

## **STATIC ANALYSIS, MODAL ANALYSIS AND DESIGN MODIFICATION IN CHASSIS FRAME TO OPTIMIZE WEIGHT BY USING COMPOSITE MATERIAL**

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### **ABSTRACT**

In the case of vehicle the term frame means the part of automobile that holds all the important components all these components constitute together to form chassis. The chassis frame has to be robust enough to resist various forces due to undulation in surface of road or any other reason. Forces act on chassis frame like shock, twist vibration and also due to heavy weight of chassis frame add extra stress. Along with strength the most important in frame designing is to have sufficient bending stiffness. Natural frequency and also played most important role in chassis frame the excitation frequency and chassis frame frequency never match otherwise it creates resonance and damage will incur in chassis frame. Now a day's lightweight material gained popularity worldwide due to their high strength and less weight.

This paper presents the static structural analysis is done using FEA method, modal analysis of a chassis frame is done to determine natural frequency and corresponding vibrational mode shapes, and also design modification done to optimize weight of chassis frame to perform this work the chassis frame designed in CATIA V5R19 and analysis is done in ANSYS 14.5. Material used for chassis frame is steel 52 and carbon epoxy composite material.

**KEYWORDS:** Chassis Frame, Composite Material, Design Modification, Finite Element Model, Modal Analysis, Static Analysis, Weight Optimization