Elaboration of a digital model for estimation of power parameters of a rolling process in a continuous rolling mill

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ABSTRACT

Development of pipe rolling industry led to a wide application of continuous rolling mills with a retained mandrel and 3-roll calibres for billets rolling. It required refinement of a number of theoretical provisions, related to kinematics change of the process. Within the framework of this research, a methodology for determination the process power parameters was developed, based on the energy theory. An experimental research was performed with the purpose of finding a pattern of influence of rolling process parameters to the angle of contact of a mandrel and the value of roll widening. Values of average pressure at the point of contact with working mills and a mandrel were determined during the formation of the equation of powers projection on the longitudinal axis. Developed mathematical models and the estimation algorithm of power parameters of a rolling process in a continuous rolling mill allowed the researchers to determine the pipe rolling force in a continuous rolling mill with a quiet high precision. Acquired patterns might be applied both in research and in the development of rolling data tables for pipe-rolling units with continuous rolling mills.