

Development of Small-sized Aerodynamic Brake for High-speed Railway

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There is a strong demand for improving brake system performance of Shinkansen to shorten the stopping distance at the time of an emergency such as a huge earthquake. In this study, we discussed an aerodynamic brake system using small-sized drag panels. From the computational fluid dynamics and wind tunnel experiments, the suitable shape of the drag panel, arrangement and an opening-and-closing mechanism of the panel were developed. In addition, a full-scale prototype aerodynamic brake device was designed and manufactured. Its aerodynamic characteristics were examined on a large wind tunnel with a high Reynolds number. It was proven that the target braking force was obtained with the small-sized aerodynamic brake placed into a modeled turbulent boundary layer around the train at a running speed of 300 km/h.