



Analytical and Experimental Investigation of Vertical Vibration of a Freight Wagon in the Presence of Mechanical Asymmetry

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Abstract: Production and construction asymmetry of railway vehicles in the presence of multiple track irregularities on the rail influences the time flow of the wheel. It has an influence on wheel and rail wear defects, especially on driving safety. Production and construction asymmetry was found during the experimental investigation of the basic parameters of mechanical properties of a double-axel freight wagon of Smmps type. This was an impulse for a systematic investigation of the influence of production and construction asymmetry on the vertical dynamic of complex mechanical systems, such as a railway vehicle. The current contribution introduces a methodology of analytical solution of the influence of production and construction asymmetry on the vertical dynamic response of a double-axel freight wagon in the presence of multiple track irregularities. Measured field data were used to validate the model.

Keywords: *asymmetry; analytical model; experiment; vertical vibration.*

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