



PROCEDURE FOR MAINTENANCE OF ACTIVE LEVEL CROSSINGS

Work Procedure: SHRI-004-WPST-03



Signal & Telegraph Section

CONTROLLED COPY NO:

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Issued By:

A blue ink signature, likely of the authorised person, Troy Barker.

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1.0 PURPOSE

To establish a standard maintenance procedure to be followed in the maintenance of SteamRanger Heritage Railway's active level crossings.

2.0 SCOPE

SteamRanger Heritage Railway's active level crossings shall be maintained to this procedure by a SteamRanger Signal Maintainer.

3.0 REFERENCES

Maintenance Instructions located within document SHRI-004-WPST-02 Signal Maintenance Handbook:

MI 01	MI 13	MI 28	MI 43
MI 02	MI 14	MI 30	MI 44
MI 04	MI 15	MI 33	MI 45
MI 06	MI 16	MI 35	MI 46
MI 07	MI 19	MI 37	MI 47
MI 08	MI 20	MI 38	MI 48
MI 09	MI 21	MI 39	MI 49
MI 10	MI 22	MI 40	MI 50
MI 11	MI 23	MI 42	
MI 12	MI 24	MI 43	

4.0 DEFINITIONS

Not Applicable

5.0 PROCEDURE**5.1 Preparation Action**

1. Check current document status of Service Sheet SHRI-004-WFST-01 with details located on SteamRanger Intranet.
2. Check plans and details to ensure familiarity with the crossing control and operating circuits.
3. Advise Train Control of your intention to operate and test the crossing. Obtain appropriate track work authority.

When trains are expected:-

- a) Ensure that all equipment is returned to normal.
 - b) Do not conduct shunt tests, earth leakage tests or energise SR relays.
 - c) Ensure that road traffic stops for passage of train.
 - d) If equipment is unable to be restored to normal, advise Train Control and use the services of a crossing keeper for the passage of trains, until returned to service.
4. Check calibration status of measuring equipment. If in doubt, refer to Document SHRI-004-WPST-07.

5.2 Responsibility

1. The Signal Maintainer is responsible for the efficient maintenance, both corrective and preventative, of all level crossings and associated equipment.
2. Any abnormal situation shall be corrected as soon as possible and any serious situation that affects normal operation of the equipment must be attended to immediately.
3. Ensure all equipment is fully operational for any train movement and at completion of the maintenance action, otherwise Train Control should be advised immediately.
4. The Signal Maintainer shall fully complete the on site service record cards and associated Service Sheet for Active Level Crossings SHRI-004-WFST-01 during the maintenance action.

5.3 Safety Warning

1. Ensure utilisation of issued safety clothing, footwear and equipment and comply with relevant WH&S instructions.
2. If possible, position a second person (qualified crossing keeper), to observe train and road movements and ensure Signal Maintainer is alerted of approaching traffic.

5.4 Maintenance Action

1. The Signal Maintainer shall carry out inspection and maintenance in accordance with this Work Procedure and respective Maintenance Instructions (MI), contained within the Signal Maintenance Handbook SHRI-004-WPST-02 and fully complete the Service Sheet SHRI-004-WFST-01.
2. Each step on the Service Sheet has a corresponding box which shall be filled out as follows:
 - a) Place a tick into the box to show completion of step.
 - b) Write 'N/A' if step is not applicable.

If any step cannot be completed, use the Comment Section to provide a concise explanation.

- c) Any non-conformance or faults detected during maintenance must be recorded in the Comment Section. All urgent faults must be attended to at the time of service action. A risk rating must be applied as follows to all non-closedout faults:

(U) URGENT – Repair before next train or book crossing out of service

(H) HIGH – High Priority (repair within 6 months)

(N) NECESSARY – Repair within 12 months or re-inspect

(RI) REGULAR INSPECTION – Repair when timeslot/finance available

3. The completed Service Sheet shall be promptly sent to the S&T Manager.
4. Service Timeframes

Service A – The timeframe for a Service A to be conducted on Active Level Crossings is six weekly.

Service B – The timeframe for a Service B to be conducted on Active Level Crossings is six monthly.

Service C – The timeframe for a Service C to be conducted on Active Level Crossings is twelve monthly and may include a signal audit.

6. Other Documentation

The following forms shall be used when work is undertaken on an installation outside of scheduled servicing or when a non-conformance/fault situation is detected during servicing or at any other times.

- SHRI-004-WFST-02 Signal Maintenance Record Sheet

5.4.a TRACK RELAY & INDUCTION LOOP LEVEL CROSSINGS

The following process is to be used for the installations detailed below:

RLX No.	KM	Location	Road Name
RLX0107	53.04	Littlehampton	North Tce
RLX0108	54.40	Mt Barker	Cameron St
RLX0110	56.80	Mt Barker	Wellington Rd
RLX1723	68.70	Bugle Ranges	Wistow Road
RLX0125	80.90	Strathalbyn	East Tce
RLX0127	81.45	Strathalbyn	High St
RLX0128	81.60	Strathalbyn	South Tce
RLX0129	81.70	Strathalbyn	Milnes Rd
RLX0139	104.90	Finniss - Currency Creek	Strathalbyn – Goolwa Rd (Canoe)
RLX0152	115.15	Goolwa	Hutchinson St
RLX0159	121.58	Middleton	Main Rd
RLX0166	125.57	Port Elliot	The Strand

5.4.1 SERVICE A:

1. Track Circuits

Examine and maintain track circuit hardware:

- Rail bonds MI 21
- Track leads and terminations MI 22
- Insulated rail joints MI 23
- Switch Insulation MI 24
- Bootlegs MI 39

2. Enclosures

- a) Examine relay/battery enclosures and environs. MI 44
- b) Check relay/battery enclosures wiring and fittings. MI 45
- c) Examine battery wells and environs MI 34
- d) Examine test switch/push button enclosures. MI 38
- e) Ensure all locks operate freely.

3. Flashers and Relays

Visually inspect Flasher Units and Relays:

- Flasher Relay MI 11
- XR Relays MI 12

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4. Power Supply Equipment
 - a) Examine and maintain secondary batteries. MI 16
 - b) Inspect power supplies/charging equipment:
 - Power Supply Enclosures MI 36
 - Rectifiers (RX and RT Type) MI 13
 - Transformers MI 14
 - RZ100 and RZ100T Units MI 15
 - TRI 300 series power supply unit MI 46
 - c) Conduct Earth Leakage Tests MI 40
5. Active Protection Equipment
 - a) Inspect mast, foundation and base. MI 10
 - b) Flashing light units:
 - Examine and clean units. MI 02
 - Check alignment and adjust if necessary. MI 04
 - c) Strobe light units (if installed):
 - Examine and clean units. MI 47
 - d) Inspect and clean the contacts of the highway crossing gong. MI 06
 - e) Inspect Wig Wag Unit (Cameron St Only) MI 01
6. Passive Protection Equipment
 - Inspect highway crossing approach signs and road markings. MI 42
7. Perform Function Test. MI 07

5.4.2 SERVICE B:

Includes the procedure outlined in Service A and the following:

1. Track Circuits

- a) Read shunt currents and voltages of all track relays using the appropriate shunt and adjust if required.

- Secondary	MI 19
- Lucas Pulse	MI 20
- Inverter	

- b) Perform track shunt sensitivity tests MI 41

2. Relays and Timers

- a) Visually inspect relays:

- Shelf Type	MI 48
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- b) Test Relays and Time Delay Units

- NF2 Relay	MI 11
- XR / XP Relays	MI 12
- Time Delay Units	

3. Active Protection Equipment

- a) Read voltage at lamps after 3 minutes continuous crossing operation. MI 09
If voltage is found to be outside the appropriate range, conduct further investigation before taking corrective action.

- b) Remove sounder of highway crossing gong, inspect hammer, clean and adjust all parts. MI 06

- c) Service Wig Wag Mechanism (Cameron St Only) MI 01

4. Pole Line

Inspect pole line and terminations.	MI 28
	MI 30

Examine lightning arrestor enclosures, wiring and fittings.	MI 33
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5. Telephone (if applicable)

- | | |
|--|-------|
| a) Examine telephone enclosure and environs. | MI 35 |
| b) Check telephone is operational | MI 35 |

5.4.3 SERVICE C:

Includes the procedures outlined in Service A and Service B and the following:

1. Power Supply Equipment

Clean all battery terminals and apply a coat of Battery Terminal Protector.

Check all battery leads, connections and terminals.

2. Enclosures

Examine cable pits and cable junction points.	MI 37
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3. Maintenance Plans

Ensure all required maintenance plans are current and in good condition, at each location.

Request replacement prints if required.

5.5. Reinstatement Action

5.5.1. Ensure all enclosures and equipment are securely locked.

5.5.2. Perform Operation Test.	MI 08
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5.5.3. Inform Train Control that signal maintenance action has been completed.

5.6.a GRADE CROSSING PREDICTOR (GCP 3000 & GCP 4000) LEVEL CROSSINGS

The following process is to be used for the installations detailed below:

RLX No.	KM	Location	Road Name
RLX0109	55.50	Mt Barker	Dutton Rd
RLX0059	56.30	Mt Barker	Alexandrina Rd
RLX0111	57.30	Mt Barker	Hurling Drive

Where Maintenance Instructions (MI) are not referenced in this document, Maintainers can refer to the Manufacturer's GCP maintenance guides.

5.6.1 SERVICE A:

1. Track Circuits

Examine and maintain track circuit hardware:

- Rail bonds MI 21
- Track leads and terminations MI 22
- Insulated rail joints MI 23
- Switch Insulation MI 24
- Bootlegs MI 39

2. Enclosures

- a) Examine relay/battery enclosures and environs. MI 44
- b) Check relay/battery enclosures wiring and fittings. MI 45
- c) Examine battery wells and environs MI 34
- d) Examine test switch/push button enclosures. MI 38
- e) Ensure all locks operate freely.

3. Flashers and Relays

Visually inspect Flasher Units and Relays:

- Check SSCCIIIi Flasher Relay flash rates

4. Power Supply Equipment

- a) Examine and maintain secondary batteries. MI 16
- b) Inspect power supplies/charging equipment:
 - Power Supply Enclosures MI 36
 - Transformers MI 14
 - TRI 300 series power supply unit MI 46
- c) Conduct Earth Leakage Tests MI 40

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5. Active Protection Equipment

- a) Inspect mast, foundation and base. MI 10
- b) Flashing light units:
 - Examine and clean units. MI 02
 - Check alignment and adjust if necessary. MI 04
- c) Strobe light units (if installed):
 - Examine and clean units. MI 47
- d) Inspect and clean the contacts of the highway crossing gong. MI 06
- e) Check and record parameters of predictor on maintenance card
 - Calibrate if required and record readings
- f) Review GCP history, logs and errors and report any anomalies
- g) Inspect and check voltage on shunt enhancer panel (5-6V dc)

6. Passive Protection Equipment

- Inspect highway crossing approach signs and road markings. MI 42

7. Perform Function Test. MI 07

5.6.2 SERVICE B:

Includes the procedure outlined in Service A and the following:

1. Track Circuits

- a) Track Shunt Tests
 - Perform a hardwire shunt at 100% and 50% marks on both sides of the Predictor, record results
 - Shunt island track, record results
 - Note any anomalies, recalibrate if required (refer to GCP Handbook)

2. Relays and Timers

- a) Visually inspect relays:
 - Q Type MI 49
- b) Test Relays MI 12
 - XR / XP Relays
- c) Change out Q type XR relays

3. Active Protection Equipment

- a) Check mast terminations for tightness and clean
- b) Check crossarm terminations and clean

4. Download and Save Logs

5.6.3 SERVICE C:

Includes the procedures outlined in Service A and Service B and the following:

1. Power Supply Equipment

If required, clean all battery terminals and apply a coat of Battery Terminal Protector.

Check all battery leads, connections and terminals.

2. Active Protection Equipment

- Verify SEAR II (if fitted) and SSCCIIIi setups are as per plan.

3. Enclosures

Examine cable pits and cable junction points.

MI 37

3. Maintenance Plans

Ensure all required maintenance plans are current and in good condition, at each location.

Request replacement prints if required.

5.7. Reinstatement Action

5.7.1. Ensure all enclosures and equipment are securely locked. Reset High Ez, Low Ex, Power supply and SEAR alarms.

5.7.2. Perform Operation Test.

MI 08

5.7.3. Inform Train Control that signal maintenance action has been completed.

6.0 DOCUMENTATION

As outlined throughout the procedure.