ABSTRACT

Hydrogen embrittlement of a HSLA-80 and a HSLA-100 steel in seawater under cathodic charging conditions has been studied using slow strain rate technique. The materials have been used in both as-received (quenched and aged) and in simulated weld heat affected zone conditions. The effects of applied potential, strain rate, precharging and variations in heat input on strength, ductility and fractographic behaviour have been interpreted in the light of existing knowledge in the field. A microstructural correlation of susceptibility for embrittlement has been suggested. A mathematical model has been worked out for predicting the flow stress of the hydrogen charged material at different strain rates and applied potentials.

Key words : Hydrogen embrittlement, cathodic charging, slow strain rate technique, HSLA steels