

INSTALLATION OF SUBSTATION SERVICES.

INSTALLING SIMPLE SERVICES.

1. GENERAL.

This Instruction describes the principles involved in installing simple telephone services.

2. AUTHORITY FOR WORK.

The facility required will invariably be authorised by a Telephone Order, and except in special circumstances, the instructions on this order will be based on the Plan Numbers listed in the Standard Telephone Facilities Handbook. Where the subscriber requires apparatus in addition to, or differing from, that shown on the Telephone Order, the Technician will obtain a request on a Form Tel. 40.

3. WORK TO BE DONE IN ADVANCE OF ISSUE OF ORDER.

Urgent work required to be performed in advance of the receipt of the Telephone Order shall only be carried out on the authority of the Divisional Engineer who must quote the number of the order allocated by the Telephone Branch. Full details shall be kept of the time taken and equipment and materials used and/or recovered, together with the numbers of the supporting documents (Form WP. 20, etc.) so that the Telephone Order, when received, can be completed accurately. In large depots, it may be preferable to carry stocks of blank "M" copies of the Telephone Order forms, one of which may be filled in locally to enable the Technician to carry out the work and record the details. This handwritten form is retained until the real order is received. This latter form is then completed by transcribing the details from the temporary form which may then be destroyed.

4. UNSTANDARD SERVICES.

Services differing from those listed in the Standard Telephone Facilities Handbook are not permitted without the prior approval of an Engineer. Where circuit alterations are approved, the Technician is responsible for ensuring that an amended or new circuit diagram is placed in the equipment.

5. LOCATION OF TELEPHONES, ETC.

On arrival at the job, the Technician shall ask the subscriber where he would like the instruments fitted, but if the request is for an unsuitable position the subscriber must be advised of the objection and a more suitable location selected.

In general the telephone shall be installed where good natural or artificial lighting permits -

- (i) satisfactory operation by the subscriber and
- (ii) inspection and adjustment by the service technician.

Locations in which the instruments are exposed to direct sunlight should be avoided, particularly in the case of equipment containing dry cells.

When it is found necessary to erect apparatus on a single brick wall, or on glazed or hard tiles, the attention of the subscriber must be drawn to the liability of damage being done to the wall. Before commencing work, the subscriber shall be requested to sign a copy of Form SE.80 or its equivalent relieving the Department of the responsibility for any damage caused to the wall surface other than that due to carelessness. Should the subscriber decline to give the required undertaking, another location must be selected. If this cannot be readily decided on, the Senior Technician must be advised. The work shall not be commenced until an arrangement has been agreed which is satisfactory to both the subscriber and the Department.

Telephones should be placed where the bell is clearly audible to the subscriber. In locations where difficulty in hearing the bell is anticipated, the Senior Technician should be advised so that he may discuss with the subscriber the advantages of an extension bell, and if decided on, arrange for the necessary authority.

6. UNUSUAL LOCATIONS.

Telephone instruments shall not be installed in unusual situations such as bathrooms or obscure locations in buildings. Where subscribers insist on having the telephone installed in what appears to the Technician to be an unusual location, the case shall be referred, through the Senior Technician, to the Divisional Engineer for a ruling before the installation is effected.

7. LOCATIONS SUBJECT TO ACCIDENT HAZARDS.

Apparatus shall not be installed in a situation where an accident risk exists, that is, where a person using or passing by the apparatus is exposed to the risk of injury or where the apparatus itself may be damaged or cause damage to fragile property. The most common circumstances under this heading are -

- (i) Proximity to stairs leading up or down, trapdoors or other means of passage from one level to another where a person may be injured if he does not take care in approaching, leaving, or whilst using the apparatus.
- (ii) Proximity to electric light or power wires, switches, outlets, earthed objects, etc. Inspecting officers shall watch this carefully.
- (iii) Proximity to doors whether fixed or not, movable or sliding sections, piled merchandise or other movable objects. It is particularly important that apparatus and/or wiring shall not be fixed to any fittings or objects subject to movement or in any way unstable. Do not stand table type telephones on any unstable support from which they may fall.
- (iv) Projection of apparatus into or over shafts or passageways used for the handling of heavy merchandise likely to damage it.
- (v) Extension of cord from instruments across a passageway.
- (vi) Proximity to surrounding objects which would obstruct the ready removal of the receiver, the operation of the generator handle, or the opening of apparatus for inspection.
- (vii) Proximity to fragile objects which may be damaged by dropping a handset or a receiver.

8. DAMP SITUATIONS.

No apparatus shall be fitted in a damp position such as on a damp wall or close to a window which may be left open and expose the apparatus to rain or moisture.

Where adequate protection is not available, the subscriber should be advised that it is necessary for a protective cover to be provided. The Senior Technician will discuss with the subscriber suitable protection which shall be provided by the subscriber or at his expense.

9. CORROSIVE FUMES.

Occasionally it is necessary to install apparatus in a location where corrosive fumes, etc., may damage it. In such a circumstance and unless the conditions are extreme, the apparatus should be installed in a position in which the minimum damage is likely to occur. In every case, the Senior Technician should be advised of all the details and he shall inform the subscriber that any damage sustained by wiring or apparatus due to the conditions will be chargeable.

10. DANGEROUS AREAS.

Certain areas such as bulk petrol storage depots and ammunition factories are dangerous areas and it is not customary for Departmental workmen to enter them. Usually special flame-proof telephones are required and these are not supplied by the Department.

The usual practice in such cases is for the Department to provide a line in a safe area, terminating the line on a block as near the danger area as safety permits. The subscriber is then responsible for extending this line to where he wants the instrument and he uses his own material and labour. He is also responsible for the maintenance of the service beyond the end of the Departmental construction. The instruments fitted shall be of an approved pattern and the insulation resistance, etc., of the wiring shall conform to Departmental standards.

Divisional Engineers shall issue instructions to ensure that all services of this nature are brought to their notice and they shall investigate the circumstances to see that the safety of Departmental officers is safeguarded.

11. EXCESSIVE VIBRATION OR NOISE.

A position where the apparatus would be subject to vibration is not desirable. The terminal block of a handset telephone service is not affected by vibration but a fixed transmitter telephone or a C.B. extension switch which contains a relay shall always be fitted to a rigid mounting. If no other support is available, and if the vibration is not sufficient to cause the bell to tinkle, the bell set associated with a table telephone may be placed on a support liable to vibrate. If there is no other alternative to a wall subject to vibration, the Technician should advise the Senior Technician before fitting equipment.

Except where no other position is available, a telephone must not be installed in a noisy location. If the subscriber experiences transmission difficulty in using the instrument during the test after installation, the Technician should advise the subscriber to install a sound-proof cabinet and the circumstances should be referred to the Senior Technician immediately.

12. SUBSTATION PROTECTORS.

When a substation protector is required, it shall be fitted in a position where it is readily accessible to Linemen who should not be required to enter the house to obtain a test. It must be protected from the weather, and if placed on an external wall, should be between 6 and 7 feet from the ground to obviate the necessity to use a ladder. Although the risk is remote, protectors shall not be installed in any location where a spark from the arrester could ignite inflammable materials such as curtains.

Where an underground lead-in is provided from aerial wires and the cable enters from the ground level near a skirting board, the protector shall not under any circumstances be installed near the floor. In such cases the protector shall be installed where it is readily accessible but away from risk of interference or damage. If the terminal block on the telephone cord is to be fitted near the terminal block to which the incoming cable is connected, a two pair cable may be run to the protector. A separate earth wire shall be run. The sheath of one- or two-pair cable shall not be used as a portion of an earth run from a protector.

13. FITTING OF APPARATUS.

On obtaining the desired location for the apparatus, the Technician should make a survey to determine the best method of routing the wiring which should be kept as short as possible while consistent with approved wiring methods. For methods of securing apparatus see Telephone Engineering Instruction, Substation I 0011.

Each instrument or item of equipment shall be fitted squarely and technicians are supplied with a spirit level to ensure this.

When fitting equipment to a surface, or when cutting a hole in a floor or wall, the maximum care must be exercised to avoid damage to the structure or to any hidden pipe, cable or wire.

Apparatus shall be fitted direct to masonry walls without a backboard unless difficulty is experienced. On wall surfaces other than wood or masonry, it may be necessary to fit backboards to avoid damage to the wall or to make certain that the apparatus is securely fixed.

When fitting a wall telephone the height of the transmitter shall be discussed with the subscriber. The usual height of the centre of the transmitter on a fixed transmitter wall telephone is approximately 4'8" from floor level. The height of a wall handset telephone is not critical and the subscriber's wishes should be met unless an unsuitable location is requested.

When fitting a table handset telephone the terminal block shall be fitted in any convenient position to suit the wiring but it shall not be fitted where damage can occur either to the terminal block or the cord and wiring.

In some buildings, there is sufficient space beneath the floor to make this a convenient area in which to run the wiring. Sometimes the Installation staff is advised of the location of the instruments before the building is erected and in these cases provision is made for wiring during the construction of the building, due regard being given to safeguarding from damage by workmen any wiring installed in advance and, where possible, to a satisfactory method of replacing the wiring should a fault occur. In multi floor buildings or large areas where tables may be placed some distance from a wall or suitable wiring run, wire shall not be run on the surface of the floor without protection. Where runs over the surface of the floor are the only means of wiring to the instruments, cover strip shall be used. In general provision may be made for suitable conduits etc., into which the cables may be drawn when the services are being provided, but the cables themselves are only provided in advance where subsequent drawing-in would be difficult.

Where dry cells are required they shall be installed in a vertical position with the terminals on top. They should not be installed in damp or unusually hot places such as near stoves, radiators, or in direct sunlight even when in a battery box. The battery box will be located so that the wiring run is a minimum length but it should not be placed where it is subject to disturbance or damage. It should be as inconspicuous as possible; if in a cupboard it must be accessible and lighting must be sufficient for inspection. Where disturbance is possible, the box must be secured by screwing to adjacent woodwork, for example, floor or skirting.

All wiring shall be subject to the methods set out in the relevant Engineering Instruction, but the following points are particularly applicable to this Instruction -

- (i) All wiring shall be run as inconspicuously as possible; staples, clips, etc., shall be placed at regular and approximately equidistant intervals; wiring on open surfaces shall only be run in a vertical or horizontal direction;
- (ii) Except at a crossing, fixed telephone wiring shall not be closer than 2" from electric lighting or power cables, conduits, sprinklers or gas pipes. Where the crossing of these obstacles is unavoidable, a saddle of bakelite or wood shall be used to avoid direct contact.
- (iii) The sheath of 1 pair and 2 pair cable shall enter an instrument, battery box or terminal block for 1 inch only. Sufficient unsheathed conductor shall be provided to enable the terminals of the apparatus to be freely reached with slack and spare. In a battery box sufficient length of unsheathed conductors shall be left to allow the dry cells to be removed from the box for inspection without disconnecting the wires.
- (iv) Particular care shall be taken with two pair and larger cables to ascertain whether the conductors are of a twisted pair or quadded formation.
- (v) Where paper or 1 and 2 pair textile insulated cables are to be jointed they shall be effectively sealed against dampness by using a wiped joint or a terminal block and an approved sealing compound.

14. ADVICE TO SUBSCRIBERS ON OPERATION OF EQUIPMENT.

On all simple services, the Technician shall ensure that the subscriber is fully conversant with the operation of the equipment provided and that he understands the significance of the various service tones, that is, dial tone, etc. The subscriber's attention should also be drawn to the information given in the front pages of the Telephone Directory.

When a P.M.B.X. has been installed, the operators must be advised that it is important to switch the power off when the exchange lines are night switched and the board is unattended. This is particularly important when the power supply is obtained from dry cells on small installations.

In the case of P.A.B.X's., and floor pattern P.M.B.X's., the Telephone Branch arranges for one of its officers to carry out this instruction and Senior Technicians are responsible to see that the Telephone Branch is advised of the date and time of cutover so that they can arrange for an officer to attend. In the event of delays occurring in the arrival of the Telephone Branch officer, the installing technician must ensure that the subscriber can operate the equipment so that traffic can be passed.

15. COMPLETION OF RECORDS.

The exchange or extension number of all telephones shall be neatly written on the label on the dial or dial dummy.

An apparatus card, Form EM.23, shall be prepared and inserted in each public telephone or P.M.B.X. when installed. This card should be placed in a convenient position where it will not interfere with the working of the equipment. These cards are not required in other equipment.

Where the service is provided by using pairs in indoor distribution cables, details of cross connections etc. shall be neatly, legibly and accurately recorded on the relevant cable record card or in the cable book.

16. DUPLEX SERVICES.

Full particulars regarding the functioning and installation of Duplex services are given in Telephone Engineering Instruction, General E 0101 and I 0101.

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