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Analysis of truck tire rolling noise and structural vibrations

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Legislators are increasingly demanding towards the vehicle and tire industry for further reduction of tire/road noise emissions. With the need to develop quieter tires, noise has become one of the driving performance criteria in the design process, together with safety, wear and rolling resistance. Next generation truck tires will have to meet more severe legal requirements. In this context, noise has to be improved both at constant speed for the tire regulation and under acceleration for the vehicle legislation. Field test results of different tire tread designs under accelerated and constant speed conditions are given in this presentation. Noise mechanisms and effects of rolling conditions are discussed based on pass-by and near-field microphones. In addition, the dynamic vibration of a truck tire casing is analysed using both detailed FEA modelling and experimental results.