

TECHNICAL INSTRUCTION	TI 095 Issue 4 26/05/2010 Page 1 of 14
	NETWORK RAIL - SIGNAL ENGINEERING Signal Overrun Risk Assessment
Relevant Standard: NR/L2/SIG/14201, Issue 2	

Purpose

To provide guidance and information to promote consistency of the signal overrun risk assessment process using the SAT-DA software and the criteria for the selection of signals for Detailed Assessment.

Scope

This instruction applies to all trained users of SAT-DA software used for undertaking signal overrun risk assessments as required by Company Standard NR/L2/SIG/14201. This applies to both assessments of Existing Layouts and also in connection with Infrastructure Change.

Compliance Requirements

The information contained in Section 2 of this Technical Instruction is mandatory. Immediate compliance is required for Existing Layouts and Infrastructure Change projects that have not received Approval in Principle of the Signalling Scheme Plan at GRIP stage 4.

The information contained in Section 3 of this Technical Instruction is mandatory. Immediate compliance is required for Existing Layouts and Infrastructure Change projects (irrespective of GRIP stage). In respect of SAT assessment, the requirement to use SAT Local applies to all SAT assessments that are commenced after the issue of this instruction.

The information contained in Section 4 of this Technical Instruction is mandatory for Infrastructure Change projects that have not completed Detailed Assessment.

The information contained in Section 5 of this Technical Instruction is for guidance purposes. It does however reflect best practice to date. Any further improvement suggestions or examples of best practice should be sent to the System Risk Control Specialist (satassistance@networkrail.co.uk), Safety & Compliance to consider inclusion in any future issue of this Technical Instruction.

Originator's Details:-

This instruction has been produced through cross-functional stakeholder consultation within Network Rail. Consulted parties for this issue were:

- John Alexander, Signal Engineering
- Alan Symons, Safety & Compliance
- Paul Humphreys, Infrastructure Projects
- John Egan, Infrastructure Projects

Any future changes proposed to this document will require agreement by ALL of the relevant functions (i.e. Engineering SP&C, Operations & Customer Services, Safety & Compliance and Infrastructure Projects).

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Changes in this issue

In the light of experience of applying the earlier version of this standard a number of ambiguities have been corrected in this version.

A section has been added on the management of the risk associated with SASSPADs and also on the establishment and agreement of the effectiveness of TPWS installations.

Following an application to RSSB, the industry has revised the definition of a signal which does not require detailed assessment (often known as a simple signal) and this is also reflected in this issue of the TI.

Expiry Date

This Technical Instruction will remain in place until (i) it is updated, or (ii) a Level 3 standard is produced containing the guidance contained herein, or (iii) SAT is replaced by a new Risk Assessment Toolset (i.e. SORAT) and hence new guidance is required.

Staff to be Briefed

Staff requiring briefing on the content of this Technical Instruction include:

- All current users of the SAT software package (e.g. Area based Operations Risk Control Co-ordinators, Signalling Scheme Project Managers, Signal Design Engineers, Signalling Project Engineers, Signalling Scheme Designers). This includes both Network Rail employees and contracted outside parties.
- Relevant posts under the Professional Head (S&T)
- Relevant posts under the Head of Operations
- Relevant Sponsors and Responsible Persons (as defined in NR/L2/SIG/14201)
- Staff undertaking the role of Competent Independent Person

Abbreviations & Definitions

ALARP	As Low As Reasonably Practicable
ATP	Automatic Train Protection
CCF	Control Centre of the Future
CDR	Conditional Double Red
CEBN	Chief Engineer's Briefing Note
DA	Detailed Assessment
DMU	Diesel Multiple Units
DVT	Driving Van Trailer
ECS	Empty Coaching Stock
EMU	Electrical Multiple Units
ERTMS	European Rail Traffic Management System
FOC	Freight Train Operating Company
GRIP	Guide to Railway Investment Projects
HST	High Speed Train
ORCC	Operations Risk Control Co-ordinator
OSS	OverSpeed Sensor
PPS	Probability of Points Set
ROL	Restricted OverLap
SAT	Signal Assessment Tool (Microsoft Access based software used for undertaking signal risk overrun risk assessment)
SASSPAD	Start Away from Signal SPAD
SFAIRP	So Far As Is Reasonably Practicable
SPAD	Signal Passed At Danger
TOC	Passenger Train Operating Company

TPWS	Train Protection & Warning System
TSERAT	Timetable Search Engine for Risk Assessment Tools
TSS	Train Stop Sensor
WTT	Working TimeTable

Background

Signal overrun risk assessment is presently undertaken by trained users of the SAT-DA software. This software has been in use within Network Rail (formerly Railtrack) since 2003. During its early use variations were identified in the way the process was being applied and the way in which data was being entered into the SAT-DA software. To promote a more consistent way of undertaking the risk assessment; this Technical Instruction has been produced, and at the same time the opportunity has been taken to define the most up to date requirements and guidance.

Detail Of Technical Instruction

1. Scope of Signals Requiring SAT Risk Assessment

Company Standard NR/L2/SIG/14201 defines the risk assessment process to be followed for assessing signal overrun risk and the circumstances within which the risk assessment process is to be applied. The risk assessment process applies to both Infrastructure Change (as defined in Section 5.2) and Existing Layouts (as defined in Section 5.3).

All main signals shall be subject to the risk assessment process detailed in NR/L2/SIG/14201 unless:

(i) they satisfy the modified requirements of Section 4.4 a) of Group Standard GI/RT7006 (see 1.1 below)

OR

(ii) they satisfy the requirements of Section 4.4 b) of Group Standard GI/RT7006 AND a train protection system other than TPWS (e.g. ATP, ERTMS) is available for all trains.

OR

(iii) they are at the exit from a siding with trapping protection.

Note: Exclusion of siding exit signals from the signal overrun risk assessment process does not waive the requirement to assess risks arising from derailment at the trap points.

Shunt signals are not required to be subject to the risk assessment process except where they are regularly used to protect junction conflicts on running lines. Trapping protection may be regarded as removing junction conflicts.

1.1 Derogation 09/191/DGN

GI/RT7006 clause 4.4a is modified to read:-

a) A stop signal on plain line with no points or crossings between the stop signal and the next stop signal ahead, meeting all the following criteria:

i. The signal and the associated preceding caution signal(s), and the associated AWS equipment, are compliant with the requirements of the RGSs that are in force at the time of the risk assessment and which are relevant to the control of overrun risk.

- ii. It is unlikely that a driver would misinterpret another nearby signal as being applicable to his train (this applies at both the stop signal and the preceding caution signal(s)).
- iii. The signal is free of approach control.
- iv. A full overlap is provided beyond the signal, with no provision made for the use of reduced or restricted overlaps. See GK/RT0064.
- v. There are no infrastructure features between the stop signal and the next stop signal ahead that could either increase the likelihood of a collision or could significantly worsen the consequences of a collision or derailment.

Note: GI/GN7606 guidance on clause iii above is amended to interpret this requirement as including warning (W) class routes, controlled double red (CDR), three to four aspect transitions, four aspect 1/3 rule controls or less than minimum signal spacing (in three aspect signalling) as reasons for approach control.

Note: GI/GN7606 guidance on clause v above is amended to interpret this requirement as Stations, Tunnels, Viaducts, Manual or Automatic Level Crossings.

1.2 Changes to Authorised Line Speeds and Traffic Levels

The risk assessment process is not limited to signals altered by a project or immediately affected by revised infrastructure. Existing unaltered signals may need assessment where the changes carried out by a Project are intended to provide for new or increased traffic flows or changes in speed. The change in speed or traffic flow may occur only on conflicting routes.

Removal of infrastructure facilities (e.g. a crossover) may result in the need to revisit signal overrun risk assessments for those signals where any remaining traffic is rerouted.

1.3 Fringe Signals

Signals where one or more of the preceding caution signals are altered by a Project but which are not themselves altered do not require assessment unless the prior signal is provided with new approach release control.

Signals which are not altered by a Project but which read into the re-signalled area with no change in speed or traffic levels need not be assessed during the design phase. The existing signal overrun risk assessment shall be updated by the Project for changes in non-junction conflict data as part of the 'as-built' records.

Where the signal beyond the re-signalled area, or reading into the re-signalled area is owned and operated by another Infrastructure Manager, no assessment is required. The other Infrastructure Manager should be advised of the changes that will be made and requested to review their operational risks in the light of the changes proposed.

2 Signal Assessment Tool Cut Off Score when a Detailed Assessment is Required

2.1 Infrastructure Change

The criteria referred to in NR/L2/SIG/14201 Section 7.1) to select signals for Detailed Assessment is defined as follows:

The top 20% of signals requiring risk assessment within the scope defined by Section 1 above, when placed in order of descending SAT score before the mitigation provided by TPWS fitment has taken into account shall be subject to Detailed Assessment.

Additionally, any signal where the SAT score is 150 or greater after the mitigation provided by TPWS (if fitted) has been taken into account shall always be selected for Detailed Assessment.

Where it can be demonstrated that there is no change to the layout risk, or that all reasonably practicable mitigation measures have already been applied, the persons giving Approval in Principle to the Scheme Plan at GRIP stage 4 may agree that some or all signals can be excluded from Detailed Assessment. The project team shall provide a written demonstration that there is no change to the layout risk, or that all reasonably practicable mitigation measures have already been applied.

Note: Where all the SAT scores are very low, it may be appropriate to consult with the relevant parties in correspondence rather than calling a meeting to undertake the Detailed Assessment.

The assessor shall also consider inclusion of any signals that may not fulfil either of the above criteria but where there are extremes in the balance between collision frequency score and consequence (before the mitigation provided by TPWS is taken into account). The assessor shall contact the Chairman of the Signal Sighting Committee for advice on those signals that are worthy of further study and also review the SPAD history of altered or equivalent existing signals.

2.1.1 Stage Works and other Scheme Plan Changes

Following a Detailed Assessment of the top 20% of signals it is common for further changes to be made to the scope of a Project. Once plans have been approved, stagework plans showing the implementation strategy will be produced: these may have conflicts in different positions to the final layout as signals and points are moved or commissioned separately.

DA assessments should be reviewed to confirm the mitigations remain valid and the signal overrun risk has been reduced so far as is reasonably practicable.

Where a revised SAT score is above that of the threshold previously determined for the Project, the signal shall be subject to Detailed Assessment.

Review of previous DA results following changes to the layout shall involve O&CS representatives. TOC/FOC representatives at the DA shall be advised of the results of the review. If the changes proposed give rise to concerns at the internal review the DA panel shall be reconvened.

In simple cases (e.g. increased distance to conflict point) it may be possible to determine that the SAT score will reduce without calculating the new SAT score. The qualitative argument should be recorded in the SAT assessment.