

Information for users

To access individual modules referenced within this standard, links are provided from the Related Documents tab. Clicking on a specific reference will display the corresponding module information.

Alternatively, you may use the search facility to search for a module by using the complete module reference number – such as NR/L3/SIG/30082/002 – in the search field.

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ISSUE

8

SMTH

NR/SIG/11231

Signal Maintenance Testing Handbook

Publication Date: 6 September 2014

 **Documents**
Document Sharing Hub

This Network Rail standard contains colour-coding according to the following Red–Amber–Green classification.

Red requirements – *No deviations, could stop the railway*

- **Red requirements shall** always be complied with and achieved.
- Red requirements shall be presented in a red box **with the word “shall” or expressed as a direct instruction**.
- Accountability for the efficacy of red requirements lies with the Professional Head/Standard Owner.
- Red requirements are monitored for compliance.
- Corrective actions shall be enforced if deviations are discovered through functional checks (e.g. engineering verification visits, audit or Operations Self-Assurance).

Amber requirements – *Controlled deviations, approved risk analysis and mitigation*

- **Amber requirements shall** be complied with unless deviation has been approved in advance.
- Amber requirements shall be presented with an amber sidebar **and with the word “shall” or expressed as a direct instruction**.
- Accountability for the efficacy of these requirements lies with the Professional Head/Standard Owner, or their nominated Delegated Authority.
- Amber requirements are monitored for compliance.
- Deviations **may** be permitted. Deviations are approved by the Standard Owner or through existing Delegated Authority arrangements.
- Corrective actions shall be enforced if **non-approved** deviations are discovered through functional checks (e.g. engineering verification visits, audit or Operations Self-Assurance).

Green – *Guidance*

- Guidance is based on good practice. Guidance represents supporting information to help achieve **Red** and **Amber** requirements.
- Guidance shall be presented with a dotted green sidebar **and with the word “should” (usually in notes) or as a direct instruction**.
- Guidance is **not mandatory** and is not monitored for compliance.
- Alternative solutions may be used. Alternative solutions do not need to be formally approved.
- Decisions made by a competent person to use alternative solutions should be backed up by appropriate evidence or documentation.

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1 Job roles

This manual applies to Signalling Technicians.

The job titles and roles quoted throughout NR/SMTH reflect those used within Network Rail, it shall be the responsibility of companies outside Network Rail to map the responsibilities and accountabilities of these job titles and roles to the equivalent ones within their own companies.

2 Reference documentation

These are as detailed in [Part01/Appendix/A](#)

3 NR/SMTH Status

The indexes on the following pages show the latest (current) issues of the individual NR/SMTH documents. Updated NR/SMTH documents take time to introduce into service due to briefing and the requirement to implement at the correct point in the maintenance cycle. Compliance shall be achieved by the date shown, but they may be implemented and the previous version withdrawn on or before the compliance date.

The status column indicates NR/SMTHs amended or withdrawn by this update in accordance with the following:

Status Note	Meaning
Unchanged (U)	NR/SMTH unchanged by this update*
Amended (A)	NR/SMTH amended by this update. Compliance to be achieved on or before the compliance date. Prior to compliance, the previous issue of the NR/SMTH remains in force. Actual compliance date to be achieved will be advised by your SM(S)/Line manager
New (N)	A new NR/SMTH introduced by this update. Compliance to be achieved on or before the compliance date. Actual compliance date to be achieved will be advised by your SM(S)/Line manager
Re-instated or Relocated (R)	An NR/SMTH that has had to be re-instated or has been relocated from within one of the other parts of the SMTH but has not been amended.
Withdrawn (W)	NR/SMTH to be withdrawn by this update on or before the compliance date. Actual withdrawal date will be advised by your SM(S)/Line manager

*: This indicates no technical changes, any changes to the format and job descriptions or roles are not classed as the document being changed.

4 NR/SMTH queries or comments

If you have any queries or comments about any of the NR/SMTH suite, contact in the first instant should be made to your SM(S) or line manager. If the query or comment cannot be

answered at this level, the SM(S) or line manger should contact the person named on the standard briefing note (under the heading 'for further information contact') or signalengineers@networkrail.co.uk

5 External Documents

The external documents quoted in NR/SMTH are available as indicated:

BSi British Standards Institution:

<http://www.bsonline.bsi-global.com>

OPSI Office of Public Sector Information:

<http://www.opsi.gov.uk>

(This covers Acts of Parliament and Statutory Instruments (Regulations) published since 1988.)

HSE Health and Safety Executive:

<http://www.hse.gov.uk>

HSE Books:

<http://www.hsebooks.com>

RGS Railway Group Standards:

<http://www.rgsonline.co.uk/default.aspx>

6 Definitions

Definition	Meaning
Application Logic	Any technology based method that configures a product so as to provide site specific command and control instructions. Application logic includes: a) mechanical logic (e.g. in lever frames); b) electro-mechanical logic (e.g. in relay interlocking); c) electronic switching or code (e.g. in electronic interlocking, telephone concentrators or cab secure radio); d) any combination of the above.
Extensive and Simultaneous	If any of the following criteria are exceeded then the work shall be classed as extensive and simultaneous and shall not be undertaken as maintenance testing as defined in this table. a) Three teams of three people b) Work takes more than one shift of a maximum of twelve hours (book on/book off) c) Thirty or more tail cable disconnections d) More than two point machine replacements e) More than two signal head replacements (all types) f) Replacement of any lineside multi-core cable

Definition	Meaning
Maintenance Testing	Known also as Like-for-Like replacement. The removal and restoration of a product in a previously operational system, where the work does not change the configuration or functionality of the system. Engineering details are not provided for the work, and instead the existing infrastructure records are used as the reference documents. Typically, such work is carried out to replace/repair defective or life-expired products. The work may involve replacing the original item of equipment with the exact same new or refurbished item or replacing it with a different make that is identical in all areas (apart from visual appearance) to the original. Work undertaken by maintenance testing shall not exceed the definition of extensive and simultaneous.
Works Testing	Works testing consists of the construction/installation of new or modified products and/or application logic where the work changes, or potentially changes, the configuration or functionality of the system. The work is carried out in accordance with engineering details supplied for the purpose. For the purposes of this document, the definition includes: a) the installation of totally new systems; b) the alteration of existing systems; and c) the abolition (also known as 'recovery') of existing systems.
Maintenance Tester	An individual with the competencies and authority to work appropriate to the required work assigned to specify and/or perform the tests necessary to ensure that the physical implementation of a design is correct and meets all the specified test and acceptance criteria.
Test Plan	A test plan comprises any document or suite of documents that determines and defines the processes, resources and specifications required for the testing and commissioning of a product at a specific location.

7 Index of [NR/SMTH/Part 01](#)

Section	Description	Issue No.	Issue Date	Compliance Date	Status
Index		03	06/09/14	07/03/15	A
Appendix A	References	06	02/03/13	07/09/13	U
Appendix B	Signal Maintenance Testing Related Documents	06	06/09/14	07/03/15	A
Appendix E	Action Definitions	02	02/03/13	07/09/13	U

8 Index of [NR/SMTH/Part 02](#)

Section	Description	Issue No.	Issue Date	Compliance Date	Status
Index		02	02/03/13	07/09/13	U
Part 02	Introduction and Overview	06	02/03/13	07/09/13	U
Appendix A	Maintenance Testing Guidance	05	05/03/11	03/09/11	U
Appendix B	Test Plan Requirements	05	05/03/11	03/09/11	U
Appendix C	Test Record Requirements	06	02/03/13	07/09/13	U
Appendix C01	Maintenance Test Plan Tick Sheet	01	05/03/11	03/09/11	U
Appendix D	Diversion of Circuits and Cable Renewal	02	02/03/13	07/09/13	U
Appendix D01	Cable Core Temporary Label	01	05/03/11	03/09/11	U
Appendix E	Procedure for Monitoring a Damaged Cable	01	05/03/11	03/09/11	U

9 Index of [NR/SMTH/Part 03](#)

Section	Description	Issue No.	Issue Date	Compliance Date	Status
Index		02	06/09/14	07/03/15	A
Part 03	Defined Checks and Tests	05	05/03/11	03/09/11	U
Check A01	Defined Check: Check for Correct Type	05	05/03/11	03/09/11	U
Check A02	Defined Check: Check for Damage	05	05/03/11	03/09/11	U
Check A03	Defined Check: Check for Safe Insulation	05	05/03/11	03/09/11	U
Check A04	Defined Check: Check for Correct Installation	05	05/03/11	03/09/11	U
Check A05	Defined Check: Check for Isolation	05	05/03/11	03/09/11	U
Check A06	Defined Check: Check for Correct Labelling	05	05/03/11	03/09/11	U
Check A07	Defined Check: Correlation Check	05	05/03/11	03/09/11	U
Test B01	Defined Test: Wire Count	05	05/03/11	03/09/11	U
Test B01	Wire Count Grid Sheet	01	05/03/11	03/09/11	U

Section	Description	Issue No.	Issue Date	Compliance Date	Status
Appendix A					
Test B02	Defined Test: Continuity Test	05	05/03/11	03/09/11	U
Test B03	Defined Test: Insulation Test	05	05/03/11	03/09/11	U
Test B04	Defined Test: Cable Function Test	05	05/03/11	03/09/11	U
Test B05	Defined Test: Earth Test (DC up to a nominal 120V)	05	05/03/11	03/09/11	U
Test B06	Defined Test: Earth Test (AC up to a nominal 110V)	05	05/03/11	03/09/11	U
Test B07	Defined Test: Aspect Test	05	05/03/11	03/09/11	U
Test B08	Defined Test: Point Detection and Correspondence Test	06	06/09/14	07/03/15	A
Test B08 Appendix A	Point Permutation Chart: One Point End	01	05/03/11	03/09/11	U
Test B08 Appendix B	Point Permutation Chart: Two Point Ends	01	05/03/11	03/09/11	U
Test B08 Appendix C	Point Permutation Chart: Three Point Ends	01	05/03/11	03/09/11	U
Test B08 Appendix D	Point Permutation Chart: Four Point Ends	01	05/03/11	03/09/11	U
Test B08 Appendix E	Point Permutation Chart: Five Point Ends	01	05/03/11	03/09/11	U
Test B08 Appendix F	Point Permutation Chart: Six Point Ends	01	05/03/11	03/09/11	U
Test B09	Defined Test: Absolute Block Controls Test	05	05/03/11	03/09/11	U
Test B10	Defined Test: Tokenless Block Controls Test (BRB Type)	05	05/03/11	03/09/11	U
Test B11	Defined Test: Tokenless Block Controls Test (Open/Sealed Cancel Type)	05	05/03/11	03/09/11	U
Test B12	Defined Test: Tokenless Block Controls Test (Direction Lever)	05	05/03/11	03/09/11	U
Test B13	Defined Test: Token Block Controls Test	05	05/03/11	03/09/11	U
Test B14	Defined Test: Tablet Block Controls Test	05	05/03/11	03/09/11	U
Test B15	Defined Test: No Signaller Key-Token Block Controls Test	05	05/03/11	03/09/11	U
Test B16	Defined Test: No Signaller Token Remote (NSTR), No Signaller Token (NST) Block Controls Test	05	05/03/11	03/09/11	U
Test B17	Defined Test: Absolute Block Recovery Test	05	05/03/11	03/09/11	U
Test B18	Defined Test: Tokenless Co-operative	05	05/03/11	03/09/11	U