# Railway Accident Investigation Unit

# Ireland

# INVESTIGATION REPORT

## Dangerous occurrence between Ballybrophy and Portlaoise 12th September 2015

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## Report publication



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## Reader guide

All dimensions and speeds in this report are given using the International System of Units (SI Units). Where the normal railway practice, in some railway organisations, is to use imperial dimensions; imperial dimensions are used and the SI Unit is also given.

All abbreviations and technical terms (which appear in italics the first time they appear in the report) are explained in the glossary.

Descriptions and figures may be simplified in order to illustrate concepts to non-technical readers.

## Report preface

The RAIU is an independent investigation unit within the Department of Transport, Tourism and Sport (DTTAS) which conducts investigations into accidents and incidents on the national railway network, the Dublin Area Rapid Transit (DART) network, the LUAS, heritage and industrial railways in Ireland. Investigations are carried out in accordance with the Railway Safety Directive 2004/49/EC enshrined in the European Union (Railway Safety) (Reporting and Investigation of Serious Accidents, Accidents and Incidents) Regulations 2014.

The RAIU investigate all serious accidents. A serious accident means any train collision or derailment of trains, resulting in the death of at least one person or *serious injuries* to five 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.

The RAIU may investigate and report on accidents and incidents which under slightly different conditions might have led to a serious accident.

The purpose of RAIU investigations is to make safety recommendations, based on the findings of investigations, in order to prevent accidents and incidents in the future and improve railway safety. It is not the purpose of an RAIU investigation to attribute blame or liability.

## Report summary

On Saturday morning, 12th September 2015, a joint Balfour Beatty Rail Ireland (BBRI) and Iarnród Éireann (IÉ) team were working in a *T3 Possession*[1] on the Dublin to Cork *Up and Down Lines* near to the 54 mile post (MP). The *Weekly Circular* stated that the T3 Possession was to be shortened (by time) to 05:20 hrs, to allow for *Single Line Working* SLW on the Down Line from 05:20 hrs. However, according to the *method statement* for the works, the T3 Possession was to change to SLW on the Down Line at 06:00 hrs.

There was one worksite in the T3 Possession where ballast cleaning was being undertaken; BBRI, with IÉ staff were working with a *ballast cleaner* as part of the planned upgrade of the Dublin to Cork Line.

At 05:40 hrs, the BBRI ballast cleaning crew members, who were accompanied by two IE staff, were attempting repairs to the ballast cleaner; when an empty passenger train (Train J207) travelling from Laois Train Care Depot (County Laois) to Mallow (County Cork) passed through the ballast cleaning location. The BBRI and IÉ staff were unaware of the train's approach, however, they were in a place of safety as the train past and as a result there were no fatalities or injuries as a result of this incident; however there was potential for them to be in a position of danger.

The staff (both BBRI and IÉ) who were with the ballast cleaner were not briefed that the T3 Possession had been lifted and that SLW was coming into operation on the adjacent line, as a number of IÉ staff responsible for safety on the site were not familiar with the IÉ Weekly Circular relevant to the works.

There was also a discrepancy between the number of staff allocated to the works and the number actually present on site.

The immediate cause of Train J207 passing adjacent to the worksite without the prior notification to the ballast cleaning staff was as a result of ES2 informing the Person in Charge of Possession (PICOP) (who in turn informed the Signalman) that the Down Line was clear for trains, without briefing any of the ballast cleaning staff on the introducing of SLW arrangements.

[1] Sometimes referred to as a TIII, absolute possession or T3 Absolute Possession.

Contributory factors associated with the incident are:

- The Engineering Supervisor (ES2) was not aware of the T3 Possession planned termination time of 05:20 hrs;
- The Resource Allocation Sheet, prepared by IÉ's Infrastructure Planning Team was not effective at ensuring staff rostered for work reported for duty.

The underlying cause associated with this incident is:

- There is no prompt on the Site Safety Briefing Form to ensure all staff are aware of the contents of the current IÉ Weekly Circular.

The RAIU have made the following two safety recommendations as a result of the investigation:

- IÉ-Infrastructure Manager (IM) should review the site safety briefing procedures to make sure all personnel have made themselves aware of the information contained in the relevant Weekly Circular.
- IÉ-IM should review the method of allocation and accountability for General Operatives detailed for work sites; this is to ensure that sufficient personnel attend and remain on site.

## Contents

# The Incident

## Summary of the incident

1 A T3 Possession was scheduled on both the Up and Down Lines between Ballybrophy and Portlaoise (64MP to the 51MP), between 23:15 hrs on Friday night 11th September 2015 and 05:20 hrs on 12th September 2015, as per the IÉ Weekly Circular 3679. The T3 Possession was to facilitate the cleaning of ballast on Up Line of the the Dublin to Cork Line as part of a pre-planned programme of engineering work to upgrade the line.

2 On Friday the 11th September 2015 a combined work team of BBRI and IÉ staff were scheduled to work from 23:00 hrs until 06:00 hrs to perform this work. There were five members of BBRI staff who were operating the ballast cleaner and six members of IÉ staff, with three members of the IÉ staff performing necessary safety roles (including the Person in Charge of Possession (PICOP)), and the rest of the IÉ team performing manual tasks associated with the ballast cleaner.

3 Before the commencement of work, on the 11th September, in Portlaoise Goods Yard, the PICOP gave a briefing to the BBRI and IÉ staff on the 'Ballast Cleaning Method Statement' (referred to as the Method Statement for the remainder of the report) and the 'CCE Department Site Safety Briefing Form' (which will be referred to as a Site Safety Briefing Form for the remainder of the report).

4 At 00:00 hrs the IÉ and BBRI staff commenced work in the T3 Possession. The work continued as planned until 04:30 hrs (12th September) when the BBRI staff carried out a scheduled system check on the ballast cleaner. At 05:00 hrs the BBRI staff recommenced work and continued to work on the *cess* side of the Up Line; they were unaware that the T3 Possession on the adjacent line was due to finish at 05:20 hrs and SLW would commence, allowing trains to use the Down Line.

5 At 05:10 hrs the BBRI staff became aware of a noise and vibration on the ballast cleaner, indicating there may be a problem with the machine. The BBRI staff identified a fault in the area of one of the front axles on the machine. Two of the BBRI staff accessed the axle area from both sides of the machine to try and fix the problem.

6 At approximately 05:39 hrs one of the BBRI staff operating the ballast cleaner saw, what he thought was a *Road Rail Vehicle* (RRV) approaching and announced this over their intercom headsets to alert the crew (RRVs would be used regularly during possessions for the transport of goods, or other light tasks).

7 The oncoming vehicle was approximately fifteen yards away when the crew realised it was a train. The train was an empty passenger train, (Train J270) which was travelling from Laois Train Care Depot to Mallow, there was a 40 kilometre per hour (km/h) (25 miles per hour (mph)) TSR in place on the Down Line. As the train passed on the Down Line adjacent to the area where the BBRI and IÉ staff were working, all staff were in a place of safety at the time and as a result there were no injuries.

8 There had been no warning of the train and all of the staff working on the line were of the opinion that the adjacent line to where they were working was within a T3 Possession at the time the train passed by (see Figure 1 for location of incident).

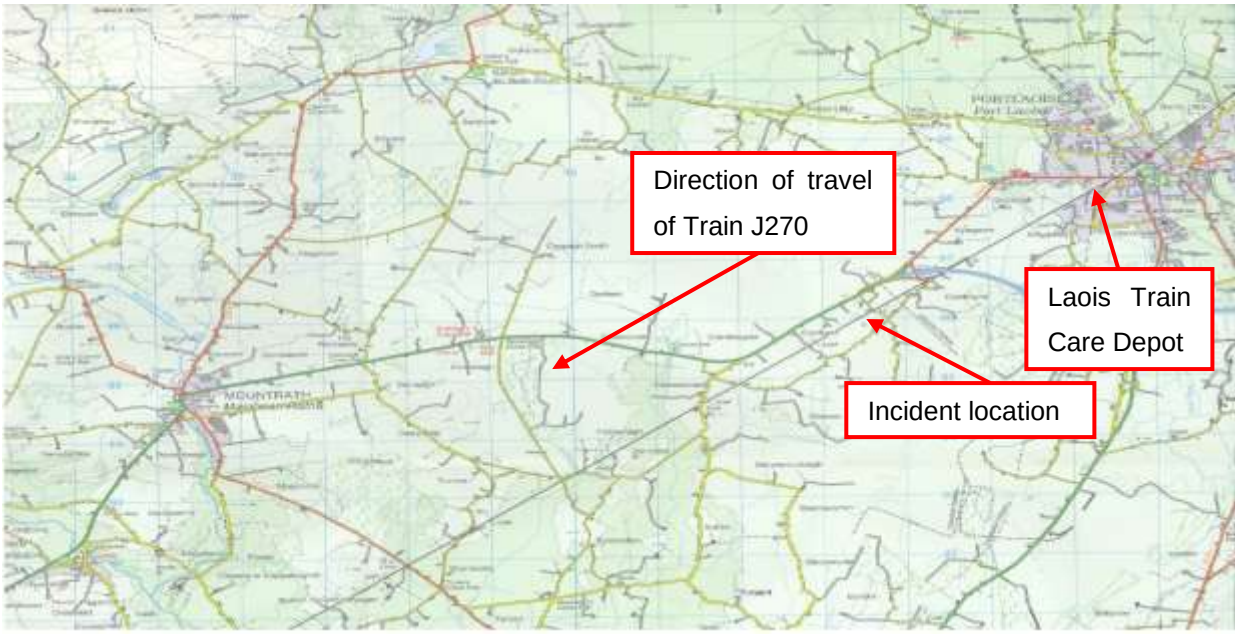


**Figure 1 – Location of the incident**

## Parties and roles involved, directly and indirectly, in the incident

### Parties involved in the incident

**Iarnród Éireann**

9 IÉ is the *railway undertaking* (RU) who owns and operates mainline and suburban railway services in Ireland and operates under a safety certificate issued by the Commission for Railway Regulation (CRR). The Railway Undertaking Licence is issued in conformity with European Directive 2012/34/EU and S.I. 249 of 2015; the licence was renewed on 24th September 2015 for a period of five years.

10 IÉ is also the *infrastructure manager* (IM) owns and operates the railway infrastructure in Ireland and operates under a safety certificate issued by the CRR. The Infrastructure Manager Safety Authorisation is issued in conformity with European Directive 2012/34/EU, the authorisation was renewed on 25th March 2013 for a period of five years.

11 The purpose of the safety certificate is to provide evidence that the RU and IM:

- Has established its Safety Management System (SMS) in accordance with Article nine and Annex III of the Railway Safety Directive (RSD), and;
- Can meet the requirements laid down in the Technical Specifications for Interoperability (TSI) and other relevant European Community legislation, and in National Safety Rules, in order to control risks and provide rail transport services safely on the network.

12 The IÉ network is primarily divided into three Divisions (Dublin, Athlone and Limerick Junction). These Divisions are further sub-divided into a number of *Regions* which themselves consist of several *CCE Locations*. The primary IÉ departments associated with this incident are the:

- CCE Department – responsible for the design, inspection, maintenance and renewal of the railway's infrastructure;
- IÉ Infrastructure Planning Team – Planning team responsible for planning possession resources;
- Intercity and Commuter Network (ICCN) Department – responsible for the operation of trains on the mainline, excluding the DART network. This includes the supervision of train drivers and control of train movements through Centralised Traffic Control (CTC) Dublin and the Regional controlling cabins.

**Balfour Beatty Rail Ireland**

13 BBRI is part of the Balfour Beatty Group, and have been operating as an RU since March 2014. BBRI operate and maintain On Track Machines (OTMs) on behalf of IÉ. BBRI staff comprises of a number of OTM Driver Operators (OTMDOs) and fitter groups which are located throughout Ireland. BBRI were responsible for operating the ballast cleaner at the time of the incident.

14 The Safety Certificate is issued in conformity with European Directive 2012/34/EU and S.I. 249 of 2015; the certification was granted on the 25th September 2015 until 23rd February 2019.

**Other parties not directly involved in the incidents**

15 The Commission for Railway Regulation (CRR) is the national safety authority, which is responsible for the regulatory oversight of the Safety Management System (SMS) and enforcement of railway safety in the Republic of Ireland in accordance with the Railway Safety Act 2005 and the European Railway Safety Directive. The CRR's mission is to advance the safety of railways in Ireland through diligent supervision and enforcement. The CRR is required to ensure that each railway organisation operating in Ireland understands and effectively manages the risk to safety associated with its activities.

**Roles involved in the incident**

16 The IÉ staff directly involved in the incident were;

- PICOP – A member of protection staff, who has duties prescribed in Part T3 of the IÉ Rule Book, at the time of the incident, the PICOP was responsible for the establishment of a protected working environment;
- ES1 – An ES nominated to manage the safe execution of works within the engineering worksite. This includes arranging the *marker boards* (such as Stop and Obtain Instruction Boards (SOIBs)) and authorising the movements of train in and out of the work site. ES1 was also performing the role of Track Safety Co-ordinator (TSC);
- ES2 – A Permanent Way Inspector (PWI) who took on the role of ES to enable ES1 to facilitate working through low bridges and to attend to other tasks related to the ballast cleaning works;
- Two IÉ engineers were accompanying the Ballast Cleaning BBRI Crew and one IÉ driver was driving the ballast cleaner.

17 BBRI had a number of staff present at the time of the incident:

- BBRI Team – Four man crew operating the ballast train;
- BBRI Mobile Controller – who accompanied the crew on the ballast cleaner and is responsible for supervising the BBRI Crew.

## General description of the railway

### Infrastructure

18 The line involved is the Up Line from Dublin to Cork line, commencing at the 64 MP and working towards the 51 MP. The track is *double line track,* flat bottom *continuously welded rail* (CWR) mounted on concrete sleepers set in ballast. The cess is the part of the track outside the ballast shoulder that is deliberately maintained lower that the sleeper bottom to aid drainage, see Figure 2.

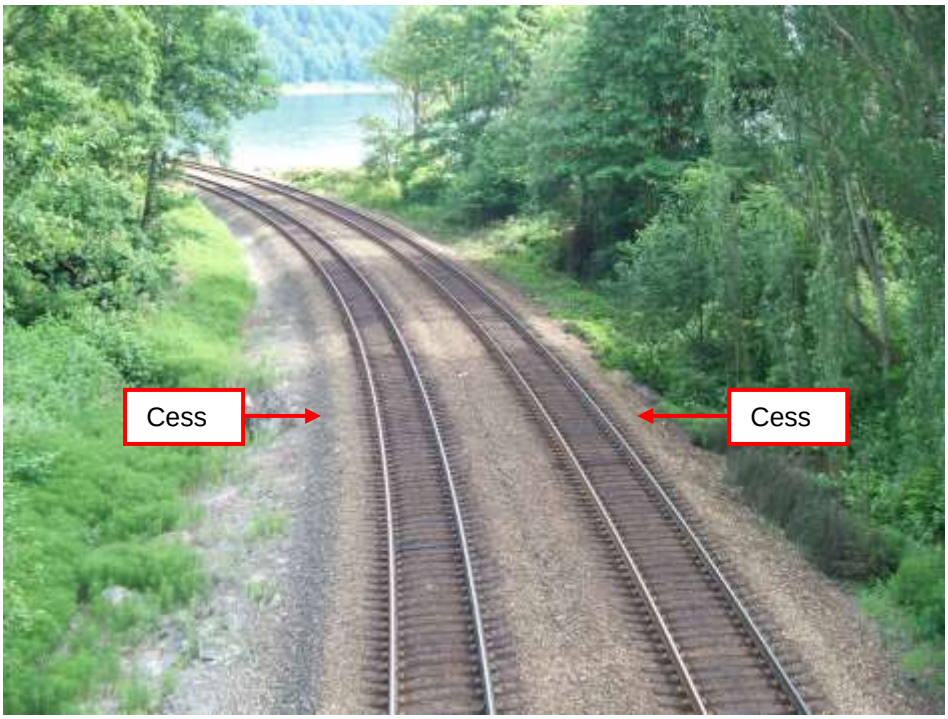


**Figure 2 – Location of the cess**

19 The maximum line speed is 144 km/h (90 mph). During the possession works there was a 'moving' temporary speed restriction (TSR) of 40 km/h (25 mph) imposed on the line open to traffic opposite the ballast cleaning work site.

20 No factors in relation to the condition of the track or infrastructure were found to have contributed to the incident.

**Rolling stock**

21 The ballast cleaner (OTM 781) was manufactured in 2011 and is a four bogie Plasser & Theurer machine (see Figure 3), the maximum transit speed is (96 km/h) 60mph, however on the IÉ infrastructure the maximum OTM permissible speed is 64 km/h (40 mph). The machine length is (buffer to buffer) 44,200mm. The overall height is 4. 039 m and the overall width is 2.9 m. The total mass of OTM 781 is 145 tonnes.

22 The central features are a powerful *cutter chain* that excavates the fouled ballast and at the same time prepares the foundation for the new ballast. The ballast is cleaned in large oscillating screens with several screening levels and the clean ballast is returned to the track directly behind the excavating chain; the residue from cleaning is then passed into a spoil conveyor for disposal.

**Figure 3 – OTM781 Plasser & Theurer RM90 Ballast Cleaner**

23 Train J270 was a six carriage Class 22000 *Diesel Multiple Unit* (DMU), the unit is 140 m long and has a mass of 378 tonnes. The maximum allowable speed of the DMU is 160 km/h (100 mph).

**Signalling and Communications**

24 The line is operated under the rules and regulations for signalling by track circuit block, the coloured signals comprise of two, three and four aspect *coloured light signals*, the line is controlled by the *Controlling Signalman* (which will be referred to as the Signalman for the remainder of this report) at Centralised Traffic Control (CTC), Connolly, Dublin.

25 In relation to possessions, signalling limits are protected using two and three aspect colour light signals, controlled by the Signalman. These are referred to as *protecting signals*, and are normally put to red on all approaches to the possession by the Signalman.

26 The means of communication between the Signalman and protection staff on the IÉ network is via telephone (including mobile telephone and signal post telephone).

### Operations

27 Section T, of Part 3, of the IÉ Rule Book (latest version published in 2011), sets out the procedures for controlling vehicle movements and operations within a possession, this is discussed further in the Evidence section of this report.

28 Marker boards and *detonator* protection must be placed at the limits of the possession and any line joining the possession at a junction.

29 To allow certain types of engineering works to be undertaken in a safe environment normal train movements are required to be stopped at pre-arranged locations and times. To do this railway lines are blocked by taking a possession either in accordance with Section T3[2] of the Rule Book.

30 Information of planned possession work, including durations and locations, is published in the Weekly Circular which is sent via email to engineering personnel one week in advance, then disseminated in hardcopy to safety critical IÉ personnel and other relevant stakeholders such as BBRI.

## Fatalities, injuries and material damage

### Fatalities and injuries

31 There were no fatalities, major or minor injuries as a result of this incident.

### Material damage

32 No material damage occurred to IÉ rolling stock or infrastructure as a result of this incident.

## External circumstances

33 There were no external circumstances (e.g. weather conditions) identified that contributed to this incident.

[2] Sometimes referred to as a TIII or absolute possession.

# RAIU Investigation

## RAIU decision to investigate

34 In accordance with the Railway European Union (Railway Safety) (Reporting and Investigation of Serious Accidents, Accidents and Incidents) Regulations 2014, the RAIU investigates incidents and accidents on the national railway.

35 Given that under slightly different circumstances, this incident may have led to a serious accident where there could have been potential for fatalities or serious injuries the RAIU have made the decision to conduct a full investigation.

## Scope of investigation

36 The RAIU must establish the scope of the investigation to ensure that only pertinent information is recovered and reviewed. Therefore, for this investigation, the RAIU have defined the following scope:

- Establish the high level sequence of events of the incident;
- Establish, where applicable, the immediate cause, contributory factors, underlying factors and *root causes*;
- Establish if any of these factors contributed to the incident;
- Examine the relevant elements of the safety management system.

## Investigation and evidence

37 During this investigation the RAIU collated and logged the following evidence:

- Witness testimonies from IÉ and BBRI personnel;
- IÉ Ballast Cleaning Method Statement (WK 37 Friday 11/09/2015);
- Weekly Circular 3079;
- Possession information;
- IÉ Rule Book;
- IÉ investigation reports into possession incidents;
- IÉ standards, procedures and other documentation;
- Risk Assessment for ballast cleaning working under total possession and SLW Arrangements;
- Staff Roster Sheet;
- Training and competence records;
- Possession arrangement forms;
- ES Certificates;
- IE ES Supervisor Prompt List;
- CCE Department Site Safety Briefing Form;
- Voice Communication Calls.

# Evidence

## Possession protection arrangements & worksite planning

### Rule Book – Part T, Section 7.0 – Principles

38 Section 7.1, Part T, Need For Possessions, of the Rule Book states that "A possession of the line must be arranged when engineers trains or on-track machines are to be used and it is not practicable to regulate their movements in connection with the work by the normal signalling system".

39 Section 7.2, Part T, Responsibility for Arranging Possessions, of the Rule Book states "The Engineering Department requiring the possession must agree beforehand with the Operations Department the extent and duration of the possession and the location(s) of the work together with the arrangements for communications".

### Planning

40 The works for the T3 Possession were planned during control room meetings in the weeks prior to the occurrence and were included in the internal IÉ eight week plan and published in Weekly Circular, W.C. 3679 (see Figure 4), which was published on Monday 31st August 2015, and circulated to relevant IÉ and BBRI staff, and other relevant stakeholders. The ballast cleaning and possession arrangements are boxed in red in Figure 4.

**MONDAY 7TH TO SUNDAY 13TH SEPTEMBER, 2015 (CONTD.)**

**DAYS OF THE WEEK: MON=1; TUE=2; WED=3; THUR=4; FRI=5; SAT=6; SUN=7**

**ENGINEERING WORKS REQUIRING ABSOLUTE POSSESSIONS - SECTION T PART III** *** W.C. 3679**

W.C. 3679 W.E. 13.09.15

| Section | Protecting Signals | Up Only Down Only Up & Down Single | Times From | Times To | SLW | Days of the Week | Work Description | Miles From | Miles To | Office Use ONLY |
|---|---|---|---|---|---|---|---|---|---|---|
| **DUBLIN-CORK-DUBLIN (CONTD.)** | | | | | | | | | | |
| Heuston-Glasnevin Jctn. | CW27 to HN271 | Middle Road | 20.00<br>00.01 | 24.00<br>05.00 | No<br>No | 1,2,3,4,5,_,_<br>_,_,3,4,5,6,_ | Phoenix Park Tunnel Upgrade Work | 0¼ | 2¾ | */DN/010 |
| Inchicore-Sallins | HN242 & HN239 to HK175 | Down Fast & Slow | 23.45<br>00.01<br>00.01<br>00.01 | 24.00<br>05.15<br>05.40<br>07.50 | No<br>No<br>No<br>No | 1,2,3,4,5,6,_<br>_,2,3,4,5,_,7<br>_,_,_,_,_,6,7<br>_,_,_,_,_,_,7 | Track Repairs | 2¼ | 20½ | */DN/011 |
| Sallins-Inchicore | HK174 to HN243 | Up Fast & Slow | 00.30<br>00.30<br>00.30 | 05.20<br>05.40<br>07.50 | No<br>No<br>No | _,2,3,4,5,_,_<br>_,_,_,_,_,6,7<br>_,_,_,_,_,_,7 | Track Repairs | 20½ | 2½ | */DN/012 |
| Sallins-Ballybrophy incl. Kildare, Portarlington and Portlaoise Loop | HK175 & CY189 to BY488 & BY490 | Down | 00.15<br>00.10 | 05.00<br>05.00 | No<br>No | _,2,_,4,5,_,_<br>_,_,3,4,5,_,_ | Track Repairs | 20¼ | 64 | */DN/013 |
| Ballybrophy-Sallins incl. Portlaoise, Portarlington and Kildare Loops - not Sallins Loop | BY491 to PN252 & HK174 | Up | 00.10 | 05.00 | No | _,2,3,4,5,_,_ | Track Repairs | 64 | 20¼ | */DN/014 |
| Portlaoise-Ballybrophy | CY110 to BY488 & BY490 | Down | 23.40<br>00.01<br>23.50<br>00.01 | 24.00<br>05.20<br>24.00<br>08.55 | No<br>No<br>No<br>No | _,_,_,_,_,5,_<br>_,_,_,_,_,6,_<br>_,_,_,_,_,6,7<br>_,_,_,_,_,_,7 | Ballast Cleaning | 51 | 64 | */DN/015 |
| Ballybrophy-Portlaoise | BY491 to CY109 | Up | 22.35<br>00.01 | 24.00<br>05.20 | No<br>No | _,_,_,_,_,5,_<br>_,_,_,_,_,6,_ | Ballast Cleaning | 64 | 51 | */DN/016 |
| **At 05.20 hrs on Saturday 12th September Ballybrophy/Portlaoise Up road possession will be shortened to read as follows** | | | | | | | | | | |
| Ballybrophy-Portlaoise | BY491 to PL280 | Up | 05.20 | 23.15 | Yes | _,_,_,_,_,6,_ | Ballast Cleaning | 64 | 52½ | */DN/017 |
| **Traffic Arrangements - See pages 49 - 90 for details.** | | | | | | | | | | |
| **At 23.15 hrs on Saturday 12th September Ballybrophy/Portlaoise Up road possession will be extended to read as follows** | | | | | | | | | | |
| Ballybrophy-Portlaoise | BY491 to CY109 | Up | 23.15<br>00.01 | 24.00<br>09.15 | No<br>No | _,_,_,_,_,6,_<br>_,_,_,_,_,_,7 | Ballast Cleaning | 64 | 51 | */DN/018 |

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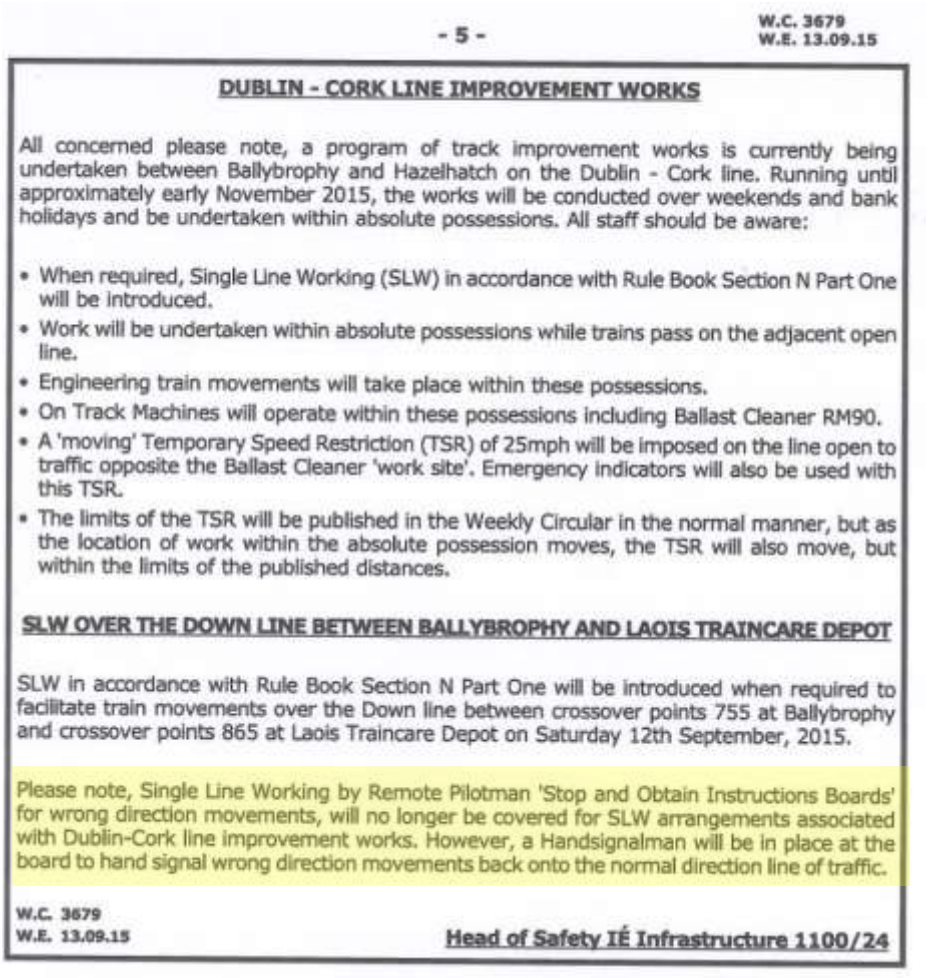
**Figure 4 – Weekly Circular 3679**

**Safety critical staff notices**

41 Section A 2.0 Safety and Security in the Rule Book, (2.2) states: "Where Notices are exhibited for employee's general information, your booking on duty is taken as an indication that you have read such notices". The reference to Notice at 2.2 is including the IÉ Weekly Circular as the Rule Book covers the Weekly Circular and Northern Ireland Railways (NIR) Weekly Operating Notice.

42 The Weekly Circular states that "At 05:20 hrs on Saturday 12th September Ballybrophy/ Portlaoise Up road[3] possession will be shortened to read as follows", and states that the Down Line T3 Possession will cease at 05:20 hrs.

43 The Weekly Circular also states that "Single Line Working by Pilotman 'Stop and Obtain Instruction Boards' for wrong direction movements, will no longer be covered for SLW arrangements", see Figure 5 (highlighted section).



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W.C. 3679
W.E. 13.09.15

**DUBLIN - CORK LINE IMPROVEMENT WORKS**

All concerned please note, a program of track improvement works is currently being undertaken between Ballybrophy and Hazelhatch on the Dublin - Cork line. Running until approximately early November 2015, the works will be conducted over weekends and bank holidays and be undertaken within absolute possessions. All staff should be aware:

- When required, Single Line Working (SLW) in accordance with Rule Book Section N Part One will be introduced.
- Work will be undertaken within absolute possessions while trains pass on the adjacent open line.
- Engineering train movements will take place within these possessions.
- On Track Machines will operate within these possessions including Ballast Cleaner RM90.
- A 'moving' Temporary Speed Restriction (TSR) of 25mph will be imposed on the line open to traffic opposite the Ballast Cleaner 'work site'. Emergency indicators will also be used with this TSR.
- The limits of the TSR will be published in the Weekly Circular in the normal manner, but as the location of work within the absolute possession moves, the TSR will also move, but within the limits of the published distances.

**SLW OVER THE DOWN LINE BETWEEN BALLYBROPHY AND LAOIS TRAINCARE DEPOT**

SLW in accordance with Rule Book Section N Part One will be introduced when required to facilitate train movements over the Down line between crossover points 755 at Ballybrophy and crossover points 865 at Laois Traincare Depot on Saturday 12th September, 2015.

Please note, Single Line Working by Remote Pilotman 'Stop and Obtain Instructions Boards' for wrong direction movements, will no longer be covered for SLW arrangements associated with Dublin-Cork line improvement works. However, a Handsignalman will be in place at the board to hand signal wrong direction movements back onto the normal direction line of traffic.

W.C. 3679
W.E. 13.09.15

Head of Safety IÉ Infrastructure 1100/24

**Figure 5 – Weekly Circular W.C. 3679 Extract**

[3] Line is sometimes referred to as Road

**Resources**

44 The IÉ Infrastructure Planning Team prepared a Resource Allocation Sheet, detailing all the staff to be present at the time of the possession, their roles and their contact details. The Resource Allocation Sheet included a total of thirteen IÉ staff, including the PICOP, ES1 and general operatives. This Resource Allocation Sheet was presented to ES1, who in turn presented it to the PICOP.

## Roles & responsibility of staff during a possession

**General description**

45 The roles and responsibilities as set out in the Rule Book, are a joint publication between IÉ and NIR. Section T Part 3 deals with the arrangements for the T3 Possessions of the line.

**Part T, Section 8.0 – General Instructions**

**Appointment of PICOP**

46 The Engineering Department concerned must appoint a person in charge of the possession (PICOP). The appointment of the PICOP must be made at the planning stage. The PICOP must be:

- Currently Certified competent as a PICOP;
- Familiar with the line and location concerned;
- Fully aware of the possession arrangements;
- Appointed primarily for this purpose and not have other duties unless agreed at the planning stage.

**Appointment of Engineering Supervisor**

47 The Engineering Department concerned must appoint a person to be in charge of each work site under possession, the ES. The name of each ES must be given to the PICOP beforehand. An ES may also act as PICOP subject to the requirements of Clause 8.1. An ES must be certified competent to perform the duties of an ES.

**Part T, Section 9.0 – Instruction to PICOPs**

**Responsibilities of the PICOP**

- To ensure the necessary protection is provided for the possession;
- To authorise movements entering or within the possession to ensure their safety;
- To ensure the possession is given up so that normal working is safely resumed.

48 Part T, Section 9.7.1, entitled 'Before the possession is given up', states the following requirements for the PICOP:

- Must ensure it is safe for the possession to be given up;
- Each ES is required to assure you, the PICOP, that the portion of line is clear and safe for trains to pass, all marker boards have been removed and anyone remaining on or near the line is aware that traffic may be resumed;
- Must receive a completed and signed ES's Certificate from the ES at each work site within the possession; or receive an assurance from the ES concerned that the ES's Certificate has been completed and signed;
- Tell the signalman that you are ready to give up the possession;
- Must then complete Part D of your Possession Arrangements Form.

**Part T, Section 10.0 – Instructions to ESs**

49 Part T Section 10.1, Your Responsibilities.

- To ensure that the necessary marker boards are provided to indicate limits of your work site;
- To authorise movements entering or within your work site to ensure their safety;
- To ensure the work site is cleared when work is finished so that the possession may be safely given up.

50 Part T, Section 10.6. 'What you must do when work is complete' states that the ES must make the following arrangements when:

- Each TSC has signed the ES's Certificate (Part E) to the effect that the work is completed, or continuing but no longer relies on the possession arrangements;
- All work necessitating the stoppage of trains is completed;
- All trains or on track machines have left the work site.

51 When the above has been checked, the ES must carry out the following when the work is complete, the ES must:

- Check that the portion of line affected by the work is now clear and safe for trains to pass;
- Tell anyone remaining on or near the line that traffic working may be resumed;
- Arrange for any marker boards to be removed.

52 When these arrangements have been completed the ES must complete Part D of the ES's Certificate and hand this to the PICOP. Alternatively, the ES can verbally give the assurance to the PICOP in this portion of the certificate that you have done this. The ES's Certificate must be forwarded to the PICOP as soon as possible.

## Documentation associated with the possession

### Ballast Cleaning Method Statement

53 The main documentation associated with the specific works to be carried out during the possession are outlined in 'Ballast Cleaning Method Statement', published on the 9th September 2015 by the Infrastructure Department Manager by the Chief Civil Engineering, (CCE) Infrastructure Department. This is a controlled document prepared, approved and reviewed within the Infrastructure Department Planning Team. This method statement includes the: works overview; parties involved in works; worksite arrangements; worksite briefing arrangements; plant; methodology; Ballast Cleaning Planned Shift Timeline; Resource Allocation Sheet for personnel allocated to work in the possession.

54 In relation to Section 4, 'Works briefing arrangements', the method statement states that:

- "Prior to Works all personnel involved in the works or visiting the site will be briefed on the Method Statement and risk assessments for this work";
- "When protection arrangements change from T3 Possession of both roads to T3 Possession of one road and SLW on the adjacent road, staff will stop work and receive an additional site briefing informing them of the change in protection arrangements";
- *Track Safety Co-ordinator* (TSC)/*Lookout* to be used to ensure personnel access to the live road only when safety measures are in place.

55 Step sixty-one of the 'Methodology' section of the Method Statement, states that "all staff to be briefed prior to protection arrangements being changed" i.e. staff would be briefed prior to SLW being introduced on the Down Line, as work would continue on the Up Line.

56 Appendix B of the Method Statement, Worksite Timeline, has included a timeline for the work (see Figure 6). This timeline is incorrect as it shows that 'T3 Possession – Both Roads' is to continue until 06:00s hrs with the 'T3 Possession Up Road & SLW Down Road' to commence at 06:00 hrs.

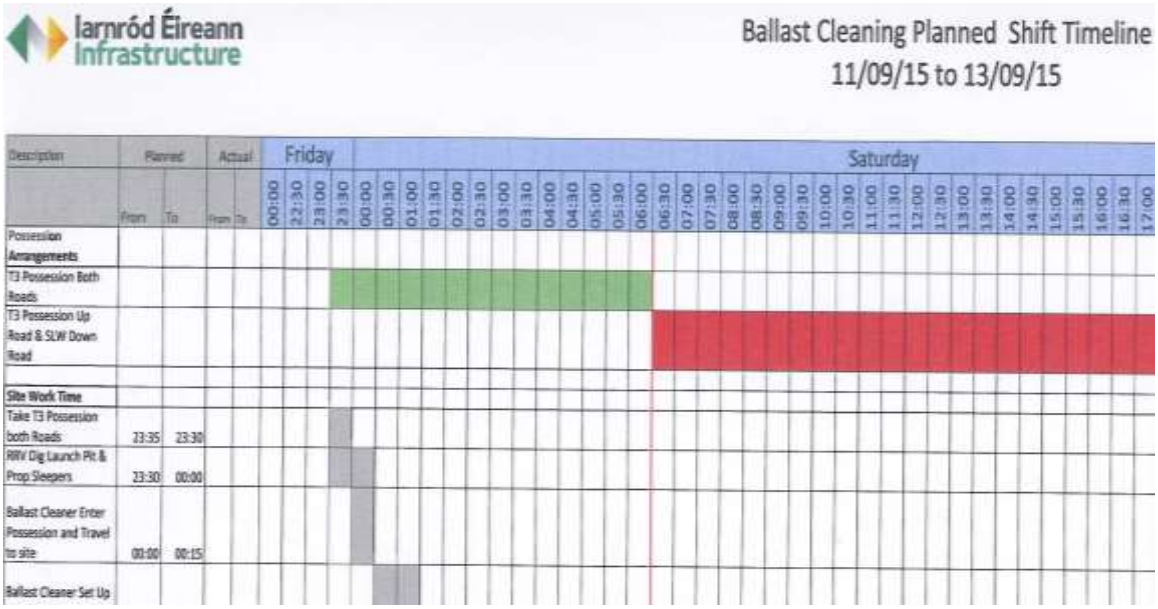



**Figure 6 – Worksite Timeline taken from the Method Statement**

## Prompt List

57 A Prompt List is issued by the Planning Team IÉ Infrastructure Department to ESs as a high level prompt to give assistance in the form of an overview or reminder to supervisors on site of what to briefing the staff on. Figure 7 shows the sheet issued for the work scheduled to commence on Friday the 11th September 2015. Prompt 8, shows that a briefing should be given on the SLW arrangements stating "Stop works and re-brief all staff regarding change in protection arrangements from T3 both roads to SLW Down Road and T3 of Up".

Iarnród Éireann Infrastructure

Ballast Cleaning Weekend 12

Prompt List for Shift 1 – Friday 11th / Saturday 12th September 2015 22:00 to 07.00

***IE Supervisor:***

| No | Task | Approx Start Time | Complete |
|---|---|---|---|
| 1 | Carryout Site Briefing of Method statement | 22:30 | |
| 2 | PICOP to take Possession T3 Both roads | 23:30 | |
| 3 | Dig Ballast Cleaner Launch Pit at the 54 mp - Move Sleepers etc | 23:30 | |
| 4 | Ballast Cleaner Into Site from Portlaoise, Set up and Carry Out Cleaning<br>- Ballast Cleaner enter into possession from Portlaoise sleeper depot | 00:01 | |
| 5 | Erect 25MPH TSR on Down Road<br>– ¾ Mile long for movements in both directions. Ballast Cleaner set at centre of restriction. | Before hand back of T3 both roads | |
| 6 | Leave 4 rail road dumpers at Pat Fogerty gate way for side cast during the day | 03:30 | |
| 7 | Ensure " Stop and Obtain instruction" Board on LTCD End opposite PL280 of site is Covered so that SLW can be set up | 04:00 | |
| 8 | Stop works and Re-Brief All staff regarding change in Protection arrangements from T3 both roads to SLW Down road and T3 of Up | Approx 05:45 | |
| 9 | RRV + Plough Bucket & Large Bucket to be left on Up line Dublin side of Ballast Cleaner | 05:45 | |
| 10 | PICOP to hand back T3 protection of Down Road | 06:00 | |
| 11 | Ballast Cleaner to Stop Working and Maintenance to Commence | 08:00 | |
| 12 | Brief the Oncoming IE Supervisor | 06:00 | |

Notes:

**Figure 7 – Prompt List for 'Ballast Cleaning Weekend 12'**

**Risk assessment for Ballast Cleaning Under SLW**

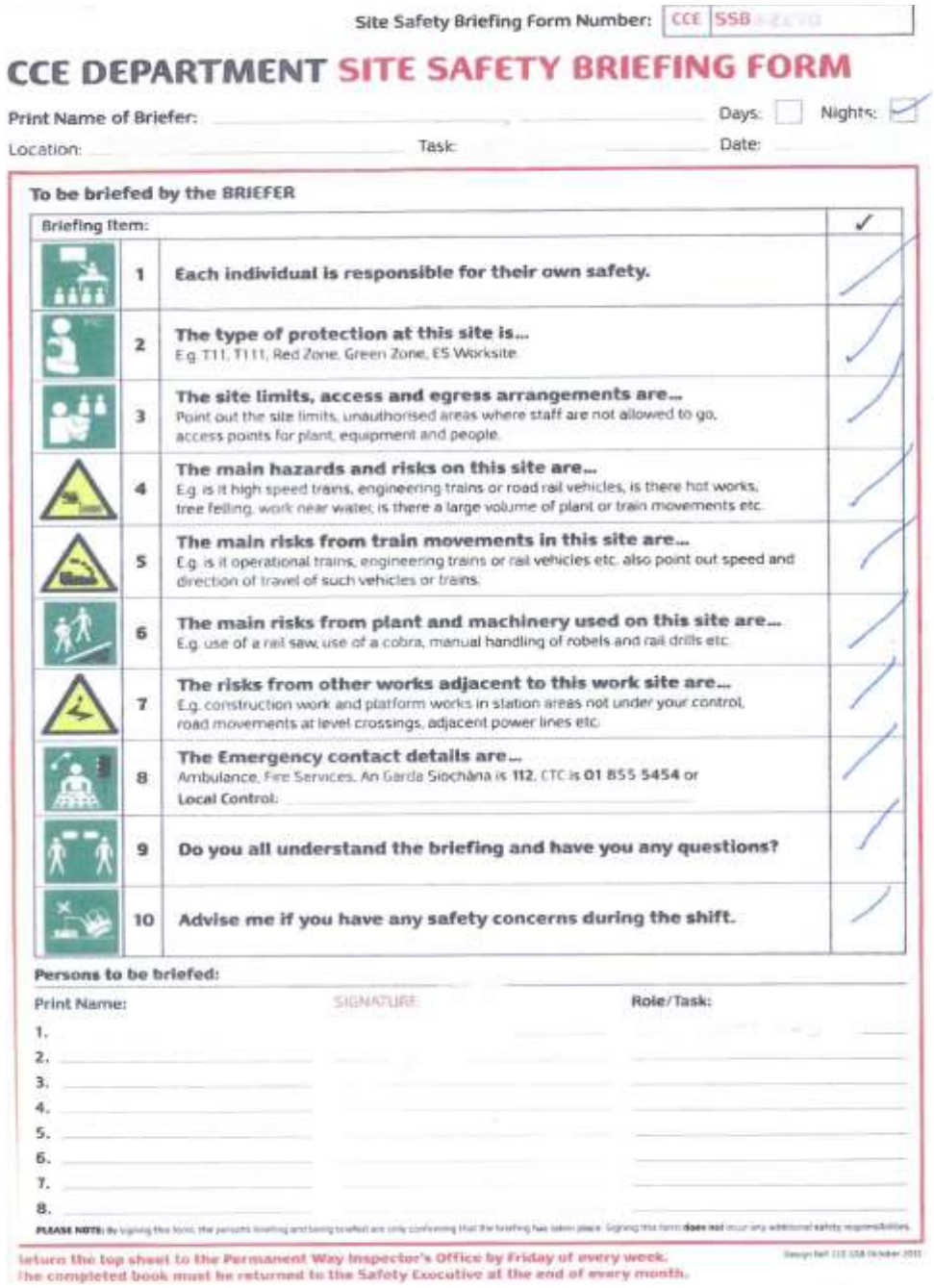
58 A risk assessment was published by the Planning Team on the 30th April 2015, it states a risk consequence on the transfer from T3 Possession from both roads, to T3 Possession on one and SLW on the other as an intolerable risk for death or injury.

59 The additional safety measures required to mitigate this risk are given as:

- Briefing of all staff of working arrangements prior to works and on site;
- Works to stop for a period during the switchover from T3 Possession to SLW and staff to receive an additional briefing;
- TSC/Lookout to be used to ensure no personal access the live road unless suitable safety measures are in place;
- Set up marker boards under T3 of both roads prior hand back of one road to SLW;
- TSC to set up a safe system of work if access to the live road is required.

**Site Safety Briefing Form**

60 There is a briefing booklet issued by the CCE Department for use on-site, which is used to record site safety information briefed regarding work on a site, see Figure 8. Each person both briefing and receiving the safety briefing, signs the form when briefed and a copy is retained for submission to the Safety Executive Dept. IÉ-IM.



Site Safety Briefing Form Number: CCE SSB

CCE DEPARTMENT SITE SAFETY BRIEFING FORM

Print Name of Briefer: Days: ☐ Nights: ✓

Location: Task: Date:

To be briefed by the BRIEFER

| Briefing Item: | | | ✓ |
|---|---|---|---|
| | 1 | **Each individual is responsible for their own safety.** | ✓ |
| | 2 | **The type of protection at this site is...** E.g. T11, T111, Red Zone, Green Zone, ES Worksite | ✓ |
| | 3 | **The site limits, access and egress arrangements are...** Point out the site limits, unauthorised areas where staff are not allowed to go, access points for plant, equipment and people. | ✓ |
| | 4 | **The main hazards and risks on this site are...** E.g. is it high speed trains, engineering trains or road rail vehicles, is there hot works, tree felling, work near water, is there a large volume of plant or train movements etc. | ✓ |
| | 5 | **The main risks from train movements in this site are...** E.g. is it operational trains, engineering trains or rail vehicles etc. also point out speed and direction of travel of such vehicles or trains. | ✓ |
| | 6 | **The main risks from plant and machinery used on this site are...** E.g. use of a rail saw, use of a cobra, manual handling of robels and rail drills etc. | ✓ |
| | 7 | **The risks from other works adjacent to this work site are...** E.g. construction work and platform works in station areas not under your control, road movements at level crossings, adjacent power lines etc. | ✓ |
| | 8 | **The Emergency contact details are...** Ambulance, Fire Services, An Garda Síochána is 112, CTC is 01 855 5454 or Local Control: | ✓ |
| | 9 | **Do you all understand the briefing and have you any questions?** | ✓ |
| | 10 | **Advise me if you have any safety concerns during the shift.** | ✓ |

**Persons to be briefed:**

| Print Name: | SIGNATURE: | Role/Task: |
|---|---|---|
| 1. | | |
| 2. | | |
| 3. | | |
| 4. | | |
| 5. | | |
| 6. | | |
| 7. | | |
| 8. | | |

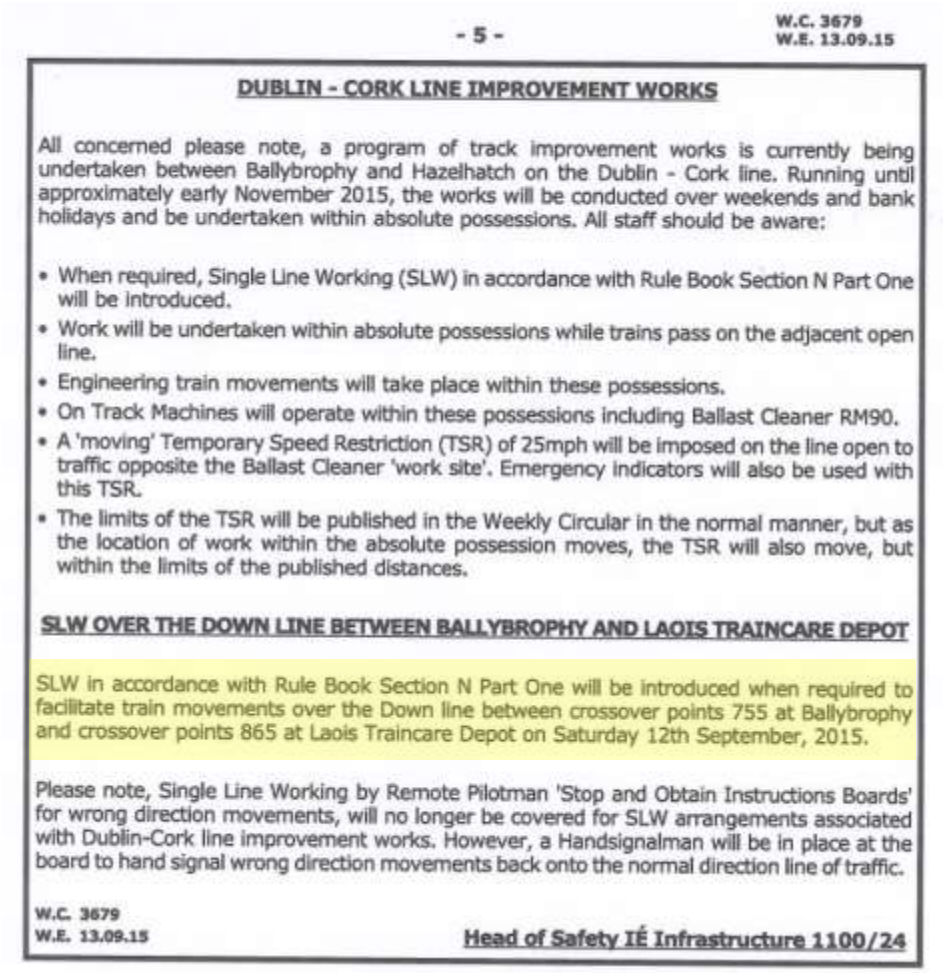
PLEASE NOTE: By signing this form, the persons briefing and being briefed are only confirming that the briefing has taken place. Signing this form does not incur any additional safety responsibilities.

Return the top sheet to the Permanent Way Inspector's Office by Friday of every week.
The completed book must be returned to the Safety Executive at the end of every month.

**Figure 8 – CCE Department Site Safety Briefing Form**

**Weekly Circular**

61 The Weekly Circular also directly refers to the changing protection arrangements, stating "SLW in accordance with Rule Book Section N Part One will be introduced when required to facilitate train movements over the Down Line…. on Saturday 12th September, 2015", see Figure 9 (highlighted section).



- 5 -

W.C. 3679
W.E. 13.09.15

**DUBLIN - CORK LINE IMPROVEMENT WORKS**

All concerned please note, a program of track improvement works is currently being undertaken between Ballybrophy and Hazelhatch on the Dublin - Cork line. Running until approximately early November 2015, the works will be conducted over weekends and bank holidays and be undertaken within absolute possessions. All staff should be aware:

- When required, Single Line Working (SLW) in accordance with Rule Book Section N Part One will be introduced.
- Work will be undertaken within absolute possessions while trains pass on the adjacent open line.
- Engineering train movements will take place within these possessions.
- On Track Machines will operate within these possessions including Ballast Cleaner RM90.
- A 'moving' Temporary Speed Restriction (TSR) of 25mph will be imposed on the line open to traffic opposite the Ballast Cleaner 'work site'. Emergency indicators will also be used with this TSR.
- The limits of the TSR will be published in the Weekly Circular in the normal manner, but as the location of work within the absolute possession moves, the TSR will also move, but within the limits of the published distances.

**SLW OVER THE DOWN LINE BETWEEN BALLYBROPHY AND LAOIS TRAINCARE DEPOT**

SLW in accordance with Rule Book Section N Part One will be introduced when required to facilitate train movements over the Down line between crossover points 755 at Ballybrophy and crossover points 865 at Laois Traincare Depot on Saturday 12th September, 2015.

Please note, Single Line Working by Remote Pilotman 'Stop and Obtain Instructions Boards' for wrong direction movements, will no longer be covered for SLW arrangements associated with Dublin-Cork line improvement works. However, a Handsignalman will be in place at the board to hand signal wrong direction movements back onto the normal direction line of traffic.

W.C. 3679
W.E. 13.09.15

Head of Safety IÉ Infrastructure 1100/24

**Figure 9 – Notes on the Weekly Circular in relation to Dublin – Cork Improvement Works**

## Events before, during and after the occurrence

### Events before the incident

62 Weekly Circular, W.C. 3679, was published on Monday 31st August 2015, which included details of protection arrangements for the possession works occurring on the 11th and 12th September to facilitate the cleaning of ballast on the Dublin to Cork Line as part of a pre-planned programme of engineering work to upgrade the line. The T3 Possession was scheduled on both the Up and Down Lines between Ballybrophy and Portlaoise (64MP to the 51MP), between 23:15 hrs on Friday night 11th September 2015 and 05:20 hrs on 12th September 2015, as per the IÉ Weekly Circular 3679, the arrangements. At 05:20 hrs the T3 Possession would be shortened (by time) to the Up Line and SLW would commence on the Down Line, to allow for the movement of trains on the Down Line.

63 The list of staff allocated to the works was included in the Method Statement issued by the Infrastructure Managers Department on the 9th September 2016.

64 On Thursday the 10th September the ES2 went on site with the IÉ Infrastructure Planning Team and was briefed on the technical aspects of the work programme, ES2 then briefed PICOP on Friday evening of the 11th September before he commenced duty, as PICOP was unable to attend the earlier briefing.

65 In preparing for the briefing, the PICOP became aware that, of the other eleven IÉ staff on his allocation list five were not present and two others were required to leave at 4:30 am, there was one additional person present not on his list who he had not been expecting, the absent personnel were all general operatives which the PICOP was expecting to have available to assist on the work site. Of the five staff, three did not report for duty, and two were scheduled to leave at 04:40 hrs as they were required for additional duties on Saturday and needed additional rest time to comply with work time regulations.

66 At approximately 23:00 hrs a site briefing, using the Prompt List, was carried out by the PICOP at Portlaoise Goods Yard in relation to the proposed work on the T3 Possession for all the IÉ and BBRI staff. All staff present signed the Site Safety Briefing Form after the briefing.

67 After the briefing, the PICOP made adjustments to his proposed allocation work proportionate with the manpower available to him, he subsequently took control of the T3 Possession from the Signalman at 23:30 hrs and commenced to have preparatory work done to facilitate the BBRI Team.

68 At 00:00 hrs the BBRI Team and the BBRI Mobile Controller went to the ballast cleaner where the BBRI Mobile Controller gave the team a further briefing on the IÉ Method Statement before they commenced preparatory work on the ballast cleaner.

69 At 00:10 hrs, PICOP informs Signalman that the ballast cleaning is in place and the Signalman returns the points to normal.

70 At 00:15 hrs the IÉ and BBRI staff commenced work in the T3 Possession. The work continued as planned until 04:30 hrs (12th September) when the BBRI staff carried out a scheduled system check on the ballast cleaner. At 05:00 hrs the BBRI staff recommenced work and continued to work on the cess side of the Up Line; they were unaware that the T3 Possession on the adjacent line was due to finish at 05:20 hrs and SLW would commence allowing trains to use the Down Line.

71 At 01:35 hrs, as the ballast cleaning progressed ES1 was replaced by ES2, this was required to allow ES1 to facilitate the ballast cleaner moving through low bridges and other related duties with RRVs. The change of ES for the work site was not communicated to the BBRI Team or IÉ staff manning the ballast cleaner, but was properly documented on the T3 Possession records at the time.

72 At 05:10 hrs a problem was detected with the ballast cleaner's front axle and the operation was halted to allow the BBRI Team to investigate the problem. Two members of the BBRI Team dismounted the ballast cleaner and accessed the front axle from both sides of the track to try to identify and assess the problem.

73 At approximately the same time (05:10 hrs) the driver of Train J270 in Laois Train Care advised the Signalman that the train was now ready to depart for Mallow.

**Events during the incident on Saturday 12th September 2015**

74 At approximately 05:20 hrs the Signalman contacted the PICOP informing him that there was a train stabled in Laois Traincare Depot which needed to leave and asked if the Down Line was clear to allow Train J207 to proceed to Mallow, where it would be put into passenger service.

75 PICOP stated he would check the situation on site and ring him back as soon as possible; at 05:21 hrs PICOP contacted ES2 to check. At the time of the call ES2, accompanied by ES1, was covering the SOIB boards as set out in the Method Statement and Prompt List (Prompt 7) in preparation for the SLW, which they thought was due to commence at 06:00 hrs; they both looked towards the site (they were approximately one mile from the ballast cleaner) and saw the Down Line was clear and told PICOP that the Down Line was clear for trains, they were not aware that

there was a problem with the ballast cleaner. ES2 finished completing the task and started to walk the mile back to the worksite.

76 At 05:24 hrs, PICOP returned the call to the Signalman and the T3 Possession was handed back at 05:33 hrs, with the Down Line cleared for trains under SLW arrangements (the Up Line remained under T3 Possession); and at 05:36 hrs the route was called for Train J270 and the train commenced towards Mallow.

77 At approximately 05:39 hrs one of the BBRI staff operating the ballast cleaner saw what he thought was the lights of an RRV approaching and announced this over their intercom headsets to alert the crew.

78 The oncoming vehicle was approximately fourteen metres (fifteen yards) away when the BBRI and IÉ staff realised it was a train. Train J270 was travelling at a speed of 40 kilometre per hour (km/h) (25 miles per hour (mph)) as per the 'moving' TSR.

79 All staff were in a place of safety and the train passed on the Down Line adjacent to the area on the Up Line where the BBRI and IÉ staff were working (one of the BBRI staff had been on the Up Line examining the faulty axle around five minutes previous to the train passing). There had been no warning of the train and all of the staff working on the line thought that the adjacent line to where they were working was within a T3 Possession at the time the train passed by; and the ES2 had not made it made to the worksite to tell the staff of the change to protection arrangements.

**Events after the incident on Saturday 12th September 2015**

80 The BBRI personnel initially consulted with their safety co-ordinator and reported the near miss to the PICOP at 06:20 hrs.

**Summary of the events before, during and after the occurrence**

81 A summary of the events is as follows:

| Date | Time | Event |
|---|---|---|
| 11/09/15 | 23:00 hrs | Site safety briefings carried out by PICOP to all IÉ and BBRI staff on site. |
| | 23:41hrs | T3 Possession granted to PICOP by Signalman for engineering works Portlaoise to Ballybrophy. |
| 12/09/15 | 00:10 hrs | PICOP advises ballast cleaner in place, signaller to return points to normal. |
| | 01:35 hrs | The ES2 replaces ES1 on ballast cleaning task. |
| | 04:30 hrs | Ballast cleaner stopped for three hour maintenance check. |
| | 05:00 hrs | Ballast cleaner recommenced on the cess side. BBRI staff worked from the cess side as they thought they had one hour before T3 Possession was handed back. |
| | 05:10 hrs | A fault with the ballast machine front axle was identified by the crew on the ballast cleaner, who dismounted to check the front axle. |
| | 05:10 hrs | Driver of Train J270 in Laois Train Care advised the Signalman that the train was now ready to depart for Mallow. |
| | 05:20 hrs | The Signalman contacted PICOP to advise of a train waiting to depart with a path for 05.30 hrs and could this movement be facilitated, PICOP advised Signalman he would phone back as quickly as possible. |
| | 05:21 hrs | PICOP telephoned the ES2 who confirmed the route was clear. |
| | 05:24 hrs | PICOP advised Signalman that the route for the train was clear |
| | 05:36 hrs | Route called for passage of Train J270. |
| | 05:39 hrs | A member of the BBRI Team identified what he thought was an RRV approaching and announced this over the headsets to alert the crew. The vehicle was approximately 15 yards away when the realised it was a train. |
| | 06:20 hrs | PICOP received phone call from a member of the BBRI Team reporting the occurrence as a near miss incident. |

# Analysis

## Possession Protection Arrangements

### Weekly Circular

82 Weekly Circular, W.C. 3679, was published on Monday 31st August 2015, which included details of protection arrangements for the possession works occurring on the 11th and 12th September to facilitate the cleaning of ballast on the Dublin to Cork Line as part of a pre-planned programme of engineering work to upgrade the line. The T3 Possession was scheduled on both the Up and Down Lines between Ballybrophy and Portlaoise (64MP to the 51MP), between 23:15 hrs on Friday night 11th September 2015 and 05:20 hrs on 12th September 2015, as per the IÉ Weekly Circular 3679, the arrangements. At 05:20 hrs the T3 Possession would be shortened (by time) to the Up Line and SLW would commence on the Down Line, to allow for the movement of trains on the Down Line (see paragraphs 40 and 42).

83 The Weekly Circular also specifically identified the ballast cleaning possession works, highlighting that SLW arrangements would be put in place on the 12th September to allow for the running of trains on the Down Line (paragraph 61); and also stated that the SOIB boards did not need to be covered (paragraph 43).

### Possession Planning

84 The Resource Allocation Sheet, prepared by the IÉ Infrastructure Planning Team allowed for thirteen member of staff (paragraph 44), however on the night of the T3 Possession, five staff did not report for duty, two others were required to leave at 4:30 am, and one person, not on the Resource Allocation Sheet, reported for duty (paragraph 65).

85 This resulted in the PICOP having to make adjustments to his proposed work, proportionate with the manpower available (paragraph 67); and in addition the loss of general operatives resulted in the engineering supervisors having to carry out general operative duties, such as covering the boards (paragraph 75), irrespective of the fact that this was not required (paragraph 41).

### Method Statement & Prompt List

86 The Worksite Timeline, as set out in the Method Statement is incorrect, as it states that the T3 Possession is to continue to 06:00 hrs on both the Up Line and the Down Line, with SLW arrangements beginning at 06:00 hrs (paragraph 56), as opposed to the correct start time of 05:20 hrs.

87 This error continues onto the Prompt List, which states that the works should be stopped and a re-briefing should be given on the SLW arrangements at 05:45 hrs in preparation for the change in protection at 06:00 hrs (see paragraph 57), as opposed to correct time of 06:00 hrs. There is also an error on the Prompt List and Method Statement in relation to covering the SOIB boards, where these documents request the task to be done, which conflicts with the arrangements set out in the Weekly Circular (paragraph 43).

**Site Safety Briefings**

88 PICOP carried out a site safety briefing prior to going on site, using the Prompt List as a guide and briefing the staff on the Method Statement and all staff signed the Site Safety Briefing Form (paragraph 66). The BBRI Mobile Controller gave the BBRI Team an additional briefing on the Method Statement onsite (paragraph 68).

89 The staff were not re-briefed on the protection arrangements prior to ES2 telling PICOP that the Down Line was open to trains (paragraph 75). ES2 was in the process of walking back to the worksite when Train J207 (travelling on the Down Line) passed the ballast cleaner (stationary on the Up Line), (paragraph 75). In addition, ES1 or ES2 did not briefing any staff that the person performing the role of ES had changed (paragraph 71).

**Actions at the time of the incident**

90 When PICOP rang ES2 to see if that Down Line was clear for the passage of train, ES2 looked towards the worksite (one mile away) and saw the Down Line was clear, so informed PICOP that the Down Line was clear for trains (paragraph 75). ES2 did this despite not being able to communicate with the worksite of the changing situation. ES2 was also unaware that there was a problem with the ballast cleaner and that BBRI staff were accessing both lines. As ES2 was walking back to the worksite to communicate the changing circumstances to the staff, Train J207 passed through the possession without the staff being aware that SLW was in operation.

91 ES2 was undertaking a task of covering SOIB boards at the time he was talking to the PICOP, however the Weekly Circular clearly stated that the SOIB boards did not need to be covered (paragraph 43). They were carrying out this task as there was a shortage of general operatives on site.

# Conclusions

## Summary of conclusions

92 The Weekly Circular was clear and concise in setting out the arrangements for protection, in particular in relation to the shortening (by time) of the T3 Possession on the Up Line to 05:20 hrs and allowing SLW arrangements on the Down Line to allow for the movement of trains (paragraphs 82 and 83); it was also clear in relation to the covering of SOIB boards (paragraph 83).

93 The Method Statement and Prompt List included the incorrect timings for the T3 Possession, stating that the T3 Possession for both the Up Line and the Down Line was scheduled until 06:00 hrs, when in fact it was scheduled for both lines until 05:20 hrs, with the introduction of SLW arrangements at that time (paragraphs 86 and 87).

94 The BBRI Team and IÉ staff were briefed on the working arrangements but were not briefed properly on the protection arrangements, and as such were not informed that these SLW arrangements were to be introduced at 05:20 hrs and as such thought that the T3 Possession of both lines was to continue until 06:00 hrs (paragraph 89). As a result, the train passed adjacent to their worksite without receiving prior warning, they also were unaware of the change of ES (from ES1 to ES2), (paragraph 89).

95 ES2 was one mile from the worksite covering SOIB boards which contradicts the requirements in the Weekly Circular (paragraph 91)), when he told the PICOP that the Down Line was clear for trains, knowing that he would not be able to communicate this to the worksite immediately and not knowing there was a problem with the ballast cleaner (which resulting in the BBRI staff using both lines). He was also unaware that SLW was to be introduced at 05:20 hrs and as such it can be concluded that ES2 was unfamiliar with the contents of the Weekly Circular 3679.

96 IÉ Infrastructure Planning Team's Resource Allocation Sheet was not a true reflection of the resources which were available at the time of the possession, which resulted in the PICOP having to make amendments to the workload and ES1 and ES2 carrying out tasks usually assigned to general operatives.

## Immediate cause, contributory factors and underlying causes, root causes and additional observations.

97 The immediate cause of Train J207 passing adjacent to the worksite without the prior notification to the ballast cleaning staff was as a result of ES2 informing the PICOP (who in turn informed the Signalman) that the Down Line was clear for trains, without briefing any of the ballast cleaning staff on the introducing of SLW arrangements.

98 Contributory factors associated with the incident are:

- CF-01 – ES2 was not aware of the T3 Possession planned termination time of 05:20 hrs;
- CF-02 – The Resource Allocation Sheet, prepared by IÉ's Infrastructure Planning Team was not effective at ensuring staff rostered for work reported for duty.

99 The underlying cause associated with this incident:

- UC-01 – There is no prompt on the Site Safety Briefing Form to ensure all staff are aware of the contents of the current IÉ Weekly Circular.

## Relevant actions taken or in progress

### Actions taken by IÉ

100 IÉ have advised the RAIU that the following actions have taken in relation to this incident:

- The Ballast Cleaning Method Statement was reviewed and amended to include the requirement that all work activity must stop so as to allow all relevant staff to be briefed on the change in protection arrangements from T3 Possession on both lines to T3 Possession of one line and adjacent line open to rail traffic. This action was completed on the 16th September 2015;
- ES2 and PICOP were stood down immediately after the incident;
- ES2 and PICOP are now participating in a support and development plan that was designed to address the issues identified during the investigation. This support and development plan includes monitoring by means of announced and unannounced site visits by the Chief Competence Assessor and briefings carried out as required. This action commenced on 20th February 2016 and was scheduled to be completed by 20th April 2016;
- The CCE Department have introduced a written record of the briefing that takes place when the protection arrangements are changed. This action was completed on the 16th September 2015;
- The CCE Department have introduced the process of having a dedicated TSC placed with the ballast cleaner at all times during the works. This action was completed on the 16th September 2015;
- The CCE Department have introduced a system whereby during the T3 Possession for ballast cleaning flashing beacons are now placed to identify the exclusion zone on the adjacent line to the ballast cleaner;
- The CCE Department have introduced a position of Project Coordinator and Safety Compliance, who assists the Infrastructure Manager Dublin in relation to safety control and compliance with regard to ongoing projects in the Dublin area;
- The Safety Manager CCE has issued out a Safety Bulletin to all staff reminding them of the requirement that they must receive a site safety briefing before accessing a work site;
- The Infrastructure Manager IM Dublin briefed the Dublin Division PWIs meeting that took place on 25th September 2016 on this occurrence.

## Actions taken by BBRI

101 BBRI have introduced a system whereby the BBRI Mobile Controller completes a check list at the start and during the Ballast Cleaning shift that records the names of the relevant staff to the Safe System of Work and the contact details. This action was completed on 1st October 2015.

## Actions taken by CRR

102 Upon receiving notification of the occurrence, the CRR undertook a Post Incident Inspection that focused on IÉ-IM's compliance with its approved SMS. The CRR identified that IE-IM were non-compliant with certain clauses of CCE Standard CCE-SMS-003, Briefings, however, sufficient evidence was supplied to demonstrate to the satisfaction of the Inspector that action had been taken to address the non-compliance.

# Safety recommendations

## General description

103 In accordance with the Railway Safety Act 2005 (Government of Ireland, 2005a) and the European railway safety directive (European Union, 2004), recommendations are addressed to the national safety authority, the RSC. The recommendation is directed to the party identified in each recommendation.

104 There was a difference between the timings in the Weekly Circular and on the Prompt List given to the Safety Critical Staff regarding the termination time for the T3 Possession, the PICOP and ES did not check the relevant Weekly Circular and an over reliance on the Prompt List meant they were unaware of the correct timings. (CF-01, CF-03) The RAIU make the following safety recommendation.

**IÉ-IM should review the Site Safety Briefing procedure to ensure all personnel have made themselves aware of the information contained in the relevant Weekly Circular.**

105 The Engineering Supervisors were engaged on a task that was both no longer required and if necessary should have been done by general operatives, distracting them from their main safety duties, as a result the RAIU make the following safety recommendation.

**IÉ-IM should review the method of allocation and accountability for general operatives detailed for work sites, to ensure that there are sufficient personnel on site to perform the required duties.**

# Additional information

## List of

| | |
|---|---|
| BBRI | Balfour Beatty Rail Ireland |
| CCE | Chief Civil Engineer |
| CF | Causal factor |
| CoF | Contributory factor |
| CPWI | Chief Permanent Way Inspector |
| CRR | Commission for Railway Regulation |
| CTC | Centralised Traffic Control |
| CWR | Continuous Welded Rail |
| DART | Dublin Area Rapid Transit |
| DMU | Diesel Multiple Unit |
| DTTAS | Department of Transport, Tourism and Sport |
| ES | Engineering Supervisor |
| ICCN | Intercity and Commuter Network |
| IE | Iarnród Éireann |
| IM | Infrastructure Manager |
| IM | Iarnród Éireann Infrastructure Manager |
| IPPM | Infrastructure Production Plan Manager |
| m | Metre |
| MP | Mile Post |
| No. | Number |
| OTM | On Track Machine |
| OTMDO | OTM Driver Operator |
| PICOP | Person In Charge of Possession |
| PWI | Permanent Way Inspector |
| RAIU | Railway Accident Investigation Unit |
| RM | Regional Manager |
| RRV | Road Rail Vehicle |
| RU | Railway Undertaking |
| SLW | Single Line Working |
| SMS | Safety Management System |
| SSOW | Safe System of Work |
| SI Units | International System of Units |
| TSC | Track Safety Coordinator |
| TSR | Temporary Speed Restriction |
| UF | Underlying factor |

## Glossary of terms

| | |
|---|---|
| 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. |
| Ballast Cleaner | A machine that excavates the ballast from under the track, discards the dirt, oversize and undersized pieces, and then returns the good ballast to the track. |
| CCE Location | A grouping of activities or workplaces, typically organized either geographically or organizationally, that are considered as a single area of accountability within the CCE Department. |
| Cess | The part of the track outside the ballast shoulder that is deliberately maintained lower that the sleeper bottom to aid drainage. |
| Coloured light signals | Signals which convey movement authorities to drivers by means of coloured lights |
| Continuous welded rail | Sections of rail that are welded together. |
| Contributory Factor | Factors relating to actions taken by persons involved or the condition of rolling stock or technical installations. |
| Controlling Signalman | The Signalman designated to control a specific section of track. |
| Cutter chain | The part of a ballast cleaner that excavates ballast from beneath the track. |
| Control Room Process | Meeting that incorporates a visualisation room where the local supervisory/management team make prioritized decisions related to Maintenance production plans, progress reporting of different measures of performance, reviews of plans and revising actions to meet those plans, Occupational safety risks and asset safety risks and the appropriate risk mitigation actions, initiating practical problem solving for specific problems and controlling the extent of 5S workplace improvement action plans. |
| Detonator | A coin-sized device, fixed to the rail, that when a train wheel rolls over it, it make a loud sound as a warning signal to train drivers. |
| Division | Made up of a number of regions and several CCE Locations. |
| Double line track | A route with two tracks |
| Down Line | The line on which trains normally travel away from Dublin to Portlaoise. |
| Engineering train | A train used in connection with engineering works, e.g. carrying spoil. |
| Engineering Supervisor | The person nominated to manage the safe execution of works within an engineering worksite. This includes arranging the marker boards and authorising the movements of train in and out of the work site. |
| Extensive damage | Damage that can be immediately assessed by the RAIU to cost at least €2,000,000 in total. |

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| Immediate cause | Direct and immediate causes of the occurrence including contributory factors relating to actions taken by persons involved or the condition of rolling stock or technical installations. |
| Incident | Any incident, other than an accident or serious accident, associated with the operation of trains and affecting the safety of operation. |
| Infrastructure Manager | Organisation that is responsible for the establishment and maintenance of railway infrastructure, including the management of infrastructure control and safety systems. |
| Lookout | A competent person whose duties are to watch for and give warning of approaching trains. |
| Marker Board | Double sided boards and have two flashing red lights at the entrance to the work area and two flashing yellow lights at the exit to the work area. |
| Method Statement | A document that details the way a work task or process is to be completed. The method statement should outline the hazards involved and include a step by step guide on how to do the job safely. |
| Mile Post | A post used to denote a location on a railway line using miles from a fixed point known as the 0 milepost. |
| National safety authority | The national body entrusted with the tasks regarding railway safety in accordance with European directive 2004/49/EC. |
| On Track Machine | Any piece of specialist railway plant which moves only on the rails and is normally self-propelled e.g. ballast cleaners, rail cranes, etc. |
| Permanent Way Inspector | Permanent Way Inspector is responsible for overseeing and guiding workplace activities in his CCE Location. |
| Person in Charge of Possession | The competent person nominated to manage the following: safe and correct establishment of the protection for the possession; managing access to the possession by the Engineering Supervisor; managing the establishment of engineering works in the possession; liaising with the Signalman regarding passage of trains in and out of the possession; controlling the movement of the train between the protection and work sites; ensuring that all the forgoing is correctly removed in reverse sequence and the possession is relinquished and the line handed back to the Signalman. |
| Possession | A period of time during which one or more tracks are blocked to trains to permit work to be safely carried out one or near the line. Two types of possessions are available and are named after the section of the Rule book that details them. These are T3 and T4 Possessions. |
| Protection | The marking of the limits of a portion of line that has been blocked to the passage of trains. This includes the installation of a secondary system of warning (fog signals) to drivers in the event of unauthorised movements in or out of possession limits. |

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| Protecting signals | A signal that prevents trains from entering a section where conflicting movements may take place. |
| Incident | An accident, serious accident or incident. |
| Railway Undertaking | Organisation that operates trains. |
| Region | Sub-division Consisting of a number of CCE Locations |
| Road Rail Vehicle | Any vehicle adapted to operate equally well on road and rail. |
| Root cause | Causes related to framework conditions and application of the SMS. |
| 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. |
| Serious injury | Any injury requiring hospitalisation for over 24 hours. |
| Single Line Working | When one line of a double line becomes blocked, single line working by pilotman allows trains to travel over the other line in either direction. |
| Standard | A document that mandates technical, operational or managerial requirements. |
| Tamper | A machine that can lift and slew the track while simultaneously compacting the ballast. |
| T3 Possession | A possession taken for an agreed period without the facility to run trains in the area during that period until such time as the holder of the possession decides to relinquish it. |
| Track Safety Co-ordinator | The person nominated to make arrangements to prevent anyone within a work group being endangered by trains. There can be several work groups within a possession each with their own Track Safety Coordinator (TSC). |
| Underlying cause | Causes related to skills, procedures and maintenance. |
| Up Line | The line on which trains normally travel away from Portlaoise to Dublin. |
| Weekly Circular | A document published on a weekly basis, providing information about engineering works, possessions requested, changes to services and speed restrictions. |

## References

IÉ (2007), Section T, Rule Book

IÉ (2015) Ballast Cleaning Method Statement, Ballast Cleaning Up Road 54 MP to 52 ½ MP Dublin – Cork, published on the 9th September 2015.

IÉ (2015), Prompt List for Shift 1 – Friday 11th /Saturday 12th September 2015, 22:00 to 07:00.

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