



Republic of the Philippines
Department of Education
National Capital Region
Schools Division Office – Muntinlupa City

SPECIAL PROGRAM FOR TECHNICAL VOCATIONAL EDUCATION (SPTVE)
SHIELDED METAL ARC WELDING 7 QUARTER 3 WEEK 1

- I. Topic: BASIC HAND TOOLS AND EQUIPMENT USED IN SHIELDED METAL ARC WELDING
II. Objectives: 1. Name the basic hand tools and equipment in Shielded Metal Arc Welding
2. Classify the basic tools and equipment.
3. Appreciate the importance of these tools and equipment.
III. Brief Introduction of the Lesson

Shielded Metal Arc Welding, otherwise known as manual metal arc welding or flux shielded arc welding, is a process that uses a flux-coated electrode to form the weld. A list of common basic hand tools used in SMAW and their uses are provided with picture illustration for your better comprehension. Hand tools are classified into four and each classification has different types and uses.

1. Measuring tools
2. Cutting tools
3. Driving tools
4. Holding tools

MEASURING TOOLS



A. PUSH PULL RULE. This flexible rule when extended will support itself, but may also be used to measure curved, irregular surfaces.



B. STEEL TAPE is similar to a steel tape rule except for its flexible number of feet that are marked on the tape.



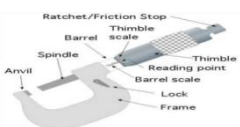
C. STEEL RULE. This is the most common tool used in tool room. It is made of tampered steel about 1/8 inch thick and 3/4 inch wide and 6 to 12 inches long.



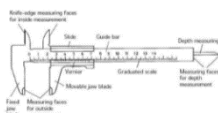
D. TRY SQUARE is an instrument used to measure the squareness of an object.



E. COMBINATION SQUARE It is an instrument combined with 45°, 90° and a protractor.



F. MICROMETER CALIPER. Is a precision measuring instrument used to measure dimensions in thousandths of an inch



G. VERNIER CALIPER is a precision measuring instrument used to measure the inside, outside diameter, as well as depth of hole and slot.





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CUTTING TOOLS



A. HACKSAW is a tooth cutting tool usually with a solid and adjustable frame. The main parts are handles, blade, tightening screw and nuts. The tool is mainly used in cutting metals like plates, pipes, rods, bars, angular, etc.

- **Frame.** It is the main body of the hacksaw which holds the blade.
- **Blade.** It is made of thin, high grade steel usually 1.27 mm thick and 30.48cm long with an inclined row of teeth serving as cutter.

B.FILES are made of high grade steel which are hardened and tempered. Each file has rows of teeth that form, shape and finish metal by removing small chips and smoothing rough edges of the metal surface. They differ in length, shape, cut and coarseness.



KINDS OF FILES

b1. Mill file a single-cut file used for filing and finishing brass and bronze.



b2. Flat file is usually rectangular in shape and tapered slightly in width and thickness. It is one of the most commonly used files for general work



b3. Square file is intended for filing square or rectangular holes.



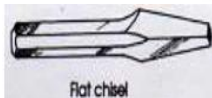
b4. Round file is used primarily for enlarging holes.



b5. Half-round file is used for filing curved or concave surfaces.



b6. A triangular file is used for filing surfaces that meet at least 90°.



Flat chisel



C.COLD CHISEL. A wedge-shaped tool used to shear, cut, and chip metal

Types of cold chisel and their particular functions:

D. SCRAPER is used in removing points, burrs and sharp edges from metal surface and similar parts.



E. PUNCHES- are used for permanent marking on the surface of metal





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DRIVING TOOLS



A. HAMMER

- a1. Ball peen hammer is used for straightening bending and deforming metals.
- a2. Chipping hammer is used for removing slag on weld and with two faces,

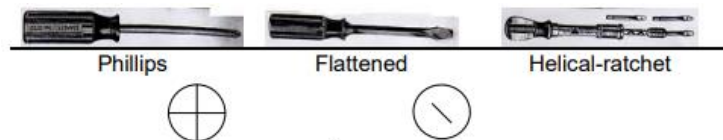


Adjustable Wrench

B. WRENCH- is used for loosening and tightening light and heavy nuts and bolts. There are different kinds and sizes of wrenches designed according to uses and functions. An adjustable wrench has a movable jaw which makes it adjustable to various sizes of nuts.

C. SCREW DRIVER-is hand tool that is designed to turn screws. The blade is made of steel, attached to one end of a wooden or plastic handle. The other end is flattened to fit slots in the heads of screws on bolts.

A heavy type of adjustable wrench is the monkey/pipe wrench.



HOLDING TOOLS

A. CLAMPS are made of different sizes and appearance that are fitted to its purpose. These devices have been designed to hold work securely while performing skills through grinding, bending, fitting and cutting of metals. Some types of clamps and metal vises are:



- a1. Tool maker clamp is used for holding small parts both at the bench and at the machine. This tool is also known as a parallel clamp.



- a2. C-Clamp is an all-purpose clamp that is generally used for all kinds of work.



- a3. Drill vise is a sturdy steel vise with movable jaw that easily goes back or forth by raising the handle.

- a4. Machinist vise is a work holding tool for machining activity



- a5. Hand vise V block with clamp is used to hold metal stocks for small machining operation.



- a6. Vise Grip is a tool used to grip the stock tight enough to hold the object.



- a7. Tong is used to hold the metal to be forged and must be held securely while working.



- a8. Pliers are used for holding, cutting and twisting wires.





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IV. Activities:

Activity 1	
A	
1. Phillips screw	
2. Box Wrench	
3. Scraper	
4. Square file	
5. C-clamp	
6. Steel tape	
7. Cold chisel	
8. Machinist vice	
9. Ball peen hammer	
10. Hand vise	
11. Open-ended wrench	
12. Hack saw	
13. Steel rule	
14. Helical-ratchet screw	
15. Chipping hammer	

Activity 2

Group the following handtools below according to their classification. Use the table below.

- Hammer
- Steel rule
- Vise Grip
- Try square
- Screwdriver
- Wrench
- Hacksaw
- C-Clamps
- Files
- Steel tape
- Cold Chisel
- Pull-push rule
- Scraper
- Pliers

MEASURING TOOLS	CUTTING TOOLS	DRIVING TOOLS	HOLDING TOOLS

V. Assessment: Directions: Choose the letter of the correct answer.

- A measuring tool used to measure the squareness of an object.
A. Hacksaw B. Screw driver C. Hammer D. Try Square
- Tools used for measuring or setting of distances, and to lay out arcs and circles.
A. Dividers B. Screw driver C. Hammer D. Wrench
- A wedge-shaped tool used to shear, cut, and chip metal.
A. cold chisel B. scraper C. punch D. files
- Tool used for loosening and tightening light and heavy nuts and bolts.
A. Hacksaw B. Screw driver C. Hammer D. Wrench
- A tool used to hold the metal to be forged and must be held securely while working.
A. Tong B. pliers C. D. vise grip clamp

VI. Reflection: Write down at least 5 BASIC HAND TOOLS AND EQUIPMENTS that you have at home and classify each of them.

References:

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