



**AUSTRALIAN RAIL TRACK CORPORATION LTD**

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**Signalling**

**Title**  
**Level Crossings**

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**Document Control**

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		Refer to Reference Number	H Olsen	M Owens	Refer to minutes of meeting 12/08/04

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The technical content of this document has been approved by the relevant ARTC engineering authority and has also been endorsed by the ARTC Safety Committee.

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## About This Standard

This Standard defines the procedures and tests to be followed when working on active level crossing infrastructure.

# Document History

**Primary Source** – RIC Standard SC 00 52 00 35 SI Version 2.0

## List of Amendments –

<b>ISSUE</b>	<b>DATE</b>	<b>CLAUSE</b>	<b>DESCRIPTION</b>
1.1	01/09/2004		▪ Reformatting to ARTC Standard
1.2	14/03/2005	Disclaimer	Minor editorial change

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## 1 GENERAL

Level crossing protection systems and level crossing mechanisms shall be installed and maintained in accordance with the Level Crossing Equipment Manual.

The moving parts of power-operated boom gates and half boom barriers shall be kept clean, adequately lubricated and checked for efficient operation at each rostered maintenance visit by the signalling maintainer. Boom gates and half boom barriers are balanced when installed and the balance shall not be altered unless some alteration has been made to the booms or fittings.

In the case of AC electric type gate mechanism particular attention shall be given to the magnetic brake, the armature shall be adjusted, as necessary, to compensate for wear of the brake shoes. The friction drive or clutch shall also be checked and adjusted when necessary.

Where automatic half boom barriers are provided the signalling maintainer shall observe the operation of the mechanism and check the operating time. All cases where the descending or clearing times are considered excessive shall be reported to the Signal Engineer for investigation.

It is essential that the visibility of the lights to road users be maintained at the highest level practical.

Problems where viewing of lights is affected by direct sunlight shining on the lens are to be investigated thoroughly for practical solutions. The ARTC General Manager ISP or nominated Signalling representative should be consulted for advice.

The operation and focus of Type "F" flashing lights shall be checked regularly, the lenses and reflectors kept clean and replaced when scratched or tarnished and lamps replaced as necessary. The voltage on each of the lamps shall be checked under operating conditions (with the test switch off) to meet the recommended value at intervals not exceeding 6 months. Refer to SMP 31.

Where the lamps are of the LED type the diode array is to be checked to ensure that at least 75% of the lamp is still functioning, where this is not the case the lamp unit is to be replaced. Where resistors are installed to adjust the lamp current, they are to be inspected for deterioration and heat damage and replaced if necessary.

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

Road signs outside the railway boundary are not the responsibility of ARTC, however staff are required to bring to the attention of the local road authority situations where these signs are noticed to be obscured or missing or damaged. Any such report to the local Road Authority should be recorded.

The signalling maintainer shall investigate immediately any report that the power supply indicator PSI alarm lights are extinguished in the level crossing test switch box.

Using the test switch box the level crossing shall be operated and the power supply indicator (PSI) alarm lights shall be observed.

Before leaving the level crossing the signalling maintainer shall ensure that the crossing is fully operational and that nothing has been left switched off, disconnected or unlocked including battery chargers, test switches and emergency switches.

A level crossing location maintenance visit sheet, shall be kept in each level crossing location/cupboard and tests and observations carried out each maintenance visit shall be recorded thereon.

In addition the level crossing lights, booms (if applicable) and bells, are to be examined for damage and vandalism wherever a remote monitored level crossing is traversed when travelling or carrying out other maintenance duties.

Further to the normal maintenance schedules by the signalling maintainer there shall be an additional level of inspection and test by a Signal Engineer or other suitably accredited and authorised delegate. These inspections and tests shall be carried out every three months for actively protected level crossings without booms or remotely controlled level crossing monitors, every six months for level crossings with automatic booms or remotely controlled level crossing monitors and every 12 months for level crossings with booms and remotely controlled level crossing monitors.

## **2 UPPER QUADRANT SIGNAL MECHANISMS USED TO OPERATE PEDESTRIAN BOOM BARRIERS**

Upper quadrant signal mechanisms on pedestrian boom barriers are to be used in the normal direction of rotation only, ie., looking from the back (hold clear end) of the motor, rotation clockwise to lift and anti -clockwise to drop.

(If the direction of rotation is changed from the normal direction, the uni-directional ratchet wheel has to be reversed and this alters the relationship between wheel, motor shaft, pawl and pawl pivot. The result is a tendency of the pawl to be pulled toward the ratchet wheel with load on the mechanism and failure of the hold clear mechanism to release even though the hold clear coils are open circuit)

### **2.1 Swing Gates**

There is little periodic maintenance required for these mechanism.

At two yearly intervals the gate hinges should be removed, cleaned and regreased with a high temperature (wheel bearing) grease. Ensure the roll pins are replaced in the hinge pins.

At around 4 to 6 years depending rail traffic density, it is recommended that the motor/gearbox assembly be removed and returned to the manufacturer for service.

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## 3 LEVEL CROSSING MONITOR

Fault and warning indications displayed by the level crossing monitor or reported by the level crossing monitor are to be investigated and rectified with appropriate urgency.

The level crossing monitor system has a facility to prevent false alarms being reported to its control centre when maintenance is carried out. The fault reset button is to be pressed and held until the LOGIC led starts to flash (about 5 seconds) in order to temporarily disable reporting of alarms and warnings. At the completion of maintenance activities all fault and warning conditions brought up by any of the maintenance actions must be cleared and then the fault reset button pressed to resume normal operation.

The maintenance disable does time out (nominally 45 minutes) and any alarms and warnings that have not been cleared will be reported to the control centre.

All fault and warning conditions detected by the level crossing monitor are latched and must be cleared by maintenance staff in accordance with the level crossing monitor equipment manual.

Fault and warnings will not clear until the level crossing monitor has detected that the actual fault or warning condition has been rectified. For example, all lamps must operate for at least 20 seconds after a failed lamp has been replaced to clear a lamp fault.

If the level crossing lamps are replaced or re-adjusted then the crossing should be operated for 30 seconds to confirm that the level crossing monitor's lamp detection is working correctly. If a lamp fault or warning occurs then the lamp learn procedure is to be carried out in accordance with the level crossing monitor equipment manual.



**LEVEL CROSSING LOCATION MAINTENANCE VISIT SHEET**

**LOCATION:**

<b>DATE OF VISIT</b>									
<b>CHARGE CURRENT (A) (500 MA into Battery)</b>									
<b>FLOAT VOLTAGE (V)</b>									
<b>UNDER VOLTAGE ALARM (V) (12.2V - 10 Cell or 14.64V - 12 Cell)</b>									
<b>MR6 DIODE CHECK</b>									
<b>ELECTROLYTE LEVEL</b>									
<b>LAMP VOLTAGE SS &amp; CS (6 MONTHLY)</b>									
<b>OPERATING LOAD CURRENT (A)</b>									
<b>VOLTAGE OF CELLS UNDER LOAD (Lowest Cell &amp; Battery Voltage) AFTER 2 MINUTES OPERATION</b>									
<b>EARTH LEAKAGE (AC) Active &amp; Common Bus</b>									
<b>EARTH LEAKAGE (DC) Positive &amp; Negative Bus</b>									
<b>ALIGNMENT OF LAMPS</b>									
<b>LAMP CHANGEOUT</b>									
<b>MONITOR</b>									
<b>REMARKS</b>									
<b>SIGNATURE</b>									