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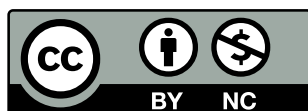
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BIMONTHLY

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

### **K. Krasnowski – Possibilities of Increasing the Fatigue Strength of Welded Joints in Steel S700MC through High Frequency Impact Treatment (HiFIT)**

DOI: [10.17729/ebis.2018.6/1](https://doi.org/10.17729/ebis.2018.6/1)

The article presents today's possibilities of modifying the fatigue strength of welded joints made in steel S700MC using the high frequency impact treatment (HiFIT). Research-related fatigue tests involved MAG-welded butt joints, T-joints with two-sided fillet welds as well as joints with a longitudinal rib and a girth fillet weld. The tests required the adjustment of appropriate parameters of the HiFIT and the performance of the above-named treatment in relation to the half of previously made joints. The article presents results of fatigue tests of joints after welding and after the HiFIT. The research also included the development of fatigue characteristics and the calculation of fatigue categories FAT, constituting the basis for the design of structures exposed to fatigue (in accordance with European standards). The results obtained in the tests unequivocally demonstrated the possibility of increasing the fatigue strength of welded joints made in steel S700MC by applying the HiFIT, with the level of fatigue strength modification depending on the type of a joint.

### **R. Krawczyk – Analysis of Low-Amplitude Indications in Ultrasonic Tests of Thick-Walled MAG-Welded Butt Joints**

DOI: [10.17729/ebis.2018.6/2](https://doi.org/10.17729/ebis.2018.6/2)

The article presents an attempt at the clarification of low-amplitude indications, i.e. below the level of assessment, frequently detected in ultrasonic tests of welded joints. The above-named indications, non-evaluable in accordance with

requirements of related standards used in ultrasonic tests, are often present in MAG-welded joints. The attempted clarification of the above-named exemplary indications required the performance of tests involving thick-walled MAG-welded butt joints.

### **J. Hołowaty, B. Wichtowski – The World's First Road Truss Welded Bridge in the Light of NDTs**

DOI: [10.17729/ebis.2018.6/3](https://doi.org/10.17729/ebis.2018.6/3)

December 2018 marks the 90-th anniversary of the construction (1928) of the world's first road truss welded bridge (put into operation in August 1929). The bridge designed by Professor Stefan Bryły is a truss bridge with the deck below the arch, having a span length of 27 metres. The article discusses the technical condition of the bridge during non-destructive acceptance tests performed in 1929 and the results of diagnostic tests performed in 1958 and 1960 by the Gdańsk University of Technology and the West Pomeranian University of Technology in Szczecin.

### **N. Konieczna – Comprehensive Procedure of the Assessment of the Quality of Welded Joints Made in Alloy INCONEL 617**

DOI: [10.17729/ebis.2018.6/4](https://doi.org/10.17729/ebis.2018.6/4)

The development of the power engineering industry forces designers and material engineers to develop and implement new technologically advanced materials, including alloy INCONEL 617. There are numerous works concerning tests focused on the alloy microstructure, yet welded joints made of INCONEL 617 have not been discussed in detail. The description of the microstructure of welded joints provides designers, design engineers and welding engineers with knowledge enabling them to assess the

service life and degradation of welded joints in elements made of INCONEL 617. The article presents the analysis and the assessment of the microstructure of TIG-welded joints made of nickel alloy INCONEL 617. The tests involved the use of light and scanning microscopy. Precipitates revealed in the tests were identified using EDS-based chemical composition microanalysis XRD-based phase analysis. The verification of the test results also required the performance of analysis carried out using the scanning transmission electron microscope. The tests revealed the presence of precipitates both in the base material and in the weld. The presence of precipitates including  $\text{Cr}(\text{Mo})_{23}\text{C}_6$  or  $\text{Ti}(\text{CN})$  carbides increases the strength of the alloy, whereas identified dislocations and twins intensify the hardening effect.

## T. Ślęzak - Characteristics of MAG Welded Joints Made in Fine-Grained High-Strength Steel S960QL

DOI: [10.17729/ebis.2018.6/5](https://doi.org/10.17729/ebis.2018.6/5)

The paper presents the results of investigation performed in relation to butt welds made in steel S960QL using the MAG method. The research involved two types of welds, i.e. I (square butt weld preparation) and V-shaped. Metallographic tests enabled the determination of the HAZ area and helped identify structural changes in the heat affected zone. The neighbourhood of the fusion line revealed the presence of slight porosity. The analysis of the chemical composition of the HAZ and that of the weld indicated slight differences in their carbon equivalent values, indicating the proper selection of the filler metal. Microhardness tests indicated substantial differences of hardness between the fusion line and the weld. The weld characterised by square butt preparation revealed better characteristic.

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