

Accepted Manuscript

Title: Measurement of the Keyhole Entrance and Topside Weld Pool Geometries in Keyhole Plasma Arc Welding with Dual CCD Cameras

Authors: X.F. Liu, C.B. Jia, C.S. Wu, G.K. Zhang, J.Q. Gao



PII: S0924-0136(17)30177-2
DOI: <http://dx.doi.org/doi:10.1016/j.jmatprotec.2017.05.012>
Reference: PROTEC 15220

To appear in: *Journal of Materials Processing Technology*

Received date: 28-3-2017
Revised date: 11-5-2017
Accepted date: 12-5-2017

Please cite this article as: Liu, X.F., Jia, C.B., Wu, C.S., Zhang, G.K., Gao, J.Q., Measurement of the Keyhole Entrance and Topside Weld Pool Geometries in Keyhole Plasma Arc Welding with Dual CCD Cameras. *Journal of Materials Processing Technology* <http://dx.doi.org/10.1016/j.jmatprotec.2017.05.012>

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.

Measurement of the Keyhole Entrance and Topside Weld Pool Geometries in Keyhole Plasma Arc Welding with Dual CCD Cameras

X. F. Liu^{1,2}, C.B. Jia^{1*}, C. S. Wu¹, G. K. Zhang^{1,3} and J. Q. Gao¹

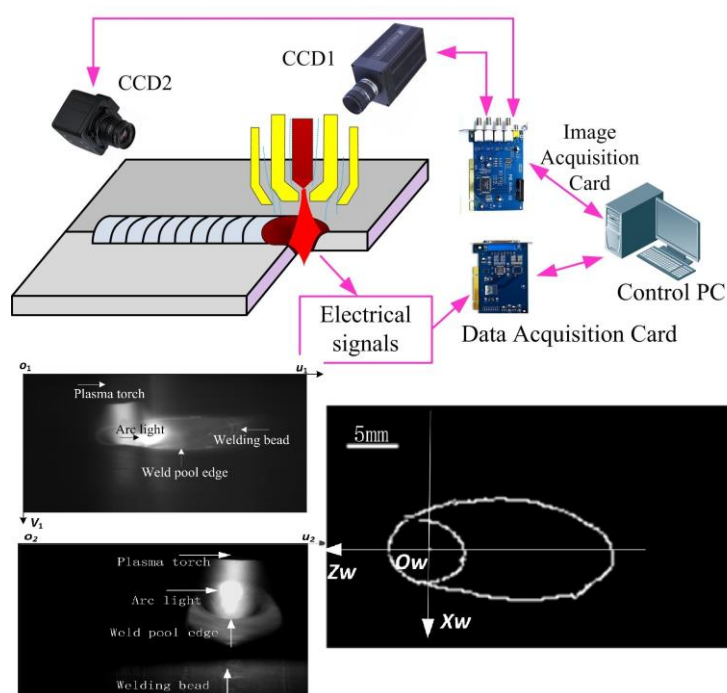
1. MOE Key Lab for Liquid-Solid Structure Evolution and Materials Processing, and Institute of Materials Joining, Shandong University, Jinan, China 250061

2. Shandong College of Electronic Technology, Jinan, China

3. Leibniz Institute for Plasma Science and Technology, 17489 Greifswald, Germany.

*Corresponding author: jiachuanbao@sdu.edu.cn

Graphical abstract



Abstract: Dual cameras were employed to observe the complete topside weld pool from the lateral side and to capture the keyhole entrance from the rear view in plasma arc welding. By image registration, the images were fused into a cohesive whole in the same physical coordinate system. Weld pool and keyhole behaviors were studied under different welding parameters. Possible interaction mechanisms between plasma arc, gas flow, liquid metal and keyhole were discussed. Instant and significant influences on the keyhole entrance shape and geometries originated in the changed forces applied on the surrounded liquid metal.

Keywords: keyhole entrance, topside weld pool, keyhole plasma arc welding, image registration, visual sensing.

1 Introduction

As a high energy-density welding method, the constrained arc in keyhole plasma arc welding (K-PAW) could join medium-thickness plates in one pass without any groove. High efficiency with lower cost of this technology makes it possess many advantages over laser beam welding

Download English Version:

<https://daneshyari.com/en/article/5017982>

Download Persian Version:

<https://daneshyari.com/article/5017982>

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