

# Iarnród Éireann Safety Report 2017









# Contents

<b>Our Safety Leadership</b>	<b>3</b>
Introduction by Chairman	3
Chief Executive's Report	4
Senior Safety Leadership and Management	6
Senior Safety Leadership	8
Internal Safety Governance Structure	8
<b>Safety Focus Areas</b>	<b>10</b>
Greystones-Ballygannon Coastal Defence Works	10
Ballast Cleaning Project	11
Project Delivery to Date	13
Station Fire Safety	14
Rail Milling	15
<b>201 Loco Sanding System Retrofit</b>	<b>16</b>
Limerick Re-signalling Works	17
ECM Certification CME Department	19
<b>Current trends in Safety</b>	<b>21</b>
<b>Derailments and Collisions</b>	<b>24</b>
<b>Counter-Terrorism Emergency Exercise – Docklands Station</b>	<b>25</b>
<b>Well-on Track – We walked half way round the Earth in 6 weeks</b>	<b>26</b>
<b>Road Fleet</b>	<b>28</b>
Status of recommendations from external agencies	29

**VALUING**  
OUR PEOPLE 

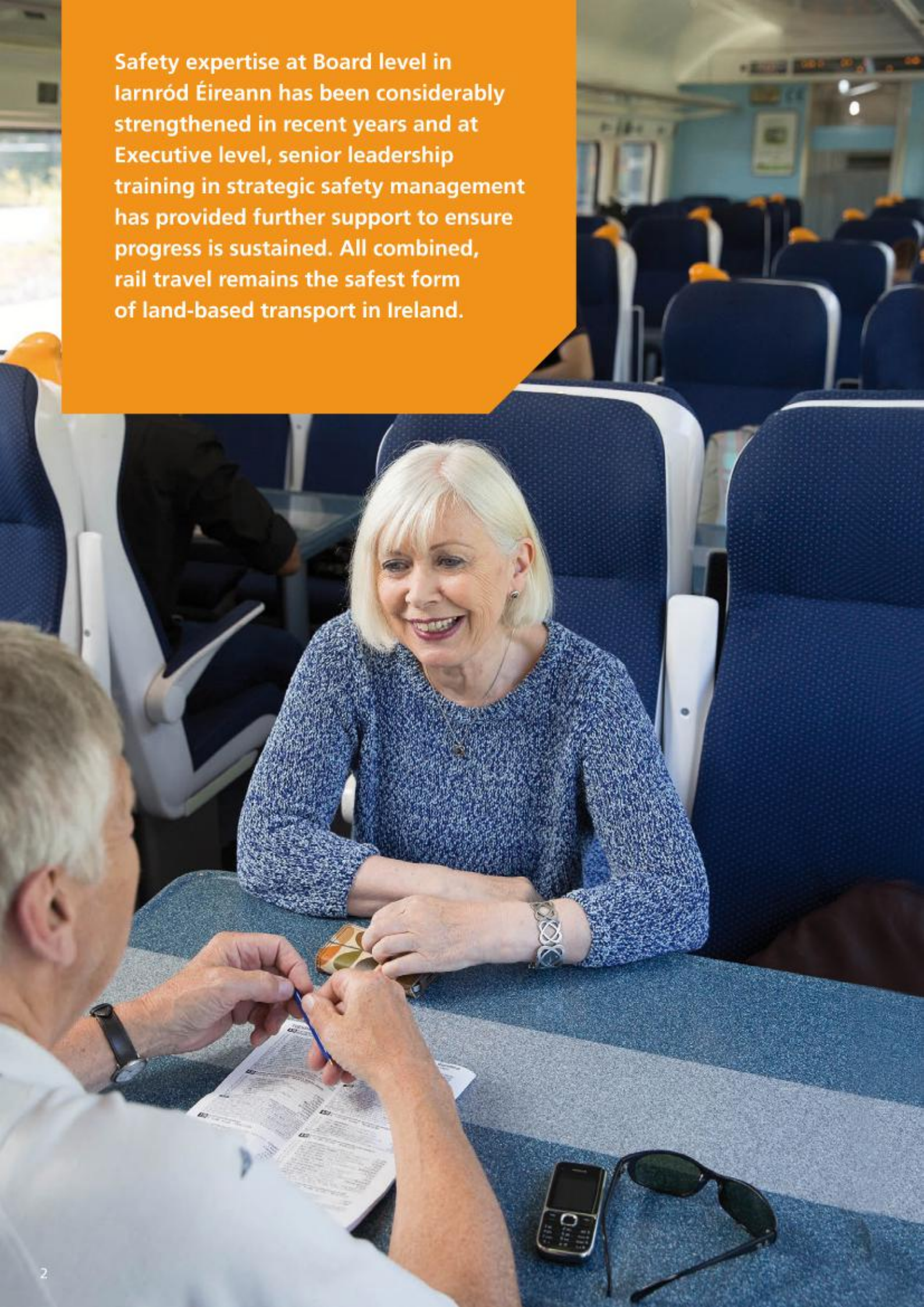
**PROUD**  
OF OUR PAST,  
**PASSIONATE**  
ABOUT OUR FUTURE

**IARNRÓD ÉIREANN**  
**ONE TEAM** 

**CUSTOMERS**  
AT THE HEART  
OF OUR BUSINESS 



Safety expertise at Board level in Iarnród Éireann has been considerably strengthened in recent years and at Executive level, senior leadership training in strategic safety management has provided further support to ensure progress is sustained. All combined, rail travel remains the safest form of land-based transport in Ireland.





# Our Safety Leadership

## Introduction by Chairman

Welcome to Iarnród Éireann's annual safety report. As a railway infrastructure provider and train operator, safety is our number one priority. We commit to providing a safe railway environment for all our customers and people with Always Safe being the first and most important of our core values.

Our approach to safety management has provided the basis for the performance improving incrementally each year to a level now acknowledged to be among the best of railways in the European Union. The hard work and dedication of Iarnród Éireann employees across the network to improve safety whilst increasing passenger journeys ensures continuous development and strive for excellence to provide our customers with a safe journey to their destination.

Safety expertise at Board level in Iarnród Éireann has been considerably strengthened in recent years and at Executive level, senior leadership commitment to implementation of the safety management system has provided further support to ensure progress is sustained. All combined, rail travel remains the safest form of land-based transport in Ireland.

Notwithstanding our success, there are still challenges to running a safe railway that we face every day. We continue to operate with constrained levels of funding that force hard choices to be made daily amongst our key safety priorities.

Underfunding in infrastructure and fleet renewal, as well as the deferral of implementation of new technology in train protection and at level crossings, has generated increased requirements for maintenance and human resource interventions. A new Infrastructure Manager Multi Annual Contract (IMMAC) is currently being negotiated with the Department of Transport, Tourism and Sport, to cover the five year period 2019-2023. It is anticipated that this will see a significant closing of the funding gap to steady state for infrastructure maintenance and renewal. The IMMAC will see the roll out of the safety critical radio communication (GSM-R) and train protection system (TPS). A separate source of funding is available through the National Transport Authority for the development of a new national train control centre (NTCC).

As well as ensuring our customers are safe, the safety of all Iarnród Éireann staff and contractors employed to work with us is of paramount importance to all of us. We must all play a part in ensuring that each and every one returns home safe after a days' work at Iarnród Éireann and will be giving this greater emphasis during 2018 and beyond.

In this report, we outline the current status and trends in safety management areas of particular interest, and how we manage these to provide a safe, reliable service for our customers, employees and third parties. We have also included a brief description of our approach to managing safety more broadly, including safety governance and management arrangements.

We also share our views on where we can make further progress, with details of three particular areas of development being provided as case studies, because we recognise complacency is the enemy of safety. As one team, we in Iarnród Éireann will continue to work to our value of being Always Safe.

### Frank Allen

*Chairman, Iarnród Éireann*

**We must all play a part in ensuring that each and every one returns home safe after a days' work at Iarnród Éireann and will be giving this greater emphasis during 2018 and beyond.**



## Chief Executive's Report

The safety of passengers, members of the public using our network and our employees is of paramount importance. Our values: "customers at the heart of our business" and "Always Safe" are there to provide a transport service, where our employees and customers feel safe and to continuously to improve working and travelling environments. The Safety Management System provides the framework for addressing hazards and risks in the workplace and sets out the structures, responsibilities and arrangements for the effective management of health and safety. Underpinning this framework is a comprehensive range of safety policies, systems and procedures to help minimise the risk of accident or injury to employees, customers and anyone affected by the company's activities.

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The Company has a strong safety record and this is acknowledged by the European Union Agency for Railways' review of safety performance, and the Commission for Rail Regulation (CRR) Safety Performance Report. However, sustainable funding must be addressed to ensure we maintain and improve safety, and the commitments in this regard under the National Development Plan are very welcome.

Safety performance indicators in 2017 saw many improvements, including:

- The number of Signals Passed at Danger (SPADs) reduced from 13 to 9.
- There were 11 level crossings closed on operational lines during 2017, which reduced the risks of incidents on these lines.

The Government's recently announced National Development Plan will allow us to expand over the coming decade – however, we will face pressure on capacity in the shorter term.

Third party incidents, predominantly slips, trips and falls in stations, showed a reduction on 2016. This is supported by the Platform Train Interface project, which will continue its work in 2018 to further reduce these incidents;

Positive progress has been made with the CRR in gaining approval to commence installing warning lights at a number of user worked level crossings. Work will continue into 2018 to finalise design and commence installation.

The process of applying to the CRR for recertification of the Railway Undertaking and reauthorisation of the Infrastructure Manager in conformity with Directive 2004/49/EC and applicable national legislation, commenced during the year and will conclude in the first quarter of 2018.

Despite the consistent reductions in recent years, reportable lost time accidents amongst employees showed an increase from 43 to 55. A working group was also set up to develop initiatives to reduce employee accidents.

Our focus remains on preventative measures with a series of initiatives launched during the year to measure and enhance safety culture, these include:

- Participation in the PRIME European culture project, with a further culture survey of employees planned for 2018;
- Training in human factors, route information booklets, and possession maps.
- Well On Track, wellbeing initiative

**Jim Meade**, CEO, Iarnród Éireann







The Safety Management System provides the framework for addressing hazards and risks in the workplace and sets out the structures, responsibilities and arrangements for the effective management of health and safety.





## Senior Safety Leadership and Management

Iarnród Éireann Board Director and senior management positions are filled with rail professionals experienced at the most senior levels from across the industry with summary profile information on those in roles with key safety responsibilities presented as follows.



**Frank Allen**, was appointed as Chairman of Iarnród Éireann in October 2017, and is also a Non-executive director of Coras Iompair Éireann. Frank is an independent financial consultant and was Chief Executive of the Railway Procurement Agency (RPA) from 2002 to 2012. In this period, RPA had responsibility for building the Red and Green lines of the Luas light rail system, and for extending them to the Docklands, Cherrywood and Citywest. Frank is a graduate of UCC and MIT. He previously worked for the World Bank in Washington DC, arranging finance for infrastructure development in developing countries and in Eastern Europe and was Head of Infrastructure Finance for KBC Bank in Ireland. He is Chairperson of Depaul Ireland, which provides accommodation and other support to homeless people.



**Jim Meade**, was appointed as Chief Executive Iarnród Éireann in May 2018. He has worked in Iarnród Éireann throughout his career, beginning in 1983, initially in mechanical engineering, before moving to operations management. Prior to his appointment as Chief Executive, he served as Director, Railway Undertaking, since 2013.



**John Reville, Director, Railway Undertaking (Acting)**. John has recently assumed the role of Director Railway Undertaking in an acting capacity as the previous incumbent, Mr. Jim Meade has been appointed to the role of Chief Executive. John is currently responsible for the management, control, supervision and delivery of all passenger and freight rail operational activities and fleets across the national rail network. He has worked as part of the Iarnród Éireann team since 1991 in a number customer facing front line roles before moving to the operational management side of the organisation in 2004.



**Don Cunningham, Director, Infrastructure Manager**. Don joined Iarnród Éireann in 2006 firstly as Director, New Works and then Assistant Chief Executive, Engineering. Under the organisational restructuring to achieve compliance with European Union requirements, he was appointed Director, Infrastructure in 2013, covering civil engineering (track and structures), signalling & electrical engineering, New Works (capital investment projects) and Infrastructure Operations (CTC and level crossing control centres). Don has spent most of his career in the mining industry with Anglo American PLC and has also worked with Lisheen Mine in Tipperary.



**Kay Doyle, Strategic Safety Manager**. Kay's role is to lead the development of safety strategy and policy and provide impartial expert advice across the organisation. Kay joined Iarnród Éireann in 1982, and has worked in a range of roles across the company, including train operation, freight and infrastructure. These include Operations Safety Manager and Head of Safety, Infrastructure Manager.





**Joseph Sullivan, Head of Health & Safety, Railway Undertaking.** Joe's role is to lead the development and on-going monitoring of the Railway Undertaking safety management system. Joe joined Iarnród Éireann in 2000, and has worked in a range of roles across the company, including production management, continuous improvement, & quality. Joe took up the role of Health & Safety, RU in November 2017.



**Sinéad Clair, Head of Health & Safety, Infrastructure Manager.** Sinéad's role, is to direct and oversee the management of safety for the Infrastructure Manager business, ensuring its compliance with all obligations under relevant legislation. A civil engineer with international railway experience she joined Iarnród Éireann in 1997 undertaking a range of roles including the delivery of major infrastructural projects, in procurement and in strategy.



**Tommy Wynne** was appointed to the CIÉ Board in December 2013 under the Worker Participation (State Enterprises) Acts, 1977 to 2001 and to the Iarnród Éireann board at the same time. He is a member of the Board Safety Committee. Tommy joined Iarnród Éireann as a depot man in 1991 and became a train driver in 1994. He is currently the Chairman of the Transport Sector and Utilities and Construction Division of SIPTU.



**Carolyn Griffiths is Chair of the Board Safety Committee and a non-executive Director of Iarnród Éireann.** Carolyn is a fellow of both the Royal Academy of Engineers and the Institution of Mechanical Engineers. She is the immediate Past President of the Institution of Mechanical Engineers and is chair of the UK Parliamentary Advisory Council for Transport Safety- Rail Group. Then can you start again in her piece with, She has extensive experience of the railway industry having worked in various sectors in the UK, Singapore, Germany and Sweden. Her two most recent positions were Senior Vice President of a multinational company and the founding Chief Inspector of the Rail Accident Investigation Branch in the UK. She was awarded an Honorary Doctorate by Cranfield University in 2013 for her achievements in and contributions to the rail industry.



**Mal McGreevy** is a non-executive Director of Iarnród Éireann, a member of the Board Safety Committee and Chair of the Board Train Advisory Group. Mal, who recently retired from the position of General Manager, Rail Services, Translink, Northern Ireland Transport Holding Company, has extensive experience in the transport sector. A Mechanical Engineer by profession, Mal has held senior positions in both bus and rail companies since joining Ulster Bus in 1988, culminating in his appointment as General Manager – Rail Services in 2004.







Taking part in Cycle for Suicide round Ireland cycle event

## Senior Safety Leadership

Initiatives to support the Continuous development of our safety culture under the corporate mission, vision and suite of values, including 'Always Safe', 'One Team', and 'Valuing our People' are now being established as our way of working across the organisation. The objectives of the programme are to co-ordinate and progress actions that foster a positive safety culture while developing competency in safety leadership across the organisation. A range of measures initiated under the programme in 2017 include the following:

- Annual Safety Awards
- Safety tours by Senior Management
- Participation in company supported health and wellbeing initiative
- Pilots of wellbeing initiatives
- Involvement of frontline staff in the revision of the Safety Management System
- Participation in the development of rules and processes

## Internal Safety Governance Structure

Iarnród Éireann has well established corporate governance arrangements that have been incrementally enhanced through the years in line with the Code of Practice for the Governance of State Bodies issued by the Department of Finance. These provide for safety governance and include a specific Board Advisory Group for safety along with those for Infrastructure and Train Operations that prioritise discussion on safety arrangements for their respective functions. These structures combine meeting processes for all levels of management with those representing Board tasked with governance responsibility.

Figure 11(from last years) shows those groups that are directly involved in the safety management and governance with other functions also addressing safety as part of fulfilling on their responsibilities. Reporting is organised around four week periods with meeting cycles scheduled to review performance after each period. A dashboard with a balanced set of leading and lagging indicators is used for tracking performance against targets and noting actions being taken to address any adverse trends. Key indicators from lower level management reports cascade up through the reporting structure into an Iarnród Éireann Always Safe Dashboard which is then used at Board and other governance level reviews.



## Overview of safety management and governance structure



### Board Safety Committee

The Board Safety Committee ('BSC'). The Iarnród Éireann board BSC was established to advise the Iarnród Éireann board and executive on issues relating to safety of passengers, workers, contractors, neighbours and the public more generally. The Group comprise of: Carolyn Griffiths Iarnród Éireann Director, Mal McGreevy Iarnród Éireann Director, Tommy Wynne Worker Director, and is attended by the CEO, Director IM, Director RU, Strategic Safety Manager, Head of Health and Safety IM, Head of Health and Safety RU. A Corporate Governance review was completed during the year benchmarking rail with non-rail.

### Safety Reps Conference 2017

On Thursday 12th October, the Safety Representatives conference was held in the Training Centre, Inchicore. There were 35 safety reps in attendance and the event was facilitated by colleagues from the IM Safety Departments.

The theme on the day was around Behavioural Safety and Safety Culture. The conference began with an interactive safety play called 'The Mousehole'. It was a true story of a horrific incident on-board an oil rig and illustrates how even the smallest actions can have major consequences when it comes to workplace safety. It was delivered by Theatre at Work and was facilitated by Annette Tierney. It highlighted the attitudes and behaviours which can contribute to a fatality. The session involved participation from the audience and involved some lively discussion and left us all with a greater understanding of how even small things can make a big difference.

Other presentations on the day were

- Behavioural Safety
- Balfour Beatty Ireland Close Call Reporting
- Prime Safety Culture Survey
- Ending with a Workshop on how to increase Close Call Reporting.

### SMS review

The safety management system has been reviewed in preparation for the applications for recertification for the Railway Undertaking and reauthorisation for the Infrastructure Manager in conformity with Directive 2004/49/EC and applicable national legislation. This commenced during the year and the process concluded in the first quarter of 2018.

### The IÉ IM Infrastructure Operational Risk and Interface Group

The IÉ IM Infrastructure Operational Risk and Interface Group provides a quarterly forum by which Iarnród Éireann's (IÉ) Infrastructure Manager (IM) meets with Railway Undertaking's (RUs) to co-ordinate operational risk reduction and mitigation activity, and share best practice in the management of operational risk. These issues include areas of joint operational risk, such as SPADs, operating irregularities, level crossing incidents and platform train interface issues. The forum allows discussion around revised operational procedures or new developments within either one of the railway undertaking's or the infrastructure manager's business. It also allows an opportunity to explore any transferable lessons from attendees, and discusses the salient points of any high-profile international rail accidents or published investigation reports.



## Safety Focus Areas

In Iarnród Éireann, we recognise our status as a regulated rail network infrastructure provider and train operator. The operational railway is continuously susceptible to changing environmental conditions. There is a continued drive for efficiencies, which requires a flexible and innovative approach to risk management strategies. This provides multiple opportunities to review, monitor and enhance mitigations depending on the changing conditions and challenges.

We use a range of risk models to identify and mitigate risks to the delivery of a safe, reliable, efficient railway. The risk models provides a framework for areas of the business to recognise both threats and opportunities early which allows us to work collaboratively and proactively to manage our assets.

A number of projects were completed during the year contributing to the improvement in safety.

### Greystones-Ballygannon Coastal Defence Works

From inception and construction of the railway along this length of track 17.5mp to 19mp, the sea has always been a major factor and a hazard to the railway. Since the railway was built it has been relocated inland on numerous occasions. The most recent realignment was in the late 1960's when the track was realigned 30 metres inland to combat the erosion effects of the sea.

Over the years constant monitoring has been undertaken in this area and a steady inland creep of the beach due to erosion has threatened the railway formation. Due to this, a coastal defence initiative was undertaken to try and combat this steady creep of the beach toward the railway line. In the mid 2000's a major rock armouring installation was undertaken which has stood fast over this time, but recent storm events have taken their toll on this protection. A lot of the smaller foundation material has been washed out thus leaving the larger rocks vulnerable to storm washout, which was starting to happen.





In 2016 the CCE Department commenced three phases of maintenance schemes for this rock armour installation. Two phases were completed in 2016-2017, 1) Greystones South beach 17.5mp to 17 3/4mp, and 2) Ballygannon 19mp to 18.5mp. In 2017-2018 the final and longest phase that joined the first two phases together at Ballygannon 17 3/4mp to 18.5mp was undertaken.

All of these works involved removing all the existing rock armour and reinstalling the foundation layers that had been washed out due to storms and tidal action and reinstating and adding to the rock armour.

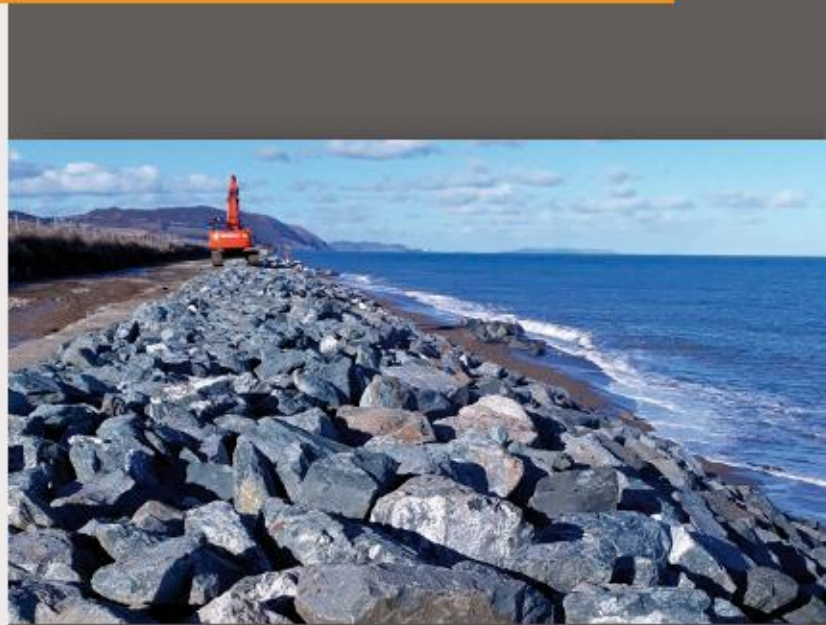
During the final phase Storm Emma struck with a vengeance and the sea defences were called into action. This time due to the nature forces and direction of the storm it inflicted some major damage to the rock armour system. As part of the final phase of the works the damaged areas were repaired.

All works were completed successfully and should give the railway further protection for years to come.

## Ballast Cleaning Project

### Background

The Dublin to Cork Line is the primary rail route in Ireland linking the two major cities in the Republic (165 miles of mainly double track). It was substantially renewed in the 1970's & 1980's with concrete sleepers and continuous welded rail (CWR) making the route circa. 40 years old. For a number of years the route suffered from underinvestment and this reached a crisis point in recent times due to the failure of the track formation. Formation failure occurs as over time the cyclical loading from the passage of trains creates fine material (through attrition of the ballast) which in turn impedes drainage through the ballast and eventually results in "wet beds" or "mucky boxes".



Rock Armour installed at the 18.2mp Ballygannon



55t Excavators placing 10 ton boulders in to place at the 18mp Ballygannon



Figure 1 Example of "mucky boxes" or "wet beds"





Figure 2 T781 Plasseur & Theurer Ballast Cleaning machine



Figure 3 Ballast Cleaner working during SLW



Figure 4 The Ballast Cleaner cutting bar removing the ballast from underneath the track

The consequence was an unsustainably high level of maintenance spend, attributed to spot repairs of failed formation. By their nature, such spot repairs are short lived and require repeat visits which exacerbated the problem. Also to mitigate the safety risk due to this defect and also to allow repairs to be effected safely the necessity to impose Temporary Speed Restrictions (TSRs) had become a common occurrence. Ultimately this resulted in a reduced ride quality and, if left unresolved, would have eventually resulted in reductions in line speeds.

As this defect had become such a widespread problem across the Cork Line the only practical solution was to consider full ballast replacement and the installation of drainage systems. The most cost effective and efficient method of ballast replacement was the deployment of an On Track Machine (OTM) called a "ballast cleaner" which cleans the ballast that supports the sleepers along with improving the alignment (particularly in the vertical plane) and improving drainage, in effect a formation rehabilitation process. Such a formation rehabilitation project means that Iarnród Éireann could ensure a better performing and more reliable railway asset.

Iarnród Éireann approached the project with the aim of providing a safe system of work that would allow the ballast cleaner to operate for as many hours as possible whilst minimising disruption to our customers. By reviewing and deploying the modern technologies on the ballast cleaner OTM, GPS survey trolley track monitoring, High Output Ballast System (HOBS) train, detailed safety planning and site operation and extensive preparation work it was possible to reintroduce a practice where engineering works are operating on one line when the other line is open to traffic. This is known as Single Line Working (SLW) conditions.

The agreed delivery strategy was to close one of two tracks between two stations from Friday night to Sunday Morning (34hour blockage of the line) and operate the ballast cleaner continuously. This therefore maintained a service for our customers despite the major engineering works being undertaken. A special timetable was compiled to accommodate these works.





From a sustainability and environmental point of view, the Ballast Cleaning Project presents many benefits. The ballast is cycled through the machine and is run over a number of sieves. The unusable/spoil material is removed and the ballast which can be recovered is recycled back into the track. In other forms of ballast renewal it is not possible to separate ballast types and the entire quantity would be removed and disposed of.

### **Project Delivery to Date (2015 to 2017 and going forward)**

In the years 2015 to 2017, following receipt of specific government funding, Iarnród Éireann commenced the programme of formation rehabilitation with a focus on the most heavily trafficked section of the route, which was also supported by technical analysis to be in the poorest physical condition.

In 2015 & 2016 the programme targeted 44 miles in the section between Hazelhatch and Portlaoise. In 2017 the programme primarily targeted the next section of the Cork Line from Portlaoise to Ballybrophy, where 24 miles were completed.

The project delivery strategy has proved very effective, having already ballast cleaned 68 miles of track over the three year period.

The 2018 programme has targeted a further 23.3 miles to substantially complete the remaining suitable sections between Hazelhatch and Ballybrophy. This will result in having ballast cleaned over 91 miles of track on the Dublin-Cork Line.

The ballast cleaning works undertaken to date have been a success and have allowed for line speeds, between Hazelhatch Station and Cherryville Junction (Kildare), to be increased from 90mph to 100mph. This increase in line speed has resulted in improved journey times passed on to our customers.



## Station Fire Safety

IM CCE Buildings and Facilities department undertook a Fire Safety Gap analysis in 2017 at all Operational Stations.

An Independent assessment was carried out by ARUP. It highlighted three streams of issues for IÉ

- RU tenant Fire Safety Management did not address unmanned & partial manned locations. A revised RU Fire Safety Manual is being developed with B&F Technical support with a view to addressing any gaps highlighted in the ARUP report/risk assessment relating to Operational Management. Each Station local emergency plan is being reviewed & this will include revised Fire Safety Management over the next 6/9 months.
- Infrastructure upgrade – the report has identified gaps in Fire stopping, requirement for fire doors, additional mechanical Smoke extract, additional emergency lighting and non-compliant escape stairs/routes. A priority listing based on Risk is being costed to seek Fire Safety Compliance funding Phase 2 for submission to 2019 IM budget proposals (Phase 1 installed detection systems & created National Fire detection monitoring/response key holder protocol in 2016/2017 and funded ARUP Fire Safety Gap analysis surveys/report).
- Infrastructure – minor maintenance issues with detection/emergency lighting identified in ARUP report have been closed out. Station Fire detection & emergency lighting are inspected to IS 318 & IS 317 any issues are reviewed & resolved by B&F M&E Section/ Competent approved contractor.







Removal of gauge corner cracking on the Cork line

The photos above demonstrate the type of results achieved by rail milling.

## Rail Milling

In 2017 we treated a total of 210 miles of rail by rail milling on various sections along the following lines;

- Dublin to Belfast Line
- Dart Area
- Dublin to Cork Line
- Limerick to Waterford
- Portarlinton to Galway
- Cherryville to Athy

Milled strips were selected by consultation between the technical department, the ultrasonic team and the local Permanent Way Inspectors & Regional Managers. Information from track recording vehicle runs, ultrasonic eddy current test runs and local permanent way knowledge was combined to select and prioritise the work. In addition to restoring rail profile and improving rail wheel interface the following defects were also encountered and removed;

- High/Low Welds
- Gauge Corner Cracking
- Corrugation
- Indentations
- Wheel Burns
- Side Wear





Sandbox behind Cowcatcher supplying sand to nozzle and wheel-rail interface. (Photo K. Marnane)

## 201 Loco Sanding System Retrofit

The 2017 low rail adhesion (LRA) season kicked off strongly with ex-hurricane Ophelia followed by a lovely autumnal dewy morning. No better a test, or timing, for the new 201 sanding system.

The 201 Loco fleet, operating since 1995, have proven reliable workhorses for the passenger and freight services on the IÉ network. As the six axles of the 201 loco are the only propelling or driving force on the Mark IV, Enterprise or freight trains there was a clear and increasingly pronounced requirement to improve traction on these axles especially during times of LRA. The issues on the Northern line in the Mount Pleasant area have proven particularly problematic for services in recent years. This, along with an overall benefit of sanding foreseen throughout the network to operational times, availability and wheel damage, have made the investment in 201 sanding essential. Other fleets already have sanders.

The sanding system chosen is a variable rate automatic and manual sanding system from Knorr-Bremse. The automatic part of the system operates using signals from the loco and new additional wheel probes. These probes allow the sanding

system calculate wheel spin and slip similar to WSP systems found on other IÉ rolling stock or like the ABS on a car. When the sanding system detects spin or slip at the wheel rail interface sanding is activated and sand is shot at the wheel rail interface at a rate of 2.25 grams per meter of rail in accordance with our signalling standard I-SIG-2169. This aids friction and adhesion of the vehicle to the track. The variable rate type system allows sanding in traction from standstill in traction, and in braking it allows sanding to 10kph in normal braking and 0.5kph in Emergency braking. A manual sanding button is also available to the driver on their desk should they require it in traction or braking.

The lead axles of the loco in the direction of travel will sand ensuring wheel rail conditioning from the earliest possible moment.

While sanding is not a silver bullet to fully overcome the worst cases of LRA, it will improve traction to get trains up gradients such as that found at Mount Pleasant, which has stopped trains previously, and also improve adherence to service timetables.



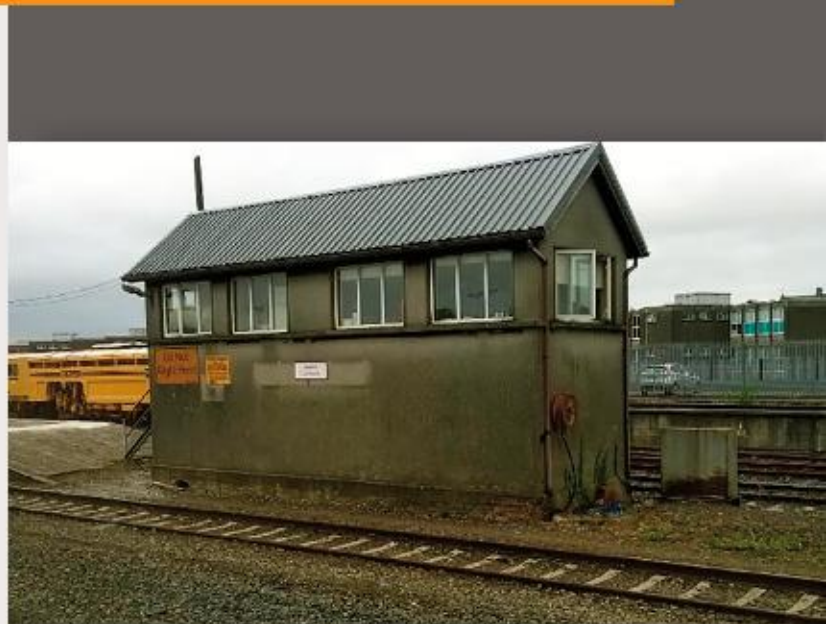
Stopping distances will also be improved adding to the safety of the fleet. We look forward to hearing more good feedback from drivers over the next few weeks and hope that instances such as those that drove this and the successful 2600 DMU sanding projects are assigned to history.

## Limerick Re-signalling Works

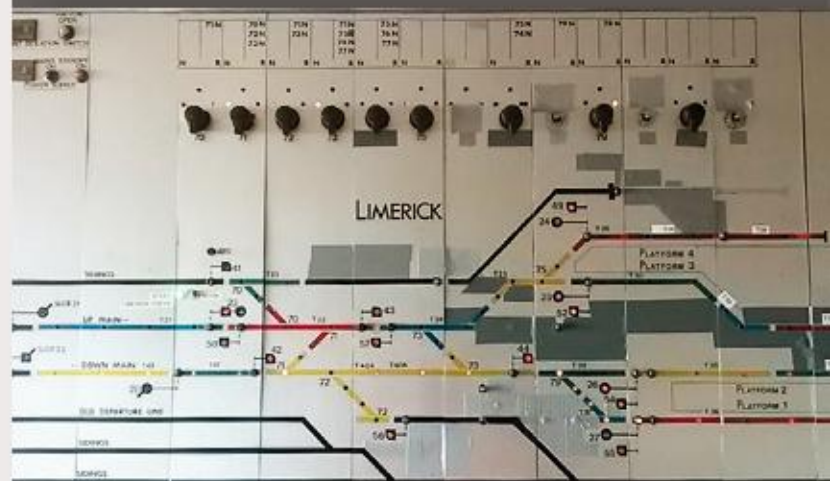
The Limerick Re-signalling Project, was completed in 2017. It involved the replacement of life expired signalling equipment and control systems for the Limerick Station area and its approaches from Ennis and Limerick Junction with a new micro-processor based solid state interlocking control system using colour light LED signals, clamp lock type point operating mechanisms and axle counter train detection equipment. Additionally, trackside equipment for the Continuous Automatic Warning System in-cab signalling was installed. The works also included installation of new cable routes, lineside equipment cases and buildings, lineside telephones, modification of the cab to control centre radio communications system and a new control room in a building adjacent to the station.

The two existing signal cabins were closed. Limerick Station cabin was located at the end of platforms 1 and 2 and it was demolished to extend these platforms to take longer trains. Limerick Check cabin is located about 900 metres from the station near the junction for the Ennis Line/Western Rail Corridor. The Station cabin was an all-electric installation dating from around 1972 while the Check cabin was an older mechanical lever operated cabin which had various changes made to it over the years so that it included some electric operation including signalling on the Ennis Line which was installed as part of the Western Rail Corridor project.

Commissioning of new signalling equipment for Limerick effectively commenced in September 2016 with a programme of converting some of the power operated point mechanisms with Clamp Lock type machines, these being controlled from the existing signalling. The conversion works took place over several periods of three day line closures.



Old signal cabin at Limerick Station



Old Control Panel at Limerick Station



Old signal cabin at Limerick Check





Old signal cabin at Limerick Check



New Control Room at Limerick



New telephones and signals at Limerick

During these closures, most services to and from Limerick ran. The conversion works also facilitated some advance testing of these points prior to the commencement of the main commissioning.

The main commissioning commenced on Sunday 4th June at end of service when both existing signal cabins, Limerick Station and Limerick Check were closed. A three week commissioning period commenced which saw the disconnection and removal of all signalling equipment controlled from Limerick Station cabin and most signalling equipment controlled from Limerick Check cabin. Some Western Rail Corridor signalling on the Ennis branch along with the Clamp Locks previously installed were transferred to the new signalling control system. New interfaces to the existing signalling control systems at Ennis and Killonan Jct. was installed and tested. Six remaining sets of points had to have clamp locks installed, this could not be done beforehand as it would have required closing the station to traffic. During the three week closure, platforms 3 and 4 were reconstructed to remove a reverse curve in platform 3 and facilitate longer trains at it.

All of the new signalling along with the new control systems were given final tests and a test train ran over the new control area to check signals, train detection systems and the in-cab signalling system. The signalling was commissioned on Sunday 25th June in the evening ready for start of normal services on Monday 26th June.

The replacement of the old signalling allowed up to a fourfold increase in speeds between the station and the Ennis Line junction, improving journey times between Limerick and Ennis/Galway, Limerick Jct./ Dublin and Ballybrophy/Nenagh.

The in-cab signalling was formally commissioned on Sunday 23rd July. It covers the last 1.6km from its previous endpoint on the Limerick Jct. line into the platforms and to about 3.5km from Limerick on the Ennis Line.



The new signalling allows trains to approach or depart from the platforms along either line as far as the old Check Cabin, improving flexibility in working.

The new signalling system was designed in-house by IÉ Signalling, Electrical and Telecommunications Department. Installation, Testing & Commissioning was carried out primarily by IÉ SET Construction Unit and IÉ SET Testing & Commissioning Section.

### ECM Certification CME Department

**An Entity in Charge of Maintenance (ECM) plays an important safety role in the European railway system by ensuring that the vehicles for which it is in charge are in a safe state of running by means of a system of maintenance.**

European railway safety law requires that ECMs are certified as entities in charge of maintenance ECM, by an accredited certification body to ensure the safe state of running of vehicles.

CME Department achieved Entity in Charge of Maintenance (ECM) certification for all freight vehicles and attestation for all passenger fleets at all locations in October 2017.

The certification and attestation will be subjected to annual surveillance audits to ensure the continued compliance and continuous improvement.



Reverse curve at platform 3 before reconstruction



Approach to new platform 3 post reconstruction



## Current trends in Safety

Railways in Ireland continue to be among the safest in Europe, with a very good safety record when compared to other EU member states. Passenger and workforce fatalities, normalised by train kilometres are shown in figure x below, which demonstrates that we are among the safest railway networks in the European Union. We have worked hard to maintain our safety performance over the past decade in the face of continuing pressure on funding for asset maintenance and renewals.

While we are pleased to maintain our position as one of the safest European rail networks, we remain vigilant to the sensitivity of that position due to our small network size. We are acutely aware that a single fatality event would alter our safety record considerably, and do not permit our good record to date to make room for complacency.

Key indicators from lower level management reports cascade up through the reporting structure into an Iarnród Éireann Always Safe Dashboard which is then used at Board and other governance level reviews.

Railways in Ireland continue to be among the safest in Europe.

### Facilities per Billion Train KM



Passenger and workforce fatality rates on European Union railways 2011-2015

Source: Railway Safety Standards Board annual safety performance report 2017/18



The key indicators monitored at board level are described below:

### Customer and third party accidents

The predominant cause of customer accidents are slip trips and falls and injuries to passengers attempting to board or alight a train, (known as platform train interface accidents) The majority of customer accidents result in minor injury only, such as bruising, grazing, sprain or other minor injury, usually requiring first aid only.

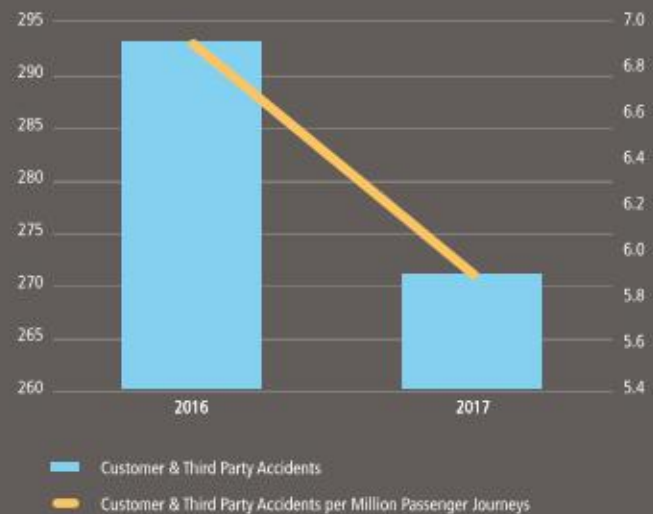
### Platform Train Interface Accidents 2017

Platform train interface accidents represent over 25% of all customer accidents. While 2017 saw a 26% reduction in the number of these accidents, with all accidents resulting in minor injury only, platform train interface remains a key focus area, due to the potential of serious injury.

A platform train interface working group was established to focus on the risk of platform train accidents. The group is approaching the issue from a number of perspectives, including:

- Analysis of our existing accident data,
- Development of a Risk Evaluation Tool for platform interface risk
- Developing communication and engagement strategies
- Review of possible engineering solutions

## Customer and Third Party Accidents



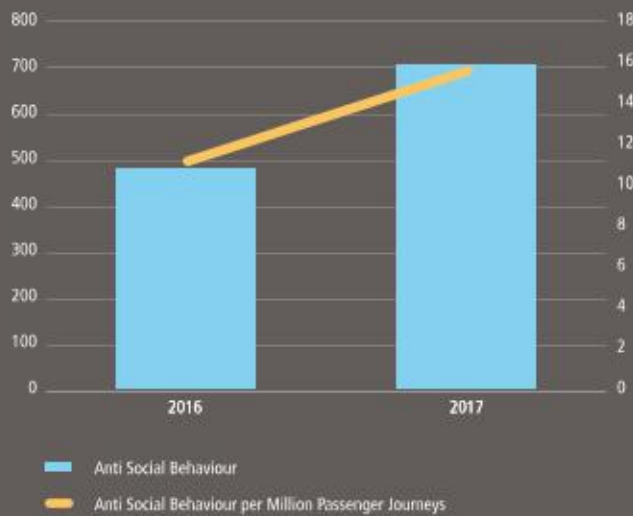
Customer and third party accidents reduced considerably from 2016 levels

## Customer and Third Party Platform Train Interface Accidents





## Anti-Social Behaviour



## Customer and Third Party Platform Train Interface Accidents



## Employee Lost Time Accidents (Reportable)



## Antisocial Behaviour

Reported anti-social behaviour has increased on 2016 significantly, partially due to increase awareness and better reporting among staff. Responding to this increase, a monitoring room has been established, with active monitoring of CCTV for stations on the DART network. The level of security coverage at local level has been increased, and station management and security contractors work with An Garda Síochána around specific events and times, which based on analysis have higher likelihood of anti-social behaviour incidence. A memo of understanding has been established with An Garda Síochána, regarding response to anti-social behaviour. Further analyses and targeted initiatives are under development in 2018.

## Signals Passed as Danger trend

The number of signals passed at danger has continued its downward trend. We will continue to monitor the effectiveness of the initiatives which have been introduced and strive to develop further initiatives to continue the downward trend in 2018. The introduction of the driver reminder appliance across the fleet continues to provide benefit and its usage is monitored. Work is continuing on the development of human factors initiatives to further increase situational awareness and manage distractions.

## Workforce injury

Despite the consistent reductions in recent years, reportable lost time accidents amongst employees showed an increase from 44 to 55. A cross functional working group has been set up to examine in detail the type of accidents and determine causal analysis with a view to developing initiatives to reduce employee accidents going forward.



## Level Crossing Category 1 near miss

2017 saw an increase category 1 level crossing near misses.

A comprehensive engagement programme forms part of the overall level crossings strategy. It initially focussed on local users and attendance at crossings and is currently focussing on business entities and other potential user groups such as Coillte, ESB Networks, An Post, Irish Creamery Milk Supplier Association, Irish Farmers's Association and Freight Transport Association.

Closures continue to be sought on a line by line basis and a range of work streams and initiatives are ongoing in the area of the management of level crossings including review of skewed crossings, traffic counts, and interface with cyclists.

No prosecutions for level crossing misuse were sought by Iarnród Éireann in 2017.

## Bridge Strikes

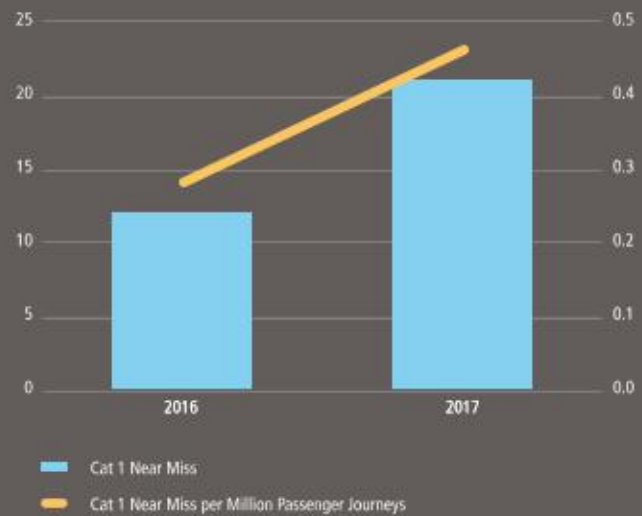
The last 5 years has seen 441 recorded bridge strikes on the network.

Reductions have been seen at key areas although there has been also some offsetting with increased traffic levels.

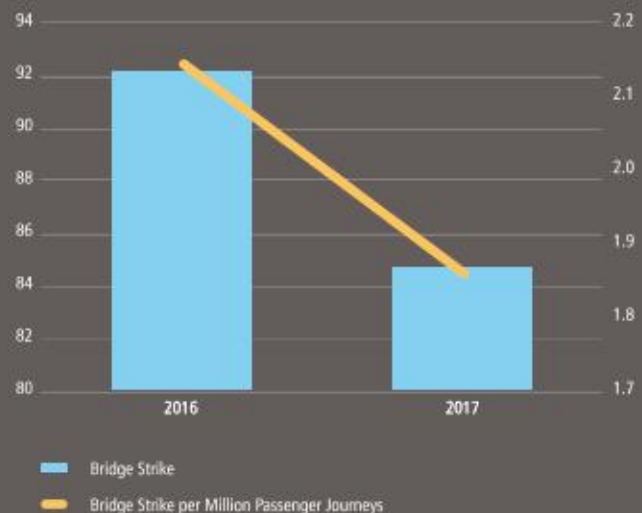
A range of initiatives are being carried out as part of our Bridge Strike Management Strategy. Use of technology forms an integral and increasingly important part of our current strategic actions. The use of decision support tools help to inform the strategic direction as well as demonstrate the value of the chosen strategies.

The strikes listed for the 10 bridges in the following table represent 28% of all bridge strikes (including both under and overbridge as well as recorded strikes on non-operational lines) over the last 5 years.

## Category 1 Level Crossing Near Miss



## Bridge Strikes





## Bridge Strikes

No.	Bridge	Location	No. Strikes 5 yr period	Status
1	UBL154	N24 Carrick-on-Suir	20	Bridge heightened to 5.03m, no strikes since
2	UBB25	R124 Portmarnock, Co Dublin	16	Cameras in place
3	UBR54	Upper Erne St, Dublin 2	15	Low masonry bridge
4	UBC145	N80 Portlaoise	14	Road diversions & VMS in place
5	UBR61	Bath Ave, Dublin 4	14	Cameras in place
6	UBS514	R368 Carrick-on-Shannon	12	Bash beam in place
7	UBR56	Macken St, Dublin 2	9	Low masonry bridge
8	UBR60	Sth Lotts Rd, Dublin 4	9	Cameras in place
9	UBC406	Cork City (Cork-Cobh line)	8	Improvements to signage on public road, no strikes in 12 mths
10	UBC80	Rathangan Rd, Kildare	8	Protected structure on a regional road

The most frequently struck bridge, UBL154 on the Limerick/Waterford route was raised in early 2017 and no strikes have occurred since then. This is an example of engagement with local authorities for funding/co-funding of high risk bridges and other opportunities are being explored.

Mitigations are also in place for a number of the other bridges on this list. Camera installations are now in place at UBLL38, UBR60, UBR61 and UBB25 thus allowing continuation of service post-strike event. Cameras are provided at track and road level to allow initial clearance of the strike by inspector viewing the output remotely. Follow up inspection is still carried out after preliminary clearance of the strike.

Other mitigations include bash beams and variable message sign (VMS). Two frequently struck bridges at Erne Street and Macken Street are low masonry structures and so do not present significant safety risks. UBC406 on the Cork/Cobh line has seen improvements to advance and bridge warning signage and no strikes have occurred here in the last year. Through liaison with local authorities an improvement programme of warning signage and traffic management is being developed.

A range of technology based initiatives will be developed in 2018.

### Derailments and Collisions

There was one train derailment occurrence on a running line in 2017: A low speed derailment of a DART Train north of Dun Laoghaire station on the 13th September.

There were two collisions with a buffer stop on a running line occurrences in 2017:

- A passenger train collided with the buffer stop at Newbridge Station on 4th October. No injuries were sustained.
- An out of service RPSI train collided, at slow speed with a buffer stop in Connolly Station on 16 December. No injuries were sustained.

Train derailment and collisions between trains and with buffer stops remain at low levels. Precursors that could lead to derailment and collision accidents continue to be monitored, in order to monitor the risk of these type of accidents.



## Counter-Terrorism Emergency Exercise – Docklands Station

On Friday 14th July last, we conducted a joint emergency exercise with An Garda Síochána at Docklands Station to test our processes and how our people react in emergency situations. There was lots of Garda activity on the morning as they responded to a terrorist threat in the area whereby two men driving a black van knocked down a female pedestrian on her bike and then stabbed two different females before fleeing into Docklands Station.

While in the station one of the terrorists began to wound customers, while the other proceeded to take hostages on-board a stationary train waiting on the platform before being apprehended and gunned down by the emergency response unit. This was a very well run exercise and provided a learning opportunity for all involved in order to improve our training programmes. We were delighted to be given the opportunity to assist our Gardaí in planning for all types of emergency situations so they are able to respond to security threats if required in the future.

Garda Commissioner Nóirín O'Sullivan thanked Iarnród Éireann in her press conference after the exercise for assisting in the planning and allowing them the use of our facilities. Well done to everyone involved especially Noel Ryan, Infrastructure Dept., DART, Pearse Station who was the direct liaison to An Garda Síochána and made sure everyone who needed to be involved was included and kept well informed.

**On Friday 14th July last, we conducted a joint emergency exercise with An Garda Síochána at Docklands Station to test our processes and how our people react in emergency situations.**





## Well-on Track – We walked half way round the Earth in 6 weeks



One of our company values is Valuing Our People and as part of embedding this throughout the organisation we launched a companywide health and wellbeing programme, which was available for all colleagues to join. The overall aim was to promote physical activity and general health and well-being among employees.

The programme which was conducted by Laya Healthcare had two key features, the Virtual Games App and I Commit. The Virtual Games App facilitated recording of physical activity and I Commit provided online courses dealing with lifestyle topics. Individuals could choose the lifestyle topic that interested them most.

A choice of ten lifestyle topics was available ranging from healthy eating, losing weight, getting better sleep, reducing stress and managing finances. Each week a module was sent to participants, which included educational videos, articles and tips on how to develop skills and tools to enhance well-being.

The Virtual Games App recorded the physical activity of individuals and teams throughout the company. Participants registered on teams depending on where they work and logged activity daily which was posted on team leader boards. Individual activity could only be seen by fellow team members. Infrastructure Management (IM), Railway Undertaking (RU) and Shared Services (SS) had their own team leader boards for the teams in each company and there was a global leader board for the three divisions.

Points achieved through various physical activities, logged on the app, were converted into distances. Activities included walking, cycling, running, crunches and weight lifting.

Over the course of the programme Laya provided tips and hints on how to try out new exercises and how to build on different activities.

IM took the lead early on and maintained it throughout the programme. On a weekly basis, updates were given on the distance travelled. The top three teams were also from IM;

- 1st – IM Ops South (Mallow)
- 2nd – IM CCE (Inchicore)
- 3rd – IM Ops East.

At the end of 6 weeks, we as a company had walked 20,301 km, the equivalent of half the circumference of the Earth.

During this pilot programme there were some teething problems, so it worked better for some people than others. We are working hard to ensure that any adverse issues that arose in this programme will be resolved before the commencement of the next programme. We are committed to the promotion of health and wellbeing in Iarnród Éireann. These initiatives will benefit those who take part, in their general health and consequently in their ability to live prosperous and fulfilled lives.

We would like to hear from people who are interested in getting involved in health and wellness initiatives in their workplace. Through such a network, health information and initiatives will be disseminated. The network will monitor and aid decisions on what programmes are needed and what works for people so that the best possible outcomes can be achieved, if you would like to get involved please email [caroline.osbourne@irishrail.ie](mailto:caroline.osbourne@irishrail.ie) or call 01-7032310 (ext. 2310).

It is well recognised that good habits spread by creating the environment where the healthy choice is the easier choice. Take the challenge, take part, help us all to get 'Well-On Track'.



## The Virtual Games - Engagement



- Regrettably the programme could not have been as successful as anticipated because the app is not compatible with the company standard Windows phone. A lot of people could not participate as a result and requested that their user details be removed from the app.
- The email address [virtualgamessupport@Layawellness.ie](mailto:virtualgamessupport@Layawellness.ie) was blacklisted which meant a lot of employees never received their log in details for both programmes upon launching.

"I think the thing that makes me try harder each week in this programme is the virtual games"

## The Virtual Games – Leading Teams



### Infrastructure Manager Top 3 Teams:

IM Ops South (Mallow)  
Average Points - 419.05  
Total Points - 73753

IM CCE (Inchicore)  
Average Points - 409.44  
Total Points - 288244

IM Ops East  
Average Points - 349.45  
Total Points - 46127

### IE HQ Top 3 Teams:

IE HQ Corporate Communications  
Average Points - 211.11  
Total Points - 55732

IE HQ Shared Services  
Average Points - 52.91  
Total Points - 46563

IE Freight  
Average Points - 0.43  
Total Points - 38

### Railway Undertaking Top 3 Teams:

RU CME Production  
Average Points - 70.64  
Total Points - 24864

RU Mainline District  
Average Points - 64.48  
Total Points - 22698

RU Support Services  
Average Points - 57.91  
Total Points - 157980

## I Commit Closing Survey Results

Overall, how would you rate I Commit?



How would you rate the blog content?



How would you rate the video content?



How would you rate the podcasts?



Do you feel I Commit has helped you achieve your goal?

75% Yes  
25% No

Do you feel you received too much communication about I Commit?

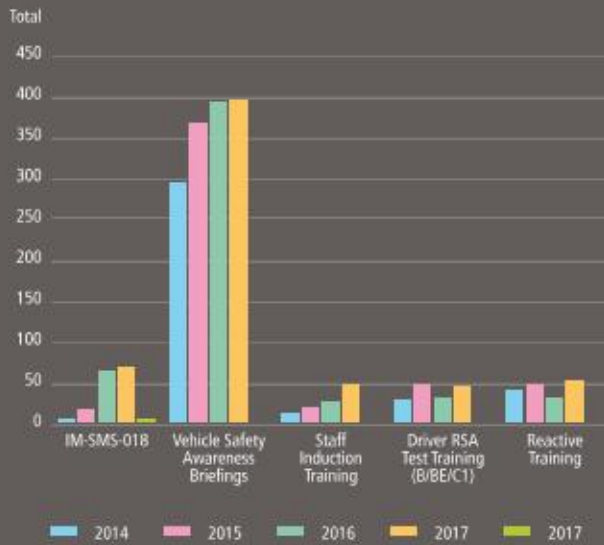
100% No

What medium did you find most effective in terms of helping you achieve your goal?

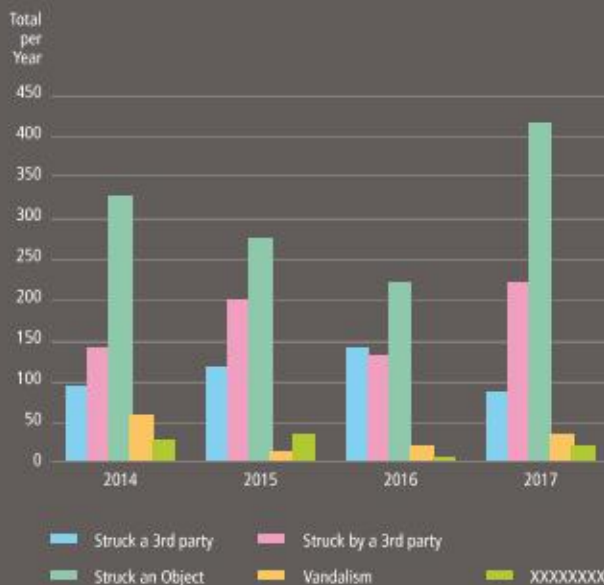
Videos - 75%  
Blogs - 25%



## Road Vehicle Driver Safety Training Stats 2014/2017



## Road Vehicle A.I Stats 2014/2017



## Road Fleet

Since Oct 2011 the IM Safety Department has undertaken to pro-actively manage the risk associated with driving road vehicle for work. With a fleet of 520 road vehicles (Job, Pool, Staff, Personal owned) and a cohort of 1500 drivers a strategy was embarked upon:

The road vehicle accidents within the IM Department were evaluated. This review identified the custom and practices prevalent.

The following initiatives and progress has been made:

1. Three Safety Executives have been trained as RSA Approved Driver Instructors
  - One full time Road Fleet Safety Executive within the IM Safety Department and two safety executives who provide assistance when available.
2. Evaluate and risk assess each type of vehicle being provided to the end user to ensure all vehicles provided are fit for purpose.
3. Liaise with other stakeholders with a view to benchmark their control measures against IM's
  - Consult with the RSA, HAS, Garda, ESB, Army, on best industry practice to establish the best way forward ensuring the safety of the drivers and the fleet of vehicles are legislative compliant.
  - Hold Road Vehicle Safety Seminars periodically, with attendance from major stakeholders and other established recognised entities.



4. Set out Safety policies stemming from the internal Quarterly Road Vehicle Safety Review Workshops, to ensure, all staff members and their respective managers are briefed on the particular road vehicle they are receiving for use (5 different vehicle types).
5. Provide pro-active training and briefings in the following categories;
  - Car/Car derived Van category B Vehicles
  - Commercial Vans <3500kg
  - Commercial Vans >3500kg
  - Heavy Goods Vehicles Trucks
6. Train the three Safety Executives in road vehicle accident collision investigation to evaluate the root cause of collisions, and set out appropriate mitigations.
7. Provide re-active training and briefings to all staff involved in road traffic collisions.
8. Advise management on preventative measures.
9. Develop and circulate risk assessments.
10. Carry out vehicle audits, liaise with local management and progress with findings internally and also liaising with vehicle providers.
11. Develop a new entrant induction programme for all incoming staff who are intending to drive road vehicles for work.
12. Deliver the induction training programme at local level through the IM divisional departments.

### Status of recommendations from external agencies

The three types of activities that give rise to recommendations from external agencies are as follows:

### RAIU Accident Investigations

The Railway Accident Investigation Unit (RAIU) is an independent investigation unit within the Department of Transport, Tourism and Sport (DTTAS). The RAIU investigate serious accidents and incidents on the railway network in order to establish, the causes an accident. They then make recommendations, the intention of which is to avoid similar types of accidents occurring in the future.

### Government initiated safety reviews

The Irish Government initiated four safety between 1998 and 2006. Three were conducted by I.R.M.S. and the fourth by AD Little. These reviews made numerous recommendations addressed to Iarnród Éireann, which were progressed through a fifteen year railway safety programme which saw approximately €1.6 billion investment targeted at the recommended safety improvements. We continue to implement a small number of these historical safety recommendations.

**The RAIU investigate serious accidents and incidents on the railway network in order to establish, the causes an accident. They then make recommendations, the intention of which is to avoid similar types of accidents occurring in the future.**



### CRR supervision activity outcomes

The Commission for Railway Regulation conducts various supervision activities to monitor our compliance with railway safety legislation. These include asset inspections, process audits, audits of compliance with our safety management system, and post incident inspections, following an

accident or incident. All of these supervision activities generate outcomes. Some outcomes require us to take action, such as “Non Compliances” and “Action Required” outcomes.

The recommendation or outcomes from these three activities are collectively referred to as recommendations. The implementation of all three types of recommendation is monitored by the CRR, who must be satisfied with the evidence provided to them that the recommendation has been addressed.

Considerable progress has been made during 2017 in closing recommendations which had been issued prior to the start of 2017. Of the 68 recommendations open at the start of 2017, collection and submission of evidence to the CRR has been completed for 38 (56%) during 2017.

...the IM Safety Department has undertaken to pro-actively manage the risk associated with driving road vehicle for work.











#### Contact Details

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