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Guided By

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Project Title

ANALYSIS ON THE EFFECTIVE UTILIZATION OF EXHAUST GASES IN AUTOMOBILES

Abstract:

A major part of the heat supplied in an internal combustion engine is not realized as work output, but dumped into the atmosphere as waste heat. If this waste heat energy is tapped and converted into usable energy, the overall efficiency of an engine can be improved. The percentage of energy rejected to the environment through exhaust gas which can be potentially recovered is approximately 30-40% of the energy supplied by the fuel depending on engine load. Thermoelectric modules which are used as thermoelectric generators are solid state devices that are used to convert thermal energy from a temperature gradient to electrical energy and it works on basic principle of Seebeck effect. This paper demonstrates the potential of thermoelectric generation. The study also revealed that energy can be tapped efficiently from the engine exhaust and in near future thermoelectric generators can reduce the size of the alternator or eliminate them in automobiles.

In order to meet the increasing electrical demands of modern automobiles, bigger and bulkier alternators are connected to engines. Bigger and bulkier alternators which operate at an efficiency of 50 to 62% consume around 1 to 5% of the rated engine. About 30% of the energy supplied to an IC engine is rejected in the exhaust as waste heat. If approximately 6% heat can be recovered from the engine exhaust, it can meet the electrical requirements of an automobile and it would be possible to reduce the fuel consumption around 10%.

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