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Characterising reheated microstructures of microalloyed multipass C-Mn steel welds



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ABSTRACT:

The Charpy performance of C-Mn steel welds can vary significantly due to variations in the concentrations of trace elements, such as Ti, B, Al and N, which are often not measured or controlled by electrode manufacturers. This can result in unpredictable shifts in the ductile-to-brittle transition temperature and potentially lead to unexpected brittle fracture. We aim to develop an understanding of the effects of the Ti-B-Al-N system on absorbed energies for multipass C-Mn HSLA steel welds, by characterising a set of welds in which the concentrations of these elements are systematically varied. To date, microstructural analysis has focused on establishing whether the concentrations of Ti, B, Al and N affect the reheated grain structures in multipass weld metals, and preliminary results suggest that these regions do not change significantly. Ongoing work will seek to determine whether chemical segregation is a driver for the Charpy performance of the aforementioned alloys.

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