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BIULETYN
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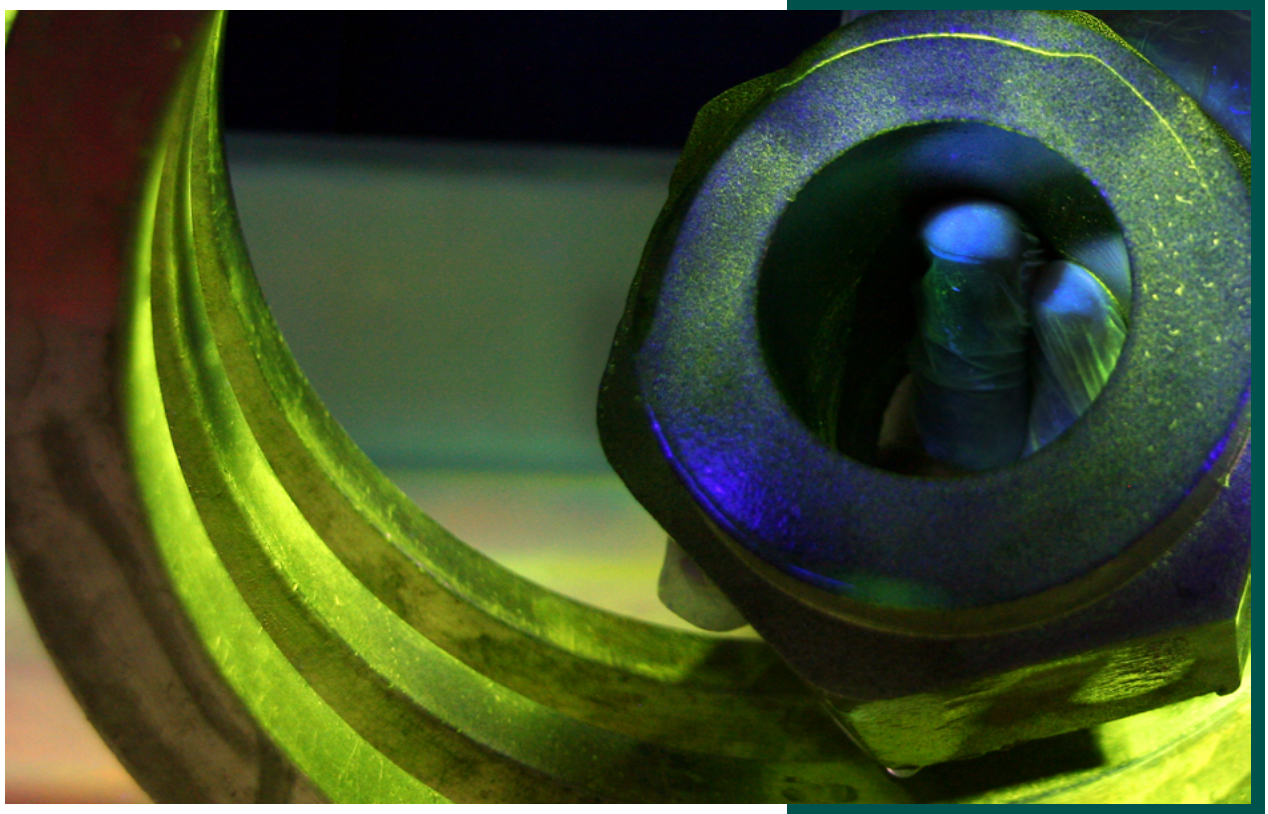

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INSTITUTE OF WELDING BULLETIN

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No. 1 BIMONTHLY

CONTENTS

INSTITUTE OF WELDING

The International Institute of Welding and The European Federation for Welding, Joining and Cutting member

Summaries of the articles

B.E. Paton – Advanced Studies and Developments of the E.O. Paton Electric Welding Institute in Welding and Allied Technologies

DOI: *10.17729/ebis.2019.1/1*

The article presents a number of recent solutions developed at the E.O. Paton Electric Welding Institute including technologies and equipment for welding performed using highly-concentrated power sources such as plasma, laser and the electron beam. The above-named technologies were developed in order to weld pipes, thick titanium, aluminium–lithium alloys and high-strength steels. The solutions presented in the article also include vapour-phase technologies used in the production of nanostructured materials enabling the joining of composite materials and intermetallics. The article also discusses newly developed technologies and equipment used in underwater welding and cutting as well as a new electron beam tool for welding in outer space. In addition, the article suggests the application of postweld treatment based on high-density electric impulses and high-frequency mechanical peening in order to increase the service life and reliability of welds. In addition, the article presents the use of digital equipment based on high-sensitive solid-body converters used in non-destructive tests of welded joints as well as the application of industrial robots provided with a technical vision system in relation to products characterised by complex geometry. The article also presents a new method enabling the growing of single crystals of refractory metals and new equipment enabling the welding of live tissues.

M. Różański, T. Pfeifer, M. Szymura – Effect of a One-Time Repair of a Welded Joint Made in Steel S960QL on the Properties of the HAZ

DOI: *10.17729/ebis.2019.1/2*

The fabrication of steel structures is often accompanied by the necessity of removing defects and welding imperfections formed during welding. An additional thermal cycle accompanying the making of a new weld has an undoubtedly detrimental effect on the mechanical properties of the heat affected zone (HAZ). The article discusses results of technological tests concerning the effect of MAG repair welding on the properties of the HAZ butt joints made of steel S960QL.

J. Nowacki, N. Sieczkiewicz, M. Nocoń – The Use of 3D Scanning Technology in Measurements of Welding Distortions

DOI: *10.17729/ebis.2019.1/3*

The article describes primary issues related to measurements of welding distortions performed using 3D scanning methods. The study includes a review of available industrial 3D scanning solutions. The research involved the experimental investigation of high-strength steels containing welding distortions as well as the SAW surfacing of steel S960QL steel performed using various welding parameters. The research-related tests included the selection of an appropriate 3D scanning technology. During the tests, steel plates were measured using GOM ATOS III Triple Scan and 3D scans were obtained using Kinect for Windows v1 and v2, DAVID SLS-3. The research results demonstrated that the choice of a metrology-grade 3D scanner used for measurements of weld distortions ensured the obtainment of required accuracy of measurements.

B. Ładecki, Ł. Knysak – Non--Destructive Testing of Brazed Joints Made in Thin-Walled Austenitic Steel Pipes

DOI: *10.17729/ebis.2019.1/4*

The article discusses methods used in the non-destructive testing of brazed joints made in thin-walled austenitic steel pipes using nickel and silver-based filler metals. Comparative tests involving the use of the radiographic and the ultrasonic method revealed the possibility of applying ultrasonic technique when defining quality levels in relation to brazed joints in thin-walled pipes. The ultrasonic method may serve as a cheaper alternative to the radiographic method in the automation of the non-destructive testing of the above-named joints in batch production.

A. Sawicki – Static Characteristics of Defined Ignition Voltage Used in the Modelling of Arc Within a Wide Range of Current Excitation

DOI: *10.17729/ebis.2019.1/5*

The article presents relatively extensive sets of selected functions useful for the approximation of voltage-current characteristics of static arc of defined and undefined ignition voltage values. The article contains graphs of the above-named functions presenting their effectiveness in the mathematical representation of arc within wide ranges of current excitation. Selected static characteristics were applied to the Pentegov mathematical model. The research also involved simulations of processes in circuits with models of arc having defined and undefined ignition voltage.

M. Alexy, D. Van de Wall, G. Shannon, M. L. Boyle – Batteries need strong connections - are resistance, laser and micro TIG welding the best suited joining technologies?

DOI: *10.17729/ebis.2019.1/6*

The contacting of battery cells is very essential and technologically challenging step during the battery pack manufacturing. The goal is to achieve best weld joint without defects to enable high current flows. This requires high quality welding and joining process. A number of technologies is already well established respectively is typically used to solve most common applications. All three technologies resistance, laser and micro TIG welding are well suited for integration into production lines that may be either standalone or automated operation. To maintain the required throughput that offers high quality and yields, it is important to have a clear understanding of which process is best for the particular battery pack size, tab and terminal material, type, and thickness. In addition, the selected process and integration solution should include process monitoring, process data management, and weld quality assessment.

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