

# DESIGN AND TRANSIENT THERMAL ANALYSIS OF PISTON & CYLINDER WITH DIFFERENT FINS OF IC ENGINE

A project report submitted In the partial fulfillment of the requirements for award of degree of

**BACHELOR OF TECHNOLOGY**

**IN**

**MECHANICAL ENGINEERING**

**Submitted by**

|                       |            |
|-----------------------|------------|
| MAHAMMAD SARTAZ AZEEZ | 18815A0335 |
| MARISSETTY GANESH     | 18815A0338 |
| SONTENA MANIKANTA     | 18815A0359 |
| MANGA RAJU            | 18815A0334 |

Under the guidance of

**NIDHI CHOUDHARY M.Tech**

**Assistant professor**

**DEPARTMENT OF MECHANICAL ENGINEERING**



**AVANTHI INSTITUTION OF ENGINEERING AND TECHNOLOGY**

(PERMANENTLY AFFILIATED TO JNTU-KAKINADA, ACCREDITED BY NBA & NAAC, APPROVED BY AICTE, RECOGNISED BY UGC 12F & 2b)

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

TAMARAM, MAKAVARAPALEM, NARASIPATNAM-531113

2018-2021

# DEPARTMENT OF MECHANICAL ENGINEERING

AVANTHI INSTITUTE OF ENGINEERING AND TECHNOLOGY



## CERTIFICATE

This is to certify that the project entitled **“DESIGN AND TRANSIENT THERMAL ANALYSIS OF PISTON & CYLINDER WITH DIFFERENT FINS OF IC ENGINE”** is this record of the work carried out by **MAHAMMAD SARTAZ AZEEZ (18815A0335)**, **MARISSETTY GANESH (18815A0338)**, **SONTENA MANIKANTA (18815A0359)**, and **MANGA RAJU (18815A0334)** 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 year 2018-2021.

*Nidhi Choudhary*

NIDHI CHOUDHARY M.Tech

**Project Guide**

V. HARIKIRAN M.Tech (Ph.D)

**Head of the Department**

**External Examiner**

## **ABSTRACT**

### **Design and Transient Thermal analysis of Piston & Cylinder with different fins of IC Engine**

Internal combustion engines are employed in all automobiles nowadays where the thermal efficiency plays a crucial role in deciding the performance of the vehicle. It greatly depends on heat distribution through the piston, cylinder and fins which happens through combined modes of heat transfer. Heat distribution through the piston and fins play a vital role in dissipation of heat generated inside the cylindrical block in order to maintain temperatures inside the cylinder within limits. The design of piston, fins, type of coolant circulated and body design are the key factors that decides the heat dissipation rate based on material characteristics of the piston and cylinder block. A piston and cylinder block is designed using computer aided design tool CATIA V5. A transient thermal analysis will be carried out using a simulation tool ANSYS. The heat distribution throughout the body of piston and fins for different coolant fluids will be studied. Another key parameter that decides the heat transfer characteristics is the material of the cylinder block which can be varied and iterated for heat flux studies. The areas of high thermal stresses induced will be identified for designed engine and the results so obtained for different materials are analyzed to decide the best material suitable to be employed in an IC engine of desired capacity. The finite element analysis is repeated for materials of different grades of Aluminium and gray cast iron to identify the areas of highly induced thermal stresses.