APPLICATION OF RESPONSE SURFACE MODELING FOR DETERMINATION OF FLUX CONSUMPTION IN SUBMERGED ARC WELDING BY THE EFFECT OF VARIOUS WELDING PARAMETERS

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ABSTRACT

Purpose : Submerged arc welding (SAW) is a common arc welding process where the total welding cost includes the cost of the flux consumed during welding, SAW is preferable more its inherent qualities like easy control of process variables, high quality, deep penetration, smooth finish. Flux used in submerged arc welding contributes a major part towards welding cost. In submerged arc welding (SAW), selecting appropriate values for process variables is essential in order to control heat-affected zone (HAZ) dimensions

And get the required bead size and quality. Also, conditions must be selected that will ensure a predictable and reproducible weld bead, which is critical for obtaining high quality. In this investigation, mathematical models were developed to study the effects of process variables and heat input on various metallurgical aspects, namely, the widths of the HAZ, weld interface, and grain growth and grain refinement regions of the HAZ In the present work, the effect of operating voltage, welding current, welding speed and basicity index on flux consumption has been studied. Flux consumption for each bead was weighed.

Design/Methodology : The experiment was designed based on a five level factorial central composite rotatable design with full replication . The experimental calculations and results graph was conducted as per the design matrix using Design Expert Software.

Technique : The response surface methodology (RSM) is a set of techniques that encompasses (i) the designing of a set of experiments for adequate and reliable measurement of the true mean response of interest; (ii) the determining of mathematical model with best fits; (iii) finding the optimum set of experimental factors that produces maximum or minimum value of response; and (iv) representing the direct and interactive effects of process variables on the bead parameters through two dimensional and three dimensional graphs.

KEYWORDS : R.S.M , Process Parameters, Submerged Arc Welding, H.S.L.A Material, Design Expert.