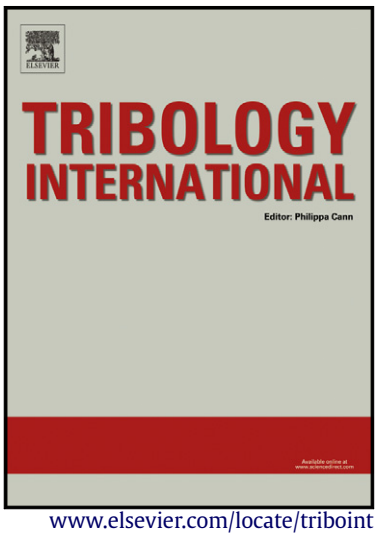
Author's Accepted Manuscript



www.elsevier.com/locate/triboint

Determination of oil demand for textured surfaces under conformal contact conditions

Slawomir Wos, Waldemar Koszela, Pawel Pawlus

PII: S0301-679X(15)00215-7
DOI: http://dx.doi.org/10.1016/j.triboint.2015.05.016
Reference: JTRI3691

To appear in: *Tribology International*

Received date: 5 September 2014
Revised date: 7 April 2015
Accepted date: 1 May 2015

Cite this article as: Slawomir Wos, Waldemar Koszela, Pawel Pawlus, Determination of oil demand for textured surfaces under conformal contact conditions, *Tribology International,* http://dx.doi.org/10.1016/j.triboint.2015.05.016

This is a PDF file of an unedited manuscript that has been accepted for publication. As a service to our customers we are providing this early version of 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

Determination of oil demand for textured surfaces under conformal contact conditions

Slawomir Wos, Waldemar Koszela, Pawel Pawlus*

* corresponding author, tel. +48-178651183, fax +48-178651183, email: ppawlus@prz.edu.pl

RZESZOW UNIVERSITY OF TECHNOLOGY, 35-959 RZESZOW, POWSTANCOW WARSZAWY 12, POLAND

Abstract

Tests were carried out in conformal starved lubricated conditions using a pin-on-disc tester with flat-on-flat configuration. Four types of textured discs were tested, the oil pockets of 5% and 17% densities were positioned in spiral and radial layouts. At the beginning of tests, the following volumes of L-AN 46 oil were supplied into the contact zone: 2.65 mm^3, 5.3 mm^3, 10.6 mm^3 and 21.2 mm^3. In further test parts, the sliding assemblies were not lubricated.

Higher dimples density resulted in small force fluctuation, smaller coefficient of friction and four times smaller oil demand compared to untextured disc or disc with smaller dimples density. Tribological performances of discs with smaller dimples density were better than those with untextured samples. The tribological behaviour of assembly with spiral dimples array was better than that with radial oil pockets layout for area density of 17%.

Keywords: surface texturing, friction force, pin-on-disc

Accepted manuscript

1. INTRODUCTION

Surface texturing results in improvement of tribological properties of sliding assemblies. The machined oil pockets (dimples, holes or cavities) can minimise friction force for mixed or full lubrication or can be traps for wear debris to prevent abrasive wear [1, 2, 3]. Dimples can be also a reservoir for lubricant in starved lubrication regime to prevent seizure. This mechanism was the reason of using plateau-honed cylinder surface, which joins good sliding properties of a smooth topography with an ability of maintain oil of a rough texture [4, 5, 6, 7].

The textured bronze specimens exhibited a much longer lifetime than untextured reference samples. This experiment was made using block-on-ring tester [8], sliding assembly was lubricated with only one drop of commercial oil.

Surface texturing caused decrease in the friction force of 75% in starved lubricated conditions, using pin-on-disc tester [9]. This kind of tester was applied to study the effects of

Download English Version:

https://daneshyari.com/en/article/614228

Download Persian Version:

https://daneshyari.com/article/614228

Daneshyari.com