

Fatigue properties estimation based on hardness measurements and tensile properties of a dissimilar weld joint

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Abstract : This work aims to estimate the high cycle fatigue properties of a dissimilar weld joint made of 2205 duplex and 13% Cr supermartensitic stainless steels. The filler metal used is the 2507 superduplex stainless steel. Two methods were used; one is a direct method that consists of experimental fatigue tests conducted under rotating bending conditions. The other method is an indirect method where the fatigue properties are estimated by means of empirical expressions based on hardness measurements and tensile properties such as Young modulus and tensile strength. Results show that for high cycle fatigue regime, the overall behavior of the dissimilar weld joint is controlled by the weld metal that has the lowest fatigue limit. The two base materials have the same level of fatigue limit which is slightly higher than that of the weld metal. A good agreement was obtained between the two used methods for the two base materials in contrast with the weld metal.

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