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VARIOUS TYPES OF WELDING – A REVIEW

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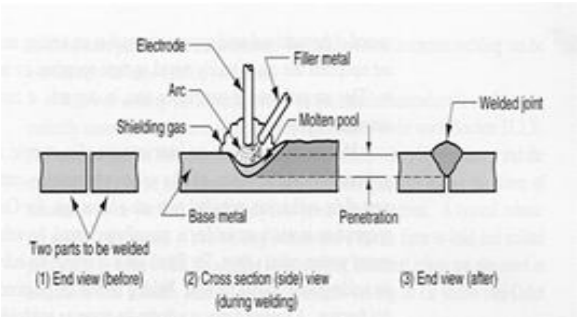
Abstract – In the today's manufacturing market, quality and productivity play vital role as the market competition are very stiff and cut throat now a days. Industry is trying to develop various type of technique to increase quality and productivity and minimize the cost of product. Welding is one of the mostly used technique in industry. Welding is a fabrication process that we far joining at two similar and dis-similar parts. In the present research paper an attempt is made to understand various welding technique and to find the best welding technique for material. The main two types of welding are TGT and MIG welding. Apart from this, there are various welding processes like under water welding, robotic welding etc. the process of welding give rise to increase in internal energy of solid typically by the application heat

Keywords - MIG, TIG, Welding, Joints.

I.INTRODUCTION

Welding is fabrication process that joints two materials, usually metals or thermoplastics, by causing fusion, which is distinct from lower temperature metal joining techniques such as brazing and soldering, which don't melt the base metal. A concentrated heat source melts the material in the weld area; the molten area then solidifies to join the pieces together. Sometimes a filler material is added to the molten pool to strengthen the weld



Welding is joining two pieces of metal by:

- Heating to temperature high enough to cause softening or melting
- With or without application of pressure
- With or without use of filler metal
- Melting point same as metals beginning joined or melting point below metals but about 800º F.

II.TYPES OF WELDING

Some of the best known welding methods include:

1. Shield metal arc welding (SMAW)

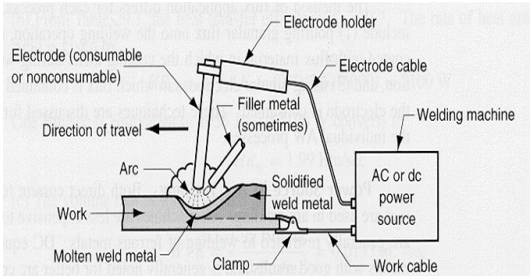
It's also known as "stick welding or electric welding", uses an electrode that has flux around it to protect the weld puddle. The electrode as it slowly melts away. Slag the weld puddle from atmospheric contamination.

2. Gas tungsten arc welding (GTAW)

It's also known as TIG (tungsten inert gas) uses a non-consumable tungsten electrodeto produce the weld. The weld area is protected from atmospheric contamination by an inert shielding gas such as argon or helium.

3. Gas metal arc welding

Commonly termed MIG (metal inert gas) uses a wire feeding gun that feeds wire at an adjustable speed and flows an argon based shielding gas or a mix of argon and carbon dioxide (CO2) over the weld peddle to protect atmospheric contamination.



4. Flux-cored arc welding (FCAW)

Flux-cored arc welding (FCAW or FCA) is a semi-automatic or automatic arc welding process. FCAW requires a continuously-fed consumable tubular electrode containing a flux and a constant-voltage or, less commonly, a constant-current welding power supply. Almost identical to MIG welding except it uses a special tubular wire filled with flux, it can be used with or without shielding gas, depending on the filler.

5. Submerged arc welding (SAW)

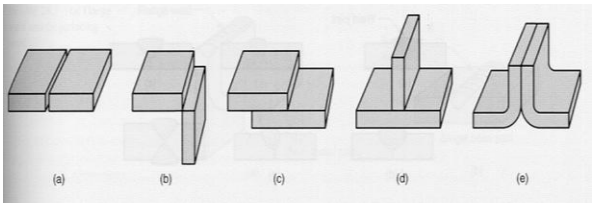
It uses an automobile fed consumable electrode and a blanket of granular fusible flux.

6. Electro slag welding (ESW)

A highly productive single pass welding process for thicker material between 1 inch (25mm) and 12 inch (300mm) in vertical or close to vertical position.

7. Electric resistance welding (ERW)

A welding process that produces coal-scene of lying surface where heat to from the weld is generated by the electrical resistances of the material. In general, an efficient method, but limited to relatively thin material.



Many different energy sources can be used for welding, including a gas flame, an electric arc, a laser, an electron beam, friction and ultrasound.

III. ADVANTAGES AND DISADVANTAGES OF WELDING -

Advantages-

- Versatility - readily applied to a variety of applications and a wide choice of electrodes
- Relative simplicity and portability of equipment
- Low cost
- Adaptable to confined spaces and remote locations
- Suitable for out-of-position welding

Disadvantages-

- Not as productive as continuous wire processes
- Likely to be more costly to deposit a given quantity of metal
- Frequent stop/starts to change electrode
- Relatively high metal wastage (electrode stubs)
- Current limits are lower than for continuous or automatic processes (reduces deposition rate)

Submerged Arc Welding (SAW)

Advantages

- Lends itself to the production of consistently high quality welds with minimum operator skills.
- Minimum of welding fume and of arc visibility (radiation).
- Well suited to welding thick sections.
- Suitable for welding carbon, low alloy and alloy steels.
- Relatively high metal deposition rates

Disadvantages

- Flat or horizontal position welding only
- Care required to preserve correct electrode alignment, as electrode
- Tip and weld pool are underneath solid flux cover

Flux Cored Arc Welding (FCAW)

Advantages

- Versatility - suitable for a variety of positions and applications
- Capable of relatively high deposition rates
- Enables “one process” operation for individual projects – simplifies training, supervision and logistics

Disadvantages

- Incorrect selection of consumables and parameters may lead to lower weld toughness
- Potential for lack-of-fusion type defects if welding parameters are incorrect or misalignment occurs
- Fume extraction may be required

Gas Tungsten Arc Welding (GTAW)

Advantages

- Applicable to a very wide range of materials.
- Especially good for welding thin sections and delicate workpieces
- Capable of producing welds of high quality and appearance

Disadvantages

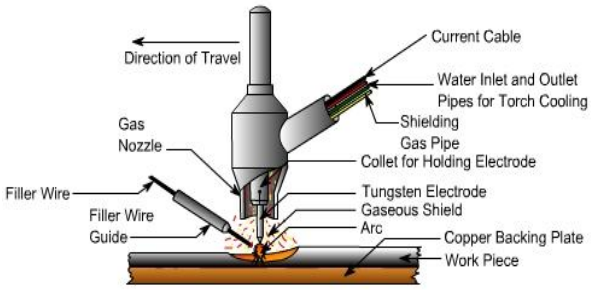
- Generally restricted to flat or horizontal welding
- Source: The Institute of Materials Engineering Australasia.
- For more information on this source please visit The Institute of Materials Engineering Australasia.

IV.LITERATURE REVIEW

From the literature review, it is found that welding of Aluminium is a big challenge by conventional arc welding process. Again repeatability of welding depends on its control on welding speed and other processing parameters. In this work to perform welding of 3 mm Aluminium plate, an automated TIG welding setup was made. Welding of the Aluminium plate was done by changing the welding current and welding speed to get a high strength joint. To get better strength welding of the Aluminium plate also done from both side. Effect of welding speed and applied current on the tensile strength of weld joint, micro hardness of the weld pool and macrostructure of the joint was analysed.

Cost Considerations for the Metals Lab:

Incurred costs fall under four areas: equipment costs, energy costs, labor costs, and material costs (AWS, 2004). Of particular interest to this research are equipment costs and student contact time (actual time welding) on the equipment. The following is a general introduction to the equipment and its use.



V.CONCLUSION

- To make joints with application of pressure and frictional heat.
- This work has focus on the effect of active flux on gas welding here we have select three various input parameters like weldling speed, welding current and arc welding.
- These types of welding processes are widely developed in automotive, ship, aerospace and other industries.
- This study explores microstructure and the tensile strength, impact strength, hardness and mechanical properties of different kinds of weld materials welded by the MIG and TIG welding under the influence of various welding process parameters.
- This review reveals the proper selection of welding process parameters in GMAW and TIG is highly complicated.

VI.REFERENCES

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