International Congress
Motor Vehicles & Motors 2014

VEHICLE AS A SAFETY FACTOR OF THE TRANSPORTATION ACTIVITY

Proceedings of Papers

October 9th - 10th, 2014
Kragujevac, Serbia

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Publisher: Faculty of Engineering, University of Kragujevac
Serbia, 34000 Kragujevac, Sestre Janjić 6

For Publisher: Prof. dr Miroslav Živković - Dean

Editors: Dr Božidar Krstić, prof.
Dr Dragan Taranović, assist. prof.

Technical preparation: Dr Dragan Taranović, assist. prof.

Picture on the cover: Nemanja Lazarević

Print CD: Faculty of Engineering, University of Kragujevac, Kragujevac

ISBN 978-86-6335-010-6

Year of publication: 2014.

Number of copies printed: 200

CIP - Каталогизација у публикацији
Народна библиотека Србије, Београд

629.3(082)
621.43(082)

INTERNATIONAL Congress Motor Vehicles & Motors (5th ; 2014 ; Kragujevac)
Vehicle as a Safety Factor of the Transportation Activity : proceedings / International Congress Motor Vehicles & Motors 2014, [5], October 9th-10th, 2014, Kragujevac, Serbia ; [congress organizers Faculty of Engineering, University Kragujevac ... [et al.] ; editors Božidar Krstić, Dragan Taranović]. - Kragujevac : Faculty of Engineering, 2014 (Kragujevac : Faculty of Engineering). - IX, 546 str. ; 30 cm

Tiraž 200. - Napomene i bibliografske reference uz tekst. - Bibliografija uz svaki rad.

ISBN 978-86-6335-010-6

Publishing of this book is supported by:

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- European Union by the "*DIAUSS - Development and Improvement of Automotive and Urban Engineering Studies in Serbia*" Joint Project [JP 516729-2011] as part Tempus Program

CONTENT

INTRODUCTORY LECTURES

SECTION A
Transport Challenges in Emerging Economies

SECTION B
Power Train Technology

SECTION C
Vehicle Design and Manufacturing

SECTION D
Vehicle Dynamics and Intelligent Control Systems

SECTION E
Driver/Vehicle Interface, Information and Assistance Systems

International Congress Motor Vehicles & Motors 2014

Kragujevac, October 9th-10th, 2014

MVM2014-034

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HUMAN BODY TRANSMISSIBILITY RESPONSE TO VERTICAL WHOLE BODY VIBRATION: ANTHROPOMETRICS EFFECTS – CASE STUDY SERBIA

ABSTRACT: The biodynamic response of human body exposed to vertical random whole body vibration in term of seat to head transmissibility function (STHT) is investigated in this study. The STHT response of 30 male human subjects exposed to three levels of the vertical random vibration (0.55, 1.75 and 2.25 m/s2 RMS) was measured in two sitting conditions (K – without seat backrest inclination, S – with seat backrest inclination) in the 0.3-30 Hz frequency range. The body mass revealed strong effect on the male STHT responses. The primary resonance frequency of heavier subjects was lower than that of the lighter subjects, while the peak magnitude was higher for the heavier subjects.

KEYWORDS: whole body vibration, Seat to Head Transmissibility Function (STHT), vertical vibration, body mass

INTRODUCTION

The influence of vertical, broadband, random, vibrations on the human body was examined through the seat-to-head transmissibility function (STHT). The biodynamic human response to whole body vibration (WBV) can be characterized using four biodynamic response functions. The driving point mechanical impedance (DPMI), apparent mass (APMS) and transfer mechanical impedance (TMI) are biodynamic functions often used to describe “to the body" biodynamic functions. The seat-to-head transmissibility function (STHT) describes the vibration transmitted through the body, [2].

The number of papers considering STHT is small in comparison with the number of papers considering DPMI. In this paper, the investigation of human body response to broadband random vibration was performed using STHT and these investigations were focused on vertical directional excitation.

From the synthesis of reported data on transmission of seat vibration to the head, it has been shown that seat-to-head vibration transmissibility is most significantly affected by the sitting posture, particularly the backrest contact. The study proposed different ranges of seat-to-head vibration transmissibility for back supported and back unsupported sitting postures. Apart from the sitting posture, the transmission of seat vibration may also be affected

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