

INFLUENCE OF ROLL WEAR IN HOT ROLLING OF STEEL AT HOT STRIP MILLS

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ABSTRACT

In a Hot Strip Mill (HSM), steel slabs are plastically deformed to achieve hot rolled (HR) coils of desired size, shape and mechanical properties. HR coils are widely used in construction, fabrication, pipe, container and other industries. A large proportion of HR coils are further rolled to thinner gauge coils in cold rolling mills. These cold rolled (CR) strips are used in white goods, automobiles, barrel, roofing, packaging and many other applications. Stringent market demands on cost and quality of the rolled products put proportional thrust on HSM to improve its performance. It is therefore required to explore measures for improving techno-economic parameters of the mill. During hot rolling, steel is deformed at roll bite at temperature ranging typically from 850-1150 °C. Under severe cyclic mechanical and thermal loads and in presence of abrasive scale, wear of rolls is inevitable. The paper reviews adverse effect of roll wear on performance of the HSM. Factors responsible for higher wear rate of rolls have been studied. Some of the cases have been discussed to show influence of roll wear on HSM parameters like campaign size of rolling, specific roll consumption, profile and surface quality of HR coils, etc. It has been demonstrated that rate of roll wear accelerates after reaching a critical production level. At higher campaign size of rolling, having severely worn rolls, strip profile gets distorted and some of the surface defects like rolled-in-scale and ridge in the rolled products may get generated. Undoubtedly, roll consumption increases with increase in roll wear and at lower campaign size of rolls.

Keywords: Hot rolling, Tribology, Roll, Wear, Surface defects

