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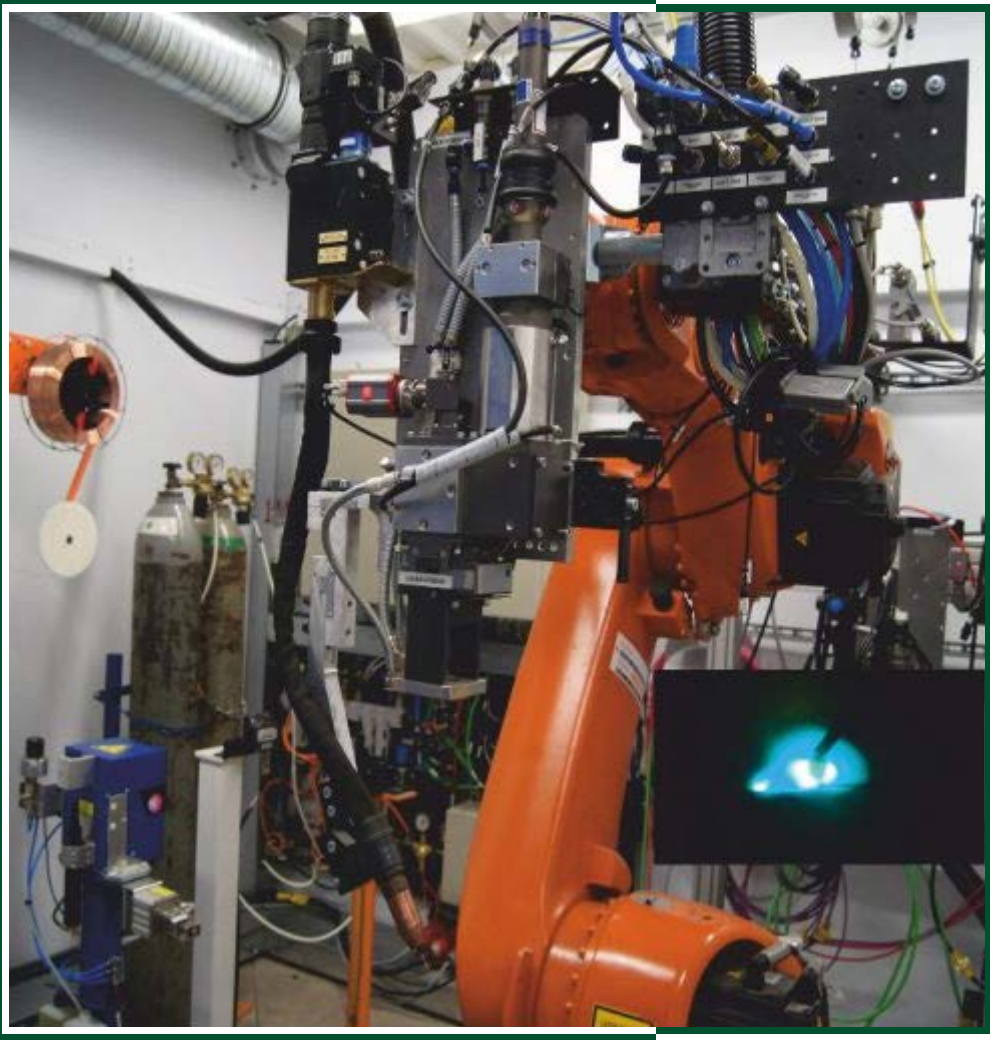

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CONTENTS

INSTITUTE OF WELDING

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Summaries of the articles

M. Banasik, S. Stano, M. Urbańczyk – Hybrid laser + electric arc welding. Development and possibilities (Part I)

The article briefly presents the history of hybrid laser welding (laser + arc), describes the advantages of the latest laser sources used in welding engineering, presents technological heads for hybrid laser arc welding (HLAW) and demonstrates the advantages of hybrid welding if compared with laser welding and arc welding used separately.

M. St. Węglowski, T. Pfeifer – Influence of cutting technology on the quality of unalloyed steel surface

The article presents requirements concerning quality after cutting in accordance with the requirements of PN-EN 1090-1+A1:2012P and PN-EN ISO 9013:2008 standards as well as the results of surface tests after cutting with a laser beam, plasma, oxygen and water stream. The test results reveal the significant influence of the cutting technology on surface quality. The research related quality tests involved the measurements of perpendicularity, hardness, profile height and metallographic examination. The lowest hardness was achieved by water cutting, whereas the highest was obtained by plasma cutting under the water surface. The lowest porosity was achieved by means of plasma cutting over the water surface, whereas the highest by laser beam cutting. The lowest perpendicularity tolerance was obtained by plasma cutting under the water surface (1.6 m/min), whilst the highest was achieved by laser beam cutting and HD plasma.

S. Błacha, M. Zeman – Initial assessment of weldability of modern PB2 steel for power engineering

The article contains information concerning a new generation steel designated as PB2 (X13CrMoCoVNbNB9-2-1) intended for the operation in power boilers of fresh steam supercritical parameters. The article presents the results of tests on the effect of welding thermal cycles on the structure, toughness and hardness of the simulated HAZ of power engineering PB2 steel as well as the susceptibility of this steel to hot cracking. The tests involved the use of a simulator of thermal-strain cycles. The publication also contains the results of the tests of similar butt joints in PB2 steel pipes subjected to the post-weld heat treatment.

J. Pikuła, T. Pfeifer, J. Mendakiewicz - Influence of the shielding gas on the properties of VP-GMA braze-welded joints in zinc coated steel sheets

The article presents the results of research on overlay brazing and weldbrazing of hot-dip galvanized sheets carried out in order to determine the influence of shielding gas composition and electrode-negative (EN) ratio on the process and properties of overlay brazes and weldbrazed joints. The parameters analysed included joint geometry, wettability, zinc coating oxidation, spatter and porosity.

P. Irek - Laser surface alloying of AlSi7Cu4MgMn aluminium alloy with silicon carbide

The article presents the results of tests on the laser surface alloying of AlSi7Cu4MgMn aluminium alloy using silicon carbide. The objective of the tests was to establish the influence of laser beam power and travel rate, ceramic powder feeding rate and presence of activating flux on the quality of seams surface alloyed with an HPDDL laser using SiC particles as well as to determine the optimum technological process conditions. The assessment of the quality of surface alloyed seams was carried out using macro and microscopic examination verifying the

proper generation of a composite layer on the surface and the percentage fraction of SiC particles in the root run. The article also presents the results of microhardness measurements in the cross-sections of laser-processed layers.

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