

Analysis of Aerodynamic Car in CFD

MUKUNDJEE PANDEY*

*Mechanical Engineering Department

Centurion University of Technology and Management, Odisha, India

*For correspondence: E-mail: mukundjee.pandey@cutm.ac.in

AKASH KUMAR RANSINGH¹, ANUSWAR SATPATHY², ITISHREE PANDA³

^{1,2,3}M.Sc. MATHEMATICS

Centurion University of Technology and Management, Odisha,
India

ABSTRACT:

The aerodynamics behaviour of a car basically consists of two forces that is drag and lift forces which are the neediest thing for the safety, consumption of fuel, consistency for a car. Previously there are many articles published in the aerodynamics field for vehicle for the purpose of optimizing the configuration of the vehicle to decrease the consumption of fuel and to optimize the aerodynamic performance by discouraging the two forces (Drag and Lift forces). Now a days, there are many researchers who are keep going on this field. Here the purpose of this article is to reduce the aerodynamic behaviour (Drag and Lift forces) by analysing the flow field around the car. In this paper there is a comparison of result obtained from CFD analysis of the model that exist. This paper is also intending to simulate the model and compare the results. This analysis is done by using 3D EXPERIENCE software by importing the model from grab card and giving the velocity from 80 km/h to 500 km/h in each interval of 10 km/h.

KEY WORDS: AERODYNAMIC, 3D EXPERIENCE, DRAG FORCE, LIFT FORCE.

INTRODUCTION:

For the transportation purpose, the wheeled-motor vehicle car came into global in 20th century and it is kept on developing itself day by day(gradually) for the betterment of beings and economics.

Car deals with its own aerodynamical physics that is when a car travels, the fluid i.e., air around the car imposes pressure above it, which creates the viscous effect in the fluid which is observed in a thin layer, which is called as boundary layer too. When car moves, the air also moves around it and get separated while reaching the rear end of the car. The viscous property of the fluid governs the motion of the fluid which is dependent upon Reynolds number, where Reynolds number is depending upon length, viscosity, velocity of the car.[1][2]

T.D. IPILAKYAA et al. describes the use of spoiler and experimentally show us by comparing the results of two car model, one having spoiler and the other don't have the spoiler. He also concluded that the car model having spoiler in rear gave less drag or lift. Spoiler are used to rise the grip of car on road. Only the weight of car forces the tire down onto the road. It actually gives more down force not more power. It works like airplane wings and generate down force on the body of car. It is also helpful in reducing the drag and lift by which we get the car having less fuel efficiency, better speed. It is attached on the rear side of vehicle at different angles from -5° to 5° . [3][4]

SAUD HASSAN describes about the designing of rear back light angle and it affects the drag force, lift force. He took an Ahmad body with different back light angles and compared the results. He concluded that if we will increase the backlight angle, the drag force will reduce but the lift force is not affecting so much. [5]

Racing cars are always at high speed as compare to normal cars. So, the designing of racing car is different from normal cars. The racing cars focus to increase the down force and