

Application of the wheel-flat detection algorithm using advanced acoustic signal analysis

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Abstract: Urban rail communication is one of the most attractive public modes of transport. There are plenty of advantages for the community and environment of using this kind of transport. Furthermore, vibroacoustic comfort and noise annoyance aspects during urban rail vehicles operations are significant topics for passengers and city dwellers. These problems are also important for rail fleet managers and city authorities. Therefore, dynamic interaction between wheel and rail during vehicle passage should be kept in good technical condition. On the other side, the impact noise is the one of the most annoying noise emitted by urban rail vehicles inside the cities. The flat spots (wheel-flats) on the wheel or rail surfaces are one of the main causes of increasing rolling noise level. The main aim of the article is to present the novel approach of the wheel-flat detection algorithm using advanced acoustic signal analysis. The measurement equipment was placed in the near field of track in one of the tram depots. Several measured cases are distinguished by high impact noise level. The wheel-flat detection system is described by implementation of different kind of frequency and time processing methods on measured acoustic data.

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