

# **MODELING AND STRUCTURAL ANALYSIS OF HEAVY VEHICLE CHASSIS MADE OF POLYMERIC COMPOSITE MATERIAL BY THREE DIFFERENT CROSS SECTIONS**

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## **ABSTRACT**

The chassis frame forms the backbone of a heavy vehicle, its principle function is to safely carry the maximum load for all designed operating conditions.

This paper describes design and analysis of heavy vehicle chassis. Weight reduction is now the main issue in automobile industries. In the present work, the dimensions of an existing heavy vehicle chassis of a TATA 2515EX vehicle is taken for modeling and analysis of a heavy vehicle chassis with three different composite materials namely, Carbon/Epoxy, E-glass/Epoxy and S-glass /Epoxy subjected to the same load as that of a steel chassis. The design constraints were stresses and deflections. The three different composite heavy vehicle chassis have been modeled by considering three different cross-sections. Namely C- type, I- type and Box type cross sections. Static analysis of a 3-D model has been performed using ANSYS 12.0. Compared to heavy vehicle steel chassis the polymeric composite heavy vehicle chassis is found to have 66% lesser stresses, 33%~42% higher stiffness, 32%~54% higher frequency and weight reduction of 73%~80% is achieved.

**KEYWORDS :** heavy vehicle chassis, Static analysis, Carbon/Epoxy, E-glass/Epoxy and S-glass /Epoxy,