

Engineering Standard
Signalling and Control Systems

ST S 43012

Perform inspection and circuit testing of Signalling Works (SCS12)

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Standard

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Document control

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Summary of changes from previous version

Summary of change	Section

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1 Perform Inspection and Circuit Testing of Signalling Works (SCS12)

This unit covers the application of knowledge and skills required to perform inspection and Circuit Testing of new or altered signalling works. (Non operational)

1.1	Elements	1.2	Performance Criteria
SCS12.1	Prepare to carry out inspection and Circuit Testing of signalling equipment	SCS12.1.1	Obtain all necessary documentation and work instructions.
		SCS12.1.2	Accurately determine the scope of the work to be carried out, and the status of the previously tested equipment.
		SCS12.1.3	Identify the inspections and circuit tests to be carried out, the sequence in which they are to be performed, and the methods to be used.
		SCS12.1.4	Ensure that all design documentation required for the work is available, accessible and a current approved issue.
		SCS12.1.5	Ensure that documentation is available for reporting and recording the work to be undertaken in compliance with organisational requirements.
		SCS12.1.6	Check that the resources provided, including competent staff, tools and calibrated equipment, are appropriate for the work.
		SCS12.1.7	Ensure independence of testing - that testing staff did not install the installation under test.

1.1 Elements	1.2 Performance Criteria
	SCS12.1.8 Ensure that all necessary planning and reporting arrangements for track access and worksite protection ('work on track') are completed, and work locations are accessed safely, notifications made within agreed timescales and in accordance with site access procedures.
SCS12.2 Safely manage work and interfaces to ensure that the inspection and Circuit Testing does not compromise the integrity of the existing signalling system.	SCS12.2.1 Conduct a Risk Assessment to ensure that your work practices minimise the risk of damage or disturbance to equipment under test and other adjacent equipment.
	SCS12.2.2 Clearly identify the boundaries between the installation under test and operational equipment, define the limits of circuit testing.
	SCS12.2.3 Ensure that the circuit testing process and relevant information is communicated clearly to all team members.
	SCS12.2.4 Where damage or disturbance to operational equipment occurs, or is noticed, ensure it is protected, reported and dealt with in accordance with organisational procedures.
SCS12.3 Lead Inspection & Circuit Testing of the signalling installation	SCS12.3.1 Carry out the inspection and circuit tests in an appropriate sequence using approved methods and procedures.
	SCS12.3.2 Follow the appropriate procedures for use of tools and equipment to carry out the required circuit tests.
	SCS12.3.3 Record the results of all inspections and circuit tests.

1.1 Elements	1.2 Performance Criteria
	SCS12.3.4 Review the test results and promptly resolve any inconsistent or incomplete test results.
	SCS12.3.5 Identify any defects or variations from the inspection & circuit testing activities and document them for appropriate action.
	SCS12.3.6 Ensure that all tools, test devices, and equipment are removed on completion of testing – links in place, temporary bridges etc removed and accounted for, inspection area is clear, location is secured and notifications made within agreed timescales and in accordance with site access/egress procedures.
SCS12.4 Certification and the finalisation of circuit testing and reporting activities	SCS12.4.1 Certify all inspection and circuit test results.
	SCS12.4.2 Ensure that all test records and certification have been completed and submitted in accordance with organisational procedures.
	SCS12.4.3 Report completion of activities in line with organisational procedure.

1.3 Range of Variables

Signal Location includes:

- Relay rooms
- Walk in locations
- Apparatus cupboards
- Signalling equipment outside a Relay room, walk in location, or apparatus cupboard

Relevant standards and instructions include:

- SWMS & SWI's
- Project Safety Agreement, Interface Co-ordination Plan, Site Integrity Agreement, Project Safety Management Plan.

- Inspection and Testing Principles
- Inspection and Testing Procedures
- Signalling Safeworking Procedures
 - Risks and Controls Associated with Testing and Certifying Equipment
 - Renewal Work
 - Security, Fire Protection, Weather Proofing and Cleanliness of Signalling Equipment, Housings and Locations
 - Use of Radio Transmitters Near Electronic Signalling Systems
 - Safety Issues for Signalling Personnel
 - Signalling Locations and Equipment – Security Locks and Keys
 - Calibration of Tools and Instruments for Signalling Applications
- Equipment Specifications
- Manufacturers equipment manuals

Standard configuration documents and records include:

- Circuit Books
- Track plan / signalling plan or Detailed Site Surveys(DSS)
- Work Instructions
- Testing Plan

Work activities may include:

The Circuit Tester competency (refer *MN S 41412*) allows personnel to be able to work in a live signalling environment as outlined below:

- Carry out inspection and testing of new or altered signalling works in accordance with an Inspection and Test Plan provided by others and in conjunction with SPG 0711.1 Roles, Responsibilities and Authorities Table 1 - Minimum Licensing or Authorisation requirements for suitably experienced personnel implementing New and Altered Works.
- The work may include leading a small team of Assistant Testers and / or Circuit Testers.
- The work may be conducted as interface wiring or as standalone new work.

Note: This unit does not include verification that the system interlocking functions in compliance with design, or validation of the design to specifications and signalling principle

Tests may include:

The types of inspection and testing activities on new or altered signalling works is described in with *SPG 0711.3 Inspection and Testing Principles Section 2.3 Table of Typical Inspections & Tests to Verify Physical & Functional Compliance*

- Documentation Check
- Correlation Checking
- Apparatus Inspection
- Wire Count

- Null Count
- Insulation Test
- Bell Continuity Test
- Hand Trace

1.4 Knowledge Requirements

The following underlying knowledge elements are requirements for the achieving of this competence:

- Read and follow work instructions
- Read and interpret signalling documentation
- Correct selection and use of test equipment and meters or gauges
- Correct application of test methods
- Use of appropriate testing communication protocol
- Test recording and documentation
- Reporting and contact relationships

1.5 Competency Requirements

The following knowledge, competency and entry requirements shall be demonstrated as a pre-requisite to the awarding of this competency:

Pre-Requisite Entry Requirements

- Rail Industry Safety Induction card (RISI)
- WHS General Construction Induction Training Card (GIT Card also known as White Card)
- Rail Safety Worker Category 1 Health
- Electrical Trades Certificate or Relevant Tertiary Qualification and
- Minimum of Signal Electrician Work Group Leader (or supervisor equivalent), or
 - Demonstrated experience as an Assistant Tester and either Signal Electrical Installer Authorisations or Design Checking Competencies in Signal Design, **or**
 - Demonstrated experience of the use of IRSE Licence 1.3.155 – Signalling Verification Tester.

Training Requirements

- TfNSW EI40 Sydney Trains Signalling Safeworking Procedures
- TfNSW ST46 Signal Circuit Inspection and Testing
- TfNSW EJ11 Electrical Installation Standards and Practices for Sydney Trains Signalling Equipment
- TfNSW EJ05 Signalling Principles 1

Technical Competency requirements

- Be assessed as competent in Competency Standard ST S 43012 Perform Inspection and Circuit Testing of Signalling Works using Competency Assessment Tool MN S 43012 Perform Inspection and Circuit Testing of Signalling Works.

- UEENEEN104A Test copper rail signalling cable

Behavioural Competency requirements

- Working with people
- Adhering to principles and values
- Planning and organising
- Following instructions and procedures
- Coping with pressures and setbacks

Note: Circuit Tester competency requires a Sydney Trains Authorisation as described in *MN S 41412 Process for Signalling Personnel – Authorisations & Licensing Section 6.1.*

1.6 Evidence Guide

This provides essential advice for the assessment of the unit and must be read in conjunction with the performance criteria and range statement.

Each element and associated performance criteria must be demonstrated on at least two occasions, one of two being a practical demonstration.

Before the critical aspects of evidence are considered, all pre-requisites must be met

Candidates demonstrate their knowledge and understanding of Circuit testing by:

- Documentary evidence of appropriate training and qualifications held
- Responses to questioning by the competence assessor

Candidates demonstrate their competence to carry out inspection and circuit testing of a new or altered signalling installation by:

- Log book showing relevant experience of inspection and testing of signalling works
- Supervisor's report on testing and inspection performance.
- Practical demonstration of the required range of inspection and testing activities in a real or simulated signalling installation

Critical aspects of evidence required to demonstrate competency in this unit:

Demonstrated consistent performance across a representative range of contexts from the prescribed items below:

Perform Inspection and circuit testing of new signalling works including the following:

- Site access obtained correctly
- Interpreting signalling documentation correctly
- Identifying the risks of inspection and testing in a live Signal Location
- Mitigating the risks that were identified
- Directing and communicating effectively with team members
- Perform each of the individual inspection and testing activities listed in (SPG 0711.3 Inspection and Testing Principles Section 2.3).
- Completing relevant records and documentation

- Dealing with unplanned events by drawing on essential knowledge and skills to provide appropriate solutions incorporated in the holistic assessment with the above listed items.

1.7 Assessment Context

This unit should be assessed as it relates to normal workplace practice using procedures, information and resources typical of a workplace. This should include a suitable work environment, facilities, equipment and materials to undertake actual work as prescribed in this unit.

Where simulation is considered a suitable strategy for assessment, conditions must be authentic and as far as possible replicate the real workplace environment both behaviourally and functionally.