

A PROJECT REPORT ON

Thermal and Structural Analysis of an Electronic Cooling Fan using CATIA and ANSYS

A project report submitted in partial fulfillment of the requirements for the award of the Degree of

BACHELOR OF TECHNOLOGY

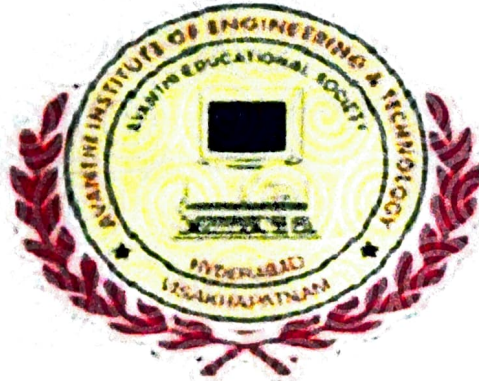
IN

MECHANICAL ENGINEERING

SUBMITTED BY

K.VENKATESH	(20811A0319)
J.PAVAN KUMAR	(20811A0314)
K.RAJESH	(20811A0315)
K.DILIP KUMAR	(20811A0317)
S.CHAITANYA SAI	(20811A0335)

Under the esteemed guidance of
Mr. A.N.S.SURYA PRAKASH M.Tech
Assistant Professor



DEPARTMENT OF MECHANICAL ENGINEERING

AVANTHI INSTITUTE OF ENGINEERING AND TECHNOLOGY

(PERMANENTLY AFFILIATED TO JNTU-GURAJADA VIZIANAGARAM, ACCREDITED BY NBA & NAAC

A+, APPROVED BY AICTE, RECOGNISED BY UGC 12f & 2b)

(Affiliated to Jawaharlal Nehru Technological University Gurajada, A.P)

TAMARAM, MAKAVARPALEM, NARSIPATNAM-531113

2020-2024

AVANTHI INSTITUTE OF ENGINEERING AND TECHNOLOGY

(APPROVED BY A.I.C.I.T.E AFFILIATED TO JNTU-GV, A.P)

(AN NAAC A+ & N.B.A ACCREDITED INSTITUTION)

TAMARAM, MAKAVARAPALLEM, NARSIPATNAM -531113



DEPARTMENT OF MECHANICAL ENGINEERING

CERTIFICATE

This is to certify that the project work entitled —**THERMAL AND STRUCTURAL ANALYSIS OF AN ELECTRONIC COOLING FAN USING CATIA AND ANSYS** submitted by **K.VENKATESH(20811A0319),J.PAVANKUMAR(20811A0314),K.RAJESH(20811A0315), K.DILIP KUMAR(20811A0317),S.CHAITANYA SAI (20811A0335)** to Avanthi Institute of Engineering and Technology, Makavarapalam, Visakhapatnam in partial fulfillment for the award of the degree of Bachelor of Technology in Mechanical Engineering, is a bonafide record work carried out by them, under guidance and supervision during 2020- 2024.

The results embodied in this project work have not been submitted to any other university or institute for the award of any degree.

PROJECT GUIDE

A.N.S.SURYA PRAKASH M.Tech

Assistant professor

HEAD OF DEPARTMENT

Dr.V.HARI KIRAN

Associate professor

EXTERNAL EXAMINER

Head of the Department
Department of Mechanical Engg.
Avanthi Institute of Engg. & Tech.,
Makavarapalem, Anakapalli Dt. -531113

ABSTRACT

The thermal and structural management of electronic devices is crucial for maintaining optimal performance and reliability. This project focuses on the thermal analysis of an electronic cooling fan using CATIA for design and subsequent analysis. The project begins with the comprehensive design of the cooling fan using CATIA, considering factors such as airflow dynamics, geometry optimization, and material selection.

The intricate modelling capabilities of CATIA ensure precise representation of the fan's components, facilitating efficient heat dissipation. Model of 4, 6 & 8 Nos blade design made, Subsequently, the cooling fan undergoes thermal analysis using advanced analysis techniques to simulate its performance under various operating conditions. Finite Element Analysis (FEA) is employed to assess temperature distribution, thermal gradients, and heat transfer efficiency within the fan assembly. By Varing Materials like Carbon Fiber & Kevlar Fiber

The results of the thermal and static analysis provide valuable insights into the fan's thermal and structural behaviour, aiding in the identification of potential hotspots and optimization with material change. The findings of this project contribute to the advancement of electronic cooling technology, with potential applications in various industries where thermal management is critical for device reliability and longevity.

Keywords: Electronic cooling fan, Thermal analysis, Airflow dynamics, Geometry optimization, Finite Element Analysis, CATIA.