ANALYSIS OF COOLING SYSTEM IN VEHICLE ENGINES

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Abstract

The advancement in the field of aerodynamics and the engine Management system has made the modern vehicles lot more Faster as compare to one from the previous generations. The engine size has not increased much for reaching this much speed and torque requirement. Modern engine which produce efficient results in form of fuel efficiency and power to weight ratio runs at higher rpm and produce more power every cycle, this is a great boon but the amount of heat to be released from the engine to the surrounding increases with the increase in maximum power and speed requirement. That is why we need a more advance engine cooling system that can achieve proper cooling of the engine without any compromise with the aerodynamics shape of vehicle [1], [2].

Keywords: vehicle, engine, cooling, temperature, heat

Introduction

The transportation of goods and passengers using the modern highways where the speed requirement is lot higher with heavy load on the vehicle combined with problems in hot summers surely require an advance engine cooling system [3], [4]. After developing several ideas those are based on changing the radiator construction or assisting some other components and process with the system. Such as changing the type of fin material used, their construction, use of turbocharger etc the radiator is located in front of the engine. It has a top and bottom tanks to accommodate coolant water.The cooling fins in the form of tube are arranged vertically in between these two tanks. When the engine attains above normal temperature the thermostat allows the coolant water into the radiator top tank. When the coolant water flows to the bottom tank of the radiator via cooling fins, the heat presents in the coolant water transfer to the atmo-sphere by conduction and convection methods by the fin materials and cooling fan air respectively [5]. Thus the radia-tor is acts as a heat exchanger of the cooling system in I.C. engine. The pros/cons of these design idea as were considered based upon the rate of heat dissipation and other limitations as per individual idea. From which these two design changes came to be much more promising than the rest of others. First one is the use of carbon foam fins instead of aluminum fins on current radiator design, more heat dissipation can be obtained. Because carbon foam increases the surface area exposed to the air. This is mainly due to the fact that the carbon foam is porous and allows the air to flow through it in addition to allowing the air to flow around it. Second one is that the convective opposition between the coolant and the tubing is diminished by nano-liquids, a two-stage blend made out of fine particles in suspension in a consistent and soaked fluids, it gives an exceptionally pivotal upgrade in

warmth move when contrasted with customary radiator coolant [6], [7].

Result and Conclusion

The application of carbon foam as the radiator material in the design shows an increased rate of heat transfer that is much greater than the required heat transfer. Hence, the existing radiator can be made smaller in size by reduction in width. Also, the Nanofluid, shows an increase rate of heat transfer that is also a great way to enhanced the rate of convection between the inner walls of the tubing and the fluid, this rate of heat transfer is greater than the required value and hence the radiator can work efficiently even at higher load and speed requirement in hot climatic conditions.

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