Title: Weld-Metal Property Optimization from Flux Ingredients through Mixture Experiments and Mathematical Programming Approach.

Author(s): Ademola Adeyeye and Festus Oyawale

Outlet: Journal of Materials Research, Vol 12, No 3.pp 339-343

Date: 2009

Abstract: This paper presents a new methodology for weld-metal property optimization from welding flux ingredients. The methodology integrates statistical design of mixture experiments with mathematical programming optimisation technique. The mixture experiments responsible for the modelling of the weld metal properties as a function of welding flux levels while mathematical programming optimizes the model. Data and confirmed models from the literature were used to perform optimization on the responses. The maximum values possible with the prevailing conditions for acicular ferrite, charpy impact toughness and silicon transfer are 51.2%, 29.3J and 0.231% respectively, while the maximum oxygen content possible is 249 ppm. The new methodology is able to eliminate the limitations associated with the traditional experimental optimization methodology for flux formulation.