



**Railway Accident
Investigation Unit
Ireland**

Annual Report



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Foreword

The Railway Accident Investigation Unit's purpose is to independently investigate occurrences on Irish railways with a view to establishing their cause and make recommendations to prevent their recurrence or otherwise improve railway safety.

Thirty five preliminary examinations were carried out in 2011, from which three full investigations were commenced. The first investigation involved a road vehicle struck at a manually operated level crossing being worked by members of the public. The second investigation involved a runaway locomotive. And the third related to an axle journal bearing failure on a locomotive.

The Railway Accident Investigation Unit published seven investigations reports in 2011 relating to occurrences that took place in 2010. These related to: four level crossing accidents, two of which were serious accidents; two derailments; and an equipment failure on a train. A total of seventeen new safety recommendations were issued in 2011. The focus of the safety recommendations was: the effective implementation of safety controls; improvements to risk management systems; implementing effective communication procedures; and the management of risk at user worked level crossings.

Seventy seven safety recommendations have been issued in total up to the end of 2011, including fourteen issued by the Railway Safety Commission in advance of the appointment of a Chief Investigator for the Railway Accident Investigation Unit in 2007. The Railway Safety Commission monitors the implementation of safety recommendations. The Railway Safety Commission has advised that of the seventy seven recommendations issued to date, twenty nine have been closed out as having been addressed, seventeen are complete and awaiting verification that they have been addressed, and a further thirty one are open.

David Murton
Chief Investigator

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List of abbreviations

ERA	European Railway Agency
ÍÉ	Iarnród Éireann
NIB	National Investigation Body
No.	Number
NSA	National Safety Authority
RAIU	Railway Accident Investigation Unit
RSC	Railway Safety Commission
SI	Statutory Instrument

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1. Background

In April 2004, the European Parliament passed 'Directive 2004/49/EC of the European Parliament and of the Council of 29 April 2004 on safety on the Community's railways and amending Council Directive 95/18/EC on the licensing of railway undertakings and Directive 2001/14/EC on the allocation of railway infrastructure capacity and the levying of charges for the use of railway infrastructure and safety certification' (the Railway Safety Directive). This directive set out the requirement for each European Union member state to establish a National Safety Authority (NSA) to oversee the regulation of railway safety and a National Investigation Body (NIB) to act as an independent no blame accident investigation body.

The Railway Safety Act 2005 was passed on the 23rd December 2005, transposing the Railway Safety Directive into national legislation and creating the framework for the establishment of the Railway Safety Commission (RSC). On the 1st January 2006 the RSC was established transferring the regulation of railway safety from the then Department of Transport. The Railway Safety Act 2005 established the RSC to act as the NSA and perform the duties outlined in the Railway Safety Directive associated with the licensing of railways. The Railway Accident Investigation Unit (RAIU) was established as a functionally independent unit within the RSC to act as the NIB, independently investigating railway occurrences. The roles of the RSC and the RAIU were subsequently elaborated upon under the European Communities (Railway Safety) Regulations 2008, Statutory Instrument number 61 of 2008 (SI no. 61 of 2008) dated the 6th March 2008.

The purpose of an investigation by the RAIU is to improve railway safety by establishing, in so far as possible, the cause or causes of an accident or incident with a view to making safety recommendations for the avoidance of 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 Railway Safety Act 2005 as amended by SI no. 61 of 2008 and the European Railway Safety Directive.

2. RAIU

2.1 The organisation

The RAIU comprises a Chief Investigator and a team of three investigators, each able to perform the role of Investigator In Charge as necessary. The RAIU shares administrative support with the RSC, all other functions are carried out independently of the RSC. The organisation chart for the RSC, including the RAIU, is shown in Figure 1.

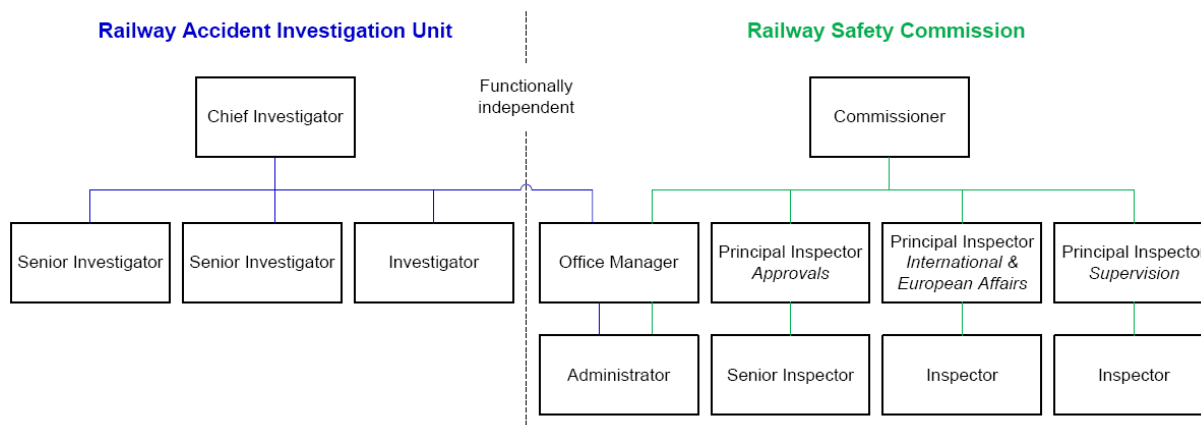


Figure 1 – Organisation chart

Plans remain in place to merge the RAIU, the Air Accident Investigation Unit and the Marine Casualty Investigation Board into a multi-modal accident investigation body within the Department of Transport, Tourism and Sport, giving them total independence from their respective regulatory bodies.

2.2 Railway networks within the RAIU's remit

There are ten railway systems within the RAIU's remit. These are:

- The Iarnród Éireann (IÉ) national heavy rail network;
- The Luas light rail system in Dublin;
- The Bord Na Móna industrial railway;
- Seven heritage railway systems.

For each of these railway systems there are entities identified as Railway Undertaking and Infrastructure Managers. Railway Undertakings are defined as organisations that provide the transport of goods and/or passengers by rail on the basis that the undertaking must ensure traction, including undertakings that provide traction only; which operate under a safety management system approved by the RSC through the issue of a safety certificate. Infrastructure Managers are defined as organisations that establish and maintain railway infrastructure, including the management of infrastructure control and safety systems; which operate under a safety management system approved by the RSC through the issue of a safety authorisation. There are ten organisations that act as Railway Undertaking and Infrastructure Manager for a railway network and two organisations that act solely as Railway Undertakings, there are currently no organisations that act solely as an Infrastructure Manager.

The national heavy rail system is owned by IÉ. IÉ are the Infrastructure Manager and are also the primary Railway Undertaking with responsible for management of commercial train operations, station operations and Centralised Traffic Control. The heavy rail system is interoperable with the heavy rail system in Northern Ireland and cross boarder services are operated by IÉ in conjunction with Translink, the Railway Undertaking responsible for the management of commercial train operations, station operations and Centralised Traffic Control in Northern Ireland. These operations are carried out under IÉ's Safety Case and Translink is classified as a guest operator. A heritage railway undertaking based in Northern Ireland, the Railway Preservation Society of Ireland, also operate steam trains on the heavy rail system several times a year as a guest operator. The performance of the national heavy rail system is reported to the European Railway Agency (ERA) in accordance with European reporting requirements.

The Luas light rail system is owned by the Railway Procurement Agency. Veolia Transport is the Railway Undertaking that operates passenger services, the passenger stops and the Central Control Room. Veolia is also the Infrastructure Manager responsible for the maintenance of the infrastructure.

The Bord Na Móna industrial railway is owned and operated by Bord Na Móna, acting as the Railway Undertaking and Infrastructure Manager for the transport of peat on its network. As this is an industrial railway and does not carry passengers it only falls within the RAIU's remit where the railway interfaces with the public, at level crossings and bridges, and other railways, at bridges.

The operational heritage railway systems in 2011 include: Cavan and Leitrim Railway; Diffin Railway; Fintown Railway; Irish Steam Preservation Society; Lartigue Monorailway; Waterford and Suir Valley Railway; and West Clare Railway. Each of these acts as the Railway Undertaking and Infrastructure Manager for their system.

2.3 Non-investigative activities

As part of its role as an NIB, the RAIU actively participates in the development of accident investigation processes and procedures through the work of ERA. To this end, the RAIU participated in the 2011 NIB plenary meetings and provided input on the direction of NIB related work. RAIU was also a member of the ERA taskforce set up to develop a system of cross auditing for the NIBs.

The RAIU continued to participate in a joint working group with the Air Accident Investigation Unit and the Marine Casualty Investigation Board on the formation of a multimodal investigation body within the Department of Transport, Tourism and Sport. The RAIU moved into shared facilities with the Air Accident Investigation Unit and the Marine Casualty Investigation Board in January 2011.

The RAIU attended the International Railway Safety Conference. As part of this, RAIU continued to assist with the organisation of the conference, arranging the NIB meeting and chairing one of the conference sessions.

The Memorandums of Understanding entered into with the Transportation Safety Board of Canada and the Rail Accident Investigation Board of the United Kingdom of Great Britain and Northern Ireland remain in place. The RAIU continued to work towards the possibility of further Memorandums of Understandings with An Garda Síochána and the Coroner's Society of Ireland.

3. Occurrences

3.1 Classification of occurrences

Occurrences fall into one of three types as defined in SI no. 61 of 2008:

- Accident – An unwanted or unintended sudden event or a specific chain of such events which have harmful consequences including collisions, derailments, level crossing accidents, accidents to persons caused by rolling stock in motion, fires and others;
- Serious accident – Any train collision or derailment of trains, resulting in the death of at least one person or serious injuries to 5 or more persons or extensive damage to rolling stock, the infrastructure or the environment, and any other similar accident with an obvious impact on railway safety regulation or the management of safety, where extensive damage means damage that can be immediately assessed by the RAIU to cost at least €2,000,000 in total;
- Incident – Any occurrence, other than an accident or serious accident, associated with the operation of trains and affecting the safety of operation.

For clarity the meaning of the following terms should be noted:

- Harmful consequences – Injury to persons and/or damage to equipment;
- Serious injury – Any injury requiring hospitalisation for over 24 hours.

3.2 Investigation of occurrences

The RAIU have investigators on call, 24 hours a day, 7 days a week, who are notified of reportable occurrences by the Railway Undertakings in accordance with the Railway Safety Act 2005. Based on the nature of the occurrence and the legal requirements, a decision is made on whether or not an investigation is required. In accordance with the Railway Safety Directive, the RAIU must investigate serious accidents; accidents and incidents are investigated depending on the potential for safety lessons to be learnt.

Where notified occurrences warrant further investigation to determine whether or not an investigation is warranted a preliminary examination is carried out and one of the following four determinations is made:

- No further investigation – no safety improvements are likely to be identified that could have prevented the occurrence or otherwise improve railway safety;
- Monitor railway investigation – the investigation of the railway organisation with responsibility for the party investigation is monitored for adequacy and to ensure any further information that comes to light is taken into considered by the RAIU;

- Trend investigation – where the occurrence is part of a group of related occurrences that may or may not have warranted an investigation as individual occurrences, but the apparent trend warrants investigation;
- Full investigation – there is clear evidence that the occurrence could have been prevented or the severity of the outcome could have been mitigated through the actions of those parties involved either directly or indirectly in the installation, operation and maintenance of the railway.

Investigations are classified as one of three types under the Railway Safety Directive:

- Article 19(1) – Investigations into serious accidents on the IÉ network, the objective of which is possible improvement of railway safety and the prevention of accidents;
- Article 19(2) – Investigation into accidents and incidents, which under slightly different conditions might have led to serious accidents on the IÉ network;
- Article 21(6) – Investigations into railway accidents and incidents under national legislation, this includes all investigations relating to the Luas light rail system, the Bord Na Móna industrial railway and the heritage railways.

For each investigation, the level of damage to rolling stock, track, other installations or environment is identified and classified based on the European common safety indicators as follows:

- None;
- Less than €150,000 (<€150,000);
- Equal to or greater than €150,000 (≥€150,000);
- Equal to or greater than €2,000,000 (≥€2,000,000).

Within seven days of a decision to carry out a full investigation, the RAIU advise the relevant railway undertaking of the decision. In accordance with SI no. 61 of 2008, the RAIU also notify the ERA within seven days of a decision to carry out a full investigation into an occurrence on the IÉ network.

The RSC, An Garda Síochána, the Health and Safety Authority and other organisations may carry out investigations in parallel with an RAIU investigation. The RAIU will share its own technical information with these Investigation Bodies, however, the investigations are carried out independently. Based on its investigation, the RAIU produce a report that is provided to all relevant parties, including the Railway Undertaking, the RSC and the Department of Transport, Tourism and Sport. Reports relating to the IÉ network are also provided to ERA. All investigation reports are made available in the public domain once they have been published.

In accordance with the Railway Safety Act 2005, for all occurrences notified to the RAIU the relevant railway must carry out an investigation and produce a report within six months.

3.3 Summary of occurrences in 2011

There were thirty five preliminary examinations carried out in 2011. These are broken down into serious accidents, accident and incidents by network in Table 1. From the preliminary examination reports produced, three full investigations were commenced, these are detailed in section 4 below.

Table 1 – Preliminary examination reports in 2011 by network

Railway Network	Serious Accidents	Accidents	Incidents
IÉ	6	18	1
Luas	1	9	0
Heritage railways	0	0	0
Bord Na Móna	0	0	0
Total	7	27	1

3.4 Investigations within the past five years

Table 2 shows the areas that have been examined through the RAIU investigations by occurrence type over the past five years. The occurrences are presented for all railways and for the IÉ network only. Figure 2 shows the RAIU's investigations by type for 2011 and for the past five years. Occurrences at level crossings and derailments remain the main focus of RAIU's investigations with collisions also representing a significant portion.

Table 2 – Full investigations within the past five years by type

Occurrence		Year					5 year average	
Type	Subset	2007	2008	2009	2010	2011	Total	Percentage
Serious accident	Collisions	-	-	-	-	-	-	-
	Derailments	-	-	-	-	-	-	-
	Level crossing	-	1 (1)	-	2 (2)	-	3 (3)	13.04 (15)
	To persons due to rolling stock in motion	-	-	-	-	-	-	-
	Fires	-	-	-	-	-	-	-
	Others	-	-	1 (1)	-	-	1 (1)	4.35 (5)
Accident	Collisions	-	-	3 (2)	-	1 (1)	4 (3)	17.39 (15)
	Derailments	-	1 (1)	2 (1)	2 (1)	-	5 (3)	21.74 (15)
	Level crossing	1(1)	2 (2)	-	2 (2)	1 (1)	6 (6)	26.09 (30)
	To persons due to rolling stock in motion	-	-	-	-	-	-	-
	Fires	-	-	-	-	-	-	-
	Others	-	-	-	1(1)	1 (1)	2 (2)	8.7 (10)
Incident	Infrastructure	-	-	-	-	-	-	-
	Energy	-	-	-	-	-	-	-
	Control-command & signalling	-	-	-	-	-	-	-
	Rolling stock	-	-	-	-	-	-	-
	Traffic operation & management	-	1 (1)	1 (1)	-	-	2 (2)	8.7 (10)
	Others	-	-	-	-	-	-	-
Annual Total		1 (1)	5 (5)	7 (5)	7 (6)	3 (3)	23 (20)	100 (100)

Note: The statistics for the IÉ network only are in brackets.

Investigations in the past 5 years



- Serious Accident - Collisions
- Serious Accident - Derailments
- Serious Accident - Level crossing
- Serious Accident - To persons due to rolling stock in motion
- Serious Accident - Fires
- Serious Accident - Others
- Accident - Collisions
- Accident - Derailments
- Accident - Level crossing
- Accident - To persons due to rolling stock in motion
- Accident - Fires
- Accident - Others
- Incident - Infrastructure
- Incident - Energy
- Incident - Control-command & signalling
- Incident - Rolling stock
- Incident - Traffic operation & management
- Incident - Others

Investigations in 2011

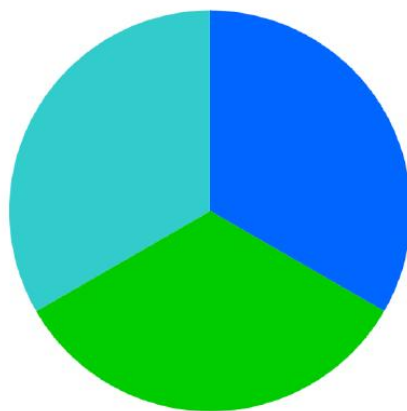
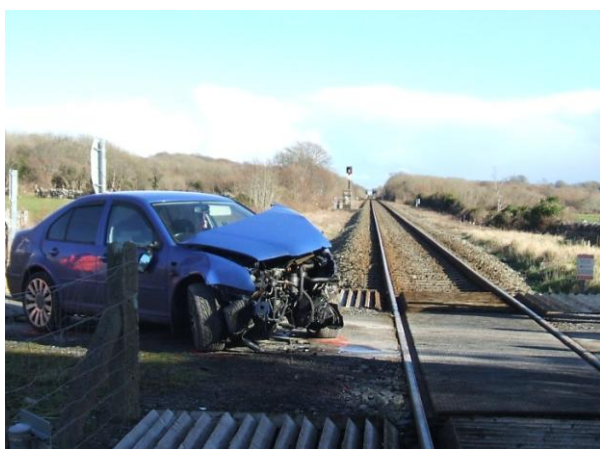


Figure 2 – Investigation trend 2007-2011

4. Investigations commenced in 2011

4.1 Road vehicle struck at level crossing XG173

At approximately 12:13 on the 14th February 2011 a car was struck by the 09:30 passenger service from Heuston Station (Dublin) to Ceannt Station (Galway) at user worked level crossing XG173. As the train approached XG173, the train driver observed a car encroaching onto the line, sounded the horn and applied the emergency brake. The train struck the car as it was attempting to reverse clear of the railway line. The occupants of the car were hospitalised for their injuries and released the same day. The train sustained minor damage to its suspension and damping equipment. The car sustained substantial front end damage.

**Occurrence classification:**

Accident.

Subset:

Level crossing.

Investigation classification:

Article 19(2).

Fatalities and injuries:

Minor injuries.

Damage:

<€150,000.

Figure 3 – Car strike at XG173

4.2 Runaway locomotive at Portlaoise Station

At approximately 11:35 on the 29th September 2011, locomotive 083 was travelling from Limerick Junction to Portlaoise Rail Depot when it was stopped on Portlaoise Loop. The train driver disembarked the locomotive in order to set the route for the locomotive to travel into Portlaoise Rail Depot. While the driver was on the ground, the locomotive began to roll towards Portlaoise Station, passing a signal at danger and colliding with a buffer stop at Portlaoise Station.



Figure 4 – Runaway locomotive

Occurrence classification:

Accident.

Subset:

Collisions.

Investigation classification:

Article 19(2).

Fatalities and injuries:

None.

Damage:

<€150,000.

4.3 Bearing failure on a locomotive at Connolly Station

At approximately 18:35 on the 18th October 2011, the 16:10 passenger service from Belfast to Dublin arrived into Connolly Station (Dublin). A member of the rolling stock maintenance staff inspected the train and found that one of the axleboxes on the locomotive was glowing and smoking. The train had set off a hot axlebox alarm whilst travelling from Belfast but no fault had been found upon inspection. There was a bearing failure on the last axle of the locomotive, which had been operating in push pull mode with the locomotive at the rear of the train pushing the carriages.



Figure 5 – Failed bearing on locomotive 233

Occurrence classification:

Accident.

Subset:

Others.

Investigation classification:

Article 19(2).

Fatalities and injuries:

None.

Damage:

<€150,000.

5. Investigation reports published in 2011

5.1 Overview of investigation reports for 2011

The RAIU published seven investigation reports in 2011. These related to two serious accidents and five accidents. A total of seventeen new safety recommendations were made.

5.2 Laois Traincare depot derailment



Figure 6 – Laois Traincare Depot Derailment

At 15.25 hours on the 20th January 2010 a Class 22000 six carriage train was scheduled to leave Laois Traincare Depot after routine servicing. The intended destination of the train was Heuston Station. The Train Driver performed his pre-departure checks and the Shunter authorised the train to proceed out of Laois Traincare Depot as far as signal PL278, which controls the exit from the depot onto the down loop adjacent to the main line. The Shunter set the number 2A points for the train to leave the depot. The Train Driver stopped at signal PL278

as he was unable to read it due to sunlight shining on the signal and requested that the Shunter walk forward to check the signal aspect. The Shunter had been waiting at the number 2A points for the train to exit the depot in order to reset the points for the headshunt, protecting the down loop. He walked forward until he had a clear view of signal PL278 and advised the driver he had a proceed aspect. The Train Driver moved the train forward checking the aspect displayed when the signal was shaded by the train. The Shunter then walked back towards the depot and as he passed the points handle for the number 2A points, he operated the points. The train was still travelling over the points and derailed.

The immediate cause was:

- The movement of the number 2A points as the train was passing over them causing the carriages to take diverging routes and carriages three and four to derail.

The contributory factors were:

- The Shunter was taken away from normal task to check the aspect of Signal PL278 for the Train Driver due to the effects of sunlight on visibility of the signal;
- It was standard practice in Laois Traincare Depot to leave the points handle for the number 2A points engaged when not in use;

- The points mechanism at the number 2A points required little effort to operate;
- The remedial action taken to improve the visibility of signal PL278 was ineffective resulting in the occasional practice of shunters assisting train drivers with reading of the signal.

The underlying factors were:

- The operating procedure for Laois Traincare Depot did not control the risk of accidental operation of the number 2A points;
- A Signal Sighting Committee was not convened to investigate concerns raised by train drivers with signal visibility.

Two safety recommendations were made:

- IÉ should ensure that the risks relating to use of spring assisted manual points are identified and that appropriate control measures are implemented based on the risks identified;
- IÉ should ensure that the Signal Sighting Committee is informed when train drivers report difficulties viewing a signal and the Signal Sighting Committee should verify that the reported difficulties are addressed effectively.

5.3 Secondary suspension failure on a train at Connolly Station



Figure 7 – Failed bogie to carbody connection

At approximately 22:50 on the 7th May 2010 the 21:05 passenger service from Longford to Connolly Station arrived into Platform 1 at Connolly Station in Dublin. The service was operated by a four carriage Class 29000 Diesel Multiple Unit referred to as Unit 10. A member of the contract cleaning staff subsequently observed that there was a problem with one of the carriages and advised IÉ personnel. Unit 10 was found to have returned from passenger service with its secondary suspension system over-inflated on one of the bogies of carriage

29310. The over-inflation had led to the failure of the centre pivot retaining plate bolts and the airbags lifting the centre pivot pin out of the bogie centre. Unit 10 had been undergoing maintenance prior to being released for passenger service on the 6th May 2010 and had entered passenger service with the secondary suspension functioning incorrectly on the trailer bogie of carriage 29310.

The immediate cause was:

- The secondary suspension levelling valves were fitted to the incorrect sides of the bogie.

The contributory factors were:

- The lack of clear instruction for maintenance personnel on the maintenance procedures to be carried out;
- The lack of clear visual markings or written advice in procedures for maintenance personnel to distinguish between the two different levelling valves;
- A job card was not generated to ensure sign off of the necessary post installation checks as complete.

The underlying factors were:

- The design of the secondary suspension system allowing the fault to develop to the point that the train entered an unsafe state;
- The ineffectiveness of maintenance and operational controls in place in managing the risks relating to over-inflation of the secondary suspension;
- The ineffectiveness of the hazard log in addressing the hazards relating to the over-inflation of the secondary suspension;
- The ineffectiveness of the hazard log in addressing the hazards relating to the failure of the centre pivot pin to perform its intended function.

Two safety recommendations were made:

- IÉ should ensure that the risks relating to use of spring assisted manual points are identified and that appropriate control measures are implemented based on the risks identified;
- IÉ should ensure that the Signal Sighting Committee is informed when train drivers report difficulties viewing a signal and the Signal Sighting Committee should verify that the reported difficulties are addressed effectively.

5.4 Tram derailment at the Point Stop on the Luas Red line



Figure 8 – Derailed tram at Point stop

On the 13th May 2010, Luas Tram 3006 was travelling on the shuttle service between Dublin Heuston Railway Station and the Point Stop on the Luas Red line. At 22:10 Tram 3006 proceeded into The Point Stop with the intention of stabling at the Inbound Platform, however the tram travelled towards the Event Platform, and not the Inbound Platform as intended. The Tram Driver stopped Tram 3006 and after communicating with the Controller in the Central Control Room, changed driving cab ends and drove Tram 3006 outbound, derailing the third

bogie on a set of spring points.

The immediate cause was:

- Tram 3006 had not travelled clear of the spring points before carrying out a reverse manoeuvre.

The contributory factors were:

- The Controller was not fully aware of the exact position of the tram;
- Communications between the Tram Driver and Controller were not clearly understood;
- The Tram Driver momentarily forgot that Tram 3006 would derail over the spring points due to its current position.

The underlying factor was:

- There is no mandatory procedure other than in an emergency call for a Controller and a Tram Driver to clarify and check any misunderstandings in radio transmissions.

One safety recommendation was made:

- Veolia should introduce a communication protocol between normal and emergency for given situations where a clear understanding between a tram driver and Central Control Room are required.

5.5 Person struck at level crossing XE039, County Clare



Figure 9 – Level crossing XE039

At approximately 22:00 on the 27th June 2010 the Train Driver of the 21:45 service from Ennis to Limerick sounded the horn on the approach to user worked level crossing XE039. As the Train Driver was sounding the horn he observed a farmer, 162 metres ahead of the train, pushing a cow through the gates of XE039 onto the railway, approaching the railway line from the Train Driver's right. As the train continued to approach XE039 the Train Driver applied the brake and

sounded the horn twice. As the Farmer continued to push the cow, the train struck the Farmer and the cow. As the train passed over XE039 the Train Driver heard a noise and saw the cow fall to the left of the train, he was not aware that the train had struck the Farmer. The train stopped 200 metres beyond XE039. The Train Driver went back to XE039 on foot and found both the Farmer and the cow on the side of the track on the opposite side of the track to the one had they approached from. The Train Driver requested the assistance of the emergency services, who were contacted by the Galway Line Signalman. The ambulance service arrived via a bridge over the railway 552 metres from XE039 and was then guided to the access road for XE039. The Farmer was fatally injured and pronounced dead at the scene.

The immediate cause was:

- The train arrived at XE039 as the Farmer was attempting to move the cow clear of the railway line.

The contributory factors were:

- The vegetation at XE039 may have affected the Farmer's ability to see the train.

The underlying factors were:

- The information provided to staff carrying out measurement surveys at level crossings did not provide information on the minimum safe distance from the nearest rail that the viewing distances should be measured from;
- The time required to cross the railway safely where the crossing route is skewed was not taken into account in the calculation of the warning time of approaching trains.

The additional issue identified was:

- The information available to Centralised Traffic Control on the location and access to the level crossing was not used to assist the emergency services to locate and access the accident site.

Three new safety recommendations were made:

- IÉ should ensure that risk assessments are produced for all user worked level crossings to identify all hazards specific to particular level crossings;
- IÉ should review their documentation on the measurement of viewing distances at existing user worked level crossings to ensure that the viewing distances provide sufficient views of approaching trains to allow level crossing users cross safely;
- IÉ should review their procedures for the management of accidents to ensure that communication with the emergency services is clear and provides the necessary information to locate an accident site without undue delay and access it by the most appropriate point.

One previous safety recommendation from June 2008 was reiterated:

- IÉ to develop and implement a vegetation management programme that addresses vegetation management on a risk basis, prioritising high risk areas.

5.6 Gate strike at level crossing XC219, County Cork



Figure 10 – Level crossing XC219

At 10:22 on the 2nd July 2010, the 08:00 Heuston to Cork passenger service passed through Level Crossing XC219 without incident. Approximately thirty seconds later a Track Recording Vehicle approached XC219 in the opposite direction, as the Gate Keeper was in the process of closing the gates across the railway line. The Track Recording Vehicle struck one of the gates which resulted in damage to the gate and the Track Recording Vehicle. There were no injuries or fatalities as a

result of this accident.

The immediate cause was:

- The Gate Keeper was in the process of closing the level crossing gates across the railway line as the Track Recording Vehicle arrived at the level crossing.

The causal factor was:

- The Gate Keeper did not fully adhere to the operation instructions provided for the opening and closing of the level crossing gates.

The contributory factors were:

- The Gate Keeper's co-ordination and concentration may have been affected by the presence of Cannabis in his system;
- There was no engineered safeguard introduced at the Level Crossing to ensure that the Level Crossing gates could not be opened to road traffic when a train was approaching, as the system was dependent on the full adherence of the gate keepers to the operation instructions.

The underlying factor was:

- No formal risk assessment process was carried out at the Level Crossing since its initial installation to measure its compliance against criteria introduced in IÉ's current signalling standard.

Two safety recommendations were made:

- IÉ should identify similar manned level crossings where human error could result in the level crossing gates being opened to road traffic when a train is approaching; where such level crossings exist, IÉ should implement engineered safeguards; where appropriate;
- IÉ should review its risk management process for manned level crossings to ensure that risks are appropriately identified, assessed and managed to ensure that existing level crossing equipment is compliant with criteria set out in IÉ's signalling standards, where appropriate.

5.7 Road vehicle struck at level crossing XM096, County Roscommon



Figure 11 – Level crossing XM096

At approximately 11:13 on the 2nd September 2010, the 09:30 freight service from Ballina to North Wall was travelling along the left hand curve on the approach to user worked level crossing XM096. As XM096 came into view, the Train Driver observed a tractor stationary on the track at the level crossing. The Train Driver sounded the horn and applied the brake. The Farmer driving the tractor was looking downwards as the train approached and had

his arm between his legs in the area of the controls. Just before the train reached XM096 the Farmer looked up at the train. The tractor did not move clear of the railway line and was struck by the train. The train came to a stop 469 metres beyond the level crossing. The Farmer was fatally injured and pronounced dead at the scene.

The immediate cause was:

- The tractor was stationary on the track as the train arrived at the level crossing.

The contributory factors were:

- The tractor may have stalled on the track;
- Vegetation may have obscured the Farmer's view of the approaching train from his position on the track;
- The Farmer may not have been looking for an approaching train as some of the level crossing users were known to incorrectly read the green aspect on the railway signal protecting level crossing XM093 as an indication that no trains were approaching.

The underlying factors were:

- There was no formal process in place to ensure communication with the known users of the level crossing other than through the signage at the level crossing, including addressing known issues in relation to their use of the level crossing;
- The information provided to level crossing users through signage at the level crossing was found not to include information provided in the level crossing user booklet relating to the advice that the signals are solely for the control of train movements and on what to do in case of difficulty when crossing the railway.

The additional observations, not relating to the occurrence, were:

- The system of risk management in place was not found to provide for interim measures to be taken to mitigate risk in advance of more long term control measures;
- The shortfall in the viewing distances at the Level Crossing were not proactively managed;
- The warning time of an approaching train specified in the governing documentation only takes into account a normal movement across the railway and does not include a safety margin to allow for difficulties that may arise when a level crossing user is crossing the railway;
- The robust nature of the fencing at the Level Crossing, which was made up of disused rail, could lead to increased severity of the outcome of a collision between a train and a road vehicle.

Two new safety recommendations, relating to the occurrence, were made:

- IÉ should put in place a formal process for identifying and communicating with known users of user worked level crossings;
- IÉ should review the effectiveness of its signage at user worked level crossings, and amend it where appropriate, taking into account the information provided in the level crossing user booklet. The review should include the information on the use of railway signals, what to do in case of difficulty when crossing the railway and ensuring the signage is illustrated in a clear and concise manner, taking into account current best practice and statutory requirements.

Three new safety recommendations, relating to additional observations made during the investigation but not relating to the occurrence, were also made:

- IÉ should update its risk management system to ensure that interim control measures are put in place where longer term controls to address risks require time to implement;
- IÉ should review how it determines the safe crossing time for user worked LCs to ensure the safe crossing time allows adequate time for movements and includes a safety margin, over and above the crossing time;
- IÉ should review its use of disused rail as fencing at user worked LCs to ensure it cannot potentially increase the severity of a collision and where this is the case, replace the disused rail with appropriate fencing.

One safety recommendation previously issued in June 2008 was also reiterated:

- IÉ to develop and implement a vegetation management programme that addresses vegetation management on a risk basis, prioritising high risk areas.

5.8 Road vehicle struck at level crossing XM250, County Mayo



Figure 12 – Level crossing XM250

At approximately 10:50 on the 24th October 2010 as the 10:15 passenger service from Athlone to Westport approached Level Crossing XM250, the train driver saw a car approaching the level crossing while the level crossing gates were open to the railway. The train driver sounded the horn and applied the emergency brake; however the train struck the car whilst it was trying to reverse away from the level crossing. There were no fatalities or

injuries as a result of this accident. There was damage to the front of the car.

The immediate cause was:

- The car stopped at the level crossing, in a position that encroached into the path of the approaching train, and then was struck by the train when attempting to reverse away from the level crossing.

The contributory factors were:

- There are no road markings or marker posts at the Level Crossing identify the decision point for users to allow them to stop clear of the railway line and make a decision to cross safely or wait;
- The level crossing gates, which provide a barrier to the railway, were open when the car driver arrived at the level crossing.

The underlying factor was:

- IÉ has not introduced adequate measures to reduce the frequent misuse at the level crossing in relation to level crossing users leaving the gates open to the railway.

One new safety recommendation, relating to the occurrence, was made:

- IÉ should upgrade the Level Crossing to ensure that the operation of the Level Crossing is not reliant on any direct action by the level crossing user.

Two safety recommendations previously issued in February and July 2008 were reiterated:

- IÉ must identify crossings that are regularly misused and take proactive action to manage the increased risk created by this misuse;
- IÉ should assess the risks relating to road users' behaviour in identifying a safe stopping position at User Worked Level Crossings and based on the outcome of this risk assessment, IÉ should introduce measures to allow safe use of this type of level crossing.

6. Recommendations

6.1 Monitoring of RAIU recommendations

Under the Railway Safety Act 2005, the RSC is responsible for monitoring the implementation of RAIU recommendations. All recommendations issued by RAIU are addressed to the RSC unless otherwise stated and the implementers are identified in the recommendation. The recommendations issued by the RAIU are reviewed by RSC for acceptability and where RSC accept the recommendations it monitors their implementation. Table 3 identifies the three status codes assigned to recommendations by RSC and the definition of each.

Table 3 – Recommendation status descriptions

Status	Description
Open	Feedback from implementer is awaited or actions have not yet been completed.
Complete	Implementer has taken measures to effect the recommendation and the RSC is considering whether to close the recommendation.
Closed	Implementer has taken measures to effect the recommendation and the RSC has considered these and has closed the recommendation.

Open recommendations are those for which RSC has received some or no update from the organisation or organisations responsible for implementing the recommendation and for which further action is deemed to be required by RSC. This status is assigned by RSC.

Complete recommendations are those where the organisation responsible for implementing the recommendation is satisfied that it has carried out the necessary actions to address the recommendation and for which RSC has received evidence of implementation that it will review to determine whether or not the recommendation is closed. This status is advised to RSC by the organisation or organisations responsible for implementing the recommendation.

Closed recommendations are those for which RSC is satisfied that the organisation responsible for implementing the recommendation has taken suitable action to address the recommendation. This status is assigned by RSC.

6.2 Progress in 2011

The progress with the implementation of recommendations in 2011 is shown in Table 4. The status of thirty three recommendations did not change in 2011, of which thirteen were issued in 2011. The status of eight recommendations was upgraded from open to complete, of which four were issued in 2011. The status of three recommendations was upgraded from open to closed. The status of eleven recommendations was upgraded from complete to closed. The status of five recommendations was reverted from complete to open.

Table 4 – Progress with recommendations in 2010

Status	End 2010	New in 2011	End 2011
Open	21	13	29
Complete	23	4	17
Closed	16	0	31
Total	60	17	77

In 2011, RSC held progress meetings with IÉ in March, August, September and November on recommendations. The progress with recommendations relating to Luas was discussed at the supervision meetings with Veolia which were held in February, May, September, November and December. An update is included in the Appendix on the status of individual recommendations that were not closed prior to 2011 and the recommendations are listed in chronological order by investigation report. For clarity a comment has been included on the status of individual recommendations.

6.3 Summary of status of recommendations

As of the 31st December 2011 the RAIU have made 63 recommendations, in addition to these the RAIU have included the 14 recommendations made by RSC in its investigation report published in 2006 on the collapse of the Cahir viaduct in 2003. All recommendations were accepted by their Addressee and the Implementer. The status of the recommendations as of the end of 2011 is included in Table 5.

Table 5 – Status of recommendations by year

Year	Recommendations	Accepted by implementer	Open		Complete		Closed	
			No.	%	No.	%	No.	%
2006	14*	14	2	14.3	2	14.3	10	71.4
2007	-	-	-	-	-	-	-	-
2008	7	7	3	42.86	1	14.28	3	42.86
2009	13	13	3	23.08	2	15.38	8	61.54
2010	26	26	10	38.46	8	30.77	8	30.77
2011	17	17	13	76.47	4	23.53	0	-
Total	77	77	31		17		29	

*Recommendations issued by the RSC

The overall progress with the closure of recommendations is shown in Figure 16. Over a third of all recommendations have been closed and over twenty percent of recommendations are at a stage where the organisation responsible for implementing them believes they have been fully addressed.

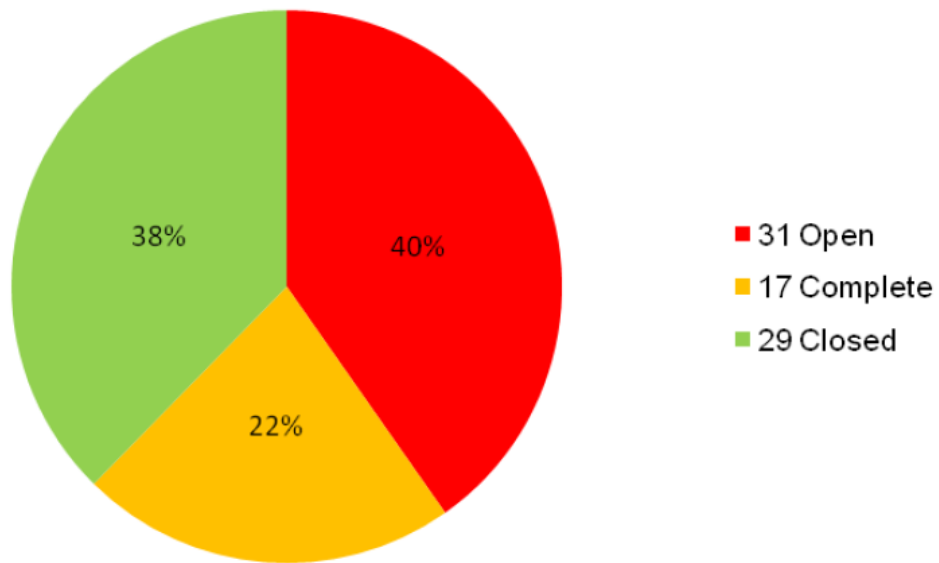


Figure 13 – Status of recommendations

Appendix – Status of individual recommendations by report

Investigation report no.	None	Issued	July 2006
Inquiry into the Derailment of a Freight Train at Cahir Viaduct on 7th October 2003			
Recommendations			Total no. 14
2006-001	<p>IÉ should conduct a review of its safety management system to identify all areas where design, inspection and maintenance procedures are not fully developed and documented, and should establish a programme to develop and implement the necessary specifications and standards prioritised on the basis of safety risk. The content and structure of each specification or standard should reflect the safety criticality of the various elements of the associated procedure or physical asset.</p>		
Comment	No change of status in 2011.		Status
			Complete
2006-003	<p>IÉ should review the derailment containment arrangements on its various structures and make whatever modifications might be required to ensure that they are fit for purpose and capable of preventing disproportionate failure.</p>		
Comment	No change of status in 2011.		Status
			Open
2006-009	<p>IÉ should ensure that, pending full implementation and validation of new data management systems including those currently in course of development, comprehensive and up to date records of infrastructure asset inspection and maintenance are maintained and that relevant data is effectively promulgated to inspectors, maintainers and managers.</p>		
Comment	Status reverted from complete to open in 2011.		Status
			Open
2006-015	<p>IÉ should review its existing communications systems and take whatever action is necessary to ensure that on all parts of system train drivers are provided with an effective means of communication with the controlling signalman.</p>		
Comment	No change of status in 2011. Note: Recommendation 2006-014 does not exist.		Status
			Complete

Investigation report no. 07062801		Issued 18 th June 2008	
Report into the Collision at Level Crossing XN 104 between Ballybrophy and Killonan on the 28th of June, 2007			
Recommendations			Total no. 7
2008-001	IÉ to review the various sources of information relevant to level crossings and develop a standard, or suite of standards, consolidating information on: civil engineering specifications; signage specifications; visibility of approaching trains; and inspection and maintenance. Ensuring effective implementation and compliance		
	Comment	No change of status in 2011.	Status Open
2008-002	IÉ to develop a robust system that identifies current landowners who have crossings on their property and records the delivery of information to them. This should include the distribution of information to known contractors and should consider timely reminders coming up to the silage season.		
	Comment	No change of status in 2011.	Status Complete
2008-003	IÉ to develop and implement a vegetation management programme that addresses vegetation management on a risk basis, prioritising high risk areas.		
	Comment	Status reverted from complete to open in 2011. This recommendation was reiterated twice by RAIU in 2011 as part of investigation reports 2011-005 and 2011-006.	Status Open
2008-004	IÉ to ensure that a system is put in place for effective implementation of existing standards and to manage the timely introduction of new and revised standards, this should include departmental instructions.		
	Comment	Status reverted from complete to open in 2011.	Status Open
2008-005	IÉ to review the standards relating to on-board data recorders, ensuring that correct operation, accuracy and post incident downloads are effectively addressed.		
	Comment	Status upgraded from open to closed in 2011.	Status Closed

Investigation report no.		08022801	Issued		2 nd March 2009	
Report into the Fatality at Level Crossing XX 032 between Ballina and Manulla Junction on the 28th of February 2008						
Recommendations					Total no.	4
2009-001	The RSC should carry out a review of the suitability of this type of level crossing on public roads. This review should include, but not be limited to, factors such as continual misuse, signage, user mobility, environmental and human factors.					
	Comment	No change of status in 2011. Due for completion by the end of the first quarter of 2012.			Status	Open
2009-002	IÉ should, taking into account the close proximity of the three level crossings, close or upgrade some or all of these crossings.					
	Comment	No change of status in 2011. Two planning applications have been rejected, one for the closure of XX31 and a second for the construction of a bridge over the railway line to replace XX31 with a road linking XX32 and XX33.			Status	Open
2009-003	IÉ must identify crossings that are regularly misused and take proactive action to manage the increased risk created by this misuse.					
	Comment	No change of status in 2011. This recommendation was reiterated by RAIU in 2011 as part of investigation report 2011-007.			Status	Complete
2009-004	IÉ are to put in place procedures that will capture and manage near miss reports.					
	Comment	Status upgraded from complete to closed in 2011.			Status	Closed

Investigation report no. 08011001 Issued 6 th April 2009			
Report into the derailment of a Tara Mines freight train at Skerries on the 10th of January 2008			
Recommendations			Total no. 2
2009-005	IE should put in place a risk based process to ensure ongoing review of the suitability of the temperature settings of the Hot Axle Box Detectors.		
	Comment	Closed in 2010. RAIU found through an investigation commenced in 2011 that several reviews have taken place but there is no documented process implementing this recommendation.	Status
			Closed

Investigation report no. 08073101		Issued 29 th July 2009	
Collision between a train and a road vehicle at level crossing XN125, Cappadine, on the Ballybrophy to Killonan line 31st of July 2008			
Recommendations			Total no. 2
2009-009	<p>IÉ should assess the risks relating to road users' behaviour in identifying a safe stopping position at User Worked Level Crossings and based on the outcome of this risk assessment, IÉ should introduce measures to allow safe use of this type of level crossing. This recommendation was reiterated by RAIU in 2011 as part of investigation report 2011-007.</p>		
	Comment	No change of status in 2011.	Status
			Open
2009-010	<p>IÉ should carry out risk assessments on level crossings that fail to meet the viewing distances specified in the RSC guidance and implement appropriate measures in order to meet this guidance as a minimum.</p>		
	Comment	Status upgraded from open to complete in 2011.	Status
			Complete

Investigation report no.		08120201	Issued		1 st December 2009	
Collision of a train with the gates of level crossing XH066, Bridgetown, on the Limerick Junction to Rosslare Strand line, 2nd of December 2008						
Recommendations					Total no.	3
2009-011	IÉ should review the training and competency management of gatekeepers and signalling maintenance personnel.					
	Comment	Status upgraded from complete to closed in 2011.			Status	Closed
2009-012	IÉ should review the design of signal indicators to ensure their design encourages correct interpretation.					
	Comment	Status upgraded from complete to closed in 2011.			Status	Closed
2009-013	The RSC should audit IÉ's training and competency management system to verify its effectiveness.					
	Comment	Status upgraded from open to closed in 2011.			Status	Closed

Investigation report no. 2010-R001				Issued 4 th March 2010	
Collision of a Locomotive with Passenger Carriages at Plunkett Station in Waterford on the Limerick to Rosslare Line, 29th of March 2009					
Time & Date		20:12, 29 th March 2009		Location Plunkett Station, Waterford city	
Railway		IÉ		Line Limerick to Rosslare line	
Recommendations					Total no. 2
2010-001	IÉ should review their systems for training and competency management of signalmen ensuring working as a relief signalman is taken into account.				
	Comment	Status upgraded from open to closed in 2011.			Status
					Closed
2010-002	IÉ should ensure procedures are put in place for the operation and maintenance of the MU-2-B1 valves.				
	Comment	Status upgraded from complete to closed in 2011.			Status
					Closed

Investigation report no. R2010-003				Issued 10 th June 2010	
Derailment of an on track machine at Limerick Junction Station on the Dublin to Cork Line, 3rd of July 2009					
Time & Date 04:50, 3 rd July 2009		Location Limerick Junction Station			
Railway IÉ		Line Dublin to Cork line			
Recommendations					Total no. 2
2010-003	IÉ should put in place a formalised process to ensure that life expired points are removed from service, where this is not possible a risk assessment should be carried out and appropriate controls should be implemented to manage the risks identified.				
	Comment	Status upgraded from open to complete in 2011.			Status Complete
2010-004	IÉ should ensure On Track Machine maintenance personnel are trained and competent to examine the wheelsets.				
	Comment	Status upgraded from complete to closed in 2011.			Status Closed

Investigation report no.		2010-R004	Issued		16 th August 2010
Malahide Viaduct Collapse on the Dublin to Belfast Line, on the 21st August 2009					
Time & Date		18:20, 21 st August 2009	Location		Malahide viaduct
Railway		IE	Line		Dublin to Belfast line
Recommendations					Total no. 15
2010-005	IE should put appropriate interface processes in place to ensure that when designated track patrolling staff (who report to two or more divisional areas) are absent from their patrolling duties, that appropriate relief track patrolling staff are assigned to perform these patrolling duties.				
	Comment	Status upgraded from complete to closed in 2011. A permanent way inspectors' map has been produced that identifies the area of responsibility for patrol gangers, these areas no longer overlap.			Status Closed
2010-006	IE should amend the Track Patrolling Standard, I-PWY-1307, to remove the requirement for track patrollers to carry out annual checks for scour.				
	Comment	Status upgraded from complete to closed in 2011.			Status Closed
2010-007	IE should formalise their 'Civil Engineering and Earthworks Structures: Guidance Notes on Inspections Standard', I-STR-6515, which should include guidance for inspectors on conducting inspections and identifying structural defects. On formalising this document IE should re-issue, in the appropriate format, to all relevant personnel.				
	Comment	Status upgraded from complete to closed in 2011.			Status Closed
2010-008	IE should introduce a verification process to ensure that all requirements of their Structural Inspections Standard, I-STR-6510, are carried out in full.				
	Comment	No change of status in 2011.			Status Complete
2010-009	IE should ensure that a system is put in place for effective implementation of existing standards and to manage the timely introduction of new and revised standards.				
	Comment	Status reverted from complete to open in 2011. Departmental quality management system standards relating to document management are being issued.			Status Open
2010-010	IE should ensure that a programme of structural inspections is started immediately in accordance with their Standard for Structural Inspection, I-STR-6510, and ensure that adequate resources are available to undertake these inspections.				
	Comment	Status upgraded from complete to closed in 2011.			Status Closed

2010-011	IÉ should carry out inspections for all bridges subject to the passage of water for their vulnerability to scour, and where possible identify the bridge foundations. A risk-based management system should then be adopted for the routine examination of these vulnerable structures.			
	<table border="1"> <tr> <td data-bbox="352 376 517 472">Comment</td> <td data-bbox="517 376 1257 472">No change of status in 2011. The project to implement this recommendation is in progress.</td> <td data-bbox="1257 376 1396 472">Status Open</td> </tr> </table>	Comment	No change of status in 2011. The project to implement this recommendation is in progress.	Status Open
Comment	No change of status in 2011. The project to implement this recommendation is in progress.	Status Open		
2010-012	<p>IÉ should develop a documented risk-based approach for flood and scour risk to railway structures through:</p> <ul style="list-style-type: none"> Monitoring of scour risk at sites through scour depth estimation, debris and hydraulic loading checks, and visual and underwater examination; Provision of physical scour / flood protection for structures at high risk; Imposing of line closures during periods of high water levels where effective physical protection is not in place. 			
	<table border="1"> <tr> <td data-bbox="352 801 517 898">Comment</td> <td data-bbox="517 801 1257 898">No change of status in 2011. Environmental plans are being developed.</td> <td data-bbox="1257 801 1396 898">Status Open</td> </tr> </table>	Comment	No change of status in 2011. Environmental plans are being developed.	Status Open
Comment	No change of status in 2011. Environmental plans are being developed.	Status Open		
2010-013	IÉ should adopt a formal process for conducting structural inspections in the case of a report of a structural defect from a member of the public.			
	<table border="1"> <tr> <td data-bbox="352 994 517 1090">Comment</td> <td data-bbox="517 994 1257 1090">No change of status in 2011. Staff notices are posted on a regular basis.</td> <td data-bbox="1257 994 1396 1090">Status Complete</td> </tr> </table>	Comment	No change of status in 2011. Staff notices are posted on a regular basis.	Status Complete
Comment	No change of status in 2011. Staff notices are posted on a regular basis.	Status Complete		
2010-014	IÉ should introduce a training, assessment and competency management system in relation to the training of structural inspectors, which includes a mentoring scheme for engineers to gain the appropriate training and experience required to carry out inspections.			
	<table border="1"> <tr> <td data-bbox="352 1276 517 1373">Comment</td> <td data-bbox="517 1276 1257 1373">Status upgraded from complete to closed in 2011. A competency management standard has been issued.</td> <td data-bbox="1257 1276 1396 1373">Status Complete</td> </tr> </table>	Comment	Status upgraded from complete to closed in 2011. A competency management standard has been issued.	Status Complete
Comment	Status upgraded from complete to closed in 2011. A competency management standard has been issued.	Status Complete		
2010-015	IÉ should review their network for historic maintenance regimes and record this information in their information asset management system. For any future maintenance regimes introduced on the network, IÉ should also record this information in their information asset management system.			
	<table border="1"> <tr> <td data-bbox="352 1559 517 1655">Comment</td> <td data-bbox="517 1559 1257 1655">No change of status in 2011.</td> <td data-bbox="1257 1559 1396 1655">Status Open</td> </tr> </table>	Comment	No change of status in 2011.	Status Open
Comment	No change of status in 2011.	Status Open		
2010-016	IÉ should incorporate into their existing standards the requirement for the input of asset information into the technical database system upon completion of structural inspections.			
	<table border="1"> <tr> <td data-bbox="352 1794 517 1877">Comment</td> <td data-bbox="517 1794 1257 1877">Status upgraded from complete to closed in 2011.</td> <td data-bbox="1257 1794 1396 1877">Status Closed</td> </tr> </table>	Comment	Status upgraded from complete to closed in 2011.	Status Closed
Comment	Status upgraded from complete to closed in 2011.	Status Closed		

2010-017	IÉ should carry out an audit of their filed and archived documents, in relation to structural assets, and input this information into their information asset management system.	Comment Status reverted from complete to open in 2011. Archiving of bridge data is taking place.	Status Open
2010-018	The RSC should review their process for the closing of recommendations made to IÉ by independent bodies, ensuring that they have the required evidence to close these recommendations. Based on this process the RSC should also confirm that all previously closed recommendations satisfy this new process.	Comment No change of status in 2011. RSC has reviewed and updated its procedures for the management of safety recommendations, which will be published in the first quarter of 2012. A review of the safety recommendations issued by AD little and IRMS is taking place.	Status Open
2010-019	The RSC, in conjunction with IÉ, should develop an action plan in order to close all outstanding recommendations in the AD Little Review (2006) and the International Risk Management Services Reviews (1998, 2000, 2001). This action plan should include defined timescales for the implementation and closure of all these recommendations.	Comment No change of status in 2011. A review of the safety recommendations issued by AD little and IRMS is taking place.	Status Open

Investigation report no. 2010-R005				Issued 24 th August 2010		
Irregular operation of Automatic Half Barriers at Fern's Lock, County Kildare, on the Dublin to Sligo Line, 2nd September 2009						
Occurrence date		2 nd September 2009		Location		
Level crossing XG019		Railway		Dublin to Sligo line		
IÉ		Line		Dublin to Sligo line		
Recommendations					Total no.	1
2010-020	IÉ should review the competencies of all signalmen to ensure that when signalmen are assigned relief duties they have the required training and experience to perform these duties appropriately.					
Comment		No change of status in 2011.			Status	
					Open	

Investigation report no.		2010-R006	Issued		15 th November 2010
Derailment of empty train due to collision with landslip debris outside Wicklow Station, 16 th of November 2009					
Occurrence date		16 th November 2009	Location		28 ½ milepost
Railway		IE	Line		Dublin to Rosslare Europort
Recommendations					Total no. 6
2010-021	IE should review their vegetation management processes to ensure that vegetation covering substantial earthworks structures is adequately maintained to facilitate the monitoring and inspection of earthwork structures by patrol gangers and other inspection staff.				
	Comment	No change of status in 2011. A vegetation management standard is being developed.			Status Open
2010-022	IE should review the effectiveness of their standards in relation to conducting earthworks inspections during periods of heavy rainfall, ensuring that earthworks vulnerable to failure are inspected during these periods by appropriately trained patrol gangers or inspectors.				
	Comment	Status upgraded from open to complete in 2011.			Status Complete
2010-023	IE should review their Standard for Track Patrolling, I-PWY-1307, for its effectiveness in identifying any third party activities that occur inside and outside the railway boundaries that could affect safety and where any deficiencies are found, IE should develop an alternative process for the identification of these third party activities.				
	Comment	No change of status in 2011.			Status Complete
2010-024	IE should review their structures list and ensure that all earthworks are identified and included on this list. Upon updating this list, a programme for the inspection of earthworks is to be developed and adopted at the frequency requirements set out by the Structural Inspections Standard, I-STR-6510.				
	Comment	No change of status in 2011.			Status Open
2010-025	IE and the RSC should review their process for the issuing of guidance documents, to ensure that the third parties affected by these guidance documents are made aware of their existence.				
	Comment	Status upgraded from open to complete in 2011. IE have updated their website to include a page on third party works. RSC is reviewing its processes.			Status Complete

2010-026	IÉ should review the effectiveness of their Structural Inspections Standard, I-STR-6510, with consideration for the possibility of more thorough inspections being carried out on cuttings to establish the topography and geotechnical properties of cuttings; and from this information identify any cuttings that are vulnerable to failure.
Comment	No change of status in 2011.
Status	Complete

Investigation report no. 2011-R001				Issued 19 th January 2011			
Laois Traincare Depot Derailment, 20 th January 2010							
Occurrence date		20 th January 2010		Location		Laois Traincare Depot	
Railway		IÉ		Line		Dublin to Cork line	
Recommendations						Total no. 2	
2011-001	IÉ should ensure that the risks relating to use of spring assisted manual points are identified and that appropriate control measures are implemented based on the risks identified.						
	Comment	No change of status in 2011.					Status
2011-002	IÉ should ensure that the Signal Sighting Committee is informed when train drivers report difficulties viewing a signal and the Signal Sighting Committee should verify that the reported difficulties are addressed effectively.						
	Comment	Status upgraded from open to complete in 2011.					Status

Investigation report no.		2011-R002	Issued		5 th May 2011
Secondary suspension failure on a train at Connolly Station, 7 th May 2010					
Occurrence date		7 th May 2010	Location		Connolly Station
Railway		IÉ	Line		Dublin to Sligo line
Recommendations					Total no. 3
2011-003	IÉ should ensure all work in rolling stock maintenance depots is carried out in accordance with its control process.				
	Comment	Status upgraded from open to complete in 2011.			Status
					Complete
2011-004	IÉ should review its process of managing the hazard log in relation to the Class 29000s to ensure the adequacy of this process and verify that implementation of closure arguments in the hazard log is effective.				
	Comment	No change of status in 2011.			Status
					Open
2011-005	IÉ should evaluate the risks relating to failure of the centre pivot pin to perform its function due to over-inflation of the secondary suspension and determine if any design modifications are required to avoid future failures.				
	Comment	No change of status in 2011.			Status
					Open

Investigation report no. 2011-R003				Issued 11 th May 2011	
Tram derailment at The Point stop, Luas Red Line, 13th May 2010					
Occurrence date 11 th May 2010		Location The Point stop			
Railway IÉ		Line Luas Red line			
Recommendations					Total no. 1
2011-006	Veolia should introduce a communication protocol between normal and emergency for given situations where a clear understanding between a tram driver and Central Control Room are required.				
	Comment	Status upgraded from open to complete in 2011.			Status
					Complete

Investigation report no.		2011-R004	Issued		27 th June 2011
Gate Strike at Buttevant Level Crossing (XC 219), County Cork, on the 2nd July 2010					
Occurrence date		2 nd July 2010	Location		Level crossing XC219
Railway		IÉ	Line		Dublin to Cork line
Recommendations					Total no. 2
2011-007	IÉ should identify similar manned level crossings where human error could result in the level crossing gates being opened to road traffic when a train is approaching; where such level crossings exist, IÉ should implement engineered safeguards; where appropriate.				
	Comment	No change of status in 2011.			Status
					Open
2011-008	IÉ should review its risk management process for manned level crossings to ensure that risks are appropriately identified, assessed and managed to ensure that existing level crossing equipment is compliant with criteria set out in IÉ's signalling standards, where appropriate.				
	Comment	Status upgraded from open to complete in 2011.			Status
					Complete

Investigation report no. 2011-R005				Issued 18 th July 2011	
Person struck at level crossing XE039, County Clare, 27th June 2010					
Occurrence date 27 th June 2010		Location Level crossing XE039			
Railway IÉ		Line Limerick to Claremorris line			
Recommendations				Total no. 3	
2011-009	IÉ should ensure that risk assessments are produced for all user worked level crossings to identify all hazards specific to particular level crossings.				
	Comment	No change of status in 2011.			Status
					Open
2011-010	IÉ should review their documentation on the measurement of viewing distances at existing user worked level crossings to ensure that the viewing distances provide sufficient views of approaching trains to allow level crossing users cross safely.				
	Comment	No change of status in 2011.			Status
					Open
2011-011	IÉ should review their procedures for the management of accidents to ensure that communication with the emergency services is clear and provides the necessary information to locate an accident site without undue delay and access it by the most appropriate point.				
	Comment	No change of status in 2011.			Status
					Open
Note	Recommendation 2008-003 from investigation report 07062801 was reiterated.				

Investigation report no. 2011-R006				Issued 4 th October 2011	
Road vehicle struck at level crossing XM096, County Roscommon, 2nd September 2010					
Occurrence date 2 nd September 2010		Location Level crossing XM096			
Railway IÉ		Line Athlone to Westport line			
Recommendations					Total no. 5
2011-012	IÉ should put in place a formal process for identifying and communicating with known users of user worked level crossings.				
	Comment	No change of status in 2011.			Status
					Open
2011-013	IÉ should review the effectiveness of its signage at user worked level crossings, and amend it where appropriate, taking into account the information provided in the level crossing user booklet. The review should include the information on the use of railway signals, what to do in case of difficulty when crossing the railway and ensuring the signage is illustrated in a clear and concise manner, taking into account current best practice and statutory requirements.				
	Comment	No change of status in 2011.			Status
					Open
2011-014	IÉ should update its risk management system to ensure that interim control measures are put in place where longer term controls to address risks require time to implement.				
	Comment	No change of status in 2011.			Status
					Open
2011-015	IÉ should review how it determines the safe crossing time for user worked level crossings to ensure the safe crossing time allows adequate time for movements and includes a safety margin, over and above the crossing time.				
	Comment	No change of status in 2011.			Status
					Open
2011-016	IÉ should review its use of disused rail as fencing at user worked level crossings to ensure it cannot potentially increase the severity of a collision and where this is the case, replace the disused rail with appropriate fencing.				
	Comment	No change of status in 2011.			Status
					Open
Note	Recommendation 2008-003 from investigation report 07062801 was reiterated.				

Investigation report no. 2011-R007 Issued 19 th October 2010			
Car Strike at Knockaphunta Level Crossing (XM250), County Mayo, 24th October 2010			
Occurrence date	24 th October 2010	Location	Level crossing XM250
Railway	IÉ	Line	Athlone to Westport line
Recommendations			Total no. 1
2011-017	IÉ should upgrade the Level Crossing to ensure that the operation of the Level Crossing is not reliant on any direct action by the level crossing user.		
	Comment	No change of status in 2011. A planning application has been granted to replace the level crossing with a bridge over the railway line.	Status Open
Note	Recommendation 2009-003 from investigation report 08022801 and recommendation 2009-009 from investigation report 08073101 were reiterated.		



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