Aerodynamic Analysis in the Design of an Electric Car Vehicle Model Tobacco Style M-164 with Computional Fluid Dynamic (CFD) Method

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ABSTRACT

The aerodynamic aspect is one of the most important things in the automotive sector which is used to find information on the performance of an aerofoil model design. This aerodynamic analysis was carried out on the design of the Tobacco Style M-164 electric car model. In this study, the aerodynamic analysis of the model design was carried out by examining the distribution of fluid flow along the body contour to obtain the maximum fluid pressure, drag force, and drag coefficient values, which are aerodynamic effects along the body contours. The analysis is carried out by simulating the fluid flow flowing in the model design using Autodesk CFD 2018 software. The purpose of this analysis and simulation is to find out what the maximum fluid pressure, drag force, and drag coefficient values are received by the model design with different fluid velocity variations namely 50 km/h, 60 km/h, 70 km/h and 80 km/h where the fluid velocity is assumed to be the same as the vehicle speed. The method used is a simulation analysis method with 3 times the data collection, then the average data obtained from the test results. Based on the research results, it shows that the value of the maximum fluid pressure and drag force is directly proportional to the increase in fluid velocity, while the value of the decrease in the drag coefficient is not too significant. The highest maximum fluid pressure value generated in the model design occurs at a speed of 80 km/h at 101736 Pa. The highest drag force value generated in the model design occurs at a speed of 80 km/h at 50.66 N. While the value of the decrease in the drag coefficient is 6.2% with the highest value of 0.3272.

Keywords: *aerodynamics, maximum fluid pressure, drag force, coefficient of drag*