APPROXIMATE MODEL FOR PREDICTING STATIC RECRYSTALLIZATION OF FERRITIC STAINLESS STEEL TYPE 430

R. Benchouieb, D. BERDJANE, S. Achouri, O.GHELLOUDJ, F. LEMBOUB

Abstract : An approximate model for predicting static recrystallisation of ferritic stainless steel type 430, in hot rolling is proposed. In this model, the effect of variables such as strain, strain rate, temperature and initial grain size were considered during hot rolling operations. A set of integrated mathematical models for predicting static recrystallisation evolution during hot rolling has been developed through laboratory research work experiments. It consists of many sub-models such as percentage of recovery, recrystallisation kinetics, time for 50 percent of recrystallisation, recrystallised grain size and grain growth. Some of the most important theoretic basic approaches to describe the kinetics of primary recrystallisation were first independently developed and comprehensive portrayed by Johnson and Mehl, Avrami as by Kolmogorov (Often named the JMAK-theory).The quantitative determination of the effects of these variables obtained, analysed and compared in the context of the recrystallisation kinetics of this material.The predicted results are in good agreement with measured of laboratory tests. The results of constitutive models based on semi empirical equations will be compared in the next publication to more sophisticated models based on cellular automata, vertex and Monte-Carlo-Potts methods.

Keywords : ferritic stainless steel, hot rolling, Static recrystallisation, Mathematical model.