

Yaw Angle Effect on the Aerodynamic Performance of Rear-Roof Spoiler of Hatchback Vehicle

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Abstract : Rear-roof spoiler is commonly used for improving the aerodynamic performance of road vehicles. This study aims to investigate the effect of yaw angle on the effectiveness of strip-type rear-roof spoiler in providing lower drag and lift coefficients of a hatchback model. A computational fluid dynamics (CFD) method was used. The numerically obtained results were compared to the experimental data for validation of the CFD method. At increasing yaw angle, both the drag and lift coefficients of the model were to increase. In addition, the effectiveness of spoiler was deteriorated. These unfavorable effects were due to the formation of longitudinal vortices around the side edges of the model that had caused the surface pressure of the model to drop. Furthermore, there were significant crossflow structures developed behind the model at larger yaw angle, which were associated with the drop in the surface pressure of the rear section of the model and cause the drag coefficient to rise.

Keywords : Ahmed model, aerodynamics, spoiler, yaw angle

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