

Abrasive Wear Resistance of Hypoeutectic 16 wt% and 26 wt% Cr Cast Irons with Molybdenum

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Abstract. Hypoeutectic 16 wt% and 26 wt% Cr cast irons with nil, 1 and 3 wt% Mo were prepared in order to investigate their abrasion wear resistance. The annealed test pieces were hardened from 1323 K and then tempered at three levels of temperatures between 673 and 823 K for 7.2ks, the temperature giving the maximum hardness ($H_{T_{max}}$), lower temperature than that at $H_{T_{max}}$ ($L-H_{T_{max}}$) and higher temperature than that at $H_{T_{max}}$ ($H-H_{T_{max}}$). The abrasive wear behavior was evaluated using the two-body type abrasion wear test or Suga abrasion wear test. It was found that hardness and V_{γ} in the heat-treated specimens varied depending on the Cr and Mo content. A linear relation was obtained between wear loss and wear distance. The lowest wear rate (R_W) was obtained in the $H_{T_{max}}$ specimen. The highest R_W was obtained in the $H-H_{T_{max}}$ specimen. Under the same heat treatment condition, the R_W in 16% Cr cast iron was much larger than that in 26% Cr cast iron. The R_W decreased with increasing the hardness in the both series of the cast irons. The lowest R_W obtained in the specimen with a certain amount of retained austenite, 25% V_{γ} in 16% Cr cast iron and 15% V_{γ} in 26% Cr cast iron, respectively.

Keywords: High chromium cast irons, abrasive wear resistance, heat treatment, hardness, volume fraction of retained austenite