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Dynamic wheel/rail forces induced by trams at low frequencies

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This work is part of various experimental and theoretical investigations into the noise and the vibrations caused by trams in Nantes, France. It focuses on the problem of the low frequency vibrations induced in the track and the ground and particularly on the excitation mechanism at the wheel/rail interface. In order to estimate the corresponding dynamic wheel/rail forces, axle-box vibrations have been measured on a carrying bogie in various vehicle and track configurations. Additionally, a specific instrument has been used to measure the rail unevenness at large wavelengths likely to excite the vehicle/track system in the low frequency range. Finally, the vertical receptance of the different tracks has been measured by using an impact hammer. In the paper, all these experimental results are presented and the validity of a simple vehicle/track interaction model is discussed.