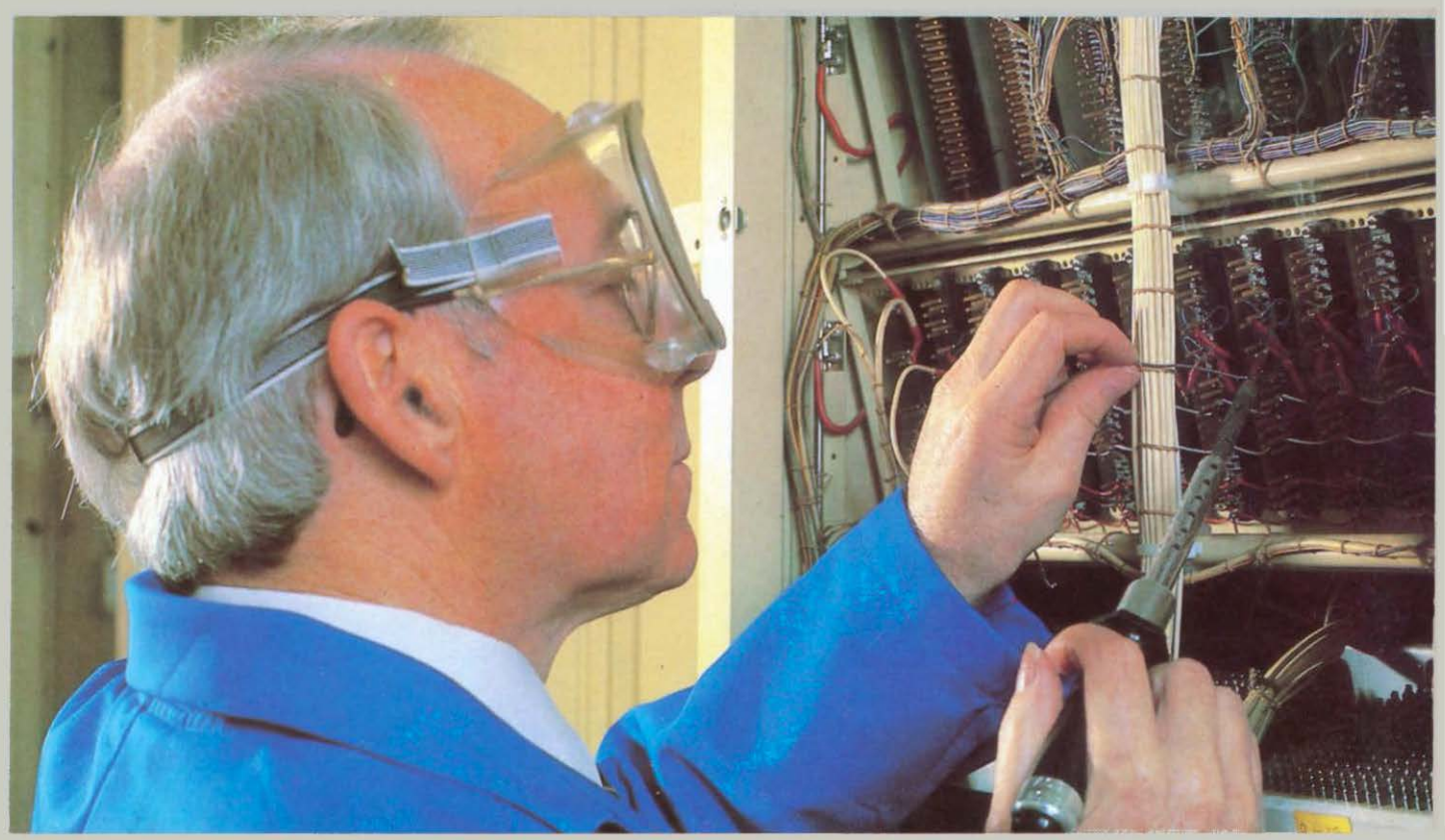
esg 3



Precautions for internal work

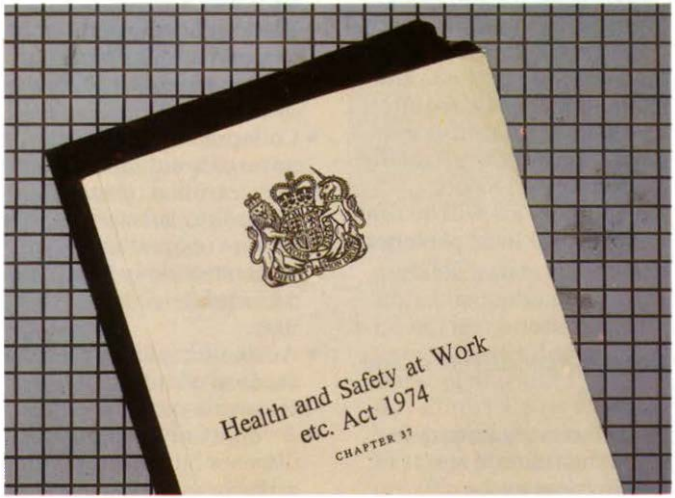
Within BT, there are a wide variety of instruction types and it would be difficult to quote all types on each subject page. Throughout this ESG, therefore, we have employed a simple reference system eg [4]. This means you should turn to page 62 and look at line 4 of the table.

Contents

Introduction

This guide is written for internal staff working in BT operational buildings and in customers premises. You may believe that the environment in which the internal work is carried out is not as hazardous as that for external staff. However, the potential for serious accidents does exist and it is essential to follow safety instructions faithfully.

Please keep this safety guide handy. Read it thoroughly and digest it, but do bear in mind that, like the other Safety Guides, it cannot cover every detail, for which it is necessary to consult the various sources of official instruction listed.



This booklet is one of a series of Safety Guides. Every officer in the Engineering and Technical Grades is supplied with, and signs for, a personal copy of each Guide relevant to his duties. [1]

Please remember that, although many of the rules are those of BT, a significant number reflect requirements laid down in Statute. In other words, some rules are there because they are part of the law of the land. You also have general duties under the Health and Safety at Work etc. Act 1974 to protect, not only other people, but yourself as well. Consequently, it is possible for you to be both the injured party and to suffer the indignity of prosecution. It's worth thinking about.

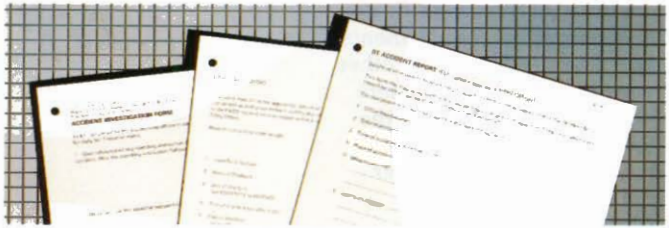
In any event, prevention is better than cure. [2]

Reporting accidents

Injuries

Whilst everyone hopes that accidents will not occur, it is probable that some of you will sustain injury at work.

When accidents occur, it is essential to fill in certain forms. In brief, the procedure is as follows:



- An entry must be made in the Accident Book.
- A Form A1559 must be completed by the injured person unless they are unable to do so, in which case, it may be done by another person.
- The supervising officer must complete a Form A1560.
- The supervising officer must complete a Form A1561 whenever an injured person is absent from duty for one hour or more because of the accident.
- The forms must be sent to the local personnel unit within four working days of the accident. [3]

Some diseases and some injuries are so serious (involving loss of sight, fractures, amputations and death) that the law requires them to be reported to the enforcing authority (usually the Health and Safety Executive). This will be dealt with by your local personnel unit. [4]

Dangerous occurrences and diseases

Whether or not injury is sustained, certain occurrences and work related diseases have, by law, to be reported to the Health and Safety Executive. We cannot list all the circumstances here but the list includes:

- Collapse of hoists, lifts and scaffolds.
- Failure of pressure vessels.
- Explosion or fire resulting in the cessation of normal work for more than 24 hours.
- Electrical explosions and/or fire if the equipment is out of service for 24 hours or more.
- Collapse of 5 tonnes or more of building structure.
- Uncontrolled release of hazardous substances.
- Failure of breathing apparatus likely to present a hazard to health of the user.
- Acute ill-health requiring medical attention due to toxic substances.
- A variety of work related diseases including asbestosis. [4]

Housekeeping reminders

They say that cleanliness is next to godliness but in this business it is essential for safety. A few reminders:

- Do not drop wire ends or bits of insulation under foot. Put scrap wire in the bins provided.
- Keep your work bench tidy.
- Do not leave leads trailing as they may trip someone.
- Mobile and other portable testers should be returned to the maintenance storage area when not in use.
- Return steps to their proper storage point when not in use.
- Do not leave tools, small testers and other equipment under foot or on the treads of steps and ladders.
- When visiting premises, co-operate with the local staff in keeping stores and temporary stores ship shape.
- Where possible, small portable testers should be stored in cupboards.
- Do not leave portable testers unattended on steps, platforms or travelling ladders without being properly secured. Brackets Mounting DA provide support on travelling ladders.
- Never leave an unguarded soldering iron. Always put it in its appropriate rest and unplug it as soon as possible.
- Belts Pocket are a useful aid to tidiness.

Everyday matters

Working position

Internal work is prone to situations which involve working in cramped places. You are therefore reminded of general advice on the subject:

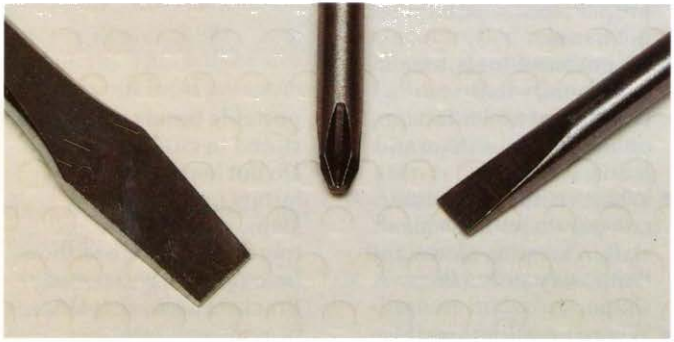
- Avoid creating situations requiring anyone to work in cramped conditions.
- If you have to work in cramped confines, be sure to relieve the strain frequently, eg by changing position.
- Keep any awkward manoeuvres slow and deliberate.
- Do not get up from a low level with a sudden twisting movement. Straighten up first and then turn in two steady and deliberate movements.

Hand tools

Look after your work tools so that they stay in first class condition. This will not only make jobs easier but will make them safer as well. For example, you would be asking for trouble if you were to use a blunt knife or a screwdriver with a split handle.

Exchange any tools that are damaged or worn beyond repair and always use the proper tool for the job.

Mis-use of handtools is one of the most common causes of accidents. [5]

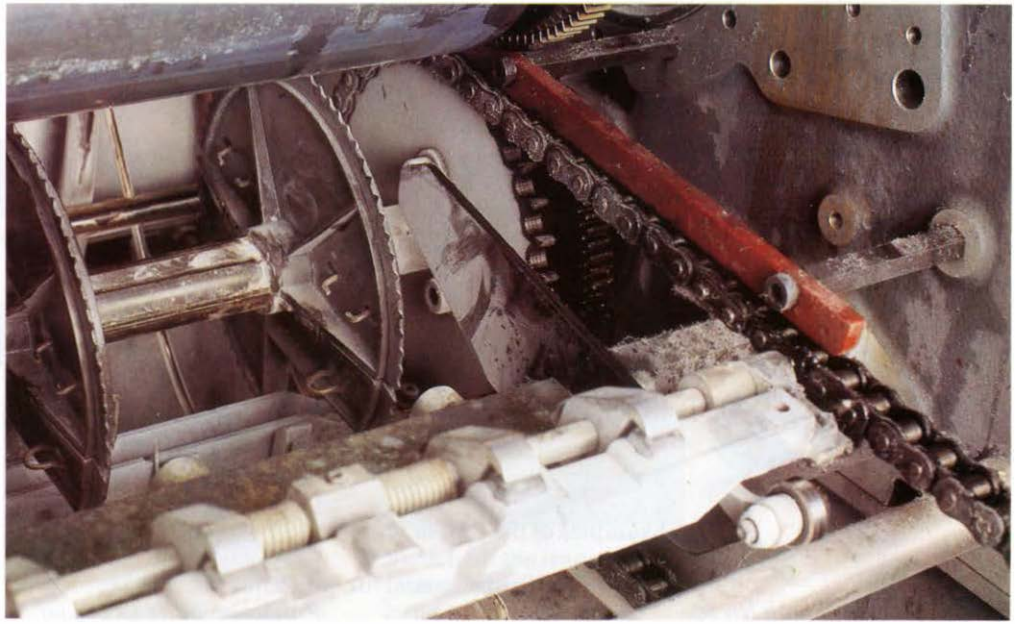


Machinery

Although machinery must, by law, be guarded, there are, inevitably, some parts to which access is essential. It is, therefore, important to keep clear of moving machinery whenever possible.

For those who have to work on machinery:

- Keep all loose clothing safe by wearing overalls. Do not wear a tie.
- If you have long hair, make it safe by tying it back or by using a special cap.
- Do not carry out work on moving parts unless **Absolutely Essential** – horrific accidents occur every year in industry through this. If you are authorised to operate machinery with its guards removed and interlocks overridden, ensure the emergncy stop is within easy reach or is manned by an assistant.
- If such work is essential (it should be a most rare occurrence) do not work on a machine until you have ensured that it cannot start automatically or be started by someone else. Typically, you might padlock an electrical isolator in the OFF position and/or disconnect the hydraulic starting system. [6]



Strippers cable coaxial No 3

Strippers cable sheath No 8

Strippers cable sheath No 10

Stripping cable

Use the proper tools and prescribed methods whenever possible but if the use of a knife is unavoidable, keep hands behind the cutting edge and away from the body.

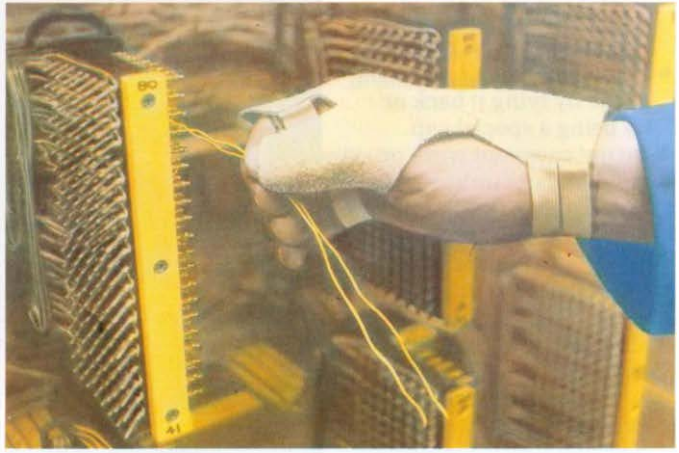
Examples of the proper tools are:

- Strippers Cable Coaxial for Coaxial Cable.
- Strippers Cable Sheath Nos. 7, 8 and 9 to remove the outer sheathing of internal cable.
- Strippers Cable Sheath No. 10 to remove the outer sheathing of flat cable.

Running jumpers

Full information on safe working and jumpering is given in BT instructions. In brief they are as follows:

- Wear Protectors, Hand.
- Do not pull and tug hard to recover. Trace and free.
- Bend over ends of unterminated wires temporarily.
- Re-wind spare wire onto coil after use and bend over free end.



Protectors hand in use.

- Do not trail wire under foot.
- Consign scrap wire straight to the scrap bins.
- Wear Eye Shields No 5 or No 3.
- Do not drop bits of insulation and wire ends under foot. Collect and secure scrap as each wire is terminated.

Soldering

Only low voltage soldering irons should be used. Carelessness with hot irons remains a prevalent source of burn injuries and present a degree of fire risk. Keep these points firmly in mind:

- Do not switch on a soldering iron until just before you are ready to use it.
- Do not park a soldering iron where it may be a risk to the unwary.
- Position a piece of card below the work area to catch any solder splashes.
- Never flick surplus solder off the iron. Wipe it off with a rag or sponge material when provided.

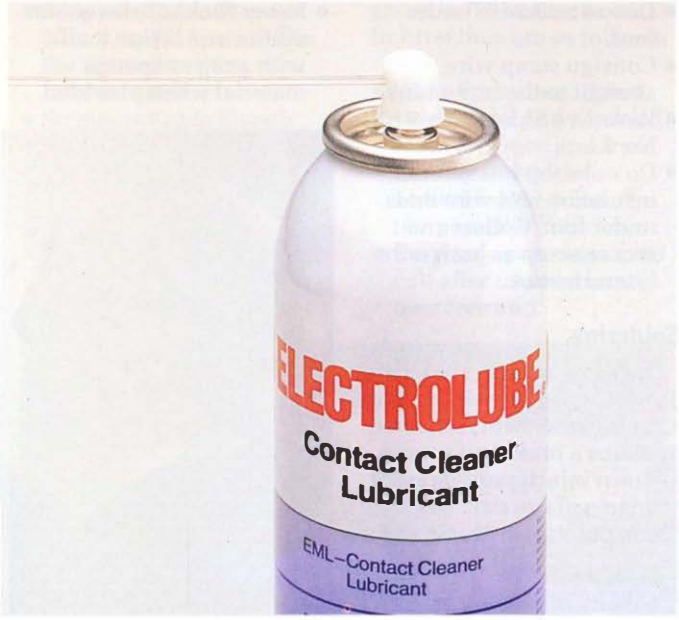
- Ensure adequate ventilation when soldering wire with PTFE insulation.
- Try to solder below eye level if possible.
- Wear Eyeshields No 5 as the minimum protection.
- Switch off the iron immediately the task at hand is finished.

Trailing leads

Trailing leads can all too easily form a tripping hazard. Remember these rules:

- Keep leads close to the rack and wall on which equipment is being used.
- Cross gangways by routing cables overhead where possible but do not foul travelling ladders.

- Where a lead must intrude at low level, mark it with hazard warning tape or a guard.



Acoustic shock

Sudden exposure to excessively high sound levels can damage hearing. Check that no-one is listening on the line before you apply a high level tone.

Aerosols

Use only approved aerosols. Remember, that some aerosol sprays are not only hazardous to health but can cause permanent damage to equipment.

Hazard rooms

Certain rooms contain equipment which is potentially dangerous. Such rooms are designated as Hazard Rooms – for obvious reasons. Examples are hv sub-stations, engine rooms, lift motor rooms, refrigeration plant rooms and it is the aim to restrict access to authorised staff. A hazard room is readily recognisable from the warning notice posted on the door. It must be kept locked when unoccupied.

Keep out unless you are authorised to be there. [9]

Store rooms

- Make every effort to keep store rooms tidy.
- Keep gangways clear.
- Do not treat store rooms as rooms for junk.
- Do not obstruct use of access equipment.
- Do not climb up stores racking. Use the proper equipment.
- Keep heavy stores to lower shelves.
- Never obstruct an emergency escape route.
- NEVER use a cable chamber as a store.
- Do not leave stores in a battery room or use a cable loft.

Cabling lofts

- Access to cabling lofts is restricted to authorised staff.
- It is advisable to notify another person of your whereabouts before entering.
- Climb access ladders unencumbered. Use a lift line to hoist tools up into the loft.
- Keep entrances and exits clear of obstruction. Do not use a cable loft as a store.
- Before entering, switch on all lights. Do not work with inadequate lighting. Have faulty lights repaired immediately.
- Do not stand or walk on ceiling joists. Use walkways provided. Where, exceptionally, walkways are blocked with cables, place temporary boards over the cables but be sure that they do not overhang so as to constitute a tilting hazard. Always wear a safety helmet when working in a loft. 10

Cabling

Always use the correct access equipment to cable runways or cable grids. Do not use short steps and create a risk of over-reaching. Do not work from the top tread of steps.

The Ladder Extension Number 6A is designed specifically for access to

cable grids and should be used whenever possible.

It should not normally be necessary to climb up on to overhead racking to run cables. However, where this is unavoidable, use crawling boards to move about.

Keep clear of bus-bars and avoid drawing cables over bus-bars as this action may damage the insulation.

Be sure to maintain a good standard of housekeeping:

- Remember the general advice on page 3
- Position cable drums to cause a minimum obstruction. Guard as necessary.
- Remove cable drum battens and packing materials to the designated storage area.
- Be sure to remove any nails from battens and drum flanges as each batten is removed.
- Do not trail cables so as to form a tripping hazard. Tidy ends of newly run cables back to the racks out of the way.

Chart holders

Always restore chart holders to their stowed position flat against the rack after use. Old style chart holders which are left projecting are a source of head injury to the unwary. Even the plastic bracket of the newer style item can catch someone awkwardly.

Apparatus covers

Dealing with apparatus covers that have been removed is largely a matter of commonsense and good housekeeping. Some specific points on such covers are as follows:

- When replacing a cover, make sure that it is properly seated and locked into position.

- Where there are facilities for parking a cover that has been removed, make sure it is secure in the parked position.
- Place other covers that have been removed in a safe position, eg tidily behind the rack guard rail. **TXK magnetic shelf covers must never be stacked onto other covers.**

- Where large numbers of covers are removed simultaneously, take them to a suitable, safe guarded area away from working operations.
- Do not balance a loose cover on the tread of steps or a travelling ladder.

- Do not leave drop-front covers projecting into gangways.
- Replace fuse mounting covers immediately work on the fuse mounting is finished.

Circuit cards and outriggers

Do not leave circuit cards or outriggers projecting without suitable guarding and never use one on an optical fibre system. [11]

Coaxial systems

Anyone responsible for transmission equipment associated with coaxial cable routes must be conversant with BT instructions and, in the case of cables carrying power, with the separate instructions for the particular route in question.

Only the authorised maintenance officer for the station concerned is permitted to switch off the power except in an emergency and under certain circumstances involving construction, installation and acceptance testing.

With hv and mv power fed systems (other than systems on the 60MHz route) power must be disconnected **before** the cable is opened. The officer disconnecting the power must give the officer-in-charge of the jointers the correct token(s) released when power is switched off to confirm that the power is off. Verbal and written assurances are not acceptable.

Low voltage power feeding systems and systems on the 60MHz route are designed to be safe. Even so, power must be disconnected from the coaxial pairs to be worked on BEFORE work starts on these pairs. Work on only one pair at a time. [12]

Optical fibre system equipment

Some optical fibre systems are entirely safe and are designed as such. Those not designated as safe systems are controlled by a system of work which ensures the power is removed before the optical path is broken. Ensure you comply with the requirements of the instructions.

Never use an outrigger on optical fibre systems [11]

Submarine cable terminals

Personnel concerned must be thoroughly conversant with the power safety procedures set out in BT instructions and with the cable system switching procedures. [13]

Radio stations

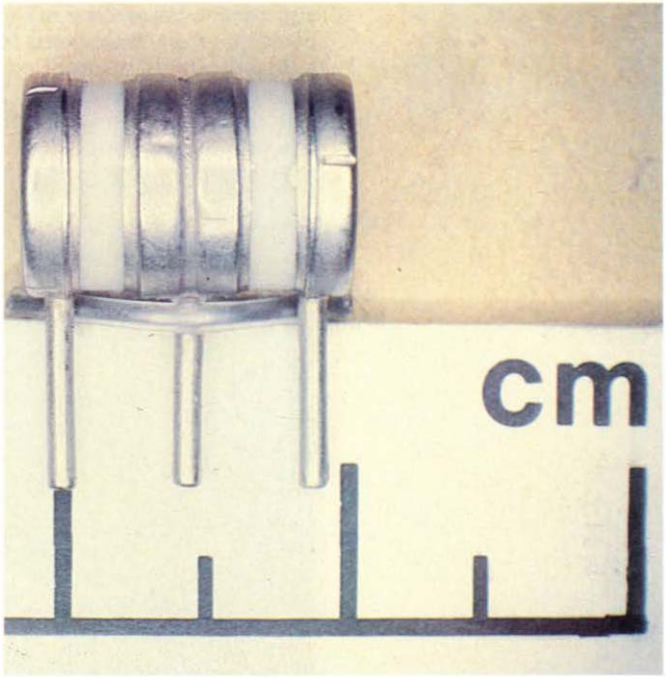
If your duties require you to work in a radio station, you should have a copy of ESG9 in your possession and be fully conversant with its contents. [14]

Line and power contacts

Traditional standards used in BT have prevented all but a few contacts with mains supplies. When a contact does occur, however, or is suspected of having occurred:

- Inform the RSC.
- Wear Gloves IR.
- Use correct extractor to remove the fuse.
- Take care not to earth the extractors.
- Display a warning notice on the fuse mounting.
- Wait for the RSC to give a 'clear' before removing the warning notice.
- Ensure the Safety Officer is informed.

Note: Gloves IR should be kept readily available near each MDF. Remember that the plastic coating on handles of Pliers Wiring and similar tools is there for comfort and is not intended for electrical insulation. [15]



Protector 14A showing short circuit facility.

New equipment

Generally, careful attention is given, at its design stage, to the safety aspects of new equipment. However, problems sometimes come to light and should be reported. If the problem represents a serious safety hazard, report it to your supervising officer and ensure your Safety Officer is informed. [61]

Lifts

Always use lifts sensibly. For example:

- Never use a lift when a fire alarm is sounding.
- Never overload a lift.

Do not put your hand through the gates.

- Never put your arm between closing doors.
- Never put your arm through a lattice gate.
- Do not ride in service lifts.
- Never interfere with an out-of-service lift.
- When leaving a lift, be prepared for floor level differences.
- If the lift stops between floors, do not panic. Just follow the instructions in the lift ie press the alarm button or telephone the emergency number. UNDER NO CIRCUMSTANCES attempt to leave the lift until instructed by a fireman or other authorised personnel.

If you repair lifts, it is particularly important that you do not take short cuts:

- Always ensure safety signs are properly placed. [17]
- Remember that lifts are large machines (see page 5) and ensure you comply with BT instructions. [18]

For your personal protection

A range of personal protection equipment is available to protect you from injury. Make sure you have the equipment proper to your official duties and that you wear it, not only when instructions specifically require it, but if you believe there is any risk of injury whatsoever.

Also, it is good sense to make use of the OFFICIAL protection equipment for any OFF-DUTY tasks which might involve risk of injury.

Always keep your equipment in good order and change it if you are in any doubt at all about its condition.

There are certain circumstances where the use of personal protection equipment is obligatory or particularly important. The circumstances applying to internal work are summarised in the following pages.

Head protection

Safety helmets

You must wear a safety helmet in the following circumstances:

- Work in a lift shaft.
- Operations with hoists.
- Work with suspended loads.
- Work near cranes, lifting beams etc.
- On building and construction sites

Scalp protector.

- On some internal construction work, especially rack erection.
- Work in lofts.
- Work above false ceilings.
- Work under floors.
- Where there is other significant risk of head injury.

Do not use a safety helmet in place of a motorcycle helmet – it does not meet legal requirements and will not give you the necessary protection.

Scalp protectors

A scalp protector is not an alternative to a safety helmet. It will not protect you from falling objects but may be used in preference to a safety helmet where the sole risk is from bumps and grazes from stationary objects eg when working under vehicles. [19]

Eye protection

Eyeshields

Most circumstances requiring obligatory use of eye protection arise from specific legal requirements ie it is required by law. Others reflect known risks. It is your duty to comply in either case and so no distinction is made in the following list.

Eyeshields No 3 must be used for:

- Using a high speed metal saw.
- Cutting holes in bricks, masonry etc.
- Plugging operations.
- Drilling overhead.
- Using hammer drills.
- Using compressed air to remove swarf etc (an operation to avoid where practicable).
- Using cartridge tools (eg plug firing guns).
- Chipping or wire brushing paint, scale, rust etc.
- Working on hv oil circuit breakers.
- Changing main power distribution circuit fuses.
- Using aerosol sprays.
- Manipulating battery acid, alkali and corrosives and for all work with secondary cells use No. 3A

Eye shields No 3 over glasses

Eyeshields No 5 is the minimum protection YOU MUST WEAR for:

- Work with abrasive wheels.
- Machining metals.
- Striking one metal tool with another.
- Striking masonry nails.
- Cutting or knocking out cold rivets, bolts, etc.
- Handling, coiling or cutting springy wire (including lift ropes).
- Cutting wire or metal strapping under tension.
- Removing kiosk glass.
- Using tools at or above eye level.
- Jumpering, wiring, soldering.
- Using power wrapping tools.
- Working on or very close to bare, live dc busbars.
- Changing alarm type fuses.

NOTE: Eyeshields No 3 should always be worn in dusty atmospheres or where conditions may cause particles to fly ie shrink wrapping of equipment racks, general equipment recovery work and windy conditions.

If you wear ordinary spectacles, you must wear Eyeshields No 3 for risks other than very light impacts.

If you wear industrial spectacles, you must supplement them by Eyeshields No 3 where obligatory use is required. 20

Keep a dispenser of demisting solution handy for use with Eyeshields No 3.

Welding

Welders must use Goggles No 3 for gas welding and an approved welding shield for electrical welding.

Lasers

Special precautions may be necessary to protect the eyes when working in the vicinity of lasers used for such operations as floor alignment. See page 24. 21 22

Hand protection

Be sure to wear the correct gloves for the job. Examples for internal work are:–

- Protectors Hand – wiring tag blocks.
- Gloves Battery Man – for work on secondary cells.

Gloves Leather No. 2.

- Gloves Leather No 1 – removing broken glass.
- Gloves Leather No 2 – handling apparatus racks and other heavy gear.
- Gloves IR – isolating suspect contacts with mains power.

- Gauntlets IR – work on high voltage apparatus (strictly as a secondary protection).

If rings cannot be removed from fingers, wear appropriate gloves or tape them over, especially before jumpering or working on power supply circuits. Also, cover or remove watches and jewellery. [23]

Hearing protection

Protectors Ear No 1A, or where special circumstances demand, a suitable alternative, should be worn where noise levels may be excessive. Examples are:

- Working in an engine room with the engine running.
- In locations and conditions indicated by safety signs.
- In locations identified as being excessively noisy.
- Where a suspect situation is still under investigation.
- When using a percussion drill in confined spaces.
- When using cartridge-operated tools. [24]

Respiratory protection

BT provide three main types at present

Respirator No. 1A

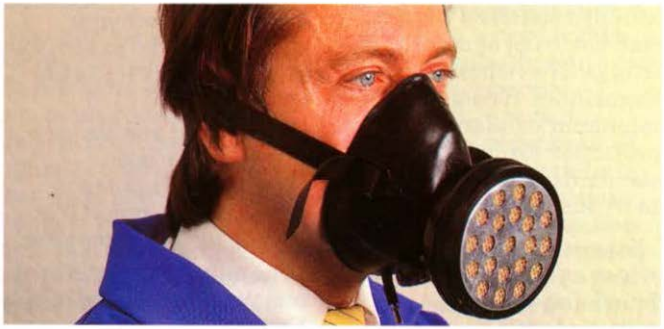
This is a half mask (ori-nasal) respirator with pneumatic face seal and a single, replaceable filter. It should be held on a personal basis by those whose duties require them to work in dusty places. Its use for asbestos work is strictly limited to short term removals, see page 20.

Respirator No. 2A

This is a full face, positive pressure respirator used mainly in BT for major asbestos removals by qualified staff. 24

Respirator No. 3A

This is disposable and affords the same filtration efficiency as the Respirator No. 1A. It is to be worn *only* in situations where it is known that dust hazards are minimal eg when using Man Made Mineral Fibre Board No. 2 (see page 21) for fire stopping.



Foot protection

Working in an internal environment does not mean that you can afford to neglect the protection of your feet. In certain circumstances, for example when handling apparatus racks, protective footwear is strongly recommended. Styles suitable for internal duties are readily available under the subsidised protective footwear scheme. 25

Health & Hygiene

At all times

Maintain a good standard of personal hygiene.

Take special care when working in dirty conditions. Be alert for the unexpected.

Barrier Cream is provided for your protection – make sure it is available and use it.

Following work – Always wash your hands. Remember contamination can be passed from hand to mouth by smoking and eating. Always ensure that when any product is being used, an aerosol spray for example, you diligently follow the manufacturers instructions and BT's method of use. 27

Asbestos

Asbestos may be encountered at any time by staff engaged with internal work. Notices must be fixed on surfaces of known asbestos materials warning staff not to cut or make fixings. The Asbestos Regulations 1969 provide a minimum standard of protection for staff but BT standards are clearly defined in BT Instructions.

Some typical situations where asbestos could be found are:–

- Boiler lagging.
- Fire stopping.
- Wall partitioning and ceiling tiles.
- Cement building materials ie corrugated sheeting, water and flue pipes etc.
- Vehicles.
- Loft areas in customers premises and our own buildings.

Remember: Provided it is left undisturbed, sealed asbestos is perfectly safe as it cannot produce dust.

Asbestos is dangerous only when fibre migration is occurring. If you encounter any un-labelled suspect material, contact your supervisor, who in turn must inform the District Safety Officer.

Likewise, if you suspect that you have been accidentally exposed to asbestos dust, report it in writing to your supervisor.

The only BT staff who can remove asbestos under BT's National Removal Licence

will have been fully trained and qualified for such work.

Remember if you contravene any of BT's documented Asbestos Procedure you could face prosecution. 28

Dimethylacetamide (DMA) and Dimethylformamide (DMF)

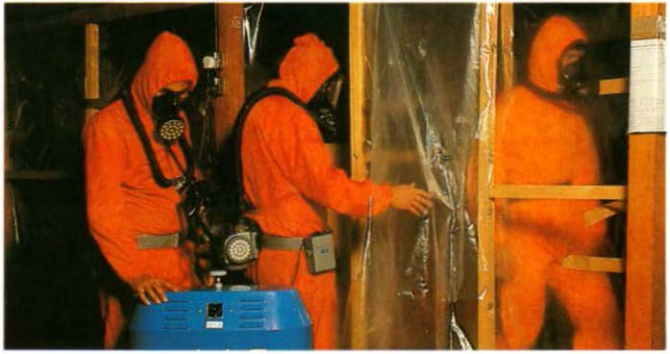
These substances are used as the electrolyte in some electrolytic capacitors. The hazard is not significant, contamination causing only temporary irritation and discomfort.

Nevertheless, if accidental exposure occurs, wash affected parts of the body as soon as possible. If eyes are affected, flood them copiously with quantities of clear water and seek medical attention. In the event of accidental digestion, seek medical advice as soon as possible. If possible when seeking medical attention, state clearly the nature of the chemical ie DMA or DMF. 29

Man-made Mineral Fibre (MMMF)

Man-made Mineral Fibre Board No. 2 is used within BT as a technically approved fire stopping material.

Staff involved with this material may experience, as with all glass fibre products, a temporary skin irritation. Although, the skin becomes desensitized to this irritation after a short period of work, staff are instructed to wear disposable overalls, disposable gloves, Eye-shields No. 3A, Helmet No. 3A and Respirator No. 3A or equivalent as an additional safeguard against the possibility of any respirable fibres. Remember to carry out your works practice strictly in accordance with BT instructions. All staff engaged on this practice must be suitably trained.



The use of barrier cream is not recommended as it could encourage the fibres to stick to the skin.

Following completion of any work, staff should rinse their hands and arms under cold running water for several minutes prior to using soap and water. [30]

Lead

Work with lead is subject to the Control of Lead at Work Regulations, which provide fundamental requirements for controlling exposure to lead hazards. In BT, the risk of excessive levels of lead in the blood is limited to very few staff, mainly certain battery specialists. All staff concerned must be familiar with the contents of instructions. [31]

Mercury

Mercury is toxic and vapourises at room temperature. There is a minor risk from the occasional breakage of small components, eg mercury wetted reed relays.

If you have to work with components containing mercury, you must be familiar with the relevant instructions.

For example, you must:

- Never attempt to dismantle a mercury wetted reed relay – it is pressurised.
- Break reed relays only under the specified controlled conditions. Always wear gloves and Eyeshields No. 5 (non-spectacle wearers).
- Do not allow faulty items to accumulate. Dispose of them immediately.
- Always wash your hands thoroughly after handling faulty items containing mercury, paying particular attention to the finger nails. If you have a cut or abrasion, wash the cut under running water, bandage it and report to a doctor or hospital. [32]

Mineral oil

Frequent exposure to mineral oils can defat the skin and may lead to dermatitis. Prolonged exposure can lead to warts, swellings, ulcers and sore patches of skin which do not heal. If you work with mineral oils, and any of these conditions occur, seek medical attention immediately:

When working with mineral oils:

- Minimise skin contact – wear Gloves No. 220 for dispensing fuel oil.
- Do not wear oil-soaked clothing.
- Do not put oily rags in pockets, especially trouser pockets.
- Wash off all traces of oil after work. [33]

Polychlorinated Biphenyls (PCBs)

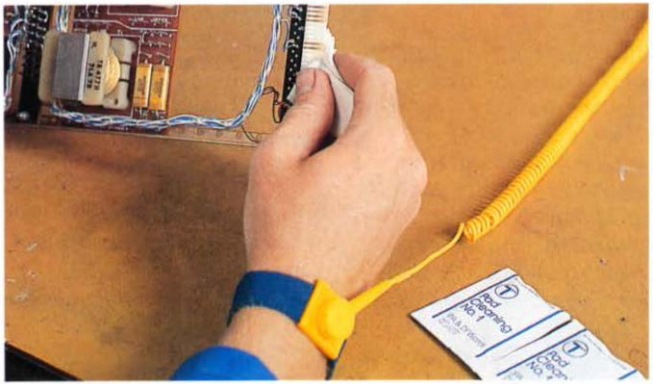
PCBs are used in some small ac mains capacitors and as an insulating fluid in

some large high voltage transformers. There is a small risk to persons from prolonged skin contact and from swallowing large quantities (an unlikely eventuality!!!).

Full information on PCBs and components known to contain PCBs are given in standing instructions. The precautions when leaking components are found, in brief:

- Treat the fluid as PCB unless it is positively known not to be PCB.
- Wear Gloves Disposable.
- Do not smoke, eat or drink in the working area.
- Wrap the recovered item in Rags Synthetic or equivalent.
- Wipe off surplus fluids with Rags Synthetic or equivalent.
- Moisten fresh rags with paraffin or use white spirit to clean up equipment and work area. Dispose of as detailed in instructions.
- Use hot water and detergent to clean benches.
- Wash hands thoroughly.

The use of PCB materials in new telecommunications equipment is illegal except under very special conditions.[34]



IPA wipes in use

Polytetrafluorethylene (PTFE)

There is no hazard from cold working with PTFE. A fume hazard occurs if it is heated above 300°C but the effect, although unpleasant, is so far as is known, only temporary.

For full information see internal instructions.
The main precautions are:

- DO NOT SMOKE where PTFE is being worked.
- Pay attention to personal hygiene, especially your hands eg do not eat or smoke until hands have been washed.

- Do not solder PTFE insulated wire in a confined space unless effective fume extraction is provided or you are wearing a Respirator No. 1A fitted with an effective fume filter. [35]

Solvents

All solvents,whether in liquid or aerosol form, evaporate quickly. Consequently, when working with them, it is necessary to ensure good ventilation at all times. In addition, some solvents are highly flammable and some have anaesthetic properties

Not only are some unapproved solvents hazardous to health, but they can damage equipment by, for example, coating electrical contacts and attacking insulating materials. It is important, therefore, to ensure you do not use any solvent unless it has full BT approval. In addition, ensure you always use them in the way stated in BT instructions. [36]

NB. Benzine and carbon tetrachloride are prohibited solvents.

Sulphuric acid

Concentrated sulphuric acid is corrosive and will cause severe burns. Its use in BT is restricted mainly to diluted form for secondary cells. The relevant precautions appear on pages 48 to 50.

Semi-conductor devices

Do not attempt to dismantle any semi-conductor device as it may contain a beryllium oxide heat sink which, if worked on, could create some respirable toxic dust. [37]

Lasers

This section deals with lasers used for industrial purposes such as floor and ceiling alignment. It does not apply to optical fibre systems. These are dealt with on page 13.

Lasers range from ones with dangerous high intensity beams (Classes 3 and 4) to some of such low

Under pressure

intensity (Class 1) as to be incapable of causing physical injury. There should be an instruction dealing with the safe use of each particular type in service. Note that the main risk is from burns and that the eyes are particularly vulnerable.

- You must be competent and trained to use a laser.
- Only the minimum number of personnel should be present.
- Never view any laser beam directly. Although the beams from Class 1 lasers are prefectly safe it is simply bad practice to look at any beam. Get into good habits.
- Always wear eye protection when specified.
- Do not use anything to deflect a beam off course.
- Exceptionally, the supervising officer may authorise untrained personnel to be in the vicinity of a laser if the beam is enclosed or otherwise safe. [38]

Air and gas under pressure

Compressed gas (mainly air) is used for a variety of purposes. However, it can cause damage to any part of the body and has been known to kill. It is necessary, therefore, to impose rules which, in brief, include:

- Never dust yourself down with compressed air.
- Never put your hand in an air stream.
- Only authorised staff are permitted to carry out maintenance and repair of pressurised systems.

- Under no circumstances must you ever "play" with compressed gases.
- Do not cause loose particles to be thrown about as they will enter eyes, ears and skin.
- Never move a gas cylinder by its regulator.
- **Never grease the threads on an oxygen cylinder – it is extremely dangerous.**

Access equipment

If an injury is sustained, then:

- Foreign bodies must be removed from eyes only by First Aid or medical staff.
- If eyes, ears or nose are affected by blast, cover with a clean pad and seek medical attention.
- If the skin is penetrated, seek medical attention immediately.

Remember, clothes give little or no protection. 39

Fluid and greases under pressure

We are concerned here with hydraulic systems, high pressure fuel injection systems, high pressure greasing systems and the like. The hazards involved in the failure of such a system are severe. Consequently, if a leak occurs, KEEP WELL CLEAR and report it.
If injury does occur, take the patient immediately to hospital. 40

For information on general purpose access equipment and its safe use, refer to ESG1 and other instructions.

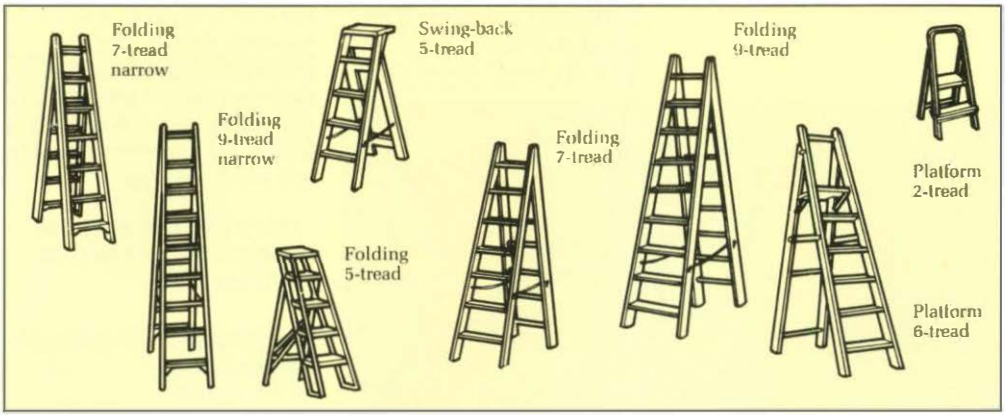
PLEASE DO NOT resort to improvisation such as standing on chairs. Do not alter equipment eg the end stop of the Stool No. 3 is to prevent its use on end.
It must not be removed.
In fact, such action would constitute an offence under the Health and Safety at Work Act.

Steps and ladders

- DO NOT use steps or ladders which do not bear a local BT serial number.
- DO NOT use steps or ladders which are in poor condition. Inspect them before use.
- DO NOT use Steps Narrow 7 or 9 Tread except in wiring gangways.
- DO NOT work from the top tread of steps unless they are provided with a hand or knee rail.
- DO NOT leave tools on steps and ladders.
- DO NOT paint or varnish rungs and treads.
- DO NOT lend steps or ladders to others.
- DO NOT drop things from a ladder.
- DO NOT climb on racking.
- DO NOT take a metal ladder or steps into an apparatus room.
- DO NOT use your foot to release the brake on a travelling ladder.

- Set ladders to the correct angle (4 up – 1 out) whenever possible. When this is not possible, you must make special provision such as blocking or getting someone else to "foot" the ladder.
- Tie ladders at top and bottom wherever possible.
- Ensure that treads do not have an excessive build-up of dirt or wax. Remove by using an approved detergent.

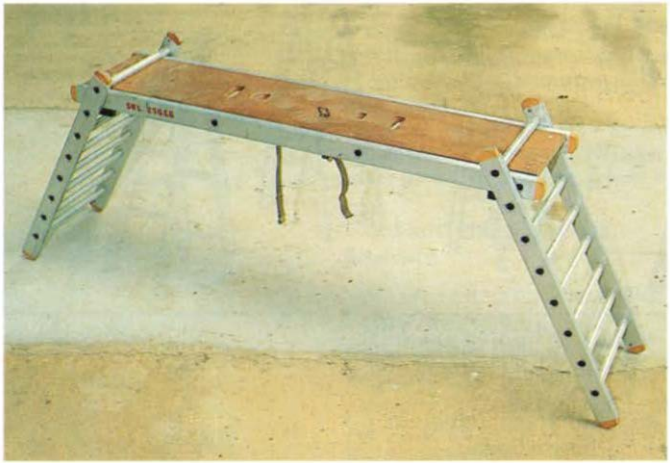
- Position step and ladders for the most comfortable working position. Do not over-reach.



- Take account of opening doors, blind corners and similar hazards.
- Climb unencumbered.
- Seek assistance, particularly if the work requires side thrust.
- Only one person on steps or ladder at a time.
- Always ascend and descend FACING the

ladder or steps.

- Store wooden steps in a cool, dry place. They must be well supported in a horizontal position off the ground or stored vertically on a dry base. Never store



steps and ladders in a battery room as the corrosive atmosphere will harm them.

- Treat steps and ladders with care Never throw them about or drop them.

It is permissible to use customers' access equipment when circumstances are such as to make this a sensible thing to do. For example, it is safer, and, therefore, more sensible to use a customer's fixed loft ladder than to attempt entry to a loft from steps.

ALWAYS CHECK THEM THOROUGHLY BEFORE CLIMBING. 41

Special access equipment for internal use

Kit Staging

Kit staging No.3 is for use by internal construction staff to provide access at levels between 833mm-2.365m (2′ 9″-7′ 9″) in steps of 250mm (10″). It was designed for situations with limited space and is suitable for two persons and their equipment up to a total distributed load of 272 Kg (600 lb). Kit Staging Nos. 1 and 2 can also be used for major EL&P work.

Full instructions are issued with each kit, but here are a few reminders:

- Take great care to avoid overhead bus-bars and other obstructions.
- Apply the brakes before climbing.
- Fit toe boards and guard rails (a legal requirement) if working over 2m (6′ 6″) up.
- NEVER move staging when someone is on it. 42

Steps Mobile

Mobile steps are available for use in exchanges, repeater stations and stores. Earlier types relied on the weight of the user to override spring loaded castors to lower outrigged support pads to the floor. Later types use a lever system to lower castors for manoeuvrering purposes.

Remember! Because of the open bus-bars, Steps Mobile must not be used in Strowger exchanges except for meter reading photography. 42

Trestle Aluminium

This is intended for use by internal construction staff working between apparatus racks. The working height is adjustable from 533mm (1'9") to 1.4m (4'7"). 42

Ladder Feet No. 1A

These are intended mainly for indoor use to give additional security on polished floors and other smooth surfaces when using ladders Extension Nos. 4A and 5B and Ladder No. 11A.

- Take care to prevent contamination with oil, mud, etc.
- Clean frequently to remove any build-up of floor polish.
- Use only on dry surfaces.
- Do not relax normal precautions for using ladders. 42

Ladder Leveller No. 1A

This is used to stabilise ladders where the difference in floor level between stiles lies in the range 36mm (1.4") to 355mm (1' 2"). The range is covered in increments of 8mm (0.3"). 42

Trestle aluminium

Lifting and handling

Internal work involves handling a wide variety of items, some of them extremely heavy. Make the fullest use of the available lifting and handling mechanical aids.

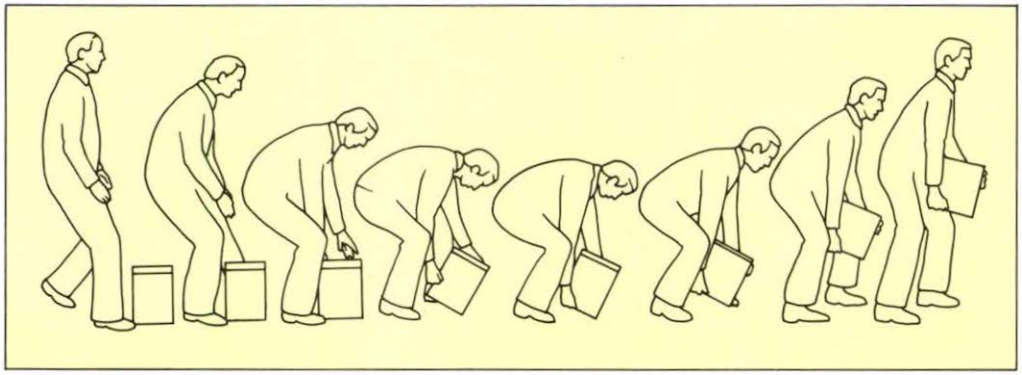
Manual handling

If you have to lift manually, make sure you are familiar with the proper lifting techniques outlined in ESG1 and other instructions. ⊞

Avoid the need to climb whilst holding heavy equipment such as relay sets. Seek assistance particularly if the load is an awkward one to handle.

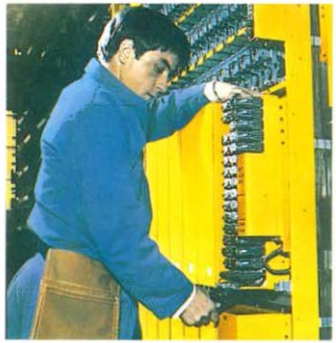
Rack handling

Manual erection of apparatus racks must be avoided wherever practicable. Full use must be made of rack handling equipment and trained teams. As with hoisting operations (see page 34) only one person must be in charge. ⊞



TXK1 shelf handling

Always use the shelf loader available for lifting individual TXK1 shelves.



Heavy strowger relay sets

Some very large relay sets (eg CFC SSAC No. 9) may be found difficult to remove due to high initial U point spring pressure. Use Lifter, Relay Set No. 1 to avoid risk of strain in removing these. A lifter should be kept readily available at the end of each rack suite.

Fully locate the lifter on the

auxiliary tie bar at a position centrally beneath the relay set. Lever upwards to disengage. Hold relay set steady while the lifter is removed and secured. The relay set can then be lifted clear. Be sure to return the lever to the stowage point at the end of the rack suite.

Tight fitting covers

Tight fitting covers are sometimes a problem. Do not lose patience and use brute force but remove them with care. Do not simply force such a cover back on. Identify the cause and rectify it.

Lifter Relay Set No. 1

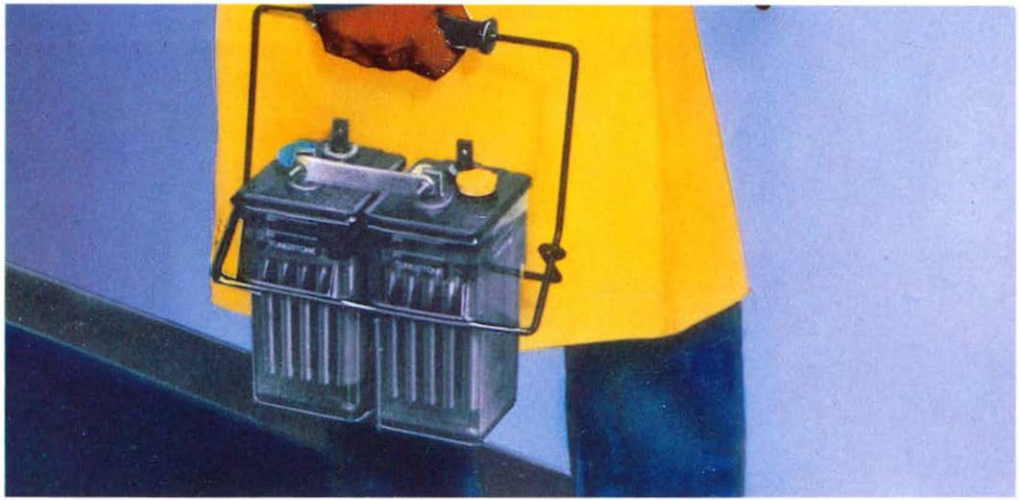
Use a Lifter Relay Set No 1 to release heavy relay sets from their jacks (on racks with an auxiliary tie bar).

Long items

Take special care when handling long items in apparatus rooms particularly near bus-bars, fuse panels, etc. Seek assistance before carrying a long item around blind corners or through doorways.

Moving secondary cells

Use Carriers Cell No. 1A and 2A to carry enclosed type cells. Remember, two men are required to handle the Carriers Cell No. 2A which accommodates the larger size of cells.



Moving cable drums

Always wear gloves and, preferably, protective footwear when handling large cable drums.

Never use a length of piping

or a batten for steering a cable drum. Use the proper tool – Tools Slewing.

Stack battens neatly after removal and extraction of all nails.

Never leave floor traps unguarded.

Fuel inlet pit covers

Internal staff do not regularly lift manhole covers. When required to do so great care should be taken. If the cover is a BT standard pattern, a Lifter Manhole No. 4 should be employed wherever practical and manual lifting used only as a last resort. If the cover is not a BT standard pattern, it should be lifted by using the correct lifting keys. **On no account should improvised keys be used.**

Covers should be lifted, depending on their types, by using the principles shown in ESG2, modified if required to suit local circumstances. A copy of ESG2 must be kept on site.

Floor traps and panels

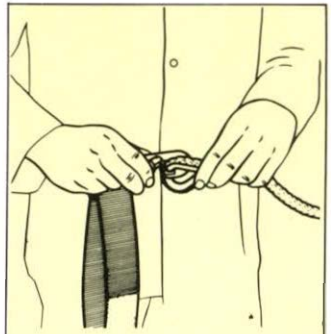
When required to be opened, make sure that hinged covers are securely

latched back. Use only the correct key or suction tool to lift floor panels. NEVER leave an open floor panel or trap unguarded.

Trolley No. 5A

This useful trolley can be used by one man to transport equipment weighing up to 45kg (100lb) between vehicles and customers' premises. Two men are usually required to carry a loaded trolley upstairs or over obstructions.
An important feature of the trolley is that it can lower a load from table level and convert into a barrow. 45

Hoisting



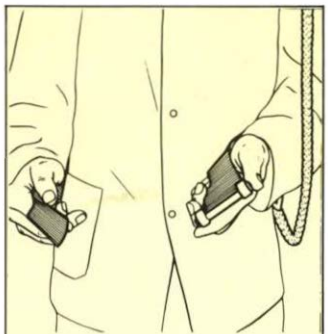
Clip snaphook to static line.

Hoisting requirements are given in standing BT instructions. Briefly the rules are as follows:

On the outside:

- Only trained personnel are permitted to operate hoisting equipment.
- You must have specific authorisation from the Engineering Officer in Charge to operate hoisting equipment.
- One person must be in direct control and is the only one permitted to give orders.
- Other members of the hoisting team must obey these orders.
- The hoisting area must be fenced off to safeguard those not engaged in the hoisting operation. In some circumstances, it will be necessary to close off the entire area.
- Personnel not directly involved in the hoisting operation must not enter the hoisting area.
- Safety signs must be displayed.
- Guide ropes must be attached to the equipment and, where practicable, ground staff must be situated outside the hoisting area.
- All personnel concerned must wear safety helmets throughout the operation.
- All personnel concerned must wear Eyeshields No. 3 throughout the operation.

Screw safety collar fully forward to the closed position. Check that latch cannot open.

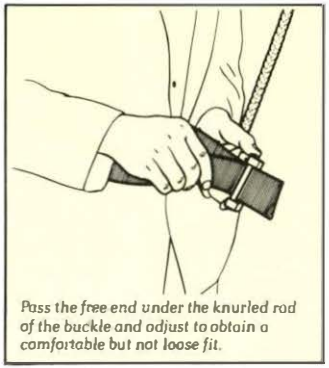


Now pass the belt round your waist with D ring and snaphook to the back.

On the inside:

Where any door gives access to the area of hoisting operations, be sure that the warning notice A53085N is displayed on the inside of the doors whilst hoisting is in progress.

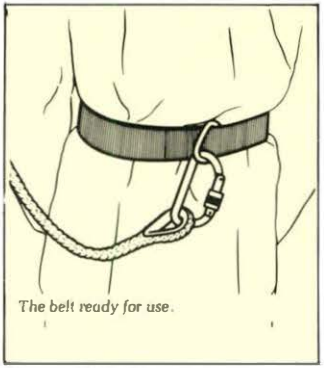
At first floor level and above, special provision is



Pass the free end under the knurled rod of the buckle and adjust to obtain a comfortable but not loose fit.

Now poss the free end through the other half of the buckle.

Attach the free end to the Velcro strip.



The belt ready for use.

made for the safety of personnel having to work at an open apparatus entrance. This comprises two static lines and safety belts.

Remember the following:

- Obtain Belts Safety No. 5 and the key to the static line stowage.
- Inspect the safety belts carefully for cuts, tears and abrasions.
- Check that the snap hook latch snaps shut properly and that the locking barrel functions correctly.
- Ensure that the static lines are of 8 core plaitted construction. If you find a 3 core twisted type, do not use them and inform your supervisor.
- Check the static lines for cuts, tears and abrasions.
- Do not open the apparatus doors until you and the other operatives are properly harnessed to static lines.
- Do not approach an open entrance unless you are wearing a safety harness attached to a static line.
- If you have to leave the vicinity temporarily, undo the safety belt and leave it fastened to the static line. **Never unfasten the static line.**
- Never leave an open entrance unattended.
- After work is complete, close the barriers and doors before removing the safety belts.
- Stow and lock the static lines and return the safety belt to the Engineering Officer in Charge at once.

Stotic lines in use

Aftermath of gas explosion at Mayfield UAX.

Gas precautions

The main defence against ingress of gas is effective sealing of cable duct entries and entry points for other services. In certain cases there may also be ventilated exchange jointing boxes, ventilated interceptor chambers or permanent gas monitors in cable chambers. Normal cable chamber/ trench ventilation also gives some measure of protection against the build up of an explosive mixture should gas enter. It is, therefore, important that the cable chamber/trench ventilation is never obstructed. Remember Mayfield....

Gas testing

Anyone likely to be concerned with gas testing must be proficient in the use of Indicator Gas No. 5. Full details on gas testing are given in ESG4 but here are a few reminders. A copy of ESG4 must be kept on site.

- Keep cable chamber doors locked when no work is in progress.
- Put out all cigarettes and naked lights before opening the door to building or cable chamber.
- Partly open the door and test with IG5 at top, centre and bottom of the opening. **Note: You must carry out a gas test** irrespective of there being permanent gas monitors.
- If the first gas test is negative, enter the chamber but test at regular intervals at overhead, floor and waist heights.
- Avoid switching on lights until an area is known to be free of gas.
- Test also at cable duct entries in cable chambers and trenches.
- Record tests in the station diary.

With a trapdoor, prop it open a few inches and test immediately under it. Treat as a jointing chamber. See ESG4 for details.

Gas seal checks

Gas seals are subject to the following inspections:

- A check for obvious faults when visiting a cable chamber or other entry point.
- A visual inspection immediately after cabling work is completed.
- A visual inspection when cabling work is suspended for any reason.

- A special visual inspection on every occasion of advice of a gas leak in the exchange local line plant area.

Ensure duct seals are in good condition.

- A routine visual inspection every six months.

BT instructions give details of the actual checks to be applied. Note that the particulars of each routine and special inspection must be entered in the exchange diary.

Opening duct seals

Before underground staff disturb or open duct seals where no permanent gas monitor is in operation, they are expected to contact the Engineering Officer in Charge (EOC) who must ensure that a temporary gas monitor is first provided and in operation.

Found Gas? Now What?

If gas is detected, it is an emergency situation. You must be thoroughly conversant with the action before the event. Here is a very brief resume in situations/action form:

Situation 1 – Gas in cable chamber or cable trench entrance.

Action 1 – DO NOT ENTER. Close door or trap and display warning. Report to External Plant Maintenance Control (EPMC) or Customer Service Area Emergency Control (CSAEC) and inform the EOC of the gas level. Check for gas in the rest of the building.

Situation 2 – Gas up to 50% Lower Explosive Limit (LEL) detected in cable chamber, trench or building.

Action 2 – Ventilate by opening windows and doors. Report as before and continuing testing for gas.
In addition
– If gas is ABOVE 10% LEL, extinguish naked flames including boilers, other appliances and appliance pilots. Display warning

Fire precautions

notices and assist EOC in warning staff supervisors that evacuation may be necessary. Continue testing.

Situation 3 – Gas over 50% LEL detected in cable chamber, trench or building.

Action 3 – Signal evacuation. Extinguish naked flames, ventilate the building and display warning notices at entrances. Report as before and stand by to assist emergency services.

Situation 4 – Gas over 50% LEL detected before entry into an unoccupied building.

Action 4 – Do not enter. Warn, report and stand by as for an occupied building. 47

Operational buildings have a very low fire risk and fires are a rare occurrence. Do not, however, become complacent.

In general:

- Ensure that you are familiar with the the fire precautions for your building.
- Know the location of fire appliances and fire exits.
- Know what action to take in the event of a fire.
- Close cable holes with temporary fire stopping until permanently filled.
- Keep fire doors closed. **Do not jam them open.**
- Keep hot soldering irons in a proper rest.
- Where propane is used, have fire fighting appliances ready to hand.
- Do not leave a gas cylinder unattended in any part of a building not specifically designed for gas cylinder storage. Do not use a cylinder over 5kg. 48
- Take special care with temporary heating appliances. Site and guard these so as to avoid any risk of one being knocked over.

- Report defective or missing fire fighting appliances to the Fire Precautions Officer. His name appears on the fire notice card (A295) posted in your building.
- Treat flammable liquids as you would highly flammable liquids (see page 40).

Electricity

Highly flammable liquids

- Limit the quantity at the work point to the minimum necessary for the work.
- Remove lid or stopper for no longer than is necessary.
- Prevent spillage.
- If spillage does occur make it safe promptly.
- Remove contaminated rags and other materials to a safe place or put them in a closed metal container.
- Do not smoke or have naked flames nearby. Ensure no-one else does.
- Return empty vessels to the store pending safe disposal. 49

High voltage sub-stations

Only trained and certified personnel are allowed to work in high voltage (hv) sub-stations. They must be well versed in the detail of the instructions covering hv work.

Basic points on access to hv sub-stations and control of hv work are:

- Access to and work in all BT sub-stations on a site is controlled by the Authorised Person HV.
- No person may work in a sub-station unless expressly authorised as in instructions.
- All hv work must be authorised by the Engineer HV by issue of an Authority to Work.
- The Authorised Person HV will carry out the safety work and will then issue a Permit to Work.
- All hv work requires a Permit to Work. For your own sake and the sake of others, ensure you comply fully with the permit to work system. Never exceed the limit of work

stated on a permit.
- Only an Authorised Person HV or a Competent Person HV under the immediate supervision of an Authorised Person HV may operate or work on hv apparatus.
- No person may work alone at any time.
- Sub-stations must be kept locked except when attended.
- Contractors will appoint their own Authorised and Competent Persons as necessary. 50

Mains distribution

The following golden rules apply to all mains distribution circuits:

- Only authorised persons may work on mains circuits
- The Engineering Officer in Charge of the building must be informed before any work commences.
- Always isolate the circuit before you start work on it.
- Where an isolating switch is 'locked off' retain the key.
- Where fuses are removed to isolate a circuit, retain custody of the fuses. DO NOT leave them on top of the fuse box.

Before starting work, ensure that the equipment is dead by the following three checks:

- Check your test equipment on a known live circuit.
- Test the isolated circuit.

Keep locked when unattended.

- Hang a suitable safety sign at the point of isolation.
- Before reconnecting the supply, ensure you have removed all shorting links and straps.
- Re-check your test equipment. 51

Replacement of fuses

- Check that the circuit served is fault free.
- Where possible isolate circuit from supply.
- Wear Eyeshields No. 3 and hand protection against arcing.
- Always replace a fuse with one of the same rating. **NEVER** replace a fuse with one of higher rating.
- Replace fuse with a firm positive action to minimise arcing.

Resetting circuit breakers

Observe the precautions for replacing fuses.

Never interfere with trip settings.

Replacing lamps and tubes

- Always switch off the circuit before replacing a lamp or fluorescent tube.
- Only qualified staff may replace sodium or mercury vapour lamps which should be bandled with great care to minimise risk of breakage.

- Place old fluorescent tubes or vapour lamps in empty cartons for immediate disposal. Never allow them to accumulate.

Working on mains powered equipment

Where work is to be carried out on mains voltage equipment, a safe system of work must be followed. Briefly:

- Work with the equipment unpowered whenever possible – this will nearly always be the case (say, about nine times out of ten) because faults such as shorts and dis's can easily be found with an ohm-meter.
- If it must be powered, send it to a workshop such as an ARC whenever possible (see pages 46 and 47)
- Work on live equipment only if **ABSOLUTELY ESSENTIAL**. This should be a very infrequent occurrence.

When, exceptionally, work is carried out near live conductors:

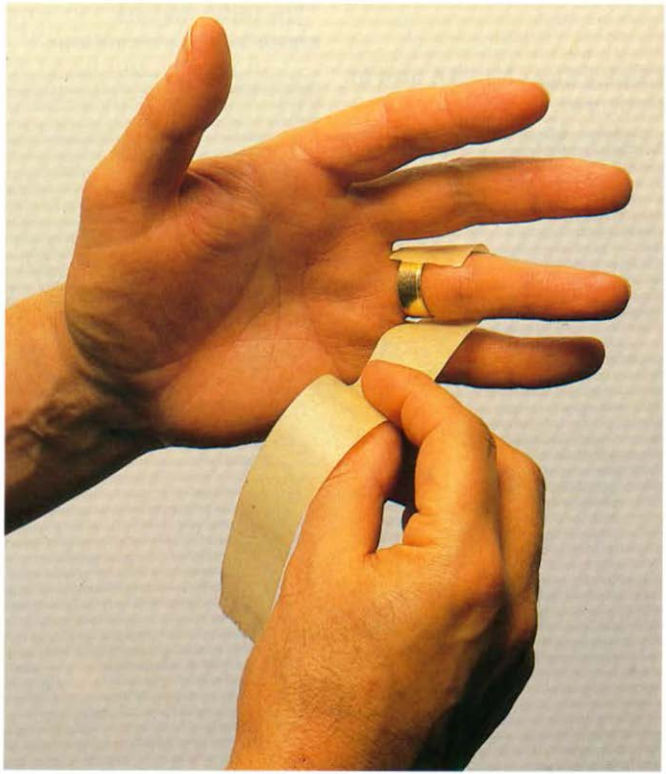
- Whenever possible ensure that at least one other person is available to render assistance in the event of an accident and that the person knows how and where to cut off the power in an emergency.
- Where possible, temporarily insulate live conductors and adjacent metal.
- Stand on an insulating mat if the floor is conductive.
- Avoid body contact with metal work.
- Remove or cover finger rings, watches, jewellery etc.
- Whenever possible, work one handed.
- Use insulated tools and test prods. Remember that plastic covering on wiring pliers is there for comfort only and is not designed as insulation against mains voltage.
- Be careful not to extend dangerous voltages by test cords which have exposed conductors or connectors. Whenever possible, use test cords with retractable probes.
- Never use a mains voltage soldering iron or one which is earthed.

Remember:
HSE statistics show that more electrocutions occur through "failure to isolate" than from any other cause.

Do not work "live" unless you have to. 52 56

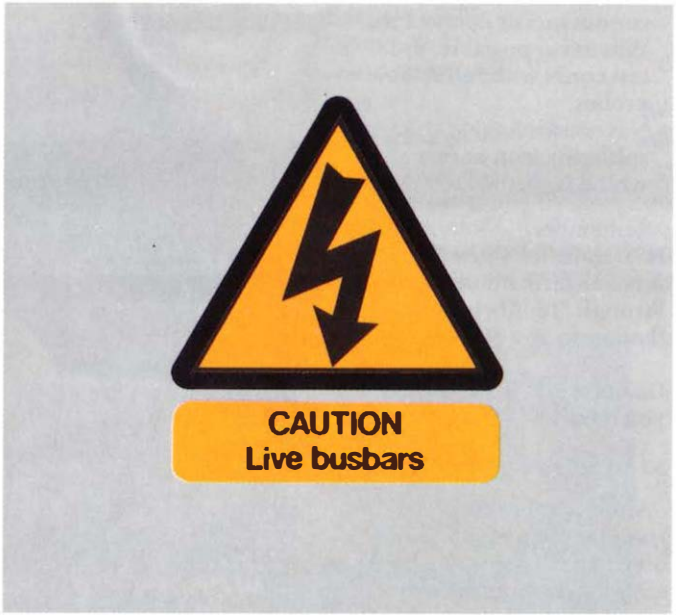
50 volt distribution

Although there is very little risk of electric shock from 50 volt dc power distribution circuits (the bus-bar supplies) the currents carried can be very large. Accidental shorting will result in 'explosive melting' of the bridging metal (eg spanner or finger ring) with the consequent risk of severe burns and eye injury.



Display Signs No. 14A near to work area

The following are reminders of precautions necessary when working on 50 volt dc power supplies:



- Do not work in close proximity to bare live dc power distribution if this can be avoided.
- Do not forget to remove or tape watches, straps, rings and other jewellery.
- Make sure that tools cannot fall from pockets.
- Check work area for exposed live metalwork and damaged insulation.
- Protect exposed live metal, live bus-bars and adjacent earthed metalwork.
- Use folded dust sheets, stout canvas, fibre board etc.
- Cover a generous area beyond the immediate work area.
- Secure temporary insulation with tape or string.
- Display Signs No. 14A near to the work area.
- Do not impede secondary cell ventilation. Do not use polythene sheeting to protect cells.
- Use the special insulated tools provided.
- Handle long items with care.
- Keep other metal items well clear, eg metal cased testers.
- Do not use metal steps or ladders. 53

Electrostatic Protection (ESP) Equipment

One of the problems with modern electronics is that it is prone to damage by static electricity. BT provides all the hardware necessary to prevent this damage and has taken care to reduce any attendant personal safety risks to a minimum. Consequently, there are very few extra rules for your safety.

- Use only BT-supplied equipment. In particular, never use wire in place of the proper ESP cord as it lacks the electrical impedance essential for both your own protection and that of the equipment.
- Use the proper bonding point provided on most new equipment or, if this is not provided, the ESP Adaptor No. 1 (a shrouded bulldog clip) on other equipment.
- Do not forget to detach the ESP cord before walking away.

NB The ESP Plug is provided specifically for workbench use in BT operational buildings and must not UNDER ANY CIRCUMSTANCES be used on apparatus racks or in customers premises. 54

Work Bench Facilities

Work bench facilities in repair centres such as General Purpose Workshops and Area Repair Centres (ARCs) must comply with BT instructions for physical, mechanical and electrical safety. Such centres are considered under the Factories Act as being workshops. Workbenches used for casual repair in apparatus rooms however, are considered not to be workshops but you should remember that the standards of provision must ensure safety. Also bear in mind the advice on tidiness (see page 3) and maintain good working practices.

General purpose workshops

Only properly trained and competent personnel are allowed to operate workshop machinery. Also, to meet various statutory requirements, as for the mounting of abrasive wheels, they must be formally registered and authorised. Here are a few brief reminders.

- Maintain good housekeeping – clean, tidy benches and work areas are essential.
- Maintain clear, marked gangways.
- Maintain good lighting and ventilation.
- Keep storage racks neat and accessible with heavy items low down.
- Do not obstruct fire appliances or emergency escape routes.
- You must use the machine guards provided.
- Make safe loose clothing, (eg ties), long hair, braclets, etc.
- Wear eye protection where stipulated, see page 16.
- Wear Protectors Ear No. 1A in noisy situations.

Electrical workshops

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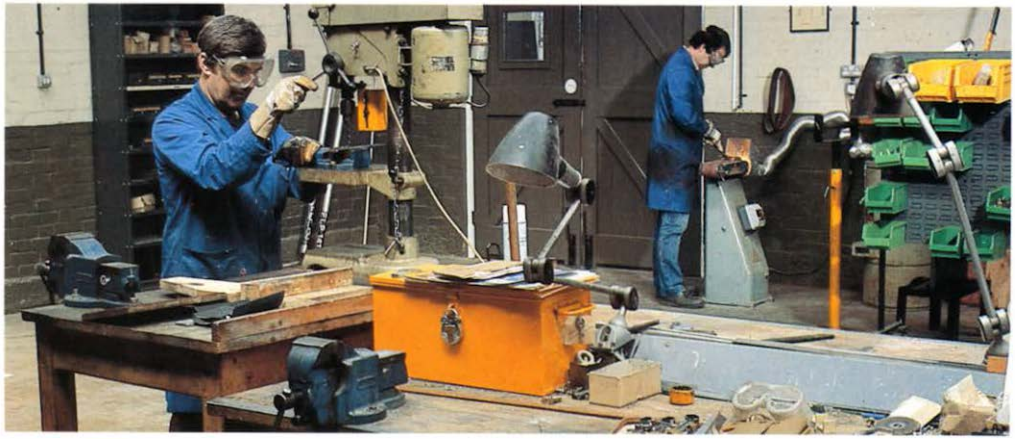
These are equipped to special criteria. Each type of work bench must be used only for the category of work stipulated for the type of bench.

The following applies when access is required to voltages exceeding 150 volts dc or 50 volts ac rms (unsafe voltages):

- Work is limited to specially authorised qualified staff and restricted to an area which only they may enter.
- Staff not authorised to work with unsafe voltages (including visitors and cleaning staff) may enter the restricted area only when power to the benches is off.
- At least one other member of staff must have an authorised officer clearly in view when the latter is engaged in work with unsafe voltages.
- The second person must know precisely where to reach the bench power isolation switch.
- All workshop personnel must be able to perform artificial resuscitation.
- Do not take liquids into a restricted area when the bench power is on.
- Any wet parts of a restricted area must be allowed to dry before powering the benches.
- Do not use conductive polish.
- Remove or cover finger rings, watches, jewellery, etc.



- Do not use pins on a wall or partition within 1.5 metres of a bench.
- Be careful not to distract others.
- Keep the floor space within 1.5 metres of a bench clear except where trolley mounted equipment is actually in use.
- Whenever possible, work one handed.
- Use insulated tools and test prods.
- Be careful not to extend dangerous voltages by test cords with exposed conductors or connectors.

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Batteries and battery rooms

First aid

In the event of acid or alkaline splashes, first aid is essential:

- On the skin – wash copiously with water.
- In the eye – irrigate with running water or saline solution. Seek hospital treatment immediately.
- On clothes – remove contaminated clothes immediately. Then wash any skin affected.

General precautions for all battery rooms

- Keep the room clear, well ventilated and free from obstruction. Do not use a battery room as a store room.
- Remove or cover finger rings, watches, jewellery, etc.
- Do not smoke or use naked flames.
- Plan the work so as to minimise the number of operations which could cause a spark.
- Do not drink battery topping up fluid.
- Store acid only in purpose designed recepticles. In no circumstances store it in a distilled water container or a utensil that might be used for drinking.
- Do not use plastic sheeting as protection for enclosed type cells during building work. Static charges can build up on such sheeting.
- Do not use metallic utensils for topping up.
- Use single ended insulated spanners when working on live connections.
- On any operation which may involve risk of acid splash, wear a headcovering, acid-proof overalls, Gloves Batterymans Light, plastic apron and Eyeshields No. 3A. As an alternative to Gloves Batterymans Light, Marigold gloves or similar may be used but must be scrapped after use.
- If the atmosphere in a battery room is uncomfortable, check the charging rate and ventilation of the cells. If you are hypersensitive to acid fumes, consult your Safety Officer about a suitable respirator.
- Do not work near or on enclosed cells which are on gassing charges or on heavy discharge (more than 1 hour rate).
- If the work involves sulphuric acid, ensure there is a supply of sand, sawdust or weak alkaline available. Also, that clean-up materials are available for spills.
- When diluting acid, always add acid to water. **It is extremely dangerous to add water to acid.**

Open cells

In addition to the general precautions, remember the

following:

- In rooms with natural ventilation, open leeward (downwind) windows rather than windward (upwind) windows.
- Handle a scaling stick carefully so as to prevent scattering of acid drips.

Enclosed cells

- Use the purpose-designed carriers to carry cells.
- Use test instruments with fully insulated cases or use long test leads to keep instruments well clear.
- Return hydrometers to their stands after use. Avoid flicking acid from the ends of the tube.

Major work on cells

- Major work generally concerns power and battery specialists assembling cells on site and repairing or renewing cells.
- Work with lead is subject to the Control of Lead at Work Regulations. Staff carrying out major work should be conversant with the Code of Practice and the relevant health safeguards.
- In addition to the protective clothing mentioned at the beginning this ESG, Gloves Batteryman Heavy and Boots IR9A (use with trouser legs outside) should be used when handling sulphuric acid or acid soaked plates. Locally purchased plastic aprons may also be worn between overalls and the felt apron.
- If lead burning is necessary in the same room as enclosed cells, use a temporary partition to screen them, keep charging to a minimum. Ventilate the room before, during and after work.

Connecting batteries to bus bars

Whenever possible, ensure the last connection is to the earth pole and that it is made outside the battery room. Never connect battery live terminals last.

Portable batteries

Charging stations must be properly laid out and equipped with exhaust ventilation above any bench. 57

Customers' premises

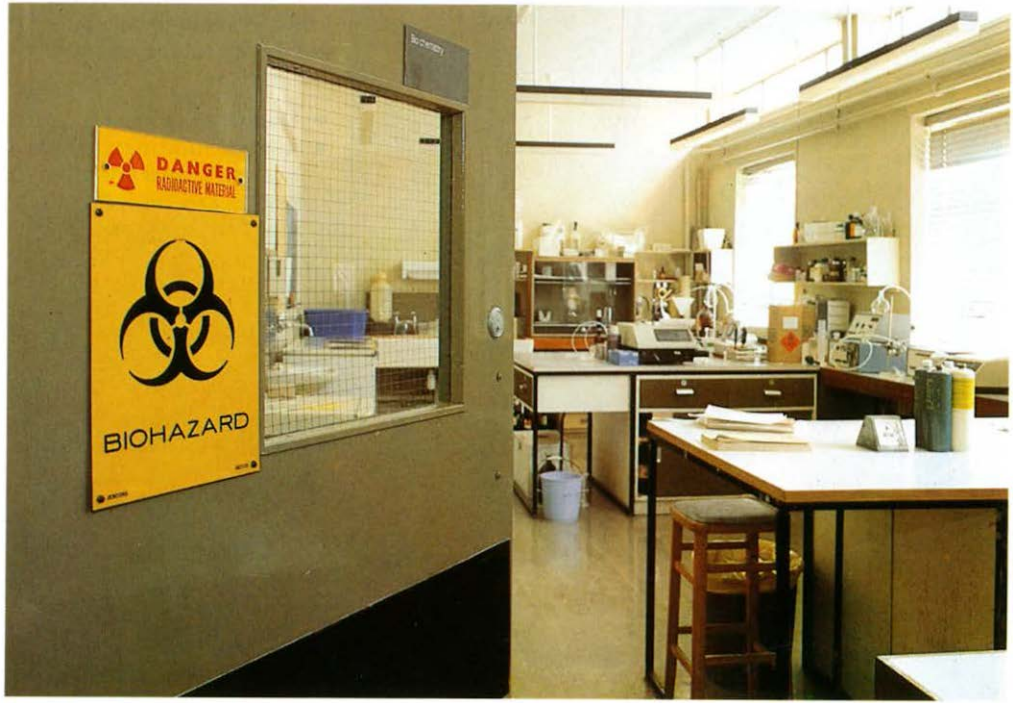
Customers' safety rules

Staff visiting customers premises are expected to observe customers safety rules and procedures where these exist. BT instructions give details but note that you should **never** sign any customers documentation pertaining to safety matters unless they are approved by BT. 58

Abnormal hazards

Staff who visit customers premises must be familiar with the special precautions to be observed where abnormal hazards exist. Such hazards include:

- High voltage electricity and local rise of earth potential in generating stations and at sub-stations.
- Fire and explosion risks due to flammable materials such as petroleum and natural gas.
- Poisonous substances.
- Asbestos.
- Building hazards on building sites.
- Paint spraying.
- Infectious diseases.
- Ionising radiation.
- High power lasers.
- Total flooding fire protection systems. 59 62



Cutting and drilling holes in walls

Before starting to cut or drill a hole in a customers wall you must make every effort to avoid concealed electricity cables, gas and water pipes:

- Always use a locator.
- In large buildings, ask the owner, architect or other responsible representative for information on concealed services.
- In small buildings ask the occupier for this information.
- In addition, check the positions of exposed outlets, fittings, etc as these form useful tell-tale guides.
- Be particularly careful in modern timber-framed buildings not to penetrate or ignite the waterproof membrane which is built into the walls.

Remember to look out for asbestos.
(See page 20).

Floor traps

Some floor traps to underfloor ducting require a special key for removal. Always obtain this key from the customer. NEVER attempt to open the traps without the key.

Where it is necessary to leave a duct open during cabling operations, guard suitably, eg with a box guard.

Trunking system

Unless it is **absolutely unavoidable**, new cables, plant and equipment should not be placed in common service ducts, crawlways, etc where there may be a potential asbestos risk.

BT cables must NEVER be run in conduits, ducts, cable trays, etc which contain electricity supply cables.

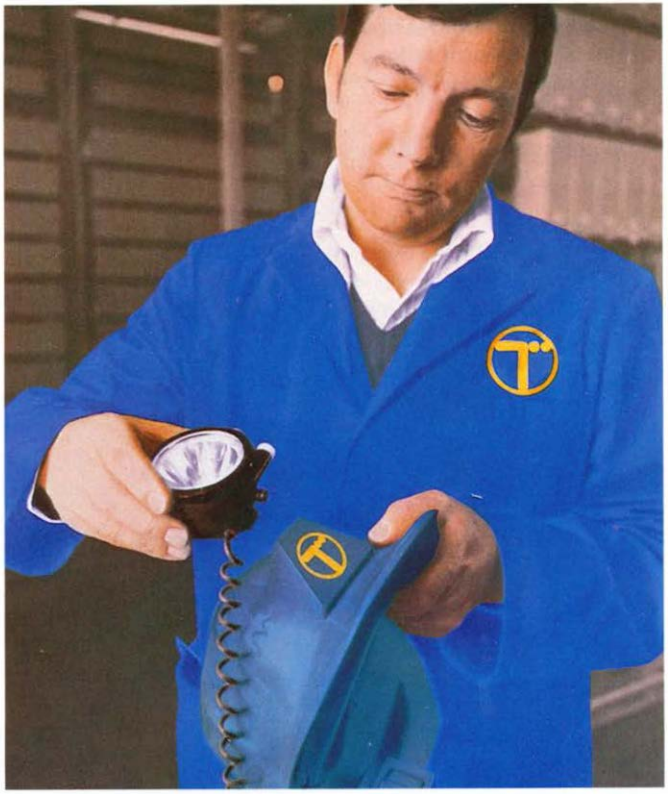
REMEMBER

- Check that the duct for BT cable is separate from that for power cables. **This separation is mandatory.**
- Check that no mains power terminals project into the duct with BT cable.
- Check that no gaps exist in the divisions between compartments of multi-compartment systems as this will permit a draw tape to enter the power duct.

If the checks indicate that the second or third conditions cannot be met, cease work and inform your supervisor of the situation.

Cabling in lofts and roof spaces

- Do not use improvisations to gain access to a loft or roof-space. If there is no permanent access equipment and you do not have a suitable ladder or steps, seek assistance.



Lamp hand electric No. 13.

- Do not work with inadequate lighting. It is useful to fit a Lamps Hand Electric No. 13 to a safety helmet.
- Do not move around by balancing on ceiling joists. Use crawling boards or Platforms No. 1.
- Do not let crawling boards overhang excessively between joists.
- Keep BT cables at least 50mm (2") from all electricity supply cables. [60]

Positioning of apparatus

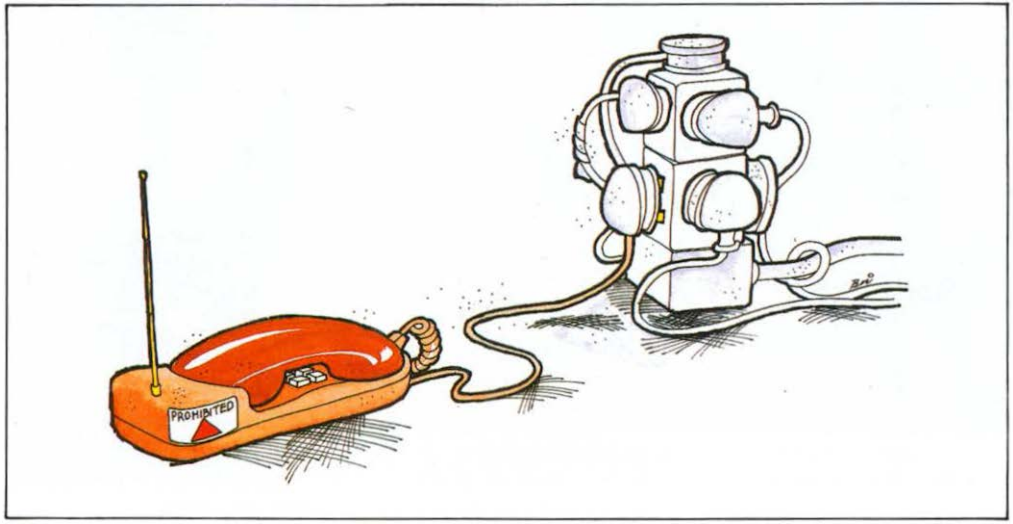
- Site customer apparatus where its position will not constitute a hazard to persons using the accommodation.
- Do not create a tripping hazard when running cables or cords across floors.
- Take care that floor capping does not form a tripping hazard.

- Give careful consideration to ease of maintenance.
- NEVER locate a distribution point where personnel may be put at risk, eg in lift shafts, lightwells, rubbish chute delivery areas.

Customers' power

Where mains operated BT equipment requires a protective (mains) earth, the customer must provide a supply point complying with the current edition of the IEE Wiring Regulations.

- Before connecting any mains operated equipment, test the mains supply using an earth/line loop impedance tester.
- NEVER use the mains earth as a signalling earth except by direct connection to the building main earth terminal. If this requires access to a compartment or unit containing hazardous voltages, the customer must provide an adjacent external earth terminal.
- Do not interfere with the customers power supply. If a socket is faulty, ask the customer to have it repaired.

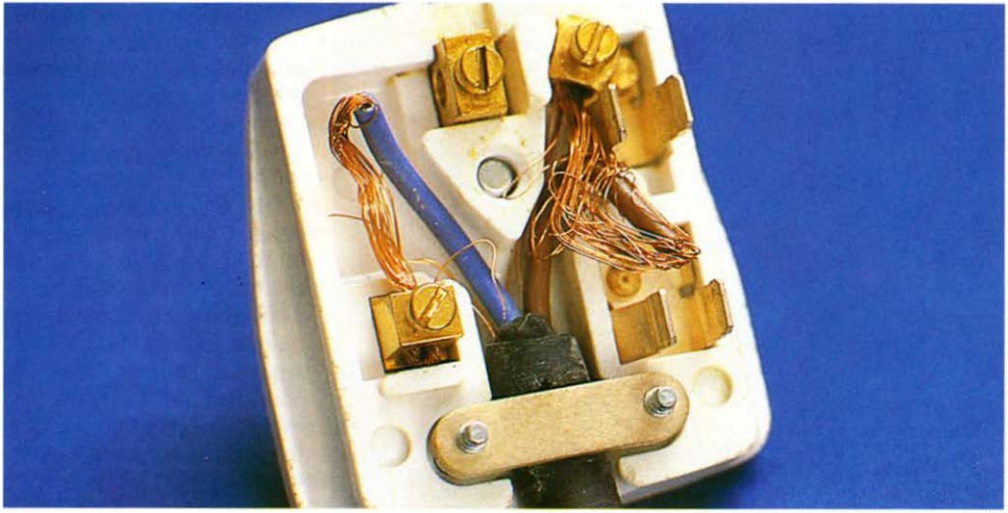


- Use only BT issue or BT approved 13 amp plugs (Plugs for Socket Outlet No. 103 and 104).
- Always fit a fuse of the lowest rating compatible with correct operation of the equipment concerned.
- Ensure that the mains lead is properly terminated on its plug. [61]
- UNDER NO CIRCUMSTANCES use an ESP Plus (see page 45) in customers' premises.

Use of mains powered tools

Only Class 2 (double insulated) mains voltage power drills may be used. The use of Class 1 (earthed) electric drills with a working voltage above 110 volts is prohibited because customers' earth connections are known not to be reliable.

Requests by authorised site representatives to use 110 volt tools on building

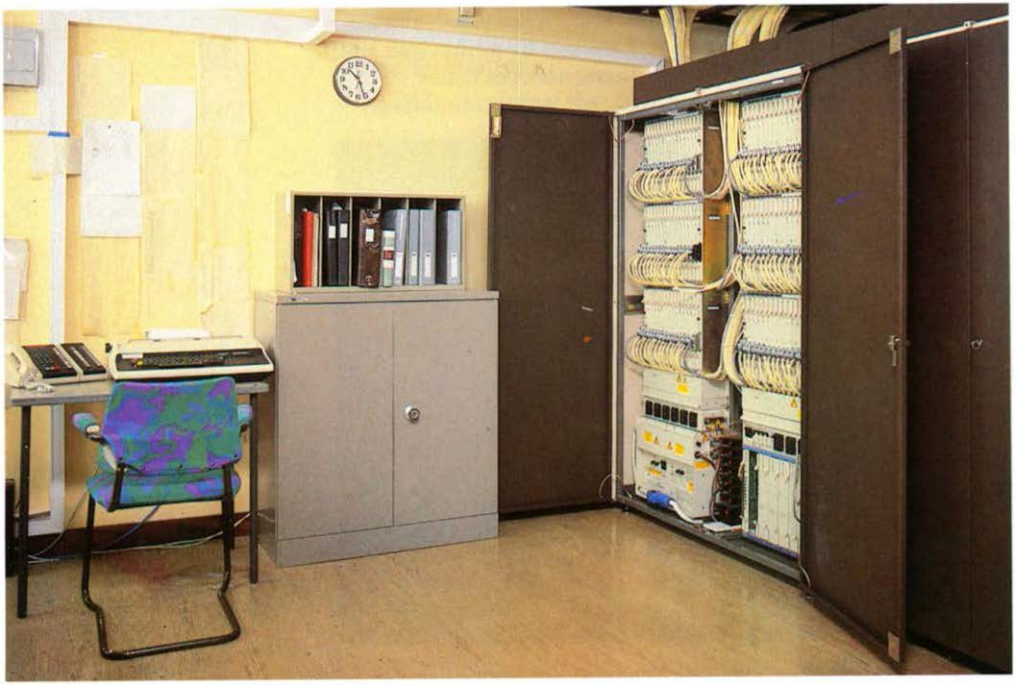


Hazardous wiring found on a customer's premises

sites should be complied with.

PABX rooms

- The precautions for exchange apparatus rooms apply equally to PABX apparatus rooms.
- The precautions for PABX batteries are the same as for the corresponding public exchange situation.
- Be sure that any total flooding fire extinguishing system has BT approval and is recorded. Familiarise yourself with the attendant rules. [62]



Illicit attachments

This section is included because some unapproved attachments, generally those which are mains powered, present danger to the user and to anyone working on the network.

If the attachment is a safety hazard, and particularly if there is mains on the BT line, ask the customer to disconnect it immediately. Then telephone your local reporting centre as soon as possible from another location – not of course, from the premises where the offence is being committed. Confirm your report in writing.

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3	SFY/LAP/A011 SFY/LAP/A502	CSM:S4A011 CSM:S4A502
4	SFY/LAP/B017	CSM:S4B017
5	SFY/CSP/A021 (M4E5050) TMA/MAG/J010	CSM:S1A021
6	SFY/LAP/B038 BES/LLE/A014 PWR/ACS/C026 TXA/MCE/A010	CSM:S4B038 TI:J7A0024
7	TXA/MEP/A061	TI:A1F5251 TI:E1A5001
8	TXA/MEP/A074	
9	BPP/PLG/H526	TI:H5A2004
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11	SFY/CSP/B039	CSM:S1B039
12	EPT/CFE/C010 (E3H5402) EPT/PPS/A022	 TI:E3H5403
13		
14	SFY/CSP/B014 TMN/RSM/A122 TMN/RSM/B010	CSM: S1 B041 CSM: S7 A001 to A007 TI:P1C3200

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[14]	TMN/RSM/B011 TMN/RSM/B020 TMN/RSM/B085 TMN/RSM/C010 TMN/RSM/C018 Local Instructions	TI:A2E0101 TI:A2P3505 TI:A2P3506 TI:M4H1010
[15]	TXE/XE4/C068	
[16]	SFY/CSP/A019 SFY/CSP/A020 SFY/CSP/A030 (A1F1001) BAN/MAP/A150	CSM:S1A019 CSM:S1A020 CSM:S1A030
[17]	BES/LLE/A012	TI:H12D0015
[18]	BES/LLE/xxxx (series)	TI:H12A0014 TI:H12D0017 TI:H12E0020 TI:H12F0012-0015 TI:H12G0012 TI:H12H0011 TI:H12H0016
[19]	SFY/CSP/D015	CSM:S1D015
[20]	SFY/CSP/D011	CSM:S1D011
[21]	SFY/CSP/B040	
[22]	SFY/CSP/D010	CSM:S1D010
[23]	SFY/CSP/D014	CSM:S1D014
[24]	SFY/CSP/D016	CSM:S1D016

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[26]	SFY/CSP/D017	CSM:S1D017
[27]	SFY/CSP/B045	CSM:S1B045
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[29]	SFY/CSP/B022	CSM:S1B022
[30]	TXA/IPP/B027	
[31]	SFY/CSP/B020 SFY/CSP/B021 SFY/LAP/B015	CSM:S1B020 CSM:S1B021 CSM:S4B015
[32]	SFY/ISP/A015	TI:E1H1007
[33]	SFY/CSP/B030	CSM:S1B030

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35	SFY/CSP/B024	CSM:S1B024
36	SFY/CSP/B033 SFY/CSP/B035 TXA/MEP/A074	CSM:S4B033 TI:E6H5012
37	TXE/XE4/C050	
38	SFY/CSP/B040	TI:M4E0201
39	SFY/CSP/B032	CSM:S1B032
40	SFY/CSP/B031	CSM:S1B031
41	TMA/TAM/C013 SFY/CSP/A100 (P4B 0500/0530/0660/0690)	TI:A2D0026 TI:P4B0500 CSM:S1A100
42	TMA/TAM/B017	TI:A2D0026 TI:P4B0640 TI:C1A8008
43	SFY/CSP/A015	CSM:S1A015
44	TXS/CFE/B030	TI:A6D1951 TI:A6D1952
45	TMA/APN/A032	TI:S3F0029
46	BES/ESV/B103 BES/LLE/A301 to A305	CSM:S4A501 CSM:S1D010

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49	EMT/FPN/A010 EMT/FPN/B010 EMT/FPN/C010 EMT/FPN/C020 EMT/FPN/C030 EMT/FPN/D010 EMT/FPN/D020 BES/HTG/B101 BPP/PLG/C210	TI:H15W0025 TI:H15W0035 TI:H15W0040 TI:H15W0045 TI: E15 W0011 TI: E15 W0014 TI: E15 W0030 TI:H1W0010 TI:H1W0011

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[50]	PWR/HVS/A001 PWR/HVS/A010 PWR/HVS/A011 PWR/HVS/B010 PWR/HVS/B011 PWR/HVS/C010 Local Instructions	TI: E12 B7000 TI:E12B7001 TI:E12P7001 TI:E12P7003 TI:E12P7011 TI:H9E1023
[51]	BES/ESV/A010 BES/ESV/B100 BES/ESV/B101 BES/ESV/B103 BES/ESV/B106 PWR/ACS/A001 PWR/ACS/A014 PWR/ACS/C027	TI:H10E2000 TI:H10F1000 TI:H10F5024
[52]	SFY/CSP/A030 (A7E 1001)	CSM:S1A030
[53]	SFY/ISP/A011 PWR/DCS/A001 PWR/DCS/A014 PWR/DCS/B022 TMN/RSM/B020	CSM:S3A011 TI:P6B0020
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56	ESV/BES/B108	
57	PWR/BCL/A011	TI:A7E0015 TI:E12C0013 TI:E12F0002 TI:E12F0011 TI:H9E1014
58	SFY/CSP/A018 SFY/ESP/A011 (A2E5001)	CSM:S1A018 CSM:S2A012
59	SFY/CSP/A100 (P6C0100) SFY/CSP/B042 SFY/CSP/B044	CSM:S1A100 CSM:S1B042 CSM:S1B043 CSM:S1B044
60	CSS/CWC/B040 (C3R2060)	CSM:S1A018
61	BES/ESV/B106	CSM:S1A999
62	SFY/CSP/C010	CSM:S1C010 TI:C3D1001 TI:P6C0100

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