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**SUSTAINABLE DEVELOPMENT
OF AUTOMOTIVE INDUSTRY**

Proceedings of Papers



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MVM2012-064

Miroslav Demić¹

Jovanka Lukić²

Danijela Miloradović³

Jasna Glišović⁴

INFLUENCE OF DETERIORATION OF VIBRATION PARAMETERS ON MOTOR VEHICLE'S VIBRATION COMFORT

ABSTRACT: A model based dynamic simulation has a significant role during motor vehicle's development. A role of modeling is very significant in the preliminary phases of design - in definition of governing parameters. In practice, it is usually assumed that the vehicle's vibration parameters are constant during exploitation, which is basically incorrect. Namely, all the research shows that there is vibration parameters deterioration during exploitation and, thus, there are changes in motor vehicle's dynamic characteristics. In this paper, an attempt is made, based on preliminary results, to point to the fact that these changes should also be considered in preliminary phases of vehicle design.

KEYWORDS: vehicle, vibration parameters, deterioration, comfort

INTRODUCTION

Dynamic simulation based on modeling of designed systems has an important role in motor vehicles development process. In practice, a whole range of vehicle models is used [4, 5, 7-13, 23]. Let's assume that a mechanical model of the observed motor vehicle is described, in general, by differential equation [5, 6]:

$$\ddot{Z} = \ddot{Z}(Z, A, U, L, Q, t) \quad (1)$$

where:

- Z - is a vector of generalized coordinates of the vibration system,
- A - is a vector of system vibration parameters,
- U - is a vector of control functions,
- L - is a function that considers random variations of vibration parameters characteristics during vehicle exploitation,
- Q - is excitation time function (originating from road roughness, engine operation, unbalanced masses, tire nonuniformity) and
- t - is time.

¹ Miroslav Demić, Ph.D., full professor, University of Kragujevac, Faculty of Engineering, 6 Sestre Janjić Street, 34000 Kragujevac, Serbia, demic@kg.ac.rs

² Jovanka Lukić, Ph.D., full professor, University of Kragujevac, Faculty of Engineering, 6 Sestre Janjić Street, 34000 Kragujevac, Serbia, lukicj@kg.ac.rs

³ Danijela Miloradović, Ph.D., teaching assistant, University of Kragujevac, Faculty of Engineering, 6 Sestre Janjić Street, 34000 Kragujevac, Serbia, neja@kg.ac.rs

⁴ Jasna Glišović, M.Sc., teaching assistant, University of Kragujevac, Faculty of Engineering, 6 Sestre Janjić Street, 34000 Kragujevac, Serbia, jaca@kg.ac.rs

