Evaluation of microstructure and mechanical properties of 410NiMo as an overlay layer on low alloy steel

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Abstract
The aim of this study is to reach an increased service life for parts using in sour environment by weld overlaying process. In this investigation, two successive layers of ER410NiMo were clad on
low alloy steel substrates. To reduce the likelihood of Hydrogen Induced Cracking (HIC) and producing stable hydrogen traps, Post Weld Heat Treatment (PWHT) was conducted. Microstructural analysis, X-ray diffraction studies, and mechanical tests show significant increase for austenite volume fraction after second stage of PWHT. In fact, not only two-stage PWHT reduce the samples hardness, but it also increases austenite volume fraction which is a more resistant microstructure against hydrogen cracking.

Keywords: Weld overlaying, Hydrogen sulfide, Hydrogen embrittlement, Martensitic stainless steel, Temper.