Aditya College of Engineering & Technology

Aditya Nagar, ADB Road, Surampalem – 533437
Department of Mechanical Engineering

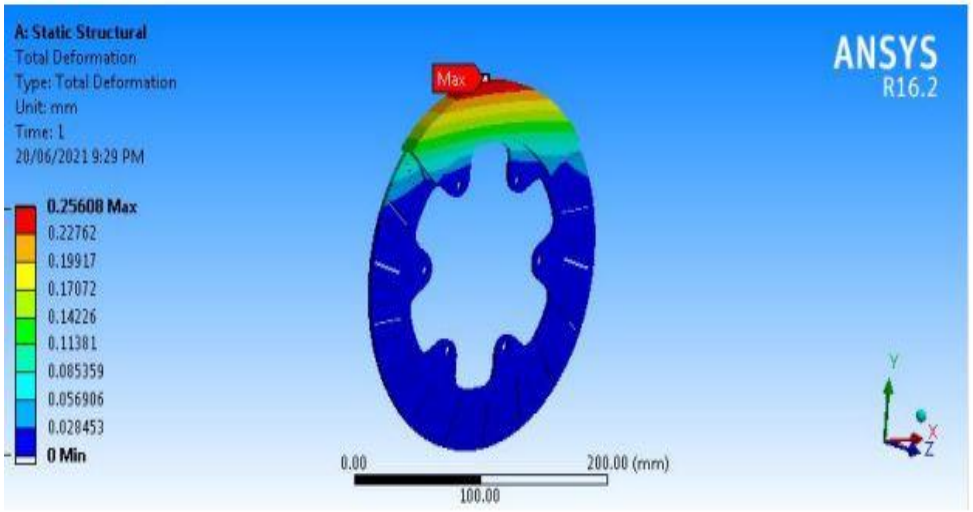
Academic Year: 2020-2021

Project Title:	Optimization of Design and Static Thermal Analysis of Disc Rotor using Finite Element Method	
Guide Name:	Mr. R.Prasad	
Students Name with Roll No.:	18P35A03A3	Valluri Satya
	18P35A03A8	Yallapu Sai raju
	17P31A03A8	Vadisileti Ravi teja
	17P31A03A0	Polimati Syamprasad
	17P31A0387	Kasilanka Ravi chakradhar

Abstract	PO's Mapping	PSO's Mapping
Brakes are one of the most significant safety systems in an automobile. In the braking process, the rotor will be exposed to large stresses which result in surface cracking, overheating of brake fluid, seals and other components. There fore one of the main tasks of the braking system is to reduce the surface temperature of the brake rotor. Failure of brakes especially in two-wheelers have been one of the major causes for many accidents. The forced stresses acting on the disc rotor due to forced braking damages the disc and eventually it breaks. This shows that no proper material and design has been chosen while analyzing the disc at different conditions. The study describes the various designs like Normal disc rotor and slotted disc with holes brake rotor. The main objective of this project is to propose a new automotive brake disc rotor design for BAJAJ PULSAR 150 which will reduce the total deformation and increase the maximum heat dissipation. Ventilated disc(Existing design) and Sloted with normal holes (Proposed design) is designed using catia v5 software. The static structural analysis and thermal analysis of brake disc rotor is done using ANSYS 16 using various materials Grey cast iron, Alsic, Ti6AL4V, AISI 6150, EN8, which is a dedicated finite element package used for determining the von - misses stresses, shear stress, strain, deformation, total heat flux. across the disc brake profile. The best of the designed and material of brake disc rotor is to be suggested based on the magnitude of von - misses stresses, shear stress, strain deformation, total heat flux.	PO1, PO2, PO3, PO4, PO5, PO8, PO9, PO10,PO11,PO12	PSO1, PSO2, PSO3

PO1: Engineering Knowledge	**PO5:** Modern Tool usage	**PO9:** Individual & Team Work
PO2: Problem Analysis	**PO6:** Engineer & Society	**PO10:** Communication Skills
PO3: Design & Development of solutions	**PO7:** Environment & Sustainability	**PO11:** Project Management & Finance
PO4: Investigations on complex problems	**PO8:** Ethics	**PO12:** Life Long Learning
PSO1: Mechanical Engineers must be able to analyze, design and evaluate mechanical components and systems using cutting-	**PSO2:** The ability to work in manufacturing and other sectors' operations and maintenance plants	**PSO3:** As part of a team or individually, plan and manage activities in micro, small, medium and large enterprises

edge software tools as required by the industries from time to time.		



Relevance to PO's and PSO's

PO1	Applied the subject knowledge in designing of disk rotor by using different materials.
PO2	Studied and analysed existing designs of different types of rotors.
PO3	Structure of rotor is designed under simulation.
PO4	Students are able to find feasible solution for various design problems.
PO5	Solid works and Ansys workbench tools are used for design and simulation.
PO8	Students are able to apply ethical principles and commit to professional ethics.
PO9	Design of components and optimisation also done by team collaboration.
PO10	Students are able to present their work through presentation and documentation.
PO11	Plan of action to completing the simulation by using various boundry conditions.
PO12	Further students can improve results by learning advanced tools in Ansys software.
PSO1	Identify the difficulties in problem and then able to create design and analysis with suitable boundry conditions by using Ansys software.
PSO2	Proper analysis is required in manufacturing industry.
PSO3	Suitable management skills are gained by doing this work.