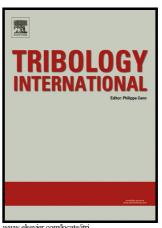
Author's Accepted Manuscript

Study of the Interfacial Mechanism of ZDDP Tribofilm in Humid Environment and its Effect on Tribochemical Wear; Part I: Experimental

Pourya Parsaeian, Marcel C.P. Van Eijk, Ileana Nedelcu, Ardian Morina, Anne Neville



www.elsevier.com/locate/itri

PII: S0301-679X(16)30436-4

DOI: http://dx.doi.org/10.1016/j.triboint.2016.11.012

Reference: JTRI4451

To appear in: Tribiology International

Received date: 12 September 2016 Revised date: 28 October 2016 Accepted date: 7 November 2016

Cite this article as: Pourya Parsaeian, Marcel C.P. Van Eijk, Ileana Nedelcu. Ardian Morina and Anne Neville, Study of the Interfacial Mechanism of ZDDl Tribofilm in Humid Environment and its Effect on Tribochemical Wear; Part I Experimental, Tribiology International http://dx.doi.org/10.1016/j.triboint.2016.11.012

This is a PDF file of an unedited manuscript that has been accepted fo publication. As a service to our customers we are providing this early version o the manuscript. The manuscript will undergo copyediting, typesetting, and review of the resulting galley proof before it is published in its final citable form Please note that during the production process errors may be discovered which could affect the content, and all legal disclaimers that apply to the journal pertain

ACCEPTED MANUSCRIPT

Study of the Interfacial Mechanism of ZDDP Tribofilm in Humid Environment and its Effect on Tribochemical Wear; Part I: Experimental

Pourya Parsaeian*, Marcel C.P. Van Eijk, Ileana Nedelcu, Ardian Morina, Anne Neville

^aUniversity of Leeds, School of Mechanical Engineering, institute of Functional Surfaces, Leeds, UK. SKF Engineering and Research Centre, The Netherlands

*Corresponding author: E-mail address: p.parsaeian@leeds.ac.uk (Pourya Parsaeian)

Abstract

Wear performance of any tribological system can be influenced in a complex way by water contamination. Water can be the cause of steel corrosion which, in turn, can accelerate wear. It can decompose the additives in the oil and create a more corrosive environment which leads to the higher wear in the system. A key novelty of this study is to investigate the effect of relative humidity and the tribochemical changes on the tribological performance and tribofilm characteristics of boundary lubricated systems by means of designing a humidity control system integrated to the Mini Traction Machine (MTM) and Spacer Layer Interferometry Method (SLIM) for the first time. The system is capable of simulating rollingsliding conditions continuously where lubricant can be contaminated with water. This paper is the first part of a two-part study and the theoretical aspects of the work is the subject of the second part of this investigation. It was observed that humidity hinders the tribofilm formation, especially at higher values of relative humidity and lower temperatures and it can significantly affect the wear process. The correlation between tribofilm thickness, water concentration, temperature and wear of the system was studied. The experimental results suggest that the higher the humidity, the higher the wear of the system and it is more noticeable at lower temperatures where the tribofilm in thinner. The surface chemistry of zinc polyphosphates was investigated as a function of humidity.

Keywords: ZDDP, Boundary lubrication, Relative humidity, Wear

Download English Version:

https://daneshyari.com/en/article/4986220

Download Persian Version:

https://daneshyari.com/article/4986220

Daneshyari.com