

**MICROSTRUCTURAL AND HARDNESS INVESTIGATIONS ON
SIMULATED HEAT AFFECTED ZONE (HAZ) IN
P91 CREEP RESISTING STEEL**

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ABSTRACT

Thermal simulation has been used to investigate the structure and hardness of the subzones of the heat affected zone (HAZ) in welded P91 creep resisting steel. Microstructures corresponding to the sub-zones of the HAZ of actual welds were produced using a dilatometer. By simulation, the microstructure of each major subzone was reproduced in relatively large volumes compared with the corresponding subzone of the HAZ in an actual weldment. A simulated post-weld heat treatment (PWHT) was then imposed to gauge the effect on the structure and properties of the simulated sub-zones of the HAZ. Microstructural analysis and hardness testing confirmed that increasing peak temperature resulted in increases in the solution of alloy carbides, the mean austenite grain size and the hardness after cooling. Subsequent simulated PWHT served to re-precipitate carbide and to significantly reduce the hardness of the HAZ subzones

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