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On The Performance of Implementing Pre-conditioned Oxide Film of HSS Rolls in A Hot Strip Mill

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Hot strip mills require higher-quality, incident-free rolls to enhance productivity in the production of technical strips with stringent surface quality requirements. This necessitates rolling engineers to innovate new operational designs. The spin-cast HSS grade roll, engineered in Europe, stands as one of the most advanced grades developed over decades. Despite being a mature product, there is still room for improvement, particularly in terms of the roll surface condition, to meet the ever-growing demands of strip products.

Hot strip mill operations have effectively harnessed the natural formation of a thin oxide glaze on HSS rolls during the rolling process. Extensive research has been conducted to gain a comprehensive understanding of this phenomenon. It is crucial to establish this protective glaze in the early stages of each rolling campaign. Maintaining the oxide glaze for as long as possible is essential for producing strip products with high surface quality. However, the formation of this glaze requires a certain amount of time under hot rolling conditions, often resulting in the first few strips being rolled without a fully developed oxide glaze on the roll surface. Therefore, a pre-conditioned oxide film (POF) on the ground surface of HSS rolls is necessary to ensure the development of a well-formed oxide glaze under harsh rolling conditions.

This article describes the operation and implementation of a pre-conditioned oxide film on HSS rolls in a hot strip mill at Baosteel. The rolls are prepared in the roll shop after grinding and before usage. Following years of development, the POF rolls has been fully integrated into the mill's operations, enabling the production of high-quality strips while also achieving a cost saving of up to 50% for HSS rolls.

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