

Microstructure and mechanical behavior of TIG bimetallic joints

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Abstract : Bimetallic weld techniques have progressed a great deal in the last decade. In this work, the effect of the filler metal composition on microstructure and mechanical behavior of dissimilar HSLA-X70/304L stainless steels weld joint is investigated. The dissimilar weld joints are fabricated using austenitic, duplex and low Carbon filler metal. The mechanical behavior is investigated through microhardness, Charpy impact and tensile test. The results show that, the weld metal composition has a great influence on mechanical properties and microstructure of weldments, in particular the grain size and phases nature, changes with filler metal composition. In addition, presence of martensitic slats in the FZ when using the low Carbon filler metal, detailed microstructure examination is carried out and related to the mechanical behavior of the dissimilar joints.

Keywords : TIG welding, Bimetallic weld, HSLA, DSS, HAZ, microstructure, Microhardness