World Academy of Science, Engineering and Technology
International Journal of Aerospace and Mechanical Engineering
Vol:13, No:06, 2019

Impact of Wheel-Housing on Aerodynamic Drag and Effect on Energy Consumption on an Bus

Authors : Amitabh Das, Yash Jain, Mohammad Rafiq B. Agrewale, K. C. Vora

Abstract : Role of wheel and underbody aerodynamics of vehicle in the formation of drag forces is detrimental to the fuel (energy) consumption during the course of operation at high velocities. This paper deals with the CFD simulation of the flow around the wheels of a bus with different wheel housing geometry and pattern. Based on benchmarking a model of a bus is selected and analysis is performed. The aerodynamic drag coefficient is obtained and turbulence around wheels is observed using ANSYS Fluent CFD simulation for different combinations of wheel-housing at the front wheels, at the rear wheels and both in the front and rear wheels. The drag force is recorded and corresponding influence on energy consumption on an electric bus is evaluated mathematically. A comparison is drawn between energy consumption of bus body without wheel housing and bus body with wheel housing. The result shows a significant reduction in drag coefficient and fuel consumption.

Keywords : wheel-housing, CFD simulation, drag coefficient, energy consumption
Conference Title : ICAMAAE 2019 : International Conference on Advances in Mechanical, Aerospace and Automotive Engineering
Conference Location : Vienna, Austria
Conference Dates : June 20-21, 2019