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Извештај

са учешћа на конференцији
COMETA 2018 – 4th International Scientific Conference

Поштовани,

У периоду од 27-30.11.2018. године учествовала сам у раду конференције " COMETA 2018 – 4th International Scientific Conference“ у организацији: Универзитета у Источном Сарајеву - Машинског факултета. Конференција је одржана на планини Јахорина, у хотелу Бистрица.

На отварању конференције присуствовали су представници из Владе Републике Српске и управе Машинског факултета у Источном Сарајеву. У оквиру конференције предавања су била организована у неколико сесији. Рад који сам ја представила са коауторима, под називом:

„Design of the transition zone of the turbine shaft to flange by biomimetics principles”, Д. Момчиловић, И. Аманасовска, Р. Мумровић

нашао је на велико интересовање колега и био је тема дискусије и након самог излагања резултата.

На конференцији су учествовале колеге из 13 земаља, углавном из региона, али и из неколико западноевропских земаља. Предавања су била веома посећена и пре свега поткрепљена дугим и богатим дискусијама.

У радном делу конференције била је уврштена и промоција књига-уџбеника колега професора са Машинског факултета у Источном Сарајеву. Поред радног дела програма, симпозијум је садржао и прилику за неформалне разговоре, успостављање нових контаката и идеја за будућа заједничка истраживања. Ово је било посебно значајно за мене, јер сам обновила постојеће контакте са колегама из региона, али успоставила и нове контакте са колегама који су веома заинтересовани да своје резултате у наредном периоду представе на Семинарима у МИ САНУ и да учествују у конференцијама које организујемо.

Изложени радови објављени су у Зборнику радова у електронској форми.

У прилогу Извештаја достављам: Потврду о прихватању рада за усмено излагање, Копију првих страница Зборника радова, Копију првих страница објављеног рада и неколико фотографија.

С поштовањем,

У Београду, 04.12.2018.



др Ивана Атанасовска,
виши научни сарадник

Прилози:

COMET α 2018

4th INTERNATIONAL SCIENTIFIC CONFERENCE

27th - 30th November 2018

Jahorina, Republic of Srpska, B&H



University of East Sarajevo

Faculty of Mechanical Engineering

Conference on Mechanical Engineering Technologies and Applications

East Sarajevo, 10.10.2018.

Paper No: COMET α 2018 – 51

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DESIGN OF THE TRANSITION ZONE OF TURBINE SHAFT TO FLANGE BY BIOMIMETICS PRINCIPLES

Author (s):

Dejan Momčilović, Ivana Atanasovska, Radivoje Mitrović

Dear colleagues,

It is our pleasure to inform You that Your above mentioned paper has been accepted by Scientific Committee for presentation on 4th International Scientific Conference "COMET α 2018 - Conference on Mechanical Engineering Technologies and Application ", which will be held on the mountain Jahorina, hotel Bistrica, November 27th-30th, 2018.god.

More information about conference You can find on the following sites:

www.ues.rs.ba

www.maf.ues.rs.ba

Best regards,

President of the Organizing Committee

Prof. dr Milija Krašnik



UNIVERSITY OF EAST SARAJEVO
FACULTY OF MECHANICAL
ENGINEERING



4th INTERNATIONAL SCIENTIFIC CONFERENCE



COMETa2018

„Conference on Mechanical Engineering
Technologies and Applications“

PROCEEDINGS

27th-30th November
East Sarajevo-Jahorina, RS, B&H

ZBORNİK RADOVA SA 4. MEĐUNARODNE
NAUČNE KONFERENCIJE
"Primijenjene tehnologije u mašinskom inženjerstvu"
COMETa2018, Istočno Sarajevo - Jahorina 2018.

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DESIGN OF THE TRANSITION ZONE OF TURBINE SHAFT TO FLANGE BY BIOMIMETICS PRINCIPLES

Dejan Momčilović¹, Ivana Atanasovska², Radivoje Mitrović³

Abstract: The consideration of the optimal design of the transition zone of turbine shaft to flange has a high impact within the turbines design. The main principles of biomimetics give a new and prosperous point of view on the machine design, and could recommend new options in the design solutions for the zones with high stress concentrations. In this paper, a particular turbine shaft with flange is used for research of the possible biomimetics solutions in the zone of the transition radius. The traditional design of this transition zone is compare with the new design option inspired with transition zones in nature. The presented turbine shaft to flange design by biomimetics principles are based on the design of transition zones on trees. The Finite Element Analysis is performed for the traditional designed transition zone, as well as for the transition zone with design based on the biomimetics. The comparative analysis of the obtained results leads to the conclusions about the advantages of the biomimetics approach in this area of machine design.

Key words: Biomimetics, Finite Element Analysis, Fatigue, Fracture, Turbine shaft

1 INTRODUCTION

Machines are in many respects similar to living creatures. Their birth is laborious thing. They get afflicted with childhood illnesses (the period of initial trials) and undergo a sort of adolescence (the break-in period); then they work for a long time, get old, and eventually pass away. Machines ache from rough handling, their bodies collect scratches and dents which deteriorate. It is no wonder that such terms from the world of the living as "aging," "fatigue," "inheritance," "survivability," [1] exist in theory of machine design.

Last decade, the present and the future requirements in machine element design are shifted toward energy efficiency, as a common term that describe longer life of machines and more reliable operation with diminishing overhaul periods. Optimization of machine elements geometry is also one of key pathways toward that goal of the energy efficiency. Using biomimetic principles as inspiration, fine optimization of present

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Design of the transition zone of turbine shaft to flange by biomimetics principles

geometries of machine elements can be done, which will lead to longer and safer life of machines. The good example of solutions offered by nature, with emphasize on design of geometry can be found in the references of few authors dedicated to research in this area [2-3].

2 THE BASIC BIOMIMETICS PRINCIPLES

Biomimetics is a word that emerged as a combination of words: bios - life and mimetic - imitation. Biomimetics is a discipline that finds sustainable technological solutions using patterns and strategies of nature that have passed the most difficult tests of evolution and time. Biomimetics is different from other bio-approaches based on the targeted observation and study of organisms and ecosystems, and the application of the so-called basic design principles in innovation. Although Otto Schmitt defined this discipline in 1957, now is the right moment for biomimetics, as the processes of developing of the human awareness about the need for returning to the nature and to establishing harmony with the environment (expressed through the requirements for Sustainable Development, Ecology and Energy Efficiency) and high technological development in all spheres (Measuring Instruments, Mathematical Methods, Production Technologies) achieve their peak, [4]. In that sense, it is not surprising that this discipline tends to be the top interest of scientists, first of all those who deal with a multidisciplinary approach.

2.1 Transition radius on trees

In this paper, the biomimetics principles are used in the research of the innovative design for the transition zones of the high loaded shafts. The inspiration is found in the geometry solutions of the nature in the case of trees, [2]. In figure 1 two examples of the transition zone on trees are shown.



Figure 1. Transition zone on trees:
(a) Platanus in Topčider park, in Belgrade, Serbia, photo: D. Momčilović;
(b) The tree in the forest with the geometrically reconstruction of transition zone, [2]

Прилог: Фотографије са конференције



