

PROJECT REPORT ON
Gear Train Optimization of high speed machinery by 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

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DEPARTMENT OF MECHANICAL ENGINEERING
AVANTHI INSTITUTE OF ENGINEERING AND TECHNOLOGY
(PERMANENTLY AFFILIATED TO JNTU-GURAJADA VIZIANAGARAM, ACCREDITED BY
NAAC A+, APPROVED BY AICTE, RECOGNISED BY UGC 12f & 2b)

TAMARAM, MAKAVARAPALEM, ANAKAPALLI DIST-531113

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DEPARTMENT OF MECHANICAL ENGINEERING

CERTIFICATE

This is to certify that the project work entitled—**GEAR TRAIN OPTIMIZATION OF HIGH SPEED MACHINERY BY USING CATIA AND ANSYS** submitted by **Janapala Sai Charan Kumar(21815A0350),Juttu Ganesh(21815A0319), Yarramsetti Vamsi Krishna(21815A0345),Mattam Govardhan Naidu (21815A0326), Choppa Sarath Chandra(21815A0367)** 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

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EXTERNAL EXAMINER

ABSTRACT

This project aims to optimize gear trains for high-speed machinery using CATIA and ANSYS. Gear trains are crucial in various mechanical systems, especially in high-speed applications where efficiency and reliability are essential. The objective is to combine CATIA for designing and modelling gear trains with ANSYS for analysing their performance under high rotational speeds.

CATIA is used to design Helical gear trains, considering factors like gear types, sizes, and arrangements to meet specific machinery requirements. It allows precise visualization and manipulation of gear geometry to create optimized designs tailored to each application.

The designed gear train models are then analysed using ANSYS for finite element analysis. This evaluates their structural integrity, stress distribution, and performance under actual operating conditions. Weaknesses or stress concentrations can be identified and addressed by subjecting the gear train assembly to simulated loads and conditions.

Helical gear train use for Reverses Motion design as per requiment of power and motor speed. Same design check for maximum load by load on pinion taken as step of 13K, 15K, 20K, 25K and 30K Newtons are applied on helical gear and check the stress and other parameters material High speed steel. Dynamic analysis model also be carried for mode frequency.

KEY WORDS: Gear trains, Finite element analysis, CATIA, ANSYS.