

Investigating the Influence of Roof Fairing on Aerodynamic Drag of a Bluff Body

Authors : Kushal Kumar Chode

Abstract : Increase in demand for fuel saving and demand for faster vehicles with decent fuel economy, researchers around the world started investigating in various passive flow control devices to improve the fuel efficiency of vehicles. In this paper, A roof fairing was investigated for reducing the aerodynamic drag of a bluff body. The bluff body considered for this work is Ahmed model with a rake angle of 25deg was and subjected to flow with a velocity of 40m/s having Reynolds number of 2.68million was analysed using a commercial Computational Fluid Dynamic (CFD) code Star CCM+. It was evident that pressure drag is the main source of drag on an Ahmed body from the initial study. Adding a roof fairing has delayed the flow separation and resulted in delaying wake formation, thus improving the pressure in near weak and reducing the wake region. Adding a roof fairing of height and length equal to 1/7H and 1/3L respectively has shown a drag reduction by 9%. However, an optimised fairing, which was obtained by changing height, length and width by 5% increase, recorded a drag reduction close 12%.

Keywords : Ahmed model, aerodynamic drag, passive flow control, roof fairing, wake formation

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