ME 724: Essentials of Turbulence
Course Project Abstract

Flow around a Simplified Car Model

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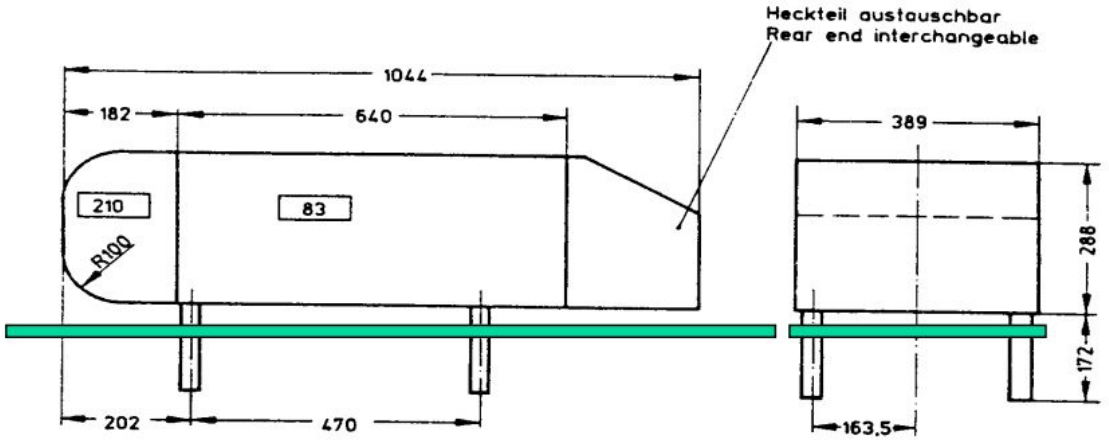
The aim of this project is to simulate turbulent flow over a simplified car model and correlate the results to that achieved by experiments for the same. The motivation to do this is to be able to observe how the aerodynamic effects play their role for different geometries of the vehicle body. A specific vehicle geometry (called Ahmed body) is to be studied for the same. The slant angles for the rear portion of the vehicle have been varied (studied for 25 degrees and 30 degrees) and the observations will be made for the two cases. The choice of these angles is because of the fact that the flow separation within the wake of the slant occurs at the critical angle of 30 degrees.



Model geometry for the car. The rear surface angle will be varied in the analysis

The webpage shared on the course Moodle page contains experimental data for the problem and will be used for comparison with the simulations. Attempts will be made to make the mesh as fine as possible for better results within the computational capability limits. The project also aims to theoretically try to explain the nature of the results, and to justify the assumptions taken to get to the results, if any. A RANS/LES model will be used to study the flow and the performance will be analyzed on the basis of experimental results by comparison of velocity profile and drag and flow analysis.