

MATERIAL STORAGE AND HANDLING.

This E.I. describes material storage methods and the responsibilities of the Engineering and Technical staff in the receipt, storage and control of internal Plant material.

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1. GENERAL.

1.1 Standard units for storing equipment are described; where suitable storage units exist, however, they must not be replaced immediately, but should be retained until worn out, and then replaced by new items of the standard type.

1.2 For the storage of substation instruments, see E.I. TELEPHONES Substation O 0002.

1.3 Mechanical aids used in the movement, positioning and unpacking of major items of plant are described in E.I. INTERNAL PLANT INSTALLATION Practice H 1010.

1.4 Types of Installation. The methods and units described here are used in :-

(i) Installations in all types of new buildings.

(ii) Extensions and rearrangements in occupied buildings.

In new installations, storage space, convenient to the main installation area, is generally available, but if insufficient, additional storage should be arranged in portable huts on the site.

In extensions to working equipment, the installation staff must operate in part from an Installation Depot but additional accommodation may have to be provided by the use of portable huts on the site or the leasing of premises.

2. RESPONSIBILITY.

2.1 The Supervising Technician or Officer in Charge of an installation will make a member of the installing staff responsible for the receipt, storage, control and issue of all materials delivered to the building for the project. When material is delivered to a project at which the installation staff has not yet arrived, arrangements must be made through the appropriate channels for the senior local technical officer to receive and store the material pending the arrival of the installation staff.

2.2 An officer must be made responsible for the examination of all material handling plant and, if doubtful about its reliability, he must arrange for it to be tested by the appropriate authority.

In addition, he will see that the storing of all material and the disposal of packing and other waste is done without fire risk.

2.3 The creation of dust and other hazards which could cause plant maintenance difficulties must be avoided at all times.

2.4 It may be necessary to accept delivery of material before the start of the work. In such cases, deliveries must be checked for quantity and damage and, where necessary, repacked and stored until required as detailed in this E.I. When storing equipment the safe loading limit of the floor must not be exceeded.

The normal safe loading limit for a floor designed to accommodate standard 10 ft. 6 in. equipment racks is 480 pounds per square foot. Auxiliary rooms not located on the same floor slab are usually only designed for a safe loading limit of 112 pounds per square foot. These limits must not be exceeded when stacking equipment - take particular care when storing cases in tiers.

In buildings not specifically designed for the installation of internal plant, advice of the safe floor load must be sought from the Buildings Branch. In such buildings a notice showing the safe loading limits must be displayed prominently.

2.5 When equipment extensions are done in occupied buildings, the selected officer responsible for the receipt, unpacking and checking, etc., of material must see that action is taken to prevent interference with service activities.

With the co-operation of the service staff, storage and other facilities should be allotted to meet efficiently the needs of both staffs.

2.6 The Officer-in-Charge will be responsible for the disposal of empty packing cases, cable drums, etc., in accordance with approved departmental procedure. He will arrange, where economical, the return to Stores, for onward despatch to the manufacturers, of all items used in cases for the safe packing of material, including rack carriers. These items are generally marked, to this effect, by the manufacturer.

3. PICTURES OF VARIOUS STORAGE METHODS.

3.1 The figures and pictures referred to in the various sections have been grouped together to facilitate the reading of this E.I.

The figure or picture numbers appear in different sections of this E.I. and repetition of the figure is thus avoided.

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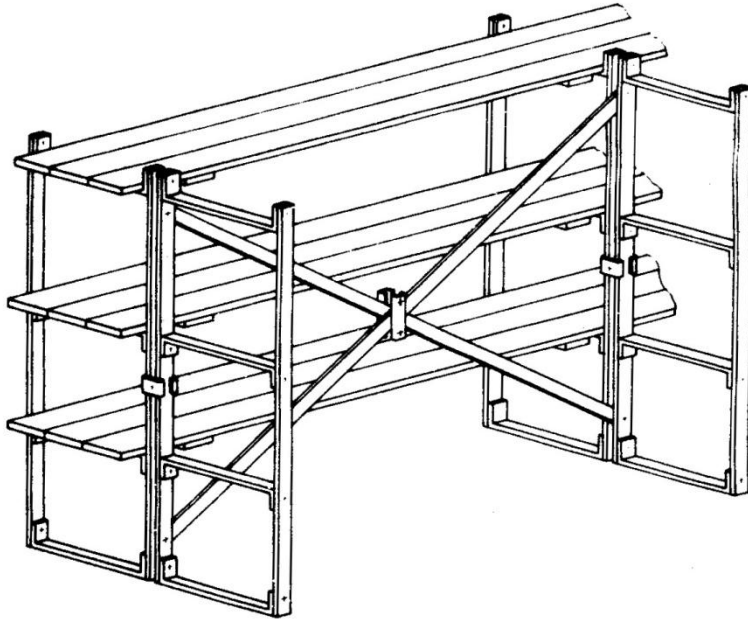


FIG. 1. TYPICAL STORAGE SHELVES.
(Storage of Ironwork)

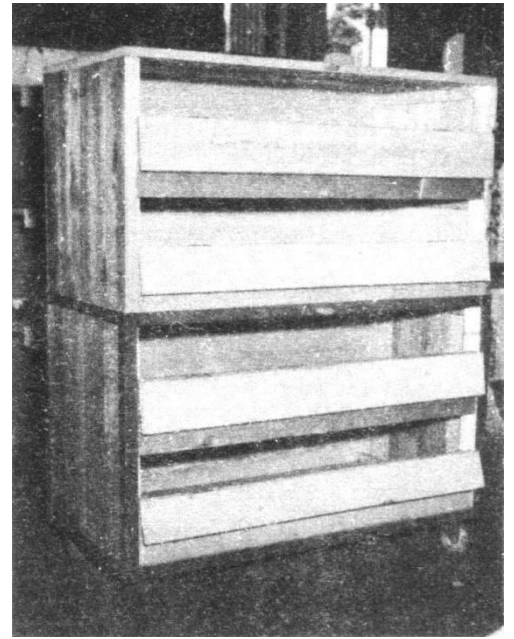


FIG. 2. TYPICAL PORTABLE STORAGE
BIN.
(Note the drop down hinged
doors and ironwork frame)

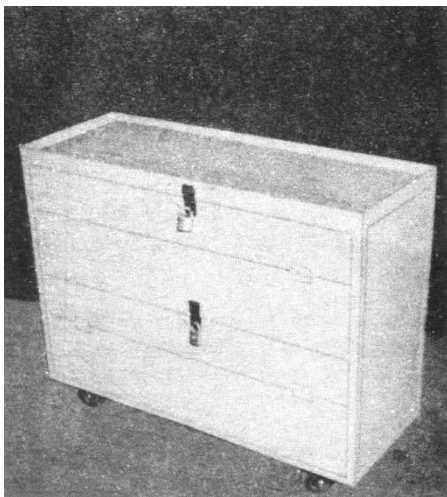


FIG.3 TYPICAL PORTABLE
STORAGE BIN,
FITTED WITH LOCKS.

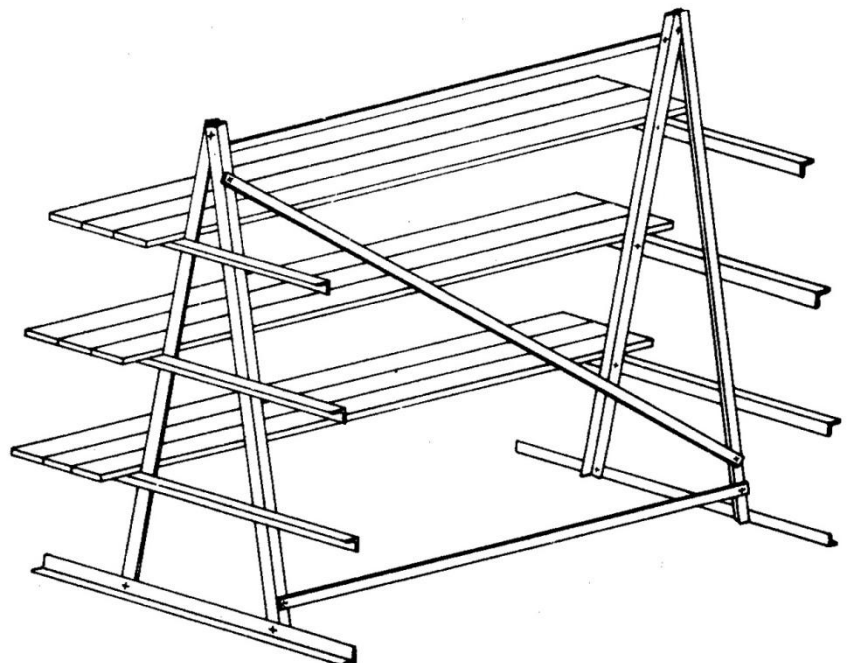


FIG. 4. TYPICAL STORAGE SHELVES - STORAGE OF COPPER.
(To obviate damage during handling)

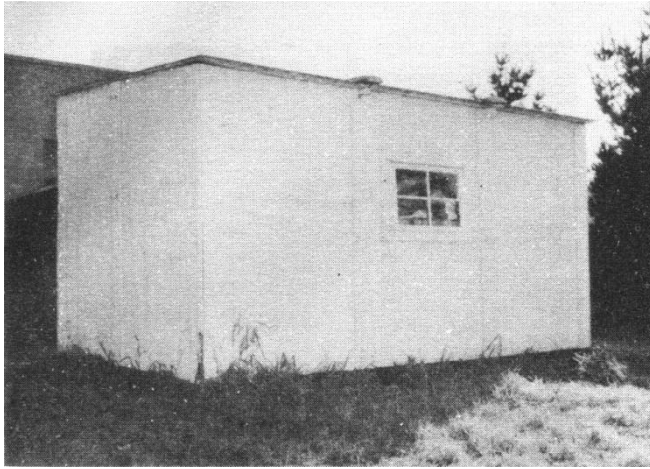


FIG. 5. PORTABLE BUILDING - TEMPORARY
STORAGE UNIT.
(Complete)

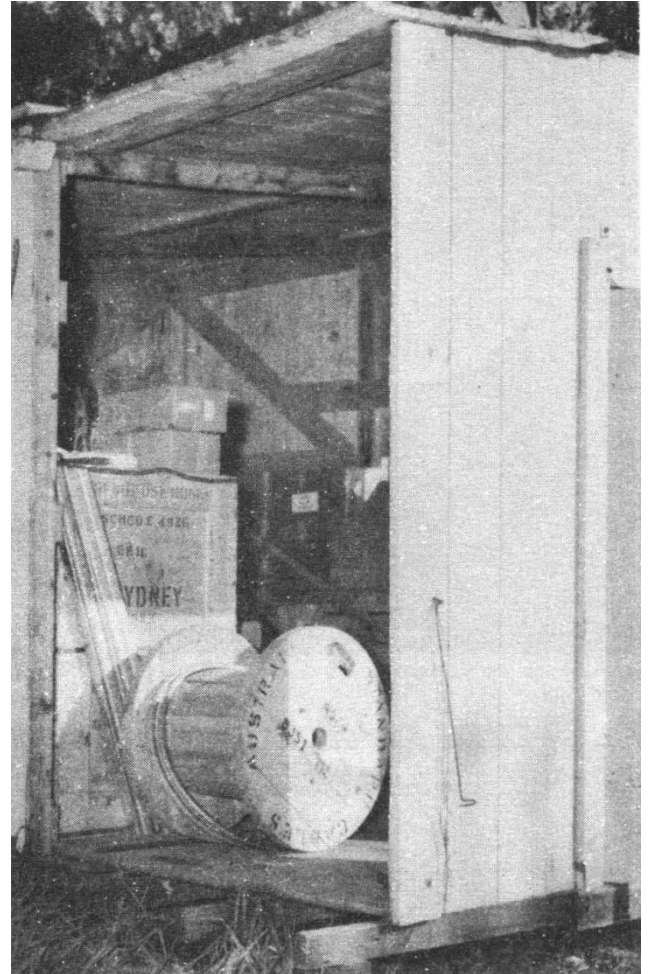


FIG. 6. PORTABLE BUILDING - TEMPORARY
STORAGE UNIT.
(Showing storage method)



FIG. 7. PORTABLE BUILDING - TEMPORARY
STORAGE UNIT.
(Showing Assembly Method)

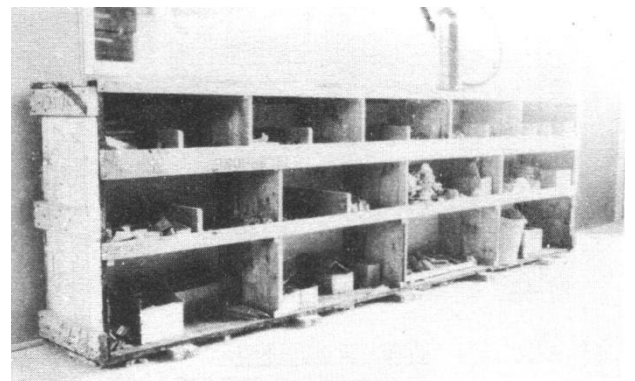


FIG. 8. TEMPOARY WOOD STORAGE BINS.
(Bins of this type must not be
used as a general practice.
They engender untidy storage
methods and waste manpower in
their assembly.)

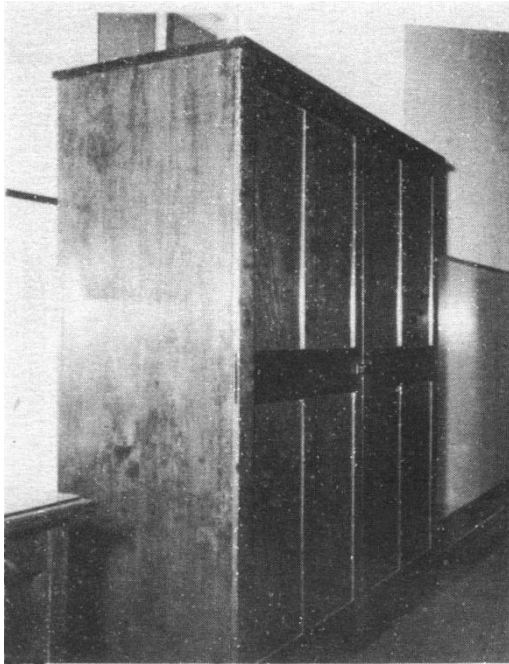


FIG. 9. TYPICAL CLOSED TYPE SMALL
PARTS CABINET.
(Doors Closed)

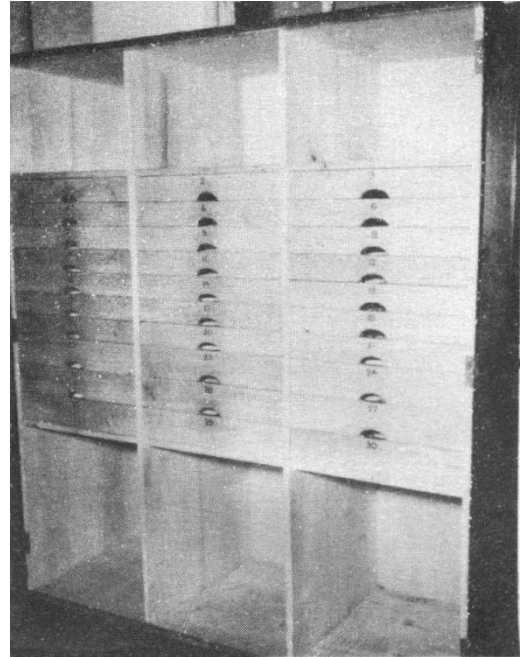


FIG. 10. TYPICAL CLOSED TYPE SMALL
PARTS CABINET.
(Doors Open)

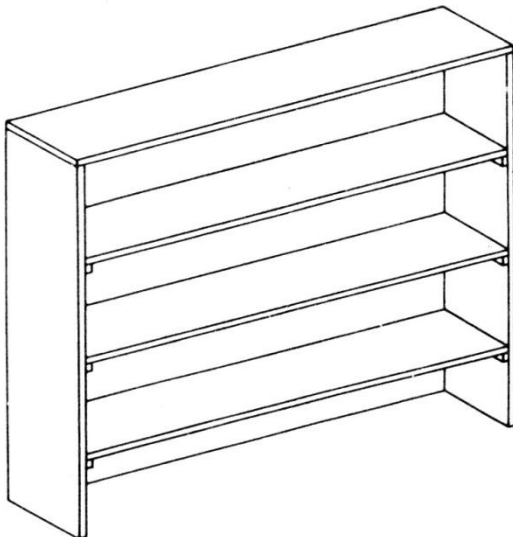


FIG. 11. STORAGE SHELVES.

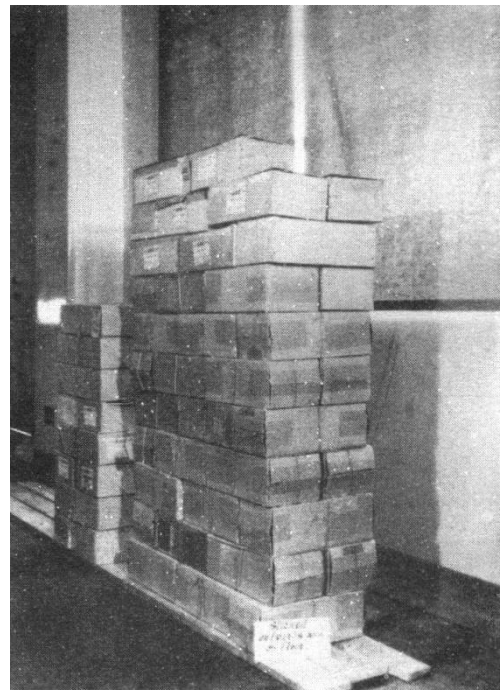


FIG. 12. TYPICAL PIER STORAGE OF
TELEPHONE EQUIPMENT
CARTONS.

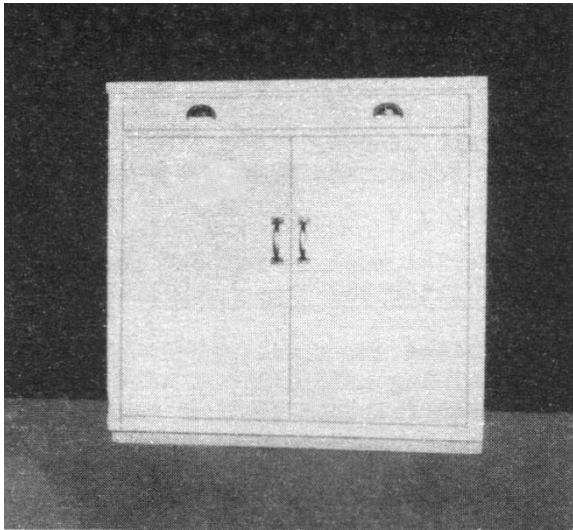


FIG. 13. STORAGE CABINET FOR SPARE
ARMATURES.

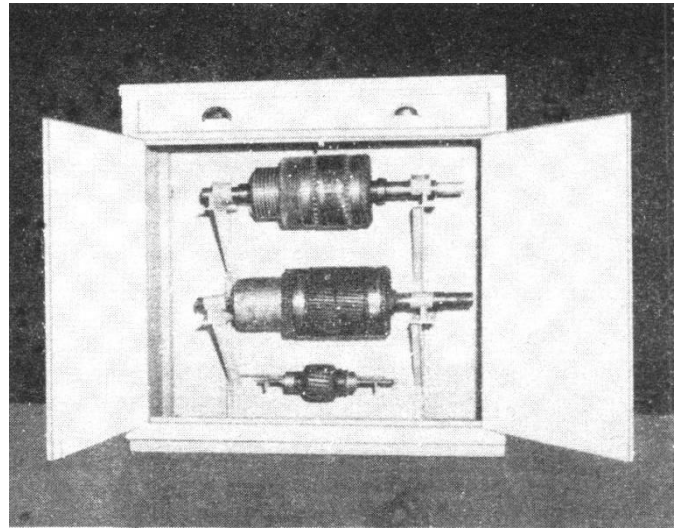


FIG. 14. STORAGE CABINET FOR
SPARE ARMATURE.

(Showing Armatures in Situ)

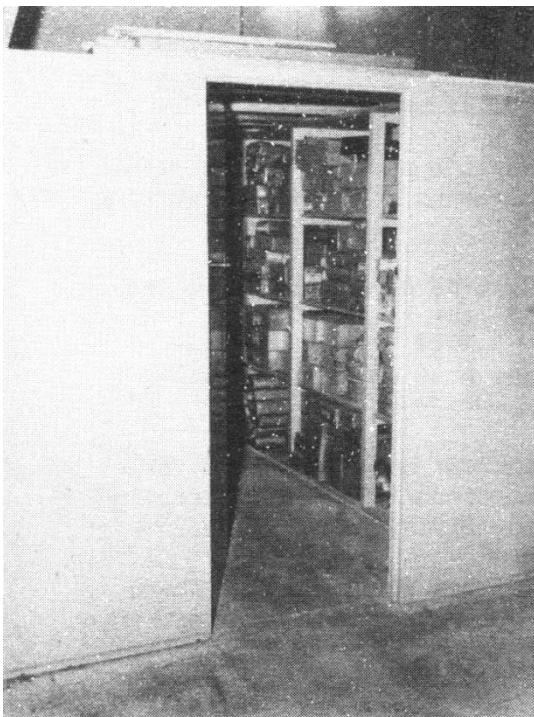


FIG. 15. STORING SMALL ITEMS
IN A LOCKED ROOM.

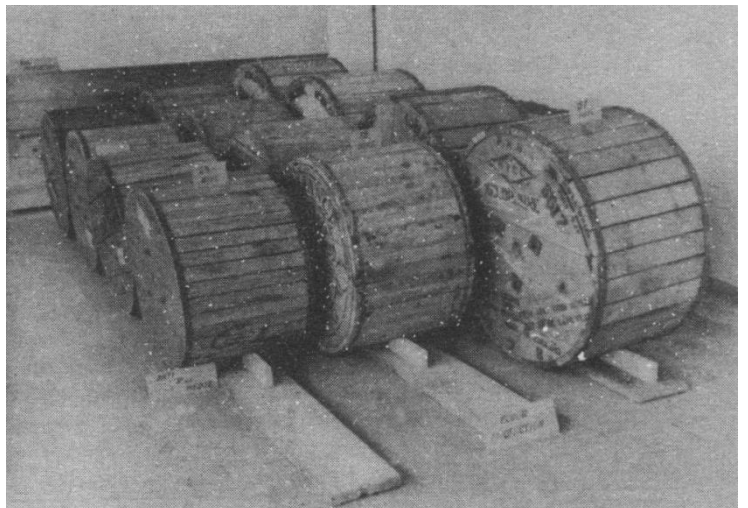


FIG. 16. STORING CABLE DRUMS.

4. RECEIPT OF MATERIAL.

4.1 Unpacking. Cases of material must be unpacked with care to avoid damage to the contents. This is especially necessary when handling cases containing fragile items of equipment. The procedure is:-

- (i) Cases must be opened with suitable case opening appliances. Case piers must not be hammered off. For approved list of tools, see E.I. INTERNAL PLANT INSTALLATION General T 1010.
- (ii) After opening the cases, all surplus packing material must be removed from the unpacking area to waste bins; it must not litter the unpacking area.
- (iii) The material must be carefully removed from the cases and transferred to the selected storage area or bins. When cases containing material are held in the open, action must be taken to protect the material from weather damage.

4.2 Checking and Inspection. All material included in a delivery must be checked against the consignment note, certified correct and signed for by the receiving officer. Every item or package of material contained in cases must be inspected, identified and quantities checked against the delivery invoice. The quantity of each item received must be entered in a material record. A suitable entry must also be made on the material record sheet of the place of storage.

4.3 Damage. Any damage must be immediately reported to the Supervising Technician or Officer-in-Charge who must report it to the Divisional Engineer.

4.4 Material Delivered for Complete Exchanges, etc. Where a complete internal plant installation is supplied by an individual contractor, the delivery of this material may be received in bulk.

Where the installation is to be started at once, the procedure below must be followed:-

- (i) The packing cases containing the superstructure must be unpacked and this material stored adjacent to the area where it will be assembled.
- (ii) The racks must be unpacked and stored either in an open area in a vertical position or in their correct position, the aim being to clear the working area of packing cases and waste material,
- (iii) The remaining items included in the contract must be unpacked and stored as indicated elsewhere in this E.I.

Where the material will not be used at once, its storage must be arranged as in paragraph 2.4 and elsewhere.

4.5 Errors and Omissions. All variations between the consignment note and the material received must be immediately reported to the Supervising Technician or Officer-in-Charge who must check the variation and report it to the Divisional Engineer.

4.6 Testing and Acceptance of Contract Equipment Delivered Direct to Exchange. Where contracts are let for direct supply of automatic exchange equipment to the exchange building, testing and acceptance of the equipment must be done within 90 days of delivery to enable any insurance claims by the Department to be effective.

If the exchange building is not ready for equipment and the material must be stored elsewhere, the testing and acceptance must be done elsewhere within the same period.

5. LOCATION OF MATERIAL.

5.1 Storage Space must be allotted by the responsible officer to permit the safe storage of material.

5.2 Storage Areas are required for:-

Ironwork - overhead, runways, I.D.F., Terminating Bays, Filter Bays and M.D.F.

Racks (Various).

Minor parts used in overhead ironwork assemblies.

Cable.

Jack-mounted and panel equipment.

Power plant.

Power distribution, including busbar and miscellaneous fittings.

Secondary batteries.

Minor items, bulk storage.

Minor items, bin storage.

5.3 Installations in New Buildings. The following space will, in most cases, be available for storage for some period during the installation -

Open areas in equipment rooms outside the area where initial equipment will be erected, provision being made to retain space for free movement of material.

Maintenance store room.

Maintenance rooms (except Supervising Technician's room).

Power Room.

Battery room.

Air conditioning room.

Emergency power room.

Installation work room.

Some details about storing follow.

5.4 Ironwork. Ironwork in long lengths must be stored adjacent to the area in which the overhead structure is to be erected. These items must be stored on the floor in neat bundles so that they can be lifted directly to their final position without changing their orientation. This method will obviate damage to walls or equipment which occurs when long lengths of ironwork are swung around during handling. Long lengths of tie bar and runways can be stored on prefabricated stands similar to those in Fig. 1.

Small parts used in overhead ironwork construction must be stored in portable storage bins (see Fig. 2).

Cable. Cable must be stored on the floor on which the cable will be used. Areas for storing cable will usually be available at one end of the equipment room.

Jack mounted and Panel Equipment. Items packed in cartons must be removed from the outer case and stored in the maintenance store room or the equipment room adjacent to the area in which they will be checked and adjusted. Switches of the same type must be stored together. Loose panels must be unpacked on receipt and either screwed to permanent locations on the racks or stored on shelves, depending on the quantities involved. Portable testing equipment must be stored on shelves until required.

Power Plant. Power plant, including power panels, ringing machines, power rectifiers, generators, etc., must be stored in the power room or in the rooms in which they are to be installed.

Power Distribution Parts. Parts including clamping plates, bolts, nuts, insulating pieces, insulators, etc., will be stored in portable bins (see Figs. 2 and 3).

Busbar must be stored on platforms on the floor, or on prefabricated stands (Fig. 4) in the rooms in which it will be installed. Take special care against theft, damage or distortion.

Secondary Batteries. Containers are usually supplied unpacked and must be stored in two tiers around the battery room walls. Take care not to damage the lead lining and the lead overhang.

Battery Plates and Separators. When delivered in wooden crates, the plates must be removed on delivery, inspected for damage or corrosion and stacked in piles in a dry position. Plates must not be placed directly on the floor but stacked on a wooden base to prevent bending and covered with oiled paper to prevent damage from acids in the timber.

In handling battery plates special precautions must be taken to avoid creating lead peroxide dust which may be injurious to health.

Wood separators must be unpacked immediately, stored in a tank containing acidulated distilled water and must be examined at least twice weekly to see that they are damp. All glass containers and glass fittings must be retained in cases until required, to minimise breakages.

Minor Items Storage. Small parts, such as supervisory alarm lamps, jack strips, designation plates, miscellaneous relay parts, etc., must be stored in the maintenance room or spare parts cabinet on suitably labelled shelves, or in drawers. Items of commercial value, such as nuts, bolts, screws, solder, etc., should be stored in mobile storage bins fitted with lock and key.

- 5.5 Extensions in Occupied Buildings. Where space available for storage is limited, the principles mentioned previously in this Section should be followed. However, when necessary, portable huts (Figs. 5, 6 and 7), leased premises and nearby installation depots should be used to obtain maximum efficiency in the receipt, storage and issue of material.

6. STORAGE UNITS.

- 6.1 This Section describes the various types of storage units or methods for -

- Storage in bins, portable and fixed.
- Storage on Shelves.
- Storage on piers.
- Storage in service rooms and open areas.

These storage items may comprise -

- Manufactured steel bins.
- Prefabricated steel bins.
- Standard storage bins units.
- Wood bins made on the job.

- 6.2 Typical Storage Units are shown in Figs. in Section 3. These are typical only. Suitable bins will be used by installation groups in all States and should be transferred from job to job.

It is especially emphasised that existing bins are not to be replaced until they are beyond further repair.

The bins in Figs. 2 and 3 - made out of packing case timber - have been designed for moving around the installation and to carry the assembly items used for the overhead ironwork and power distribution systems. This type of bin prevents the scoring of the floor surface as it acts as a storage unit where the work is being done. The random storage of small metal fittings, for ironwork and power distribution, on the floor results damage to floor coverings. Portable storage units must be included as a standard installation kit item.

- 6.3 Storage Bins are used for bulk storage of small irregularly-shaped items of equipment. Typical items are various fixing details (bolts, screws and plugging material), tie bar fittings, busbar clamps, insulators, brackets and fittings.

Bins fitted with drawers are used for fragile material, miscellaneous spare parts and minor installation parts.

- 6.4 Shelving of the general type in Fig. 11 must be used for such items as terminal blocks, jack strips, fuse mountings, protectors, etc. Such shelving should generally be of commercial manufacture.

- 6.5 Pier Storage, in Fig. 12 must be used for items in cartons, such as relay sets, bi-motional switches, etc., when -

- (i) equipment is supplied as a complete installation;
- (ii) equipment is delivered from a central adjustment depot and awaits rack mounting;
- (iii) switches are delivered for examination.

This equipment must be in properly sealed dustproof cartons.

Pier storage can also be used for other items, such as cable in coils, where protection from moisture is essential.

Storage must be arranged as described in Section 7 to permit the full circulation of air around the equipment.

- 6.6 Power Plant. A storage unit and combined writing desk, as in Figs. 13 and 14 should be supplied for the storage of spare motor generator armatures, bearings, oil rings, etc., and power room records.

The Engineer, when inspecting building sketch plans, must see, where possible, that provision has been made for a "built-in" unit for this purpose.

The storage of battery room maintenance parts is covered in E.I. POWER PLANT Batteries B 3110.

- 6.7 Service Rooms. The Service Section storeroom must be reserved for that section but may be used to house small items of equipment until a late stage in the installation (see Fig. 15).

7. STORAGE METHODS.

7.1 This section describes the storage method for items, depending on size, shape, risk of theft or fire, quantity to be stored and possibility of damage by weather and dampness.

7.2 Small Items. Screws, small fittings and fuses are best stored in drawer or bin type units. Only one type of item should be located in any one drawer or bin unless the items are in small labelled packages. The items must be arranged in convenient order and each clearly designated. Items of considerable commercial value must always be under lock and key.

7.3 Medium Sized Items, including reels or coils of wire, panels and electron tubes, which are of regular shape, must be stacked on shelves. If several types of item are stored on one shelf, they should be separated and designated. The heavier items should be located on lower shelves. To conserve space, neatness in stacking is essential.

7.4 Large and Heavy Items, such as cable drums and ironwork, which cannot be stored in shelf or bin units, are most conveniently stored in stacks. Separate stacks must be used for each type of item unless a small quantity only is involved. Adequate space must be left between stacks so that additions and withdrawals can be made. Any items which could be damaged by dampness, or which sweat when in contact with a concrete floor, must be separated from the floor surface by timber battens or piers; equipment must not be stacked against walls. (See Fig. 12.)

Where it is necessary, due to limited accommodation, to store the material in a yard, protection should be provided by means of tarpaulins or temporary roofing. Ironwork should be painted to prevent deterioration due to rusting.

Heavy items, such as cable drums, must be stacked on the roll edge and chocked to prevent movement. They should not be stacked on each other unless this is absolutely necessary and, when this is done, special safety precautions must be taken. They should also be stored so that a clear run is available for measuring the longest lengths required or so that they can be readily moved to a position where the cable can be measured. Drums must be placed so that similar sizes of cable are together and placed back to back with an aisle between rows (see Fig. 16).

7.5 Scrap and Recovered Material. Scrap packing material must be placed in heaps in the yard and separated from other material to reduce fire risks. Installation waste or litter must be regularly burnt in an incinerator to maintain neat and tidy sites. Some types of packing cases and cradles are returnable to store immediately after the equipment is unpacked, and must be returned and not stored in the open.

In some instances it may not be economical to return packing cases to the Stores Branch, for example, from distant country centres. In these cases the responsible Engineer must advise regarding methods of disposal.

All scrap items of material which can be sold readily must be stored in special bins and adequate precautions taken to prevent theft. The disposal of scrap can only be arranged on the Divisional Engineer's authority.

7.6 Inflammable Material. Special attention must be given to the bulk storage of material, such as cotton waste and inflammable liquids. These must be stored under a locked external shelter, marked "Inflammable" and brought into the main building in small quantities only, as required for use. Inflammable liquids must be stored well clear of other material, and inflammable scrap material must be stored in fire resistant bins adjacent to fire extinguishers.

To minimise fire risk, only small quantities of inflammable material may be stored in the main building, and then only in specially selected locations.

7.7 Solvents. Synthetic tiles can be damaged by turpentine, carbon-tetrachloride, etc. Storage of any such solvents must be arranged to avoid direct contact with the floor coverings. Pure turpentine must on no account be brought into any exchange building see E.I. TELEPHONE General M 0200.

END.