

33. OPERATING PROCEDURES OVERHEAD AND ELECTRICAL EQUIPMENT

Procedures 1 to 11

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1. OVERHEAD EQUIPMENT

Power for electric trains is supplied at 1500 volts from trackside substations to the overhead wiring system. The catenary wire is supported on insulators attached to the overhead structure. The contact wire is suspended from the catenary wire at a suitable height above rail level by means of dropper wires spaced at regular intervals.

2. SWITCHES

(a) Section Switches

Section switches are air break switches controlling part of an electric traction section. They are attached to overhead structures or on the wall of buildings.

Section switches are either:

- (1) 'two position', or
- (2) 'three position'.

Each position is clearly marked.

(b) Two Position Switches

Two position switches join or divide electric sections into sub-sections or isolate branch sections as follows:

- (1) the 'closed' or 'in' position, sub-sections or branch section are jointed, and
- (2) the 'open' or 'earthed' position, sub-sections or the branch section is isolated from each other and earthed.

(c) Three Position Switches

Three position switches are similar to two position switches, but have an intermediate position.

The positions are:

- (1) 'closed',
- (2) 'open',
- (3) 'earthed' or 'in', and
- (4) 'out' or 'earthed'.

3. SWITCHING ARRANGEMENTS

Stationmasters, Signallers and other employees whose duties may require operation of overhead sectioning switches must be conversant with the sectioning arrangements at the location where they are required to work. They must be instructed in operating procedures and must be able to determine by observing switch contacts, the status of the switch, ie whether it is in the 'open', 'closed' or 'earthed' position.

All employees required to operate switches must know the location and function of the switches and have access to the keys for the padlocks securing the switches.

(a) Overhead Wiring Isolated

Stationmasters, Signallers and competent employees must take precautions to prevent any electric train with raised pantographs from entering an isolated and earthed section.

(b) Switches Operated During Extreme Emergency

Overhead switches must only be operated with permission from the D.C. Systems Officer.

Under extreme emergency:

- (1) a competent employee may operate an overhead section switch, and
- (2) the D.C. Systems Officer must be notified as soon as possible.

(c) Switching Instructions to be Recorded

All messages exchanged in connection with the operation of section switches must be recorded in the Train Register Book, Log Book or other book provided.

All messages must be repeated back.

Amended by SW 1003/2003

4. PROCEDURE TO BOOK OUT THE OVERHEAD TRACTION POWER ~~DURING ELECTRIC TRAIN RUNNING TIMES~~

Whenever it is necessary to make the train overhead power unavailable for electric trains during electric train running times and a Signaller is on duty, the following procedure will take place.

(a) Booking Out the Overhead Traction Power

- (1) The Overhead Representative must advise the Signaller of the exact area where overhead traction power will be unavailable.
- (2) The Signaller must inform the Train Controller of the circumstances.
- (3) The Train Controller must ensure that no electric trains are required to travel through the affected area.
- (4) The Train Controller may then grant permission to the Signaller to book out the overhead power.
- (5) The Signaller may then grant permission to the Overhead Representative. The details of the work, commencing with the phrase "... line/track unavailable for electric trains", must be entered in the Train Register Book, across the figure columns. Both the Signaller and the Overhead Representative must verify and endorse the entry in the Train Register Book.
- (6) The Signaller must sleeve the levers leading to the affected area.
- (7) The Signaller must advise the Signaller at the opposite end of the affected line. The Signaller at the opposite end of the section must endorse the Train Register Book accordingly.
- (8) If the overhead power is still unavailable for electric trains when Signallers are to change over, the Signaller going off duty must fully instruct the Signaller coming on duty as to the circumstances. The Signaller coming on duty must endorse the Train Register Book accordingly.
- (9) The Overhead Representative will then liaise with Electrol who will in turn confer with the Train Controller as to whether electric train traffic has ceased in the area concerned.
- (10) After the Train controller has ensured the cessation of electric train traffic, Electrol may grant permission to open the isolators. The standard operating procedures to prepare the area and issue permits must be carried out.

(b) Restoration of the Overhead Traction Power

When the overhead power is to be restored, the following procedure will take place.

- (1) After the work has been completed and the permits relinquished, the standard operating procedures to return the area to a state where Electrol has control and indication of the overhead power supply must be carried out.
- (2) Once the Overhead Representative has completed the switching operations, the Signaller must be advised that the affected line/track is available for electric trains.
- (3) The Signaller must endorse the Train Register Book, across the figure columns, commencing with the phrase "... line/track available for electric trains". The endorsement in the Train Register Book indicates that the overhead switching is set to allow the restoration of overhead power by Electrol. It does not mean Electrol has restored the overhead power. Both the Signaller and the Overhead Representative must verify and endorse the entry in the Train Register Book.
- (4) The Signaller must inform the Signaller at the opposite end of the affected line, who must record the circumstances in the Train Register Book.
- (5) The Signaller must advise the Train Controller of the circumstances.
- (6) The Signaller must not route any electric trains to the affected area until advised by the Train Controller. In the case of a bi-directional running line, the Signallers at both ends of the line must not route any electric train to the affected line until advised by the Train Controller.
- (7) The Train Controller must confer with Electrol and ascertain when overhead power will be returned.
- (8) When advised by Electrol that overhead power has been restored, the Train Controller must give the Signaller permission to route electric trains to the affected area.
- (9) The Signaller must then remove any lever sleeves previously applied.

(c) Signaller not on Duty when Overhead Traction Power is to be Restored

If a Signaller is on duty when the Overhead Representative wishes to book out the overhead power but no Signaller will be on duty when it is expected to book the overhead power back in, the following procedure must also take place.

- (1) Signaller must add an endorsement in the Train Register Book that the Train Controller must be conferred with as to whether the overhead power has been restored.
- (2) The Overhead Representative must advise the Train Controller when the overhead work has been completed and is now available for electric trains. The Train Controller must endorse the Train Control Graph accordingly.
- (3) The Signaller must sleeve the levers leading to the affected area.
- (4) The Signaller commencing duty must obtain permission of the Train Controller prior to routing any train into the affected area. The Train Controller must confer with Electrol and ascertain when overhead power will be returned.
- (5) After obtaining permission from the Train Controller to route trains to the affected area, the Signaller must remove any lever sleeves previously applied. A notation is to be made in the Train Register Book as to the circumstances.

(d) Signaller Not on Duty

Should a Signaller not be on duty, the affected overhead power section/s must be protected in the normal manner. The Train Controller must be advised by the Overhead Representative prior to the work taking place and at the completion of the work.

(e) Voice Recording Equipment Provided

At locations where voice recording equipment is provided, there is no need for the Overhead Representative to go to the signalling location to book out the overhead power. The Signaller and Overhead Representative must exchange names for record purposes. The Signaller is to endorse the Train Register Book accordingly.

5. PROMPT REPORTING OF FAULTS

(a) Observation of Irregularities

Employees observing irregularities must report the circumstances to the:

- (1) nearest Stationmaster or Signaller, and
- (2) Train Controller.

The Train Controller must inform the D.C. Systems Officer.

Irregularities include the following:

- (1) wires hanging loose or out of position,
- (2) steady arm attachment disconnected from the overhead wire or structure,
- (3) excessive sparking or flashing,
- (4) bridge fittings or guards displaced,
- (5) water flowing onto the overhead wiring,
- (6) broken insulators or brackets,
- (7) tree branches touching overhead wiring,
- (8) displaced or broken structures, or
- (9) damaged pantograph or equipment on the roof of an electric train.

6. WARNING NOTICES IN PUBLIC SIDINGS

Warning notices are displayed in all public sidings with overhead wiring, to draw attention to the danger of touching the overhead equipment.

No work must be performed on or near overhead equipment without approval from the D.C. Systems Officer.

7. PERMIT TO WORK

If it is necessary for any person to work within 2 metres of the apparatus, the D.C. Systems Officer will determine if the work can be undertaken with the apparatus 'live'.

This does not apply to any unscreened overhead fitting.

If the work cannot be carried out with the apparatus 'live', the D.C. Systems Officer must arrange for a 'Permit to Work' to be issued in accordance with the Electrical Safety Rules.

8. PERSONS NOT TO GO ON ROOF OF CARRIAGES

No person must go on the roof of any carriage or wagon in the electrified area unless authorised and the overhead wiring is isolated and earthed.

Unless specifically trained and authorised to do so, employees working on any structure near overhead wiring must take care not to approach within one (1) metre of wiring, or allow any equipment they are working with, to come into contact with any part of the overhead equipment.

9. 1500 VOLT RETURN CURRENT

(a) Cables Connections

Cables are connected:

- (1) to each substation, tie-station, tramway crossing switch box, and
- (2) from the yard official's bridge at Flinders Street Yard to the bonded running rails or impedance bonds.

These cables carry return current from 1500 volt circuits.

It is dangerous if:

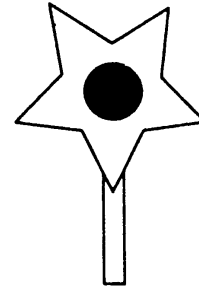
- (1) the cables are broken,
- (2) the running rails on both sides of the junction of cables are broken, or
- (3) the running rails are broken.

10. ELECTRIC TRAINS

(a) Terminal Stop Signs

Unless buffer stops are provided, a 'white star' with a large 'black dot' is provided 15 metres from the point where a pantograph would leave the contact wire.

This 'white star' with a 'black dot' is the overhead wire 'terminating' sign.



During shunting operations, where buffer stops are not provided, competent employees involved in shunting of electric trains must ensure the leading pantograph does not overrun the overhead wire terminating sign.

(b) Driver to be in Front Cab

The Driver of an electric train shunting towards an overhead terminating sign, must:

- (1) drive from the leading end, and
- (2) stop at least three metres from the terminating sign.

This instruction must be adhered to unless:

- (1) Rules and Operating Procedures,
- (2) Master Train Plan, or
- (3) Working Timetable indicate otherwise.

11. PANTOGRAPH OVERRUNNING OVERHEAD WIRE

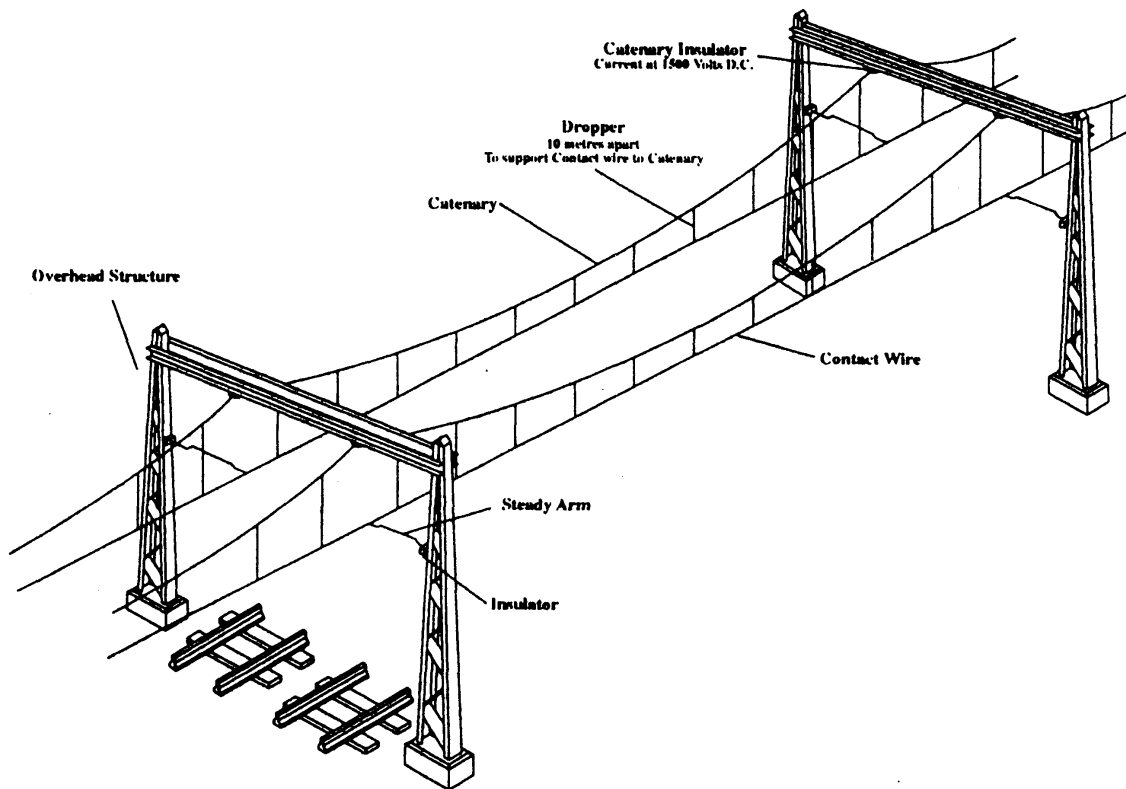
In the event of a pantograph overrunning the overhead wire, the Driver must:

- (1) lower and inspect it, and
- (2) ensure it is not damaged.

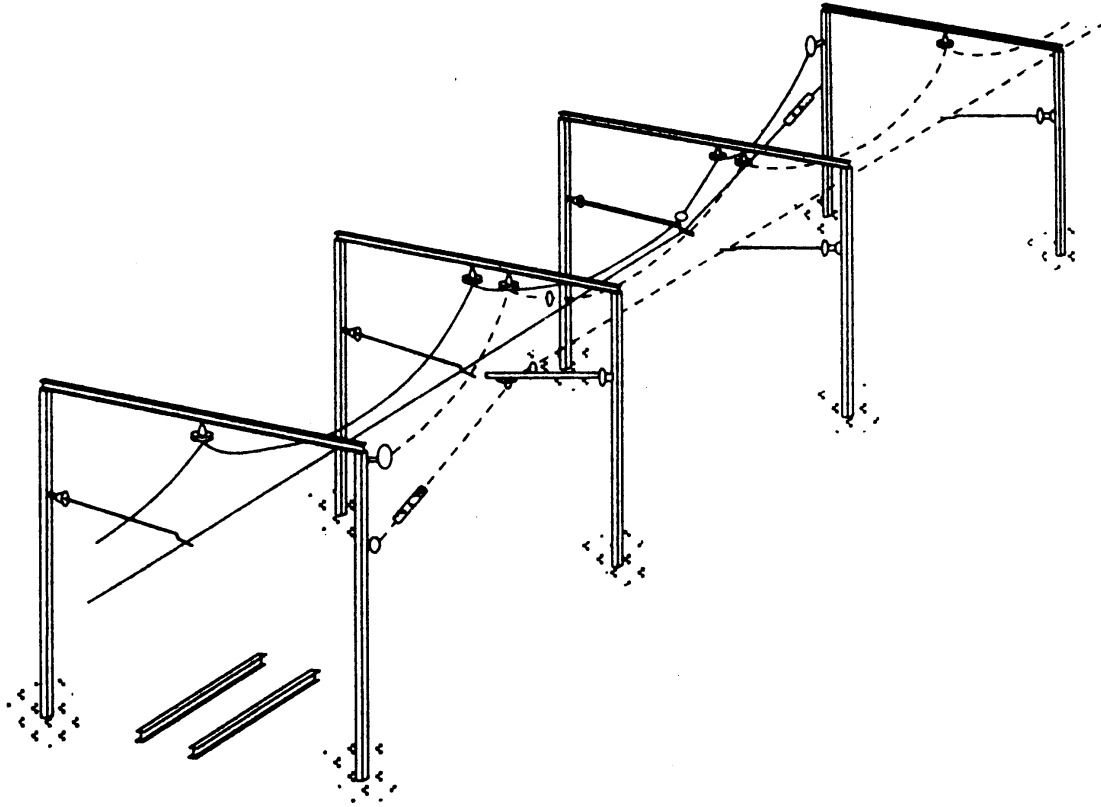
A multiple unit electric train may be set back by using the other pantographs.

A single unit electric train must be hauled back by another train or locomotive.

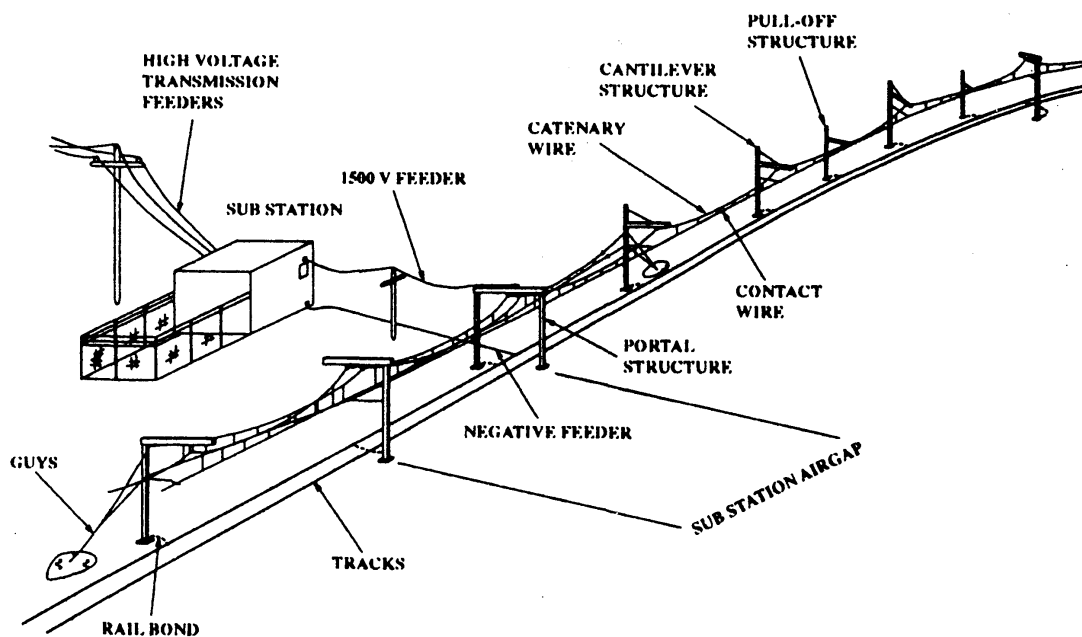
Double decker train pantographs may become alive in the event of diode failure and hence must be treated with extra caution during shunting operations as a result of overhead wiring breakdowns.



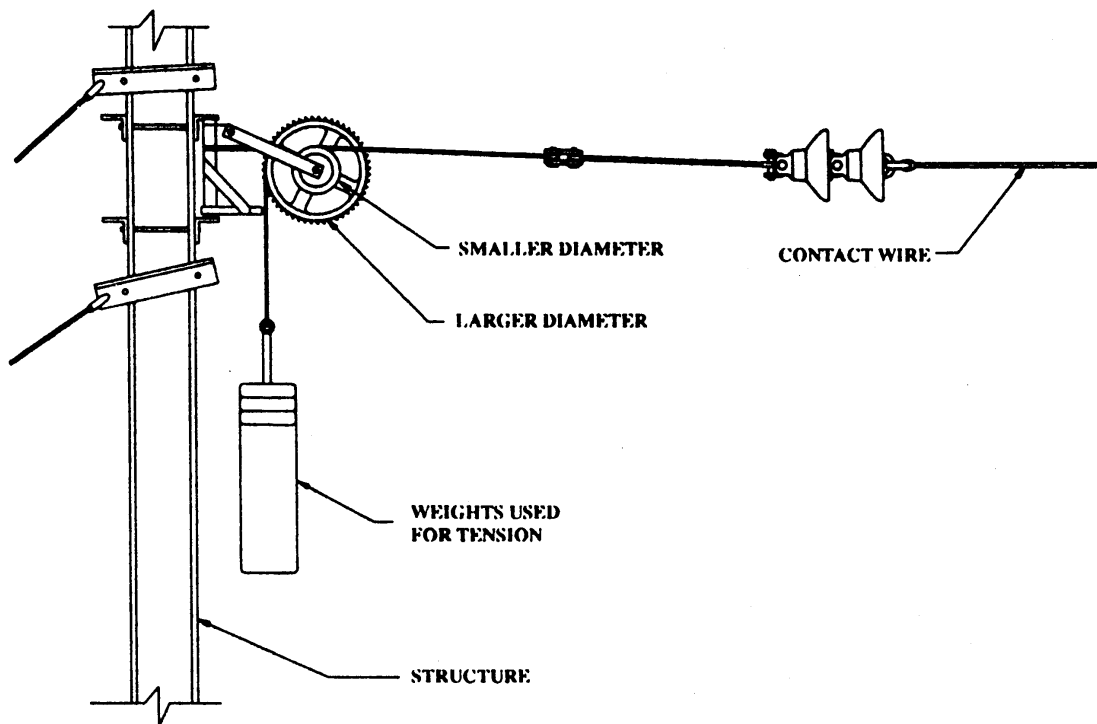
Typical Overhead Electrical Equipment



Typical Overhead Air Gap

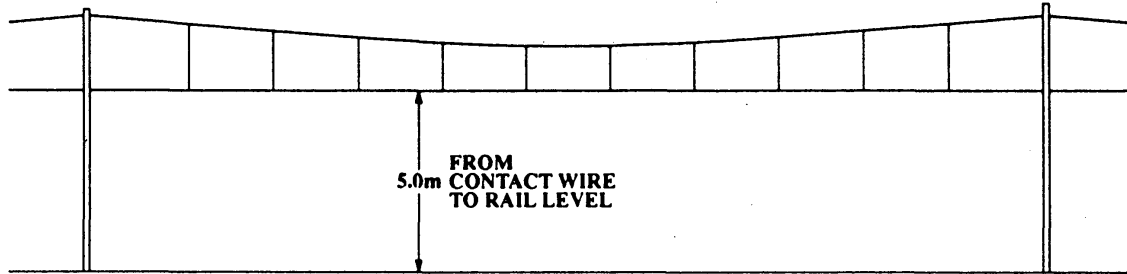


Typical 1500 Volt Feeding Arrangement at Sub Station

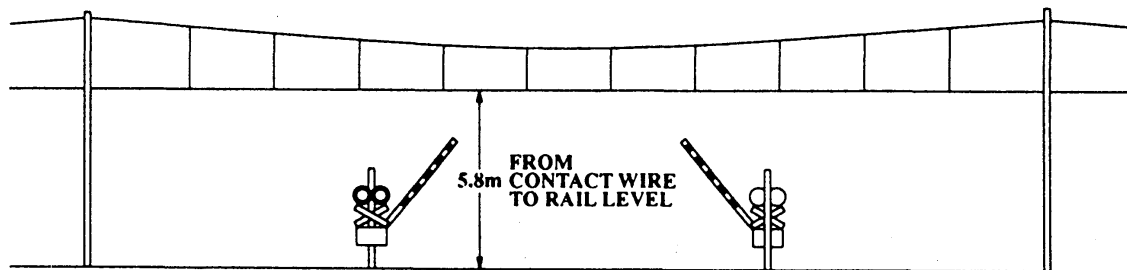


Contact Wire Weight Tension System

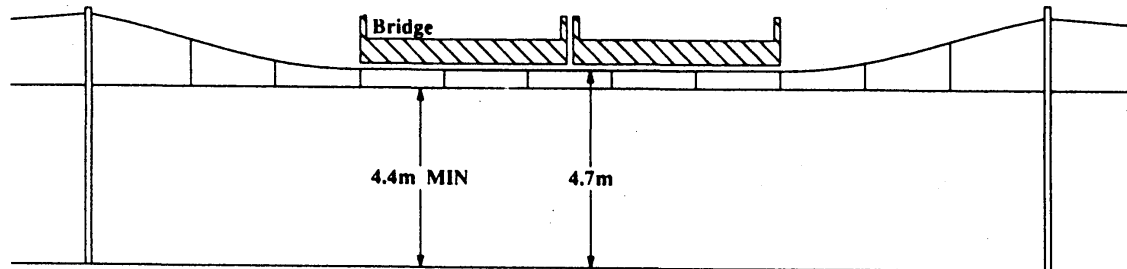
NORMAL HEIGHT



LEVEL CROSSINGS



UNDER BRIDGES



Contact Wire Heights

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