AUSTRALIAN RAIL TRACK CORPORATION LTD

Discipline: Engineering (Signalling) **Category: Standard**

Maintenance of Signal Sighting and Signals

SMP 31

Applicability

New South Wales	✓	**CRIA (NSW CRN)**	✓

Primary Source

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Amendment Record

Version	Date Reviewed	Clause	Description of Amendment
1.1	1 September 2004		Reformatting to ARTC Standard.
1.2	14 March 2005	Disclaimer	Minor editorial change. Footer reformatted.
1.3	2 June 2010		Various information transferred to ESM-04-01. Position titles updated. Document transferred to current template and edited for grammar and style.

Contents

About This Standard

This document defines the procedures and tests to be followed when carrying out sighting checks, lamp voltage and other maintenance activities on colour light and semaphore signals.

1 General – Incandescent Lamp Units

For information about the maintenance of signal sighting and signals, refer to ESM-04-01 Maintenance and Sighting of Semaphore Signals and Train Authority Indicators.

In difficult cases where the signal indication cannot be distinguished due to sunlight shining directly onto the lenses, the ARTC Executive Manager Standards, Systems and Performance, or a nominated signalling representative, shall be consulted for advice on improving the situation.

The interior of all lamp cases shall be checked to be painted matt black to minimise reflection of any external light.

The matt black paint on the hoods and on the front of backgrounds shall be checked to be in good condition and be such that there can be no reflection of external lights. Repainting should be carried out using matt black exterior enamel paint.

The condition and sealing of signal lamp cases shall be checked to ensure that external light cannot enter the lamp case through cracks or any openings.

Outer lenses of colour light signals shall be checked to be intact to ensure that phantom indications are not possible from external light reflecting back through the coloured lens.

If there are partially or completely missing outer lenses, these must either be replaced immediately or the coloured lens or roundel be removed or securely covered with dark, non-reflective material and the lamp must be removed and the respective controlling relay disconnected.

On running signals, the indications more restrictive than the defective indication may be left working. For example, if the outer lens for a full clear green indication is defective then the medium and caution indications may be left working, but if the outer lens for the most restrictive proceed indication (caution or low speed as applicable) is defective then the running signal must be retained at stop. The signal indications (clear or medium) or the signal (if the caution or low speed indications are affected) shall be booked out of use via the NRF 003 Infrastructure Booking Authority form and an entry made in the train register book by the signaller. Particulars of temporary repairs shall be included in the failure report.

These immediate measures concerning partially or completely missing outer lenses are not normally necessary in the case of the signal red aspect where phantom indications would be a safe side condition.

Whenever outer lenses are replaced they shall be replaced by the same type and care shall be taken to ensure that spreadlight lenses and deflecting sectors are correctly orientated.

The back of a colour light/searchlight signal shall not be opened with a train approaching, or if the back is already open it shall be closed to prevent a false aspect being displayed to the driver.

Signal Maintainers shall regularly examine colour light signal lampcase doors to ensure they fit neatly when closed to prevent external light entry and that the securing devices or locks are in good condition and are effectively securing the doors closed. Before they leave the signal they shall check that the doors are securely closed and locked.

1.1 Sighting Check – Incandescent Lamp Units

Maintenance Supervisors are to assess and determine those signals which may be subject to phantom indications, (by inspection from a train 90 minutes after dawn and 90 minutes before dusk if necessary).

Where a false proceed indication is possible from sunlight, arrangements must be made to have anti-phantom filters fitted to the lens units concerned.

For Type F level crossing signals, similar action is required to ensure that road users receive good sighting of the level crossing lights. Since the advent of monitoring equipment will mean that daily inspections will no longer occur, it will be the responsibility of the Signal Maintainer to check signal focus and intensity as part of the maintenance visit. This will necessitate viewing the signals from a distance of approximately 100 metres (or the maximum sighting distance if less than 100 metres) on all approaches to the crossing.

For further information about the maintenance of signal sighting and signals, refer to ESM-04-01 Maintenance and Sighting of Semaphore Signals and Train Authority Indicators.

1.2 Lamps/Lamp Changing

Where both filaments of a lamp have failed or where no aspect is displayed, the defect shall be reported in accordance with failure reporting procedures.

Care must be taken to ensure that any lamp used is the correct type by checking that the voltage, wattage and filament arrangement are suitable for the circuit in which they are to be used.

Multi-filament lamps (SL 35 type) shall be a good fit in the holder and properly seated with the main filament at the focal point of the lens. Triple pole (independent) double filament lamps should be inserted in the holder so that the main filament is normally illuminated. It shall also be checked that on breaking the main filament circuit, that the auxiliary filament is illuminated.

When installed, new lamps shall be observed to light up before being left in service. The supply voltage shall be less than the rated value of the lamp. Refer to the lamp ratings table below.

New lamps shall be kept in their wrapping and stored in a dry place until they are put into service to prevent any damage or deterioration due to corrosion.

To obtain maximum life from a lamp it is necessary to adjust the lamp voltage as near as possible to the minimum voltage (outlined in the Lamp ratings table below). The lamp voltage shall be measured across the terminals of the lamp holder.

Level crossing light voltages are to be measured using a Fluke meter of a type which can measure the maximum voltage with the level crossing test switch in the Normal position and all lamps operating normally.

Signal lamp voltages shall be checked on installation and whenever lamps are changed, or at intervals not exceeding twelve months.

Level crossing lamp voltages are also to be checked on installation and whenever lamps are changed, or at intervals not exceeding six months.

Lamp Ratings

Lamp Rating		Maximum Voltage	Minimum Voltage
10 Volt	5 Watt	9.7v	9.4v
10 Volt	11 Watt	9.7v	9.4v
10 Volt	13/3.5 Watt	9.7v	9.4v
10 Volt	18 Watt	9.5v	9.0v
10 Volt	18/3.5 Watt	9.5v	9.0v
10 Volt	25 Watt	9.7v	9.4v (level crossings)
12 Volt	2/2 Watt	10.7v	9.0v

12 Volt	24/24 Watt	11.7v	(11.5v)*	11.3v (11.1v)*
12 Volt	24/24 Watt	10.7v	(11.3v)+	0.2v (11.1v)+ (subsidiary and marker lights only)
12 Volt	36 Watt	11.2v		10.7v
12 Volt	36 Watt	10.1v		9.5v (subsidiary lights only)
120 Volt	15 Watt	Bus Bar Volt		
130 Volt	60 Watt	Bus Bar Volt		

* The value shown in brackets applies where separate voltage taps are not provided for the main and auxiliary filaments and the auxiliary filament is not subject to the voltage drop across the filament changeover relay coils.

+ The value shown in brackets applies to SSI installations only.

Colour light signal lenses shall be regularly cleaned. Since many lenses are made of plastic; soap or mild detergent and water only shall be used as a cleaning agent. Proprietary products which contain abrasives must never be used.

1.3 Semaphore Signal – Motor Worked

Refer to Section 2 Semaphore Signal – Motor Worked in ESM-04-01 Maintenance and Sighting of Semaphore Signals and Train Authority Indicators.

1.4 Banner Signals

When maintaining banner signals, give special attention to the free movement of the motor spindle and to the correct adjustment of the arm contacts. The arm returns to normal by gravity and shall be regularly tested in this respect. Lubricate all bearings with an approved light oil. Clean the glass and lamps on each maintenance visit.

1.5 Mechanical Signals

Refer to Section 3 Mechanical Signals in ESM-04-01 Maintenance and Sighting of Semaphore Signals and Train Authority Indicators.