Evaluation of Aerodynamic Noise and Intake Flow Rate of Running Wind Intake by Wind Tunnel Experiment

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In order to cool the equipment installed under Shinkansen trains, running air is used directly instead of fans. A wind tunnel experiment was conducted to evaluate the shape of the intake, which can draw in a large amount of flow and reduce aerodynamic noise. In the wind tunnel experiment, five types of intake shape were examined using a model to measure the flow velocity inside the duct and the noise generated by the intake. The results showed that the intake flow rate was affected by the shape of the opening and that the aerodynamic noise generated was reduced by rounding the lip of the intake. We also found that placing protrusions or dimples near the lip increased the intake flow rate and the aerodynamic noise. Changing the position of the dimple, rather than making it shallower, also increased the intake flow rate and reduced the increase in aerodynamic noise.