

A PROJECT REPORT ON

STRUCTURAL OPTIMISATION OF AIRCRAFT WING SPAR USING CATIA AND ANSYS

A project report submitted in partial fulfilment of the requirements for the award of the

Degree of

BACHELOR OF TECHNOLOGY

IN

MECHANICAL ENGINEERING

SUBMITTED BY

NAMBARU DEVI SIVA SANKAR PRASAD	20811A0327
CHEEDI SAI KRISHNA	20811A0310
ADARI SAI TEJA	20811A0302
SHEIK SAMEER	20811A0336
MADDU DEVARA SURYA RAJA PRASAD	20811A0320

Under the esteemed guidance of
Mr.B. RAMAKRISHNAM.Tech
Assistant Professor



DEPARTMENT OF MECHANICAL ENGINEERING

AVANTHI INSTITUTE OF ENGINEERING AND TECHNOLOGY

(PERMANENTLY AFFILIATED TO JNTU-GURAJADA VIZIANAGARAM,

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

(TAMARAM, MAKAVARAPALEM, ANAKAPALLI DIST-531113)

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AVANTHI INSTITUTION OF ENGINEERING AND TECHNOLOGY

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

(TAMARAM, MAKAVARAPALEM, ANAKAPALLE-531113)



DEPARTMENT OF MECHANICAL ENGINEERING

CERTIFICATE

This is certify that the project work entitled—**STRUCTURAL OPTIMIZATION OF AIRCRAFT WING SPAR USING CATIA AND ANSYS** submitted by **N.D.S.S PRASAD (20811A0327), CH.SAI KRISHNA (20811A0310), A. SAI TEJA (20811A0302), SK. SAMEER (20811A0336), M.D.S.R PRASAD(20811A0320)**, to Avanthi Institution of Engineering and Technology, Makavarapalem, Visakhapatnam in partial fulfilment for the award of the degree of bachelor of Technology in Mechanical Engineering, is a bonafied record work carried out by them, under guidance and supervision during 2020-2024.

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


PROJECT GUIDE

Mr. B. RAMA KRISHNA M.tech

Assistant Professor


HEAD OF THE DEPARTMENT

Dr. V. HARI KIRAN

Associate Professor

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


EXTERNAL EXAMINER

ABSTRACT

This project focuses on optimizing the structural design of aircraft wing spars using CATIA and ANSYS software, crucial for enhancing aircraft efficiency and reliability. Beginning with a thorough review of existing designs and analysis techniques, it employs CATIA for parametric modelling and design refinement. CATIA enables engineers to iteratively adjust wing spar geometry based on aerodynamic, structural, and weight considerations.

ANSYS is then utilized for structural analysis and optimization, employing finite element modelling to predict behaviour under various thickness and materials are varied. Optimization involves defining parameters to achieve performance goals such as weight reduction while maintaining integrity. The project integrates multidisciplinary factors like aerodynamics NANC 4421 and manufacturing constraints. This approach showcases a systematic method for aerospace structural optimization, applicable to advanced aircraft design.

KEY WORDS: Aircraft Wing Spars, Aerodynamic, Structural, Optimization CATIA, ANSYS.