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Mathematical Models for GMAW and FCAW Welding Processes for Structural Steels Used in the Oil Industry

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Abstract : With increase the production oil and lines transmission gases that are in ample expansion, the industries medium and great transport they had to adapt itself to supply the demand manufacture in this fabrication segment. In this context, two welding processes have been more extensively used: the GMAW (Gas Metal Arc Welding) and the FCAW (Flux Cored Arc Welding). In this work, welds using these processes were carried out in flat position on ASTM A-36 carbon steel plates in order to make a comparative evaluation between them concerning to mechanical and metallurgical properties. A statistical tool based on technical analysis and design of experiments, DOE, from the Minitab software was adopted. For these analyses, the voltage, current, and welding speed, in both processes, were varied. As a result, it was observed that the welds in both processes have different characteristics in relation to the metallurgical properties and performance, but they present good weldability, satisfactory mechanical strength e developed mathematical models.

Keywords : Flux Cored Arc Welding (FCAW), Gas Metal Arc Welding (GMAW), Design of Experiments (DOE), mathematical models
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