



2<sup>nd</sup> International Hybrid Conference and Exhibition “Welding and Additive Manufacturing – WAM”  
21-22 Nov. 2024 Istanbul, Turkey

## Digitized Quality Inspection in Welding Production

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### ABSTRACT

A comprehensive overview of weld quality control and assurance for welded structures, focusing on preventing failures due to fatigue loading is provided. It highlights the drawbacks and limitations of current quality control systems and discusses the international weld quality standards and guidelines used in modern welding production. Additionally, a new online method for quality control and assurance of welded structures is introduced. This method aims to enable complete, online evaluation of large quantities of welds in an accurate and repeatable manner. The information gathered will not only determine weld quality levels concerning fatigue strength but also improve process control, welding power sources, and robot control systems. A key aspect of this new approach is the integration of digital visual inspection technology, specifically the Winteria system. This system captures high-resolution images of welds and uses sophisticated algorithms to detect defects, inconsistencies, and other quality issues that may not be visible through traditional inspection methods. Winteria's digital inspection capabilities allow for a more thorough and consistent assessment of weld quality, contributing to better overall quality control. The incorporation of advanced digital visual inspection technology and laser scanning serves as a modern tool for automated, unbiased geometrical weld quality assurance in a production environment. Today, this integrated system, Winteria, is commercialized and successfully implemented at several manufacturing sites.

**Keywords:** Welding, Digitalization, Quality Assurance, Fatigue and Fracture, Inspection, Digitalization.

### Biography



Dr. Zuheir Barsoum is a Professor of Lightweight Structures at the Department of Engineering Mechanics, KTH Royal Institute of Technology in Stockholm, Sweden. He holds an annual endowment through SSAB (Swedish Steel Company). His research interests include the fatigue and fracture of engineering materials and structures, structural integrity, joining and welding of lightweight metals, and computational weld mechanics. He currently supervises five PhD students and has authored or co-authored over 200 articles in international journals and conferences. Professor Barsoum plays an active role in the International Institute of Welding (IIW). He has also authored and co-authored books on IIW design recommendations. He has received international awards through IIW, including the Granjon Award in 2010 and the Gedik Award in 2020, for his contributions to the fields of design and structural integrity. In addition to his academic achievements, Professor Barsoum has been active in commercializing research. He is a co-founder of Winteria® ([www.winteria.se](http://www.winteria.se)), a company that develops and sells digitized systems for quality assurance in welding and other manufacturing processes.