

**A Study on Aerodynamic Noise Reduction Method of a Pantograph Head Using Flow  
Control Techniques**

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Reduction of aerodynamic noise emitted from the pantograph head is one of the very important subjects for the speed-up of Shinkansen trains from an environmental point of view. In this study, two kinds of aerodynamic noise reduction methods using flow control techniques are investigated. One is a steady suction method and the other is a flow control method applying synthetic jet actuators. The results of wind tunnel tests show that both techniques can reduce the narrow-band-peak noise emitted from the pantograph head.