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Investigation of the lubricants influence on the ironing process

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Abstract

Results of experimental and numerical investigations of the three types of lubricants influence on the ironing process are presented in this paper. The tribological model was based on the strip sliding between the two lateral contact elements. The strip was made of the low carbon steel. Variations of the friction coefficient and the contact pressure in the single-stage ironing were recorded at the constant sliding speed for each of the tested lubricants. The effective normal stress distribution within the material was simulated by the finite element method (FEM). The objective was to compare the applied lubricants from the aspect of their applicability in the ironing process.

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1. Introduction

The ironing process in cold conditions is frequently characterized by the high contact pressures and local load of the tool, especially in the case of the multi-phase process. In such conditions, the lubricant has the decisive influence on plastic forming. Absence of lubricant would cause the direct contact of the machined piece with the tool, what would significantly disrupt the stability of the forming process. Lubrication, as a measure of reducing the damaging influence of friction, enables increase of the deformation and the degree of deep drawing [1]. Application of

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