

Overview: High speed steels for hot rolling mill rolls

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Abstract. The development of materials for the outer shell has enjoyed rapid advances beginning in the early 1980s, culminating in the application of cast alloys of the Fe-C-Cr-W-Mo-V system, which replaced high-chromium cast iron and Ni-hard cast iron with better performance. These alloys are generically termed high speed steels (HSS) or, less often, multi-component white cast irons (MWCI).

The idea of using these alloys for the manufacture of work rolls for hot-strip mills resulted from an insight into the requirements involved in this type of application: fundamentally, the capacity to retain a high level of hardness even when submitted to high temperatures, and also wear resistance. Both are fulfilled by the classical high speed steels.

The development of the microstructure in high speed steels through solidification and heat treatment is reviewed, emphasizing the effects of the alloy chemical composition and of the cooling rate on the features of the matrix and eutectic carbides.

Work roll damage is a complex process characterized by the simultaneous operation of several damage modes. The relationship between damage modes and features of the HSS microstructure is discussed.

Keywords: *high speed steel, rolling mill roll, multi-component white cast iron*