Study of Mechanical Properties on Thick Titanium Alloy (Ti - 6Al- 4V) Multi-Passes Weld

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ABSTRACT
The aim of this study “Experimental study of Mechanical Properties on Thick Titanium Alloy (Ti – 6al – 4v) Multi-passes Weld”, is to assess the effect of heat input by GTAW process of mechanical properties on thick titanium alloy. Titanium alloy (Ti-6Al-4V) is alpha-beta alloys type when properly treated, have an excellent combination of strength and ductility. They are stronger than the alpha or the beta alloys. Furthermore, a heavy thickness application of titanium is being increasingly utilize. GMAW is recommending joining titanium and titanium alloys. It is less than costly, required skills and experience, and applications are widely especially compare with other welding processes. 200cm Ti-6Al-4V alloy pleats were prepared, and divided to four pieces (500 mm long, 200 mm widths and 15 mm thickness) each two pieces multi passes welded by GTAW process. Optimum selection of parameters such as Welding speed (mm/s), Welding voltage (V), Welding current (A) adapted as inputs and Ultimate tensile (MPa) Impact Strength (J), Hardness (HRC), as outputs. All weldment pass through requirement tests. For that, after welding process, the welding plate’s specimen prepared for tensile test, impact tests, and hardness test. Thirty specimens fabricated for each test. The analysing of the mechanical properties as tensile strength, impact and hardness, of titanium weldment find slightly lower than in the base metal.

KEYWORDS: Mechanical Properties, Tensile test, Impact test, Hardness test, Titanium Alloy, GTAW.