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BT 205: Engineering Mechanics

UNIT 3

Welding & soldering

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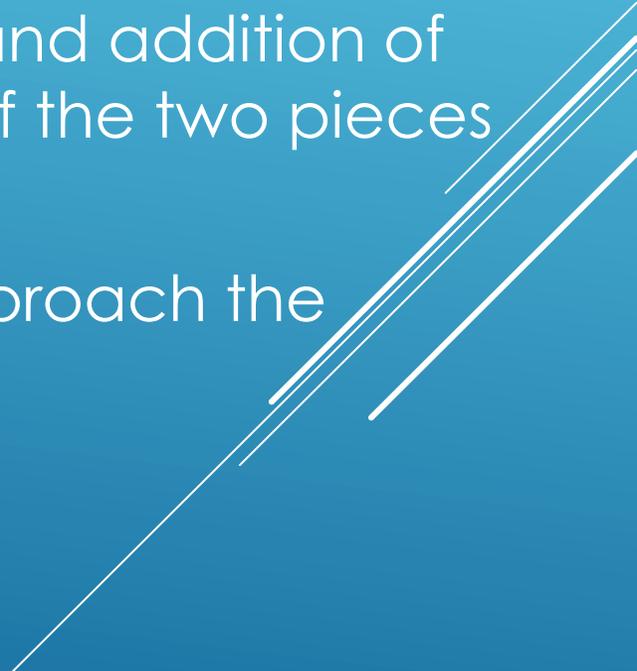
❖ What is welding?

- Types of Welding.
- Advantages / Disadvantages.
- Precautions and Safety Gear.

❖ What is soldering?

- How its done?
 - Advantages of soldering.
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WHAT IS WELDING?

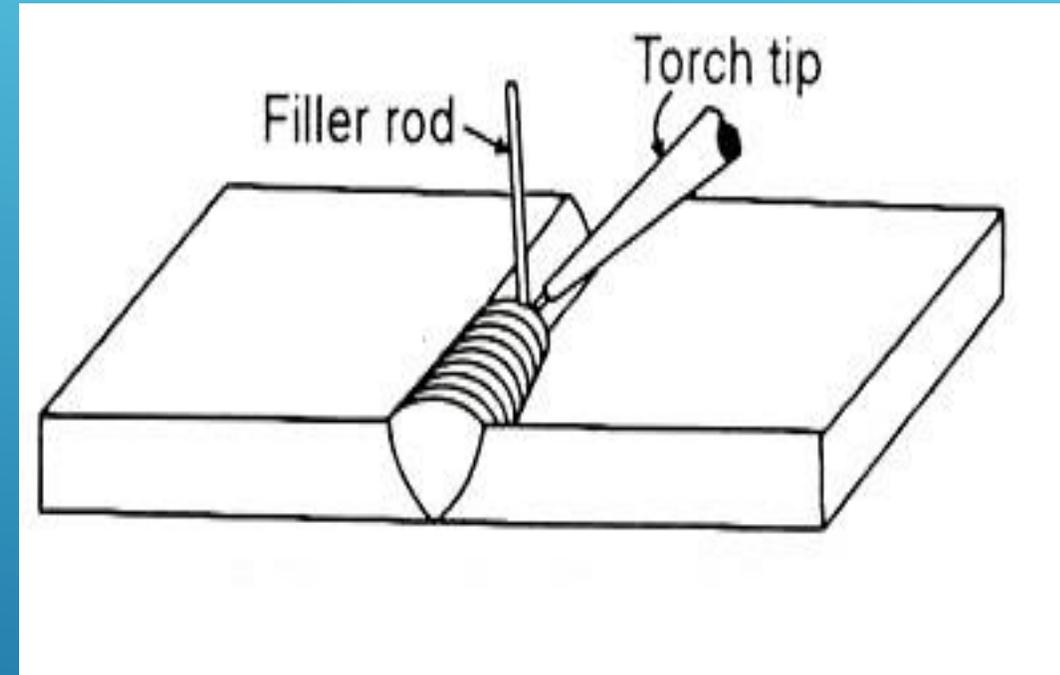
- Welding is the process by which two pieces of metal can be joined together through the use of extreme heat or pressure and addition of other metals or gases, causing the metallic structures of the two pieces to join together .
 - The heat is applied locally to make the surfaces to approach the melting point and fuse together.
- 

TYPES OF WELDING

- ▶ Based on the method used, welding can be broadly classified into:
 - ▶ Fusion Welding.
 - ▶ Pressure Welding.
- 
- A decorative graphic consisting of several parallel white lines of varying lengths, slanted diagonally from the bottom right towards the top right, set against a blue gradient background.

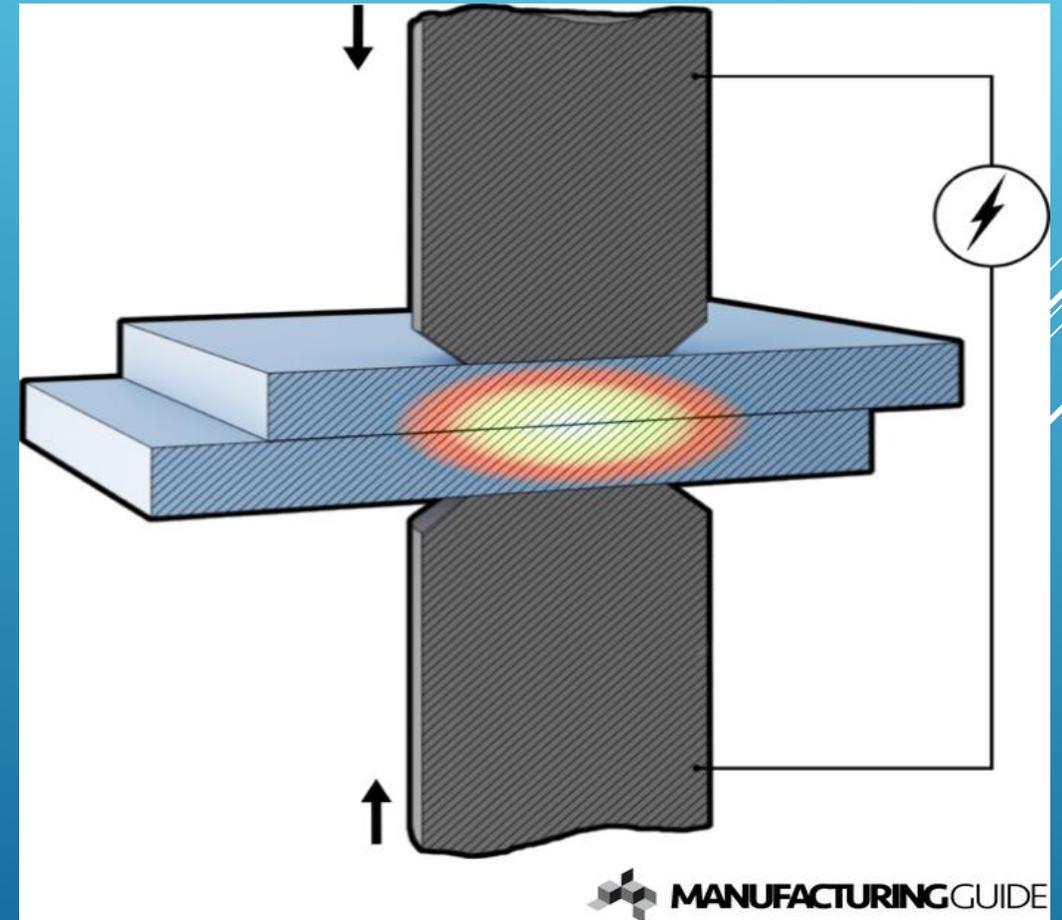
FUSION WELDING

- ▶ Welding processes in which heat is primarily applied for melting the surfaces to be welded. In this process, base metal is melted by means of heat. Often, in fusion welding, a filler metal is added to the molten pool to facilitate the process and provide bulk and strength to the joint.



PRESSURE WELDING.

- ▶ In pressure welding, the parts to be joined are first locally heated (electrically) at the place where the joint is to be formed and are then squeezed together in the plastic state so that they are united. In general, no filler metal is employed. Cold pressure welding makes use of high pressure, without the help of heat, to unite the parts.



ADVANTAGES AND DISADVANTAGES OF WELDED CONNECTIONS.

ADVANTAGES

- ▶ Complete rigid joints can be provided with welding process.
- ▶ Welded joints are economical as less labour and less material is required.
- ▶ The alternation and addition to the existing structure is easy.

DISADVANTAGES

- ▶ Welded joints are more brittle and their strength is less than the members joined.
- ▶ Skilled labour and electricity are required for welding.
- ▶ Due to uneven heating & cooling of the members during the welding, the members may distort resulting in additional stresses.

PRECAUTIONS AND SAFETY MEASURES.

- ▶ To prevent injury to personnel, extreme caution should be exercised when using any types of welding equipment. Injury can result from fire, explosions, electric shock, or harmful agents.
- ▶ Do not weld in a building with wooden floors, unless the floors are protected from hot metal by means of fire resistant fabric, sand, or other fireproof material.
- ▶ Remove all flammable material, such as cotton, oil, gasoline, etc., from the vicinity of welding.
- ▶ Before welding or cutting, warn those in close proximity who are not protected to wear proper clothing or goggles.

SAFETY GEAR



Welding Helmet.

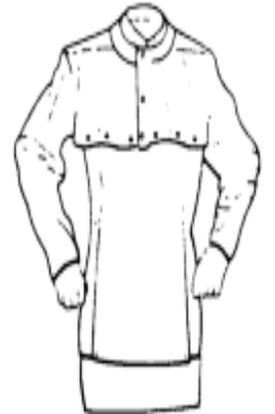
P.S: not Spetsnaz Helmet from
PUBG



LEATHER APRON



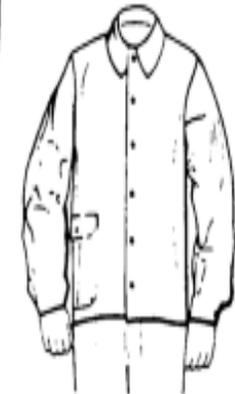
LEG APRON



CAPE AND BIB



SLEEVES



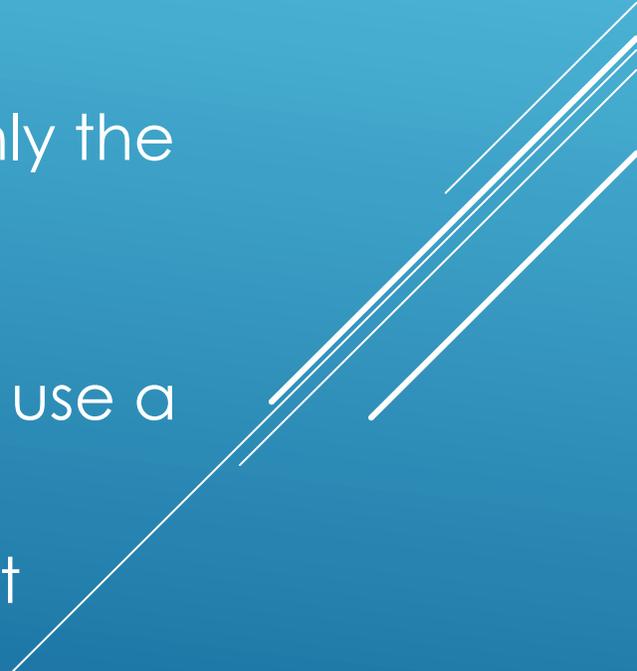
COAT



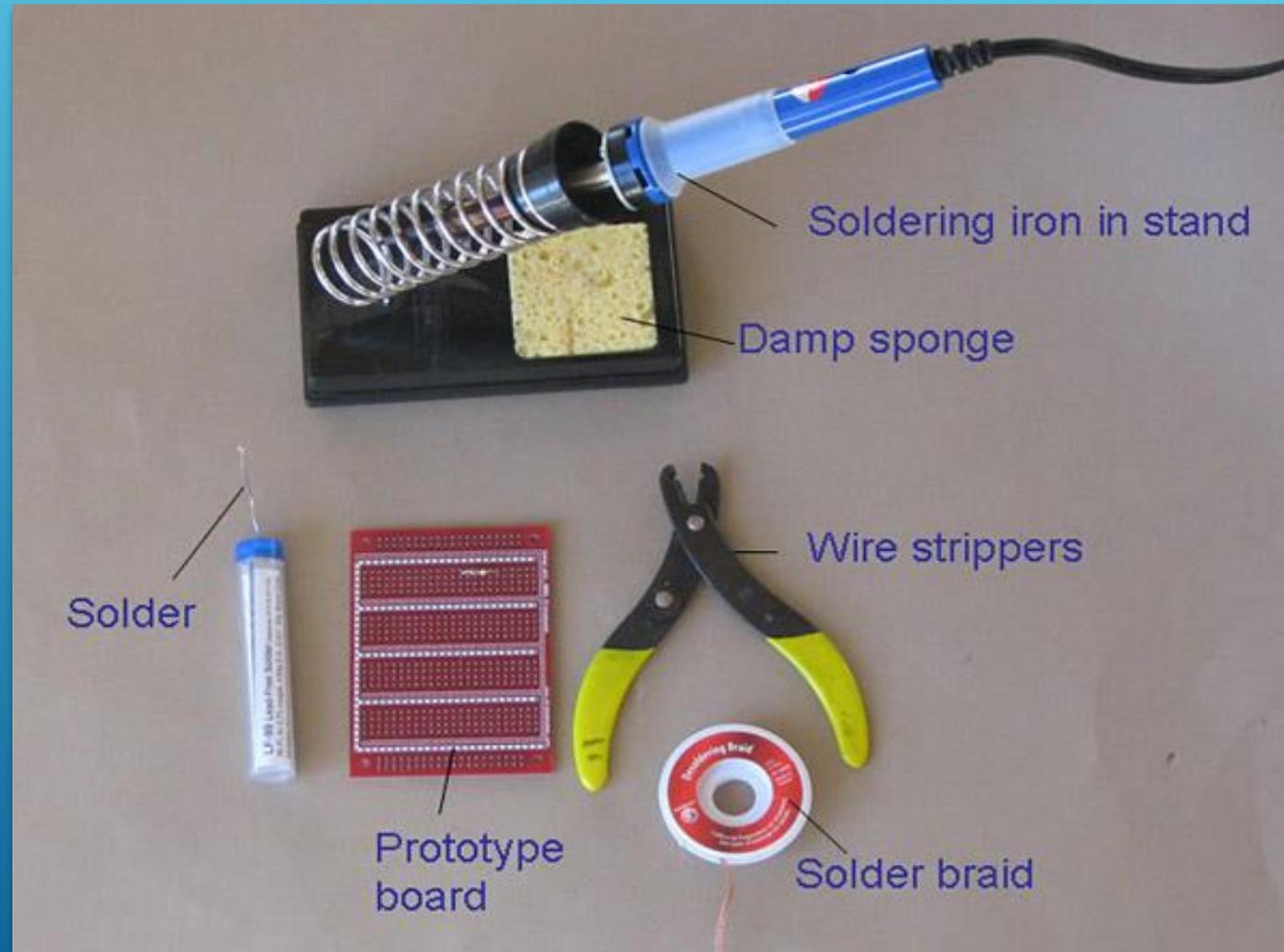
GLOVE

Figure 2-4. Protective clothing.

WHAT IS SOLDERING?

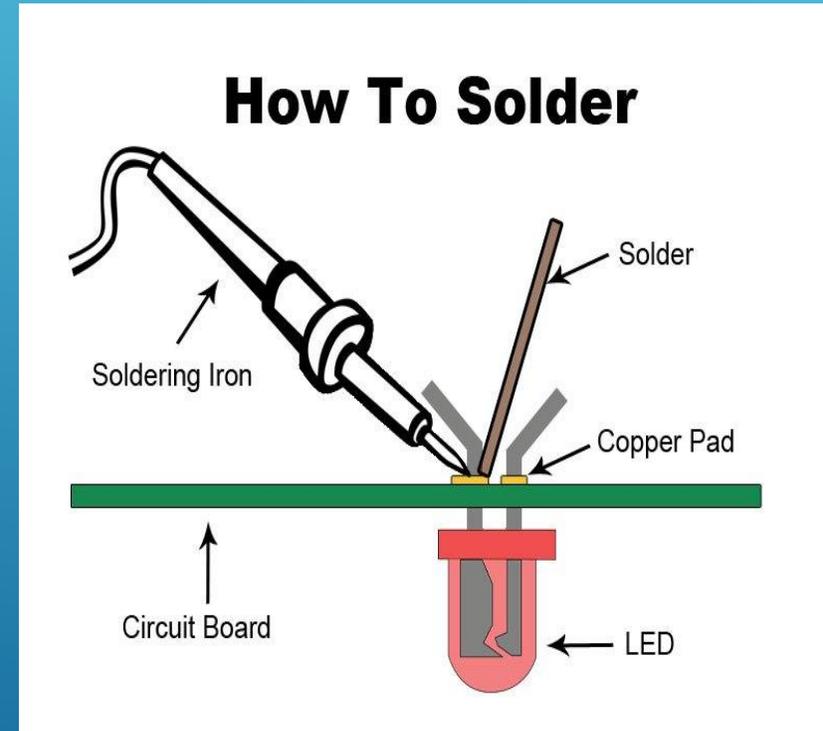
- ▶ Soldering is a joining process that uses a filler metal to join parent materials (multiple) that remain solid.
 - ▶ The components to be joined are not heated only the filler metal.
 - ▶ Filler metals are alloys with melting temperatures below 450 °C (840 °F). Soldering may or may not use a fluxing agent.
 - ▶ Used in electronic components where heat is not feasible.
- 

SOLDERING EQUIPMENT.



PROCESS OF SOLDERING

- ▶ Only the solder (filler) is melted in the process.
- ▶ The molten solder is applied on the joint as a glue.
- ▶ It is electrically conducting.
- ▶ Tin – lead solder wire is used.



Advantages.

- ▶ Soldering requires temperatures around 400°F.
- ▶ The solder flows between the electrical connectors to bond them together. Since the solder is metal, it conducts electricity.
- ▶ Circuit boards floated on a molten solder bath make multiple connections with a single operation. The solder only sticks to the components and not the board itself.

Disadvantages.

- ▶ Large sections cannot be joined.
- ▶ Soldering joints can not be used in high temperature applications.
- ▶ Low strength of joints.
- ▶ Fluxes may contain toxic components.
- ▶ Careful removal of the flux residuals is required in order to prevent corrosion.

QUERIES?

The image features a solid blue background with a gradient from light to dark. In the center, the word "QUERIES?" is written in a bold, white, sans-serif font and is underlined with a thick white horizontal line. On the right side of the image, several thin, white, parallel lines are drawn diagonally from the bottom-left towards the top-right, creating a sense of motion or a modern design element.

THANK YOU FOR YOUR PRECIOUS TIME

