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Speaker 2

Effect of niobium on microstructural and mechanical properties of the heat affected zones of welded marine steel



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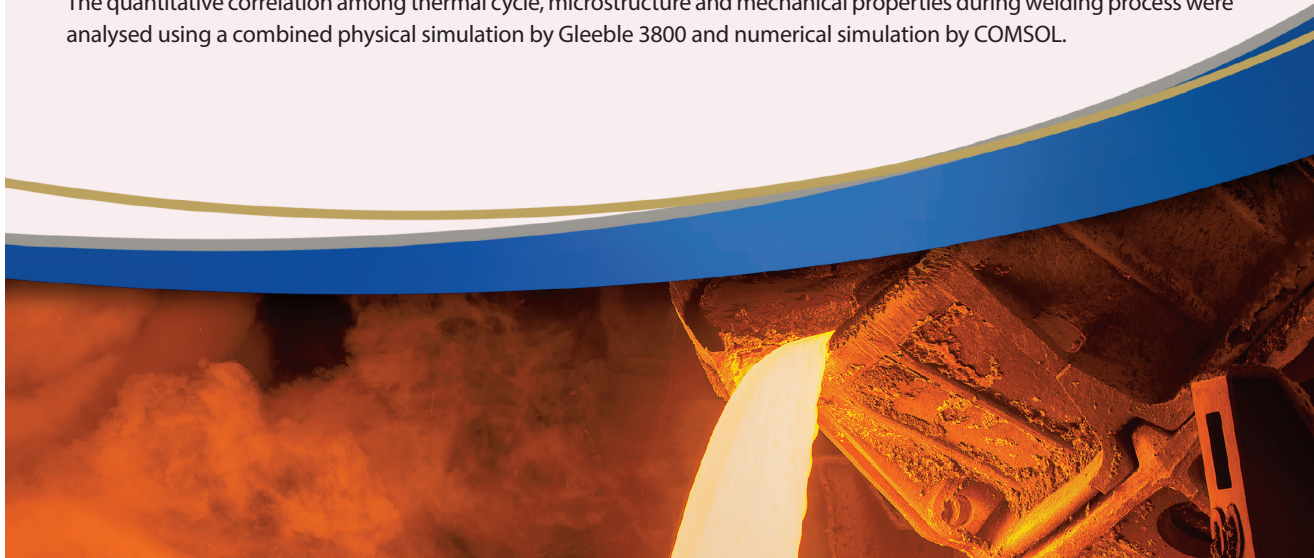
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ABSTRACT:
The effect of niobium on the heat affected zone of welded E36 marine steel is investigated under different heat inputs from 50kJ/cm to 250kJ/cm during welding. Thermal simulation tests on two E36 steel plates, one with niobium (E36-Nb) and the other without (E36), were conducted by Gleeble 3800. Microstructure and mechanical properties of the welded samples were characterized by optical microscopy (OM), and electron back-scatter diffraction (EBSD), Brinell hardness tests and Charpy impacts tests, respectively. The measured welding thermal cycles in the Gleeble experiments were used as input in a heat transfer-phase transformation model to simulate the thermal process of E36 marine steel. The Leblond-Devaux parameters for phase transformation were evaluated using continuous cooling transformation (SHCCT) diagram. The quantitative correlation among thermal cycle, microstructure and mechanical properties during welding process were analysed using a combined physical simulation by Gleeble 3800 and numerical simulation by COMSOL.

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