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# Spotlight on *Structures*



## Editor's Featured Article

Associate Editor, Iman Hajirasouliha, has chosen a paper on the potential of wire arc additive manufacturing under the influence of key process parameters as the Featured Article for Volume 84 of *Structures*.

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### Influence of metal transfer modes and process conditions on WAAM-fabricated AM46 carbon steel walls

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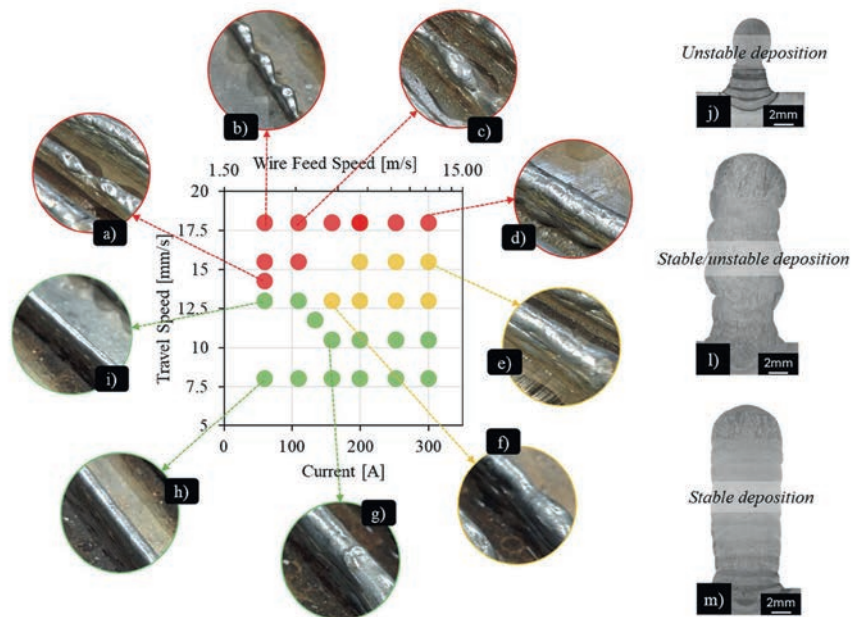
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window (produced by CMT), characterisation of 10-layer walls (produced by CMT, S-GMAW and P-GMAW), and mechanical testing of large-scale walls (produced by P-GMAW) to construct a process-property map. Experimental characterisation revealed that the heat input (HI) and the wire feed speed to travel speed (WFS/TS) ratio govern the cooling time ( $\Delta t_{c/s}$ ), which exhibited a linear dependence on HI. Bead width and height were governed by combined effects of HI and WFS/TS, while hardness, yield strength and ultimate tensile strength

followed inverse power-law correlations with HI. Ultimate strain showed a positive correlation with HI. In parallel, an analytical modelling framework is proposed to establish predictive equations linking process parameters with thermal cycles, deposition geometry and mechanical properties. These models aim to accelerate process planning and enable property-driven slicing strategies for WAAM structural applications.

→ Read the full paper at <https://doi.org/10.1016/j.istruc.2025.110936>

Wire arc additive manufacturing (WAAM) holds significant potential for the fabrication of intricate, medium to large-scale metallic components. However, current research predominantly targets lab-scale specimens, often exploring limited ranges of process parameters and overlooking the complex interactions between thermal, geometrical, and mechanical factors. In this study, a comprehensive experimental program is conducted to systematically investigate the influence of key process parameters, namely current, voltage, wire feed speed, and travel speed, across three gas metal arc welding (GMAW) transfer modes: cold metal transfer (CMT), conventional spray (S-GMAW) and pulsed current (P-GMAW). 3Dprint AM46 carbon steel was used as the feedstock material. The investigation proceeded in three stages: development of a broad process



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