

2nd edition, July 2004

Translation

I

Fixed and portable lineside telephones

*Postes téléphoniques fixes et portatifs de pleine voie
Ortsfeste und tragbare Streckenfernsprecher*



UNION INTERNATIONALE DES CHEMINS DE FER
INTERNATIONALER EISENBAHNVERBAND
INTERNATIONAL UNION OF RAILWAYS

Leaflet to be classified in Volumes:

IV - Operating
VII - Way and Works

Application:

With effect from 1 June 2004
All members of the International Union of Railways

Record of updates

1st edition, January 1960	First issue
2nd edition, July 2004	Overhaul of leaflet

The person responsible for this leaflet is named in the UIC Code

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Summary

The purpose of the Leaflet is to define, fo all lines not equipped with GSM-R:

- the use of fixed and portable lineside telephones as provided for train staff, maintenance gangs, station staff, and in some cases for customers;
- the functionality of the circuits to which the telephones are connected;
- the technical characteristics, for both telephones and circuits, of:
 - the calling equipment,
 - the supply components,
 - the means of connection of the telephones,
 - the method of installation.

1 - Foreword

Although the set of principles defined in the present document are to a large extent based on old concepts, in the majority of cases they are still fully applicable today.

However, it should be noted that the identified systems, whilst retaining their functionality, have benefited from the latest technical advances, rendering them more efficient.

The introduction of GSM-R and its numbering scheme, and the use of general network phone set as lineside phone set, are not handled in the present leaflet.

NB : Tests are currently under way concerning the use of public GSM systems for railway operational use. The procedures for such applications need to be followed closely and the set of references adapted. These applications are not included in the present document.

2 - Use of lineside telephones on lines not equipped with GSM-R

2.1 - General

On all railway systems, fixed and portable telephones are made available along the railway lines for the use of train crews, maintenance gangs, station staff and the public. The arrangements in force vary, however, with the railway system according to:

- the general operating principles, laid down principally in the regulations governing traffic movement, safety, infrastructure management and customer services;
- the organisation and grouping of the services;
- the technical equipment of the line (e.g. its method of electrification, its method of signalling, the form of the telecommunications circuits, which can be provided by overhead lines, copper cables or fibre optics);
- the type of line (particularly high-speed lines).

2.2 - Signal telephones

Fixed telephones are normally preferred when used in connection with signals. These telephones can then be used for communication between train crews brought to a stand at signals (absolute or permissive) and the staff concerned with safe running. Use of these telephones often facilitates the issue of written or verbal orders for passing signals at danger; they must therefore be as safe as possible.

Consequently, the telephones and circuits connecting them are usually of a special kind and are centred on the person responsible for safe working at the station, post or track. If this is the case, it is not authorised for them to be connected to the general service telephone system or with other telephone circuits.

Very often, the telephone is connected by an individual circuit and this feature allows the person responsible for safe working to recognise unmistakably the identity of the point making the call. The following arrangements are also met with however:

- the signal telephones are situated on an omnibus circuit connecting the persons responsible for safe working at one or both of the two adjacent stations and the intermediate block posts, level crossings and other signal telephones on the section of line; the caller must give his identity orally;
- several signal telephones are situated on an omnibus circuit, but each telephone is equipped with a device enabling the caller to be identified by the recipient; the privacy of the communications is not necessarily ensured;

- the telephones at the approach to stations closed at night are connected during the night to the operating control circuit (dispatching) or redirected to the person responsible for line safety, or to the person responsible for traffic control;

these telephones are also used by technical staff responsible for track and signal maintenance.

The telephones are situated either at the foot of a signal or several metres in front of it (this latter being the usual practice). The telephones can be placed either in the open air, or in a box or a hut.

2.3 - Telephones at level crossings

Many railways make use of fixed telephones at level crossings. These telephones are sometimes connected to the neighbouring block post (or signal box) or to the two adjacent boxes. Alternatively, these telephones are situated on an omnibus circuit connecting those responsible for safe working at stations with the block posts; information can be communicated to level crossings for special train services, for the institution of wrong line running and, on some systems, for important delays.

The telephones at level crossings can be used by the staff of any department to make contact with stations (disabled trains, maintenance of track, catenaries and electrical installations).

Some railways provide a telephone for road users so that they can contact one or both of the adjacent stations.

2.4 - Telephones on electrified lines

The regularly spaced telephones found along electrified lines are used either for requesting the switching off and restoration of the electric current (emergency circuit), or for communications relating to the maintenance of the electrification systems. One or two series of telephones are used for these two purposes, depending on the organisation of the railway.

The emergency telephone circuit is usually provided with fixed telephones. It usually gives direct access to the official controlling the supply of current to the catenaries (with the option of diverting to the Controller), but sometimes access is direct to the Controller, who then passes on the call. Sometimes the calls can also be passed on to a "traction" official who is responsible for breakdown services and assistance as regards electric traction stock. No instance has come to notice where contact is made over the general service telephone system.

The emergency circuit is a "long distance" telephone circuit which is nearly always cabled and having transmission characteristics rather similar to those of the operating control circuits (see *UIC Leaflet 754* dealing with these circuits), but different apparatus for calling the line controller (telephones in emergency circuits can be of the receiving kind). Fixed lineside telephones are often regularly spaced from 500 to 2 500 metres depending on the traffic, the particular circumstances and the railway, the distance most frequently met with being from 1 000 to 1 100 metres.

Some railways report that they use rainproof telephones with a movable gravity arm which houses the receiver and a mouthpiece accessible from the exterior. Generally speaking painted inscriptions (arrows) on the poles, catenary masts, etc. indicate the direction of the nearest telephone.

Certain railways use the same telephones as those for signals, fitted with switches to divert them onto the special emergency circuit.

The catenary maintenance departments quite often use the emergency telephone circuits. There are on certain railway systems however, special circuits for their use; these circuits are then equipped with sockets to which the maintenance gangs connect portable telephones supplied to them. The circuits, which are normally connected to stations can be connected to the operating control circuit at times of important activity.

2.5 - Telephones for maintenance and permanent way works

Many railways find it beneficial for maintenance and permanent way gangs to be able to communicate with adjacent stations. Such communications can either have a direct bearing on the safe running of trains if used in the scope of the performance of a safety contract (blocking of a line, for example), or they may have no direct bearing on the safe running of trains when applied in a different framework (e.g. service communications), but permit the saving of valuable time.

In long tunnels, fixed telephones placed in refuges 1 000 metres apart are generally used.

The communications:

- from the gangs: often concern the connecting and disconnecting of the telephone, the exact position of the work, the opening and closing of the tracks and where applicable, the details of snow-clearing operations;
- from the station: often contain information concerning the running of special trains and those running before time, including, on certain railway systems, advice of important delays and the approach of very fast trains, etc.

The majority of railways do not use this communication for the purpose of ensuring the safety of gangs or large special vehicles. The safety of the gangs is usually covered by lookout men, although certain railways also make use of mobile signals for this purpose. Although the telephone is an element contributing to safety, action is only seldom taken when the telephones become out of order. Such action then takes the form of instructions to trains to slow down (running at sight or at a restricted speed of 30 or 45 km/h).

NB : It should be noted that some railways use other methods, (e.g. radio, treadles) to advise the gangs of approaching trains.

Certain railways use such communications to advise about random incidents: hot box on a passing train, obstruction of a nearby level crossing, etc.

Quite often, track maintenance gangs use portable telephones, and where necessary, flexible cable is unrolled along the tracks from their working site to the nearest telephone socket. The circuits are often connected to station exchanges.

When cables are used for telephone circuits, the sockets are quite often placed at similar intervals to those of the emergency telephones. Where overhead lines are provided, some railways use special signs to mark the insulators of the circuits to which the gangs can connect; these are often omnibus circuits. The gangs are then provided with poles to facilitate the connecting of the telephones.

2.6 - Telephones for public use

- At halts that are unstaffed or not permanently staffed, telephones on station fronts provide a communication link either with the person in charge of safety at one of the adjacent stations, or with the person in charge of line safety, so that users can be advised of the situation concerning the running of trains.
- In stations with a public level crossing between platforms protected by a warning device to regulate track crossings, a telephone is available to the public.
- On some railways where electrification is by third rail, telephones for use by the public in contacting the electrification control in an emergency are provided at stations.

2.7 - Other special telephone circuits connected to lineside telephones

Some railways state that they find the following satisfactory:

- omnibus telephone circuits for staff engaged in the maintenance of signal equipment, especially along lines equipped with automatic block. These circuits have sockets situated in various cupboards, block posts, etc. connected with the relay rooms of the signal boxes at the terminal stations;
- accident telephone circuits, by means of which it is possible to connect any intermediate point situated along the tracks to the headquarters of the Regional Management of the railway thereby facilitating the arrangements for assistance. The telephone circuits along the tracks include either sockets (in the case of overhead lines or cables), or special signs hooked on to the insulators.

The telephones used in conjunction with these circuits are always portable ones;

- the Safety Management Module circuit. The safety management module is a computerised speech recognition system integrated into the architecture of a relay station with computer control. It has the vital task of providing safety management for work carried out in the track by automatic means conforming to the regulations for such work, together with the implementation of safety measures under the responsibility of the railway operating services.

Special telephone sockets are placed along the track so that the person responsible for implementation can communicate with the Safety Management Module using a portable telephone terminal (portable telephone with high acoustic definition).

A pre-determined dialogue procedure controls the exchange process between the person responsible for implementation and the system.

3 - Technical characteristics for telephones and circuits

3.1 - Equipment for calling stations or the line controller from the lineside telephone

1. Signal telephones

Depending on the circumstances, signal telephones requiring only short distance local circuits are:

- fitted with a magneto generator, or other calling device (telephones of "local battery" type);
- of the "central battery" type as regards calls (the microphone current can however be obtained from local dry cells if this arrangement is suitable).

If the signal telephones have to be connected to long distance circuits (e.g. operating control), they must be designed accordingly.

If these telephones are connected to omnibus circuits, the magneto generators (or other calling devices) must be sufficiently powerful.

In cases where the transmitting device is used to identify automatically the telephone making the call, such device naturally includes the necessary special calling equipment.

2. Telephones at level crossings

These telephones are generally of the "local battery" type with a magneto generator, or other calling device. In some cases, telephones of "central battery" type are used.

3. Fixed emergency telephones

Since emergency circuits are often of the long distance type, the calling equipment varies according to the composition of the circuit. The following methods are met with:

- the call is made orally, the circuit being terminated by an "acoustic calling relay";
- the call is made by central battery by closing the phantom circuit of the quad, the telephone connecting itself to the circuit by four leads when the receiver is lifted; the call can proceed from section to section up to the end of the line (4-wire circuit), or be accomplished by transmission of 500 Hz (6-wire circuit);
- the call is made by short-circuiting a phantom circuit supplied with alternating current at 50 Hz and then by impulses at 500 Hz;
- multi-frequency code calls (ITU code).

4. Portable telephones

In nearly all cases, portable telephones are fitted with magneto generators, or other calling devices.

Sometimes, in order to reduce weight, the telephones do not have calling facilities. Instead the call is made orally the circuits then being equipped with "acoustic calling relays".

Portable Telephone Terminals are also available. These are portable telephones specifically for use in systems with speech recognition.

3.2 - Calling apparatus for lineside telephones

1. Signal telephones

These telephones are nearly always provided with bells operated by alternating current or with electronic ringing tones.

When the telephones are situated in huts, a very powerful external bell is also used.

2. Telephones at level crossings

These telephones are provided with ordinary bells operated by alternating current or with electronic ringing tones.

Sometimes, in crossing-keepers' huts, loudspeakers are also used.

3. Fixed emergency telephones

These telephones can be provided with bells operated by alternating current or with electronic ringing tones.

NB : The voltage of the calling current is restricted to 60 volts in some countries; elsewhere it is often between 90 and 150 volts.

3.3 - Supply

The supply for telephones is still provided using the "local battery" method in very many cases.

The use of a "central battery" is tending to increase a little for signal telephones, fixed emergency telephones and special telephones. The existence of telephones making use of both systems is noted; the microphone is fed locally and calls are made by means of a central battery system.

Use of a "central battery" allows for the operation of telephones at distances of up to 15 to 20 km from the supply point.

3.4 - Connection of the telephone to the circuit

In order to restrict circuit losses, the permanent connection of telephones to circuits is avoided whenever possible; the actual connection is effected either by unhooking, by opening the cupboard or by raising the movable arm.

Along electrified lines, particularly for safety reasons if electrification is by alternating current, but sometimes to improve circuit balance, a repeating coil is often inserted between the cable conductors and telephone or socket. No lightning arrester or fuse is then used.

If repeating coils cannot be inserted (e.g. in the case of central battery supply), fuses and lightning arresters are used.

When connecting a fixed telephone or permanent socket to an overhead telephone line, precautions must be taken as dictated by local circumstances; this may, in particular, involve the use of a short cable often possessing high dielectric strength. Lightning arresters and fuses are frequently used.

The use of poles for connecting portable telephones to overhead lines has already been mentioned.

Normally, track maintenance gangs using portable telephones are also supplied with flexible cables between 300 and 500 metres long, rolled on drums and fitted with male and female plugs at the ends; sometimes a second length of cable is connected in series. The flexible cable is often of a plastic insulated type.

3.5 - Method of installation of fixed telephones

Fixed telephones are often constructed to withstand exposure in the open air; they are installed either on uprights made of cement, concrete or metal (not catenary masts), or against the fronts of buildings or walls, using suitable iron fittings. Some are provided with a small metal writing shelf.

In some cases fixed telephones are installed in huts possessing doors fitted with locks which can be opened and closed with a square key (Berne key). If connections can be made to several circuits, sometimes only one telephone is used in conjunction with switches (operated by means of a special key which can only be withdrawn when the controller is returned to the normal position).

3.6 - Installation of portable telephones

No special arrangements have been indicated, this work being carried out in accordance with local circumstances.

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Printed by the International Union of Railways (UIC)

16, rue Jean Rey 75015 Paris - France, July 2004

Dépôt Légal July 2004

ISBN 2-7461-0793-7 (French version)

ISBN 2-7461-0794-5 (German version)

ISBN 2-7461-0795-3 (English version)