Telecom Australia

TOOLS AND OTHER AIDS

ISSUE 1, 1981

Issued to

NAME .....

STATION .....

ISSUED BY
General Manager
Engineering Department

INTRODUCTION

TOOLS AND OTHER AIDS

This lines instruction handbook describes the tools and work aids supplied for use in Telecom Australia and tells how to select them and use them safely.

Particular attention is paid to safety, as many of these tools and aids can cause serious injury if wrongly used. On the other hand, their skilled use enables work to be done quickly, neatly and safely, and with least effort.

You may have used some of the tools described here for many years. However it will pay you to study the sections dealing with them to ensure you are using them in the most effective and safest way.

Tools and other aids have been covered in various publications within Telecom Australia but this instruction handbook is the first comprehensive publication about them. Follow these instructions and work in safety.

GENERAL MANAGER - ENGINEERING
TELECOM AUSTRALIA

Issue 1, 1981

ACKNOWLEDGEMENT

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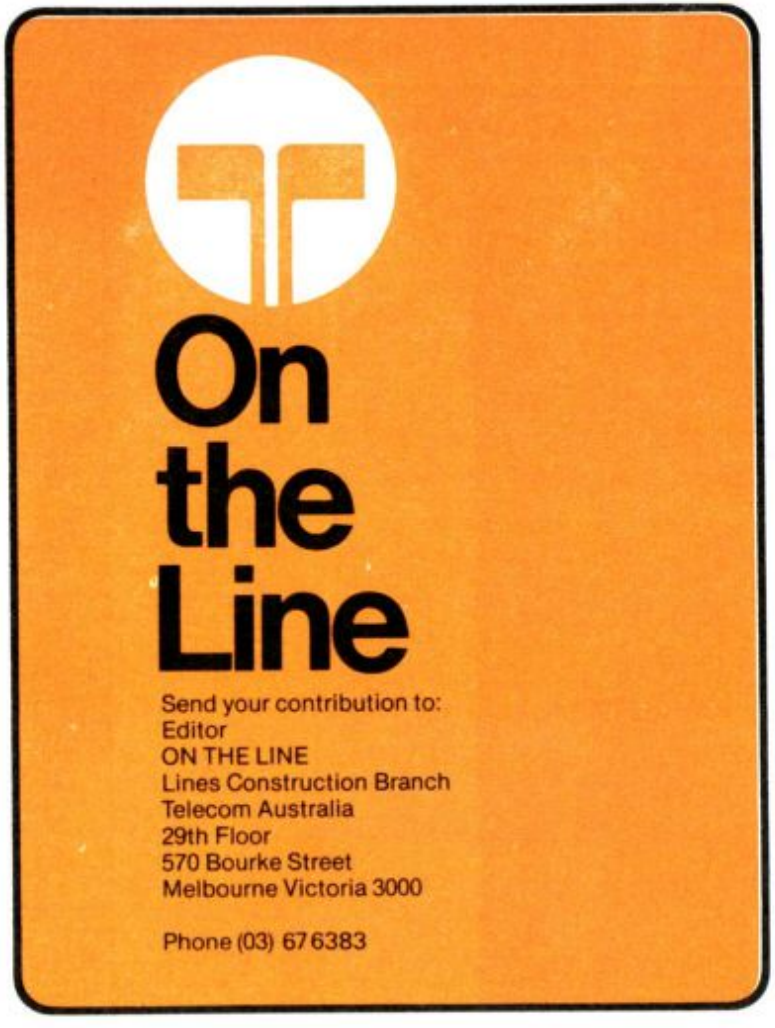
ON THE LINE



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ON THE LINE is your newspaper. It contains interesting facts, achievements, pictures, suggestions, problems, items of interest etc. It depends on contributions from External Plant Staff.

ON THE LINE is over 20 years old and your efforts have kept it afloat. Don't hesitate to contribute a story or your experiences, whether personal, technical, on or off the job. Assistance is available to help you prepare an article.

. Photographs can be arranged by your supervisor or District Telecom Officer.

. Drawings, sketches or cartoons can be organised by your District Telecom Office.

. If you supply the facts by phone or mail, ON THE LINE can organise a story.

. Names do not need to be published but would be appreciated.

. Nothing submitted, nothing published. Remember its your newspaper.

SECTION B

SAFETY GENERAL

- THE NEED FOR ACCIDENT PREVENTION
- THE EFFECTS OF ACCIDENTS ON
  - VICTIMS
  - SUPERVISORS AND THEIR STAFF
  - TELECOM
- LEARN THE FACTS ABOUT SAFETY
- ACTION TO BE TAKEN IN THE CASE OF AN ACCIDENT

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THE NEED FOR ACCIDENT PREVENTION

Accidents have cost Telecom millions of dollars and caused a great deal of suffering and hardship to staff concerned, together with anxiety and worry to their wives and families.

Lines staff have accounted for over half of the reported total lost time through accidents, and when this lost time is included with minor accidents they account for over 60% of the total accident costs in Telecom.

Consider the effects of accidents and the cost of injuries from several points of view; the victims', the supervisors' and their staff's, then Telecom's.

The Effects of Accidents on :

Victims

- Personal suffering and hardship
- Loss of earnings
- Inconvenience and cost to dependants due to an incapacitated member of the family
- Continuing disability in many cases of injury
- Incapacity for the same job again
- Incapacity for activities outside normal work, for example hobbies, sport, social activities.

Some of these effects can be measured in terms of money because the victims usually receive compensation or social service payments, but such payments cannot compensate for the inability of a person to lead a useful and satisfying life.

Supervisors and their Staff

What are the effects of an accident on you, the Supervisor?

How might you feel as the Supervisor?
How might it affect you as a Supervisor and your work output?

Such effects could be :

. Worry
. Difficulty in getting work done with less staff
. Extra reports, training, etc., with increased work load
. Loss of prestige
. Reduced promotion prospects.

How does an accident affect the staff under your control?

Accidents can lead to :

. Loss of staff morale
. Reduced work output
. Increased backlog.

Clearly,as a Supervisor you must do your utmost to prevent accidents to staff under your control. Read Section B of the Field Supervision and Depot Management Handbook. This Section deals with Supervisors' responsibilities.

Telecom

(a) Costs . Legal
. Administration and Management
. Damaged equipment, plant and material
. Lost production

(b) Others. Loss of a skilled worker
. Idle equipment and machinery
. Bad reputation.

These costs and time losses affect efficiency and reputation.

As well as their effect on those involved, accidents clearly reduce operating profits.

Much of the success of other organisations in substantially reducing their lost time accident rate is attributed to the training of supervisors in the basic principles of accident prevention.

Our Training Schools have a 3 day course in accident prevention which highlights the supervisor's role, and his responsibility for promoting safety to his staff.

. Supervisors must develop and maintain safety awareness in day-to-day work
. Management strongly supports and encourages supervisors to accept full responsibility for the prevention of accidents to staff under their control
. Telecom aims to achieve a significant reduction in the Lost Time Accidents.

Lines staff say to yourself :

"Let's meet the challenge to reduce the accident rate"
With support and active involvement by supervisors it can be done.

LEARN THE FACTS ABOUT SAFETY

The prevention of accidents in Telecom is not only the concern of management but should also be yours. You must learn how to work without hurting yourself or endangering your fellow workers. Your own efforts are important in keeping your workplace safe. Learning your work must involve learning to work safely. The correct way of doing any work must be safe; any unsafe way is wrong.

Stop and think for a moment what you have read about safety. Reading this handbook and the handbook on safety for external plant staff "Line up your Safety" should help make you more aware of why it is important to prevent accidents.

You will need to develop this awareness till it is an integral part of your skill. As long as you are learning something about your job you should be learning how to do it safely.

You need to develop an almost instinctive control over your actions so that you do not expose yourself or others to injury.

LEARN TO ACT AND WORK SAFELY

Accident Prevention

Accidents can be prevented by eliminating possible causes. The place to start is with yourself. The best people to work with are those who are alert and considerate, careful and responsible. You will win the respect of these people by developing similar qualities. This handbook will help you to prevent accidents and the instructions will tell you how to :

- make your general work habits safe
- prevent hazards developing
- act in an emergency.

REPORT ALL ACCIDENTS OR DAMAGE TO EQUIPMENT NO MATTER HOW MINOR THEY SEEM TO BE. MINOR DAMAGE COULD DEVELOP INTO SERIOUS FAILURE IF NOT REPORTED.

Safety is our Responsibility

- We are responsible for our own safety
- We are also responsible for the safety of our workmates and the public
- We must know and put into use the safety procedures appropriate to each job
- We must wear and use the safety equipment appropriate to each job.

It is our duty to report any condition which may result in a hazard.

SAFETY GENERAL

SAFETY AWARENESS IS BEING RESPONSIBLE

Safety rules are for protection of human lives. There are a considerable number of other official publications containing safety rules which can and do prevent many accidents, but there are times when a safety rule is not effective. For example :

- When it is seen - but not read
- When it is read - but not applied
- When it is known - but not obeyed
- When it is deliberately violated.

Statistics show that most accidents are caused by the simpler tasks :

- Handling, lifting, carrying, being struck by or caught between moving objects
- Falls from ladders, stairs, steps and even falling on level ground
- Slipping on or striking against objects
- Driving motor vehicles - mainly through failure to follow road rules and to practice normal courtesy.

Do we think enough about the hazards of such tasks? - Obviously not. If we did, we could reduce these accidents to tens instead of recording hundreds and thousands. Think more about accident prevention in all tasks. Observe the safety precautions and look for the hazards. By doing so we can win and prevent accidents.

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What is an Accident?

An accident is an uncontrolled sequence of events which reasonable precautions could prevent, and usually results in damage to people, property and/or production.

Every day, all over the world people are being killed, blinded or maimed in accidents. You think : "This won't happen to me. It happens to the other chap, but not me". These things do happen to people like you. Perhaps not today. Perhaps not this week. Perhaps not even this year. But sooner or later, and more likely sooner, accidents happen to people like you if you don't know how or don't bother to guard against them.

If you are involved in an accident where injury or illness occurs, make sure you give an accurate report of the accident to your Lines Officer or Lines Supervisor. He will report the accident to his superior and fill in an Accident Report Form, P400.

After the P400 is filled in the accident will be investigated to find out what caused it. Action will then be taken to try to prevent a similar accident. It is important to give a complete and true account of the accident so that the right corrective action can be taken.

Distribution of P 400

The correct distribution of accident report forms (P 400) is as follows :

(a) Page 1 (white copy) - forward direct to Personnel Department, Assessing Unit, 25th Floor, 570 Bourke Street, Melbourne
(b) Page 2 (pink copy) - forward direct to Personnel Department, Chief Accident Prevention Officer, 26th Floor, 570 Bourke Street, Melbourne
(c) Page 3 (yellow copy) - to be kept by Staff Clerk
(d) Page 4 (blue copy) - to be forwarded to supervisory officer.

SAFETY GENERAL

Remember that, unless the facts are known, the best action which can be taken to avoid a repetition may be overlooked. All accidents must be reported, claim or not, injury or not. If an accident claim is likely under the Compensation Act 1971-74 it is essential to report the accident promptly and make a claim for compensation as soon as possible.

Remember, accidents happen when :

. There is something wrong with the materials
. There is something wrong with the tools
. There is something wrong with the method
. There is something wrong with the person.

ACTION TO BE TAKEN IN THE CASE OF AN ACCIDENT

Be prepared to act immediately an accident occurs. Quick and organised action can prevent further injuries, prevent suffering and even save a life.

Don't panic.
Take charge (someone has to).
Assess the situation :

. Any injuries?
. How many?
. How bad?

Delegate people to do specific things; particularly with serious accidents. Send someone to phone police and someone to phone for an ambulance. Do not move the victim; unnecessary movement can seriously aggrevate injuries. If there is a risk of further injuries, i.e., due to fuel igniting, then only should movement of the injured person to a safer area be considered.

Remember the A-B-C of saving lives.

TELECOM AUSTRALIA POLICY ON SAFETY

It is the policy of this Commission that every employee shall be provided with a safe and healthy place in which to work. To this end, every reasonable effort will be made in your interest in the fields of accident prevention, fire protection and health preservation.

In particular terms, this policy is :

. To place the safety of employees and the public ahead of protection of its equipment and service
. To provide and maintain a safe plant
. To ensure that all staff are instructed how to perform their jobs safely
. To train supervisors in high and potentially high accident rate areas in the basic principles of accident prevention
. To establish safety committees in appropriate areas and to provide for employee consultation on accident prevention measures
. To hold all levels of management fully responsible and accountable for accidents in the areas under their control
. To ascertain the cause of and take corrective action for every accident, whether it has caused injury or not
. To regard all industrial accidents as preventable.

Observe Your Work Area and Look For :

. Work being carried out without authority
. Hazardous work being carried out without a warning or signal to people nearby
. Failing to secure materials or equipment against unexpected movements
. Taking unsafe positions or posture
. Operating or working at unsafe rate (eg running, jumping, rushing work)
. Loading, placing, storing, mixing, etc unsafely.

Observe the Operation of Equipment and Look For :

- Working on moving or hazardous equipment
- Using unsafe equipment and using equipment unsafely
- Safeguards provided
- Clothing of employees (failure to use and wear personal protective clothing and equipment)
- Conduct of others.

NOTE : All the above points are dealt with in more detail under relevant sections in this Handbook.

SECTION C

SAFETY PRECAUTIONS

- FALLS, FALLING OBJECTS
- STRIKING AGAINST OBJECTS
- LIKELY HAZARDS, SAFETY TIPS
- SOLDERING TOOLS
- COMPRESSED AIR
- NOISE HAZARDS
- DUST HAZARDS

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FALLS, FALLING OBJECTS

From Telecom's accident report falls and falling objects cover a third of all accidents each year. A large number of these occur as a result of persons stumbling on loose objects or slipping on wet, dirty or greasy floors on level surfaces. Many of these accidents should not have happened if good housekeeping had been encouraged and maintained.

Good housekeeping cannot be achieved by an occasional grand clean-up; it is a continuous condition which must be given proper attention. Senior management must set a good example by initiating a housekeeping programme and insisting on good housekeeping practices throughout the whole organisation. For the programme to be a success you must give it your full support.

The employee is responsible for keeping his own work site clean and tidy. Management cannot be at all places all the time, therefore it is your responsibility to keep tools and equipment in their proper place.

UNSAFE CONDITIONS OF WORK

The Work Area

Just as your home must be kept clean and tidy to be safe and pleasant to live in, so should your work area be clean and tidy for it to be safe and pleasant to work in. Have a place for everything and keep everything in its place. This is called good housekeeping.

SAFETY PRECAUTIONS

SAFE CONDITIONS
KEEP WORKPLACE
SAFE AND EFFICIENT

- Keep all passageways, aisles and exits clear of obstructions over which people could trip
- Remove immediately any oils, paints, greases and other fluids that have spilt on the floor
- Keep your work area clear and tidy and do not allow discarded pieces of material to accumulate
- Do not leave tools and materials scattered about thoughtlessly while you are on a particular job
- Put away all the tools you are not using
- Returning tools to their correct place is not only being safe, it is also being considerate of your workmates who also need the tools
- Use the receptacles provided for waste and refuse
- Stack materials so that they cannot fall and so that they do not project dangerously
- It is particularly dangerous to have round stock lying on the floor.

Slips and Falls

Slips and falls are the top problem for anyone concerned with safety. These accidents are responsible for many hours and days of lost time and often result in fatalities or permanent disabilities.

SAFETY PRECAUTIONS

If a serious accident happens at home to a member of the family the worry is with us at work so that our minds wonder from the job on hand and we become careless. The accident at home may then lead to another at work.

We all have to be on the lookout for the little things that cause slips and falls. Some simple, safe rules you should follow, not only on the job, but at home and on the street as well, are :

Walk - don't run. You'll save yourself a lot of grief and headaches. Leave the running to track men.

Notice danger ahead of you. You'll protect your life, limbs and wallet.

When you are on stairs, ladders, ramps and walkways, you have to be especially careful to walk and to watch your step. Use hand rails where provided. Running on patches of loose stone or gravel, mud or wet clay is very dangerous.

You may feel that all this talk about running only refers to the youngsters and that older men could not be accused of doing anything so undignified. However, stairs are a typical example in which you may catch yourself out.

Don't Fall For It

It pays to be alert. Here are a few examples of situations where accidents are likely to occur.

- Entering or leaving manholes, trenches or other excavations
- Working on uneven ground or in wet and slippery conditions
- Failing to look where you are going

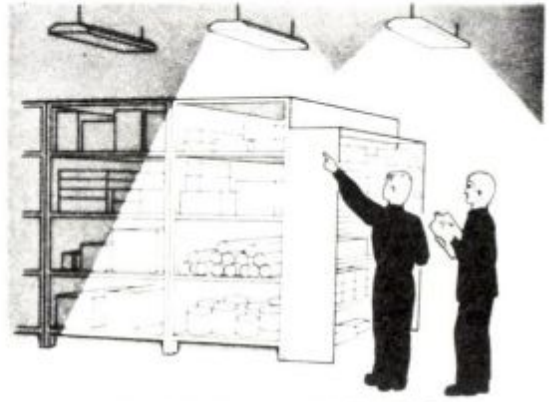
SAFETY PRECAUTIONS

- Hurrying or slipping on uneven surfaces, ladders, stairs or ramps (ladders include manhole ladders)
- Using makeshift supports such as boxes, drums or chairs
- Carrying bulky objects which obstruct the view
- Running up or down stairs
- Failing to realise that the stair handrail is a safety aid and should be used
- Failing to take extra care where a hand rail is not available
- Reading, putting on an overcoat or similar acts while going up or down stairs
- Failing to use both hands for gripping ladders when climbing up or down
- Wearing badly worn boots or shoes or inadequate footwear such as thongs etc.
- Day dreaming and skylarking.

Don't fall for an accident. Experience show that when we slip or fall certain facts are usually apparent.

Look for :

- Defective surfaces or equipment
- Poorly maintained ladders
- Insecure platform or ladder
- Inadequate lighting



REPORT FAULTY LIGHTING

Danger of Falling While Climbing Ladders

Body balance is essential for safe work on ladders. Place the weight of your body on both feet, therefore giving you balance. Shifting the body or reaching too far from the ladder may cause loss of balance and a dangerous fall. Remember that your movement is restricted, which is a fact often forgotten.

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Safety Belt

On climbing a ladder you must secure yourself to the pole with a safety belt as soon as you reach the working position. You are permitted to remove the belt only to change your working position or to descend the ladder.

Safety Line

Before starting work aloft, a safety line must be secured to the pole. This line is your life line - it can be the difference between life and death in the event of electrical accident so be sure to use it when you next climb a pole.

Manhole Ladders

Many injuries are caused by falls from manhole ladders. Maybe we are lulled into a sense of false security and imagine that the drop is not as dangerous as from the top of a pole.

But think again!

- Manhole ladder rungs are metal and smaller in cross section than ordinary ladder rungs. They are smoother than wood rungs and provide less bearing surface as well as less friction or grip
- Being underground, the ladder rungs are usually damp or wet, even the part above water
- Many types of footwear, even safety boots and shoes, have rubber soles

MANHOLE LADDERS

. Think about the combination of a damp or wet small metal bearing area (the rungs) and rubber or other smooth shoe or boot soles - the perfect situation for a slip unless you descent and climb slowly and carefully
. Make sure that your feet are placed well forward on the ladder rungs and grip the ladder firmly with your hands.

Remember that the first few steps descending and the last few steps leaving a manhole are the most dangerous because there is nothing secure above ground to hold on to. If you allow that extra few seconds to take special care you can help eliminate this type of accident.

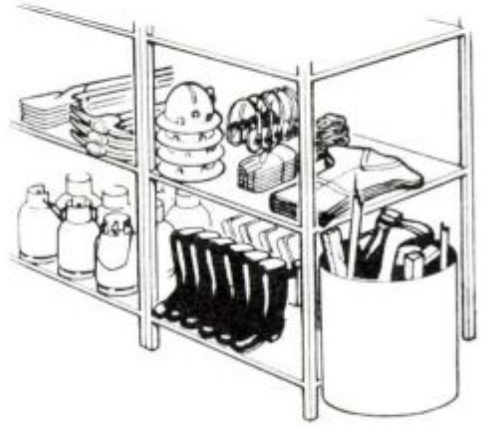
STRIKING AGAINST OBJECTS

Here again good housekeeping plays an important part in preventing accidents caused by striking against an object or even being struck by a falling object.

Housekeeping means cleanliness and orderliness. Store material in its correct place and dispose of scraps and off cuts in bins - a place for everything and everything in its place.

Do not allow material to protrude from its storage rack and make sure all material or tools are stored well away from the edge of the rack.

If you come up against a situation where metal protrudes beyond the shelf take corrective action by removing or restoring the object safely. If unable to do so immediately, tie colourful rags on the end so as to attract attention to the hazard. Report the problem to your supervisor.



Aisles are marked on the floors to show definite avenues of travel. These aisles must be kept clear of all material, parts, and so on, to reduce hazards.

Don't form a habit of leaving things in a gangway "just for a moment". This habit will sooner or later lead to an accident.

NOTE : Machines and other apparatus should be so placed that the employee has adequate working space, and travelling ways should be of such width that employees may move without danger. Adequate drainage of the work place and travelling ways should be provided.

Protect Yourself

- Stay out from under cranes, suspended loads, overhead work
- Stand clear when you hear warning bells or horns or power trucks and overhead equipment
- Keep clear of barricaded areas
- Wear protective equipment as required.

Head protection is a must on certain jobs, especially around overhead work or where there might be falling objects. Be hard-hatted, not hard-headed!

Mandatory Wearing of Protective Clothing

The policy on the mandatory wearing of protective clothings and equipment prescribes clearly the conditions for which industrial helmets (safety cap and safety hat style) shall be worn (see EI LINES General SP 1020 titled Safety Helmets for Lines Staff).

The following relates to the likelihood of persons being injured by objects falling :

- When working below another person and there is likelihood of persons being injured by objects falling from above and it is impracticable to provide overhead protection
- In any other work situation where in the opinion of the Supervising Officer a safety hazard exists and there is a danger from falling objects, or staff are likely to injure their heads in performing their duties.

SAFETY PRECAUTIONS

Look out Below!

That yell, "look out below!" usually comes too late to protect the man who is being told to look out. So to prevent accidents involving falling objects, we need more that lung power.

In most cases where something falls on a man from above, two parties are at fault - the one who causes something to fall, and the one who is in a position to be hit if something falls.

Almost always, things that fall are tools or material being used on jobs. The man above knows there are people below, and those below know there are people working above. Knowing these facts, these people can do a lot to prevent such accidents.

The Man Above

He is responsible for letting the people below know that he's working over their heads. Then he has the responsibility to watch his tools, equipment and materials, to make sure that none are dropped or knocked down.

Some jobs, by their very nature, involve such a great danger of falling objects that they require that the area below be cleared and roped off and signs posted. Others can be handled safely, with a little extra precaution with tools and loose material.

Don't put tools carelessly into your pockets, where they may fall out when you bend over or lean and reach.

If your job does require a cleared area below for safety, check with somebody in authority before you start working. Go to your supervisor and be sure he understands what you're going to do, and when you're going to do it. He can arrange for someone to keep watch to make sure that no one enters the danger area.

The Man Below

People working on the ground or floor below have a responsibility, too. If you're warned to stay out of an area, stay out, for your life's sake. And if there's work overhead that looks risky to you, and you haven't been warned away, ask your supervisor if it isn't time to go.

In some kinds of work, the hazard of falling objects is so great that a protective helmet is needed at all times. Just remember this, the best hat in the world won't save a skull if the hat isn't worn. So if yours is a job that calls for a hard hat, keep it on and keep alive.

Another kind of falling object accident most common is the object that doesn't fall from overhead, but from your hand or from your bench. It's not likely to kill, but if it's heavy, it can smash toes!

That's why every man who works with heavy tools or material must wear footwear with hard steel caps built in to act as helmets over his toes.

Get those safety boots or shoes and keep wearing them if you want to stand on your own two feet.

LIKELY HAZARDS, SAFETY TIPS

One person cannot know all about everything. It takes a long time for any person to learn all he may be reasonably expected to know. Realise the limitation of your own knowledge and experience so that you do not endanger yourself or others by your ignorance. It never hurts to ask but it often hurts not to ask.

- Learn and respect the limitations of various jobs
- Never attempt to operate any machine you have not been trained to use
- Always ask you supervisor for instruction on the use of any unfamiliar equipment you are required to use.
- Never operate any tap or valve unless you are authorised to do so. Avoid distorting any pipe work
- Always take extra care when working in unfamiliar situations.

Only licensed employees are permitted to undertake certain activities, such as electrical work, the operation of explosive powered tools, crane driving, rigging, scaffolding and plumbing. Unauthorised interference with electrical equipment is both hazardous and against the law.

You be the Judge

We all have a personal responsibility to work safely whatever the situation. We must set a good example and follow safe working practices which will encourage others to do the same. The life of any one of us can depend on our overall performance in accident prevention.

You may sometime come across a fellow worker who believes that not wearing a safety belt, not tying a ladder, not using a safety line, not wearing a helmet etc, are courageous actions. Such a person is empty headed and a danger to himself and those nearby. People who shun safety will become a statistic.

HOT STUFF - SOLDERING TOOLS

Yes, a hot soldering iron is HOT! Accident reports show that some linemen forget this simple fact.

They forget also that just a touch of soldering tool will sear flesh, or in the case of your eyes possibly cause the loss of sight.

What Hazards do Soldering Tools Represent?

. Remember, an operating soldering tool is hot. To find out how hot the tool is, or to determine if it will melt solder, make a test with a piece of solder held against the tip. Don't hold the tool near the face or hand to feel the heat of the tip (accident reports show that people do this)

The only way to determine if a tool will melt solder is to test it with solder

. Working position is another important factor in the safe use of the soldering tool

Have the face of the soldering tool above the work. Reaching up to solder overhead is bound to lead to an accident caused by falling hot solder or other objects

. When soldering keep the hand clear of the tip and heating element. Hold the solder at least 50 mm from the end or severe burns can result from heat transferred from the tool tip

SAFETY PRECAUTIONS

. Avoid accumulation of excess solder on the tool tip, wipe off excess solder or drop it into a tin. Flicking the solder from the tip or terminal is dangerous - molten metal may get into eyes, ears or hair

. These notes are written from an accident prevention viewpoint, but do not forget that circuit failures may be caused if solder splatters over terminals or equipment

Taking precautions for personal safety in the use of soldering tools will enhance the safety of those nearby.

. Avoid soldering over the heads of persons standing or working below

. Avoid handing a hot tool to another person. The safe way is to first place it in a holder or rest. Then the handle can be grasped firmly

A hot soldering tool will ignite combustible material. The only way to eliminate this fire hazard is to place it in its holder or rest after using the tool.

The use of the electric soldering tool requires additional safety precautions

. Keep the soldering tool and cord out of the way of others

. Never leave an operating soldering tool unattended or unprotected. When the tool is to be left unattended, or its use is no longer required, disconnect the plug from the outlet

When using an electric or gas soldering tool and especially at customer's premises, always remember that other people and particularly small children may not be aware of the accident hazards.

SAFETY NOTE : Remember a soldering tool lead lying on the floor or footpath is a hazard to everyone who walks in the vicinity. Use guards where necessary or protect the lead with boards.

Maintenance of Electric Soldering Tool

Safety of any electric tool depends upon keeping that tool in good operating condition.

Maintenance of electric soldering tools should include :

. Inspect the cord and plug

  Never use any electrical tool with faulty or damaged lead or plug. Return it immediately for replacement.

. Check the handle, make sure it is tight and free of cracks and splinters

. Keep the tip dressed and free of sharp lips or gouges. A mooth tip will slide easily from a soldering lug. A rough tip will catch and jerk which may cause hot solder to splatter over your hands and arms, or in your eyes, ears or hair

. Be sure the tip is anchored securely in the element housing.

You should have time for safety especially when using a soldering tool in order to protect yourself and others near you.

SAFETY PRECAUTIONS

No job is so urgent or so important that you cannot take time to do it safely.

Remove Solder Safely

The best and safest way to clean tags is to use a hot soldering tool and more solder.

If the tag is horizontal - apply tool underneath the tag until it is hot, a touch of solder on tag and tool will cause all the solder on the tag to become fluid, a process which is aided by the flux supplied by the additional touch of solder.

If the tool is lowered gradually all surplus solder on the tag will be drawn off, leaving the tag clean and smoooth, ready for reterminating.

If the tag is vertical - take more care because surplus solder, if not prevented, will flow down the tag holes of the block. The thick solder, therefore, must be melted using a soldering tool, and drawn upwards from the tag using a scraper. A scraper may be made from a piece of old hack-saw blade suitably shaped. Take care to avoid flicking the molten solder upwards, as there is a risk of hot solder entering your own or your mate's eye.

Having removed the surplus, a further application of the soldering tool and a small touch of solder will make the tag clean and ready for re-use. Safety glasses must be worn at all times while cleaning tags.

COMPRESSED AIR

Compressed air is available from various sources such as air compressors, compressed air cylinders, reticulation lines and outlets.

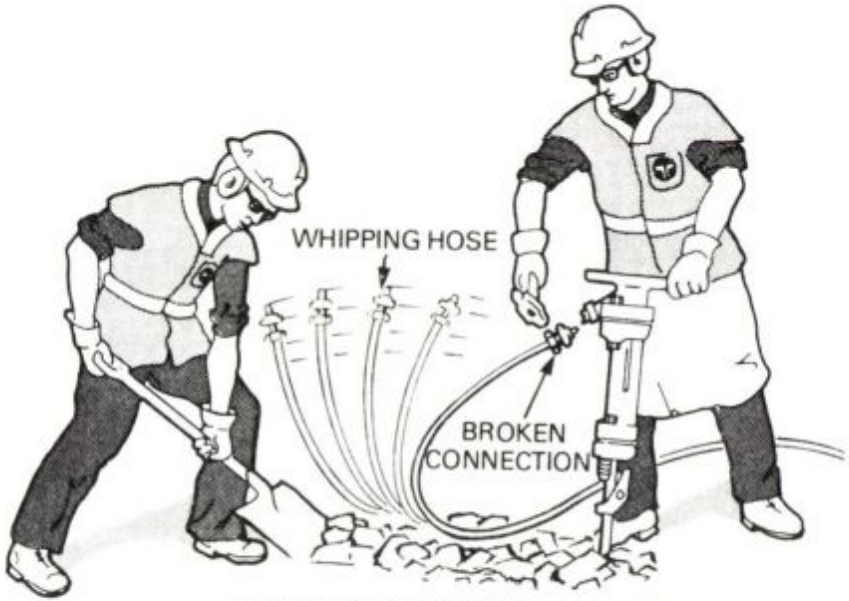
Air compressors must only be operated by trained operators with a current certificate of competency. The operator is responsible for maintaining the machine in a safe condition in accordance with the appropriate service chart.

Accidents can be prevented by recognising the real cause and taking suitable precautions

. Do not use air hoses that are in any way faulty. Air hoses should be replaced as soon as they commence to perish. If the hose end becomes soft and spongy a short length can be removed and the hose coupling refitted

. Do not continue to use pneumatic tools that are in any way faulty. Continued use of the tool may lead to parts breaking off, and causing injury from flying pieces

. Do not tighten hose fittings excessively by using a hammer. If the fittings fracture with high pressure air in the hose serious injury can occur



DON'T USE A HAMMER TO TIGHTEN COUPLINGS — INJURY CAN OCCUR

SAFETY PRECAUTIONS

Take great care to avoid the folloing injuries associated with the use of compressed air :

- Physical injury from the bursting of equipment, vessels or hoses containing compressed air
- Injury from foreign substances being blown into the eye, ear or onto the skin
- Internal injury from compressed air entering the body. Such injuries can often prove fatal
- External injury from a blast of compressed air
- Noise induced hearing loss caused by a high velocity air blast
- Injury caused through an explosion of the air compressor due to the accumulation of oil in the air receiver. Drain the air receiver at least twice daily to remove oil, moisture, etc

Safety Note : It's good sense to be aware of the hazards of using compressed air.

Restrictions in use of Compressed Air

Compressed air from a compressed air system shall not be used :

- For personal cooling
- To remove dust or other material from the clothing or body
- To clean the compressor or tools
- For general cleaning purposes

Other precautions which must be observed are :

. Do not direct a compressed air stream at any employee. Practical jokes with compressed air are strictly prohibited

. Do not bend the air hose to cut off the air supply to a tool

. Hoses crossing traffic way must be protected by two boards of adequate dimensions laid on either side of the hose

Safety Clothing and Equipment

Wear a leather apron when operating pneumatic tools because the exhaust contains oil and moisture which will affect clothing.

. Adjust the exhaust deflector to direct the exhaust outlet away from the operator

. In dusty conditions wear a respirator mask and use the water spray attachment on pneumatic tools

. Wear safety footwear to avoid foot injury

. Wear ears muffs in noisy conditions

. When using a pneumatic tool for breaking concrete, safety goggles, high impact type (Serial 34/43) of wide vision, should be worn

The Air Compressor (General)

. An air compressor is equipment with automatic mechanisms which stop the air compressing operation at a pre-determined pressure

. The air supplied from a compressed air system is such that it does not exceed the recommended contaiminated level within the breathing zone of any employee.

NOISE HAZARDS

Exposure to intensive noise can cause temporary or even permanent loss of hearing, depending on the length of exposure and the intensity of the sound. Ear muffs provide the best protection from high noise levels. The type supplied to external plant staff can be worn with safety helmets.

Definition

Noise has been described as a sound without agreeable musical quality, or as an unwanted or undesired sound. The decibel (dB) is a term used to described the intensity of sound. It is a unit of graduation; to say that a sound is 60 dB means that it is 60 dB more intense than a sound standardised as the reference level.

The potential cost of noise - induced hearing loss to industry is greater than for any other occupational disease. Telecom places noise control in the same category as, for example, safety against electrical accidents and AC portable power tools safety. Workers are entitled to be protected against loss of hearing as much as they are against injury and other occupational accident.

Noise Mitigation Programme

Telecom has introduced a Noise Mitigation programme with the following aim :

. No Telecom employee will be exposed to a noise level greater than 85 dB over a normal working day
. To reduce machinery noise levels to a practical minimum
. To carry out a staff education and awareness campaign at work locations
. Trained staff to carry out testing of work sites - Environmental/ Machine noise - Personal noise dosimetry - octave band analysis of problem areas/machines

The staff education and awareness programme is carried out by your occupational health nurse in liaison with your safety officer.

Noise survey tests are conducted by trained staff to measure :

. background noise level
. the maximum sound pressure level under normal working conditions at operating positions within the test site. Testing is discontinued if the maximum level is less than 85 dB
. identify and measure the primary noise sources within the site

. persons in the area subjected to noise dose; these persons include operators of noisy machines, persons exposed to highest noise levels on entering noisy areas during the course of a working day. Measurements to be taken "INSIDE" and "OUTSIDE" the Ear Muff

A noise monitoring instrument "Metrologger" is used to monitor the noise level the employee is exposed to in the course of the working day. The Metrologger is a unique pocket-size instrument which can be worn in the pocket or on the belt as a personal dosimeter.

Noise Susceptibility

Not everyone develops the same hearing loss when exposed to the same noise; some susceptible persons develop impairment comparatively quickly. Such persons are often aware that noise disturbs them more than others; many suffer from undue head noise after a day's work and some from nausea and loss of balance.

The cause of susceptibility is not apparent. Nor is it known whether the condition is permanent and stable throughout life, or the temporary outcome of a metabolism disorder.

Attempts have been made to detect the susceptible person. There are tests, but none is generally accepted for field use.

Noise annoyance is largely an individual response, and varies with person and situations.

Effects on Efficiency and Performance

The effect of noise on efficiency is derived partly from industrial experience and partly from laboratory studies. It is difficult to demonstrate any prolonged effect on performance or working efficiency but, inasmuch as sound can cause annoyance, accidents or difficulty in communication, and may be a factor in absenteeism, some effect may be presumed.

Other Effects of Noise

In certain circumstances, noise may cause a loss of electrical resistance in the skin, reduced gastric activity, or increased muscle tension. Exposure to short loud sounds can cause temporary rise in breathing and heart rates, a rise of blood pressure, or a lessened flow of gastric juice, but these responses quickly subside when the noise ceases.

Excessive noise may cause :

- dizziness
- loss of balance
- oscillation of the eyeballs

Personal protective devices are the only practical and economical method of reducing the risk, and no programme can be considered successful until you - the worker - insist on wearing the protectors. The object of an ear-protector is to limit the amount of sound reaching the drum, so lessening the possibility of annoyance or hearing loss.

Ear muffs are provided for your safety, so wear them when you are subjected to high noise levels or excessive noise causing annoyance.

Deafness is an occupational disease which leads to serious emotional problems, voice deficiency and pain. So don't risk your hearing for the sake of the simple process of not placing the ear-muff correctly on your ears.

Correct wearing of ear-muffs is essential. Place the cups vertically to cover the complete ear obtaining a close fit and higher insulation value.

Safety Note : A simple rule is : Wear ear-muffs when you have to shout to communicate with your fellow worker.

EVERYDAY NOISES
Identifying harmful noise sources

	Sound intensity ratio	Sound level in dB (A)		Sound source
Harmful range	1000000000000000	140		Jet engine
	10000000000000	130		Riveting hammer
				THRESHOLD OF FEELING
Constant exposure requires protection	1000000000000	120		Propeller aircraft
Protection range				
	100000000000	110		Rock drill
Critical zone	10000000000	100		Plate fabrication shop
	1000000000	90		Heavy vehicle
		85		
	100000000	80		Very busy traffic
	10000000	70		Private car
	1000000	60		Ordinary conversation
Safe range	100000	50		
	10000	40		Soft music from radio
	1000	30		Quiet whisper
	100	20		Quiet urban dwelling
	10	10		Rustle of a leaf
	1	0		THRESHOLD OF HEARING

Telecom Australia

Issued in the interests of safer living at work – at home – on the road, by the Accident Prevention Section, Headquarters.

DUST HAZARDS

There has in the past been a lack of interest in this health hazard. Industrial indifference extends from the fact that current evidence suggests that no long term chronic health conditions are likely to result from exposure. However, free fibre particles of dust suspended in the air may enter the respiratory system and cause temporary personal discomfort. To overcome this, precatuions can be taken by wearing a respirator mask, using an exhaust fan or water spray will minimise the inhallation of dust particles.

Most modern houses and an increasing number of older houses are insulated in the ceiling and in some cases the wall cavity areas. If working in sub floor and above ceiling situation take precautions against some insulants such as fibreglass because the fibre particles irritate the skin and the respiratory system.

Precautions against irritant insulation materials and when working in very dusty conditions are :

. An airborne contaminants facemask be made available if felt that dust etc., could cause discomfort
. Protective gloves should be worn
. Combination overalls should be worn if only for the period while in contact with the insulation. Overalls should not be mandatory especially in hot climates where comfortable clothing may be preferred by staff
. Appropriate eye protection should be worn
. On completion of work, insulation material adhering to the overalls or clothing should be removed by brushing with a suitable brush, and any exposed part of the body should be washed with soap and water.

Dust particles, not only a hazard to the respiratory system but also to the eye, could cause soreness and require medical treatment if small foreign matter enter the inside of the eye.

Use the wide vision high impact lens type of goggles (Serial 34/73) for extra protection around the eyes. Ensure that the goggles are a good fit and firmly strapped around your head.

SECTION D

MANUAL HANDLING AND LIFTING

- GENERAL PRINCIPLES
- KEY FACTORS IN HANDLING A LOAD
- POSITION FEET CORRECTLY
- MAINTAIN A STRAIGHT BACK
- LOWER THE BODY
- CORRECT HOLD
- POSITION THE HEAD
- POSITION THE ARMS
- USE LEGS
- USE OF BODY WEIGHT
- SHOVELLING
- LIFTING AND HANDLING TELECOM MATERIAL
- DANGER TO OLDER PEOPLE

Issue 1, 1981

MANUAL HANDLING AND LIFTING

GENERAL PRINCIPLES

Manual lifting and carrying can subject the body to great strain and frequently causes serious and permanent back injury if done incorrectly. These injuries often accumulate over a period of time.

To prevent injuries resulting from the lifting and carrying of objects :

- Use suitable mechanical equipment whenever possible
- Use the appropriate protective equipment
- Learn the correct methods of lifting and carrying.

For handling heavy material or equipment use mechanical aids, but there are still many operations which call for manual handling and lifting.

Many accidents occur during lifting or lowering, pushing or pulling while handling material or equipment. These accidents are caused by workmen using wrong methods or attempting to lift or carry weight beyond their physical capacity.

Result :

- Strained back muscles
- Prolapsed discs (slipped forward or down out of place)
- Ruptured spinal discs
- Hernia
- Other painful injuries.

Avoid these injuries by handling and lifting material with the application of proper manual lifting techniques, particularly bending the knees and using the leg muscles rather than the back to do the work.

MANUAL HANDLING AND LIFTING

The correct method of manual handling and lifting avoids use of "brute force" and produces an efficient lifting action with the maximum of safety. This method requires knowledge of several principles :

Before starting any handling procedure :

- Size up the load
- Position the feet correctly for balance
- Obtain a proper hold on the object
- Maintain a straight back
- Make maximum use of the powerful leg muscles and body weight
- Bend your knees.

KEY FACTORS IN HANDLING A LOAD

Size up the Load

If required to manually lift a load, size up the load first and make the following observations :

- Is it too heavy or unexpectedly light?
- Is it bulky or awkward to handle?
- Is there a mechanical aid available?
- Can it hinder vision?
- Does it need more than one person to handle it safely?
- Consider the area; is it slippery or rough?
- Is there sufficient space to lift correctly?

When loads are excessively heavy, bulky or awkward so that they cannot be readily grasped, would cause loss of balance, or would hinder the vision of one person, two or more persons should share the load. The use of simple handling aids such as rollers, skids, trolleys, jacks or levers should be considered.

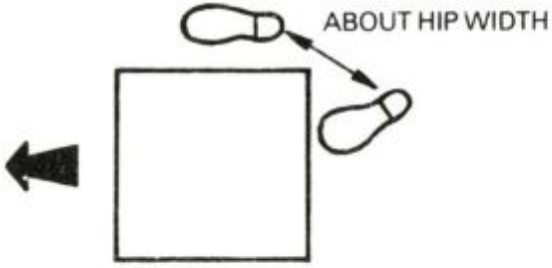
Dirty, greasy or wet articles must be cleaned when such conditions would make the load hard to hold. Otherwise handle with hooks, ropes or other lifting aids.

POSITION FEET CORRECTLY

Position the feet in a secure position and comfortably apart. Place one foot beside the load and the other behind the load before lifting proceeds. This is necessary for proper balance.

When lifting, the feet should be placed close to the load in order to keep the back straight, allowing the load to spread evenly over the surface of the discs and avoiding strain on the back muscles. The hard work of lifting is done by the powerful leg muscles. REMEMBER TO BEND YOUR KNEES!

- Place feet around load
- Feet comfortably apart



MANUAL HANDLING AND LIFTING

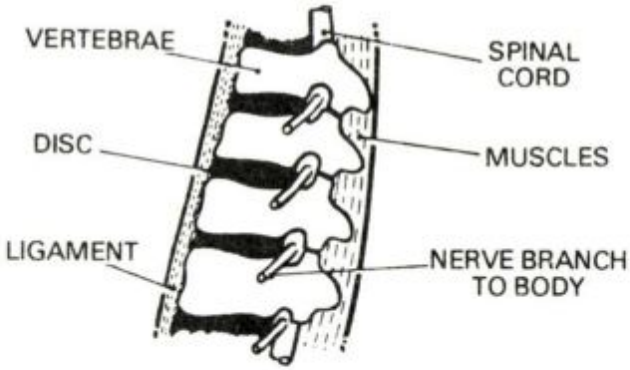
- When lowering the load it should if possible be positioned between the feet
- For forward movement the front foot should be placed beside the load and pointing in the direction of movement
- When moving backwards (removing loads from a bench or rack) one foot should be placed backwards to take the combined weight of load and body. Most of the weight should be on the rear foot before any pivoting movement is made.

- Front foot gives balance.
- Rear foot gives thrust.

- Rear foot safeguards balance.
- Front leg, with knee slightly bent to allow body to move back, does the thrusting.

MAINTAIN A STRAIGHT BACK

A straight back is the most important factor in avoiding back injury, however a straight back does not imply a vertical back. For example the body may be inclined forward during lifting operations.



The strongest position of the spine is the straight position; any other position increases strain on the back muscles, ligaments and discs.

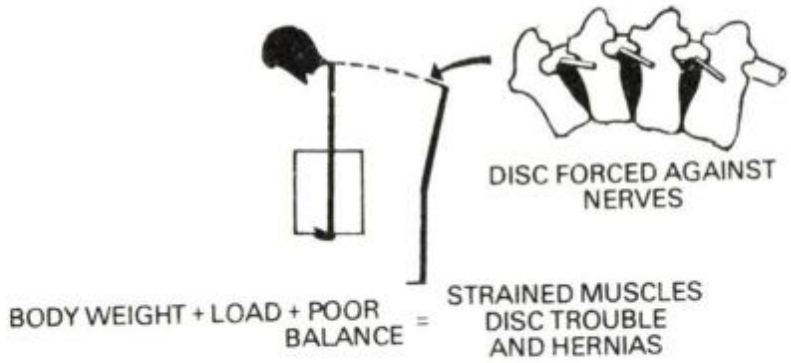
Avoid twisting; all handling movements should be carried out smoothly and rhythmically to avoid imposing undue strain on the back muscles or spine.

LOWER THE BODY

Relax the legs and get down to the load. Try to keep the advances leg to an angle greater than 90^{o} otherwise maximum leg thrust will be lost. Keep the advanced foot flat on the ground. The heel of the rear foot may be raised off the ground and the leg pivoted on the ball of that foot. Bend at the knees, not with your back.

Lifting with a bent back can cause strained back muscles, ligaments, ruptured discs and hernias because :

MANUAL HANDLING AND LIFTING



- The spine is working at a mechanical disadvantage; the spinal muscles must lift the load plus the weight of the trunk, head and arms

- With the lower back flexed the discs are compressed at the front and extremely high pressures are exerted at the rear of the discs. With excessive strain the disc can burst and the jelly-like contents extrude. These extrusions can press on nerves and ligaments causing severe pain and disability

- There is an excessive build up of pressure in the abdomen to help support the back which increases the risk of hernias.

MANUAL HANDLING AND LIFTING

Lifting with a straight back avoids strain - prevents injury because :

. The load is spread evenly over the surface of the discs and there is no tendency for them to protrude or rupture

. There is no strain on the back muscles. The hard work of lifting is done by the powerful leg muscles.

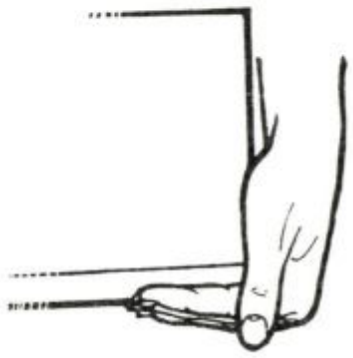
. The lower abdomen is not compressed and the risk of a hernia is reduced

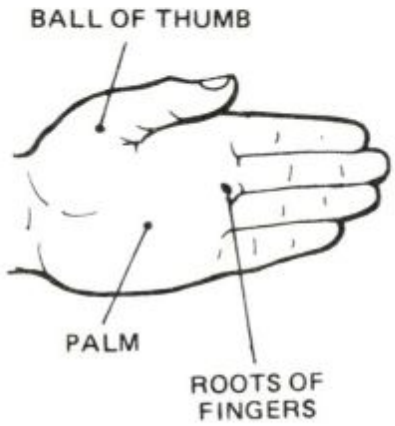
. Bend your knees
. Back straight, knees relaxed
. Head up - chin in.

CORRECT HOLD

The hand must have a comfortable and secure hold on the object. Take a firm hold by using the palm of the hand to grip the object in the best possible grip according to the size, shape and weight of load (palmer grip). Avoid the use of a finger grip. Bad initial grip, in addition to straining the fingers, may cause the object to be dropped with consequent injury to the legs or feet.

Wear gloves when handling hot, rough, sharp or corrosive materials.

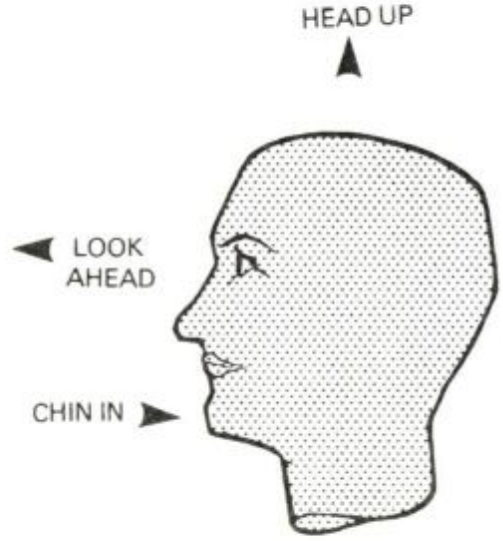




POSITION THE HEAD

Keeping the head erect and chin in straightens and locks the spine, which in turn raises the chest and positions the shoulders for more efficient arm action and stability. Merely tucking the chin in towards the chest without raising the head does not produce the desired effect, however, this is better than allowing the head to sag.

Always look in the direction of travel.



POSITION ARMS

The load should be carried close to the body with your arms straight as possible. Keep your elbows close to the side of your body. Lifting or carrying with arms out from the body places the weight of the load on the arms, shoulders and back muscles.

In lifting, the hand on the same side of the body as the forward foot should grasp the side of the load furthest from the body. The other hand should gasp the opposite side of the load.

When carrying, the hand supporting the far side of the load should grasp the load to the body. In some cases it may be necessary to have both hands undernearth to support the load.

Where the load obscures vision, an assistant is required to help carry the load or mechanical handling should be employed.

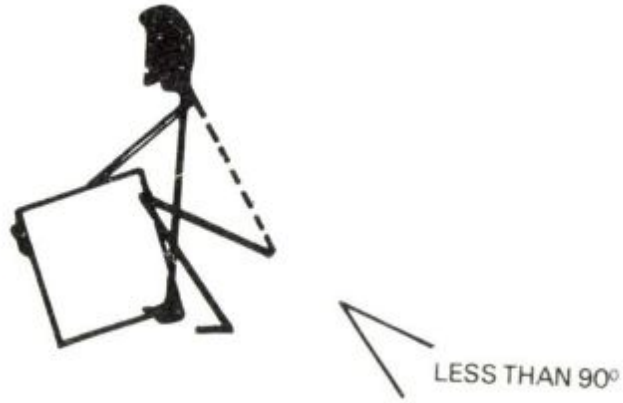
POSITION OF ARMS WHEN CARRYING

MANUAL HANDLING AND LIFTING

BEND YOUR KNEES AND USE THE LEGS TO DO THE WORK

Correct use of the powerful leg muscles for lifting or lowering a load eliminates most of the risk of back injury. Start the lift by thrust of the legs and move forward towards the load. The body should now be moving forward and upward. Where possible, allow some of the weight to be taken on one thigh and use the legs to help propel the load forward.

When the load must be raised above waist level, the leg can be used to help lift it to the required level. Carry out all handling movements smoothly and rhythmically.



If the load is bulky for heavy and no mechanical or other aid is available, obtain the right sort of assistance. If you are to share the weight over level ground it is better if the person helping you is about the same height as yourself.

When a change in direction is required during handling, the body must be turned by pivoting on the feet, never by twisting the back.

REMEMBER : Head up, chin in and look in the direction of travel.

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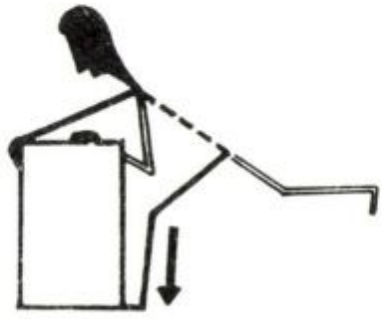
USE OF BODY WEIGHT

Body weight should be used as a counter balance to save muscular effort when tilting a heavy case or drum.

Use your body weight as a momentum, to set the load in motion.

When setting the load in motion, avoid jerking by applying a force slowly to the load through your shoulder muscles, arms and hands.

Place your feet correctly and relax your knees so that your body weight can be transferred from one leg to the other as required.



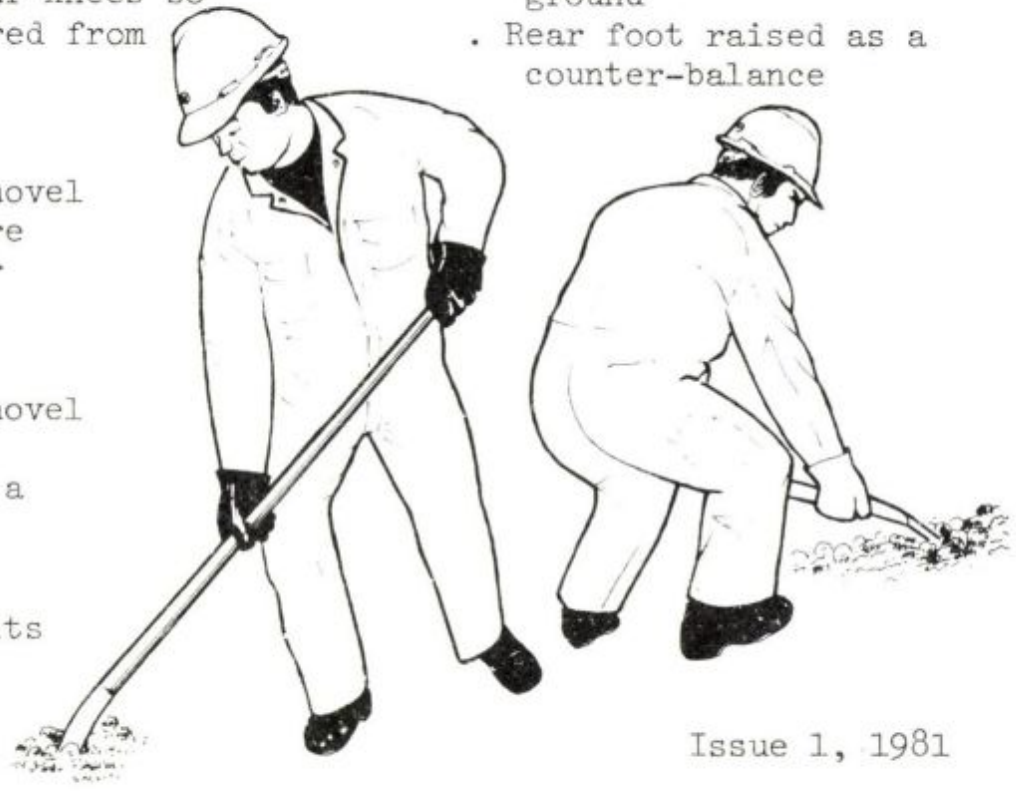
. Advanced foot thrusts agains ground
. Rear foot raised as a counter-balance

SHOVELLING

The selection of the correct type of shovel for a specific job is important. Where material is being transferred to other than a specific area the long-handled shovel may be found ideal.

Where material is being handled by a shovel in a confined space or where granular material is being placed in a hopper, a short shovel may be preferred.

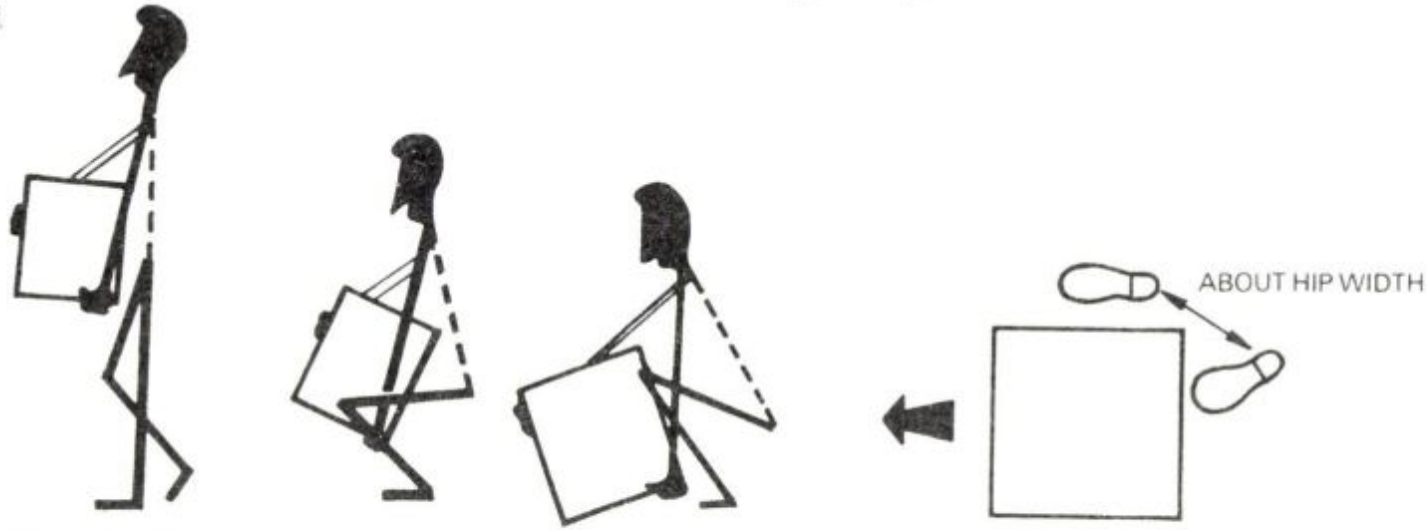
It is essential that the length of the handle of the shovel is adequate for its purpose.



MANUAL HANDLING AND LIFTING

Summary of Key Factors in Handling a Load

- Size up the load
- Position feet
- Maintain and straight back
- Position head
- Proper hold
- Position arms
- Bend your knees
- Use leg muscles
- Use body weight



LIFTING AND HANDLING TELECOM MATERIAL

The key factors outlined in this section are application to all manual handling operations in Telecom. It may be necessary to slightly modify some of the movements or positions to suit the circumstances but the basic concepts such as making maximum use of leg muscles and miantaining a straight back apply to all operations.

The correct way to handle items commonly encountered by external plant staff is fully illustrated in EI LINES General SP 9012 Manual Handling and Lifting of Material and Equipment.

DO YOU KNOW THE CORRECT WAY TO REMOVE A MANHOLE COVER?
LINES GENERAL SP 9012 WILL SHOW YOU.

It is the Supervisor who has the responsibility for making sure that instruction in the correct methods of manual handling gets through to his staff and for ensuring that these methods are used at all times.

Once this instruction has been given it is the responsibility of staff to adopt the correct techniques to safeguard against back injuries.

Correct manual handling techniques are an essential part of External Plant duties. They must be used if the present high accident rate is to be reduced.

NOTE : If you have not received training in the correct techniques of manual handling speak to your supervisor.

(a) Right (b) Wrong

TYPICAL MODEL FOR DEMONSTRATING LIFTING TECHNIQUES

NOTE : The wrong method shows the discs compressed at the front and have high pressure exerted at the rear. Therefore, the basic conept of mantaining a straight back applies to all manual lifting.

DANGER TO OLDER PEOPLE

Investigations show that while people can use "brute force" without injury while relatively yound injury will certainly follow where the same practices are adopted as people get older.

Older people are susceptible to strained backs and hernias because of changes in physical condition. Through heavy work over the years, hundres of small injuries may occur to the spinal or lumbar discs causing small tears in the disc casing. Because discs cannot repair themselves, the sumulative effect of such minor injuries can eventually result in a ruptured disc giving painful injury, and permanent disability.

So be smart, reduce the "brute force" as you get older.

The safe way is the right way, the cheapest way and the happiest way.

REMEMBER : SAVE YOUR BACK - BEND YOUR KNEES

SECTION E

LADDERS

- RULES
- CHOOSING
- ERECTING
- LOWERING
- ANGLE OF SLOPE
- CHECKING
- STORING
- CARRYING
- TRANSPORTING
- MANUAL HANDLING AND LIFTING
- SAFE WORKING ON A LADDER

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LADDERS

Portable ladders should be used only when it is not practical to use a more suitable means of access, or when doing simple jobs. It is preferred that elevating platform vehicles be used when doing heavy or lengthy work, where ladders of sufficient height cannot be obtained or the area is unsafe for ladders.

If your work requires you to use a ladder, it is in your interest to know the precautions to be observed for the safe use and care of ladders.

Severe injuries may be suffered by a person falling even a small distance.

Where the access is temporary and scaffolding cannot be fitted, then portable ladders can be used. This section sets out the requirements and procedures to be followed in the use of these ladders.

Portable ladders of wood or aluminium are available in step single or extension types.

. A step ladder is a self-supporting portable ladder of fixed length having, flat steps and hinged back legs. Its size is determined by the overall length of the ladder measured along the stiles. Step ladders can be single or double sided

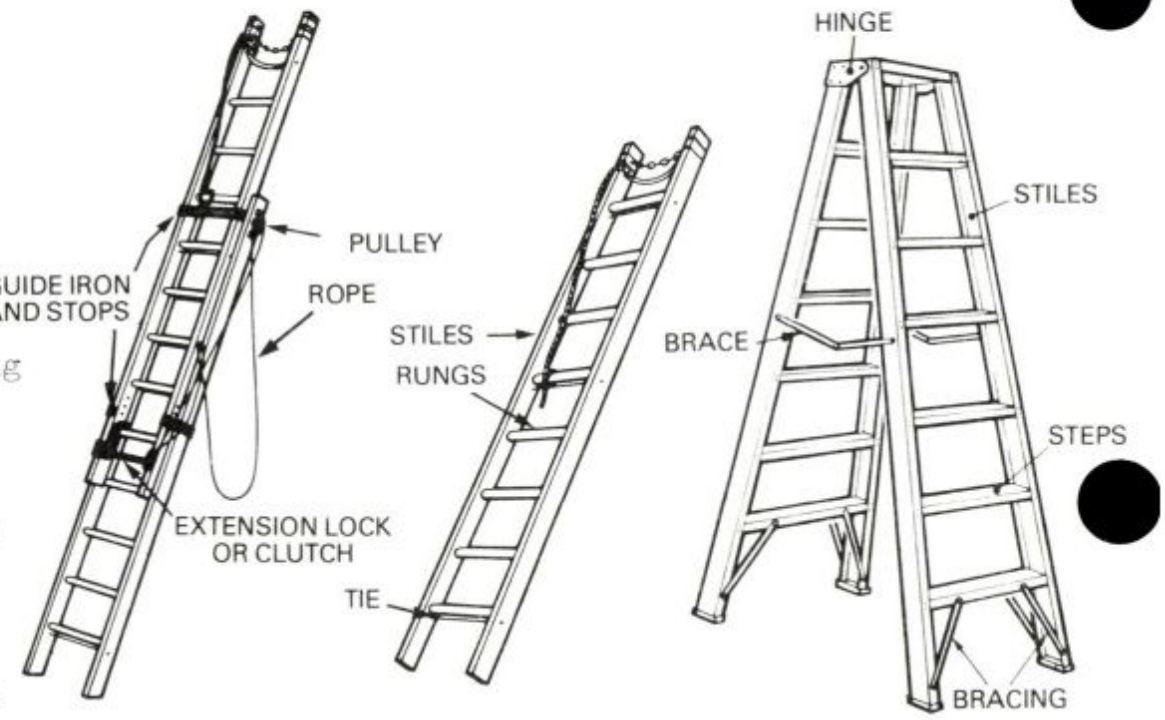
. A single ladder is a non self-supporting portable ladder of fixed length. Its size is determined by the overall length

SAFETY NOTE : METAL LADDERS SHALL NOT BE USED WHERE ANY ELECTRICAL HAZARD EXISTS. THE LADDER MUST BE PERMANENTLY MARKED "NOT TO BE USED FOR ELECTRICAL WORK".

LADDERS

. An extension ladder is a non self-supporting portable ladder adjustable in length. It has two sections travelling in guides or brackets to allow adjustment in length. Its size is determined by the overall length when extended to the maximum safe working position.

A considerable number of accidents have occurred through people falling from ladders and for this it is necessary that only people without disabilities or ailments mentioned below are permitted to use ladders. In addition to people with obvious disabilities such as loss of limb, people with ailments such as heart disease, epilepsy, fear of heights, susceptibility to dizzy turns or with a known history of 'freezing' on ladders should not be permitted to use a ladder.



Ladders purchased in Telecom are of the following lengths : 4m, 5m, 6.5m, 7.5m, and 9m.
NOTE : SOME 5.18 m LADDERS WHICH WERE PREVIOUSLY ISSUED AS AN IMPERIAL LENGTH LADDER ARE STILL IN SERVICE, THESE ARE TO BE CONSIDERED AS 5 m LADDERS FOR THIS INSTRUCTION.

RULES FOR PORTABLE LADDERS

- Know the regulations that apply to ladders in your work (ref: EI LINES General SP 9102)
- Choose the type of ladder appropriate to the task
- Check that the ladder is in good condition
- Store, transport and erect the ladder carefully
- Place the ladder in a safe working position
- Adopt correct working procedure on the ladder.

CHOOSING THE CORECT LADDER

Step Ladder

- Suitable for use in places where there is no support adjacent to the work area
- Select a ladder of sufficient height to reach the work without standing above the third step from the top. Never stand on the top step
- There must be sufficient space to use a step ladder. The legs must be in the fully spread position and the brace in the locked position.

LADDERS

Single Ladder

- Suitable for use where there is support adjacent to the work area
- Select a ladder of sufficient length so that it can be used at the correct angle of slope. Never climb higher than the second top rung to reach the job.

Extension Ladder

- Requirements for an extension ladder are as for single ladder except with this ladder additional height can be obtained. If a single ladder does not reach a safe working height, an extension ladder should be used.

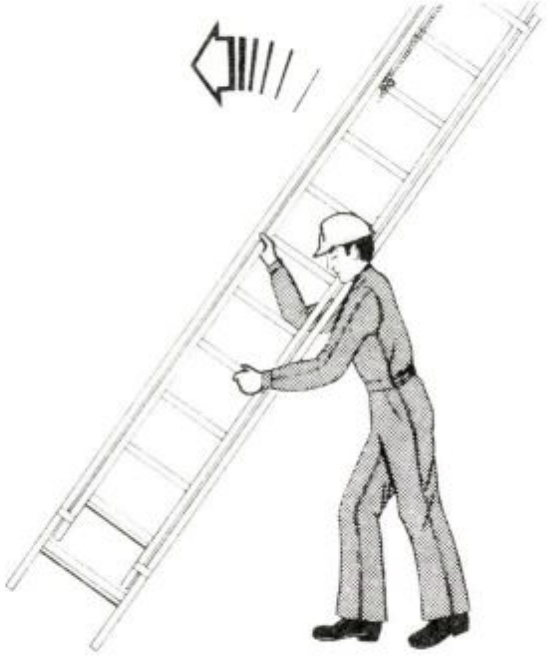
ERECTING LADDERS

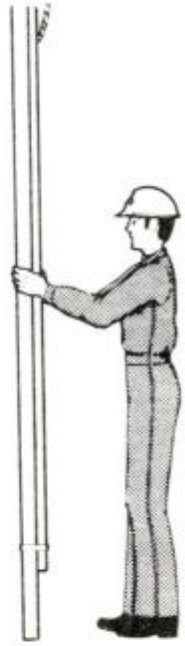
Check there is a safe, firm and level footing before erecting any ladder. Clean up any mud, oil, water on floors or concrete paths and make sure the ground is stable enough to support the ladder plus any loads.

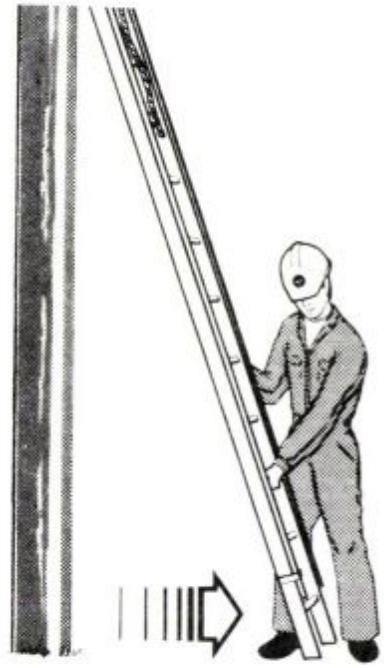
Extension ladders up to 5 m may be lifted directly into position by one man from the carrying position as follows :

i. Lower the foot of the ladder to the ground from the carrying position (if necessary brace it against the base of the pole or support to prevent slipping).
ii. The ladder can then be lifted from the shoulder by walking forward until the ladder is vertical.
iii. Extend the ladder to the required height and lower gently against the pole or support
iv. Check the angle of slope and adjust as necessary.

LADDERS







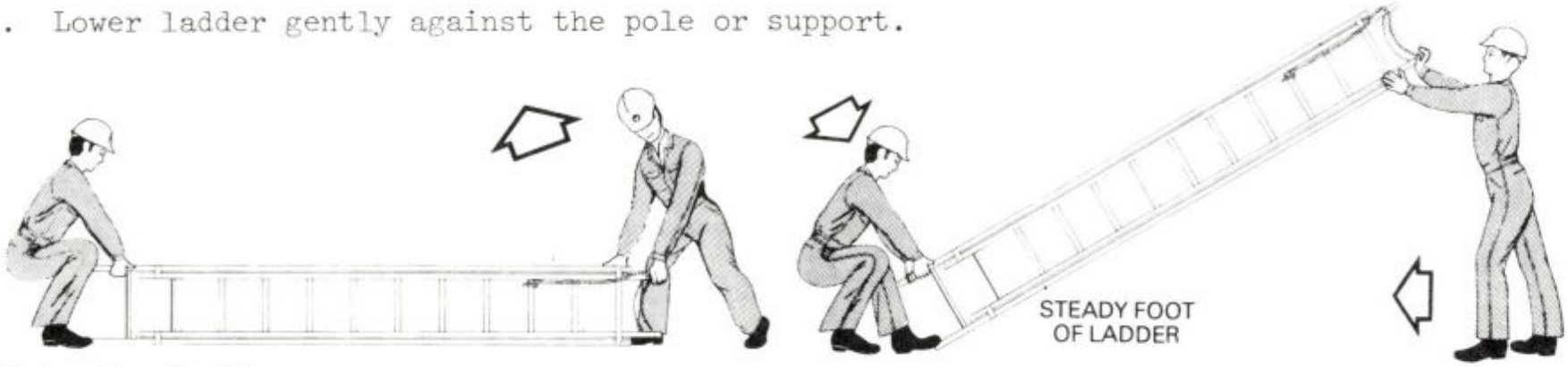
When two people are required to erect ladders, proceed as follows :

- Lie the ladder on edge with one stile on the ground
- Place the ladder at right angles to the pole or support
- Select the required firm footing and place the foot of the ladder 1/4 to 3/8 the length of the ladder from the pole or support
- One person shall place his foot on the underneath stile at the foot of the ladder and pull on the upper stile
- The other person shall lift the top end of the ladder and walk slowly forward - lifting hand over hand

LADDERS

. Steady the ladder as it becomes vertical and then both persons together extend to the required height

. Lower ladder gently against the pole or support.



Extending Ladders

Extension ladders must be kept closed until they are vertical. Ladders can be extended to a length equal to their rated size. The minimum overlap of the two sections is predetermined by the placement of hardware and fittings. Ladders should never be extended so that the clutch on the top portion engages the top rung of the bottom portion of the ladders.

One person to extend an extension ladder up to 5 m :

Keep the ladder closed until vertical and then place a foot against the bottom of the stile. Pull on the rope to extend to the required height. Make sure that the clutch is locked in position and check that the ladder footing is secure.

NOTE : 4 m extension ladders are supplied and used without rope and pulleys. However, they are fitted with a securing rope at the top of the ladder to tie the ladder to the pole.

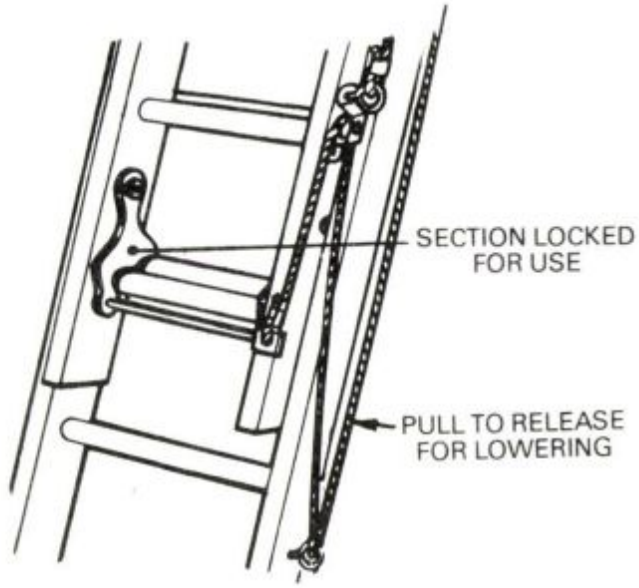
These ladders are short and light and can be safely extended by hand.

LADDERS

Two persons to extend a large extension ladder :

One person stands behind the ladder and holds it vertical. Take care to keep hands clear of the moving upper section. Hold the stiles and not the rungs.

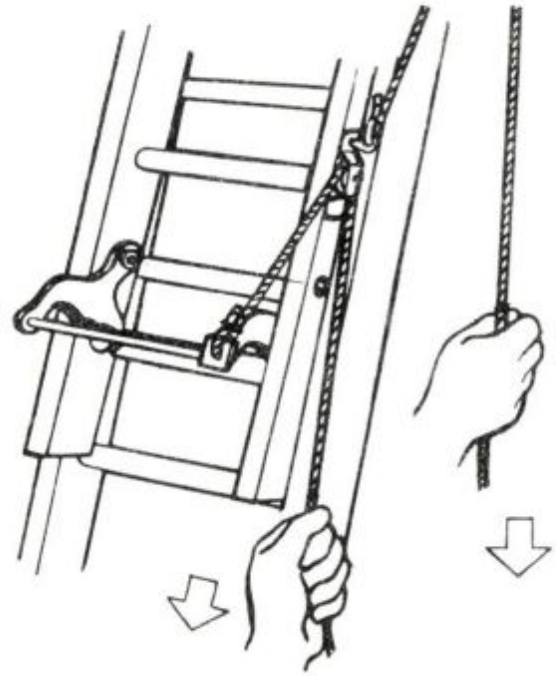
The second person uses the rope to extend the ladder to the required height. Make sure that the clutch is locked in position and check that the ladder footing is firm.



LOWERING EXTENSION LADDERS

The method used to lower large extension ladders (6.5 m and over) is in reverse to extending and erecting. Pull the ladder almost vertical and while one man steadies the ladder, release the clutch. Take care to keep hands clear of the moving upper section. Small extension ladders (upto 5 m) may be steadied and lowered by one person using the same procedure.

LADDERS



SAFETY NOTE : AN EXTENSION LADDER SHOULD NEVER BE MOVED FROM ONE LOCATION TO ANOTHER WHILE EXTENDED. FOR SAFETY REASONS IT SHOULD BE FIRST LOWERED AND THEN EXTENDED AT THE NEW LOCATION.

ANGLE OF SLOPE FOR LADDERS

Select a ladder of sufficient length so that :

. The correct angle of slope is obtained when the horizontal distance from the top support to the foot of the ladder is 1/4 to 3/8 of the length of the ladder between its feet and upper resting point (Fig a)

. When the ladder is supported against a wall or platform, and the supporting edge is below the top of the ladder as shown in Fig b, the ladder must be extended at least one metre above the supporting edge this is helpful to get onto the roof

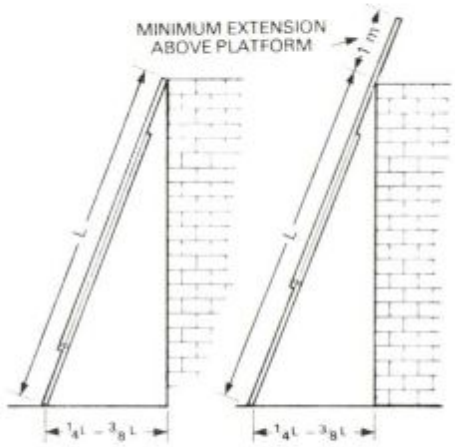


Fig a Fig b

Do not work from the rung above the supporting edge.

. A simple method to check the angle of slope is to stand at the foot of the ladder and extend the arm. When the angle of slope is correct the elbow will just touch the stile.

NOTE : If a ladder does not meet the above conditions use an elevated platform or scaffolding.

Fig c

LADDERS

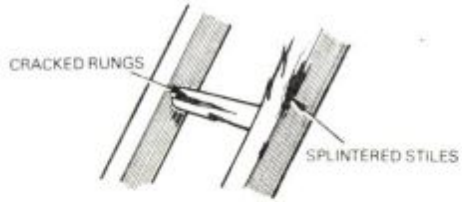
CHECKING LADDERS

Ladders should be kept in good condition, clean and free from splinters. Rungs on single or extension ladders and tread joints on step ladders should be tight and all fittings should be securely attached.

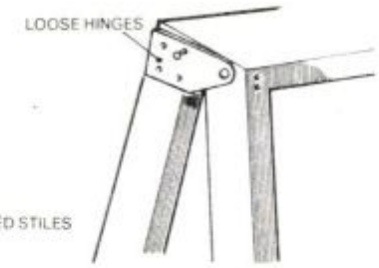
Pulleys should be lubricated and all moving parts should operate freely without bending or undue play. Frayed or worn ropes should be replaced.

Ladders are inspected by an authorised Lines Officer upon initial delivery and every six months thereafter whether in use or not. In between this period the ladder could have been mishandled, dropped or damaged, so before you use any ladder visually check that it is free from the following defects :

- Loose steps or rungs that can be moved by hand
- Slippery steps or rungs
- Cracks or splits in steps, rungs or stiles
- Splinters or burns on steps, rungs or stiles
- Loose nails, screws, bolts or other metal parts
- Damaged or missing ties
- Uneven footings or damaged or worn non-slip bases.



DO NOT USE



DO NOT USE

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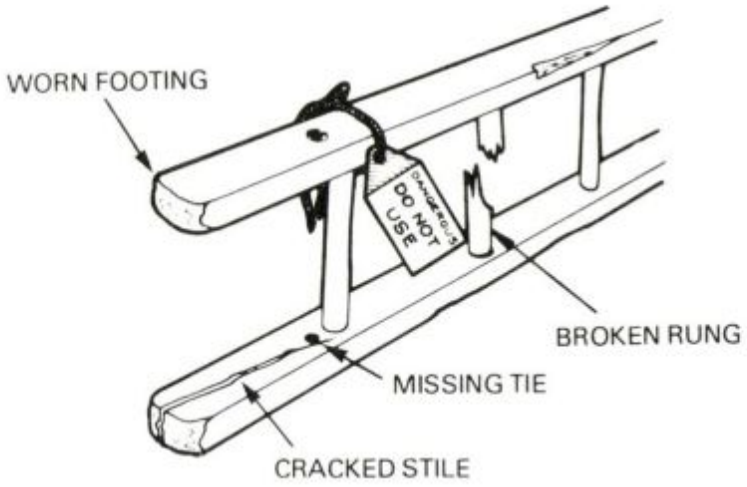
In addition check step ladders for defects such as :

- Loose hinges
- Ineffective spreaders
- Wobbly ladder from side strain



Extension ladders must also be checked for defects such as :

- Defective clutches, stops, guide irons or pulleys
- Deterioration of rope from wear or exposure to chemicals or other destructive agents.

Any damaged or defective ladder should be taken out of service and labelled - "Dangerous! Do Not Use" - pending repair or destruction.

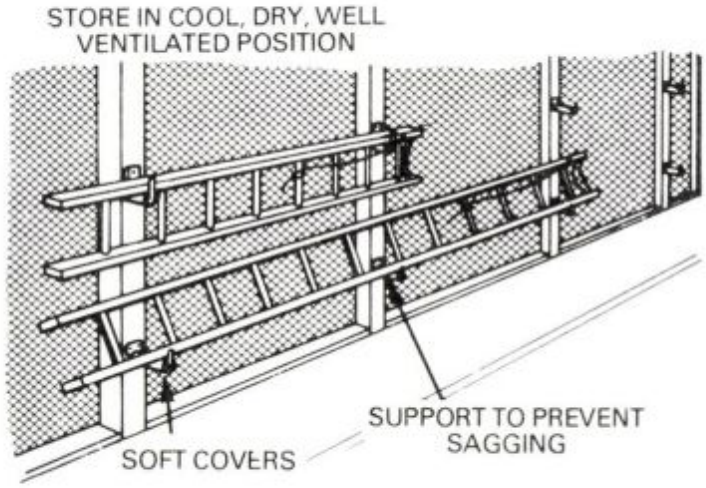
After repairs are done on an extension ladder check to see if the replaced rope, hardware and fittings are not placed to allow the clutch on the top position to engage the top rung of the bottom portion of the ladder, that is, not to allow the ladder to extend beyond its safe working position.

LADDERS

STORING LADDERS

When not in use, ladders should be cleaned if necessary and stored in a dry, well ventilated and sheltered area and supported on horizontal racks at a sufficient number of points to prevent sagging.

Ladders should not be multi-stacked. Supporting points be covered with soft material and contact with sharp or abrasive objects should be avoided.



CARRYING LADDERS

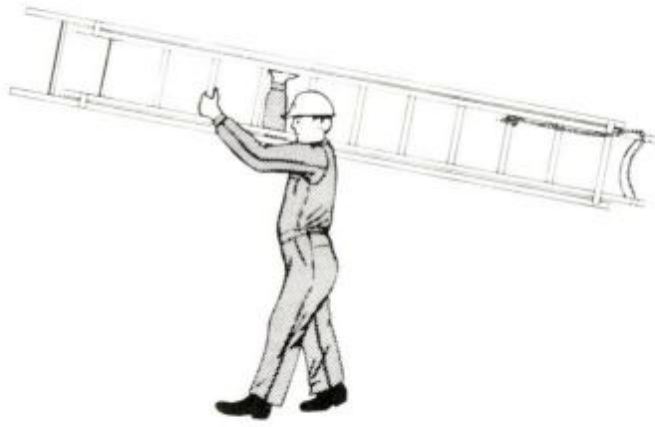
Small extension ladders may be carried by one person by placing it on a shoulder in the following manner :

. Hold the ladder vertical

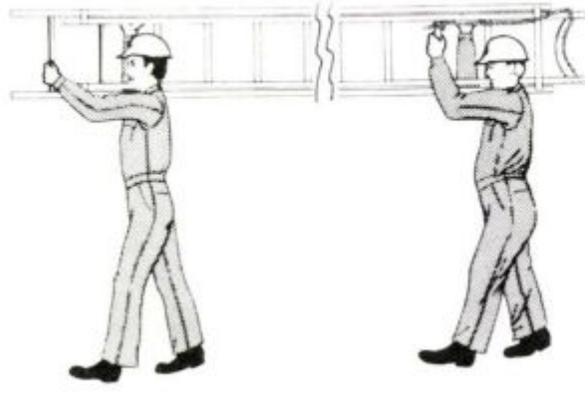
. Rest one stile against a shoulder

. Find the approximate centre of balance and, using manual lifting principles, lift onto shoulder

- Adjust until evenly balanced
- Hold with one hand and control direction and balance with other
- Carry ladder so that the leading end is at least 2 m above the ground
- Carry the ladder so that the foot of the ladder is the leading edge.



When the use of an extension ladder over 5 m in length is foreseen, at least two people should be available to carry and place it in position. One person should lift and carry each end, taking care to ensure that the ladder does not create a hazard when turning corners.



This change will require time to equip field staff to implement the principles. The details are to be covered in related State Instructions which should be read in conjunction with EI LINES General SP 9102.

Large extension ladders need at least two people to carry and place them in position. The ladder should be raised to the shoulder using manual lifting principles. When two people are carrying these ladders the tallest person should lead and be as close as practicable to the leading edge of the ladder.

LADDERS

TRANSPORTING LADDERS

Equipment should not be placed on a ladder during transport. Racks must be used :

- to prevent sagging
- minimise overhang
- to allow the use of secure strapping

The securing straps must be of the correct length and maintained in good condition. Ensure that the securing straps are passed around the horizontal member of the ladder rack.

To further reduce damage to the ladder the supporting points on the rack should be covered with soft material and care taken that the ladder is not dropped when loading or offloading.

To avoid injury to the persons moving ladders from vehicles, Manual Handling Principles must be applied.

SAFETY NOTE : TAKE CARE IN WINDY CONDITIONS OR WHEN ADJACENT TO PEDESTRIAN OR VEHICULAR TRAFFIC. DO NOT RISK INJURY BY ATTEMPTING TO CARRY A LARGE LADDER BY YOURSELF.

MANUAL HANDLING AND LIFTING OF LADDERS

Ladders can cause an injury to your back if incorrectly lifted or removed from a vehicle. It is very important that the basic steps of handling a load are learnt and strictly observed when manual handling and lifting ladders.

THE SIMPLE RULE IS TO KEEP A STRAIGHT BACK AND BEND YOUR KNEES

The key factors are :

Size up the load - determine whether one person can lift the load
- larger ladders require two persons to lift

- Position of feet - helps maintain balance
- Keep a straight back - the most important factor
- Position of head - head up, chin in maintains a straight back
- Correct hold - comfortable and secure hold
- Lift steadily - don't rush the lift

Loading or Offloading Ladders from Vehicles using Manual Handling Principles

Back injuries have been caused by incorrectly loading or offloading ladders from vehicles.

Next time you load or offload your ladder, think about it, do it correctly and avoid injury.

The following steps should be taken :

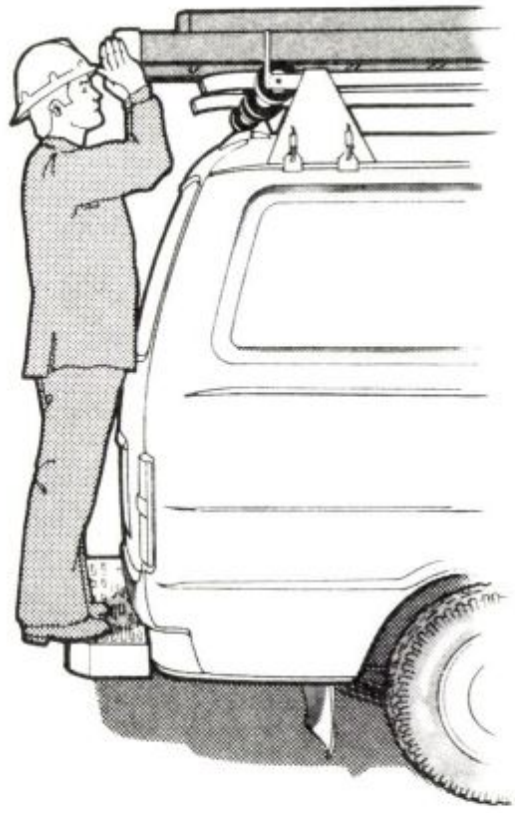
Step 1

Pull the ladder out, on the rollers which are provided on the racks, to about 3/4 of its length.

A short person should stand on the running board for the first pull. Stepping down as the ladder moves out.

Be in control of the ladder at all times.

Do not pull the ladder out too fast or bump your head. A safety helmet must be worn.



Step 2

Lower the ladder to the ground, supporting it near its feet and keep your back straight, chin in and knees bent.

Step 3

Turn the ladder on to a stile with the top end resting on the rack and the foot of the ladder on the ground.

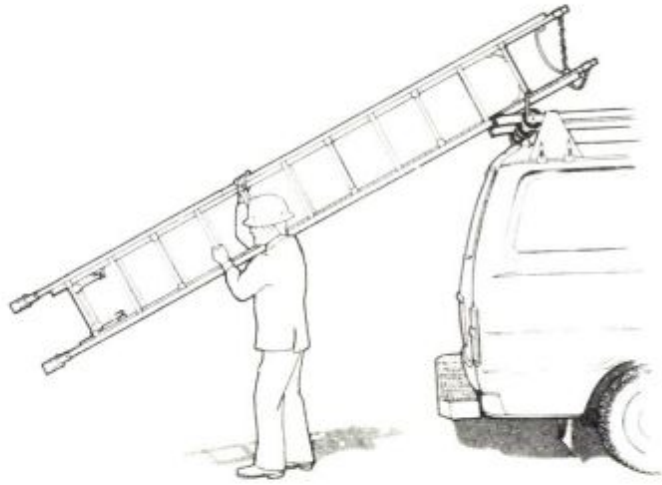
Step 4

Place yourself as near to the centre of balance of the ladder as possible, rest the stile on your shoulder, then walk forward and raise the lower end of the ladder about 2 m above the ground. Always bend your knees to get into position and lift with your leg muscles.

The correct method of carrying extension ladders is discussed on Page E-12 of this handbook.

When loading ladders onto vehicles, the same steps should be followed as when offloading ladders, but in reverse order.

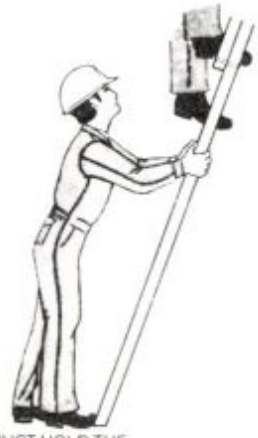
Take care when giving the final push to place the top of the ladder onto the front rack support. Push the ladder smoothly onto the rack and avoid jerking your body. Keep your back straight, bend your knees and push with your legs.



SAFE WORKING ON A LADDER

- Clean up wet or oily floors
- Never place a ladder in front of a doorway, unless the door is blocked open, locked or a workmate stands on guard
- Never use any makeshift foundations such as drums, boxes or blocks to get extra height
- Tie the foot of the ladder in position if there is no one to hold it
- Get a workmate to 'foot' the ladder to prevent it slipping, if you cannot tie the bottom
- Check that the support for the top of the ladder is secure
- If placing a ladder against a pole it must be tied. Make sure the chain straddles the pole
- When there is a danger of the public knocking the ladder, erect suitable guards or have a workmate stand on guard

DOORS — LOCKED 1
BLOCKED 2
OR GUARDED



ONE PERSON MUST HOLD THE FOOT FIRMLY WHILE THE OTHER CLIMBS

LADDERS

. Avoid electrical wire or operational pipes (gas, steam, sprinklers etc).

Before climbing, clean any mud or grease off your shoes. Whether you are standing or moving on a straight or extension ladder, face the ladder and be sure to have at least one hand free to grip a stile of the ladder at all times.

When ascending or descending the ladder :

. Move with a smooth careful action to avoid swaying or bouncing the ladder

. Hold on with both bands (grip the stiles not the rungs)

. Do not carry any tools or materials in your hands

. Do not climb higher than the second top rung

. Never slide down a ladder

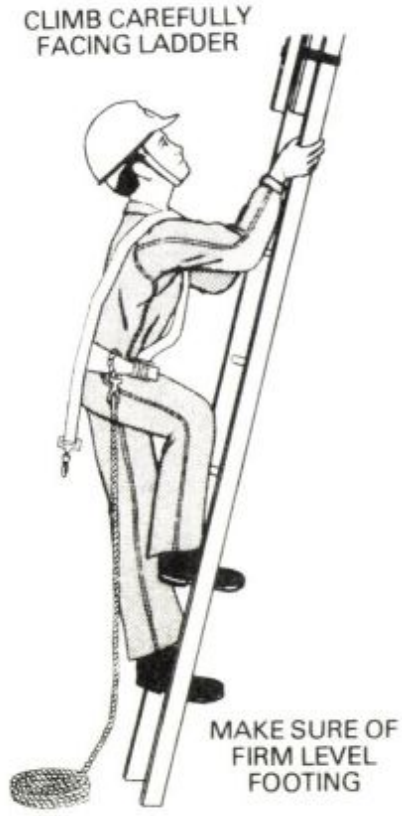
When working on the ladder

. Make sure any tools you carry in pockets or pouchers are secure

. Do not leave small tools or equipment on the top of step ladders

. Use a safety/hauling line to raise and lower tools and material

. Do not reach out too far from a ladder as this could cause you to overbalance.



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These general rules apply to step ladders also. Make sure the step ladder has its legs in the fully spread position before climbing. Always face the ladder. When working at maximum height (feet on third step from the top) keep your feet well spaced and brace your legs against the ladder. Make all your movements slowly and carefully.

One person only at a time should use a single sided step ladder. Step ladders built with steps on both sides are built to carry the weight of two persons. Therefore, a maximum of two persons is permitted.

SECTION F

HAND TOOLS

- OPERATORS TRAINING
- USING HAND TOOLS
- CORRECT TOOL APPLICATION

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OPERATORS TRAINING

. Training in the use of minor mechanical aids is, in most cases, incorporated into various training courses conducted by State Training Centres

It is the Senior Lines Officer's responsibility to determine, before a minor mechanical aid is used, whether the operator has received prior training in the correct use and maintenance of the unit concerned. If not, arrangements must be made for the training of the operator.

. Major mechanical aids training requirements are for the operator to hold a current Certificate of Competency for a particular class of unit and a civil drivers licence endorsed for driving heavy vehicles

The responsibility for the training of operators to obtain a Certificate of Competency rests with the Automotive Plant Section, Services Branch in each State.

Requests for training of operators must be made to the District Telecom Managers and Supervising Engineers who shall forward the request to the Senior Engineer, Mechanical Aids.

It is the responsibility of the local Senior Lines Officer to submit the request and in no way allow an untrained operator to use a major mechanical aid.

. Users of hand tools, like any mechanical aid operator, require a certain amount of training and practical experience to reach a satisfactory level of skill. The training to achieve these skills is given in Telecom Training Centres in all States The practical experience is gained through on the job training where the repeated use of hand tools improves performance and understanding of the safe and correct use of tools.

The trainee must follow the general direction given by the person training him. To reach the required standard of skill he must pay particular attention to the instructor's explanations and demonstrations. Supervised practice is essential.

USING HAND TOOLS

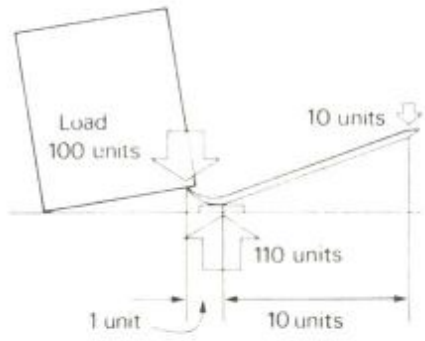
Correct use of hand tools requires an understanding of their capabilities. As you handl a tool learn from the feel and action of them. What you feel, see and hear can teach you general principles.

Many hand tools are simple machines. You apply the effort. They help you to do work. They use many simple mechanical principles.

Try to reason out why hand tools are designed as they are and why certain materials are used in them. This will help you achieve effective use of hand tools.

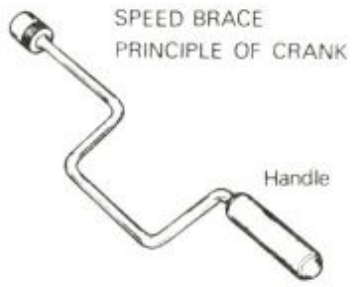
A skilled worker learns much through his hands. Concentrate and try to understand why things feel as they do. Hand tools are direct extensions of your hands. You will become aware of the simple mechanical principles by experience, even if you have never learned the theory behind them.

Example 1: You have probably used levers. The position where you apply the force on the lever must be further from the point of support than the position where the lever contacts the load. This gives a mechanical advantage. With a small force you can move a large load. The ratio of the distance from the fulcrum to the point of force and distance from the fulcrum to the point of load is in direct proportion to the mechanical advantage i.e., the mechanical advantage shown in the sketch is 10 to 1.



Lifting load with pinch bar – first type of lever action

Example 2: Pedals on a bicycle operate as cranks. Some hand tools also operate as cranks. When a force acts to turn an object about its axis, the turning effect is called the turning moment or torque. This means that when using a cranked tool it is best to keep the pressure at right angles to the plane of the crank. You will realise this when you use any form of brace.



Learn to work out how the turning moment is applied by any tool you use to turn an object about an axis.

It is essential, when using any hand tools, that you use the right tool for the right job. Makeshift tools or unsafe tools are very dangerous and will give a poor performance.

CORRECT TOOL APPLICATION

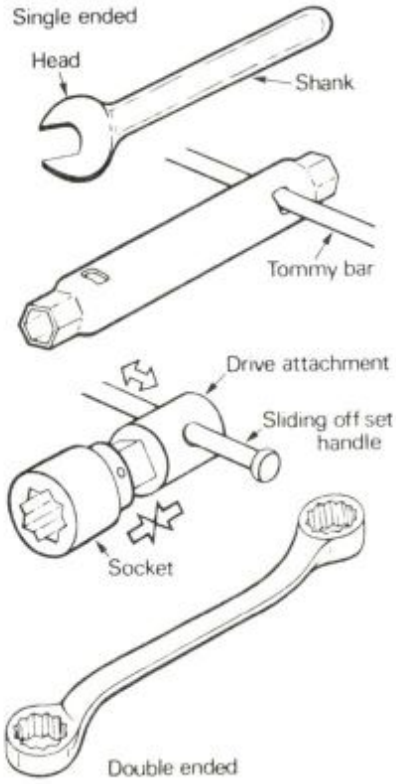
General engineering hand tools that are used in many different situations are explained in this section which is intended as a guide to on-the-job training and may be used by Instructors and Supervisors or for self-teaching purposes.

HAND TOOLS

Spanners

Spanners vary considerably in shape to provide ease of operation under different conditions. There are four basic types:

- Open end spanners
- Tube or tubular box spanners
- Socket spanners
- Ring spanners.



The correct spanner to use is one that:

- Is of sufficient strength
- Fits exactly
- Allows room for use
- Will allow the job to be done in the shortest time.

Safe Use of Spanners

Turn open end and ring spanners by pulling on the shank. Pulling is safest as there is less chance of hitting your knuckles if the spanner or the nut gives suddenly. If you are forced to push the spanner, use the base of your hand and keep your hand open. Use both hands on large spanners.

Keep yourself balanced and braced to avoid slipping if the spanner moves suddenly. Hold on to some support if there is any chance of falling.

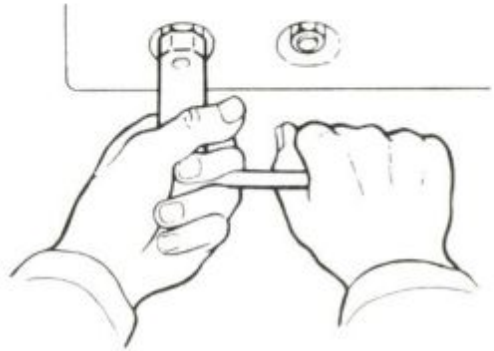
Socket spanners are versatile multi-purpose tools having a hex-type socket to grip a hexagonal nut closely and give the most positive drive. Socket spanners are available with a six point single hex-type socket or the twelve point double hex-type socket.

The socket spanner used by external plant staff, for removing the captive nut on cabinets and pillars to allow the cover to be raised, has the twelve point double hex-type socket to give a positive hold on the nut and a greater range of engaging positions.

Four and eight point sockets are available for square nuts.

Use the socket spanner as for the tubular box spanner i.e., with two hands.

PILLAR AND CABINET SOCKET SPANNER



Size and Identification of Spanners

The size of a spanner is determined by the nut or bolt it fits. The distance across the flats of a nut or bolt varies both with the size and thread system.

. British System

The nominal size of the bolt is used to identify the spanner, e.g. a spanner to fit a British Standard Fine bolt with a half-inch nominal diameter would be marked ½ BSF. A spanner to fit a Whitworth bolt with a seven-sixtenths of an inch nominal diameter would be marked 7/16 W. The W series will fit one size above a BSF series, e.g. 7/16W spanner will fit a ½ BSF bolt.

. Unified Standard System

Spanners for Unified bolts are marked with a number based on the decimal equivalent of the nominal fractional size across the flats of the hexagon following the sign AF, e.g. 50 AF.

. Metric Standard System

Spanners for metric bolts are marked with the size across the jaw opening followed by the abbreviation "mm", e.g. 15 mm.

NOTE: The British system spanners are no longer being purchased by Telecom, however a few are still in use and the user should recognise this system.

The British Standard system is also known as the British Standard Whitworth system.

Correct Fit of Spanners

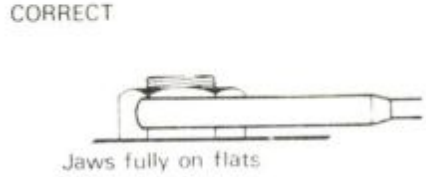
It is dangerous to use a spanner that does not fit correctly. It could result in injury to the user and damage to the spanner and the nut. To fit exactly, a spanner must be:

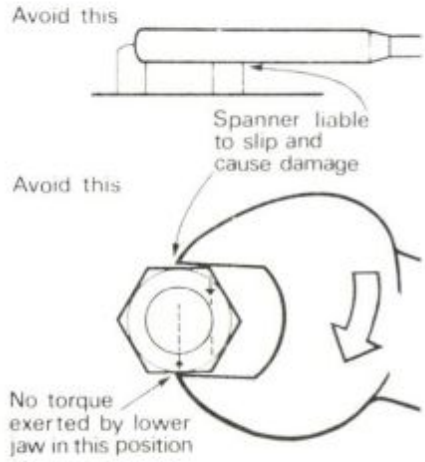
- The correct size
- Placed correctly on the nut
- In good condition

Never use a spanner from one thread system on another thread system. Spanners have their jaws slightly wider than the width of the nut so that they can be placed into position easily. Any more than a few excess hundredths of a millimetre clearance could cause the spanner to slip under pressure.

Place the spanner so that its jaws bear fully on the flats of the nut.

Off-centre placement concentrates pressure on a small area. The spanner is liable to slip and burr the corners of the nut.

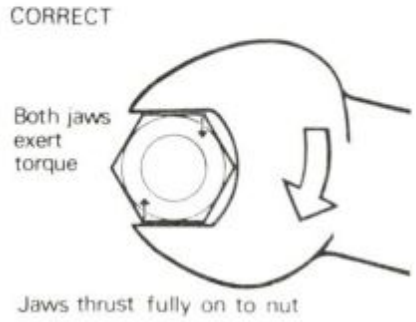




HAND TOOLS

Failure to place the spanner fully onto the nut is liable to damage the spanner and the nut. Only when the lower jaw makes contact with the outer edge of the flat is the maximum turning effect on the nut produced.

Place the jaws fully on to the nut. It is best to pull towards the shorter jaw so that the contact point at the jaw tip is the minimum distance from the shank.

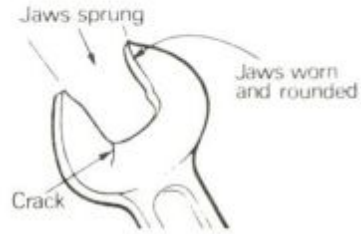


Inspection of Spanners

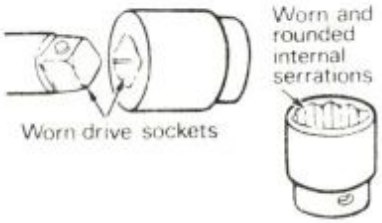
Incorrect use damages spanners.

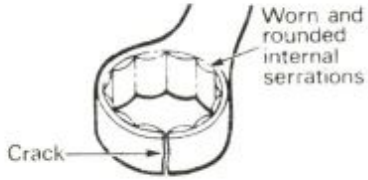
Always check the condition of a spanner before you use it. Look for any defect that would cause the spanner to slip under pressure.

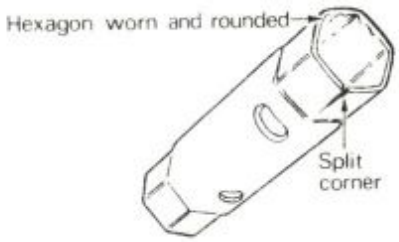
Never exert excessive pull on a spanner, particularly by using a pipe to extend the length of a spanner.



CAUTION: DISCARD ANY DEFECTIVE SPANNERS. THOSE SHOWN IN THE SKETCH ARE DANGEROUS.



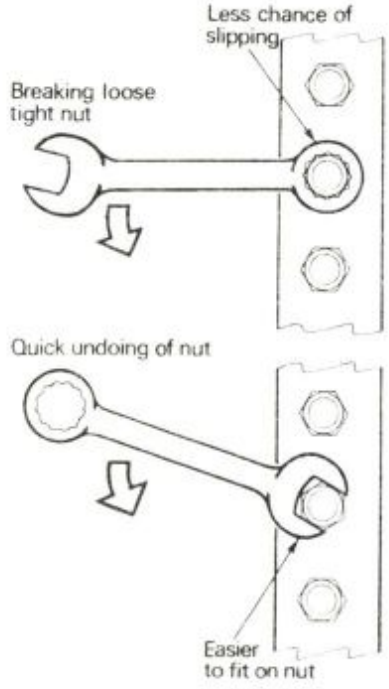




Choosing Spanners for Efficient Working

For any specific job, choose the type of spanner that will allow the job to be done in the shortest time. Make the effort to learn the range of spanners available in your work, e.g., with combination ring and open end spanners, break loose a tight nut with the ring end as it will not slip. However, you would lose time lifting off and replacing the ring spanner if it can only move part of a turn. In this case, use the open end to unscrew the loosened nut.

For turning nuts where movement is unrestricted use socket spanners.



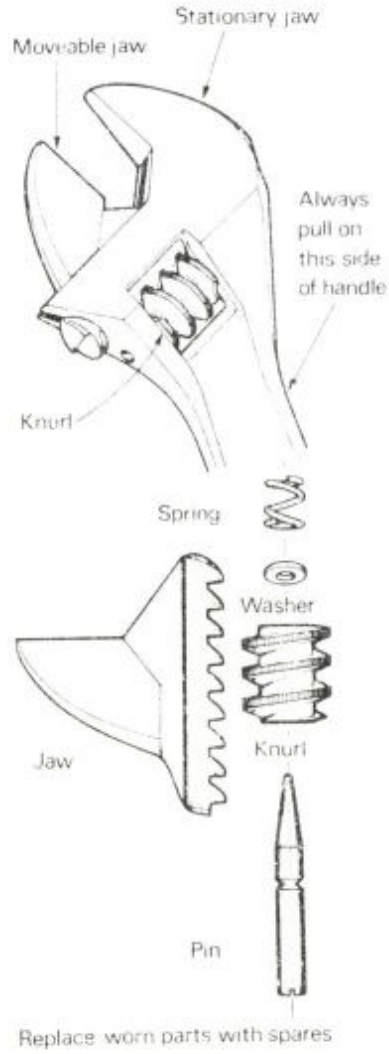
Adjustable Spanners

Most common types of adjustable spanners are similar to open end spanners, but they have one movable jaw. The opening between the jaws of a typical 250 mm spanner can be adjusted from zero to 28.5 mm.

Adjustable spanners may range in length from 100 mm to 760 mm. The type illustrated has its jaws set at an angle of 22½° to the handle.

Adjustable spanners are convenient for use where a full kit of spanners cannot be carried, for example on maintenance work.

They are not intended to replace fixed spanners which are more suitable for heavy service. Keep adjustable spanners clean and oil the moving parts occasionally. Inspect for damage before use. If the movable jaw or knurled screw are cracked or worn, replace them with spares.



Use an adjustable spanner only when the correct fixed spanner is not available.

Use adjustable spanners carefully as follows:

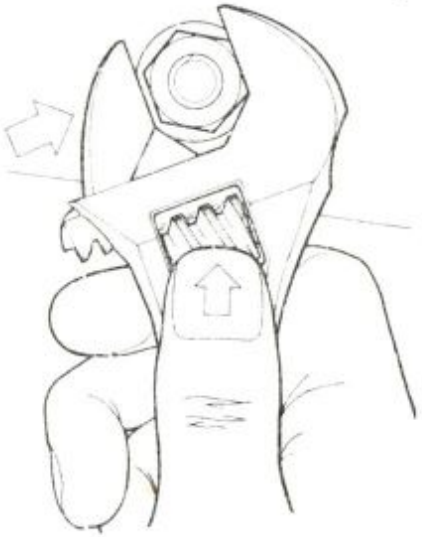
. Place the spanner on the nut so that the jaw opening points in the same general direction as the handle is to be pulled. In this position, it is less likely to slip and the required turning force can be exerted without damage to the moving jaw and knurl

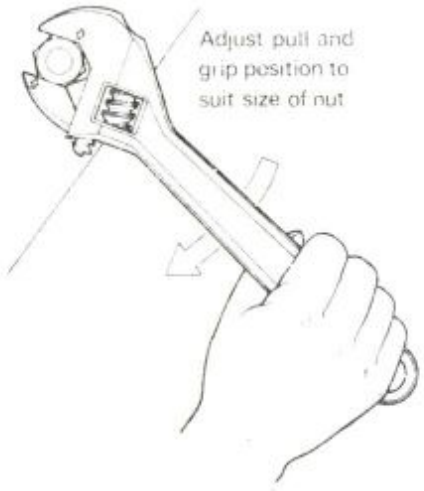
. Push jaws into full contact with nut

. Use thumb to tighten the adjusting knurl so that the jaws fit the nut snugly

. Pull cautiously. The length of the handle is designed to suit the maximum opening of the jaws. With small nuts a very small pull on the handle will produce the required torque.

These rules should be applied when using any of the large range of different types of spanners and wrenches that have adjustable jaw openings.





Stillson Pipe Wrenches

Use these for gripping and turning pipes with a wide range of diameters.

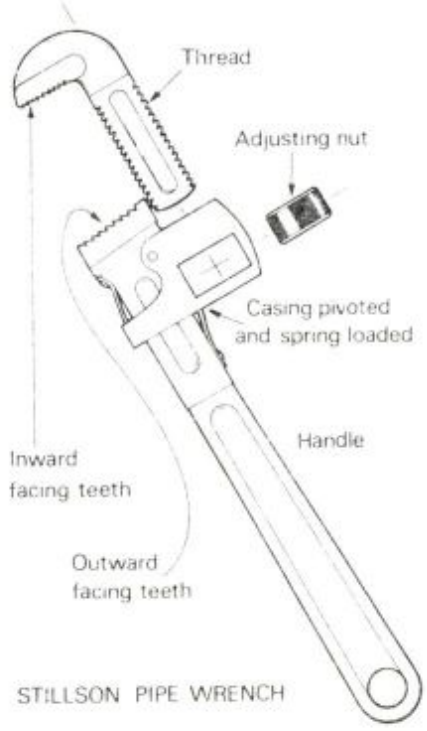
Fixed to the handle is a jaw with outward facing teeth. Attached to this handle by a pivot pin is a spring loaded casing that carries a knurled adjusting nut. This engages with a thread on the adjustable arm of a jaw with inward facing teeth.

Once the jaws are adjusted, the spring loading keeps them in contact with the work and the toggle action causes the hardened serrations to bite into the work.

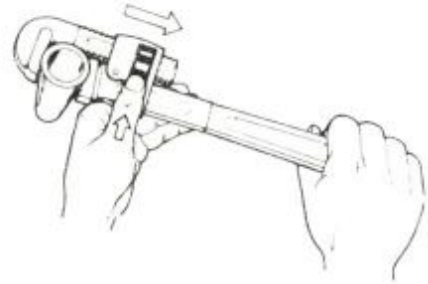
Use two hands to set it on the pipe. Centre the pipe against the fixed jaw. Use the left thumb to push the adjusting nut around to close the jaws. When the grip is tight, pull the handle with the right hand.

When changing grip use the left hand to keep the jaws in the correct position.

The jaws will mark the work. File off any burrs. Never use them on polished or plated surfaces which require a strap wrench. Never grip hardened materials as this will damage the serrations. Clean and oil the adjusting nut regularly.



STILLSON PIPE WRENCH



Never use on bolt heads or nuts except to remove a jammed nut that is already so damaged it must be discarded.

There are many different types of pipe wrenches. Make sure you know how to correctly use any type of pipe wrench available in your workshop.

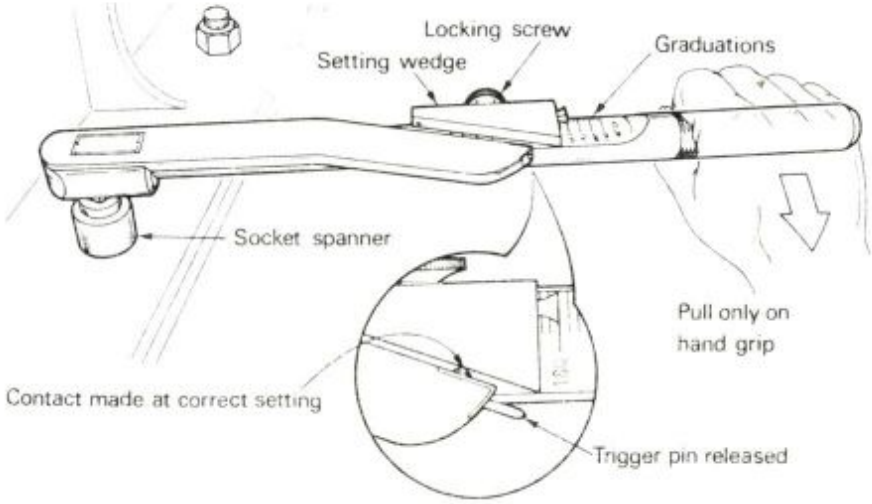
TENSION WRENCHES

A tension wrench acts as a torque limiting device for turning nuts to a pre-determined degree of tightness. This avoids breaking fasteners. It is also essential to avoid wrapping or springing components held by multiple fasteners that could be unevenly or excessively tightened.

Some tension wrenches have direct reading indicators that you must watch as you pull the handle to the desired extent. With others, you preset the desired graduation and pull until you detect a signal, which may be an audible click, this releases a trigger pin or an automatic release within the wrench mechanism.

To apply the correct torque with a tension wrench:

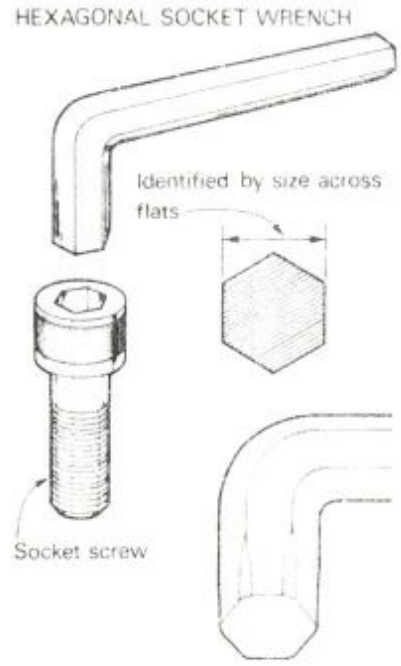
. Check that the thread of the nut and the bolt are clean and well formed
. Pull slowly with evenly increasing effort on the hand grip of the handle.



Hexagon Socket Wrenches

Hexagonal section bars of tool steel bent to an L shape (called Allen Keys) are used to turn set screws having internal hexagon sockets. They are available in sets ranging in size from 1.5 millimetres to 19 millimetres across the flats.

Make sure socket and wrench are clean before use. Use the correct size. Insert to full depth. Discard if the ends become worn or rounded as they are liable to slip under load.



Discard if ends are worn or rounded

SCREWDRIVERS

Hand-held screwdrivers include:

. Standard types with tips to suit recessed head screw slots

. Special types with tips to suit recessed head screws.

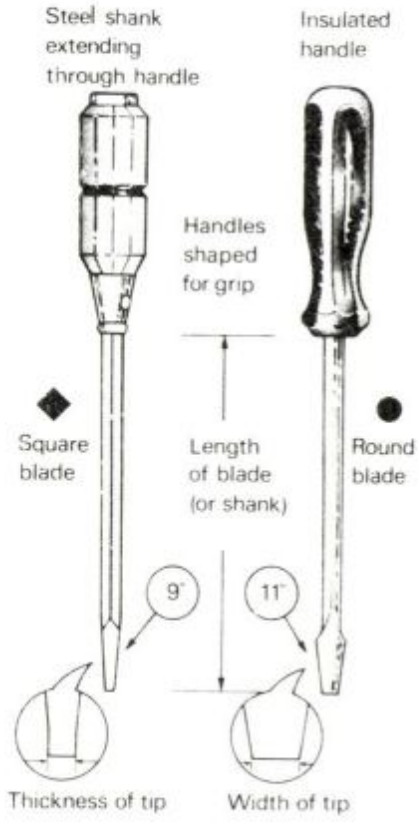
Screwdriver tip attachments are made to fit spanner kit accessories and drill braces. A wide variety of screwdriver tips are made for power tools.

Standard Screwdrivers

Standard screwdrivers are made with:

- Tips to fit screws with slotted heads
- Handles of metal, wood or moulded insulating material, shaped to give a good grip for turning
- Blades of hardened and tempered carbon steel or alloy steel
- Round or square blades, with lengths ranging from 40 millimetres to more than 350 millimetres
- Flared tips which vary in length and thickness with the length of the blade.

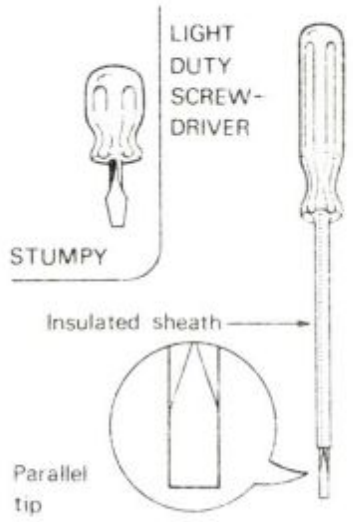
Screwdrivers are specified in size by length of blade and width of tip. A very small screwdriver is about 45 millimetres by 3 millimetres, while a large screwdriver is about 300 millimetres by 10 millimetres.



Variations of standard screwdrivers include:

. 'Stubby', 'stumpy' or 'dumpy' screwdrivers (about 40 mm by 6 mm) for use where there is limited room

. Light duty screwdrivers with parallel tips (The blade may be sheathed in insulation to avoid shortcircuiting live parts).



Standard Shaped Tips

A correctly shaped standard tip:

. Engages the screw slot securely

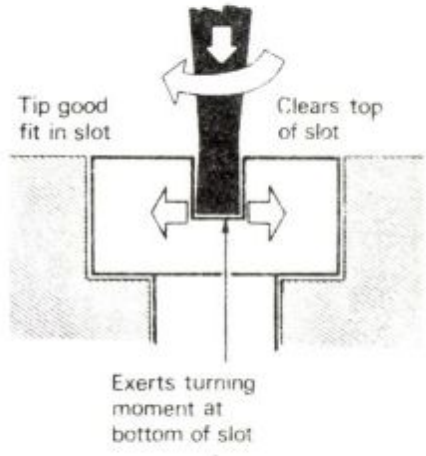
. Is almost as thick as the slot

. Is parallel ground to clear the top edge of the slot

. Exerts its turning moment at the bottom of the slot

. Has a width not less than three-quarters of the length of the slot

. Turns the screw with a minimum of downward pressure on the blade.



CORRECT FIT OF TIP IN SLOT

Newly bought screwdrivers may have incorrect tips. A blade that tapers out from the tip tends to rise out of the slot. Excessive downward pressure is required to counteract this. Thus there is a danger of slipping which could result in:

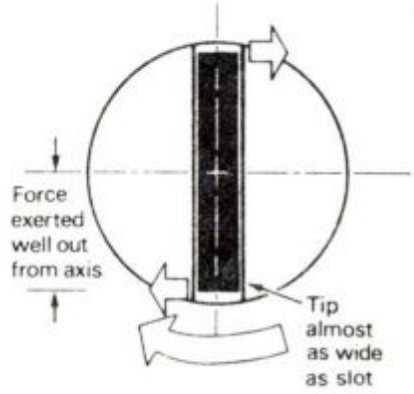
. Damage to the screwhead

. Damage to the work

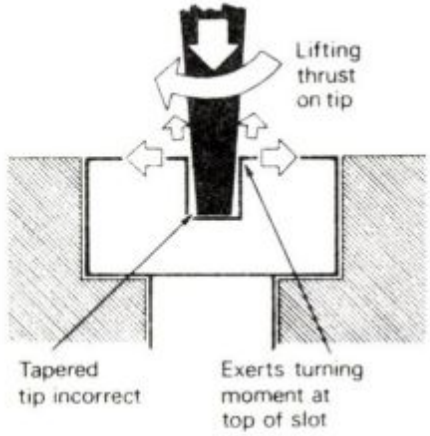
. Abrasion to your hand.

Inspect each of your screwdrivers. If the blade has a uniform taper from the tip, the shape is incorrect. The faces of the tip should be parallel at the points of engagement with the sides of the slot.

Some alloy steel tips can be filed to the correct shape. Other tips may require careful parallel grinding. Remove just enough metal to make the faces of the tip parallel for a distance equal to just over half the width of the tip.



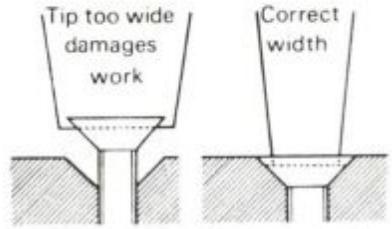
CORRECT FIT OF TIP IN SLOT



INCORRECT FIT OF TIP IN SLOT

Selecting the Correct Size Tip

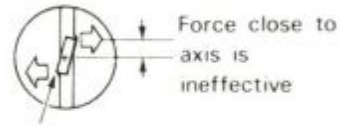
Always select the size of tip carefully. The width of the tip should almost equal the length of the bottom of the slot. Too wide a tip could damage the work. Too narrow a tip could damage the screw and the tip.



Tip almost as long as bottom of slot

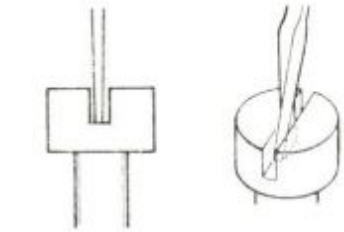
Tips that are too narrow exert their turning force too close to the screw axis. Also the blade axis may not be lined up with the screw axis. Turning pressure tends to damage the tip and the screw rather than turn the screw.

The thickness of the tip should almost equal the width of the slot. When the tip is too thin, it may twist out of shape when force is exerted. Trying to force in too thick a tip will damage the slot.

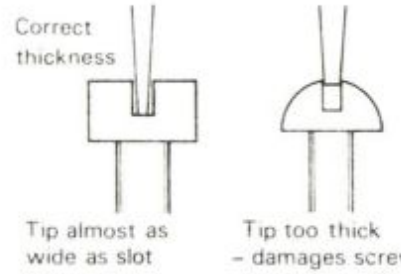


Narrow tip damages screw & tip

Six widths of tip are commonly available. Each width is available in three or four different lengths. Thickness of tips usually vary with the length of the blade. Find out the range of screwdrivers that best suits your work. Get the required screwdrivers and always use the correct one.



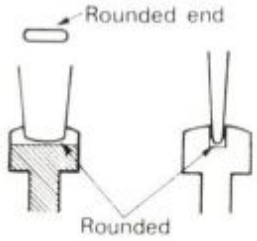
Tip too thin - blade twists



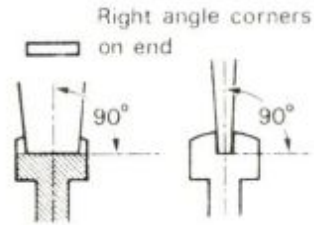
Keeping Tips in Good Condition

With constant use, screwdriver tips wear. Worn tips tend to slip dangerously. Inspect screwdriver tips regularly. If they are worn and rounded as shown, restore them to the correct shape. Tips are restored by dressing.

Where possible, dress the tip with a file. Begin filing on the end of the tip. After dressing, the tip must be symmetrical about the axis of the blade. All corners must be square. The end must be at right angles to the axis in both planes. The tip thickness must be correct. The faces of the tip must be parallel for a distance equal to just over half the width of the tip.



Worn and dangerous



Correct shape restored

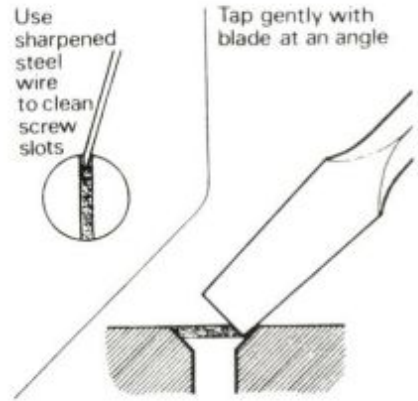
If it is necessary to grind the tip, take care not to overheat it. Grind only a little at a time and allow the tip to cool each time. An overheated tip will be too soft for use, and would have to be hardened and tempered again.

Incorrectly dressed tips - Dangerous

Cleaning Screw Slots

Where slots in screws in apparatus are filled with dust or paint, use a sharpened piece of steel wire to clean them out.

Alternatively, screwdrivers with steel shanks right through the handle may be used. Tap them gently to force the blade along the slot at an angle.



Rusty screws should have penetrating oil applied first. After cleaning the slot, the screwdriver may be tapped gently to seat the tip in the slot.

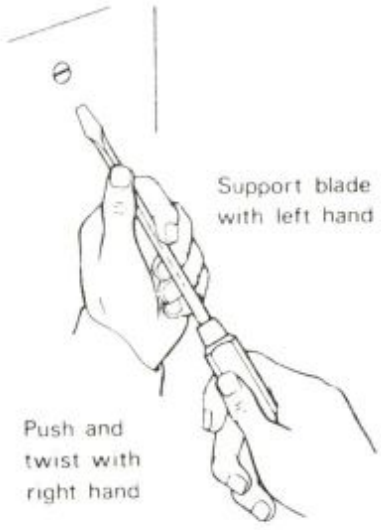
Damaged screw slots should be cleaned and deepened slightly with a hacksaw blade or warding file before use.

Burrs on screws are dangerous. File them off.

Using a Screwdriver

Decide the correct size tip to suit the screw slot. Select the longest suitable driver with that size tip. Make sure your hands and the handle are dry and not greasy.

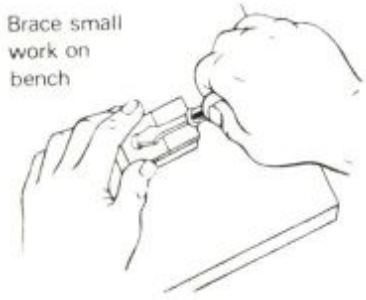
Hold the screwdriver with its axis in line with the axis of the screw. Guide the blade with one hand and apply just sufficient pressure with the other hand to keep the tip in the slot. Twist firmly and steadily.



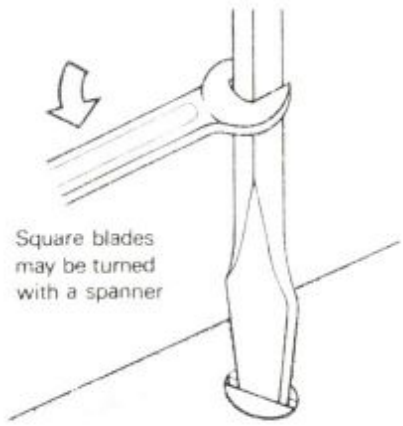
Keep the tip centred in the slot and the axis of the blade in line with the axis of the screw. This will prevent slips which cause accidents.

Take care in tightening small screws. Too much turning pressure will shear them off.

Always brace small work against the bench or other firm support before using a screwdriver. Never hold small work in your left hand while using a screwdriver. It could slip and penetrate your hand.



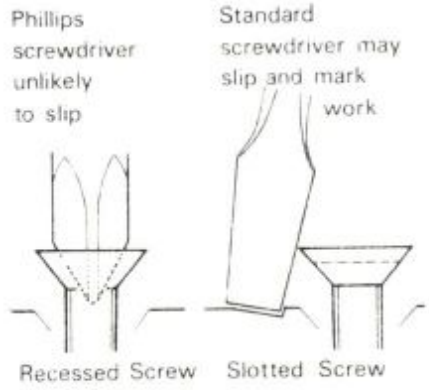
To turn large screws, use a screwdriver with a square blade. Apply extra twisting force with the aid of a close fitting spanner. As one hand pulls the spanner, keep the axis of the blade in line with the axis of the screw with the other hand.



Never use pliers or toothed wrenches to apply twisting force to a screwdriver.

Screwdrivers for Recessed Head Screws

A wide variety of recessed head screws are used in manufactured articles, which are often assembled using power driven screwdriver tips. Never use the wrong type or size of screwdriver as this will seriously damage a screwhead recess. Ask your supervisor about the correct tip.



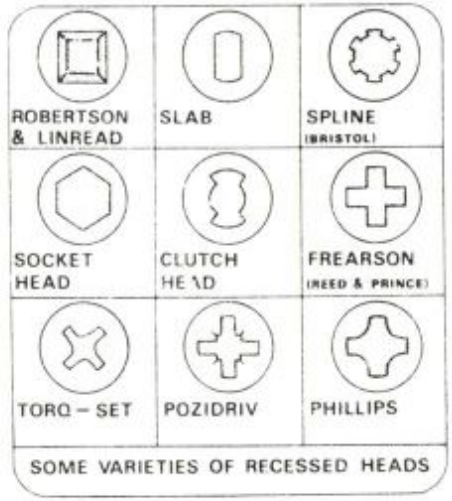
Hand-held screwdrivers with cross type tips for cross or cruciform type recesses are common.

. Phillips (Australian Standard Type I) has been the most common type. It will drive both in Phillips and Pozidriv recesses

. Pozidriv (Australian Standard Type II) is an improved type that is now being used more frequently. Use it only on Pozidriv recesses. Do not use on Phillips type recesses

. Frearson (American Standard Type II) is now rarely used. It had a sharp well defined point with a 75° angle. Do not use on any other cross recess.

A set of the four sizes of Phillips screwdrivers will fit a wide range of cross recesses in screws of Australian, British and other overseas manufacturers. Pozidriv screwdrivers are best for Pozidriv recesses and number 2 and 3 point sizes drive about 75% of the commonly used Pozidriv screws.



SOME VARIETIES OF RECESSED HEADS

Phillips Screwdrivers

Phillips screwdrivers are made with:

. Cruciform tips that are unlikely to slip from the cruciform slot in Phillips recess head screws

. The end of the four flutes tapered to an angle of 53°

. The extreme end ground to 110°

. Four different sizes to cover the full range of screws.

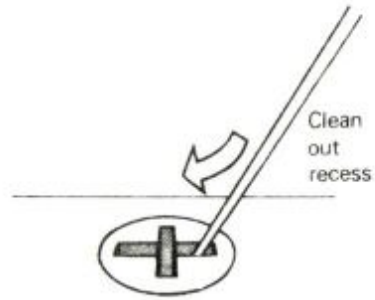
Stubby, stumpy or dumpy screwdrivers with recessed point numbers 1 and 2 are available.

The table below is typical of the range of Phillips screwdrivers available.

Point Number	1	2	3	4
Blade Length	75 mm	100 mm	150 mm	200 mm
Blade Diameter	5 mm	6 mm	8 mm	10 mm
Screw Number	1-4	5-9	10-16	18 & up

USING A PHILLIPS SCREWDRIVER

Always clean all paint or dirt from the recesses in the screwhead before fitting the screwdriver. Use a short piece of sharpened steel wire. Take care not to flick or blow dirt into your eyes.



Check the type and size of screw. These screwdrivers are not suitable for use in other forms of cruciform recess.

The correct size tip will completely fill and bed down in the recess without side play.

When using the screwdriver be sure to:

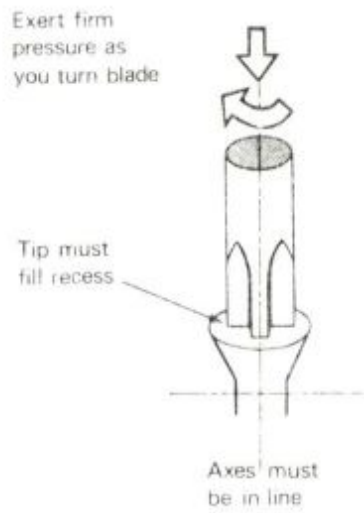
. Keep the axis of the blade in line with the axis of the screw to prevent uneven loading which could damage the recess

. Exert more downward pressure than you would with a standard tip.

Handle these screwdrivers carefully. Their fluted ends are brittle. They may break if you knock or drop them.

NOTE:

. The above section applies equally well for Pozidriv screwdrivers.



Identification of Recessed Screws and Screwdrivers

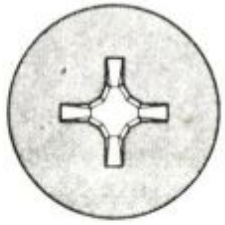
Because Pozidriv screwdrivers are unsuitable for use with Phillips recess fasteners you may need to identify both types of tip. Compare tips of the same size. Both types have 53° end angles formed by the wings. Also there is a second taper that gives the extreme end a blunted appearance. Their differences are listed below.

Phillips tips have:

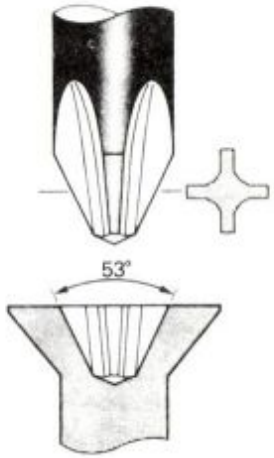
- Wings that taper
- Shallow two-faceted flutes between the wings.

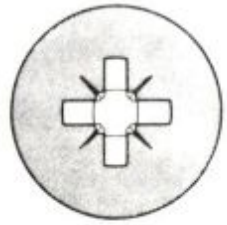
Pozidriv tips have:

- Wings that have straight sides
- Small ribs or projecting flutes between the wings. Feel these with your thumb nail.

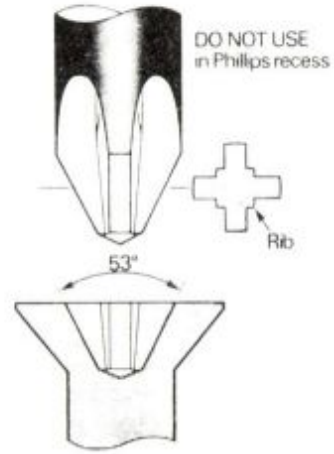


PHILLIPS





POZIDRIV



Phillips recesses have all facets tapering towards the bottom of the recesses. Pozidriv wing recesses are slightly wider and have straight sides. Note the flutes and radiating indicating marks midway between the wing recesses.

Advantages that are claimed to result from using Pozidriv screwdrivers in Pozidriv recesses are as follows:

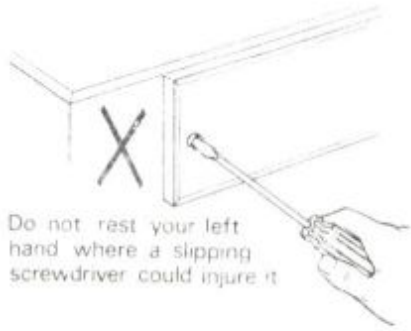
. 'Cam-out' or riding out of the recess is eliminated by virtue of engaging vertical driving faces so greater torque can be used

. Driver strength is increased by the ribs between the driver wings

. Alignment is easier because of the positive engagement of the tip in the recess so that there is less chance of damage to the work for convenient starting of screws.

Using Screwdrivers Safely

- Select the correct type and size of screwdriver for the work
- Check that the tip is in good condition and a good fit in the screw slot or recess
- Check that the handle is free of splits, defects and grease
- Keep your hand away from where it could be injured by a slipping screwdriver
- Brace small work on the bench or hold it in a vice
- Keep the axis of the blade in line with the axis of the screw
- Never try to use a screwdriver as a lever, pry or pinch bar. This could break the tip or bend the blade. Bent blades are hard to keep centred
- Never try to use a screwdriver as a punch or chisel: hammering on the handle could break or split it



Do not rest your left hand where a slipping screwdriver could injure it

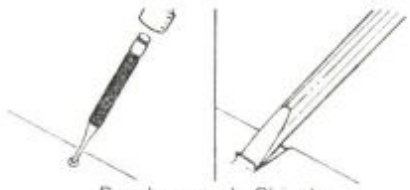
Use Pinch Bars for levering
Never use a Screwdriver

Screwdrivers with bent blades are useless

. Never apply excessive twisting force with a screwdriver. This could break the tip or shear off the screw. Learn the 'feel' or spring of a screwdriver that is loaded

. Take care when dressing a screwdriver tip on a grinding wheel. Wear safety goggles. Do not allow the tip to overheat

. Take care when using self-tapping screws. These are hardened and can damage some screwdrivers. It is best to use hard tips - those not easily filed - and make sure they are a good fit.



Punches and Chisels are made to be hit with a hammer —Screwdrivers are not

Do not use screwdrivers with split handles

Introduction to Pliers

Pliers are:

. Made of high carbon tool steel or alloy steel that is forged, machined and heat treated

. Classified by type and length

. Provided with handles shaped to give an efficient grip for the hand

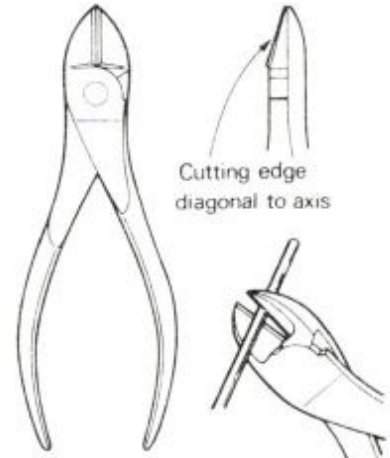
. Made with a great variety of jaw shapes designed for cutting, holding, gripping, pulling, pushing, twisting or turning.

Some types of pliers are intended mainly for cutting. Others are for holding and manipulating. The most common types combine these functions.

Cutting Pliers

Diagonal cutting pliers (or side cutters) are:

- Made with the jaws set at an angle
- Obtainable with bare or insulated handles
- Available in sizes from 100 to 200 mm
- Used for shearing off wires after jointing cable conductors, removing wire ties and interlayer whipping from units, etc
- Useful for pulling, cutting to length and spreading cotter pins.



DIAGONAL CUTTING PLIERS

Short ends of wire, particularly steel wire, are liable to fly when cut. Guard against this. Cut with the free end of wire pointing away from you. Wear goggles if necessary.

The sharp edges of the cut surfaces must be filed off if they are likely to cut someone.

Flat Nose Pliers

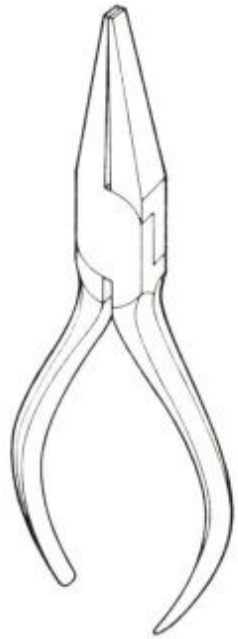
Flat nose pliers are:

- Made with tapered wedge-shaped jaws with flat gripping surfaces that may be either smooth or serrated

- Used for bending and folding narrow strips of thin sheet metal

- Able to shape wiring in electrical equipment.

There are a large number of variations of flat nose and round nose pliers used for special purposes. Some of these are covered in this handbook.

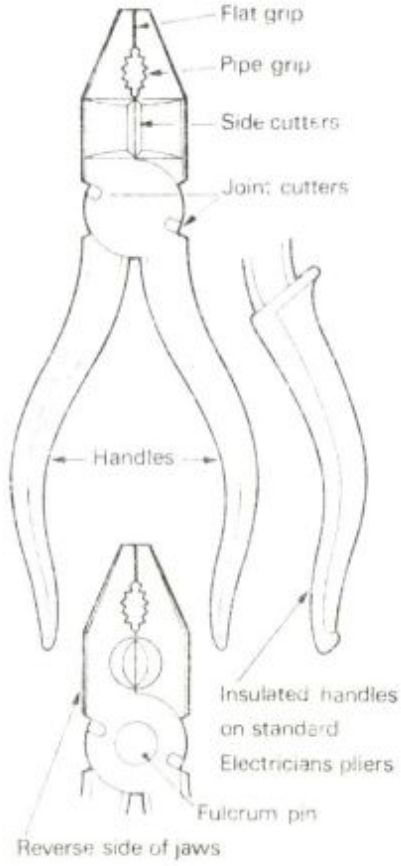


FLAT NOSE PLIERS

Combination Pliers

Standard engineers pliers are called combination pliers in Australia because of their versatility.

- The flat jaw tips are serrated for general gripping
- The pipe grip is serrated for gripping cylindrical objects
- Two joint cutters are provided for shearing off steel wires
- Side cutting jaws are for cutting softer wires. In some cases, when the side cutting jaws are closed, a small gap is left between the flat jaws. This allows for sharpening the side cutting jaws
- Combination pliers are available in sizes from 150 to 230 millimetres.



STANDARD ENGINEERS PLIERS OR COMBINATION PLIERS

Using Comination Pliers

- Grip small round objects at right angles to the flat jaws for greater control

. Use soft inserts when gripping finished surfaces to avoid marking them

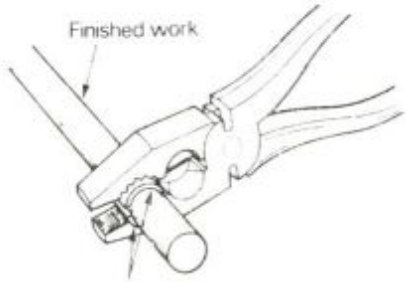
. Never grip hardened surfaces directly as this would damage the serrations

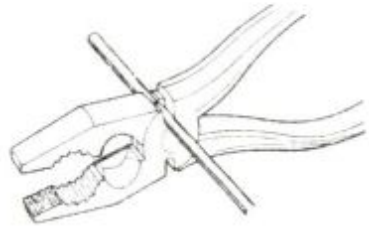
. Grip wires in line with the flat jaws to twist them

. Use the side cutting jaws only for cutting softer wires

. To cut harder steel wires, use only the side cutters. These have strong 90° shearing edges and are placed to have greater mechanical advantage than the side cutting jaws of the combination pliers. Open the pliers wide until the cutter grooves in adjacent jaws line up. Insert the wire with the short end facing away. Squeeze to cut

. Never cut wires in tension until you have made sure the ends cannot fly dangerously.





Cutting steel wire

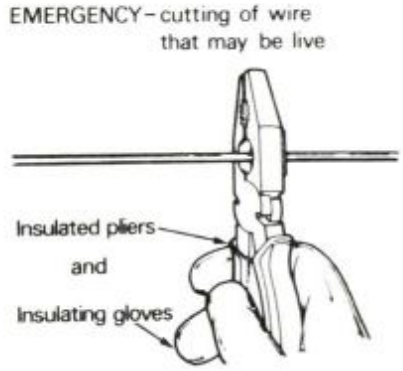
HAND TOOLS

Insulated Pliers

Combination, diagonal cutting and other types of pliers may be obtained with insulated handles.

This insulation is intended as an additional safeguard against electric shock. Do not rely on it as the only protection from contact with live parts.

Before any work is done on electrical equipment, it should be switched off and isolated. Only qualified electricians should do this work. Insulated pliers provide some protection if the equipment is accidentally made live.



Using Pliers Safely

. Always use the correct type and size of pliers

. Do not try to cut material that is too large or too hard for the cutting jaws as this could deform or break them

. Never try to put extensions on the handles as this could break them.
If you have to turn a nut, use the correct size spanner - never pliers

Nut damaged by misuse of Pliers

. When gripping an object, pull towards you to turn it. There is less danger of slipping. The teeth of some multigrip pliers will grip in only one direction

. Never use unprotected pliers to grip a hardened, polished or plated surface

. Keep pliers clean - wash in a suitable solvent and dry regularly

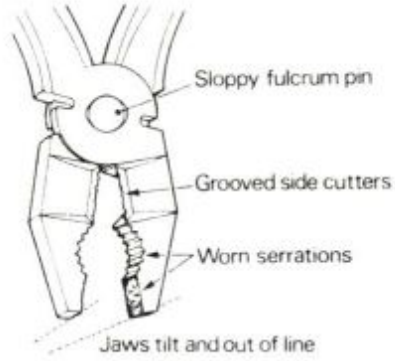
. Oil the pivot pin to keep it free moving and to reduce wear

. Inspect pliers regularly - worn tools can slip and damage your hand and the work piece

. Replace damaged insulating sleeves

. Never subject good pliers to heat. This could ruin them

. Worn out pliers can be used as tongs for holding hot work when they are useless for anything else. Gloves are required for this operation.



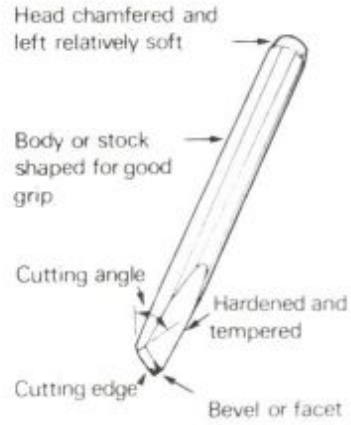
Damaged Pliers are dangerous

HAND TOOLS

Chisels

Various types of chisels are used to cut, chip or remove metal where this cannot be done economically in a machine. Large amounts of metal may be removed by pneumatic chisels. Metals made red hot may be cut with special chisels. But, in general metalwork, unheated metals are cut by cold chisels.

Chisels are forged to shape and then heat treated. The head is left soft so that chips do not fly from the head when it is struck with the hammer. Also the head is chamfered to limit the formation of overlapping burrs. Chisel bodies of octagonal or of oval cross-section are common.



The size of a cold chisel is the width of its cutting edge. However, the chisel can range in length from 15 cm to 60 cm.

Generally lines staff use the chipping or flat cold chisel to chip metal, cut iron pipes along the seam, or to make a straight cut when removing a piece of concrete from a slab.

A mortar chisel, commonly known as a Plugging Chisel, is also available to Lines staff when working on brick construction during installation.

Uses of Cold Chisels

- Bringing a job to approximate size and shape by quick removal of waste material before it is finished by filing or scraping
- Cutting oil grooves and key ways
- Cutting up light stock and sheetmetal
- Preparing edges for welding
- Cutting out rivets or seized nuts.

How to use a Cold Chisel

Much practice and careful observation of the following directions are necessary if you are to learn to use a cold chisel skillfully.

Select the chisel, hammer and working position carefully.

Select the largest chisel that is suitable for the job to be done. Select a hammer that is much heavier than the chisel. The hammer must have sufficient weight to drive the chisel into the work without excessive rebound. But it should not be too heavy to use over a long period. Most general work is done with a 200 mm chisel and a 0.5 kg hammer.

Cold chisels have particular advantages in chipping metal from jobs in awkward locations, for example when you work on construction components that are fixed in position. When the height and location of the surface to be chipped is so fixed, position your feet and body to :

. Retain your balance

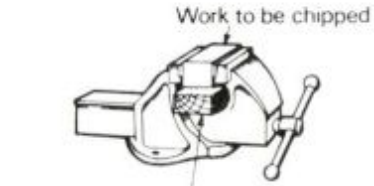
. Gain as much freedom of movement as possible

. Avoid fatigue.

However, it is best to learn the art of chipping by removing small amounts of metal from parts held in a vice. Safety goggles must be worn while chipping. All chipping must be done away from you.

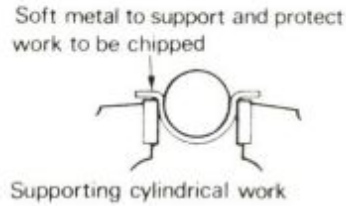
Grip and support the work firmly in a vice

In chipping, as in any other cutting process, the more rigid the job the better the cut. Use a wooden block to support the job to be chipped, then the impact of the blows cannot drive it out of position.



It is most efficient to work on a surface which is the same height from the floor as your elbow. If chipping in a vice, fix the job at the height of your elbow when you stand upright. Position the surface to be chipped near the top of the vice jaws, so that you chip directly towards the fixed jaw of the vice.

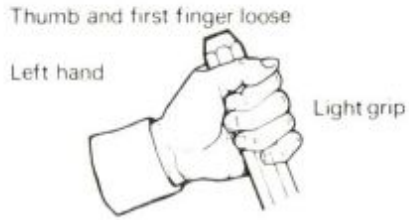
Secure, support and protect the finish of cylindrical work in which keyways or recesses are to be chipped by using a shaped soft metal clamp of copper, brass or similar metal. The radius of the inside of the clamp must conform closely to the radius of the shaft.



Grip the hammer and chisel correctly

Grip the hammer handle firmly near its free end. This will allow you to swing the hammer steadily with a free wrist action. Note that too tight a grip becomes tiring and results in blisters and that allowing the thumb to rest along the handle will result in it being jarred.

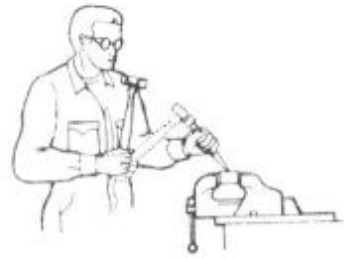
Grip the chisel with the knuckles uppermost so as to permit a clear view of the cutting edge when it is held in position at the correct angle. With a 20 cm chisel the hand should be curled around the chisel with about 25 mm of its head protruding.



Maintain a light grip with the third finger supported by the second and little fingers, with the rest of the hand relaxed. Curl the thumb and first finger around to act as a loose guide. Note that a tight grasp could result in a jarred hand. The recommended light grip will allow the hand to slide down the chisel in the event of a mishit and lessen the effect of the blow on the hand.

Small chisels may be held lightly between the thumb and the first and second fingers so that the cutting edge may be seen clearly.

Control the swing of the hammer and the direction of the cut



When starting a cut with a chisel, hold the cutting edge of the chisel at the point to be cut and at the correct angle. Keep watching the cutting edge. Until you have checked the cut made by the chisel and developed your timing, use firm sharp blows delivered mainly with a wrist action.

For roughing cuts, swing the hammer in an arc from its extreme position over the right shoulder, then bring it down with an easy free motion for a uniformly timed series of blows.

Use a cutting lubricant when cutting steel.

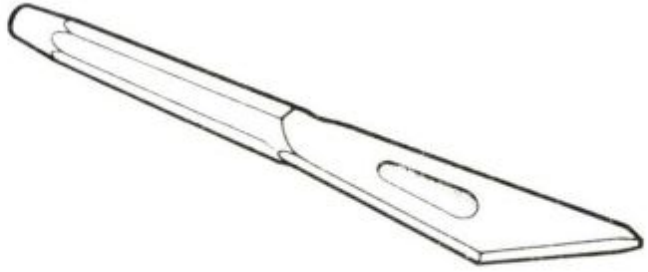
Keep a piece of oily waste in a container nearby. Dip the cutting edge of the chisel in the lubricant frequently so that a free cutting action is maintained. Do not use a lubricant when cutting cast iron.

Safety Precautions for Using Cold Chisels

- Always wear safety goggles when chipping
- Check that your hands, the body and head of the chisel and the handle and face of the hammer are clean, dry and free from grease
- Check that the hammer is not chipped or cracked on its body and that the handle is sound and fixed firmly in the head
- Make sure that the size of the chisel and its cutting angle are correct for the job and that you hold the chisel with the correct light grip
- Hold the hammer correctly and check that you have an unobstructed swing
- See that the job is secure or gripped firmly in a vice and adequately supported
- Always chip away from you and provide chipping screens to protect other workers from chips flying from the job
- Watch the cutting edge of the chisel
- Use comparatively light blows until you are confident of your swing
- File the sharp edges off chipped surfaces as soon as you finish
- Do not use a chisel which is 'mushroomed' on the striking face. Grind the end to a chamfer before using.

The Mortar Chisel

The mortar chisel has been formed from a normal bar with the cutting edge flattened down to a width less than the thickness of the mortar in a brick construction. These chisels are available in the one size. The stock of the chisel is given a shape that allows it to be held firmly without twisting in the hand.



Engineering Hand Saws

At times you may cut small stock bars, rods, tubes and sheets by hand. Similarly you must cut small parts to rough shape and parts that are fixed in awkward positions. Hand sawing is the most handy method of doing these jobs and also it does not distort the parts being cut.

Engineering hand saws are made with various types of frames which hold renewable blades in tension. Hacksaws are the most commonly used. Other types include sheet saws, pad saws and piercing saws.

HAND HACKSAWS

Most hand hacksaws have frames that are adjustable to take several different lengths of blade. A set screw enables the bow to be set in different positions in the handle.

A tubular adjustable type with completely guarded hand grip is shown. Such a grip gives good control of the frame when sawing vertically with the blade set in the same plane as the frame.

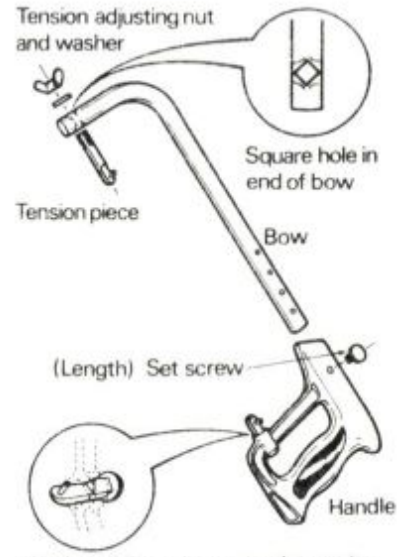
HACKSAW FRAME and BLADE

The tension and blade holding pieces have square shanks to allow them to be set in any one of four positions. From the flats of these pieces, hardened steel pins project at a slight angle to hold the blade. A wing nut is used to apply the correct tension to the blade.

Hacksaw frames should be well balanced and rigid when tensioned.

When not in use, the tension should be removed from the frame by loosening the wing nut. Clean and oil the tension piece and wing nut from time to time.

The adjustable hacksaw shown has a solid steel bow and a pistol grip handle. After the blade is removed the frame length can be adjusted. The notched bow is pivoted to clear the pin in the U-shaped sleeve. It is then moved in or out and pivoted back to engage the pin in the required notch.

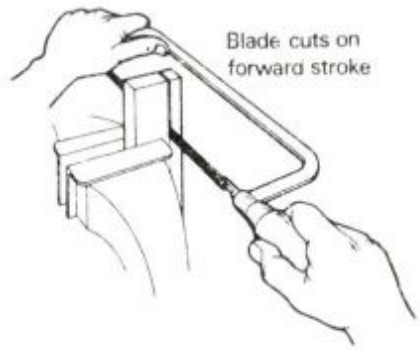


Blade holding piece may be set in any of four positions

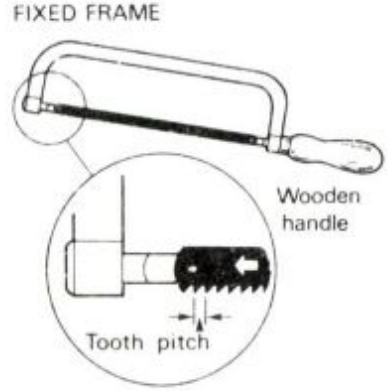
To make cuts greater than the depth of the frame, set the blade at right angles to the plane of the frame. With the blade in this position, the best grip is given by a rounded hardwood handle.

Hold the handle in the right hand with the thumb on top and the index finger below. Press the handle into the palm of the hand with the remaining three fingers.

With the left hand, lightly grip the front end of frame just above the wing nut.



The hacksaw shown has a rigid fixed frame. In all types of hacksaws, the blade must be fitted so that the teeth face away from the handle. The teeth cut on the forward stroke only.



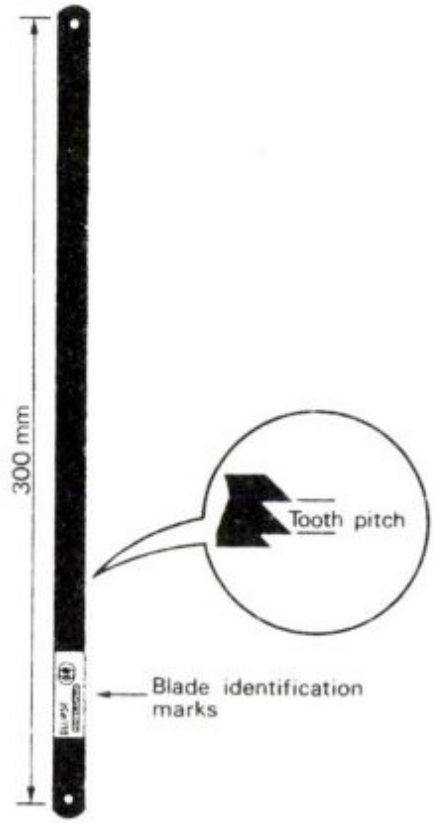
Hand Hacksaw Blades - Materials

Two metals commonly used to make hacksaw blades are low tungsten steel and high speed steel. In each case, different heat treatments are used to vary the characteristics of the blades.

i. Low tungsten steel blades are used for general purpose sawing of mild steel, copper, brass, aluminium and similar metals. They are available in two types:

. Flexible type blades are hardened on the cutting edge only so that they are not easily broken

. All hard blades are hardened throughout. These may shatter if used incorrectly, so wear safety goggles when sawing.



ii. High speed steel blades provide for fast cutting and maximum blade life. They should always be used for sawing alloy steels, heat treated steel and other hard metals.

. Flexible type blades are hardened on the cutting edge only so that they resist breakage more than all hard blades. Use this blade when first learning to saw hard materials.

. Hard blades are best for skilled users. Their rigidity is an aid to accurate sawing and they have a long life when used carefully.

iii. Hacksaw blades are usually supplied with either 18, 24 or 32 teeth per 25 mm.

. 18 teeth per 25 mm is a general purpose blade for use on materials over 4 mm thick

. 24 teeth per 25 mm is for use on 1.5 to 4 mm thick material

. 32 teeth per 25 mm is for use on material with a thickness of less than 1.5 mm.

Wear on Teeth

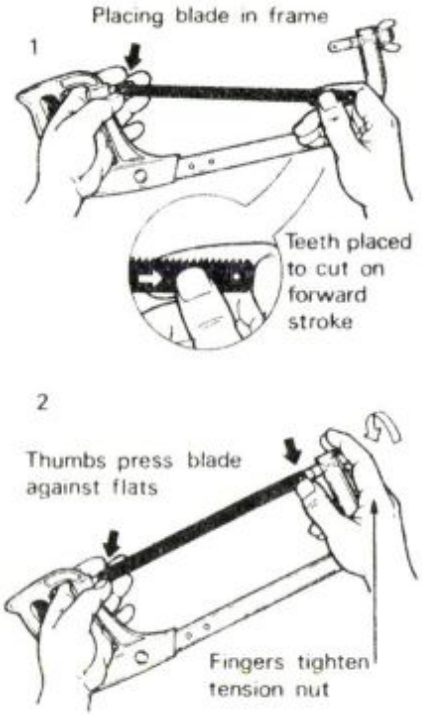
. Use the full length of the blade on each stroke to equalise the wear on the teeth

. Excessive speed - too many strokes per minute, particularly with too short a stroke - can overheat portions of the teeth so that their temper is altered and they wear excessively

. Use the correct number of teeth per 25 mm for the thickness of material to be cut
  - too few "teeth per 25 mm" will cause tooth breakage leading to premature replacement
  - too many "teeth per 25 mm" will extend length of time required to complete the cut.

Fitting a Hacksaw Blade in its Frame

. Set frame to correct length
. Hold handle in left hand
. Check that both holding pins are on the same side
. Hold front of blade in right hand with teeth facing right
. Fit blade on left pin and steady with left thumb
. Fit blade on right-hand pin
. Use thumbs to press blade hard against flats of blade holders
. Use wing nut to tension blade
. Take up slack - then give the wing nut three full turns
. Check the tension - the blade should 'ring' sharply when its back is plucked with your thumb nail.



NOTE : that flexible blades should be strained tighter than hard blades.

CAUTION:

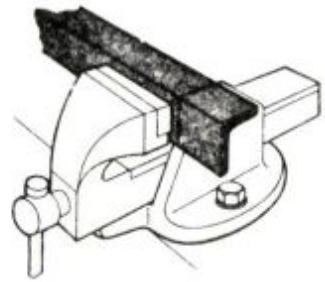
Excessive tightening may strain the frame score pins and break hard blades.

. If the blade flexes sideways when cutting, more tension is needed.

. After a few strokes with a new blade, tighten it a little.

Holding Material for Sawing

When using a vice to hold material to be cut, place it so that the cut can be:



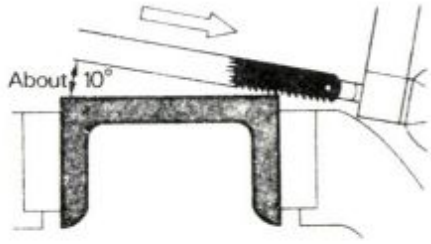
. Made vertically downwards

. Started on a flat surface

. Started at a slight angle to the back edge

. Made with the maximum number of teeth engaged.

Make sure that the work cannot move, spring or chatter. Clamp it rigidly as close to the vice as possible.



Clamp thin material between two pieces of wood and saw through the lot to avoid chatter.

Where it is necessary to cut along a marked line, use a piece of wood behind the thin sheet to brace it against the forward cutting stroke.

Using the Hacksaw

Control the hacksaw with both hands. Keep the saw straight and upright. Do not allow the blade to twist or move sideways.

Thin material clamped between wood pieces

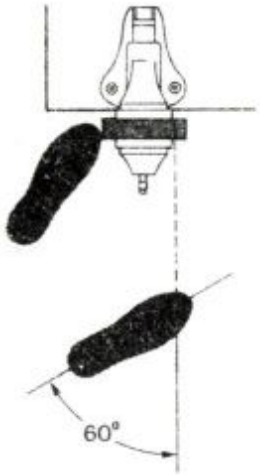
Grasp the handle firmly in your right hand.

Use the grip that suits you best. As shown in the inset, placing the finger along the frame can help control the direction of cut.

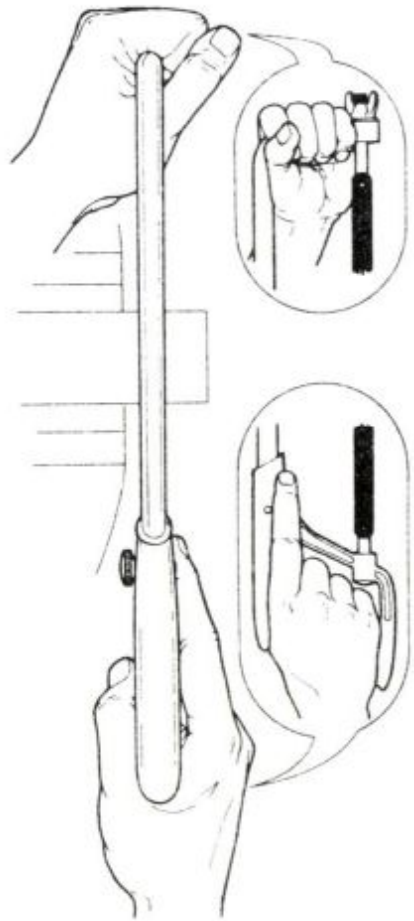
Grip the front of the frame just above the wing nut with your left hand. Note the illustrations on this page.

Stand with the front of the right foot about 400 or 500 millimetres from the vice.

Place the toes of the right foot in line with the cut to be made. Stand with the left foot forward for good balance.

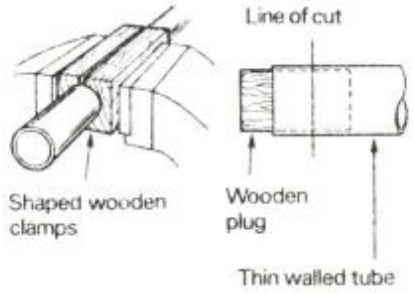


Individuals may vary positions of feet within shaded areas



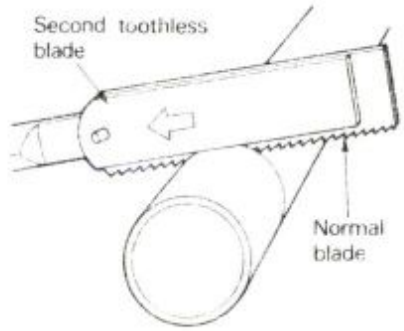
Cutting Thin Walled Tube

To prevent thin walled tube collapsing when it is being clamped and cut, use split jigs, shaped wooden clamps or wooden plugs for support.



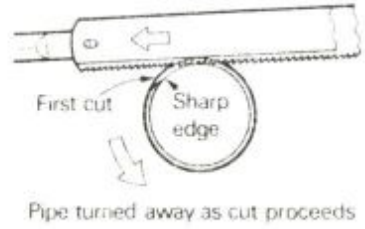
- Mark the circumference of the tube where the cut is to be made

- Fit a second toothless blade in the frame alongside the fine pitch cutting blade



- Make a cut at a small angle to the horizontal

- When the guide blade rides on top of the tubing, loosen the vice and turn the tubing about 30° away from you



. Carry on cutting and turning until through the tube.

This ensures that sufficient teeth are in contact and prevents teeth striking the sharp edge at the back of the tube.

Hacksaw Safety

. Pay attention when using a hacksaw. Should the blade cut through suddently or break there is a danger of striking your hands if they are not under control

. Wear safety goggles when sawing. Pieces of metal can fly from a blade that breaks

. Use a brush to clear chips away. Keep the inside of tubes and recesses free of chips when sawing

. Take special care when the cut is almost through. Arrange for the support of the material being cut off if it is liable to move and jam the blade

. Beware of sharp edges left after cutting. Use a file to smooth off the edges

. Store the hacksaw so that you can pick it up without striking your hand on the teeth

. Never test the sharpness of the teeth by rubbing your fingers on them.

Special Saws

SHEET SAW

. A SHEET SAW has a thin tempered steel back plate to which a normal 300 mm hacksaw blade is fixed. It may be used to cut all forms of plain and corrugated sheet material

PAD SAW HANDLE

. A PAD SAW consists of a special handle capable of holding a section of hacksaw blade or a key hole saw blade. Knurled and slotted set screws hold the blade rigidly in a strong steel tube which extends right through the wooden handle. Pad saws are used for short stroke sawing in awkward positions

BROKEN HACKSAW BLADE

KEY HOLE SAW BLADE

. A JUNIOR SAW holds a small 150 mm blade with 32 teeth per 25 mm by the spring tension of the bow. It is useful for cutting small sections in confined positions.

JUNIOR SAW

HAMMERS

The design and size of hammers depends on their intended use. The types used may be classified into two broad categories according to the head material. They are:

. hard heads made from high quality tool steel

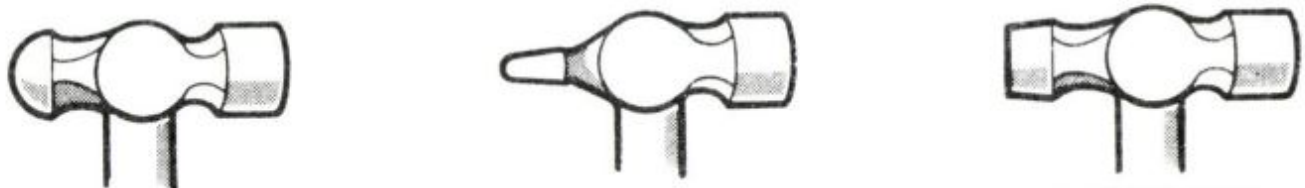
. soft heads made from material such as copper, lead, rubber, plastic and rawhide.

The types discussed in this handbook are the hard headed engineers hammers which range in mass from about 100 to 1400 grams and have the following typical head designs :

. Ball Pean

. Straight Pean

. Cross Pean



(a) BALL PEAN (b) STRAIGHT PEAN (c) CROSS PEAN

The ball pean type has one flat face used for general work, such as when using a cold chisel or driving a nail, and the other face (pean) is spherical in shape. One typical application of the pean is for spreading the end of rivets.

A straight pean type is one in which the pean is in line with the handle and a cross pean hammer where the pean is at right angles to the handle.

The cross and straight pean hammers can be used in corners not accessible to a ball pean type.

Soft headed hammers are used on work which could be damaged by using hard headed types. The actual type selected depends on the nature of the work.

Hammer Handle Replacement

When correctly fitted, good quality hickory hammer handles have a very long life, but occasionally hammer handles become loose or damaged and have to be tightened or replaced. A damaged handle can be removed by cutting it off near the head and drilling out the remaining wood in the head.

The method of fitting a new handle is as follows:

. Select a new handle of correct length

. Shape the handle so that it fits tightly into the oval hole of the head

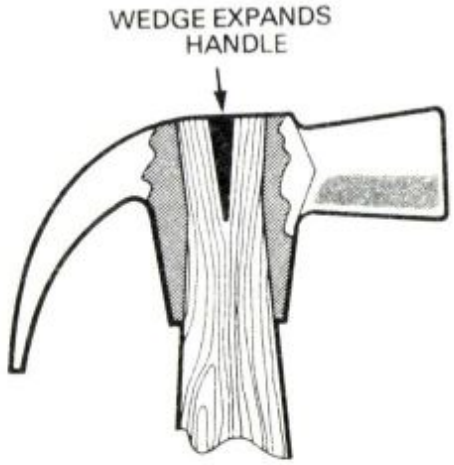
. Use a mallet to drive the handle into the head

. Check that the handle is at right angles to the head

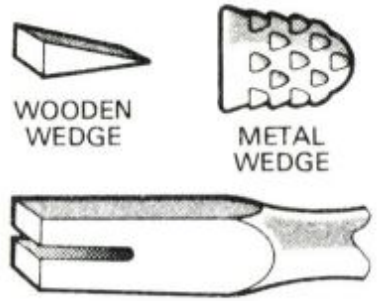
. Saw off any surplus handle that has passed through the head

. Drive wedges into slits to spread the wood (Wedges may be steel or soft straight grained wood)

. File or grind the handle end flush with the hammer head.



(c) WEDGING



(a) COMPONENTS

Three methods of wedging a hammer handle into the head:

(a) (b) (c)

The first method is frequently used but the handle is less likely to become loose when wedged as shown in the second method. For very large hammers, two wedges should be used as shown in the last method.

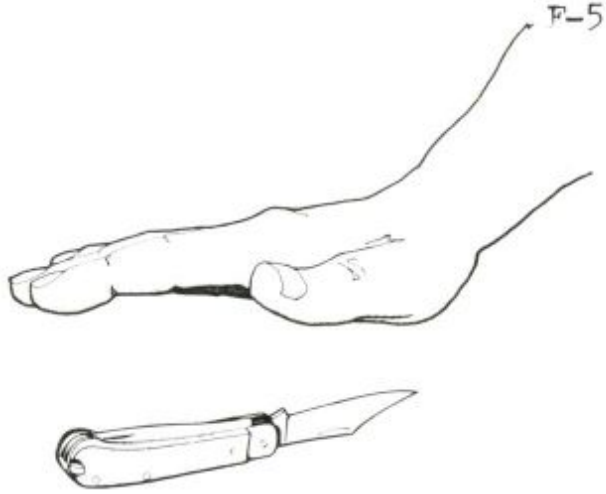
When selecting a hammer for a given task, consideration should be given to the type and mass most suitable for the work. A hammer which is too light may not be able to produce the desired result regardless of the time spent on the job. Alternatively, damage to the work may result from using a hammer which is too heavy. When using a hammer the handle should be grasped near the end for best control and effectiveness.

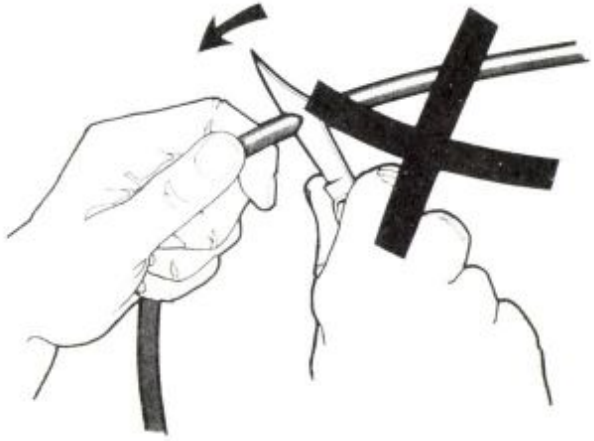
Use a Knife Safely

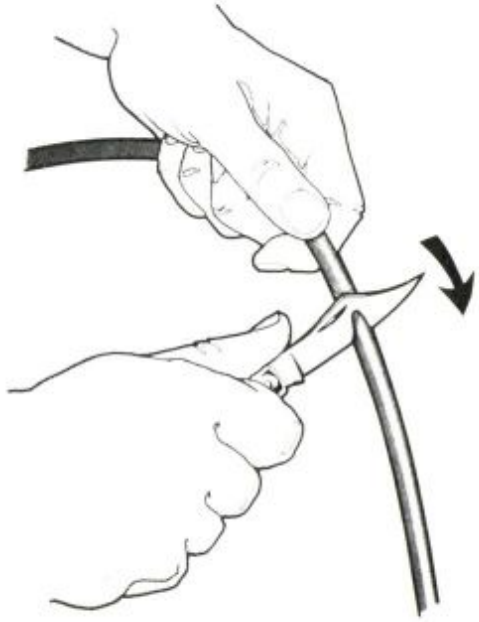
Accident reports show that a pocket knife can be dangerous and must be used carefully. When the knife is not being used make sure that it is closed. However, if in use and you put down the knife for a moment make sure that it is laid flat with the blade and point away from your reach so that the knife is picked up by the handle and not the blade.

Do not place the knife down on its back with the cutting edge upwards, serious injury may occur if you accidently drop your hand on the blade of the knife.

When cutting with a knife always cut away from you, never towards you.







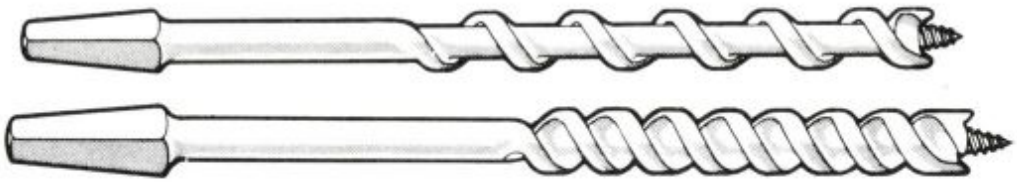
Wood Boring

When a hole is bored in wood, the size, location and purpose of the hole determines whether an auger, auger bit, wagon bit, nail bit or a twist drill is used.

AUGER BITS increases the size in steps of 1.5 mm from a range of 4.5 mm to 27.0 mm. The size is usually stamped on the shank. Lines staff generally use the single or double twist types.

. SINGLE TWIST

. DOUBLE TWIST

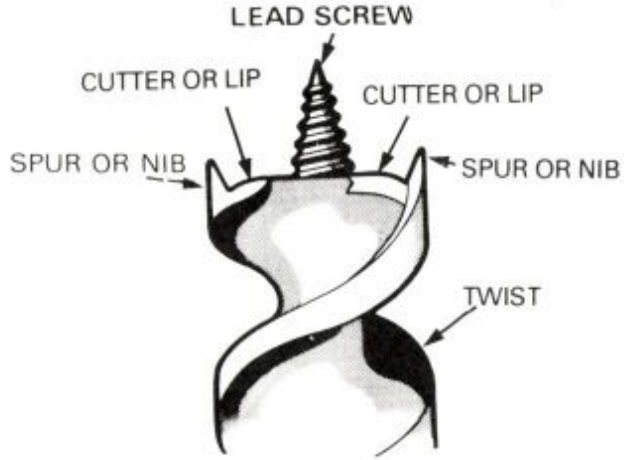


The cutting parts of an auger bit are:

. lead screw - centres the bit and draws it into the wood
. spurs or nibs - mark the circumference of the hole
. cutter or lips - cut the shaving

The twist of the bit lifts the shavings out of the hole.

The lead screws have different pitches for fast, medium or slow cutting.



(a) PARTS

(b) TYPES OF LEAD SCREWS

WAGON BITS are used to bore holes in poles when the auger bit is too short. The length of boring thread is 25 cm. These bits must be used with a wagon brace as they damage the chuck of ratchet braces.

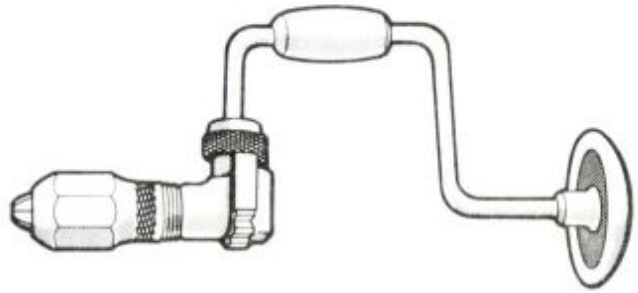
AUGERS are long bits with an eye at one end for a wooden handle. They have the same use as all other wood boring bits except that they give additional depth. Lines staff generally use augers from sizes 14.0 mm to 27.0 mm.

NAIL BITS have a square tapered head to fit a ratchet brace. The sizes vary from 1.5 mm to 80 mm. Nail bits are used to bore holes in hardwood for screw threads. Be careful not to apply too much pressure or bend these bits when boring, because they break easily.

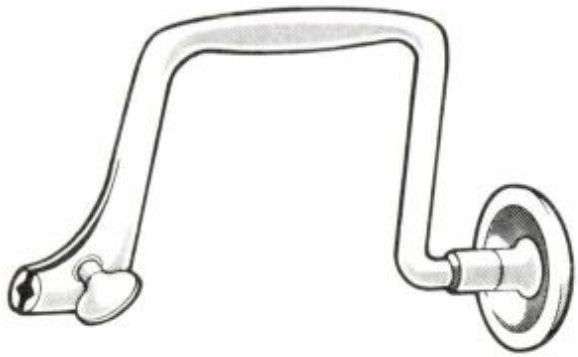
TWIST DRILLS with a square tapered head to fit in a ratchet or wagon brace are used to bore holes in wood for screws, nails or bolts, especially where there is a danger of striking hidden nails or metal. These drills usually range in sizes from 4.5 mm to 13.0 mm.

BRACES Lines staff use two types to hold and turn bits:

. Carpenter's Ratchet Brace has a ratchet driven chuck for holding bits. The ratchet may be locked, or made to operate in either direction when there is not enough room to turn the brace in a full circle.

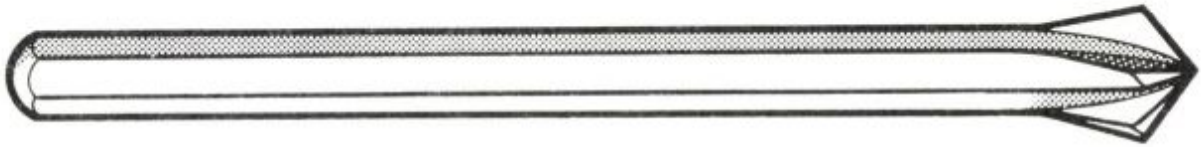


. Wagon Brace has no ratchet and the chuck is operated by a thumb screw. It is used to hold and guide wagon bits, which have a different head to auger bits.



Special Drill

A STAR DRILL is used to drill holes from 13 mm to 28 mm in diameter. The drills range from 30 cm to 90 cm in length depending on their size and the job on which they are used. They are used to drill blast holes in rock, or holes in manhole walls for fitting masonry anchors.



Files

Files are cutting tools that have large numbers of small teeth. These hardened steel teeth can cut softer materials. Pressure on the file makes its teeth penetrate the surface to be filed. When the file is forced forward, cuttings are removed from the surface. For each type of material there is an ideal tooth form that gives the most efficient cutting action.

Filing can be a :

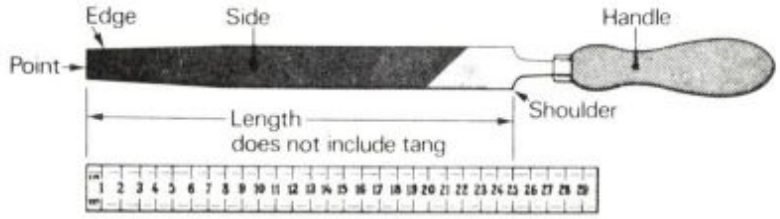
. Roughing process to alter the size and shape of a part by removing considerable material, or

. Finishing process to smooth a surface without removing much material.

Flat or curved surfaces may be produced. Both the shape of the teeth and the number of teeth per unit of length (pitch) affect the surface finish obtained by filing.

The main parts of the blade or body of a 250 mm flat file are named below. Note that the length does not include the tang.

A handle must be fitted to the tang to enable the file to be used safely. The names of these parts apply to most files.



Parts of a 250 mm file

File Classification

Files are classified according to three general features :

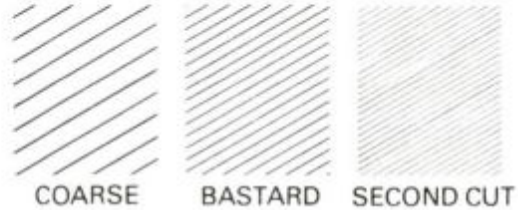
. Length
. Cut
. Kind.

The "length" is the distance from the point to the shoulder.
The "cut" of a file refers to the character and coarseness of the teeth.
The most commonly used types are known as :

. Single cut
. Double cut
. Rasp cut
. Curved tooth

and the various degrees of coarseness are known as :

. Coarse
. Bastard
. Second cut
. Smooth and
. Dead smooth.



Single cut files are generally used to obtain a smooth surface, or a sharp cutting edge, such as on cutting shears.

Double cut files are designed for fast metal removal, and are usually used with heavy pressure. The diamond-shaped teeth are formed by a double set of parallel chisel cuts that cross each other diagonally.

Rasp cut files have a series of individual teeth designed for fast removal of relatively soft materials.

Curved tooth files have a series of curved teeth, and are generally designed for use on sheet aluminium and steel.

The coarse and bastard cuts are used on heavy work requiring rapid cutting, whereas second cut and smooth files are used where accuracy or a good finish is wanted. The degree of coarseness depends on the length of the file. Longer files have less teeth per unit length than short ones.

File Handles

Every file must be fitted with a handle for two reasons :

. To avoid the danger of the sharp tang piercing the hand
. To give control over the pressure and direction of the file.

While plastic file handles are available, turned handles of soft wood with spun steel ferules are most commonly used. The length of the file governs the size of the handle required.

The handle must fit firmly and its axis be directly in line with the axis of the file.

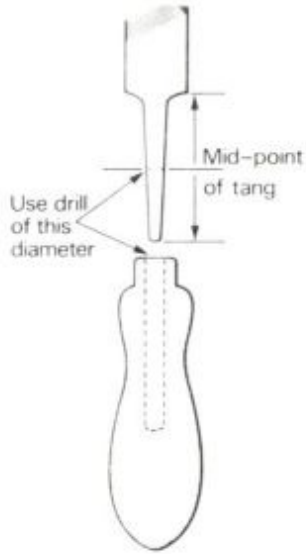
File Handles (Cont'd)

Two methods are used for fitting file handles :

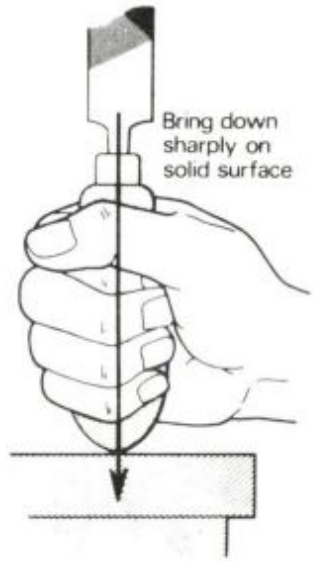
. Drill an axial hole in the handle with a drill that has a diameter equal to the width of the tang at its mid point.

  Insert the tang into the hole and mate with the handle. Hold the handle with the file upright, then bring down the handle sharply on a solid bench top.

. Alternatively, drill a small pilot hole in the handle along its axis. Hold the blade of the file with a wet cloth and then heat the tang. When the tip of the tang is red hot, push it into the handle to a depth of three quarters of its length and then withdraw the tang. Wait until the tang cools, then reinsert it into the hole and firmly fix in the handle as shown.



Drill handle to suit tang



Fix tang in handle

File Selection

When selecting a file for a particular task, several factors need to be considered so that the most suitable file is chosen. These factors are :

. the type of material to be filed
. the shape of the surface
. the amount of material to be removed
. the desired surface finish.

Although many files are suitable for use on a wide range of material, special files are made specifically for such material as brass, aluminium and stainless steel and should not be used on other materials.

When filing flat, unconfined surfaces, files of the longest suitable rectangular cross-section are used.

Slots, holes and curved surfaces require files of suitable cross-section and size. Some jobs call for a file with a safe edge to prevent damage to an adjacent finished surface.

Where a comparatively large amount of material has to be removed, rough, coarse or bastard cut files are used to speed the process. Then a fine cut file is used to produce the required surface finish. Coarse cut files should not be used on hard surfaces or narrow edges.

Care of files

Files are fine cutting tools. To cut well they must be kept clean. Because they are tempered very hard, they are brittle and easily damaged. Observe the following rules :

. Keep files clean and dry
. Keep the job clean with a bench brush
. Never rap the file on a bench or strike it with a metal object
. Never subject the file to bending or excessive pressure
. Store files separately from each other and from other tools
. Make sure that file handles are sound and that they fit firmly.

SECTION G

PORTABLE 240 V AC POWER TOOLS

- GENERAL
- HAZARDOUS SITUATIONS
- TOOLS AND ACCESSORIES
- OPERATING PRACTICES FOR POWER DRILLS
- CARE OF TWIST DRILL BITS
- PORTABLE CIRCULAR SAWS
- OPERATING PRACTICES FOR CIRCULAR SAWS
- ELECTRICAL SAFETY
- PORTABLE ANGLE GRINDER
- OPERATING PRACTICES FOR ANGLE GRINDER
- PORTABLE IMPACT WRENCH
- MAINTENANCE AND REPAIR OF TOOLS
- FLEXIBLE EXTENSION CORDS
- REGULAR INSPECTION AND TESTING OF POWER TOOLS AND EXTENSION CORDS

Issue 1, 1981

GENERAL

This Section details :

i. portable double insulated 240 V AC power tools supplied through state supply branches

ii. instruction on the safe use and care of the tools and typical job applications.

Earthed frame tools must be withdrawn from service and replaced with the equivalent double insulated tool. Where an earthed frame tool is the only suitable tool for the job, it is essential that the tool be operated from an earthed outlet. The outlet must be tested for earth using a Power Outlet and Appliance Test Set (S334/3)

If there is doubt about the earth connection, earthed frame tools must not be used because of the risk of electrocution.

HAZARDOUS SITUATIONS

For the purpose of this handbook a hazardous situation is defined as any area outside a building, above ceilings, below floor level, on construction sites, or in incomplete buildings.

Portable Earth Leakage Core Balance Relay Units (ELCBR) are to be used in hazardous situations where portable tools are powered from the 240 V mains supply or from a portable alternator unit.

PORTABLE 240 V AC POWER TOOLS

HAZARDOUS SITUATIONS (Cont'd)

Heater/Ventilator/Alternator units (HVA) are fitted with a fixed ELCBR which has an overload circuit breaker to cut the power supply if the alternator is overloaded. This fixed unit will be modified to by-pass the Earth Leakage Relay once the unit develops a fault. Be aware that this modification has been carried out. Check with your supervisor.

When using an HVA unit in a hazardous situation, and the overload circuit breaker has been modified, a portable ELCBR must be used.

Statistics show that extension leads are a major factor in electrical accidents. They often extend a long way and not enough care is taken to protect the cord.

To reduce the hazard of extension leads :

. visually check them before use
. check the area that the lead will cross and remove any possible cause of damage
. keep their use to a minimum.

When an extension cord is needed for outside work, extra safety is provided by using the Telecom approved reel, S435/10.

Portable power tools used incorrectly are hazardous. Therefore, understand the correct method of using each tool before starting work.

If you are not sure how to use a power tool, an "Operating Instruction" pamphlet supplied with a new tool could be of some help. Reading the pamphlet may prevent injury to you or other staff or damage to the tool.

If still in doubt ask your supervisor how to use the tool.

NEVER USE A PORTABLE POWER TOOL IF IN DOUBT OF ITS ELECTRICAL SAFETY.

TOOLS AND ACCESSORIES

The power tools listed below are available for Telecom staff. They will perform a wide range of work with maximum safety.

TYPE OF TOOL	SERIAL/ ITEM No	TYPE OF TOOL	SERIAL/ ITEM No
10 mm TWO SPEED DRILL	435/1	10 MM TWO SPEED IMPACT DRILL	435/3
13 mm TWO SPEED DRILL	435/12	13 mm TWO SPEED IMPACT DRILL	435/13
16 mm TWO SPEED DRILL	435/2	16 mm TWO SPEED IMPACT DRILL	435/4
190 mm CIRCULAR SAW	435/5	PORTABLE EXTENSION LEAD	435/10
240 mm CIRCULAR SAW	435/6	ELCBR	435/11
16 mm REVERSIBLE IMPACT WRENCH	435/7		
180 mm ANGLE GRINDER	435/8	2 CORE, 7 m ORANGE CORE-7A WORKING	435/14
66 mm ROTARY HAMMER	435/9	2 CORE, 7 m ORANGE CORD-10A WORKING	435/15

TABLE 1 PORTABLE 240 V AC POWER TOOLS AND ACCESSORIES

NOTE : Items 14 and 15 are replacement cords for double insulated tools only. These cords must not be used for extension cords, because they are only two core and have no earth connection.

PORTABLE 240 V AC POWER TOOLS

Supplementary Handle

Drills and angle grinders have a supplementary handle to give you stability when using them and if using a drill, to resist twisting of the tool if the drill bit jams. Also, in blind drilling the handle gives you protection in case the bit accidently touches a live wire.

Never hold the drill chuck or the drill bit if you cannot see what the bit is touching.

BE SAFETY WISE - ALWAYS USE THE SUPPLEMENTARY HANDLE.

Electric Shocks

Many electrocutions occur to bare-footed victims. Wear Telecom approved rubber-soled safety boots or shoes when using power tools.

Wearing of safety shoes is covered in Telecom Australia's policy under mandatory wearing of personal safety clothing and equipment (see Section K of this handbook).

Recent investigations show that many accidents involving power tools have happened to staff using non serialised tools. Only use tools obtained through your state supply branch.

Do not expose the tool to rain or water.

Avoid touching water pipes, refrigerator bodies, steel sinks and other metal objects when drilling. For additional safety when drilling in damp conditions e.g., where hidden power wiring could be near, wear rubber gloves S 34/14-21 and use a rubber mat S 34/54.

REMEMBER - NO DRILL IS SAFE UNLESS YOU HAVE FIRM CONTROL OF ITS OPERATION.

PORTABLE 240 V AC POWER TOOLS

Safety Rules

- Keep work area clean
- Keep work area well lit
- Dress safely - do not wear loose clothing or jewellery
- Wear non-skid safety footwear
- Wear safety glasses
- Wear a dust mask if the drilling operation is dusty
- Wear ear muffs when using the drill for long periods
- Do not carry the drill with a finger on the switch, it may accidently start
- Remove the power plug from the socket when not using the drill and before changing the drill bit, etc
- Always hold small items with a clamp or in a vise. Never hold loose material in your hand
- Never carry a tool by the cord. Do not pull by the cord. Keep the cord away from heat, oil and sharp edges. Check the cord regularly and have it replaced if damaged
- Do not operate a tool in explosive atmospheres. Sparks from the motor may ignite gas or fumes. Use a portable combustible gas detector if you suspect gas
- Remove keys and adjusting wrenches - get into the habit of checking before switching on
- Always visually inspect a tool for damage before use
- Extension cords must be tested and approved as in EI LINES General SP 4010
- If drill has been dropped :
  - Unplug it
  - Check for signs of cracking or breakage of the housing
  - Check that the chuck rotates free and true
  - If there are signs of damage, return the drill for testing. Do not use the tool

SAFETY NOTE : USE A HAND TOOL FOR DRILLING INTO ASBESTOS CEMENT. IF A POWER TOOL IS TO BE USED, READ EI LINES GENERAL SP 9041 AND OBEY THE INSTRUCTIONS.

PORTABLE 240 V AC POWER TOOLS

Rotary, Impact and Hammer Drills

Table 2 gives general guidelines for selecting a tool for a drilling task.

All drills ordered against the Headquarters power tools contract 1980 will be supplied without a "lock-on" switch mechanism. This has been done to improve operator safety, as a number of accidents involving "lock-on" switches have occurred recently.

Do not use the "lock-on" switch if it is fitted. Make sure that it is not engaged before plugging in the power tool.

MAX CHUCK CAPACITY	TYPE OF DRILL	NOMINAL SPEED LOW/HIGH	NOMINAL IMPACT SPEED LOW/HIGH	MAX DRILL BIT DIAMETER FOR DRILLING IN				SERIAL ITEM No
				STEEL	ALUMINIUM	WOOD	MASONRY	
	Two Speed Drill	(rpm)		Speed L/H	Speed L/H	Speed L/H	Speed L/H	
10 mm		600/1600	-	10/6mm	15/9mm	25/15mm	-	435/1
13 mm		500/1200	-	13/7mm	18/10mm	30/18mm	-	435/12
16 mm		400/1000	-	16/8mm	20/13mm	38/20mm	-	435/2
10 mm	Two Speed Impact Drill	600/1600	14000/32000 per min	10/5mm	15/10mm	25/16mm	16/8mm	435/3
13mm		500/1200	19000/35000 per min	12/8mm	18/12mm	25/18mm	19/12mm	435/13
16 mm		400/1000	5100/11400 per min	16/10mm	20/13mm	50/20mm	100/30mm	435/4
66 mm	Rotary Hammer	400/800	3500per min	-	-	-	26mm (Solid Bit) 66mm (Core Bit)	435/9

TABLE 2 : GUIDELINES FOR DRILL SELECTION

Drill Speed Selection (RPM)

The best speed of a drill depends on the material being drilled and the type of steel from which the drill bit is made.

Drill speeds for given material are usually stated in terms of peripheral speed in metres per minutes (MPM). This is the speed at which the outer ends of the cutting edges travel Therefore, for a given peripheral speed, a small drill must have a higher spindle speed (RPM) than a larger one to cut at the same rate.

DRILL BIT SIZE (mm)	ALUMINIUM	BRASS	CAST IRON	MILD STEEL	MALLEABLE IRON	HARD CAST IRON	TOOL OR HARD STEEL	ALLOY STEEL
1	20000	20000	6000	8000	8000	4000	5000	5000
2	19000	10000	3000	4000	4000	2000	3200	3200
3	6500	6500	2000	2600	2600	1500	1500	1500
4	5000	5000	1500	2000	2000	1000	1100	1100
5	4000	4000	1300	1500	1500	900	1000	1000
6	3500	3500	1000	1300	1300	700	800	800
7	3000	3000	900	1100	1100	600	700	700
8	2500	2500	800	1000	1000	500	600	600
9	2500	2500	700	800	800	400	500	500
10	2000	2000	600	700	700	400	500	500
11	2000	2000	600	700	700	400	400	400
12	1500	1500	500	600	600	350	400	400
13	1500	1500	500	600	600	300	350	350
14	1000	1000	400	600	600	300	350	350
15	1000	1000	400	500	500	300	300	300
16	1000	1000	400	400	400	300	300	300

TABLE 3 : GUIDELINES FOR DRILL SPEED SELECTION (RPM)

Drill speed depends on the material being drilled. The above figures are the average recommended speeds for various drill bit diameters.

Drilling Facility Selection

Two Speed Drill - Select 'low' or 'high' speed.
Impact Drill - Set tool for normal drilling and then select 'low' or 'high' speed as required. For 'Impact' set tool to hammer.
Rotary Hammer - Do not use for normal drilling. Set drill drive switch to 'off' and hammer drive switch to speed required.

OPERATING PRACTICES FOR POWER DRILLS

. Keep your hands away from the chuck - do not stop the drill by holding the chuck
. Stay alert - watch what you are doing
. Do not force the tool - apply light pressure and let the drill cut at its own rate
. Use the right tool for the job
. Check that the drill bit is sharp. Select the correct type of drill bit for the tool and the material being drilled
. Look after your power drill. Only use accessories designed for the tool
. When not in use, the tool should be stored in a dry place and in its carrying case
. Do not apply pressure to the drill before switching on. Run the tool for a few seconds before applying pressure. Centre punch the material to aid locating the drill bit
. Ease the pressure on the tool when the bit is about to break through
. Withdraw the drill bit from the hole at intervals to prevent the flutes clogging, particularly when drilling deep holes
. Make sure that the drill bit is secure to the chuck. Tighten the chuck jaws using the key supplied
. Before drilling through a wall etc, check that the other side of the wall is clear of hazards.

Rotary Type Power Drills (Serial 435 Item 1, 2, 12)

Rotary Power Drills are suitable for drilling metal, wood, plastics and ceramics. They can be used for drilling brick, earthenware, and softer classes of stone but an impact drill is preferable. The drilling bit and speed should be appropriate for the material (See drill speed selection table).

Rotary drills without impact action are not suitable for drilling in concrete containing hard, coarse aggregate.

For all free-hand drilling operations, the supplementary handle should be used. This is a safe working practice.

Impact Type Power Drills (Serial 435 Items 3, 4, 13)

. Their main area of application is for drilling holes in stone, brick and concrete
. The cam arrangement in the impact mechanism delivers axial blows after each drill revolution, which causes the cutting edges to pulverise the material being drilled
. When impact drilling masonry, tungsten carbide tipped drill bits with a negative rake should be used to withstand the percussive force
. The impact mechanism should be engaged only to drill masonry. Do not use the impact action when drilling metal or wood.

Rotary Hammers

. These tools should be used only for masonry work and not for drilling metals or wood
. There is a choice of three different modes of operation :

MODE 1 Hammer Action Only. For breaking intc masonry, eg concrete, brick etc

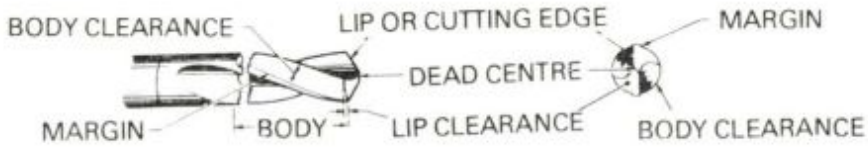
MODE 2 Rotating and Hammering Action. For drilling into masonry.

MODE 3 Rotating Action Only. For drilling into metals, plastics or timber, but as stated above, these tools are not recommended for drilling into the above materials since this can be adequately performed by two speed drills provided for that purpose.

CARE OF TWIST DRILL BITS

The problem of getting maximum economy and good use from twist drills is one which faces every user. The answer lies in knowing the factors which affect drills.

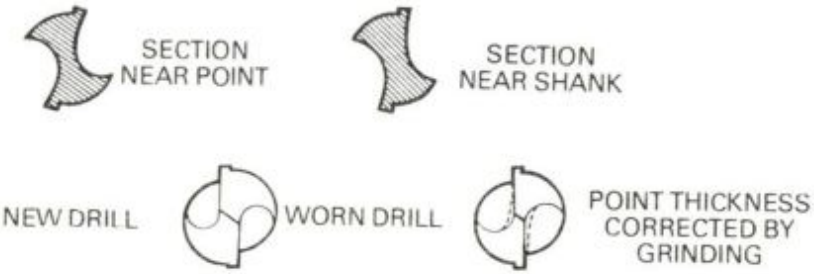
- Use good quality high speed steel drill bits. Poor quality bits have a limited life and in the end will cost more
- Keep the drill bit sharp. Breaking occurs due to the bit not being sharpened before it becomes dull. Also check the bit to see if it is badly worn at the corners of the lands. It may need regrinding.
- Insert the drill bit into the chuck so far as possible but not further that the flutes. The chuck must not grip the flutes. Tighten the jaws firmly
- Take care when removing a bit from a chuck. Do not allow the point to drop onto a hard surface
- Use a centre punch to mark the location of the hole. This assists the start of drilling. When drilling a large diameter hole, drill a small pilot hole to give clearance for the web of the larger bit
- Keep the flutes clear, especially when drilling deep holes. Withdraw the bit occasionally to prevent the flutes becoming clogged
- A steady pressure must be used when drilling by hand; allowing the bit to dwell will cause rapid dulling and also work-hardening on some materials
- Make sure that the work is held rigidly and is supported as close as possible to the bit
- When drilling thin materials, place a piece of wood or other material under the work to prevent distortion of the hole
- When drilling small holes, keep as close to the maximum recommended speed as possible
- Use lubricants if appropriate. Ensure that a sufficient supply of lubricant reaches the drill bit point
- The twist drill point angle, as measured from the cutting edges through the axis of the drill, depends upon the material being drilled. An angle of 118° is satisfactory for the average class of work.



POINT ANGLE

PARTS OF A DRILL

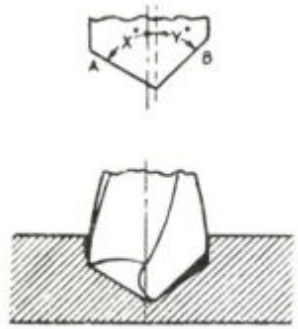
Web Thinning. The web is the wall which separates the flutes. To give the drill bit rigidity and torsional strength, the web is increased in thickness towards the shank. With repeated resharpening of the drill, the web at the chisel edge becomes too thick. This prevents the drill cutting under normal pressure, so the web must be thinned at the point by grinding.



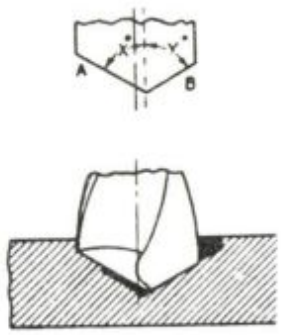
Grinding Drill Bits. Drills need grinding to modify or restore the point angles and clearance angles. The advantages of using correctly ground bits are :

- Better quality work
- Less heat generated by friction
- Less pressure required
- Less power required

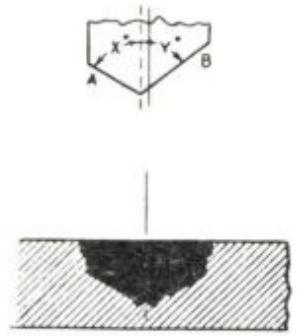
The cutting edges must be of equal length and at the same angle to the drill axis. A drill with a true central pivot has reduced pressure between the lands and the hole being drilled, allowing for better cutting action. The drilled holes are made oversize when these conditions are not met.



Lips of equal lengths but at unequal angles

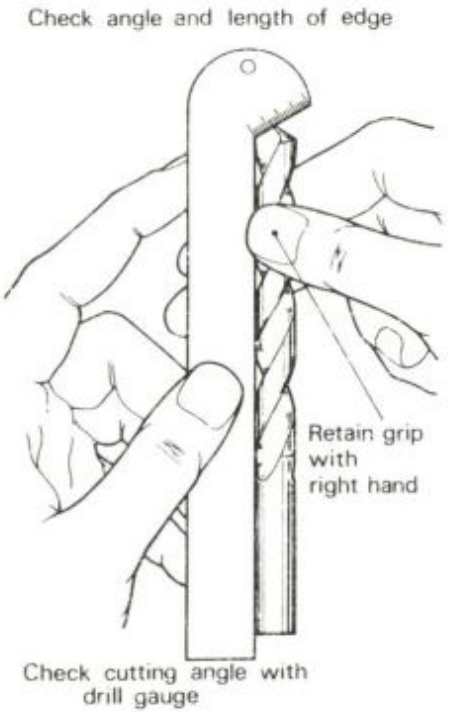


Lips of unequal lengths but at equal angles



Lips of unequal lengths and unequal angles.

Use a drill sharpening gauge to check that the cutting angle is correct (normal work 118°), the cutting edges are of equal length and the lip clearances are equal and correct (about 12°).



The point angle depends on the hardness of the material to be drilled. Hard materials require a larger point angle than softer ones. Drills for general work are supplied with a point angle of 118°. Point angles suitable for other metals are shown below :

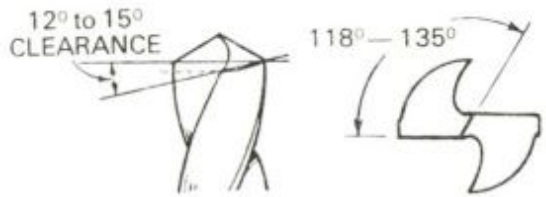
MATERIAL	POINT ANGLE	LUBRICANTS
ALUMINIUM		
Shallow Hole	90°	Soluble Oil
Deep Hole	130°	Kerosene
BRASS	118°-125°	Soluble Oil
COPPER	100°-130°	Soluble Oil
CAST IRON	80°	Soluble Oil, Dry
	80°	Compressed Air
HARD PLASTIC	118°	Dry
STEEL		
Mild & Cast	118°	Soluble Oil
Tool, Tensile, Stainless	130°	Soluble Oil
WOOD	90°	Dry

TWIST DRILL POINT ANGLE FOR VARIOUS MATERIALS

Lip Clearance Angle is necessary to allow the cutting edges to 'dig in' to the work and also to reduce the area of contact so that less heat is generated.

The clearance angle varies from 10° for hard materials to 17° for soft materials. For general work, the lip clearance angle should be 12-15°.

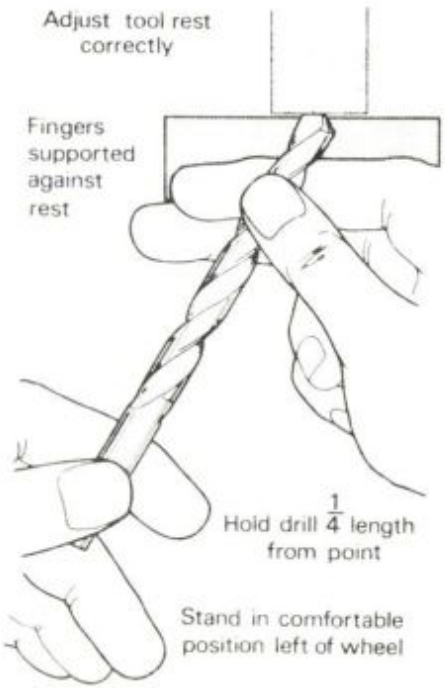
If the clearance angle is too great there is risk of chipping the cutting edges.



Sharpening a Twist Drill

A twist drill can be sharpened on a bench grinder by using the following method :

- Check that the surface of each wheel is running true and that the wheels are dressed clean
- Make sure the tool rests are adjusted correctly and tightened
- Put on a pair of well-fitting safety goggles

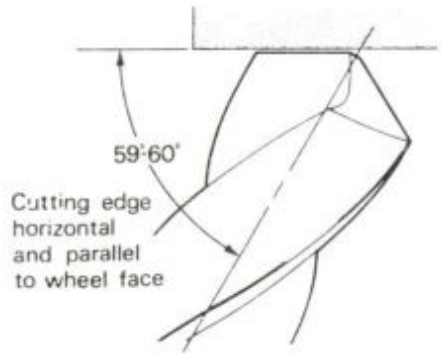


. Hold the drill at about ¼ of its length from the point

. Support the hand on the tool rest

. Hold the shank of the drill

. Place the drill so that it makes an angle of 59°-60° to the wheel face

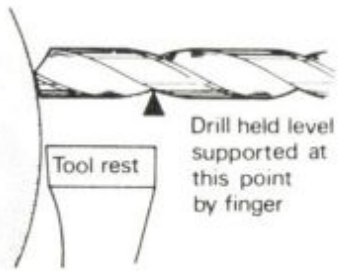


. Hold the drill level and one cutting edge horizontal and parallel to the wheel face

. Grind as little as possible

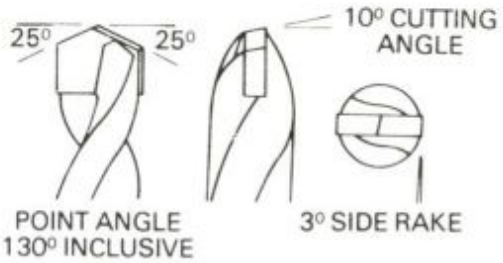
. Avoid overheating

- apply light pressure against the wheel face

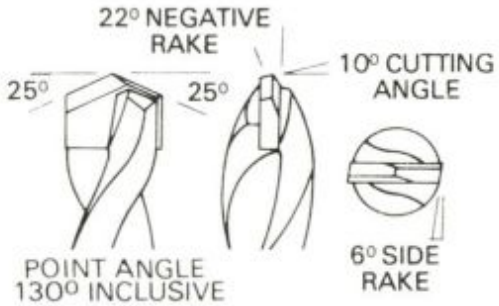


Care of Masonry Drill Bits

- Only use the low speed range of the drill. Do not exceed 600 rpm
- Keep a firm pressure against the work. Do not apply excessive force as this will cause the drill bit to overheat
- Withdraw the drill from the hole, from time to time, to clear the flutes
- Keep the drill bit sharp - resharpen with an 80-100 grit silicon carbide grinding wheel
- Masonry drills are expensive. The tungsten-carbide tip is hard, brittle and easily damaged if misused
- Allow the tip to cool slowly. Do not plunge an overheated tip into water or oil
- Do not use masonry drills on wood or metals
- Select the correct type of drill bit for rotary drilling or impact drilling. The cutting lip angles are different.



ROTARY DRILL TIP ANGLES



IMPACT DRILL TIP ANGLES

Core Cutters

Core cutters are employed where larger diameters have to be drilled.

The kind of material to be drilled will determine the type of core cutter to be used and whether a rotary, impact or hammer drill is required. The selection of the correct electric drill depends on the diameter of the hole to be drilled. Refer to manufacturers' specifications.

Core cutters are designed to be used with a centering drill to guide the core cutter concentrically, at least during the initial cutting action. After the core cutter bit has penetrated about 6 mm, the centering drill can be removed if required.

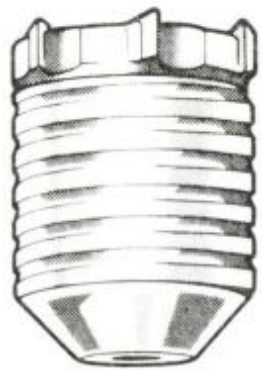
Core cutter bits and centering drills are carbide-tipped and are used mainly for drilling masonry, concrete and brick-work.

It is important to see that the drill is guided straight through the material to prevent undue friction to ensure the free rotation of the bit. Dust and particles produced during drilling should flow freely from the work or should be removed as these particles can compact causing over-heating and jamming.

To drill into concrete, brick, concrete blocks and stone, use an impact or hammer drill i.e., in addition to the rotating action, a hammer action is needed. The hammer action will speed up the process.

Core cutters and centering drills must be kept sharp and should be examined often, especially after drilling through reinforced concrete, to ensure that a reinforcing rod did not damage the core bit.

Core cutters are available in various sizes to cover a vast range of drilling jobs.



PORTABLE CIRCULAR SAWS

Portable circular saws are provided in two sizes for use by staff engaged in work such as building trenches, manholes and general carpentry.

i. 190 mm Circular Saw (S435/5)

ii. 240 mm Circular Saw (S435/6)

Each saw has a guard fitted which covers the blade when the tool is idling or not in use. During the cutting operation, the guard moves back to allow for cutting. On completing the cut, the guard returns to cover the blade, giving protection to the operator.

Other features of the saws are :

. Bevel cutting adjustment with a protractor scale allows the cutting angle to be set between 0^{o} and 45^{o}

. Depth of cut adjustment to obtain a neat cut. The depth of cut should be adjusted so that the saw blade projects beyond the underside of the wood by about the depth of the saw teeth

. Riving knife is fitted on some models to keep the slot cut in the timber apart, so as to clear the rotating saw blade which reduces the load on the motor

. Rip fence should be used when rip-sawing. This maintains a straight sawing line and reduces the danger of overloading the motor if the saw blade jams.

OPERATING PRACTICES FOR CIRCULAR SAWS

. Place the work on a rigid support such as a bench or pair of saw horses with the part to be cut-off to your right
. Mark the line of cut on the work. Set the work so that the cut-off line is beyond the end of the support to your right
. If the work is short or small, clamp it down. Do not try to hold the pieces by your hand
. Hold the saw with both hands and rest the front of the saw base on the work. Before starting the motor, push the blade lightly against the edge of the work and then back it off about 5 mm.
. Start the motor and when the blade comes up to full speed push the saw forward and begin sawing. As the cutting progresses, the lower guard will begin telescoping into the upper guard
. Do not force the cutting. Let the saw cut at the most efficient speed allowed by the type of cut and the material being cut
. When the cut is completed, release the switch and give the blade time to stop before lifting the saw from the work. On thru-cuts, be sure the lower guard is closed before setting down the saw
. If you drop the saw, unplug it. Check to see that the blade and lower guard operate freely, and that there are no signs of cracking or breakage of the motor housing, handle or guards before proceeding
. If there is any question of damage to the saw, have it tested with an Appliance Test Set. The insulation test is particularly important. Do not use the tool if it is damaged
. Store the tool in a dry place when not in use, preferably in a suitable metal box
. Keep the cord away from heat, oil and sharp edges
. Inspect the cord periodically and have it replaced if damaged
. Flexible Extension Cords
  - Use approved and tested cords, particularly if working outdoors
  - Ensure that both the tool cord and the extension cord, if used, are clear of the line of cut.

Safety Rules for Circular Saws

Do

. Keep work area clean - cluttered areas and benches invite accidents
. Keep work area well lit
. Dress safely. Do not wear loose clothing or jewellery
. Wear safety glasses
. Wear non-skid safety footwear
. Wear dust mask if cutting operation is dusty
. Wear ear muffs if using the saw for long periods
. Keep guard in place and in working order
  - Never wedge or tie lower guard open
  - Check operation of lower guard before using
. Hold the material to be cut in a vice or by a clamp
  - secure work properly
  - use both hands to hold the saw
. Visually inspect the tool for damage before use
. Stay alert - watch what you are doing

SAFETY NOTE : USE HAND TOOLS IF POSSIBLE FOR SAWING ASBESTOS CEMENT PRODUCTS. IF POWER TOOLS ARE USED, ABIDE BY THE REQUIREMENTS OF EI LINES GENERAL SP 9041.

DON'T

. Do not attempt to remove the cut material with your hands while the blade is rotating
  - keep hands away from the blade
. Do not start the saw without a purpose
. Do not operate the saw when tired
. Do not overreach - keep a proper footing and balance at all times
. Do not carry saw with a finger on the switch
. Do not force saw - it will do a better and safer job at the rate for which it was designed
. Do not use saw for cutting branches or logs

. Do not operate saw in gaseous or explosive atmospheres. Motors in these tools spark and may ignite fumes. Use a portable combustible gas detector if gas is suspected. Refer EI LINES General SP 4000.

SAFETY NOTE : REMOVE POWER PLUG FROM SOCKET BEFORE CHANGING THE BLADE AND WHEN THE SAW IS NOT IN USE.

Attaching and Removing Blades or Wheels

To remove blade clamping screw :

. On new Saws without blade attached. Turn screw counterclockwise with blade wrench provided. If screw does not loosen, tap the outer end of the wrench sharply in a counterclockwise direction.

. On Saws with blade attached. Retract the lower blade guard, then place the saw blade on a piece of scrap timber so that the teeth dig in slightly. (This prevents the blade from turning). With the wrench provided, turn the clamping screw counterclockwise to remove the screw, front flange and the blade.

. To Attach the blade. Retract the lower blade guard and place the blade over the inner flange with the printed side of the blade out that is with the teeth at the bottom of the blade, pointing forward. Fit the front flange, with its recessed side out, onto the spindle, aligning the flat in the flange with the flat on the spindle. Thread the clamping screw firmly by hand to hold the flange in position. Place the saw blade on a piece of scrap timber (this prevents the blade from turning), then tighten the clamping screw clockwise with the blade wrench.

. Check for any wobble during rotation of the blade. This can be done by switching the tool on and then off and observing the blade as it slows down. If there is wobble, it may be caused by either a dirty flange or a bent blade. In the case of a dirty flange, the tool, should be cleaned and re-checked. A bent saw blade must be returned to the Store and replaced with another blade.

Cutting Depth Adjustment

. Remove power plug from socket before making this adjustment
. For the most efficient cutting action, set the Depth Adjustment to one tooth of the blade below the material to be cut. This distance is from the tip of the tooth to the bottom of the gullet in front of it. This keeps blade friction at a minimum, removes sawdust from the cut, and results in cooler, faster sawing.

NOTE : When using carbide-tipped blades, allow only one half of a tooth to project below the material being cut.

Adjusting the Cutting Depth

. Remove power plug from socket before making this adjustment
. Place the saw with the base plate vertical and the depth adjustment knob up. Loosen the depth adjustment knob
. Place a scrap piece of the material to be cut along the side of the blade. Move the base plate until the blade projects from the plate to the desired distance. Retighten the knob firmly.

Bevel Angle Adjustment

. Remove power plug from socket before making this adjustment
. On the front of the saw is a bevel angle adjustment device consisting of a calibrated quadrant and a knob. To set the saw for a bevel cut, loosen the knob and tilt it to the angle desired. Retighten the knob firmly.

CAUTION : WHEN MAKING BEVEL CUTS, KEEP THE SAW BASE PLATE FLAT ON THE WORK. THIS ENSURES AN ACCURATE BEVEL CUTTING ANGLE AND PREVENTS THE BLADE FROM BINDING IN THE CUT.

Rip Guide

. The rip guide reduces the need to scribe guidelines, especially when making a series of rip cuts of the same width
. The guide is attached to the saw near the bevel adjustment point. Remove the power plug from the socket before making an adjustment.

PORTABLE 240 V AC POWER TOOLS

ELECTRICAL SAFETY

. Guard against electric shock hazard

- Do not expose the saw to rain
- Do not use saw in damp or wet locations
- Avoid body contact with earthed surfaces (eg water pipes, stainless steel sinks, refrigeration enclosures etc)
- Tool can be made live if the blade cuts live wiring in a wall, floor or ceiling
- Use rubber gloves and a rubber mat for additional safety if working in a hazardous situation

. Power Cord

- Do not abuse cord
- Never carry saw by cord
- Do not yank cord from power socket.

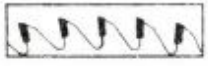
	Combination Rip and Cross Cut for fast ripping and general cross-cutting.
	Cross Cut for fast, smooth cross-cutting.
	Planer for very smooth finish cuts.
	Non-ferrous for cutting soft non-ferrous metals.
	Friction for cutting corrugated galvanised iron.
	Tungsten Carbide Tipped for cutting hardwood chipboard
	Abrasive Cutting-off Wheel (depending on the type of abrasive in a wheel) . for cutting concrete, brick, stone, marble, slate etc . for cutting steel

TABLE 4 : SAWBLADES AND ABRASIVE CUTTING-OFF WHEELS

PORTABLE ELECTRIC ANGLE GRINDER

This tool can be used for many types of work, such as grinding, brushing and cutting of metals, stone and wood. The motor casing, switch handle and side handle are constructed of a tough, abrasive-resistant plastic, capable of withstanding normal use without fracture or deterioration.

The technical specifications for the tool are given in the table below :

Input Power Rating	150 W
Weight	5 kg
No load speed	8500 rpm
Full load speed	5000 rpm
Disc diameter	180 mm
Disc thickness	5-10 mm
Disc bore	22.3 mm

TABLE : NOMINAL TECHNICAL DATA FOR ELECTRIC ANGLE GRINDER

ANGLE GRINDER DISCS AND APPLICATIONS

The disc types and their application are numerous and varied. However the main application areas are as shown in the table below :

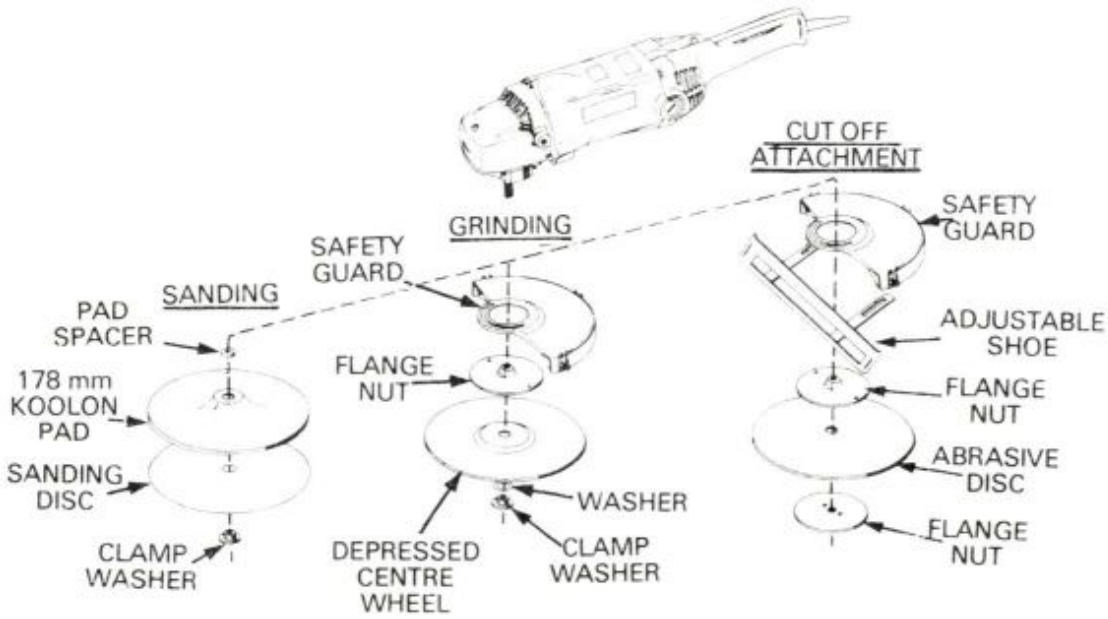
APPLICATIONS	DISC TYPE	DISC SIZE
Weld Dressing - steels	Depressed Centre	180 x 10 x 22.3 mm
Cutting - steels and masonry	Flat reinforced	180 x 3 x 22.3 mm
Fettling - Steels and masonry	Depressed Centre	180 x 10 x 22.3 mm

OPERATING PRACTICES FOR ANGLE GRINDERS

- Use the correct size and type of disc for the material and job at hand
- The disc selected must be rated at greater than the speed of the tool, otherwise the disc may shatter
- Damaged discs must not be used. Vibrating discs must be replaced immediately
- The discs must fit the spindle or fixture easily and without force. Do not use a hammer
- Do not enlarge the mounting hole, as this increases the risk of fracture
- Use only the flanges and nuts supplied with the tool to secure the disc. Make sure that the surfaces of the flanges are clean before assembly
- Excessive loading should be avoided as this pressure on the tool will not improve the cutting or grinding efficiency
- Store discs, pads, etc., in a dry place when not in use. Protect them from physical damage
- Always use the supplementary handle to keep proper control over the grinder.

Mounting of the Discs

For grinding work where a depressed centre abrasive grinding disc is used, an inner flange must be used together with the flange nut. For "cut-off" work, a parallel-sided cutting disc must be used with inner and outer flange, together with an appropriate flange nut (refer to "Operating Instructions" pamphlet).



Adjustment of Disc Guard Position

Depending on the particular job, it may be necessary to rotate the disc guard of the tool to an alternative position in order to make the disc more accesible to the job. However, the operator must ensure that at the same time the guard position provides adequate protection to himself. The method for guard position adjustment is detailed in the "Operating Instruction" pamphlet for the tool.

Accessories

. Roughing

For high material removal use the roughing grinding wheel. During grinding work the angle grinder is held at an angle of approximately 30^{o}, so that the roughing wheel can grind at this angle and is worn from the outside.

Accessories (Cont'd)

. Cutting-Off

Always use the cutting-off guard when carrying out this work.

. Surface grinding with plastic grinding disc

The plastic grinding disc is most suitable for the grinding of surfaces. For fine work use low speed.

. Surface grinding with cup wheel

When carrying out work with the cup wheel use the correct guard

. Working with the conical steel wire brush

For the removal of old coats of paint and rust, and for de-scaling it is best to use a conical steel wire brush.

. Grinding with foam rubber and sponge rubber disc

For the grinding of flat surfaces it is best to use the foam rubber disc, and for curved surfaces the sponge rubber disc.

The grinding sheets are stuck to the disc by means of a special adhesive.

Carbon Brushes

If the brushes on a tool wear below the length recommended by the manufacturer, the spring pressure will be insufficient to keep them on the commutator at the correct pressure. If worn, the brushes must be checked or replaced at an authorised service centre.

PORTABLE REVERSIBLE IMPACT WRENCH

The portable reversible impact wrench is used for tasks such as tightening and loosening nuts, bolts and other screw connections. Its main application is the maintenance of vehicles and machines and any other job where its use will save time and excessive manual effort.

The technical specifications are detailed in the table below :

Imput power rating	300 W
Weight	3 kg
Full load speed	1000 rpm
No load speed	1600 rpm
No of impacts at full load	2000/minute
Maximum Torque	18 Nm

TABLE : NOMINAL TECHNICAL DATA FOR REVERSIBLE IMPACT WRENCH

CAUTION :

- When using the tool for screwdriving operations ensure that the screwdriver blade makes a neat fit with the screw slot, as excessive play between the contact surfaces causes damage to the slot and can damage the screwdriver blade.
- Take the same care when using a Philips head or Pozidrive screwdriver, and socket attachments.
- Use only special impact sockets with reinforced walls to avoid loss of tightening torque

Safety Rules for Impact Wrenches

. Make sure that your work area is well lit

. Wear non-skid safety footwear

. Keep a proper footing and balance

. Do not wear loose clothing or jewellery

. Do not operate the impact wrench in gaseous or explosive atmospheres.

Beware of petrol vapour. The motor normally sparks and may ignite the fumes (Use a portable combustible gas detector if you suspect combustible vapours. (Refer to EI LINES General SP 4000)

. Always visually inspect the tool before use.

REMOVE THE POWER PLUG FROM THE SOCKET BEFORE ATTEMPTING ANY ADJUSTMENTS.

Electrical Safety

Guard against electric shock :

. Do not expose tool to rain
. Do not use tool in damp or wet locations
. Do not abuse cord
. Do not carry tool by cord
. Do not tug cord from power socket
. Inspect cord regularly and have it replaced if damaged.

MAINTENANCE AND REPAIR OF TOOLS

In order to achieve a long life with a high safety standard, maintenance of the tool must be carried out at specified times.

The tools should be cleaned with a cloth after use, and placed back in their carrying case. Make sure that the tool and accessories are secure in the case to protect them from damage during transport or storage.

Do not use petroleum based solvents such as kerosene to clean the tool, as these may effect the non-metallic surfaces of the tool.

If the tool is used in a dusty environment or generates dust or particles, clean the tool using a small brush. Always disconnect the tool from the power source before cleaning.

Lubrication

Tools should be lubricated as specified by the manufacturer. External lubrication may be carried out by staff, but internal lubrication and replacement of gear box grease etc, may only be carried out at an authorised service centre.

Authorised Service Centres

A list of service centres and service agents is provided in the pamphlet supplied with each tool, but if this gets lost, the manufacturer's head office in Australia can be contacted for the address of the nearest service centre. The testing, servicing and some repairs to tools can be carried out within the Buildings Branch Service Centre in each State.

Defective Material Report (DMR)

If a tool is sent for repair due to failure of a component of the tool, a DMR Form E712 should be prepared for the tool. This will enable a critical analysis of the suitability and reliability of each type and brand of tool to be performed.

FLEXIBLE EXTENSION CORDS

. National statistics show that extension cords have contributed to a number of fatal electrical accidents, so their use should be avoided whenever possible. They are susceptible to damage and need special care when in use

- Only orange coloured 3 core flex of current capacity as given below shall be used for extension cords :
  - Serial 192/330 - 7.5 A rating
  - Serial 192/334 - 10.0 A rating
  - Serial 192/338 - 15.0 A rating
- Do not use a 2 core flex for an extension cord, as earthed frame tools or appliances may be used with the cord and they require an effective earth connection for safe operation
- Extension cords must be tested regularly with a Power Outlet and Appliance Test Set (S334/3)
- Wherever possible new extension cords are purchased with a factory fitted moulded plug and socket.
- Repairs or the fitting of new plugs or sockets to extension cords must be carried out by a licenced electrician.

Use and Maintenance of Extension Cords

- Look over the surrounding area when laying out an extension cord. If an extension cord must cross an area used by vehicles or pedestrians, place boards on either side of the cord to reduce the risk of damage. Take care not to have the cord pass over sharp edges; metal edges in particular
- The older type of extension cords may have a rubber sheathing. Keep them free from oil or grease. Should these substances get on to the rubber sheathing, wipe off immediately to avoid deterioration of the rubber
- Make sure that the plug and socket do not get damaged and stay free of moisture
- If multiple outlets are required at the end of an extension cord, have a proper switched multiple outlet panel made up by a licensed electrician. Do not use the plug in a double adaptor
- No joints shall be made in the length of the extension cord
- Regular inspection must be conducted at intervals not exceeding 6 months

PORTABLE 240 V AC POWER TOOLS

- If an extension cord is suspected of being faulty it must be withdrawn from service immediately and tested
- Before an extension cord is issued from store, or after a faulty lead has been repaired, have it tested with a Power Outlet and Appliance Test Set
- Where an extension cord is being used with a portable ELCBR unit and a power tool, place the ELCBR between the power outlet and the extension cord
- An approved 25 m extension cord, rated at 240 V AC/10A fitted with two weatherproof sockets, a moulded plug, reel and carrying handle is provided under S435/10 for use in hazardous situations (See Page G-1).
- Extension cords stored on reels must have the full length of the cord unwound before use. If this is not done, overheating from lack of ventilation can melt the insulation and cause the wire to short circuit and then catch fire. The unwound cord must be loosely coiled and placed out of the way where it will not be a hazard to other staff or passers-by
- Before using any extension cord, visually examine it for :
  - damage or deterioration of the sheath
  - damage to the plug or socket
  - loosening of the cord anchorage or terminations.

REGULAR INSPECTION AND TESTING OF POWER TOOLS AND EXTENSION CORDS

It is a mandatory requirement that :

- Portable AC power tools in regular use be inspected for damage to the body of the tool, cord and plug, and electrically tested for faults at intervals not exceeding 4 months
- Extension cords be tested at intervals not exceeding 6 months
- Power tools held in store for issue for occasional use be tested immediately before issue
- Power tools returned from repair centres be tested before they are re-issued

PORTABLE 240 V AC POWER TOOLS

The electrical testing of the tools and extension cords is to be performed using the "Single Phase Power Outlet and Appliance Test Set, Serial No 334/3" which is fully described in EI BUILDINGS Electrical Services S0100, and in the technical instruction entitled "Power Outlet and Appliance Test Sets Serial No 334/3" supplied with each test set.

Before conducting the electrical tests each tool should be examined for :

. damage to the casing
. damage to the flexible cord and plug
. loosening or deterioration of cord anchorage facilities
. any other features which may give rise to hazards.

Before conducting the electrical tests, each extension cord should be examined for :

. damage or deterioration of the sheath
. damage to the plug or socket
. damage at the interface between the cord and accessories where a moulded plug and socket is used
. loosening of the cord anchorage or the wire terminations

A nominated officer of Telecom using the Applicance Test Set will carry out the necessary electrical tests and visual inspection of the tools in his area and will keep a "Record of Safety Test - Portable AC Power Tools" card, Form E64, for each extension cord and power tool tested and inspected. The information to be recorded and the format of this record card is given below.

Should an electrical test or visual inspection show a fault, the officer must withdraw the tool from service, arrange the necessary repairs and make the appropriate entries to both Parts A and B of the record card.

Repairs to tools MUST NOT be carried out by unqualified staff. All repairs must be performed by a licenced electrician.

PORTABLE 240 V AC POWER TOOLS

Telecom Australia

RECORD OF SAFETY TEST – AC APPLIANCES, PORTABLE TOOLS AND EXTENSION LEADS
SEE E.I. BUILDINGS S 0100

Tool Type, Serial/Item ..... Make, Manufacturer's Serial No. .....

or extension lead – Local No. ..... Voltage Current Rating ..... Date of Issue ... / ... / ... Location .....

A – VISUAL AND ELECTRICAL TEST Maximum recommended time duration between tests: Fixed appliances - 24 months. Portable appliances and extension leads - 4 months. Portable appliances (infrequent use) - 12 months.

Date Tested	Appliance or Extension Lead, physical condition (passed or faulty)	Insulation and earth resistance using test set 334/3		If faulty state type of fault	Date for Next Test	Responsible Officer's Signature
		Test 2.2 or 3.1	Test 2.3 or 3.2			

B – APPLIANCE OR EXTENSION LEAD REPAIR

Date Despatched for Repair	Extent of Repair Required	Comments	Date Returned	Responsible Officer's Signature

E 64 (6/78) (FRONT)

RECORD OF SAFETY TEST - FORM No E64 (FRONT)

PORTABLE 240 V AC POWER TOOLS

A – VISUAL AND ELECTRICAL TEST Maximum recommended time duration between tests: Fixed appliances – 24 months. Portable appliances and extension leads – 4 months. Portable appliances (infrequent use) – 12 months.

Date Tested	Appliance or Extension Lead: physical condition (passed or faulty)	Insulation and earth resistance using test set 334/3		If faulty state type of fault	Date for Next Test	Responsible Officer's Signature
		Test 2.2 or 3.1	Test 2.3 or 3.2			

B – APPLIANCE OR EXTENSION LEAD REPAIR

Date Despatched for Repair	Extent of Repair Required	Comments	Date Returned	Responsible Officer's Signature

E 64 (6/78) (BACK)

RECORD OF SAFETY TEST - FORM No E64 (BACK)

PORTABLE 240 V AC POWER TOOLS

Replacement Cords for Double Insulated Tools

2 Core, 7 metre long, orange power cords are available to replace faulty or damaged cords on 240 V AC double insulated portable power tools.

These cords are to be fitted by a licenced electrician only. Replacement of cords must not be attempted by field staff.

Only 2 core power cords may be used on double insulated power tools. Three core power cords with an earth conductor must not be used on double insulated tools.

Following the installation of the cord, the tool must be tested using the "Single Phase Power Outlet and Appliance Test Set" and the test recorded on Form E64 before being returned to service.

The details of the replacement cords are :

. Serial 435 Item 14

Cord Replacement

2Core, 7 metres long, Orange, fitted one end with an approved 240 V AC moulded plug, and the other end stripped, 2 x 24/0.20 for 7 ampere maximum working.

. Serial 435 Item 15

Cord Replacement

2 Core, 7 metres long, Orange, fitted one end with an approved 240 V AC moulded plug, and the other end stripped, 2 x 32/0.20 for 10 ampere maximum working.

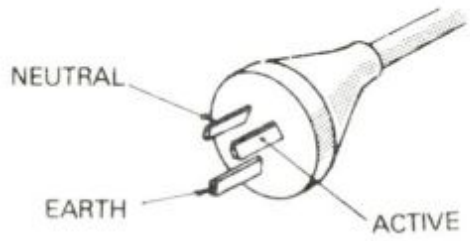
The use of these replacement cords as flexible extension cords is BANNED as they are only two core.

Replacement of Damaged Plugs on Double Insulated Tool Cords

Damaged plugs on 7m long, two core power cords may be replaced by a licenced electrician, although complete replacement of the cord and plug assembly may offer additional safety.

If replacing the plug, the electrician shall ensure that :

. the conductor insulation is stripped back only far enough to make a proper connection
. all conductors are terminated so that there is no undue strain on the connections
. a resilient plastic three pin plug similar to Ring Grip No 6 or Clipsal No 439 or 439D is used
. The pin configuration shown below is used
. the tool is tested using the Power Outlet and Appliance Test Set before re-use.



Replacement of Damaged Plugs on Double Insulated Tool Cords (Cont'd)

Colour Codes for appliance leads

Conductor	Old Australian	International
Active	Red	Brown
Neutral	Black	Blue
Earth	Green or Green/Yellow	Green/Yellow

Both these codes are acceptable to SAA but all new wiring will use the International Code.

NOTE : Double insulated tools use two core power cords only. No connection is made to the earth pin on the plug.

Replacement Cord or Plug on Earthed Appliances or Extension Cords

If it is necessary to keep earthed body portable AC power tools because no alternative double insulated tool is available, it is essential that only 3 core power cords are used. Where possible, the earth conductor should be slightly longer than the other conductors to prevent undue strain disconnecting the earth conductor before the live conductors. Plug or cord replacement must only be carried out by a licenced electrician. The tools or extension cord must be tested using the Power Outlet and Appliance Test Set before being re-issued.

Locating Power Cables in Walls Before Drilling

The normal use of the cable pair identification set Type F set (S419/41) is to identify telephone cable pairs by applying a balanced audio tone to one pair at a time at one end and detecting the signal with the receiving unit at the remote end. For a description of the unit see EI LINES Cables TE 4305.

Because of the receiver (probe) unit's ability to detect transmitted signals when the probe tip is capacitively coupled (held near) to a circuit, it can be a useful aid in detecting the approximate location of 240 V AC power cables concealed behind a wall whether of plaster or timber. IF THE TEST DOES NOT INDICATE THE PRESENCE OF A POWER CABLE, IT CANNOT BE ASSUMED THAT ONE DOES NOT EXIST IN THE AREA, AS THIS TEST IS NOT ALWAYS COMPLETELY EFFECTIVE.

The power cable detection procedure to be adopted is as follows :

. Ensure that the receiver unit and ear piece assembly are functional
. Switch on a known working light switch and probe the switch with the receiver unit. A load, sharp sound should be heard through the ear piece. This procedure serves two purposes. It proves the satisfactory operation of the receiver and ear piece and also familiarizes the operator with the type of tone that is typically produced by a power cable
. Turn on all light switches in the vicinity of the area into which it is required to drill and search this area with the tip of the receiver. The tone received will be maximum along the run of the power cable and will weaken as the probe is moved away

Locating Power Cables in Walls Before Drilling (Cont'd)

. Power point wiring can be detected by using the same search technique as above. There is no need to load the power outlets.

NB

1. Probing near fluorescent lamps can cause unwanted tones to be received, but as the probe approaches a power cable its received tone will dominate the unwanted tones and so allow its detection. If possible the fluorescent lamps should be turned off.

2. Power cables housed in plastic conduit can be detected and traced with the probe. Those cables housed in metal conduit cannot be detected with the Type F set due to the screening effect of the metal surrounding the cable. However, the metal conduit itself provides some protection, but the precautions outlined in this handbook must by obeyed.

REFERENCES

The following EI's are referred to in this handbook :

LINES General SP 4010 - Portable 240 Volt AC Power Tools

LINES General SP 4000 - Dangerous Gases in the Underground Network

LINES Electrical Services S 0100 - Testing Procedures for Use of Single Phase Outlet and Appliance Test Set, Serial 334/3

LINES General TE 4305 - Cable Pair Identification Set Type F (S419/41)

LINES General SP 9041 - Safe Working Practices for Asbestos Cement Products.

SECTION H

SAFETY CHECK AND INSPECTION OF TOOLS AND EQUIPMENT

- PERIODIC SAFETY CHECKS AND INSPECTION
- TOOLS AND EQUIPMENT

Issue 1, 1981

SAFETY CHECKS AND INSPECTION OF TOOLS AND EQUIPMENT

PERIODIC SAFETY CHECKS AND INSPECTION :

ITEM	PERIOD	E.I.
. AC Power Tools	4 mths	LINES General SP 4010
. Heater/Ventilator/Alternator 240V AC	6 mths	LINES General MA 4000
. Ear Muffs	6 mths	LINES General SP 1000
. Explosive Powered Tools	12 mths	LINES General SP 4013
. Fire Fighting Equipment (In Season)	1 mth	LINES General SP 9810
. First Aid Kits	6 mths	LINES General SP 9100
. Gas Detectors	3 mths	See Section K
. Safety Gloves	6/12 mths	LINES General SP 9100
. Handtools	6 mths	LINES General SP 9100
. Ladders	6 mths	LINES General SP 9102
. Pneumatic Tools	Weekly	LINES Conduits MA 4121
. Ropes and Safety Lines	6 mths	LINES General TE 1510
. Safety Belts	6 mths	LINES Aerial TE 5240
. Safety Helmets	6 mths	LINES General SP 1020
. Safety Vests	6 mths	LINES General SP 9304

SAFETY NOTE : Identifying unsafe conditions must be followed by immediate corrective action, otherwise the check tests and inspections are useless.

TOOLS AND EQUIPMENT

AC Power Tools : All tools and equipment shall be inspected by a Senior Lines Officer at intervals not exceeding 4 months. Where the condition of any tool or item of equipment is in doubt, it must be withdrawn from service and brought to the notice of the Supervisor. Only certified safe items may be used.

SAFETY CHECKS AND INSPECTION OF TOOLS AND EQUIPMENT

We ask :

. The nominated testing officer - "Are you maintaining your Record of Safety Tests on Tools and Equipments?"

. You the operator - "Do you know if the equipment you are about to use has been tested?"

Heater/Ventilator/Alternator : Periodic safety checks are carried out at an appropriate workshop in accordance with local practice to ensure that safety standards are maintained. The safety checks are detailed in EI LINES General MA 4000.
The only maintenance carried out in the field will be the operator's daily checks on minor items, for example, checking for gas leaks, tightening or replacement of spark plugs etc.

Ear Muffs : All staff are responsible for their own safety and for the recognition of hazardous situations. The safeguarding of hearing efficiency is no exception and ear muffs are provided for protection from high noise levels. So staff should recognise the situations requiring hearing protection and obtain an ear muff from their supervisor.

Staff are required to handle and store with care the ear muff issued to them and must maintain it in an efficient condition. Should they become unserviceable due to damage, dust and dirt impregnation or any other cause they must be returned to the responsible officer for replacement.

Ear muffs purchased for use by staff are of the type which may be comfortably worn with or without safety helmets.

Explosive Powered Tools : The manufacturer's maintenance instructions shall be strictly observed.

Every explosive powered tool shall be -

. completely overhauled by the manufacturer or his authorised agent at least once in every period of 12 months
. cleaned at least once a day after use
. inspected for defects by the operator immediately before its first use on any day.

At least once in every week in which the tool is used every direct-acting tool shall be dismantled and examined for defects by a well-trained and authorised operator.

Log Book

The Supervisor or his delegated officer shall create a log book for each tool and ensure that the tool operator records details as follows :

. The operator shall after each examination specify in the log book the condition of the tool, any defects, repairs or adjustments carried out, the date of the examination, his name and signature. The log book shall also carry a record of manufacturer's checks.

SAFETY NOTE: OPERATORS SHALL NOT CARRY OUT REPAIRS OTHER THAN SIMPLE REPLACEMENT OF WORN PARTS WHICH ARE SPECIFICALLY LISTED IN THE MANUFACTURER'S INSTRUCTION FOR USE. ALL OTHER REPAIR WORK SHALL BE CARRIED OUT BY THE MANUFACTURER OR HIS AGENT.

Fire Fighting Equipment : The provision and maintenance of fire fighting equipment is a responsibility of the Buildings Branch. Requirements for fire protection and fire precautionary measures will be determined by the Fire Protection Committee in each State.

The provision and maintenance of extinguishers for motor vehicles is the responsibility of the Branch or Division concerned.

SAFETY CHECKS AND INSPECTION OF TOOLS AND EQUIPMENT

Arrangements will be made by the Fire Protection Committee for the inspection of fire fighting equipment in the metropolitan areas at 12 monthly intervals. The inspecting officer will ensure that fire fighting systems are functioning correctly and that appliances are in the correct location and ready for immediate use.

Fire evacuation drills are carried out at periods as decided by the Fire Protection Committee at a time decided in consultation with External Plant Managers.
The fire evacuation drill is designed to ensure that all staff are thoroughly familiar with procedures for evacuating a building by alternative exits.
Particulars of each drill are recorded by the Officer-in-charge, i.e., the nominated Senior Officer in the Section in which the evacuation is being carried out.
Staff should be on the alert to observe and report any weakness in the fire drill or procedure so that an efficient organisation can be achieved.

First Aid Kits : The Senior Lines Officer must check that first aid equipment is satisfactory and complete in all items. See section K.

Gas Detectors : The only maintenance required in the field is the replacement of accessories, replacement of 1.5V dry cell batteries, or with the AE 10-40 gas detector, charging of the nickel cadmium batteries. For all other maintenance, the detector must be withdrawn from use and forwarded to an Instrument Repair Centre in accordance with State practice.
Supervisors and Lines Officers are to carry out periodic field checks of combustible gas detectors with test kits every three months or at any other time when a detector is suspect. The method of recording such tests, and the action to take for defective gas detectors are described in EI's stated in Section K.
The authorised officers who field check gas detectors should familiarise themselves with the symptoms and possible causes of fault conditions listed in the manufacturer's trouble shooting guide.
Issue 1, 1981

Gloves, Industrial : Safety checks on gloves must be carried out by a Senior Lines Officer at intervals of not more than six months. These gloves protect staff from many hand injuries on aerial, conduits and cabling work, provided they are worn in appropriate work situations. The unsafe conditions to look for when checking gloves are :

. Signs of hardness or cracking due to contamination of oil, grease or solvents
. Loose or worn stitching
. Holes or tears
. Foreign matter embedded in the glove material.

It is also the worker's responsibility to look for the above conditions before use. If any defect is noticed then the gloves should be handed in for a replacement.

Gloves, Rubber (Electrical Protection) : Before being used, every glove must be visually examined inside as well as outside to determine its condition.
Visually check for :

. Surface cracks, cuts or nicks which would tend to cause the rubber to tear when stretched, broken blisters in the rubber, or embedded foreign material breaking through the surface
. Signs of perished rubber or softening due to contamination by grease, oil or solvents
. Abrasive wear sufficient to affect the mechanical strength or effective thickness of the rubber.

NOTE : The above defects within 25 mm of the open end of the wrist or gauntlet may be disregarded if minor.

Air test : Where the visual test is satisfactory, air test the rubber gloves as detailed in EI LINES General SP 9100 or the Accident Prevention section in handbooks.

Gloves having passed the visual and air test are to be punch marked or date stamped on the cuff of the gloves, this indicates to the user the month and year of inspection. Do not use any gloves which have exceeded 12 months since the last inspection for electrical test to the proof voltage by the State Materials Testing Section.

Electrical Testing : The Material Inspection group is equipped to carry out the electrical proof testing of rubber gloves. The Testing Centre is responsible for acceptance testing new rubber gloves and testing rubber gloves held in Supply Branch stores before issue to the field.

NOTE : Examination and testing of rubber gloves for electrical protection as detailed in EI MATERIALS General R 0001 relate to procedures recommended by Headquarters. These procedures vary slightly in each State.

Storage : Senior Lines Officers, Lines Officers and Supervisors must check how rubber gloves are stored in party or individual kits. Gloves must be dry and unfolded in a suitable envelope or container to protect them from damage by sharp tools or contamination.

Handtools : Lines staff are required to check the condition of hand tools before they use them. The use of wrong, improvised or defective tools could cause an accident. Therefore, hand tools such as hammers, chisels, knives, wrenches, gads, picks, shovels etc. are examined visually for the following unsafe conditions :

- Loose head
- Wedge missing
- Handle split, cracked or broken
- Rough or splintered handle
- Dull blade or edge nicked (Axes and adzes, chisels, knives etc)
- Split or cracked blade
- Spread or cracked eye
- Loose worm screw, damaged jaws (on wrenches, spanners, etc).

Make sure that the hand tool being used does not have grease on the handle as this could cause the tool to slip out of the operators hand, possibly causing serious injury to himself or a person nearby.

Ladders : Complete inspection must be performed by an authorised Lines Officer to ensure that ladders are structurally sound :

- Upon initial delivery
- Every six months thereafter whether in use or not
- If it is suspected that a ladder has been mishandled, dropped or damaged.

EI LINES General SP 9102 and Section E of this handbook describes the points to check when examining ladders. The load testing procedure is covered in the EI.

Pneumatic Tools : The Supervisor and compressor operator are responsible for seeing that the correct practices are observed at all times, and for correcting irregular plant operations.

All checks and minor attention to tools must be made by the compressor operator. If major repairs are necessary, the tool must be sent to workshops, General Works.

Inspection of pneumatic tools are carried out at weekly intervals. Safety checks are done before using a tool and at the end of the day. The inspection and safety checks are detailed in EI Lines Conduits MA 4121.

Safety Belts, Safety Lines and Ropes : Safety checks and inspection of safety belts, safety lines and ropes are carried out by a Senior Lines Officer at intervals of not more than six months whether in use or not, including those held in an Area or District store. On completing the inspection the Officer will enter the date of the inspection in the Tool Register and certify on Form E that all such equipment is in a safe condition.

SAFETY CHECKS AND INSPECTION OF TOOLS AND EQUIPMENT

Safety Belts : Safety belts are provided with an inspection card to show particulars of both departmental and manufacturer's initial inspection. The reverse side of the card must have the date of last inspection and the signature of the Senior Lines Officer. Refer EI LINES Aerial TE 5240 for details on inspection of safety belts.

It is also lines staff responsibility to keep a check on the belt issued to them and if any defect is found to return it to the Senior Lines Officer. He in turn will return the faulty belt to the Divisional Store, together with the carrying bag and the inspection record card and a replacement belt will be issued. The Senior Lines Officer makes out, in triplicate, a Safety Belt Repair Order Form E692 and details the repair required.

SAFETY BELT REPAIR ORDER

TO

Please carry out the following repairs to —

BELT No.

On completion return to —
STOREMAN
TELECOM AUSTRALIA

Three pages :
1. To be sent with Belt
2. To Storeman
3. Retain in Book.

SAFETY NOTE : AS SOON AS ANY DECREASE IN SPRING PRESSURE IS DETECTED OR OTHER MALFUNCTION OF THE SNAP HOOK IS SEEN OR SUSPECTED, THE BELT MUST BE IMMEDIATELY WITHDRAWN FROM SERVICE AND SENT FOR REPAIR.

Safety Helmets : It is the responsibility of supervising officers to ensure that adequate stocks of helmets and replacement harnesses are always available and that helmets are worn in the situations listed in EI LINES General SP 1020, or in other situations deemed necessary.

Supervisors must ensure that staff understand the principles involved in the "safe use and care of safety helmets" and that any accessories which are applicable to the work environment are provided if requested.

Safety helmets and accessories are included in the 6-monthly safety check for tools and equipment (LINES General SP 9100) and it is the Senior Lines Officer's responsibility to check these items for damage or expiry of working life.

Lines Staff must check their helmet regularly to spot possible defects. Where the safe condition of any helmet or accessory is in doubt, a detailed check must be made.

SAFETY NOTE : HEAD INJURIES CAN BE SUBSTANTIALLY REDUCED BY THE CORRECT USE OF SAFETY HELMETS.

Safety Vests : Staff who wear safety vests shall be responsible for cleaning them as described in EI LINES General SP 9304, and maintaining the garment in a serviceable condition. At the end of each working day and for long term storage, the safety vest should be neatly folded and stored in the re-usable plastic bag, in a cool dry place.

SAFETY CHECKS AND INSPECTION OF TOOLS AND EQUIPMENT

When the brilliance of a safety vest has significantly decreased, compared to that of a new garment, the Supervisory Officer shall authorise replacement of the vest. Safety vests held by the depot store for intermittent use and replacement purposes should be cleaned by local arrangement. EI LINES General SP 9304 describes the washing method.

Where safety vests are required to be worn, the officer in charge is responsible for seeing they are supply and worn.

SAFETY VEST

WARNING SIGNS

Inspect warning signs to see that they are legible and that they meet the needs for the types of activities of the party or individuals. Check warning lamps for broken glass or len's and that they operate satisfactorily. The Line Supervisor is responsible for examining or testing any items whose safe condition is in doubt.

SECTION I

FIRES

- PREVENTING FIRES
- FIGHTING FIRES
- CLASSIFYING FIRES
- TYPES OF FIRE EXTINGUISHERS

Issue 1, 1981

PREVENTING FIRES

Fires cannot start without fuel. Fuel is anything combustible - any solid, liquid or gas that can burn. Flammable material is anything capable of being easily ignited and of burning rapidly.

Get rid of all unnecessary combustible material as soon as possible. Good housekeeping is essential.

To achieve an acceptable level of fire safety the aim should be to minimise :

i. the risk of fire occurring
ii. injury or death of persons from fire
iii. damage to property and equipment from fire.

Telecom employs Fire Safety Officers in each State who provide an advisory service to management and staff on fire safety and are located within the Buildings Branch. The Fire Safety Officers may be reached at the addresses and phone numbers listed at the end of this section.

In the event of a Fire

Memorise these simple steps to be taken should a fire occur :

. Notify the Fire Brigade immediately
. Alert the House Warden, Floor Warden or Supervisor and staff to commence evacuation procedures
. Attempt to extinguish the fire, using the portable fire extinguishers or fire hose reels
. Evacuate if the fire cannot be controlled.

The first few minutes after a fire starts are vital in controlling the fire. It is better for the fire brigade to arrive at a small fire under control than to arrive at a large fire out of control.

Housekeeping

Good housekeeping and fire safety awareness will greatly reduce the risk of fire in buildings :

. Do not smoke in prohibited areas

. Use an ashtray for your ash and cigarette butt

. Do not allow waste to accumulate; clean your work area regularly

. Use only metal containers for the disposal of rubbish

. Dispose of flammable and oily waste in lidded metal containers

. Keep storage and use of flammable and combustible liquids to a minimum. Use only correct containers and storage facilities

. Store cylinders of compressed gases in isolation

. Use welding, oxyacetylene or other such equipment in a clean work area

. Keep exits clear of obstructions

. Clear heavy vegetation from around buildings

. Provide adequate fire breaks

. Use only properly constructed incinerators.

Take special care with flammable gases (acetylene, LP gas, etc) and flammable liquids (petrol, kerosene, cleaning fluids, solvents, thinners etc). These flammable gases and liquids are best stored in an isolated area, away from heat.

FIGHTING FIRES

You should know what to do if a fire occurs. Your knowledge may prevent injury to yourself and others :

- Know the location and use of the portable fire extinguishers in your work area
- Know the location and operation of the fire hose reels in your work area
- Know the location of exits and assembly areas
- Know the location of all fire alarms
- Keep the escape routes clear of obstructions
- Know the telephone number of your Fire Safety Officer.

NOTE : If you have evacuated the building, do not re-enter until advised to do so.

Fire extinguishers should be kept away from extreme heat and cold. Never return a used one to point of location - label it and leave it for refilling, or replacement by a serviceable extinguisher.

CLASSIFYING FIRES

CLASS A fires are of common combustible materials such as wood, cloth, paper and packing materials.

Cooling the burning material is the most effective way of extinguishing Class A fires.

WATER from a bucket or hose is best for putting out Class A fires. Water is particularly useful in cooling materials to the point where they cannot re-ignite and in penetrating the fire.

WATER TYPE EXTINGUISHERS are also excellent for putting out Class A fires.

ORDINARY COMBUSTIBLES

FOAM EXTINGUISHERS may also be used. These extinguishers will put out small Class A fires but are not as effective as water extinguishers.

CLASS B fires are of flammable liquids such as petrol, kerosene, oil, grease, paint, thinners and solvents.

Blanketing or smothering the fire to exclude oxygen is the most effective way of extinguishing Class B fires.

CAUTION
NEVER USE WATER ON A CLASS B FIRE AS IT MAY SPREAD THE BURNING LIQUID.

DRY POWDER CHEMICALS and carbon dioxide gas (CO_2) extinguishers are excellent for putting out Class B fires.

FOAM EXTINGUISHERS are best for putting out burning liquids in containers when the liquid is likely to be hot enough to re-ignite on contact with oxygen.

FLAMMABLE LIQUIDS

FIRES

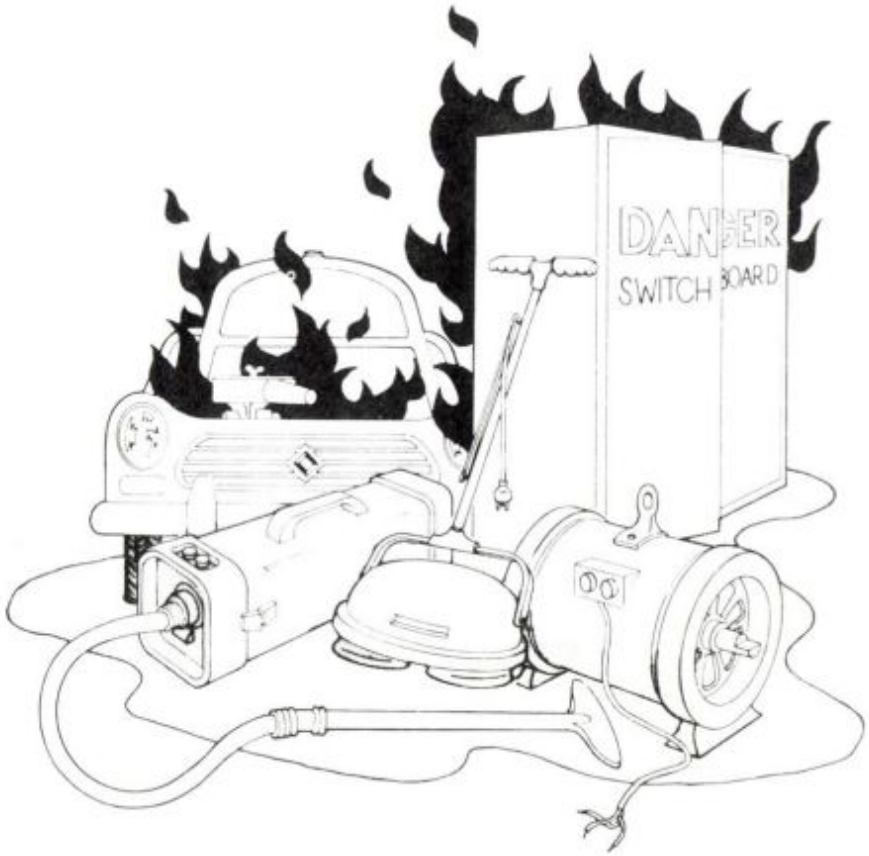
Vapourising liquid extinguishers may be used with care on some burning liquids.

CLASS C fires involve live electrical equipment such as light fittings, motors, generators, cables, wiring, switches, switchboards, and electronic equipment.

BLANKETING or smothering the fire to exclude oxygen is the most effective way of extinguishing Class C fires.

VAPOURISING LIQUID

(Bromochlorodifluoromethane BCF), dry powder chemical and carbon dioxide (CO_2) extinguishers are effective in putting out Class C fires.



ELECTRICAL FIRES

CAUTION

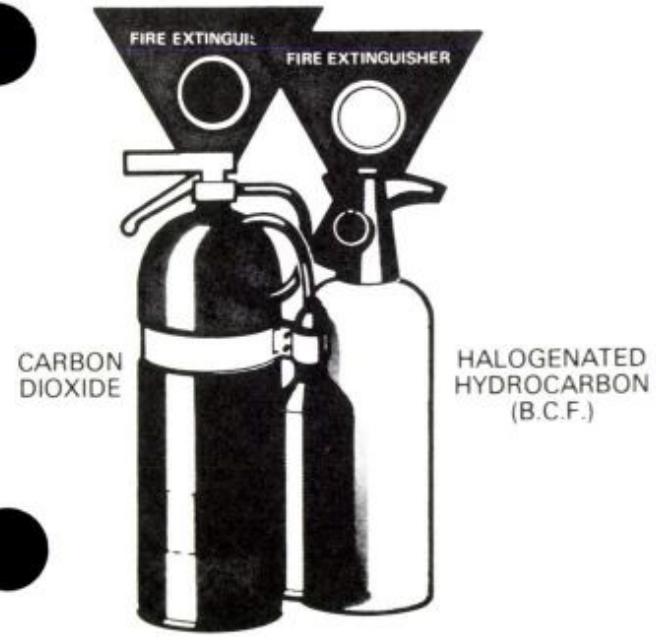
THE EXTINGUISHING AGENT USED ON CLASS C FIRES MUST BE A NON-CONDUCTOR OF ELECTRICITY TO AVOID SHOCK AND FURTHER DAMAGE TO EQUIPMENT. NEVER USE WATER OR FOAM EXTINGUISHERS.

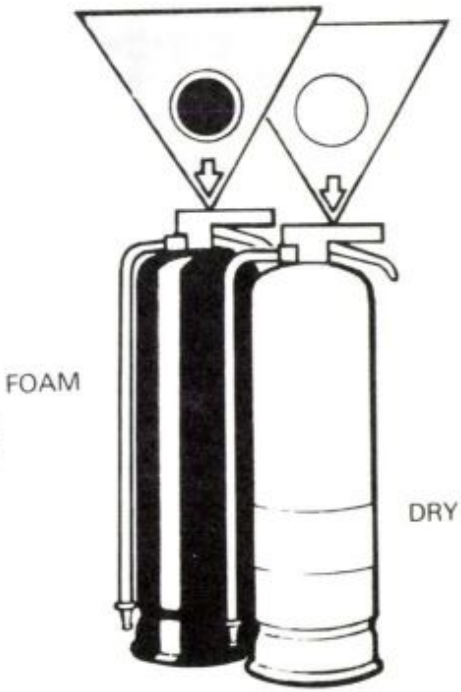
TYPES OF FIRE EXTINGUISHERS

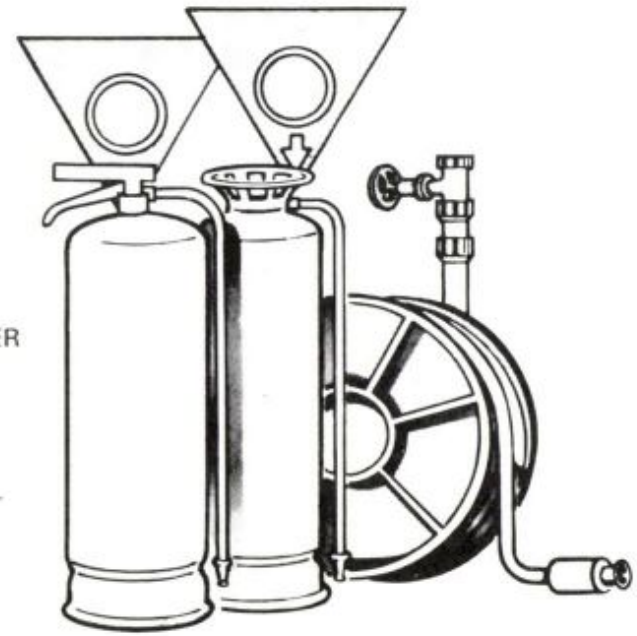
There are five basic types of extinguishers with several varieties in each type :

- Water filled extinguishers (painted red)
- Carbon dioxide (CO_2) extinguishers (Painted red with black bands)
- Vapourising liquid extinguishers (painted yellow)
- Foam extinguishers (painted blue)
- Dry powder extinguishers (painted red with white bands)

On each extinguisher there should be displayed an instruction plate.
This tells how to operate the extinguisher. Also it may explain on what type of fire it is to be used.
Always read the instruction plate before you use a fire extinguisher.
Your should have received or will receive instruction concerning the correct use of fire fighting appliances.



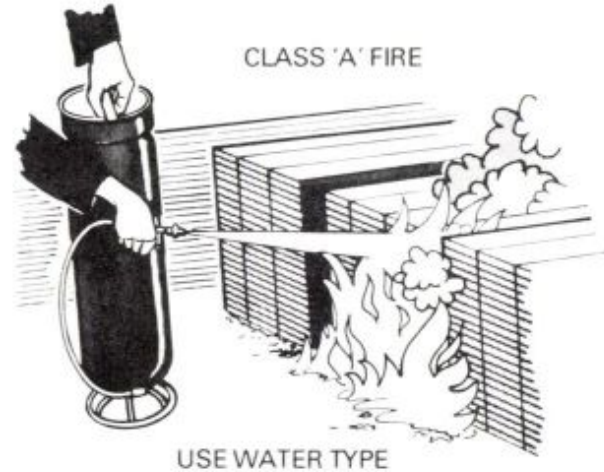




WATER FILLED EXTINGUISHERS

Suitable for fighting Class A fires.

- The Soda-Acid type - operates until empty
- The Gas Pressure type - operates until empty
- The Stored Air Pressure type - trigger operated and can be stopped at any time by releasing the trigger. Commonly used on combustible materials type fires.



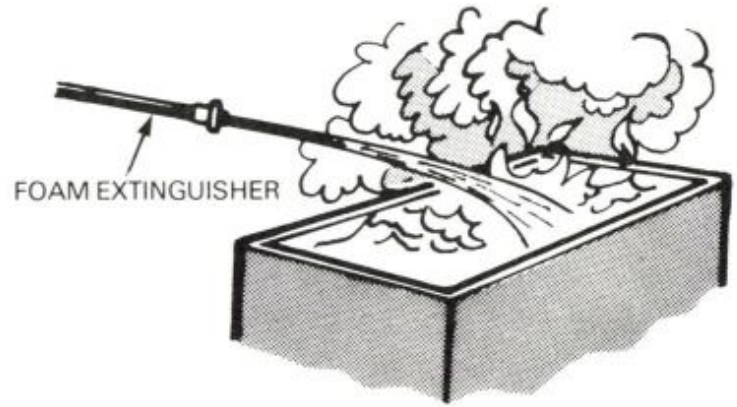
CLASS 'A' FIRE

USE WATER TYPE EXTINGUISHER

CARBON DIOXIDE (CO_2) EXTINGUISHERS

Most suitable for fighting Class B and Class C fires. The operation mechanism must be fully opened to prevent freezing the outlet. They may have a plunger, lever, trigger or valve. Operate according to instructions. Useful for :

- Dealing with fires involving electronic and delicate laboratory equipment
- Dealing with small fires in flammable liquid escaping over both vertical and horizontal surfaces.



CLASS 'B' FIRE

CAUTION

EXPOSURE FOR SOME TIME TO CARBON DIOXIDE IN A CONFINED SPACE COULD CAUSE SUFFOCATION. GET CLEAR OF THE AREA IMMEDIATELY AFTER USE. VENTILATE THE SPACE TO DISPERSE THE GAS AS SOON AS POSSIBLE.

VAPOURISING LIQUID EXTINGUISHERS (BCF)

Suitable for Class B and C fires and small Class A fires.

- BCF extinguishers have a wide application being specially useful in vehicles, industrial motors and electrical installations

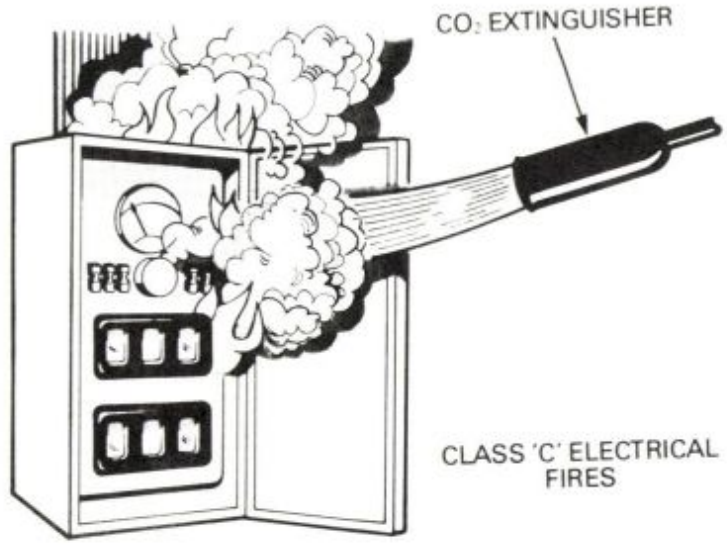
- Caution is required if they are used in confined space.

These extinguishers are trigger operated and can be stopped at any time by releasing the trigger.

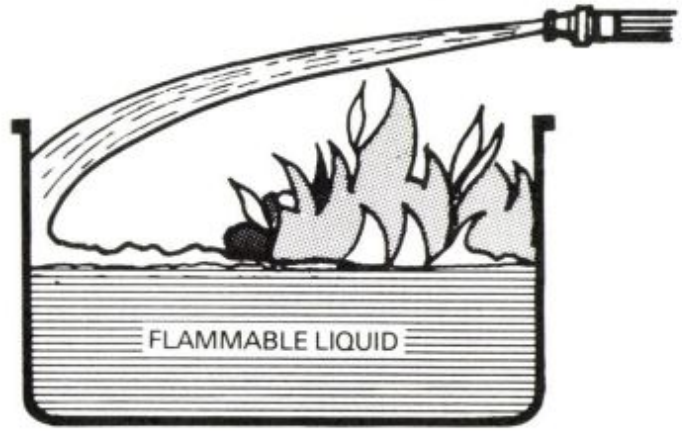
FOAM EXTINGUISHERS

Suitable for Class B fires and limited Class A fires.

Most effective in dealing with fires in containers or flammable liquids. The foam blanket remains in position long enough for the liquid to cool below re-ignition point. These extinguishers operate until empty.



CLASS 'C' ELECTRICAL FIRES



AIM FOAM JET AT BACK SIDE OF TANK

DRY POWDER EXTINGUISHERS

Suitable for Class B and Class C fires.

These extinguishers have a very rapid smothering action for putting out fires. The dry chemical tends to shield the operator from heat.

Dry powder is the most effective extinguisher of large areas of burning liquid, particularly large free-flowing spills.

The small dry powder extinguisher has a pistol grip trigger and can be brought into use quickly.

Releasing the trigger stops the extinguisher.

A publication titled "Emergencies and You" prepared by Buildings Branch, HQ, on emergency procedures to be taken in the event of a fire, is available from your State Distribution Officer.

The following are the addresses and phone numbers of Telecom's Senior Fire Safety Officers :

WA	SA	VIC
5th Floor	10th Floor	15th Floor
Cable House	BP House	Tivoli Court
14-16 Victoria Ave	30 Flinders Street	239 Bourke Street
PERTH WA 6000	ADELAIDE SA 5000	MELBOURNE VIC 3000
Phone (09)326 6524	Phone (08)225 6876	Phone (03)62 9766

Issue 1, 1981

TAS
4th Floor
Kirksway House
Kirksway Place
HOBART TAS 7000

Phone (002) 20 8333

NSW (POSTAL ADDRESS)
Box 6031 GPO
SYDNEY NSW 2001

Phone (02)231 2606

NSW
233-239 Castlereagh Street
SYDNEY NSW 2000

Phone (02) 221 3382

QLD
1st Floor
Australia House
145 Eagle Street
BRISBANE QLD 4000

Phone (07)225 8829

SECTION J

HEART-LUNG RESUSCITATION

This Section will be published at a later date.

ENGINEERING INSTRUCTION LINES GENERAL SP 9000 Issue 1, 1978 is under review.

SECTION K

SAFETY EQUIPMENT

- RANGE AND APPLICATION OF PERSONAL SAFETY CLOTHING AND EQUIPMENT
- TYPE OF SAFETY CLOTHING OR EQUIPMENT
- SAFETY CLOTHING AND EQUIPMENT MANUAL
- GAS DETECTORS
- GUARDS AND BARRIERS
- SAFETY SIGNS
- PIT LIFTING HANDLES
- SAFETY BELT AND LINE
- MANHOLE LIFTING AID
- FIRST AID SUPPLIES
- MISCELLANEOUS EQUIPMENT
- SUPERVISORS RESPONSIBILITY

Issue 1, 1981

RANGE AND APPLICATION OF PERSONAL SAFETY CLOTHING AND EQUIPMENT

Telecom Australia's policy in respect to the mandatory wearing of personal safety clothing and equipment are as follows :

The provisions of the policy apply equally to all people, including visitors.

Aim

It is the aim of Telecom Australia to substantially reduce lost time due to industrial accidents or occupational disease, and adherence to this policy will greatly assist that objective. Responsibility for safety is a matter for all individuals and all managers equally. The effects of accidents are not confined to the injured person alone. The suffering of an accident, receiving treatment and rehabilitation has an indirect effect on the lives of many other people, especially the injured person's family.

Definition

Personal safety clothing and equipment is defined as that clothing and equipment provided by Telecom Australia free of charge and issued to officers and employees in specified circumstances or areas where the nature of work involved or the conditions under which they are employed demands the wearing or issuing of safety clothing and/or equipment for their own personal protection.

Types of Personal Safety Clothing and Equipment

A list of the types of personal safety clothing and equipment, the staff groups to which they apply and the working conditions under which they shall be worn is included in this section of the handbook.

SAFETY EQUIPMENT

Mandatory Wearing of Personal Safety Clothing and Equipment

If you do not wear an item of personal safety clothing and/or equipment in circumstances or areas where it has been determined that such clothing or equipment shall be worn you shall be transferred, for the remainder of the shift, to other duties which do not require the wearing of that item of personal safety clothing or equipment.

If it is not possible to transfer you to other duties, it will be necessary for you to be placed on leave without pay. Repeated refusal to wear the prescribed clothing and/or equipment may necessitate disciplinary action.

Exemption From Wearing Personal Safety Clothing and Equipment

In cases where you submit medical evidence supporting your inability to wear the prescribed safety clothing and/or equipment, you shall be transferred to other duties which do not require the wearing of that item of clothing or equipment. If it is not possible for you to be transferred to such duties, you may be granted sick leave under the provisions of Staff By-Law 42(1). However, if the medical condition is likely to continue to prevent you from wearing the prescribed safety clothing and/or equipment indefinitely or regularly, it may be necessary to transfer you permanently to other duties or where this is not possible, refer you to the Commonwealth Medical Officer for advice. Any action to transfer you to other duties, grant leave without pay or take other action mentioned above, shall be taken in consultation with you and your Staff Association.

Authority to Issue or Purchase Safety Clothing and Equipment

The authority to approve the issue or purchase of personal safety clothing and equipment has been delegated to certain officers in your Administration. Your supervisor should be aware of these officers.

Maintenance of Personal Safety Clothing and Equipment Issues

If you have been issued with personal safety clothing and/or equipment you have an obligation to look after that clothing and/or equipment and keep it in reasonable and safe condition. Those items of equipment which require periodic testing by an approved testing authority (e.g., safety belts) are to be made available at the prescribed interval.

Lost, Stolen or Damaged Items

If any of your personal safety clothing or equipment, issued under these instructions, is lost, stolen or damaged you must submit a signed statement, together with a report to the appropriate delegate who will take such action, as necessary, to replace or repair the item.

Return of Personal Safety Clothing and Equipment

All issued personal safety clothing and equipment remains the property of Telecom Australia and is to be returned by you on leaving Telecom Australia or upon transfer to duties which do not require that particular safety clothing and equipment.

Purchase of Safety Footwear

In addition to the above policy and procedures, the following shall apply specifically to safety footwear. Two pairs of safety footwear of a type approved by Telecom Australia, will be provided to staff. The footwear is to be issued to existing and new staff, as appropriate.

Replacement will be made as required based on fair wear and tear, on a one for one basis.

SAFETY EQUIPMENT

Purchase of Safety Footwear (Cont'd)

Individual staff will be required to obtain their safety footwear, after approval, on a E121/FAE349 provided by the appropriate delegate.

Implementation

The provisions of this policy are being implemented as follows:

- The requirement to wear safety clothing and equipment and the exemption provisions be implemented immediately

- Existing staff, whose duties require them to wear personal safety clothing and equipment shall be given not less than one months notice of those requirements when particular working environments are newly prescribed.

Subsidies for safety footwear have been discontinued.

SAFETY EQUIPMENT

TYPE OF SAFETY CLOTHING OR EQUIPMENT	SERIAL/ITEM No
Aprons - Welders To be worn for protection against sparks and hot metal during welding and cutting operations and for protection of personal clothing.	N/S
Boots - Rubber Safety (or PVC) To be worn when working on the ground in situations where there is a risk of contact with power voltages, impacts, mud, water etc.	545/321-329
Ear Muffs To be worn : . When operating or working in close proximity to breakers, drifters, spaders and other pneumatic impact tools . When operating or working in close proximity to machines which produce noise levels over 85 dBa. Such machines will be identified and appropriately marked . When operating or working in close proximity to explosive powered tools in a confined space.	34/34

SAFETY EQUIPMENT

TYPE OF SAFETY CLOTHING OR EQUIPMENT	SERIAL/ITEM No
Ear Muffs	34/34

To be worn :

. In other situations as considered necessary by the supervisor in charge of the work.

Footwear - Safety (Boots and Shoes) N/S

To be worn by :

. Technical installation groups where they are required to handle the heavier types of equipment such as large relay sets, equipment racks, larger switchboards and power equipment

. Lines staff, both operative and supervisory, working in the field as well as depot staff, who are required to handle plant, materials, heavy tools or equipment

TYPE OF SAFETY CLOTHING OR EQUIPMENT	SERIAL/ITEM No

. Workshops and service staff, including supervisors, working in the heavier industrial areas, e.g., :

- Those working in metal and machine shops, carpenters and painters.
- Technicians, workshops assistants and process workers required to handle heavy equipment such as racks, switchboards, power panels and prefabrication of telephone and radio equipment.
- Those working on automative plant and equipment overhaul

. Stores operative staff (Supply Branch) and heavy haulage and stores cartage drivers

. Other staff, who in the course of their employment, are required to work on either private premises or in an environment where they are subject to hazards equivalent to those outlined above.

SAFETY EQUIPMENT

TYPE OF SAFETY CLOTHING OR EQUIPMENT	SERIAL/ITEM No
Gas Detectors To be used in manholes or any confined space where there is a risk of the presence of carbon monoxide or combustable gas.	420/2, 12, 13, 53

Glove - Heat Resistant 360 mm Long To be worn for protection from flame and direct heat e.g., heat treatment and metal polishing, or handling sheet metal, timber, bricks, cast concrete, armoured cable, wire or steel sections.	34/128 & 130

Glove - Leather, Gauntlet Half Gauntlet To be worn for protection from heat, abrasion or sharp materials, e.g., welding, heat treatment and metal polishing, or handling sheet metal, timber, bricks, cast concrete, armoured cable, wire or steel sections.	34/122 123

SAFETY EQUIPMENT

TYPE OF SAFETY CLOTHING OR EQUIPMENT	SERIAL/ITEM No
Glove - PVC 260 mm long	34/119-121

To be worn for protection from acid, alkalis, oils and solvents, e.g., handling oils, creasote, paints, synthetic glues or casting resins, cleaning solutions, creosoted poles, greasy materials, metal sheets and sections, bricks, cement, timber wire, cable, etc., maintaining fire extinguishers and secondary batteries and electroplating and unpleasant cleaning tasks.

Glove - Rubber 430 mm long	34/22-24

To be worn for protection from abrasion, acids and alkalis, e.g., during maintenance and replating of large open secondary batteries and for electroplating.

SAFETY EQUIPMENT

TYPE OF SAFETY CLOTHING OR EQUIPMENT	SERIAL/ITEM No
Glove - PVC 356 mm long	34/116-118

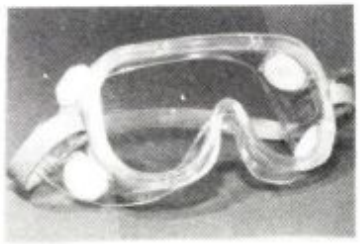
To be worn for protection from acids and alkalis, e.g., during replating of large open secondary batteries where heavier gloves than standard weight are necessary, also for sand blasting.

Glove - Rubber 650 V working 260 mm long	34/14-17
360 mm long	34/18-21

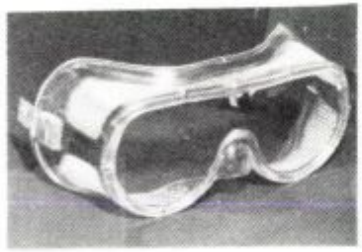
To be worn for protection from electrical hazards, e.g., for tradesmen, technicians and linemen working on wires or equipment and for using tools likely to contact power voltages.

To be worn when using electric drills or grinders in an earthed situation, not standing on rubber mats, or where there is any possibility of contacting household power or lighting wires.

TYPE OF SAFETY CLOTHING OR EQUIPMENT	SERIAL/ITEM No
Goggles - Dust, Ventilated To be worn where fine dust particles or chemicals are a hazard to the eyes.	34/73



Goggles - Safety (Wide vision high impact type) To be worn when performing grinding operations, etc., when breaking concrete, etc., and when drilling above chest height.	34/43



Goggles - Welding (correct filter should be worn filter shade No 4, 5 & 6) To be worn when gas welding, brazing or cutting. Shade required must be stipulated. NOTE : Arc welding requires the use of either Helmet-Welding (Serial 34/81-82) or Shield Welding (Serial 34/83) which provide both head and eye protection.	34/49-51, 67 and 68

SAFETY EQUIPMENT

TYPE OF SAFETY CLOTHING OR EQUIPMENT	SERIAL/ITEM No
Hair Nets	34/60

To be worn by staff who have long hair while working in any environment where their hair may get caught in machinery.

Helmets - Industrial (Safety cap & Safety hat style) 34/109 & 112

To be worn :

. When associated with conduit and manhole construction, cable hauling, pit & pipe construction, buried cable installation or operation of mechnical aids or working in any other excavation
. When associated with aerial line work including drop wire distribution
. When working below another person and there is likelihood of persons being injured by objects falling from above and it is impracticable to provide overhead protection

NOTE: For work associated with masts and towers a safety helmet area is that unprotected area around the base of the tower or mast of a diameter equal to the tower height whilst any staff are working on the mast or tower.

. When entering or working in cable tunnels

(Helmet accessories e.g., sweat bands, peak sunvisor and neck protector, are optional)

TYPE OF SAFETY CLOTHING OR EQUIPMENT	SERIAL/ITEM No
. When working on explosives work or when in the vicinity of the shot site	
. On building sites declared as "safety helmet areas" under State legislation	
. On sites and locations where industrial organisations have declared particular sections of their premises "safety helmet areas" and their own staff are required to wear helmets on the job	
. In any other work situation where in the opinion of the Supervising Officer a safety hazard exists and there is a danger from falling objects or staff are likely to injure their heads in performing their duties.	
Helmet - Welding (Recommended filter shade must be used)	34/81-82

To be worn when electric welding.

NOTE : Shield-Welding may be used as an alternative.

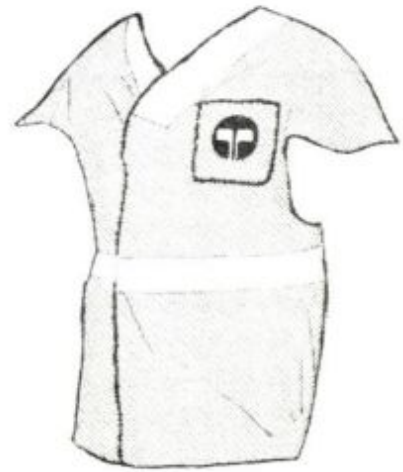
SAFETY EQUIPMENT

TYPE OF SAFETY CLOTHING OR EQUIPMENT	SERIAL/ITEM No
Mask - Dust To be worn for protection against long term or extreme nuisance dust such as occurs in spray painting and shot and sand blasting.	34/135
Respirators To be worn in dusty conditions and where dust caused by the use of pneumatic tools or high speed cutting equipment could endanger the health of the operator. To be worn where exposed to toxic vapours and fumes	34/76-79
Safety Belts To be worn when working up a pole.	34/47

TYPE OF SAFETY CLOTHING OR EQUIPMENT	SERIAL/ITEM No
Safety Line (12 m length) To be used while working on poles or in manholes.	34/105
Safety Line (20 m length) To be used while working on poles or in manholes where additional length of line is required.	34/133
Shield - Face To be used for protection of forehead, eyes, face and throat against acid, corrosive or alkali splashes, i.e., when working in battery rooms or laboratories.	34/96
Shield - Welding (Recommended filter shade must be used To be used when electric welding. NOTE : Helmet-Welding, may be worn as an alternative.	34/83

SAFETY EQUIPMENT

TYPE OF SAFETY CLOTHING OR EQUIPMENT	SERIAL/ITEM No
Spectacles - Safety Clear safety glass lens, non optical type	34/44 & 56
To be worn when soldering or other operations where spattering may occur.	
Smoke Tinted	/136
To be worn when soldering or for other operations where spattering may occur.	
Vests - Safety (Small) (Large)	34/131, 132
To be used while actually engaged on line work on or close to roadways, or in other work situations where, in the opinion of a supervisory officer, a safety hazard exists. The vests are to ensure that the wearers will be clearly visible for some distance by vehicle drivers.	



SAFETY CLOTHING AND EQUIPMENT MANUAL

The Safety Clothing and Equipment manual provides field staff and supervisors with a ready reference to the items of safety clothing and equipment which are available within Telecom.

The manual comprises fifteen sections of which the first nine contain safety items which are mandatory in accordance with Telecom policy as expressed in this handbook. The other six sections cover other safety items, mainly equipment, which are available and should be used in the interest of accident prevention.

As an added service the manual has an index of hazards with reference to the appropriate section which relates to the specific safety item to be worn for that particular hazard.

Also the manual lists relevant reference of EI's and Australian Standards.

NOTE : This manual should be readily available at your Line Depot to assist you in the selection of safety clothing and equipment. If not ask your supervisor to obtain a copy from your local State Distribution Officer.

GAS DETECTORS

Gas leakage from a variety of sources into the underground network can result in a build-up of gas in confined spaces, causing hazards of fire, explosion, poisoning and asphyxiation.

Such dangerous gases include natural and manufactured gas (reticulated gas), liquified petroleum gas (LPG), petrol and fuel oil vapours, carbon monoxide, carbon dioxide, soil gases and foul air, and a range of industrial gases including sulphur dioxide, ammonia, acetylene and hydrogen.

Never underestimate the dangers posed by gas. Gas accidents can lead to loss of life, serious injury to Telecom staff and the general public, and extensive damage to property.

All staff who need to enter manholes, tunnels, exchange cable entry chambers, jointing pits, and excavations or other work areas adjacent to gas pipes or where the presence of gas is suspected must have gas detectors.

Telecom provides the following portable combustible gas detectors :

. COMBINED INSTRUMENTS AE 10-40	SERIAL 420	ITEM 13	LINES General TE 4410
. CROWCON GASCHECK 74 GC	SERIAL 420	ITEM 53	LINES General TE 4470
. COSMOS XP 301 B	SERIAL 420	ITEM 12	LINES General TE 4420
. CARBON MONOXIDE DETECTOR	SERIAL 420	ITEM 2	LINES General TE 4440

These detectors are available from district, engineering and main stores and are described in the above EI's.

The EI's includes procedures to be followed by staff to avoid accidents due to the presence of gas in the underground network, correct gas testing procedures, and appropriate action to be taken when gas is detected. The EI's also include all operating, testing, maintenance and repair procedures of the instruments.

Issue 1, 1981

Cable Jointing Handbook No. 1, section C and W of Issue 5, 1979, and Cable and Conduits Handbook, section R of Issue 4, 1980, also refers to gas detectors. Using these instruments as laid down in the instructions is not only mandatory, it is a sensible precaution against possible serious injury to yourself, your workmates and by-standers.

Purchase of portable combustible gas detector M.S.A. Model 2 has been discontinued, however a few are still being used in various districts throughout Telecom and information on its operation, use and maintenance can be obtained from EI LINES General TE 4430 and Instruction Handbook Cable Jointing No. 1 Issue 5, 1979 section W.

SAFETY NOTE : THE RELIABILITY OF THE GAS DETECTORS IS ONLY AS GOOD AS THE CONDITION OF THEIR BATTERIES. CHECK THE BATTERY BEFORE LEAVING THE DEPOT.

Independent Charging Battery Pack

A quantity of battery chargers Serial 420/52 with two internally switchable charging rates and three outlets for charging upto three batteries at the same time, are being used within external plant as an auxiliary battery charger for the gas detector Model AE 10-40 so as to independently charge the 40 hour life detachable battery to avoid taking the detector off the job and to provide for a change-over service with a charged battery pack. The battery pack can be obtained separate to the gas detector under Serial 420/51.

GUARDS AND BARRIERS

Where there are openings such as pole holes, or any work is being done which requires openings in the road or footpaths, special care must be taken to ensure that there is adequate protection to prevent the occurrence of accidents.

GUARDS AND BARRIERS (Cont'd)

Open manholes — Manhole guards for safety precautions when working in manholes. Serial 103-1 and 25.
Used also as a frame for a jointers tents and for a tarpaulin support when removing dangerous gas from manholes if ventilators are not available, i.e., use of windsail.
Two sizes are available. The larger guard is extendable.

Excavations in roadways footpaths, etc. — Excavations and openings must be protected at all times by barriers or other effective means of preventing accidents.
Types of barriers available :

Steel Barrier, painted yellow and black serial 103 Items 11-13.
Wooden Barrier, painted white for greater visibility Serial 103 Item 30.

All barriers are supported by steel or wooden post, painted in their respective colours. Check the safety clothing and equipment manual for the serial and item numbers.

SAFETY SIGNS

This section deals with symbolic and text type safety signs.

Layout of Symbolic Signs

Prohibitory signs denote an order forbidding an action, e.g., no smoking. They have a White background with a Red circular band and crossbar. The safety symbol is Black.

SAFETY SIGNS (Cont'd)

Mandatory action and obligation signs denote an order for obligatory action, e.g., wearing of protective clothing. They are circular in shape having a Blue background and a White safety symbol.

Caution signs denote a potential hazard e.g., poison hazard. They have a Yellow or Telecom Gold colour background and a Black triangular band. The safety symbol is Black.

Emergency Information signs relate to escape routes, emergency exits, safety equipment, first aid, etc. The background is Green and the safety symbol is White.

Fire Emergency Information signs relate to fire fighting equipment and its location. They are rectangular or square in shape as necessary to accommodate the safety symbol. The background is Red and the safety symbol is White.

NOTE : The safey signs available within Telecom at present do not comply with the colour shape format detailed above, these will be progessively brought up to standard. The symbolic signs shown are commercially available.

Prohibitory

Mandatory

Caution

Emergency

Layout of Text Type Signs

Caution signs denote a potential hazard and can be identified by a BLACK rectangle with the word caution in YELLOW lettering. Where the caution panel is part of a sign the word caution is placed at the top of the sign. The sign message is in BLACK letters.

Danger signs prohibit and warn of potential dangers e.g., DANGER - GAS - NO SMOKING, DANGER - HIGH VOLTAGE. These signs have the word DANGER in WHITE letters in a RED oval. The red oval is placed on a BLACK panel with a WHITE line surrounding the oval. The remainder of the sign has a WHITE background with the message in BLACK letters.

Emergency information signs relate to escape routes, emergency exits, safety equipment, first aid etc. These signs have WHITE letters on a GREEN background.

Fire signs are used to indicate the location of fire related equipment, e.g., fire extinguishers etc. The sign text and any arrow or symbol is WHITE on a RED background.

The Ezi-Lift utilises a rolling fulcrum, giving maximum leverage during the initial lift action when the seal is broken. As the cover is raised, the fulcrum shifts from the single small roller to the three larger rollers. When the cover has been lifted sufficiently it may be rolled away from the manhole.

Section F of the Cables and Conduit Instruction Handbook Issue 4, 1980 details the technique required for using the Ezi-Lift manhole cover lifter.

FIRST AID SUPPLIES

There is only one main type of first aid kit available, although other kits may be provided for special situations.

This kit is known as the Basic First Aid Kit and replaces existing first aid kits for general use in all locations. One kit is available in external areas for every 20 staff or part thereof and in internal areas for every 50 persons or part thereof. In internal areas the location of kits shall be clearly displayed by a large green cross and they shall be readily accessible to all staff. Where rest room are available the first aid kit should be placed there.

The delegated officer for the area is responsible for replenishing contents of the kits. Staff working in external areas are responsible for maintaining their own kits by way of order through the supply system.

The kit contents are given in the Safety Clothing and Equipment manual but may be varied at the discretion of the Occupational Health Advisor, Headquarters.

The Basic First Aid Kit is available under serial 540 item 33.

MISCELLANEOUS EQUIPMENT

Rubber mat Solid rubber mat serial 34 item 54 with electrical resistance to 650 V is available for use as a protective ground covering when using electrical appliances or tools and there is a possibility of coming into contact with electrical voltage.

As a safety precaution EI LINES General SP 4010 and SP 4020 emphasis : To achieve additional protection when using power tools a rubber mat should be used in conjunction with an Earth Leakage Core Balance Relay (ELCBP).

Clove - Polka Dotted 34/126 General purpose. Use for packing stores, general labouring task. Useful for work where secure gripping is required.

Ladder Platform When working on a single or extension ladder a platform, ladder type, serial 116 item 1, is available for attachment to a rung of a ladder to relieve strain of standing on a narrow rung.

The platform is useful when it is anticipated that the work requirement on a ladder is for a lengthy duration.

Supervisors Responsibility When personal safety clothing and equipment are issued to line staff, they must be made aware of their responsibility in the "safe use and care of" these items. It is the Supervisor who must ensure that his staff understands this requirement and it is his responsibility to arrange periodical inspection of the safety clothing and equipment as set out in this handbook.

Before any equipment, new or used, is issued for use by line staff, the Supervisor must satisfy himself as to the condition of the equipment.

It is essential that sufficient stock of belts, helmets, vests etc be held at the various depots, so that there will be no temptation to retain an unsound item of safety clothing or equipment rather than hand it in and have to wait days, or even weeks, before it is replaced.

Location and Use

Signs other than those painted on existing surfaces should be constructed and erected so that they themselves do not create a hazard.

Signs should be removed as soon as the information they contain is no longer effective, e.g., signs giving warning of men working ahead should be removed when they cease working.

The selection of locations for signs is important. Not only should the message that the sign carries be legible, but it should attract the attention of and be clearly visible to all concerned.

Care should be exercised in the choosing of sign mounting locations to ensure that the possibility of the signs becoming obscured by stacked materials is prevented or at least minimised.

Signs should be placed slightly above eye-level : however, other levels may be advisable at times. Also do not place them on movable objects, such as, doors, windows and racks where a change in position would void the purpose of the sign.

Prohibition, danger, obligation and caution signs should be sited in relation to a particular hazard to allow anyone ample time after first viewing the sign to heed the warning.

Location and Use (Cont'd)

This distance will vary, e.g., signs warning against the touching of switches or other electrical equipment should be placed close to the equipment, whereas signs used in plant yards or on constructional work should be placed sufficiently in advance of the danger zone to permit the warning to be perceived before the danger zone is reached.

Spotlighting of signs, special illumination or self-illumination and the use of reflective materials should be considered where the general lighting, either natural or artificial, does not provide for adequate visibility of signs.

For emergency exits and the like, lighting that is independent of the main source of power should be provided so that in the event of power failure the signs will continue to function in the intended manner.

To remain effective, signs should be maintained in good condition, kept clean and well illuminated.

Section 14 of the Safety Clothing and Equipment manual details the complete range of Safety Signs available in Telecom with respective serial and item number.

NOTE: Several traffic control signs are available in Telecom, check the manual for the sign suitable for your requirement.

PIT LIFTING HANDLES

Pit lifting handles have been designed and introduced into Telecom as an aid for handling and installing individual pits. A minimum of two handles must be used to handle a cable jointing pit. For manual handling of the larger pits, additional pairs of handles are required.

A pair of pit lifting handles may be used to lift, transport and lower the larger sizes of cable jointing pit in conjunction with a mechanical aid and a sling. For safety reasons it is important that the sling is positioned correctly with the sling hooks engaging against the "tee" formed by the bearing plate arm.

EI LINES Conduits TE 4100 and Instruction Handbook Cable and Conduits Issue 4, 1980 Section O, describes the Pit Lifting Handles, their use and manual handling principles.

SAFETY NOTE : NO PIT CAN BE LIFTED WITH A SINGLE PIT LIFTING HANDLE.

SAFETY BELT AND LINE

Safety Belt Wearing a safety belt when working up a pole is mandatory and you must secure yourself to the pole with the belt as soon as reaching the working position. The only time you are permitted to remove the belt is when changing the working position or to descend the ladder.

Provided through serial 34 Item 47 are adjustable terylene webbing body belts with adjustable pole strap fastened by a snap hook and protected from wear by a fabric sheath.

Supplied with your safety belt is an instruction sheet, carry case and history card.

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SAFETY BELT AND LINE (Cont'd)

Length of belt 1830 mm x 50 mm wide.

SAFETY NOTE : ALWAYS TAKE CARE OF YOUR SAFETY BELT - YOUR LIFE MAY DEPEND UPON IT.

Safety Line Before starting work aloft, a safety line must be secured to the pole. This line is your life line - it can be the difference between life and death in the event of an electrical accident so be sure to use it when you next climb a pole.

The safety line comprises a snap hook spliced to 12 mm diameter rope.

Rope length 12 m serial 34 item 105.
" " 20 m serial 34 item 133.

Examine safety belt and ropes regularly to see that they are in good condition. Keep them dry because you never know one day you may require a safety belt or line to pull a victim away from live wire during an electrical accident rescue.

MANHOLE LIFTING AID

Generally, where an adult male is required to handle, on his own, goods, material or equipment in excess of 25 kg aids should be used.

For lifting manhole covers the lifting aid 'Ezi-Lift' serial 116 item 109 should be used to avoid back injury.

The lifting aid can be folded for easy storage and transportation.