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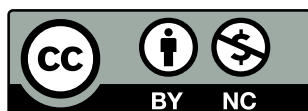
BIMONTHLY

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INSTITUTE OF WELDING  
The International Institute of Welding  
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## Summaries of the articles

**M. St. Węglowski, W. Grobosz,  
J. Marcisz, B. Garbarz –  
Characteristics of Fusion Welded and  
Friction Welded Joints Made in High-  
Carbon Nanobainitic Steels**

DOI: [10.17729/ebis.2018.4/1](https://doi.org/10.17729/ebis.2018.4/1)

Intense research on the metallurgy of iron alloys have recently resulted in the development of technologies enabling the making of high-carbon nanobainitic steels. Because of their chemical composition, the above-named steels belong to hard-to-weld materials. To identify the possibility of welding such steels using arc-based methods and welding in the solid state it was necessary to make test joints and perform related metallographic tests. The test results revealed that it is possible to obtain both fusion and pressure welded joints if the process was performed in the softened state, i.e. before the final heat treatment. Afterwards, joints should be subjected to a heat treatment ensuring the obtainment of a previously assumed microstructure and required hardness distribution in the weld and HAZ.

**R. Krawczyk – Evaluation of the  
Effectiveness of Low-Density  
Couplants in Ultrasonic Tests**

DOI: [10.17729/ebis.2018.4/2](https://doi.org/10.17729/ebis.2018.4/2)

The article presents the analysis of the effectiveness of acoustic feedback required in ultrasonic contact tests. The analysis included low-density couplants, the use of which aimed to provide the most effective transfer of the beam of ultrasonic waves from the probe to an element subjected to an ultrasonic test. The tests were performed using a normal probe emitting longitudinal waves and an angle probe emitting shear waves. The tests involved the use of standard specimens as well as steel specimens having various test surfaces.

**M. Kasińska, T. Piwowarczyk,  
W. Derlukiewicz, P. Fijołek  
– Assessment of Macro and  
Microstructure of Welded Joints  
Made of Steel P265GH Using  
Various Combinations of Welding  
Consumables**

DOI: [10.17729/ebis.2018.4/3](https://doi.org/10.17729/ebis.2018.4/3)

The article presents the assessment of the macro and microstructure of welded joints made in steel P265GH using various combinations of filler metal wires and shielding gases. In addition to microstructural analysis, tests involved hardness measurements of all of the joint zones, i.e. the weld, HAZ and the base material. In addition, each specimen (i.e. the weld and the base material) was subjected to the analysis of chemical composition. The performed analysis made it possible to determine the degree of morphological conformity of welding consumables with steel P265GH.

**A. Węglowska – The Use of a Bobbin  
Tool in the Friction Stir Welding  
of Plates Made of Aluminium Alloy  
EN AW 6082 –T6**

DOI: [10.17729/ebis.2018.4/4](https://doi.org/10.17729/ebis.2018.4/4)

The article presents test results concerning the friction stir welding of 6 mm thick plates made of aluminium EN AW – 6082. The welding process was performed using a tool consisting of two shoulders and a probe. The tests were concerned with the effect of welding parameters in the process of welding and the quality of joints. Related visual test results enabled the assessment of the effect of a bobbin tool on the formation of a weld, the presence of surface imperfections and the continuity of material in welds (based on metallographic tests). Mechanical properties of the joints were identified in static tensile tests and in hardness

measurements. The effect of welding conditions on the welding process and weld formation was determined through measurements of temperature on the weld surface, performed using a thermographic camera, and measurements of force and torque affecting the tool, performed using a LowStir device. The test results revealed that the use of the bobbin tool enabled the obtainment of joints characterised by the compact structure of welds, material continuity, strength and repeatability comparable with those obtained using the conventional tool.

### **N. Konieczna, J. Adamiec – Susceptibility of Alloy IN617 to Hot Cracking**

DOI: [10.17729/ebis.2018.4/5](https://doi.org/10.17729/ebis.2018.4/5)

The article presents results of tests concerning the susceptibility of alloy IN617 to hot cracking. The research-related tests required the inert gas-shielded melting of test alloy sheets using a tungsten electrode in forced strain conditions. The process of melting involved 3 mm and 5 mm thick test sheets. The tests of the welded joints included the macro and microstructural analysis of the molten area, base material and heat affected zone. Results obtained in the DTA differential analysis were used to perform tests using a Gleeble 3800 simulator. In the above-presented manner it was possible to determine the high-temperature brittleness range (HTBR) of alloy IN617 as well as to identify the effect of strains on the development of hot cracks in the Transvarestraint test. The tests were supplemented with the fractographic analysis of the crack area. It was revealed that the hot cracking phenomenon occurred within the high-temperature brittleness range of the alloy and depended on the size of strain as well as

on the presence of eutectics formed in the solid-liquid state.

### **J. Tomków, J. Haras – Types of Surface Impurities versus the Quality of Brazed Joints**

DOI: [10.17729/ebis.2018.4/6](https://doi.org/10.17729/ebis.2018.4/6)

Brazing is one of the primary joining processes increasingly often applied in industry. Because of their mechanical properties, overlap joints are particularly popular when making brazed structures. The use of brazed joints in structures of critical importance requires that particular attention be paid to joint quality, e.g. by the appropriate cleaning of surfaces to be joined. The article presents results of non-destructive tests of brazed joints made in steel S235JRG2. Surfaces used in the tests were deliberately contaminated to simulate the presence of welding imperfections. Afterwards, the test specimens were subjected to non-destructive (visual and radiographic) tests aimed to determine the effect of surface impurities on the quality of brazed joints.

### **B. Wichtowski, K. Pysiak – The Quality of Butt-Welded Joints in Steel Railway Bridges in Szczecin**

DOI: [10.17729/ebis.2018.4/7](https://doi.org/10.17729/ebis.2018.4/7)

This year marks the 40<sup>th</sup> anniversary of Professor Andrzej Fabiszewski's death (1924–1978). He was a forerunner of the X-ray testing of butt welds in railway bridges in Poland. Professor Fabiszewski spent most of his life in Szczecin. The paper presents results of welded joint tests of 11 railway bridges located in the city of Szczecin. The results can be used for a new multi-level procedure of load-bearing capacity assessment of bridges in operation.



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