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Thermal Analysis of Three Cylinder Engine Head and Performance Optimisation

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Abstract: *In the present work thermal analysis of thermal barrier coated compression ignition engine is done .The heat transfer through the cylinder head with and without ceramic insulation is analysed .two different insulation coating materials are used .Heat transfer is analyzed and the amount of coolant required is optimized to save the heat lost and power consumed. Series of experimentations and computational software are used for the thermal analysis of the L.H.R. (low heat rejection) engine. The rapid advances in computer and simulation technology make it possible to model complex geometrical shapes, assign load cases and analyze associated deformations and material behavior. The results show that optimization of the cooling system of the conventional and L.H.R. engine saves the extra heat lost in cooling and is available for improving the engine performance. The internal combustion engine is a rich source of examples of almost every conceivable type of heat transfer. There are a wide range of temperatures and heat fluxes in the various components of the internal combustion engine. Internal combustion engines come in many sizes, from small model airplane engines with a 0.25 " (6 mm) bore and stroke to large stationary engines with a 12" (300 mm).About 25 % of the air/fuel mixture energy is converted to work, and the remaining 75% must be transferred from the engine to the environment. The heat transfer paths are many, and include many different modes of heat transfer. In this module, we will discuss the heat transfer processes in the engine components, then consider the engine parameters and variables which affect the heat transfer processes. Maximum amount of heat is transferred through the cylinder head. In this project we have taken efforts to analyze the heat transfer through the cylinder head of three cylinder S.I. engine. CAE is extensively used for simulation. Heat transfer is analyzed for different rates of coolant flow and a optimized coolant flow rate is suggested***.**

Keywords: Cylinder Head, Thermal Analysis, Heat Transfer

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