

Accepted Manuscript

Title: Microstructure and mechanical properties of underwater wet welded high-carbon-equivalent steel Q460 using austenitic consumables

Authors: HongLiang Li, Duo Liu, YanYu Song, YaoTian Yan, Ning Guo, JiCai Feng



PII: S0924-0136(17)30228-5
DOI: <http://dx.doi.org/doi:10.1016/j.jmatprotec.2017.06.009>
Reference: PROTEC 15262

To appear in: *Journal of Materials Processing Technology*

Received date: 24-4-2017
Revised date: 6-6-2017
Accepted date: 6-6-2017

Please cite this article as: Li, HongLiang, Liu, Duo, Song, YanYu, Yan, YaoTian, Guo, Ning, Feng, JiCai, Microstructure and mechanical properties of underwater wet welded high-carbon-equivalent steel Q460 using austenitic consumables. *Journal of Materials Processing Technology* <http://dx.doi.org/10.1016/j.jmatprotec.2017.06.009>

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1 Microstructure and mechanical properties of underwater wet welded high- 2 carbon-equivalent steel Q460 using austenitic consumables

3 HongLiang. Li^a, Duo Liu^{a,b*}, YanYu Song^b, YaoTian.Yan^b, Ning Guo^{a,b}, JiCai Feng^{a,b}

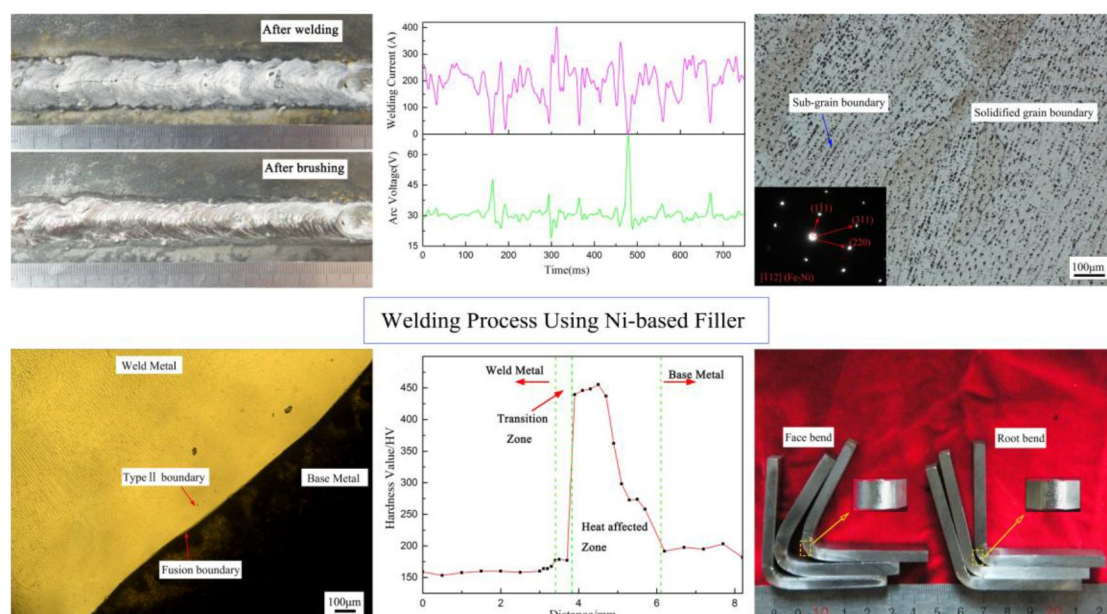
4 (^a State Key Laboratory of Advanced Welding and Joining, Harbin Institute of Technology, Harbin 150001, China

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

8 Abstract

9 Underwater wet flux-cored arc welding of Q460 steel using specially developed Ni-based filler and
10 commercially obtained ER308 were investigated. Wet welded joints using Ni-based filler were of
11 high performance with high ultimate tensile strength (518 MPa) and impact toughness of the weld
12 metal (128.9 J/cm²). ER308 failed to acquire sound welded joints due to extensive slag remained in
13 the bottom of groove. The highest microhardness (450 HV) was recorded on the coarse-grained
14 heat-affected zone of the base metal for both joints. Type II boundaries existed in the interfaces
15 between austenitic weld metal and ferritic base metal. Compared to austenitic stainless steel weld
16 metal, nickel-based weld metal possessed the ability to be significantly diluted by Q460 base metal.

17 Graphical Abstract



18 **Key words:** Q460 steel; Underwater wet welding; Flux-cored wire; Microstructure; Mechanical

19 properties

* Corresponding author. Tel/Fax: +86 631 5677156.

E-mail address: li duo0376@163.com (D. Liu).

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