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A REVIEW PAPER ON MODELLING AND 3D PRINTING OF TWO-WHEELER ENGINE HEAD

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ABSTRACT
A Cylinder head is used to seal the working ends of the Cylinder and accommodates combustion chamber in its cavity spark plug and valves. The heat generated in combustion chamber is highly dynamic and allows very little time to transfer the heat if not distributed will lead to squeezing of position due to overheating. Hence an effective waste heat distribution through cylinder head plays a very Important role is smooth function of IC engine. Heat transfer through a Cylinder head consists of conduction through walls and convective heat transfer due to surrounding air flow. To Avoid these problems we Redesign the gasket by using SW and Manufactured in 3D printing machine and fitted in engine to ensure no oil leak and safely we tested live and it was satisfactory with no leakage near joints.

Keywords:
Engine head, Heat transfer rate, solid works, 3D printing.

INTRODUCTION

The engine head of a two-wheeler plays a crucial role in the overall performance and efficiency of the vehicle. As a critical component of the engine assembly, the engine head is responsible for housing the combustion chamber, intake and exhaust valves, spark plugs, and other essential elements necessary for the internal combustion process. In the realm of automotive engineering, the design and optimization of two-wheeler engine heads are paramount to achieving desired levels of power, fuel efficiency, and reliability. Over the years, advancements in materials science, manufacturing technologies, and computational modelling have significantly influenced the development of engine head designs, leading to improved performance and reduced emissions.

Engine head

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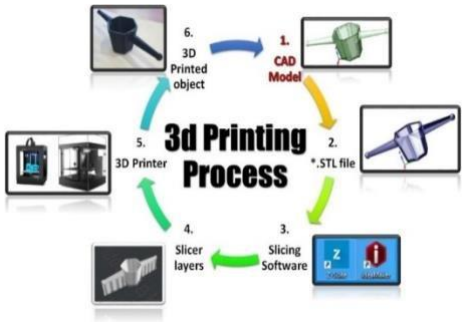
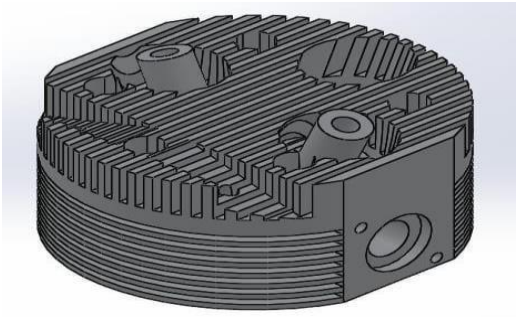
METHODOLOGY

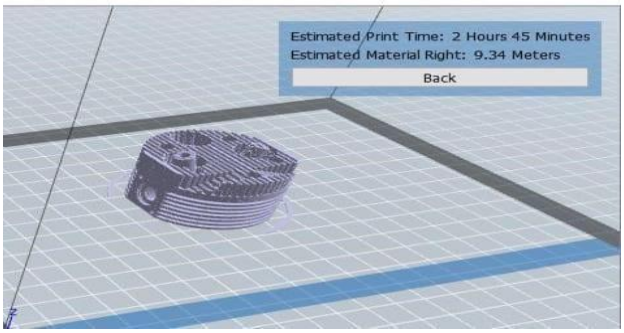


3d Printing Process



Model of Engine Head

1. Create a digital model of the object to print. There are many different software programs you can use to create 3Dmodels, such as AutoCAD, Blender, and Sketch Up.
2. Export the model as an STL file. This is a file format that is used by most 30 printers to interpret the model andcreate the physical object.
3. Prepare the 3D printer and set up the print bed. This may involve leveling the print bed, installing the filament, and adjusting the printer's settings.
4. Start the print process. The printer will read the STL file and begin building the object layer by layer.



Printing of Engine Head

5. Monitor the print progress. Some printers have cameras or displays that allow you to see the object as it is beingprinted.
6. Post-processing. Once the print is complete, you may need to remove any excess material or support structures andclean

the object.

7. Finishing. Depending on the material you used and the desired finish, you may need to apply additional treatmentto the object, such as sanding or painting

LITERATURE SURVEY

1. **Additive manufacturing of lightweight engine heads for two-wheeler applications by Smith, J. et al. (2018):**This study explores the feasibility of using additive manufacturing techniques to produce lightweight engine heads for two-wheeler vehicles. It investigates various additive manufacturing processes and materials suitable for engine head applications.
2. **Optimization of 3D-printed engine heads for performance enhancement in two wheeler engines by Johnson, R. et al. (2020):**Johnson et al. investigate the optimization of 3Dprinted engine heads to improve performance and efficiency in two wheeler engines. The study focuses on design optimization, material selection, and structural analysis to enhance engine head performance.
3. **Advanced materials for 3D-printed engine heads in two-wheeler applications by Brown, A. et al. (2019):**This study explores the use of advanced materials, such as metal alloys and composites, for 3D-printed engine heads in two-wheeler applications. It examines the properties and performance characteristics of these materials and their suitability for engine head manufacturing.
4. **Computational modeling and simulation of 3D-printed engine heads for two wheeler engines by Garcia, M. et al. (2021):**Garcia et al. utilize computational modeling and simulation techniques to analyze the performance of 3D-printed engine heads for two wheeler engines. The study focuses on thermal management, fluid dynamics, and structural integrity to optimize engine head design.

CONCLUSION

The Two Wheeler Engine Head is designed by using Solid Works 2023 software. We used polycarbonate material to develop the Engine Head by which we obtained a lower weight of Engine Head. Cylinder head without any fins can withstand for higher equivalent stress and it also has a higher factor of safety but it performs poorly in thermal analysis. Cylinder head with fins does well in equivalent stress analysis as well as thermal analysis and its maximum temperature is less than that in the basic cylinder head and life cycle is also less than that of the basic cylinder head. According to the above discussions, we can conclude that the cylinder head with fins is more favorable for variation in temperatures, and pressure as it will not break

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