Introduction and Use of Axle Counters – Managing the Risk

Synopsis
This document mandates requirements for managing the introduction and use of axle counters so that operational risks are controlled during planning, implementation and operational stages.

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Issue record

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GE/RT8217 issue 2 ceases to be in force and is withdrawn as of 05 February 2010. GE/RT8217 issue 3 comes into force as of 06 February 2010.

Supply

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Part 1 Purpose and Introduction

1.1 Purpose

1.1.1 This document mandates requirements for managing the introduction and use of axle counters so that operational risks are managed during planning, implementation and operational stages.

1.2 Introduction

1.2.1 Background

1.2.1.1 The railway industry has in recent years looked increasingly towards using axle counter systems, rather than track circuits, as the primary means of train detection.

1.2.1.2 When considering introducing an axle counter-based train detection system, the following operational issues need to be addressed by the compatibility review forum:

a) the method adopted for resetting and restoring the axle counter system and any consequences for railway undertakings in requirements for examination of the line

b) the potential loss of a method of emergency protection, since track circuit operating clips will be ineffective

c) the need to assess the adequacy of driver to signaller communication systems

1.2.1.3 Issue 2 of this document was published in April 2003 to support the ongoing introduction and use of axle counters. It was recognised that axle counter technology was evolving rapidly as methods and processes developed and that it was likely the standard would need reviewing to remain fit for purpose. In accordance with the Railway Group Standards Code, and as part of a structured review of all standards, this document was examined to confirm whether it remained in scope. Some requirements have been found to be a single duty holder responsibility and therefore should no longer be mandated in a Railway Group Standard.

1.2.1.4 Information relating to sharing information between duty holders during the planning process can be found in GE/RT8270 Assessment of Compatibility of Rolling Stock and Infrastructure. Requirements that relate to operational requirements have been retained and revised to aid clarity.

1.2.2 Principles

1.2.2.1 The requirements of this document are based on the principle that the infrastructure manager and railway undertakings affected by a proposed axle counter scheme should share information in the compatibility review forum that address the issues listed in 1.2.1.2, so that transitional risks are managed as an axle counter scheme is introduced. In particular, consideration should be given to the need to improve train to signaller communication. In general, a system from the following hierarchy (referenced in paragraph 1.2.4.1), in order of preference may be adequate, subject to confirmation of adequate coverage, quality and availability in the particular area:

i) GSM-R

ii) CSR
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iii) IVRS
iv) NRN
v) lineside telephones

Where coverage, quality or availability is inadequate, the adequacy of two or more systems in combination with each other should be considered.

1.2.2.2 An axle counter system should not be brought into operational use until all the technical, procedural and operational systems required to support normal, degraded and emergency operations have been implemented. This may include the need to issue IVRS handsets.

1.2.2.3 Staff affected by an axle counter scheme should be provided with appropriate information and training to facilitate transition to the new mode of train detection, and ongoing safe operation (particularly during failure conditions, or recovery from failures or engineering possessions when reset and restoration procedures are invoked).

1.2.3 Related requirements in other documents

1.2.3.1 The following Railway Group Standards contain requirements that are relevant to the scope of this document:

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1.2.4 Supporting documents

1.2.4.1 RSSB report ‘Risk Assessment of Failure of the Interim Voice Radio System (IVRS)’ dated May 2006. Authors: David Harris, Kaj Somaiya and Katherine I’ Anson.
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2.1 Responsibilities of the infrastructure manager and railway undertakings affected by an axle counter scheme

2.1.1 Requirement for communications systems
2.1.1.1 The infrastructure manager and railway undertakings shall, for double and multiple track routes, assess the adequacy of communications systems between train and signaller, to mitigate against the potential loss of protection to adjacent lines provided by application of track circuit operating clips.

2.1.1.2 The infrastructure manager and railway undertakings shall provide people working on or near the line, whenever they are required to be in possession of track circuit operating clips, with a means of direct communication with the controlling signaller.

2.1.2 Requirement to implement mitigating measures before bringing an axle counter system into operational use
2.1.2.1 The infrastructure manager and railway undertakings shall not bring an axle counter system into operational use until all the technical, procedural and operational systems required to support normal, degraded and emergency operations have been implemented.

2.2 Responsibilities of the infrastructure manager

2.2.1 Requirement to consider plans
2.2.1.1 The infrastructure manager shall convene a compatibility review forum, including participants with suitable expertise in axle counter systems, to consider the specific axle counter proposal and share information on the need for mitigation measures to address issues listed in paragraph 2.2.2.1.

2.2.2 Requirements when proposing to introduce an axle counter scheme
2.2.2.1 The infrastructure manager shall, when proposing to introduce an axle counter scheme, share information with affected railway undertakings through the compatibility review forum to confirm that the scheme plan addresses and mitigates operational risks arising from the following issues (as a minimum):

   a) the method adopted for resetting and restoring the axle counter system
   b) the potential loss of a method of emergency protection (where applicable in relation to the current method of train detection)
   c) the adequacy over the line of route of train to signaller communication systems.

2.2.2.2 The infrastructure manager shall identify to railway undertakings all lines where axle counters provide the means of train detection.

2.3 Responsibilities of railway undertakings affected by an axle counter scheme

2.3.1 Requirement to provide additional emergency communications equipment on trains
2.3.1.1 Railway undertakings shall only permit a train to operate over a route equipped with axle counters when the train and/or the driver of the train has been provided with any communication equipment required to be provided for that route as a result of the compatibility review forum.
Part 3 Application of this document

3.1 Application - infrastructure manager

3.1.1 Scope
3.1.1.1 The requirements of this document apply to all axle counter installations used as the primary means of train detection for double and multiple track systems in signalling schemes introduced from the date this standard comes into force.

3.1.2 Exclusions from scope
3.1.2.1 There are no exclusions from the scope specified in clause 3.1.1.1 for the infrastructure manager.

3.1.3 General compliance date for infrastructure managers
3.1.3.1 This Railway Group Standard comes into force and is to be complied with from 06 February 2010, except as specified in section 3.1.4. Where the dates specified in section 3.1.4 are later than the above date, this is to allow infrastructure managers sufficient time to achieve compliance with the specified exceptions.

3.1.4 Exceptions to general compliance date
3.1.4.1 There are no exceptions to the general compliance date specified in clause 3.1.3 for infrastructure managers.

3.2 Application - railway undertakings

3.2.1 Scope
3.2.1.1 The requirements of this document apply to all axle counter installations used as the primary means of train detection for double and multiple track systems in signalling schemes introduced from the date this standard comes into force.

3.2.2 Exclusions from scope
3.2.2.1 There are no exclusions from the scope specified in clause 3.2.1 for railway undertakings.

3.2.3 General compliance date for railway undertakings
3.2.3.1 This Railway Group Standard comes into force and is to be complied with from 06 February 2010, except as specified in section 3.2.4. Where the dates specified in section 3.2.4 are later than the above date, this is to allow railway undertakings sufficient time to achieve compliance with the specified exceptions.

3.2.4 Exceptions to general compliance date
3.2.4.1 There are no exceptions to the general compliance date specified in clause 3.2.3 for railway undertakings.

3.3 Health and safety responsibilities

3.3.1 Users of documents published by RSSB are reminded of the need to consider their own responsibilities to ensure health and safety at work and their own duties under health and safety legislation. RSSB does not warrant that compliance with all or any documents published by RSSB is sufficient in itself to ensure safe systems of work or operation or to satisfy such responsibilities or duties.
Definitions

Axle counters
Throughout this document the term ‘axle counters’ refers to all the axle counters being installed within the geographic limits of a particular named scheme.

Axle counter system
A method of train detection in which track-mounted equipment counts the number of axles (by detecting wheels passing a detection point) entering and leaving a track section at each extremity, and this information is evaluated to determine whether the track section is occupied or clear.

Compatibility review forum
A meeting convened by the proposer (the infrastructure manager in the case of an axle counter scheme) with affected parties to exchange information and review the compatibility of a proposed change with the assets of the affected parties. The functioning of a compatibility review forum is described in GE/RT8270 Assessment of Compatibility of Rolling Stock and Infrastructure.

CSR
A legacy analogue train radio system (cab secure radio) providing secure direct communication between driver and controlling signaller.

GSM-R
A digital radio system (Global System for Mobile communications – Railways) based on the GSM Mobile communication standard adapted for use on European railways. The GSM-R system for the purposes of this document is one that complies with the EIRENE Functional Specification (version 5) and the System Requirement Specification (version 13).

IVRS
A portable communication system (interim voice radio system) utilising mobile telephone handsets issued to traincrew providing an emergency link to the controlling signaller.

NRN
A legacy analogue non-secure train radio system providing a dial telephone facility, also emergency call facility between driver and local operations control.

Reset
The action of setting the number of axles registered in a track section to zero.

Restoration
The final action in accepting an axle counter back into service after failure, disturbance or miscount.

Scheme
A systematic plan to install or upgrade axle counters within defined geographic limits.

Track circuit
For the purposes of this document, the term ‘track circuit’ refers to the detection of trains, within a particular section of track, by means of the electrical circuit created between the running rails by one or more train axles.
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References

The Catalogue of Railway Group Standards and the Railway Group Standards CD-ROM give the current issue number and status of documents published by RSSB. This information is also available from www.rgsonline.co.uk

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