

Investigation of Radiation Characteristics of the Noise from a Rail

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Theoretical models, such as TWINS (Track-Wheel Interaction Noise Software) developed in Europe, and microphone array measurements have been widely used to gain better understanding of rolling noise. However, the array measurements are often inconsistent with the TWINS predictions and give less prominence to the rail than the TWINS models. The objectives of this paper are to find out whether the microphone array measurements give a correct estimate of sound power radiated by the rail. Through the analysis of the performance of a microphone array, it is found that a horizontal array cannot detect a large part of the noise from the rail at high frequencies where free wave propagation occurs in the rail. It is concluded that the results obtained by using microphone arrays do not reflect the radiation characteristics of the noise from a rail, and this leads to the underestimation of the contribution of the rail component of noise.