

# Maintenance Responsibilities, Frequencies, Recording

ESM-26-01

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## 1 Introduction

This standard defines the signalling processes that describe the maintenance responsibilities, frequencies and recording of signalling maintenance tasks.

## 2 General Responsibilities

Maintainers responsible for signalling maintenance shall clearly understand that the object of good maintenance is to prevent failures by planned maintenance activities and intelligent anticipation rather than to wait until they happen. It is particularly important to be aware of circumstances where there is reasonable cause to suspect that reliable operation of equipment may have been jeopardised, e.g. by construction activities, mechanised track maintenance activities, etc.

Signal Maintenance Engineer's and/or Signal Managers are responsible to ensure the performance of maintenance necessary to meet safety standards and reliability requirements.

Signal Engineers, Signal Managers, and Signal Maintainers / Electricians are responsible for efficiently maintaining the equipment on their sections to ensure the availability of the equipment and its reliable operation to safely and efficiently regulate train movements.

Signal Engineers/Managers are to ensure that the Maintenance works management system (WMS) correctly reflects the signalling assets in service. They must ensure that the WMS is updated to include new assets that are brought into use and other assets that are decommissioned out of use. The information and maintenance activities must be consistent with the requirements of the Technical Maintenance Plan or Tailored Technical Maintenance Plan as appropriate.

Signal Work Group Leaders who are in charge of Signal Mechanical maintenance employees are also responsible for ensuring that the maintenance of the mechanical equipment within the area of responsibility is completed in accordance with the Technical Maintenance Plan and Service Schedules / Standard Jobs.

Signal Maintainers / Electricians are responsible for the maintenance of the whole of the electrical safe working instruments, electrical and mechanical signalling equipment and circuits, including level crossing warning systems, on their assigned sections in accordance with the Network rules and Network Procedures, maintenance instructions, maintenance rosters, technical maintenance plans & service schedules, relevant standards, procedures and equipment manuals. If due to unavoidable circumstances the required maintenance schedule is missed resulting in the maintenance being non-compliant then the equipment is to be booked out of order or the necessary waiver obtained.

Signal Maintainers / Electricians and especially Work Group Leaders are required to assure himself/herself, as far as reasonably practical, of the integrity and reliability of equipment maintained or tested by either ARTC or contract personnel. Any work involving disconnection or re-connection of signalling circuit wires and cables requires the attendance of the Signal Maintainer / Electrician.

The actual maintenance actions carried out should ensure that the signalling equipment will operate safely and reliably until the next maintenance visit.

Signal Work Group Leaders are to ensure:

- all signal maintenance personnel, including contractors hold current accreditation;

- all personnel are competent for the work to be carried out;
- that the work is carried out correctly and completed in accordance with the Technical Maintenance plan and Service Schedules;
- that their signalling staff is knowledgeable and competent to perform their duties;
- they assist in the development of the skills and proficiency of their signalling staff;
- they provide training and mentoring to inexperienced and junior signalling employees as required;
- they ensure that their staff is aware of safety hazards;
- that staff know the safety precautions and that they practice safe work methods.

Signal Maintainers / Electricians are also responsible for the maintenance of phones in traffic huts and signal post and yard phones where fitted unless specifically assigned to the communications maintenance team/contractor.

Signal Maintenance employees in charge of others are also responsible for the direction and supervision of persons placed under their control and in their care, and are to ensure the equipment on the section is effectively and efficiently maintained.

Signal Maintainers / Electricians shall as soon as practical become fully conversant with the equipment and circuits etc. on their section, including the particular condition and maintenance requirements of each item of equipment, and the applicable specifications, equipment manuals, technical maintenance plans & service schedules, instructions, procedures, Network Rules and Network Procedures. They shall familiarise themselves with relevant emergency arrangements. As far as practicable, they are also to become fully conversant with the equipment on adjacent sections, and thus be capable of performing effective service and repair on adjacent sections when required to do so in an emergency.

Maintainers are responsible for ensuring the security of all equipment that they work on. When attending equipment fitted with doors, covers, lids etc. the Signal Maintainer / Electrician is responsible for ensuring that they are left properly secured in position, closed and where applicable, locked.

Signal Maintainers / Electricians shall record all equipment requiring corrective maintenance action/s in the maintenance management system and report to the Team Manager any matter which appears to require urgent attention which is beyond his/her own means to rectify, the Signal Maintenance Engineer should also be made aware of these situations.

### **3 Maintenance Reports and Records**

In order that maintenance of systems and equipment be carried out in a controlled, programmed manner it is necessary to keep accurate, updated records or History Cards. Signal Maintainers / Electricians are required to complete and sign Maintenance Schedule Task (MST), Work Orders, reports and test records in accordance with these procedures.

Maintenance records and reports are an important documented account that is used to investigate incidents and train accidents. They assist in demonstrating the integrity of the signalling system.

Records of actual maintenance carried out are also required to assist in determining the optimum level of maintenance for each type of equipment.

### 3.1 Maintenance Frequencies

Maintenance frequencies are set out in the Technical Maintenance Plan (TMP). The maintenance actions (tasks) are determined using the original equipment manufacturers recommendations as a foundation and any relaxation of periodicity or variation to maintenance tasks are justified using any of a suite of maintenance requirements analysis techniques such as Failure Modes, Effects and Criticality Analysis, Fault Tree Analysis and Fine Charts.

The standard maintenance frequencies assume the asset/s are in good condition, the Annual Asset Condition Report for signalling assets provides an assessment of the condition of assets in a particular area.

Assets that fall below the minimum condition value (see work Instruction) must be maintained at a frequency of at least half of the periodicity specified in the TMP or managed in accordance with the corrective maintenance procedure within the asset management system.

Changes to the approved standard maintenance frequencies that result in an increase in the maintenance periodicity require the approval of the General Manager Technical Standards.

Maintenance frequencies and actions are subject to continuous review and all signal maintenance personnel are encouraged to provide feedback on the results of their experience and suggestions for improvement or where assets have deteriorated and require more frequent or targeted maintenance.

The Signal Maintenance Engineer or responsible Signal Manager is to direct that additional or more frequent maintenance be carried out where site specific conditions, (such as asset condition, road movement, or equipment approaching its life expectancy, etc.) would otherwise cause a reduction in safety integrity or in reliability below requirements.

### 3.2 Management of Equipment Requiring Corrective Maintenance

Signal Maintainers/Electricians should be particularly vigilant when performing maintenance to detect any equipment in the area that requires corrective action/s e.g. track circuit bonding, notice boards, and any changes to track circuit ballast conditions that may have recently occurred or since the previous maintenance visit. This could be due to vandalism, storm damage, dragging equipment, weather, geological disturbance or activities by track & civil or other work groups. Where it is identified that equipment requiring corrective maintenance may impact on the safe and reliable performance of the signalling system it is to be rectified immediately or booked out of service. If the equipment requiring corrective maintenance is not of urgent nature then it shall be reported for corrective maintenance action in the asset management system. This may involve periodic reassessment of the equipment to determine that it has not deteriorated further and that it is fit for continued service until the corrective maintenance task is completed.

### 3.3 Reports and Records

Details of the planned maintenance schedules and frequencies and the actual inspections, preventative and corrective maintenance performed, including regular safety critical tests, shall be documented using a reliable reporting and recording system. The asset management system combined with signalling equipment history cards and test record sheets, where specified under the relevant maintenance procedure, are appropriate for this purpose.

The Signal Maintenance Engineer/Manager or Team Manager is to analyse maintenance records and compliance performance monthly and arrange corrective action if required.

## 4 Compliance Management

A system of managing and reporting compliance with standards for nominated maintenance tasks has been introduced for defined safety critical signalling assets and components. These assets and components are defined as an item whose failure, either by itself or as a hidden function in concert with one other failure, will result in the likelihood of a significant incident occurring, causing injury to the public or staff.

A safety critical task is one that protects against an immediate or likely failure mode (or root cause of a system failure) in a safety critical asset/component or a population of asset/components forming a system.

The characteristics of safety critical tasks are generally rapidly developing and adverse following the breach of the defined conditional criteria. There is significant risk associated with safety critical tasks being extended beyond the specified task period without defined and approved risk mitigation measures in place.

To manage the known failure modes of these safety critical assets/components, the maintenance tasks have been categorised as Safety Critical tasks and allocated set time periods with appropriate planning latitudes for the maintenance/inspection tasks to be carried out to mitigate the risk of critical failure.

The difference in importance between the tasks to manage the safety critical assets/components is the failure characteristics of the condition being assessed by the examination task.

### 4.1 Safety Critical Task

The safety critical asset/component being the “Facing Point Lock” and the allocated task being “Gauging the gap between switch and stock rail to ensure the lock has not drifted beyond its specified limits” or “Level 1 maintenance of a level crossing” being a series of allocated tasks to various components of the equipment, such as battery, battery charger, relays, lights, bells, booms, etc.

There may be safety critical tasks associated with Legacy equipment which is in use in some areas of the network. These shall be maintained and reported in accordance with their nominated requirements.

### 4.2 Management and Reporting Compliance

The Signalling Technical Maintenance Plans define preventative maintenance tasks for signalling infrastructure equipment. Each task has planning latitude which reflects the allowed variation around the task.

Safety Critical tasks shall be completed within the defined planning latitude. For those tasks that cannot be achieved due to special circumstances, an Engineering Waiver must be obtained in accordance with engineering waiver management.

Items listed under the heading ‘Other Safety Tasks’ in the following table should normally be completed within the maintenance latitude, however where unforeseen circumstances occur and it is known that the planning latitude will be exceeded, an Engineering Waiver must be obtained.

Work orders that become due within the schedule period and are completed, shall be closed off using the maintenance recording system as soon as practical, but not later than the commit date for the next period.

Failure to secure the appropriate Engineering Waiver will require removal of the particular asset from service.

	<b>NSW</b>	<b>VIC</b>	<b>SA/WA</b>
<b>SAFETY CRITICAL</b>	Level Crossings Lvl1 Points Lvl1 (FPL & Detection, all) Electric Train Staff Lvl3 * Electric Locks (Lever Frame only) * Mechanical Interlocking Tests (Main Frame > 4 Levers only) * Upper Quadrant Signals. * ML Releasing Switches (Unmodified only) * Relay Interlocking Tests (Single Cut CCTS and without ELD only) * AC Track Circuit (Double Rail – Traction only) #	Level Crossing Lvl1 Points Lvl1	Level Crossing Lvl1 Points Lvl1
<b>OTHER MAINTENANCE TASKS</b>	All Other Signalling Tasks	All Other Signalling Tasks	All Other Signalling Tasks

\* NSW Legacy equipment

# NSW Interface only

### 4.3 Signal Engineer Inspection/Test Reports and Certificates

Reports and certificates shall be completed and kept by the Signal Maintenance Engineer or relevant Signal Manager for the specific inspections or tests required to be carried out by them or their suitably accredited delegate.

### 4.4 Signal Maintenance Periodicity and Asset Condition

The condition of signalling assets should be recorded in a Signal Asset Condition Assessment System. Corridor and Team performance reports should include this information, including any action to rectify the condition of the asset/s and/or to increase the maintenance frequency to manage the degradation in condition. Degradation in the discreet assets is managed under the corrective maintenance management process described in asset management system.

## 5 Lines on Which Rail Traffic has been Suspended

Should rail traffic on a line be suspended, signal maintenance may also be suspended with the approval of the Corridor Manager and the relevant Signal Manager. The Operations Manager for the corridor affected must be notified in writing advising that signal maintenance is not being carried out and that no train movements are permitted until arrangements have been made for

## Lines on Which Rail Traffic has been Suspended

the signal maintenance to recommence and completed and any defects attended to and repaired prior to commencement of any train movement. Written acknowledgement of this event is required from the Operations Manager. All signalling equipment, civil and track infrastructure is to be collectively booked out of order on an Infrastructure Booking Authority form and forwarded to the relevant Train Transit Manager. A Train Notice is also required to ensure all operators are made aware of the situation.