RAIL SAFETY AND STANDARDS BOARD

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Briefing Leaflet

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The following modules and handbooks will be re-issued and come into force on 07 June 2025:

Handbook 16 AC electrified lines

Handbook 17 DC electrified lines

Module AC AC electrified lines

Module DC DC electrified lines

RS521 Signals, Handsignals, Indicators and Signs handbook

Handbook 16 AC electrified lines

KEY CHANGES

New rules were introduced in this handbook some years ago to refer to the operation of bi-mode trains which could either provide their own traction power, or take this from the electrification system on ac electrified lines. With greater experience of the operation of trains of this type, the rules have now been updated and they are now referred to as multi-mode trains. Some wording has been changed to use terms consistently.

New signs have been introduced where electric trains coast with lowered pantographs, or a multi-mode train changes to self-powered mode. These will now be black and yellow in colour so that they can easily be distinguished from permanent power changeover locations.

The instructions concerning defective balises which would prevent automatic power changeover (APCo) being carried out have been changed to refer to a balise that will prevent APCo taking place and not to the 'zero balise' that only operates if changeover has not already been completed.

The competency of a safe work leader (SWL) is no longer a recognised one. All references to a safe work leader have been removed from the handbook.

DETAIL OF CHANGES

Section headings in bold relate to issue 6 of Handbook 16.

1 Definitions

Overhead line permit

This section has been changed to remove reference to the obsolete competency of safe work leader (SWL).

3 Dangers of the system

3.1 Treating the OLE, pantographs and associated roof-mounted electrical equipment as being live

The section has been changed to remove reference to the obsolete competency of safe work leader (SWL).

3.4 Reporting defects to the signaller

The section has been changed to explain that the balises referred to are those which would prevent APCo taking place automatically.

The term 'APCO' has been changed to 'APCo' for consistency.

4 Personal safety

4.2 Working on vehicles

The section has been changed to remove reference to the obsolete competency of safe work leader (SWL).

9 Overhead line permits

9.1 Issuing an overhead line permit

The section has been changed to remove reference to the obsolete competency of safe work leader (SWL).

9.2 During the work

The section has been changed to remove reference to the obsolete competency of safe work leader (SWL).

9.3 Changes of personnel within the work group

The section has been changed to remove reference to the obsolete competency of safe work leader (SWL).

9.4 When the work is suspended or completed

The section has been changed to remove reference to the obsolete competency of safe work leader (SWL).

10 Arranging coasting under the OLE

The term 'bi-mode' has been changed to 'multi-mode' for consistency.

The illustrations of the boards have been changed to show the new design.

Handbook 17 DC electrified lines

KEY CHANGES

New rules were introduced in module AC some years ago to refer to the operation of bi-mode trains which could either provide their own traction power, or take this from the electrification system on ac electrified lines. With greater experience of the operation of trains of this type, they are now referred to as multi-mode trains. Corresponding instructions have now been included in this handbook for multi-mode trains which can operate over dc electrified lines.

Section 12 concerning movement of electric trains between live and isolated sections has been expanded to include multi-mode trains. There is a new instruction concerning a multi-mode train entering or leaving a section where an emergency switch-off is in place, in which case the collector shoes must be retracted to prevent that section being livened up.

The competency of safe work leader (SWL) is no longer a recognised one and all reference to this obsolete competency has been removed.

DETAIL OF CHANGES

Section headings in bold relate to issue 5 of Handbook 17.

1 Definitions

Conductor rail permit

The section has been changed to remove reference to the obsolete competency of safe work leader (SWL).

3 Dangers of the system

3.1 Treating the CRE, shoe gear and associated exposed live train-mounted electrical equipment as being live

The section has been changed to remove reference to the obsolete competency of safe work leader (SWL).

8 Types of isolation

8.1 Planned isolation

The section has been changed to remove reference to the obsolete competency of safe work leader (SWL).

12 Moving electric and multi-mode trains between live and isolated sections

The title has been changed to include multi-mode trains.

A new instruction has been introduced to state that a multi-mode train must have the collector shoes retracted before entering or leaving a section of line where an emergency switch-off is in place. This is to prevent the section being livened up.

Module AC AC electrified lines

KEY CHANGES

New rules were introduced in this module some years ago to refer to the operation of bi-mode trains which could either provide their own traction power, or take this from the electrification system on ac electrified lines. With greater experience of the operation of trains of this type, the rules have now been updated and they are now referred to as multi-mode trains. The definitions have been changed and some wording has been changed to use terms consistently.

New signs have been introduced where electric trains coast with lowered pantographs, or a multi-mode train changes to self-powered mode. These will now be black and yellow in colour so that they can easily be distinguished from permanent power changeover locations.

New instructions have been introduced concerning defective balises which would prevent automatic power changeover being carried out. Before treating these as defective, the signaller must ask the driver of the next train intended to carry out a power changeover (PCO) whether any problem is experienced, and if not normal working can be resumed as the problem is not related to the balise. There is a similar instruction concerning signage that is reported as difficult to see or missing.

A new section 19 has been introduced concerning PCO between ac electrification and other forms of traction power. It describes the signs that can be provided, but as the type of changeover can vary, as well as the on-board and trackside equipment, section 19.1 explains that the actions that a driver has to take will be those in train operating company instructions.

DETAIL OF CHANGES

Section headings in bold relate to issue 8 of module AC.

1 Definitions

Electric train

The term 'bi-mode train' has been changed to 'multi-mode train' for consistency.

Multi-mode train

The definition of bi-mode train has been altered to a definition of a multi-mode train, and the word 'tractive' changed to 'traction', for consistency.

Self-powered mode

The definition has been changed from 'self-powered train' to 'self-powered mode' in the interests of accuracy, as 'self-powered mode' is used in the wording of the module, but 'self-powered train' is not.

11 Electric trains moving to or from non-electrified lines or lines blocked to electric trains

11.1 Towards an isolated section

The words 'bi-mode' and 'tractive' have been changed to 'multi-mode' and 'traction' for consistency.

The instruction has been changed to say that the signaller 'can' authorise a movement rather than 'may' as this is more consistent with other rules.

11.2 To and from non-electrified lines

The instructions have been changed to show electric trains and multi-mode trains separately as the requirements are different.

The instructions concerning multi-mode trains state that pantographs 'are to be lowered' as it is possible that they have not lowered in response to a driver's actions.

11.3 A line blocked to electric trains

The words 'bi-mode' have been changed to 'multi-mode' and 'APCO' to 'APCo' for consistency.

The wording has been changed to specify when pantographs must be lowered.

Equipment varies between different types of train and it is not always the case that APCo equipment is to be isolated. This has been changed to say that the equipment must be disabled so that it will not operate.

11.4 Wrong-direction movements by a multi-mode train

The word 'bi-mode' has been changed to 'multi-mode' in the heading and the text. for consistency.

The words 'traction changeover' have been changed to 'power changeover (PCO)' for consistency.

Equipment varies between different types of train and it is not always the case that APCo equipment is to be isolated. This has been changed to say that the equipment must be disabled so that it will not operate.

12 Driver's instructions following a loss of line light, ADD operation, tripping or damage to the OLE

12.6 Examining the train or OLE

The words 'bi-mode' and 'tractive' have been changed to 'multi-mode' and 'traction' for consistency.

12.8 Isolating the ADD

The words 'bi-mode' and 'tractive' have been changed to 'multi-mode' and 'traction' for consistency.

13 Signaller's instructions following a report of a defect or tripping of the OLE

13.7 Multi-mode trains

The title and the wording have been changed from 'bi-mode' to 'multi-mode' and 'tractive' to 'traction' for consistency.

14 Instructions for examining the OLE

14.2.1 How the OLE is to be examined

The wording has been changed from 'tractive' to 'traction' for consistency, as this is a more usual term.

14.2.2 If a train can operate using its own traction power or coast with pantographs lowered

The title and the wording have been changed from 'tractive' to 'traction' for consistency, as this is a more usual term.

14.3 Responsible person arriving on site

This has been changed to show the new design of boards which are black on yellow rather than white on black to distinguish them from signs that apply at a permanent power changeover location.

15 Moving trains after an OLE incident

15.2 When a pantograph has been damaged but another is available or the train is a multi-mode train

The title and wording have been changed from 'bi-mode' to 'multi-mode' for consistency.

15.4 Allowing trains to coast at 20 mph (30 km/h) with pantographs lowered

A cross reference has been included for completeness to where the coasting signs are illustrated.

15.5 Allowing trains to coast at high speed with pantographs lowered

The title has been changed to make it consistent with the text.

The signs shown are now the new design coloured black on yellow rather than white on black to distinguish them from signs that apply at a permanent power changeover location,

For completeness, the 'driver's actions' now explains that the 'advance lower pantograph' sign displays two flashing white lights.

15.6 Multi-mode trains

The title and wording have been changed from 'bi-mode' to 'multi-mode' for consistency.

Equipment varies between different types of train and it is not always the case that APCo equipment is to be isolated. This has been changed to say that the equipment must be disabled so that it will not operate.

17 Electric trains driven off the contact wire

If a multi-mode train has been driven off the contact wire with any pantograph raised, the existing instruction that it can continue in self-powered mode still applies. An additional precaution has however been added that no pantograph must then be raised until this is authorised by a person who is competent to do so.

18 Defective automatic power control (APC) inductor, APCo balise or PCO signs

The title has been changed to refer to 'APCo' rather than 'APCO' for consistency and because of the inclusion of instructions on PCO signs in this section.

18.3 Defective APCo balise

This section now includes some instructions previously shown in section 3.4, as this section is a more relevant place.

This now requires a signaller receiving a report concerning a defective balise that will prevent APCo taking place to stop the next train to which APCo applies and ask that driver to report whether there is any difficulty with the changeover. If not normal working can be resumed. This is a relaxation on the existing instruction which required all drivers to be advised until the defect was reported in order, without any initial attempt to confirm the report.

The wording has been changed to explain that this refers to a balise that will prevent APCo taking place automatically and not to a 'zero' balise that operates if the changeover has not already taken place.

The driver's instructions have been changed to state more correctly when APCo must have been completed in relation to the location of signs, and add a new instruction concerning changeover to the ac system.

18.4 Missing, damaged or obscured PCO signs

This is a new section expanded from the previous reference in section 3.4 as this section is a more relevant place.

It now requires a signaller receiving a report to stop the next train to which PCO applies and ask that driver to report whether there is any difficulty in seeing the sign. If not normal working can be resumed. This is a relaxation on the existing instruction which required all drivers to be advised until the defect was reported in order, without any initial attempt to confirm the report.

The driver's instructions have been changed to state more correctly when a changeover from the ac system must be made in relation to where signs are provided, and add a new instruction on changeover to the ac system.

19 Power changeover (PCO)

This is a new section providing general instructions about PCO to or from the ac overhead system.

19.1 When PCO is required

This section states that train operating company instructions will explain where and how PCO is to be carried out.

19.2 Approaching a PCO location

This section describes the signs that are provided and that train operating company instructions will explain what actions the driver is required to take.

19.3 Passing a PCO location

This section describes the signs that may be provided and that train operating company instructions will explain what actions the driver is required to take.

It also explains the actions where a 'do not raise pantograph' sign is provided.

19.4 When PCO does not take place on all routes at a junction

This section describes the signs provided and the actions required by the driver.

19.5 When PCO takes place at a stand at a specified location

This section describes the signs provided and the actions required by the driver.

19.6 When PCO is not planned

This section describes the actions required of the driver and signaller when this is to happen.

Module DC DC electrified lines

KEY CHANGES

New rules were introduced in module AC some years ago to refer to the operation of bi-mode trains which could either provide their own traction power, or take this from the electrification system on ac electrified lines.With greater experience of the operation of trains of this type, they are now referred to as multi-mode trains. Corresponding instructions have now been included in this module for multi-mode trains which can operate over dc electrified lines. New definitions have been included.

Section 12 concerning movement of electric trains between live and isolated sections has been expanded to include multi-mode trains. There is a new instruction concerning a multi-mode train entering or leaving a section where an emergency switch-off is in place, in which case the collector shoes must be retracted to prevent that section being livened up.

There is a new section 13 concerning the movement of multi-mode trains to or from non-electrified lines. These rules are similar to those published in module AC.

A new section 14 has been introduced concerning PCO between dc electrification and other forms of traction power. It describes the signs that can be provided, but as the type of changeover can vary, as well as the on-board and trackside equipment, section 14.1 explains that the actions that a driver has to take will be those in train operating company instructions.

DETAIL OF CHANGES

Section headings in bold relate to issue 6 of module DC.

1 Definitions

Multi-mode train

A new definition of a multi-mode train has been included.

Self-powered mode

A new definition of self-powered mode has been included.

12 Moving electric and multi-mode trains between live and isolated sections

This title of section 12 has been changed to refer to multi-mode trains.

12.1 Towards an isolated section

The wording of section 12.1 has been changed to refer to all multi-mode trains rather than just dual-powered locomotives.

12.2 Electric or multi-mode train entering or leaving an isolated section

The title has been changed to include multi-mode trains.

A new instruction has been introduced to say that a multi-mode train must have the collector shoes retracted before entering or leaving a section of line where an emergency switch-off is in place. This is to prevent the section being livened up.

For completeness, an instruction has been included to say that a train with collector shoes must not enter an isolated section or a portion of line where an emergency switch-off is in place unless the shoes have been retracted.

12.3 Taking a possession around a train

A new instruction has been introduced to say that a possession must not be taken around a train that has collector shoes unless the shoes have been retracted.

12.4 Train entering a possession

For completeness, an instruction has been introduced that a train with collector shoes must not enter a possession unless the shoes have been retracted.

13 Multi-mode trains moving to or from non-electrified lines

This is a new section to cater for multi-mode trains changing over from dc electric power.

13.1 Moving to and from non-electrified lines

Section 13.1 describes the driver's actions.

13.2 Wrong-direction movements by a multi-mode train

This is a new section corresponding to the instructions in module AC.

14 Power changeover (PCO)

This is a new section providing general instructions about PCO to or from the dc electrified system.

14.1 When PCO is required

This section states that train operating company instructions will explain where and how PCO is to be carried out.

14.2 Approaching a PCO location

This section describes the signs that are provided and that train operating company instructions will explain what actions the driver is required to take.

14.3 Passing a PCO location
This section describes the signs that may be provided and that train operating company instructions will explain what actions the driver is required to take.

It also explains the actions where a 'do not raise pantograph' sign is provided.

14.4 When PCO does not take place on all routes at a junction
This section describes the signs provided and the actions required by the driver.

14.5 When PCO takes place at a stand at a specified location
This section describes the signs provided and the actions required by the driver.

14.6 When PCO is not planned
This section describes the actions required of the driver and signaller when this is to happen.

14.7 Defective APCo balise
This requires a signaller who has received a report concerning a defective balise that will prevent APCo taking place to stop the next train to which APCo applies and ask that driver to report whether there is any difficulty with the changeover. If not, normal working can be resumed. If there is any difficulty, the drivers of subsequent trains must be advised.

This refers to a balise that will prevent APCo taking place and not to the zero balise that only operates if changeover has not already taken place.

The driver's instructions explain when APCo must have been completed in relation to the location of signs.

14.8 Missing, damaged or obscured PCO signs
This section requires a signaller receiving a report to stop the next train to which PCO applies and ask that driver to report whether there is any difficulty in seeing the sign. If not, normal working can be resumed. If there is any difficulty, the drivers of subsequent trains must be advised.

The driver's instructions explain when a changeover must be made in relation to where signs are provided.

RS521 Signals, Handsignals, Indicators and Signs handbook

KEY CHANGES

The title of section 9 has been changed as the range of signs now applies to lines other than ac electrified lines.

There is a new section 9.2 which shows all signs associated with power changeover.

The previous section 9.2 has been renumbered 9.3 and renamed 'Temporary PCO signs' as the signs are also used in situations where multi-mode trains change to self-powered mode, rather than coasting. The signs have been changed to distinguish them from signs at permanent power changeover locations.

The competency of safe work leader (SWL) is no longer a recognised one and all reference to this obsolete competency has been removed.

DETAIL OF CHANGE

Section headings in bold relate to issue 8 of handbook RS521.

5 Other signals and indicators

5.4 Work-site marker boards

The section has been changed to remove reference to the obsolete competency of safe work leader (SWL).

9 Electrified lines and power changeover (PCO) signs

9.2 PCO signs

The title of section 9 has been changed because of the introduction of a new section 9.2.

This is a new section which includes all the signs concerned.

9.3 Temporary PCO signs

The section has been renumbered from 9.2 and renamed as the signs are used in situations apart from coasting.

The new designs of signs are shown.

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