CFD analysis for merdeka 2 solar vehicle

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ABSTRACT

Vehicle's low drag force is critical to achieve higher speed and for efficient energy usage. Most solar vehicles that participated in the World Solar Challenge event adopted the 'cockroach' shape which has been considered as the best shape to achieve optimum speed and aerodynamics characteristics. However, the team from University of Malaya decided to design their entry vehicle based on the profile of a box fish, said to possess an even lower drag coefficient value. This paper describes the aerodynamics characteristics numerical study of the solar vehicle using a computational fluid dynamics (CFD) code called FLUENT. The numerical computation is based on the frontal area of the vehicle and the obtained results have shown reasonable values of drag and lift coefficients when compared to ordinary road vehicles.

KEYWORDS:

Box Fish Shape; CFD; Solar Vehicle; World Solar Challenge

REFERENCES

1. Mercedes-Benz bionic car modeled on boxfish. [Image on the Internet][updated 2005 June 7; Cited (2010) April 13] Available from http://www.dancewithshadows.com/auto/mercedes-benz-bionic-cargallery.asp

2. Fluent, F.(2006) *6.3 User's Guide, Fluent Inc*. Cited 3 times. Lebanon, NH

3. Launder, B.E., Spalding, D.B.(1972) *Lectures In Mathematical Models of Turbulence*. Cited 2617 times. Academic Press London, England

4. (1992) *Vehicle Aerodynamics: Wake Flows, Computational Fluid Dynamics, and Aerodynamic Testing, Society of Automotive Engineers, Warrendale book PA* Society of automotive engineers and SAE international congress and exposition

5. Automobile drag Coefficients: WIKI.[Internet][Cited: (2010) April 15] Available from http://wapedia.mobi/en/Automobile_drag_coefficients