An Evaluation Method for Aerodynamic Noise Generated from the Lower Part of Shinkansen Train

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We have developed a method to estimate aerodynamic noise generated from a bogie of a high speed train by using a directional microphone array in a low-noise wind tunnel test. First, on the basis of the measurements obtained in a running test, the horizontal velocity profile under the running train cars was modeled appropriately for wind tunnel tests. To simulate the velocity profile, flow velocity gradient in a free shear layer around the nozzle was suitably applied. Second, the noise generated from the bogie section was measured using a two-dimensional microphone array, and a method to estimate the noise using the measured results has been developed. Finally, the proposed method was validated by comparing the estimated lower part noise with the result of a field test conducted near the track.