

DESIGN AND ANALYSIS OF CAR BODY USING CFD SOFTWARE

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ABSTRACT

In previous times, the dynamics of a car body and its design were done manually. This was subjected to a lot of errors and took a lot of time. The analysis was also done manually on real automobiles which resulted in a major loss of resources and cost a lot of money. This was subjected to lot of errors and took a lot of time. To reduce the probability of error occurrence, computer applications were developed to design automobiles and their features. The design of automotive systems using simulation tools features cost reduction and quality enhancement. The evolution of computer aided design (CAD) systems and related technologies has promoted the development of software for chassis modelling. It visualizes the main outputs of the model, which consist in numeric data and graphic elements. This reduces the simulation time dramatically and enables the optimization process to come to successful results. The following paper presents the method of modelling and design of the car body using modern software tools, to obtain as much as possible a realistic model suitable for further analysis. The work is based on elements of aerodynamics and vehicle dynamics and impact of external influences on it. This paper presents the procedures for obtaining the results from a combination of more modern tools (CCM+), which is certainly a trend in modern ways of designing and constructing.

PROBLEM DEFINITION

Existing System: The earlier existing system was fully based on manual labour. Automobiles were designed, analysed and developed based on designs that were done manually. The analysis involved testing of an automobile created specifically for the purpose of testing and it was tested by manual labour.

Drawbacks of Existing System:

The drawbacks of the earlier existing system are that the design of the car was done manually which required huge manual labour, and manual measurements and calculations were done which were subjected to lot of errors. The testing or analysis was also done manually which resulted in great risk for manual labour and loss of money and resources due to the expenses on the damages that were prone to take place during the testing or analysis.

MODULES

Design Module:

This module handles the design of the automobile using CAD software. The chassis of the car is first designed followed by the body based on the measurements required for proper functioning of the car.

Analysis Module:

The module handles the testing of the car based on the design, using CFD software. once the design of the car is completed, the design is analysed using the CFD software

to test the load balance of the car based on its aerodynamics.

TECHNICAL REQUIREMENTS

Software Requirements:

- CATIA V5 R20 – It is the CAD(Computer Aided Design) software used to design the car.
- ANSYS - It is the CFD(Computational Fluid Dynamics) software used to perform analysis on the car.

Hardware Requirements:

- Intel i5 3rd generation or above processor
- 4GB DDR3 RAM
- Graphics Card

CONCLUSION

Thus, a car body has been designed and tested keeping in mind, the standards and guidelines set by major car manufacturers. The usage of software such as CATIA V5 R20 and ANSYS have been instrumental in the development of the car's body which meets the standard requirements set by major car manufacturers. It is observed that computer aided designing and computational fluid dynamics can serve as a platform for students to take up designing and developing various types of automobiles based on futuristic technology and there is hope that this project serves as an inspiration for aspiring designers and developers to develop and launch projects of this on their own in the future.

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