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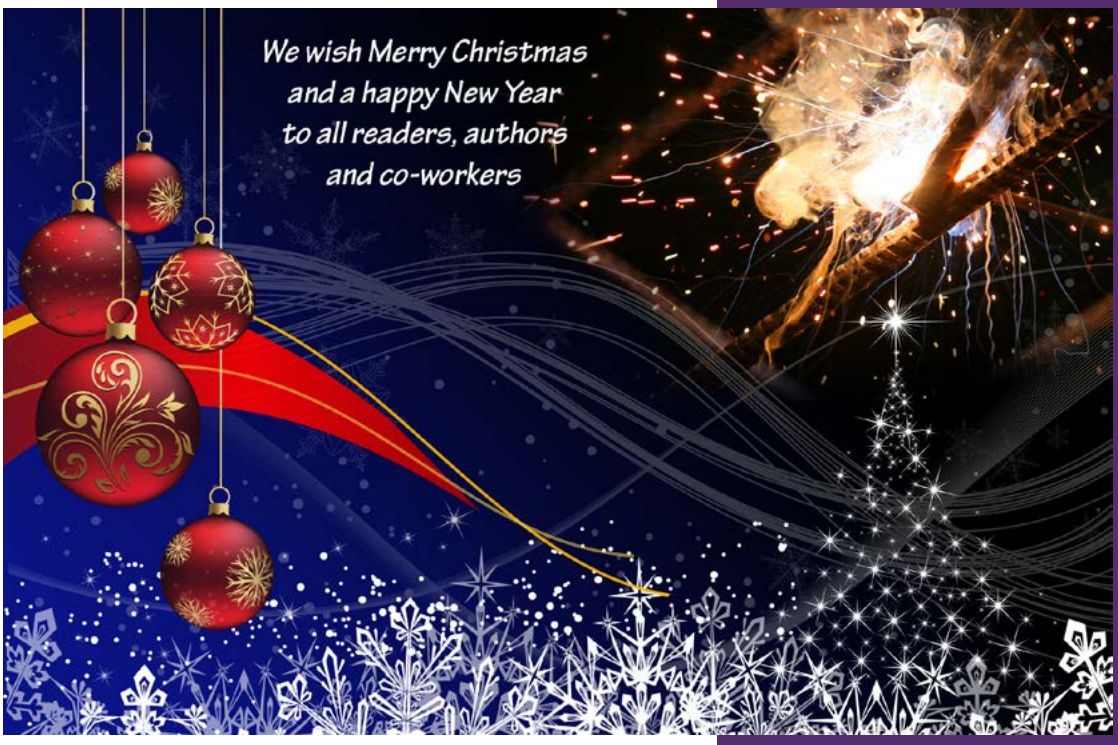

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INSTITUTE OF WELDING

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

Summaries of the articles

M. Różański, T. Pfeifer, W. Grobosz – Effect of the Single Repair of Welded Joint in Steel S690QL on HAZ Properties

DOI: *10.17729/ebis.2017.6/1*

An essential stage in the making of steel structures involves the removal of welding imperfections. Undoubtedly, an additional thermal cycle accompanying the remaking of a weld adversely affects the mechanical properties of the HAZ. The article presents the results of technological tests concerning repeated MAG-based arc repair welding on the properties of the HAZ in welded joints made of steel S690QL.

A. A. Babynets, I. A. Ryabtsev, A. I. Panfilov, W. W. Peremitko – Effect of Powder Surfacing on the Geometry of Run Surfaced on Flat and Cylindrical Elements

DOI: *10.17729/ebis.2017.6/2*

Comparative tests of self-shielded arc surfacing of flat and cylindrical elements led to the conclusion that both of the above-named cases revealed the identical effect of surfacing conditions on the run width and the base material content in the layer subjected to surfacing. It was revealed that penetration depth and stirring degree were mostly affected by the value of surfacing current whereas the stability of welding process, the formation of the surfaced layer and its quality were influenced by arc voltage. Shallower penetration depth in the case of the cylindrical elements if compared with that of the flat elements, subjected to surfacing performed using the same surfacing parameters, was attributed to the shift of the electrode in relation to the perpendicular. The identified correlations enable the use of test results obtained in relation to the surfacing of flat surfaces when adjusting the optimum surfacing conditions in relation to cylindrical elements.

I.K. Senchenkov, O.P. Chervinko, I.A. Ryabtsev, I.I. Ryabtsev, A.A. Babynets, E. Turyk – Calculations of the Number of Allowed Surfacing-Based Repairs of Machinery Elements Exposed to Cyclic Thermal and Mechanical Loads

DOI: *10.17729/ebis.2017.6/3*

The article presents a method enabling the assessment of fatigue service life and the calculation of the number of allowed surfacing-based repairs of cylindrical elements (on the side surface) exposed to thermal and mechanical service loads. A cylinder intended for hot operation was subjected to analysis aimed to determine the allowed number of surfacing-based repairs. As a result, it was possible to assess the entire duration of safe cylinder operation.

L. Grolik, T. Kik, P. Irek – Modelling of Welding Processes – Applied Models and Examples

DOI: *10.17729/ebis.2017.6/4*

The article aims to present the manner in which welding processes are modelled using dedicated software programmes, provides examples concerning applications of various heat sources and indicates the necessity of performing tests aimed to increase the consistence of simulation results with those obtained in experimental verification.

S. L. Schwab, I. K. Petrychenko, S. V. Akhonin – TIG Welding of Titanium Alloy VT22 Performed Using External Magnetic Field Control

DOI: *10.17729/ebis.2017.6/5*

The article presents results of tests concerning the effect of transverse magnetic field on the change in the spatial position of arc column during the TIG flux-cored welding of titanium.

The tests enabled the development of the multi-run welding of 8 mm thick high-strength titanium alloy VT22 using crosswise magnetic field. It was revealed that the use of transverse magnetic field made it possible to change weld pool solidification conditions as well as to control the shape and dimensions of the weld enabling the obtainment of properly shaped welds characterised by satisfactory quality.

V. M. Kislitsyn, S. A. Voronin - Contact-Resistance Assessment of the Stress-Strain Condition of Welded Joints

DOI: *10.17729/ebis.2017.6/6*

NDT-related diagnostics have triggered renewed popularity of the contact-resistance method indicating linear dependence between the electric resistance of metals and tensile stress having significant resistance sensitivity. The contact-resistance method enables the indication of a moment where elastic stresses transform into plastic stresses and can also be used to detect welding imperfections.

N. Pocica, L. Tuz – Microstructural Characteristics of Nickel Alloy Grade 600 After High-Temperature Thermal Cycle

DOI: *10.17729/ebis.2017.6/7*

Alloy grade 600 is characterised by high oxidation resistance at high temperature and resistance to stress corrosion. Because of the above-named characteristics, the alloy is widely used in the chemical and food industries as well as in nuclear engineering. However, the alloy belongs to the group of hard-to-weld materials and, because of that fact, has a wide range of a solidification point, which extends the size of the liquid-sensitive fracture area extending beyond the weld pool and occurring in the partially melted zone. The susceptibility of alloys to solidification cracking is determined using high-temperature simulation. The study presents results of tests performed using a Gleeble 3800 simulator. The tests were performed to identify parameters characterising properties of alloy Inconel 600 at high temperature, during heating and cooling, i.e. nil ductility temperature (NDT), nil strength temperature (NST) and ductility recovery temperature (DRT). The identification of the above-named temperatures enabled the determination of the high-temperature brittleness range (HTBR). The material structure in the specimen rupture area was subjected to observation. The specimen fractures were subjected to observation aimed to reveal features revealing fracture types.

M. Panas, P. Kowalski, M. Ostrysz, W. Łacisz, A. Skublewska, M. Dylewski, P. Gawroński, M. Gajowniczek, P. Cegielski – Robotic Arc Surfacing in the Additive Technique-Aided Creation of Models

DOI: *10.17729/ebis.2017.6/8*

Previously used reconditioning of worn machinery parts based on welding methods, primarily arc surfacing and thermal spraying, enabled the restoring of nominal shapes and dimensions as well as other parameters and functional properties of elements. Intensively developing 3D print additive methods enable the creation of models and functional prototypes, including machinery elements. The article presents original works aimed at the implementation of MIG/MAG robotic arc surfacing (in its low-energy CMT variant) in the design and fabrication of 3D metal models.

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