

Abstract

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Analysis of the influence of turning, mill turning, roller burnishing and grinding processes on the tribological performance of steel using the example of the wheel-rail contact

Due to the constantly increasing wear of railway wheels, which endangers the geometrical integrity of the contact surfaces, the original geometry must be reproduced through regular conditioning of the surfaces. It is known that the surface and fringe layer properties have a significant impact on the wear behavior in tribological contact. This work therefore focuses on the influence of different machining processes on the wear behavior of wheel steel in rolling contact. The processes turning, mill turning, roller burnishing and grinding were implemented and their effect analysed. Following the determination of the surface properties, the operational behavior of wheel steel samples was analysed by determining their wear development in rolling contact on a specialised test bed. The wear of the contact surfaces due to a continuously increasing load was determined through measurement and analysis of the surfaces of the tribologically loaded samples. The investigations provide fundamental knowledge in relation to the influence of machining processes on the wear development. The results highlight the importance of appropriate conditioning processes in order to increase the lifetime of railway wheels.