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Level 2

Prioritisation of Signal Engineering Equipment Defects

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Issue record

Issue	Date	Comments
01	April 2007	First Issue
02	August 2008	Updated to reflect Phase 2A / Engineering reorganisation responsibility change, no technical changes.
03	June 2010	Updated to reflect the requirements of NR/L3/TRK/1202 in respect of fixed stretcher bars on point systems

Compliance

This Network Rail standard is mandatory and shall be complied with by Network Rail and its contractors if applicable from 04 September 2010.

When this standard is implemented, it is permissible for all projects that have formally completed GRIP Stage 4 to continue to comply with the Issue of any relevant Network Rail Standards current when GRIP Stage 4 was reached and not to comply with requirements contained herein, unless the designated Standard Owner has stipulated otherwise in the accompanying Briefing Note.

Reference documentation

NR/L2/SIG/10016	Requirements for an Asset Maintenance Process
NR/L2/SIG/10047	Management of Safety Related Reports for Signalling Failures
NR/L2/SIG/10660	Implementation of Signalling Maintenance Specifications
NR/L2/SIG/11231	Signal Maintenance Testing Handbook
NR/L2/SIG/10027	Surveillance of Signal Engineering Activities
NR/L2/SIG/10028	Inspection of Signal Engineering Activities
NR/L2/SIG/11400	HPSS Handbook
NR/L3/SIG/10179	The Installation & Maintenance of 35mm Square Section Adjustable Stretcher Bars
NR/L3/TRK/1202	S&C systems – Flat bottom full depth switches – Management of fixed stretcher bars assemblies, lock stretcher bars, fastenings and associated defects

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1 Purpose

This Level 2 provides uniform guidance for prioritising signal engineering defects (i.e. work arising from signalling maintenance activities or asset inspections where the task cannot be undertaken at the time it was identified.)

2 Scope

Where defects with signalling equipment are identified, rectification prioritisation shall be in accordance with this Level 2 document. Ordinary fault rectification is not part of defect management. A 'failure' shall normally be repaired by the attending faulting team, the repair being permanent if possible. However, should a temporary repair be undertaken, which needs more work to make the repair permanent (for example, a temporary re-allocation of a relay contact) or a defect identified which shall need to be rectified at a later time (e.g. AWS Strength and Polarity Test giving 'Yellow' requiring rectification but not immediately,) such work shall be prioritised in accordance with this Level 2 document. Urgent safety related repairs are not included, as these require rectification immediately.

3 Definitions

Integrated Control Centre

The Network Rail integrated control centres and the Network Rail infrastructure fault controls delegated with monitoring of infrastructure faults and allocation of fault teams.

Prioritisation

Assigning a period of time to each item of work arising identifying when it shall be scheduled for remedial action. It shall take into account whether a delay in action shall result in deterioration to an unsafe or unreliable condition.

Signal & Telecoms Maintenance Engineer

Senior person competent in signal engineering who has technical responsibility for a geographical area and for the management of Depot staff.

Section Manager (Signals)

Person responsible to the Signal & Telecoms Maintenance Engineer, who is responsible for the management of the Signalling Technicians for a geographical sub-area.

Workbank

A system capable of recording work arising from signalling maintenance activities or asset inspections where the task cannot be undertaken at the time it was identified. It shall also record work that has been carried out in order that all work to each asset is recorded. Ellipse shall perform this function.

4 Fundamental Rules of Defect Management Process

The recommended prioritisation of each item of work identified shall depend upon its individual circumstances. The priority ratings may be adjusted accordingly to

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remedy a condition which, if delayed, would deteriorate to an unsafe or unreliable condition.

Note that where the safety of the line could be affected the signal, engineering staff shall undertake immediate action(s) so that the appropriate protection is afforded. The process assumes staff carrying out signal engineering activities are competent.

The process is not intended to prevent an action being given a higher priority than listed here if there are good safety or performance reasons for making it a higher priority. Should the action be proposed for a higher priority, then the Signal & Telecoms Maintenance Engineer shall agree it at the review and fully document the reasons for the decision.

Work, once identified, can be recorded in different ways (but should always be submitted in Ellipse):

Scheduled as “work arising” (entered into Ellipse or Workbank)

Submitted as a renewal (usually but not exclusively the replacement of a piece of signalling equipment).

The processing of “renewals” once identified shall be managed outwith this specification, although recorded in accordance with this specification so that the detail is not lost.

Where in Appendix A advice to a Section Manager (Signals) or Signals & Telecoms Maintenance Engineer is described as “immediate”, this shall be read as during the working day or, outside office hours, during the next working day.

5 Prioritisation of Signal Engineering Work

Signalling work that is identified during signalling maintenance activities or asset inspections and cannot be completed at the time shall be recorded as work arising. Any items of equipment, systems or installations that require renewal shall also be recorded.

All work arising shall be checked against the prioritisation matrix (Appendix A) for recommended actions and time-scales. Some lines of entry in Appendix A have two or more priorities shown in the table. The first entry denotes the action required relatively quickly, perhaps to make equipment safe; the second could be the longer term remedial action. Alternatively, some of the defects may have differing priorities depending on the cause.

Where mandated actions and time-scales can be met the work shall be entered into the Workbank and the work planned to the required time-scales. If the work has already been completed, the Workbank shall record that the work has been carried out against the asset. If the work cannot be completed in the timescales, the work shall still be entered into Ellipse so that Ellipse contains a complete record of the work required. Such work shall be scheduled for completion as soon as practicable.

Where the prioritisation matrix does not mandate actions or time-scales for the work arising, the local management team shall determine the work and priority (i.e. the Section Manager (Signals) and the Signals & Telecoms Maintenance Engineer). The work shall then be entered into the Workbank and the work planned to the agreed time-scales.

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Work arising details for each asset shall be recorded on an Ellipse WAIF form, this includes work which has been completed so that Ellipse has a record of work carried out to each asset. Note that where handhelds are in use, WAIFs may be achieved electronically.

The prioritisation matrix uses the “M” system of prioritisation described below. One of these values shall be assigned to each Workbank entry to allow the identified work to be scheduled for remedial action.

Priority	Time-scale
MO	Up to 10 days
M1	4 weeks (28 days)
M3	13 weeks (91 days)
M12	52 weeks (365 days)
M24	1 to 2 years (365 to 730 days)
M36	2 to 3 years (730 days to 995 days)
M99	Logged i.e. a job can be listed without an end date. This can be used for recording work outside the standard planning system.

In addition, an “inspection only” task might arise from a defect – until such time as the problem is rectified. “Inspection only” tasks shall be prioritised according to need, but shall not normally exceed 13 week intervals.

A list of defects and recommended priorities are given Appendix A. The list is not exhaustive and additional defects can be added based upon the examples quoted. This list is expected to grow and change as lessons are learnt. The Signal & Telecoms Maintenance Engineer shall manage this list and add or amend as necessary, when advised of request changes.

The priorities listed above are the preferred signalling values and align to the frequencies defined within scheduled signalling maintenance. Other values may be used e.g. M6 for 6 months and M9 for 9 months etc. if these values accurately reflect the work priority however most identified work should fit into the values listed in the above table.

The priority rating and content of the Workbank shall be reviewed at regular intervals by the local management team (persons competent in signal engineering and capable of assessing the risk of delaying the work to be undertaken.) Typically, such a review shall be scheduled at least once per month. A more frequent review is recommended.

Non completion of high-risk work shall be highlighted so that appropriate action can be taken to mitigate the risk.

In order to independently review the Workbank periodically, a more senior engineer such as the Route Asset Manager (Signals) shall review a sample of the Workbank, to review the prioritisation applied to the work and progress with respect to the planning and achievement of the work within the time-scales. This review shall be undertaken at least every 13 weeks.

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6 Appendix A Priority Matrices

6.1 Appendix A1: Cables and Wires

Cables & Wires	
Defect or Work Arising Identified during Maintenance or Inspection	
Refer to SMTH NR/L2/SIG/11231 Signal Maintenance Testing Handbook plus notes below	
Priority	Action
M0 (1 week)	STME shall be advised of all new diversions and any decision to extend cable testing.

- 01: The Section Manager (Signals) (SFI Level 2 competent) may authorise a circuit to remain in operation at values down to 0.5M Ω . However, every effort should be made to divert the circuit at the earliest opportunity and definitely within 48 hrs if there are any previous core diversions or within 72 hours if this is the first. The Signal Maintenance Testing Handbook allows the Signal & Telecoms Maintenance Engineer to authorise a circuit to remain in operation at values below 0.5M Ω whilst repair/replacement is arranged subject to a satisfactory risk assessment being undertaken.
- 02: A delay in testing shall be authorised by an SFI Level 2 competent person. A maximum delay of 48 hrs if the cable has existing faulty cores, otherwise a maximum delay of 72 hrs is permitted.
- 03: Extending the test interval following the 3, monthly tests shall be authorised by an SFI Level 2 competent person.

Cables & Wires	
Defect or Work Arising Identified during Maintenance or Inspection	
Wet or dry wire degradation that is new or not consistent with classification already awarded	
Priority	Action
M0 (Immediate)	If competent in wire degradation assess situation and if risk of conductors coming into contact with each other, make safe. If it is not possible to insulate immediately, escalate to SFI level 2 competent person.
M0 (48/72 Hours)	Inform the Signal & Telecoms Maintenance Engineer if not consistent with classification already awarded

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Cables & Wires	
Defect or Work Arising Identified during Maintenance or Inspection	
Earth bus bar test above maximum Acceptable values	
Priority	Action
M0 (Immediate)	Investigate and rectify. If not possible to rectify escalate to SFI level 2 competent person

Cables & Wires	
Defect or Work Arising Identified during Maintenance or Inspection	
Earth bus bar test above maximum Safety values	
Priority	Action
M0 (Immediate)	Investigate and rectify. If not possible to rectify escalate to SFI level 2 competent person immediately Inform Signal & Telecoms Maintenance Engineer if earth test result above maximum Safety values

Cables & Wires	
Defect or Work Arising Identified during Maintenance or Inspection	
Earth Leakage Detector trips	
Priority	Action
M0 (Immediate)	Reset. If cannot reset, investigate and rectify.
M1 (1 Month)	Investigate and rectify if ELD trips regularly

Cables & Wires	
Defect or Work Arising Identified during Maintenance or Inspection	
Verdigris or other forms of contamination	
Priority	Action
M0 (Immediate)	Remove any contamination which presents immediate risk of short circuit between terminals
M3 (3 Month)	Renew terminal blocks if contamination cannot be cleaned off. Apply approved terminal protection to prevent re-growth of Verdigris.

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6.2 Appendix A2: Location Cases and Relay/Equipment Rooms

Location Cases and Relay/Equipment Rooms	
Defect or Work Arising Identified during Maintenance or Inspection	
Relay Contact faulty requiring use of another contact	
Priority	Action
M0 (1 Week)	Inform Signal & Telecoms Maintenance Engineer

Location Cases and Relay/Equipment Rooms	
Defect or Work Arising Identified during Maintenance or Inspection	
Damage to relay case e.g. cracks, distortion, discolouration or internal damage such as silver sulphide crystals, loose wires, broken internal component	
Priority	Action
M0 (Immediate)	If damage could result in maloperation of the relay renew the relay and take steps to protect the integrity of the signalling system if necessary.
M0 (1 Week)	Inform Signal & Telecoms Maintenance Engineer where no immediate action was necessary.

Location Cases and Relay/Equipment Rooms	
Defect or Work Arising Identified during Maintenance or Inspection	
Earth Leakage Detector trips or earth test above maximum acceptable voltage.	
Priority	Action
M0 (Immediate)	See Cables & Wiring

Location Cases and Relay/Equipment Rooms	
Defect or Work Arising Identified during Maintenance or Inspection	
Black relay base or plug board showing signs of silver migration	
Priority	Action
M0 (Immediate)	Assess immediate risk of circuits around area where silver migration present. Renew base or relay if necessary. Examine other relays at same location.
M0 48/72 Hours)	Inform Signal & Telecoms Maintenance Engineer.
M0 (1 Week)	Signal & Telecoms Maintenance Engineer to risk assess and determine appropriate action where a large quantity of equipment is affected at one site

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Location Cases and Relay/Equipment Rooms	
Defect or Work Arising Identified during Maintenance or Inspection	
Supports or foundations for a location case failing	
Priority	Action
M0 (1 Week)	Inform Signal & Telecoms Maintenance Engineer and agree priority and remedial action.

Location Cases and Relay/Equipment Rooms	
Defect or Work Arising Identified during Maintenance or Inspection	
Loose or missing cable clamps	
Priority	Action
M0 (Immediate)	Tighten if possible If there is a danger of cable cores shorting across cables, arrange for temporary support.
M3 (3 Months)	Renew if adjustment not possible. Provide where not present Renew temporary support in an acceptable permanent format (see Signalling Installation Handbook)

Location Cases and Relay/Equipment Rooms	
Defect or Work Arising Identified during Maintenance or Inspection	
Internally rusted location case	
Priority	Action
M0 (Immediate)	Remove rust and prevent rust pieces falling on vital equipment e.g. terminals
M0 (1 Week)	Inform Signal & Telecoms Maintenance Engineer if a persistent problem where location case should be considered for reskinning or renewal.