

# IMPROVING WEAR PROPERTIES OF HIGH-CHROMIUM CAST IRON BY MANGANESE ALLOYING

ali hadji, Khédidja BOUHAMLIA, Hichem MAOUCHE

**Abstract:** High-chromium cast irons are widely needed by several industrial areas where wear is the dominant environment. They are used in mining, cement- and steel-making plants, and many others. Their microstructure consists of netted eutectic carbides embedded in an austenitic or martensitic matrix. The wear behaviour is mainly controlled by the carbides shape and also matrix type. Several scientific works try to improve the wear behaviour and to optimize the life service of this cast iron by using various techniques. In this work, we intend to study the effect of manganese content on the microstructure properties and wear behaviour of a 15 % chromium white cast iron used for ball mill production. The present work treats the wear behaviour, after heat treatment, of a manganese-alloyed high-chromium cast iron. A set of specimens were melted in an induction oven by varying the manganese content in the range 0–3 %. Heat-treated samples were analysed by optical microscopy, MEB (SEM) scanning electron microscopy, differential scanning calorimetry, and X-ray diffraction and were wear tested by abrasion and friction. Increasing the manganese addition gave a structural evolution and a wear resistance improvement. The best wear behaviour is obtained with samples containing 3 % Mn.

**Keywords :** Chromium cast iron, carbide-forming elements, eutectic carbides, secondary precipitation, abrasion, friction