

FE THERMAL ANALYSIS AND EXPERIMENTAL VALIDATION ON THE COMPONENTS OF SI ENGINES

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ABSTRACT

To test the performance of different versions of SI engines (conventional engine, CE and catalytic coated engine, CCE, copper being coated on the piston crown and on the inner surface of cylinder head) with any new fuel or fuel blend, the possibility of deterioration of lubricating oil placed in between piston and liner of the engine is to be checked, which results in damaging the mechanical stability and decrease in the engine efficiency. As it is difficult to check practically, FE thermal analysis was adopted. FEA is important in evaluating the lubricating oil deterioration, as the liner is subjected to high temperatures and the piston crown and inside of the cylinder head are coated with copper. Thermal analysis includes the determination of temperature distribution and heat flow rate across the components (piston, liner and cylinder head) of SI engine. The prediction is important which determines the efficient combustion by means of catalytic coating on the surface of piston crown and over the inside surface of cylinder head. These studies are conducted on CE and also on CCE in order to emphasize the advantage of CCE over CE in producing efficient combustion. The temperature and heat flux rate at the component surfaces was found to be increasing along both axis and radius of piston, liner and cylinder head of CCE over CE. The temperature of lubricating oil was also found to be increasing with CCE over CE but it was found to be within the safe temperature limits to avoid deterioration.

KEYWORDS: *Conventional Engine, Copper Coated Engine, FE Thermal Analysis, Lubricating Oil, Deterioration*

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