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 (HTmax), lower temperature than that at HTmax (L-HTmax) and higher temperature than that at HTmax (H-HTmax). 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 Vγ 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 (RW) was obtained in the HTmax specimen. The highest RW was obtained in the H-HTmax specimen. Under the same heat treatment condition, the RW in 16% Cr cast iron was much larger than that in 26% Cr cast iron. The RW decreased with increasing the hardness in the both series of the cast irons. The lowest RW obtained in the specimen with a certain amount of retained austenite, 25%Vγ in 16% Cr cast iron and 15%Vγ in 26% Cr cast iron, respectively.

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