

Accepted Manuscript

Title: The effect of alumino-thermic addition on underwater wet welding process stability

Author: H.L. Li D. Liu N. Guo H. Chen Y.P. Du J.C. Feng

PII: S0924-0136(17)30076-6
DOI: <http://dx.doi.org/doi:10.1016/j.jmatprotec.2017.02.023>
Reference: PROTEC 15135

To appear in: *Journal of Materials Processing Technology*

Received date: 13-12-2016
Revised date: 24-2-2017
Accepted date: 25-2-2017

Please cite this article as: Li, H.L., Liu, D., Guo, N., Chen, H., Du, Y.P., Feng, J.C., The effect of alumino-thermic addition on underwater wet welding process stability, *Journal of Materials Processing Technology* (2017), <http://dx.doi.org/10.1016/j.jmatprotec.2017.02.023>

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.



The effect of alumino-thermic addition on underwater wet welding process stability

H.L. Li^a, D. Liu^{b*}, N. Guo^{a,b}, H. Chen^a, Y.P. Du^a, J.C. Feng^{a,b}

^a State Key Laboratory of Advanced Welding and Joining, Harbin Institute of Technology, Harbin 150001, China

^b Shandong Provincial Key Laboratory of Special Welding Technology, Harbin Institute of Technology at Weihai, Weihai 264209, China)

Abstract: Real-time electric signal data, metal transfer images and weld appearances at different alumino-thermic additions in underwater wet flux-cored arc welding (FCAW) were obtained. The electric signal results showed that the thermite addition would improve the stability of the wet welding process while the weld appearances at larger content of thermite displayed numerous tiny spatters. The shock in weld pool due to metallurgical reaction was responsible for the tiny spatters. Two typical modes of metal transfer process, globular repelled transfer mode and surface tension transfer mode, were observed. The aluminum flux addition changed the droplet diameter, transfer time and relative proportion of metal transfer mode. When the thermite addition increased from 0 to 50%, the weld penetration depth increased from 2 mm to 4 mm, and the weld dilution rate increased from 22% to 37%.

Keywords: Underwater wet welding; FCAX; Welding process stability; Alumino-thermic.

1. Introduction

Underwater wet welding has been applied widely in the construction and repairing of offshore steel structures due to its easy operation and cost-effectiveness. According to Fydrych et al. (2016), rapid cooling rate, high diffusible hydrogen content in deposited metal, limited visibility and increased pressure with water depth were crucial issues in wet environment. Łabanowski et al. (2008) suggested that welding arc became unstable and loss of alloying

* Corresponding author. Tel/Fax: +86 631 5677156.
E-mail address: liuduo0376@163.com (D. Liu).

Download English Version:

<https://daneshyari.com/en/article/5018057>

Download Persian Version:

<https://daneshyari.com/article/5018057>

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