GE/RT8000/HB17
Rule Book

Handbook 17

Handbook 17
DC electrified lines

Issue 3
September 2015

Comes into force
05 December 2015

This handbook is for those personnel who need to go on the operational railway in a DC electrified area to carry out their duties, with the exception of a:

- **train driver**
- **guard**
- **shunter**
- **signaller**
- **crossing keeper**
- **designated person (DP).**

The personnel listed above will not receive this handbook but will get Rule Book module DC DC electrified lines.

All personnel, other than those listed above, who go on to the operational railway are defined as track workers for the purpose of the Rule Book.

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Note: This handbook does not apply in the Merseyrail area or between Drayton Park and Moorgate. Network Rail publishes local instructions separately for these.

1 Definitions

Emergency switch-off

An emergency switch-off is carried out by the electrical control operator (ECO) when it is essential to switch off the electrical supply immediately, when someone is in danger from live conductor rail equipment (CRE).

The ECO will switch off the electrical supply to:

- the electrical section affected
- the abutting electrical section either side.

Conductor rail permit

A permit that is signed and issued by the authorised person and given to the controller of site safety (COSS), designated person (DP) or safe work leader (SWL) who is to carry out work on or near to the CRE.

This permit states exactly what electrical equipment is isolated and on which, or near to which, it is safe for the specified work to begin.

If a conductor rail permit has been issued it does not mean train movements have stopped.

2 Competence

You must not go on or near the line in an area with CRE unless your certificate of competence in personal track safety states that it is valid on lines electrified by the DC system.

Table A of the *Sectional Appendix* shows which lines are electrified by the DC system.

If new CRE is being installed, or an electrified area is being extended, the instructions in this handbook will not apply until the equipment has been declared live.

You will be told about this in an energisation warning notice.

If you are not sure whether the CRE is live, you must treat it as live and dangerous to life.

3 Dangers of the system

3.1 Treating the CRE as being live

CRE, shoe gear and under-floor mounted electrical equipment on trains are extremely dangerous. It may be fatal if you touch or go near any of them, or if you allow anything to touch or go near them.

Live CRE is dangerous to life. You must treat CRE as being live at all times unless one of the following applies.

- A planned isolation has been taken and a conductor rail permit has been issued to the COSS or SWL.
- A temporary isolation has been taken as shown in Network Rail instructions.
- A local isolation has been taken as shown in local isolation instructions.
- The ECO has given an assurance that the CRE has been switched off in an emergency.

You must not:

- touch or step on CRE or guard boarding
- allow clothing, tools, equipment or any object you are carrying to touch CRE unless they are intended for this purpose
- step between the conductor rail and the adjacent running rail
- touch broken or displaced CRE
- touch the collector shoes on any train, whether or not the collector shoes are touching the conductor rail
- step into flood water which may be in contact with the CRE
- direct a jet of water or any other liquid onto the CRE.

Traction return current passing through the running rail is not normally dangerous to life. However, you must not touch the running rail at the same time as touching any metalwork nearby that is not directly connected to the running rails.

You must treat cables running alongside and crossing under lines as being live. You must not interfere with these cables or their protective covers.

You must not touch broken running rails or bridge the gap between them.

3.2 Reporting damage, defects and flood water

You must immediately make sure the following are reported to the ECO:

- damage to cables, cable routes or connected equipment
- flashovers or electrical explosions seen or heard in any electrical equipment
- any leakage of oil from a cable or cable oil tank
- damage to a conductor rail
- burning, smoking or excessive flashing of conductor rails or cables connected to them
- a broken or parted rail or broken conductor rail
- a broken or defective bond
- a broken or defective insulator
- equipment or debris in contact with the conductor rail and running rail.

If the damage or defect will affect the safe operation of trains, you must first report this to the signaller.

If you become aware that the line is flooded above sleeper level, you must report this to the ECO in the quickest way possible. You must state the depth and extent of the flooding.

You must also report to the ECO any change to the extent of the flooding.

4 Personal safety

4.1 Precautions that must be taken

You must always take care when working close to the CRE. You must also take special care if you or anything you are using or carrying will be nearer than 300 mm (1 foot) to the CRE.

If you are applying a track-circuit operating clip, or a track-circuit operating device (T-COD), you must always apply it to the running rail furthest from the conductor rail first and then to the running rail nearest to the conductor rail.

When removing a track-circuit operating clip, or a T-COD, you must remove it from the rail nearest to the conductor rail first and then from the rail furthest from the conductor rail.

If you have to place detonators, you must attach them to the running rail which is furthest from the conductor rail.

If the emergency services need to go on or near the line, the person in charge at the site must tell the officer in charge from each emergency service about the presence of the conductor rail and which parts have been switched off.

If you are to manually operate or secure points and the conductor rail is not gapped or protected by guard boarding next to the motor or blade to be secured, you must place a conductor rail shield over the conductor rail before starting work.

4.2 Moving materials or equipment

You should avoid carrying materials or equipment over the conductor rail. If you need to carry an object over a conductor rail, you must make sure that it does not come into contact with a live conductor rail.

You must not drag objects across, or drop them on, a conductor rail.

4.3 Attending to vehicles

If possible, you must work on the side away from the conductor rail when performing tasks such as:

- operating handbrakes
- coupling vehicles
- uncoupling vehicles
- passing beneath the buffer level of coupled vehicles
- going underneath vehicles.

If it is not possible to do this on the side away from the conductor rail, other than when operating handbrakes, you must first place a conductor rail shield over the conductor rail.

If a conductor rail shield is not available, or cannot be fitted, arrangements must be made for the electricity to be switched off.

You may examine a vehicle without first getting the electricity switched off as long as you do not touch the conductor rail or overhead trolley wires, or any electrical equipment connected to them.

However, if severe arcing has taken place, you must get the electricity switched off before carrying out the examination.

5 Communicating with the ECO

5.1 Directly or by another person

You can contact the ECO, or you can ask another person to contact the ECO on your behalf.

If another person asks you to contact the ECO, you must make sure that you get the necessary information from that person before speaking to the ECO. You must also get any other information that the ECO asks for.

5.2 Identifying yourself and the location

When contacting the ECO, you must state:

- your name, job title and employer
- the line or lines concerned
- the location (for example, the nearest bridge, station, signal, block marker or other structure)
- the telephone number or radio call number (whichever you are using) so that the ECO can contact you if necessary.

If the ECO gives you a message identification number, you must state it each time you speak to the ECO.

6 Emergency switch-off

Note: An emergency switch-off of the CRE does not mean that train running has been stopped.

6.1 Immediate actions

You must immediately contact the ECO (or arrange for this to be done) if you become aware of:

- a derailment
- a fire on a vehicle or train or a lineside fire
- a person in contact with or in danger of coming into contact with the CRE
- an incident or other emergency requiring, or likely to require, the electricity supply to be switched off
- an emergency evacuation of passengers from a train.

If you receive a message from another person about an emergency, you must pass on all this information to the ECO.

When you contact the ECO, you must first say '**This is an emergency call**'.

You must tell the ECO:

- the reason why you want the electricity to be switched off
- whether any person is in danger from live CRE
- whether short-circuiting bars have been applied
- whether the emergency services are waiting to give assistance.

If you are not at the site, you must relay the information from the ECO to the site and from the site to the ECO.

6.2 Further actions

You must stay in contact with the ECO, or if you have reported the incident through another person, stay in contact with that person until you have been assured that one of the following applies:

- the electricity has been switched off, or
- other arrangements have been made.

If the ECO agrees to the emergency switch-off, the ECO will decide who will be regarded as the person in charge of electrical emergency (PICEE).

If you are the person passing on this information on behalf of someone else, you must stay in contact with the ECO until an assurance has been given that one of these arrangements has been put in place.

6.3 Using a short-circuiting bar

If you cannot contact the ECO direct or through another person to get the electricity switched off in an emergency, you may apply a short-circuiting bar. However you must only do this if you are competent to do so and a person is in danger through contact with the CRE.

You must not use a short-circuiting bar where there is a guard board between the conductor rail and the adjacent running rail or a yellow plastic shroud is fitted to the underside of the conductor rail.

Before you use a short-circuiting bar, you must make sure there is no conductor-rail section gap between where you apply it and the section of conductor rail you need to be switched off.

You must consider any other portions of conductor rail to be live until the ECO gives an assurance they have been switched off.

Once you have applied the short-circuiting bar, you must leave it in position until it is no longer needed.

You must tell the ECO as soon as you have used a short-circuiting bar and give the exact location where it was applied.

You must get permission from the ECO before you remove a short-circuiting bar and then tell the ECO when you have removed it.

6.4 PICEE Managing the emergency switch-off

If you are appointed by the ECO as the PICEE, the ECO will tell you the extent of the emergency switch-off.

You must identify yourself to anyone arriving on site.

If the emergency services are called to site, you must tell the officer in charge from each emergency service about the presence of the CRE and which parts have been switched off.

The ECO will tell you before shortening the area of the emergency switch-off. You must tell everyone at the site about the new limits.

If passengers are to get out of a train which is not at a platform, you must make sure that all passengers are kept clear of the CRE.

If you hand over the responsibility of the emergency switch-off to someone else, you must tell the ECO immediately. You must give the name, job title and employer of the new PICEE taking over.

If you are the new PICEE, you must immediately confirm the emergency switch-off arrangements with the ECO.

As soon as the emergency is over and the affected section can be switched on, you must:

- warn everyone involved that the electricity is about to be switched on
- make sure everyone is clear of the CRE
- remove any short-circuiting bars or other materials used during the emergency switch-off and place them clear of the CRE.

You must then tell the ECO that the emergency is over and wait for further instructions.

If the emergency will go on for a long time or it is necessary for work to be carried out on or close to the CRE, an isolation must be taken as shown in section 8.

When the planned or temporary isolation has been taken, the ECO will tell you that you are no longer required to carry out any further duties as the PICEE.

7 Rescuing a person from the CRE

If it is necessary to rescue a person from live CRE, you should arrange for an emergency switch-off or use a short-circuiting bar as shown in section 6.

If it is not possible to get the electricity switched off or you cannot use a short-circuiting bar, you can try to rescue a person from live CRE as long as:

- you cover your hands with something which is dry and will not conduct electricity
- you stand on dry non-conducting material
- you do not use any metal objects.

If you cannot do this, you must only try to move the person using dry insulating material.

8 Types of isolation

Note: Isolation of the traction current does not mean that train running has been stopped.

8.1 Planned isolation

The COSS or SWL must not allow work to start that requires an isolation until the COSS or SWL has received a conductor rail permit (CRP).

The COSS or SWL must explain to everyone in the group the limits of the isolation and any hazards or conditions specified on the CRP, before allowing them to start work.

The COSS or SWL must keep the CRP until the group has finished working. The COSS or SWL must then immediately return the CRP to the person who issued it.

You must immediately tell the authorised person (AP) if your CRP is lost. The AP will arrange to issue you with another CRP endorsed 'Duplicate'.

If another COSS or SWL is to take over before the work is completed, the limits of the isolation must be explained to the new COSS or SWL and the CRP must then be handed to the new COSS or SWL.

If you are the new COSS or SWL, you must make sure you understand the limits of the isolation and any hazards or conditions before taking over the CRP.

If when your work is complete, you find that you have lost your CRP, you must tell the AP. You must carry out a visual inspection with the AP to make sure that all personnel and materials are clear of the CRE.

8.2 Temporary isolation

These isolations must be granted as shown in Network Rail instructions and only to a person who has been trained in those instructions.

8.3 Local isolation

A local isolation can only be taken where a local isolation instruction has been issued.

9 Protecting isolated sidings where there is no local instruction

If you are the person in charge of the siding possession (PICOS), you must arrange for points to be placed and kept in the position to prevent trains entering the area to be isolated.

The points must be protected against movement by:

- the signaller or operator using reminder appliances if worked from a signal box, ground frame or shunt panel, or
- securing them if they are hand points.

You must record the details in writing.

10 Track isolating switches and hook switches

You may only operate a track isolating switch or hook switch if you are competent to do so and have the authority of the ECO.

The ECO will give you instructions on whether the switches are to be opened or closed and the order in which they are to be operated. You must immediately tell the ECO when you have operated the switch.

You must replace the white sleeve to a normally open hook switch when restoring it to its normal position to prevent it from being operated accidentally.

You must keep a track isolating switch enclosed and locked to stop unauthorised interference. You must fit a caution notice to a normally open track isolating switch to prevent it being operated accidentally.

11 Short circuits

If you are asked to examine the conductor rail for a short circuit, you must treat the conductor rail as being live at all times because the ECO may try to restore the electricity supply at any time.

If you see an object that is causing or is likely to be causing the short circuit, you must not try to remove it until the ECO tells you it is safe to do so.

You must not enter a tunnel until you have told the ECO that you are about to do so. You must tell the ECO immediately you have left the tunnel. When you are in the tunnel, the ECO will not try to restore the electricity supply.

12 Moving electric trains between live and isolated sections

If you are responsible for authorising train movements, before authorising a train that has collector shoes to enter or leave an isolated section, you must get confirmation from the driver that all collector shoes are secured in the raised position clear of the conductor rail.

Notes