7TH BALKANTRIB'11

International Conference on Tribology

PROCEEDINGS

Editor: Prof. K.-D. BOUZAKIS

3-5 October 2011, Thessaloniki-GR

▶Contents

7TH BALKANTRIB'11
International Conference on Tribology

PROCEEDINGS

Editor: Prof. K.-D. BOUZAKIS

3 - 5 October 2011, Thessaloniki-GR

Contents

7th BALKANTRIB'11
International Conference on Tribology

PROCEEDINGS

ISBN 978-960-98780-6-7

Thessaloniki - Greece

Printed by

EDITIONS ZITI
18th klm Thessaloniki - Perea
P.O. Box 4171 – 570 19 Perea -Thessaloniki
Tel.: +30 2392 072.222 – Fax: +30 2392 072.229
e-mail: info@ziti.gr

www.ziti.gr

Contents

SCIENTIFIC COMMITTEE

Conference Chairmen

Prof. K.-D. Bouzakis, *Greece*
Prof. S. Mitsi, *Greece*

International Scientific Committee

Prof. G. Andreadis, *Greece*
Prof. N.N. Antonescu, *Romania*
Prof. E Assenova, *Bulgaria*
Prof. M. Babic, *Serbia*
Prof. G. Cholakov, *Bulgaria*
Prof. E. Diaconescu, *Romania*
Prof. F. Dimofte, *USA*
Prof. K. Efstathiou, *Greece*
Prof. E. Iakovou, *Greece*
Prof. S. Ivanov, *Bulgaria*
Prof. B. Ivkovic, *Serbia*
Prof. G. Haidemenopoulos, *Greece*
Prof. M. Kandeva, *Bulgaria*
Prof. Ch. Karachaliou, *Greece*
Prof. Zh. Kalitchin, *Bulgaria*
Prof. M.B. Karamis, *Turkey*
Prof. N. Manolov, *Bulgaria*
Prof. G. Mansour, *Greece*
Prof. A. Michailidis, *Greece*
Prof. N. Michailidis, *Greece*
Prof. G. Mischev, *Bulgaria*
Prof. I. Mitov, *Bulgaria*
Prof. R. Paraskevopoulou, *Greece*
Prof. D. Pavelescu, *Romania*
Prof. A. Rac, *Serbia*
Prof. V. Pojidaeva, *Bulgaria*
Prof. G. Savaidis, *Greece*
Prof. P. Seferlis, *Greece*
Prof. G. Skordaris, *Greece*
Prof. K. Stanulov, *Bulgaria*
Prof. I. Tsiafis, *Greece*
Prof. A. Tudor, *Romania*
Prof. G. E. Zaikov, *Russia*
Prof. D. Vlachos, *Greece*

ORGANIZING COMMITTEE

President:
Prof. K.-D. Bouzakis

Vice Presidents:
Prof. S. Mitsi
Prof. K. Efstathiou

Treasurers:
Prof. G. Mansour
Mr S. Kalambokidis

Secretariat:
Dipl.-Phys., MSc. O. Tacha
Mrs. E. Melliou

Members:

Prof. I. Tsiafis
Prof. G. Andreadis
Lect. R. Paraskevopoulou
Dipl.-Eng. M. Grigoriadou
Dipl.-Eng. G. Giannopoulos
Dipl.-Eng. G. Kalidaropoulos
Dr.-Eng. E. Bouzakis
Dr.-Eng. G. Maliaris
Dr.-Eng. I. Mirisidis
Dr.-Eng. G. Skordaris
Dr.-Eng. A. Tsouknidas
Dr.-Eng. E. Varitis
Dipl.-Eng. M. Batsiolas
Dipl.-Eng. S. Gerardis
Dipl.-Eng. G. Katirtzoglou
Dipl.-Eng. S. Kombogiannis
Dipl.-Eng. S. Makrimallakis
Dipl.-Eng. M. Pappa

SPONSORS

Mechanical Engineering Department,
School of Engineering,
Aristoteles University Thessaloniki

Research Committee of the
Aristoteles University Thessaloniki

Scientific Sponsor:
International Institution for Production Research (CIRP)

Contents

WEAR PROPERTIES OF SHOT PEENED SURFACES OF 36NiCrMo16 ALLOYED STEELS UNDER LUBRICATED CONDITION

M. Babic[1], D. Adamovic[1], S. Mitrovic[1], F. Živic[1], D. Dzunic[1], M. Pantic[1]

1. Faculty of Mechanical Engineering, Sestre Janjic 6, Kragujevac, Serbia

ABSTRACT

Shot peening processing is used to increase static and dynamic strength of the working part. Not just a change of surface layers characteristics but also a change of tribological characteristics can be obtained by using this method.

Results of laboratory investigations presented and analysed in this paper are related to effects of final machining by shot peening as a surface plastic forming, and they are further tribologically validated by wear tests using 36NiCrMo16 alloyed steel.

Tribological investigations showed that total effects of final machining by shot peening have positive influence on tribological behaviour of machined parts and that they can contribute to improvement of tribological level of tribomechanical elements.

KEYWORDS: Shot Peening, Wear, Friction, Alloy Steel

1. INTRODUCTION

Character and intensity of tribological process and consequently exploitation characteristic of tribomechanical elements depend on microgeometry of contact surfaces. Existence of optimum roughness can be discussed from aspects of friction and wear intensity. Roughness variation in both directions if compared to its optimum value is followed by increase of the friction coefficient and wear intensity. Parameters of shape and micro-roughness, such as radius of asperities tips and exponent of the bearing curve of profile, are of special significance for tribological processes development.

Optimum values do not have universal character, but are conditioned by spectra of parameters of working conditions and contact pair structure. In case when micro-geometry parameters deviate from optimum values, then optimal or equilibrium level to which minimum potential energy corresponds, is realised during a running-in period. Running-in of contact surfaces represents period of initial wear. Intensive plastic forming occurs and also asperities destruction followed by surface layer hardening /1/, due to relatively high specific mechanical loads conditioned by small real area of contact at newly machined surfaces.

Microgeometry of contact surfaces represents very important aspect often neglected during parameters specification of shot peening, process qualification and production control /2,3/. Shot peening can eliminate or mitigate negative effects of surface defects, in case when shot bombardment ball is properly adopted to surface topography. Surface that is created after the shot peening is anisotropic.

By knowing Ra roughness parameter, we intuitively know that lower roughness corresponds to higher fatigue time. This is justified if we compare surfaces obtained by the same machining process, but it can be a wrong approach if surfaces created by different processes are compared. It is not correct to compare surfaces created by different processes (grinding, lathe turning, etc.) and that same surface obtained after shot peening.

Schematic representation of surface roughness obtained by shot peening (surface A) and by other processing (surface B) is given in Figure 1. Surfaces A and B have same Ra (mean arithmetic deviation of surface) and thus can be considered to have the same fatigue life Intuitively we know that the fatigue characteristics of surface A are better than surface B, because the stress concentration at the bottom of the B valley is much higher than in case of A.