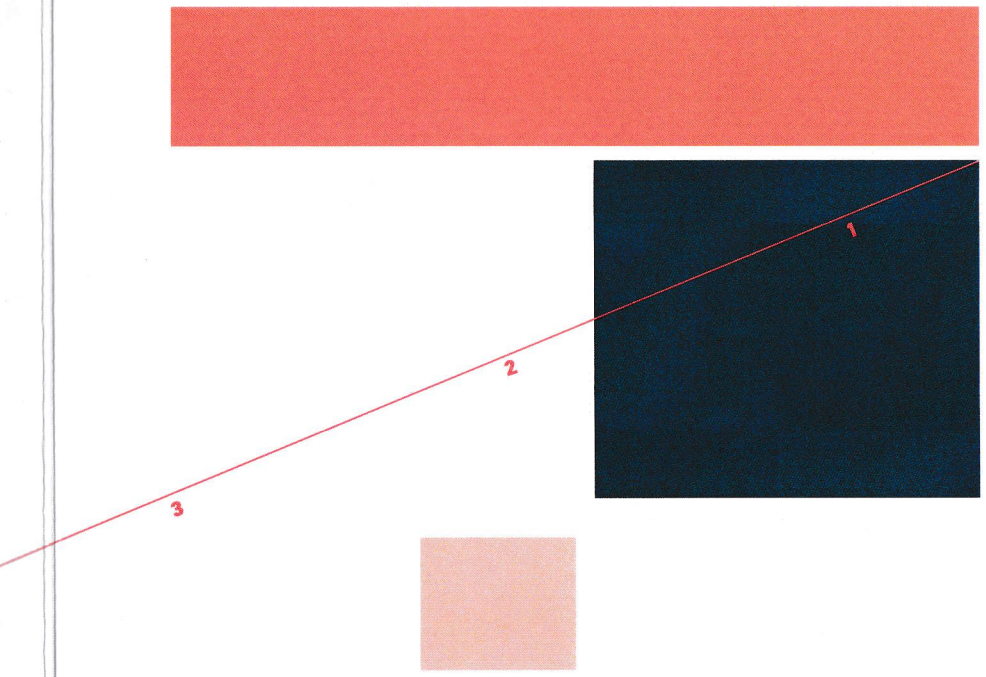
23rd International Baltic Conference

Materials Engineering 2014

Book of Abstracts



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Association of Baltic Materials Societies
Lithuanian Materials Research Society

23rd International Baltic Conference

MATERIALS ENGINEERING 2014

Book of Abstracts

October 23-24, 2014
Kaunas
Lithuania

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Abstracts included in this book were not refered.

PREFACE

The book you are currently holding contains the Abstracts of papers presented in the 23rd International Baltic Conference on **Materials Engineering 2014** which was held in Kaunas, Lithuania, October 23-24, 2014.

The conference attracted many of the best known leading scientists and specialists from almost all of the different fields of expertise covering materials engineering issues: New Materials, Powder Metallurgy, Foundry Technology, New Experimental Techniques, Textile and Wood Materials, Coating Technology, Tribology, and Welding Technology.

At 2014 were received 88 contributions from 13 countries. Over 95 participants from 11 countries took part in the conference. Continues the tradicion all the contributions have been peer-reviewed and just selected paper will be published in the Special Issue of Journal *Materials Science (Medžiagotyra)*.

We want to thank all authors, referees, members of the Organizing Committee, the Programme Committee, and International Scientific Committee, chaired by Professor S. Tamulevičius for their efforts, which made the Conference possible.

23rd International Baltic Conference **Materials Engineering 2014** was organized by Kaunas University of Technology, faculty of Mechanical Engineering and Design, Department of Production Engineering with the collaboration and support of the Association of Baltic Materials Societies, the Lithuanian Materials Research Society.

We hope these abstracts will serve as a valuable source of information on the state of the art in materials engineering.

With kind regards,

On behalf of Organising Committee
Conference Chair
Assoc. Prof. R. Bendikienė

and an Al_2O_3 ball. After the tests, the state of the surface was analyzed to find the differences in the wear mechanism between the individual composites.

DISTRIBUTED MULTI-SENSOR REAL-TIME MONITORING SYSTEM WITH REMOTE DATA ACCESS

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[2]Institute of Electronics and Computer Science, Latvia
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In this paper the advanced monitoring system of multiple environmental parameters is presented. The purpose of the system is the estimation of energy efficiency for the research stands with different constructions. The structure of a data acquisition system includes a real-time interface with sensors and a data logger that allows to acquire and to log data from all sensors with fixed rate. The data logging system provides a remote access to the processing of the acquired data and carries out periodical saving at a remote FTP server using an Internet connection. The structure of the system and the usage of sensors are presented. Different interfaces with energy measuring devices are discussed. The implementation results of the system are presented.

This work has been supported by a funding from European Social Fund within the grant Nr. 2013/0027/1DP/1.1.1.2.0/13/APIA/VIAA/007.

PRACTICAL APPROACH FOR TOOL LIFE ESTIMATION

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Milling remains one of the most versatile technologies for detail shape creation in manufacturing. Machine tools with several axis of movement and precise numerical controls are able to manufacture complex geometries from medical implants to parts needed in space technology etc. Many factors influence the quality of the workpiece and the cost of the manufacturing. Tool choice being one with considerable impact. Depending on the specific type of milling operation and on the material of the billet, coating on the cutting tool can have significant influence to quality and cost of the process.

In this study an attempt is made to develop methodology for relatively simple but effective means for evaluating the quality and suitability of a

coating for a particular milling operation. Flank wear width is generally recognized as the key indicator for tool life criteria. Relatively complex geometry of the mill makes the flank wear measurements somewhat difficult. In practice several other indication of worn tool are used: changes in the spectra and level of the cutting sound, shape and color of the chip, quality of the manufactured surface and the presence of the burr. Here measurements by optical measurements are analyzed and reasoned. Additional information is found by scanning electron microscopy. Comparative experimental work has been conducted with cutting force measurements. Results of the two methods show good comparability. Several industrial coatings are tested.

CATHODIC CAGE PLASMA NITRIDING OF Ti6Al4V ALLOY

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Glow discharge nitriding process is increasingly being used for modifying the properties of titanium and its alloys with the aim to increase their frictional wear resistance, fatigue strength and unlike PVD methods ensures the formation of diffusive layers with very good adhesion to the substrate.

In the glow discharge assisted processes the effect of cathode sputtering allow, producing layers on materials that undergo auto-passivation like titanium and its alloys but as well hinders treatment of details with complicated shapes, e.g. fine threads or details with sharp edges or straight-through and blind holes. In those areas the effect of sputtering is more intense which causes the layers to have different surface topography or even of a different layer thickness and for ready-made parts unfavourable visual aspect. It is possible to eliminate the effect of cathode sputtering of treated parts with the application of active screen nitriding process. The cathode here is in a form of active screen called as well cathodic cage that enables the free flow of reactive gases around treated details. The details are isolated from the voltage applied to the screen and are in contact with the generated low-temperature plasma. Main advantages of the cathodic cage plasma nitriding process are: limitation of the influence on surface topography, maintaining high smoothness of nitrided elements and ease of treatment of thin-walled, small parts with complicated shapes.

The paper will show comparison of nitride layers produced on Ti6Al4V titanium alloy in conventional dc plasma nitriding (DCPN) and elaborated cathodic cage plasma nitriding (CCPN) processes as well practical examples of composite layers and parts produced using CCPN method.