



ANALYSIS OF TWO WHEELER BIKE ENGINE FIN USING THREE DIFERENT MATERIALS FOR REDUCING TEMPERATURE IN A HIGHER RATE



A PROJECT REPORT

Submitted by

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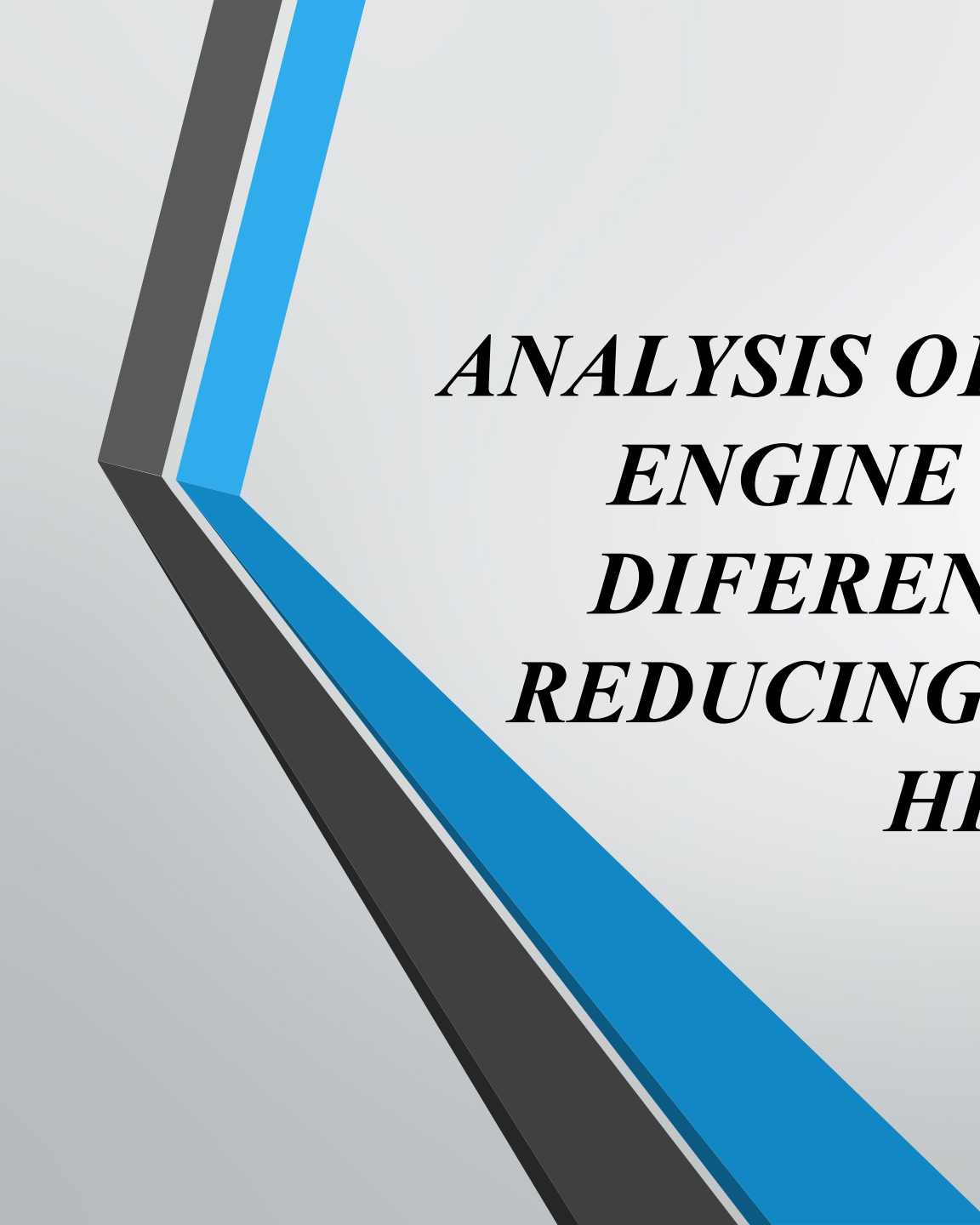
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***ANALYSIS OF TWO WHEELER BIKE
ENGINE FIN USING THREE
DIFERENT MATERIALS FOR
REDUCING TEMPERATURE IN A
HIGHER RATE***

ABSTRACT

- The Engine cylinder is the heart of the automobile components, which is subjected to high temperature variations and thermal stresses. In order to cool the cylinder, fins are provided on the surface of the cylinder to increase the rate of Heat transfer. By executing the thermal analysis of the engine fins, it is helpful to know the heat dissipation rate and temperature distribution inside the cylinder. The main aim of the present project is to analyze the thermal properties like Directional Heat Flux, Total Heat Flux and Temperature Distribution of a modified conical design along with the existing model (Harley Davidson model fin) with three different materials (Cast iron, Aluminium alloy and Magnesium alloy). The design for the fins model will be prepared in CATIA V5R20 and analyzed using ANSYS WORKBENCH with an Average Internal Temperature and Stagnant Air-Simplified case as Cooling medium on Outer surface with reasonable Film Transfer Coefficient as Boundary Conditions.

INTRODUCTION

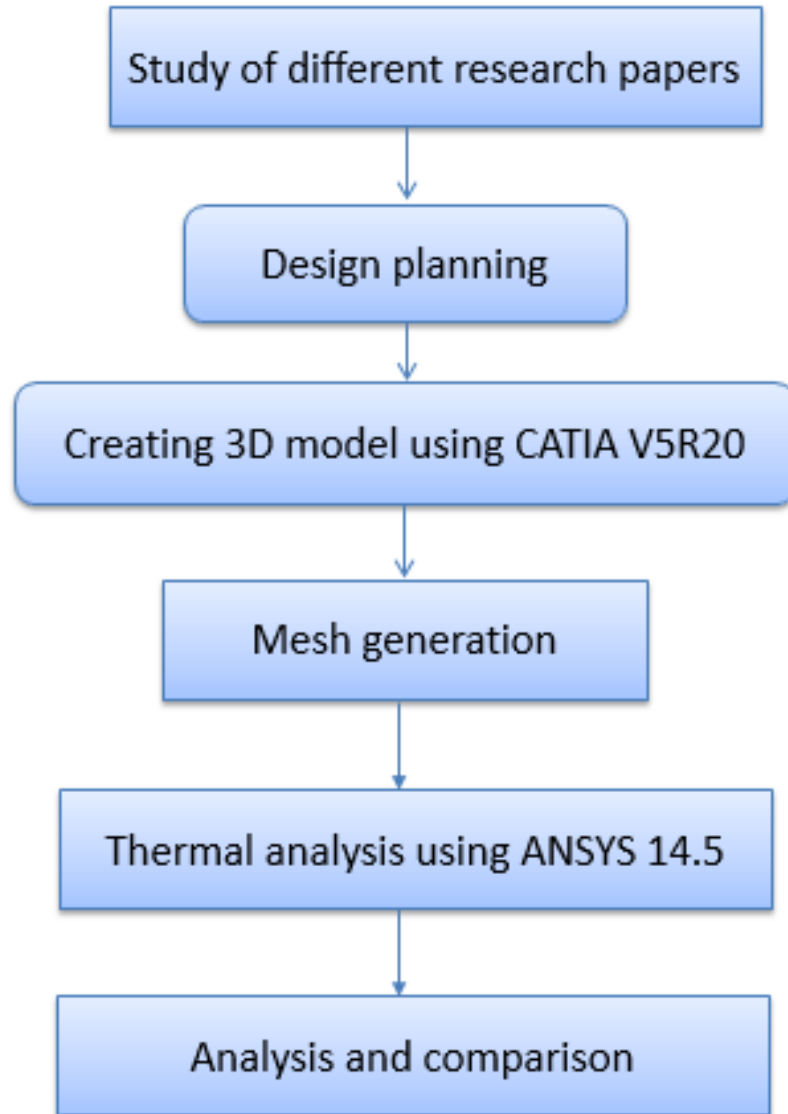
In Internal Combustion engines, combustion of air and fuel takes place inside the engine cylinder and hot gases are generated. The temperature of gases will be around 2300-2500°C. This is a very high temperature and may result into burning of oil film between the moving parts and may result it seizing or welding of same. So, this temperature must be reduced to about 150-200°C at which the engine will work most efficiently. Too much cooling is also not desirable since it reduces the thermal efficiency.

LITERATURE REVIEW

S. No.	TITLE	AUTHOR	ABOUT
1.	Design and thermal analysis on engine cylinder fins by modifying its material and geometry	A Sathishkumar*, MD KathirKaman, S Ponsankar, C Balasuthagar	The major automobile component subject to high temperature variation and thermal stress is engine cylinder. Fins are used on the surface of engine cylinder to increase the heat transfer rate.

S. NO	TITLE	AUTHOR	ABOUT
2.	Analysis of Heat transfer through fins of an IC Engine using CFD	Abhishek Mote, Akshay Choukse, Atharva Godbole, Dr. Pradeep Patil, Avinash Kumar Namdeo	The CFD software was used to simulate the heat transfer across the fins under two different air velocities around the fins.
3.	Design and Analysis of Engine Fins	S.Mayakannan, V.Jeevabharathi, D.Sureshkumar. N.Ashokkumar	The aim of this project investigates alternative cooling methods for an engine fins Assembly. IC engine fins Assembly temperatures by worth of conduction cooling are needed for operating pressure.

METHODOLOGY



EXISTING SYSTEM

- In existing engine fin we are having a cylindrical like structure for temperature reduction. This may results in increase in weight as well as occupying a higher space.

LITERATURE REVIEW

TITLE: Thermal Analysis of Engine Cylinder with Fins by using ANSYS Workbench

AUTHOR: Mulukuntla Vidya Sagar, Nalla Suresh

ABSTRACT: The Engine cylinder is one of the major automobile component, which is subjected to high temperature variations and thermal stresses. In order to cool the cylinder, fins are provided on the surface of the cylinder to increase the rate of Heat transfer. By doing thermal analysis on the engine cylinder and fins around it, It is helpful to know the heat dissipation rate and Temperature Distribution inside the cylinder. We know that, by increasing the surface area we can increase the heat dissipation rate, so designing such a large complex engine is very difficult. The main aim of the present project is to analyse the thermal properties like Directional Heat Flux, Total Heat Flux and Temperature Distribution by varying Geometry(Circular, Rectangular),material (Aluminium Alloy, Magnesium Alloy) and thickness of Fin (3mm,2mm) of an approximately square cylinder model prepared in SOLIDWORKS-2013 which is imported into ANSYS WORKBENCH-2016 for Transient Thermal analysis with an Average Internal Temperature and Stagnant Air-Simplified case as Cooling medium on Outer surface with reasonable Film Transfer Coefficient as Boundary Conditions.



TITLE: Thermal Analysis Of Engine Cylinder Fins By Varying Its Geometry And Material

AUTHOR: N. Phani Raja Rao, Mr. T. Vishnu Vardhan

ABSTRACT: The Engine cylinder is one of the major automobile components, which is subjected to high temperature variations and thermal stresses. In order to cool the cylinder, fins are provided on the surface of the cylinder to increase the rate of heat transfer. By doing thermal analysis on the engine cylinder fins, it is helpful to know the heat dissipation inside the cylinder. The principle implemented in the project is to increase the heat dissipation rate by using the invisible working fluid, nothing but air. We know that, by increasing the surface area we can increase the heat dissipation rate, so designing such a large complex engine is very difficult. The main purpose of using these cooling fins is to cool the engine cylinder by air. The main aim of the project is to analyze the thermal properties by varying geometry, material and thickness of cylinder fins. Transient thermal analysis determines temperatures and other thermal quantities that vary over time. The variation of temperature distribution over time is of interest in many applications such as in cooling. The accurate thermal simulation could permit critical design parameters to be identified for improved life.

INTRODUCTION TO CAD/CAM/CAE

The Modern world of design, development, manufacturing so on, in which we have stepped can't be imagined without interference of computer. The usage of computer is such that, they have become an integral part of these fields. In the world market now the competition is not only cost factor but also quality, consistency, availability, packing, stocking, delivery etc. So are the requirements forcing industries to adopt modern technique rather than local forcing the industries to adapt better techniques like CAD / CAM / CAE, etc.

The Possible basic way to industries is to have high quality products at low costs is by using the computer Aided Engineering (CAE), Computer Aided Design (CAD) And Computer Aided Manufacturing (CAM) set up. Further many tools is been introduced to simplify & serve the requirement CATIA, PRO-E, UG are some among many

DESIGN DETAIL

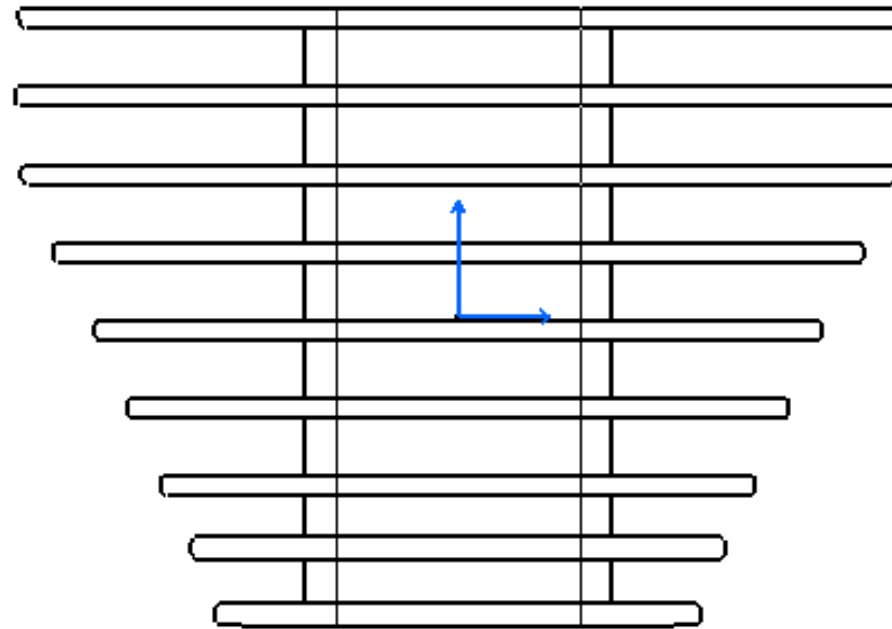
4.11.1 Modelling of Cylinder Fin:

Cylinder along with fin was modelled in SOLIDWORKS-2013. The dimensions of the cylinder along with fin were taken for a square engine whose stroke ratio is unity. Fins with different geometries (circular and rectangular) were modelled using SOLIDWORKS-2013.

4.11.2 Procedure

- Observe and understand the given models top and front view clearly and there dimension
- Adjust the unit system in solid works as SI system
- Go to sketch select the front view from the given views
- First draw the center line assumed distance by using line command
- Then draw one side of front view with assume dimension
- By using the smart dimension command adjust the fin length , groove length , upward projection of cylinder and projection distance from center line which is the diameter of the fin flank in case of circular fins and for the rectangular fins take it as the diagonal length of the fin flank

2D DESIGN OF MODIFIED ENGINE FIN



ADVANTAGES

- Heat transfer rate will be higher
- Increases engine efficiency
- Reduces weight by changing the shape (new model conical shape) of the fins, thus increasing the fuel efficiency

DISADVANTAGES

- We know that the length of fins is directly proportional to the heat transferring rate. But the larger length is may be cause of bending in the fins and also increases the weight of engine. Therefore the overall efficiency will goes to decrease.

APPLICATION

An air cooled motorcycle engine release the heat to the atmosphere through the mode of forced convection, fins are provided on the outer surface of the cylinder block of the engine. ... The fins allows the cooling wind over its surface and transfer heat from fins surface to the air.

FUNCTION

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