

Engineering Procedure  
Signalling and Control Systems

PR S 47110

# Inspection and Testing of Signalling: Introduction

Version 1.0

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Procedure

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## Document control

Version	Date	Author/ Prin. Eng.	Summary of change
1.0	8 March 2019	E Pace	New Document

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## 1 Introduction

This document is the first in a series of documents that prescribe the procedures for quality assurance, inspection, testing, and commissioning of new and altered Signalling (i.e. Signals and Control Systems) works on the Sydney Trains network.

## 2 Scope

The individual documents in this series are listed below.

<b>PR S 47110</b>	Inspection and Testing of Signalling: Introduction (This document)
<b>PR S 47111</b>	Inspection and Testing of Signalling: Roles, Responsibilities and Authorities
<b>PR S 47112</b>	Inspection and Testing of Signalling: Plans, Programs, Documentation and Packages
<b>PR S 47113</b>	Inspection and Testing of Signalling: Inspection and Testing Principles
<b>PR S 47114</b>	Inspection and Testing of Signalling: Inspection and Testing Procedures
<b>PR S 47115</b>	Inspection and Testing of Signalling: Typical Inspections and Tests Signalling Apparatus
<b>PR S 47116</b>	Inspection and Testing of Signalling: Interface Requirements and Procedures for Alterations
<b>PR S 47117</b>	Inspection and Testing of Signalling: Standard Forms
<b>PS S 47118</b>	Inspection and Testing of Signalling: Typical Signal Support Procedures for Trackwork

### 2.1 Purpose

The purpose of this series of documents is to ensure a consistent and comprehensive approach to the planning, management implementation and documentation of Signalling Works on the Sydney Trains Network.

### 3 Reference documents

This series of documents shall be read in conjunction with Sydney Trains Safety Management System, and also in conjunction with Sydney Trains Signal Engineering Standards, including Equipment and Construction Specifications, and specifically the documents listed below.

#### ASA Documents

<b>ESG 0007</b>	Glossary of Signalling Terms
<b>SC 00 02 10 02 SP</b>	Reassessment of Signalling Infrastructure Workers
<b>TMG A1419</b>	Authority to Work on Railcorp Signalling Infrastructure – Permit to Work
<b>SPG 0711.1</b>	Roles, Responsibilities and Authorities
<b>SPG 0711.2</b>	Plans, Programs, Documentation and Packages
<b>SPG 0711.3</b>	Inspection and Testing Principles
<b>SPG 0711.4</b>	Inspection and Testing Procedures
<b>SPG 0711.5</b>	Typical Inspections and Tests for Signalling Apparatus
<b>SPG 0711.6</b>	Interface Requirements and Procedures for Alterations
<b>SPG 0711.7</b>	Standard Forms
<b>SPG 0711.8</b>	Typical Signal Support Procedures for Trackworks
<b>SPG 0711.10</b>	Procedures for Design Integrity Testing and Function Testing to Control Tables
<b>SPG 0703</b>	Signalling Documentation and Drawings
<b>SPG 0719</b>	Computer Based Interlocking

#### Sydney Trains Documents

<b>MN S 40000</b>	Signalling Safeworking Procedures
<b>MN S 41412</b>	Process for Signalling Personnel – Authorisations & Licensing
<b>PR S 41415</b>	Signal Engineers, Contract Personnel – Authorisation Status and Licensing Boards
<b>PR S 41416</b>	Log Book Procedures
	Signal Engineering Instructions and Guidelines
	Sydney Trains Project Management Documents (RPMM) Rail Asset Enhancement
	Sydney Trains Infrastructure NMD/AMD/MW Division Documents

### Australian Standards

<b>AS 4292.1</b>	Railway Safety Management Part 1: General Requirements
<b>AS 4292.2</b>	Railway Safety Management Part 2: Track, Civil and Electrical Infrastructure
<b>AS 4292.4</b>	Railway Safety Management Part 4: Signalling and Telecommunications Systems & Equipment
<b>AS/NZS 4360</b>	Risk Management [List all standards and other documents (including legislation) that are referred to in the body of or appendices of this standard.]

## 4 Terms and Definitions

The following definitions apply to this series of documents:

Term	Definition
<b>Activity</b>	An Activity is defined by the following: <ul style="list-style-type: none"> <li>• A stand-alone unit of work</li> <li>• Work required on a piece of equipment or apparatus that is individually numbered or that is identified on a working drawing</li> <li>• Equipment brought into use or taken out of use</li> <li>• Testing as set out in standards and procedures</li> <li>• Safeworking and Signalling Safeworking requirements</li> <li>• Documentation requirement</li> </ul>
<b>Authorising Officer</b>	The Commissioning Engineer during the Installation, Testing or Commissioning Period.
<b>Commissioning</b>	That stage of the works where there is the bringing into use of any new and altered Signalling, interface or stage works.
<b>Commissioning Period</b>	The Commissioning Period starts when the existing equipment is "booked out of use" and ends when the new or altered works are "brought into use".
<b>Emergency Work</b>	The Inspection and Testing of Signalling Specifications (0711.1 to 0711.8 inclusive) set out the principles for personnel, planning, implementation, and evaluation of the work. In an emergency, should any or some of these requirements be not practicable the work may be planned and implemented in accordance with specific directions of the Professional Head Signalling and Control Systems.

Term	Definition
<p><b>Factory Acceptance Test (FAT)</b></p>	<p>Factory Acceptance Testing is performed when a new software and/or data build needs to be released to a control area or as a product. FAT process verifies that the Control Systems software operates correctly with the site-specific data for the specified control area. Furthermore, that the whole system operates correctly under failure and stress conditions.</p> <p>FAT shall be performed on any data and/or software to be released to site. FAT is run on Sydney Trains premises using site hardware and site data configuration, if possible. The FAT process always uses a software version, which has passed FQT process successfully.</p>
<p><b>Formal Qualification Test (FQT)</b></p>	<p>Formal Qualification Test shall focus on software functions independent of site-specific data. All new functionality will be thoroughly tested to ensure it meets requirements. Existing functionalities will be tested to ensure no defects have been created since the last release. Successful FQT will verify that a software build meets all functional requirements and is ready to be tested with site-specific data.</p> <p>Testing will be done on Sydney Trains premises with as-near-to production equipment as possible. Telemetry systems will only be used in cases where applications for these systems have changed.</p>
<p><b>Installation Period</b></p>	<p>The Installation Period commences with the issue of “Approved for Construction” design, approval of any Signal Sighting Checklist &amp; Forms, Detailed Site Surveys and the completion of services searches and ends with the completion of the Inspection and Testing Status Certificate.</p>
<p><b>Major Signalling Work</b></p>	<p>The term Major signalling work covers all new and altered construction work that is, not “Minor signalling work”. These may range in scale from smaller projects up to resignalling projects extending over several years.</p> <p>Whatever the scale of the project, Major Signalling Work involves the use of multi-stage documentation for the planning and implementation of the installation, testing and commissioning.</p> <p>Examples of work likely to be classified as Major signalling work include:</p> <ul style="list-style-type: none"> <li>• Involves multiple teams working inter-dependently that requires coordination or sequential changes,</li> <li>• Any work that requires Design Integrity Testing by a Signal design engineer.</li> </ul>

Term	Definition						
<p><b>Minor Signalling Work</b></p>	<p>The term Minor Signalling Work covers changes to signalling infrastructure having the following characteristics:</p> <ul style="list-style-type: none"> <li>• It involves minor changes to the signalling infrastructure.</li> <li>• Involves the use of single stage documentation for the planning and implementation of the installation, testing and commissioning.</li> <li>• It may be a single change</li> <li>• It may be a sequence of similar but independent changes, (e.g. conversion of signal aspects to L.E.D (signals group) or change of Work Stations (Control Systems group). Each alteration from book-out to book-in will be of a short duration (by the same personnel within one shift or possession). Or may be a sequence of independent changes, with a program scope extending over several days or even weeks, e.g. progressive upgrading of existing individual - signals, trainstops, track circuits, point drives or level crossings.</li> <li>• A single work team is carrying out each change, with no work, that needs to be coordinated with that of other signalling teams working in the same area implementing other works.</li> <li>• It may be carried out simultaneously by multiple teams working independently (without any interfaces or overlaps) of each other.</li> <li>• The work is to be planned, implemented and commissioned under the control of one individual Commissioning Engineer.</li> </ul> <p>Examples of work likely to be classified as Minor Signalling work include:</p> <table border="0" style="width: 100%;"> <tr> <td style="vertical-align: top;"><b>Like for like with minor adaptations</b></td> <td>Change point machine LED conversion with changed lamp proving</td> </tr> <tr> <td style="vertical-align: top;"><b>Additional item without changes to existing wiring</b></td> <td>Repeater signal Warning light</td> </tr> <tr> <td style="vertical-align: top;"><b>Additional item with minor changes to existing wiring, but not interlocking</b></td> <td>Level crossing monitor Surge protection Power supply or ECO upgrade Telemetry Interface Work Station upgrade</td> </tr> </table>	<b>Like for like with minor adaptations</b>	Change point machine LED conversion with changed lamp proving	<b>Additional item without changes to existing wiring</b>	Repeater signal Warning light	<b>Additional item with minor changes to existing wiring, but not interlocking</b>	Level crossing monitor Surge protection Power supply or ECO upgrade Telemetry Interface Work Station upgrade
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<p><b>Minor Works Package</b></p>	<p>Minor Works Package refers to a document that includes the elements of an Inspection and Testing Plan, Installation Work Package, Commissioning Work Package and Handover Documentation Package.</p>						
<p><b>Post-Commissioning Period</b></p>	<p>The Post-Commissioning Period starts when the Commissioning Period finishes and ends with the Post-Commissioning Meeting.</p>						
<p><b>Regional Signals Representative</b></p>	<p>The person, normally the Territory Signal Engineer or the Territory Asset Engineer, nominated as the signalling representative for their area.</p>						



<b>Term</b>	<b>Definition</b>
<b>Pre-Commissioning Period</b>	The Pre-Commissioning Period coincides with the preparation phase of the Commissioning Work Package and ends when the Commissioning Period starts.
<b>Release</b>	The final Control Systems data build documentation.
<b>Signalling</b>	The name given to identify when the Signals discipline and Control Systems discipline collaborate together as one entity.
<b>Site Acceptance Test (SAT)</b>	SAT is performed on site when a new site release has passed both FQT and FAT. SAT will show that the software and data for a given release works on site and is ready to be used by the area controllers. Testing will demonstrate that new functionalities and assets meet requirements and no errors particular to a given site have been introduced.
<b>Task</b>	A task is one of a number of elements of work that are required to complete an Activity.