



Railway Accident Investigation Unit

Ireland



INVESTIGATION REPORT **Operating irregularity during Single Line** **Working between Dundalk and Newry**

23rd March 2013

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RAIU
2nd Floor, 2 Leeson Lane
Dublin 2
Ireland

email: info@raiu.ie
website: www.raiu.ie
telephone: + 353 1 604 1241
fax: + 353 1 604 1351

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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 units; imperial these are used and the SI Unit is also given.

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

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

Report preface

The RAIU is an independent investigation unit within the Railway Safety Commission (RSC) which conducts investigations into accidents and incidents on the national railway network, the DART network, the LUAS, heritage and industrial railways in Ireland. Investigations are carried out in accordance with the Railway Safety Directive 2004/49/EC and the Railway Safety Act 2005.

The RAIU investigates all serious accidents. A serious accident means any train collision or derailment of trains, resulting in the death of at least one person or *serious injuries* to five or more persons or *extensive damage* to rolling stock, the infrastructure or the environment, and any other similar accident with an obvious impact on railway safety regulation or the management of safety.

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

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

Report summary

On Friday, 22nd March weather conditions between Dundalk and Newry were such that there was a heavy downfall of snow and localised flooding in the area, causing landslips. This resulted in degraded conditions on the railway line running cross-border between the Republic of Ireland and Northern Ireland. Single Line Working (SLW) with a Pilotman was introduced over the *Down Line*, between Dundalk and Newry, to keep the rail services operational.

On the morning of Saturday 23rd March, the Down Line remained clear for rail traffic and SLW was reintroduced between Newry and Dundalk. The first service of the morning was the 06:50 hours (hrs) Belfast to Dublin which departed Newry at 07:51 hrs with a Pilotman, from Northern Ireland Railways (NIR), on board. Although certified as a competent Pilotman, the Pilotman had never performed the role prior to this date.

On arrival at Dundalk, the passengers disembarked from the train and the Pilotman contacted the Signalman from Iarnród Éireann (IÉ), to tell him he was returning with the same train; which was travelling to Belfast and he was going to disembark at Newry. The Pilotman told the IÉ Signalman to signal the next train, the 07:35 hrs Dublin to Belfast service (Train A122), through Dundalk into the SLW. The Pilotman did not have the authority to give this instruction, as the IÉ Signalman is the person who gives permission for train movements.

However, the IÉ Signalman followed the Pilotman's instructions, allowing the 07:35 hrs Dublin to Belfast service to enter the SLW section behind the empty train returning to Belfast with no Pilotman present, which is in contravention of Section N of the IÉ Rule Book.

The train was stopped by an NIR Signalman approximately 800 metres (m) from Newry Station as it was an unauthorised movement.

The immediate cause of Train A122 entering a SLW section between Dundalk and Newry without a Pilotman was as a result of the train being signalled for the route. The causal factors associated with the incident are:

- The IÉ Signalman did not follow the procedures set out in the Rule Book, by setting the route for Train A122 to allow Train A122 proceed into a SLW section without a Pilotman, after the Pilotman requested for the train to proceed into the section;
- The Pilotman did not follow procedures set out in the Rule Book in that he requested that the IÉ Signalman send on Train A122 without a Pilotman;
- The IÉ Signalman did not inform the driver of Train A122 of the SLW established on the route he was travelling.

Contributory factors associated with the incident are:

- The IÉ Signaller was inexperienced in SLW resulting in him not questioning the instructions given by the Pilotman and not using the procedure of blocking the entrance to the SLW section;
- The Pilotman was inexperienced in the practical aspect of SLW, and was under pressure to resolve an unforeseen situation, resulting in him requesting a train to be allowed travel into a SLW behind the train he was travelling on board;
- The Pilotman who was implementing the SLW did not have adequate local knowledge of routes or layout of stations used by cross-border services;
- The signalling equipment and infrastructure to facilitate *bi-directional signalling* cross-border has not been commissioned, resulting in the requirement to use the SLW process;
- The communications between the Signalmen and the Pilotman were affected by the use of a mobile phone, in that, the mobile phone had poor signal strength and was roaming in border area and the lack of awareness of the regional prefixes resulted in all parties being unable to connect with each other at the required times.

Underlying factors associated with the incident were:

- The training and competence for SLW in both NIR and IÉ is theoretical classroom-based which has led to a lack of practical understanding when confronted with the SLW procedures, in particular where a change in the planned running of trains has occurred.

Three new safety recommendations were made as a result of this incident:

- IÉ/NIR should review the signalling infrastructure cross-border with a view to commissioning the bi-directional signalling;
- IÉ/NIR should each review their training, assessment and competency management of signalmen and pilotman in relation to SLW with Pilotmen to ensure they are confident in performing their respective duties during SLW and are familiar with the routes covered;
- IÉ/NIR should each review current communication procedures with regard to the updated communication equipment now available.

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The occurrence

Summary of the occurrence

- 1 On Friday 22nd March weather conditions between Dundalk and Newry were such that there was a heavy downfall of snow and localised flooding in the area, causing landslips. This resulted in degraded conditions on the double line railway running cross-border between the Republic of Ireland and Northern Ireland. SLW with a Pilotman was introduced on the Down Line, between Dundalk and Newry, to keep the rail services operational.
- 2 On the morning of Saturday 23rd March, the Down Line remained clear for rail traffic and SLW was reintroduced between Newry and Dundalk. The first service of the morning was the 06:50 hrs Belfast to Dublin which departed Newry at 07:51 hrs with an NIR Pilotman on board. The Pilotman had never performed the role as Pilotman before.
- 3 On arrival at Dundalk, the passengers disembarked the train and Pilotman contacted the IÉ Signalman at CTC Dublin Connolly to tell him he was returning with the same train, which was being worked empty to Belfast and he was going to disembark at Newry. He instructed the IÉ Signalman to signal the next train, the 07:35 hrs Dublin to Belfast service, through Dundalk into the SLW.
- 4 The IÉ Signalman did this, allowing the 07:35 hrs Dublin to Belfast service enter the section where SLW was in operation behind the empty train returning to Belfast, with no Pilotman present at the entrance of the SLW section,.
- 5 The train was stopped by an NIR Signalman as an unauthorised movement approximately 800 m from Newry Station, see Figure 1 for location of the incident.

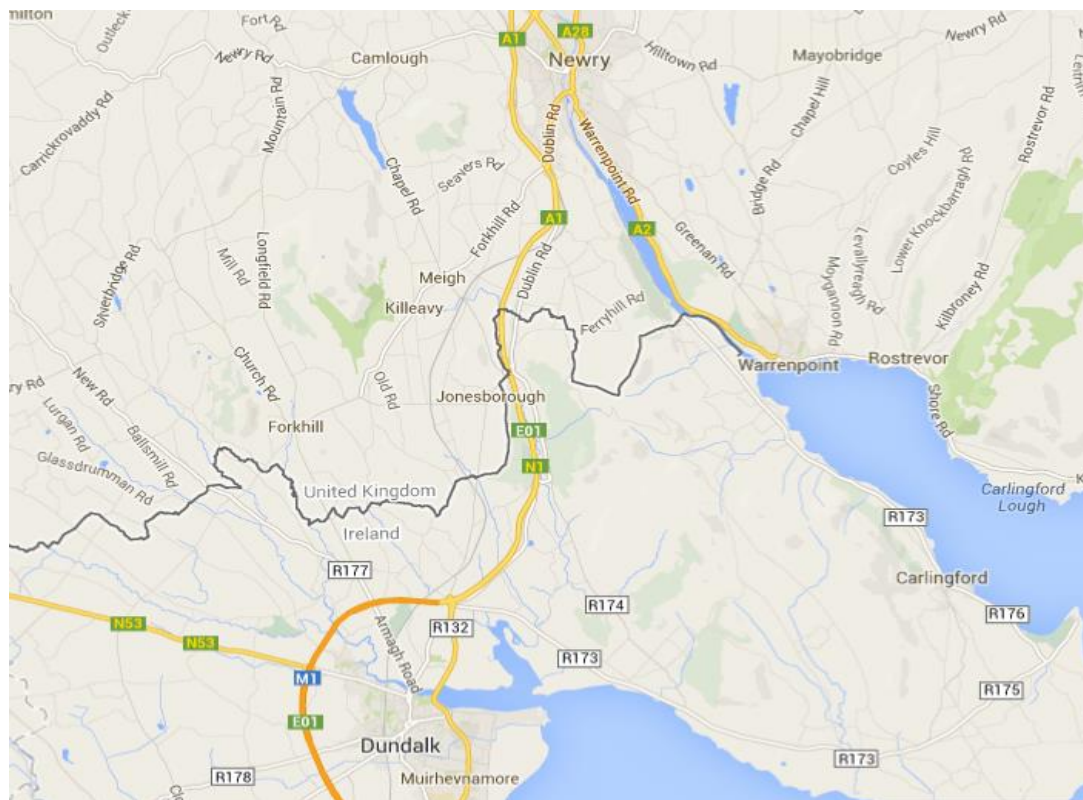


Figure 1 – Location of incident (showing route from Dundalk to Newry)

General description of the railway

Infrastructure

- 6 The route between Dublin, Connolly Station (0 Milepost (MP)) and Belfast, Central Station (113 ½ MP) is double line throughout. The track is flat bottom *continuously welded rail* (CWR) mounted on concrete sleepers in ballast.
- 7 The 59 ½ MP indicates the border between Northern Ireland and the Republic of Ireland, IÉ operate the Republic of Ireland rail network and NIR operate the Northern Ireland rail network.

Rolling stock

- 8 The trains will be referred to using their train identification number throughout this report for ease of reading:
 - Train A121 was the NIR 06:50 hrs passenger service from Belfast Central to Connolly Station, Dublin. The train operated to Dundalk Station, where passengers transferred to another train to continue to Connolly. The train was a 3000 Class CAF, diesel multiple unit (DMU)

consisting of three carriages identification numbers 3305, 3505 and 3405; 3305 was the leading carriage which was equipped with a radio for communicating with Centralised Traffic Control (CTC) at Dublin Connolly;

- Train E100, operated from Dundalk Station to Newry Station without passengers on board. It was previously Train A121, changing service designation to Train E100 after terminating at Dundalk;
- Train A122, was the IÉ 07:35 hrs passenger service, operating from Connolly Station, Dublin to Belfast Central Station. The train consisted of a De-Dietrich set hauled by a 201 Class Locomotive (207); behind the locomotive was 608-9 (van) and carriages 9202, 9212, 9207, 9216, 9402, 9101 and 9003.

Signalling

- 9 The double track route from Connolly Station, Dublin to Belfast Central Station is signalled using two, three and four aspect *colour light signals*. Trains are signalled under *Track Circuit Block* (TCB) regulations and detection is achieved by *track circuits*.
- 10 Lineside Signals have been installed between Newry and Dundalk that have the capability to allow bi-directional working; this would allow trains to be worked in either direction, on one line, under normal signalling arrangements; however the system has not been commissioned.
- 11 The line between Connolly Station (0 MP) and north of Dundalk up to the 59 ½ MP which marks the border with Northern Ireland, is controlled by two signalmen based in CTC, Dublin.
- 12 When a train crosses the border into Northern Ireland a signaller in the Portadown Signal Cabin (PSC) takes control of signalling the train.

Communications

- 13 There is train radio coverage between the trains and the controlling signalman at PSC and CTC, Dublin. All NIR trains that operate in the Republic of Ireland are fitted with separate radios to allow communication with CTC.
- 14 For SLW, communications between the Pilotman and the Signalmen would normally be carried out by mobile phone and in this case the Pilotman was given the Portadown Station Inspectors phone due to the requirement to be able to communicate with both PSC (United Kingdom telephone number) and CTC (Republic of Ireland telephone number). This is within the confines of the Rule Book. Historically a spare mobile phone was available at PSC but this had been withdrawn in 2011.

Operations

- 15 SLW is introduced when bi-directional travel has to be worked using one line, which is not signalled to facilitate bi-directional travel. To allow such working, a pilotman is required to be appointed as part of the SLW process. SLW is discussed in more detail later in this report.
- 16 In the location of the incident, the *Up Line* (towards Dublin) normally allows for travel from Newry Station to Dundalk Station and the *Down Line* (towards Belfast) normally allows for travel from Dundalk Station to Newry Station, see Figure 2.

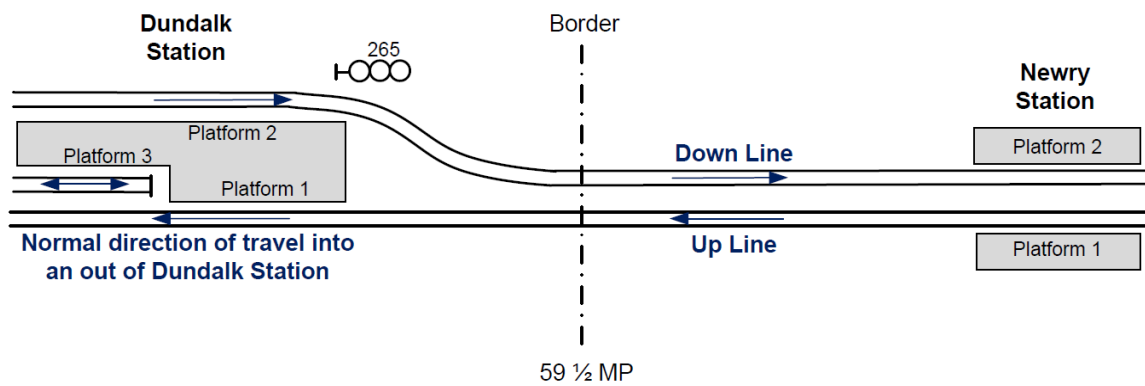


Figure 2 – Normal operations on Up and Down Line

- 17 Dundalk Station has three Platforms: Platform 1 is used for trains travelling south to Dublin; Platform 2 can be used bi-directionally but is generally used as the Northbound platform (Signal 265 is the Platform *Starting Signal* for northbound trains); Platform 3 is used for trains travelling south and trains terminating in Dundalk, see Figure 2.
- 18 On the day of the incident, part of the Up Line was affected by flooding leading to the line being closed, see Figure 3. This resulted in all trains operating in both directions on the Down Line, with trains travelling towards Belfast operating in the normal, 'right' direction and travelling towards Dublin operating in the opposite direction to normal, 'wrong' direction.

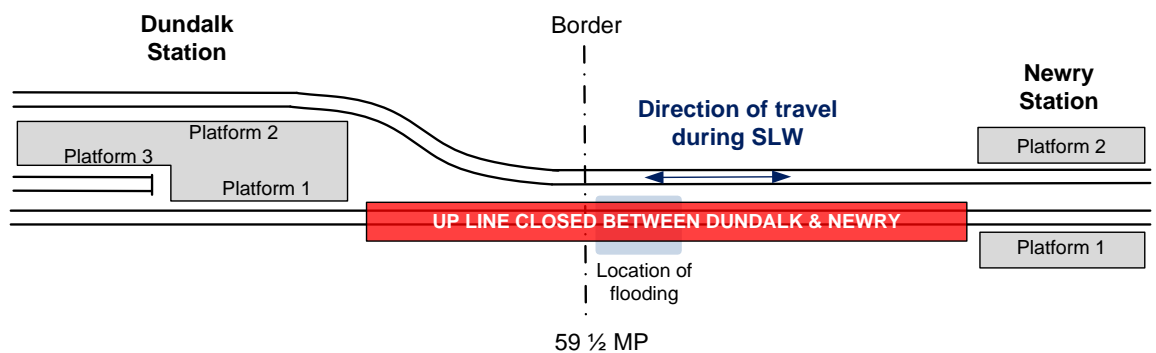


Figure 3 – Closed Up Line and operations on Down Line

- 19 CTC and PSC control consoles have the capability of showing trains in real time, including one signalling section into each other's jurisdiction i.e. CTC can see one signalling section past the 59 ½ MP across the border into Northern Ireland.
- 20 There are also *Train Describers* which show trains scheduled to enter the control panel however this does not show the trains in real time. Any movement outside of the *Working Time Table* are notified by telephone in advance.

Fatalities, injuries and material damage

Fatalities and injuries

- 21 There were no fatalities or injuries as a result of this incident.

Material damage

- 22 There was no material damage caused as a result of this incident.

Parties and roles involved in the occurrence

Parties involved in the occurrence

- 23 IÉ *Railway Undertaking* (RU) owns and operates mainline and suburban services in the Republic of Ireland. The departments involved in the incident are as follows:
- Operations – Responsible for the operation of trains, except in depots, and the supervision of drivers and other operation staff.
- 24 IÉ *Infrastructure Manager* (IM) manages the design, installation, testing inspection, maintenance, renewal and operation of the railway's physical assets. The departments involved in the incident are as follows:
- Signalling, Electrical and Telecommunications – Responsible for the design, installation and maintenance of signalling equipment;
 - Operations, performance and control – Responsible for the operations, performance and control of signalling and level crossing staff.

25 NIR RU operates train services in Northern Ireland. At the time of the incident the NIR RU Operations Department was responsible for the operation of trains and also the control and operation of the signalling system. Transfer of performance and control of signalling staff to NIR IM is planned to take place in 2014/15.

26 NIR IM is responsible for the design, installation, inspection, maintenance, and renewal of the railway infrastructure, i.e. track, signalling and structures. The Signalling and Telecoms Department within NIR IM is responsible for the design installation and maintenance of signalling equipment.

Roles involved in the occurrence

27 The roles involved in the incident are as follows:

- NIR Driver – Driver of the Train A121, was an NIR employee with ten years driving experience, who was trained and competent to drive trains;
- IÉ Driver – Driver of Train A122 was an IÉ employee with eleven years driving service, he was trained and competent to drive trains;
- Pilotman – An NIR employee for thirteen years. His normal duty was as a signalman at PSC, which he had been undertaking for seven years. He was trained and competent to act as a Pilotman, however, he had never acted as a Pilotman and did not have any route knowledge south of the border;
- IÉ Signalman – An IÉ employee with five years' service, who was deemed trained and competent to perform the role of signalman. On the day of the incident he was the Sligo/Northern Line Signalman (CTC) who controls the lines from south of Drogheda (31 MP) to north of Dundalk (59 ½ MP). He had one year experience with CTC, previous to this he had performed the role of relief signalman on the DART system;
- NIR Signalman A – Signalman with ten years experience, responsible for controlling the section of track from the border to Lurgan;
- NIR Signalman B – Signalman with twenty years experience, responsible for controlling the section of track from Lurgan to Lisburn;
- Portadown Traffic Inspector – Responsible for railway operations from Lisburn to the border;
- CTC Duty Manager – The manager responsible for overseeing CTC;
- NIR Chief Traffic Controller – Line Manager for the NIR Control Office, who has an overview for all train movements on the NIR network.

Parties not directly involved in the occurrence

- 28 The RSC is the national safety authority, which is responsible for the regulatory oversight of the Safety Management System (SMS) and enforcement of railway safety in the Republic of Ireland in accordance with the Railway Safety Act 2005 and the European Railway Safety Directive. The RSC issues the *Safety Certificates* to IÉ RU and IÉ IM; which is issued to provide evidence that the railway has established its SMS and can meet the requirements laid down in the national safety laws and European legislation; which is subject to the RSC's regulatory oversight and enforcement of compliance.
- 29 The Department of Regional Development (DRD) is responsible for the regulatory oversight of the railway safety Management System in Northern Ireland; while Northern Ireland's Health and Safety Executive (HSE) carry out the enforcement functions; the DRD issues the safety certificate to NIR.

External circumstances

- 30 During the previous day, Friday 22nd March 2013, there was extensive snow accompanied by high winds which resulted in areas of localised flooding between Dundalk and Newry. Rainfall of 24.2 millimetres (mm) was recorded by Met Éireann on the day.
- 31 The weather on Saturday 23rd March, the day of the incident, was overcast and dry. Rainfall of 0.9 mm was recorded with a maximum temperature of 3.6° Celsius. The average wind speed was recorded at 14.5 kilometres per hour (km/h).

RAIU Investigation

RAIU decision to investigate

- 32 In accordance with the Railway Safety Act 2005 the RAIU investigates all serious accidents. Given the unusual nature of this occurrence and given that under slightly different conditions, this occurrence may have led to a serious accident, such as a collision, where there could have been potential for fatalities, serious injuries and extensive damage a decision was made to investigate under article 19 (2) of the Railway Safety Directive (EC, 2004).
- 33 While the incident occurred primarily in the Republic of Ireland, it occurred close to the border with Northern Ireland and involved organisations, trains and employees from both sides of the border. In accordance with European Directive 2004/49/EC and the Memorandum of Understanding between them, the RAIU agreed with the UK Rail Accident Investigation Branch (RAIB) that this investigation would be opened by the RAIU alone. Under this arrangement the RAIU are designated the 'lead body' who are responsible for conducting the investigation and producing the report, and the RAIB are the 'partner body', who were kept informed of progress and assisted as necessary.

Scope of investigation

- 34 The RAIU must establish the scope of the investigation to ensure that only pertinent information is recovered and reviewed. Therefore, for this occurrence, the RAIU have defined the following scope:
- Establish the sequence of events;
 - Establish, where applicable, the *immediate cause*, *casual factors (CF)*, *contributory factors (CoF)* and *underlying factors (UF)*;
 - Examine the relevant elements of the safety management system;
 - Examine any other significant safety deficiencies identified as a result of this investigation.

Investigation and evidence

- 35 During the investigation the RAIU collated the following evidence:
- Witness statements and interviews from employees involved in the occurrence;
 - Other interviews from members of NIR and IÉ with information pertaining to the incident;
 - Training and competency records of the signalmen and pilotman;

- IÉ and NIR standards, procedures and other documentation;
- Standards, procedures and documentation from other relevant bodies.

Evidence

IÉ & NIR SLW interface

- 36 SLW with Pilotman is an infrequent practice in with both NIR and IÉ; and there is no record of SLW being established cross-border between Dundalk and Newry prior to 22nd of March 2013.
- 37 On the day of the incident, it was decided between NIR Chief Traffic Controller and the Duty Manager CTC that NIR would lead the planning as they were responsible for the maintenance for the area where the flooding and landslip had occurred; and the operation of the first train to be sent through SLW in the 'wrong' direction.

Staff training and competency management

NIR training and competency management

- 38 In NIR trainee signalmen undergo a thirteen-week training course and competency assessment process in order to become a signalman. The signalman training includes training to become a pilotman; this module is taken in weeks twelve and thirteen. This pilotman training is conducted in a classroom; exercises are simulated and there is no practical element to the training. When the trainee is deemed to be competent as a signalman, he is also certified as a pilotman. Once competent, signalmen undergo biannual training in signalling and pilotman working; this training is again simulated in the classroom.
- 39 Therefore, in this incident, NIR Signalman A, NIR Signalman B and the Pilotman were all deemed competent as signalmen and pilotmen; having ten, over twenty years and five years experience as signalmen respectively and were in date for competence. All had experience working under SLW conditions, acting as signalmen; however the Pilotman had never preformed the role of pilotman until the day of the incident.

IÉ training and competency management

- 40 In IÉ the basic training to become a signalman is five weeks, with additional training required depending on the signalling system to be used by the trainee. While pilotman training is included in the signalman training course, the trainee is not certified as a pilotman when he is passed competent as a signalman as pilotman training is a separate training module. As with NIR, SLW training is conducted in the classroom using power point and flip charts. Once competent signalmen undergo biannual assessment to maintain their competency.

41 Therefore, in this incident, the IÉ Signaller was deemed competent as a signaller but was not certified as a pilotman. He had five years experience as a relief signaller with the DART system and one year of experience on the Sligo/Northern Line control panel, based in CTC.

The Rule Book

General description

42 The Rule Book is a joint publication between IÉ and NIR. Section N, Part One of the Rule Book sets out the principles and instructions associated with SLW. Section N, Part One is broken down into five parts: Principles; General Instructions; Instructions to Pilotman; Instructions to Signallers; Instructions to Drivers. The instructions applicable to the incident included in these instructions are described in the following paragraphs.

Section N, Part One, 1.0 – Principles

43 Subsection 1.1 states that SLW must be introduced whenever the traffic of a double line is to be worked over one line which is not signalled for bi-directional working.

44 Subsection 1.2, 'Function of the Pilotman' states that the Pilotman must:

- Be present whenever a train enters or fouls the single line;
- Personally authorise each such movement, but must first obtain the Signaller's permission for the movement concerned.

45 The subsection states that there are some exceptions to the above principle, however, it is highlighted in red text, that in every case, the movement must be authorised by the Signaller.

Section N, Part One, 2.0 – General Instructions

46 Subsection 2.1, 'Appointment of the Pilotman' states that the Pilotman must be: currently certified as competent as a Pilotman; and familiar with the line concerned.

47 Subsection 2.7, 'Authority for movements to enter to foul the Single Line' states that the:

- Pilotman must be present and personally authorise the Driver of any movement which is to enter or foul the single line;
- Pilotman must first obtain the permission of the Signaller controlling the entrance to the section before authorising any such movement;

- Signalman is however permitted to authorise such movements without the Pilotman being present in certain circumstances, however, none of these circumstances were applicable on the day of the incident.

Section N, Part One, 3.0 – Instructions to the Pilotman

48 This section gives comprehensive instructions to the Pilotman under a number of different circumstances during SLW, such as instructions for before SLW starts, during SLW and when SLW is to be withdrawn. It includes details on checks with the Signalman, arrangements with the SLW forms, checks before SLW begins, authorising movements and riding with the driver.

49 Subsection 3.1.1, 'What you must check with each Signalman' gives specific instructions in relation to what the Pilotman must check with the Signalman, which specifies:

- The details of the SLW arrangements;
- Whether the obstructed line is under possession;
- The time(s) Signalmen change duty;
- The time(s) intermediate signal box(s) open;
- Whether any of the following will be effected by SLW: manned level crossings; automatic level crossings; unworked points; intermediate signal boxes which are closed.

50 Subsection 3.2.1, 'What you must understand about authorising movements' states that the Pilotman must:

- Be present and personally authorise the Driver of any movement, other than in specific circumstances (not related to this incident), which is to enter or foul the single line;
- First obtain the permission of the Signalman controlling the entrance to the section before authorising any such movement;
- Also have the Signalman's express permission before authorising any movement to pass a signal at danger.

51 Subsection 3.2.3, 'What you must do additionally when authorising movements in the wrong direction' states that the Pilotman must remind the Driver of the presence of temporary or emergency speed restrictions.

52 Subsection 3.2.4, 'When you must ride with the driver' states that the Pilotman must ride with the Driver:

- Unless there is another train to follow; or
- If the train is worked by two or more locomotives, travel with the driver of the rearmost.

Section N, Part One, 4.0 – Instructions to the Signalman

53 Section N, Part One, Subsection 4.0 gives comprehensive instructions to the Signalman under a number of different circumstances during SLW. Such as arrangements to be made with the Pilotman and the authorisation of movements.

54 Section 4.2.1, 'When you may authorise movements to enter the single line' states that the Signalman:

- May authorise movements to enter or foul the single line only as permitted in the Train Signalling Regulations;
- Must not give such authority unless the Pilotman is present where the movement is to enter or foul the single line, except in specific circumstances (not applicable to this incident).

Section N, Part One, 5.0 – Instructions to Drivers

55 Section N Part One, Section 5 gives instructions to the Driver, under a number of different circumstances during SLW.

56 Subsection 5.1, 'Before entering or fouling the single line' that driver must have the personal authority of the Pilotman, except in specific circumstances not applicable to this incident. Subsection 5.2 continues with what the driver must understand when authorised to enter or foul the single line.

Train Signalling Regulations and General Instructions to Signalmen

57 Included in IÉ's 'Train Signalling Regulations and General Instructions to Signalmen' (SGIs), Section 6.2 of the 'General Instructions to Signalmen' states that a *reminder appliance* should be used when signalling trains in the case of signals protecting a portion of line over which trains may pass only after the driver has been cautioned or given instructions. Section 6.3 goes on to state that the remainder appliance can be removed in order to operate the signal control device when a movement is to proceed after the Driver has been cautioned or instructed as necessary.

58 Section 14.4 'If an Emergency Speed Restriction is imposed' of the 'General Instructions to Signalmen' states that the signaller must stop each train approaching the restriction and tell the Driver.

59 IÉ's instructions for signalmen, Section 6.0 'Train proceeding without authority', Subsection 6.2 states that the signaller must take whatever action is appropriate to the circumstances which includes 'arranging for the train concerned and/or any other which may be endangered to be stopped by use of train-radio or any other means of communication. NIR's instructions are similar.

60 IÉ's instructions for signalmen in Section 12.2 of the 'TCB Regulations' states that, during SLW:

- The Pilotman must be present at the end where the train is to enter the single line;
- Trains in the right direction over the single line must be signalled normally;
- Before clearing a signal controlling the entrance to the single line in the right direction, the Signaller must ensure that the Pilotman has given the necessary instructions to the Driver.

European Union Interoperability

61 European Union (EU) Legislation allows an RU to operate in another member state, if the RU has certification confirming acceptance of the:

- RU's SMS; and
- Provisions adopted by the RU to meet specific requirements necessary for the safe operation of the relevant network.

62 IÉ and NIR meet these requirements; with the RSC (Republic of Ireland) and DRD (Northern Ireland) beginning a five year programme into the regulatory oversight of these requirements. The Health and safety Executive (HSE) will deliver the programme in Northern Ireland and the RSC in the Republic of Ireland.

Events before, during and after the incident

Events before the incident on Friday 22nd March 2013

63 On Friday 22nd March 2013, the day before the incident, there was heavy snowfall along with high winds, heavy rainfall and localised flooding in the Dundalk to Newry section which resulted in a Temporary Speed Restriction (TSR) of 30 miles per hour (mph) (48km/h) being imposed on the Up Line between 60 ½ MP and 61 MP at 12:08 hrs.

- 64 As a result of the rising water levels on the Up Line, NIR Control made the decision to close the Up Line at 09:19 hrs; and at 11:30 hrs SLW was established over the Down Line between Newry and Dundalk. The precise location of the SLW section was between crossover points 701 at the 69 mile post just south of Newry platform and crossover points 195 which are situated a short distance north of Dundalk Station.
- 65 A *Handsignaller* was posted at crossover points 905 to signal trains moving over the points in the wrong direction, (i.e. trains travelling south towards Dublin). The points were confirmed locked by CTC, Connolly. All movements and associated protection measures required for the SLW on Friday the 22nd March were found to be in compliance with the rules and regulations.
- 66 At 12:08 hrs, due to a further increase in water levels, a TSR of 30 mph (48 km/h) was imposed on the Down Line.
- 67 During this SLW, the Pilotman reported a landslip on the Down Line (between 61 ½ MP and 61 ¼ MP), but reported the line as passable. Following further examination, the train services between Newry and Dundalk were suspended at 15:49 hrs. The SLW was cancelled at 17:34 hrs and a T3 Possession was granted at 18:01 hrs for remedial works.
- 68 Given the weather conditions, the NIR Chief Traffic Controller and the IÉ CTC Duty Manager made arrangements to reintroduce SLW on Saturday. This was in case the weather conditions did not improve; this planning was led by NIR as they were the IM on the section of line where the flooding and landslips occurred. It was agreed that the:
- 06:50 hrs Belfast to Dublin service, Train A121, would operate to Dundalk, where passengers would transfer to another train for their remaining journey to Dublin, that was in Dundalk Platform 3;
 - 07:35 hrs Dublin to Belfast service, Train A122, would operate as normal;
 - Empty Train A121 would change the train identity to become Train E100, and travel to Belfast ahead of Train A122, which was the scheduled Enterprise Service.
- 69 The Pilotman was arranged on Friday, by the Portadown Traffic Inspector as part of the provisional arrangements should the above be implemented. The Pilotman was not familiar with the line south of the border, and did not state this at the time. A different Pilotman had performed the duty on the Friday SLW.
- 70 The Pilotman was informed of the plan, and briefed by phone; however the Pilotman did not recall being informed of the empty train service to Belfast, Train E100. The Pilotman went over the proposed train movements for Saturday and assured himself of these before he left work. He did not realise that Train A121 would have to return empty to allow the northbound Train A122 to

follow. The Pilotman had assumed that Train A121 would proceed to Dublin Connolly and he would return to Newry on northbound Train A122.

Events before the incident on Saturday 23rd March 2013, prior to SLW being established

71 At 06:00 hrs on the morning of Saturday 23rd March, the T3 Possession was cancelled on the Down Line between Newry and Dundalk; with an TSR of 30 mph (48 km/h) imposed on the Down Line between 60 ½ MP and 61 ½ MP; and the Up Line remaining closed due to flooding.

72 It was decided to implement the plan agreed the previous day, and prior to commencing SLW, PSC and CTC were contacted by NIR Controller and CTC Duty Controller, respectively, and informed of the following services:

- Train A121, the Belfast to Dublin 06:50 hrs service was to travel to Dundalk, where the passengers would transfer at Dundalk for the remainder of their journey to Dublin;
- When Train A121 emptied, it would then return to Belfast empty for train set equalisation as Train E100, ahead of Train A122;
- Train A122, the 07:35 hrs service from Dublin to Belfast;
- Train A123, the 08:00 hrs Belfast to Dublin;
- Other scheduled services from Belfast to Dublin and Dublin to Belfast.

73 At 06:00 hrs the IÉ Signalman arrived for duty, he was informed by the Pilotman at 07:11hrs that SLW would be in operation between Newry and Dundalk. However, the Signalman did not apply the reminder appliance at any stage.

74 At 06:00 hrs the Pilotman arrived for duty at Portadown Station, where he was issued with the Portadown Stations Inspectors mobile phone. He had a discussion with NIR Signalman B at PSC in relation to the SLW; and although the Signalman mentioned the empty service to Belfast (Train E100), the Pilotman did not register that the train would have to return from Dundalk before Train A122, the scheduled Dublin to Belfast service.

75 At 07:11 hrs the Pilotman contacted the IÉ Signalman to confirm his identity and went over the SLW requirements to assure himself as to the procedure, he told the IÉ Signalman that he would contact him again at Newry to dictate the SLW form.

76 The Pilotman completed the relevant SLW documentation prior to boarding Train A121 at Portadown Station to carry out the duties of Pilotman. Although certified as a Pilotman, this was the first time the he had carried out duties as Pilotman as he was normally rostered as a Signalman at PSC.

77 At 07:51 hrs, Train A121 (the scheduled 06:50 hrs Belfast to Dublin train), departed Portadown Station accompanied by the Pilotman who was to commence SLW at Newry.

Events during the incident, the commencement of SLW

78 During the morning, the Pilotman's issued mobile phone received a number of calls regarding staffing issues and other service information both in calls and in texts; as the mobile number was normally used by the Portadown Station Inspector.

79 Train A121 arrived into Newry Station at 07:40 hrs, the Pilotman contacted NIR Signalman A and at 07:42 hrs contacted the IÉ Signalman; he dictated the SLW Form and noted any local arrangements. Both the Signalmen and the Pilotman completed their respective forms at this stage and repeated them to confirm the arrangements.

80 At 07:44 hrs the Pilotman was given permission to enter the SLW Section. Train A121 departed Newry at 07:50 hrs travelling on the Down Line towards Dundalk in the 'wrong' direction.

81 In CTC, the Duty CTC Traffic Executive observed and supervised the IÉ Signalman at CTC while the 'wrong' direction movement occurred and Train A121 travelled to Dundalk without incident.

82 On approaching Dundalk Station the driver informed the Pilotman that when the passengers disembarked the train, he was continuing to Dublin on another train and that the train they were on was returning to Belfast empty, as Train E100 with a different driver. At this time, the Pilotman stated that he was unaware of this movement, and said he had expected the train to continue to Dublin Connolly and he would return to Newry as Pilotman on the Train A122, the 07:35 hrs Dublin to Belfast Service.

83 On arrival at Dundalk Station at 08:18 hrs the passengers disembarked the train as planned to continue their journey to Dublin on another train which was on Platform 3. This caused confusion among the passengers and the Pilotman could not identify any station staff to assist him in directing the passengers as he was unfamiliar with the staff and station. The Pilotman was unable to get anyone to liaise with at Dundalk as he had expected and could not get through to PSC on the mobile phone for direction. The Pilotman felt under pressure at this time as there was some confusion as to what was happening with the now empty Train E100 which was blocking Platform 2.

84 The Pilotman made the decision to travel on Train E100 and disembark at Newry. He contacted the IÉ Signalman to inform him of this decision, and told him to signal Train A122 into the SLW section following his train. He also informed the IÉ Signalman of his intention to travel on Train A123 (the 08:00 hrs Belfast to Dublin service) from Newry to Dundalk. These instructions were

repeated by the IÉ Signaller and acknowledged as correct by the Pilotman. During this conversation the IÉ Signaller appeared anxious to talk with the driver of Train A122 and asked the Pilotman to ask the driver to contact him.

85 The Pilotman attempted to contact the PSC to inform NIR Signaller A of this decision; however, his mobile phone, a UK mobile phone, could not connect to the number (as the UK prefix for the PSC was not entered), the mobile phone was also cutting out due to network roaming in the border area.

86 At 08:31 hrs Train E100 departed for Belfast Central accompanied by the Pilotman (thirteen minutes after arrival at Dundalk). This train was to operate in advance of Train A122, the 07:35 hrs Dublin to Belfast service.

87 The IÉ Signaller contacted the driver of Train A122 as it approached Dundalk, from Dublin. He informed the driver that he would be held at Signal DD278 as an empty train (Train E100) was departing for Belfast, see Figure 4. The IÉ Signaller also informed the driver of the ETSR between the 60 ½ and 61 ½ MP; however, he did not inform the driver of the established SLW.

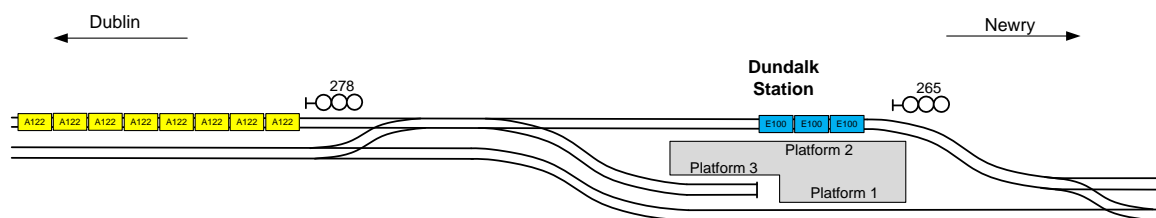


Figure 4 – Train A122 held at DD278 while Train E100 at Platform 2

88 Train E100 then departed Dundalk for Newry at 08:30hrs, with the Pilotman on board.

89 At 08:33 hrs the IÉ Signaller signalled Train A122 into Dundalk Platform 2. The IÉ Signaller also set the signals for Train A122 to travel through the SLW section on its onward journey. When the IÉ Signaller requested this route Signal DD265 cleared to a yellow aspect. At no stage did the IÉ Signaller stop Train A122 at Signal DD265; caution the driver that SLW was in operation or ensure a Pilotman was present to authorise the movements of Train A122.

90 When Train E100 approached the border into Northern Ireland, the Pilotman was able to connect with the PSC. He informed NIR Signaller A that he was travelling on Train E100. NIR Signaller A acknowledged this but queried if he had permission to do this and then disconnected.

91 NIR Signaller A informed NIR Signaller B of the Pilotman's actions and the NIR Signaller B queried why the Pilotman was travelling on Train E100. They also discussed the possibility of Train A122 being late and the possibility of the 08:00 hrs Belfast to Dublin, Train A123, travelling

to Dundalk before Train A122 left Dundalk. NIR Signalman A attempted to contact the Pilotman on his mobile to clarify the situation; however, he was unable to connect with the mobile phone.

92 NIR Signalman B phoned the IÉ Signalman to enquire if Train A122 was running late (as the Pilotman was on Train E100). The IÉ Signalman confirmed that Train A122 was at Platform 2 in Dundalk.

93 However, during this time (at 08:39 hrs), Train A122 proceeded into the SLW section without a Pilotman (with the driver being unaware SLW was in operation), see Figure 5.

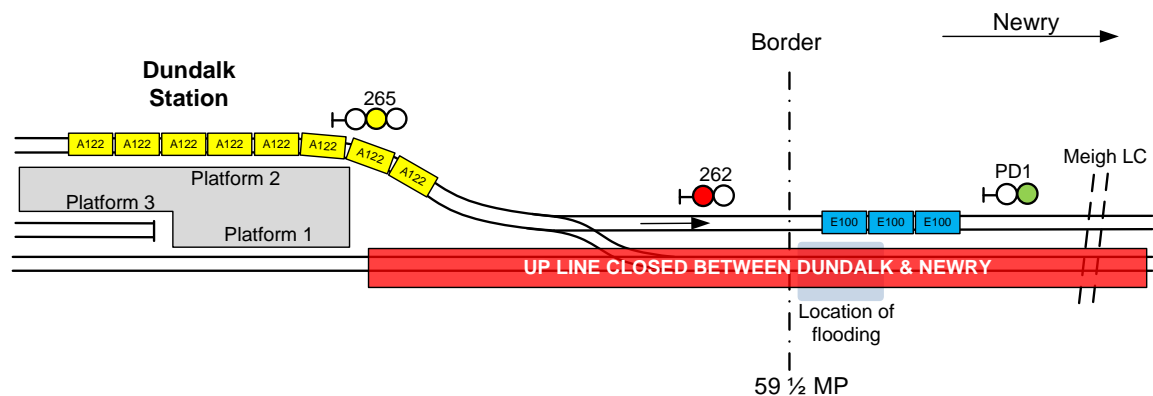


Figure 5 – Train A122 entering SLW section behind Train E100

94 Instead of the IÉ Signalman making an emergency call to Train A122 to stop the train; he attempted to contact the Pilotman by phone, however, he was unable to connect to the Pilotman's mobile phone.

95 At 08:43 hrs the NIR Signalman A noticed Train A122 on his console, and this was unexpected and meant that two trains were travelling in the SLW section. Signalman B contacted the IÉ signalman who confirmed that the train had entered the SLW section. Signalman A contacted the Portadown Traffic Inspector for instructions, The NIR Inspector told Signalman A to stop the train as this was an unauthorised movement and await further instructions.

96 Train E100 arrived into Newry Station at 08:47hrs where the Pilotman disembarked and the train continued to Belfast.

97 Train A122 was stopped at 08:55 hrs before Signal PD3, approximately half a mile from Newry Station, see **Figure 6**.

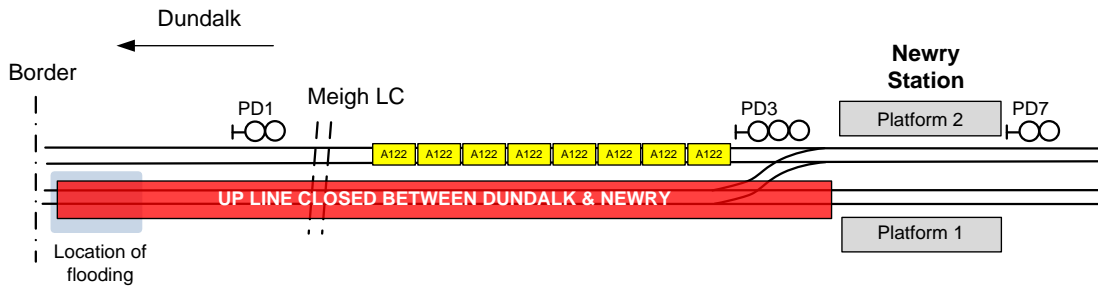


Figure 6 – Train A122 stopped after contact with NIR Signalman B

98 The Portadown Traffic Inspector liaised with the Duty On Call Manager and the Chief Traffic Controller and a decision was made to cancel SLW and allow Train A122 to proceed under normal signalling into Newry Station.

99 SLW was cancelled at 09:21 hrs by the Pilotman and the driver of Train A122 was instructed by Signaller A at PSC to obey all signals and continue his journey at 09:25 hrs.

Events after the incident

100 The Portadown Traffic Inspector contacted the Duty Manager CTC to find out the sequence of events that had occurred in the SLW.

101 After some discussions between NIR Signalman B, NIR Control Office and the NIR Traffic Inspector the decision was made to reintroduce SLW for Train A123 (the 08:00 hrs Belfast to Dublin service).

102 The IÉ Signalman was relieved from duty and tested for drugs and alcohol, which is routine in this type of incident. The tests were subsequently found to be negative.

103 As the cause of the incident had not been initially established and time taken in communications between the relevant parties, the Pilotman was not stood down and he continued his duties as Pilotman on the 08:00 hrs Belfast to Dublin service (Train A123) travelling from Newry to Dundalk. On this occasion he was accompanied by another member of NIR staff who was there for route familiarisation.

104 When full details of the incident were known, the Pilotman was stood down on arrival at Dundalk. He then travelled to Portadown Station for drugs and alcohol testing; the tests were subsequently found to be negative.

105 See Figure 7 for a summary of events on the day of the incident:

Time (hrs)	Events on the day of the incident
06:00	The Up Line remains closed as a result of flooding and it is decided to use SLW. An ETSR is imposed on the Down Line between 60 ½ MP and 61 ½ MP.
06:00	The Pilotman arrives for duty at Portadown Station and is issued with a mobile phone; subsequently, this mobile continuously received calls and texts for the attention of the Portadown Station Manager throughout the course of the day.
Approx 06:00	The Pilotman discusses the SLW with NIR Signalman B, who mentions the empty train service from Dundalk to Belfast (Train E100), however, he does not register this.
07:11	The Pilotman contacts the IÉ Signalman to confirm his identify and tells him that he will contact him at Newry.
07:42	At Newry, the Pilotman contacts the IÉ Signalman in relation to the commencement of SLW.
07:50	Train A121 travels into the SLW section.
07:52	The Pilotman contacts the IÉ Signalman to confirm he is on Train A121 and confirms he will return to Newry on Train A122. The IÉ Signalman acknowledges this.
Approx 08:00	On approaching Dundalk, the driver of Train A121 informs the Pilotman that the train they are travelling on is returning empty, to Belfast with another driver. The Pilotman states that he has not heard of this train service.
08:18	Train A121 enters Dundalk Platform 2 where passengers disembarked for their onward journey to Dublin, from Platform 3.
08.20	The Pilotman attempts to contact NIR Signalman A using the mobile phone without success. The Pilotman contacts the IÉ Signalman to inform him of his decision to travel on Train E100 and disembark at Newry. The Pilotman tells the IÉ Signalman to signal Train A122 into the SLW section, the IÉ Signalman acknowledges this.
08:27	The IÉ Signalman contacts the driver of Train A122 and informs him to wait at signal DD278 until Train E100 departs. He also informs the driver of the ETSR. He does not inform the driver of the SLW in operation.
08:31	Train E100 departs Dundalk for Belfast.
08:36	The IÉ Signalman signals Train A122 into Dundalk Station, Platform 2. He also sets the route for Train A122 to depart into the SLW section on its onward journey. The reminder appliance was not applied on the panel.
08:37	The Pilotman contacts NIR Signalman A to inform him that he was travelling on Train E100. NIR Signalman A acknowledged, however, he does query if permission has been given for this and disconnects.
08:38	On reflection, NIR Signalman A is unsure of the Pilotman's actions and discussed these actions with NIR Signalman B of this, with both concurring that the Pilotman should not be on Train E100.
08:39	NIR Signalman B contacts the IÉ Signalman to query the position of Train A122. NIR

	Signalman B instructs the IÉ Signalman not to allow Train A122 into the SLW section without at Pilotman.
08:39	Train A122 departs Dundalk, into the SLW section, without a Pilotman as the route has been set previously.
08:40	The IÉ Signalman attempts to contact the Pilotman's mobile phone.
08:43	NIR Signalman A sees Train A122 travelling in the SLW section behind Train E100.
08:45	NIR Signalman A contacts the Portadown Traffic Inspector to report the incident and get direction on what action to take.
08:47	Train E100 arrives into Newry Station with the Pilotman on board.
08:55	NIR Signalman A stops Train A122. Having received the instruction from his manager.
09:27	SLW is cancelled by the Pilotman
09:25	Train A122 is given permission to proceed into Newry Station by Portadown Signaller, obeying all signals.

Figure 7 – Summary of events on the day of the incident

Similar occurrences

106 No similar occurrences to this incident have been recorded by NIR or IÉ.

Analysis

IÉ & NIR SLW interface

107 SLW rarely occurs on both the IÉ and NIR networks; with no record of SLW being worked cross-border between Newry and Dundalk previous to this incident (paragraph 36).

108 This may have resulted in there being no formal structure or process between NIR and IÉ for the planning of cross-border SLW working, with NIR taking control of the SLW process (paragraph 37). As a result, NIR appointed the Pilotman for the SLW.

Training and competency management

Signalmen

109 NIR Signalman A, NIR Signalman B and the IÉ Signalmen were all competent signalmen, with ten, twenty and one years' experience, respectively (paragraphs 27 & 39).

110 The IÉ Signalman had one year's experience on the Sligo/Northern Line (paragraphs 27 & 41) and until the day of the incident had never managed SLW prior to the day of the incident. All SLW experience prior to the day of the incident was classroom-based simulations (paragraph 40).

111 NIR Signalman A & NIR Signalman B both have experience of SLW (paragraph 39).

112 The IÉ Signalman was also not passed competent as a Pilotman, unlike the NIR signalmen, and therefore had no experience of acting as Pilotman (paragraph 40).

Pilotman

113 IÉ and NIR have different training requirements for Signalman and Pilotman, in that in NIR the training to become a Pilotman is included in the Signalman training, as a result all NIR Signalmen are competent Pilotmen (paragraph 38). In IÉ, Pilotman training is a separate module to the Signalman training; as a result not all Signalmen are Pilotmen (paragraph 40).

114 In The case of the incident, The Pilotman was a competent Signalman with seven years experience in PSC. As with NIR training, he was also trained and competent to perform the duties of Pilotman. However, he had never performed the role of Pilotman until the day of the incident (paragraphs 27 & 39), with the only Pilotman experience he received being classroom-based, where exercises are simulated.

Application of the Rule Book and the SGIs

Actions of the IÉ Signalman

115 The IÉ Signalman was notified that there would be SLW established at 07:42 hrs with an ETSR imposed between Up Line between 60 ½ MP and 61 MP. As such, the IÉ Signalman was required to, in accordance with IÉ's SGIs:

- Use a reminder appliance to protect the portion of line with the restriction, in this case the ETSR and SLW (paragraph 57);
- Stop each train approaching the restriction and tell the Driver (paragraph 58);
- Only remove this reminder appliance to operate the signal control device when a movement is to proceed after the Driver has been cautioned or instructed as necessary (paragraph 57).

116 In accordance with Section 12.2 of the 'TCB Regulations', in the SGIs, the IÉ Signalman should have ensured that, before clearing the signal controlling the entrance to the single line (Signal 265) the Pilotman had given the necessary instructions to the Driver (paragraph 60).

117 In addition, the IÉ Signalman was not authorised to allow movements to enter or foul the single line unless the Pilotman was present, with the IÉ Signalman giving the Pilotman permission for all movements during SLW (paragraph 54).

118 However, on the day of the incident, the IÉ Signalman made a number of contraventions in relation to the Rule Book and the SGIs, in that he did not:

- Use the reminder appliance (paragraph 73);
- Stop Train A122 at the entrance signal to the single line (paragraph 89);
- Caution the Driver of Train A122 that SLW was in operation (paragraph 89);
- Ensure that a Pilotman was present to authorise the movements of Train A122 (paragraph 89);
- Instruct the Pilotman to travel with Train A122 (the following train) instead of Train E100, instead he took instructions from the Pilotman (paragraph 84).

119 The IÉ Signalman may have made these contraventions as he was relatively inexperienced with only one year's experience (paragraph 27) in the area and no practical experience of SLW. In addition, as the Pilotman was more experienced than the IÉ Signalman, the IÉ Signalman may have assumed that the Pilotman was correct when he issued the instructions to signal Train A122 into the SLW section (paragraph 84) and therefore did not question the Pilotman's instructions.

120 In addition, on becoming aware of his error, he did not immediately stop Train A122 (paragraph 94) in accordance with the SGIs (paragraph 59); instead he tried to contact the Pilotman who was on board Train E100 (paragraph 94).

Actions of the Pilotman

121 The Pilotman was appointed as Pilotman on Friday evening, to commence Pilotman duties on Saturday morning. As such, the Pilotman was required to, in accordance with the Rule Book:

- Be familiar with the line concerned (paragraph 46);
- Be present and personally authorise the Driver of any movement which is to enter or foul the single line (paragraph 47);
- Obtain the permission of the Signaller controlling the entrance to the section before authorising any such movement (paragraph 44);
- Remind the Driver of the presence of temporary or emergency speed restrictions (paragraph 51);
- Must ride with the Driver unless there is another train to follow (paragraph 52).

122 However, on the day of the incident, the Pilotman made a number of contraventions in relation to the Rule Book requirements above, in that he:

- Was not familiar with the line, particularly south of the border (paragraph 46);
- Wasn't present to personally authorise the Driver of Train A122 to proceed into the SLW section, as he made the decision to travel on Train E100 (paragraph 84);
- Did not obtain the permission of the IÉ Signaller to ride on Train E100, instead he informed the IÉ Signaller that that was the action he was taking (paragraph 84);
- Did not remind the Driver of Train A122 of the presence of temporary or emergency speed restrictions as he had no contact with this driver;
- Did not ride on the rearmost train (Train A122) and allow Train E100 to travel without a Pilotman, after giving him instructions.

123 The Pilotman may have made these contraventions, as he:

- Only became aware of Train E100 on approach to Dundalk, a service he had not planned any movements for (paragraph 82);
- Became distracted from his duties as Pilotman when confronted with passengers trying to catch the onwards train to Dublin (paragraph 83), which was amplified by the fact he was unfamiliar with his surroundings;
- Became frustrated with the communications, as he was continuously receiving calls and texts for the Portadown Station Manager (paragraph 78); and he was also unable to contact the

signalmen in CTC and PSC, at all times, due to the poor signal strength of the mobile phone and the international prefixes (paragraph 85);

- Was unsure of his duties as Pilotman, in that, he was instructing the IÉ Signalman instead of taking instructions from the IÉ Signalman (paragraph 84).

124 In addition, given his inexperience acting as Pilotman, the Pilotman may have found confidence in his decision to travel on Train E100, given that the IÉ Signalman did not question his actions; which may have reinforced his decision to travel on Train E100 (paragraph 84).

Actions of the Driver of Train A122

125 The Driver of Train A122, who was travelling northbound from Dundalk, was not informed of the SLW in operation (paragraph 89). Therefore when he got the proceed aspect for the route; he proceeded into the area of SLW. Had the Driver of Train A122 known of the SLW, he would have waited for the arrival of a Pilotman.

Actions of NIR Signalman A

126 At 08:43 hrs the NIR Signalman A noticed Train A122 on his console crossing the border, this was unexpected and meant that two trains were travelling in the SLW section. Instead of stopping the train, in accordance with the SGIs (paragraph 59); he contacted the Portadown Traffic Inspector for instructions, the Inspector told him to stop the train as this was an unauthorised movement and await further instructions (paragraph 95).

Communications

127 The Pilotman was unable to ring his own control room in PSC from Dundalk for direction on his mobile phone as the international prefix was not on the phones directory and there was also a problem with the mobile phone cutting out due to network roaming in the border region. (paragraph 85). The situation was further confused by the volume of calls he was receiving on this particular mobile phone which were totally unrelated to the SLW operation (paragraph 78). There was no attempt made to communicate on the train radio.

128 There was some difficulty in making contact by mobile phone generally as the users were not familiar with the international prefixes; no consideration was given to making use of *signal post telephones* because the Pilotman had use of a mobile telephone.

Signalling system

129 Bi-directional signals have been installed between Newry and Dundalk; however they are not operational (paragraph 15). Had they been commissioned there would be no requirement to use SLW procedures.

Conclusions

IÉ & NIR SLW interface

130 There are no set planning procedures between the two jurisdictions to deal with sudden unforeseen circumstances such as occurred on the 22nd and 23rd March. Staff in each jurisdiction were unfamiliar with the route characteristics of the other's network. This is further complicated by the fact that SLW is rarely implemented across the two networks (paragraphs 107 & 108).

Training and competency management

131 In NIR, Pilotman training forms part of the training to become a Signaller. SLW training for pilotmen and signalmen is classroom-based, and exercises are simulated. When passed as competent Signallers, signalmen are also passed competent as Pilotmen (paragraph 113). Competency is assessed as part of the Signallers Competency Management System.

132 In IÉ, the Pilotman training is separate to Signaller training. SLW training for signalmen, similar to NIR, is classroom based with no practical element to the training. This meant that Pilotman had never performed the role of Pilotman and the IÉ Signaller had not experienced SLW in a practical scenario, prior to the day of the occurrence (paragraph 114).

133 The lack of any practical training in relation to SLW for signalmen and pilotmen may have resulted in the:

- IÉ Signaller not having confidence in the practical elements of SLW, it may also have been compounded by the fact that the signalman only had one year of experience as a signalman in CTC;
- Pilotman being unsure as to which train to ride with and becoming distracted as he was unfamiliar with his duties and the location;
- The NIR Signalmen checking with their supervisor before stopping the train as an unauthorised movement (paragraph 126).

Application of the Rule Book and the SGIs

Actions of the IÉ Signaller

134 The IÉ Signaller was notified that there would be SLW established at 07:42 hrs with an ETSR imposed on the Up Line between 60 ½ MP and 61 MP. As such, the IÉ Signaller was required to use a remainder appliance to protect the SLW section, which would remind him to stop, caution

and instruct the drivers and pilotmen in the SLW section; however, he did not use this device on the day of the incident (paragraph 118).

135 In addition, the IÉ Signaller was not authorised to allow movements to enter or foul the single line unless the Pilotman was present, with the IÉ Signaller giving the Pilotman permission for all movements during SLW, however on the day of the incident, the IÉ Signaller allowed Train A122 to enter the SLW section without the Pilotman present (paragraph 118).

136 The IÉ Signaller may have taken these actions as he was relatively inexperienced in the area and had not experienced SLW outside a classroom environment (paragraph 132). This may also have led him to take the instructions from the Pilotman, who he may have deemed more experienced; who told him to allow Train A122 to follow behind Train E100, the train on which the Pilotman was travelling (paragraph 119).

137 On becoming aware of his error, he did not immediately stop Train A122 instead he tried to contact the Pilotman who was on board Train E100 (paragraph 120).

Actions of the Pilotman

138 The Pilotman was appointed as Pilotman on Friday evening, to commence Pilotman duties on Saturday morning, however, at no stage did the Pilotman declare he had not been familiarised with the line south of the border and the layout of Dundalk (paragraph 122).

139 Instead of correctly obtaining the permission of the IÉ Signaller to authorise the movement of Train E100 and instructing the Driver of Train E100 to proceed, while he would travel on Train A122, as is set out in the Rule Book and SGIs, the Pilotman instead travelled on Train E100 and instructed the IÉ Signaller to signal through Train A122 without any pilotman present (paragraph 122).

140 The Pilotman may have taken these actions as he became confused with what he thought was a change to the planned services; he also became distracted by the passengers at Dundalk Station, the unfamiliar surroundings and had become frustrated with the volume of calls and texts on his mobile phone and its poor signal strength (paragraph 123).

141 He may also have thought he had made the correct decision as the IÉ Signaller did not question his instructions to allow Train A122 to travel behind him with no Pilotman (paragraph 124).

Actions of the Driver of Train A122

142 The Driver of Train A122, who was travelling northbound from Dundalk, was not informed of the SLW in operation, therefore when he got the proceed aspect for the route, he proceeded into the area of SLW (paragraph 125).

Actions of NIR Signalman A

143 At 08:43 hrs the NIR Signalman A noticed Train A122 on his console crossing the border, this was unexpected and meant that two trains were travelling in the SLW section. Instead of stopping the train, in accordance with the SGIs; he contacted the Portadown Traffic Inspector for instructions, the Inspector told him to stop the train as this was an unauthorised movement and await further instructions (paragraph 126).

Communications

144 The communications between the Pilotman and CTC; and the Pilotman and the PSC were poor as a result of the mobile phone connections between the Republic of Ireland and Northern Ireland; and all parties were confused by the international dialling codes needed to prefix telephone numbers (paragraph 127 & 128).

Signalling system

145 Bi-directional signals have been installed between Newry and Dundalk, however they are not operational. Had they been commissioned there would be no requirement to use SLW with Pilotman procedures (paragraph 129).

Immediate cause, contributory factors and underlying factors

146 The immediate cause of Train A122 entering a SLW section between Dundalk and Newry without a Pilotman was as a result of the train being signalled for the route.

147 The causal factors associated with the incident are:

- CF-01 – The IÉ Signalman did not follow the procedures set out in the Rule Book, by setting the route for Train A122 to allow Train A122 proceed into a SLW section without a Pilotman, after the Pilotman requested for the train to proceed into the section;

- CF-02 – The Pilotman did not follow procedures set out in the Rule Book in that he requested that the IÉ Signaller send on Train A122 without a Pilotman;
- CF-03 – The IÉ Signaller did not inform the driver of Train A122 of the SLW established on the route he was travelling.

148 Contributory factors associated with the incident are:

- CoF-01 – The IÉ Signaller was inexperienced in SLW resulting in him not questioning the instructions given by the Pilotman and not using the procedure of blocking the entrance to the SLW section;
- CoF-02 – The Pilotman was inexperienced in the practical aspect of SLW, and was under pressure to resolve an unforeseen situation, resulting in him requesting a train to be allowed travel into a SLW behind the train he was travelling on board;
- CoF-03 – The Pilotman who was implementing the SLW did not have adequate local knowledge of routes or layout of Stations used by cross-border services;
- CoF-04 – The signalling equipment and infrastructure to facilitate bi-directional signalling cross-border has not been commissioned, resulting in the requirement to use the SLW process;
- CoF-05 – The communications between the Signaller and the Pilotman were affected by the use of a mobile phone, in that, the mobile phone had poor signal strength in border areas and the lack of awareness of the regional prefixes resulted in all parties being unable to connect with each other at the required times.

149 Underlying factors associated with the incident were:

- UF-01 – The training and competence for SLW in both NIR and IÉ is theoretical classroom-based which has led to a lack of practical understanding when confronted with the SLW procedures, in particular where a change in the planned running of trains has occurred.

Relevant actions taken or in progress

Actions taken by IÉ

150 The Sligo/Northern Line Signaller received corrective coaching.

151 The IÉ IM Safety Audit Unit conducted an audit during 2013 on the selection, training, competence and assessment of Signallers at CTC in compliance to Safety Standard, OPS-SMS-4.0, Selection, Training, Monitoring and Assessment of CTC Signallers. This standard was superseded by OPC-SMS-024 in March 2013 on the reorganisation of IÉ and is a mirror of OPS-SMS-4.0, Selection, Training, Monitoring and Assessment of CTC Signallers, with the main changes being the allocation of responsibilities of the new structure.

Actions taken by NIR

152 At the date of publication of this report, NIR have briefed all signallers on the incident and lessons learnt. The Pilotman had his safety critical profile reviewed and has undertaken additional assessment.

153 Prior to the incident NIR had commenced developing an Auxiliary Duties Competence Handbook that includes pilotman working.

154 A practical lesson is to be included in Pilotman initial training and ongoing competency training.

Joint Actions by IÉ/NIR

155 An IÉ and NIR have formed a cross-border group of managers whose objective is to regularly liaise regarding operational issues and to enhance route knowledge in each others' jurisdictions.

156 A cross-border exercise is planned to simulate both planned and unplanned events that may occur during a cross-border SLW.

Safety recommendations

General description

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

New safety recommendations related to the occurrence

158 The railway line from Dundalk to Newry is currently signalled bi-directionally north of the border into Newry, bi-directional signalling has been installed on the entire section but has not been commissioned (CoF-04). To avoid the infrequent practice of SLW with Pilotman on this section of track, the RAIU make the following safety recommendation:

IE/NIR should review the signalling infrastructure cross-border with a view to commissioning the bi-directional signalling.

159 The Pilotman and IE Signalman were inexperienced in the practical aspects of SLW single line working especially where more than one train was involved, neither had any experience outside a theoretical lesson in a classroom (CF-01, CF-02, CF-03, CoF-01, CoF-02, CoF-03 & UF-01). As a result, the RAIU make the following safety recommendation.

IE/NIR should each review their training, assessment and competency management of signalmen and pilotmen in relation to SLW with Pilotman to ensure they are confident in performing their respective duties during SLW and are familiar with the routes covered.

160 There is no clear instruction on the use of mobile telephones by Pilotmen, communication was hampered by the International Codes required when crossing from Newry to Dundalk (CoF-05). As a result, the RAIU make the following safety recommendation:

IE/NIR should each review current communication procedures with regard to the updated communication equipment now available.

Additional information

List of abbreviations

°C	Degrees Celsius
CoF	Contributory factor
CWR	Continuous Welded Rail
IM	Infrastructure Manager
kg	Kilogram
km/h	Kilometres per hour
m	Metre
No.	Number
RAIU	Railway Accident Investigation Unit
RSC	Railway Safety Commission
RU	Railway Undertaking
SI Units	International System of Units
SLW	Single Line Working
TCB	Track Circuit Block
UF	Underlying factor

Glossary of terms

Accident	An unwanted or unintended sudden event or a specific chain of such events which have harmful consequences including collisions, derailments, level-crossing accidents, accidents to persons caused by rolling stock in motion, fires and others.
Bi-directional signals	An arrangement of signals and interlocking that allow trains to be run in either direction.
Block telephones	A telephone located on or near a signal that allows direct communication to a controlling signalman.
Colour light signals	Signals that convey movement authority to train drivers by means of coloured lights.
Continuous welded rail	Sections of rail that are welded together.
Contributory factors	Any factor(s) that affects, sustains or exacerbates the outcome of an occurrence. Eliminating one or more of these factor(s) would not have prevented the occurrence but their presence made it more likely, or changed the outcome.
Controlling signal	A signal which can be made to display a stop aspect.

Controlling signalman	The signalman designated to control a specific section of track.
Down direction	Direction where trains normally run towards Belfast.
Down Line	The line on which trains normally run towards Belfast.
Enterprise Service	The Enterprise service operates between Belfast and Dublin and is jointly run by IÉ and NIR.
Extensive damage	Damage that can be immediately assessed by the RAIU to cost of at least €2,000,000 in total.
Handsignaller	A competent person authorised to control the passage of trains by means of coloured flags and railway fog signals.
Immediate cause Incident	The situation, event or behaviour that directly results in the occurrence. Any occurrence, other than an accident or serious accident, associated with the operation of trains and affecting the safety of operation.
Infrastructure Manager	Organisation that is responsible for the establishment and maintenance of railway infrastructure, including the management of infrastructure control and safety systems.
National safety authority	The national body entrusted with the tasks regarding railway safety in accordance with European directive 2004/49/EC.
Pilotman	A trained person who rides on a train during times of signal failure or emergencies to ensure trains are worked safely.
Railway Undertaking	Organisation that operates trains.
Reminder Appliance	A device used by a Signaller to remind the signaller that a particular switch should not be operated because that operates a signal function which is protecting a possession or obstruction
Rolling stock	Railway vehicles.
Safety Certificate	A certificate to provide evidence that the railway has established its Safety Management System and can meet the requirements laid down in national safety laws and European Legislation.
Serious accident	Any train collision or derailment of trains, resulting in the death of at least one person or serious injuries to 5 or more persons or extensive damage to rolling stock, the infrastructure or the environment, and any other similar accident with an obvious impact on railway safety regulation or the management of safety, where extensive damage means damage that can be immediately assessed by the RAIU to cost at least €2,000,000 in total.
Serious injury	Any injury requiring hospitalisation for over 24 hours.
Signal Post Telephone	Telephone located at or near a signal that allows communication direct to the controlling signal box
Single Line	When one line of a double line becomes blocked, single line working by a

Working	pilotman allows trains to travel over the other line in either direction.
Temporary speed restriction	A speed restriction imposed, generally for a short time, usually as a result of engineering work, to guarantee the safe passage of trains.
Track circuit block	A signalling system that uses track circuits to confirm the absence of trains in order to control the movement of trains.
Train describers	A computerised system that tracks trains using train circuits.
Underlying factor	Any factor(s) associated with the overall management systems, organisational arrangements or the regulatory structure.
Up direction	Direction where trains normally run towards Dublin.
Up Line	The line on which trains normally travel towards Dublin.
Whistle board	A board positioned on the side of the track that indicates to train drivers that they are to sound the train horn.
Working Time Table	Lists all trains and all relevant points and times.

References

European Union (2004), Directive 2004/49/EC of the European Parliament and of the Council of 29 April 2004 on safety on the Community's railways and amending Council Directive 95/18/EC on the licensing of railway undertakings and Directive 2001/14/EC on the allocation of railway infrastructure capacity and the levying of charges for the use of railway infrastructure and safety certification (Railway Safety Directive), 2004/49/EC, 29th April 2004.

Iarnród Éireann (2007), Rule Book.

Iarnród Éireann (2007), Train Signalling Regulations and General Instructions to Signalmen.

Northern Ireland Railways (2007), Rule Book.