A project report on

PARAMETRIC MODELLING AND OPTIMIZATION OF CAM MECHANISM USING CATIA AND ANSYS

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

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CERTIFICATE

This is to certify that the project entitled **"PARAMETRIC MODELING AND OPTIMIZATION OF CAM MECHANISM USING CATIA AND ANSYS"** is the record of the work carried out by the ALUGOLU GANESH (21815A0303),THOTA VENKATA BALA SUBRAHMANY (20811A0340),M.S.V.SATYANARAYANA(20811A0322),V.PREMJI(20811A0343),and the A.LAXMAN(20811A0304),students of the final year of the 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 year 2023-2024.

PROJECT GUIDE

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ABSTRACT

PARAMETRIC MODELLING AND OPTIMIZATION OF CAM MECHANISM USING CATIA AND ANSYS

This project focuses on the parametric modeling and optimization of a cam mechanism, a critical component in various mechanical systems, using CATIA for design and Ansys for analysis. Cam mechanisms are widely employed in numerous applications including automotive engines, robotics, and manufacturing machinery due to their ability to convert rotary motion into reciprocating or oscillating motion.

The first phase of the project involves the parametric modeling of the cam mechanism using CATIA, a powerful computer-aided design (CAD) software. Parametric modeling allows for the creation of a flexible and adaptable design that can be easily modified to accommodate different specifications and requirements. Various parameters such as cam profile, follower type, and operating conditions are defined and optimized within the CATIA environment to achieve the desired performance characteristics.

Once the parametric model is established, the next phase involves the analysis and optimization of the cam mechanism using Ansys, a leading finite element analysis (FEA) software. Ansys enables engineers to simulate real-world operating conditions and evaluate the performance of the cam mechanism under different loads, speeds, and environmental factors. Through advanced FEA techniques, the stress distribution, deformation, and dynamic behavior of the cam mechanism are analyzed to identify areas of improvement and optimize the design for enhanced performance and reliability.

The optimization process aims to maximize the efficiency, minimize wear and tear, and optimize the overall performance of the cam mechanism while ensuring compliance with design constraints and specifications. Design parameters are systematically adjusted and refined using optimization algorithms to achieve the optimal solution within the defined constraints.

By integrating parametric modeling with advanced analysis and optimization techniques, this project offers a comprehensive approach to the design and optimization of cam mechanisms, enabling engineers to develop high-performance and reliable mechanical systems for a wide range of applications. The results of this project contribute to the advancement of cam mechanism design methodologies and facilitate the development of innovative and efficient mechanical systems in various industries.