Structural Integrity of Solid-State Welded & Additively Manufactured Metals

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Solid-state processing techniques are revolutionising the field of metal joining and additive manufacturing (AM) by offering unparalleled advantages. Contrary to fusion-based methods, solid-state processes require significantly lower heat. This aspect is pivotal in mitigating thermal distortion and residual stress, enabling the deposition of materials with minimal microstructural degradation, minimising the presence of microstructural defects and thus improving part structural integrity. Furthermore, these processes enable the joining and manufacturing of multi-material composites, enabling unprecedented material and structure design optimisation. For this reason, such a class of techniques is more and more employed in a wide range of industrial sectors.

This symposium explores recent developments in **solid-state processing techniques** from different perspectives. This session will focus on recent advancements in structural performance and strategies for further enhancement. Contributions addressing modelling, process optimisation, hybrid approaches, and case studies on the adoption of these technologies in high-performance manufacturing are encouraged.

A non-exhaustive list of solid-state welding techniques that are welcome includes friction stir welding (FSW), linear friction welding (LFW), ultrasonic welding (USW), diffusion bonding, and magnetic pulse welding (MPW). Regarding additive manufacturing methods, cold spray, binder jetting, friction stir additive manufacturing, friction surfacing, and ultrasonic additive manufacturing (UAM) are just a few examples of methods that fit well the symposium's theme.

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The symposium is going to showcase the outcomes of these projects, along with other independent contributions related to the structural integrity of AM materials.