National Signal Maintenance Standards Briefing December 2024

Providing technical leadership

Standards covered by this briefing

This briefing pack is intended to act as the detailed briefing for the following standards:

- **NR/L3/SIG/10663 Signal Maintenance Specifications**
- **NR/L3/SIG/10064 General Instructions for Staff working on S&T Equipment**
- **NR/L3/SIG/11231 Signal Maintenance Testing Handbook**
- NR/L3/SIG/10661 Signalling Maintenance Task Intervals
- NR/L3/SIG/10665 Reliability Centred Maintenance of Signalling Equipment
- NR/L3/SIG/10047 Management Of Safety Related Reports For Signalling & Telecoms Failures

Standards in Bold above have been updated in December 2024.

Managing the Transition between App Versions

The current version of the S&T Maintenance App is:

igMaint 2023/2 will be withdrawn 01/03/2025

The new S&T Maintenance App will be available from:

SigMaint 2024/1 released 11/11/2024

It is Region/Route decision when to make the transition from 2023/2 to 2024/1
All colleagues must have transitioned to SigMaint 2024/1 by 01 March 2025.

NR/L3/SIG/10064 – Issue 12

General Instructions

GI’s

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GI's - Changes in Part B

Module(s) / Test	Name	Summary of Changes	Type of change
B002	Disconnections – During Failures or to Work on S&T Equipment or the Release of Controls	Excludes Box has been updated to reflect the New B009 Document	Amended
B008	Disconnections – Additional Protection for Line Blockages by Signalling Disconnections or Technician's Controls	Excludes Box has been updated to reflect the New B009 Document	Amended
B009	Disconnections – Protection for T3-D by Technician's Controls	See briefing slide	New

GI B009 - Disconnections – Protection for T3-D by Technician's Controls

Why has it been introduced.

To introduce a procedure for the disconnection of signalling controls when a T3-D is applied, as the method of protection for a T3 possession. This new procedure separates T3-D (B009) from line blockage arrangements (B008).

What has changed.

A new general instruction that sets out the requirements and process for the disconnection and reconnection of signalling controls for a T3-D protection type possession.

NR/L3/SIG/10663 – Issue 18

Signal Maintenance Specifications

SMS

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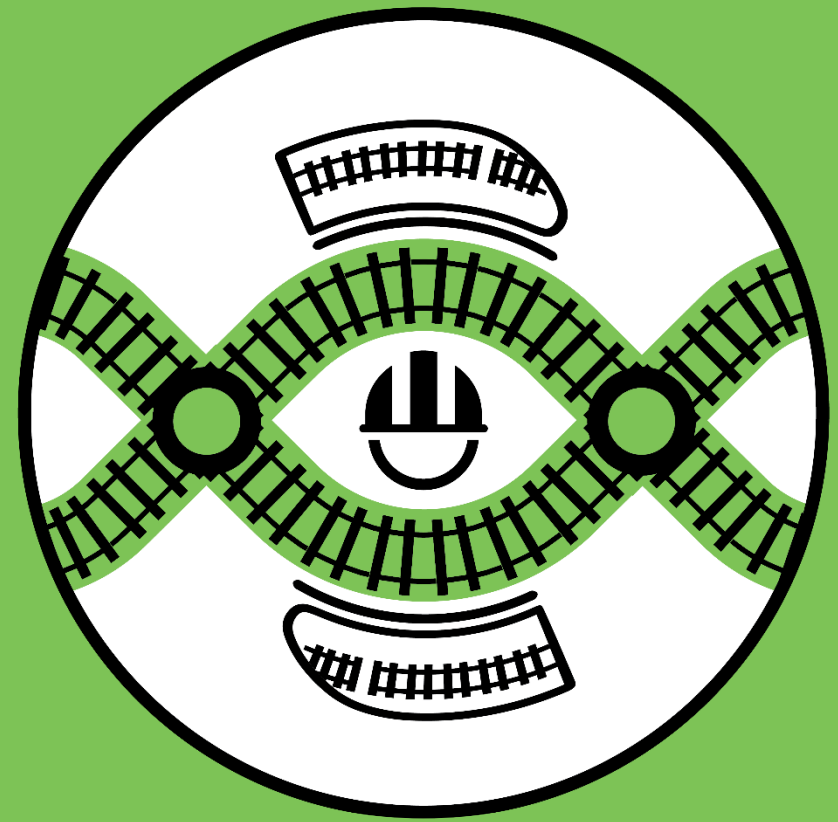
SMS - High Level Changes

Section of Standard	Title	Changes in this update	New Documents	Amended Documents	Withdrawn Documents	Total
Part A	Part A	None	-	-	-	-
Part B	**Specified Tests**	**Yes**	-	3	-	**3**
Part C	**SMS Tasks**	**Yes**	2	14	-	**16**
Part D	**Level Crossing Annual Test**	**Yes**	-	1	-	**1**
Part E	Maintenance Specifications & Specified Tests Index for Assets not Owned by Signalling	None	-	-	-	-
Part L	**The Signal Maintenance "As Directed Policies"**	**Yes**	-	2	-	**2**
Part R	Maintenance Record Cards	None	-	-	-	-
Part T	Maintenance Specifications & Specified Tests Index for Telecom Assets	None	-	-	-	-
Part Z	**Reference Values**	**Yes**	-	2	-	**2**
Appendix	NR/SMS/Part/Appendix	None	-	-	-	-
Total			**0**	**21**	**3**	**24**

Documents changes are "side barred" for ease of identification except where changes have been made throughout.

SMS PART B



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SMS - Changes in Part B

Module(s) / Test	Name	Summary of changes	Type of change
Test 013	Detection Test Clamp lock	Briefing Slide	Amended
Test 055	Secondary Cell Test	Briefing Slide	Amended
Test 210	Electromagnetic Lock Test	Minor wording change, erroneous word ‘sound’ has been removed from step 2.1.	Amended

SMS Part B Test 13 – Detection Test Clamp Lock

Why has it changed

There has been a rise in failures caused by RH tappet not being level with LH Tappet, wear to components and movement of S&C increase the risk of failure. This check has been added for Tappets to be checked during faulting and maintenance to help capture this failure mode and avoid repeat failures.

What has changed

Clarification added to final check, Ask the Signaller to operate the points to normal and reverse positions (twice if possible) and confirm with the Signaller that detection is obtained on each movement.

New steps:

1.4 To check tappets are level, with the switch rail open by approximately 25mm

SMS Part B TEST 055 Secondary Cell Test

Why has it changed:

The new issue has an additional 10 steps to check the condition of each cell within the battery string and confirm the monitoring system is alarming correctly in line with Siemens guidance.

What has changed:

Additional steps have been added to Section 4 [Siemens Power Box (PB) Cells].

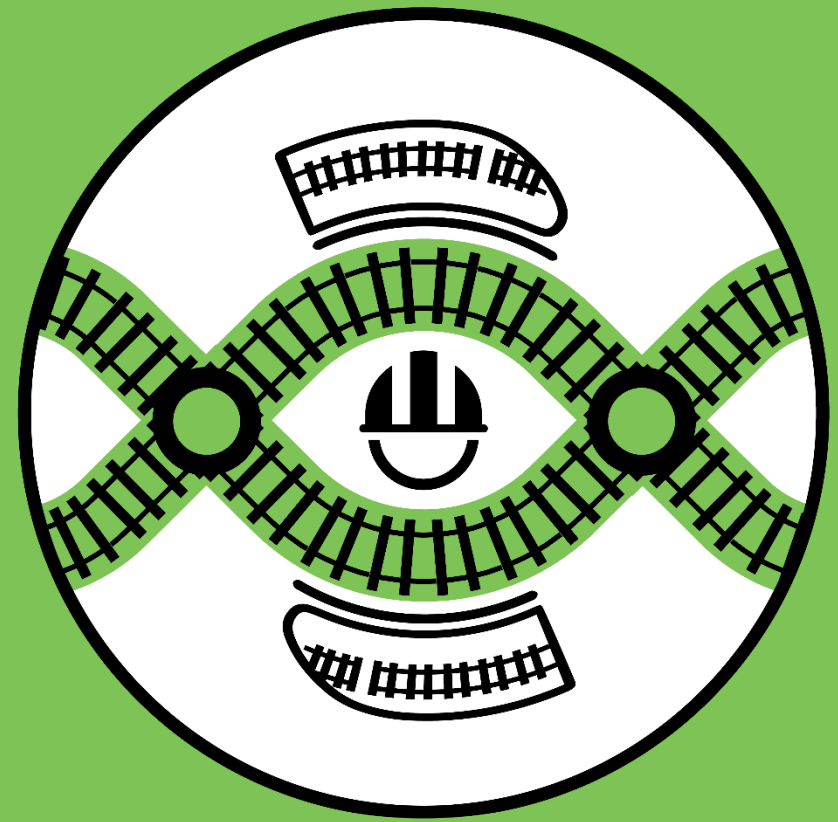
Two new figures (figure 2 & figure 3) have been added to clarify the battery test points and the components of a Siemens charge rack.

Wording has changed in the following steps:

The following note has been added to step 4.5:

"**If any of the strings do not have an output of between 20V – 30V or there is a 'battery old' / 'battery failed' indication on the Charge Rack, <u>do not</u> undertake step 4.6."**

SMS PART C



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SMS - Changes in Part C

Module(s)	Name	Type of change
AX41	RSR123 Wheel Sensors	Amended
EL34	Siemens Signalling Systems	Amended
LC15	Miniature Stop Light (MSL) & Warning Light (MWL) Units	Amended
LC21	Barrier Machine BR Spec 843	Amended
LC22	EBI Gate 630 Barrier Machine	Amended
LC30	Barrier Machine – S60	Amended
LV21	Electric Locks	Amended
PB11	Clamp Lock Hydraulic Points	Amended
PC05	Point Machine HW Style	Amended
PC41	Point Machine WRSL Style 63	Amended
PF01	Point Fittings	Amended
PF08	Dynamic Point Inspection	New

SMS - Changes in Part C

Module(s)	Name	Type of change
SG19	Banner Repeater Signal - Filament Type Head	Amended
SW04	SATWS/ATWS Fixed Systems	New
TD35	Train Describer WRSL VME Bus Based	Amended
TQ14	GETs Treadle Replacement Unit	Amended

SMS Part C AX41 Frauscher : RSR123 Wheel Sensors

Why has it changed

To align with latest information from Frauscher regarding securing RSR123 wheel sensors to the rail to reduce the potential for them to become loose or detached. This aligns the SMS with the information contained within Notice Board 215 issue 3.

What has changed

Service B – minor changes to correct wording errors and improve clarity.

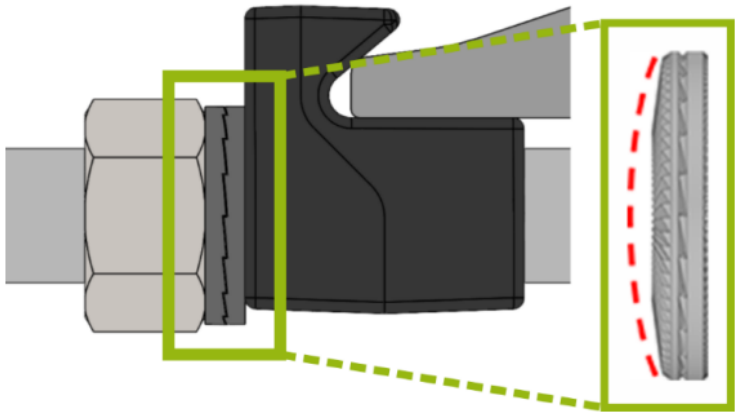
Periodic Task 2 has been rewritten to improve clarity and reflect the latest information from Frauscher. New and amended figures included. The most significant changes are:

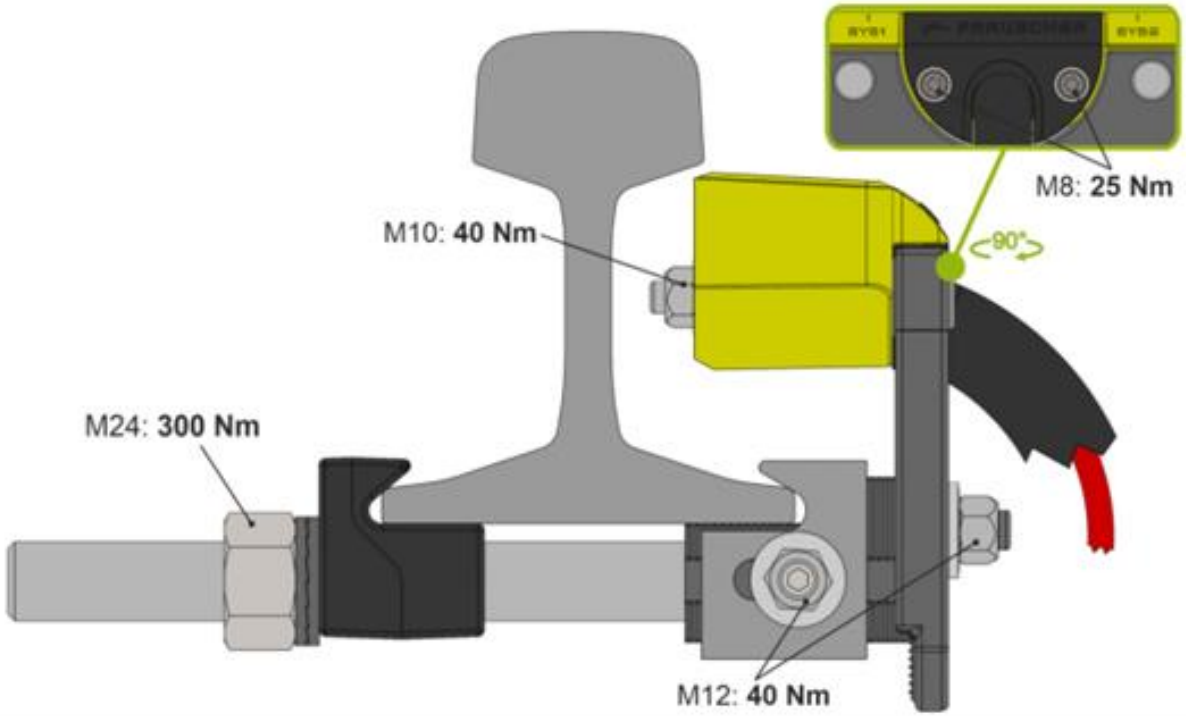
- Introducing the use of a Nord-Lock NLX24 washer as an alternative to the use of a spring washer on the M24 stud which is used to fix the rail claw to the rail. The use of Nord-Lock NLX24 washers is mandatory for strike-out wheel sensors on Vamos crossing systems (as per NR/SIN/212) if plain nuts are being used to secure the rail claw.
- Permitting the use of Hardlock fixings where authorised by the Route Engineer (Signalling).
- Requiring the application of 300Nm torque on the M24 fixings to secure the rail claw to the rail.

SMS Part C AX41 Frauscher : RSR123 Wheel Sensors continued

Some examples of new/amended diagrams in Part C AX41

- Left: Figure 6 – showing correct orientation of domed face of Nord-Lock NLX24 washer
- Right: Figure 8 – showing use of Nord-Lock NLX24 washer and the torque values to be used with GS04 rail claw (the only change to torque values from previous issue of Part C AX41 is the 300Nm torque on the M24 rail fixing)





SMS Part C EL34 - Siemens Signalling Systems

Why has it changed:

WTS Equipment has been added to EL34.

The inclusion of WTS equipment creates opportunities to maintain ‘self-monitoring’ equipment at extended frequencies, FOF or when directed to by incorporated RCM.

Failures of batteries in PR1W systems on the N&E route has driven the requirement for a more specific WTS equipment service.

This update has created a baseline service that will be refined in new issues following risk assessment/justification sessions with Siemens and trials on schemes such as the East Coast Digital Programme.

What has changed:

The service document has been re-written taking appropriate steps from EL21, EL31 and EL34 to produce a ‘catch all’ Siemens signalling system service.

Service A and Periodic Task 1 have been added to the document for WTS fitments only.

A flowchart will be provided in NR/L3/SIG/10661 to support scheduling the new services.

Photographs have been added to clarify what some equipment is (e.g. different forms of surge cassette).

New steps:

The changes to the structure are outlined in the table to the right and will be detailed in the EL34 flowchart found in NR/L3/SIG/10661:

Current EL34 Services	New EL34 Services
	PT1 - Remote service (364 days) [Only for WTS*].
	Service A (364 days) [Only for WTS*].
Service B (364 days)	Service B (WTS*, Modular 364 days).
Service C (1820 days)	Service C (WTS*, Modular 1820 days)
Service D (3640 days)	Service D (3640 days).

** Please refer to the EL34 in NR/L3/SIG/10661 Iss. 27 for scheduling information.*

SMS Part C LC15 Miniature Stop Light (MSL) & Warning Light (MWL) Units (including audible warnings where provided)

Why has it changed

Part C LC15 has been amended to include steps associated with audible warning devices to support maintenance activities on level crossings where audible warning devices have been provided in addition to the MSL and MWL units.

What has changed

- Title has been amended to include “(including audible warnings where provided)”
- “Includes” box has been amended to include “(including audible warnings where provided)”
- Service A has been expanded to include new steps 2, 3 and 4
- Service R1 has been expanded to include new step 6.6

New steps

- Service A, step 2 contains steps for checking audible warning devices (where provided)
- Service A, step 3 contains steps for checking Mechanical Sangamo/Schlumberger Audible Warning Control Units (AWCU) (where provided)
- Service A, step 4 contains steps for checking Electronic Audible Warning Control Units(AWCU) (where provided)

The above steps are based on the equivalent checks in Part C LC11.

- Step 6.6 specifies completion, as part of service R1, of the checks in steps 2, 3 and 4 where the applicable equipment is provided.

SMS Part C - LC21 - Barrier Machine BR Spec 843

Why has it changed

Updated steps to accurately reflect, while AFBCL is an "automatic" type of crossing, it fully fences the road when lowered and it has been determined that the lock down feature should be implemented which requires the Auto/Manual valve to be in the "Manual" position as specified in NR/L2/SIG/11201/ModX15.

As per NR/L2/SIG/11201/Mod X02, full barrier crossings must cover the entire width of the road and footpaths with no unfenced space greater than 150mm. This was checked for four-barrier installations but not for two-barrier installations where the barrier tip can be next to a boundary fence.

What has changed

AFBCL now refers to checking the Auto/Manual valve for the lock down feature is correctly in the ‘Manual’ position.

Includes a step to check the dimension between the barrier tip and any boundary fencing on 2-barrier manual crossings.

Wording has changed in the following steps

MCB, RB, CCTV, AFBCL & TMOB Only

5.2 Check the Auto/Manual valve is in the ‘Manual’ position and the ‘lock down’ feature is effective.

Resistance should be felt when the boom is lifted.

AHBC, ABCL & OCB only

5.3 Check the Auto/Manual valve is in the ‘Auto’ position and the ‘lock down’ feature is not effective the boom can be fully raised by hand.

And,

1.6

b) both barriers are lowered that the distance between the barrier tip and the crossing boundary fence is no more than 150mm. **(2 Barrier Installation Only)**

SMS Part C LC22 - EBI Gate 630 Barrier Machine

Why has it changed

To reflect the introduction of a gravity fall version of the EBI Gate 630 barrier machine in addition to the previously available drive down version and other product developments since the previous version was published.

What has changed

- Step 2.5 b) has been amended to clarify the maximum permitted fall time for each different type of EBI Gate 630 barrier machine – see extract below:

> 2.5 Check the self-falling operation of the barrier machine, check the following and rectify if necessary:
>
> a) Remove blocking pin and then the crank handle from the crank hole.
>
> b) The falling time shall not exceed:
>
> - 20 seconds for the drive down version (EEG-310128/01 or EEG310129/01)
> - 10 seconds for the gravity fall version (EEG-310125/01)

- The first paragraph of step 4 has been reworded for clarity. There is no change to the intent of this paragraph.

New steps

- Step 2.6 has been added to check the signaller's stop command is effective when used during the lowering sequence.
- Step 2.7 has been added to check that the 'lock down' feature is effective, to prevent a member of the public raising the barrier boom manually.

SMS Part C LC30 - Barrier Machine – S60

Why has it changed

To amend torque settings in line with latest information received from the manufacturer, Siemens.

What has changed

- Service A, step 1.7 – shear bolt torque setting changed to 10Nm.
- Service B, step 3.4 – shear bolt torque setting changed to 10Nm.
- Service B, step 3.5 – king pin torque setting changed to 150Nm.
- Service B, step 3.8 – conversion bracket bolts torque setting changed to 70Nm.
- Service B, step 3.9 – boom support bolts torque setting changed to 60Nm.

SMS Part C - LV21 - Electric Locks

Why has it changed

Update to the Includes box to remove an error.

What has changed

- The Includes box now correctly reads; “Individual Lever Locks”.
- Minor wording amendments in highlighted sections.

SMS Part C PB11 - Clamp Lock Hydraulic Points

Why has it changed

To address reliability failures arising from incorrect fluid levels where level indicators are missing or damaged.

Final checks with the Signaller have been revised for clarity and consistency.

What has changed

Fluid and Gauge checks have been amended.

2.14 (Service A) and 13.4 (Service V1) now include “where the level indicator is damaged or missing report as corrective maintenance”

The last step of each service has been revised.

Ask the Signaller to operate the points to normal and reverse positions (twice if possible) and confirm with the Signaller that detection is obtained on each movement.

SMS Part C PC05 – Point Machine HW Style

Why has it changed

To improve checks for operator safety, clearance of cables around protruding parts and security of fixings to embed a Special Instruction Notice (SIN 218).

What has changed

Final checks with the Signaller have been revised for clarity and consistency.

Step added to specifically check for any cables in close proximity to the lock rod. This is due to a number of incidents, one particularly serious, where the lock rod had pierced the insulation of a DC Traction cable resulting in an electrical fire, destroying the machine, other significant damage to nearby infrastructure and damage to rolling stock.

Clarity provided in regard to checking the handle cut-out operation prior to any attempt to move the points on manual. This is due to a number of incidents, at least one RIDDOR injury, where an operator was struck by the handle when the cut out had not operated in the designed manner.

Steps updated to cover the requirements first published under SIN/218 which was issued in response to failures of extension plate securing studs causing a machine to move in its relationship with the stock & switch thereby potentially allowing the switch to be open by more than 3.5mm. Torque checks are applied after a visual check for movement.

SMS Part C PC41 – Point Machine WRSL Style 63

Why has it changed

Security of fixings to embed a Special Instruction Notice (SIN 218).

What has changed

Final checks with the Signaller have been revised for clarity and consistency.

Steps updated to cover the requirements first published under SIN/218 which was issued in response to failures of extension plate securing studs causing a machine to move in its relationship with the stock & switch thereby potentially allowing the switch to be open by more than 3.5mm. Torque checks are applied after a visual check for movement.

SMS Part C PF01 – Point Fittings

Why has it changed

Incorporations of FS Nuts for Foot Mounted (Orange) Motion Units, new Hardlock Nut arrangements and clarification of requirements including torque checks.

What has changed

Table 1 now includes FS Nuts

The Hardlock Nut section provides guidance on fasteners for point machine 1” lock rods, 1¼” drive rods and ¾” detection rods.

2.1 now references Part Z02 for torque Values

New steps:

Hardlock Nut application on Drive, Lock and Detector Rods.

Wording has changed in the following steps

2.1 Now references Part Z02 for torque Values

3.6 Fixed Stretcher Bar fasteners defects can be address without replacing the whole stretcher. Nuts and Bolts to be replaced as a pair.

4 Adjustable Stretchers Bars, Nuts and Bolts to be replaced as a pair.

5.5 Tubular Stretcher Bars, torque checks applied to all installations except for foot mounted motion units where tab washers are fitted. Foot Mounted Motion Units with tab washers should be observed for movement whilst points are operated

SMS Part C PF08 – Dynamic Point Inspection

Why has it been introduced

Traditionally there was an opportunity to visually inspect S&C assets dynamically during the passage of trains, which provided a good indication of the switch panel stability. For example, POE components such as detector rods and dropper brackets which are moving excessively indicates voiding at the toe of the points.

With reduced capability to visually inspect during the passage of trains a risk has been highlighted whereby POE that is vulnerable to component failure, can become exposed and go unnoticed. This can lead to an increased risk of fatigue failure and result in a wrong-side failure event.

What has changed

This new specification allows staff to schedule dynamic assessments as required.

New steps:

Assets that require a dynamic point inspection generally fulfil one or more of the categories below:

- HW Series facing points and legacy Point machines (traditional POE designs such as WRSL Style 63) with a Line speed greater than 74mph or Track categories 1A, 1 and 2;
- POE assets with a history of multiple broken POE components or stretcher bar defects;
- TME ‘High Risk’ S&C Sites

SMS Part C SG19 - Banner Repeater Signal Filament Type Head

Why has it changed

SG19 has been updated to correct two errors, specifically the R1 service changed from filament lamps to halogen as there are no filament lamps installed in banner repeaters. Also Service R2 has been changed from Light Engine to Signal House as again, this is what is used in banner repeater signals

What has changed.

Equipment for service, steps and pictures

New steps:

PERIODIC TASKS

6. Signal House LED Illuminator Modules

6.1 Replace all LED Modules

6.2 Carry out NR/SMS/PartB/Test/022 (Signal Lamp & Light Module Proving Tests) on all replaced modules.

8.2 Test and record the supply voltage for each lamp. Replace any Halogen lamps that are discoloured / blackened. Check that all lamp(s) are correctly installed.

When undertaking maintenance on Bombardier (formerly Adtranz) fibre optic signals and indicators, a correctly installed lamp shall have the wires protruding from the bottom of the lamp assembly.

SMS Part C SW04 – SATWS/ATWS Fixed Systems

Why has it been Introduced

This is a new SMS covering the maintenance of the SATWS system as a whole. Originally SATWS was deemed as maintenance free, but there was the acknowledgement that once it was installed as a fixed system there then became elements of the installation that required maintaining.

In simple terms SW04 brings together the relevant parts of EL21 (location case maintenance), the relevant elements of RSR123 wheel sensor maintenance plus the need to check/clean worksite limit signage into one maintenance task. SW04 is new, but as mentioned above the majority of the steps are directly lifted from relevant parts of already existing SMS's (hence minimal new wording)

SMS Part C TD35 - Train Describer WRSL VME Bus Based

Why has it changed

Table was out of date and incorrect

What has changed.

Indication table has been updated

1.1 Observe on the front of the CM-2 module that the following LED's are indicating as follows:

Indicator	Correct Condition	Notes
Watchdog	SYS1 and SYS2 Flashing	If not flashing, there is a fault. See manual for further guidance.
On-Line	SYS1 or SYS2 Flashing	If neither lit, check at least one TD is available and power supplies to Changeover correct.
Available	SYS1 and SYS2 Lit	Fault either with CM-2 module or Watchdog fault as noted above.
Fault	SYS1 and SYS2 Extinguished	If either lit, investigate fault.
Auto Latch	Flashing	If extinguished, check power supplies or replace CM-2 moule.
PSU Fail	Extinguished	If lit, check for faulty TD PSU.

SMS Part C TQ14 - GETs Treadle Replacement Unit

Why has it changed

Minor wording amendments made for consistency.

What has changed

Consistency in terminology to conduct testing with a TPWS meter which is inherently True RMS.

Guidance amended in Appendix A in conjunction with Anglia team and Alstom.

Minor wording amendments.

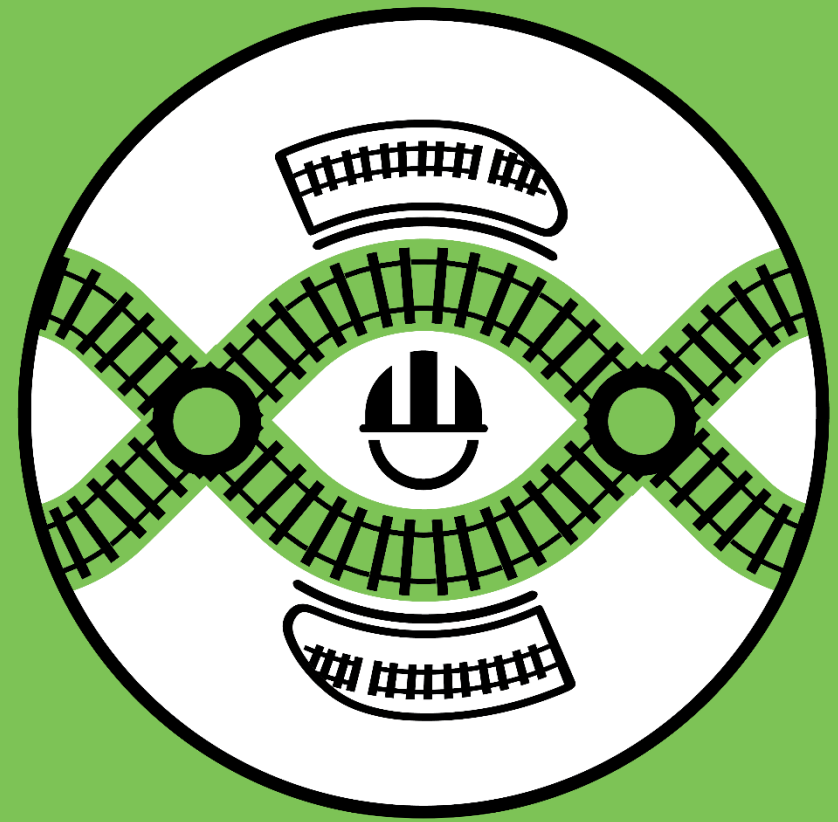
Wording has changed in the following steps

Step 2.6 to add guidance about voltages measured.

Appendix A to amend minor wording updates following recommendation from the equipment manufacturer.

Appendix A to include the wording – “True RMS multimeter (TPWS meter)”.

SMS PART D



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SMS - Changes in Part D

Module(s)	Name	Type of change
LX83	AUTOMATIC OPEN CROSSING LOCALLY MONITORED + BARRIERS	Amended

SMS Part D – LX83

AUTOMATIC OPEN CROSSING LOCALLY MONITORED + BARRIERS

Why has it changed

The steps in Section 14 did not reflect accurate operation of the Red Flashing Road Traffic Light and Drivers White Light (DWL) Signal Proving typical circuits.

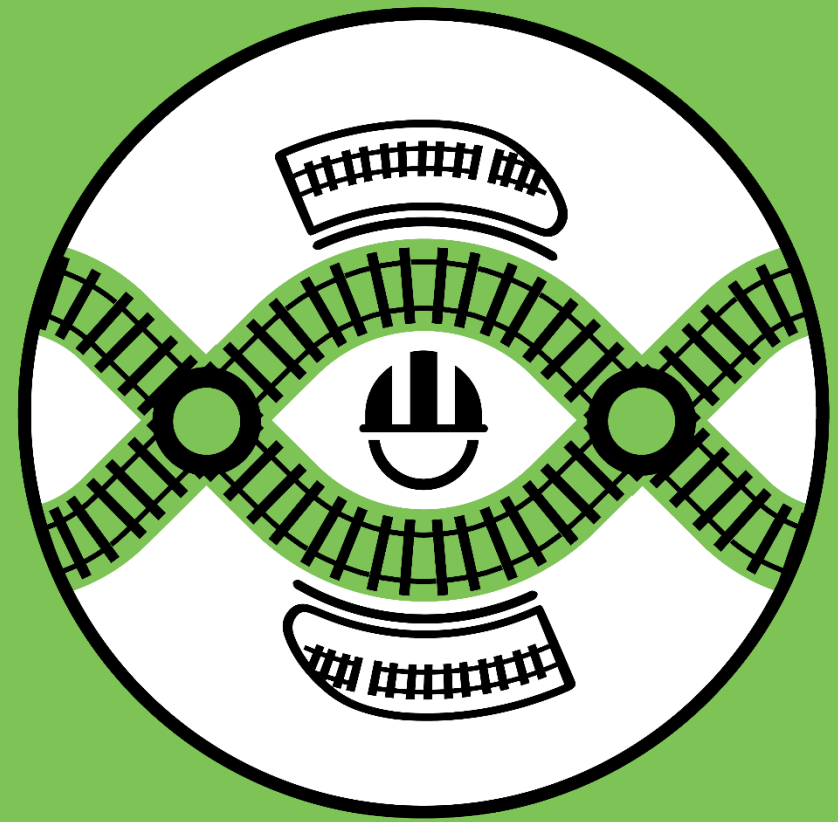
What has changed

Steps 14.11 and 14.12 have been reworded to align testing with the typical circuit design.

Wording has changed in the following steps

14.10	In turn open the operator's door (rear) of the Y and Z pedestals, Check that the DWL is extinguished and the DRL is illuminated as the door is opened	Y	Z
14.11	Check as each door is closed correctly and locked again that the DRL stays illuminated.	Y	Z
14.12	Operate the exit function and remove the train simulation. If necessary, re-set the circuits to normalise the crossing controls.	Y	Z

SMS PART L



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SMS - Changes in Part L

Module(s)	Name	Summary of Changes	Type of change
LP254	Liverpool	PB11 test 19 S&TME Direction updated to Annual	Amended
LP550	Scotland	EL21,EL31 and PC05 updated S&TME Direction	Amended

SMS Part L LP550 - “As Directed Policies” – Scotland

Why has it changed

. Set to maximum interval and more specific requirement for Electronic Timers (e.g. Micronome) and Agastat Timer

- Additional Local Policy Clause Added (PC05 Section 15 Clause 15.1)

What has changed

- EL21 Section 8 Clause 8.1

- EL31 Section 16 Clause 16.1

Timers associated with Level Crossings shall be tested annually during their annual test. All other timers to be tested 5 Yearly.

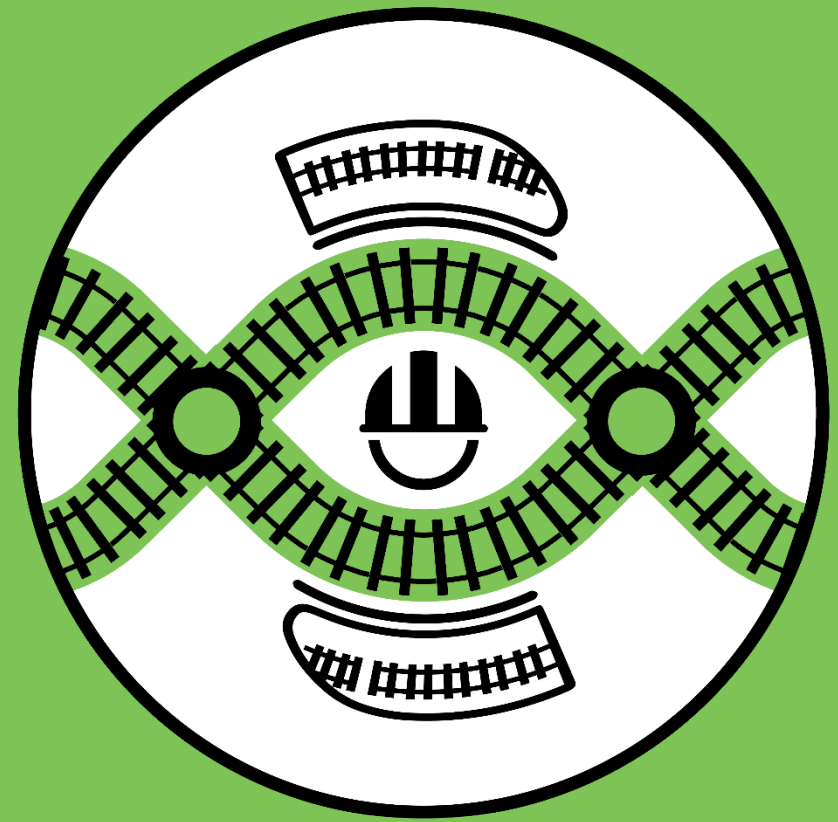
Micronome/Electronic Timers (non-thermal) fix on failure as there is no adjustments involved.

Agastat are Pneumatic and Non-Thermal, hence should be tested 5 Yearly. These timers have a knob on the top for adjustment and are sealed. For any adjustment, the seal is to be broken and resealed after adjustment.

PC05 Clause 15.1:

N/A (This section is under an R2 which is not applied in Scotland).

SMS PART Z



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SMS - Changes in Part Z

Module(s)	Name	Type of change
Z02	Point - Reference Values	Amended
Z03	Train Detection Reference values	Amended

SMS Part Z Z02 Point - Reference Values

Why has it changed

Includes new reference values for Flaig+Hommel FS Nuts for Tubular Stretchers Bars, introduction of new Hardlock Nut Arrangements for Point Fittings (Ref. NB 234) and integration of checks on Point Machine fixings (SIN 218).

HPSS Action Tables removed due to conflicts with ERR/R/0410 (NR/L2/SIG/11400 HPSS Handbook)

What has changed

Tubular Stretcher Bar Values (Section 12) to include FS Nuts

New steps

Section 24 Electric Point Machines to include:

- Soleplate Fixing Torque
- Installation values for Hardlock Nuts on Drive, Lock and Detection Rods

SMS Part Z Z03 – Train Detection - Reference Values

Why has it changed

Industry standards for rollingstock have been amended to allow for a longer wheelbase and vehicle overhang to be permitted, to aid manufacturing processes. This affects the dimensions for minimum track circuit length and Clearance Points.

What has changed

Section 3. IRJ Clearances has been updated to reflect the new dimensions.

New steps:
Where existing, minimum dimensions may be retained, however where the desired dimension has been achieved, this should be retained, so far as is reasonably practicable, as the new minimum.

NOTE: these minimum dimensions apply to all train detection types, including jointless track circuits and axle counters.

Wording has changed in the following steps

3. IRJ Clearances - only

3. IRJ CLEARANCES

Detail	Clearance	Notes
Clearance Point	Min - 4880mm	Beyond 1970mm vehicle fouling point (1970mm is measured between running edges at right angles to diverging line).
	Desired - 5860mm	
Maximum IRJ physical stagger	2600mm	Between adjacent insulated joints
	2100mm	For single rail overlap on electrified lines
Minimum effective length of TC	Min - 18.3m	
	Desired - 20m	
Maximum parallel bonded	13.0m	
Minimum distance between 2 sets	18.3m	Conventional
	11.0m	Where both staggers are less than 1600mm

Table 4 - IRJ Clearances

NR/L3/SIG/11231 Issue 20

Signal Maintenance Testing Handbook

SMTH

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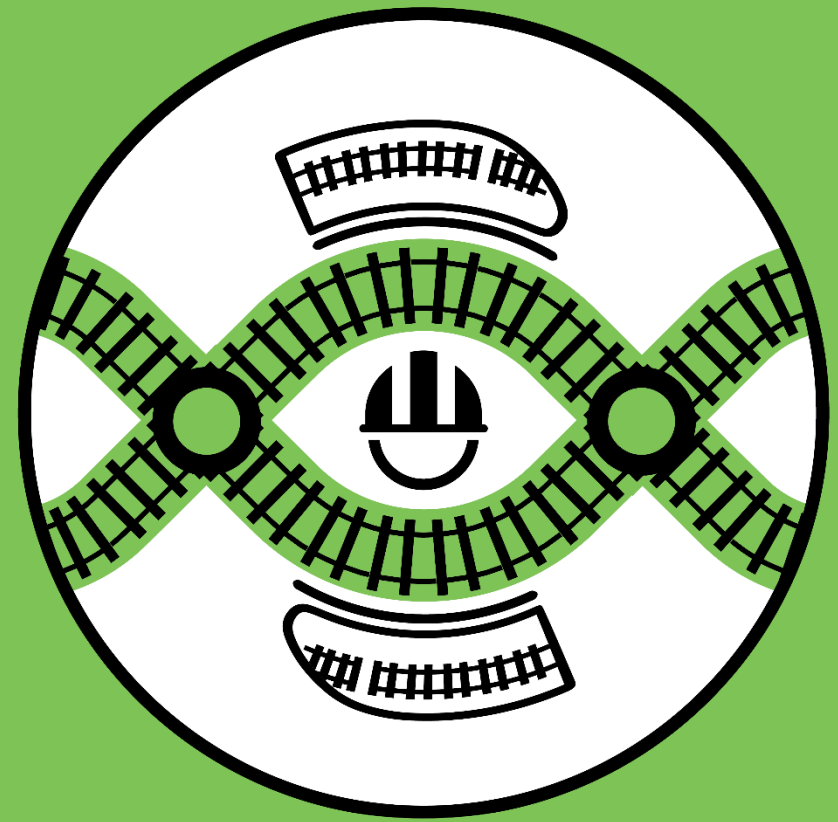
SMTH - High Level Changes

Section of Standard	Title	Changes in this update	New Documents	Amended Documents	Withdrawn Documents	Total
Part 01	**Principles and Processes**	**Yes**	-	4	-	**4**
Part 02	**Forms and Templates**	**Yes**	1	-	-	**1**
Part 03	**Defined Checks and Tests**	**Yes**	2	3	-	**5**
Part 04	**Test Plans**	**Yes**	2	19	-	**21**
Part 05	**Wrong Side Failure and Incident Investigation**	**Yes**	-	4	-	**4**
Part 06	**Test Plans for Telecoms, DOO and RETB**	**Yes**	-	-	2	**2**
Part 08	**Wrong Side Failure Test Guides**	**Yes**	2	-	-	**2**
Part 09	**Intermittent or Obscure Failure Guides**	**Yes**	-	1	-	**1**
Part 10	**Faulting Guides**	**Yes**	3	2	-	**5**
Total			**14**	**29**	**2**	**45**

Documents changes are “side barred” for ease of identification except where changes have been made throughout.

SMTH - Part 01



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SMTH - Changes in Part 01

Module(s)	Name	Type of change
Module 02	Limitations on the use of Signal Maintenance Testing	Amended
Module 04	Competency of Staff	Amended
Module 08	Pre-Planned Work and Non-Corrective Maintenance Testing	Amended
Module 09	Testing Sequence	Amended

SMTH - Part 01 Module 2 - Limitations on the use of Signal Maintenance Testing

Why has it changed

Module reviewed and updated as part of the work to address Wingfield and Dalwhinnie recommendations.

What has changed

Requirement order has been changed and a red box introduced at the top of the module. Updated the wording of Extensive and Simultaneous with a minimum requirements and guidance given to the Route Engineer (Signalling), Principal Route Engineer (Signalling) or equivalent around factors to consider when making decisions on work that can be permitted under the SMTH.

SMTH - Part 01 Module 4 - Competency of Staff

Why has it changed

Module updated to support and align with other activities to standardise SMTH testing and Authority to work across Network Rail Staff and its contractors.

What has changed

Minor changes to wording in identified clauses.

Clarification added that there is a minimum of 2 months required for a SMTH tester in action learning.

SMTH - Part 01 Module 8 - Pre-Planned Work and Non-Corrective Maintenance Testing

Why has it changed

To support Wingfield and Dalwhinnie recommendations. This is a module rewrite and has not been black bared due to the volume of change.

What has changed

Module updated to mandate pre-planning of SMTH activity unless it is corrective maintenance activity.

This module gives guidance to engineering management that is planning SMTH activities, clarifies responsibilities and gives guidance on what to consider when pre-planning SMTH work.

SMTH - Part 01 Module 09 - Testing Sequence

Why has it changed

Document updated to support the Bourne End Recommendations.

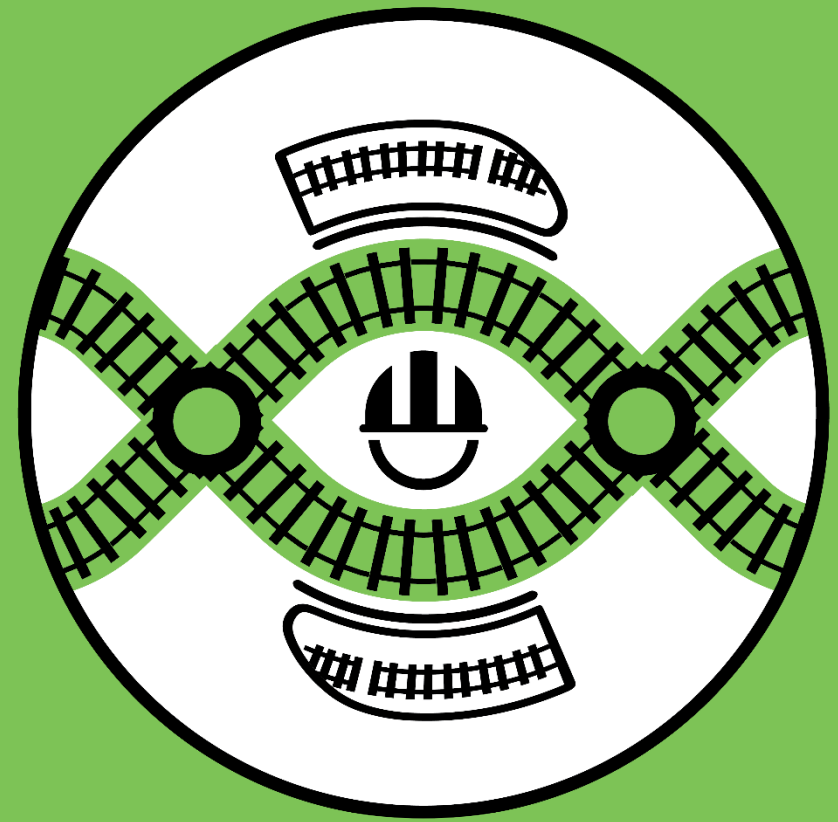
What has changed

Minor Typos corrected

New steps:

3.2 (f) Requires equipment positioned in a critical position is checked for correct position, orientation and alignment to site records.

SMTH - Part 02



Providing technical leadership

SMTH Part 02 F22 – Aspect Test Form

Why has it changed

Check sheet for aspect test has been introduced as a result of the recommendation review from Wingfield.

New Form

NR/L3/SIG/11231 Signal Maintenance Testing Handbook
NR/SMTH/Part02/Form/22
Aspect Test Sheet

Issue No: 01	Issue Date: 07/12/2024	Compliance Date: 01/03/2025

Signal Box:		**Signal Number:**	
Date:		**SMTH Log Sheet No:**	
Name:		**Signature:**	

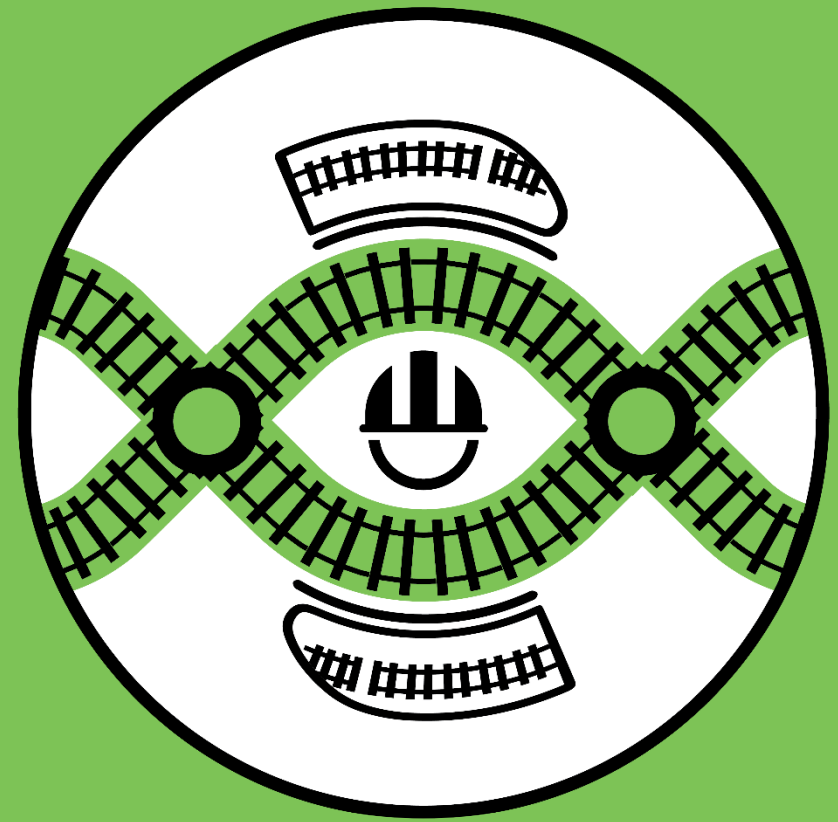
Signal Type (circle / add):	Main Aspect	Position Light Junction Indicator	Banner	Position Light Signal	Searchlight	Route Indicator	Flashing Aspects				

	Circle / add as applicable:	Position 1 Red	Position 2 Yellow	Position 3 Top Yellow	Position 4 Green	Position 5 ON	Position 6 OFF
Step of Aspect Test							
a.							
b.							
c.							
d.							
e.							
f.							
g.							
h.							

END

Sheet 1 of 1

SMTH - Part 03



Providing technical leadership

SMTH - Changes in Part 03

Module(s)	Name	Type of change
Check A01	Defined Check: Check for Correct Type	Amend
Check A08	Defined Check: Check for Correct Configuration	New
Test B07	Defined Test: Aspect Test	Amend
Test B08	Defined Test: Point Detection and Correspondence Test	Amend
Test B28	Defined Test: Telephones	New

SMTH Part 03 - Check A01
Defined Check: Check for Correct Configuration

Why has it changed

As a result of a review of the Dalwhinnie recommendation this check was reviewed with minor modifications

What has changed

Where information to complete checks in section 2 is missing, there is now a requirement to stop and seek authorisation.

Minor changes to wording in identified clauses.

New steps

4.1 Before the machine is dispatched to site, check that it is correctly configured by correlating against the site diagram.

SMTH Part 03 Check A08 - Defined Check: Check for Correct Type

Why has it been Introduced

New Document was created as a result of a review of the Dalwhinnie recommendation this check is to emphasise the importance of equipment configuration in the before work steps.

SMTH Part 03 B07 - Defined Test: Aspect Test

Why has it changed

As Part of the Wingfield Recommendations

What has changed

A new step to complete an Aspect Test Sheet has been introduced to assist the tester and provide a record of test.

Example of a completed sheet has been included in Figure 1 of the test plan

SMTH Part 03 Defined Test B08: Point Detection and Correspondence Test

Why has it changed

As part of the Dalwinne recommendations it was stressed the importance of caring out Point detection and correspondence test in the correct order to identify failures in common detection circuits.

What has changed

Table 1 User information, was a green requirement and is now an amber requirement, below is a reminder of amber requirements.

Amber requirements – *variations permitted subject to approved risk analysis and mitigation*

- Amber requirements are to be complied with unless an approved variation is in place.
- Amber requirements are presented with an amber sidebar.
- Amber requirements are monitored for compliance.
- Variations can only be approved through the national variations process.
- Non-approved variations will be investigated and corrective actions enforced.

SMTH - Part 04

Providing technical leadership

SMTH - Changes in Part 04

Module(s)	Name	Type of change
AX40	Replace a Frauscher Wheel Sensor RSR123	Amend
AX53	Remove and Refit Frauscher Wheel Sensor RSR123	Amend
CA02	Renew a lineside Multi-Core Cable in stages	Amend
CA03	Renew a Cable or Wire	Amend
CA04	Joint or Add a Length of Cable	Amend
CA06	Renew a MIL5015 Plug Coupled Cable (“interconnect”) with a Non-Certified Replacement	Amend
CA07	Renew a MIL5015 Plug Coupled Cable (“interconnect”) with a Certified Replacement	Amend
CA08	Replacing one end of a damaged MIL5015 “interconnect” cable	Amend
CA12	Remove and Refit a Multi-core Cable	Amend
CA13	Re-termination of a Broken Existing Cable Core or Wire	Amend
CA21	Renew a Single Ended MIL5015 Plug Coupled Cable (“lead”) with a Certified Replacement	Amend
CA22	Renew a Single Ended Plug Coupled Cable (“lead”) with a Non-Certified Replacement	Amend

SMTH - Changes in Part 04

Module(s)	Name	Type of change
EL09	Remove and Refit a Plug in Unit - Relay	Amend
IS16	Replace a HIMatrix Programmable Logic Controller (PLC) F30 / F35 and F3	Amend
IS17	Download Data to a HIMatrix Programmable Logic Controller (PLC) F30 / F35 and F3	Amend
LD15	Replace an EBI Gate 630 Barrier Machine	Amend
PB05	Replace an Electric Point Detector or Microswitch	Amend
PC51	Replace a Complete Point Machine	Amend
PH01	Replace a HPSS Electrical Component	Amend
TE01	Replace a Telephone	New
TE02	Replace a Telephone – PETS / KETS (AHB)	New

SMTH Part 04 - Test Plan AX40
Replace a Frauscher Wheel Sensor RSR123

Why has it changed

To align with latest information from Frauscher regarding securing RSR123 wheel sensors to the rail to reduce the potential for them to become loose or detached. This aligns the SMTH with the information contained within Notice Board 215 issue 3.

What has changed

Step 14 for consistency with the rest of the Test Plan the term ‘train detector’ has been replaced with ‘wheel sensor’.

New steps

3. Requirement to remove any coarse contaminants from the rail foot using a steel wire brush where the wheel sensor is to be mounted has been added to Before Installation Work.

SMTH Part 04 Test Plan AX53 - Remove and Refit Frauscher Wheel Sensor RSR123

Why has it changed

To align with latest information from Frauscher regarding securing RSR123 wheel sensors to the rail to reduce the potential for them to become loose or detached. This aligns the SMTH with the information contained within Notice Board 215 issue 3.

What has changed

Step 13 – for consistency with the rest of the Test Plan the term ‘train detector’ has been replaced with ‘wheel sensor’.

New steps

A requirement to remove any coarse contaminants from the rail foot where the wheel sensor is to be mounted has been added to before installation work.

SMTH Part 04 Test Plan - CA02
Renew a lineside multi- core cable in stages

Why has it changed

To highlight that this test plan is only for use on lineside multicore cables where possession of the whole cable is not possible. This test plan now requires authorisation from the Signal Maintenance Engineer who is responsible for evaluating risk involved. This will help with the awareness of risk when using this test plan.

What has changed.

The title has been changed from **“Multi-core cable”** to “**Renew a lineside Multi-core cable in stages”**

Includes and excludes boxes have been amended.

To use this test plan authority must now be sought from STME.

Minimum steps to be completed before cable can be left unattended has been amended.

New steps:

4 Check position of links, red dome nuts or equivalent are correct to the wiring diagram. This is in addition to wire count to aid the tester identify incorrectly fitted links in step 19

9 Check joints are sealed and secured (where cables have been jointed) This is to confirm all joints are complete and sealed before stage works begins.

18. CONTINUITY TEST the replacement cores to prove there is not a cross in the circuit. This is to confirm there are no open circuit / high resistance cores or crossed conductors in the new cable.

Wording has changed in the following steps

13. Check the existing cable cores are isolated at both ends. This step requires the tester to make sure there are no bare conductors on the redundant cable cores.

34 All test results shall be recorded on record card NR/SMS/T054/RC/01. The SMTH log sheet shall include the cable identification and/or cable from/to

SMTH Part 04 Test Plan – CA03
Renew a cable or wire

Why has it changed

This test plan is to be used when full possession of the cable is possible.

What has changed.

Tail cables and multi core cables have been added to Includes section.

Continuity test has been removed from Before Installation Work as it is covered by step 14 during After Installation Work.

New steps:

3. Check position of links, red dome nuts or equivalent are correct to the wiring diagram. This step has been introduced to aid the tester identifying incorrectly replaced links in step 18.

Steps 21,22 & 23 have been added as no requirement to checks for spare cores in previous issue.

21. Check any additional spare cores in the replacement cable are terminated.

22. Check spare cores in the replacement cable, that cannot be terminated, are correctly insulated (bomb tailed with ends cut back) (see GI E052).

23. Check links are removed at both ends of any terminated spare cores.

Wording has changed in the following steps

2. WIRE COUNT wording standardised.

For tail cables and single wire, testers are reminded of the requirement in SMTH Part 1 module 5 to follow * steps in relevant test plan

SMTH Part 04 Test Plan - CA04
Joint or add a length of cable or wire

Why has it changed

New steps have been added to aid tester identify hazards when jointing cables. New requirement to complete record card.

What has changed.

5. Correlation check has been replaced with WIRE COUNT. In line with the rest of CA series.

11. Check joints are secure and sealed. Has been moved, now carried out before continuity and insulation test.

We have added some new steps:

6. Check position of links, red dome nuts or equivalent are correct to the wiring diagram.

10. WIRE COUNT the affected cable/wire to the wiring diagram.

23. All test results shall be recorded on record card NR/SMS/T054/RC/01. The SMTH log sheet shall include the cable identification and/or cable from/to.

Wording has changed in the following steps

17. Where a cable has been removed from a termination point and rectification of temporary diversion have not been recovered, check any links, red dome nuts or equivalent, are correctly replaced to diagram and secured.

20.Check links are removed at both ends of any terminated spare cores.

For tail cables and single wire, testers are reminded of the requirement in SMTH Part 1 module 5 to follow * steps in relevant test plan.

SMTH Part 04 Test Plan - CA05
Divert a faulty cable core

There is no change to the test plan, 2 power point presentations have been produced to add clarity to the requirements of this test plan.

1. Diversion of a faulty cable core Technical brief

2. Guidance for Steps 1 and 14 can be found in ‘SMTH CA05 Test Plan Guidance’ Power Point presentation

SMTH Part 04 Test Plan
CA06 Renew a MIL5015 plug coupled cable (interconnect) with a non-certified replacement

Why has it changed.

This test plan is for ‘plug and play’ cables with MIL5015 plug couplers at both end of the cable, and has been laid out for 28 days or more, or the cable has been pulled through UTX

What has changed.

The title has been changed to make purpose of test plan clearer

Incorrect Hyperlink in excludes 3. has been removed

Unsealed in excludes section changed to uncertified

Error with numbering has been corrected.

SMTH Part 04 - Test Plan CA07
Renew a MIL5015 plug coupled cable (“interconnect”) with a certified replacement

This test plan is for ‘plug and play’ MIL5015 cables with plug couplers at both end of the cable, where its packaging is undamaged and has a certificate of conformance. Or If packaging is damaged or certificate is missing the cable has been tested in accordance with instructions from SM(S). This is due to the reduced testing involved with this Test Plan, the SM(S) is responsible for evaluating any risk. If there is any doubt use CA06 which is a more comprehensive test plan for ‘plug and play’ MIL5015 cables with plug couplers at each end.

What has changed.

The Title has been changed to make clear the intended purpose of this test plan.

The below note has been moved from the end of the test plan to ‘During Installation’ section, this is to aid the Tester in making a decision to use CA06 if cable has been damaged during installation.

‘If any damage is observed or suspected during installation, testing shall be required as detailed in NR/SMTH/Part04/CA06 (Renew a Plug Coupled Cable (“interconnect”) with a Non-Certified Replacement)

SMTH Part 04 - Test Plan CA12
Remove and Refit a Multicore Cable

This test plan is for remove and refit the same multicore cable

Why has it changed.

Test plan has been amended and improved.

What has changed.

Wording changed in includes section b) ‘core or wire’ has been changed to ‘cable’

New steps:

8 CONTINUITY TEST each core in the cable. This is to check for crosses or H/R cable cores

9. INSULATION TEST the cable. To check cable has not been damaged.

SMTH Part 04 Test Plan - CA13 Re-termination of a broken existing cable core or wire

Why has it changed.

Test plan improved with additional steps

New steps:

3. Isolate the affected core/wire from the supply.

4.Check cable core/wire is correctly labelled.

SMTH Part 04 – Test Plan CA21
Renew a single ended MIL5015 plug coupled cable(“lead”) with a certified replacement

Test plan is only intended for single ended MIL5015 plug coupled cables, where packaging is undamaged and have a certificate of conformity. Or been laid out in preparation for less than 28 days. If the packaging is damaged or certificate is missing the cable can be tested in accordance with instructions from SM(S). This is due to the reduced testing involved with this Test Plan, the SM(S) is responsible for evaluating any risk. If there is any doubt use CA22 which is a more a more comprehensive test plan for cables with MIL5015 plug couplers fitted at one end**.**

What has changed.

Title and Includes section amended to cables ‘fitted with MIL5015 plug or receptacle’

11. Check cable is replaced correctly to the wiring diagram. Requiring the tester to check every replacement cable to the wiring diagram.

New steps:

13. Check replacement cable is not susceptible to mechanical damage.

SMTH Part 04 Test Plan - CA22
Renew a single ended plug coupled cable (“lead”) with a non-certified replacement

This test plan is intended for single ended plug coupled cables (‘’lead’’) not fitted with MIL5015 specification plug or receptacle for example, TPWS, SSI, Point machine.

Why has it changed

Test plan improved with additional steps

Note in step 12 has been removed, requiring all cables to be checked to wiring diagram.

New steps:

14. Check replacement cable is not susceptible to mechanical damage.

SMTH Part 04 Test Plan EL09
Remove and Refit a Plug in Unit - Relay

Why has it changed

Due to risk of confusion with EL08 the Title has changed From Remove and Replace to Remove and Refit

SMTH Part 04 Test Plan - IS16
Replace a HIMatrix Programmable Logic Controller (PLC) F30 / F35 and F3

This test plan is intended for MCB Level Crossing where relays have been replaced by a HiMatrix PLC.

Why has it changed:

The F35 PLC has been added to allow road lights to be current proved in an alternative way.

What has changed:

Anywhere F30 was mentioned F35 was added and anywhere F30 and F3 has been changed to read F30 / F35 and F3.

SMTH Part 04 Test Plan- IS17
Download Data to a HIMatrix Programmable Logic Controller (PLC)
F30 / F35 and F3

This test plan is intended for MCB Level Crossing where relays have been replaced by a HiMatrix PLC.

Why has it changed:

The F35 PLC has been added to allow road lights to be current proved in an alternative way.

What has changed:

Anywhere F30 was mentioned F35 was added and anywhere F30 and F3 was mentioned, has been changed to read F30 / F35 and F3**.**

SMTH Part 04 Test Plan LD15
Replace an EBI Gate 630 Barrier Machine

Why has it changed

To reflect the introduction of a gravity fall version of the EBI Gate 630 barrier machine in addition to the previously available drive down version and other product developments since the previous version was published.

What has changed

Three additional steps have been added to the Test Plan to check specific features of the barrier machine operation. In addition, a typographical error has been corrected and some headings within the Test Plan have been reworded to improve clarity.

New steps

- Step 29 – to check the falling time is between 6 and 10 seconds
- Step 56 – to check the signaller's stop command is effective when used during the lowering sequence.
- Step 57 – to check that the 'lock down' feature is effective, to prevent a member of the public raising the barrier boom manually.

Wording has changed in the following steps

- Step 9 – typographical error corrected

SMTH Part 04 Test Plan PB05

Replace an Electric Point Detector or Microswitch

Why has it changed

SMS/PartB/Test 16 Detection Test (Supplementary Detectors) found missing from the Test Plan.

What has changed

Test 16 Added

SMTH Part 04 Test Plan – PC51
Replace a Complete Point Machine

Why has it changed

Following Dalwhinne Recommendations. Test plan has been improved for clarity and has been linked to the new defined check that has been introduced in Part 3.

What has changed

1. Check replacement unit is not damaged and is the CORRECT TYPE has been changed in line with the rest of the SMTH test plans

New Step

2. Check replacement unit for CORRECT CONFIGURATION (internal configurable wiring and straps)

although there is an error with the formatting of the hyperlink it will direct the test to the correct defined check, this will be corrected in the next issue

SMTH Part 04 Test Plan PH01
Replace a HPSS Electrical Component

Why has it changed

This Test Plan has been updated to clarify the required tests when replacing a HPSS Electrical Component.

What has changed

The includes box has been updated to clarify length of supplementary cables to aid in identification and added LVDT to Supplementary rail position sensors.

Note amended to Clarify use of 8/10mm detection gauges and added reference to HPSS handbook.

Removed reference to cable protection seals in step 8 and removed red asterisk.

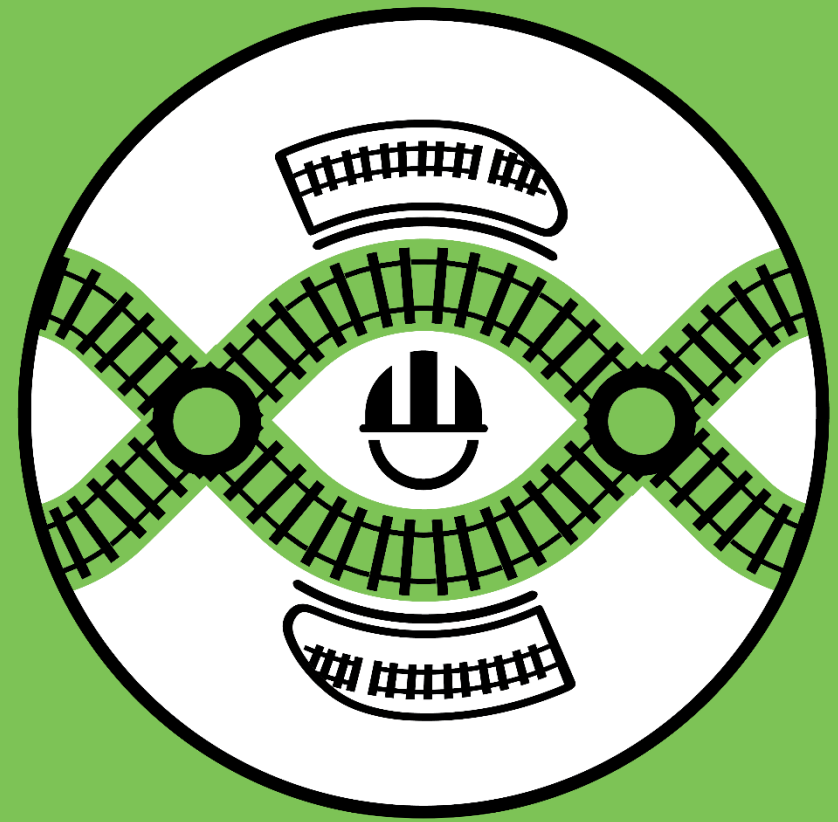
Extra tests for replacement of Brake, Power Isolation Switch and ECU have been included.

Clarified which tests are relevant for Single or Multiple Supplementary Detectors.

Removed General information which is in HPSS handbook.

Reordered tests to ensure testing is completed in correct order.

SMTH - Part 05



Providing technical leadership

SMTH - Changes in Part 05

Module(s)	Name	Type of change
Module S03	Single Obvious Cause - Exempted Failures	Amend
Module S10	Test Result Reporting	Amend
Module S12	Sign Back Matrix	Amend
Module S22	Management of Obscured Signals	Amend

SMTH Part 05 Module S22 - Management of Obscured Signals

Why has it changed

The PIR (Post-Implementation Review) held following the 2023 growing season, several improvements were identified.

Also, the December 2023 Rule Book update aligned with the new module but caused a small mismatch in the cross-reference.

What has changed

Flow-chart - New flow entry point which bypasses Signaller & Driver interaction where the evidence is already present that the signal is obscured (e.g. through S&T Cab Ride or review of CCTV). Correction of reference to Rule Book TS11 7.4

Review of wording in several clauses to provide better guidance and clarity.

Wording has changed in the following steps

Clause 2.2 - Signal Fault Category. Reworded and guidance added to make the requirements clearer.

Clause 3.1 - Dual Allocation of Faults. Amber 'shall' requirement lessened to guidance 'should'.

Clause 3.2 - Clearance activity. Timescale to rectify now mandated within 28 days, except where authorised by SFI staff.

Clause 3.3 - SFI Level 1 Response. Expectations and requirements re-written to clarify.

Clause 3.4 - Significance Assessment. Re-worded to be clearer on the requirement.

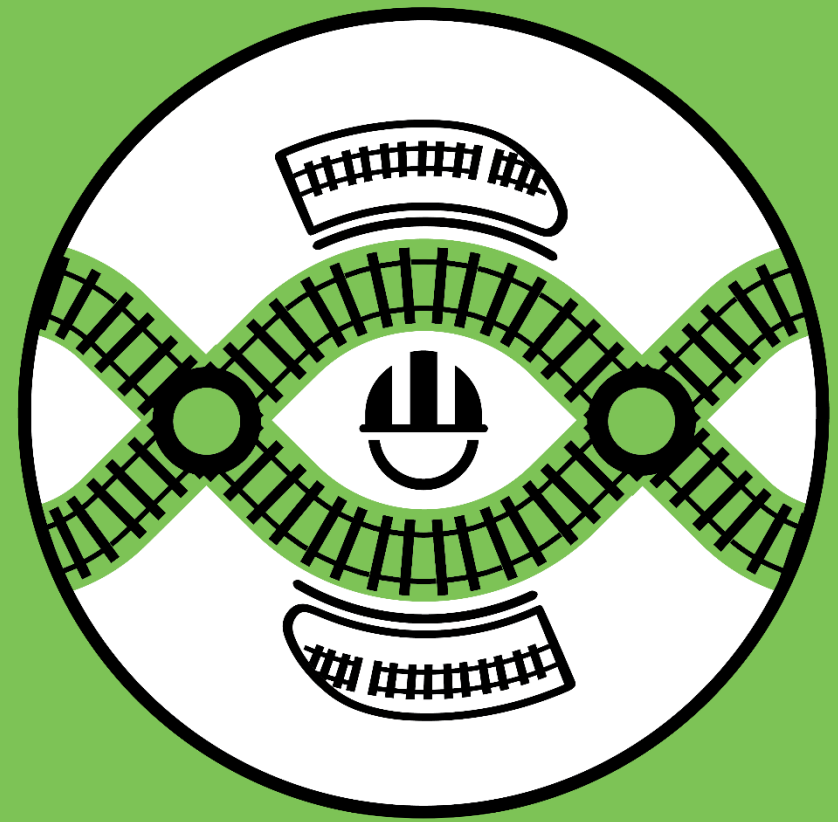
Clause 3.5 - Low Risk Obscuration. Additional consideration added (Overspeed risk).

Clause 3.9 - Section Manager (Signalling) Review. Greater emphasis on collaboration.

Clause 3.10 - Closing the Failure Record. Reference to Sign back matrix to determine authority level for sign back.

Clause 3.11 - SINCS File. Amber 'shall' requirement lessened to 'should'.

SMTH - Part 06



Providing technical leadership

SMTH Part 06 Modules -

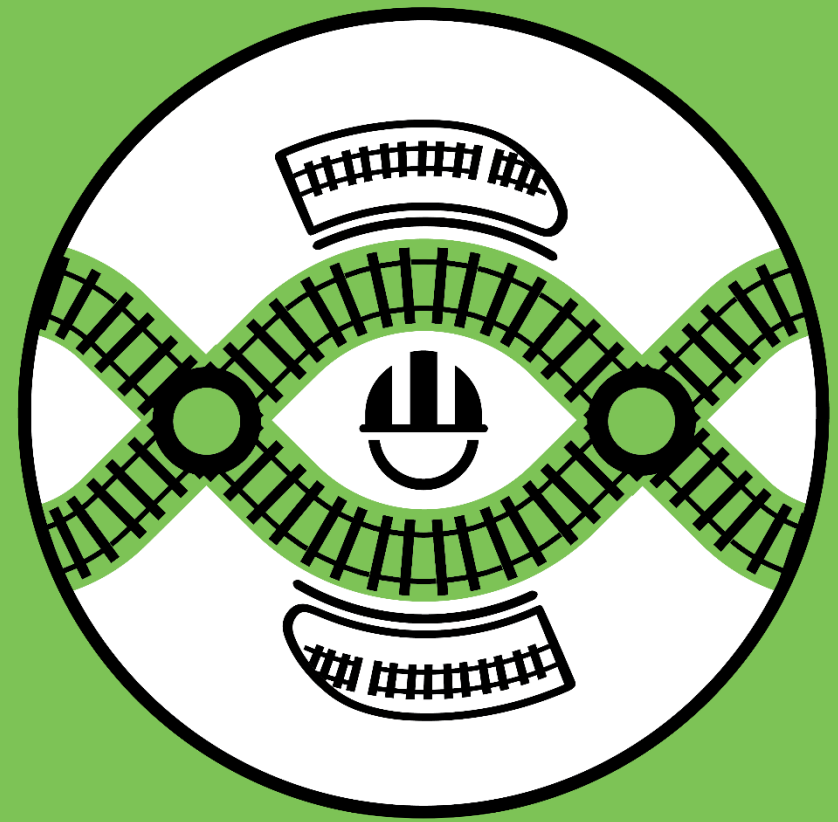
Why has it changed

TEL001 - Replace an Operational Telephone
TELTFI001 - Operational Telephones

Have been withdarawn,

See slide 93 SMTH Telecom elements – Faulting Guides / Test Plans for more information

SMTH - Part 08



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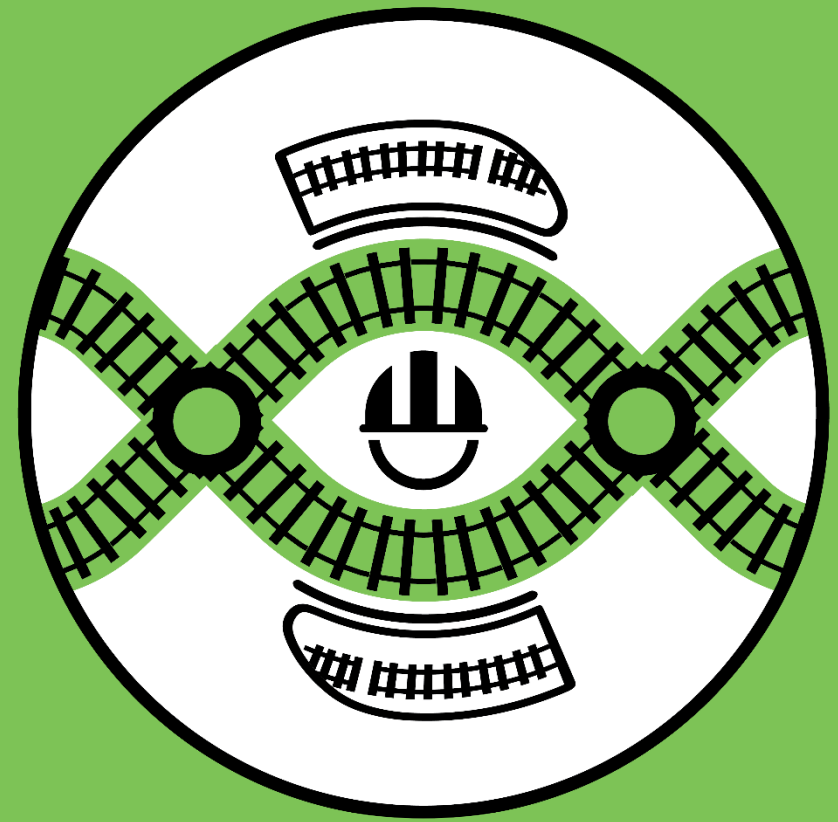
SMTH - Changes in Part 08

Module(s)	Name	Type of change
T046	Wrong Side Failure Test Guide: Telephone	New
T047	Wrong Side Failure Test Guide: Telephone (PETS / KETS)	New

SMTH - Part 10



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SMTH - Changes in Part 10

Module(s)	Name	Type of change
FF28	Faulting Guide: HIMatrix Programmable Logic Controller (PLC) F30/ F35 & F3	Amend
FF29	Faulting Guide: HiMatrix Manually Controlled Barrier Level Crossing	Amend
FF33	Faulting Guide: Telephones	New
FF34	Faulting Guide: PETS (AHB)	New
FF35	Faulting Guide: KETS (AHB)	New

SMTH Part 10 Test Plan - FF28
Faulting Guide: HIMatrix Programmable Logic Controller (PLC) F30 / F35 and F3

This test plan is intended for MCB Level Crossing where relays have been replaced by a HiMatrix PLC.

Why has it changed:

The F35 PLC has been added to allow road lights to be current proved in an alternative way.

What has changed:

Anywhere F30 was mentioned F35 was added and anywhere was written F30 and F3 has been changed to read F30 / F35 and F3.

SMTH Part 10 Test Plan - FF29
Faulting Guide: HIMatrix Manually controlled barrier Level Crossing

This test plan is intended for MCB Level Crossing where relays have been replaced by a HiMatrix PLC.

Why has it changed:

The F35 PLC has been added to allow road lights to be current proved in an alternative way.

What has changed:

Anywhere F30 was mentioned F35 was added and anywhere was written F30 and F3 has been changed to read F30 / F35 and F3.

New steps:

6.3 Check the failed RTL lamp current transducer for fault, test the voltage on the current transducer terminals connected to the HIMatrix F35.

SMTH Telecom elements – Faulting Guides / Test Plans

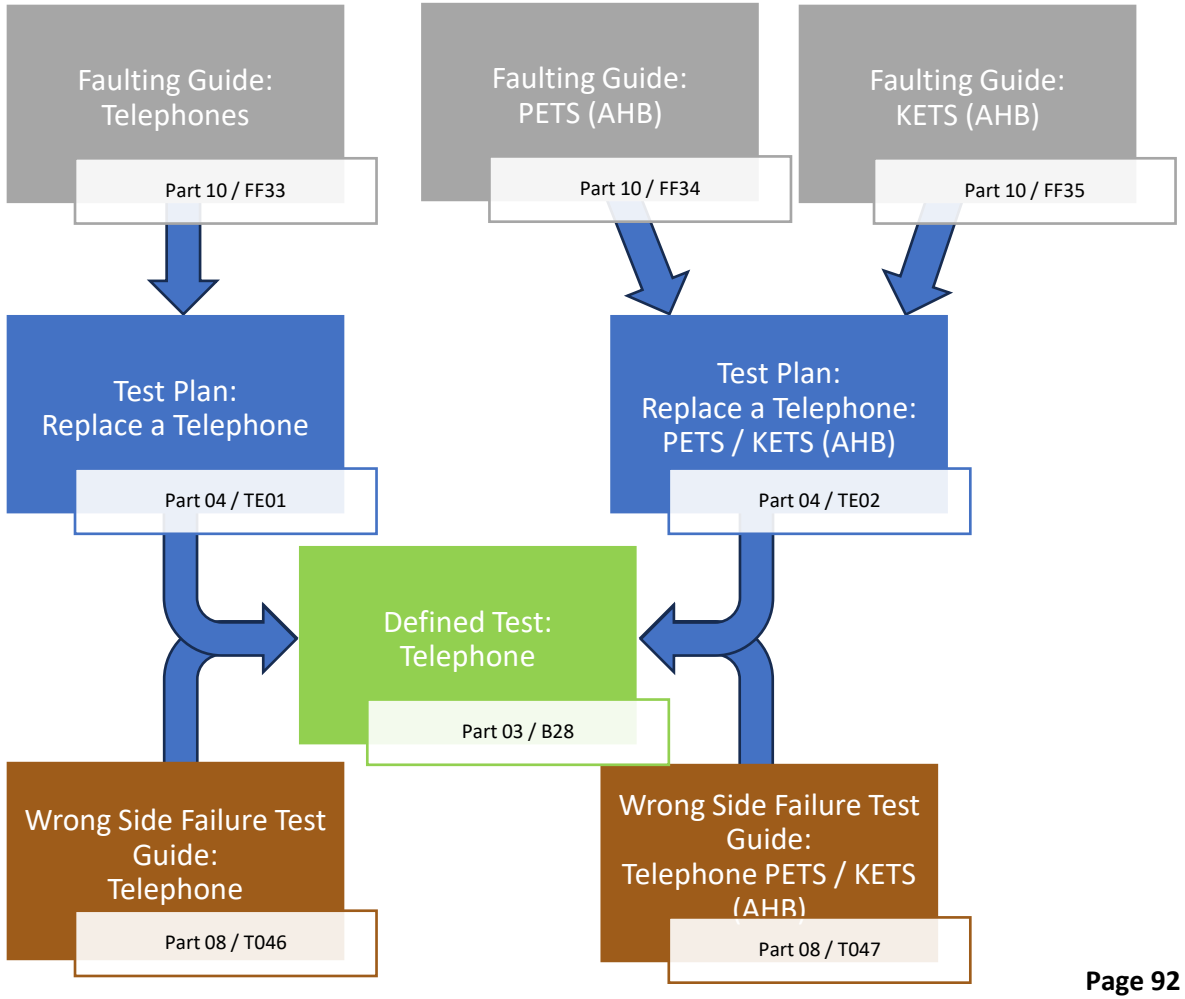
Why has it changed

The SMTH investigation into telephone failures often fails to establish the underlying cause. Too many unresolved failures are occurring. The elements of SMTH that relate to telephones have been reviewed and amended to strengthen the Guides and Test Plans.

What has changed.

- TEL001 and TELTFI001 have been removed.
- Faulting Guides have been created for; Telephones, PETS and KETS.
- New Test Plans have been created for; Telephones, PETS/KETS.
- Two Wrong side Failure Guides have been created to support the investigation into Safety Related failures of Telephones, PETS/KETS.
- A Defined Test has been created for a telephone.

- The telecom section of S12 – Sign Back matrix, has been revised in respect to levels relating to telephone failures.
- Additional criteria has been included in S10 – Test Results Reporting, for telephone failures.



Any Questions?

For any future changes or queries please contact:

Route Employees: Your Regional Representative, as detailed below

Non-Route Employees: Email Signal.engineers@networkrail.co.uk

Route Representatives:

Region	Routes	Lead	Deputy
North West and Central (NW&C)	Central North West West Coast South	Owen Flanders	Andrew Witton
Wales	Wales	Joshua Robinson	Jamie Pace
Western	Western	Matthew Redstone	Neil Pratten
Scotland's Railway	Scotland	Scott Paterson	Bhajaman Singh
Southern	Kent NR High Speed Sussex Wessex	Jude Parsons	Stephen Dapre
Eastern	Anglia East Coast East Midlands North and East	Richard Atkinson	Matthew Cook

The End