Research on Distribution of Residual Stresses of Cold Rolled Sheet Distorted Area Based on ANSYS

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Based on the value of longitudinal distribution of the residual stresses in the strip with the cold rolled strip in different forms under stress loading, this paper establishes a finite element model. According to the simulation analysis on different stress curve functions and under some coefficient combining conditions of different stress curve functions, it is discovered that the stress acting lengths and the features are completely different under the actions of even-degree and odd-degree stress functions, and under the even-degree function, the residual stresses are distributed evenly at the far end of the strip, and the length location of the point where the residual stresses tends to be stable on the strip are linearly related to the strip width; under the odd-degree function, the residual stresses are distributed linearly in the horizontal direction of the strip while without any changes along the strip length. According to the analysis results of the strip's shear stress, a little strip shear stress is not enough to produce deformation. The result of this paper has profound guiding significance for cold-rolled strip flatness closed-loop control. Only with different control strategies for different flatness deviations after fitting, can the quality of the strip steel flatness be improved more effectively, thereby reducing the impact of the lag in flatness detection on the strip flatness control as far as possible.

Keywords: Cold Rolling, Stress Function, Residual Stress, Finite Element

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