

Investigation of Specific Wear Rate of Austenitic and Duplex Stainless Steel Alloys in High Temperatures

Authors : Dler Abdullah Ahmed, Zozan Ahmed Mohammed

Abstract : Wear as an unavoidable phenomenon in stainless steel contact sliding parts is investigated In this work. Two grades of austenitic AISI 304, and S31254, as well as duplexes of S32205, and AISI 2507, were chosen to compare their wear behavior in temperatures ranging from room temperature to 550°C. The experimental results show that AISI 304 austenitic and AISI 2205 duplex stainless steel had lower wear resistance compared with S31254 and AISI 2507 in various temperatures. When the temperature rose to 140°C, and the wear rate of all grades increased, AISI 304 had the highest at 7.028×10^{-4} mm³/Nm, and AISI 2507 had the lowest at 4.9033×10^{-4} mm³/Nm. At 300°C, the oxides began to form on the worn surfaces, causing the wear rate to slow. As a result, when temperatures exceeded 300°C, the specific wear rate decreased significantly in all specimens. According to the XRD patterns, the main types of oxides formed on worn surfaces were magnetite, hematite, and chromite.

Keywords : wear, stainless steel, temperature, groove, oxide

Conference Title : ICMME 2024 : International Conference on Metallurgical and Materials Engineering

Conference Location : Amsterdam, Netherlands

Conference Dates : August 05-06, 2024