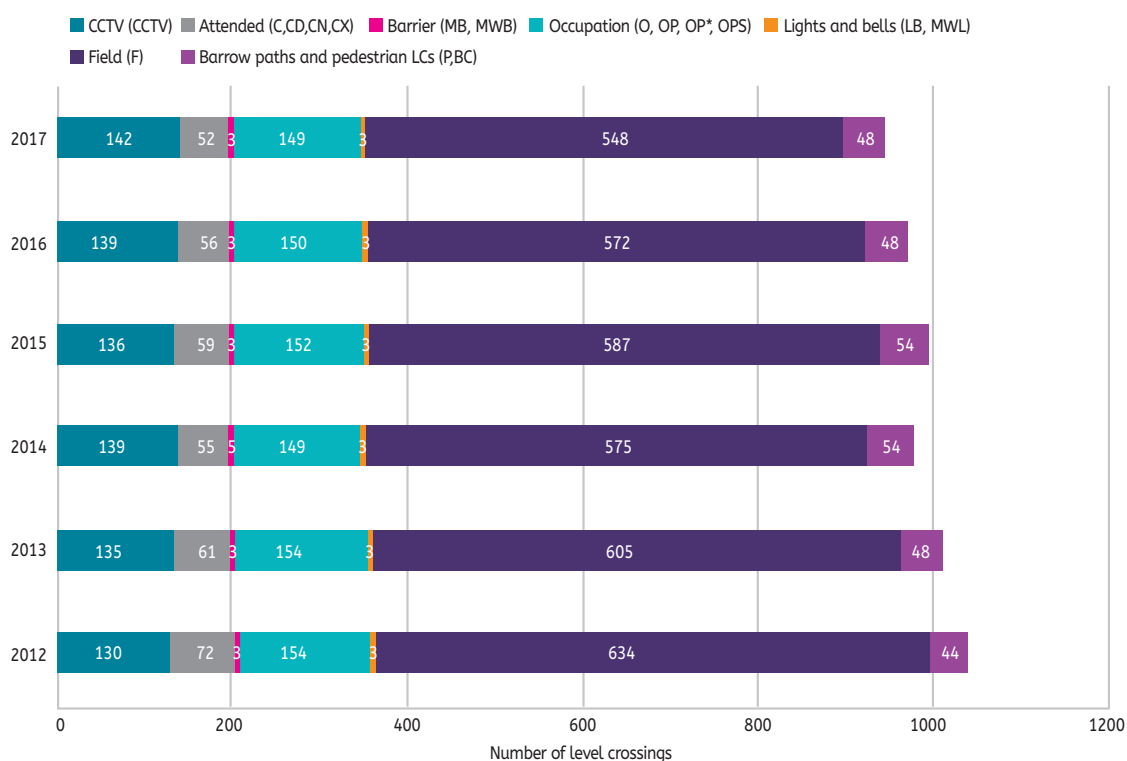


Figure 11: Level Crossing by type in Ireland

### 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. The trend in recent years has been a steady decline,

and data for 2017 was one of the lowest years to date (Figure 12), the result of sustained attention to investigating and analysing the factors contributing to SPADs.

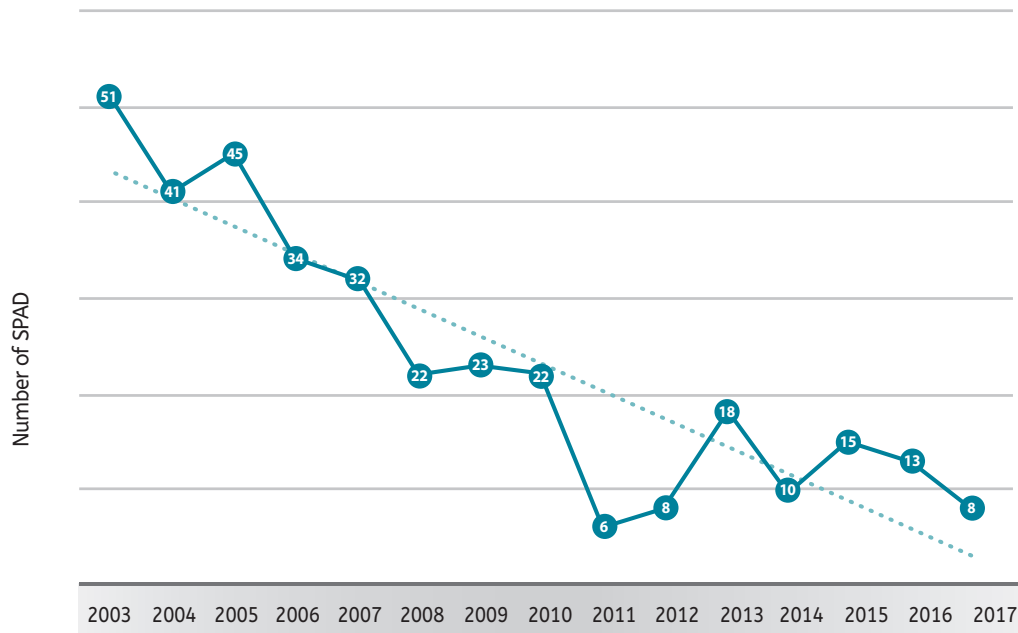


Figure 12: IÉ SPADs by year

### 2.2.3.4 Train Derailment

Train derailments remain at low levels and are unchanged from 2016 (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.

The slight rising trend of derailments in IÉ Sidings from 2013-15 has reversed. In 2017, there was one derailment on or fouling a running line and four derailments 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

Iarnród 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

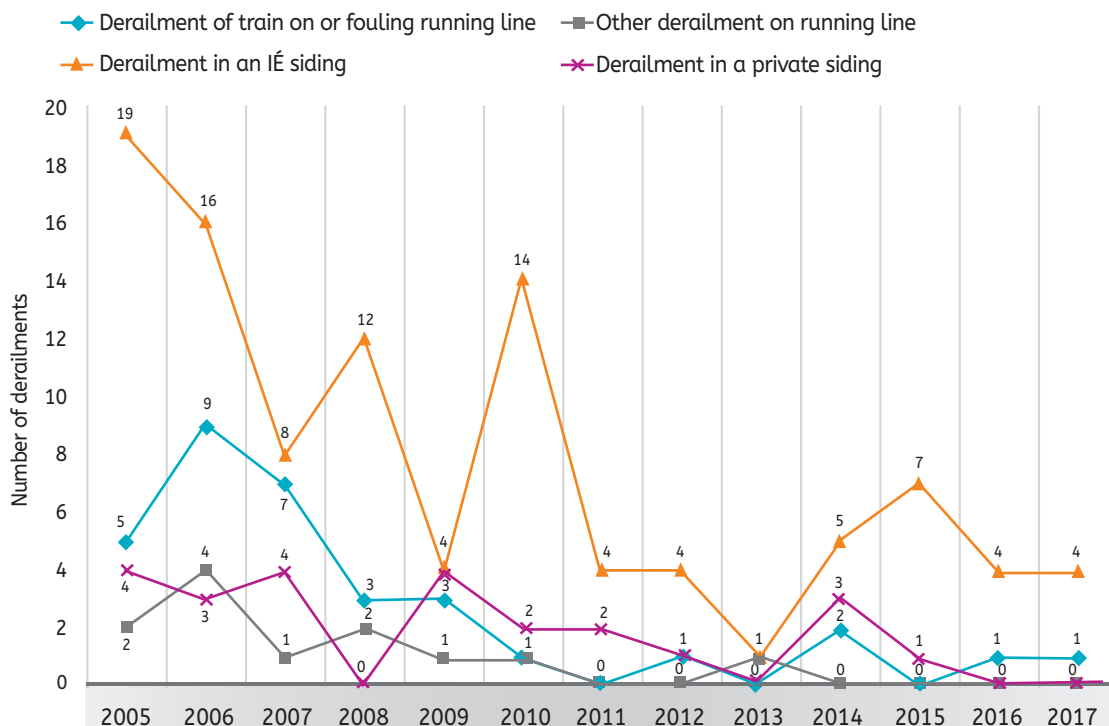


Figure 13: Train Derailments by Year



Failures with rolling stock have the potential to be the cause of serious accidents. The number of reported occurrences remained very low in 2017. There was a reduction in fires, but a corresponding increase in axle and door related issues.

### 2.2.5 Iarnród Éireann Infrastructure Incidents

IÉ operate and maintain a large number of infrastructure assets including track, stations, bridges, culverts, tunnels, level crossings, buildings, cuttings and embankments, points and crossings, signals etc. all of which must be inspected and maintained at varying

prescribed frequencies. Assets can fail due to aging and fatigue and the railway network in Ireland is abundant in legacy structures such as bridges and culverts. Rigorous inspection programme's and preventative maintenance minimise the risk of catastrophic failures. However, from time to time incidents do occur and data relating to some of these is now presented.

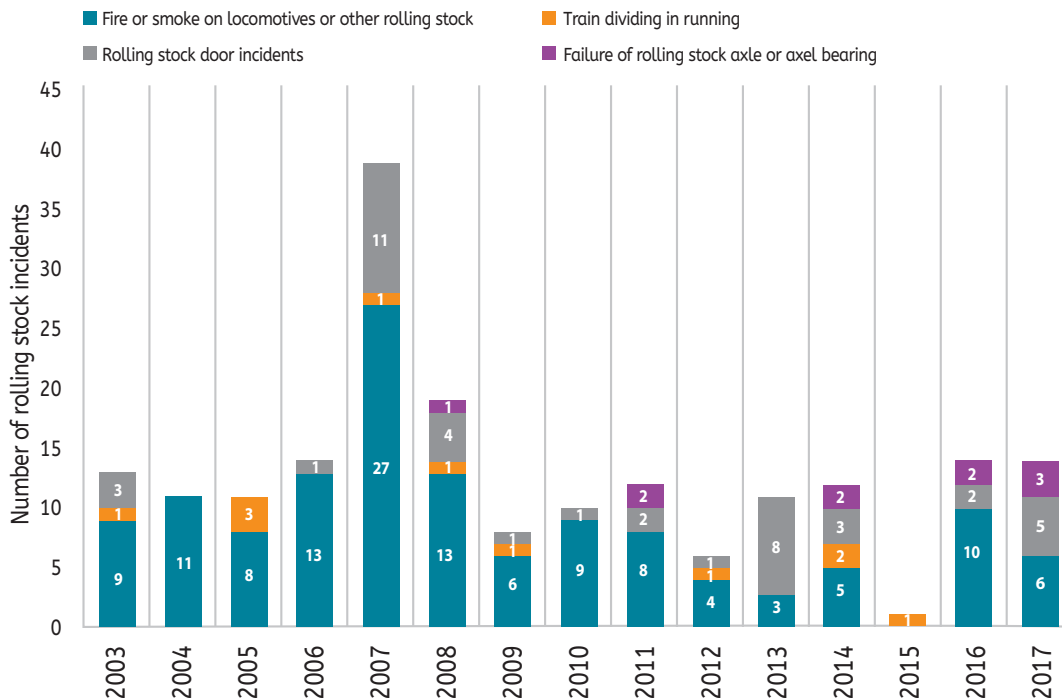


Figure 14: Rolling Stock Incidents by year

### 2.2.5.1 Broken Rails and Fishplates

Iarnród Éireann visually inspects the track at least once per week and rails are ultrasonically tested at least every 2 years, with the vast majority tested annually. There were two broken rails on a passenger carrying line in 2017 consistent with an overall decreasing trend

established since 2003 (Figure 15). Whilst these did not result in a train accident, it is an area where IÉ remains vigilant. The CRR closely monitors Iarnród Éireann's management of its assets through regular supervision meetings, inspections and audits.

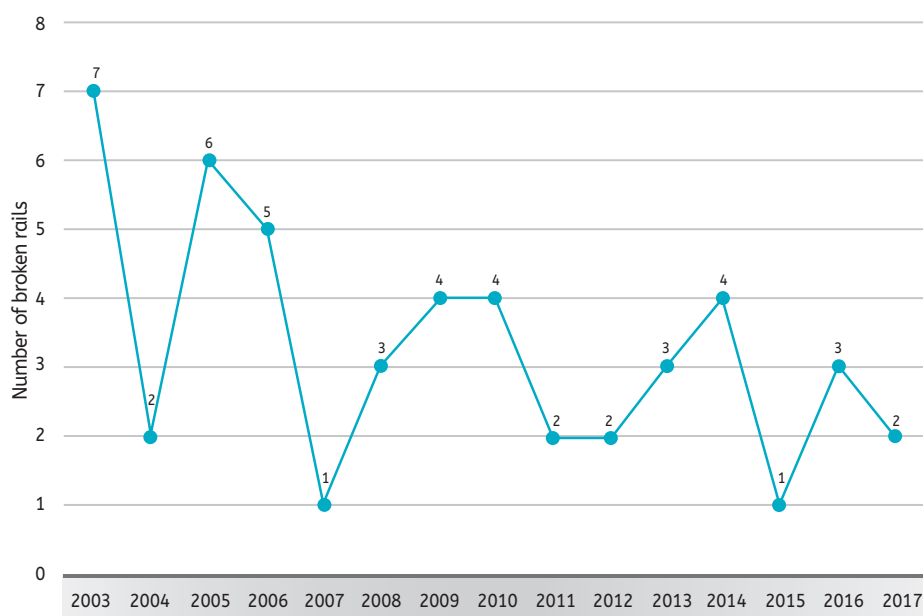


Figure 15: Broken Rails by year



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

A fishplate is a special bolted connection that joins two rails together. The trend for 'Cracked or Broken Fishplates' continues on the overall downward direction seen since 2003 (Figure 16). Following a small rise in 2012, a significant decrease was noted for 2013, with this trend continuing to 2017. It is noted that the IÉ Railway Safety Investment Programme included the installation of continuous welded rail (CWR) has lead to an overall reduction in the number of fishplates on the network.

### 2.2.5.2 Bridge Strikes

A railway bridge may be a road over the railway or it may carry the railway over a road. A bridge strike is where a road vehicle strikes the parapet or roadside containment of a bridge over the railway or where a road vehicle strikes the underside of a railway bridge over a road. Both types of incident can, in certain

circumstances, result in very severe consequences. Road users should be mindful of their driving in the vicinity of the railway. If driving an oversized vehicle, road vehicle drivers should know their vehicle height relative to the use of any underpass.

The total number of bridge strikes, i.e., both under-bridge and over-bridge, fell in 2017 compared to 2016 (84 vs. 93 in 2016) with the majority being under-bridge strikes (Figure 17). Overall, the trend for both under- and over- bridge strikes has remained relatively stable since 2008.

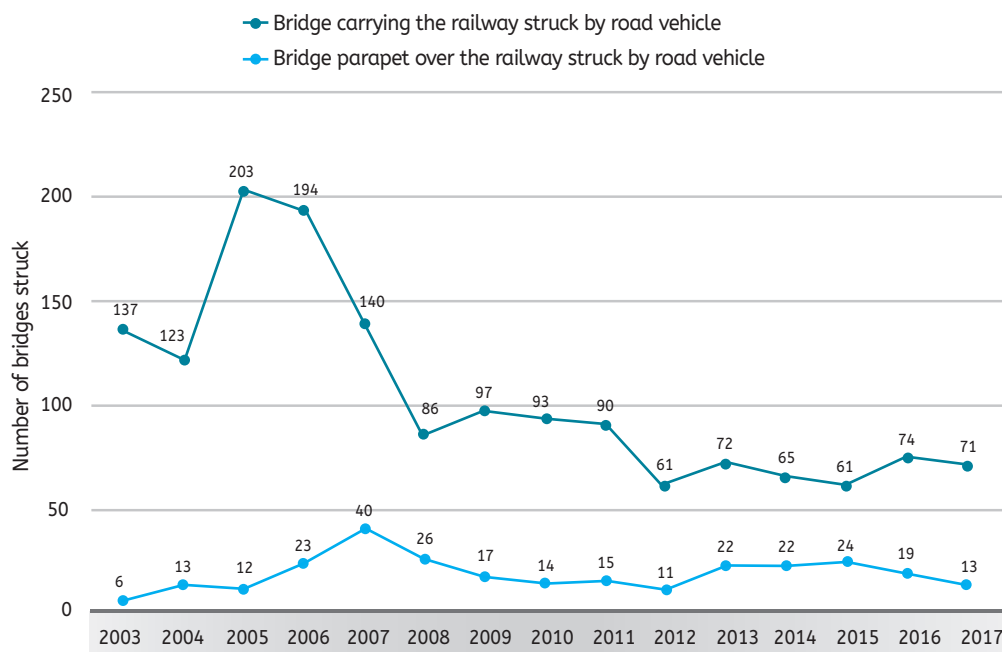


Figure 17: Railway Bridges struck by road vehicles

### 2.3 Balfour Beatty Rail Ireland

Balfour Beatty Rail Ireland Limited (BBRI) are contracted to operate and maintain Iarnród Éireann's fleet of heavy track maintenance equipment. They are classified as a Railway Undertaking (RU) under the Railway Safety Act 2005, as amended and therefore are required to have an approved Safety Management System (SMS). Under Commission Regulation (EU) No.1158/2010 on a common safety method for assessing conformity with the requirements for obtaining a safety certificate, Parts A and B Safety Certificates covering the operation of on track machines (OTMs) over the Iarnród Éireann network were issued to Balfour Beatty Rail Ireland Limited (BBRI) on 24th February 2014.

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

BBRI is a relatively small organisation and have notified a staff level of 57 to the CRR. BBRI does not operate any passenger services. The nature of the track maintenance work is such that they provide many of their services outside peak and daytime periods. The total train kilometres for 2017 was 118,848km, an increase on the 108,526km in 2016.

Table 3 shows the reported occurrences for BBRI in 2017, including one SPAD and two derailments. This is an increase in reportable incidents over the previous year where there was only one reportable incident involving a points run through. The incidents have been investigated and actions taken to minimise the chance of reoccurrence.

Table 3: BBRI occurrences 2017

Occurrence	Number
SPAD	1
Derailments	2
Minor occupational injuries	2
Rail infrastructure damage incidents	20 <sup>4</sup>

<sup>4</sup> These include accidental damage to sleepers, rails and other trackside equipment whilst undertaking track maintenance (Tamping) activity.





## 2.4 Transdev (Luas) Statistics

All trams and tramway infrastructure is owned by Transport Infrastructure Ireland (TII) and, through a competitive tender, 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.

Passenger journeys in 2017 were 37.6 million, compared to 34.1 million in 2016 while tram kilometres increased from 3.59 million to 3.91 million (Figure 18). This continues the long-term trend for increasing passenger journeys and reverses a slight decline in the previous year which was in large part due to the closure of the Red Line from Jervis Street to Connolly and The Point

(6 of the busiest 32 stops) for six weeks during Luas Cross City (LCC) construction work. The Luas Cross City opened on 09/12/2017 enabling increased passenger numbers over the new Green Line extension.

### 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 the 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.

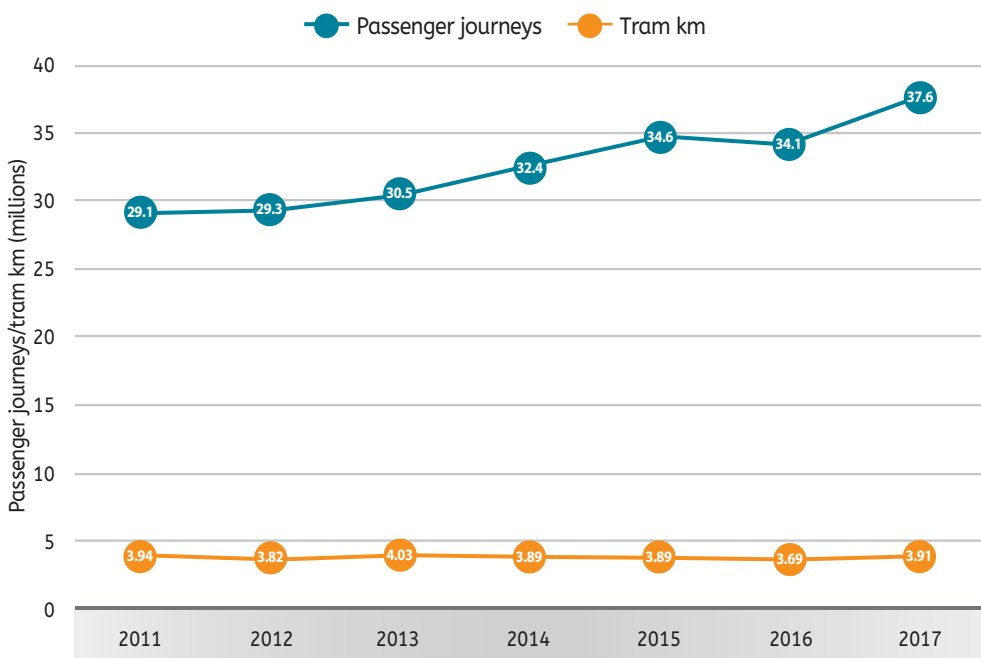


Figure 18: Luas passenger journeys 2011-2017

The number of road traffic collisions has increased to 29 in 2017 from 23 in 2016 (Figure 19). The majority of this increase was on the Green Line, which had only a single collision in 2016 and six in 2017. The majority of these were in the Harcourt area, and none were recorded

in the Cross City line during the single month of 2017 when this was open. The number of RTC per million tram kilometres rose in 2017 compared to 2016 (Figure 20) but has not reached the peaks of 2013/2014.

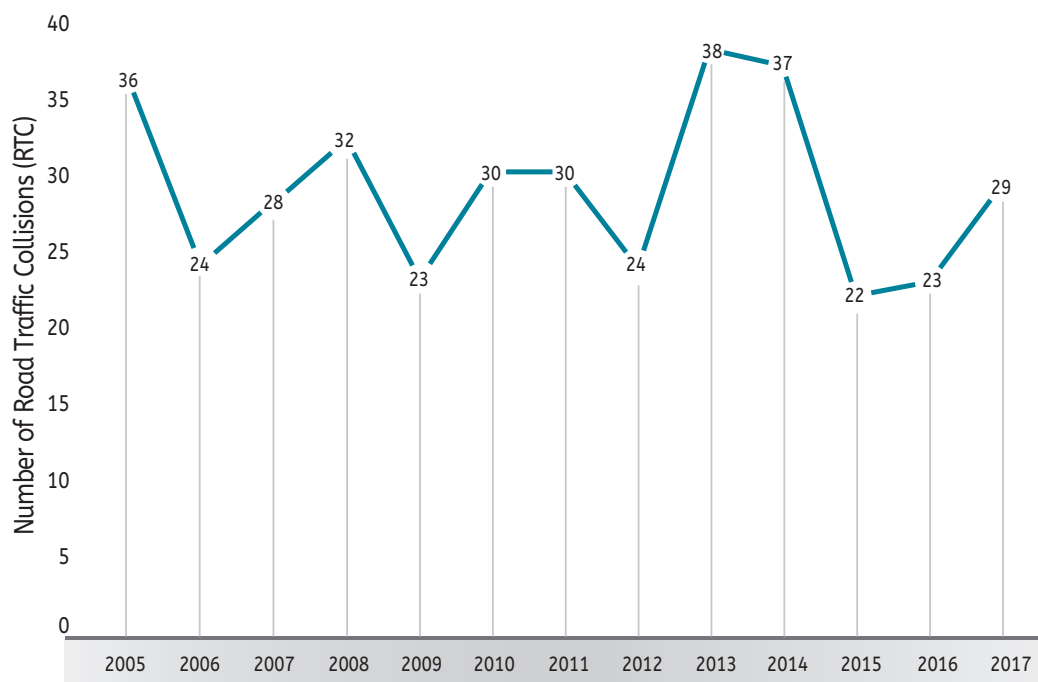


Figure 19: Number of Road Traffic Collisions involving a tram

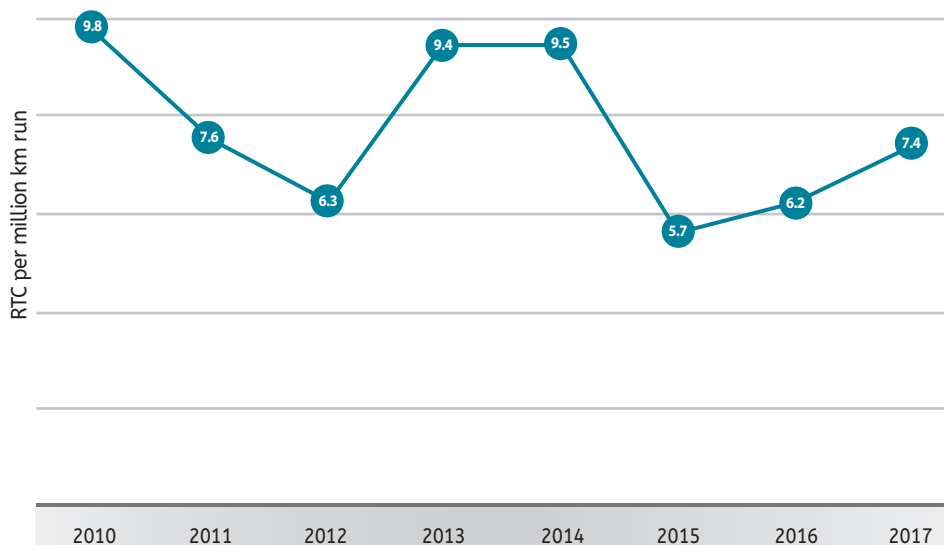


Figure 20: RTC per million km run

### 2.4.2 Tram / Person Contact

A significant majority of incidents where contact is made between trams and pedestrians or cyclists occur in and around Dublin city centre. The Luas Red Line in particular operates through 41 signalled junctions which are at grade. Such junctions carry a higher risk of

the tram coming into contact with persons. A total of nine such incidents occurred in 2017 (Figure 21), a slight increase on the trend in recent years. Of these, three were cyclists and six were pedestrians with seven incidents occurring on the Red Line and two on the Green line.

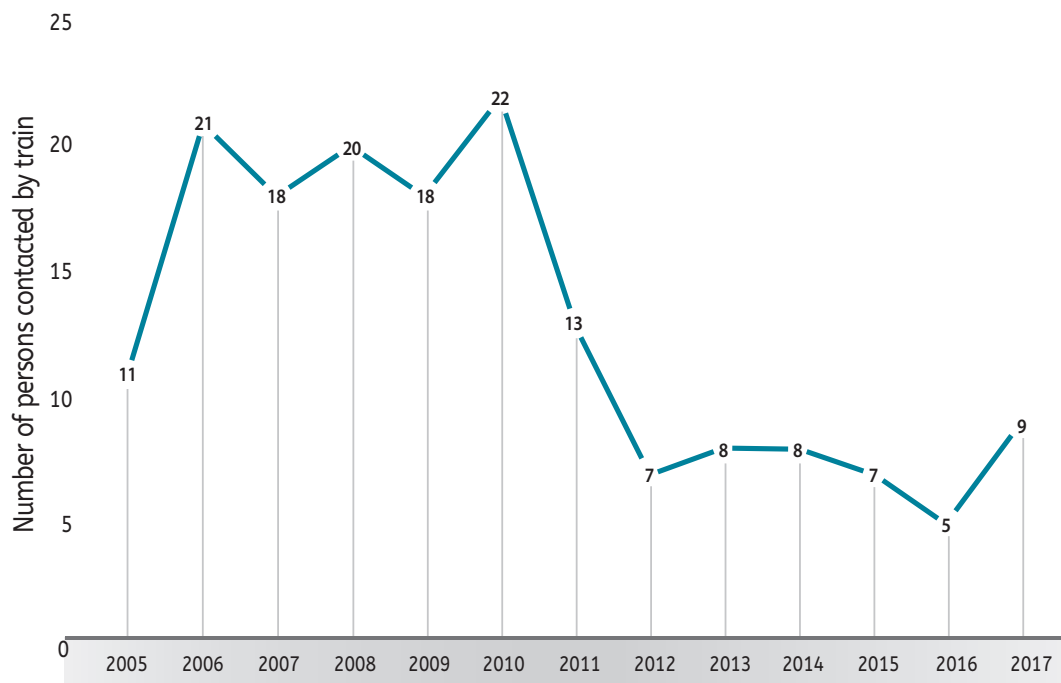


Figure 21: Persons coming into contact with Tram

### 2.4.3 Tram Derailments

There were no derailments in 2017, with two derailments having occurred in 2016 (Figure 22). However, the previous derailment was in 2010 so 2016 appears to have been an anomaly and in neither incident in that year were any faults found with either the infrastructure or rolling stock.

### 2.4.4 Tram Emergency Brake Applications

In addition to its standard 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 798 EB applications in 2017 representing a 51% increase on 2016 figures and the highest figure since 2005 (Figure 23). The CRR are conducting an analysis to better understand this increase in emergency brake applications.

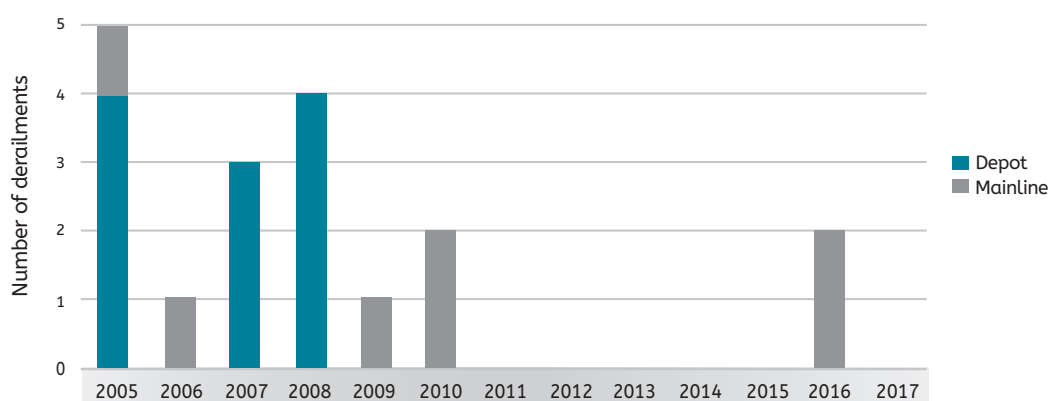


Figure 22: Tram derailments

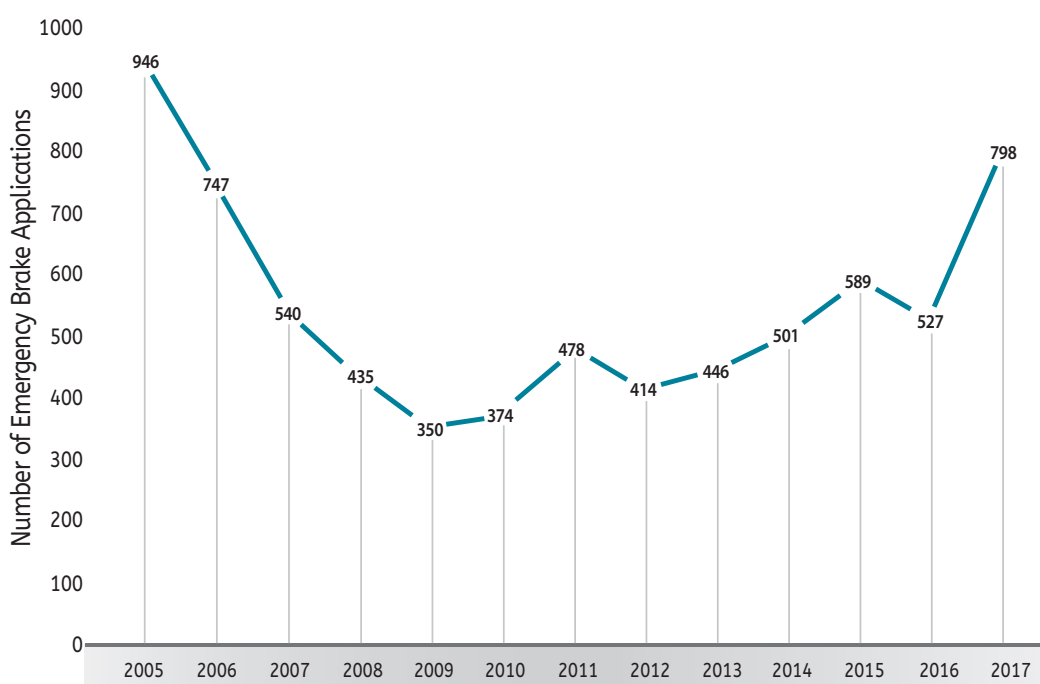


Figure 23: Emergency Brake Applications

## 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 50 underpasses, of which 47 are under roads and three are under Iarnród Éireann rail lines.

Bord Na Móna reported one derailment and four level crossing incidents/accidents in 2017 (Figure 24), although the derailment occurred at a level crossing and so also accounts for one of the four level crossing incidents. Two of the level crossing incidents were relatively minor incidents relating to operation of the gates, while the third involved minor contact with a vehicle. The organisation investigated all incidents and identified actions to reduce the probability of reoccurrence.

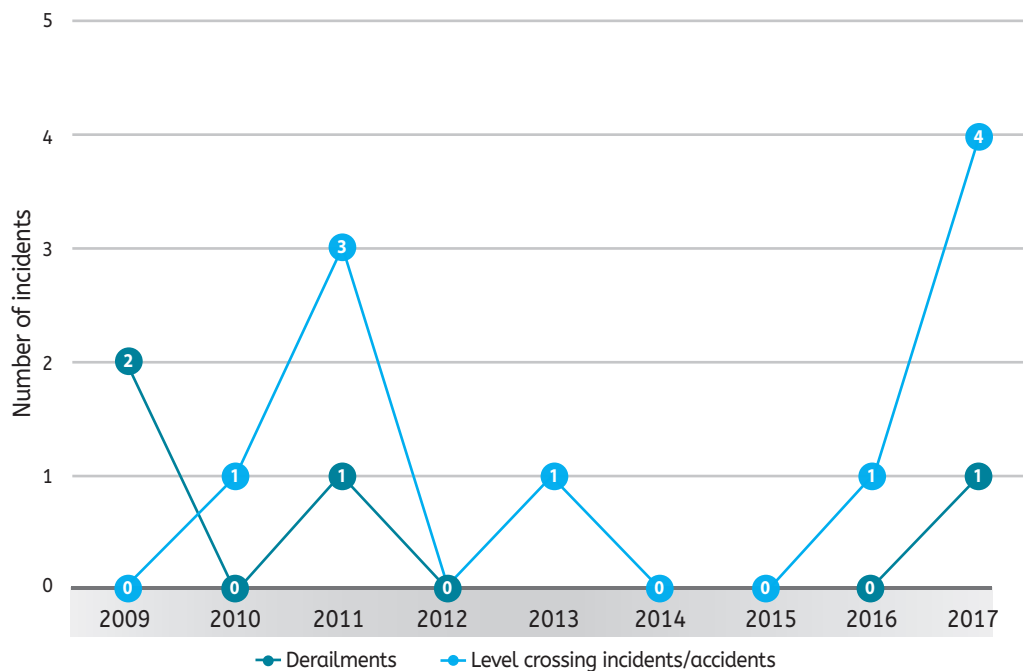


Figure 24: Bord na Mona derailments and level crossing incidents/accidents

## 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 Railway<sup>5</sup>
- Tralee & Dingle Railway<sup>5</sup>
- Diffin Lake Railway, Oakfield Park, Raphoe
- West Clare Railway<sup>5</sup>
- Finntown & Glenties Railway
- Waterford & Suir Valley Railway (W&SVR)
- Railway Preservation Society of Ireland (RPSI)
- Lullymore Heritage Railway
- Listowel Lartigue Monorail
- Irish Steam Preservation Society Stradbally

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 2017 on any of the heritage railways.

### 2.6.1 Railway Preservation Society of Ireland

The Railway Preservation Society of Ireland (RPSI) is a special case of heritage railway as they hold a Safety Certificate allowing them to operate as a Railway Undertaking (RU) operating steam and diesel hauled heritage trains on the Iarnród Éireann rail network. 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 Iarnród 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 5161 miles (8301 km) in 2017, slightly reduced on 2016 (6000 miles), with one minor passenger injury. There was one reported incident in 2017, involving a collision with a buffer stop in Connolly, but the loco in this case was owned and being operated by Iarnród Éireann. The CRR are conducting an investigation into this occurrence.

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<sup>5</sup> These railways have not yet received a Safety Management Certificate from the CRR and were reported as being non-operational in 2017



## 3 | Public Representations

### 3.1 Introduction

The CRR encourages the public, passengers, railway staff and others to bring any railway safety concerns to its attention and this can be done by telephone, post, email, or via the CRR website ([www.crr.ie](http://www.crr.ie)). The input of all stakeholders in the railway, including employees, passengers, and the general public is valuable in the CRR's work to improve railway safety. Where these 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.

### 3.2 2017 Data and Commentary

In 2017, the CRR received 57 direct or indirect representations relating to a range of heavy and light rail infrastructural and operational matters, one fewer

than received in 2016 (Figure 25). Of these, 50 are related to Iarnród Éireann, with two of those relating to both the Infrastructure Manager (IÉ-IM) and the Railway Undertaking (IÉ-RU), 31 relating to IÉ-RU, and 17 relating to IÉ-IM. Six representations were received relating to the LUAS (Dublin Light Rail) system (nine in 2017), one for Bord Na Mona (BNM; private industrial 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.

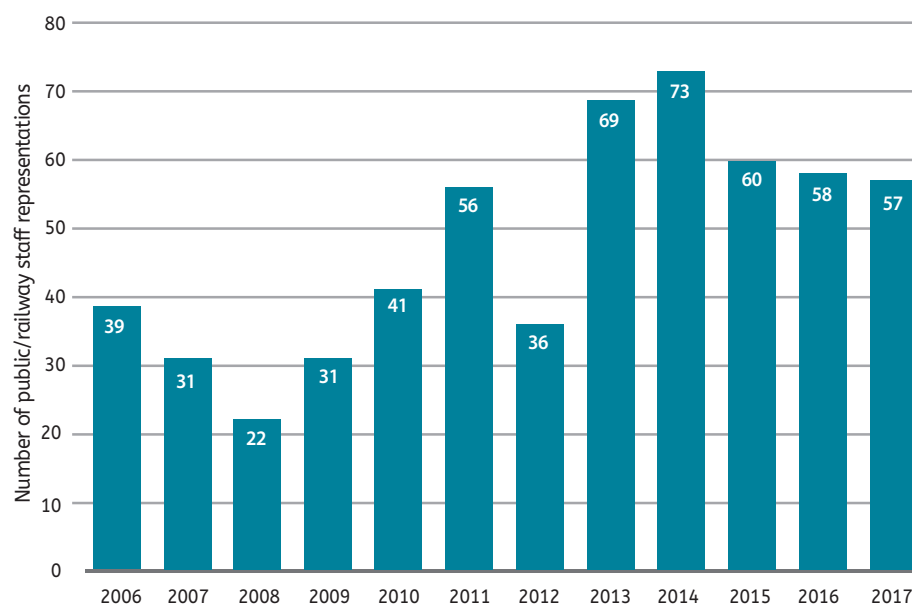


Figure 25: Public Representations to the CRR by year



Representations from 2017 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 (new category for 2017): 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 2016 in terms of overall number or types of complaints, with the main variation being a reduction in representations related to train operations; this may be related to a reduction in complaints regarding overcrowded services.

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.

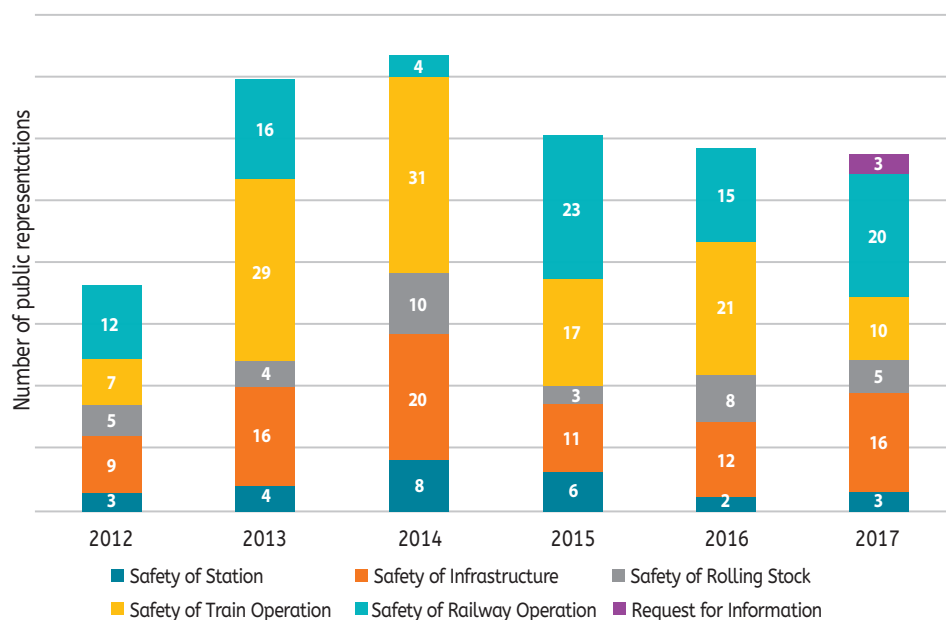


Figure 26: CRR Public Representation by category



## 4 | Railway Safety Trends in Europe

### 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 relate to heavy rail only and do not take into account light rail (such as Luas) or metro systems,

or self-contained heritage railway systems. As the NSAs report a year in arrears, 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%.

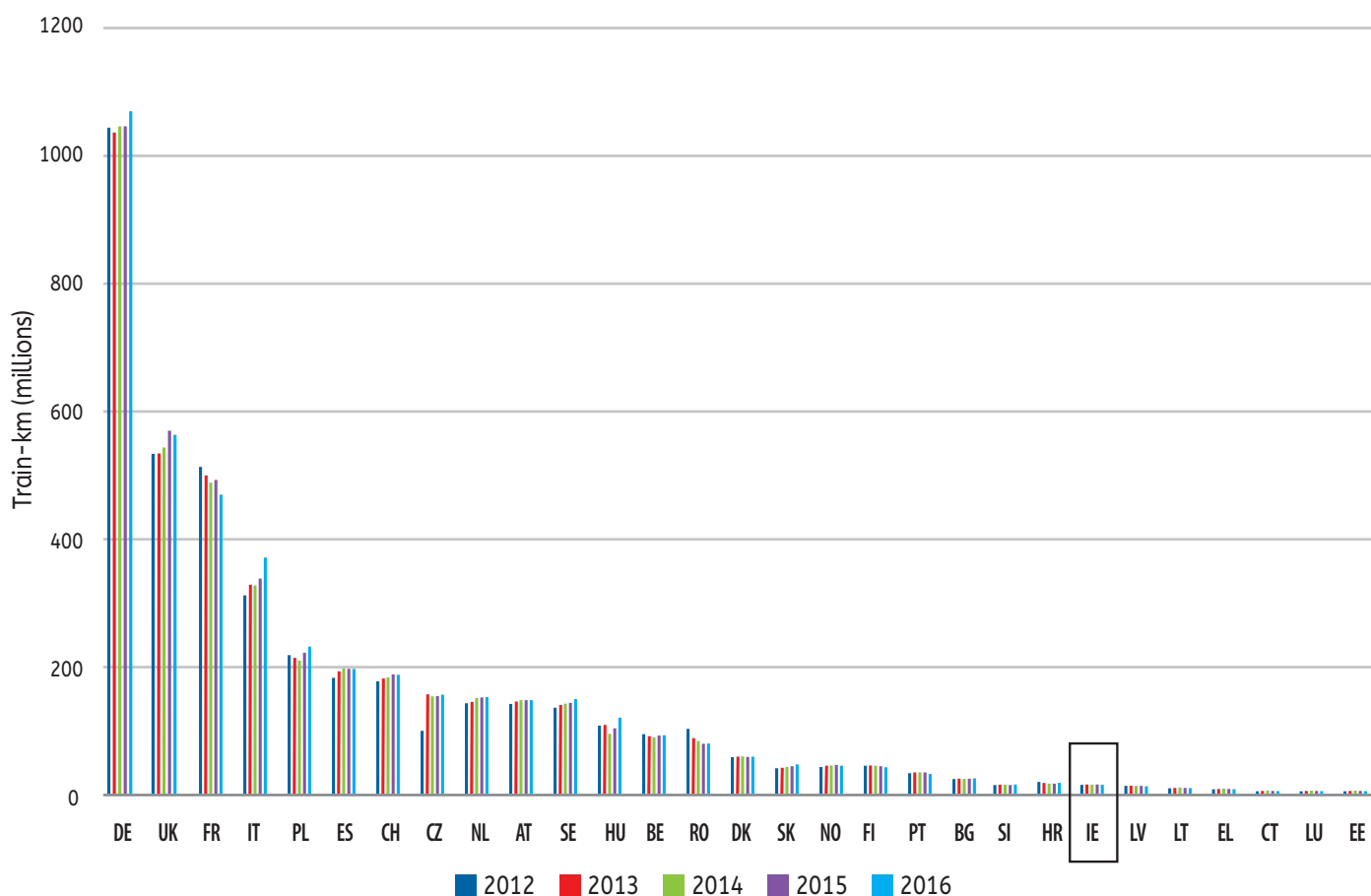


Figure 27: Total train-km (millions)

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.

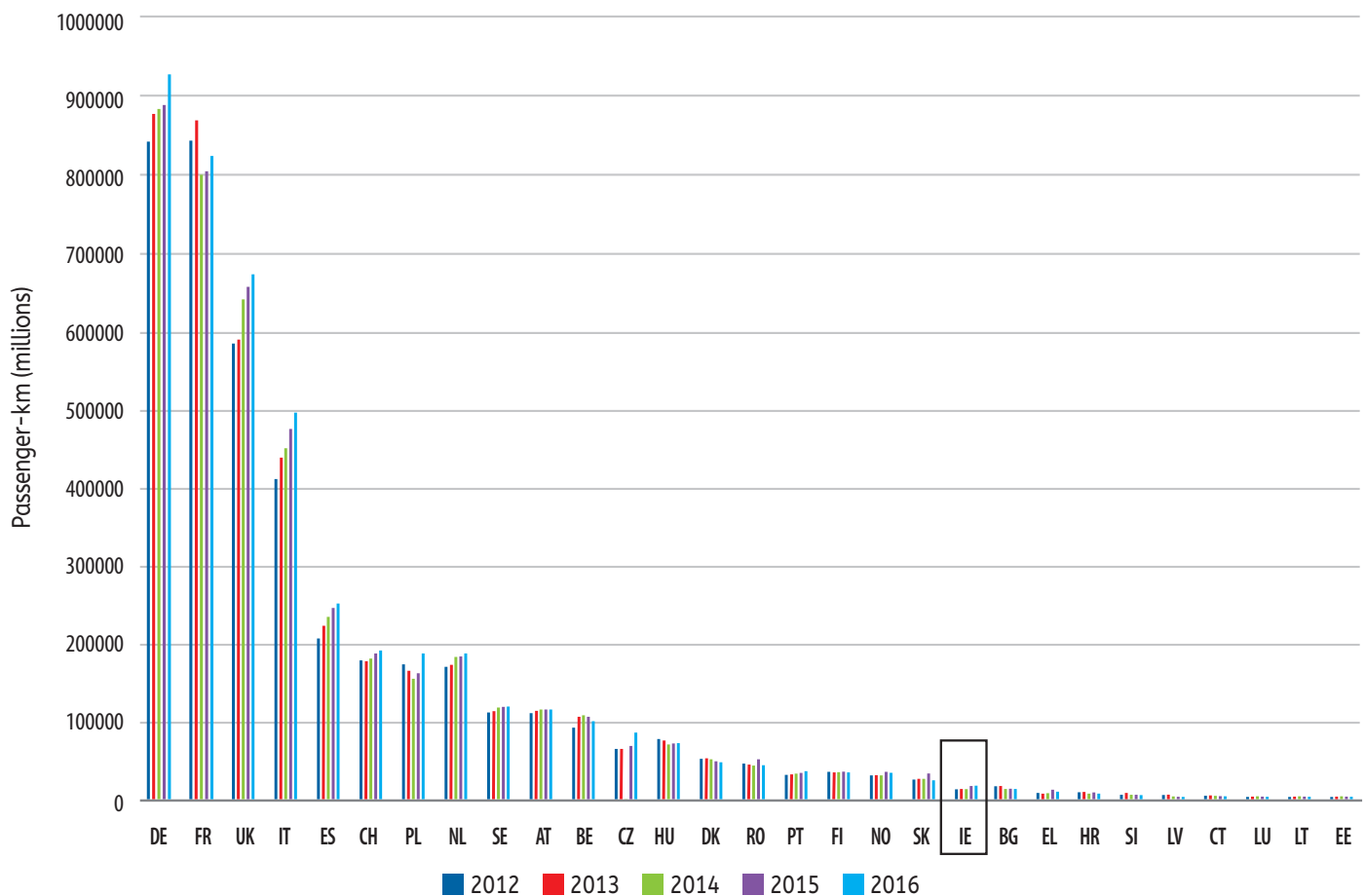


Figure 28: Total passenger-km (millions)

### 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; see Section 6.2). 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.

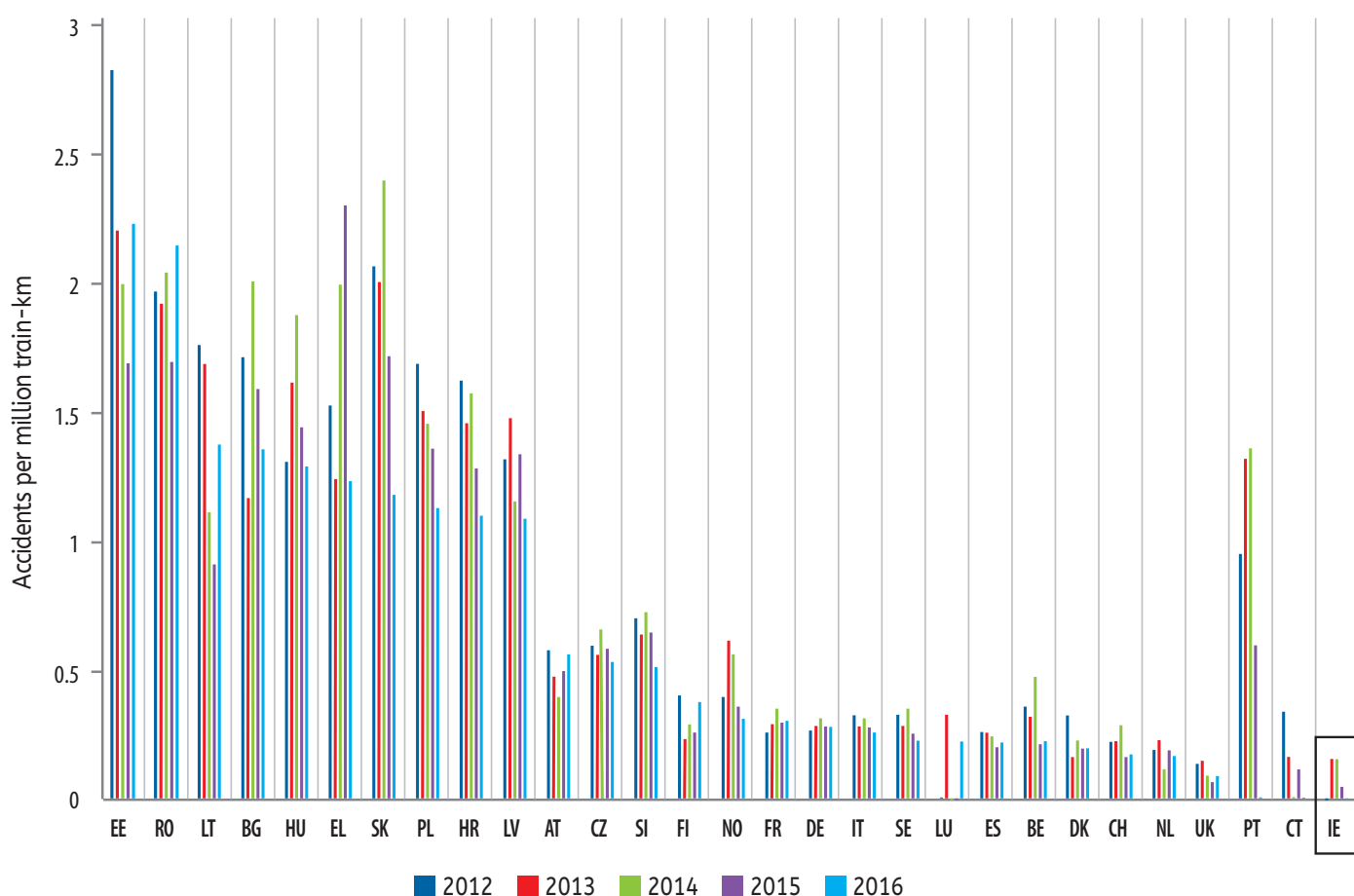


Figure 29: All accidents per million train-km

#### 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 as discussed earlier in this report, the 2017 rate is lower again. However, there are still improvements to be made in this area.

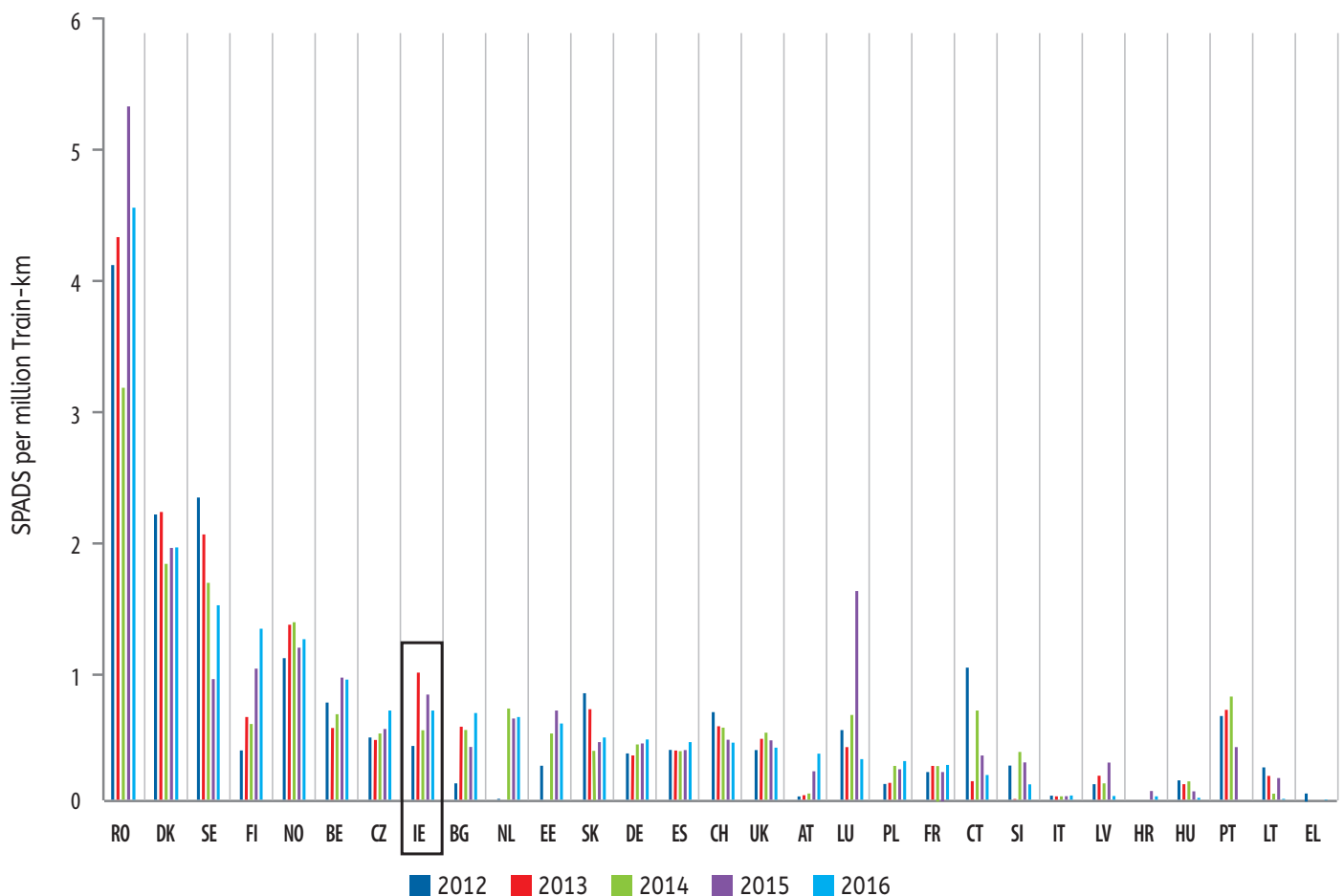


Figure 30: Signals passed at danger per million train-km

#### 4.5 Level-crossing accidents relative to train km

Level Crossings are a significant risk to railway safety and the density of level crossings 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.

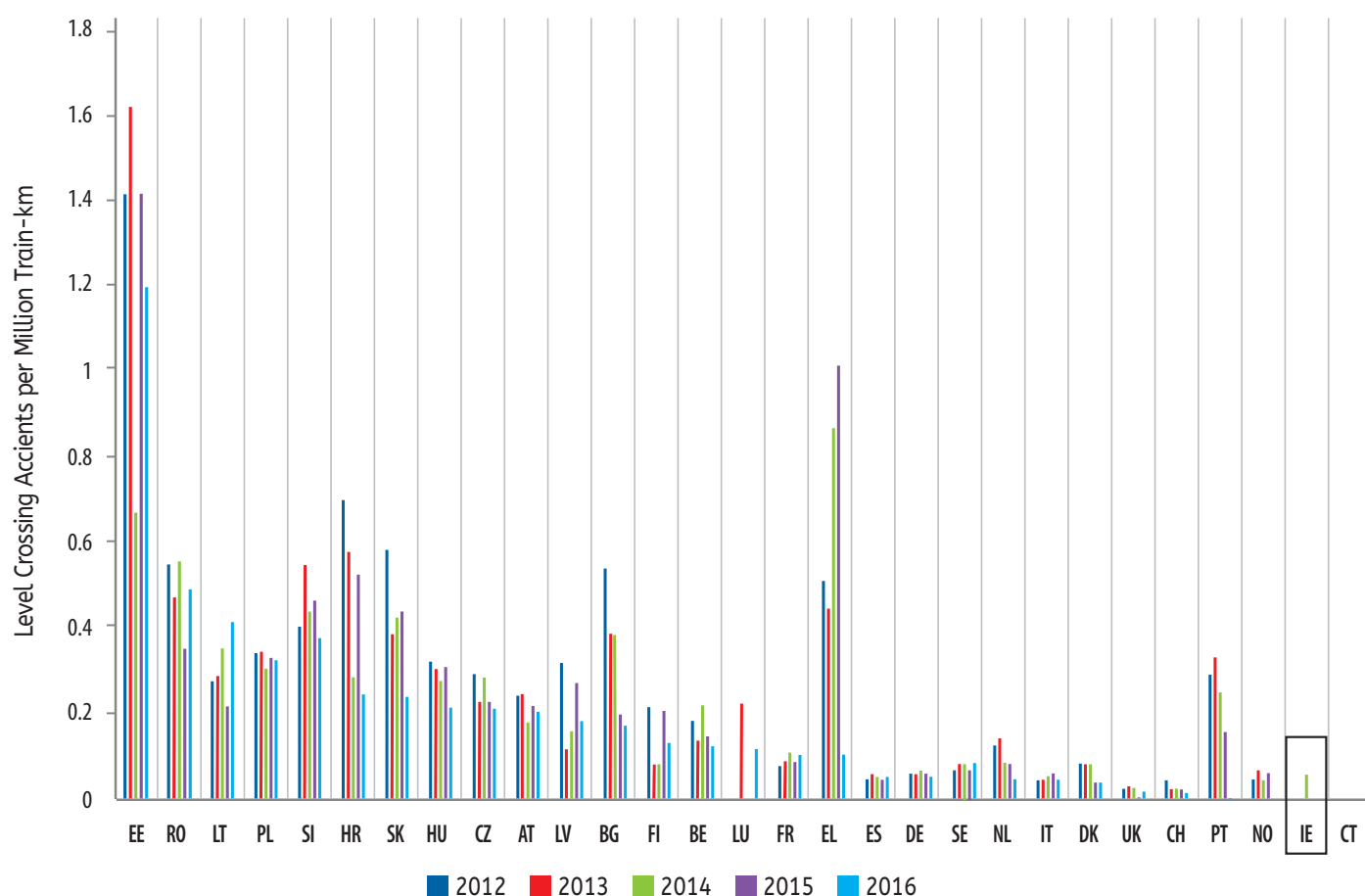


Figure 31: Level crossing accidents relative to train km



#### 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.

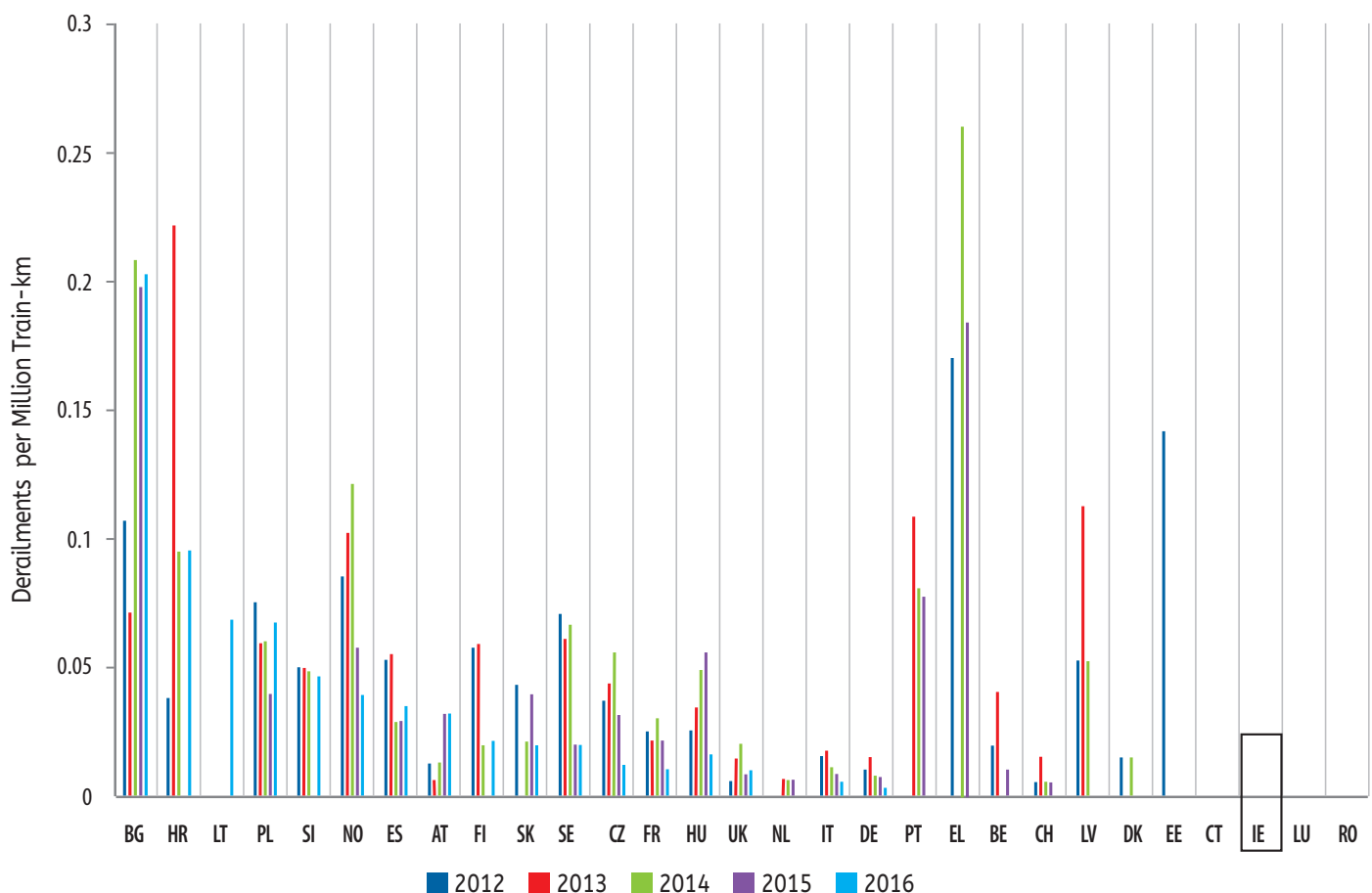


Figure 32: Derailments of trains relative to train km

#### 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 2017 provided a stark reminder that despite many indicators showing improvement in overall safety performance, potential still exists for catastrophic accidents. 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.

##### India

On 21 January 2017, an express passenger train derailed in Andhra Pradesh killing 41 people and injuring 68. Initial reports suggested sabotage of the track, but no evidence was found to support this theory. The initial investigation suggests rail fracture as the immediate cause.

On 19 August 2017, an express passenger train derailed in Uttar Pradesh. 23 people were killed and 156 were injured. The accident occurred because the train was allowed into a section undergoing maintenance.

##### Belgium

On 18 February 2017, a passenger train derailed in Leuven, Belgium. One person was killed and 27 injured. Although the investigation is ongoing, the initial findings indicate that the immediate cause of the accident was excessive speed through a set of points. The train was travelling at 100kmph where the speed limit was 40kmph.

On 27 November 2017, a passenger train collided with a car at a level crossing at Morlanwelz, Belgium. Although no-one was injured in this accident, during the recovery operations three carriages detached and ran away. While running uncontrolled, the unit struck four infrastructure workers, killing two, and subsequently collided with a passenger train having passed through three stations and over five level crossings, travelling for about 14 kilometers. Five people were injured in this collision. Initial reports suggest that the coupling failed, causing the unit to split and run away.

##### Romania

On 8 April 2017, a freight train derailed at Merișor, Romania, killing both crew members on board. Initial investigations suggest that the train braking system failed, and the runaway train derailed on a bridge in a curve. The train was travelling at almost 100kmph while the bridge had a speed limit of 30kmph.

##### Greece

On 13 May 2017 an intercity passenger train derailed in Adendro in the north of Greece. Five carriages of the train derailed, and the engine and one carriage collided with a house. One passenger, the driver, and another member of the train crew were killed and a further ten people injured. The initial investigation suggests that the train was travelling at an excessive speed of almost 145kmph where the line speed was 60kmph.

### Spain

On 28 July 2017 a passenger train collided with a buffer stop França station in Barcelona. The train was travelling at a speed of 30kmph at the time of the collision, one bogie derailed and 53 people were injured. The investigation is ongoing but initial reports suggest that the train did not brake on entering the station.

### Egypt

On 11 August 2017, two passenger trains collided in the suburbs of Alexandria, Egypt killing 41 people and injuring 179. The initial investigation suggests that the driver of one of the trains passed a signal at danger at high speed and collided with a stationary train waiting to enter a station.

### Singapore

On 15 November 2017, a metro train travelling at 16kmph rear-ended another stationary train at Joo Koon metro station in Singapore, resulting in 38 injuries. The stationary train was in the process of being de-trained due to a fault. Both trains were under the control of an automated Communication Based Train Control (CBTC) signalling system at the time of the accident. The investigation found that a bug in the software allowed the CBTC system to identify the six car train as a three car. While the train was being de-trained, the open status of the platform doors prevented the second train from entering the station, but once the doors closed, the second train accelerated towards the first as the signalling system believed there was a gap to be filled.

### Germany

On 5 December 2017, a passenger train ran into the rear of a freight train near Meerbusch in Germany. 50 people were injured. The investigation is ongoing but initial reports suggest that the driver may have been incorrectly given permission to pass a signal at danger. A further possible factor in the collision, which occurred at 19:30, is the low visibility of freight train tail lights.

### France

On 14 December 2017, a train collided with a school bus on a level crossing near Perpignan in France. The bus was severed in two, six school children were killed and 22 injured. The investigation centres around whether the barriers operated correctly to protect the crossing.

### Washington

On the first day of opening after a \$181.1 million project to upgrade the rail corridor, a train derailed at speed on a bridge over an Interstate. The accident occurred on 18 December 2017 and three people were killed. The original project plan had recommended that the curve where the accident occurred be replaced with a straighter alignment, but the final plans omitted this aspect to achieve the project with a smaller budget. The NTSB investigation determined that the train was travelling at almost 80mph as it passed a speed board advising a line speed of 30mph. The driver reported that it was only his second journey driving over the new alignment and thought he was on a different part of the track. Positive train control (PTC), a form of Automatic Train Protection, was not yet functional on the locomotive involved in the accident.



## 5 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 40 Preliminary Examination Reports (PER) and initiated two full investigations into railway accidents and incidents in 2017 (Table 4). They also commenced a 'Trend investigation into Signals passed at danger' (SPAD) occurrences. The RAIU published their investigation/trend investigation reports in 2016 and all safety recommendations made have been assigned to the applicable railway organisations and the CRR are tracking their implementation.

Table 4: RAIU investigations initiated in 2017

Date of Incident	Details	Duty Holder
31/01/2017	Near miss, Knockcroghery Level Crossing	ÍÉ-IM
13/09/2017	DART Derailment, Dun Laoghaire	ÍÉ-RU

### 5.3 RAIU Investigation Reports 2017

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 2017, the RAIU published two investigation reports which are 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.

Table 5: RAIU investigation reports published in 2017

Date Report Published	Date of Incident	Title of Report	No. of recommendations made	Duty Holder
07/11/2017	17/12/2016	Diffin Light Rail Passenger Fall, Co. Donegal	4	DLR
20/12/2017	31/01/2017	Near miss at Knockcroghery Level Crossing, XM065, Co. Roscommon	5	ÍÉ-IM

#### 5.4 RAIU Safety Recommendations 2017

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, nine were made in 2017. In accordance with the Railway Safety Directive the RAIU should 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 shall 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', 'Complete' or 'Closed'. These are defined as follows;

- Open** Feedback from implementer is awaited by CRR or actions have not yet been completed.

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- Complete** Implementer has advised that it has taken measures to effect the recommendation and the CRR is considering whether to close the recommendation.

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- Closed** Implementer has advised that it has taken measures to effect the recommendation and the CRR is satisfied that the work has been completed and has closed the recommendation.

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A summary is presented below of the actions taken (at the time of writing) in relation to the two RAIU Investigation Reports published in 2017 where safety recommendations were made, and the status of each recommendation.

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.

Similarly, 'complete' status safety recommendations are likely to have been reviewed by the CRR and further evidence in support of the railway organisations claim that the recommendation had been addressed is either awaited or has been supplied and is undergoing review by the CRR.

**R2017 – 001** Diffin Light Rail Passenger Fall, Co. Donegal 17th December 2016*(Report Published 7th November 2017)***Summary:**

On Saturday 17th December 2016, a 'Santa Express' train service was operating at Diffin Light Railway (DLR), a 4.5 km narrow gauge railway based in Oakfield Park, Raphoe, Co. Donegal. At approximately 17:00 hrs, shortly after departing Santa's Grotto, a family of nine (including a six year old girl) boarded the Santa Express, for their return journey to Oakfield Park Station. The train travelled a short distance, before starting to travel around a right hand curve, when the six year girl fell from the train, became entangled with the side of the train and was dragged a short distance along the gravel before the train came to a stop. The child sustained injuries to her legs that required hospital treatment, a skin graft as an outpatient, and subsequent check-ups.

**Number of recommendations made****4**

Recommendation 1 (1-2017)	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.
Action/s taken / in progress	DLR submitted evidence in February 2018 of a review of the physical and procedural safeguards for the operation of trains.
Status	Open
Recommendation 2 (2-2017)	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.
Action/s taken / in progress	Evidence submitted in March 2018 demonstrated that risk assessments have been reviewed after the occurrence and simple qualitative risk assessment has been undertaken and incorporated into the updated SMS.
Status	Closed
Recommendation 3 (3-2017)	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.
Action/s taken / in progress	Evidence was submitted in March 2018 demonstrating that the SMS has been updated.
Status	Closed
Recommendation 4 (4-2017)	DLR should review their responsibilities under the Safety and Welfare at Work Regulations as to dedicated First Aid areas.
Action/s taken / in progress	Evidence submitted in March 2018 demonstrated that investment has been made in the training of personnel and the set-up of a first aid room.
Status	Closed



**R2016-002** Near miss at Knockcroghery Level Crossing, XM065, Co. Roscommon 31st January 2017*(Report Published 20th December 2017)*

Summary: At approximately 11:10:56 hrs, the 09:45 hrs passenger service from Westport to Heuston (Train A805) triggered the initiation for Level Crossing XM065 (a CCTV level crossing with lights and full barriers), which resulted in the road traffic lights flashing to indicate to road users that rail traffic was approaching. Two cars approached the level crossing from the Athlone direction, after this initiation had commenced, with one car stopping on the yellow box area (Car 1), within the confines of the level crossing and one stopping close to the level crossing barriers. When the Level Crossing Control Operator (LCCO) attended to the level crossing, the view of the car on the level crossing was obscured, but the LCCO froze the barriers for the second car which is positioned near the level crossing. When the LCCO saw the second car (Car 2) clear the level crossing, he began the closing sequence again and cleared the level crossing (the car on the level crossing could not drive off the level crossing); which resulted in the barriers fully lowering with the first car trapped in the confines of the level crossing.

Number of recommendations made		5
Recommendation 1 (5-2017)	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.	
Action/s taken / in progress	Evidence of a review of the camera position at XM065 was submitted in April 2018 and IÉ-IM advised that they intend to relocate the camera to provide the optimum view while also making some physical alterations to the crossing.	
Status	Open	
Recommendation 2 (6-2017)	The SET Department should develop a formalised risk assessment process for the positioning of CCTV cameras and associated design works.	
Action/s taken / in progress	Evidence submitted in April 2018 advised that a draft standard is in preparation.	
Status	Open	
Recommendation 3 (7-2017)	IÉ IM should identify CCTV level crossings with obstructed views and issue interim instructions to LCCOs to fully raise the barriers where there is a possibility of any obstructions on level crossings.	
Action/s taken / in progress	Evidence submitted in April 2018 advised that appropriate instructions may be issued on the basis of the SET survey results.	
Status	Open	
Recommendation 4 (8-2017)	IÉ IM should review the human factors and non-technical skills training for 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.	
Action/s taken / in progress	Partial submission made in support of HF awareness training provided to LCCCOs. Professional Handbook will be complete March 2019	
Status	Closed	

Recommendation 5 (9-2017)	IE IM should review and update the LCCC Instructions, to make them more user friendly for LCCOs.
Action/s taken / in progress	Evidence submitted in April 2018 advised that this work is ongoing.
Status	Open

### 5.5 RAIU Recommendations Summary

The table below confirms the current status of all RAIU recommendations at time of writing.

Table 6: RAIU Recommendations Summary

Year	No. of reports	No. of recommendations			
		Open	Complete	Closed	Total
2006*	1	0	0	14	14
2007	0	0	0	0	0
2008	1	0	0	7	7
2009	5	0	0	13	13
2010	6	1	0	25	26
2011	6	1	3	13	17
2012	3	1	0	12	13
2013	3	1	0	9	10
2014	6	5	1	21	27
2015	2	2	0	2	4
2016	3	13	0	7	20
2017	1	5	0	4	9
<b>Totals</b>	37	29	4	127	160

\*CRR Recommendations made prior to establishment of RAIU

In isolation the numbers of open safety recommendations may appear high, however, as stated above, railway organisations are taking actions to address the RAIU's recommendations and minimise the chance of reoccurrence. 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.

Nevertheless, excluding those recommendations made in 2017, good progress was made over the year in closing RAIU recommendations, with the number of open recommendations relating to years 2006-2016 inclusive reducing from 32 to 24, complete reducing from 22 to 4, and closed increasing from 97 to 123.



## 6 | References

### 6.1 Documents Used

CRR (2017) Annual Report 2017. Dublin: CRR

ERA (2015), Common Safety Indicator Data, <https://era.il.era.europa.eu/> retrieved 20.09.2018

RAIU (2017). Annual Report 2017. Dublin: RAIU

### 6.2 Common Safety Indicators (Railway Safety Directive 2004, Annex I)

Common safety indicators to be reported by the safety authorities:

Indicators relating to activities referred to in Article 2(2), (a) and (b), should be accounted for separately, if they are submitted.

If new facts or errors are discovered after the submission of the report the indicators for one particular year shall be amended or corrected by the safety authority at the first convenient opportunity and at the latest in the next annual report.

For indicators relating to accidents under heading 1 below, Regulation (EC) No 91/2003 of the European Parliament and of the Council of 16 December 2002 on rail transport statistics (1) shall be applied as far as the information is available.

### 1. Indicators relating to accidents

1. Total and relative (to train kilometres) number of accidents and a break-down on the following types of accidents:

- collisions of trains, including collisions with obstacles within the clearance gauge,
- derailments of trains,
- level-crossing accidents, including accidents involving pedestrians at level-crossings
- accidents to persons caused by rolling stock in motion, with the exception of suicides,
- suicides,
- fires in rolling stock,
- others.

Each accident shall be reported under the type of the primary accident, even if the consequences of the secondary accident are more severe, e.g. a fire following a derailment.

2. Total and relative (to train kilometres) number of persons seriously injured and killed by type of accident divided into the following categories:

- passengers (also in relation to total number of passenger-kilometres),
- employees including the staff of contractors,
- level-crossing users,
- unauthorised persons on railway premises,
- others.



## 2. Indicators relating to incidents and near-misses

1. Total and relative (to train kilometres) number of broken rails, track buckles and wrong-side signalling failures
2. Total and relative (to train kilometres) number of signals passed at danger.
3. Total and relative (to train kilometres) number of broken wheels and axles on rolling stock in service.

## 3. Indicators relating to consequences of accidents

1. Total and relative (to train kilometres) costs in euro of all accidents where, if possible, the following costs should be calculated and included:
  - deaths and injuries,
  - compensation for loss of or damage to property of passengers, staff or third parties – including damage caused to the environment,
  - replacement or repair of damaged rolling stock and railway installations,
  - delays, disturbances and re-routing of traffic, including extra costs for staff and loss of future revenue.

From the above costs shall be deducted indemnity or compensation recovered or estimated to be recovered from third parties such as motor vehicle owners involved in level crossing accidents. Compensation recovered by insurance policies held by railway undertakings or infrastructure managers shall not be deducted.

2. Total and relative (to number of hours worked) number of working hours of staff and contractors lost as a consequence of accidents.

## 4. Indicators relating to technical safety of infrastructure and its implementation

1. Percentage of tracks with Automatic Train Protection (ATP) in operation, percentage of train kilometres using operational ATP systems.
2. Number of level crossings (total and per line kilometre). Percentage of level crossings with automatic or manual protection.

## 5. Indicators relating to the management of safety

Internal audits accomplished by infrastructure managers and railway undertakings as set out in the documentation of the safety management system. Total number of accomplished audits and the number as a percentage of audits required (and/or planned).

## 6. Definitions

The reporting authorities may use nationally applied definitions of the indicators and methods for calculation of costs when data according to this Annex are submitted. All definitions and calculation methods in use shall be explained in an Annex to the annual report described in Article 18.

[illegible]



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