PENANG SANGAM HIGH SCHOOL

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LESSON NOTES-25

School: PENANG SANGAM HIGH **Year/Level: 11**

Subject: APPLIED TECHNOLOGY

Strand	AT 11.6: APPLIED ENGINEERING
Sub Strand	AT6.2 WELDING, SHEET METAL AND FABRICATION
Content Learning Outcome	AT11.6.2.1 Demonstrate knowledge on safety, materials, tools and processes and develop practical skills in electric welding.

Shielded Metal Arc Welding (SMAW)

Shielded Metal Arc Welding is a welding process where the heat for welding is generated by an electric arc between a flux covered metal electrode and the work.

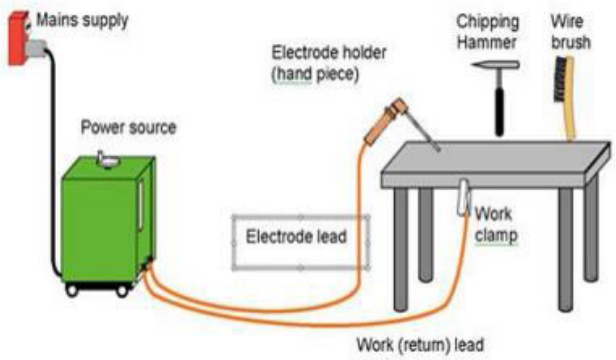
The shielded metal arc welding process is a simple and versatile arc welding process. This process is used predominantly to weld ferrous metals above 2mm thick in all the welding positions.

Welding Positions

The welding position is the orientation of the electrode with respect to the work piece to deposit the molten material, these positions are down hand (flat), horizontal, vertical (up or down), and overhead.

Equipment

The equipment for the shielded metal arc welding process consists of a power source, welding leads, electrode holder, and work clamp or attachment.



Types of Electrodes for Welding Steel

Most electrodes fall into 1 of 3 general types; cellulosic, rutile or basic. There are coatings that do not fall into these categories including non-ferrous and stainless steel types.

Advantages of SMAW

• SMAW is a widely accepted, versatile and well developed welding process.

• High quality welds are readily achieved on all steels in both the workshop and on site.

• The equipment is relatively simple, inexpensive and portable.

• The shielding gas provided by the burning flux is less sensitive to wind and drafts when compared to a process with an external shielding gas.

Tools used in Welding

Welding Helmet with flip front

A welding helmet is a type of headgear used when performing certain types of welding to protect the eyes, face and neck from flash burn, ultraviolet light, sparks, infrared light, and heat.

Slag Hammer

Slag hammer, also known as a chipping or a welding hammer is a very useful power tool. Even though using a slag hammer is quite similar to using most power tools, there are a few specifics you will need to take care of.

Vice grips

Vice-Grips are pliers that can be locked into position, using an over-center action.

Steel Brush

Steel Wire Brushes are suitable for a wide variety of applications and are generally the most economical and most widely available of the different wire brush options. Steel wire is the hardest of the commonly offered brush wires, providing a high fatigue life and durable cutting action.

Electric grinder

This tool is really versatile. It can be used for lots of materials including steel, concrete, asphalt, tile, pavers, in rescue work (to extricate victims from cars), metal bars and more. It‘s used to grind off rust, to remove old mortar, to remove paint and to polish various metals.

Welder's respirator

A welding respirator is worn by a person who welds. Welding produces harmful and potentially fatal fumes which are extremely dangerous for a person to breathe.

SAFETY IN ARC WELDING

Welding is a safe occupation when sufficient measures aretaken to protect the welder from potential hazards. When these measures are overlooked or ignored, however, welders can encounter such dangers as electric shock, overexposure to fumes and gases, arc radiation, and fire and explosion; which may result in serious, or even fatal injuries.

Personal Protective Equipment

Welders, like firemen, must wear clothing to protect them from being burned. Of all injuries to welders, burns are the most common due to sparks landing on bare skin. Welding arcs are very intense and can cause burns to skin and eyes with just a few minutes of exposure.

Arc Rays

It is essential that your eyes are protected from radiation exposure. Infrared radiation has been known to cause retinal burning and cataracts. And even a brief exposure to ultraviolet (UV) radiation can cause an eye burn known as ―welder‘s flash.

Noise

There are two good reasons to wear ear muffs or plugs:

- To keep flying sparks or metal out of your ears; and

- To prevent hearing loss as a result of working around noisy arc welding equipment, power sources, and processes (like air carbon arc cutting or plasma arc cutting).

Fumes and Gases

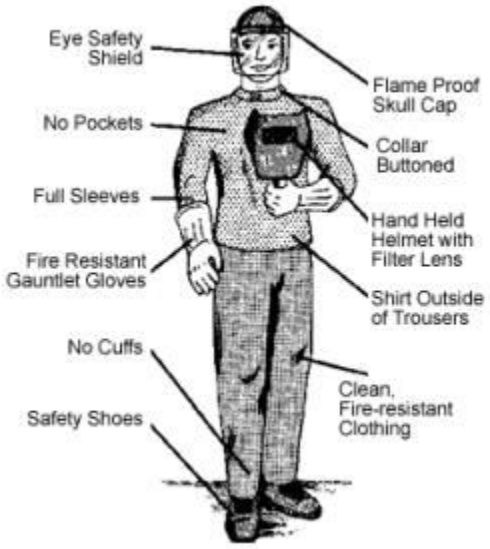
Because of the variables involved in fume and gas generation from arc welding, cutting and allied processes (such as the welding process and electrode, the base metal, coatings on the base metal, and other possible contaminants in the air).

The **fume plume** contains solid particles from the consumables, base metal, and base metal coating.

Care and Cleaning of the work area

Keeping the area around your work neat is as important as maintaining your equipment.

Keep all your equipment, cables, hoses, cylinders, etc. out of any traffic routes such as doors, hallways, and ladders. A good practice is to avoid clutter … and clean up your work area when you‘re done! Not only will it help to protect yourself and others, you'll find it much easier for you to work efficiently.



SHORT ANSWER QUESTIONS

1. List any three tools used in welding.

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2. List two advantages of SMAW.

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3. Name one type of electrode you going to use while doing steel welding.

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4. Name the tool which is used when performing certain types of welding to protect the eyes, face and neck from flash burn, ultraviolet light, sparks, infrared light, and heat.

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THE END