Wind Tunnel Experiments on Reducing Separated Flow Region around Front Ends of Cars of Narrow Gauge Railway Lines

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Separated flow around the front end of a 1/5th model car is examined by tuft visualizations and measurement of surface pressure distribution and aerodynamic drag. The front edge of the car is changed variously in size and shape in the experiments. We confirmed from the results of the experiment that the shapes with the edges rounded by circular or elliptic arcs effectively reduce the separated flow and that they can be used as a design guide for the front ends of cars of narrow gauge railway lines. The advantage of the large-scale wind tunnel experiments on the separated flow is clearly shown by comparing the results with those previously obtained from the small-scale wind tunnel (1/20th model).