EFFECT OF HEAT INPUT AND FILLER METAL ON WELDING OF SUPERAUSTENITIC AND SUPERDUPLEX STAINLESS STEELS

by

Maiada Sayed Mahmoud Mahmoud

M.Sc. in Metallurgical Engineering

A thesis submitted to the
Faculty of Engineering at Cairo University
in partial Fulfillment of the
Requirements for the Degree of
Doctor Of Philosophy
in
METALLURGICAL ENGINEERING

FACULTY OF ENGINEERING, CAIRO UNIVERSITY,
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Title of Thesis: Effect of heat input and filler metal on welding superaustenitic and super duplex stainless steels

Key Words Superaustenitic, Duplex, Super duplex, Stainless Steels, Unmixed Zone, Secondary austenite, Microstructure, Toughness, Hardness

Summary :

This work focused on comparing the effect of welding heat input within the range from 1 to 5 kJ/mm and filler metal on the Mo segregation within the microstructure due to welding of dissimilar weld joints of superaustenitic stainless steel/Incoloy 28 and duplex stainless steel/super duplex stainless steel and its effect on the mechanical and corrosion properties of the weld joints. The mechanical properties and pitting corrosion resistance were found very sensitive to formation of unmixed zone at fusion line and secondary phases within weld metal and HAZ such as NbC and secondary austenite which appeared in the microstructure after welding.

To my Family

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