Railway Accident Investigation Unit Ireland

INVESTIGATION REPORT

Near miss with an Iarnród Éireann SET Worker at Rush and Lusk Station, 20th June 2019

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Reader guide

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

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

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

Preface

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

The RAIU investigate all serious accidents. A serious accident means any train collision or derailment of trains, resulting in the death of at least one person or serious injuries to five or more persons or extensive damage to rolling stock, the infrastructure or the environment, and any other similar accident with an obvious impact on railway 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 outlining the associated safety recommendation(s); other issues may require a Safety Advice Notice.

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 occurrences that may or may not have warranted an investigation as individual occurrences, but the apparent trend warrants investigation.

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

Report Summary

At approximately 09:50:31 hrs, on the 20th June 2019, a member of Iarnród Éireann Infrastructure Manager's (IÉ-IM) Signalling, Electrical and Telecommunications (SET) Department's staff (to be referred to as SET Worker) accessed the railway line at Rusk and Lusk Station and began walking on the railway line (*Up Line*). The SET Worker was accessing the railway line to inspect electrical equipment associated with a nearby SET location case.

Seven seconds later the SET Worker sees the 08:00 hrs Belfast to Connolly passenger train approaching on the Up Line and starts to walk towards the other railway line (not occupied by the train, the *Down Line*). At 09:50:42 hrs, while standing in the middle of the Down Line, he raises his hand above his head to acknowledge the presence of the train, he is not in a *position of safety*. Two seconds later (09:50:44 hrs) the SET Worker walks across to the Down Platform and leans his elbow down on the platform and raises his other hand to acknowledge the train for a second time, he is not in a position of safety.

As the SET Worker watches the Belfast to Connolly train pass (09:50:46 hrs), the SET Worker sees the 09:29 hrs Pearse to Drogheda empty train approaching on the Down Line. The SET Worker walks, at pace, towards the ramp of the Platform and begins to climb up on the ramp of the Down Line Platform, he stumbles during the climb. At 09:50:53 the SET Worker clears the track, although he is not in a position of safety. One second later, at 09:50:54, the train travels past the SET Worker. At 09:50:56, the SET Worker is more than 1.5 m from the track, in a position of safety; he does not suffer any injuries as a result of the incident.

The immediate cause of the incident was that the SET Worker placed himself in a position of danger by not adhering to the requirements set out in the IÉ Rule Book or the SET Risk Assessment to carry out the task; a task which could have been conducted without walking on the track. Contributory factor to the incident was:

- CF-01 – The SET Worker made a last-minute decision to conduct the inspection from track level without first considering his safety;
- CF-02 – There was no consideration taken at the pre-planning of the inspection of how the inspection was going to be conducted;
- CF-03 – The SET Worker may have lost situational awareness, momentarily, due to normally working at night and had an incorrect expectation that it was safe to access the track; this may have been exacerbated due to the fact that he had not intended to walk onto the track.

The underlying factor to the incident was:

- UF-01 – There is no formal documentation, for SET Department staff, to be completed prior to going on or near the line, with checklists to manage risks that might be encountered; or, which would highlight to SET Department staff that it is unsafe to go one or near the track without a proper SSOW.

The root cause associated with the incident was:

- RC-01 – Despite the IÉ Rule Book being robust in its protection of staff going on or near the line, the current SET Safety Management System (SMS) suite of documents does not reflect this robustness in ensuring that the risks associated with SET staff members working on their own are captured and managed.

As a result of the incident, the RAIU made two safety recommendations (one of which is related to an additional observation:

- Safety Recommendation 2020003-01 – The IÉ-IM SET Department should develop a formalised process, through their SMS suite of documents, for IÉ-IM SET staff walking/ working alone, which should be completed prior to any member of SET 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.
- Safety Recommendation 2020003-02 – IÉ-IM should brief all staff of their requirements, under the IÉ Rule Book, to wear their high visibility clothing correctly.

Contents

RAIU Investigation

RAIU decision to investigate

1 In accordance with the Railway Safety Act 2005 and Statutory Instrument No. 258 of 2014 European Union (Railway Safety) (Reporting and investigation of Serious Accidents, Accidents and Incidents) Regulations 2014, the RAIU investigate all serious accidents, the RAIU may also investigate and report on accidents and incidents which under slightly different conditions might have led to a serious accident.

2 On the 20th June, at 15:31 hrs, IÉ-IM reported that there was a near miss with a member of SET at Rush and Lusk Station at approximately 10:00 hrs; this was reported immediately as under the RAIU's guidance document "Notification of occurrences to the RAIU for RUs, IMs & other Railway Organisations" (Version 2 published on the 5th April 2017 was live at the time of the incident) requires that "occurrences that under slightly different conditions may have led to a fatality, serious injury or extensive damage" be reported immediately.

3 After conducting a Preliminary Examination Report, the RAIU made the decision to conduct a full investigation into the incident, given that under slightly different circumstances this incident may have led to serious accident with the potential for fatality or serious injuries due to the IÉ-IM SET Worker almost being struck by the train.

Scope of investigation

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

- Establish the sequence of events leading up to the incident;
- Establish, where applicable, the immediate cause, contributory factors, underlying factors and root causes;
- Examine the relevant elements of the IÉ Rule Book;
- Examine the relevant *risk assessments* and registers;
- Review the SMS documentation in relation to *risk* and *hazard* identification;
- Review any previous occurrences where IÉ staff were almost struck by trains.

Investigation and evidence

5 During this investigation, the RAIU collated and logged the following evidence:

- Closed circuit television (CCTV) from Rush and Lusk Station;
- On train data recorder information;
- Working timetable;
- Witness evidence from parties involved in the incident;
- Documentary evidence from IÉ-IM standards, procedures and other documentation;
- IÉ-IM reports of investigations into similar occurrences.

The Incident

Parties & roles associated with the incident

Parties involved in the incident

6 IÉ–IM is the infrastructure manager who owns and operates the railway infrastructure in Ireland and operates under a Safety Authorisation certificate issued by the Commission for Railway Regulation (CRR). The IM Safety Authorisation is issued in conformity with Commission Regulation (EU) 1169/2010; the authorisation was renewed in 24th March 2018 for a period of four years. The IÉ-IM department involved in the incident and relevant to this investigation are:

- IÉ-IM SET Department - responsible for the design, installation and maintenance of signalling equipment i.e. responsible for the functionality of the points;

7 IÉ is also the railway undertaking (RU) who owns and operates mainline and suburban railway services in Ireland and operates under a safety certificate issued by the CRR. The 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 2018 for a period of five years. The IÉ-RU department involved in the incident and relevant to this in investigation is:

- IÉ-RU Operations – responsible for the operation of trains on the network. This includes the supervision of train drivers.

Parties not directly involved in the incident

8 Although not directly involved in the incident, IÉ - Railway Undertaking (RU) are referenced in the measures taken since the incident section of this report (paragraph 107). IÉ-RU owns and operates mainline and suburban railway services in Ireland and operates under a safety certificate issued by the CRR. The 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 2018 for a period of five years.

Roles involved in the incident

9 SET Worker – The person involved in the incident is a member of the SET Department's staff. He has been employed by IÉ for over thirty years; his current role is supervising and inspecting SET requirements for the New Works Department, which he has undertaken for twenty years. In terms of his competences associated with working on the track; the SET Worker held a Personal Track Safety (PTS) certificate (which he held since 2006) and an SET Work Protector certificate (which he held since 2011). He also held a full Track Safety Co-ordinator (TSC) Card.

10 The train drivers:

- The driver of the train travelling on the Up Line (08:00 hrs passenger service from Belfast to Dublin, Connolly (The Enterprise)) was a Northern Ireland Railways driver. The driver sounded the horn when travelling through Rush & Lusk Station. The actions of the driver were not contributory to the incident;
- The driver of the train travelling on the Down Line (09:29 hrs empty train from Pearse Yard to Drogheda DMU) was an IÉ-RU driver. The driver sounded the horn and applied the emergency brake on seeing the SET Worker. The driver reports the events to the Controlling Signalman at CTC when stopped at Rush and Lusk Station. The actions of the driver were not contributory to the incident.

Summary of the incident

11 At approximately 09:50:31 hrs, on the 20th June 2019, the SET Worker accessed the railway and began walking in the down direction[1] on the Up Line, while holding a drinking cup in his right hand and paperwork in his left hand, see Figure 1 for the sequence of events captured by station CCTV. He was to inspect electrical equipment associated with a nearby location case.

12 Seven seconds later the SET Worker sees the 08:00 hrs Belfast to Connolly passenger train approaching on the Up Line and starts to walk towards the Down Line. At 09:50:42 hrs, while standing in the middle of the Down Line, he raises his hand above his head to acknowledge the presence of the train, he is not in a *position of safety*.

13 Two seconds later (09:50:44 hrs) the SET Worker walks across to the Down Platform and leans his elbow down on the platform and raises his other hand to acknowledge the presence of the train for a second time, he is not in a position of safety. As the SET Worker watches the Belfast to Connolly train pass (09:50:46 hrs), the SET Worker sees the 09:29 hrs Pearse to Drogheda empty train approaching on the Down Line.

14 The SET Worker walks, at pace, towards the ramp of the Platform and begins to climb up on the ramp of the Down Line Platform, he stumbles during the climb. At 09:50:53 the SET Worker clears the track, although he is not in a position of safety. One second later, at 09:50:54, the train travels past the SET Worker, see Figure 1 (images taken from CCTV at the station).

15 At 09:50:56, the SET Worker is more than 1.5 m from the track, in a position of safety; he does not suffer any injuries as a result of the incident.

[1] Trains travelling towards Connolly, are travelling on the Up Line, in the Up Direction. Trains travelling towards Belfast are travelling on the Down Line, in the Down Direction.

Figure 1 – Train travels passed the SET Worker while not in a position of safety

General description of the railway

Infrastructure

16 Rusk and Lusk Train Station is located between the towns of Rush and Lusk, in north County Dublin at the 14 *milepost* (MP), see Figure 2. The line involved is the Dublin/Belfast mainline. There are continuously welded rails (CWR) mounted on concrete sleeper tracks running through the station (see Figure 3). Rush and Lusk Station has two 175 metre (m) platforms, situated on a curve, Figure 3. As there is not 1.5 m clearance between the platforms; this area is an area of *limited clearance*.

Figure 2 – Location of Rush and Lusk Station

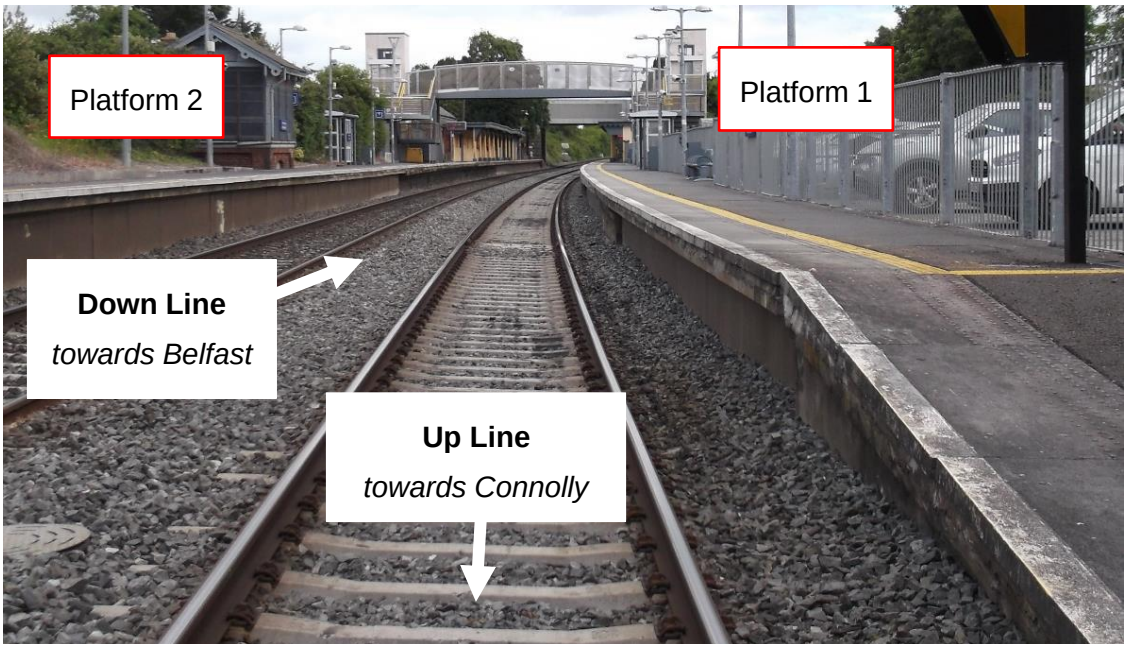


Figure 3 – Curved station platforms (image taken from IÉ Report No. R1007-2019-56)

17 An electrical location case is located in the carpark adjacent to Platform 1, see top red circle in Figure 4 (image taken from IÉ Report No. R1007-2019-56); with cabling running from the electrical location case under Platform 1 to an Insulated Block Joint (IBJ) on the Up Line, see bottom red circle in Figure 4. This is the equipment that the SET Worker was examining on the day of the incident. Both these items of equipment can be viewed from Platforms 1 and 2.

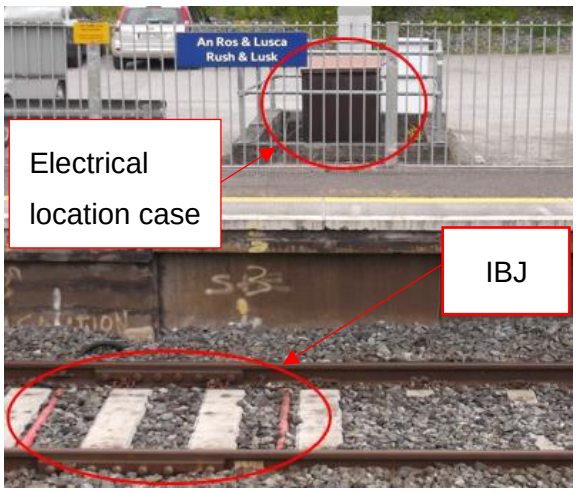


Figure 4 – Electrical location case & IBJ

Rolling Stock

18 The two trains involved in the incident were the:

- Train travelling on the Up Line – The 08:00 hrs passenger service from Belfast to Dublin (Connolly), train ID A123 (The Enterprise); non-stop through Rush and Lusk Station. The maximum permitted speed for the Enterprise train is 90 mph (145 km/h). The train was travelling at approximately 90 mph (145 km/h) when it approached Rush and Lusk Station. The horn was operational;
- Train travelling on the Down Line – The 09:29 hrs empty train from Pearse Yard to Drogheda Diesel Multiple Unit Depot (DMU), train ID C802; non-stop through Rush and Lusk Station. It was an eight-piece 29000 Class DMU. The maximum permitted speed for a train of this type is 70 mph (112 km/h). The train was travelling at 70 mph (112 km/h) when it approached Rush and Lusk Station. The On-Train Data Recorder (OTDR) indicates that the lights and horn were operational at the time of the incident; the CCTV footage shows the lights illuminated (see Figure 1).

Signalling and communications

19 The line between Dublin and Belfast is signalled using two and three and four aspect colour light signals, controlled by the North East Centralised Traffic Control (CTC) Signalman from Portmarnock to the Border and the Central CTC Signalman from Connolly Station to Portmarnock, both of whom are located in CTC, Connolly Station, Dublin. Track Circuit Block (TCB) regulations apply to this route and train detection in the area concerned is achieved by track circuits.

20 The means of communication between the train drivers and the signalman on this route is through train radio.

21 No factors in relation to the condition of the signalling and communications systems were found to have contributed to the incident.

Operations

22 Trains travelling towards Dublin, are travelling on the Up Line, in the Up Direction. Trains travelling towards Belfast are travelling on the Down Line, in the Down Direction (see Figure 3).

23 The maximum permitted line speed for the section of line through Rush and Lusk Station in the Up and Down Directions is 90 mph (145 km/h) as set out in the current Working Timetable.

24 Automated safety announcements are made at Rush and Lusk Station to warn people of approaching trains; this is the case for both trains stopping at the station and non-stop trains; announcements were made on the day of the incident; however, it should be noted that IÉ staff should not use these announcements in relation to safe access to the track.

Fatalities, injuries & material damage

25 The SET Worker did not suffer any injuries as a result of the incident.

26 There was no material damage as a result of the incident.

External circumstances

27 The weather was cloudy and fine; weather data taken from the nearest Met Éireann Weather Station, which was Dublin Airport, 13 km South/South West of the site, recorded that there was 1.3 millimetres (mm) of rainfall for the day, most of which fell late afternoon. The maximum temperature was recorded at 16.5ºC and the minimum temperature was 7.8ºC. The mean wind speed was recorded at 8.3 Knots (15 km/h).

28 Weather conditions were not contributory to the incident.

Evidence

SET Worker

29 As mentioned previously, the SET Worker's current role is of a supervising and inspecting capacity within the SET New Works Department, which he has undertaken for twenty years.

30 The duties associated with the role are mostly undertaken during night work and would involve tasks regarding the maintenance or upgrading of equipment associated with signalling which would normally be undertaken during *Green Zone* or *T3 Possession* working arrangements, with little to no train movements during this type of work.

31 The SET Worker was a certified TSC and in the six months before the incident, he carried out the duties of TSC 130 times, which involved supervising contractors, conducting safety briefings and safeguarding works.

32 In the six months before the incident, the SET Worker had only worked three separate weeks of days.

SMS Documents

Relevant SMS documents

33 The RAIU requested the SMS documents in relation to this incident, the RAIU were provided with:

- SET-SMS-001, SET Safety Management System, Version 7.0, operative since the 13th March 2018 (to be referred to as SET-SMS-001 for the remainder of this report);
- SET-SMS-006, SET Safety Management System, Hazards and Risk Assessments, Version 4.0, operative since the 13th March 2018 (to be referred to as SET-SMS-006 for the remainder of this report).

SET-SMS-001, Safety Management System

34 SET-SMS-001 is a high-level document, and in general terms requires that all activities within the SET Department are conducted in accordance with statutory obligations, IM Standards, IÉ Rule Book, Departmental Standards and Work Instructions as appropriate.

35 SET-SMS-001 outlines: the SET locations; assets and systems; accountabilities and responsibilities; occupational safety; signalling, electrification and telecoms asset safety; safety performance; and, organisation structures and obligations.

SET-SMS-006, Hazards and Risk Assessments

36 SET-SMS-006 includes information on: Accountabilities & Responsibilities; Employee Communications; Hazards; and, Risk Assessments.

37 In terms of hazards, the document outlines how hazards are identified, stating “The hazard identification process involves identifying reasonably foreseeable hazards for a work activity or asset, using expertise from competent personnel”. In addition, SET staff report occupational or asset safety hazards in a Hazard Report Book; these can be submitted anonymously, if required. Any near-miss incident must be reported on a Hazard Report Form. A formalised process is used to then introduce mitigation and close-out actions.

38 In terms of risk assessment, a Risk Assessment Panel is formed with at least three SET employees. SET employees can request Risk Assessments to be carried out for any SET activity. SET-SMS-006 provided guidance on how to conduct a risk assessment.

39 SET-SMS-006 uses the *General Principals of Prevention* and the *Hierarchy of Controls* set out in the Safety, Health and Welfare at Work Act 2005 to manage the risks controls used.

Risk Assessment relevant to the incident

40 A live SET Department Risk Assessment, Reference Number RA2555, issued on the 5th December 2013 for Projects East, for all hazards involved in conducting Signalling & Electrical Maintenance Activity was provided to the RAIU as part of the investigation, as the risk assessment appliable for the SET Worker on the day of the incident (this is to be referred to as SET Risk Assessment for the remainder of this report).

41 The document identifies thirty-six hazards[2], their associated risks, risk ranking, controls and re-calculated risk rankings. The RAIU found two relevant hazards: Hazard 1 – Trains /OTMs /Road Rail Machinery; and, Hazards 22 – Walking in tunnels / bridges / limited clearance areas, see Figure 5 for an example of the hazards identified in the SET Risk Assessment.

Hazard: 22	Risk:	S	L	RR	Risk Controls:	S	L	RR	T?
Walking in tunnels / bridges/ Limited Clearance Areas	Risk of Fatality & Serious injury	**3**	**4**	**12**	For Tunnels Staff to contact CTC where required prior to entering tunnels Ensure sufficient lighting is provided at all times e.g. Headlamp / headlamp. Staff must be trained, assessed and competent to carry out safety critical	**3**	**2**	**6**	**YES**
					duties Refuges in tunnels must be free from obstructions. Safe system of work to be set up by the TSC before any work is carried out.				

Figure 5 – Extract from SET Risk Assessment

42 In terms of Hazard 1 – Trains / OTMs /Road Rail Machinery, the risks have been identified as: Risk of Death /Injury from being hit by trains/OTMs/Road Rail Machinery. The risk controls have been identified as:

- TSC to brief and record briefing to staff about the protection arrangements
- Working timetable, Weekly Circular, Rule Book
- Staff must pay particular attention to ensure have all available information for Location.
- Section B Company Rule Book must adhere to when going on or near the line.
- Local knowledge essential
- Staff must be trained, assessed and competent to carry out safety critical duties
- Task appropriate Personal Protective Equipment (PPE) to be worn at all times e.g. High Visibility PPE to be worn at all times on or near the railway
- If required use Lookout/ SET Work Protector while working as to around Location.

[2] Note the terminology used in relation to the risk assessments, is the IÉ-IM terminology.

- Works of a minor nature: you must reach a position of safety at least ten seconds before a train arrives
- You have sufficient sighting distances
- All personnel on site must have completed a Personal Track Safety (PTS) and Safe Pass Course and be certified.
- Care and attention must be observed at all times.

43 In terms of Hazard 22 – Walking in tunnels/bridges/limited clearance areas, the risks have been identified as: Risk of fatality & serious injury. The risk controls included are:

- For Tunnels Staff to contact CTC where required prior to entering tunnels
- Ensure sufficient lighting is provided at all times e.g. Headlamp / headlamp
- Staff must be trained, assessed and competent to carry out safety critical duties
- Refuges in tunnels must be free from obstructions
- *Safe system of work*[3] (SSOW) to be set up by the TSC before any work is carried out.

44 IÉ-IM records indicate that the SET Worker was briefed on the risk assessment on the 3rd March 2016.

Pre-planning of inspections

45 It should be noted that the inspection conducted on the day of the incident was a pre-planned inspection, which was planned earlier that week with the SET Worker's manager. There was no discussion at this meeting on how the inspection was to be conducted and whether an individual risk assessment should be conducted to complete the task, as can be requested by any SET staff member (paragraph 38).

[3] According to SET-SMS-001, the objective of the SSOW is to describe specific procedures that, when done according to the steps prescribed in the SSOW, will ensure that the task can be performed in a safe manner. SSOW can typically result as a requirement from a Risk Assessment.

IÉ Rule Book

Introduction

46 The relevant sections of the IÉ Rule Book in this investigation are Subsection 2.0, Personal Safety of Section B, Part One which are outlined in paragraphs 47 to 40; and, Subsection 6.0 Instructions to Track Safety Co-ordinators of Section B, Part Two which are outlined in paragraphs 54 to 58.

Personal Safety

General description

47 Subsection 2.0, Personal Safety of Section B, Part One, of IÉ's Rule Book has the following topics (listed are the topics related to this incident):

- 2.1 – Going *on or near the line*;
- 2.2 – Responsibility for your safety;
- 2.3 – What you must do when walking on or near the line;
- 2.4 – What you must do when working on or near the line.

Going on or near the line

48 According to subsection, 2.1.2, What you must wear or use, the IÉ Rule Book states that you must wear the high visibility clothing provided; and this must be worn correctly.

Responsibility for your safety

49 According to subsection 2.2, Responsibility for your safety, one of two arrangements must be made to ensure you are not endangered by train movements, depending on the nature of your duties, for simplicity, these duties are classified as walking or working. Walking includes carrying out walking ALONE on or near the line BUT not at the same time carrying out any form of work activity such as patrolling, examining, inspecting, oiling or cleaning within 2 m of the nearest rail. Working includes all activities not described above as walking.

50 In relation to this RAIU investigation, at the exact time of the incident, the SET Worker was walking, however, he was going to be examining a piece of SET infrastructure, and as such should be prepared for working.

What you must do when walking on or near the line

Basic requirements

51 According to subsection 2.3, What you must do when walking on or near the line, the IÉ Rule Book states that:

- You must know the permissible speed of trains and the direction(s) they normally approach (2.3.2);
- You must be: alert constantly; look up frequently; not be distracted by anyone nearby; not reliant on anyone giving warning of approaching trains; not reliant on signals at Danger or level crossings open to road traffic as an indication that no train is approaching; able to hear by not wearing anything to affect your hearing (2.3.3).

What you must do when a train approaches

52 Subsection 2.3.4 states that when a train approaches you must:

- Immediately move clear of all lines unless you are clearly in a position of safety and in no danger from another train approaching unnoticed;
- Raise your arm above your head to acknowledge the warning horn;
- Put any equipment you are carrying in a safe place on the ground before the train passes;
- Stay in a position of safety until the train has passed and you are sure no other train is approaching.

What you must do where there are limited clearances

53 Subsection 2.3.7 states that where there is limited clearance (between two platforms would be consider an area of limited clearance) you must:

- Take extra care where there is limited clearance between the line on which trains may approach and other lines or adjacent structures;
- Do not stand where there is limited clearance while a train passes[4].

[4] There are no limited clearance signs placed at station platforms.

Instructions to Track Safety Co-ordinators

When it is safe for you to work alone

54 Paragraph 6.12.2, When it is safe for you to work alone, of Subsection 6.12, What you must do when working alone, of the IÉ Rule Book states that you may work alone provided:

- The work involves only patrolling, examining or inspection, or work of a minor nature as authorised in the Department Instructions;
- You will be able to remain sufficiently alert for the approach of trains and be able to reach a position of safety at least 10 seconds before a train arrives;
- Alternatively, you must arrange for the line(s) concerned to be blocked to all movements.

What you must do during the work

55 Paragraph 6.12.3, What you must do during the work, of the IÉ Rule Book, states that the TSC must: be alert constantly, look up frequently and avoid allowing the work you are doing, or anything else, to affect your seeing or hearing approaching trains.

Sighting distance

56 Sighting distance charts are provided in Subsection 6.11, of the Instructions to Track Safety Co-ordinators (see Figure 6). These include the: speed (maximum speed of approaching train); distance (of which an approaching train can be seen); time (warning time).

SIGHTING DISTANCE CHART (IN METRES)

	SIGHTING DISTANCES IN METRES TO PROVIDE MINIMUM WARNING TIME						
Permissible Speed (M.P.H.)	**15 sec**	**20 sec**	**25 sec**	**30 sec**	**35 sec**	**40 sec**	**45 sec**
100	700	900	1200	1400	1600	1800	2100
90	700	900	1100	1300	1500	1700	1900
75	600	700	900	1100	1200	1400	1600
60	500	600	700	900	1000	1100	1300
40	300	400	500	600	700	800	900
20	200	200	300	300	400	400	400

Figure 6 – Sighting distance chart from IÉ Rule Book

57 The maximum speed through Rush and Lusk Station is 90 mph (145 km/h); with the minimum distance provided for this speed being 700 m.

58 IÉ-IM calculated the sighting distances to be 155 m and 450 m for trains approaching on the Up Line and Down Line, respectively.

Events before, during & after the incident

Events before the incident

59 In the six months before the incident, the SET Worker had customarily worked nights during Green Zone or T3 Possession working arrangements.

60 The SET Worker worked the day before the incident until 17:00 hrs and started work shortly after 08:00 hrs on the day of the incident.

61 On the day of the incident, he was conducting a pre-planned inspection of an electrical location case situated in the car park at Rush and Lusk Station (paragraph 17); he had not intended on walking onto the track to conduct the inspection, his intention was to conduct the inspection from the station platforms.

62 On arrival at Rush and Lusk Station, the SET Worker checked the location case in the carpark and then walked to the track access gate adjacent to Platform 1.

63 At 09:50:18 the SET Worker walked to the end of ramp at Platform 1, stood there and looked back at Platform 1 and saluted another member of IÉ-IM staff (this member of staff was not known to the SET Worker and had no impact on the sequence of events).

Events during the incident

64 At 09:50:31 the SET Worker leaves the ramp at Platform 1 and is walking in the down direction on the Up Line, holding a drinking cup in his right hand and paperwork in his left hand, see Figure 7 (images taken from station CCTV). He is now positioned in an area of limited clearance[5]

Figure 7 – SET Worker walking on the Up Line

[5] the IÉ Rule Book states that you must "take extra care where there is limited clearance between the line on which trains may approach and other lines or adjacent structures" (Section B, Part One, 2.3.7).

65 At 09:50:38, the SET Worker hears the horn of the 08:00 hrs Belfast to Connolly passenger train and looks up and sees it approaching and starts to walk towards the Down Line, see Figure 8.

Figure 8 – SET Worker walking towards the Down Line

66 While crossing lines, he looks in the Up Direction, at the Down Line, see Figure 9.

Figure 9 – SET Worker looking, in the Up Direction, at the Down Line

67 At 09:50:42, while standing in the middle of the Down Line, he raises his hand above his head to acknowledge the presence of the train, see Figure 10; he is not in a position of safety, he remains in an area of limited clearance[6].

Figure 10 – SET Worker raising his hand over head to acknowledge the train

[6] The IÉ Rule Book states “do not stand where there is limited clearance while a train passes (Section B, Part One, 2.3.7).

68 At 09:50:44 is walks across to the Down Platform and leans his elbow down on the platform and raises his other hand to acknowledge the train for a second time, see Figure 11; he is not in a position of safety.

Figure 11 – SET Worker acknowledging train for second time

69 At 09:50:46, as the SET Worker watches the Belfast to Connolly train pass, the SET Worker sees the 09:29 hrs Pearse to Drogheda empty train approaching on the Down Line, see Figure 12.

70 The driver of the 09:29 hrs Pearse to Drogheda empty train sounds the horn several times and applied the emergency brake on seeing the SET Worker.

Figure 12 – SET Worker sees a train approaching on the Down Line

71 The SET Worker walks towards the ramp of the Platform and begins to climb up on the ramp of the Down Line Platform, see Figure 13, he stumbles as he tries to climb up.

Figure 13 – SET Worker climbing the ramp

72 At 09:50:53 the SET Worker clears the track, although he is not in a position of safety, see Figure 14.

Figure 14 – SET Worker clears the track

73 One second later, at 09:50:54, the train travels past the SET Worker, see Figure 15.

Figure 15 – Train travels passed the SET Worker

74 At 09:50:56, the SET Worker is more than 1.5 m from the track, in a position of safety, see Figure 16.

Figure 16 – SET Worker in a position of safety

Events after the incident

75 At 09:51:11 (seventeen seconds after the incident), the SET Worker travels back down onto the Down Line, see Figure 17.

Figure 17 – SET Worker goes back onto the track

76 The SET Worker crosses the Down Line and the Up Line (09:51:15), see Figure 18; and, onto the Up Platform (09:51:21) into a position of safety.

Figure 18 – SET Worker crosses over the Up Line

77 The SET Worker leaves through the track access gate, to the car park and to his car, where is remains for approximately twenty minutes.

78 At the same time, the 09:29 hrs Pearse to Drogheda empty train is now stopped on the Down Platform (the train was not scheduled to stop); the driver reports the events to the Controlling Signalman at CTC; the driver then enquired about the whereabouts of the SET Worker from another member of IÉ staff who thought that the SET Worker had left the station. The driver re-contacted CTC, who in turn issued notification of the incident as standard.

79 The SET Worker travelled to Skerries Station to conduct a pre-work inspection.

80 While in Skerries Station the SET Worker's Manager contacted the SET Worker and requested he travel to Inchicore for a discussion on the incident and drugs and alcohol testing, as is IÉ company policy, the tests were returned as negative.

Similar Occurrences

81 There are no relevant similar occurrences to this incident.

Analysis

SMS Documents

Summary of documents

82 SET-SMS-001 and SET-SMS-006 are high-level documents.

83 SET-SMS-006 does set out how risk assessments should be conducted, and the General Principals of Prevention and the Hierarchy of Controls set out in the Safety, Health and Welfare at Work Act 2005 used to manage the risks controls. The document also allows for SET staff to request risk assessment to be conducted for specific activities (paragraph 38).

Risk Assessment

84 In line with SET-SMS-006, the SET Risk Assessment identified two hazards relevant to this incident, namely Train/OTMs/ Road Rail Machinery and Walking in tunnels / bridges / limited clearance areas (paragraph 41) which requires that the requirements of the IÉ Rule Book should be adhered to (as discussed above in paragraph 87). In addition, a SSOW should be set up where hazards cannot be eliminated (paragraph 43).

Pre-planning of inspections

85 It is noted that there was no thought or discussion on how the inspection was to be conducted at the pre-planning stage and no risk assessment conducted to complete the task (paragraph 45). If considered, it would have been established that the requirements of the IÉ Rule Book could not be adhered to and a decision is likely to have been made that the inspection be conducted from platform level.

IÉ Rule Book

Personal Safety & Instructions to TSCs

86 Subsection 2.0, Personal Safety of Section B, Part One of IÉ's Rule Book identifies responsibilities and requirements related to walking or working on or near the line (paragraph 47). The SET Worker was walking on the line in preparation for working (paragraphs 49 - 50). Additional instructions for the role of TSC as set out in 6.0, Section B, Part One of the IÉ Rule Book.

87 From the relevant sections of the IÉ Rule Book, the SET Worker should have:

- Taken extra care when entering an area of limited clearance (paragraph 53);
- Been aware of the permissible speed and direction of trains (paragraphs 51 and 55);
- Remained constantly alert (paragraph 51 and 55);
- Continued looking up frequently (paragraph 51 and 55);
- Moved clear of all lines and in no danger from another train (paragraph 52);
- Not stood in a limited clearance area while the train passed (paragraph 53);
- Stayed in a position of safety (paragraph 52);
- Calculated the sighting distances to be less 700 m /15 seconds (paragraph 56); they were 155 m and 450 m for the Up Line and Down Line, respectively (paragraph 58);
- Calculated whether he could reach a position of safety at least 10 seconds before a train arrived (paragraph 54); where this was not possible, the lines should have been blocked (paragraph 54).

SET Worker

88 The SET Worker was competent for the tasks to be undertaken on the day of the incident (paragraph 31); and normally undertook supervising and inspection duties at night (paragraph 32). While working nights, the work was normally undertaken during Green Zone or T3 Possessions (paragraph 30).

89 The SET Worker had not intended to conduct the pre-planned inspection from track level, he had originally intended to conduct the inspection for the station platforms (paragraph 61).

Actions of the SET Worker on the day of the incident

90 On the day of the incident (paragraphs 59 - 74), it is clear that the SET Worker:

- Was not aware of the permissible speeds and sighting distances (as he would not have entered an area of limited clearance given the risks);
- Did not take extra care in an area of limited clearance;
- Did not remain constantly alert, in that he casually placed his elbow on the platform and was leaning against the platform as the first train approached (paragraph 68). He was not look up frequently, as he only saw the second train, when he watched the first train pass (paragraph 69);
- Did not move clear of all lines and position himself in a position of safety on seeing the first train, instead he remained on the Down Line (in a position of limited clearance) while watching the train pass on the Up Line (Figure 11);
- Did not consider that he would not be able to reach a position of safety at least 10 seconds before a train arrived; as he knowing positioned himself in a limited clearance area and was almost struck by the train on approaching on the Down Line (paragraph 72). There was three seconds, from first seeing the second train to clearing the track, albeit not in a position of safety, far least than the 10 seconds required;
- Did not give any consideration to the completion of an SSOW, which would have required him to conduct the inspection during Green Zone or T3 Possession working arrangements.

91 Had the SET Worker implemented the requirements of the IÉ Rule Book in relation to the inspection he was conducting on the day of the incident, he would not have been permitted to walk onto the track. Primarily, as he was not able to be in a position of safety at least 10 seconds before the arrival of a train; and, did not have the required sighting distances. In addition, the SSOW would have required him to adopt different protection arrangements.

Conclusion

SMS documents

Summary of SMS documents

92 SET-SMS-001 and SET-SMS-006 do set out the requirements in relation to how risk assessments should be conducted; and there a means for SET staff to request risk assessment for specific activities (paragraph 83).

Risk Assessment

93 The SET Risk Assessment relies on the requirements in the IÉ Rule Book and requires that an SSOW should be set up where hazards cannot be eliminated. Had the requirements of the SET Risk Assessment been adhered to, the SET Worker should not have gone on or near the line (paragraph 91).

Pre-planning of inspections

94 Had the SET Worker and his manager discussed how the inspection was to be conducted at this stage, or a risk assessment commenced, it would have been established that the requirements of the IÉ Rule Book could not be adhered to and a decision is likely to have been made that the inspection be conducted from platform level (paragraph 85).

IÉ Rule Book

95 The IÉ Rule Book identifies responsibilities and requirements related to walking or working on or near the line (paragraph 86); and appears to be robust in the protection of IÉ staff when adhered to in full (paragraphs 87, 90 and 91); as it sets out a number of requirements in relation to what to do/know:

- Before going on or near the line - permissible speeds, sighting distances, limited clearance area;
- Actions to be taken on the line - alert and looking up frequently;
- Actions to be taken on seeing a train – position of safety (10 seconds), clearing lines.

96 Had the requirements of the IÉ Rule Book been adhered to in full, the SET Worker would not have gone one or near the line (paragraph 91).

SET Worker

97 The SET Worker was competent to conduct the task to be undertaken on the day of the incident; and normally worked night shifts (paragraph 88). He had not intended on walking onto the railway line (paragraph 89).

98 The SET Worker did not adhere in full to the requirements of the IÉ Rule Book, in that he did not adhere to at least eight requirements of the IÉ Rule Book (paragraph 90); and did not consider the establishment of an SSOW (paragraph 90).

Immediate cause, contributory factors, underlying causes & root factors

99 The SET Worker was almost struck by a train; the immediate cause of the incident was that the SET Worker placed himself in a position of danger by not adhering to the requirements set out in the IÉ Rule Book or the SET Risk Assessment to carry out the task; a task which could have been conducted without walking on the track.

100 Contributory factor to the incident was:

- CF-01 – The SET Worker made a last-minute decision to conduct the inspection from track level without first considering his safety;
- CF-02 – There was no consideration taken at the pre-planning of the inspection of how the inspection was going to be conducted;
- CF-03 – The SET Worker may have lost situational awareness, momentarily, due to normally working at night and had an incorrect expectation that it was safe to access the track; this may have been exacerbated due to the fact that he had not intended to walk onto the track.

101 The underlying factor to the incident was:

- UF-01 – There is no formal documentation, for SET Department staff, to be completed prior to going on or near the line, with checklists to manage risks that might be encountered; or, which would highlight to SET Department staff that it is unsafe to go one or near the track without a proper SSOW.

102 Root cause associated with the incident was:

- RC-01 – Despite the IÉ Rule Book being robust in its protection of staff going on or near the line, the current SET SMS suite of documents does not reflect this robustness in ensuring that the risks associated with SET staff members working on their own are captured and managed.

Additional observation

103 It is noted from the CCTV that the SET Worker did not have his coat zipped up correctly meaning that not all of his body was covered with high visibility; subsection 2.1.2, What you must wear or use, of the IÉ Rule Book requires that high visibility coating be worn correctly (paragraph 48).

Measures taken since the incident

IÉ-IM's Report of Investigation

104 IÉ-IM conducted an internal investigation into the occurrence, Report of Investigation: Category 1 near miss with a member of staff at Rush & Lusk Station on the 20th of June 2019 (Report No. R1007-2019-56). The report found that the immediate cause of the incident was: The member of staff did not implement a SSOW prior to going on or near the railway line while carrying out an inspection. Causal factors were identified as:

- The requirements of Rule Book Section B, to establish a SSOW, were not complied with;
- The member of staff failed to anticipate the risk. He made a spur of the moment decision and placed himself in danger by not identifying a situation which increased the risk. Additionally, he did not apply the correct method or take the appropriate measures to reduce the likelihood of a serious incident occurring;
- The member of staff did not maintain full concentration and focused more on the inspection itself rather than looking at the overall task of first setting up an effective SSOW which would have exposed him to the least possible risk.

105 The underlying cause was identified as: The SET safety management system does not have a process for self-checking for an individual to assess the risks before going on or near the line similar to that applicable for when more than two are going on or near the line. There is no form/checklist or other physical item that is used on-site prior to going on to a line when working alone.

106 IÉ-IM took five actions as a result of the incident:

- IÉ-IM Safety Department issued a company-wide 'Safety Alert' notice highlighting the key safety message as a result of the near-miss occurrence (Figure 19) on the 24th June 2019. A follow-on safety message was also issued in the 'Special Notices' section of the IÉ Weekly Circular bringing attention to all employees the "Always Safe" slogan. The notice was accompanied with details of this occurrence and other similar recent occurrences with more severe consequences within the UK railways;
- The SET Worker participated in a post incident de-briefing, analysis and development discussion with his manager. He was placed on the IÉ-IM Department's Safety Management Standard, IM-SMS-018; Development & Support System – IM Staff. The Key areas of the plan were agreed and designed with a focus on, but not limited to: Discussing and addressing the safety issues identified in the incident; Refresher

training covering PTS & TSC requirements; Additional monitoring, including announced and unannounced, over the course of the support plan;

- The risk assessment for general maintenance activities in signalling, North & East (Ref. RA2555) was reviewed on the 15th of August 2019 and updated following the incident;
- An SET 'Track Safety Coordinator Application' for working on or near the line has been developed by the SET Department and is currently progressing. The TSC Application is also currently being trialled by members of staff in the Signalling Department, Waterford;
- IÉ-IM Departments have agreed to put briefing process in place to communicate the incident video and safety alerts to all staff. The IÉ-IM Safety Department and training management also reviewed the incident and relevant sections of the IÉ PTS training course to include the video for the training, competence and assessment process.

Figure 19 – Safety Alert issued after the incident

107 IÉ-IM also made two safety recommendations as a result of the incident:

- The Chief Engineer SET should develop a process for an individual member of staff to assess the risks before going on or near the line when working alone or for work of a minor nature. Consideration should be given to some form of an application of a self-checklist and/or other physical item that could be utilised prior to going on to a line when working alone;
- The IÉ-IM and IÉ-RU's Heads of Health and Safety should arrange a review of the processes that all Departments, under their remit, have in place for an individual member of staff to assess the risks before going on or near the line when working alone or for work of a minor nature. Consideration should be given to determine if some form of an application of a self-checklist and/or other physical item could be utilised prior to going on to a line when working alone.

SET SMS Documents

108 On the 10th January 2020, IÉ-IM SET Department updated SET-SMS-006 to Version 5.0, to update requirements related to on-site risk assessments, which includes requirements related to conducting site briefings "for yourself". These on-site risk assessments should be undertaken during SET operations and activities, if:

- Weather conditions or other environmental factors reduce the effectiveness of the planned risk controls;
- Unforeseen hazards which were not anticipated in the safe system of work identified;
- There is a necessity to deviate from the planned work program;
- An accident or incident occurs during the work shift.

109 On the 18th November 2019, IÉ-IM SET Department issued Safety Management Standard, SET-SMS-003-003, SET Site Safety Briefing & Risk Assessment for Yourself. This standard applies to an SET site safety briefings and risk assessments being carried out by TSCs using a mobile device when working alone; which includes scripted questions and guidance on responses in relation to the briefing script; an example of one of the sixteen topics in the questionnaire and is illustrated in Figure 20.

HAZARDS AND RISKS			
	Script Question	**Response**	
10	The main hazards and risks on this site are, you can select multiple hazards in the drop down menu. If you select "Other" as a hazard you will be prompted to enter a text response to explain what the Other hazard is.	☐ ALL TRAIN MOVEMENTS ☐ RRV OR PLANT MOVEMENTS ☐ HOT WORKS ☐ WORKING AT HEIGHT ☐ POOR UNDERFOOT CONDITIONS/SLIP TRIP OR FALL ☐ OTHER ☐ ELECTRICITY	
11	Confirm Hazards and Risks are Briefed? If you select No you will be requested to comment. If you select Yes you move onto screen 12	☐ YES ☐ NO	
11.1	Comment, in this screen you may place a comment or request to have another hazard included in list of hazards.	Flooding	

Figure 20 – Extract from SET-SMS-003-003

Safety Recommendations

Introduction to safety recommendation

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

Absence of safety recommendations due to measures already taken

111 IÉ-IM Safety Department issued a company-wide 'Safety Alert' notice highlighting the key safety message as a result of the near-miss occurrence (Figure 24) on the 24th June 2019 which reminded staff of the importance of identifying positions of safety (if any) and the requirements of being able to reach positions of safety 10 seconds before the arrival of the train. As a result of this alert, the RAIU do not consider a safety recommendation is warranted in relation to the applicable of the IÉ Rule Book.

Safety Recommendations as a result of the incident

112 As a result of the SET Worker going onto the track without conducting a review of his safety, either at the pre-planning stage or at the inspection site, despite being aware being experienced and aware of the requirements of the IÉ Rule Book; and despite not being required to access the track to conduct the inspection, the RAIU make the following safety recommendation, directed at all IÉ-IM staff (CF-01, CF-02, UF-01, RC-01):

Safety Recommendation 2020003-01

The IÉ-IM SET Department should develop a formalised process, through their SMS suite of documents, for IÉ-IM SET staff walking/ working alone, which should be completed prior to any member of SET 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.**

Safety Recommendations as a result of additional observations

113 The SET Worker was not wearing his high visibility clothing correctly (paragraph 103); as a result, the RAIU make the following safety recommendation:

Safety Recommendation 2020003-02

IÉ-IM should brief all staff of their requirements, under the IÉ Rule Book, to wear their high visibility clothing correctly.

Additional Information

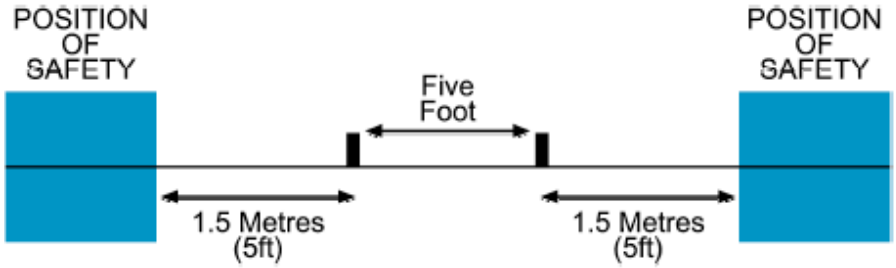
List of abbreviations

CRR	Commission for Railway Regulation
CTC	Centralised Traffic Control
CWR	Continuous Welded Rail
DMU	Diesel Multiple Unit
hr	hour
ICR	Intercity Railcar
IÉ-IM	Iarnród Éireann Infrastructure Manager
IÉ-RU	Iarnród Éireann Railway Undertaking
km	kilometre
m	metre
MP	Milepost
mph	Miles per hour
PWI	Permanent Way Inspector
RAIU	Railway Accident Investigation Unit
SET	Signalling, Electrical and Telecommunications
SSOW	Safe System of Work
TCB	Track Circuit Block

Glossary of terms

Accident	An unwanted or unintended sudden event or a specific chain of such events which have harmful consequences including collisions, derailments, level crossing accidents, accidents to persons caused by rolling stock in motion, fires and others.
Ballast Shoulder	The ballast (crushed stones, nominally 48 mm in size and of a prescribed angularity) placed at the ends of the sleepers, timbers or bearers to give lateral stability to the track.
Cess	The part of the track bed outside the *ballast shoulder*.
Contributory Factor	Factors relating to actions taken by persons involved or the condition of rolling stock or technical installations.
Down Direction	Towards Belfast.
Down Line	Line where trains are travelling towards Belfast.
ES	Engineering Supervisor
Five foot	The area between the two running rails (it is 5 feet 3 inches (1,600 millimetres ((mm).
	The General Principles of Prevention are set out in descending order of preference as follows: • Avoid risks; • Evaluate unavoidable risks; • Combat risks at source; • Adapt work to the individual, especially the design of places of work; • Adapt the place of work to technical progress; • Replace dangerous articles, substances, or systems of work by non-dangerous or less dangerous articles, substances, or systems; • Use collective protective measures over individual measures; • Develop an adequate prevention policy; • Give appropriate training and instruction to employees.
Green Zone	Is where work is arranged to take place without anyone/any group going on or near any line or siding, including in a possession, on which trains (or movements) may pass through safeguarded, separated or fenced work sites.
Hazard	SET-SMS-001 define a hazard as “a condition, event or practice with the potential to cause an injury, damage or loss”.

Hierarchy of controls	The hierarchy of controls is as follows, starting with the most preferred: • Eliminate; • Substitute; • Isolate; • Engineering Controls; • Administrative controls; • Personal protective equipment.
Immediate Cause	Direct and immediate causes of the occurrence including contributory factors relating to actions taken by persons involved or the condition of rolling stock or technical installations
Incident	Any incident, other than an accident or serious accident, associated with the operation of trains and affecting the safety of operation.
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	Locations where there are no positions of safety. Extra care must be taken in areas of limited clearance. And you must not stand where there is limited clearance while a train passes.
Lineside	Anything within the boundary of the railway but not within 3 m (10 feet) of any track.
Lookout	A competent person whose duty is to watch for, and to give appropriate warning, of approaching trains.
Milepost	Marks distances.
On or near the line	Being within a specified distance of a defined part of track, generally 3 m (10 feet) of the outside edge.
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.
Permanent Way Inspector	Responsible for programming and completing Permanent Way Maintenance and CCE renewal as required by standard in the area assigned.
Position of safety	A place allowing a clearance of at least 1.5 m (5 feet) between you (including anything you are wearing or carrying) and the nearest rail of any line on which a train is approaching.



Risk	SET-SMS-001 defines a risk as “the chance that harm will result from a hazard; the combination of the severity of the hazard with the likelihood of its happening, the probable consequence of potential harm or damage resulting from an unmanaged hazard”.
Risk Assessment	SET-SMS-001 define a risk assessment as “a structured assessment to identify the likelihood of a risk event, the severity of the adverse consequences should the event come about, and the mitigating risk control actions required”. A risk is defined as “being identified as the chance that harm will result from a hazard; the combination of the severity of the hazard with the likelihood of its happening, the probable consequence of potential harm or damage resulting from an unmanaged hazard”.
Root Cause	Causes related to framework conditions and application of the SMS.
Safe System of Work	A set of procedures according to which work must be carried out. Safe systems of work are required where hazards cannot be eliminated, and some risk still exists. When developing your safe systems of work, consider how the work is carried out and the difficulties that might arise and expose you or your workers to risk. Then develop a set of procedures detailing how the work must be carried out to minimise or reduce the risk of accident or injury.
T3 Possession	A possession taken for an agreed period without the facility to run passenger trains in the area during that period until such time as the holder of the possession decides to relinquish it
Underlying Cause	Causes related to skills, procedures and maintenance.
Up Direction	Towards Dublin.
Up Line	Line where trains are travelling towards Dublin.

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