



University of Banja Luka
Faculty of Mechanical Engineering
26th - 28th May 2011

DEMI 2011

*10th Anniversary International Conference
on Accomplishments in
Electrical and Mechanical Engineering and
Information Technology*

PROCEEDINGS

ZBORNIK RADOVA

BANJA LUKA, May 2011.



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**PROCEEDINGS OF THE 10th ANNIVERSARY INTERNATIONAL CONFERENCE ON
ACCOMPLISHMENTS IN ELECTRICAL AND MECHANICAL ENGINEERING AND
INFORMATION TECHNOLOGY**

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PREFACE

This year, the 10th Anniversary International Conference on Accomplishments in Electrical, Mechanical Engineering and Information Technology DEMI is going to be held. The number of countries taking part in DEMI is increasing so this year scientists and researchers from 17 countries are going to take part. This modest jubilee, but with a considerable number of participants, points to the fact that that DEMI Conference is becoming an internationally recognized conference with respectable participants from technologically developed countries.

The first DEMI Conference was held in 1998 and was organized by the Faculty of Mechanical Engineering in Banja Luka having aimed to draw together university and institute scientists and professionals as well as experts from a very weakened, post-war economy. Such mission and role of the DEMI Conference has remained one of its priorities to this day. From 1998-2003, the DEMI Conference was being held every year, and after that time, it started to be held every two years. The DEMI became a traditional conference and it took over a significant but demanding role of gathering researchers and scientists as well as economy experts with the aim to foster faster implementation of contemporary research and new technologies in production processes in order to ensure better competitiveness of our industry. Definitely, this task has not been an easy one to achieve.

This 10th anniversary DEMI Conference has seen a significant progress. For the first time, the official language of the Conference is English. The number of papers to be presented at the Conference is 145 from 17 countries (former Yugoslav countries, Austria, Germany, Switzerland, Italy, Norway, Poland, Romania, Bulgaria, Turkey, Australia, New Zealand). The previous DEMI 2009 Conference brought together researchers and scientists from 11 countries which indicates a greater interest in this conference. The Conference activities will be realized in six sections which encompass the following thematic fields: Production Technologies and Engineering, Mechanics and Design, Traffic Means, Thermotechnique and Energetics, Maintenance of Technical Systems and Mechatronics. Key note lectures will be delivered by scientists from universities from Switzerland, Norway, Serbia and Croatia who are involved in researches of the highest scientific level in the fields of: mechatronics, energetics, modern approaches to machine structure and product design, the ecology of transportation and global warming, paradigms of contemporary production and a company's adjustment to the current market requirements, etc.

Therefore, we hope that the papers to be presented will contribute in considering and reflection on the present situation of research in mechanical and electrical engineering as well as information and communications technologies in the regional conditions, enable comparison with developed European countries and offer new models for faster implementation of contemporary research as to encourage production in the country. As it is the most important scientific and professional conference in the fields of mechanical engineering, information and communications technologies in our country, this is expected from the DEMI Conference with good reason.



NVH INVESTIGATION OF POWER STEERING SYSTEM HYDRAULIC PUMP

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Summary: Paper presents a method for analyzing the noise and vibration problem caused by hydraulic pump of a vehicle power steering system. The method is based on experimental research and coherent analysis of observed system. Measurements are performed order to determine dominant excitation of hydraulic system in different operating conditions. Pump number of revolution was constant and was varied. Pressure of oil in hydraulic system is varied too. A method of assessment and determination of dominant NVH pump excitation is presented. Experimental results are input and output data in coherent analysis. Results showed that number of measuring channels can be reduced, especially in high frequency domain. Obtained results can be used in experiment design.

Key words: vehicle, steering system, hydraulic pump, NVH, noise, vibration, coherent analysis

1. INTRODUCTION

Contemporary vehicles are faced with undesirable fluid borne, structure borne and airborne noise. Fluid borne noise is typically generated in the fluid reservoir or in the hydraulic lines and could propagate through the mounting brackets. Structure borne noise transmitted to the driver via body structure through the pump mount, engine mounts, lines and system mounting brackets. Moan is the structure borne noise. Moan frequency is driven by natural frequency and harmonics of the pump rotational Vane Passing Frequencies or Blade Pass Frequency, depending on type of the pump [2, 4, 9, 10].

The noise generated by pump of power steering systems is an example of this kind of problem. Vane pumps are used in the majority of steering systems in automotive applications. These pumps generate noise due the vane passing frequency. Basically, the hydraulic pump noise can be classified as moan or whine, regarding the operating condition [2, 4, 5, 6].

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