

Reciprocating wear behavior of mild steel carburized using Na₂CO₃-NaCl

Abstract

The surface of the mild steel carburized using Na₂CO₃-NaCl was dominated by retained austenite. Towards the core, the amount of austenite reduced while the amount of martensite increased. Increasing the duration of the carburization resulted in higher peak hardness and case depth. It also increased the amount of cementite in the grain boundaries and the austenite grains size, rendering the steel more susceptible to cracking. The superior wear resistance of the martensite, as compared to the austenite, could be attributed to its high cracking and adhesive wear resistance owing to its high hardness and tendency to form oxides. The friction was governed by the wear mechanism and the type of microstructure at the worn scar sliding on the carbide ball.