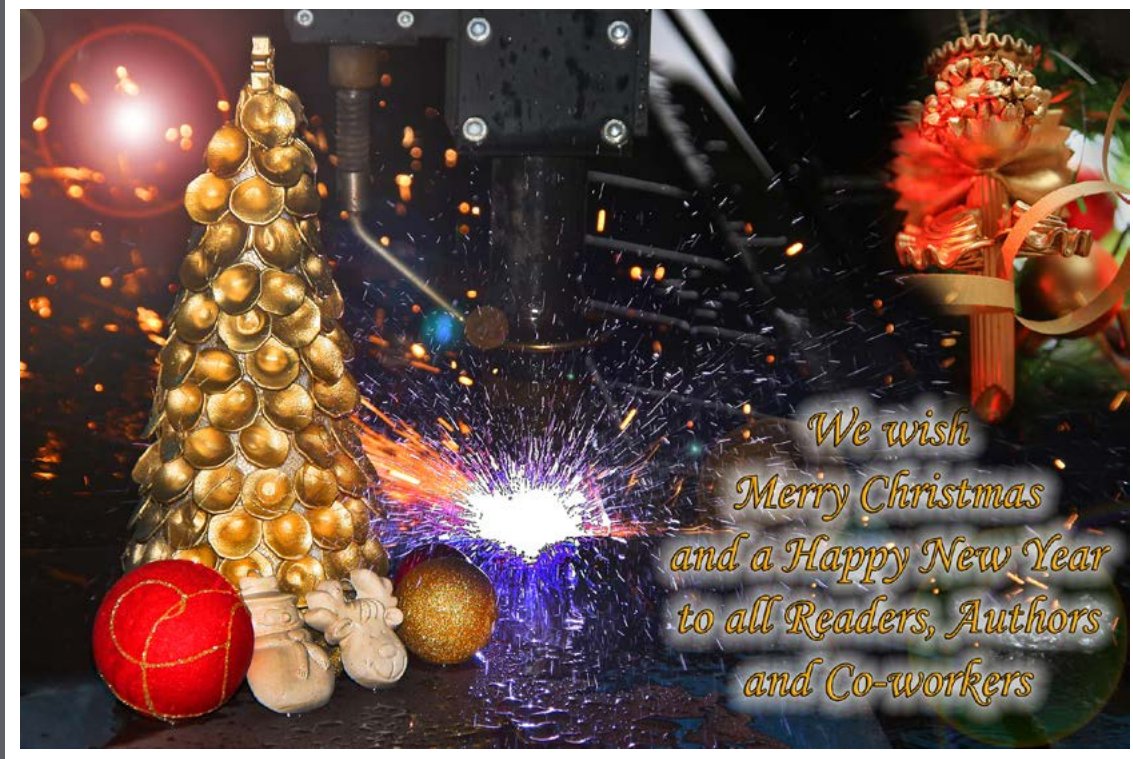
ISSN 2300-1674

# BIULETYN
## INSTYTUTU SPAWALNICTWA

70 YEARS OF INSTYTUT SPAWALNICTWA




No. 6/2015

INSTITUTE OF WELDING BULLETIN

# BIULETYN INSTYTUTU SPAWALNICTWA

No. 6 BIMONTHLY Volume 59

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**INSTITUTE OF WELDING**

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

# Summaries of the articles

## E. Turyk, W. Grobosz, T. Kuzio, St. Dudek, I.A. Riabcew – Welding Imperfections in T-joints of Thin-walled Elements Made Using Mechanised TIG welding with Filler Metal

DOI: 10.17729/ebis.2015.6/1

The article presents welding imperfections in TIG-welded T-joints of thin-walled elements made using filler metal wire. The study discusses both typical, i.e. specified in PN-EN ISO 6520-1:2009 and untypical imperfections, i.e. not classified in the standard mentioned above.

## K. Madej, S. Świdergoł, P. Jakubiec – Analysis of Cracks in Welded Joints of Pipes with Eyes made of S890QL1 Steel

DOI: 10.17729/ebis.2015.6/2

The analysis presented in the article was concerned with cracks in MAG (135) robotic welded joints of pipes with eyes made of S890QL1 steel and constituting components of the latticework of self-propelled cranes. The text also presents results of tests concerning chemical composition as well as mechanical and metallographic properties of base materials and welded joints. The article contains an assessment of radial and longitudinal cracks of joints based on fractographic tests of cracks and impact-test specimens. The text also discusses the effect of welding process thermal conditions on joint properties. Test results were referred to the theory of hydrogen-induced cracking (mechanism) according to Professor E. Tasak.

## J. Niagaj - Requirements of AFCEN and ASME Codes in Processing and Welding of Metal Parts of Nuclear Reactor Containment

DOI: 10.17729/ebis.2015.6/3

The article presents the contents and requirements of the AFCEN RCC-CW and ASME Section III codes as well as associated standard specifications concerning parent materials, welding consumables and manufacturing processes, including welding and heat treatment, used in the production of steel parts of nuclear reactor containments.

## R.A.K. Bennedbaek, C.V. Nielsen, W. Zhang – Latest Developments in Simulation and Optimization of Resistance Welding Processes

DOI: 10.17729/ebis.2015.6/4

The paper summarizes the latest developments in numerical simulation and optimization of resistance welding as well as new developments in 3D simulation. Resistance welding simulation can be applied for the prediction of weld nugget sizes in various material combinations, and for the optimization and planning of welding process parameters. Weld quality can be modelled in terms of microstructural phase changes, resulting hardness distribution and strength under specified loading conditions. New developments for 3D simulation of complex joints allow for modelling strength testing and special effects such as shunting. Furthermore, projection welding often needs 3D simulation. 3D simulation of a new, lightweight, sandwich material is presented in the paper.

## M. Slováček, T. Kik – Use of Welding Process Numerical Analyses as Technical Support in Industry. Part 3: Industrial Examples – Transport Industry

DOI: 10.17729/ebis.2015.6/5

At the present stage of industrial development, numerical analyses are nothing new. In developed countries, numerical analyses are present almost in every stage when designing a new part or structure or when developing repair and modernising technologies. Numerical analyses enable simulating welding processes without compromising the high compatibility of

simulation results with those obtained in reality. Numerical simulations are very useful tools supporting production preparation processes and assuring the highest quality of products. However, in order to satisfy the needs of various industries, it is necessary to develop computational methods, ready-to-use modules or software applications ensuring an effective and comfortable manner of performing calculations. The article is the third part of a cycle concerned with the possibility of applying numerical techniques as tools supporting the development of technologies and structures using computer simulations of welding and heat treatment processes. Part 3 is focused on examples of the use of numerical analyses in the transport industry.

## M. Saperski - Technology of Welding Large-sized Rings of Offshore Structures

**DOI:** *10.17729/ebis.2015.6/6*

The article presents practically proven technology for making single large-sized rings used in offshore structures and made of high strength steel rectangular segments (100 mm × 120 mm). The study also presents formal and documentation-related requirements as well as issues concerning quality assurance.

## A. Sawicki, M. Haltof – Selected Methods Used in Experimental Determination of Near-Electrode Voltage Drops of Electric Arcs. Part 1: Direct Methods Used in Determination of Near-electrode Voltage Drops

**DOI:** *10.17729/ebis.2015.6/7*

The article discusses the primary difficulties encountered when experimentally determining near-electrode voltage drops of high pressure electric arcs, presents the classification of measurement methods and various variants of direct and indirect measurements (known from reference publications and developed by the authors of the article).

**Biuletyn Instytutu Spawalnictwa**
ISSN 2300-1674

**Publisher:**
Instytut Spawalnictwa (The Institute of Welding)

**Editor-in-chief:** ***Prof. Jan Pilarczyk***

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