COUPLED THERMAL & STRUCTURAL ANALYSIS OF DISK BRAKE ROTOR ASSEMBLY

A Project report submitted In the partial fulfillment of the requirements for award of Degree of

BACHELOR OF TECHNOLOGY IN

MECHANICAL ENGINEERING

Submitted by

K. Pavan Kalyan	**18815A0377**
M. Rajesh	**18815A0339**
Y. Thrimurthulu	**18815A0374**
M. Prudhvi Raju	**18815A0350**

Under the guidance of

Mrs.P. SADHANA, M.Tech,

Assistant professor

DEPARTMENT OF MECHANICAL ENGINEERING

AVANTHI INSTITUTE OF ENGINEERING AND TECHNOLOGY

(PERMENANTLY AFFLIATED TO JNTU-KAKINADA, ACCDREDITED BY NBA & NAAC, APPROVED BY AICTE, RECOGNISED BY UGC 12f & 2b)

(Affiliated to Jawaharlal Nehru technological university Kakinada, A.P)

TAMARAM, MAKAVARAPALEM, NARSIPATNAM-531113

2018-2021

DEPARTMENT OF MECHANICAL ENGINEERING

AVANTHI INSTITUTE OF ENGINEERING &TECHNOLOGY

CERTIFICATE

This is to certify that the project entitled **"Coupled Analysis Of disk brake rotor"** is the record of the work carried out by **K.PavanKalyan (18815A0377), M.Rajesh (18815A0339), Y.Thrimuthulu (18815A0374), M. Prudhvi Raju (18815A0350)** students of final year B. Tech in the department of Mechanical engineering. This work is done for the partial fulfillment for the award of BACHELOR OF TECHNOLOGY during the year2020-2021.

Project Guide
Mrs.P.Sadhana,M.Tech
Assistant Professor

Head of the Department
Mr.V.Harikiran
Associate Professor

External Examiner

ABSTRACT

A Disk Brake Rotor is one of the key components in braking system of a vehicle. It is fitted onto the wheel of a bike or car where due to application of fluid pressure exerted by brake fluid, the brakes are applied to the wheel by blocking the movement of a mounting plate known to be disk brake rotor. The rotor experiences a lot of shear and friction during braking where a lot of energy is converted into heat energy. In other words, thermal stresses are built up in the disk plate of the rotor which needs to be analyzed to measure its braking performance. To do this, we will design a disk plate using Solidworks 2020 where the design is later imported to ANSYS 19.2 for analysis to be carried on. A transient structural and thermal coupled analysis is carried out to study the stresses induced in the rotor plate due to coupled forces acting over it. The heat distribution through the plate, heat flux rates and thermal stresses induced are some of the parameters that are evaluated to determine its performance. The results are iterated for different materials such as Structural Steel, Grey cast iron, Carbon ceramic composites, Aluminium metal matrix composites and Aluminium silicide metal matrix composite to decide the best suitable material to consider to be employed for an automobile wheel.