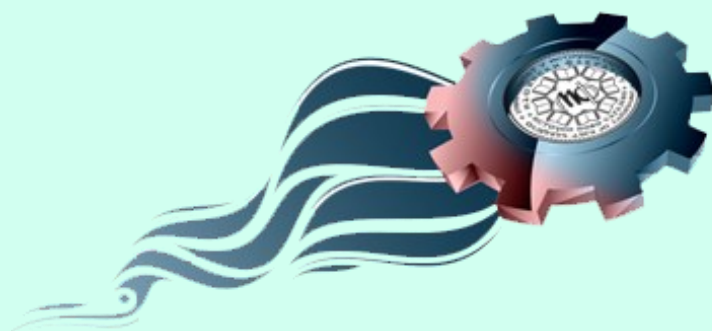




UNIVERSITY OF EAST SARAJEVO  
FACULTY OF MECHANICAL  
ENGINEERING



3<sup>rd</sup> INTERNATIONAL SCIENTIFIC CONFERENCE



***COMETa2016***

***„Conference on Mechanical Engineering  
Technologies and Applications“***

***PROCEEDINGS***

7<sup>th</sup>-9<sup>th</sup> December

East Sarajevo-Jahorina, RS, B&H

# COMET<sub>a</sub> 2016

3<sup>rd</sup> INTERNATIONAL SCIENTIFIC CONFERENCE

7<sup>th</sup> - 9<sup>th</sup> December 2016

Jahorina, Republic of Srpska, B&H



University of East Sarajevo

Faculty of Mechanical Engineering

Conference on Mechanical Engineering Technologies and Applications

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## **Z B O R N I K   R A D O V A**

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*Istočno Sarajevo – Jahorina, BiH, RS*  
*7 - 9. decembar 2016.*

*East Sarajevo – Jahorina, B&H, RS*  
*7<sup>th</sup> – 9<sup>th</sup> December 2016.*

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PROCEEDINGS OF THE 3<sup>rd</sup> INTERNATIONAL  
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## PREFACE

*Production in developed countries is based on the modernization and optimization of the production processes with the application of new technologies that are the result of scientific research. The application of new technology enables company's efficient production and competitiveness in the world market.*

*Faculty of Mechanical Engineering, University of East Sarajevo, organizes the Third international conference "COMETa2016 - Conference on Mechanical Engineering Technologies and Application", which has tasks: to increase economic competitiveness in the region and to give an contribution to creation of unique European Research Area.*

*Globally, we are witnessing a rapid development and a host of new technological solutions, which occur primarily in the multidisciplinary development (mechatronics) but also in development of completely new technologies, such as nanotechnology, biomaterials, bioengineering, new energy sources, intelligent machines and processes, micro-technique, etc. All of this puts researchers and engineers in the new challenges and creates opportunities for products and technologies that provide a precondition for economic recovery and creation of new jobs.*

*COMETa2016 conference program structure is consisted of the following thematic areas: Production technologies and advanced materials, Energy and environment, Applied mechanics and mechatronics, Development of products and mechanical systems, Quality and management and Organization and maintenance.*

*Participation in international conference COMETa2016 was achieved by: 202 authors from 9 countries, with a total of 78 papers, including 3 plenary lectures.*

*Inside of conference COMETa2016 has been planned organization of one working meeting and two round table discussion based on actual topics of conference. During the conference, it will be presented some of technical solutions produced in companies from our region.*

*The presence of a large number of participants from Bosnia and Herzegovina and abroad as well as the problems which are processed at the conference, coincide with the themes promoted by the European Union in its development programs.*


*On the basis of previous exposure, a gathering of scientists and researchers at the international conference COMETa should be understood not only as an exchange of knowledge and achievements of the narrower set of scientists and researchers, but also as a constant and serious attempt to focus social consciousness and social life on activities that ensures progress and prosperity of any society, and that is productive work, creating new knowledge and economic development.*

*On behalf of the Organizing Committee and Scientific Committee of the Conference COMETa2016, we want to express our gratefulness to all authors, reviewers, as well as institutions, companies and individuals who contributed to realization of the Conference.*

*East Sarajevo, November 19<sup>th</sup>, 2016.*

*President of the Scientific Committee*

*Prof. dr Biljana Marković*



*President of the Organizing Committee*

*Prof. dr Ranko Antunović*





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## OPTIMIZATION OF VENTILATED DISC BRAKE VANES FOR HEAVY DUTY VEHICLE

Nadica Stojanović<sup>1</sup>, Jasna Glišović<sup>2</sup>, Nenad Marjanović<sup>3</sup>, Ivan Grujić<sup>4</sup>

*Abstract: The important task for automotive engineering researchers today is to design such brake system that under all operating conditions (emergency braking, mild short-term braking and mild long-term downhill braking) has stable performances. Today, all the highest performance car manufacturers have ventilated disc brakes all around for the shortest stopping distances. However, air disc brakes for heavy duty vehicles are not far behind them. The study of the influence of the dimension of vanes to the mass of ventilated disc and deformation that occurs in the braking process is performed in this paper. Optimization process is performed in ANSYS software, by using Screening method. Application of virtual experiments during the early stage of product development provides money saving during manufacturing. Also it is possible to make a modification of the product and certainly produce such a product which will enable the manufacturer a secure market position.*

*Key words: heavy duty vehicles, optimization, ventilated disc brakes*

### 1 INTRODUCTION

Optimization techniques have the task of finding the "best" solution of the specific, mathematically defined problem. Determining the best solution or solutions close to the best leads to savings in materials and energy (whose resources are limited) or achieving the financial profit, the highest reliability or safety in operation, etc. Optimization approach tends to minimize the negative effects (effort, cost, etc.) or maximizing the positive effects (profit) [1].

Disc brakes are a typical example of axial brakes, where the pressure acting on the friction surface is realized in the direction of the rotational member's axis. In this solution the disc is attached to a wheel of the vehicle, while a caliper is attached to the supporting structure of a vehicle [2].

Disc brake and brake pads have the basic task to slow down or stop the

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