

Bearing Capacity of Roads, Railways and Airfields – Loizos et al. (Eds)

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## Track Defects and the Dynamic Loads due to Suspended (Sprung) Masses of Railway Vehicles

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**ABSTRACT:** The motion of a railway vehicle on a railway track is a forced oscillation with a forcing excitation induced by the rail running table –which has the form of a “signal”–, expressed by a random, non-periodic function. The motion is described by the second order differential equation of motion specialized for the system “vehicle-track”. The railway track, is simulated –with the observer situated on the wheel– as an elastic means with springs and dashpots. The railway vehicle has the Suspended Masses (SM) and the Non-Suspended Masses (NSM). The track defects/faults are the random excitation for the rolling wheels of the vehicle. In the case of the Suspended Masses of the vehicles, the forces resulting from the excitation, due to the track defects, when the wavelength of defects is short, are not large and have small effect on the rolling of the wheel. In the case of the Non-Suspended Masses the forces resulting from the excitation, due to the track defects of short wavelength, are large and have grate effect on the rolling of the wheel. The present paper depicts that when the wavelength of defects is long, the Suspended Masses perform a predominant role. The solution of the differential equation is presented for the Suspended Masses of the vehicle. A sensitivity is also performed and a comparison between the theoretical results for the vertical accelerations (directly proportional to the acting loads) due to the Suspended Masses vs the measured ones, in a track under operation.