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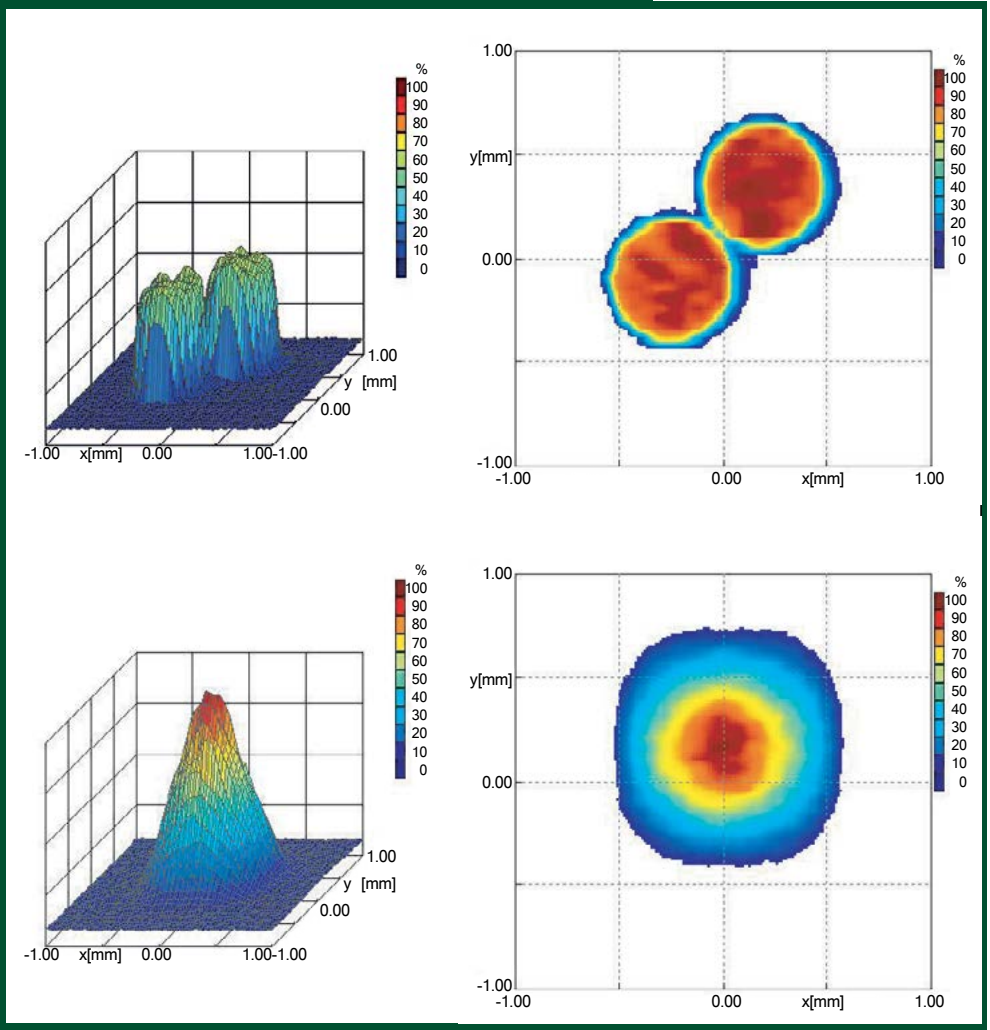

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INSTITUTE OF WELDING BULLETIN

BIULETYN INSTYTUTU SPAWALNICTWA

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CONTENTS

INSTITUTE OF WELDING

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

B. E. Paton - Research and developments of the E.O. Paton Electric Welding Institute for nowadays power engineering

Developments of the E.O. Paton Electric Welding Institute for power engineering have been presented, in particular, technologies for the welding of large-size turbine rotors, electron beam welding of thick billets of high-strength steels, technologies of submerged-arc welding and flash-butt welding with a pulsating flashing of pipes for main large-diameter gas pipelines, technology and equipment for manufacture of energy-saving heat-exchanging devices. Outlined are developments directed to increase the corrosion resistance of fuel elements and the safe service of NPP due to the application of high-temperature wear-resistant mechanized surfacing of pipeline stop valves with corrosion-resistant alloys. Practical recommendations for the repair of main pipelines without interruption of their operation are given. The investigations were carried out showing the possibility of the application of acoustic emission for monitoring welded structures operating at high temperatures. A method for the prevention of the catastrophic leakage of oil from damaged pipes of wells of oil-production platforms has been developed.

M. Banasik – Laser cutting. Progress in equipment

The article presents the current development and technical possibilities of modern laser cutters, as well as describes today's systems incorporating CO_2 molecular lasers, disc lasers and fibre lasers. The study also analyses the basic equipment and technological aspects related to cutting by means of laser cutters.

A. Pietras, M. St. Węglowski – Imperfections in FSW joints and NDT methods of their detection

The article presents the classification of imperfections present in joints welded using the FSW method. The division of imperfections is based on standards PN-EN ISO 25239:2013 and AWS D17.3. The article also provides a more extensive and precise division of welding imperfections characteristic of the FSW process along with reasons for their formation. The text also presents the requirements of the standards in relation to the boundary values of imperfections depending on imperfection types. Furthermore, the article demonstrates the advantages, disadvantages and application of given non-destructive tests with reference to the quality control of FSW joints.

T. Pfeifer - Application of variable polarity for MIG welding of aluminium alloys

The article presents the application of an innovative MIG welding technology using variable polarity for the welding of thin aluminium alloy elements and demonstrates the results of tests related to the impact of the electrode negative (EN) ratio on weld geometry and penetration depth as well as on the quality and structure of welded joints.

A. Sawicki - Influence of quasi-static gas pressure changes on electric arc modelling in electrotechnological devices

The article presents exemplary applications of devices with electric arc in gases of varying pressure used in industry practice and variants of the approximation of static arc characteristics. The article also contains an analysis of the influence of pressure changes on an arc damping factor function and presents mathematical arc models with a quasi-statically variable pressure parameter. The tests also involved simulations of processes in a simple circuit with an arc. The article also contains the results of calculations in the form of the evolution of dynamic

voltage-current arc characteristics influenced by pressure changes.

R. Schäfer, P. Pasquale - The electromagnetic pulse technology (EMPT): forming, welding, crimping and cutting

The electromagnetic pulse technology (EMPT) provides non-contact processes for joining, welding, forming and cutting of metals. EMPT processes can be used for joining, welding, forming and cutting of metals with particular success with those with high electric conductivity such as aluminum, copper and steel tubes. The procedure is so fast that it can produce solid-phase welds with a microstructure very similar to that of explosive welding. This article describes the fundamentals of the EMPT process, suitable machines and the economics of the process. Industrial applications of the technique are shown.

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EDUCATION AND GRADUATION

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- **International Welding Technologist (IWT)**
- **International Welding Specialist (IWS)**
- **International Welding Practicioner (IWP)**
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- **European Plastic Welder (EPW)**

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- **International/European Welding Engineer**
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