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# BIULETYN
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## CONTENTS





**INSTITUTE OF WELDING**

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

# Summaries of the articles

## J. Matusiak, J. Wyciślik – Analysis of influence of material-technological conditions of alternating polarity MIG welding of aluminium alloys on welding fumes emission

It has been presented laboratory experiments on the influence of material-technological conditions of welding of four grades of aluminium alloys, namely EN AW 5251, EN AW 6082, EN AW 2017 A and EN AW 5754, by innovative methods such as AC Pulse and Cold Process, on the pollutants emission level. Investigation methodics has been discussed, the test stand has been presented and the relationships between the fume and gases emission quantity and the kind of aluminium alloy subjected to welding, the grade of filler metal and current-voltage prameters of welding have been analysed in detail. The fume emitted during welding of aluminium alloys by conventional MIG method has been compared to that generated during welding by pulse MIG, double pulse MIG and by low heat input methods (CMT, ColdArc, AC Pulse and Cold Process). The purpose of the investigation was to determine a method of aluminium alloys welding which would be an advantageous alternative to the above mentioned methods in respect of work environment protection and reduction in pollutants emission.

## M. Łomozik - Structure and plastic properties of HAZ area in 13HMF steel after over 130 000 hours of operation while subjected to simulation welding thermal cycles

Structural CGHAZ, FGHAZ, ICCGHAZ and SRCGHAZ areas in the heat affected zone (HAZ) of welded joints are characterised. On the basis of simulation, in steel 13HMF after a long-lasting operation different HAZ areas were simulated in conditions imitating the effect of multiple welding thermal cycles (multilayer welding). Results of plastic properties (impact energy and hardness) tests as well as microstructure examination of individual simulated HAZ areas in 13HMF steel have been discussed.

## O. Barrera, T. Pfeifer, A. Żak - Structure of dissimillar joints of steel and nickel alloy

Results of research on the structural examination of the interface between AISI 8630 M steel and Inconel 625 butter layer have been presented. Special attention has been paid to results obtained by Scanning and Transmission Electron Microscopy in the scope of Mintweld Project.

## A. Kiszka, A. Sasiński – Determination of reasons for crack generation in hinge welded elements

The purpose of the study was to determine reasons for damaging welded pins in hinge elements and to recommend activities which can limit the incidence of pins breaking out of hinges. In order to develop a welding technology ensuring a good and repeatable quality of joints it was necessary to analyse the previously used joining technology and a weld design as well as to carry out macroscopic metallographic tests, hardness measurements and observations of the fractures of damaged elements. On the basis of the tests conducted it was possible to develop a welding technology ensuring the required quality of joints.

## A. Czupryński, J. Górka, J. Ślosarczyk – Improving the operating properties of coal mining machinery elements

It has been presented a possibility of improvement in operating properties of mine skip buckets in drawing engines, made of S355

steel, by welding of lining elements made of Hardox 450 steel to places mostly exposed to abrasive-dynamical degradation.

## A. Sawicki - Damping factor function in AC electric arc models. Part 3. Static and dynamic properties of the arc with intense cooling in plasma torches

The importance of models of arcs with intense cooling has been shown in AC plasma torch design and usage. The influence of gas mass stream that washes plasma column on the shape of static and dynamic arc characteristics has been considered. The selected effects of using a high frequency auxiliary generator, leading mainly to stabilization of the arc and linearization of its characteristics have been analyzed.

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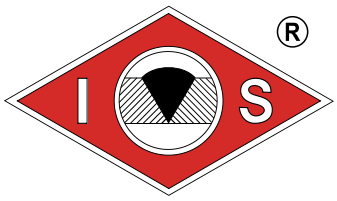
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