Simulation Analysis of the Effects of a Rail Vehicle Running with Wheel Flat

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This contribution deals with the computer simulation and the follow analysis of the rail vehicle running with wheel flat. It comprises of two parts. The first part addresses to the problem of rail vehicle operational, which wheel is damaged. There are several types of wheel damages. In this work the wheel flat problem is introduced. Generally, the rail vehicle running with wheel flat is adverse because the track can be shopworn, some parts of rail vehicle can be damaged and also operational condition for passenger or goods (depending on kind of rail vehicle) can be worse markedly. There is also included a system of forces and accelerations measurement during rail vehicle running on the given track section. The second part includes computer modelling and simulation of this phenomenon. Analyses were focused on the assessemnt of the rail vehicle motion smoothness and its damaging impact on the track. For this, there was created computer model of a twin-bogies passenger car, which the one wheel was modelled as damaged, i.e. wheel flat. Then, there were performed simulations of the rail vehicle running at various speeds. The passenger car was run on the straight track without irregularities in order to avoid adding excitation. Subsequently, values of the vertical wheel forces of the wheel with flat was evaluated.

Keywords: Dynamic analysis, Computer simulation, Rail vehicle, Wheel flat

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