Railway Accident Investigation Unit Ireland

INVESTIGATION REPORT

Investigation into two near miss events involving track workers at Bray Tunnels

RAIU Investigation Report No: D2026-R003

Issued: 22/06/2026

Report Description

Report publication

Where the report has been altered following its original publication, details on the changes will be given.

Report structure

The report structure is written as closely as possible to the structure set out in the "Commission Implementation Regulation (EU) 2020/572 of 24 April 2020 on the reporting structure to be followed for railway accident and incident investigation reports" having regard to "Directive (EU) 2016/798 of the European Parliament and of the Council of 11 May 2016 on railway safety".

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.

Further information

For further information, or to contact the RAIU, please see details below:

RAIU
2nd Floor, 2 Leeson Lane
Dublin 2, Ireland.

email: info@raiu.ie
website: www.raiu.ie
telephone: + 353 1 604 1050

Preface

The RAIU is an independent investigation unit within the Department of Transport which conducts investigations into accidents and incidents on the national railway network including the Dublin Area Rapid Transit (DART) network, the LUAS light rail system, heritage and industrial railways in Ireland. Investigations are carried out in accordance with the Railway Safety Directive (EU) 2016/798 enshrined in the European Union (Railway Safety) (Reporting and Investigation of Serious Accidents, Accidents and Incidents) Regulations 2020; and, where relevant, by the application of the Railway Safety (Reporting and Investigation of Serious Accidents, Accidents and Incidents Involving Certain Railways) Act 2020.

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 or tramline safety regulation or the management of safety. During an investigation, if the RAIU make some early findings on safety issues that require immediate action, the RAIU will issue an Urgent Safety Advice Notice (USAN) outlining the associated safety recommendation(s); other issues may require a Safety Advice Notice (SAN). In some instances, after the issue of an USAN/ SAN, a further investigation report is not warranted.

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

The RAIU may also carry out trend investigations where the occurrence is part of a group of related incidents that may or may not have warranted an investigation as individual occurrences, but the apparent trend warrants investigation.

The RAIU investigation shall analyse the established facts and findings (i.e. performance of operators, rolling stock and/or technical installations) which caused the occurrences. The analyses shall then lead to the identification of the safety critical factors that caused or otherwise contributed to the occurrence, including facts identified as precursors. An accident or incident may be caused by *causal, contributing* and *systemic factors* which are equally important and should be consider during the RAIU investigation. From this, the RAIU may make safety recommendations 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.

Summary

On the 11th October 2024 there was an alleged near miss event between a train and a member of Iarnród Éireann Infrastructure Manager (IÉ-IM) staff near Killiney Station whilst working under *red zone* conditions. The RAIU conducted a preliminary examination and after reviewing previous near miss incidents with track workers: near Ardgillan on the 27th February 2023; at Clonnydonin on the 9th October 2023; and, at Bray No. 4 *Tunnel* on the 6th December 2023 a decision was made to undertake a trend investigation.

After the trend investigation had commenced, four further incidents of near misses were reported at: Bray No. 2 Tunnel on the 10th April 2025; Powerstown on the 18th October 2025; Islandbridge Junction on the 21st October 2025; and Clonygowan on the 24th November 2025.

On notification of the incident in November 2025, the RAIU made the decision to issue USAN 006 on the 9th January 2026; this was undertaken with a view to IÉ-IM taking immediate actions, to further protect their staff accessing the live railway line by the implementation of additional risk mitigation measures. USAN 006 contained safety recommendations related to: the immediate cessation of lone track patrolling where safe *sighting distances* cannot be met and greater use of alternative safe systems of work (SSOW) with red zone working as a last resort; adopting technological and mechanised inspection methods to minimise the need for staff on the line; alongside better planning and coordination of track access through possessions or protected periods. It also requires stronger management oversight and formal authorisation processes to ensure risks are systematically assessed and mitigated, especially where work must occur while trains are running; and the rollout of the *Track Access Index* (TAI) to guide safer work planning.

Following the publication of USAN 006, the scope of the trend investigation was limited to the near miss with a Permanent Way Inspector (PWI) and Track Engineer at Bray Tunnel No. 2 on the 10th April 2025; and the near miss with a *Patrol Ganger* at Bray Tunnel No. 4 on the 6th December 2023, due to the additional risks associated with entering tunnels (i.e. they are areas of *limited clearance*). The RAIU identified the *causal, contributory and systemic factors* related to the track workers not reaching or being in a *position of safety* for sufficient time as trains approached. The following were identified as causal factors (CaF):

- CaF-01a – The PWI (acting as the *Track Safety Co-ordinator* (TSC)) did not set up a compliant SSOW for entering and working in the tunnel as a group (Bray Tunnel No. 2);
- CaF-01b – The Patrol Ganger (acting as the TSC) did not comply with a local instruction for accessing Tunnel No. 4 by not arranging *T2 Protection* and/ or obtaining *Signal Protection* from the local signalman (Bray Tunnel No. 4).

The following are likely to have been a contributory factors (CoF) to both incidents:

- CoF-01 – The members of staff were reliant on previous experience and mentoring rather than their TSC training;
- CoF-02 – The Site Safety Briefing Form is not effective at prompting TSCs to fully consider their protection arrangements.

The RAIU have identified the following systemic factors (SF) to both incidents:

- SF-01 – Instructions on tunnels in the Personal Track Safety (PTS) Handbook, was not incorporated into TSC training or reassessment;
- SF-02 – The rules and instructions for TSCs on when *Line Blockages* can be used to provide protection are limited and did not permit the work to be undertaken at Bray Tunnel No. 2 under this type of protection arrangement;
- SF-03 – The classroom training process for new TSCs includes limited structured training in the planning of a SSOW, with this being undertaken locally through mentoring; this is likely to have contributed to working without a compliant SSOW becoming normalised.

Although not causal, contributing, or systemic to the incidents in this report, the following *additional observations* (AOs) have been identified:

- AO-01 – Local instructions were identified for SSOW for multiple tunnels on the IÉ network, but these were not in documents that were available to TSCs in all the IÉ-IM departments;
- AO-02 – There was a period of time that Central Traffic Control (CTC) could not establish who was on the line in order to remove them from the line;
- AO-03 – The safe working instructions in the Patrol Length Form for Bray Tunnel No. 4 were not contained in any local instructions or reference document available to the Rosslare Line Signalman. In addition, the Rosslare Line Signalman had no maps or documentation in the signal box showing the access points relative to the structures and features of the line;
- AO-04 – The rules and instructions applicable to Line Blockages do not use consistent terminology across the operational publications with the terms Line Blockage, Signal Protection and stopping of trains in instructions.

The RAIU made a number of safety recommendation as a result of the incidents and additional observations, namely:

- Safety Recommendation 2026003-01 – IÉ-IM should review and enhance its training and assessment arrangements relating to the planning of a SSOW, to include:
    - Structured, scenario-based exercises and assessments involving the planning of protection arrangements in a range of representative operational environments, taking account of location-specific hazards (including all relevant documentation such as the TAIs and Patrol Length Features Forms);
    - Reinforcement of the application of relevant guidance contained within the PTS Handbook.
- Safety Recommendation 2026003-02 – IÉ-IM to review and standardise the process for documenting location specific instructions to make it easily accessible to those planning a SSOW.
- Safety Recommendation 2026003-03 – IÉ-IM to review the rules and instructions on accessing and working in tunnels to improve their consistency and clarity, in order to facilitate a clear understanding by staff planning a SSOW.
- Safety Recommendation 2026003-04 – IÉ-IM to consider providing signalmen with reference maps (showing access points and structures) and local instructions related to track access relative to signals in their control area.
- Safety Recommendation 2026003-05 – IÉ-IM should review and revise its rules and procedures relating to SSOWs (with particular emphasis on simplifying and clarifying the terminology used for Signal Protection and Line Blockages). IÉ-IM should then clearly define the circumstances in which each SSOW may be selected and implemented.

Contents

RAIU investigation & its context

Decision & motivation to investigate this occurrence

1 On the 15th November 2024, the RAIU on-call investigator received notification of a near miss between a train and a trackworker at Killiney, County Dublin, which occurred on the 11th October 2024.

2 The RAIU conducted a preliminary examination, into this incident and three other near misses with members of staff on the IÉ Network in 2023:

- Near miss at Ardgillan, County Dublin, on the 27th February 2023;
- Near miss at Clonnydonnin, County Westmeath, on the 9th October 2023;
- Near miss at Bray Tunnel No. 4, County Wicklow, on the 6th December 2023.

3 As a result, the RAIU's Acting Chief Investigator made the decision to conduct a full trend investigation into the incidents (*Article 20* (2)(c)), as under slightly different circumstances the incidents may have led to serious accident with the potential for causing injuries or fatalities to one or more members of staff.

4 After the commencement of the trend investigation, there were four more near misses as follows:

- Near miss with two track workers at Bray No. 2 Tunnel, County Wicklow, on the 11th April 2025;
- Near miss with a track worker at Powerstown, County Carlow, 18th October 2025;
- Reported near miss with track worker at HN709 points near Islandbridge Junction, County Dublin, on the 21st October 2025;
- Near miss with a track worker at Clonygowan, County Offaly, 24th November 2025.

5 On the notification of the last near miss at Clonygowan the RAIU issued USAN 006 (outlined in paragraphs 14 and 15), with safety recommendations, with a view to IÉ-IM taking immediate action, to further protect their staff accessing the live railway line by the implementation of additional risk mitigation measures.

Scope & limits of investigation

6 As a result of the safety recommendations made in USAN 006 (which addressed general track patrolling and inspection duties; and, accessing the line for fault finding) the scope of this investigation is confined to the near miss incidents occurring in the Bray Tunnels due to the additional risks associated with entering tunnels (i.e. they are areas of limited clearance). The RAIU have established the reduced scope and limits of the investigation, as follows:

- A review of two reported near miss events involving track workers in the Bray Tunnels on the 6th December 2023 and the 11th April 2025;
- Examination of the processes relating to walking and working in tunnels;
- Reviews of the training of staff involved in the incidents;
- Identification of any additional observations i.e. safety issues identified during the investigation; but without relevance to the conclusions on causes and consequences of near miss incidents.

Technical capabilities & investigation methods

7 The RAIU's Acting Chief Investigator allocated RAIU Senior Investigators, trained in accident investigation, to conduct this investigation, as appropriate. In this instance, no external parties were required to assist with the investigation.

8 During the investigation, the RAIU collated evidence through the submission of Requests for Information (RFIs) to the IÉ-IM Safety Department.

9 Related to this investigation, the RAIU collated and logged evidence related to the staff accessing the line and entering into tunnels, such as CCTV footage, voice communications, witness statement and interviews.

10 The RAIU reviewed documentation from IÉ-IM, for a full list of the documentation reviewed and referenced, see the References see of this report.

Communications & evidence collection

11 Communications were conducted through established processes (such as RFIs).

12 Relevant stakeholders were issued the draft investigation report for comment; comments were reviewed and responses on their comments returned. In this instance the stakeholders were: IÉ-IM Chief Civil Engineers (CCE) Department); and the Commission for Railway Regulation (CRR)[1].

13 All relevant parties co-operated with the RAIU investigation.

[1] The CRR is the National Safety Authority (NSA) for the Republic of Ireland and 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 also monitors the implementation of RAIU safety recommendations.

USAN 006

14 Following the notification of the incident at Clonygowan on the 24th November and the initial investigation findings, the RAIU made the decision to issue a USAN (USAN 006), which was issued on the 9th January 2026.

15 In three of the recent occurrences involving patrol gangers, the required sighting distances for the locations was not achievable; meaning that the patrol gangers were in a position of danger for some part of their patrol lengths. In 2020, the RAIU had previously identified that IÉ-IM appear to have, over a long period of time, accepted a certain element of risk in relation to track patrolling given that known dangers are not being adequately mitigated by patrol gangers or their managers. This appeared to continue to be the case in the investigation of the incidents in USAN 006.

16 USAN 006 contained the following five safety recommendations, which would otherwise have been issued within this investigation report. These were:

- USAN Recommendation 1 – IÉ-IM should expedite the publication of all TAIs for all remaining divisions, with a view of having these published by the end of December 2026.
- USAN Recommendation 2 – IÉ-IM should, with immediate effect, cease track patrolling, using TSCs working alone, in locations where the minimum sighting distances, set out in the IÉ Rule Book, cannot be met. Where in the interim, track patrolling is required, alternative SSOWs should be introduced; however, supervisors and managers planning the SSOW should apply a risk control hierarchy (developed with consideration to the general principles of prevention), to ensure red zone working is the last choice.
- USAN Recommendation 3 – IÉ-IM should review its track inspection methods with a view to introducing technological / mechanised systems to eliminate / minimise the need for track patrolling. Where staff access the live railway, effective safety measures technological / mechanised systems) should be implemented to eliminate / minimise track worker exposure to railway hazards.
- USAN Recommendation 4 – IÉ-IM, in terms of track access are to carry out the following:

  1. Identify access opportunities on all lines, including new access opportunities where possible;

  2. Identify work that needs to be done on or near the lines;

3. In light of 1 & 2, assess what work can be done in the available access, taking into account all other risks including (and not limited to) safety of the line;

4. Make appropriate management and supervisory arrangements to ensure so far as is reasonably practicable that the identified work is done in the identified access opportunities.

- USAN 006 Recommendation 5 – IÉ-IM are to make appropriate and effective management and supervisory arrangements to ensure, so far as is reasonably practicable, that:

  1. Any maintenance work not able to be done in access opportunities, for example *T3 Possessions,* including in response to faults and Incident, is planned and carried out in such a manner that each level of the risk control hierarchy / general principles of prevention is / are demonstrably considered before the next one down is considered, including specifically Line Blockages using technological means of protection or warning where appropriate;

  2. Where, due to other risks of physical circumstances, work cannot be carried out in any other manner other than with trains running (for example urgent repairs), technological means of additional protection and / or warning must be provided and all other precautions are taken to prevent injury; and,

  3. Where necessary to prevent immediate risks, for example to the travelling public and where it would be unreasonable to wait for technological means of protection and /or warning, all other precautions, including management and supervisory arrangements, are taken to prevent injury to persons working on or near the line from moving trains.

Description of the occurrences & background information

Description of the occurrence type

17 The incidents involved near misses with members of staff. The EU Agency for Railways categorisation for the occurrences included in this investigation are categorised as: Incidents – Traffic Operations and Management.

Background to the occurrences

18 The occurrences outlined in this investigation report are near misses between members of IÉ-IM staff and trains. The incidents reviewed in this report are the near misses at:

- Bray Tunnel No. 4 on the 6th December 2023 – Which involved a near miss between an *On Track Machine* (OTM) and a member of CCE staff carrying out a planned track patrol;
- Bray Tunnel No. 2 on the 11th April 2025 – Which involved a near miss between a passenger train and two members of CCE staff carrying out an ad-hoc site visit to inspect scrap rail.

19 Both incidents occurred in tunnels on Bray Head, County Wicklow, see Figure 1. The railway is single track between the towns of Bray and Greystones, running on a coastal alignment. The line forms part of the route from Dublin to Rosslare Harbour. The route is also used by the electric suburban DART services which operate as far as Greystones.

Figure 1 – Map of the locations

Deaths, injuries & material damage

20 There were no reported injuries to the track workers involved in the incidents.

21 There was no reported damage to rolling stock or infrastructure.

Parties associated with the incidents

IÉ-IM

22 IÉ–IM is the infrastructure manager (IM) who owns, maintains and operates the railway infrastructure in Ireland and operates under a Safety Authorisation certificate issued by the CRR. The IM Safety Authorisation is issued in conformity with Commission Regulation (EU) 1169/2010; the authorisation was renewed on the 24th March 2022 for a period of five years.

23 The IÉ-IM CCE Department directly employed the staff involved in both the incidents; this department carries out the inspections and maintenance of track and structures.

IÉ-RU

24 Although not directly involved in the incidents, IÉ-RU is the train operating division of IÉ and operates mainline and suburban railway services in Ireland under a Safety Certificate issued by the CRR. The Railway Undertaking (RU) Safety Certificate is issued in conformity with European Directive 2004/49/EC and S.I. 249 of 2015; the Safety Certificate was renewed on 23rd March 2023 for a period of five years.

OTM Contractor

25 Although not directly involved in causing the incident, the OTM in the Bray Tunnel No. 2 was operated by a contractor to IÉ-IM under their own safety certificate issued by the CRR. The Safety Certificate is issued in conformity with European Directive 2004/49/EC and S.I. 249 of 2015; the Safety Certificate was renewed on 8th July 2023 for a period of five years.

Roles involved with the incidents

Near miss at Bray Tunnel No. 2 on the 11th April 2025

26 The following roles were involved in the incident:

- PWI – A supervisory post in the track maintenance function responsible for planning and supervising maintenance work;
- Track Engineer – A technical role in the CCE Department responsible for designing, specifying and inspecting the track associated assets;
- North & East Signalman – The signalman at Dublin CTC which controls train movements onto the Bray to Greystones single section from the Dublin end[2];
- Rosslare Line Signalman – The signalman controlling the Rosslare Line from Rosslare Harbour to Greystones and the entry to the single line at the Greystones end;
- CTC Regulator – The person, based in CTC, responsible for real-time delivery of a punctual train service in accordance with the timetable and to deal with any service recovery situations.

Near miss at Bray Tunnel No. 4 on the 6th December 2023

27 The single member of staff involved in the incident was a Patrol Ganger. Patrol gangers carry out track inspection and light maintenance duties, normally working alone, as well as carrying out other maintenance tasks as part of a larger group.

[2] The *operational fringe* between CTC North and East Workstation (located at Dublin Connolly) and the Rosslare Line PCP (located at Greystones) and traffic over the single line is jointly controlled between the two locations.

Rolling Stock

28 The trains involved in the incidents were a passenger trains at Bray Tunnel No. 2 and an OTM at Bray Tunnel No. 4.

29 The rolling stock type was not contributory to the incidents.

Infrastructure

General description

30 Both incidents in the scope of this investigation occurred on running lines of the IÉ national network between Bray and Greystones (south-east of Dublin in County Wicklow).

31 The railway between Bray and Greystones is a single-track line used by trains in both directions (bi-directional). The railway is also electrified with the overhead line electrification (OHLE) system.

32 The incidents occurred between the 14 Mile Post (MP) and 15 ½ MP; mileage on the route involved is measured from Pearse Station, Dublin.

33 Trains towards Dublin are described as being in the *Up direction*, with movements towards Greystones / Rosslare are described as being in the *Down direction*.

34 The maximum permissible speed on the relevant section of single line for both incidents is 40 mph (64 km/h) for passenger trains.

35 Bray Head has four tunnels along the cliff face.

Bray Tunnel No. 2

36 Bray Tunnel No. 2 is located on the single-track railway between Bray and Greystones where the railway runs along the cliff face through a series of four tunnels; Bray Tunnel No. 2 is 135 metres (m) long, see Figure 2.

Figure 2 – Bray Tunnel No. 2 viewed from the southern *portal*

Bray Tunnel No. 4

37 The line runs above the cliff face through a series of four tunnels with Bray Tunnel No. 4 being located nearest to Greystones.

38 Bray Tunnel No. 4 is a single bore tunnel and is 992 m with limited clearances, refuges are provided at regular intervals.

Figure 3 – Bray Tunnel No. 4

Traffic Operations & Management Documentation

Introduction

39 Access to the railway is governed by an internal suite of documents, with rules, procedures and competency requirements.

40 This suite of documents includes safety management system (SMS) documents, setting out a structured framework for how IÉ manage access to the railway, by setting out policies, accountabilities and responsibilities, relevant assets, asset safety, safety performance and organisation structures to meet the requirements set out in the Railway Safety Act 2005 and the Safety, Health & Work Act 2005.

41 In addition to the SMS documents there are also technical management system (TMS) documents encompassing standards, specifications, operating procedures and guidance documentation for the technical management of CCE assets.

42 Rules and procedures are also set out in the IÉ Rule Book; the PTS Handbook; and the Train Signalling Regulations and General Instructions to Signalmen.

IÉ Rule Book

Introduction

43 The IÉ Rule Book applies to all staff working and operating on the IÉ network and is divided into sections, the sections relevant to this investigation are:

- Section B – Instructions to Persons Having Duties On or Near The Line, or on Trains or Vehicles, or At Passenger Stations:
  - Part One: General Instructions to All Persons;
  - Part Two: Additional Instructions to Persons with Specific Responsibilities;
- Section T – Accidental Obstruction of The Line, Protection of Engineering Work and Arrangements for Possessions:
  - Part Two: Protection of Engineering Work on Lines Not Under Possession (T2 Protection);
  - Part Three Arrangements for Absolute Possessions of the Line (T3 Possession[3]).

[3] The incidents did not involve T3 Possession, so this SSOW is not outlined.

Walking and working

44 Section B, Part One, Clause 2.2, states that whenever a member of staff goes on or near the line, arrangements must be made to ensure staff are not endangered by train movements; one of two arrangements applies according to the nature of the staff duties, for simplicity, these duties are classified as walking or working.

45 Walking includes carrying out duties involving walking alone but not at the same time carrying out any work activity such as patrolling, examining, inspecting, cleaning or oiling within two metres of the nearest running rail (walking also includes carrying out the normal duties of a driver, guard, signalman, shunter or crossing keeper; carrying out other duties involving the working of trains e.g. Pilotman, Operating Supervisor, etc; and carrying out handsignalling, points operating or Lookout duties).

46 Working includes all activities not described in the above paragraph. In addition, a subsequent amendment to the IÉ Rule Book states: when two or more persons walk together on or near the line, this must be considered as working. All working (as opposed to walking) must be undertaken under the direction of a TSC (Clause 2.4.2), this includes when two or more persons walk together on or near the line (paragraph 44). Before work begins the TSC must also tell each person what the SSOW they are working under is.

47 Section B, Part Two, Clause 6.12.2, When it is safe for you to work alone, states that the TSC may work alone provided: the work involves only patrolling, examining or inspecting or work of a minor nature as authorised in Departmental Instructions; the TSC will be able to remain sufficiently alert for the approach of trains and be able to reach a position of safety at least ten seconds before a train arrives.

How the TSC selects a SSOW

Green zone

48 Whenever practicable, the TSC must arrange for your group to work only in a green zone; a green zone is the safest way of working. A green zone is where the TSC arranges for the work to take place without anyone (TSC/ group) going on or near any line or siding, including in a possession, on which trains (or movements) may pass. The site of work must be either:

- Safeguarded by stopping trains on all lines;
- Separated from the nearest line open to trains, by a distance of at least 3 m (10 feet);
- Fenced from the nearest line open to trains where one or more lines remains open to trains; or,
- A combination of the above requirements.

49 Where a line is to be blocked to stop movements, one of the following methods of protection must be used as defined in Section T, Part Two (T2 Protection):

- Maintaining a suitable stop signal at danger in rear of the work and by appointing a Handsignalman; or,
- Placing a *Track Circuit Operating Device (T-COD)* on the line at or on the approach the site of the work; or,
- Disconnecting the signal(s) or signalling controls protecting the site of work.

50 Clause 6.7.2, Method you must use to block the line, must be done in accordance with above, unless:

- The Signalman requires work to be done on or near the line and you consider that this cannot be done safely with trains running on the line(s) concerned; or,
- Work is to be done on the outside of a train stopped on a running line because of a failure or exceptional incident and you consider that this cannot be done safely with trains running on the adjacent line; or,
- Maintenance work on signalling equipment is to be carried out while the line is closed, and details of this arrangement are published in the *Weekly Operating Notice*.

Red Zone

51 If a TSC is unable to arrange a green zone, the TSC/ group is considered to be working in a red zone. Red zone arrangements are where trains continue to pass on the lines or siding where the work is to take place and *Lookout Protection*[4] is used.

52 A TSC may allow their group to work in a red zone only if: absolutely necessary and it is not practicable to arrange a green zone, and Lookout Protection can be provided to give sufficient warning of all trains on the line(s) concerned.

53 Red zone arrangements can also be implemented within a T3 Possession for which additional arrangements apply. In the hierarchy of risk control this is considered above red zone working on lines open to traffic as engineering train movements typically operate at lower speeds.

When work on or near the line is not allowed

54 IÉ Rule Book, Section B, Part Two, Clause 6.6.6, When Work on or Near the Line is not Allowed, states that a TSC must not permit work to take place if they are unable to set up a green zone and they are unable to arrange adequate Lookout Protection to enable work to be done safely in red zone.

What you must do if the work takes place during fog or falling snow

55 In addition, the IÉ Rule Book, Clause 6.11.9, What you must do if the work takes places during fog or falling snow, states that before allowing work to start or continue during fog or falling snow, the line(s) concerned are “to be blocked to all movements”.

[4] IÉ Rule Book, Section B, Part Two, Clause 6.11, How to Arrange Lookout Protection, outlines that whenever it is necessary to set up a red zone, the TSC must arrange for Lookout Protection so that their group will have sufficient warning to enable everyone to reach a position of safety at least ten seconds before the arrival of a train. The number and position of Lookouts is decided according to the *warning time* needed for the work; the speed of approaching trains (permissible speed of trains) and the distance at which approaching trains can be seen (for which minimum sighting distance charts are provided). The TSC must consider the minimum warning time for tasks of a minor nature to be fifteen seconds and for all other work to be twenty-five seconds.

Train Signalling Regulations and General Instructions to Signalmen

56 The Train Signalling Regulations and General Instructions to Signalmen are instructions applicable to and issued only to staff competent to act as signalmen; these are supplementary to the IÉ Rule Book.

57 In relation to Section 11, Safety of Persons Working on or Near the Line, when you (the Signalman) require work to be done on or near the line, but the TSC considers that this cannot be done safely with trains running on the line(s) concerned, the Signalman must:

- Ascertain the exact location of the work and the line(s) on which train movements are stopped (or remain stopped);
- Agree a suitable time for trains to be stopped (unless already stopped);
- Make sure that the necessary Signal Protection is provided (including where necessary, that to be provided by another Signalman);
- Give an assurance to the person requesting protection that normal working will not be resumed until that person informs you that it is safe to do so.

PTS Handbook

58 The PTS course is a one-day railway safety awareness programme aimed at people accessing the railway corridor and other sites on the IÉ network. The aim is to outline the individual health and safety risks associated with working on the railway. The PTS course and assessment is necessary for the PTS competence.

59 The PTS Handbook supports the PTS training and provides useful information which "will assist you in remaining safe in the railway environment"; the PTS Handbook supplements the IÉ Rule Book.

60 As mentioned previously, where the required clearances for a position of safety are not available at all locations, these are areas of limited clearance. The PTS Handbook (Section 1.7) states that "When you see the sign below it means you will not have a position of safety on that side of the railway for the length of the structure", providing an example with the signage at the entrance of a tunnel, see Figure 4.

Figure 4 – Limited clearance, PTS Handbook

Figure 5 – Refuge

61 The PTS Handbook states that "Tunnels add another layer of risk to working on the railway, as a result, people are not allowed to work in tunnels while trains are running. If trains are stopped and you have received permission to enter, you still need to make sure you know where the nearest position of safety is, this will usually be in a refuge. You must have a head lamp or hand lamp with you if you are entering a tunnel".

62 A refuge is a place where it is safe for you to stand when a train is passing; they can be built out over an embankment, bridge or cut into the wall of a viaduct or tunnel, see Figure 5 for example of a refuge in tunnel.

Patrol Length Features Forms

Introduction

63 For each section of line to be patrolled by the CCE Department a Patrol Length Features Form details the permanent features of the route. The forms are provided for the purpose of route familiarisation of patrol gangers and are outlined in CCE-TMS-361, Technical Standard for Track Patrolling[5]. This requires that locations of restricted sighting and restricted clearances are included.

Bray Tunnel No. 1 & 3

64 For Bray Tunnels No. 1 and No. 3, the Patrol Length Features Form directs those track patrolling and working that: “You must attempt to set up green zone as per Section B part 6 of the Rule Book; if green zone is not available set up red zone for lone working”.

Bray Tunnel No. 2

65 The Patrol Length Features Form includes photographs for each portal of the Tunnel No.2, see Figure 6.

Figure 6 – Tunnel No. 2 portals (note the difference in bore widths)

66 For Bray Tunnel No. 2, the Patrol Length Features Form states “do not enter any tunnel unless fully equipped which must include sufficient lighting”. Of note, for track patrolling and when working, it states that “You must attempt to set up green zone as per Section B Part 6 of the Rule Book; if green zone is not available set up red zone for lone working”.

[5] In some Divisions (e.g. Division 21) a document titled “Occupational Safety Features Form” fulfils the same function as the Patrol Length Features Form but are used by other CCE staff.

Bray Tunnel No. 4

67 At Bray Tunnel No. 4, the Patrol Length Features Form includes photographs of each portal, see Figure 7.

Figure 7 – Tunnel No. 4 portals

68 The Patrol Length Features Form identifies the safe system for entering Bray Tunnel No. 4 by identifying the hazards associated with the locations and making some notes in relation to track patrolling and working. The hazards are identified, for entering the tunnel, are as follows: severe curve; public interface overhead; trespassers; train strike; slip, trip and fall; fall from height onto cliff face; broken fencing; OHLE; overhead hazards from public throwing objects onto track; and overhead hazards from debris falling from cliff face.

69 It notes that when track patrolling and when working at the locations:

- Staff must look in both directions before entering the track;
- Staff must walk in the cess way or five-foot way at all times facing traffic where practicable;
- Staff must be aware of bi-directional traffic;
- Staff must not pass the boundary fence leading onto cliff face;
- Staff must only walk under red zone and be able to reach a position of safety ten seconds prior to the arrival of a train;
- If minor works are required staff must attempt a T2 Protection and/or obtain Signal Protection from the local signaller[6] if practicable;
- Staff must contact the local Signaller before entering and when exiting the tunnel (this is in red capital letters).

70 While a photograph is provided of a refuge, there is no reference to refuges in the SSOW.

[6] Signalman, as referred to in the IÉ Rule Book.

Track Access Index

Introduction

71 The TAI which is a guidance document intended to be utilised at the planning stage of work or by TSCs when creating a SSOW when on or near the line.

72 The TAI breaks the IÉ network into quarter mile sections highlighting all hazards contained within the section. The three factors (hazards) with the highest scoring rate are: sighting distance availability; position of safety availability; and train frequency. Other hazards include: line speed; curves; and limited clearance.

73 The model has produced a colour coded hierarchy of risk for each quarter mile section of the network (Yellow = Low; Orange = Medium; Red = High; Black = Very high).

74 Very high risk is defined as having the following features: sighting distance requirements not achieved; position of safety not available, or limited, throughout the quarter mile section; high train frequency at the location; limited clearance area(s) within the quarter mile section.

75 For each quarter mile section there is a table (Figure 8) showing the protection measures available to be used (using a acronyms and symbols), these are:

- T3 – T3 Absolute Possession;
- T2 – T2 Protection;
- LO – Lookout Protection;
- WW – Walkway Available;
- Listed protection measure is the preferred option;
- Listed protection measure not required/ not applicable;

T3	–	T3 Absolute Possession
T2	–	T2 Protection
LO	–	Lookout Protection
WW	–	Walkway Available
✔	–	Listed Protection measure is the preffered option in this section
—	–	Listed Protection measure not required/not applicable in this section
✖	–	Listed Protection measure cannot be applied in this section
▲	–	Listed Protection measures must only be undertaken with the requirements detailed below

Figure 8 – Table key for protection arrangements

- Listed protection measure cannot be applied in this section;
- Listed protection measures must only be undertaken with the requirements/ elements of IÉ Rule Book Section B, Part Two, Clause 6.11, How to Arrange Lookout Protection, are fully complied with; additionally with the requirements of IÉ Rule Book, Section B, Part Two, Clause 6.6.6, When Work On or Near the Line is Not Allowed (outlined in paragraph 54).

TAI Division 1

General description

76 The first TAI for use by frontline staff (e.g. TSCs) was issued on the 25th November 2024 for Division 1 (this includes the Bray Tunnels) and the document was available on the CCE Microsoft SharePoint.

77 This means that, at the time of the incident at Tunnel No. 4, the TAI was not available but was available at the time of the incident at Tunnel No. 2. Both are outlined in this section of the report to illustrate the locational risks at the tunnels.

TAI for Tunnel No. 2 Location

78 The quarter mile section including Bray Tunnel No. 2 is illustrated in Figure 9, identifying location, line speed, risk ranking, protection required for the location, locational hazards and trackside infrastructure.

79 The risk ranking for the location is very high risk; noting limited clearance is a location hazard and that that the tunnel is specifically identified as having areas of limited clearance (circled in blue in Figure 9) and area of limited positions of safety (circled in purple in Figure 9).

80 In terms of protection requirements, it identifies that a T3 Possession, T2 Protection and Lookout Protection (LO) are permitted when working (circled in red in Figure 9) but must only be undertaken with the requirements/ elements of IÉ Rule Book (last bullet, paragraph 75).

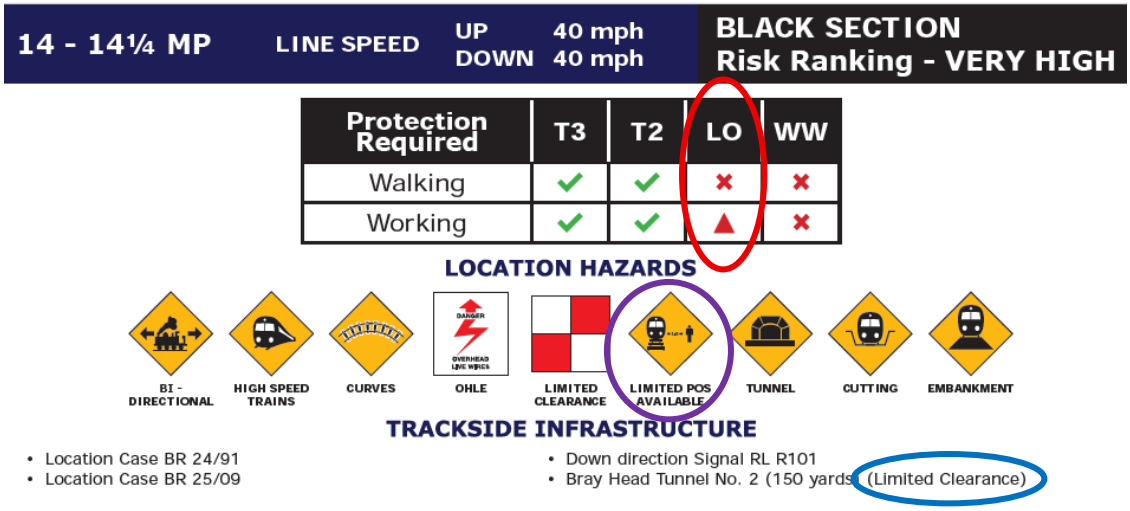


Figure 9 –TAI section for Bray Tunnel No. 2

TAI for Tunnel No. 4 Location

81 The quarter mile sections which reference Bray Tunnel No. 4 are illustrated in Figure 10.

82 The risk ranking for the location is very high risk; noting limited clearance is a location hazard and the tunnel is specifically identified as having areas of limited clearance (circled blue in Figure 10) and limited positions of safety (circled purple in Figure 10).

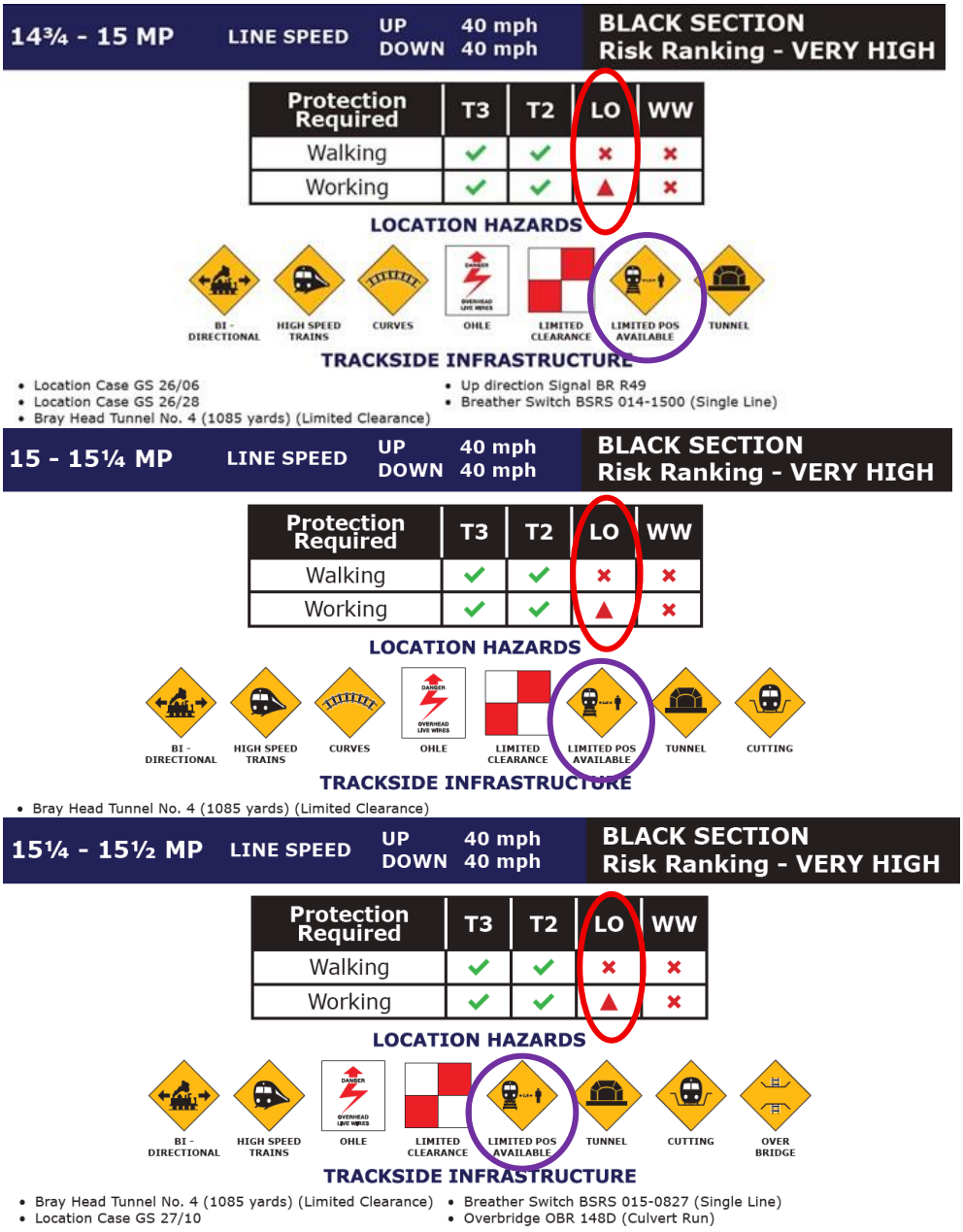


Figure 10 – TAI sections for Bray Tunnel No. 4

83 In terms of protection requirements, it identifies that T3 Possession, T2 Protection and LO are permitted when working (circled in red in Figure 10) but must only be undertaken with the requirements/ elements of the IÉ Rule Book (last bullet, paragraph 75).

The Site Safety Briefing Form

84 Before commencing work, CCE Department TSCs complete and brief a Site Safety Briefing Form (see Figure 11), which is a checklist of the briefing items to be given; within the checklist items there are additional prompts and examples for the TSC. Each item on the checklist only requires a tick to confirm its briefing.

85 Item 2 requires that the type of protection is briefed, whether it is a T3 Possession, T2 Protection, red zone, green zone, etc; but does not require the user to document a SSOW. The guidance on the Site Safety Briefing Form requires the TSC to "outline details of protection and safe zone selected". Item 4 includes prompts for train movements and Item 5 includes the speed and direction of traffic.

CCE DEPARTMENT SITE SAFETY BRIEFING FORM

Print Name of Briefer: _____ Days: ☐ Nights: ☐

Location: _____ Task: _____ Date: _____

TSC Group ☐ TSC Solo ☐ **RAMS Number:** _____

Items and Content to be Briefed:			✓
	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 and the safe entrance and exit to plant	
	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.**	

Figure 11 – Site Safety Briefing Form

Training and Competency Management of Track Workers

Introduction

86 The safety of track workers is managed through a suite of safety competencies. Occupational and IÉ Rule Book competencies relevant to this investigation are PTS (outlined in paragraph 58), TSC (TSC or TSC Solo[7]) and Lookout competencies. The TSCs are responsible for planning, arranging and implementing the SSOW, therefore this is the main focus of the section of the report.

87 The roles and responsibilities for the production and update of training materials and the booking and delivery of training and assessment are defined in the departmental standard CCE-SMS-004 Competency and Training. The specific competency standards, for TSCs, of particular relevance to this investigation are:

- IM-SMS-019 Track Safety Co-ordinator Competence Standard;
- IM-SMS-028 Track Safety Co-ordinator TSC (Solo) Competence Standard.

TSC Competence Standard (IM-SMS-019)

Training Programme & Theory Assessment

88 Initial training as TSC is undertaken in a classroom environment, where candidates must pass the theory assessment; which focusses on the content of the IÉ Rule Book. Candidates are not required to apply the knowledge in the classroom training phase to situations or in context; and are therefore not assessed on this.

89 Whilst the classroom training materials covers rules and regulations that were applicable, no reference was found in the training materials for: where to locate local instructions[8] (e.g. Patrol Length Features Forms); the use of the TAI; the process for blocking the line for passing through areas with no positions of safety or when conditions make Lookout Protection unsafe; and, safe access to tunnels.

[7] A TSC Solo is only permitted to arrange a SSOW alone i.e. not for a group.

[8] In the investigation, local instructions for individual tunnels were found to be contained in different publications with Bray Tunnel No.4 in the Patrol Length Features Form and those for the Phoenix Park Tunnel in the General Appendix. The RAIU considers this to be an additional observation, AO-01 (paragraph 147), which warrants a safety recommendation, Safety Recommendation 2026003-02 (paragraph 167).

Workplace assessment

90 After passing the theory assessment, the competence assessor carries out a workplace assessment in a live environment against defined competency criteria which includes TSCs demonstrating and explaining criteria in relation to: selecting a SSOW; calculating sighting distances for red zone working; and implementing the SSOW. At the end of the assessment the assessor deems the candidate competent or not yet competent for the role of TSC.

91 Although TSCs are trained on green and red zone working, there is no specific requirement to assess a TSC working under red zone conditions and TSCs may not routinely work under red zone (i.e. no experience of red zone).

Competence Retention

92 A competent TSC must carry out TSC duties four times within a twelve-month period (with intervals of no more than six months between duties), starting from the date of initial certification, for competence retention.

93 Workplace observations are undertaken between the 16th and 20th month, where the Competence Assessor observes the TSC carrying out TSC duties.

Re-certification

94 Re-certification then takes place at three yearly intervals with a workplace assessment. Re-certification consists of a competence assessor carrying out: a workplace assessment; a review of records to ensure that the candidate has performed TSC duties at the minimum frequency (a minimum of four times in each twelve-month period); and a review of records to ensure that the candidate has been briefed at intervals not exceeding twelve months.

TSC (Solo) Competence Standard (IM-SMS-028)

95 The TSC Solo competence applies to persons required to work alone on the infrastructure. The duties that can be performed under TSC Solo are restricted to light duties such as patrolling, examining and inspecting or work of a minor nature.

96 Persons put forward for TSC Solo undertake the TSC basic training course and must have held PTS certification for six months first.

Description of the occurrences

Near miss at Bray Tunnel No. 2 on the 11th April 2025

97 On the 11th April 2025 the PWI and Track Engineer were jointly conducting a site survey of scrap rail to plan its removal between Bray and Greystones, County Wicklow. This involved accessing the line at an access point to the south of Bray Station and walking to the location between Bray Tunnel No. 2 and No. 3 where the rail had been stacked, away from the running lines. The task was part of a larger survey of scrap rail being carried out by the PWI across several locations.

98 The PWI, acting as the TSC, completed the Site Safety Briefing Form (Figure 12) and gave a briefing to the Track Engineer. The PWI briefed that he understood sufficient positions of safety were available to walk to the site where the rails were stored.

Site Safety Briefing Form Number: CCE SSB 544715

CCE DEPARTMENT SITE SAFETY BRIEFING FORM

Print Name of Briefer: [redacted] Days: ☐ Nights: ☐

Location: Bray – Greystones Task: Track Walk Date: 11-4-25

TSC Group ✓ TSC Solo ☐ RAMS Number:

Items and Content to be Briefed:		✓
	1 **Each individual is responsible for their own safety.**	✓
PIC	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 and the safe entrance and exit to plant	✓
	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.**	✓

Figure 12 – Site Safety Briefing Form

99 The activity recorded on the Site Safety Briefing Form is indicated as a track walk. No selection is made on the form to indicate the type of protection (Item 2 on Figure 12), but this item was ticked as having been briefed. As they were walking as a group this is defined as working (and not a track walk) and so protection arrangements and a SSOW was required (paragraph 46)[9].

100 The PWI said that they applied the same arrangements when accessing the same stretch of line previously when being mentored on the area by another experienced member of staff. They understood there to be adequate distance to safely walk in the cess to site, with a detour around Bray Tunnel No. 1; and sufficient distance from the nearest running rail in Bray Tunnel No. 2 for a position of safety, except for a short section of forty to fifty metres. The PWI knew that, in the area of reduced clearance, there would be no position of safety, but considered that they could reach a position of safety within the warning time if a train arrived. As a result, the PWI did not identify the need for Signal Protection. The PWI was unaware of the PTS Handbook instructions on tunnels (paragraphs 58 to 62).

101 After accessing the line, the PWI and Track Engineer walked in the *cess* to Tunnel No. 1 where they used a walkway around the headland to avoid passing through the tunnel before continuing to Tunnel No. 2.

102 At 09:52 hrs, the 08:30 hrs Malahide to Greystones (Train E106) approached Bray Tunnel No. 2. The driver (Driver E106) sounded the horn on approaching the tunnel. On hearing the train horn, the PWI and Track Engineer cleared the tunnel by running through the remaining section of reduced bore rather than remain in the wider section. As Train E106 entered the tunnel, Driver E106 saw two people in orange *Personal Protective Equipment* (PPE) running out of the far end of the tunnel.

103 Driver E106 made an emergency brake application and stopped inside the tunnel before contacting the North & East Signalman to report the situation.

104 From outside the tunnel, the PWI hand gestured for the train to proceed. Driver E106 proceeded, at *caution*, and continued to Greystones.

[9] The TAI (paragraphs 78 to 80) specify the types of SSOW available and permit Lookout Protection (red zone working).

105 Between 10:00 hrs and 10:05 hrs it was determined in a series of phone calls between the CTC Regulator, the Rosslare Line Signalman and the North & East Signalman that Signal Protection had not been requested or obtained to access Tunnel No. 2 and none of the parties knew who the staff, on the line, were[10].

106 After arrival at Greystones, Train E106 terminated, with the rolling stock forming the return service as Train E916 (the 10:04 hrs passenger service from Greystones to Howth) with Driver E106 (now referred to as Driver E916).

107 Driver E916, now travelling to Howth was cautioned through the Bray Tunnels No. 2 and No. 3 area, by the Rosslare Line Signalman, because they believed that the track workers were still be in the area.

108 At 10:09 hrs the CTC Regulator contacted Driver E916 to confirm that the near miss involved IÉ staff. Driver E916 told the CTC Regulator that he was approaching the staff members near Tunnel No. 3. The CTC Regulator told Driver E916 to stop the train and ask the staff (PWI and Track Engineer) who they were, told them they did not have Signal Protection, to “get off the line”, ring the signalman and ring their boss.

109 The PWI said that mobile coverage was unavailable, so the CTC Regulator advised the PWI to use the nearby signal post telephone (SPT) to contact the signalman[11].

110 At 10:12 hrs the PWI contacted the Rosslare Line Signalman, as instructed, via the SPT to tell them they would be clearing the line “in a bit”. The Rosslare Line Signalman asked if they needed Signal Protection, but this was declined by the PWI.

[10] Over the next few minutes, the CTC Regulator made every effort to attempt to identify the staff through making several phone calls to various CCE and SET staff members. SET immediately knew that SET staff were not working in the vicinity of the Bray Tunnels. However, the CCE manager that was contacted, did not immediately know what staff members were on the line. The RAIU consider this to be an additional observations, AO-02 (paragraph 147), however as a result of a previous safety recommendation made in USAN 006, the RAIU consider that this does not warrant a further safety recommendation (paragraph 164).

[11] The SPT on Signal RL101 is directed to the Rosslare Line Signalman.

111 The Rosslare Line Signalman did not determine how they were going to clear the line[12] and did not ask for the PWI's phone number. The Rosslare Line Signalman did instruct the PWI to call back when clear of the line.

112 The Rosslare Line Signalman decided to put Signal Protection in place regardless[13] for the protection of the members of staff.

113 As the line was now blocked to trains, delays started to occur to train services.

114 At 10:36 hrs he PWI contacted the North & East Signalman who directed them back to the Rosslare Line Signalman (as they had granted the Signal Protection). The PWI stated that they were clear of the line and that they no longer required Signal Protection. Signal Protection was then cancelled.

[12] No maps were available to the Rosslare Line Signalman showing access points and other structures and the Rosslare Line Signalman was not aware of where the local arrangement for Bray Tunnel No.4 was documented; although noting that, although not mapped, the locations of the access points are included in the Bray to Greystones Emergency Plan. It was also identified that where local instructions for structures applied (Bray Tunnel No.4), these were not documented for the Rosslare Line Signalman and there were limited points of reference etc which would assist in placing these in context when liaising with TSCs. The RAIU consider this to be an additional observation, AO-03 (paragraph 147), which warrants a safety recommendation, Safety Recommendation 2026003-04 (paragraph 168).

[13] As the Rosslare Line Signalman believed that the PWI and Track Engineer needed to pass through a tunnel, Signal Protection was put in place. The Rosslare Line Signalman's actions in putting Signal Protection in place was based on their knowledge of Signal Protection being provided for Bray Tunnel No. 4 in the past.

Near miss at Bray Tunnel No. 4 on the 6th December 2023

115 On the 17th August 2023, less than four months prior to the incident, the Patrol Ganger involved in the incident attended and signed for a routine briefing which included the requirement “attempt a T2 Protection and/or obtain Signal Protection from the local signaller if practicable” for working in Bray Tunnel No. 4 (paragraph 69).

116 On the 6th December 2023, the Patrol Ganger accessed the line at Bray Station to undertake a routine track patrol between Bray and Greystones, heading in the Down direction. The line was open to train traffic, with Lookout Protection being the SSOW (red zone working).

117 On approach to Bray Tunnel No. 4, at the Bray end, the Patrol Ganger was passed by a Down passenger train. The Patrol Ganger thought they had time to enter the tunnel, after the train, and inspect a *breather switch*[14] (located eleven yards from the tunnel mouth at the Bray end) before calling the Rosslare Line Signalman for Signal Protection to pass through the tunnel.

118 At 12:05 hrs, the 09:35 hrs Wexford to North Wall infrastructure train comprising Track Recording Vehicle (TRV) 701 (Train Y683) entered Bray Tunnel No. 4. The operation of Train Y683 was not in the *Working Timetable*, instead it was published in the Weekly Circular.

119 On seeing Train Y683, the Patrol Ganger moved to a nearby refuge inside the tunnel between eight and ten seconds before the train arrived, see Figure 13. The Patrol Ganger acknowledged the driver of Train Y683.

Figure 13 – FFCCTV and rear facing images showing the Patrol Ganger in the refuge (Note the image recording was inverted left to right at the time).

[14] An inspection requirement in the Patrol Length Features Form.

Similar Previous Occurrences

Similar occurrences investigated by the RAIU

120 The RAIU has carried out three separate investigations into near miss incidents with staff working or walking on running lines open to traffic since its formation in 2007:

- Near miss with a Patrol Ganger near Woodlawn, Galway, on the 4th June 2019[15];
- Near miss with an IÉ SET worker at Rush and Lusk Station, County Dublin, on the 20th June 2019[16];
- Near miss with an IÉ CCE worker near Gormanston Station, County Meath, on the 21st July 2021[17].

121 While the RAIU made safety recommendations related to these incidents, those that have not been closed (at the time of the publication of this report) are now superseded by the safety recommendation made in USAN 006 (paragraph 15).

---

[15] Two safety recommendation were made in this investigation, both remain at "further evidence required" status; they are as follows:

- IÉ-IM should review its track inspection methods to see if technological/ mechanised systems and/ or other safety measures could be implemented to eliminate/ minimise track worker exposure to railway hazards whilst undertaking the task of track patrolling;
- IÉ-IM should, through their risk assessment process, conduct a review of the patrol lengths, with the objective of identifying all patrol lengths with associated risks, and introducing adequate mitigation measures to eliminate these risks. Consideration should be given to the introduction of technologies (such as *anti-collision devices*) for use by patrol gangers, with the objective of warning patrol gangers of oncoming trains.

[16] The two safety recommendations made in this investigation are closed.

[17] One safety recommendation was made, which remains at "submitted" status. IÉ-IM CCE Department should develop a formalised process, through their Safety Management System suite of documents, for IÉ-IM CCE staff walking/ working alone, which should be completed prior to any member of CCE staff going on or near the line; at a minimum consideration should be given to:

- Whether it is necessary to go on or near the line to conduct the walk / work;
- What local knowledge is required to walk /work safely;
- Whether all the requirements of the IÉ Rule Book / SSOW can be met;
- What special protection arrangements are required either at night or during the day.

Analysis

Introduction

122 This section of the report will outline the relevant safety documents, how the instructions in the safety documentation are applied on site (e.g. Site Safety Briefing Form), training and competency management, the actions of the staff involved in the incidents and the terminology associated with Signal Protection and Line Blockages.

Safety Documentation

IÉ Rule Book

123 The IÉ Rule Book is clear that track patrolling and also when two or more persons walk together that those activities are classed as working (paragraphs 45 and 46); and that all working must be undertaken under the direction of a TSC and the TSC must tell each person (when there are two or more persons) what the SSOW is (paragraph 46).

124 The IÉ Rule Book permits the TSC to select working under green zone or red zone, wherever practicable, green zone should be arranged (paragraph 48) and red zone should only be used only if absolutely necessary and not practicable to arrange green zone (paragraph 51).

125 As both incidents at the Bray Tunnels, involved working on the line, they should have been undertaken under a SSOW, with the options being:

- Green zone – Where staff are not on or near any line on which trains or movements may pass, through safeguarding, separation or fencing. Where the protection would involve the stopping of trains/ blocking the line to stop movements[18] this can be done through T2 Protection (paragraphs 48 and 49);
- Red zone – Where trains continue to operate and Lookout Protection is used (paragraphs 47 and 51);
- T3 Possession – Where a possession of the line is taken and only engineering trains can operate but using Lookout Protection as their own SSOW (paragraph 53).
- Not allowed – A TSC must not permit work to take place if they are unable to set up a green zone and they are unable to arrange adequate Lookout Protection (paragraph 54).

[18] The Train Signalling Regulations and General Instructions to Signalmen are clear on how this should be carried out (paragraph 56 and 57).

126 Section B, Part Two, of the IÉ Rule Book makes only limited provision for using Line Blockages by TSCs working with a group in Clause 6.7.2 (paragraph 50) and when working alone in Clause 6.12.2 (paragraph 47). As a result, there was no clear provision in the IÉ Rule Book for the use of a Line Blockage in the Bray Tunnel No. 2 incident. There was however provision for a Line Blockage in the IÉ Rule Book for the Bray Tunnel No. 4 incident as the TSC was working alone.

PTS Handbook

127 The PTS Handbook is clear that in areas of limited clearance, you will not have a position of safety for the length of the structure (paragraph 60). It also states that people are not allowed to work in tunnels while trains are running (paragraph 61). However, it does not explicitly prohibit walking; this instruction could be interpreted as permitting walking through tunnels (paragraph 59) which may be further reinforced by the reference in the PTS Handbook to tunnel refuges being positions of safety (paragraph 62).

Patrol Length Features Forms

128 For Tunnel No. 2 the Patrol Length Features Forms requires that, that the Patrol Ganger must “attempt” to set up a green zone, but if green zone is not available, they must set up a red zone for lone working i.e. this is not available for two or more persons (paragraph 66), this is the same for Tunnel No. 1 and Tunnel No. 3 (paragraph 64).

129 This requirement differs for Tunnel No. 4, in that staff are permitted to walk under red zone, but not work, but must contact the signalman before entering and exiting the tunnel (paragraph 69); this was briefed to CCE staff before the incident (paragraph 115).

Track Access Index

130 For Tunnel No. 2 and No. 4, the protection arrangement allowed for working in a T3 Possession, T2 Protection or Lookout Protection (paragraphs 80 and 83, respectively).

Site Safety Briefing Form

131 Item 2 of the Site Safety Briefing Form requires the TSC to brief the type of protection that is required; however, this only requires a tick box to be completed and does not require the TSC to complete details of the protection or SSOW to be implemented, it addition, it does not require the Lookout numbers or locations to be identified (paragraph 85).

RAIU review of the safety documentation

132 The Patrol Length Features Form appears to contradict the PTS Handbook, as this implies through the omission of references to Tunnels No. 1, No. 2 and No. 3, that Signal Protection was not required at these locations (paragraphs 127, 128 and 129).

133 The terminology used in instructions for stopping train movements to allow safe access to tunnels or passing through places of limited clearance was also found to be inconsistent. It is not clear whether “trains are stopped” in the PTS Handbook (paragraph 61),“contact the local signalman” and ”obtain Signal Protection” in the Patrol Length Features Form (paragraph 69) are intended to achieve the same actions and level of protection.

134 The term blockage of the line is used in the IÉ Rule Book in connection with TSC instructions (paragraphs 49 and 50), but no provision is made for using this when working in a group. When working alone however, it is permitted in the rules to additionally use Line Blockages where sighting distances are affected by fog or snow (paragraph 55). The Train Signalling Regulations and General Instructions to Signalmen refer to train movements being stopped and Signal Protection being applied as a protection method for TSC protection purposes but are less restrictive on when this may be used (paragraphs 56 to 57)[19].

[19] The RAIU consider this to be an additional observation, AO-04 (paragraph 147), which warrants a safety recommendation, Safety Recommendation 2026003-05 (paragraph 169).

Training and Competency Management

135 Whilst the training and assessments were found to be delivered to the requirements of the IÉ-IM standards and procedures, these were found to be focused on the rules and regulations e.g. the IÉ Rule Book.

136 The classroom training was also found to be solely based on rules knowledge without any training or assessment on applying this to location specific situations and scenarios such as entering tunnels (paragraph 88). The non-technical skills of planning and assessing for a SSOW, assessing risk and communicating hazards are not covered or practiced, despite the classroom training permitting errors to be made and decisions challenged without safety consequences. As a result, TSCs were significantly influenced in how they implemented SSOW by the mentoring and experience of staff in their own workplace (including supervisors) as a result TSCs were implementing SSOW without sufficient sighting distances or Lookouts as this is the accepted norm (paragraph 99) as previously identified in the RAIU USAN 006 (paragraphs 15 and 16).

Actions of the staff involved in the incidents

Bray Tunnel No. 2

137 For Bray Tunnel No. 2, the Patrol Length Features Form requires that the TSC must attempt to set up green zone and red zone is only available for lone working (paragraph 128); and, the TAI's protection arrangement are a T3 Possession, T2 Protection or Lookout Protection.

138 As a result of there being two members of staff (PWI and Track Engineer), red zone working was not an option for the works on the day. The SSOW, applied on the day of the incident, was red zone and not a T3 Possession, T2 Protection or Lookout Protection.

139 The decision-making process, in terms of the SSOW, was likely to have been influenced by the PWI's previous experience (paragraph 97) combined with the limited provision in the IÉ Rule Book for Line Blockages for work of this nature (paragraph 135).

Bray Tunnel No. 4

140 For Bray Tunnel No. 4, the Patrol Length Features Form also requires that the TSC must attempt to set up green zone and red zone is only available for lone working (paragraph 128). However, the Patrol Length Features Form also requires that for accessing Bray Tunnel No.4, the TSC must contact the Signalman (paragraph 129).

141 When accessing Bray Tunnel No.4, the Patrol Ganger did not comply with the local instruction, to contact the signalman before entering the tunnel, which had been briefed to them shortly before the incident (paragraph 115).

Conclusions

Causal, contributing, and systemic factors

142 The RAIU have identified the following causal factors, where track workers did not reach or were not in a position of safety for sufficient time as trains approached.

143 In relation to Bray Tunnel No. 2 incident, the following is identified as a causal factor:

- CaF-01a – The PWI (acting as the TSC) did not set up a compliant SSOW for entering and working in the tunnel as a group (paragraph 137 to 139).

144 In relation to Bray Tunnel No. 4 incident, the following causal factor was identified:

- CaF-01b – The Patrol Ganger (acting as the TSC) did not comply with a local instruction for accessing Tunnel No. 4 by not arranging T2 Protection and/ or obtaining Signal Protection from the local signalman (paragraph 141).

145 The following are likely to have been a contributory factor to both incidents:

- CoF-01 – The members of staff were reliant on previous experience and mentoring (paragraph 100 and 136) rather than their TSC training;
- CoF-02 – The Site Safety Briefing Form is not effective at prompting TSCs to fully consider their protection arrangements (paragraph 131).

146 The RAIU have identified the following systemic factors to both incidents:

- SF-01 – Instructions on tunnels in the PTS Handbook, was not incorporated into TSC training or reassessment (paragraph 136);
- SF-02 – The rules and instructions for TSCs on when Line Blockages can be used to provide protection are limited and did not permit the work to be undertaken at Bray Tunnel No. 2 under this type of protection arrangement (paragraphs 126);
- SF-03 – The classroom training process for new TSCs includes limited structured training in the planning of a SSOW, with this being undertaken locally through mentoring (footnote 12); this is likely to have contributed to working without a compliant SSOW becoming normalised (paragraph 136).

Additional observations

147 Although not causal, contributing, or systemic to the incidents in this report, the following additional observations have been identified:

- AO-01 – Local instructions were identified for SSOW for multiple tunnels on the IÉ network, but these were not in documents that were available to TSCs in all the IÉ-IM departments (footnote 8);
- AO-02 – There was a period of time that CTC could not establish who was on the line in order to remove them from the line (footnote 10);
- AO-03 – The safe working instructions in the Patrol Length Form for Bray Tunnel No. 4 were not contained in any local instructions or reference document available to the Rosslare Line Signalman. In addition, the Rosslare Line Signalman had no maps or documentation in the signal box showing the access points relative to the structures and features of the line (footnote 12);
- AO-04 – The rules and instructions applicable to Line Blockages do not use consistent terminology across the operational publications with the terms Line Blockage, Signal Protection and stopping of trains in instructions (footnote 18).

Measures taken by IÉ-IM since the incident

Trackworker Safety Improvement Programme Outputs to Date

148 As outlined in USAN 006, following on from a number of near miss events involving frontline IÉ-IM staff on the operational railway, IÉ-IM put in place the Trackworker Safety Improvement Programme, which has a steering committee which meets regularly to oversee and further develop safety improvements in this area. A number of work streams are at various different stages of development to improve safety for those who are walking/working on or near the line and these have generated a number of changes to systems of work, including (as reported by IÉ-IM to the RAIU):

- Publication of the TAI – Thirteen of the twenty-five divisions have had the TAI published as “live”;
- T3 Track Patrolling – After completion of the TAI for Division 1 (DART area), Division 1 was identified as a high-risk environment; as such track patrolling has moved to taking place within night time T3 Possessions. Track patrolling has also been moved to daytime T3 Possessions for other divisions (Divisions 7,8, 13 and 18) of the network where lower levels of traffic permit daytime engineering access. The guidance note BN01, Operating Procedure for Track Patrolling in a T3 Possession, Version 1.0 was issued in 2024;
- Bi-weekly (reduced frequency) Track Patrolling – After a review of the infrastructure asset base for asset assurance, there has been a move towards biweekly patrolling, which reduces the amount of time spent by patrol gangers on the track (thus reducing the exposure to risk). IÉ-IM have stated that “The coming weeks will see further moves to bi-weekly patrolling such that this will be standard for most of the network (some areas will remain for now at weekly patrolling due to asset condition, however other mitigations apply for these locations)”;
- Infrastructure Improvements – To improve the safety of those on or about the line, IÉ-IM has spent €10 million on improvements to walking routes and access points to reduce the need to walk on the line; this programme is ongoing and is prioritised on the basis of risk;
- Incident Specific Actions – Following internal investigations, specific actions have been taken to prevent the reoccurrence of similar incident, for example, having weather information in relation to patrolling in foggy conditions and the need for Signal Protection to access Bray Head Tunnels.
- Bulletins have also been issued, post-incident, to share any safety learnings;

- Changes to PPE – There has been a move to “full orange” high visibility clothing (i.e. tops and trousers are all orange with the required reflective strips), which improves the visibility of staff working on the line.
- Implementation of Technologies – A drone strategy was commenced in 2025, to mitigate the need to access the track.

149 IÉ-IM have reported the following improvement plans for 2026, as follows:

- Introduction of the Loneworker App – The Loneworker App is an addition to IÉ-IM’s suite of mitigations, as lone working is a key risk identified in night patrolling and other activities. The app has been rolled out and is operational in some areas as of 2025 and the final mass rollout is planned for the first half of 2026;
- IÉ Rule Book Change – IÉ-IM intends to revise the IÉ Rule Book during 2026 to support track patrolling in T3 Possessions;
- Implementation of Signal Protection – A revision of the rules relating to Signal Protection is planned, this aims to develop a more formalised approach to Signal Protection, to the existing methodology.

Actions taken after the near miss at Bray Tunnel No. 2, 11th April 2025

Safety Alert IM/SA/1/2025

150 Following the incident, a Safety Alert, IM/SA/1/2025, was issued by IÉ-IM on the 17th April 2025, see Figure 14; with the Safety Alert highlighting the: events; that the location was very high risk; that the TSC did not have a SSOW or the contact details for the Signalmen; the requirement to adhere to the applicable rules in the IÉ Rule Book; and, a QR link to the TAI.

SAFETY ALERT

Trackworker Near Miss

Shortly before 10.00am on Friday 11/04/2025, a Southbound DART made an Emergency Brake Application and reported a Near Miss incident with two trackworkers at Tunnel Number Two, Bray Head on the Dublin to Rosslare Line. This incident was recorded as a Category 1 Near Miss and is currently under investigation.

Tunnel Number Two is located between the 14 & 14 ¼ mile post in an area with poor mobile phone coverage and is categorised in the Track Access Index for the DART network as a 'very high-risk' or Black section.

Initial findings from this incident are, the Track Safety Co-ordinator (TSC) did not have a Safe System of Work (SSoW) in place to protect the pair. Additionally, the TSC did not have contact details for either of the Controlling Signallers responsible for the portion of line.

Before going 'on or near the line' you must ensure that the required Rule Book protection measures are in place for you and your colleagues safety. The applicable Rules for staff accessing the line are contained within Rule Book Section B, Part Two, Clause 6.0 Instructions to Track Safety Co-ordinators.

Scan the QR code for the DART Track Access Index (TAI). The TAI provides guidance for the applicable protection measures required for accessing the line for each ¼ mile section.

Always remember:

Before going on or near the line……Ask yourself these questions

- **Do I need to go on or near the line while trains are running?** – *Can this work be done using a safer system, or when trains are not running.*
- **Do all team members have the correct competencies?** – *At the briefing stage, ensure that all staff competencies are checked and are applicable to the task.*
- **Does anybody know where I am going?** – *Always tell someone if you are going on a 'live' line, always use the Stay Safe – Lone Working app.*
- **Which direction will trains approach from?** – *Remember, trains may approach you from either direction.*
- **What speed are trains travelling at?** – *train speed determines sighting distance, Remember, you must be in a position of safety 10 seconds before a train arrives.*
- **Are you familiar with the area?** – *Do you know the local hazards. Ensure there is a position of safety along your entire route, not just the work location.*
- **Have I the correct phone number for the Controlling Signaller?** – *In the event of an emergency, you must ensure you are speaking to the correct Signaller.*

Key Message

The consequences of not following Rules & Procedures can be fatal.

Figure 14 – Safety Alert IM/SA/1/2025

151 The Safety Alert also include questions staff should ask themselves before accessing the line, namely:

- Do I need to go on or near the line while trains are running?
- Do all team members have the correct competencies?
- Does anybody know where I am going?
- Which direction will trains approach from?
- What speed are trains travelling at?
- Are you familiar with the area?
- Have I the correct number for the Signalman?

CCE Briefing Note CCE_SB_2025_001

152 A CCE briefing note CCE_SB_2025_001 was issued on the 3rd June 2025 but was subsequently re-issued on the 6th June 2025 with minor changes. This briefing note contained:

- The definitions of walking and working
- Details of each of the tunnel structures and location of lineside and SPTs;
- The requirement to have a SSOW before entering any tunnel or limited clearance area
- Entering any tunnel, the requirement to contact the controlling Signaller North and East in CTC or Greystones[20] cabin using an SPT prior to any tunnel or limited clearance area to arrange Signal Protection. You must agree with the Signalman: your details, the tunnel number or Limited Clearance location, the length of time needed
- When you have left any tunnel and or limited clearance area, when safe to do so, you must contact the Controlling Signaller North and East in CTC or Greystones cabin using the nearest SPT to confirm; Your details, the tunnel number or limited clearance area, the work is complete or stopped and the line is safe for trains to pass
- Equipment required for walking and working in the area – including that additional to the IÉ Rule Book, that handheld Tetra or GSM-R radios must be carried;
- A prohibition on the use of the footpath around Tunnel No. 1.

[20] Rosslare Line Signalman.

SHED Notice SN 1000/24/ 25b

General description

153 On the 27th June 2025, following the Bray Tunnel No. 4 incident, SHED Notice SN 1000/24/25b was issued by IÉ-IM Safety, which detailed location specific instructions for the complete section of line between Bray and Greystones, which includes both Bray Tunnel No. 2 and No. 4[21]. A SHED Notice is issued to all the IÉ and RU functions.

154 The notice states that "Due to the high train frequency, limited sighting distance, limited position of safety and limited clearance areas, it is unsafe for staff to access the line between 12 ¾ and 15 ½ MPs on the Dublin to Rosslare Europort line, known as 'Bray Head'".

155 The SHED Notice provides further additional instructions for the: staff requiring access to Bray Head covering requesting Signal Protection, the Controlling Signalman and for TSCs.

156 Staff who require to enter the Bray Head (Bray to Greystones) section of line in the course of their duties must only do so if:

- They are working under the control of a TSC and have requested Signal Protection and it is confirmed to be in place; or,
- They are working under the control of a TSC who have arranged Section T Part Two (T2) Protection;
- The line is under a Section T Part Three (T3) Possession.

[21] In addition, where location specific instructions exist, these were not documented consistently between CCE and SET – the instruction relating to walking through Tunnel No. 4 was only detailed in CCE track patrolling features form (paragraph 65). Subsequent instructions were issued in different formats and in different documents such as the SHED notice (paragraphs 153 to 155). Instructions for other tunnels are in the General Appendix (paragraph 70). This inconsistent approach may increase the likelihood of instructions not being identified or uniformly applied, although where the instruction was documented was not likely to have been a factor in the Bray Tunnel No.4 occurrence as the TSC had recently been briefed and confirmed their awareness (paragraph 115). The RAIU consider this reinforces additional observation, AO-03, (paragraph 147) in terms of SSOW.

Instructions to staff requesting Signal Protection

157 When requesting Signal Protection from the Controlling Signalman, you must:

- Contact the appropriate Controlling Signaller(s) responsible for the section;
- Give your name and location;
- State the direction you are to proceed;
- State the appropriate duration you will be on the line;
- When you have gone clear of the restricted portion of line, you must advise the Controlling Signaller(s).

Instructions to Controlling Signaller(s)

158 On being requested to provide Signal Protection for staff entering the line between the 12 ¾ MP and the 15 ¾ MP on the Dublin to Rosslare Europort line. You must:

- Satisfy yourself that it is safe to provide Signal Protection;
- Place and maintain the appropriate signal(s) at danger to protect the person(s) involved while in the section;
- Place the reminder function on the signal control device(s) concerned or use the signal blocking function;
- Advise any other Controlling Signaller involved and obtain an assurance that the requirements of this instruction will be observed;
- Record the details of the Signal Protection given in the Train Register Book;
- Maintain the Signal Protection until the person who requested protection has confirmed they have exited the restricted portion of line, and you have been advised accordingly.

  Note: if you receive such advice from another Controlling Signaller, you must carry out this instruction and record in your Train Register Book the details of the arrangements made.

Instructions to TSC

159 If performing the role of TSC with staff under your control entering the line between the 12¾ MP and the 15¾ MP on the Dublin to Rosslare Europort Line[22]:

- You must arrange protection for the restricted portion of line in accordance with instructions outlined in Clause 1 before allowing staff under your control to enter that section of line;
- The protection must be maintained until all staff and equipment are clear of the restricted portion of line;
- Red Zone 'Lookout' protection is not permitted.

160 The SHED Notice differed from the previous CCE briefing notice as it required Signal Protection for the complete section of line between the 12 ¾ and 15 ¾ MP as opposed to only limited clearance areas and tunnels[23].

[22] These instructions are consistent with the principle in PTS Handbook on working in tunnels, but not the language. The SHED Notice extended the scope of Signal Protection from the PTS Handbook and modifies the IÉ Rule Book, Module B 6.2.

[23] The mechanism for ongoing reference to SHED Notice content by TSCs is not clear.

Safety Recommendations

Introduction to safety recommendations

161 In accordance with the European Union (Railway Safety) (Reporting and Investigation of Serious Accidents, Accidents and Incidents) Regulations 2020), RAIU safety recommendations are addressed to the NSA, the CRR, and directed to the party identified in each safety recommendation.

Absence of safety recommendations due to measures in progress

Introduction

162 The RAIU issued USAN 006 in December 2025 in relation to track worker safety, which made five safety recommendations to address urgent safety issues that would otherwise have formed safety recommendations in this report (see paragraphs 14 and 15). In part, those recommendations will address CaF-01a and CaF-01b (paragraphs 143 and 144).

Site Safety Briefing Form

163 In terms of the Site Safety Briefing Form being ineffective for prompting TSCs to fully consider planning their SSOWs (CoF-02, paragraph 145), the RAIU considers that USAN 006 Safety Recommendations 4 and 5 (paragraph 16) in relation to identification of access opportunities and planning works with the risk control hierarchy, this will change the planning of the works, as a result no further safety recommendation is warranted in terms of CoF-02.

Supervisory Authorisation Arrangements

164 In terms of the CTC not being able to immediately identify staff and the CCE manager contacted also not being immediately aware of who the staff were with, will be addressed through the supervisory authorisation arrangements requires in USAN 006 Safety Recommendation 5 (paragraph 16) and so a further recommendation is not warranted.

Safety recommendations as a result of this incident

165 The current classroom TSC training and assessment does not include the application of the rules to locations or scenarios and using non-technical skills in the planning process (paragraph 136). Consequently, training on the implementation of SSOW is heavily reliant on mentoring and experience gained in the workplace, where both the selection and implementation of red zone SSOW was influenced by existing work practices and non-compliant methods. As a result, the RAIU makes the following safety recommendation to address CoF-02 and SF-03 (paragraphs 145 and 146, respectively):

Safety Recommendation 2026003-01

IÉ-IM should review and enhance its training and assessment arrangements relating to the planning of a SSOW, to include:

- **Structured, scenario-based exercises and assessments involving the planning of protection arrangements in a range of representative operational environments, taking account of location-specific hazards (including all relevant documentation such as the TAIs and Patrol Length Features Forms);**
- **Reinforcement of the application of relevant guidance contained within the PTS Handbook.**

166 Whilst the provision of key infrastructure information affecting the planning of each SSOW is to be made available through the publication of TAIs as addressed in USAN 006 Recommendation 1, it was identified that the location of specific instructions, particularly those relating to tunnel access, are inconsistently documented between functions and locations and are spread across multiple documents (footnote 8). The use of standalone notices (e.g. SHED Notice SN 1000/24/ 25b) increases the likelihood of being overlooked and becoming reliant on previous experience. The RAIU makes the following safety recommendation to address CoF-01 (paragraph 145):

Safety Recommendation 2026003-02

IÉ-IM to review and standardise the process for documenting location specific instructions to make it easily accessible to those planning a SSOW.

Safety recommendations as a result of additional observations

167 It was identified that instructions related to working in tunnels contained in the PTS Handbook on access to tunnels are not consistent with other documentation or aligned to training materials, with local instructions providing further variations (footnote 22). To address this the following safety recommendation is made to address AO-01 (paragraph 147):

Safety Recommendation 2026003-03

IÉ-IM to review the rules and instructions on accessing and working in tunnels to improve their consistency and clarity, in order to facilitate a clear understanding by staff planning a SSOW.

168 It was identified that signalmen do not have information readily available to them in the form of maps or diagrams showing structures, local instructions and access points relative to protecting signals that may assist signalmen in managing incidents or Line Blockage requests (paragraph147). As a result, the RAIU make the following safety recommendation to address AO-03 (paragraph 147):

Safety Recommendation 2026003-04

IÉ-IM to consider providing signalmen with reference maps (showing access points and structures) and local instructions related to track access relative to signals in their control area.

169 It was identified that issues with both the content of rules and procedures and the understanding of these was a contributing factor to both the Bray Tunnel incidents and multiple incidents detailed in USAN 006. The terms Line Blockage and Signal Protection are repeatedly referenced in rules and instructions (footnote 22) but are used inconsistently creating potential uncertainty over their use. As a result, the RAIU makes the following recommendation to address AO-04 (paragraph 147):

Safety Recommendation 2026003-05

IÉ-IM should review and revise its rules and procedures relating to SSOWs (with particular emphasis on simplifying and clarifying the terminology used for Signal Protection and Line Blockages).

IÉ-IM should then clearly define the circumstances in which each SSOW may be selected and implemented.

Additional Information

List of abbreviations

AO	Additional Observations
CaF	Causal Factors
CCE	Chief Civil Engineer
CoF	Contributory Factors
CRR	Commission for Railway Regulation
CTC	Central Traffic Control
DART	Dublin Area Rapid Transport
EU	European Union
ft	feet
hr	hour
IÉ-IM	Iarnród Éireann Infrastructure Manager
IÉ-RU	Iarnród Éireann Railway Undertaking
IM	Infrastructure Manager
km	kilometre
km/h	kilometres per hour
LO	Lookout Protection
m	metre
MP	Mile Post
mph	miles per hour
NSA	National Safety Authority
OHLE	Overhead line electrification
OTM	On Track Machine
PIC	Person In Charge
PPE	Personal Protective Equipment
PTS	Personal Track Safety

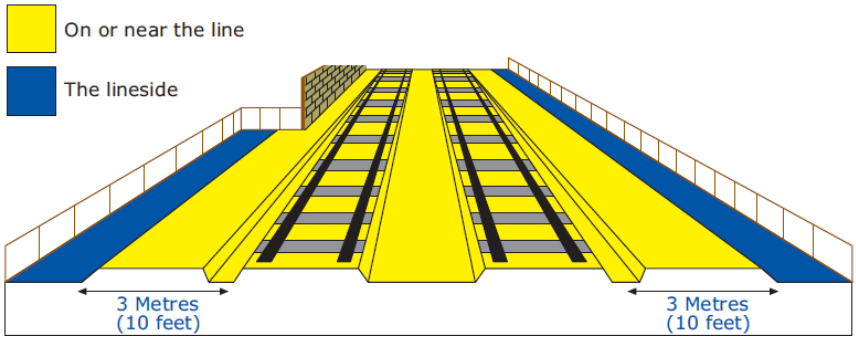
PWI	Permanent Way Inspector
RAIU	Railway Accident Investigation Unit
RAMS	Risk Assessment Method Statement
RFI	Request For Information
RU	Railway Undertaking
SAN	Safety Advice Notice
SMS	Safety Management System
SPT	Signal Post Telephone
SSOW	Safe System of Work
TAI	Track Access Index
T-COD	Track Circuit Operating Device
TMS	Technical Management Standard
TRV	Track Recording Vehicle
TSC	Track Safety Co-ordinator
USAN	Urgent Safety Advice Notice

Glossary of terms

Accident	An unwanted or unintended sudden event or a specific chain of such events which have harmful consequences. For heavy rail, the EU Agency for Railways divides accidents into the following categories: collisions, derailments, level-crossing accidents, accidents to persons caused by rolling stock in motion, fires and others.
Additional observations	Safety issues identified during the investigation, but without relevance to the conclusions on causes and consequences of an occurrence.
Anti-Collision Device	A collision prevention system, in this case, by the fitting of devices to rolling stock and portable ACDs to staff.
Article 20 of Directive (EU) 2016/798, Obligation to investigation	Article 20 (1) Member States shall ensure that an investigation is carried out by the investigating body referred to in Article 22 after any serious accident on the Union rail system. The objective of the investigation shall be to improve, where possible, railway safety and the prevention of accidents. Article 20 (2) The investigating body referred to in Article 22 may also investigate those accidents and incidents which under slightly different conditions might have led to serious accidents, including technical failures of the structural subsystems or of interoperability constituents of the Union rail system. The investigating body may decide whether or not an investigation of such an accident or incident is to be undertaken. In making its decision it shall take into account: (a) the seriousness of the accident or incident; (b) whether it forms part of a series of accidents or incidents relevant to the system as a whole; (c) its impact on railway safety; and (d) requests from infrastructure managers, railway undertakings, the national safety authority or the Member States.
Breather switch	A track device installed in continuously welded rail that permits controlled expansion and contraction of the rail due to temperature changes, helping to prevent buckling or rail fracture while maintaining track stability

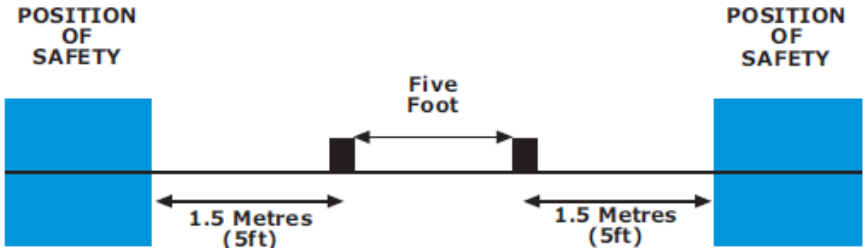
Causal Factor	Any action, omission, event or condition, or a combination thereof that if corrected, eliminated, or avoided would have prevented the occurrence, in all likelihood.
Caution	To travel at a speed that allows a train to stop short of any obstruction or danger.
Cess	The space along the running line
Contributing Factor	Any action, omission, event or condition that affects an occurrence by increasing its likelihood, accelerating the effect in time or increasing the severity of the consequences, but the elimination of which would not have prevented the occurrence.
Danger (signal)	A stop signal displaying a stop aspect
Down direction	In this accident, trains travelling to Greystones / Rosslare are travelling in the Down direction on the Down Line.
Green Zone	Where work on the line is arranged to take place without anyone in the group going on or near any line or siding, including in a T3 Possession, on which trains or movements may pass.
Incident	Any occurrence, other than an accident or serious accident, associated with the operation of trains and affecting the safety of operation. For heavy rail, the EU Agency for Railways divides incidents into the following categories: infrastructure; energy; control-command & signalling; rolling stock; traffic operations & management and others.
Investigation	A process conducted for the purpose of accident and incident prevention which includes the gathering and analysis of information, the drawing of conclusions, including the determination of causes and, when appropriate, the making of safety recommendations
Limited Clearance	Where the required clearances for a position of safety are not available at all locations, this is known as areas of limited clearance and may be indicated by a red and white chequered board. Staff must: “not stand where there is limited clearance” and “take extra care where there is limited clearance between the line on which trains may approach and other lines or adjacent structures”.
Line Blockage	Where a section of railway line is formally blocked to train movements.

Lookout	A Lookout is appointed when the safe system of work relies on warning workers of approaching trains during Red Zone working. The TSC remains responsible for arranging the safe system of work and appoints one or more Lookouts where that method is chosen
Lookout Protection	The safe system of work which relies on warning workers of approaching trains during Red Zone working using Lookouts.
Mile Post	Marks distances.
Near any railway line	IÉ define “near any railway line" as within three metres of the nearest rail; where there is a structure or a permanent fence within that distance from the nearest rail, "near any railway line" means the space between it and the nearest rail.
On or near the line	Means within 3 m (10 feet) of the nearest rail. Where there is a structure or a permanent fence within that distance from the nearest rail, “near any railway line” means the space between it and the nearest rail.



On Track Machine	A specialised rail vehicle that operates directly on the track for maintenance purposes.
Operational fringe	Operational fringe is the term used to describe where the boundary of control is between two signalling control locations or workstations. A signal controlled by one location permits a train to travel towards the other.
Personal Protective Equipment	Mandatory safety equipment worn as a control measure against workplace hazards.

Personal Track Safety	The mandatory training requirement for all staff, including contractors, whose duty requires them to go on or near the line. The content of the training material is taken from the relevant sections of the IÉ Rule Book.
Position of safety	A place allowing a clearance of at least 1.5 metres between you and the nearest rail of any line on which a train is approaching.



Patrol Ganger	A person who is trained and competent to undertake patrolling duties on a specified length of track on behalf of IÉ in line with IÉ-IM standard, Track Patrolling, CCE-TMS-361.
Portal	The extreme end of a tunnel.
Red Zone	Where work on the line is arranged to take place where trains may continue to operate
Serious Accident	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. For heavy rail, the EU Agency for Railways divides serious accidents into the following categories: collisions, derailments, level-crossing accidents, accidents to persons caused by rolling stock in motion, fires and others.
Sighting distance	The minimum distance at which an approaching train must be visible to the TSCs, as determined by the Sighting Distance Charts, to allow sufficient time for them to reach a position of safety before the train arrives. Warning times differ, depending on the speed of the line.
Signal Protection	The placing and maintaining of signals to danger in order to protect a section of line where people or objects may be obstructing the line.

Systemic factor	Any causal or contributing factor of an organisational, managerial, societal or regulatory nature that is likely to affect similar and related incidents in the future, including, in particular the regulatory framework conditions, the design and application of the safety management system, skills of the staff, procedures and maintenance.
T2 Protection	A railway safety protection system used to block a section of line from train movements so maintenance or engineering work can be carried out safely on an operational railway.
T3 Possession	Absolute possession is when engineering work is to take place which requires engineers trains or on-track-machines to be used where it is not practicable to regulate movements in connection with their work by the regular signalling systems, or where extensive engineering work is to take place for which protection under Section T Part Two is not considered suitable.
Track Circuit Operating Device	A device used to actuate track circuits in order to hold signals at danger and protect staff or work on the line.
Track Safety Co-ordinator (TSC)	The role defined in the Rule Book Section B, which is responsible for implementing a safe system of work for one or more persons working on or about the line. The TSC is responsible for arranging and overseeing the safe system of work (SSOW)
Track Safety Co-ordinator Solo (TSC Solo)	A more limited version of the TSC competence which permits persons to carry out only light duties whilst working alone and without a Lookout. A TSC Solo cannot supervise a group.
Tunnel	A railway tunnel is an excavation or a construction around the track provided to allow the railway to pass for example higher land, buildings or water. The length of a tunnel is defined as the length of the fully enclosed section, measured at rail level. IÉ maintains a definitive list of structures classified as tunnels for clarity.
Up direction	In this accident, trains travelling towards Dublin travelling in the Up direction on the Up Line.

Warning Time	The warning time needed for the work – this is the minimum needed for everyone in the group to: become aware of the approach of any train; stop work; remove any tools or equipment which may cause danger; and reach a position of safety;
Weekly Circular	The Weekly Circular, also known as the Weekly Operating Notice, contains details of the weekly operating environment for services outside the regular Working Timetable along with information on engineering possessions, temporary speed restrictions and special notices (e.g. safety and track information).
Weekly Operating Notice	The Weekly Operating Notice, also known as the Weekly Circular, contains details of the weekly operating environment for services outside the regular Working Timetable along with information on engineering possessions, temporary speed restrictions and special notices (e.g. safety and track information).
Working Timetable	The timetable published by the IÉ-IM and showing scheduled paths for public and non-public services.

References

IÉ (2007), IÉ Rule Book.

IÉ-IM (2025), CCE Safety Briefing CCE_SB_2025_001.

IÉ-IM (2022), CCE Safety briefing Ref: CCE SSB 387617 and CCE SSB 387618.

IÉ-IM (2018), IM-SMS-019 Track Safety Co-ordinator Competency Standard, Version 2.0.

IÉ-IM (2025), IM-SMS-028 Track Safety Co-ordinator TSC Competence Standard, Version 2.1.

IÉ-IM (2024), Track Access Index DART line CCE Division 1 Connolly, Version 1.0.

IÉ-IM (2023), TSC Infrequently Applied Rules Briefing, Oct 2023.

IÉ-IM (2025), R1008-2025-3 Report of near miss with employees on a running line near Killiney on the 11th October 2024.

IÉ-IM (2025), SHED Notice Staff Protection Instructions Bray – Greystones SN 1000/24/25b/01 v1.03, issued 27th June 2025.

IÉ (2021), Train Signalling Regulations and General Instructions to Signalmen.

RAIU (2022), Near miss with an Iarnród Éireann CCE Worker near Gormanston Station, 21st July 2021, RAIU Report No: 2022 – R002, Published: 8th July 2022.

RAIU (2020), Near miss with an Iarnród Éireann Patrol Ganger near Woodlawn, Galway, 4th June 2019, RAIU Report No: 2020 – R002, Published: 27th May 2020.

RAIU (2020), Near miss with an Iarnród Éireann SET Worker at Rush and Lusk Station, 20th June 2019, RAIU Report No: 2020 – R003, Published: 27th May 2020.

RAIU (2026), Urgent Safety Advice Notice (USAN) 006.