

**Analytical Study on Vibration and Acoustic Characteristics of Railway Wheels
with Different Shapes**

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Rolling noises have become an important problem of narrow-gauge railway vehicles. The noises are composed of rail noise and wheel one. By the study about the wheel noise that we performed till now, we found that the wheel noise was radiated not only from the wheel web but also from the other parts. Therefore, we carried out a more detailed 3D-modal analysis for a purpose of inspecting the mode shapes obtained from FEM analysis and calculated the sound power from each part of the narrow-gauge wheels respectively by using 3D-BEM analysis. Furthermore, we calculated the change of an acoustic effect by the geometrical modification of the wheel shapes. As a result, we found that the wheel which added to the thickness of the rim had the lowest sound level among all the wheels.