NUMERICAL SIMULATION OF BILLET CALIBRATION AND PIERCING IN A PUSH-BENCH SEAMLESS TUBE

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Abstract

The goal of this paper is to investigate the most favorable cross-section of the billet for calibration and piercing processes using current forming tools in Železniare Podbrezová rolling mill. The new billet cross-section with smaller diagonal and the same area as the current one should fit the current die cross-section. On the other hand, the severe reduction of cross-sectional area would cause billet not to fit the die coaxially and would eventually end up in eccentric piercing. The main reason for finding the different shape of the billet, in particular the more favorable billet fillets, is the tendency of the rolled material to form overlaps. This is caused by uneven material flow on the billet edges during calibration. In subsequent rolling operations, these overlaps can progress well up to the final tube. Performing a numerical simulation of calibration and piercing we can find the most favorable cross-section for perfect concentric fit of the billet inside the die with simultaneous minimization of the risk of overlapping.

Keywords: hot forming, piercing, calibration, overlap, numerical simulation

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