SOLDERING AND SOLDERING TOOLS

This E.I. describes the various responsibilities and precautions to be taken when soldering wires to tags, also the tools and materials used.

See E.I. TELEPHONE General A 1310 "Soldering Wires to Tags" also.

1. RESPONSIBILITY.

1.1 The office in charge of soldering work is responsible to see that:-

the most suitable number of men is used on the job;

each man has the necessary tools and solder and the tools are in good condition; soldering irons are switched on early enough to reach their operating temperature by the time they are required;

all platforms, stages, etc. are examined for condition, correct fixing and safety;

facilities are available to each man to collect solder droppings.

equipment is properly protected against solder droppings;

all power outlets for soldering tools are correctly fused;

all soldered connections are free of excess solder and blobs, and no solder tails are left on any lug, tag or joint.

2. APPROACH TO SOLDERING.

2.1 Each terminating device must be tested to see that solder will stick to the tags. This test will determine the degree of abrasive cleaning required.

2.2 In difficult cases it may be necessary to clean the tag, terminate and solder, wire by wire to make effective joints.

2.3 Cases of difficult soldering must be reported to the responsible Engineer. Particularly difficult cases must be reported to the Central Administration.

2.4 Only standard practices and resin cored solder are to be used.

3. SOLDERING OPERATIONS.

3.1 General. In soldering, cleanliness of the parts to be soldered is of first importance.

3.2 Precautions. Take the following precautions when soldering wires to tags:-

All traces of enamel insulation must be removed from insulated wires.

Soldering must be done as soon as possible after termination because the cleaned copper soon tarnishes and soldering is more difficult. Therefore, each block, shelf or unit of equipment must be soldered as soon as its termination is completed and should not be left unsoldered overnight.

When soldering plastic covered wires to tags, the soldering tool must not be applied to the tag any longer than is necessary because the heat may damage the plastic insulation.

To prevent melting of the plastic when the adjacent tag is soldered, plastic covered wires must not rest on tags adjacent to the me on which they terminate.

3.3 Degree of Finish. The soldering tool must be properly heated, a minimum of solder used and no burrs or solder tails left on tags or wires.

3.4 Scrap Solder. The dropping from all soldering operations must be collected and sold as scrap metal.

4. SOLDER AND FLUXES.

4.1 Solder is an alloy of tin and lead; for telecommunication equipment the best proportion is 65 per cent. tin and 35 per cent. lead. This produces a solder having a relatively low melting point and a very short plastic duration stage, thus avoiding damage to insulation by excessive heat. In future, Solder R.C. 65%/35% (Serial 4/5) must be used for all internal plant purposes.

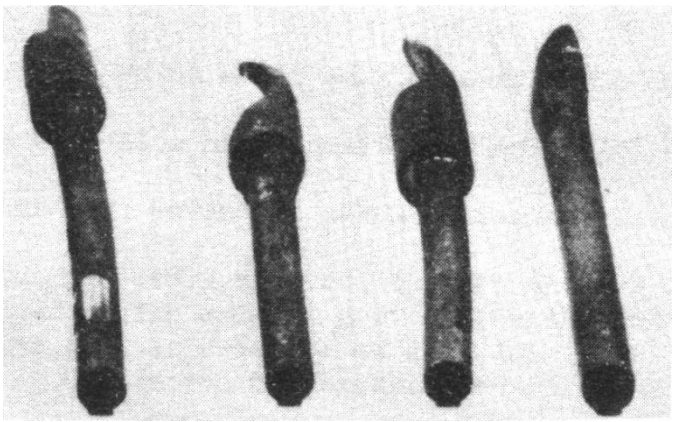
4.2 Flux. The application of heat during soldering tends to oxidise the surfaces to be jointed. Oxidised surfaces are very difficult to solder. To prevent oxidisation, a "flux" is used which either by a corrosive action attacks the oxide as it forms or by a shielding action prevents it from forming.

Non-corrosive fluxes, such as resin, are used for telecommunication purposes. The flux is usually contained in the core of the solder which is known as "resin core" solder. Corrosive fluxes must not be used.

4.3 Advantages of R.C. 65%-35% solder are described in E.I. TEIEPHONE General A 1320.

5. SOLDERING TOOLS.

5.1 Standard Soldering Tool. The 50 volt electric soldering tool (Tool No. 175) is the standard tool for internal plant installation (see Pig. 1).



50 VOLT ELECTRIC SOLDERING TOOL AND ALTERNATIVE BITS.

FIG. 1.

5.2 Other Types of Soldering Tool. In some installations electric power may not be available for soldering. In these circumstances, the copper bolt type soldering tool is used and is heated by the use of a torch or gas oven (see Fig. 2). In certain exchanges 60 volt electric soldering tools (Tool No. 174) are used to suit the voltage of the exchange.

In remote areas, when carrier or R.A.X. installation is done, it may be necessary to use 240V. irons. The 240V. irons must not be used if alternative arrangements can be made.

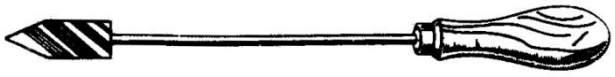


FIG. 2. COPPER BOLT TYPE SOLDERING TOOL.

5.3 General. When using soldering tools, take precautions to see that the tinned face is always clean.

There is fire risk when a petrol torch or blow-lamp is used and extreme care is necessary to prevent lighted fuel from spraying on to inflammable material or equipment.

5.4 Heating Time of Soldering Tools. A 50 volt 100 watt soldering tool equipped with a standard straight bit takes the following heating times:-

(i) To reach 218° C. (temperature at which most soft solders are molten) - 4½ minutes.
(ii) To reach 310° C. (the maximum temperature of this iron and bit) - 19 minutes.

6. POWER SUPPLY FOR ELECTRIC SOLDERING TOOLS.

6.1 Transformers. Arrangements must be made on new installations and large extensions for the provision of transformers to "step down" the commercial supply voltage to 50 volts for electric soldering tools. The transformers must be correctly earthed and protected. Auto transformers must not be used.

6.2 Distributing 50 Volt Supply to Soldering Positions. The 50 volt supply from the transformer must be connected to a distribution block fitted with a number of jacks and located close to the major soldering job. Alternatively, use the 50 volt power distribution busbars during the early stages of the installation to supply 50 volts A.C. to soldering irons. The 50 volt supply from the transformer is wired via a fuse to the busbar system, which must not be connected to the main 50 volt battery. An alarm type fuse must be fitted on each rack to feed each battery jack.

6.3 Type of Connector. All 50 volt electric irons mast be fitted with two-point switchboard plugs.

7. TINNING AND REFACING SOLDERING TOOIS.

7.1 New Soldering Tools. A typical new standard soldering tool is shown in Fig. 3. A new soldering tool is prepared for use as follows -

(1) Clean, with an old file, one side of the tip of the tool for a distance of ⅜" (see Fig. 4).

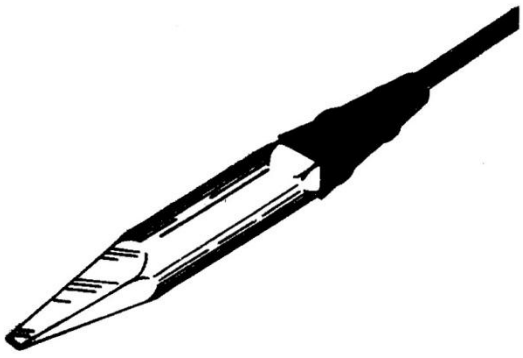


FIG. 3. NEW SOLDERING TOOL

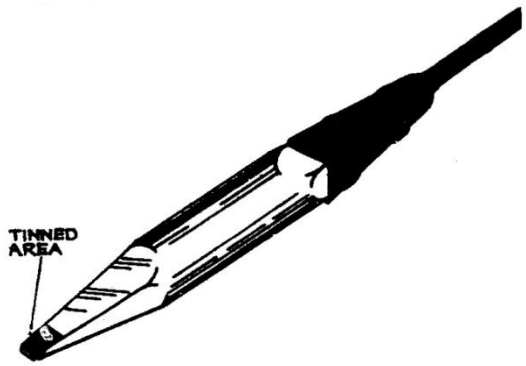


FIG.4. SOLDERING TOOL AFTER "TINNING".

(ii) Heat the tool gradually, applying resin-cored solder to the cleaned part of the tip from time to time. At a temperature just above its melting point, the solder will flow over the prepared area and give a good tinned working surface. It is very difficult to tin a soldering tool satisfactorily if the tool is too hot, because the prepared surface oxidises before the solder can be applied. Fig. 4 shows a tool prepared for soldering wire to tags.

7.2 Refacing a Soldering Tool. With continued use, the tinned part of a tool deteriorates fairly rapidly, particularly if it is used too hot. Usually it becomes hollow and uneven, and the tinning tends to creep over the sides of the tool. It is necessary, therefore, to reface a tool from time to time, and to reshape the bit by one or other of the methods indicated below –

(i) To reface a tool which is in use and hot –

(a) allow it to cool down a little;

(b) smooth off the existing face with a file (the tool is too hot if the new face tarnishes rapidly);

(c) apply resin-cored solder.

Alternatively -

(d) quench the tool in water (to cool and soften it);

(e) reshape the face with a file;

(f) retin the tool, as described in para 7.1.

(ii) Reshaping a soldering tool –

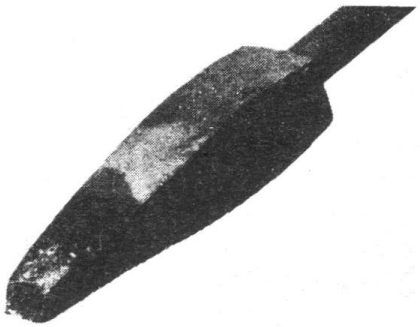
(a) heat the tool until it is red hot, so as to burn of the existing tinning;

(b) hammer it to the required shape whilst it is still hot;

(e) quench in water (to cool and soften it);

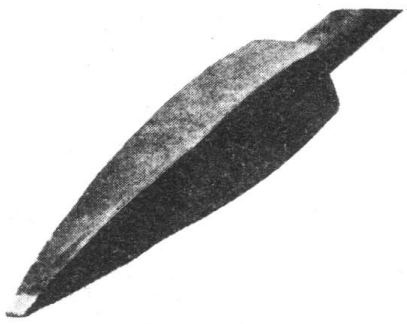
(d) prepare a new face for Ginning as described in papa 7.1.

Fig. 5 shows an early type of soldering tool which is in a bad condition and entirely unsuitable for making good soldered joints. Fig. 6 shows the same tool after reshaping. A good method of controlling the tendency of the solder to creep along the sides of the tool after refacing and while it is still hot is to rub the sides of the tool near the faced surface with an india rubber. It is imperative that soldering be done with a properly tinned soldering tool.



EARLY TYPE SOLDERING TOOL
WITH BADLY WORN FACE

FIG. 5.



EARLY TYPE WORN SOLDERING TOOL
AFTER RESHAPING AND REFACING.

FIG. 6.

END.