

# Controls for Signalling a Train onto an Occupied Line

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## Synopsis

This document defines the safety critical requirements associated with signalling a second train onto a section of railway line which is already occupied by a train.

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# Controls for Signalling a Train onto an Occupied Line

Railway Group Standard

GK/RT0044

Issue One

Date February 2000

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# Controls for Signalling a Train onto an Occupied Line

## Part A

### Issue Record

This document will be updated when necessary by distribution of a complete replacement.

Amended or additional parts of revised pages will be marked by a vertical black line in the adjacent margin.

Issue	Date	Comments
One	February 2000	New Document. Supersedes SSP 76 Section 2. SSP 76 is therefore cancelled, the remainder of SSP 76 having been superseded by GK/RT0035 issue 1. Until SSP80 is withdrawn, where the requirements of this document and SSP80 conflict, this document shall take precedence.

### Responsibilities

Railway Group Standards are mandatory on all members of the Railway Group \* and apply to all relevant activities that fall into the scope of each individual's Railway Safety Case. If any of those activities are performed by a contractor, the contractor's obligation in respect of Railway Group Standards is determined by the terms of the contract between the respective parties. Where a contractor is a duty holder of a Railway Safety Case then Railway Group Standards apply directly to the activities described in the Safety Case.

\* The Railway Group comprises Railtrack and the duty holders of the Railway Safety Cases accepted by Railtrack.

### Compliance

The provisions of this document are mandatory for design and implementation work undertaken on a scheme for which the Signalling Scheme Plan is first approved, or altered and subsequently re-approved on or after 1st June 2000.

Railtrack shall ensure that the use of existing facilities for signalling a train onto an Occupied Line is subject to reassessment when any proposed change of use may increase risks (clause 7.2) for timetable and other operational changes coming into effect on or after 7 April 2001. Otherwise, retrospective action is not required for existing layouts.

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### Supply

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# Controls for Signalling a Train onto an Occupied Line

## Part B

### 1 Purpose

The purpose of this document is to define the requirements for controlling the risk of collision between two trains, the second having been signalled onto a running line which is already occupied.

### 2 Scope

The overall scope of Railway Group Standards is as specified in Appendix A of [GA/RT6001](#).

Specifically the contents of this document applies to all circumstances in which trains are admitted to Occupied Lines by the use of fixed lineside signals, with the exception of:

- movements wholly within sidings;
- movements into sidings.

The document does not apply to the situation where the Second Train makes a further movement after it has come to a stand on completion of the movement authorised by the fixed signal.

It should be noted that specific instructions to drivers and signallers regarding signalled movements to Occupied Lines appear in [GO/RT3000](#) the Master Rule Book, and [GO/RT3062](#) the Signaller's General Instructions and Train Signalling Regulations, and are not repeated in this document.

### 3 Definitions

#### First Train

The train (or trains) ahead of the Second Train and towards which the movement of the Second Train is to be made under the authority of a signal.

#### Freight Train

For the purposes of this document, trains signalled as classes 3 to 8 and 0. By this definition, light engines and trains comprising empty coaching stock or parcels trains including travelling post offices are permitted to use facilities provided for Freight Trains.

#### Occupied Line

A portion of a running line between two successive signals which are capable of displaying a stop aspect, or between such a signal and the end of the line, on which a train, or a part of a train, is already positioned.

#### Passenger Train

For the purposes of this document, trains signalled as classes 1, 2, 5, 9 or 0. By this definition, light engines and trains comprising empty coaching stock or parcels trains including travelling post offices are permitted to use facilities provided for Passenger Trains.

#### Permissive Freight Line

A portion of a running line between two successive signals which are capable of displaying a stop aspect, or between such a signal and the end of a line, which two trains (both of which are Freight Trains) are permitted to occupy simultaneously other than for the purposes of attaching, detaching or removing vehicles.

#### Platform Sharing

Permitting two trains (both of which are Passenger Trains) to occupy a platform line simultaneously, other than for the purposes of attaching, detaching or removing vehicles, without the existence of a mid-platform signal to separate the two trains.

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### Point of Visibility

The position from which the driver of the Second Train has a clear and continuous view of the nearest end of the First Train until he brings his train to a stand short of the First Train.

### Second Train

A train which is signalled onto the Occupied Line.

## 4 Provision and use of Facilities

### 4.1 Requirements Applicable to all Train Movements

#### 4.1.1

The signalling of trains onto Occupied Lines is permitted only where there is no reasonably practicable alternative method of working which presents less risk and all reasonably practicable control measures have been implemented.

#### 4.1.2

At each location where facilities are provided to signal trains onto Occupied Lines, the Infrastructure Controller shall specify and document the particular purposes for which those facilities are permitted to be used, and shall ensure that they are not used for any other purpose.

### 4.2 Specific Requirements for Passenger Train Movements

#### 4.2.1

The provision and use of new/additional facilities for the purposes of signalling a train onto an Occupied Line, where both trains are Passenger Trains, is permitted for the purposes of attaching, detaching or removing vehicles.

#### 4.2.2

The provision and use of new/additional facilities for Platform Sharing purposes is permitted only where it is demonstrably both necessary and safe (see also clause 4.1.1). In support of this, the following requirements shall be complied with:

- a) Platform Sharing facilities shall not be provided where it is reasonably practicable to apply alternative arrangements. The alternative arrangements, in descending order of preference, are:
  - timetabling and platforming of trains so as to avoid the need for two or more trains to make use of the same platform simultaneously;
  - use of mid-platform signals to enable movement of the Second Train to be fully signalled.
  
- b) The Infrastructure Controller, when seeking approval for resignalling proposals under the Railways and Other Transport Systems (Approval of Works, Plant and Equipment) Regulations 1994, shall provide justification to HMRI for the provision of new/additional Platform Sharing facilities, and for the retention and continued use of any existing facilities. The justification shall take account of:
  - the practicability of alternative arrangements for the working of trains (see clause 4.2.2a) above);
  - the incremental cost of providing alternatives to Platform Sharing facilities, compared with the base cost of the resignalling;
  - the extent to which any existing facilities which are to be retained comply with the requirements of this document;
  - the level of risk associated with the use of the facilities for Platform Sharing purposes, compared with that of the alternatives.

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### 4.2.3

When resignalling is being undertaken, the opportunity shall be taken to review existing facilities used for Platform Sharing purposes and to eliminate them by the substitution of alternative arrangements as listed in 4.2.2a), so far as is reasonably practicable.

### 4.3 Specific Requirements for Freight Train Movements

The provision and use of new/additional facilities for the purposes of signalling a train onto an Occupied Line, where the First Train and the Second Train are both Freight Trains, is permitted for the following purposes:

- allowing trains to follow one another;
- attaching, detaching or removing vehicles.

### 4.4

The signalling of trains into Occupied Lines involving Freight Trains and Passenger Trains together (*ie* both types of train in the same signal or block section at the same time) is not permitted.

## 5 Requirements for Movements Involving Passenger Trains

### 5.1 Provision of Signals

#### 5.1.1

Where movements are taking place for the purposes described in clause 4.2, the movement of the Second Train shall be controlled by the use of signals as follows:

- a position light signal associated with a main signal; or
- a semaphore subsidiary signal associated with a main signal.

In addition, if the Second Train does not convey passengers but for the purposes of this document is included within the definition of a Passenger Train, it is permissible to control the movement of the Second Train by the use of signals as follows:

- a position light signal not associated with a main signal;
- a semaphore shunting signal.

[GK/RT0031](#) sets out the requirements for the form of the signals and the provision of associated route indicators.

#### 5.1.2

Where the Point of Visibility of the shortest permissible First Train is ahead of the signal controlling the movement of the Second Train, then the distance from the signal to the Point of Visibility shall be minimised as far as practicable without compromising other requirements for signal positioning (*eg* correct signal spacing, adequate signal sighting), in order to reduce the risk of the driver forgetting the aspect displayed and travelling too fast.

In determining the Point of Visibility, account shall be taken of variable factors such as colour and lighting on the nearest end of the First Train, lighting conditions, potential for other trains to obstruct the view, etc.

#### 5.1.3

The total distance from the signal controlling the movement of the Second Train to the commencement of the platform used for Platform Sharing purposes shall not be greater than 400 metres.

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### 5.2 Distance for Stopping the Second Train for Platform Sharing Purposes

#### 5.2.1

Where platform sharing is proposed, then the Point of Visibility shall be determined for each position that the nearest end of a First Train may occupy along the platform.

#### 5.2.2

Platform sharing is permitted if the Point of Visibility is always at or on the approach to the signal controlling the movement of the Second Train.

#### 5.2.3

Where the Point of Visibility is ahead of the signal controlling the movement of the Second Train, Platform Sharing is permitted if the distance from the Point of Visibility to the position of the nearest end of the First Train is more than that necessary for the driver of the Second Train to observe the train ahead, make a full service brake application, and bring the train to a stand a minimum of two metres short of the First Train.

The speed of the Second Train at the Point of Visibility shall be estimated on the basis that:

- the train has been brought to a stand at the signal controlling the movement into the section of line; and
- the driver is expecting the line to be clear up to the signal (or buffer stop) ahead and is controlling his speed accordingly; and
- the train is due to stop at the station.

#### 5.2.4

Where the calculation required in clause 5.2.3 shows that there is insufficient distance for stopping short of the First Train, then Platform Sharing is permitted only if suitable controls are provided, for example:

- for controlling the speed of the Second Train to a speed less than that for which the Point of Visibility provides adequate braking distance by the use of speed control systems such as TPWS, ATP or similar; or
- for preventing Platform Sharing from being used if the rear of the First Train is standing at a point where the calculation carried out in accordance with clause 5.2.3 has shown there to be inadequate distance.

### 5.3 Signalling Controls

The controls specified in this section shall be incorporated into the signalling system in track circuit block areas equipped with colour light signals.

In areas equipped with other forms of signalling, these controls shall preferably be incorporated into the signalling system. Where this is not reasonably practicable, the requirements shall be met by the provision of instructions issued to signallers.

#### 5.3.1

Where the signal controlling the movement of the Second Train is associated with a main signal (see clause 5.1.1) and both signals read to the same destination, then the operation of the signals shall be achieved by one of the following means:

- a) The signaller operating a separate control device for each one.
- b) Automatic route setting (which includes making use of train description information to ensure that the class of trains involved in the movement are compatible with each other - see clause 4.4).
- c) The signaller operating a common control device, with the selection being performed by the signalling system (dependent on whether or not there is a train ahead). This is a non-preferred option, permitted for use only in existing signal boxes which already use this method of operation.

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The signal shall not be capable of automatic operation unless movements onto an Occupied Line are prevented when the signal is working in automatic mode.

### 5.3.2

The signal which controls the movement of the Second Train is permitted to display the proceed aspect for that movement only when the following conditions are satisfied:

- a) The route up to the signal ahead of the first train is set and locked (an overlap is not required).
- b) No opposing routes called or set.
- c) The signal ahead of the first train is at danger.
- d) The line is clear from the signal to the nearest point where the end of the first train may legitimately be positioned.
- e) The first Train has completed its last signalled movement and is at a stand.
- f) The Second Train has stopped or nearly stopped at the signal.

Controls for approach locking, signal replacement, route holding, route release and SPAD mitigation are mandated in other Railway Group Standards.

### 5.3.3

The following controls shall be applied to the signal(s) towards which the movement of the Second Train is being made, in order to maintain the First Train at a stand while the Second Train is making its movement, and to prevent reading through by the driver of the Second Train:

- a) The signal(s) is permitted to display a proceed aspect only when the Second Train has stopped or nearly stopped on completion of its movement.
- b) AWS or ATP associated with the signal shall not be permitted to give any indication which conflicts with the requirement for the driver of the Second Train to stop short of the First Train.
- c) The signal(s) shall be replaced to danger as soon as practicable after the front of the First Train passes the signal.

## 5.4 Other Controls

### 5.4.1

The timetabling and working of trains shall be arranged so as to avoid the possibility of passengers alighting where it is unsafe to do so from a Second Train which cannot be fully accommodated in a platform.

### 5.4.2

Where operationally practicable, a marker board shall be provided to denote the stopping position for the Second Train.

## 6 Requirements for Movements Involving Freight Trains

### 6.1

Where movements are taking place for the purposes described in clause 4.3, the movement of the Second Train shall be controlled by the use of signals as follows:

- a position light signal associated with a main signal; or
- a semaphore subsidiary signal associated with a main signal; or

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- a position light signal not associated with a main signal; or
- a semaphore shunting signal.

The requirements of section 5.3 of this document shall be applied to movements into Occupied Lines involving Freight Trains, with the following exceptions:

- a) Where a Permissive Freight Line is equipped with automatic signals along the line, the final paragraph of clause 5.3.1 shall apply only to the signal(s) allowing Freight Trains to enter the Permissive Freight Line.
- b) Clauses 5.3.2 c) and 5.3.2 e) are not mandatory.
- c) Clause 5.3.3 a) is not mandatory.

## 7 Risk Assessment

### 7.1

The controls in this document represent the minimum mandatory requirements. Risk assessment shall be used to assist in determining the adequacy of these requirements at each specific location. Appendix A provides a non-exhaustive list of factors which shall be considered. Where the need for additional controls is identified, they shall be applied in addition to those specified in this document. Appendix B provides a non-exhaustive list of possible additional control measures.

### 7.2

Railtrack shall ensure that the use of the facilities is subject to re-assessment (using suitable and sufficient risk assessment as appropriate to the scale of the change) when there is any proposed change which may increase the risks associated with the use of such facilities, such as:

- timetable alteration;
- change of type/length of trains;
- change of operating procedures or instructions;
- infrastructure modification.

### 7.3

The Infrastructure Controller shall implement procedures to ensure that risk assessments required by this document:

- are performed in a consistent and objective manner; and
- take into account the views of train operating companies.

### 7.4

Risk assessments shall be documented and shall form part of the safety related records for the installation. These shall be managed as required by [GI/RT7001](#) Management of Safety Related Records of Elements of the Infrastructure.

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## Appendix A Risk Assessment: Factors for Consideration

The risk assessment shall include, but not necessarily be confined to, consideration of the following factors:

### Factors Affecting the Likelihood of the Second Train Failing to Stop Short of the First Train

- a) The opportunity for the driver of the Second Train to reach too high a speed to be able to stop clear of the First Train.
- b) The variability in the position of the end of the First Train arising from differing train lengths and stopping positions.
- c) The variability in the visibility of the end of the First Train as seen by the driver of the Second Train (colour and lighting on the end of the First Train, lighting conditions, potential for other trains to obstruct the view, etc).
- d) The complexity of the layout, particularly with variable distances to the Point of Visibility depending upon the platform to which the train is routed.
- e) Variations in the standards to which installations along a route or at a specific location comply, causing driver confusion.
- f) The Second Train not decelerating sufficiently quickly (eg due to poor adhesion).
- g) The driver of the Second Train failing to apply the brake correctly (eg due to misjudgement on a heavy falling gradient; misunderstanding as to which platform the train is destined for).
- h) The driver of the Second Train forgetting that the move being made is into an Occupied Line, or is distracted while approaching the end of the First Train.
- i) The opportunity that the driver of the Second Train has to correct any error or misjudgement in braking.
- j) The First Train moves (in either direction) whilst the Second Train is making the movement.
- k) Additional risks arising where the requirements of section 5.3 are met by the use of instructions, rather than by the signalling system.
- l) The likelihood of the driver of the Second Train misreading an adjacent signal or misinterpreting the correct signal, resulting in the driver entering an occupied section believing it to be clear.

### Other Factors

- a) The frequency with which movements into the Occupied Line are made.
- b) The purpose(s) for which the facilities are to be used.
- c) The risk that the Second Train is too long (eg cannot be accommodated in the length of platform available).
- d) The risk that the trains involved are incompatible (eg Freight Train making a movement towards a Passenger Train, or Passenger Train signalled into an Occupied Line where such movements are not permitted).
- e) The risks arising from use of automatic route setting.
- f) The secondary risks arising from a collision (eg spillage of hazardous materials being conveyed in Freight Trains, fouling of adjacent lines).

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### Appendix B Possible Additional Risk Control Measures

This is a non-exhaustive list of additional control measures which may be used to supplement the mandatory requirements of the document, in order to reduce further the risk so far as is reasonably practicable.

#### Signalling Control Measures

- a) Provision of enhanced track occupancy information to the signaller.
- b) Provision of train length measuring controls ("Lime Street" controls).

#### Other Control Measures

- a) Restriction, suspension or imposition of special conditions on movements onto Occupied Lines during fog, falling snow or hours of darkness.

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## References

- [GA/RT6001](#) Railway Group Standards Change Procedures
- [GI/RT7001](#) Management of Safety Related Records of the Elements of the Infrastructure
- [GK/RT0031](#) Lineside Signals and Indicators
- [GO/RT3000](#) Master Rule Book
- [GO/RT3062](#) Signaller's General Instructions and Train Signalling Regulations

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