

Experimental and Numerical Investigation of the Rolling Process of HSLA Steel

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Abstract. The strain-induced precipitation process of Nb(C,N) is widely used in microalloyed steels to improve the strength and ductile-to-brittle transition temperature. During thermomechanical processing of these steels, disperse second-phase particles precipitate and effectively stop the static recrystallization progress. As an effect, unrecrystallized austenite that is subjected to subsequent deformation passes, provides a significant number of potential nucleation sites for phase transformation. This in turn, leads to fine grained microstructure in the semi-final or final product. In the current work, both experimental and numerical investigation of bar rolling with particular attention to the influence of precipitation on final material state is under investigation. Numerical modelling capabilities in the area will be discussed with respect to prediction of strain and stress inhomogeneities at the cross-section of rolled bar.