**Effect of manganese bands on austenite formation of low carbon steels in dual phase steel manufacture.**

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**ABSTRACT**

A model has been developed to predict the heating rates required to obtain a specific amount of overlap between ferrite recrystallization and austenite formation in the heating step of dual phase steel manufacture. The predicted heating rates of 0.2, 7, 50.5 and 511 0C/s are employed on the initial hot rolled steels to heat the material to inter-critical temperatures (730-780 0C) followed by quenching to room temperature. The effect of manganese bands on the variation of through thickness austenite formation was systematically evaluated in this study. The Mn band spacing of the initial hot rolled samples was found to be 8-11 µm. For lower heating rates, the austenite morphology was found to have necklace morphology throughout the thickness. However, with the increase in heating rate (50.5, 511 0C/s), nucleation and growth of austenite significantly occurred on the Mn bands leading to a banded morphology at the centre and necklace morphology at the surface. Due to this, the micro-Vickers hardness values show significant through thickness anisotropy in the samples heat treated at higher heating rates.

*Keywords: Dual Phase steels; Heating rate, Austenite formation, Manganese bands, Morphology.*