

CORROSION STUDIES ON NITROGEN INDUCED LOW CARBON AUSTENITIC STAINLESS STEEL

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This study focuses on optimizing cold metal transfer (CMT) welding parameters for joining 301LN austenitic stainless steel using a 308L filler rod, which is specifically designed for railway coach building. For instance, traditional welding techniques like Spot welding and Metal Inert Gas (MIG) have shown corrosion, material deformation and reduced mechanical properties. This was addressed by using a new technique known as Cold Metal Transfer (CMT) welding. The literature survey was used to optimize the current, voltage and contact tip to distance as the parameters of low heat input welding. The filler material used is 308L because it is compatible with the 301LN stainless steel sheets. To systematically explore various parameter combinations, design of experiments (DOE) approach was adopted. Samples were then collected and mechanically tested in accordance with ASTM standards. Weld samples were evaluated for tensile testing, hardness analysis, bending tests and corrosion resistance. Weld penetration and integrity were examined through microstructure and macrostructure examination. The results showed a significant improvement in mechanical properties and corrosion resistance, confirming the effectiveness of optimized parameters in improving CMT welding performance for joining 301LN austenitic stainless-steel sheets in railway coach construction applications using 308L filler rod.