

Sydney Trains



Engineering System Integrity
Engineering Standard
Signalling and Control Systems

ST S 43013

Perform Circuit Function Testing of Signalling Works (SCS13)

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Document control

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1 Perform Circuit Function Testing of Signalling Works (SCS13)

This unit covers the application of knowledge and skills required to perform circuit function testing of new or altered signalling works. (Non-operational).

1.1 Elements	1.2 Performance Criteria
SCS13.1 Prepare to carry out circuit function testing of signalling equipment	SCS13.1.1 Obtain all necessary documentation and work instructions
	SCS13.1.2 Accurately determine the scope of the work to be carried out, and the status of the previously tested equipment
	SCS13.1.3 Identify the circuit function tests to be carried out, the sequence in which they are to be performed, and the methods to be used
	SCS13.1.4 Ensure that all design documentation required for the work is available, accessible and a current approved issue
	SCS13.1.5 Ensure that documentation is available for reporting and recording the work to be undertaken in compliance with organisational requirements
	SCS13.1.6 Check that the resources provided, including competent staff, tools and calibrated equipment, are appropriate for the work
	SCS13.1.7 Ensure independence of testing - that testing staff did not install the installation under test.
	SCS13.1.8 Ensure that all necessary planning and reporting arrangements for track access and worksite protection ('work on track') are completed work locations are accessed safely, and notifications made within agreed timescales and in accordance with site access procedures

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1.1 Elements	1.2 Performance Criteria
<p>SCS13.2 Safely manage work and interfaces to ensure that the circuit function testing does not compromise the integrity of the existing signalling system</p>	<p>SCS13.2.1 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</p>
	<p>SCS13.2.2 Clearly identify the boundaries between the installation under test and operational equipment, define the limits of circuit function testing</p>
	<p>SCS13.2.3 Ensure that the circuit function testing process and relevant information is communicated clearly to all team members</p>
	<p>SCS13.2.4 Where damage or disturbance to operational equipment occurs, or is noticed, ensure it is protected, reported and dealt with in accordance with organisational procedures</p>
<p>SCS13.3 Lead circuit function testing of the signalling installation to confirm compliance with design and specification</p>	<p>SCS13.3.1 Carry out the circuit function tests in an appropriate sequence using approved methods and procedures</p>
	<p>SCS13.3.2 Follow the appropriate procedures for use of tools and equipment to carry out the required circuit function tests</p>
	<p>SCS13.3.3 Record the results of all circuit function tests</p>
	<p>SCS13.3.4 Review the test results and promptly resolve any inconsistent or incomplete test results</p>
	<p>SCS13.3.5 Identify any defects or variations from the circuit function testing activities and document them for appropriate action</p>

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1.1 Elements	1.2 Performance Criteria
	SCS13.3.6 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
	SCS13.3.7 Analyse and compare the test results against the design, installation and specification requirements to identify any faults or variations
SCS13.4 Certification and the finalisation of circuit function testing and reporting activities	SCS13.4.1 Certify all circuit function test results
	SCS13.4.2 Report completion of activities in line with organisational procedure
SCS13.5 Determine the status of the tested signalling systems & equipment	SCS13.5.1 Confirm that all testing records are complete and accurately reflect the results of the testing activities carried out
	SCS13.5.2 Take effective and safe course of action to promptly resolve any inconsistencies in the test results
	SCS13.5.3 Handover to others the certified signalling installation which you have tested, including notifying any restrictions or limitations

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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 and SWIs
- 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
 - Renewals 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 Function 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.

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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*).

- Contact Proving Test
- Circuit Function Test
- Circuit Strap and Function Test
- Through Circuit Function Test
- Through System Function Test
- Power Supply Polarity Test
- Power Supply Isolation Test
- Points Correspondence Test
- Points Out of Correspondence Test
- Earth leakage Test
- Tests from ST S 43012 may also be included which are:
 - 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.

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1.5 Competency Requirements

The following knowledge, competency and entry requirements shall be demonstrated as a prerequisite 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
- Demonstrated experience in either Circuit Tester Authorisation or IRSE Licence 1.3.170 – Signalling Functional Tester.

Training Requirements

- TfNSW EI40 Sydney Trains Signalling Safeworking Procedures
- TfNSW ST46 Signal Circuit Inspection and Testing
- TfNSW EJ11 Electrical Installation Standards and Practice for Sydney Trains Signalling Equipment
- TfNSW EJ05 Signalling Principles 1
- TfNSW EJ06 Signalling Principles 2.

Technical Competency requirements

Be assessed as competent in Competency Standard *ST S 43013 Perform Circuit Function Testing of Signalling Works* using Competency Assessment Tool *MN S 43013 Perform Circuit Function Testing of Signalling Works*.

Behavioural Competency requirements

- Working with people.
- Adhering to principles and values.
- Planning and organising.
- Following instructions and procedures.
- Coping with pressures and setbacks.
- Deciding and initiating action.
- Analysing.

Note:

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

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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 which is practical demonstration.

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

Candidates demonstrate their knowledge and understanding of Circuit Function 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 function 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 Circuit Function 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.

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