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**RAILTRACK**  
*Safety & Standards*

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<b>Briefing Notes for:</b>	<b>Train Detection</b>	
<b>Document No:</b>	GK/RT0011	<b>Issue: 3</b>
	GK/GN0611	<b>Issue: 1</b>
<b>Subject Committee(s)</b>	<b>TC&amp;C</b>	
<b>Issue date:</b>	<b>August 2000</b>	
<b>Initial Compliance Date</b>	<b>7 October 2000</b>	

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**Briefing information for:**

- Issue of revised version (Issue 3) of Railway Group Standard GK/RT0011
  - Issue of new Guidance Note GK/GN0611 to support GK/RT0011
  - Proposed transfer to Railtrack Line of various Standards and Codes of Practice relating to train detection
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**1. Revision of GK/RT0011 and production of GK/RT0611**

- 1.1 Railway Group Standard GK/RT0011 has been revised, and a new Guidance Note (GK/GN0611) has been produced. GK/RTR0011 has been restructured to clarify the mandatory high-level requirements for train detection, with guidance material removed and transferred to GK/GN0611. The production of these documents is intended to facilitate the proposed transfer of other Railway Group Standards and Codes of Practice on train detection to Railtrack Line, although this transfer is not taking place at the present time. Further details of the proposed transfer is contained in part 2 of this briefing note.
- 1.2 Because of the scale of the changes to the text of GK/RT0011, black side-barring has not been used in the new version of the standard to indicate amended sections.
- 1.3 The scope of GK/RT0011 is restricted to “infrastructure-based train detection systems”, by which is meant systems primarily based on fixed track equipment, although they may additionally require some or all trains to be fitted with associated train-borne equipment (e.g. track circuit actuators). The standard no longer covers train detection systems entirely based on transmission of information from the train to a remote location (e.g. ERTMS Level 3). Such systems are to be embraced within the new Railway Group Standard for in-cab signalling systems, GE/RT8026, which is to be issued shortly.
- 1.4 The reference in issue 2 of GK/RT0011 to systems “where train positions and/or the state of tracks are wholly or partially generated by human input (e.g. absolute block section)” has been removed. The scope of the standard is limited to equipment which provides information on the presence, absence or position of trains. The requirements for use of such information within a particular signalling system (such as the absolute block system) are covered

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in the relevant standard defining the requirements for the signalling system (e.g. GK/RT0041 for track circuit block, GK/RT0042 for absolute block).

- 1.5 The definition of train detection systems has been amended to exclude reference to detection of train speed and direction of travel and train characteristics. However, clause 4.4.1 includes the possible need to provide information on direction or speed as an additional factor to be considered in selection of a suitable system of train detection.
- 1.6 Subject to the above restrictions of scope, the standard is still intended to cover all types of train detection system. However, it has been restructured so as to separate the general requirements which apply to all train detection systems (section 4) and the additional requirements which apply to train detection systems used to prove that a track section is clear of trains, such as track circuits and axle counters (section 5).
- 1.7 Issue 2 of GK/RT0011 required all train detection systems to detect all vehicles permitted to use the line, but required operating procedures to be available for the safe movement of vehicles which may not be reliably detected. Section 4.2 of issue 3 defines the specific circumstances in which vehicles which are not capable of reliably actuating the train detection systems may be permitted to operate, subject to the provision of appropriate procedures.
- 1.8 Integrity and reliability requirements of train detection systems are now related to the safety performance targets of the signalling system of which they form part (clause 4.3.1).
- 1.9 The detailed list of environmental factors to be considered has been removed from the standard, but is included in the Guidance Note.
- 1.10 A requirement has been included to mandate consideration of secondary safety benefits or disbenefits in the choice of train detection system (clause 4.4.4). Examples of such benefits and disbenefits are included in the Guidance Note.
- 1.11 The standard no longer makes reference to train detection systems giving an “undefined” output state, although the Guidance Note still includes provision for such a state, particularly under failure conditions.
- 1.12 Section 5.3 requires a derailment at trap points to maintain the track section in an occupied state until it has been established that the line is clear. Issue 2 (section 5.7) also contains the requirement to set and maintain occupied the train detection on adjacent lines which could be fouled by a rail vehicle. This requirement is not stated in issue 3 of GK/RT0011, but is to be included in new Railway Group Standard GK/RT0064 (Provision of Overlaps, Flank Protection and Trapping) which is to be issued shortly. Guidance Note GK/GN0611 includes a reference to this requirement in GK/RT0064.
- 1.13 Prescriptive requirements for response times under normal and failure conditions have been replaced by a more general requirement to avoid unsafe conditions or misleading indications arising from response times to changes of state (clause 4.5.2).
- 1.14 GK/RT0011 includes a general requirement to ensure integrity and continuity of train detection (section 5.2). The Guidance Note includes general

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information about the bonding of track circuits necessary to avoid loss of train detection, which summarises the principles underlying GK/RT0252. This includes a reference to the established rules for “yellow bonding” (which are currently included in GK/RT0252) as a suitable method.

- 1.15 Clearance requirements (in section 5.5 and Appendix A) are related to new Railway Group Standard GE/RT8029 “Management of Clearances and Gauging”, which is to be published in August 2000 and will replace existing Standard GC/RT5204.
- 1.16 The requirement for separate indication of trains within a tunnel or similar environment (in section 4.6 of issue 2) has been removed, as this is not in itself a safety requirement. However, provision of such an indication may be advantageous in facilitating compliance with Rule Book and Signalling Regulations, and guidance on this has been included in the Guidance Note (section 6.1).
- 1.17 Appendix A has been revised to remove inconsistent requirements and to improve correlation with the requirements currently shown in GK/RT0252 and GK/RC0752. The Infrastructure Controller is now required to determine alternative dimensions to be applied where vehicles with parameters which do not conform to the stated dimensions are authorised to operate, or where the track interval differs from the normal value of 1970 mm.
- 1.18 During consultation, it was identified that the existing definition of fouling point will not always ensure adequate passing clearances at crossing angles approaching 45°, although a track circuit joint positioned in accordance with the existing definition of the clearance point is likely to provide adequate clearance. The difficulty in interpreting the current definition of fouling point has led to confusion in determining required clearances for vehicles with a longer overhang than the standard. To clarify the requirements, the definition of fouling point (section A.2) has been amended; the fouling point on lines where the nominal track interval is 1970 mm is now defined as the position where the distance between the tracks is 1970 mm between running edges at right angles to the line from which clearance is being determined. (The existing definition in Issue 2 stated that the distance of 1970 mm is measured at right angles to the line in which the fouling point is being determined for crossing angles less than 45°, and along the track in which the fouling point is being determined for greater crossing angles.) The revised definition results in an increased distance of the fouling point from the crossing nose or point of divergence, with a corresponding change in the position of the clearance point. This increase will be small for small crossing angles and for angles close to 90°. As turnouts generally have a crossing angle of less than 10°, the difference at converging or diverging points will be small, and a significant change will only be required at diamond crossings. The maximum increase, for lines at an angle of 45°, will be 577 mm (measured at right angles to the “through” line), since for this angle the existing definition of fouling point provides a separation of only 1393 mm measured in this way; the corresponding increase in distance measured along the diverging line will be 816 mm.
- 1.19 Provision is also included for an appropriate fouling point to be defined to provide the required clearances on lines where the nominal track interval is greater than 1970 mm.

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1.20 The existing requirement for a maximum stagger between IRJs of 2.6 m has been extended to apply to the maximum length of any gap in effective detection of axles where continuous train detection is required (section A.5).

### 1.21 Compliance Requirements

Compliance with the provisions of GK/RT0011 Issue 3 relating to signalling design is required for all schemes involving provision of or alteration to train detection equipment for which the signalling scheme plan is approved, or altered and re-approved), on or after 7th October 2000. Where changes to GK/RT0011 result in conflict between GK/RT0011 Issue 3 and the Railway Group Standards and Codes of Practice listed in section 2.3 of this briefing note (in particular with respect to the revised definition of fouling point described in section 1.18 above), the requirements of GK/RT0011 Issue 3 shall take precedence.

For provisions of GK/RT0011 Issue 3 other than those relating to signalling design, compliance is required by 2nd December 2000. This includes the requirements in clauses 4.2.3, 4.2.4 and 4.2.5 to ensure the application of suitable operating procedures to safeguard the movement of vehicles which may not be reliably detected. It is envisaged that existing procedures will generally be sufficient to meet these requirements, but an extended interval between publication and compliance is being provided to allow for any deficiencies in existing procedures to be identified and addressed.

## 2. Proposed transfer to Railtrack Line of various Standards and Codes of Practice relating to train detection

2.1 Railtrack Safety and Standards Directorate, together with Railtrack Line, has been developing proposals and plans for the transfer of a number of documents (both mandatory Railway Group Standards and Codes of Practice) to Railtrack Line.

2.2 The Standards to be transferred include:

- A number of Standards and Codes of Practice relating to Signalling Design
- The Signalling Installation Handbook
- A number of Standards and Codes of Practice relating to Signalling Works Testing
- A number of Standards relating to signalling asset management
- A number of Standards and Codes of Practice relating to train detection.

2.3 The train detection Standards and Codes of Practice which are the subject of the proposed transfer comprise those currently included in the Train Detection Handbook (GK/RH0751), namely:

GK/RT0252	Minimum Requirements for the Bonding of Track Circuits
GK/RC0752	General Information on Track Circuits
GK/RC0753	Track Circuit Requirements for A.C. Traction
GK/RC0754	Track Circuit Requirements for D.C. Traction
GK/RC0755	D.C. Track Circuits
GK/RC0756	HVI Track Circuits
GK/RC0757	50Hz A.C. Track Circuits
GK/RC0758	83 <sup>1</sup> / <sub>3</sub> Hz A.C. Track Circuits

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GK/RC0759	VT1(SP) A.C. Track Circuits
GK/RC0760	Westinghouse Signals FS2600 Track Circuits
GK/RC0761	TI21 Audio Frequency Track Circuits
GK/RC0762	Track Circuit Actuator Interference Detector
GK/RC0763	Reed Track Circuits, Type RT
GK/RC0861	Train Wheel Detector for Signalling Purposes

In addition, GK/RT0251, which simply mandates the existence and use of the Train Detection Handbook, is to be withdrawn. JDP C006, Class 140-156 Trains not fitted with Track Circuit Actuators, will also be withdrawn, and its requirements incorporated into other standards.

- 2.4 In the particular case of the train detection documents, Railtrack Line is undertaking a major restructuring of its documentation. Most of the material in the Railway Group Standards Train Detection Handbook GK/RH0751 is expected to become part of a Train Detection Manual within the Railtrack Line suite of documentation.
- 2.5 Railtrack Line have stated that they will ensure that all the material currently in the suite of train detection Railway Group Standards and Codes of Practice is retained when transferred into their Train Detection Manual. However, the individual documents within the Manual may not be structured in the same way as the current documents.
- 2.6 The detailed requirements in the new Railtrack Line documents will be compliant with the mandatory requirements of the new issue of GK/RT0011, although in practice this is not likely to require any significant change from the requirements currently expressed in the train detection related Railway Group Standards and Codes of Practice which are to be transferred.
- 2.7 All the new Railtrack Line documents will be available on the Line CD-ROM before the current Railway Group Standard level documents are removed from the Railway Group Standards CD-ROM, so there will be no loss of continuity of information or requirements. The new documents are currently expected to be published by Railtrack Line in December 2000. A further briefing note will be issued by Safety & Standards Directorate at that time to support the withdrawal of the existing Standards and Codes of Practice from the S&SD suite.

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