

Title: Advancement in structural applications - Prototyping of CHS-to-CHS intersections welded by partial joint penetration (PJP) with continuously variable dihedral-preparation of the bevel according to ISO9692

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Today, the beveling processes largely encountered in the field of civil-structural buildings, still employs manual methods as a common tool, alongside the semi-automatic process.

However, when referring to the problem of tubular intersections for structural and architectural applications, where the complexity of the geometry often influences the manufacturing of the product due to the continuous variability of the intersection angle, the external and post-beveled dihedral angle and the applicability and efficiency of both manual and semi-automatic methods are rendered somewhat ineffective. It is a well-known fact in the field of CHS-to-CHS steel welded joints, that the end-preparation (also referred to as beveling) of plates or profiles, that is carried out in the workshop for industrial or architectural buildings, usually pursues two different methodologies and processes: manual or semi-automatic. In the current research-work, a new possibility, in terms of the design and end-machining of CHS-to-CHS welded tubular intersections by partial joint penetration (PJP), is introduced. The bevel-surface is governed along its path from design (3D-CAD) to execution (3D-CAM) by utilising a digital approach. An experimental phase aimed at obtaining 5 samples of tubular intersections was carried out. The samples were obtained by employing one of the most advanced 6-axis CO2 laser machine models available, produced by Mazak Optonics Corp (Japan), rendering the final bevel-surface fully compliant to ISO9692 requirements. recognition.

Biography

Augusto Mastropasqua currently works at the R&D Division of MZA Research - Numerical Consulting ltd (London), where he is involved in research addressing 'Complex joints in tubular steel structures manufactured by recent laser-cutting techniques'. He also holds a NAFEMS PSE certification in Core Finite Element Analysis and Dynamic and Vibration. From 2018 he is Visiting Lecturer at Polytechnic University of Milan, Department of Architecture, Built Environment & Construction Engineering.

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Session name/ number: Technologies in Laser, Optics and Photonics
Category: Oral presentation