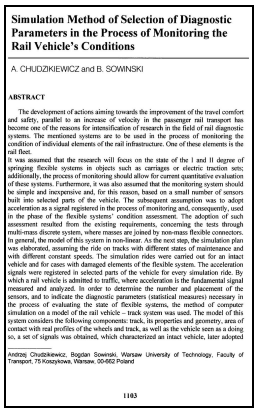
Simulation Method of Selection of Diagnostic Parameters in the Process of Monitoring the Rail Vehicle's Conditions

A. CHUDZIKIEWICZ and B. SOWINSKI

ABSTRACT

The development of actions aiming towards the improvement of the travel comfort and safety, parallel to an increase of velocity in the passenger rail transport has become one of the reasons for intensification of research in the field of rail diagnostic systems. The mentioned systems are to be used in the process of monitoring the condition of individual elements of the rail infrastructure. One of these elements is the rail fleet.
It was assumed that the research will focus on the state of the I and II degree of springing flexible systems in objects such as carriages or electric traction sets; additionally, the process of monitoring should allow for current quantitative evaluation of these systems. Furthermore, it was also assumed that the monitoring system should be simple and inexpensive and, for this reason, based on a small number of sensors built into selected parts of the vehicle. The subsequent assumption was to adopt acceleration as a signal registered in the process of monitoring and, consequently, used in the phase of the flexible systems' condition assessment. The adoption of such assessment resulted from the existing requirements, concerning the tests through multi-mass discrete system, where masses are joined by non-mass flexible connectors. In general, the model of this system in non-linear. As the next step, the simulation plan was elaborated, assuming the ride on tracks with different states of maintenance and with different constant speeds. The simulation rides were carried out for an intact vehicle and for cases with damaged elements of the flexible system. The acceleration signals were registered in selected parts of the vehicle for every simulation ride. By which a rail vehicle is admitted to traffic, where acceleration is the fundamental signal measured and analyzed. In order to determine the number and placement of the sensors, and to indicate the diagnostic parameters (statistical measures) necessary in the process of evaluating the state of flexible systems, the method of computer simulation on a model of the rail vehicle – track system was used. The model of this system considers the following components: track, its properties and geometry, area of contact with real profiles of the wheels and track, as well as the vehicle seen as a doing so, a set of signals was obtained, which characterized an intact vehicle, later adopted

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The development of actions aiming towards the improvement of the travel comfort and safety, parallel to an increase of velocity in the passenger rail transport has become one of the reasons for intensification of research in the field of rail diagnostic systems. The mentioned systems are to be used in the process of monitoring the condition of individual elements of the rail infrastructure. One of these elements is the rail fleet.

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The aim of this paper is to present the research, which allow for verification of the fundamental assumptions for the future monitoring system of the rail vehicle's conditions.

Ключевые слова:

Содержание.