

Novel Uses of Discarded Work Rolls of Cold Rolling Mills in Hot Strip Mill of Tata Steel India

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Abstract : Pinch rolls of the Hot Mills must possess resistance to wear, thermal stability, high thermal conductivity and through hardness. Conventionally, pinch rolls have been procured either as new ones or refurbished ones. Discarded Work Rolls from the Cold Mill were taken and machined inhouse at Tata Steel to be used subsequently as the bottom pinch rolls of the Hot Mill. The hardness of the scrapped work rolls from CRM is close to 55HRC and the typical composition is (C - 0.8% , Mn - 0.40 % , Si - 0.40% , Cr - 3.5% , Mo - 0.5% & V - 0.1%).The Innovation was the use of a roll which would otherwise have been otherwise discarded as scrap. Also, the innovation helped in using the scrapped roll which had better wear and heat resistance. In a conventional Pinch roll (Hardness 50 HRC and typical chemistry - C - 10% , Mo+Co+V+Nb ~ 5 %) , Pick-up is a condition whereby foreign material becomes adhered to the surface of the pinch roll during service. The foreign material is usually adhered metal from the actual product being rolled. The main attributes of the weld overlay rolls are wear resistance and crack resistance. However, the weld overlay roll has a strong tendency for strip pick-up particularly in the area of bead overlap. However, the greatest disadvantage is the depth of weld deposit, which is less than half of the usable shell thickness in most mills. Because of this, the stainless rolls require re-welding on a routine basis. By providing a significantly cheaper in house and more robust alternative of the existing bottom pinch rolls , this innovation results in significant lower worries for the roll shop. Pinch rolls now don't have to be sent outside Jamshedpur for refurbishment or for procuring new ones. Scrapped rolls from adjacent Cold Mill are procured and sent for machining to our Machine Shop inside Tata Steel works in Jamshedpur. This is far more convenient than the older methodology. The idea is also being deployed to the other hot mills of Tata Steel. Multiple campaigns have been tried out at both down coilers of Hot Strip with significantly lower wear.

Keywords : hot rolling flat, cold mill work roll, hot strip pinch roll, strip surface

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