A Paper on MIG on Aluminum Alloys

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ABSTRACT: ***Welding is the processing process employed for the integration of two identical and dissimilar metals. MIG welding is one of the most commonly used technologies in the manufacturing field. The MIG welding parameters are the most important parameters impacting the efficiency, effectiveness and cost of welding. We researched input parameters for welding such as welding current, arc voltage, welding speed, root gap and output parameters as hardness, tensile strength, impact energy and microstructure. This study is focused on the optimization methods and measurement methods used by researchers to refine the parameters. A study of MIG welding has been discussed in this research article. Previous literature and possible facets of the world of MIG welding have been explored.***

KEYWORDS: ***Mechanical and Metallurgical properties, MIG, Strength, Microstructure, Efficiency factor.***

INTRODUCTION

Metal inert gas (MIG) welding is also referred to as gas metal arc welding (GMAW). The MIG as shown in figure 1 is a welding method that was developed and commercially available in 1948, while the original principle was actually introduced in the 1920s. Metal inert gas welding is a welding procedure in which an electrical arc is formed between a consumable wire electrode and a metal workpiece that allows it to melt and join. A shielding gas is supplied along with the wire electrode via a welding gun that prevents the process from pollutants in the air [1]. MIG welding is flexible and has fewer loss of alloy components during the process and can be run as semi-automatic and fully automatic welding. The bulk of metals can be welded for this process and can be welded in all places with lower energy versions of the process [2].

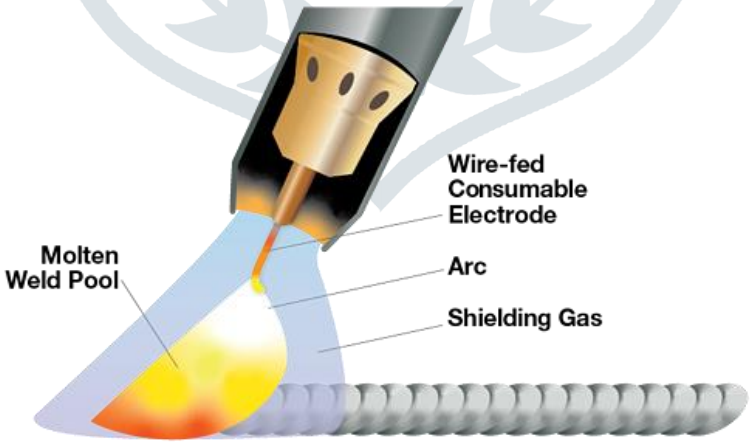

Figure 1: Typical MIG welding

The MIG welding process has many benefits that benefit from the fact that the welding process takes place in a solid state. These benefits are as follows:

One of the top benefits of MIG welding is its versatility, MIG welding increases the clarity of the welding pool, there is very little loss of alloy elements, no slag to clean, MIG welding is highly flexible and can weld

a wide range of metals and alloys. MIG welding is semi-automatic as well as fully automatic, continuously fed steel, which increases welding speed, welding efficiency and overall power [3].

The MIG welding experiment relies on a variety of variables that can influence the performance reaction. Welding process parameters primarily influence the geometry of the welding bead, such as penetration, bead reinforcement, bead width and deposition rate, which is the weight of the metal deposited per unit of time [4]. These parameters are as follows: welding current, welding voltage, travel speed, wire electrode scale, shielding gas form, electrode expansion, electrode angle, and welding joint location. Proper choice of welding parameters will improve the probability of making welds of acceptable quality [5].

LITERATURE REVIEW

MIG and TIG welding both use an electric arc to make the weld. The distinction between the two is how the arc is used. MIG (metal inert gas) welding uses a feed wire that continuously passes through a gun to generate a spark and eventually melts to form a weld. TIG (tungsten inert gas) welding requires long rods to connect two metals together [6].

One of the top benefits of MIG welding is its versatility, MIG welding increases the clarity of the welding pool, there is very little loss of alloy elements, no slag to clean, MIG welding is highly flexible and can weld a wide range of metals and alloys. MIG welding is semi-automatic as well as fully automatic, continuously fed steel, which increases welding speed, welding efficiency and overall power [7].

DISCUSSIONS

MIG and TIG welding both use an electric arc to make the weld. The distinction between the two is how the arc is used. MIG (metal inert gas) welding uses a feed wire that continuously passes through a gun to generate a spark and eventually melts to form a weld. TIG (tungsten inert gas) welding requires long rods to connect two metals together. A variety of reasons make MIG welding the right choice for your work. First of all, it's more dynamic. While TIG welding can be used on more types of metals, its efficacy on thicker jobs is minimal. MIG welding can be used on aluminium, stainless steel and steel, and on any thickness from 26-gauge sheet metal to heavy-duty structural plates [8].

MIG welding holds this tremendous advantage over TIG because the wire feed functions not only as an electrode, but also as filler. As a result, thicker bits can be blended together without having to heat them all the way through. And since it uses filler rather than a fuse, MIG welding can be used to weld two separate materials together. Speed is another justification to prefer MIG vs. TIG. The MIG gun is designed to operate continuously for long periods of time, making it more powerful and productive than its equivalent. MIG is the best option for big, commercial operations involving high output speeds. It lends itself well to automation, too. TIG welding, on the other hand, is a much slower process that emphasizes on detail. As with any production work, time equals money. And since the MIG welding process is much quicker, it's much more cost-effective. MIG components are also more easily available and much less costly than TIG parts. Finally, MIG welding is easier to master and can be improved with only a few weeks of preparation. In fact, it's even referred to as the "hot glue gun" of welding—just pull the trigger to start or stop the weld. MIG welders can carry and run a pistol with just one hand, making it a safer choice for starting welders. TIG welding, on the other hand, is a specialized process that involves the use of both hands and one foot—all doing different items.

CONCLUSION

Broad research has been conducted on parametric optimization of MIG welding.

1. A variety of researchers have studied various reaction parameters, such as micro-hardness, microstructure, depth, etc.
2. The penetration and heat affected area (HAZ) of the welded specimen.
3. In this literature study, it was concluded that current is the most common efficient parameter for welding.
4. PARY Heat treatment of welded specimens has a greater impact on metallurgical properties.

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