

Ref	NR/SP/SIG/11130
Issue	2
Date	October 2006

Business Process Document

Requirements for the Provision of SPAD Alarms at Signalling Control Centres

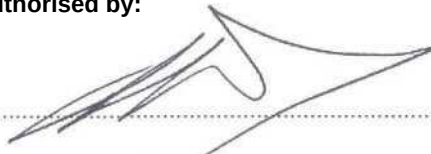
Endorsement & Authorisation

Endorsed by:



A Simmons, Professional Head of Signalling

Authorised by:



A McNaughton, Chief Engineer

Accepted for issue by:



M McManus, National Standards Manager

This document is the property of Network Rail. It shall not be reproduced in whole or part nor disclosed to a third party without the written permission of the Standard Owner.

© Copyright 2006 Network Rail

Uncontrolled copy once printed from its electronic source.

Published & Issued by: Network Rail 40 Melton Street, London NW1 2EE



Ref:	NR/SP/SIG/11130
Issue:	2
Date:	October 2006

Issue record

Issue	Date	Comments
1	December 2002	First Issue
2draft2	June 2006	SPAD Alarms with Panels mandated
2draft3	July 2006	Updates following comments
2draft4	August 2006	Update following stakeholder review

Implementation

The requirements specified in this document shall be enforced from 1st November 2006.

Compliance

This Network Rail Specification is mandatory and must be complied with by all VDU based control systems. New panels installed after 2nd December 2006 shall also comply with the new requirements. Retrospective fitment is required where a major upgrade is planned.

When this Specification is implemented, it is permissible for all projects, which have formally completed GRIP Level 4, to continue to comply with the Issue of any relevant Network Rail Standards current when GRIP Level 4 was reached and not to comply with requirements contained herein unless the designated Standard Owner has stipulated otherwise in the accompanying Briefing Note.

Where the Standard Owner has specified that all projects will comply with the requirements, specific authority not to comply can be sought in the usual manner using the appropriate non-compliance authority processes described in Network Rail Standard, [NR/SP/STP/045](#) Managing the Process for Non-compliance Authority (formerly RT/LS/P/045).

Disclaimer

In issuing this document for its stated purpose, Network Rail makes no warranties, express or implied, that compliance with all or any documents it issues is sufficient on its own to ensure safe systems of work or operation. Users are reminded of their own duties under health and safety legislation.

Supply

Copies of documents are available electronically, within Network Rail's organisation. Hard copies of this document will be available to Network Rail employees on request to the Document Controller and to other organisations from IHS Technical Indexes (01344 404409)

Copyright Network Rail
Provided by IHS under license with Network Rail
No reproduction or networking permitted without license from IHS

Ref:	NR/SP/SIG/11130
Issue:	2
Date:	October 2006

Contents

1	Purpose	4
2	Scope	4
2.1	General	4
2.2	Constraints	4
3	Reference documentation	4
4	Definitions	5
5	Performance Requirements	5
5.1	General	5
6	Particular Characteristics	6
6.1	Functional requirements	6
6.2	Signaller Actions	11
6.3	Technician / Maintainer Interface	11
6.4	Training	12
6.5	Documentation	12
6.6	Procedures for the Management of SPAD Audible Alarm Override	12
Appendix A	Example SPAD detection Scenarios	13
Appendix B	SPAD Detection System Process Flow chart	16

1 Purpose

This specification defines the operational and technical requirements for the provision of SPAD alarms at signalling control centres. The objective is to present a consistent approach that reflects best practice and to ensure that human factors considerations are properly addressed.

2 Scope

2.1 General

These requirements are primarily intended to be applied to new VDU and Panel based signalling control systems. Retrospective application of these requirements is required when a major upgrade to the signalling system is planned.

The use of SPAD alarms at other types of signalling control centre e.g. Lever Frame, may be required, in which case the principles for SPAD detection outlined in Appendix A and the general handling of alarms shall apply.

2.2 Constraints

This specification does not endeavour to define the course of action that a signaller should follow if a SPAD occurs. In such cases the signallers will follow the instructions in the Signalling Regulations and locally briefed instructions.

3 Reference documentation

The following Network Rail document is referenced within this specification:

[NR/SP/SIG/10067](#) Requirements Specification for a VDU based System

Other references are as follows:

- [1] The Ladbroke Grove Rail Part 1 Report, ISBN 0 7176 2056 5 dated 2001.

Recommendation 47. There should be a unique alarm for SPADs, which should sound until it is turned off.

- [2] The Ladbroke Grove Rail Part 1 Report, ISBN 0 7176 2056 5 dated 2001.

Recommendation 48. The speed with which signallers can take action to move points in an emergency should be improved (Para 12.22). Para 12.22 adds – this could be achieved by (for example) the detailed screen being brought up automatically (following a SPAD).

- [3] BS EN16508 Functional Safety : Safety Related Systems
- [4] BS EN50128 Railway Applications: Software for Railway Control & Protection Systems

4 Definitions

ARS	Automatic Route setting Subsystem
ARS sub-area	A grouping of signals that can have ARS active or passive
GIV	General Information VDU for system management
IECC	Integrated Electronic Control Centre
NDA	Non Described Alarm
OCU	Operators Control Unit for interfacing to the TD.
POS	Panel Overview Screen for use with large panels
SIL	Safety Integrity Level or SPAD Inhibit Long (context sensitive)
SIS	SPAD Inhibit Short for 'one shot' events
SPAD	Signal Passed at Danger
SPAD sub-area	An area in which SPAD detection takes place, normally coinciding with the signaller's control area
SSD	System for SPAD Detection
TD	Train Descriptor
VDU	Visual Display Unit

5 Performance Requirements

5.1 General

5.1.1 When SPAD monitoring is applied at a signalling installation it shall apply to all signals capable of being SPADed within a signaller's control area.

5.1.1.1 This requirement does not apply to Auto Signals that have no red aspect proving at the interlocking or to signals in absolute block sections where insufficient information is available.

5.1.2 The system for SPAD detection shall be designed to achieve the reliability and safety integrity commensurate with a SIL 1 classification [3], [4].

5.1.3 False alarms due to external system failures e.g. track circuits, shall be allowed for in the SPAD detection logic to minimise the generation of false alarms.

5.1.4 A SPAD shall be alarmed to the signaller within 500ms of the event being detected by the interlocking.

5.1.5 The objective of the SPAD alarm and the associated indications is to alert the signaller and draw his attention to the location as quickly as possible.

6 Particular Characteristics

6.1 General

- 6.1.1 For this section, the terms 'System for SPAD Detection (SSD)' and 'SPAD sub-area' have been introduced. A SPAD sub-area is the area in which SPAD detection takes place and normally corresponds to a signaller's control area.
- 6.1.2 The SSD is the generic term applied to the system that carries out the SPAD detection process, it is possible that system designers may wish to combine this function with other systems.
- 6.1.3 References to ARS may not be relevant at all sites however the design of the SSD needs to make due provision.
- 6.1.4 Examples of the new symbols referred to in this specification are included in the [NR/SP/SIG/10067](#).
- 6.1.5 Refer to Appendix B for the SPAD detection system process flow chart.
- 6.1.6 *Sentences in italics* are for clarification of the requirement or to give guidance on preferred solutions.

6.2 Panel Special Requirements

- 6.2.1 Panels will require a general information VDU (GIV) as defined in [NR/SP/SIG/10067](#) for the management of alarms and the train describer. The provision of a separate TD OCU is therefore not required.
- 6.2.2 The GIV maps shall include both TD and signalling information to allow the management of SPAD Alarms.
- 6.2.3 Each signaller's control area requires a GIV. Large panels requiring the signaller to walk from one work area to another, shall be provided with a duplicate GIV to facilitate easy access.
- 6.2.4 Large panels with complex layouts shall be provided with additional aids to quickly draw the signaller's attention to the location of the SPAD. This shall be achieved by one of the following methods:
- 6.2.4.1 One or more additional VDU panel overview screens (POS) displaying a reduced scale overview of the whole panel (or relevant part thereof) with grid lines dividing the panel into sections. When a SPAD occurs the relevant grid is highlighted in yellow such that the signaller can quickly identify the area of the panel to attend to.
- 6.2.4.2 Each signal represented on the panel shall have an adjacent indication that is illuminated yellow when a SPAD occurs at the signal.