



Management of SPADs and Proceed Authority Exceeded Events



Operations Standard

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This Australian Standard® AS 7457 Management of SPADs and Proceed Authority Exceeded Events was prepared by a Rail Industry Safety and Standards Board (RISSB) Development Group consisting of representatives from the following organisations:

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Development of the Standard was undertaken in accordance with RISSB's accredited process. As part of the approval process, the Standing Committee verified that proper process was followed in developing the Standard.

RISSB wishes to acknowledge the positive contribution of subject matter experts in the development of this Standard. Their efforts ranged from membership of the Development Group through to individuals providing comment on a draft of the Standard during the open review.

I commend this Standard to the Australasian rail industry as it represents industry good practice and has been developed through a rigorous process.

Paul Daly

Chief Executive Officer

Rail Industry Safety and Standards Board

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1 Introduction

1.1 Purpose

This Standard contains the requirements for managing signal passed at danger (SPAD) events in a way that ensures that risk following a SPAD is mitigated. It also details the requirements to ensure that each SPAD is investigated in a consistent and structured way to establish the full facts and causes, to prevent, or reduce the probability of, recurrence.

For ease of readability and for this document only the term SPAD includes a proceed authority exceeded event.

1.2 Scope

The scope includes the management of the SPAD incident from the occurrence of the event to the closure and communication of the investigation.

1.3 Compliance

There are two types of control contained within Australian Standards developed by RISSB:

- (a) Requirements.
- (b) Recommendations.

Requirements – it is mandatory to follow all requirements to claim full compliance with the Standard.

Requirements are identified within the text by the term 'shall'.

Recommendations – do not mention or exclude other possibilities but do offer the one that is preferred.

Recommendations are identified within the text by the term 'should'.

Recommendations recognise that there could be limitations to the universal application of the control, i.e. the identified control cannot be able to be applied or other controls can be appropriate / better.

For compliance purposes, where a recommended control is not applied as written in the standard it could be incumbent on the adopter of the standard to demonstrate their actual method of controlling the risk as part of their WHS or Rail Safety National Law obligations. Similarly, it could also be incumbent on an adopter of the standard to demonstrate their method of controlling the risk to contracting entities, or interfacing organisations where the risk may be shared.

Controls in RISSB standards address known railway hazards as included in an appendix.

1.4 Referenced documents

1.4.1 Normative references

The following referenced documents are indispensable for the application of this Standard:

- (a) RISSB SPAD Risk Management Guideline (2014)
- (b) ONRSR Reporting Requirements for Notifiable Occurrences (2017)

- (c) Code of Practice - Railway Operations – Rail Investigations (2014)HF
Guideline, etc

1.4.2 Informative references

The following referenced documents are used by this Standard for information only:

- (a) GO/RT3252 Signals Passed at Danger (SPADs), RSSB UK, 2003
(b) National Safety and Quality Health Service Standards – Second Edition (2018)

1.5 Definitions

Network Control Officer: A competent worker who authorises, and can issue occupancy authorities, and who manages rail traffic paths to ensure safe and efficient transit of rail traffic in the network. The competent worker can be known a Train Controller, Network Controller or Signaller.

Rail Traffic: Trains and track vehicle or vehicles travelling in the network.

Rail Traffic Crew: Competent workers responsible for the operation of rail traffic.

Safety Critical Work: Work that can lead directly to a serious incident affecting the public or the rail network.

Stop signal: A signal capable of displaying a stop aspect or indication. Additionally, for the purpose of this document, it includes:

- end of in-cab signalled movement authority
- stop boards or indicators
- limit of shunt indicators
- position light and shunting signals where the normal aspect means ‘stop’
- and (where applicable) the movement is in the direction for which the signal
- can be cleared
- possession limit boards
- marker boards at the entrance to or exit from a worksite within a
- possession
- stop indications given by authorised hand signallers or by a signaller.

1.6 Abbreviations

AWS:	Automatic warning system
CCTV:	Closed-circuit television
ONRSR:	Office of the National Rail Safety Regulator
RIM:	Rail Infrastructure Manager
RISSB:	Rail Industry Safety and Standards Board
RSO:	Rolling stock operator
RTO:	Rail transport operator

SPAD:	Signal passed at danger
SSC:	Signal Sighting Committee
TPWS:	Train protection warning system

2 Principles & categorisation

2.1 Principles

Any incident where a signal is passed at danger without authority (SPAD) shall be reported and investigated to establish contributing factors.

SPADs incidents are classified as category “A” or “B”, as outlined in the current Reporting Requirements for Notifiable Occurrences by Office of the National Rail Safety Regulator (ONRSR).

Rail Transport Operators (RTO) shall have systems and procedures which enable them to respond to and investigate the factors contributing to SPAD incidents. Such systems and procedures shall include:

- (a) provision for the passing of information between business units within the RTO at the relevant organisational levels to meet the requirements of this standard, and
- (b) arrangements for identifying and making available competent persons.

RTO's are responsible for investigating the cause of a SPAD incident, leading formal or local enquiries.

RTOs shall communicate mandatory or recommended actions resulting from the investigation of SPAD incidents to all other parties to whom they apply, who shall implement the requirements or, in the case of recommendations, apply them or justify a decision not to within their organisation.

2.2 SPAD categorisation

Any incident where rail traffic passes a stop signal is referred to as a SPAD.

Refer to the current Reporting Requirements for Notifiable Occurrences by Office of the National Rail Safety Regulator (ONRSR) – see Appendix A.

2.3 Purpose of the SPAD management process

The SPAD management process shall be included in the safety management system and provide for, but not be limited to:

- (a) the initial categorisation of the SPAD the gathering and recording of evidence as to causes,
- (b) including arranging tests, technical examinations or other investigative work on any rail vehicle, signalling and other equipment or system for which they are responsible
- (c) the transmission of accurate and timely information between the infrastructure controller and other affected RTO's, at an appropriate organisational level

- (d) fitness of staff involved.

The requirements and responsibilities for the reporting of event data shall be determined by the originations involved.

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3 Initial responses to a SPAD

3.1 Responsibility for managing SPADs

The National Rules set out the immediate actions to be applied by persons involved in a SPAD.

To ensure that any additional risk to system safety introduced by the SPAD is minimised, organisations shall have processes in place to respond to a SPAD involving:

- (a) their employees and those of their contractors
- (b) rail traffic which they operate
- (c) signalling and other equipment for which they are responsible.

3.2 Initial SPAD determination

Organisations shall have systems in place to alert them to the occurrence of a SPAD. Once the occurrence is identified the SPAD management response shall be initiated ensuring any further safety risk is prevented.

Once it has been determined that a SPAD has occurred, the process of gathering information and investigation of the event may begin.

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4 Treatment of rail personnel

4.1 Determining the continuous of safety critical work

Rail personnel who can be involved in SPAD in directly or directly are as follows, but not limited to:

- (a) rail traffic drivers;
- (b) guards;
- (c) network control officers;
- (d) shunters;
- (e) platform staff;
- (f) protection officers.

Rail Safety Workers are considered the key group of rail personnel that SPAD can affect.

Organisations shall have a process for determining whether a person (employee or contractor), who is carrying out safety-critical work is to be permitted to continue such work after a SPAD in which that person was involved.

Risk relating to future turns of duty involving safety-critical work, as well as the remainder of the current turn of duty, shall be assessed.

The decision shall be based on the known facts of the SPAD and documented sources such as records of competence assessments, safety performance monitoring and previous SPADs in which that person was involved.

The decision shall be supported by the results of a face-to-face interview, conducted at the earliest opportunity after the SPAD has occurred, by a person competent to judge the fitness of persons to complete their turn of duty after a SPAD.

A person involved in the SPAD shall not be permitted to continue on duty if there is reason to believe that person is any one of the following:

- (a) Affected by drugs or alcohol.
- (b) Medically unfit.
- (c) Shocked by the SPAD to an extent which could impair the safety of work performance.
- (d) Suffering from fatigue.
- (e) If there is evidence which indicates a violation of rules or instructions by that person without due regard for any consequences.

4.2 Medical assessments

Medical assessments of persons involved in a SPAD shall be conducted when there is reason to believe that:

- (a) a person's medical fitness contributed to the SPAD; or
- (b) a person is affected by the SPAD to an extent which could impair the safety of work performance.

A medical assessment shall always be carried out on a person who disputes that a SPAD took place when there is evidence to support that a SPAD has taken place.

An eyesight test shall be undertaken in those circumstances when difficulty in locating or responding to the signal, or preceding caution signals, is a contributing factor to the SPAD.

Medical assessments shall be conducted in compliance with the national medical fitness standards applicable to the work concerned and related to possible risk factors which are specific to the person whose fitness is to be assessed.

The examining doctor shall be provided with the following information before the examination takes place:

- (a) Driver's name, date of birth, home depot, employer.
- (b) Record of previous SPAD or other incidents in which medical factors might have been involved.
- (c) A brief written report of the incident including evidence of the driver's performance.

A driver who has been medically examined under this standard shall not be employed on train driving duties, until the results of the examination show that the driver is fit to drive trains.

Persons other than drivers shall be examined in accordance with the medical standards applicable to their work. They shall not be employed on duties where they could be responsible for a SPAD incident until the results of the examination show they are fit to be so employed.

4.3 Further D&A testing post incident

It can be necessary to conduct further drug and alcohol testing post incident.

For more information regarding drug and alcohol testing, refer to ONRSR Reporting Requirements for Notifiable Occurrences (2017).

5 Requirements for allowing rail traffic to continue

5.1 Rail traffic being moved by the SPAD driver

It shall be necessary to allow the rail traffic crew involved in the SPAD event to continue to an agreed location. This can be due to several reasons, including;

- (a) consideration of Section 4 of this Standard;
- (b) remoteness and distance from available rail traffic crew relief;
- (c) location and time of SPAD in relation to other safety risks (i.e. level crossings/bridges/mid-section);
- (d) rail traffic / infrastructure damage

The rail traffic crew shall determine whether any damage has occurred to either rail traffic or infrastructure because of the SPAD.

If safe to do, the rail traffic crew should physically inspect any effected equipment or infrastructure to determine its state.

Any damage shall be immediately reported to the network control officer.

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6 Investigations of a SPAD

6.1 Initial actions

The infrastructure controller shall initially assess the SPAD as falling into one of the following categories Category 'A1-A4' and Category 'B1-B4'.

For further guidance on SPAD Investigations can be found in Code of Practice - Railway Operations – Rail Investigations (2014).

6.2 Investigations of a category A1-A4 SPAD

Category 'A' SPADs shall be investigated to:

- (a) establish the full facts;
- (b) determine the immediate and underlying causes relating to:
 - i. infrastructure systems and equipment, including the SPAD history of the signal, sighting of the signal involved and those signals from the start of the aspect sequence, braking distances, the operation of signals and transitions between signal types;
 - ii. management systems, including supervision, training and working time patterns of all involved iii) vehicle systems and equipment.
- (c) assess human factors issues, including, but not limited to, fitness for work, the working environment, distraction issues, compliance with and fitness for purpose of rules and procedures;
- (d) ensure that the process for the input of train data into the train is adequate – for in-cab signalled rail traffic only;
- (e) determine the effectiveness and relevance of previously introduced SPAD mitigation or overrun protection methods in relation to the SPAD and identify any residual risks;
- (f) determine the scope of application of lessons learnt;
- (g) provide data for analysis and use in the management of SPAD-related risk;
- (h) assess the potential severity of the SPAD and the likelihood of recurrence;
- (i) consider the system risk arising from the circumstances of the SPAD;
- (j) analyse the impact on any supplementary risk, hazard studies or any other relevant information;
- (k) publish recommendations that address all of the system risk, including that arising from unconscious error or deliberate violation by particular individuals. Each recommendation shall have a declared indication of its relative urgency.

6.3 Collection of evidence

Organisations shall ensure that the collection of evidence is prioritised and collected, as set out below:

- (a) Perishable evidence, for example, assessments of weather, atmospheric and railhead conditions, or in-cab indications at the time of the SPAD.

- (b) Interviewing personnel, for example, obtaining written reports from.
- (c) Interviews of, personnel involved in, or who witnessed, the SPAD.
- (d) Site visit, for example, obtaining photographic evidence (including CCTV footage, where appropriate) of local conditions such as vegetation encroachment. It is permissible for this requirement to be undertaken from the driving cab of a train.
- (e) Existing records, for example, timetable change records, obtaining records that relate to previous safety events involving the same persons, location or traction unit, including a review of the risk assessment.
- (f) Organisations shall have processes in place, which ensure that event recording equipment such as train data recorders, signalling equipment event recorders and voice tapes are downloaded, secured against unauthorised interference, and analysed.
- (g) Organisations shall ensure that all collected evidence is accurately recorded and, where appropriate, accurately interpreted.
- (h) The evidence gathered shall be made available to the person appointed to lead the investigation.

6.4 Post incident inspection of infrastructure

The rail infrastructure manager shall make arrangements for an immediate post- SPAD inspection of the infrastructure and related factors. The amount of inspection shall be commensurate with the type of SPAD and the potential consequences that could have arisen.

This inspection shall consider the following factors as appropriate:

- (a) Rail conditions (including a rail head swab test).
- (b) Weather (including sunlight obscuration).
- (c) Signal visibility and condition (including structure, head alignment, lens cleanliness and red aspect filament condition, where applicable).
- (d) General signal structure condition.
- (e) Vegetation encroachment.

(This list is not exhaustive.)

When a specific allegation is made against the signalling system the rail infrastructure manager shall undertake a technical investigation of the signalling system.

6.5 Post incident inspection of rolling stock

The rolling stock operator shall make arrangements for an immediate post-SPAD inspection of the train and related factors. The amount of inspection shall be commensurate with the type of SPAD and the potential consequences that could have arisen.

This inspection shall consider as a minimum:

- (a) Visibility through windscreen (such as cleanliness and cracks).
- (b) In-cab environment (such as heating and ventilation).

- (c) Effects of sunlight on the driving cab.
- (d) Wheel and brake disc swabs.

(This list is not exhaustive.)

The RSO shall ensure that after a SPAD a functional brake test is undertaken on the train involved in the SPAD, except where there is evidence to support that the braking system of the rail traffic is not a factor for consideration as a cause of the SPAD.

When a specific allegation is made against the rail traffic braking system, the RSO shall undertake a technical investigation of the train braking system.

The RSO shall ensure that any on-board equipment associated with the signalling system (for example, in-cab signalling, automatic warning system (AWS), train protection warning system (TPWS), automatic train protection equipment is subject to a technical investigation.

6.6 Investigation process

The organisation shall have processes in place to enable it to determine:

- (a) the remit for each SPAD investigation;
- (b) the leadership and resourcing of the investigation at the first opportunity after the SPAD has occurred;
- (c) if a Signal Sighting Committee (SSC) has to be convened.

6.7 Signal Sighting committee required

An SSC shall be convened to assist investigation of any SPAD.

An SSC is not required if one was convened following a previous SPAD at that signal and all the following apply:

- (a) its report is comprehensive and is available to the investigators the investigators are satisfied that all the factors relevant to the latest SPAD were considered
- (b) the investigators are satisfied that no change has taken place to the signal or at its location, which could affect those factors
- (c) the train was wrongly authorised to pass the signal at danger after coming to a stand at the signal.

The decision not to convene an SSC shall be documented and retained with the SPAD investigation records and shall be published in the investigation report.

6.8 Remit of the signal sighting committee

The RIM shall set the remit of the SSC after consulting the train operator involved in the SPAD.

The remit shall ensure that all risk factors that could contribute to, or result from, a SPAD are considered, for example:

- (a) the previous record of SPADs at that signal and other signals in the vicinity;
- (b) reports from rail traffic crew about the approach view;
- (c) local conditions, including vegetation and light sources;

- (d) the sighting of signals, lineside signs, indicators and other features preceding the signal under investigation;
- (e) signal spacing on the approach to a SPAD;
- (f) aspect sequences on approach to and beyond the signal at which the SPAD occurred;
- (g) gradients;
- (h) distances at which the signals become readable;
- (i) stopping position of rail traffic (in regard to starting against red or yellow aspects at platforms);
- (j) rail traffic dispatch methodology (in regard to starting against red or yellow aspects at platforms).

(This list is not exhaustive.)

The RIM shall ensure that processes for checking previous records consider any renumbering of the signal within the period covered or any minor changes in signal position because of a re-signalling scheme.

6.9 Signal sighting committee report

The Rail Infrastructure Manager (RIM) shall ensure that the SSC report includes the SSC's professional judgement as to the significance and contribution of any infrastructure factors to the circumstances of the SPAD with regard to staff error.

The RIM shall ensure that the report of the SSC is made available to all railway group members involved in the SPAD, and its conclusions and any recommendations recorded in the report of the SPAD investigation.

The RIM shall ensure that the SSC report is published as an action from the SPAD investigation.

The RIM shall implement the recommendations of the SSC.

When it is determined that a recommendation is not reasonably practicable to implement, then the RIM shall document the reasons together with any alternative measures for controlling risks identified.

6.10 Investigations of a category B1-B4 SPAD

Category 'B' SPADs shall be investigated by the infrastructure controller to:

- (a) establish the facts, including (where applicable) the reason for a signal being returned to danger, or an in-cab movement authority being rescinded determine the cause of any failure or malfunction of signalling equipment
- (b) determine the adequacy of arrangements for the inspection, testing, maintenance or repair of signalling systems or equipment and identify remedies where deficiencies are evident.

6.11 Driver feedback

When a driver has reported an irregularity with the signalling system the infrastructure controller shall ensure that the cause of the signal irregularity is notified to the RSO responsible for the driver within seven working days.

If it is not possible to respond within the seven working days, then the infrastructure controller shall inform the driver's train operating company of the progress of the investigation to date and the date of the next response.

7 Requirements following a SPAD Investigation

7.1 Communicating conclusions and recommendations

Organisations shall have processes in place to ensure that the conclusions of each SPAD investigation, and recommendations arising from them, are communicated in writing within the timescales to the responsible persons.

7.2 Reviewing reports and recommendations

Organisations shall have processes in place for systematically reviewing and responding to SPAD investigation reports and recommendations that are relevant to their operations.

Decisions and actions taken in response to SPAD investigations shall be documented and the effects monitored.

Organisations shall have processes in place to:

- (a) track progress towards implementation of recommendations applicable to its operation
- (b) record and review the reasons for rejecting or modifying recommendations of a SPAD investigation (including the recommendations of the SSC).

7.3 Briefing of employees

Organisations shall have processes in place to brief their employees of the circumstances of any SPAD which is relevant to their work.

This brief shall include contractors employed by another organisations, but whose work involves controlling rail traffic or rail traffic movements within the area relevant to the SPAD.

RSO shall, as a minimum:

- (a) brief rail traffic crew about signals on routes over which they operate which have been the subject of more than one SPAD during the past five years
- (b) amend, if appropriate, local instructions or other operational processes affecting the driver.

7.4 Competency / fitness deficiency

If a SPAD investigation indicates that a cause of the event was a deficiency in either competence, or fitness, for medical or other reasons such as fatigue of a person involved in the event, the organisation responsible for controlling the risk from that person's work shall ensure the deficiency is correctly identified and remedied.

Processes shall be in place to prevent such a deficiency causing risk to system safety during the period until the person is assessed as fully competent and fit.

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8 Remedial action

8.1 Remedial action

Remedial action required or recommended because of the investigation and analysis of a SPAD incident shall be communicated by RTO to all persons or organisations affected by them.

The RTO is responsible for implementing required changes relating to infrastructure and informing the relevant business units of actions taken which affect the operation of trains over that infrastructure.

Where remedial action is recommended, the persons or business unit to whom the recommendations apply shall have processes to determine whether the recommended actions will be implemented on the basis of an assessment of risk. A decision not to implement any of the recommendations following a SPAD incident shall be justified and recorded.

The RTO shall ensure that information resulting from the investigation of SPAD incidents relevant to their Rail Traffic Crew is communicated to them. Special attention shall be given to making Rail Traffic Crew aware of any signal on routes over which they can drive that has been passed at danger repeatedly.

Recommendations for mitigation of the SPAD occurring again shall be placed as a priority.

9 Record management

9.1 Regulatory requirements

Records of SPAD investigations and other supporting document should be managed in line with the requirements of the national regulatory laws.

9.2 Incident database

The RTO shall:

- (a) maintain a comprehensive record of SPAD information and investigations;
- (b) maintain a SPAD database system and monitor data input to ensure compliance with this standard;
- (c) retain the hazard ranking index for each SPAD;
- (d) retain comprehensive records of SPAD incidents involving;
- (e) record and monitor required or recommended action and its implementation;
- (f) record action to implement the requirements or recommendations arising from a SPAD incident so that progress and results can be monitored;
- (g) communication of lessons learnt

Appendix A Hazard register

Hazard Number	Hazard	Applicable section
5.9	Signal passed at danger	All
8.1	Derailment and or collision	5
8.2	Damage to rolling stock and or Infrastructure	5
8.3	Third party property damage	5
8.4	Injury or death of an employee	4 & 5

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Appendix B ONSRNR SPAD Classification

SPAD CLASSIFICATION A1

When a SPAD has occurred and, according to available evidence, a stop aspect, indication or end of movement authority was displayed or given correctly and in sufficient time for the train to be stopped safely at it.

This includes:

- (a) when a signal displaying a stop indication is passed at danger when the driver of the rolling stock does not realise that the signal has been passed at stop and has made no attempt to bring the rolling stock to a stand before the signal and proceeds into the next section or block;
- (b) When a signal displaying a stop indication is passed at danger when the signal was displayed correctly and in sufficient time for the train to be stopped safely at it, but on available evidence, there were no external factors beyond the driver's control to prevent the train from bringing the rolling stock to a stand before the signal.

Note: Includes where further movement of the train is prevented by train control devices (train stops, AWS etc.) or a verbal instruction to stop given by the signaller / network controller.

SPAD CLASSIFICATION A2

A signal is passed at danger due to the stop indication not correctly displayed however was preceded by a correct indication on the preceding signal that would have informed the driver the signal passed was at stop.

SPAD CLASSIFICATION A3

When a signal is passed at danger due to a hand-signaller or other authorised person giving permission to the driver to pass the signal at stop without the authority of the signaller / train controller.

SPAD CLASSIFICATION A4

The stop indication was displayed correctly and in sufficient time for the rolling stock to be stopped safely however the train crew were unable to stop prior to passing signal owing to circumstances beyond his/her control (e.g. poor rail head adhesion, train braking equipment failure or malfunction etc.).

SPAD CLASSIFICATION B1

Signal restored to danger in front of approaching rolling stock due to a signalling infrastructure failure and the driver is unable to stop prior to passing the signal.

SPAD CLASSIFICATION B2

A limit of authority or signal restored to danger in front of approaching rolling stock because it was returned to danger by the person controlling that authority as a result of an error.

SPAD CLASSIFICATION B3

A limit of authority or signal restored to danger in front of approaching rolling stock by the person controlling the authority due to an emergency and driver is unable to stop prior to passing the signal.

SPAD CLASSIFICATION B4

Rolling stock without any traction unit attached or is unattended, runs away past a signal(s) at danger, or without an in-cab movement authority.

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