



2008

Railway Accident Investigation Unit (Ireland) Annual Report



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1 Review of 2008

In the last annual report it was explained that the Chief Investigator was appointed by the Railway Safety Commission (RSC) to allow the initial formation of the Investigation Unit. A recruitment process then was put in place to fill the positions for permanent staff for the RIAU. The recruitment process resulted in the successful appointment of two senior investigators and one investigator.

The processes and procedures of the investigations unit are currently being developed and formalised.

In 2008, the RIAU started five investigations into incidents and accidents.

2 Introduction to the RIAU

2.1 Function of the RIAU

The purpose of an investigation by the RIAU 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 RIAU meets Ireland's duty under this Directive.

2.3 RIAU and the NSA

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 RIAU 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 operators 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).

3 Investigations prior to establishment of RAIU

Ireland's NSA, the RSC conducted an investigation on the Cahir Viaduct Derailment Accident. The RSC conducted this formal investigation as the RAIU was not established at this time.

3.1 Derailment at Cahir Viaduct

At approximately 06.00 hours on the 7th 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.

The RSC made thirteen recommendations in relation to this accident. The open or in progress RSC recommendations in relation to this incident are summarized below:

Outstanding RSC Cahir Viaduct Derailment Recommendations

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.

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.

IÉ should implement a strategy that ensures that its ongoing track monitoring requirements are effectively met, particularly in the short term pending upgrading of the EM50 track recording vehicle.

In developing a strategy for upgrading the EM50 track recording vehicle IÉ should ensure that all available technologies for monitoring track condition are fully assessed and the specified functionality reflects the best combination of available technologies.

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.

IÉ should review and amend as necessary its 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.

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.

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.

4 RAIU investigations opened in 2007 & closed in 2008

4.1 Collision at level crossing XN 104 between Ballybrophy and Killonan

At approximately 20.00 on the 28th June, 2007, the 18.55 service from Ballybrophy to Limerick, train identification number A464, 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.

Photograph 1: Level Crossing XN104



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, parallel to the railway line, facing the direction of Ballybrophy. The trailer struck fencing on the Down side and came to a stop in the ditch to the left of the direction of travel of the train, at an angle of approximately 60° to the railway line.

The train crew established that the attendance of the emergency services was not required for either the passengers, crew or the tractor driver. No injuries were reported and arrangements were made for the passengers to continue their journey by bus.

The line was reopened on the 29th 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 immediate cause of the accident was that the tractor driver drove across the railway without stopping and checking for the approach of a train.

Causal factors were that the gates of the crossing 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.

Underlying causes were that the tractor driver was unfamiliar with the correct procedure for using unmanned level crossings as set out in Iarnród Éireann's publication "The SAFE use of unattended Railway Level Crossings" (Iarnród Éireann, 2006).

5 RAIU Recommendations

In accordance with the Railway Safety Directive 2004/49/EC the RAIU's recommendations are to be addressed to the safety authority (RSC) and, where needed by reason of the character of the recommendation, to other bodies or authorities in the Member State or to other Member States. The Member States and their safety authorities shall take the necessary measures to ensure that the safety recommendations issued by the investigating bodies are duly taken into consideration, and, where appropriate, acted upon.

5.1 RAIU Recommendations for 2008

The RAIU has made seven recommendations in 2008, all these recommendations are in relation to the Collision at level crossing XN 104 between Ballybrophy and Killonan on the 28th June 2007. These recommendations are summarised below:

RAIU Recommendations for 2008
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.
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.
IÉ to develop and implement a vegetation management programme that addresses vegetation management on a risk basis, prioritising high risk areas.
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.
IÉ to review the standards relating to on-board data recorders, ensuring that correct operation, accuracy and post incident downloads are effectively addressed.
IÉ to review the 'Monitoring the Speed of Trains' standard, including assessing the effectiveness of monitoring by means of signal cabin train registers.
The Railway Safety Commission to review and issue 'Guidelines for the Design of Railway Infrastructure and Rolling Stock'.

6 Update on progress of recommendation before 2008

6.1 Summary of RSC recommendations prior to the establishment of the RAIU

Cahir Viaduct Derailment Investigation Report is the only investigation with outstanding recommendations prior to the establishment of the RAIU.

Cahir Viaduct Derailment Outstanding Recommendations		
RSC Recommendation	Notified Action Taken	Status
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.	IÉ 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.	Open/ In progress
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.	IÉ 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.	Open/ In progress
IÉ 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.	All track monitoring procedures are in place. The EM50 track recording vehicle is one method of monitoring track parameters and there are processes in place to verify its calibration.	Open/ In progress
In developing a strategy for upgrading the EM50 track recording vehicle IÉ should ensure that all available technologies for monitoring track condition are fully assessed and the specified functionality reflects the best combination of available technologies.	EM 50 track recording vehicle upgraded.	Open/ In progress

RSC Recommendation	Notified Action Taken	Status
<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>	<p>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.</p>	<p>Open/ In progress</p>
<p>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.</p>	<p>A programme of speed checks is in place in accordance with Railway Safety Standard No. 2. District Traction Executives are currently being trained to download TELOC on-train data recorders. This will enable the use of routine downloads as part of an integrated driver competency management regime.</p>	<p>Open/ In progress</p>
<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>	<p>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.</p>	<p>Open/ In progress</p>

6.2 Summary of RAIU recommendations from 2008

The RAIU completed one investigation in 2008, this was the collision at level crossing XN104. The recommendations and the actions taken have been included in the table below:

Collision at level crossing XN104 between Ballybrophy & Killonan		
RAIU Recommendation	Notified Action taken	Status
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.	Draft standards for level crossing engineering requirements, managing the risk at level crossings and signage at level crossings have been produced and are going through the approval process.	Open/ In progress
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.	IÉ are not in a position to identify agricultural contractors but will provide copies of the Safe Use of Level Crossing booklet to the farming associations with a request that they distribute the information to contractors known to them. Notwithstanding this procedure, IÉ will continue to stress that responsibility for informing the users of level crossings such as XN104 rests clearly with the landowner.	Open/ In progress
IÉ to develop and implement a vegetation management programme that addresses vegetation management on a risk basis, prioritising high risk areas.	IÉ will prioritise vegetation management on a risk basis, encompassing issues such as signal sighting and adhesion together with level crossing view. Actual implementation will, of course, include a degree of practicality such as efficient access to adjacent work sites.	Open/ In Progress
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.	IÉ are reviewing current processes related to the implementation of standards in order to avoid ambiguity. Within IÉ there is a system for the approval, briefing and distribution of standards.	Open/ In Progress

RAIU Recommendation	Notified Action taken	Status
IÉ to review the standards relating to on-board data recorders, ensuring that correct operation, accuracy and post incident downloads are effectively addressed.	IÉ have reviewed the standards relating to the on-board data recorders and are reinforcing the process necessary to achieve the objectives of this recommendation	Open/ In progress
IÉ to review the 'Monitoring the Speed of Trains' standard, including assessing the effectiveness of monitoring by means of signal cabin train registers.	With the reduction in the number of individual signal cabins and the increased processes of on-train data recorders and other speed recording methodologies, IÉ do not anticipate any significant dependence on cabin register entries as a means of conducting checks of the speeds of trains. District Traction Executives are currently being trained to download TELOC on-train data recorders enabling the use of routine downloads as part of an integrated driver competency management regime.	Open/ In progress
The RSC to review and issue 'Guidelines for the Design of Railway Infrastructure and Rolling Stock'.	The RSC formally issued the 'Guidelines for the Design of Railway Infrastructure and Rolling Stock' on the 28th August 2008.	Closed

6.3 Implementation of recommendations during 2006 -2008

The table below illustrated the progress in the closing out recommendations:

RSC & RAIU Recommendations issued		Recommendation implementation status		
Year	Total Number	Implemented	In progress	Not implemented
2006*	13	5 (38%)	8 (62%)	0
2007**	0	-	-	-
2008	7	3 (43%)	4 (57%)	0

*RSC Recommendations for the Cahir viaduct derailment accident

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

It is noted that a considerable number of recommendations have not been closed out from the Cahir Viaduct Derailment since 2006. The RSC are continuing to monitor the progress of recommendations.

7 Investigations opened in 2008

7.1 Derailment of a Tara Mines freight train at Skerries

At 22.53 hours on the 10th of January, 2008, a Tara Mines freight train operated by IÉ consisting of a locomotive and eleven wagons derailed south of Skerries station on the Dublin to Belfast line. 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.

Photograph 2: Derailed Tara Mines freight train



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 as well as rail in its vicinity. There were no injuries and there was no release of the zinc concentrate that the wagons were transporting at the time.

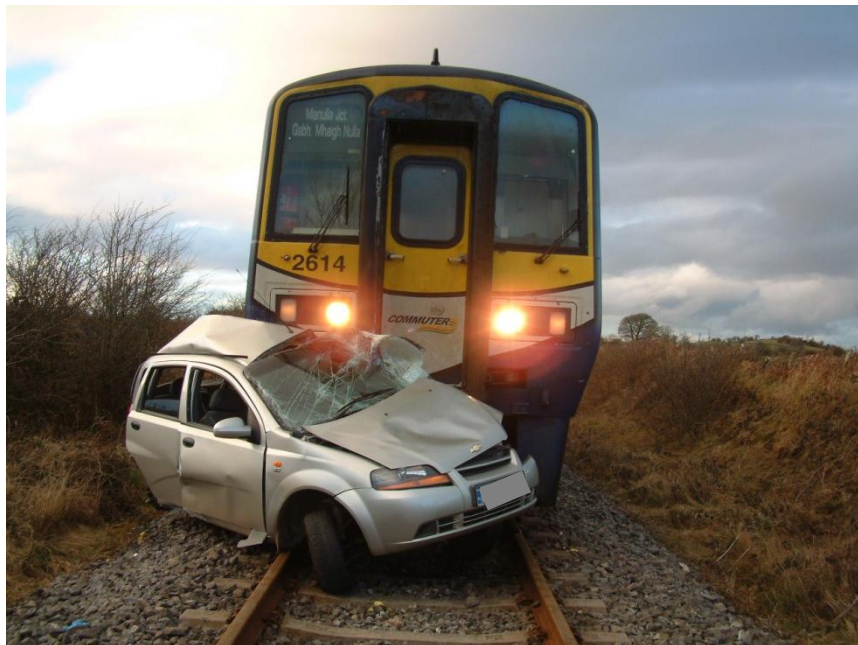
The RAIU are continuing with a formal investigation of this incident and the report will be due in early 2009.

7.2 Fatality at Level Crossing XX 032

On the 28th of February 2008 at approximately 11.07 hours the 10.50 hours service from Ballina to Manulla Junction passenger train collided with a car at user operated level crossing XX 032, which is located on the Ballina branch line, approximately 500 yards beyond the 153 milepost in the townland of Knockshanbally, County Mayo.

The train struck the car on its left hand side. The car became lodged at the front of the train and remained there until the train came to a stop approximately 350 metres (m) from the point of collision. The leading vehicle of the train was damaged but the train was not derailed.

Photograph 3: Collision at level crossing XX032



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 ambulance service, fire services and the An Garda Síochána attended the scene of the accident along with representatives of Iarnród Éireann. The passenger was detrained and continued the journey by road. The line remained closed until that evening to allow clearance and preliminary investigation work to be carried out. The train was removed from the scene of the accident to Ballina at 19.10, allowing the line to be reopened.

The RAIU are continuing with a formal investigation of this incident and the report will be due in early 2009.

7.3 Near miss at Ballymurray level crossing

On the 14th of June 2008 at 8.50 hours an empty Diesel Multiple Unit, identification number J851, travelling from Manulla Junction to Dublin, passed through the raised barriers of Ballymurray level crossing, XM 075. Approximately two seconds prior to the Diesel Multiple Unit passing, a car crossed through the level crossing and as Diesel Multiple Unit crossed the crossing another car approached but came to a stop. The RAIU are continuing with a formal investigation of this incident and the report will be due in mid 2009.

Photograph 4: CCTV image of incident



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

On the 31st of July 2008 at approximately 17.20 hours, a Diesel Multiple Unit collided with a road vehicle at level crossing XN125 (Cappadine). The train involved was the 16.45 hours (hrs) IÉ service from Limerick to Ballybrophy (train identification number A463) departed Limerick Station. At approximately 17.20 hrs, on the approach to Level Crossing XN125, located in the townland of Cappadine in county Tipperary, 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 car had been travelling from the direction of Ballinahinch towards XN125 on the road when it stopped fouling the railway line. 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.

Photograph 5: View from Cappadine level crossing



The RAIU are continuing with a formal investigation of this incident and the report will be due in mid 2009.

7.5 Collision at Bridgetown level crossing

On the 2nd of December 2008, the 8:52 hrs empty ballast train from Waterford to Rosslare Stand collided with Bridgetown Level Crossing. As the driver approached the level crossing the driver observed that the gates were closed across the railway line. The driver approached the train's emergency brakes and the train passed over the crossing, breaking both gates as it passed. There were four staff traveling on the ballast train when the incident occurred, no injuries were sustained to the crew. The crossing keeper in attendance at Bridgetown level crossing was in the process of opening the gates when the collision occurred, the crossing keeper attended hospital for shock after the incident. No other damage other than the damage to the level crossing gates occurred. The RAIU are continuing with a formal investigation of this incident and the report will be due in late 2009.

8 Statistics on rail accidents since the formation of the RAIU

8.1 Notifications

Thirty-eight notifications were received in 2008, summarised below:

- 32 notifications from IÉ
- 3 notifications from Veolia (the LUAS operators)
- 3 notification from Bord Na Móna (industrial railway)

8.2 History of Rail Accident Categories

Accidents investigated		2007	2008	
Major accidents	Collisions	1	-	-
	Derailments	-	1	Derailment of a Tara Mines freight train at Skerries, County Dublin.
	Level crossings		1	Fatality at Straide Level Crossing XX032, County Mayo.
Other accidents	Collisions	-	-	-
	Derailments	-	-	-
	Level crossings	-	2	Collision on a train with a road vehicle at Cappadine level crossing, County Tipperary; Collision of train with Bridgetown level crossing gates, County Wexford.
Incidents	Occupational accidents	-	-	-
	Level crossing	-	1	Near miss at Ballymurray level crossing, County Roscommon.
	Near misses	-	-	-

8.3 Personal Injuries as a result of accidents on the railway

Personal injuries		2007	2008
Fatally injured	Passengers	-	-
	Crew	-	-
	Third party	1	-
Seriously injured	Passengers	-	-
	Crew	-	-
	Third party	-	-
Slightly injured	Passengers	-	-
	Crew	-	-
	Third party	-	-

Third party includes level crossing users.

Third party does not include suicides or trespassers.