EFFECT OF CYLINDER BLOCK FIN GEOMETRY AND MATERIAL ON HEAT TRANSFER RATE OF AIR-COOLED 4-STROKE SI-ENGINE

Abstract:

The objective of this project is to increase the heat transfer rate of a 4-stroke air-cooled Spark ignition engine in order to reduce the losses (friction losses, uneven expansion of piston and cylinder, burning of lubrication oil) associated with heat produced during combustion stroke in the engine cylinder. The heat transfer rate of fins is mainly depending on three parameters, one is fins geometry and surface area of the fin, and the material used to manufacture the fins. In order to increase engine efficiency, different fin geometries like circular, rectangular wavy, and curved shapes are designed and different types of fin materials like aluminum alloy and copper alloy are used to increase the heat flux and to increase the efficiency of the engine. In this project numerical simulation of the engine cylinder with different fin geometries and fin materials is going to present to improve the heat dissipation rate of an engine. The modeling of fins is carried out by using SOLID WORKS whereas ANSYS will be used to conduct steady-state thermal analysis. The optimized design of fin geometry and fin material for the engine cylinder will be stated based on the results obtained from the analysis.

Keywords: Fin geometry, Heat transfer, heat flux, Ansys Workbench, Thermal analysis.