DESIGN AND OPTIMIZATION OF TRUCK LOAD BODY

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Abstract— *Truck industry is a major source of transportation in India. With an average truck travelling about 300 kilometers per day, every kilogram of truck weight is of concern to the industry in order to get the best out of the truck. The main objective of this project is to increase the payload capacity of automotive truck body. Every kilogram of increased vehicle weight will decrease the vehicle payload capacity in turn increasing the manufacturing cost and reducing the fuel economy by increase the fuel consumption. With the intension of weight reduction, standard truck body has been designed in CATIA V5 R21 software and analyzed in ANSYS software. Using by different-different cross-section as per requirements and beams were used instead of conventional rectangular box sections to reduce the weight of the body. The strength of the Truck platform is monitored in terms of deformation and stress concentration. These parameters will be obtained in structural analysis test condition environment. For reducing the stress concentration the concept of beams of uniform strength is used.*

Keywords— *Truck Body, CATIA V5 Software, Static Structural analysis, FEA, ANSYS.*

IINTRODUCTION

Handling and carrying of large quantities of materials in a truck body of varied construction upon the existing state of materials, its physical properties and required operation which is to be performed is one of the tasks taken by the mechanical and automobile engineers, which are used for carrying sand, metals, iron ore and granite blocks. Truck body is the main part of the vehicle, which contains a number of channels made up of mild steel or aluminum sheet metals. Most processing equipment units are focusing on design of the truck body with various modifications necessary to minimize the stress and improve the load factor of safety. In the design of truck body, a number of factors have to be considered. The most important factor is the selection of type of the body to perform the required operation in a satisfactory manner and the other selection criteria must be considered such as the induced stress and material properties. Vehicles and related structures disclosed in fore mentioned patents mainly worked up on the design to increase the strength, reduce weight, and enhance configurability. Hence there exists a need for the industry sector to optimize the design of dump truck body structure which allows maximizing dump truck payload capacity and simultaneously improvising the strength, reducing weight, and prolonged operational life. The present work is carried out regarding. the design optimization of a dump truck body.

Transport industry plays a crucial role in development of modern industrialized countries economy. The total weight of the load carried on the truck has been increasing drastically. Today's difficult challenge of transport vehicle is to meet the increasing demand for better performance, less weight and more reliability. All this criteria has to achieve in short duration of time. There is a considerable focus on design of the truck body, for increasing payload capacity. Replacement of rectangular cross section beams with C-cross section beams, use of Aluminum alloys instead of structural steel will be the feasible solutions for increasing payload capacity of the truck. With the use of aluminum, the strength of the truck reduces, which can be augmented by using the concept of beams of uniform strength. In the design of truck body, a number of factors have to be considered.

PROBLEM DEFINITION

Today there is demand on trucks, not only on the cost and weight aspects but also on the improved complete vehicle features and overall work performance. In addition to this number of variants that are possible due to different types of designs and modularization, call for several design iterations to arrive at a suitable combination. The project work deals with tipper load/dump body. There is considerable scope to improve the design of their product.

OBJECTIVES

- *For optimization of body design an existing model is chosen whose specifications are taken from the local industry.*
- *The main objectives of the Work is to reduce the body weight.*
- *To modify the design of truck body to get an optimized in terms of reducing weight and reducing stresses.*

- *To determine the critical point having highest stress.*
- *The main objective of this project is to increase the payload capacity of automotive truck body.*
- *Focusing on the design of the truck body with various modifications necessary to minimize the stress and to improve the load factor of safety.*
- Nitin S Gokhale, Sanjeev Badekar,"Practical Finite Element Analysis", January 2008.

DESCRIPTION OF THE PROPOSED WORK

Handling and carrying of large quantities of materials in a truck body of varied construction upon the existing state of materials, physical properties and required operation which is to be performed is one of the task taken by the mechanical and the automobile engineers which are used for carrying sand, metals, iron ore and granite blocks. There is considerable scope to improve the design of their product.

CONCLUSION

The objective to optimize the design of truck body structure which allows maximizing truck payload capacity and simultaneously improvising the strength, reducing weight, and thereby providing prolonged operational life is achieved.

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