

Accepted Manuscript

Title: Friction stir lap welding of stainless steel and plain carbon steel to enhance corrosion properties

Authors: G.R. Argade, S. Shukla, K. Liu, R.S. Mishra

PII: S0924-0136(18)30195-X
DOI: <https://doi.org/10.1016/j.jmatprotec.2018.04.048>
Reference: PROTEC 15748

To appear in: *Journal of Materials Processing Technology*

Received date: 22-12-2017
Revised date: 29-4-2018
Accepted date: 30-4-2018

Please cite this article as: Argade GR, Shukla S, Liu K, Mishra RS, Friction stir lap welding of stainless steel and plain carbon steel to enhance corrosion properties, *Journal of Materials Processing Tech.* (2010), <https://doi.org/10.1016/j.jmatprotec.2018.04.048>

This is a PDF file of an unedited manuscript that has been accepted for publication. As a service to our customers we are providing this early version of the manuscript. The manuscript will undergo copyediting, typesetting, and review of the resulting proof before it is published in its final form. Please note that during the production process errors may be discovered which could affect the content, and all legal disclaimers that apply to the journal pertain.



Friction stir lap welding of stainless steel and plain carbon steel to enhance corrosion properties

G. R. Argade¹, S. Shukla¹, K. Liu¹, and R. S. Mishra^{1, 2*}

¹Department of Materials Science and Engineering

University of North Texas, Denton, TX 76207, USA

²Advanced Materials and Manufacturing Processes Institute

University of North Texas, Denton, TX 76203, USA

*Corresponding author: Tel: +1 940 565 2316. Email: Rajiv.Mishra@unt.edu

Abstract

Friction stir lap welding -a precursor to the friction stir cladding- stainless steel on plain carbon steel was attempted. Refined microstructure with fully recrystallized austenitic grains with ~3 μm grain size and intermixing with base steel sample resulted in defect free lap weld. The pin affected region of the base carbon steel resulted in grain refinement from initial grain size of 8 μm to 2 μm . The microhardness values across the joint line showed stable values of ~250 HV on the stainless steel side and ~200 HV on the carbon steel side. Lap shear tests showed consistent load bearing capacity of ~7 kN for the stainless steel-carbon steel joint. The weld between stainless steel and carbon steel showed 100% joint efficiency with similar yield strength of ~440 MPa as the base steel sample and with an increase in ultimate tensile strength to ~600 MPa as compared to ~500 MPa for the base steel sample. The failure of clad tensile samples occurred in the base

Download English Version:

<https://daneshyari.com/en/article/7176299>

Download Persian Version:

<https://daneshyari.com/article/7176299>

[Daneshyari.com](https://daneshyari.com)