

Information for users

The following document:

NR/WI/ELP/27052
Issue 4

has had changes made to it, most recently, with effect from **04 June 2008**.

Instructions for use

It is essential that you first read and understand each letter of instruction pertaining to the standard before proceeding to use the standard. You must then apply the requirements of each letter to the standard.

NR/BS/LI/097	Issue 1	04 June 2008	Proceed to letter ►
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Date	June 2007

Work Instruction

Work Instructions for D.C. Electrified Lines on the Northern City Line

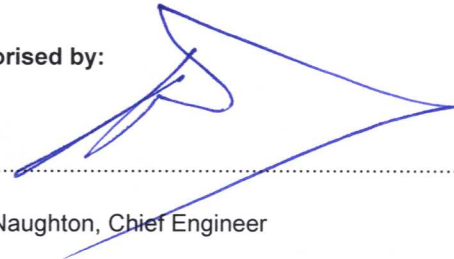
Endorsement & Authorisation

Endorsed by:



K Lydford, Head of Electrification & Plant Engineering

Authorised by:



A McNaughton, Chief Engineer

Accepted for issue by:



M McManus, National Standards Manager

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Published & Issued by: Network Rail 40 Melton Street, London NW1 2EE



Ref:	NR/WI/ELP/27052
Issue:	4
Date:	June 2007

Issue record

Issue	Date	Comments
4	June 2007	Clarification of Module D, Section 1, Clause 1.2. Dispensation added to wrt Network Rail Work Instruction NR/WI/ELP/3091 Issue 1 (Issued October 2006). Extent of Northern City Line amended. Module C, Clause 7.2 - text amended. Module D, Clause 1- Title change. Module D, Section 1, Clause 1.2 amended. Module F – Model NCL Tunnel Entry / Exit Permit included.

Implementation

June 2007

Compliance

This Network Rail work instruction is mandatory and shall be complied with by Network Rail and its contractors from June 2007

When this work instruction is implemented, it is permissible for all projects, which have formally completed GRIP Level 4, to continue to comply with the Issue of any relevant Network Rail Standards current when GRIP Level 4 was reached and not to comply with requirements contained herein unless the head of electrification and plant has stipulated otherwise in the accompanying briefing note.

Where the head of electrification and plant has specified that all projects will comply with the requirements, specific authority not to comply can be sought in the usual manner using the appropriate non-compliance authority processes described in Network Rail standard, [NR/SP/STP/045](#) *Managing the process for non-compliance authority* (formerly RT/LS/P/045).

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PERSONAL SAFETY

IT IS DANGEROUS FOR ANYONE TO TOUCH OR COME INTO THE PROXIMITY WITH LIVE CONDUCTOR RAILS AND EQUIPMENT, E.G. BONDS, CABLE ETC. SIMILARLY IT IS DANGEROUS TO ALLOW ANY OBJECT TO TOUCH OR COME TOO CLOSE TO LIVE CONDUCTOR RAILS AND EQUIPMENT.

ALWAYS TREAT CONDUCTOR RAILS AS LIVE until you are certain that the equipment has been made safe to approach or come into contact with.

There will be no danger to staff performing their normal duties providing these working instructions are observed.

FORGETFULNESS CAN BE FATAL

WORKING OF THE LINE FOR D.O.O. (P)

In the event of both the cab secure radio and the tunnel telephone system not working, the trains between Drayton Park and Moorgate, trains not already **EN-ROUTE** from Finsbury Park to Moorgate shall be diverted to and terminated at Kings Cross. Trains between Finsbury Park and Drayton Park shall be terminated at Drayton Park to Finsbury Park.

In the event of a Network Rail area cab secure radio failure affecting trains entering and departing NCL, only trains with a competent person on board before departing or entering the NCL can continue towards or departing Moorgate. (Module D, Section 1, Clause 1.2).

If an individual train radio becomes defective between Drayton Park and Moorgate, the driver shall contact the Signaller in Kings Cross Signal Box by the most expeditious mean, to confirm what action is to be taken in accordance with Part D.

DISPENSATION

These Working Instructions apply solely to the Northern City Line and are an authorised replacement for the D.C. Electrified Lines Instructions GO/RT3091, Issue 2 and Network Rail Company Work Instruction NR/WI/ELP/3091 Issue 1 (Issued October 2006).

DUTY OF SIGNALLER / SHIFT SIGNALLER MANAGER

In all cases when a Driver or other person contacts Kings Cross Signal Box contact shall be with the Signaller, he is responsible for immediately advising the Shift Signaller Manager.

EXTENT OF NORTHERN CITY LINE

These instructions apply from the buffer stops at Moorgate to the south end of platform ramps at Drayton Park Station at 2m 56ch trains can run into Drayton Park whilst the NCL is shut down.

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Module A Definition of terms applying to these instructions or in general use

Automatic power control	Means whereby the electric power circuits on the traction unit are automatically switched off, in this case, as the train enters the platform at Drayton Park station in the up direction.
APC magnet	A magnet fixed on the sleeper ends which operates the automatic power control system on a train.
Authority to Test (Form B)	A form of declaration issued by an Electrical Control Operator to a Nominated Person using the Form B 'Authority to Test'. The form is to make known to the Nominated Person exactly which conductor rails are switched off and upon which to commence testing and the application of short circuiting bars.
Block to Electric Trains (Form AE)	A form initiated by the Electrical Control Operator to arrange for the Shift Signaller Manager to block to electric trains specific lines or routes and to obtain confirmation that the block has been imposed.
Block to Electric Trains (Form AT)	A form used by the Shift Signaller Manager to arrange for the Signaller to block to electric trains specific lines or routes and to obtain confirmation that the block has been imposed.
Bond	An electrical connection in the conductor rail, running rail traction return circuit or in a signalling track circuit.
Circuit breaker	A switch arranged to open automatically when a current above a pre-determined value flows through it.
Collector shoe	A device fixed to electric trains which bears on the top of the conductor rail and collects the traction current.
Competent person	A person trained and certified as competent in Northern City Line operational matters.
Conductor rail	A rail, charged with electricity at a nominal 750 volts d.c. This is laid on insulators and fixed alongside the running rails.

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Conductor Rail Permit (Form C)	A form of authority signed and issued by a Nominated Person to a person in charge of work to be carried out on, or near to, conductor rail equipment. The purpose of the form is to make known to the person in charge of the work exactly which conductor rails are isolated (and have short circuiting bars/devices applied) and upon which or near to which it is safe for the work to commence.
Current	The flow of electricity.
Traction Current	The electric current that is collected by electric trains to power the traction motors.
D.S.D. Auto Alarm	A device to alert the Signaller that a train identified by its call number has come to a stand following the application of the brake through the D.S.D. Device.
Electrical Control Operator (E.C.O.)	The person in York Electrical Control Room who has control of the power supply to the electric traction system and who is responsible for all switching operations and isolations of electrical equipment thereon.
Electrical Control Room	The location of the apparatus for the remote control of the equipment associated with the electric traction system and the staff who operate it.
Emergency isolation	The switching off of the conductor rails initiated by the Electrical Control Operator in circumstances when it is essential to switch off the electricity supply immediately to remove danger to persons from live conductor rails.
Group Station Manager	TOC Station Manager responsible for Northern City Lines.
Guard boarding	Protective boarding placed alongside one or both sides of the conductor rail at certain locations.
Isolated	Electrical equipment is isolated when it is disconnected and separated from all sources of electricity supply in a secure way.
Isolating switch	A device that enables a section of conductor rail to be isolated locally.

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Live	Being at a voltage by being connected to a source of electricity or by induction.
Nominated Person	A person certificated as competent to carry out isolations and application of short circuiting bars, to issue and cancel Conductor Rail Permits, and nominated as such with the Electrical Control Room in relation to particular equipment or locations.
Operations Manager	The Network Rail Designated Operations and Customer Services local operations manager.
Paddle	An insulated device for lifting a collector shoe clear of the conductor rail.
Passenger Communication Apparatus (PCA)	A device provided at intervals within the passenger compartments of trains which when operated gives an indication to the Driver that the train is required to stop to attend to an on-board emergency.
Passenger emergency switch override	This is situated on the Driver's desk and permits a Driver to override the operation of the passenger emergency switch.
Person in Charge of Possession (P.I.C.O.P.)	As defined in Rule Book GE/RT8000.
Plug-in telephones	Handsets are located in every emergency cupboard. These can be used at any of the plug-in telephone sockets located throughout the tunnel sections. They are also in on-train emergency cupboards.
Plug-in telephone sockets	These are situated along each platform at each station, and also throughout each of the two tunnel bores. They comprise 3 sockets, the outer two being ETD lines and the inner an omnibus circuit.
Protective gloves	These are located in the emergency equipment cupboards at each station. They are tested to 1000 volts and shall only be used near the conductor rail when it has been confirmed that the conductor rail has been isolated or as in Module C, Clause 2.11 by competent staff.
Public emergency telephone (PET)	These are located on each platform and connect direct to the Service Delivery Centre at Kings Cross.

Section	A length of conductor rail which can be isolated by the opening of circuit breakers.
Subsection	Part of a section which can be separately isolated.
Service Delivery Centre (SDC)	TOC Control, based in Kings Cross Panel Signal Box. NOTE: This is the first point of contact for TOC related matters. Safety of the Line matters shall always be referred to the Signaller at Kings Cross Panel Signal Box.
Shift Signaller Manager	Responsible for Kings Cross Signal Box on a shift basis.
Short circuiting bar	An appliance for emergency use that, when applied to the conductor and running rails, cuts off the electric current.
Short circuiting device	A flexible appliance for electrically connecting the conductor rail to running rail to prevent the conductor rail being accidentally made live during a current isolation. When applied, the running rails are left clear for the passage of non electric trains.
Short circuiting tool	A device located in each driving cab to enable the tunnel emergency wire system to be short circuited in the vicinity of insulators.
Substation	A building containing electrical switchgear and other equipment necessary to provide the d.c. traction supply to the conductor rails.
Supervisory control system	An electrical system for the remote control of equipment at substations and track paralleling huts.
Testing device	An insulated probe which when applied between the conductor rail and the traction return running rail will indicate if the conductor rail is live.
TOC	Train Operating Company
Track paralleling hut	A building containing electrical switchgear which is arranged to connect together a number of sections of conductor rails.
Train radio	Radio equipment in the cab of each unit to enable communication with Kings Cross Signal Box or vice versa.

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Train stop	A device provided to all stop signals. It is arranged to engage with the tripcock at the leading end of an electric train to apply the brakes automatically in the event of a signal being passed at danger, or at Moorgate on a train entering the platforms in excess of the permitted speed.
Tripcock	A device fixed to an electric train that is arranged to apply the brakes automatically when the train is travelling in the normal direction in the event of a train stop being passed in the raised position.
Tripcock detector	A device fixed to the track that ensures that the tripcock mechanism of an electric train is in the correct position to be engaged by the train stops.
Tunnel clip-on telephones	These are located in the emergency cupboard in the vestibule of electric trains and consist of a telephone handset with two wires to be clipped to the tunnel emergency wire system.
Tunnel emergency trip	The switching off of the traction current using the tunnel emergency wire system.
Tunnel emergency wire system	This consists of a pair of copper wires fixed to the wall of the tunnel. In an emergency, the wires can be short circuited to effect the tunnel emergency trip.
Tunnel Entry / Exit Permit	This permit provides authorisation to enter and exit the tunnels to carry out minor maintenance work during the shut down periods provided that no engineering trains are required to work within the tunnel sections.
Tunnel headwall emergency plunger	These plungers are connected to the tunnel emergency wire system and are located in the tunnel headwall telephone boxes at stations to enable staff in an emergency to short circuit the tunnel emergency wires, so switching off the traction current and switching on the high level lighting.
Tunnel headwall telephones	These telephones are connected to the tunnel emergency wire system and are located near the tunnel headwalls at stations.
Tunnel high level lighting	The lighting extends throughout the bores and will illuminate when the traction current is switched off.

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Tunnel low level emergency lighting

This lighting extends the full length of both bores at low level. It is normally switched off, but can be switched on at each station and in addition locally at each lamp.

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Module B Description of electrification system

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1 Electrified lines

The lines between Moorgate and Drayton Park stations are electrified at 750 volts d.c. on the conductor rail system. The conductor rails extend from the south end of the platforms at Moorgate to the north end of the platforms at Drayton Park.

2 Traction power supply and location of substations

Power for traction purposes is supplied at high voltage through insulated cables to the railway substations at Finsbury Circus (located underground, adjacent to the platform at Moorgate) and Queensland Road (located at the down side of the line at Drayton Park). The substations are unattended and kept closed and locked. The switchgear they contain is remotely controlled through a supervisory control system operated by the Electrical Control Operator at York Electrical Control Room.

3 The electric traction current

- 3.1 At the substations the incoming power supply is transformed to a lower voltage, rectified, and direct current at 750 volts is fed to the conductor rails through circuit breakers and insulated track feeder cables.
- 3.2 Current is collected from the conductor rail by shoe gear mounted on the bogies of the motor coaches. After passing through the electrical equipment on the trains, the current is returned to the substation through the axles, wheels and one of the running rails of each track, the latter being connected to the substation by return feeder cables.
- 3.3 In order to provide an adequate current return circuit an auxiliary return rail is mounted directly on the sleepers, in the 4-foot way and bonded to the traction return rail at intervals. The traction return rails in the up and down tracks are bonded to both rails.

Traction return rails are not dangerous to human life.

4 Conductor rail arrangements

- 4.1 The conductor rail is supported on insulators mounted on the sleepers outside the running line, generally on the side of the track away from platforms, so that the distance between the centre line of the conductor rail and the running edge of the rail is 1ft 4 ins (406mm). The height of the top of the conductor rail is 3ins (76mm) above the top of the running rail. Gaps are provided in the conductor rail at points and crossings, at some train stops or signal positions. Other than at sectioning points the conductor rails on each side of the gap are connected by an insulated jumper cable.
- 4.2 Ramps are provided at the end of each length of conductor rail to facilitate the smooth passage of the collector shoes.

5 Switching and sectioning of conductor rails

- 5.1 At certain locations manually operated isolating switches are provided, connected to the conductor rail by insulated cables. These switches are for the purpose of isolating subsections of the conductor rail system or the associated track feeder cables.
- 5.2 The conductor rail system comprises four main electrical sections:
- Down line, Finsbury Circus Substation to Poole Street Track Paralleling Hut
 - Down line, Poole Street Track Paralleling Hut to Queensland Road Substation
 - Up Line, Queensland Road Substation to Poole Street Track Paralleling Hut
 - Up line, Poole Street Track Paralleling Hut to Finsbury Circus Substation
- All of these sections are normally live but each is capable of being switched on or off separately.
- Each main section can be subdivided into two or more subsections by means of isolating switches.

6 Track paralleling hut

An underground track paralleling hut is located adjacent to the up line tunnel at Poole Street (between Old Street and Essex Road stations) and equipped with circuit breakers for the purpose of paralleling the conductor rails of the two tracks and to provide a sectioning point. The track paralleling hut is unattended and kept closed and locked. The switchgear it contains is remotely controlled by a supervisory control system operated by the Electrical Control Operator at York Electrical Control Room.

7 Tunnel lighting arrangements

- 7.1 High level lighting is installed throughout the tunnel sections and is associated with the conductor rail system. Whilst the conductor rail is energised the lights are normally off, but when the traction current is switched off from any section or subsection of the conductor rail the tunnel lights within the corresponding length of tunnel will be switched on automatically.
- 7.2 Additionally, switches are provided in the tunnel headwall telephone cupboard at stations to enable the high level tunnel lights to be switched on whilst the conductor rails are alive. **IT CANNOT THEREFORE BE ASSUMED THAT THE TRACTION CURRENT HAS BEEN SWITCHED OFF WHEN THE TUNNEL LIGHTS ARE ON.**

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7.3 Low level emergency lighting is also installed throughout the tunnel sections. This is normally switched off but can be switched on at each station and, in addition, locally at each lamp. This lighting is independent of whether conductor rails are alive or not.

8 Tunnel emergency wire system

8.1 Tunnel emergency wires

Throughout each length of the system, a pair of copper wires is provided, supported at intervals from the tunnel side on brackets and insulators.

These wires, approximately 5 inches (13cm) apart, are arranged in sections corresponding to signal sections. They can be used in emergency for switching off the traction current.

8.2 Tunnel headwall telephones

Tunnel headwall telephones are located in recessed cupboards at stations. They can be used for the purpose of communication with the Signaller and in emergency for switching off the traction current.

8.3 Tunnel headwall emergency plungers

These plungers are connected to the tunnel emergency wire system and are located in the tunnel headwall telephone boxes at stations to enable staff in an emergency to short circuit the tunnel emergency wires, so switching off the traction current and switching on the high level lighting.

8.4 Tunnel clip-on telephones

The telephones located in Drivers' cabs shall be clipped on the tunnel emergency wire system to enable communication to the signal box by use of the marked button. To switch off the traction current the red button shall be depressed for more than 4 seconds. The yellow button is to call the Signaller.

9 Traction system changeover arrangements at Drayton Park

9.1 Outside the Moorgate to Drayton Park tunnels, the a.c. overhead electrification system is used. The overhead line equipment extends to the portals of the single bore tunnels at the south end of Drayton Park station. The tracks through Drayton Park station are thus equipped with both d.c. conductor rails and a.c. overhead line equipment.

The electric trains in use on the Moorgate to Drayton Park services are equipped to operate on both systems, and the train equipment is so arranged that the changeover from one system to the other shall be initiated by the Driver whilst the train is stationary within the platform limits at Drayton Park.

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Between the portal of the single bore tunnel for the up line at Drayton Park and the south end of the up platform at Highbury & Islington station an overhead line contact wire has been installed to give mechanical overrun protection in event of a train entering the tunnel with a raised pantograph. The Rule Book GE/RT8000, Module AC2 and NR/SP/ELP/29987, Working On Or About 25kV A.C. Electrified Lines do not apply to this wire within the single bore tunnel.

9.2 WHEN THE CURRENT IS SWITCHED OFF FROM THE CONDUCTOR RAILS IN THE DRAYTON PARK STATION AREA. THE OVERHEAD LINE EQUIPMENT WILL NORMALLY REMAIN ALIVE.

If an emergency or pre-planned work requires the isolation of the overhead line equipment, this shall be dealt with in accordance with the GE/RT8000, Rule Book, Modules AC1 or AC2 and NR/SP/ELP/29987, Working On Or About 25kV A.C. Electrified Lines respectively.

10 Electrical Control Room

The electrification system is controlled from York Electrical Control Room and is continuously staffed under the supervision of an Electrical Control Operator, who is directly responsible for maintaining the continuity of the electricity supply, for all switching operations in the substations and for giving instructions for the operation of the isolating switches. The Electrical Control Operator's responsibility covers all isolation of electrical equipment in the traction supply substations and of traction supply cables and conductor rails.

Telephone Numbers of York Electrical Control Room are:

Electrical Control Room	NRN Band III Radio * Note	ETD Telephone Numbers		PSTN Telephone Numbers (Public Subscriber Telephone Network)
		Short Code § Note	ETD (Railway Extension Trunk Dialling)	
York South Desk (Former Hornsey area)	2-174	174	037-5836 037-5837 037-4902 037-4906	01904-525952
York North Desk (Former Doncaster area)	2-173	173	037-4691 037-4962 037-4963 037-4872	01904-525622

- Notes**
- * If busy use 'P' button to obtain priority call.
 - § The ECO is able to identify calls coming in on short code emergency numbers, consequently these shall only be used for emergencies.

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Module C General instructions

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1 Supply of working instructions and responsibilities

- 1.1 Every person required to work on or in the vicinity of the lines equipped with d.c. conductor rail between Drayton Park and Moorgate shall be supplied with a copy of these instructions.
- 1.2 Persons in charge, in all organisations, are responsible for ensuring that each person under their supervision is supplied with the appropriate instructions and that each person:
 - understands which of the instructions apply to them, and that they shall make themselves acquainted with, and will be held responsible for the observance of, all such instructions;
 - fully understands the instructions relating to obtaining an emergency isolation;
 - fully understands the instructions relating to their personal safety.
- 1.3 Persons in charge, in all organisations, are responsible for ensuring that contractors and other persons carrying out work under their control know the instructions that apply to them.

2 Danger of live equipment

- 2.1 All electrical equipment shall be regarded as being **LIVE** at all times and consequently dangerous to life, except in cases when:
 - 2.1.1 The conductor rails and their connections have been isolated and short circuiting bars applied and a Conductor Rail Permit issued, or where local isolation is allowed, such other assurance has been received;
 - OR**
 - 2.1.2 In an emergency, an assurance has been received from the Electrical Control Operator that the conductor rails have been made safe. (See Clause 6 of this part.)
- 2.2 Although the tunnel high level lighting is NORMALLY switched on automatically when the traction current is switched off, IT SHALL NOT BE ASSUMED THAT THE TRACTION CURRENT HAS BEEN SWITCHED OFF when these lights are on.
- 2.3 It is extremely dangerous to be close to live electrical equipment or allow any object to come into contact with live electrical equipment.
- 2.4 Special care shall always be taken when working close to conductor rails. In addition, staff shall avoid stepping upon conductor rails or protective boarding.
- 2.5 A broken or displaced conductor rail shall be isolated and short circuiting bars/devices applied before being touched.
- 2.6 When a collector shoe is in contact with a live conductor rail, all the collector shoes on the same coach, whether or not in contact with the conductor rail will be live.

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- 2.7 When crossing the track, staff shall do so by way of a recognised crossing. If it is necessary to carry material or equipment across the track, care shall be taken to so that it does not come into contact with the conductor rail.
- 2.8 It is dangerous to direct water, or any liquid, onto or in the direction of live conductor rails.
- 2.9 Ballast, rubbish etc, shall be kept clear of insulators, bonds and conductor rails, particularly where the latter are ramped.
- 2.10 All loose objects shall be positioned where they cannot cause a short circuit through the effects of vibration and wind (draught caused by the passage of trains through the tunnel).
- 2.11 Staff working immediately adjacent to live conductor rails will be supplied with and shall use rubber gauntlets, gloves, mats or trough covers when necessary. A pair of rubber gloves or gauntlets shall be held at every station for use in an emergency, and when not in use shall be kept in the receptacle provided for that purpose. Rubber gloves and gauntlets shall be kept clean, dry and free from grease and oil.

Supervisors shall examine rubber gloves and gauntlets **EVERY 3 MONTHS** and **ANY SHOWING SIGNS OF WEAR OR DETERIORATION SHALL BE REPLACED AND THE ORIGINAL GLOVES OR GAUNTLETS SENT FOR TESTING**. A damaged rubber gauntlet or glove is **USELESS AS PROTECTION**, as is also a wet gauntlet or glove, when the moisture extends as far back as the wrist.

All damaged gauntlets/gloves shall be returned at once to the person in charge (i.e. the Supervisor, Finsbury Park or as otherwise instructed). The instructions covering the issue, storage and periodical testing of the gloves, gauntlets and mats shall be observed.

3 Communication

- 3.1 A two-way radio system is provided. All station staff shall carry a two-way radio with them at all times. After the last train of the day has departed the radio shall be put on charge.
- 3.2 Plug-in telephone sockets are located on all platforms and throughout the tunnels and can be used to make any ETD internal calls from the top and bottom sockets. The centre socket is used to set up an omnibus line.
- 3.3 Public emergency telephones (P.E.T.'s) are located on each platform, which when lifted connect direct to the Service Delivery Centre (SDC) located at Kings Cross. These telephones can be used in an emergency if no other telephone is available.
- 3.4 ALL verbal messages shall be dealt with in accordance with the Rule Book GE/RT8000 (Module G1.)

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4 Numbering of messages

- 4.1. The number of each message to or from the Electrical Control Operator shall be the time of despatch expressed as a four figure number in terms of the 24-hour clock in the Electrical Control Room, e.g. 24:00 is midnight and 00:01 is 1 minute past midnight. Thus, a message despatched at 18:15 hours would bear the number 1815.

5 Identification of locations on the line

- 5.1. Any person reporting an unusual occurrence or incident on the electrified line shall **STATE THE NUMBER**, if any, or **LOCATION OF THE TELEPHONE USED**, together with the **NAME OF THE LINE(S)** affected.
- 5.2 All messages dealing with the limits of Isolation of the Conductor Rail Permits, position of the short circuiting bars which have been laid, etc, shall also state the number(s) of the isolating switches, together with the name of the line(s) concerned.

6 Switching off the traction current in an emergency

- 6.1 Any person becoming aware of any emergency requiring or likely to require the traction current to be switched off shall immediately telephone the Electrical Control Operator or arrange for this to be done.
- 6.2 Drivers becoming aware of an emergency requiring the traction current to be switched off, on a line or lines other than that on which their train is standing, shall immediately advise the Signaller. (If there is no communication with the Signaller then a short circuiting bar shall be placed on that line in accordance with Clause 8 of this part.)
- 6.3 A Signaller becoming aware of any emergency shall carry out the appropriate regulations before asking for the traction current to be switched off.
- 6.4 The person requiring the traction current to be switched off shall act as follows:

6.4.1 In the case of staff or Drivers at stations.

Operate the tunnel emergency plunger and use the tunnel headwall telephone on the platform associated with the line from which the traction current is to be switched off. If the tunnel headwall telephone is defective, the person concerned shall use any other means of communication available to contact the electrical control operator or arrange for this to be done.

6.4.2 The person contacting the Electrical Control Operator shall state:

- That '**THIS IS AN EMERGENCY CALL**'
- Their name, grade and organisation
- Where they are speaking from
- Lines concerned and location

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- e) Why it is necessary to have the traction current switched off, and in all cases state whether any person is in danger from live equipment. Particular mention shall be made if emergency services (fire brigade, ambulance, police) are waiting to render assistance;
- f) Whether short circuiting bars have been applied.

The person shall remain in contact with the Electrical Control Operator until either:

- i Assured by the electrical control operator that the traction current has been switched off and the equipment made safe;
- or
- ii Alternative arrangements have been made.

- 6.4.3 As an alternative to the Driver-to-signal box radio system, any other radio or telephone system can be used if this would save time. **Any person receiving a message requesting the traction current to be switched off shall relay the message complete without delay, to the Electrical Control Operator**, adding details of their own name, organisation and location.
- 6.4.4 Where a train is in a tunnel the Driver shall:
- (a) Use the tunnel emergency wire clip-on telephone, clipping it to the tunnel emergency wires and depressing the Isolate Button for at least 4 seconds, or by use of the short circuiting tool, or pinching the two wires together, to initiate the tunnel emergency procedure;
 - (b) If it is not be possible to initiate the tunnel emergency procedure by use of the tunnel emergency wire system, or radio, a short circuiting bar shall be placed on the line in accordance with Clause 8 of this part, and the Signaller shall be advised of the emergency by the use of the plug-in telephone and be requested to advise the Electrical Control Operator.
- 6.4.5 It is to be particularly noted that the electrical equipment **SHALL NOT BE TOUCHED OR APPROACHED**, until an assurance has been obtained from the Electrical Control Operator that it is safe to do so, except that in the case of electric shock it can be approached to the extent permitted in BR 7243/7 entitled 'FIRST AID FOR ELECTRICAL ACCIDENTS'.

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- 6.4.6 If the person requesting the isolation hands over to another person he/she shall advise the Electrical Control Operator and the Shift Signaller Manager of the change and give the NAME, GRADE AND ORGANISATION of the person left in charge on site, WHO SHALL THEN CONFIRM to the Electrical Control Operator that he/she is now in charge of the isolation.

6.5 Action to be taken by the Electrical Control Operator in the event of a 'Tunnel Emergency Trip' operation or request for an emergency isolation

- 6.5.1 In the event of the initiation of a '**Tunnel Emergency Trip**' by the tunnel emergency wire system, or a headwall telephone emergency plunger, the circuit breakers controlling the current to both sections of the conductor rail in association with the one from which the call has been made will be automatically opened and the '**Tunnel Emergency Trip**' indications will be given in the Electrical Control Room.
- 6.5.2 The Electrical Control Operator will decide on the information given to him/her, whether to initiate an Emergency Isolation or to take other action as may be necessary and inform the Shift Signaller Manager of the action taken.
- 6.5.3 On receipt of a 'Tunnel Emergency Trip' or requests, the Electrical Control Operator shall:
- Not make any further attempt to reclose the circuit breakers;
 - Act in accordance with control room instructions to switch the current off to the section(s) concerned;
 - Advise the Shift Signaller Manager immediately.

6.6 Action to be taken by the Shift Signaller Manager in the event of a 'Tunnel Emergency Trip' operation or emergency isolation

- 6.6.1 When a 'Tunnel Emergency Trip' is initiated, a tunnel emergency lamp indication will be given at Kings Cross Signal Box. When advised or on receipt of this indication the Shift Signaller Manager shall speak to the Electrical Control Operator and obtain an assurance that the current has actually been switched off on the conductor rail section(s), on the line(s) concerned then comply with clause 6.6.3.
- 6.6.2 When an emergency isolation is to be given the Shift Signaller Manager shall comply with clause 6.6.3
- 6.6.3 Obtain details of the emergency
- Ensure that the affected line(s) are blocked to trains and reminder appliances have been placed on the switches/buttons concerned;

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- b) Agree the necessary action with the person who has initiated the traction current being switched off, and pass on the assurance from the Electrical Control Operator that the current has been switched off;
- c) If there is no communication with the person who has initiated the 'Tunnel Emergency Trip' and a train is at a stand in the tunnel, bring all trains on the affected and opposite line to a stand at stations, and thereafter request the traction current to be switched off on the opposite line.

6.6.4 If, after receipt of the details of the emergency and action to be taken, it is necessary that the current shall be switched off from other sections of the conductor rail, the Shift Signaller Manager shall immediately arrange for this to be done by the Electrical Control Operator.

6.7 Giving up the emergency isolation

Immediately the emergency has passed the Person in Charge on site shall inform both the Electrical Control Operator and Shift Signaller Manager who will, provided they are satisfied that all persons are clear of the tunnels, make the necessary arrangements for the section of conductor rail to be made alive again.

- 6.7.1 If a 'tunnel emergency trip' has occurred the Shift Signaller Manager shall operate the appropriate 'tunnel emergency wires reset' push buttons and advise the Electrical Control Operator that he/she can close the circuit breakers concerned.
- 6.7.2 If a short circuiting bar has been used, when advised of its removal the Electrical Control Operator shall advise the Shift Signaller Manager and shall not make the conductor rails concerned alive until he/she has been assured by the Shift Signaller Manager that it is safe to do so.

7 Defective tunnel emergency wire system

- 7.1 If a '**Tunnel Emergency Trip**' indication is received at Kings Cross Signal Box without a following message, the Shift Signaller Manager shall first confirm with the Electrical Control Operator that the circuit breakers associated with the line concerned have been opened. The Shift Signaller Manager shall then take action to establish the origin of the emergency call, in accordance with instruction 6.6. of this part.
- 7.2 If after carrying out the appropriate procedure, the Shift Signaller Manager is satisfied that an emergency does not exist and that an accidental or improper action or an equipment fault has initiated the trip **AND HE/SHE IS SATISFIED THE SIGNALLER HAS COMMUNICATION WITH ALL TRAINS WITHIN THAT TUNNEL VIA WHATEVER MEANS ARE AVAILABLE AT THE TIME**, he/she can operate the appropriate '**Tunnel Emergency Wire Reset**' push buttons and advise the Electrical Control Operator that he/she can close the circuit breakers concerned.