

# Railway Accident Investigation Unit (Ireland) Annual Report 2009

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## Document History

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1	19/10/2010	Correction of typographical errors in preface, Sections 2, 3, 4. Removal of incident types in Section 4. Change of footer.

## **Preface**

This is the Railway Accident Investigation Unit's Annual Report for 2009. It is created in accordance with the European Railway Safety Directive (2004/49/EC) and the Railway Safety Act 2005. The report is in four sections, as described below:

Section 1	Review of activities in 2009
Section 2	Introduction to the RAIU, its function and territory
Section 3	Summary of RAIU investigations opened in 2009
Section 4	Summary of RAIU recommendations

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## **1 Review of 2009**

In the last annual report it was explained that there was the successful appointment of two senior investigators and one investigator. As of early 2009, all investigators have commenced their roles within the RAIU.

The processes and procedures of the investigations unit continue to be developed and formalised.

In 2009, the RAIU started eight investigations into incidents and accidents.

## **2 Introduction to the RAIU**

### **2.1 Function of the RAIU**

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 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.

### **2.2 European Legal Framework**

The European Railway Safety Directive 2004/49/EC (the Directive) of 29 April 2004 aims to secure continuous improvement of safety as Europe's railways become more integrated. It also requires the establishment of independent accident investigation bodies in the member states and sets out the principles of mandatory investigations of serious accidents and incidents. The establishment of the RAIU meets Ireland's duty under this Directive.

### **2.3 RAIU and the RSC**

For the purposes of European legislation the RSC comprises two bodies, i.e., the National Safety Authority (NSA) responsible for regulating railway safety, and the National Investigation Body that conducts causal investigations of railway incidents. Though these bodies share administration and corporate governance, they are functionally separate as required under Directive 2004/49/EC. The RSC carry out safety approvals, auditing and monitoring, enforcement and investigation monitoring. The RAIU carry out causal investigations.

The Irish government has decided to merge the railway, aviation and marine investigation functions into one multi modal office, giving them total independence from the regulatory bodies.

## **2.4 RAIU's Territory**

The RAIU is charged with the investigation of incidents and accidents on the public railways. These comprise Iarnród Éireann (IÉ), LUAS operator Veolia, those heritage railways that are open to the public, of which there are currently ten, and those parts of the Bord na Móna industrial railway that interface with the public.

RAIU investigates accidents on the interoperable Irish railway network. This network has a track gauge of 1602mm. It is interoperable with the railway system in Northern Ireland, which falls under the jurisdiction of the United Kingdom's National Investigation Body, the Railway Accident Investigation Branch (RAIB).

## **2.5 Prior to the establishment of the RAIU**

Ireland's NSA, the RSC, conducted investigations into serious accidents prior to the establishment of the RAIU. One of these investigations is the investigation into the Cahir Viaduct Derailment Accident. The RSC conducted this formal investigation as the RAIU was not established at this time, however, the RAIU continue to monitor this investigation as not all the recommendations made by the RSC have been closed by IÉ.

### 3 Investigations opened in 2009

#### 3.1 Collision of a Locomotive with Passenger Carriages at Plunkett Station, Waterford, on the 29th of March 2009

On the 29<sup>th</sup> of March 2009 at 20.12 hours (hrs) the 17.35 hrs service from Dublin to Waterford arrived at Plunkett Station in Waterford. The carriages were uncoupled from the locomotive in order to move the locomotive from one end of the carriages to the other. During this move the locomotive was incorrectly routed back towards the carriages and collided with them. The locomotive was being driven from the rear cab at the time of the collision. The four wheels on one bogie of the first carriage struck derailed and a shunter, who was at the rear of the carriages at the time, was struck. The shunter was hospitalised and released the same day. Two other members of staff suffered minor injuries. There were no fatalities. There were no passengers on the carriages at the time of the accident.

#### 3.2 Derailment of an On Track Machine at Limerick Junction on the 3rd of July 2009

At approximately 04.50 hrs on the 3<sup>rd</sup> of July 2009 an IÉ regulator and tamper were travelling at less than 10 kilometres per hour from the down main line to the sidings at Limerick Junction station when the leading axle derailed. The points were set for the movement and the shunt signal was displaying a proceed aspect at the time of the derailment. The points and shunt signal were operated mechanically from the Limerick Junction South cabin. The down main line was blocked by the derailment.



Photograph 1 – Points at Limerick Junction

### 3.3 Derailment of LUAS tram at Connolly Station, LUAS Red Line, Dublin 16th of July 2009

On the 16<sup>th</sup> of July 2009 at approximately 17.10 hrs, a tram crewed by the driver, exited Connolly Station (Dublin City Centre) outbound towards Tallaght (South County Dublin).



Photograph 2 – Derailed LUAS at Connolly Stop

Whilst travelling outbound the tram driver heard a loud bang and stopped the tram. Off-duty LUAS staff were present at the scene and checked the tram, not noticing any sign of derailment, however they did notice what appeared to be an item of clothing under the tram. The driver then continued a short distance before stopping when seeing the driving cab was swerving towards the wall which ran parallel to the tracks, due to the second wheelset of the tram travelling in the diverging direction.. The driver then derailed the passengers from the rear of the tram. There were no injuries to passengers.



### 3.4 Collapse of Malahide Viaduct on the 21<sup>st</sup> of August 2009

At approximately 18.07 hrs on the 21<sup>st</sup> of August 2009, a train driver, travelling between Donabate and Malahide Stations over the Broadmeadow Estuary in north County Dublin, reported a partial collapse of the Malahide viaduct. The viaduct is a 176 metre structure, with eleven stone masonry piers, which support a concrete deck.



Photograph 3 – Malahide Viaduct Collapse

The train driver immediately called the controlling signalman who isolated the track section on the viaduct and stopped all train services travelling over the viaduct. A rock weir runs between the piers of the viaduct mitigating the effects of tidal flow on the viaduct. When the RAIU arrived at the site, one of the supporting masonry piers of the viaduct had crumbled, causing a twenty metre section of the deck (track, sleepers and ballast) to collapse.

Initial investigations of the viaduct structure, indicate that scour undermining of the pier was a causal factor to the accident.

### 3.5 Irregular operation of Ferns Lock Automatic Half Barrier on the 2<sup>nd</sup> of September 2009

On Wednesday 2<sup>nd</sup> September 2009 the 11.00 hrs passenger service from Sligo to Connolly passed through Ferns Lock Automatic Half Barrier level crossing at 13.33 hrs while the barriers were in an upright position. At the time of the incident the crossing was in a degraded operation under the control of an Emergency Operator. The Emergency Operator was on the line at the time of the incident.



Photograph 4 – Ferns Lock Automatic Half Barrier

### 3.6 LUAS tram collides with a bus on O'Connell Street, Dublin on the 16<sup>th</sup> of September 2009

On Thursday the 16<sup>th</sup> September 2009, a LUAS tram collided with a double-decker Dublin Bus at the junction of Abbey Street and O'Connell Street in Dublin City Centre. Twenty-one people were treated at hospital, three of whom were seriously injured.



Photograph 5 – LUAS tram collision with double decker bus

### 3.7 Derailment of an empty railcar at Wicklow on the 16<sup>th</sup> of November 2009

At approximately 06.30 hrs on the 16<sup>th</sup> of November 2009, an empty railcar struck a landslide South of Wicklow Station and the first vehicle had derailed all wheels with the railcar coming to rest with the front of the vehicle elevated by approximately one metre above rail level. The unit was an empty coaching stock service. The landslide was of a substantial size and stretched across the base of the cutting. Likely contributory factors include soil saturation of clay subsoil from heavy rain and deposition of large volumes of soil by a third party at the top of the cutting.



Photograph 5 – Wicklow derailment

## 4 Recommendations

### 4.1 Introduction to recommendations

The RAIU continue to monitor the closing out of recommendations and liaise with the RSC to ensure that the recommendations are understood and closed promptly. The status recommendations is described as either open, complete or closed, as described below:

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.

## 4.2 Recommendations made in 2009

This section of the report provides a summary of the accident or incidents recommendations made in 2009, as well as providing details on their status as of the 31<sup>st</sup> December 2009.

<b>Fatality at Level Crossing XX 032</b>			
<b>Date &amp; Time:</b> 11.07 hours, 28 <sup>th</sup> February 2008	<b>Location:</b> Knockshanbally, County Mayo		
<b>Report No.:</b> 08022801	<b>Report Issue Date:</b> 2 <sup>nd</sup> March 2009		
<b>Railway Undertaking:</b> Iarnród Éireann	<b>Line:</b> Ballina branch line		
<p>On the 28<sup>th</sup> of February 2008 the 10.50 hrs service from Ballina to Manulla Junction passenger train collided with a car at user operated level crossing XX 032. The car became lodged at the front of the train and remained there until the train came to a stop approximately 350 metres from the point of collision. The train did not derail. The sole occupant of the car was fatally injured. There was a train driver and one passenger on the train at the time of the collision, neither were injured. The train was removed from the scene of the accident to Ballina at 19.10, allowing the line to be reopened. The immediate cause of the accident was that the vehicle was driven onto crossing XX 032 as the train approached, as the gates of the level crossing were open when the car approached the crossing. It was found that level crossing XX 032 and other local level crossings were habitually misused, with gates being left open on a regular basis.</p>			
<b>Number of Recommendations:</b> There were four recommendations made.			
<b>Recommendation</b>	<b>2009-001</b>	<b>Status</b>	<b>Complete</b>
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.			
<b>Comment</b>			
The RSC have completed at draft review of the suitability of this type of level crossing on public roads.			
<b>Recommendation</b>	<b>2009-002</b>	<b>Status</b>	<b>Open</b>
IÉ should, taking into account the close proximity of the three level crossings, close or upgrade some or all of these crossings.			
<b>Comment</b>			
IÉ submitted a proposal to the County Council for the closure of the three level crossings, with an alternative route suggested under an underbridge, however, there have been a number of objections to An Bord Pleanála in relation to this decision.			
<b>Recommendation</b>	<b>2009-003</b>	<b>Status</b>	<b>Open</b>
IÉ must identify crossings that are regularly misused and take proactive action to manage the increased risk created by this misuse.			

<b>Comment</b>			
IÉ do identify crossings that are regularly misused, these crossing users who misuse the crossing facilities are written to and depending on the severity of the incident, the previous behavior of the user and the availability of information collected by Train Drivers or by cameras, prosecutions are taken by the Gardai			
<b>Recommendation</b>	2009-004	<b>Status</b>	<b>Open</b>
IÉ are to put in place procedures that will capture and manage near miss reports.			
<b>Comment</b>			
Near misses are reported by drivers etc and are recorded in a database and appropriate action plans developed. Overt CCTV has been provided at some crossings. Successful prosecutions have been brought against some individuals using such recordings as evidence.			

<b>Derailment of a Tara Mines freight train</b>			
<b>Date &amp; Time:</b> 22.53 hrs, 10 <sup>th</sup> of January 2008		<b>Location:</b> Skerries, County Dublin	
<b>Report No.:</b> 08011001		<b>Report Issue Date:</b> 6 <sup>th</sup> April 2009	
<b>Railway Undertaking:</b> Iarnród Éireann		<b>Line:</b> Dublin – Belfast	
At 22.53 hrs on the 10 <sup>th</sup> of January, 2008, a Tara Mines freight train consisting of a locomotive and eleven wagons derailed south of Skerries station. The first wagon of the train suffered a burnt off axle journal due to a catastrophic bearing failure, it derailed at the 17 ½ milepost and continued to travel a further 230 yards, damaged crossover SK 244 resulting in the derailment of five further wagons before the train came to a stop. Moderate damage was sustained by the leading wagon, the remaining derailed wagons suffered wheel impact damage, there was damage to sleepers over a distance of 230 yards and components of crossover SK 244 were broken. There were no injuries and there was no release of the zinc concentrate that the wagons were transporting at the time. A Hot Axle Box Detector (HABD) reading of 56 degrees Celcius was recorded eleven miles before the point of derailment, however, no alarm was triggered due to the detector's alarm temperature settings and the train continued its journey. In addition, the bearing appears to have been in operation since its manufacture in 1981 without undergoing overhaul. The immediate cause of the derailment was the catastrophic failure of bearing 633A leading to a Burnt Off Journal. Probable contributory factors were that the HABD settings not triggering an alarm and the lack of a robust bearing maintenance regime. An underlying cause to the accident was the failure to detect bearing deterioration.			
<b>Number of Recommendations:</b> There were two recommendations made.			
<b>Recommendation</b>	2009-005	<b>Status</b>	<b>Closed 2009</b>
IÉ should put in place a risk based process to ensure ongoing review of the suitability of the temperature settings of the HABDs.			

<b>Comment</b>			
IE implemented the recommendation. The RSC have closed this recommendation.			
<b>Recommendation</b>	2009-006	<b>Status</b>	<b>Closed 2009</b>
IE are to identify the necessary maintenance requirements for all Class D bearings, including producing detailed maintenance procedures taking into account their operational conditions and allowing for traceability of safety critical components, with assistance being sought from the Original Equipment Manufacturer where appropriate.			
<b>Comment</b>			
IE implemented the recommendation. The RSC have closed this recommendation.			

<b>Near miss at Ballymurray level crossing</b>			
<b>Date &amp; Time:</b> 8.50 hrs, 14 <sup>th</sup> of June 2008		<b>Location:</b> Ballymurray, County Roscommon	
<b>Report No.:</b> 08061401		<b>Report Issue Date:</b> 11 <sup>th</sup> May 2009	
<b>Railway Undertaking:</b> Iarnród Éireann		<b>Line:</b> Athlone – Westport	
On the 14 <sup>th</sup> of June 2008 at 8.50 hrs an empty Diesel Multiple Unit (DMU) travelling from Manulla Junction to Dublin, passed through the raised barriers of Ballymurray level crossing, XM 075. Approximately two seconds prior to the DMU passing, a car crossed through the level crossing and as DMU crossed. The immediate cause of the incident was that the barriers were raised to road traffic while maintenance works was being carried out, as a train approached. The RAIU found that poor communication between the signalman and the Special Class Linesman led to a misunderstanding of when there was a safe margin between trains to allow the maintenance work to be carried out; and that staff had worked together regularly in the past and this familiarity led to an informal approach to communications and therefore did not follow communication procedures. The underlying causes of the incident was the lack of a formal maintenance process for the maintenance of Automatic Half Barriers which should include the communications process and when it was safe to commence work; and the lack of competence auditing system for communications procedures.			
<b>Number of Recommendations:</b> There were two recommendations made.			
<b>Recommendation</b>	2009-007	<b>Status</b>	<b>Closed 2009</b>
Iarnród Éireann should ensure all safety critical staff have undertaken safety critical communications training and that their ongoing competency management systems specifically monitors the quality of safety critical communications.			
<b>Comment</b>			
IE implemented the recommendation. The RSC have closed this recommendation.			
<b>Recommendation</b>	2009-008	<b>Status</b>	<b>Closed 2009</b>
Iarnród Éireann should put in place safe work methods for the maintenance of AHBs, these methods should include risk assessments for any hazards identified in the maintenance of AHBs.			



<b>Comment</b>
IE implemented the recommendation. The RSC have closed this recommendation.

### Collision of a train with a road vehicle at Cappadine level crossing XN125

**Date & Time:** 17.20hrs, 31<sup>st</sup> July 2009

**Location:** Cappadine, County Tipperary

**Report No.:** 08073101

**Report Issue Date:** 29<sup>th</sup> July 2009

**Railway Undertaking:** Iarnród Éireann

**Line:** Ballybrophy – Killonan

On the 31<sup>st</sup> of July 2008 at approximately 17.20 hrs, the IÉ 16.45 hrs service from Limerick to Ballybrophy DMU collided with a road vehicle at level crossing XN125. The train driver saw a road vehicle stopped with its front end protruding onto the railway line. The train driver sounded the horn and made an emergency brake application. The train struck the road vehicle, a Toyota Corolla car, and then continued to travel approximately 130 metres past the level crossing before coming to a stop. The train was crewed by a driver and a ticket checker with four passengers on board at the time of the collision. The car was occupied by a driver and a front seat passenger. There were no injuries, the front of the car was extensively damaged and there was minor damage to the train. The immediate cause of the collision was that the road vehicle stopped in a position fouling the railway line. This was due to the lack of clear marking of a safe stopping position clear of the railway line for road users; and the lack of effectiveness of the whistleboards as a mitigation for inadequate sighting distance. Factors contributing to this accident were the condition of the level crossing surface; the angle at which the road crosses the railway; the changing orientation of the road through the crossing; and the overgrown condition of the vegetation.

**Number of Recommendations:** There were two recommendations made.

Recommendation	2009-009	Status	Open
Iarnród Éireann 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, Iarnród Éireann should introduce measures to allow safe use of this type of level crossing;			

#### Comment

Awaiting report from the review carried out by the RSC on user worked level crossings.

Recommendation	2009-010	Status	Open
IÉ should carry out risk assessments on level crossings that fail to meet the viewing distances specified in the Railway Safety Commission guidance and implement appropriate measures in order to meet this guidance as a minimum.			

#### Comment

A programme is being implemented to improved viewing distances at user worked level crossings.

<b>Collision at Bridgetown level crossing</b>			
<b>Date &amp; Time:</b> 09.40hrs, 2 <sup>nd</sup> December 2008		<b>Location:</b> Bridgetown, County Wexford	
<b>Report No.:</b> 08120201		<b>Report Issue Date:</b> 1 <sup>st</sup> December 2009	
<b>Railway Undertaking:</b> Iarnród Éireann		<b>Line:</b> Limerick Junction – Rosslare Strand	
<p>On the 2<sup>nd</sup> of December 2008 at 09.40 hrs an infrastructure maintenance train approached level crossing XH066 at Bridgetown when the level crossing gates were closed across the railway line. The train struck the gates and came to a stop approximately thirty-nine and a half metres beyond the level crossing. XH066 is a CX type level crossing, meaning that the gates are kept closed across the railway unless a train is passing. After the accident the mechanically operated semaphore signal protecting XH066 was found to be displaying an ON aspect, therefore indicating that trains should be prepared to stop in advance of the gates. The signal was reported by the train crew as displaying an OFF aspect, allowing trains to proceed and expect the gates to be open for rail traffic, at the time the train passed it. No fault was found with the signalling equipment. It was not possible to determine conclusively whether the signal was showing an OFF aspect to allow trains proceed through XH066 or it was displaying an ON aspect indicating that trains should stop in advance of the gates. The gatekeeper suffered shock and the gates of XH066 were destroyed. The immediate cause of the accident was that the train struck the gates of level crossing XH066, which were closed across the railway line. The two possible causal factors identified were either the Down Distant Signal was displaying either a WRONG or an incorrect OFF aspect when the train passed and this led the train crew to expect the gates to be open across the railway; or the train passed the Down Distant Signal whilst it was at ON and the necessary actions to stop the train in advance of XH066 were not taken. Possible contributory factors included ineffective competency management systems, inadequate training and procedures to ensure staff are suitably trained and competent to carry out their duties.</p>			
<b>Number of Recommendations:</b> There were three recommendations made.			
<b>Recommendation</b>	2009-011	<b>Status</b>	<b>Open</b>
Iarnród Éireann should review the training and competency management of gatekeepers and signalling maintenance personnel.			
<b>Comment</b>			
A competence based data base for Signal Electrical & Telecommunications (SET) staff is currently being developed and has been populated with staff names, positions and roles. Specific competencies for signalling front line staff have been allocated on a role basis and the training records for staff to date have been updated into the database. Trial of the new system for SET is expected to begin in June.			
<b>Recommendation</b>	2009-012	<b>Status</b>	<b>Open</b>
Iarnród Éireann should review the design of signal indicators to ensure their design encourages correct interpretation.			
<b>Comment</b>			
A review of the design of the signal indicator is being undertaken by IÉ.			

Recommendation	2003-013	Status	Open
The Railway Safety Commission should audit IE's training and competency management system to verify its effectiveness.			
<b>Comment</b>			
The RSC have finalised its 2010 annual audit programme and an Audit will be undertaken by mid 2010.			

#### 4.3 Recommendations made by the RAIU prior to 2009

<b>Collision at level crossing XN 104</b>			
<b>Date &amp; Time:</b> 20.00, 28 <sup>th</sup> June 2007	<b>Location:</b> Kiltyrome, County Tipperary		
<b>Report No.:</b> 07062801	<b>Report Issue Date:</b> 18 <sup>th</sup> June 2008		
<b>Railway Undertaking:</b> Iarnród Éireann	<b>Line:</b> Ballybrophy – Killonan		
<p>At approximately 20.00 on the 28<sup>th</sup> June, 2007, the 18.55 service from Ballybrophy to Limerick, collided with a tractor and trailer at a farm crossing (XN 104). The crossing is located on the Ballybrophy to Killonan line situated at 35 miles 777 yards in the Roscrea to Birdhill section. The tractor and trailer were returning to a field to collect silage for storage when they were struck by the train. The train was not derailed and came safely to a stop eighty-one metres beyond the crossing. The tractor and trailer uncoupled. The tractor struck fencing and then came to a stop on top of the signalpost, to the right of the direction of travel of the train. The trailer struck fencing and came to a stop in the ditch to the left of the direction of travel of the train. No injuries were reported and arrangements were made for the passengers to continue their journey by bus. The line was reopened on the 29<sup>th</sup> June at 15.45 following the removal of the train, the tractor and trailer, and once repairs had been carried out to signalling equipment, track and the crossing. The cause of the accident was that the tractor driver drove across the railway without stopping and checking for the approach of a train as the gates of the crossing were being left open for movements back and forth while work was going on in the adjacent field. There was also limited visibility of the line from the tractor due to vegetation at the lineside. The tractor driver was unfamiliar with the correct procedure for using unmanned level crossings as set out in IÉ's publication "The SAFE use of unattended Railway Level Crossings".</p>			
<b>Number of Recommendations:</b> There were seven recommendations made.			
<b>Recommendation</b>	<b>2008-001</b>	<b>Status</b>	<b>Open</b>
<p>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.</p>			
<b>Comment</b>			
<p>A standard has been redrafted but has yet to be approved through the established approval process. Any applicable recommendations arising from the study carried out by the RSC on User Worked Level Crossings will be incorporated into the standard.</p>			
<b>Recommendation</b>	<b>2008-002</b>	<b>Status</b>	<b>Complete</b>
<p>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.</p>			

<b>Comment</b>			
IE has a system which identifies landowners, booklets are sent to these landowners by registered post. Landowners are responsible for the distribution of information to contractors. The RSC will follow up with sample audit of landowners adjacent to a specific length of line.			
<b>Recommendation</b>	2008-003	<b>Status</b>	<b>Complete</b>
IE to develop and implement a vegetation management programme that addresses vegetation management on a risk basis, prioritising high risk areas.			
<b>Comment</b>			
A standard is currently being drafted by IE and it is IE's intention that this is in place in 2010. 140 level crossing had works undertaken in 2008 to improve sighting compared to 45 in 2007.			
<b>Recommendation</b>	2008-004	<b>Status</b>	<b>Complete</b>
IE 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.			
<b>Comment</b>			
A 'Managing Infrastructure Standard' is in place within the Chief Civil Engineer's (CCE) Department, which outlines the processes for managing infrastructure standards. The topics covered by this standard include initiation of standards, layout, authoring, editing, sign-off, archiving, accessing, printing, and distribution. The Chief Mechanical Engineer (CME) has a similar standard. The RSC is to confirm with the SET Department that they also have a similar standard.			
<b>Recommendation</b>	2008-005	<b>Status</b>	<b>Open</b>
IE to review the standards relating to on-board data recorders, ensuring that correct operation, accuracy and post incident downloads are effectively addressed.			
<b>Comment</b>			
The IE Technical Department are building an event recorder section within the technical services maintenance intranet website. This is currently being populated with operating instructions, download instructions and configuration instructions. The instructions are being rolled out to staff this time 60% of fleet types are complete on the system. Progress monitored monthly by the CME Technical Manager.			
<b>Recommendation</b>	2008-006	<b>Status</b>	<b>Closed 2008</b>
IE to review the 'Monitoring the Speed of Trains' standard, including assessing the effectiveness of monitoring by means of signal cabin train registers.			
<b>Comment</b>			
IE implemented the recommendation. The RSC have closed this recommendation.			
<b>Recommendation</b>	2008-007	<b>Status</b>	<b>Closed 2008</b>
The RSC to review and issue 'Guidelines for the Design of Railway Infrastructure and Rolling Stock'.			

**Comment**

The RSC formally issued the 'Guidelines for the Design of Railway Infrastructure and Rolling Stock' on the 28th August 2008, and have now closed this recommendation.

#### 4.4 Investigations prior to the establishment of the RAIU

The RSC conducted a formal investigation on the Cahir Viaduct Derailment Accident, as the RAIU was not established at this time. The RSC made fourteen recommendations in relation to this accident.

<b>Cahir Viaduct Derailment</b>			
<b>Date &amp; Time:</b> 06.00 hrs, 7 <sup>th</sup> October 2003	<b>Location:</b> Cahir, County Tipperary		
<b>Report No.:</b> N/A	<b>Report Issue Date:</b> July 2006		
<b>Railway Undertaking:</b> Iarnród Éireann	<b>Line:</b> Limerick – Waterford		
<p>At approximately 06.00 hrs on the 7<sup>th</sup> of October 2003 a bulk cement train travelling between Limerick and Waterford became derailed as it crossed the viaduct that carries the railway over the river Suir at Cahir. During the course of the accident the train, which comprised two locomotives and twenty two laden cement wagons, divided. The locomotives and the first ten wagons crossed the viaduct coming to a stand beyond the viaduct with the remaining twelve wagons falling through the deck of the viaduct into the river and onto the river banks. While no railway employee or other party was injured in the accident the rear twelve wagons of the train were damaged beyond repair and the deck of the viaduct required major reconstruction.</p>			
<b>Number of Recommendations:</b> There were fourteen recommendations made.			
<b>Recommendation</b>	<b>2006-001</b>	<b>Status</b>	<b>Open</b>
<p>IE 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>			
<b>Comment</b>			
<p>IE Infrastructure has already identified its requirements for standards and has included this requirement in their Railway Safety Programme. The implementation and roll out of standards has been prioritised on a safety critical basis taking account of design, inspection and maintenance requirements.</p>			
<b>Recommendation</b>	<b>2006-002</b>	<b>Status</b>	<b>Closed 2007</b>
<p>For remaining way-beam structures IE should review all available drawings and design documentation to identify, in so far as is practicable, variances from the original designs, and ensure that any safety implications are fully understood and that associated safety risks are reduced to as low as reasonably practicable.</p>			
<b>Comment</b>			
<p>IE implemented the recommendation. The RSC have closed this recommendation.</p>			

<b>Recommendation</b>	2006-003	<b>Status</b>	<b>Open</b>
<p>IE 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>			
<p><b>Comment</b></p>			
<p>IE has carried out a risk based study to identify the need for containment measures at underline bridges. The study is complete and issued for internal review. The report will provide a prioritised programme of preventative measures.</p>			
<b>Recommendation</b>	2006-004	<b>Status</b>	<b>Closed 2007</b>
<p>In parallel with, and pending implementation of Recommendations 2 and 3, IE should periodically review and amend as necessary the safety measures implemented at structures similar to the Viaduct to ensure that operational safety risk is reduced to as low as reasonably practicable.</p>			
<p><b>Comment</b></p>			
<p>IE implemented the recommendation. The RSC have closed this recommendation.</p>			
<b>Recommendation</b>	2006-005	<b>Status</b>	<b>Closed 2009</b>
<p>The training needs analysis conducted by IE on foot of the IRMS recommendation should be reviewed and, as necessary extended to include all staff involved in safety critical work. Where necessary new training plans should be introduced or existing plans modified or enhanced.</p>			
<p><b>Comment</b></p>			
<p>IE implemented the recommendation. The RSC have closed this recommendation.</p>			
<b>Recommendation</b>	2006-006	<b>Status</b>	<b>Closed 2009</b>
<p>IE should implement a strategy that ensures that it's ongoing track monitoring requirements are effectively met, particularly in the short term pending upgrading of the EM50 track recording vehicle.</p>			
<p><b>Comment</b></p>			
<p>IE implemented the recommendation. The RSC have closed this recommendation.</p>			
<b>Recommendation</b>	2006-007	<b>Status</b>	<b>Closed 2009</b>
<p>In developing a strategy for upgrading the EM50 track recording vehicle IE should ensure that all available technologies for monitoring track condition are fully assessed and the specified functionality reflects the best combination of available technologies.</p>			
<p><b>Comment</b></p>			
<p>IE implemented the recommendation. The RSC have closed this recommendation.</p>			
<b>Recommendation</b>	2006-008	<b>Status</b>	<b>Closed 2009</b>
<p>IE should review, and amend as necessary, its asset management systems to ensure that data is pertinent, comprehensive, concise and accessible and provides evidence that all outstanding issues are appropriately actioned and closed out.</p>			



<b>Comment</b>			
IE implemented the recommendation. The RSC have closed this recommendation.			
<b>Recommendation</b>	2006-009	<b>Status</b>	<b>Open</b>
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.			
<b>Comment</b>			
IÉ have well established inspection and maintenance procedures with effective dissemination of information to all relevant levels of Infrastructure staff. Implementation of the new data management system was achieved in 2008, and is referred to as IAMS.			
<b>Recommendation</b>	2006-010	<b>Status</b>	<b>Closed 2009</b>
Provision is being made in the proposed Railway Safety Programme 2004-2008, for the establishment of internal IÉ auditing procedures. As with the overall safety development programme, IÉ should ensure that the introduction of these procedures is risk based with auditing introduced first in those areas presenting that greatest safety risk.			
<b>Comment</b>			
IE implemented the recommendation. The RSC have closed this recommendation.			
<b>Recommendation</b>	2006-011	<b>Status</b>	<b>Closed 2009</b>
IÉ should review the performance characteristics of two-axle bulk cement wagons within the context of their wagon and track maintenance limits, to determine the extent to which these maintenance limits and maximum permitted speeds are mutually compatible and to propose practical solutions if necessary.			
<b>Comment</b>			
The recommendation is no longer valid as all such wagons have been removed from service as of June 2009. The RSC have closed this recommendation.			
<b>Recommendation</b>	2006-012	<b>Status</b>	<b>Closed 2009</b>
IÉ should review and amend as necessary it's arrangements for monitoring adherence to both permanent and temporary maximum train speed limits, through a combination of line-side measurement and interrogation of in-cab recorded data, to ensure that they are appropriate in the context of current driving practice.			
<b>Comment</b>			
IE implemented the recommendation. The RSC have closed this recommendation.			

<b>Recommendation</b>	<b>2006-013</b>	<b>Status</b>	<b>Closed 2009</b>
The functionality of the Teloc equipment currently in use by IÉ should be assessed, and modified as necessary, to ensure that it provides the level of access to data necessary for effective day to day safety management.			
<b>Comment</b>			
IE implemented the recommendation. The RSC have closed this recommendation.			
<b>Recommendation</b>	<b>2006-014</b>	<b>Status</b>	<b>N/A</b>
There is no recommendation no. 14			
<b>Comment</b>			
N/A			
<b>Recommendation</b>	<b>2006-015</b>	<b>Status</b>	<b>Complete</b>
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.			
<b>Comment</b>			
Mode A train radio has been commissioned on the Mayo / Ballina and Rosslare lines. An independent risk assessment was commissioned for the implementation of mode A on the lightly used lines, and it was found that installing mode A on lightly used lines would not be cost effective. The RSC is now deciding whether to close this recommendation.			

#### 4.5 Implementation of recommendations during 2006 – 2009

The RAIU also monitor the implementation of recommendations to ensure that all recommendations are closed out promptly. Table 1 below illustrates the implementation status of the recommendations:

Recommendation implementation status	Year			
	2009	2008	2007**	2006*
Open	8	2	0	3
Complete	1	3	0	1
Closed	4	2	0	10
<b>Total</b>	<b>13</b>	<b>7</b>	<b>0</b>	<b>14</b>

**Table 1 – Implementation status summary**

\*RSC Recommendations for the Cahir viaduct derailment accident

\*\*No formal investigations were carried out by the RAIU in 2007

Table 2 below illustrates the implementation status of the recommendations and their associated investigations.

Year	Investigation	Recommendation implementation status			
		Open	Complete	Closed	Total
2009	Fatality at Level Crossing XX 032	3	1		4
	Derailment of a Tara Mines freight train			2	2
	Near miss at Ballymurray level crossing			2	2
	Collision of a train with a road vehicle at Cappadine level crossing XN125	2			2
	Collision at Bridgetown level crossing	3			3
2008	Collision at level crossing XN 104	2	3	2	7
2006	Cahir viaduct derailment	3	1	10	14

**Table 2 – Implementation status expanded summary**

The total recommendation implementation status in percentage terms is as follows:

- Closed – 47%;
- Complete – 15%;
- Open – 38%.