

A
PROJECT REPORT
ON
DESIGN STRUCTURAL ANALYSIS OF TWO WHEELER ALLOY WHEEL

Dissertation submitted to the

AVANTHI INSTITUTE OF ENGINEERING AND TECHNOLOGY

Affiliated to JNTU Kakinada

For the partial fulfillment of award of the degree

B. Tech.

In

Mechanical Engineering

submitted by

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CERTIFICATE

DEPARTMENT OF MECHANICAL ENGINEERING

This is to certify that the project entitled “**DESIGN AND STRUCTURAL ANALYSIS OF TWO WHEELER ALLOY WHEEL DESIGN**” is the bonafied work carried out **G.SAIKUMAR (18815A0317) ,G.NAGA PHANINDRA (18815A0315), S.HEMANTH (18815A0355), E.THARUN KUMAR (18815A0313)** student of B.Tech (Mechanical Engineering), Avanathi Institute of Engineering and Technology during the academic year 2020-21 in partial fulfillment of the requirements for the award of the degree of Bachelor of technology in Mechanical Engineering.

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ABSTRACT

Design and Structural Analysis of Alloy Wheel. An alloy wheel is considered to be one of the main component of an automobile over which the complete weight of the vehicle relies on. It needs to satisfy aesthetic design principles with superior load withstanding capabilities. It must ensure the safety of the passenger by taking all sorts of structural loads under varying load conditions. These systems can be analysed by various non-destructive techniques and simulation tools as well. This work is focused on designing an alloy wheel rim using a computer aided design tool CATIA V5 R20 after which a structural and random vibration analysis can be carried out in simulation tool ANSYS V18.1. Alongside design of the wheel, material of the body is also a key parameter which decides the strength and load carrying capabilities. This actually measures the stability characteristics which in turn decides the strength and suitability of the wheel to be employed in an automobile. The finite element studies give von-mises stresses induced, structural deformations and various modes of frequencies where heavy stresses are developed. These results are analysed by carrying out iterations with different material grades of aluminium alloy grades AA201, AA710, magnesium alloy and structural steel and with grade AISI 4130 steel . The comparison of finite element results so obtained will decide the best alloy wheel possessing good strength and stability characteristics.

Keywords: Alloy Wheel Rim, Static-Structural Analysis, Von-mises stresses, deformation and fatigue life