

MECHANICAL TECHNOLOGY

WELDING & METAL WORK

YEAR 1
LEARNERS
BOOK

Year 1

**Technical Occupational
NCS: CAPS**

Welding

Mechanical Technology

Technical Occupational
WELDING
YEAR 1

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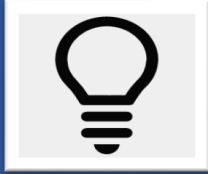
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CHAPTER 1: OCCUPATIONAL HEALTH AND SAFETY

GENERAL SAFETY and OHS ACT

English across the Curriculum (EAC):

- 1.1.1. Occupational Health and Safety
- 1.1.2. Service
- 1.1.3. Repair
- 1.1.4. Maintain
- 1.1.5. Precaution
- 1.1.6. Accident
- 1.1.7. Unsafe Acts
- 1.1.8. Unsafe Conditions
- 1.1.9. Hazard
- 1.1.10. Regulate



INTRODUCTION



What is Occupational health and Safety?

It is a planned way of working to prevent illness and injury in the workplace by identifying hazards and risks. It is the responsibility of everyone to observe the health and safety procedures in the Electrical Technology workshop

All safety rules and procedures are regulated by Occupational Health and Safety Act (OHS Act No. 85 of 1993):

- All employers must ensure that the workplace is safe, and that employees are not at risk of becoming infected with HIV at work.
- All employees are conducting safe working practices in order to avoid accidents and injuries.
- It is the duty of employers to make sure that rubber gloves and surgical masks are available in all first-aid kits.

The code of good practice on HIV/AIDS and employment contains common guidelines on how employers, employees and trade unions should respond to HIV/AIDS in the workshop.

Good housekeeping and general safety rules need to be observed and obeyed in order to prevent accident.

There is machinery, tools and consumable and hazardous materials in the workshop that can harm people and or damage property if safety rules are not observed.



BASIC WORKSHOP SAFETY RULES

The general rules of a workshop

- Do not run in the workshop.
- Know where the emergency stop buttons are positioned in the workshop.
- Always wear an apron as it will protect your clothes and hold loose clothing.
- Wear safety shoes when working in a workshop.
- Do not use a machine if you have not been shown how to operate it safely.
- Always be patient, never rush in the workshop.
- Always use a guard when working on a machine.
- Keep hands away from moving/rotating machinery.
- Use hand tools carefully, keeping both hands behind the cutting edge.
- Report any damage to machines/equipment as this could cause an accident.
- No food or drink in the workshop.
- Wear the correct protective equipment for the tools you are using.
- Tie up long hair.
- Turn the machine off before cleaning it.
- Keep the workshop clean.

	HOUSEKEEPING
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Good housekeeping is explained by the phrase ‘A place for everything and everything in its place.’ It means having no unnecessary items about and keeping all necessary items in their proper places.



The importance of good housekeeping.

Good housekeeping benefits both employers and employees alike.

Good housekeeping can:

- Eliminate clutter which is a common cause of accidents, such as slips, trips, and falls, and fires and explosions
- Reduce the chances of harmful materials entering the body (e.g., dusts, vapours)
- Improve productivity (the right tools and materials for the job will be easy to find)
- Improve your company's image (good housekeeping reflects a well-run business. An orderly workplace will impress all who enter it – employees, visitors, customers, etc.)
- Help your company to keep its inventory to a minimum (good housekeeping makes it easier to keep an accurate count of inventories)



Activity 1.1

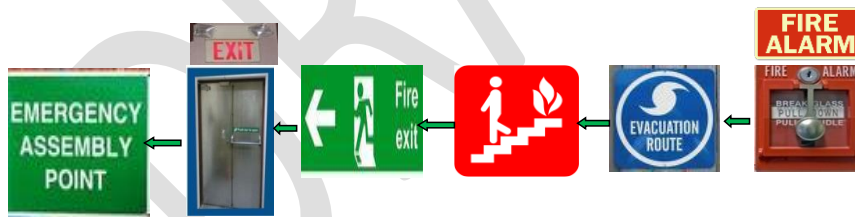
1. List six general rules of a workshop.
2. Explain the importance of good housekeeping.
3. Explain what is meant by the term 'good housekeeping' in the context of an Electrical workshop.



THE EVACUATION PLAN AND SAFETY SIGNS

Emergency evacuation

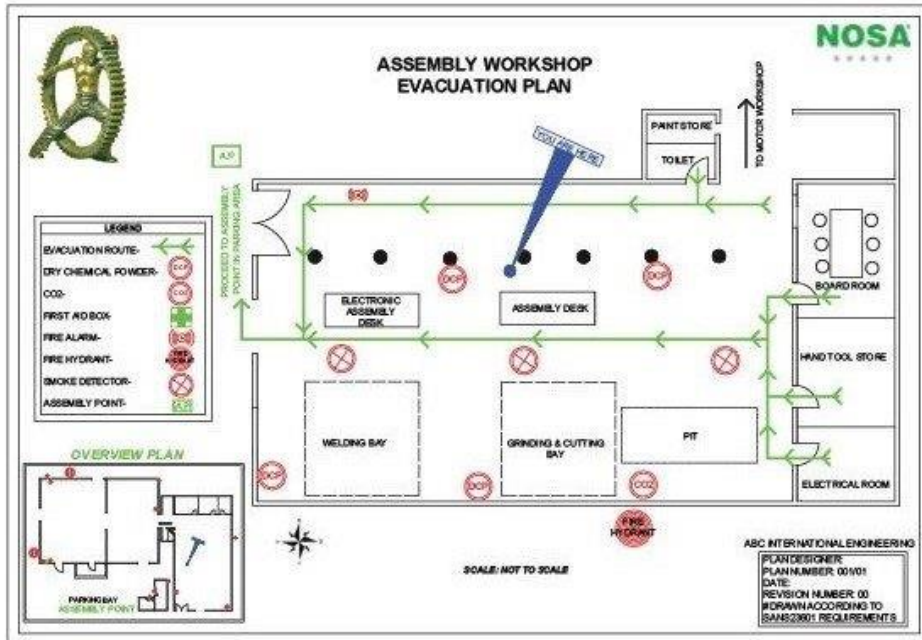
Emergency evacuation plan/route: A lay-out plan that shows how to exit a building safely during an *emergency situation*, e.g. when fire broke out, leaking of carbon monoxide from chemicals and etc .It is usually displayed on the wall.











Evacuation Procedures

- Operate the nearest fire alarm. If no fire alarm is provided, shout "Fire",
- Leave the building immediately through the evacuation route to the assembly point.
- Do not use lift to exit instead use stairs

N.B. Evacuation route is usually displayed on the wall.



Safety signs

Shape	Meaning	Colour	Example
Triangles: 	Warning: Indicates caution (potential hazards) or warning (definite hazards), for example toxic gas and electric shock.	Yellow: notifies workers to take caution and be alerted of hazards, reducing necessary risks.	
Circles: 	Mandatory action: Mandatory or recommended actions and are normally used to depict an action you must do, for example wearing eye goggles and safety hard hats.	Blue: shows a particular action or behaviour, for example instruction to wear personal protective equipment.	
Squares or rectangles: 	Information about safe condition: Shows information, i.e., general information and emergency information (first aid, firefighting).	Green: designates the location of emergency measures or equipment like first aid kits, evacuation routes, fire exits, escape ladders, or assembly point.	
A Circle with a 45° diagonal slash across the middle from the upper left to the lower right: 	Prohibition: Points out forbidden or prohibited actions.	Red signs: designates areas for emergency devices like firefighting equipment, or to emphasise unsafe or forbidden actions.	



Have you learnt something? Test your Knowledge....

ACTIVITY 2

1. List the evacuation procedures.
2. Explain what an evacuation plan is.
3. Where would an evacuation route be displayed?

4. State THREE safety sign shapes.
5. State the meaning of a warning sign.
6. State the colour you would associate with a prohibition sign.



PERSONAL PROTECTIVE EQUIPMENT (PPE)

PPE is a collective name for all items worn or used to prevent or minimize injury/ies or hazards, when performing a task. The hazards addressed by protective equipment include physical, electrical, heat, chemicals, biohazards, and airborne particulate matter. There is a variety of PPE, designed to offer specific protection. These should always be worn or used when working. Firefighters' gear for example, is suited for an environment of extreme heat with open flames and smoke. Likewise in the workshop, the appropriate PPE is to be used. You will learn about the different PPE and their appropriate use.

Overalls

Protects underneath clothing from work hazards, exposure of the body/skin from too much heat, chemicals and the others risks.



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Safety glasses

Protect the eye from particles and chemicals striking the eyes.



Working gloves

Protect the hands from various types of hazards, infection and contamination, range of injuries, from minor cuts and bruises to deep wounds and severe hand burns and from electric shock.



Safety boots

Protects the foot from falling objects or compression, and also against punctures from below





Safety helmets

Protect the user's head from injury due to falling objects.





*ACTIVITY 3*

1. Identify the protective clothing shown in (a) and (b):

(a)	(b)
	

2. Explain the purpose of the protective clothing shown in (a) and (b)

(a)	(b)
	

	UNSAFE ACT AND UNSAFE CONDITIONS
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Unsafe Act:

Every workplace has rules and guidelines to ensure that work is done safely, without injuries or damage to tools and equipment. Unsafe acts are therefore things done without adhering to these rules and guidelines. These acts can range from incorrect use of tools and equipment, to behaviour that has potential to cause injuries or damage to tools or equipment.

Examples of unsafe acts:

- Loose clothing
- Fooling or teasing your fellow worker.
- Failing to secure machinery.
- Placing objects in unsafe places.
- Making safety devices inoperative.
- Working without permission.
- Working at unsafe speeds
- Using equipment carelessly
- Lack of/or improper use of Personal Protective Equipment (PPE)
- Bypass or removal of safety device
- Unsafe position /posture
- Wearing loose clothing near machines
- Failure to put warning signs where they are needed
- Entering the workshop without permission
- Improper adjusting of machines while it is in operation.



Unsafe conditions



A work environment should be free from hazards that can cause injury/ies. The hazards posed by a work environment, constitute unsafe conditions. These have a potential to cause injuries or damage to tools or equipment.

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Example of unsafe Conditions

- Overcrowding in the workshop.
- Unsafe and poor workshop ventilation.
- Poor lighting (dull) and unsafe workshop lighting (flashing).
- Poor housekeeping.
- Unsafe constructed buildings.
- Overcrowding in the workshop.
- Working without personal protective equipment.
- No machine guards on equipment.
- Slippery floors
- Defective hand tools, equipment, machines, etc.
- Poor workshop layout or work flow



	<p><i>Have you learnt something? Test your Knowledge....</i></p> <p>ACTIVITY 4</p>
<ol style="list-style-type: none">1. What is an unsafe act?2. List THREE examples of an unsafe acts3. What is an unsafe condition?4. List THREE examples of an unsafe conditions.	

	<p>BASIC FIRST AID</p>
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First Aid is the skilled provision of treatment for a casualty or any person suddenly taken ill, using the facilities and materials available at the time, to save life and to prevent any deterioration in the condition of that person while awaiting the arrival of qualified medical assistance.

Basic components in a first aid kit



The International Organization for Standardization (ISO) sets a standard for first aid kits in order to make them easily recognizable to anyone requiring first aid. Colour used are green, with a white cross, green cross.



ISO First Aid Symbol



Alternate version of the first aid symbol

Adhesive Bandages

Covering open wounds and controlling bleeding wounds



(Mediscope, 2021)

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Adhesive Tape

Holding bandages or dressings on wounds



Antibiotic Ointment

Preventing infections in minor cuts, scrapes, or burns and Cleansing wounds prior to applying a bandage.



Antiseptic

Destroying micro-organism growth and cleansing wounds prior to applying a bandage.



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Burn Treatment

Treating burns and Helping with pain associated with burn.



Cold Pack

Reducing swelling and cooling burns to reduce damage done to soft tissue.



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Eye Covering

Bandaging an injured eye.



Hand Sanitizer

Killing germs and microorganisms on hands after caring for patient.



Medical Exam Gloves

Providing body substance isolation to protect rescuer from contacting blood borne pathogens from patient.



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Scissors

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Cutting bandages to the proper size.



Triangular Bandage





Slinging and swathing limbs and Wrapping around wounds to make a large pressure bandage.






ACTIVITY 5

1. Explain what basic first aid is
2. Complete the following work sheet by identifying and giving the purpose of the equipment found inside a first aid kit. (Orally)

NAME	ITEM	PURPOSE
Bandage		2.1
2.2		Providing isolation from bodily fluids when assisting an injured person.
Antibiotic Ointment		2.3
2.4		Providing protection to an injured eye.

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	Coldpack		2.5

Practical Task: Safety Sign



PRACTICAL: SAFETY SIGN

- Design your own safety sign that will instruct and remind people who are entering the electrical workshop that they should wear. The poster must include pictures of PPEs and their names.



CHAPTER 2: TOOL AND EQUIPMENT



INTRODUCTION

Hand tools are the most common to a number of welding fields. Learning about basic welding hand tools. Hand tools are powered by hands to function. Use and care of the hand tools is very important. There are different types of hand tools used in the workshop.



HAND TOOLS

BASIC HAND TOOLS USED IN THE WORKSHOP

This section 4 subs sections that pertain to Welding:

- Hand Tools.
- Hand power tools
- Machine Tools.
- Optional Tools (only mentioned).

Descriptive sections for the above groups are:

- Measuring Tools.
- Marking Tools.
- Cutting.
- Welding.
- Grinding.
- Drilling.

- Clamping tools in joining.
- Shaping
- Other Accessories.

English Across the Curriculum (EAC):

Always remember that any tool is an extension of your hand. When tools are misused it is possible to injure yourself or any person working around you. Furthermore when a tool is incorrectly used it can be damaged. The repair or replacement of any damaged tool results in high operational costs.

Hand Tools

Guidelines for hand tool safety:

- The first step to safe use of a hand tool is to use the correct tool for the job.
- Tools should be used in appropriate ways, to avoid personal injury and damage to the tool.
- Tools need to be used for the intended purpose in line with the design specifications.
- Invest in quality professional tools, and treat them with care and respect they will last longer.

CARE OF BASIC HAND TOOLS

- Select the right tool for the job.
- Use correct tools for the job at hand.
- Keep tools in good condition at all times.
- Inspect tools for defects before use. Replace or repair defective tools.
- Replace broken handles on files, hammers and screwdrivers.
- Ensure that the handles of tools like hammers and axes fit tightly into the head of the tool.
- Replace worn jaws on wrenches, pipe tools and pliers.
- Redress burred or mushroomed heads of striking tools.
- Keep the work space tidy. Store tools properly when not in use.

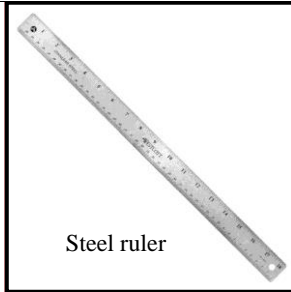


MARKING OFF TOOLS

STEEL RULER

Steel ruler is used for measuring short distances (0 mm- 300mm)

Take care not to knock the edges, particularly the ends where the graduation begins.



Steel ruler

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MEASURING TAPE

A **tape measure or measuring tape** is a flexible ruler. It consists of a ribbon of cloth, plastic, fibre glass, or metal strip with linear-measurement markings. Measuring tape is used for measuring longer lengths, but it is not accurate as a steel rule.



Measuring tape

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SCRIBER

Scriber is a marking tool used for drawing lines on a sheet metal plate.



Scriber

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DIVIDER

Divider is used for drawing circles and dividing lines on sheet metal plates.

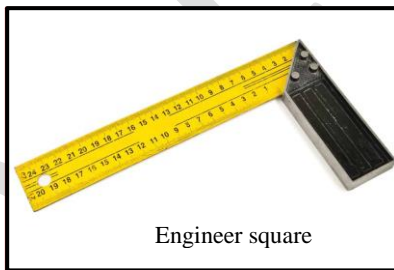


Divider

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ENGINEER SQUARE

An engineer square is a metal square, consisting of a blade and stock square. It is used for checking the squareness of the sides of an object. Do your checking against a bright light.



Engineer square

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METER STICK

Is the ruler that is one meter long, usually it is marked off in centimetre and millimetres, it is used to measure long length up to one meter. It is either a straightedge or foldable ruler.

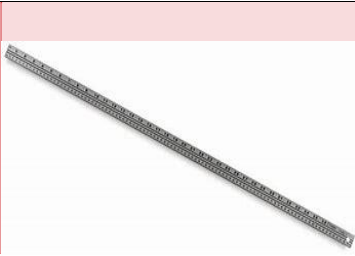
Care:

Do not drop or bend the meter stick

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METER STICK RULER



FOLDABLE METER STICK

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SCREW DRIVERS

Screw drivers are used for fastening or loosening screws.

TYPES OF SCREW DRIVERS

- Phillips or Star screw drivers
- Flat screw driver

PHILLIPS/ STAR SCREW DRIVERS

Phillips/ Star screw drivers are used for fastening or loosening star screws.



Phillips/Star screw driver

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FLAT SCREW DRIVER

Flat screw drivers are used for fastening or loosening flat screws.



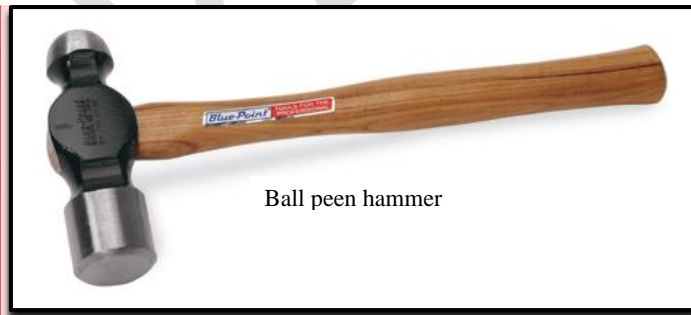
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HAMMERS

BALL PEEN HAMMER

Ball peen hammer is used for chopping out, shearing, chipping metal, punching and riveting.



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RUBBER Mallet

A rubber mallet is a tool used for finishing off the rough edges on sheet metal plates.

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**ACTIVITY 1 (TOOLS)**

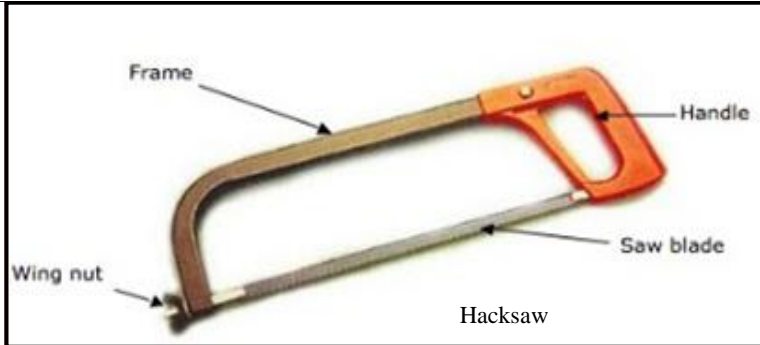
Aim: The learner will demonstrate an understanding and ability to correctly use the tools in the workshop

Exercise 1:

1. Name three hammers that are used in welding workshop.
2. Draw a neat freehand sketch of a ball- peen hammer using a pencil.
3. Give uses of the ball peen hammer.
4. What are the uses of the rubber mallet hammer?

**HACKSAW**

Hacksaw is a tool which consists of the frame and the blade. The blades come in different sizes. The size of the hacksaw is measured according to the size of the teeth on the blade. The teeth of the hacksaw point forward to enable the saw to cut on the forward stroke. It is used for cutting thin sheets of metals.



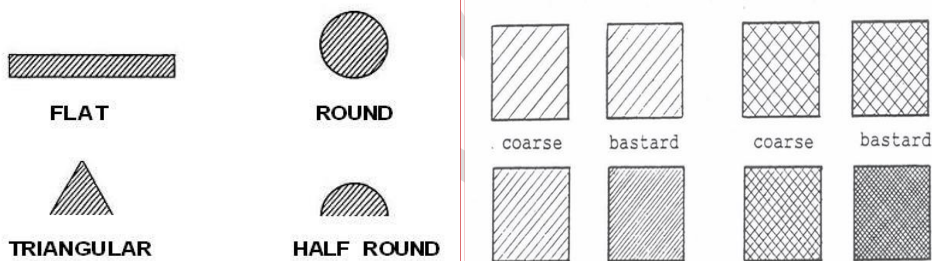
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FILES

Files are tools used for reducing the size of an object and for shaping an object.

TYPES OF FILES

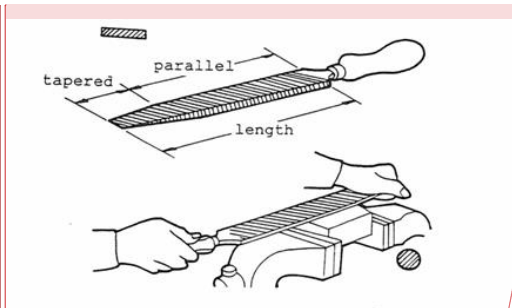
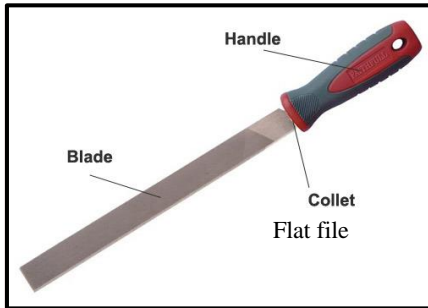


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FLAT FILE

Flat file is used for general bench work.



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ROUND FILE

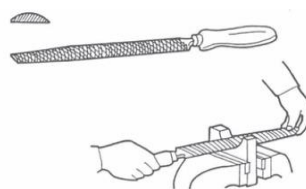
Round file is used for enlarging holes and for working in curved areas.



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HALF ROUND FILE

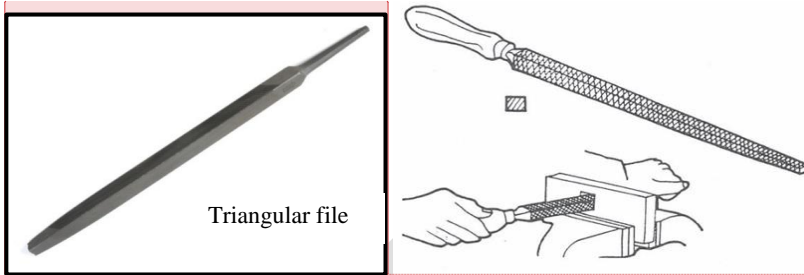
Half round file is used where round file cannot be used in enlarging holes and for working in curved areas.



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TRIANGULAR FILE

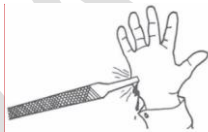
Triangular file is used for filling very narrow slots as in keys.



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LOOK OUT!

A file can be dangerous if mishandled!



Commented [u20]: draw

STANDING POSITION

Stand properly when filing.



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ACTIVITY 2 (TOOLS)

Aim: The learner will demonstrate an understanding and ability to identify different files

1. Identify the following files and write its name next to it



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SPANNERS

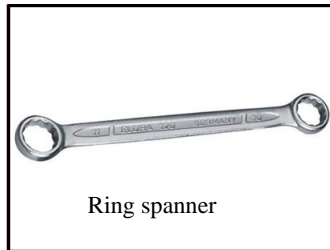
A spanner is a tool with a shaped opening or jaws for gripping and turning a nut or bolt. Spanners are used for tightening or loosening bolt and nuts.

TYPES OF SPANNERS

- Ring spanners
- Open ended spanners
- Combination spanners

RING SPANNER

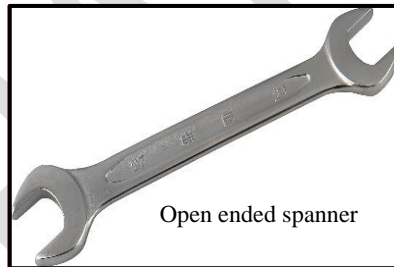
Ring Spanners are the spanners which hold the nut with a ring for both DIY and Motoring jobs. They have an open "C" into which the nut fits Ring Spanners are the spanners which hold the nut with a ring



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OPEN ENDED SPANNER

Open ended spanners are open ended at both ends.



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COMBINATION SPANNER

Combination Spanners have a ring at one end and are open ended at the other end



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**PLIERS**

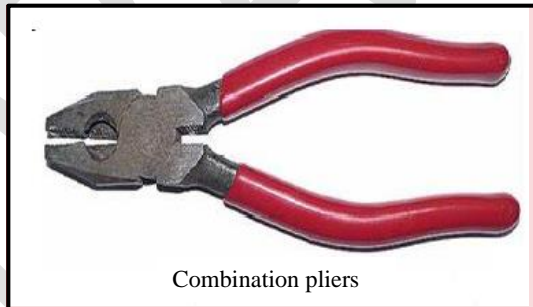
Pliers are hand tools used to hold objects firmly, possibly developed from tongs used to handle hot metals. Pliers are a multi-purpose hand tools with opposing jaws for gripping, bending and cutting metals.

TYPES OF PLIERS

- Combination pliers
- Long nose pliers
- Diagonal plier or side cutter

COMBINATION PLIER

Combination plier can be used for dual purpose, holding the object in position and for tightening.

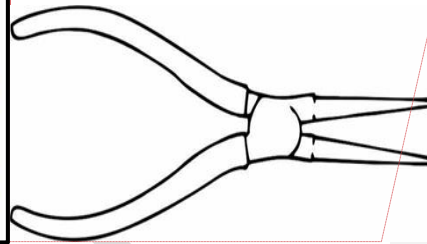
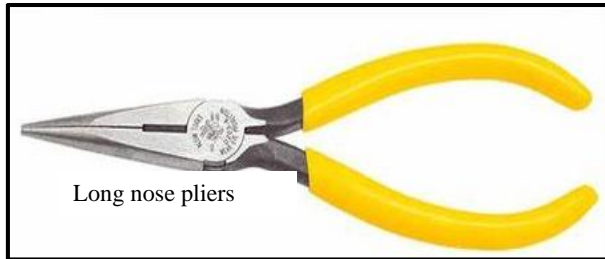


Combination pliers

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LONG NOSE PLIER

Long nose pliers are used for holding objects in position where your hands cannot fit.



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DIAGONAL PLIERS

Diagonal pliers are used for cutting wires or split pins.



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TIN SNIPS

Tin snips can cut thin sheet metal, and lighter versions make it easy to follow the outline of gaskets.



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Aviation snips are designed to cut soft metals. They're easy to use because the handles are spring loaded open and double pivoted for extra leverage.



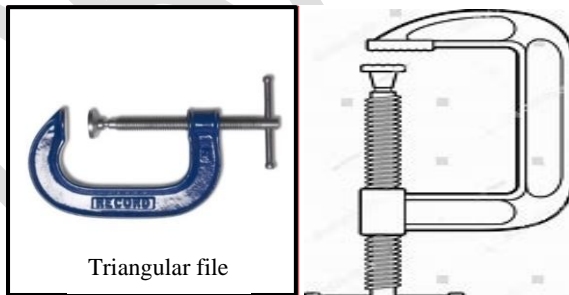
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CLAMPS

G- CLAMP

G-clamp is a tool used for holding work piece or pieces in position.



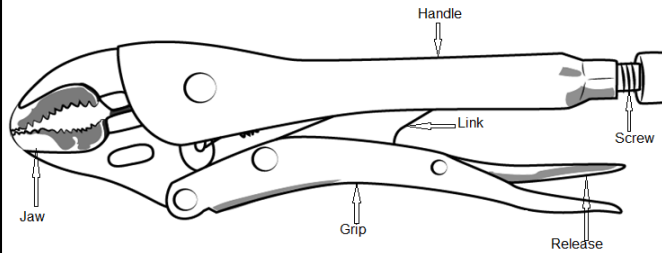
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VICE GRIP

Vice grip is a tool which used to hold work piece in position.



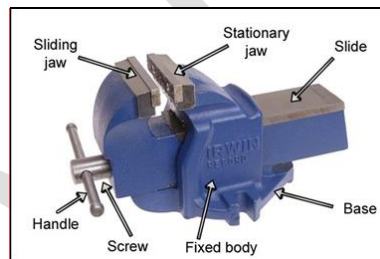
Vice grip



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ENGINEERS VICE

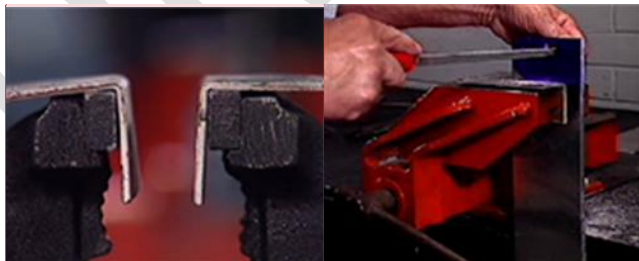
Engineer vice is a tool used for holding work piece in position when filling or cutting a work pieces with a hacksaw inside the workshop.



Engineers vice

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Soft jaws can be fitted whenever the danger of damage arises. They're usually made of aluminum or some other soft metal.



Soft jaws

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Drills are cutting tools used to remove material to create holes. Drills come in many sizes and shapes and can create different kinds of holes in many different materials.



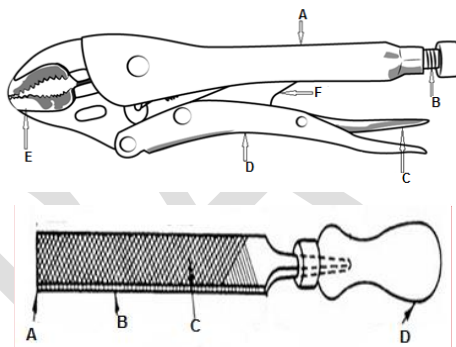
ACTIVITY .3 (TOOLS)

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Aim: The learner will demonstrate an understanding and ability to correctly use the tools in the workshop

Exercise 1:

1. Name different types of hand tools used in the welding workshop and give the function of each tool.
2. Label the following tools used in the workshop



Commented [u36]: draw



ACTIVITY 4 (TOOLS)

Aim: The learner will demonstrate an understanding and ability to correctly use the tools in the workshop

Exercise 1:







Identify and name the following hand tools

Tools	Name of the tool
-------	------------------

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ACTIVITIES 5 (TOOLS)

Tools	What is the use of the tool below
	
	
	
	

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CHAPTER 3: MATERIALS

The materials used generally in sheet metalwork include ferrous metals (plain carbon steels) and non-ferrous materials (aluminium, copper, brass, tin, lead and zinc).

Non-ferrous metals are metals which do not contain iron.

Examples non-ferrous metals

- i. Aluminium
- ii. Copper
- iii. Brass



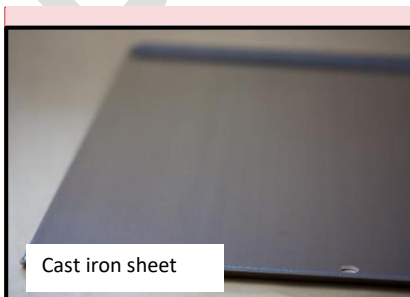
FERROUS METALS

Ferrous metals are metals which contain iron as a parent metal.

Examples of ferrous

- i. Cast iron
- ii. Carbon steel
- iii. Stainless steel
- iv. Mild steel

CAST IRON SHEETS



Cast iron sheet



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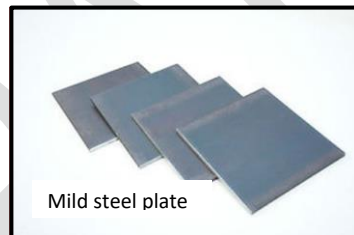
STAINLESS STEEL

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MILD STEEL

Mild steel is also known as low carbon steel. It is used for operations such as cold bending and riveting. It is easy to press into new shape, machine, weld or forge. Products like rivets, nuts, bolts, nails are made from this type of steel.



Mild steel plate

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**NON-FERROUS METALS****EXAMPLES NON-FERROUS METALS****ALUMINIUM**

Aluminium used in many industries including transportation, architectural, consumer goods, and electrical products

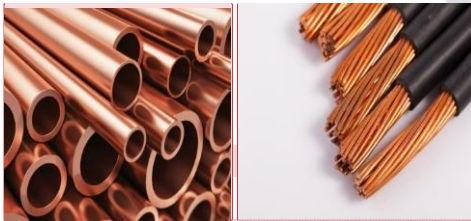


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COPPER

Copper is used as a conductor of heat and electricity



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BRASS

Brass is used to manufacture trumpets, french horns, trombones, and tubas worldwide. Electric instruments, such as electric guitars and electric violins, will also feature brass components in its interior



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






IDENTIFICATION OF MATERIALS

All metals are normally marked or colour coded on the ends to identify them. The disadvantage of this form of identification is that the marking is often lost if it is cut off and not placed in the proper storage rack.

Materials are identified and classified according to their profiles.

MATERIAL PROFILES

Angle Iron		C Channel	
Rectangular Tube		Pipe	
S Section		Square Tube	

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ACTIVITIES 1 (MATERIALS)

Take a look at the pictures below and say what are they made of metal, wood

Commented [u50]: take a pic

Made of.



Materials



Year 1

Technical Occupational

Welding



ACTIVITIES 2 (MATERIALS)



Sort the materials according to their place

Year 1

Technical Occupational

Welding



JOINING METHOD

Joining method is a process that joins two or more materials together.

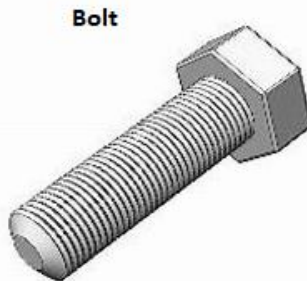
There are TWO types of joining methods.

- Semi-permanent joint (by means of bolt and nuts)
- Permanent join (by means of welding, ARC, MIG, TIG, TAG and GAS(oxy-acetylene)

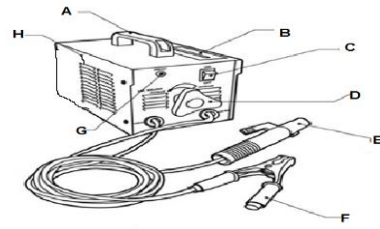
**SEMI-PERMANENT JOINING METHOD**

Examples of semi-permanent joints

- Bolts and Nuts

**PERMANENT JOINING METHOD****ARC WELDING MACHINE**

Is the process of joining two metal pieces using a flux covered electrode which is melted in an electric arc and becomes a fused part of the pieces being welded,

Welding machine (AC/DC) and the components:

Commented [T51]: Take a picture

Machine components:

- A. Machine Handle
- B. Current gauge
- C. On/Off switch
- D. Regulating knob
- E. Electrode holder (Positive terminal)
- F. Work lead/Earth clamp
- G. LED (Overload)
- H. Cooling fan

The following equipment/Tools are essential in welding:

- Electrode lead and electrode holder
- Work lead/earth clamp
- AC or DC machine
- Chipping hammer
- Wire brush
- Electrodes/Welding Rods

Electrode lead and electrode holder

- Electrode lead and holder need to be correct size and it is attached to the positive terminal of the welding machine, it holds the electrode ¹

¹ Picture need to be edited



2

Commented [T52]: Take pictures

Work lead/earth clamp

- The lead/earth clamp is attached in the negative side and will be attached to parent metal by means of a clamp



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AC or DC machine**Alternative Current (AC)**

- Is the welding machine that uses electricity to function



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DC machine

- This kind of the machine usually uses fuel to operate (petrol/Diesel)



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Electrodes/Welding Rods

- Are coated with flux which melts under the heat of welding providing a shielding gas from atmospheric gasses and provides a layer of slag to coat the weld.



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WELDING JOINT

Examples of welding joint

- Tack Weld
- Butt Joint
- Fillet Joint
- Riveting

NB: In year 1 only focus on Tack weld and Riveting.

Tack Weld

Tack welding is a temporary means to hold components in proper position while welding.

A Butt joint

A butt joint is where two parent metals are joined in the same plane or parallel to each other.

Fillet joint

A fillet joint it is used to join two pieces of flat bar at an included angle of 90° angle. A weld bead at a 45° angle to a 90° corner

**RIVETING**

A rivet gun is a tool made to apply pop rivets to a workpiece. It is used to join thin pieces of metals together

Rivets



Rivet Gun

**ACTIVITY 1 (JOINING METHODS)**

Name the kind joints given below

Commented [u57]: take pics



What is the function or the use of the following in the joining of materials



ACTIVITIES (Joining Methods)

DRAFT



ACTIVITY 2

BASIC JOINING PROCESSES

Aim: The learner will demonstrate the correct skill of joining metal plates together using pop riveting.

Exercise 1

Join TWO pieces of sheet metal plate using pop riveting.

Materials needed

- 1.6 x 75x 75 mm sheet metal plate (drilled)
- 5 mm drill bit
- Steel ruler
- scriber
- 6 x rivets
- 5 mm drill bit
- 1 x Rivet gun



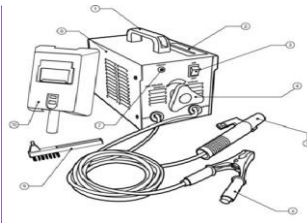
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[Eagle stainless Tube & Fabrication](#)
<https://me-mechanicalengineering.com/stakes-type>
<https://www.grainger.com/.../tools/crimping-tools-and-dies/metal-crimpers/hand-seamers>
https://www.answers.com/Q/What_is_a_cold_rivet
<https://www.mechanicalbooster.com/2018/04/what-is-soldering.html>
<https://www.harborfreight.com/3-inch-hand-seamer-66654.html>



ACTIVITY 3 (WELDING EQUIPMENTS)

Aim: The learner will demonstrate an understanding of the welding components used in the welding workshop

Exercise 1: Label 1-10 the following structure of the welding machine



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ACTIVITY 4 (WELDING EQUIPMENTS)

Aim: The learner will demonstrate an understanding of the welding components used in the welding workshop

1. Exercise 1: Give the function of the following tools.

- Electrode lead and electrode holder
- Work lead/earth clamp
- AC or DC machine
- Chipping hammer
- Wire brush
- Electrodes/Welding Rods

2. Complete the table below³

A.	B.	C.	D.	E.
				

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³ Pictures need to be reviewed

Year 1

Technical Occupational

Welding

DRAFT

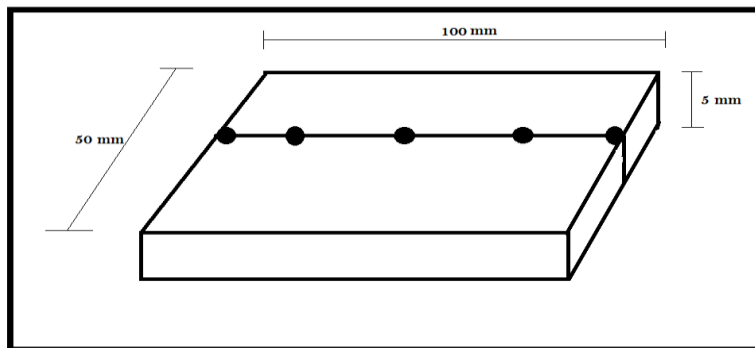
**PRACTICAL ACTIVITY 2****JOINING METHODS**

Aim: To demonstrate the understanding of Practical (Measuring, cutting and Tack Welding)

Learners are required to measure, cut and prepare two pieces of material as per the drawing. The learner must produce two tack welds that should be mechanically strong.

All stages must be assessed.

- Measuring
- Mark off
- Cutting
- Cleaning off sharp edges
- Tack Weld



Year 1

Technical Occupational

Welding

RUBRIC

[illegible]

GLOSSARY

AIDS Acquired Immune Deficiency Syndrome

HIV Human Immune Virus

NOSA National Occupational Safety Association

OHS Occupational Health and Safety

GET General Education and Training

FET Further education and Training

Capacity – the ability to do something

Component – part of a set of objects used together to perform a specific function

Engineering – the applications of science to design, build, and use machines

Entrepreneur – somebody who sets up and finances new commercial enterprises to make a profit

Environment – the physical and social conditions in which people live, and which also affect plant and animal life

Ferrous – describes materials containing or relating to iron

Forces – something that changes or tends to change the state of rest or uniform motion of a body

Friction – mechanical resistance to the relative movement of two surfaces

Joining – a process of putting materials together either with fasteners, glues or heating process

Lap – a finishing process where metal is finely polished

Machine – an apparatus using or applying mechanical power, having several parts each with a define function and together performing certain kinds of work

Maintenance – precautionary measures, actions and processes that are taken to keep a machine or engine in functional order

Malfunction – when a process or component fails to perform the required function

Materials – physical substances used in the technological process

Mechanisms – the arrangement and action of parts in a machine

Non-ferrous – materials not containing iron

Power – the capacity of a machine to do work (it is measured in watts)

Product – the physical or tangible artefact that results from a process

Properties – qualities or attributes

Year 1

Technical Occupational

Welding

Tapping – a method of cutting an internal screw thread by means of rotating a tap into a hole which is sufficiently under the normal tap size

Parging -

DRAFT