Fatigue properties estimation based on hardnessmeasurements and tensile properties of a dissimilar weldjoint

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Abstract : This work aims to estimate the high cycle fatigue properties of a dissimilar weld joint madeof 2205 duplex and 13% Cr supermartensitic stainless steels. The filler metal used is the2507 superduplex stainless steel. Two methods were used; one is a direct method thatconsists of experimental fatigue tests conducted under rotating bending conditions. Theother method is an indirect method where the fatigue properties are estimated by means ofempirical expressions based on hardness measurements and tensile properties such asYoung modulus and tensile strength. Results show that for high cycle fatigue regime, theoverall behavior of the dissimilar weld joint is controlled by the weld metal that has thelowest fatigue limit. The two base materials have the same level of fatigue limit which isslightly higher than that of the weld metal. A good agreement was obtained between thetwo used methods for the two base materials in contrast with the weld metal.

Keywords : Dissimilar weld joint, fatigue, duplex, Supermartensitique, superduplex