

DESIGN AND ANALYSIS OF A MMC PISTON USING *FINITE ELEMENT ANALYSIS*

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The material in which a continuous metallic phase (the matrix) is combined with another phase (the reinforcement) to strengthen the metal and increase high-temperature stability. The reinforcement is typically a ceramic in the form of particulates, platelets, whiskers, or fibers. The metals are typically alloys of aluminum, magnesium, or titanium. In general, the major advantages of Aluminium Matrix Composites (AMCs) compared to unreinforced materials, such as steel and other common metals, are as follows:

Increased specific strength, increased specific stiffness, increased elevated temperature strength, improved wear resistance, lower density, improved damping capabilities. The metal matrix composite materials are used in wide range of applications and they have better variant properties like mechanical, thermal and physical properties. So went through the case study about the material and its properties .and we decided to replace the aluminum alloy piston into metal matrix composite piston. Our main objective is to increase a efficiency of automobile engine The main advantage of using MMC piston is to decrease emission upto 40%. Metal matrix composites (MMCs) possess significantly improved properties including high specific strength; specific modulus, damping capacity and good wear resistance compared to unreinforced alloys. There has been an increasing interest in composites containing low density and low cost reinforcements. Now a days the particulate reinforced aluminum matrix composite are gaining importance because of their low cost with advantages like isotropic properties and the possibility of secondary processing facilitating fabrication of secondary components and we have done finite element analysis. After that we designed the piston through modeling software “PRO-E ” by the data we taken from the piston 180cc pulsar bike by the measurement and after some theoretical calculations were calculated for the analysis . The structural analysis and thermal analysis has done in Ansys12 software and then comparing the structural and thermal analysis results of a aluminum piston and metal matrix composite piston we got a feasible solution.

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