Engine and Auxiliary Systems

Edited by
Prof. Dr. A.K.M. Mohiuddin

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Abstract

The rapid expansion of motor vehicle in globally dedicates the increase of energy demand in an acceleration fashion. If driving habits remain unchanged, car will have to become nearly three times more energy-efficient by 2030 just to maintain that sector's present consumption. If energy use trends are projected to year 2100, transportation would then have to be twenty times more energy-efficient, which roughly equates to 170km per litre. In a typical U.S. city, motor vehicle emissions account for 30%-50% of hydrocarbon, 80%-90% of carbon monoxide, and 40%-60% of nitrogen oxide emissions which are contaminated the environmental, changing climate and harming ecosystem. However, if the automobile is to survive as an economically sound and viable transportation system its energy consumption and harmful emissions must be reduced. Currently battery electric and hybrid cars are considered as the energy efficient. But, the problems of these technologies are the batteries recharging time, maintenance cost and disposal. The disposal of batteries might make bio-dreadful condition which is the harmful for the humans and others living things. Advanced power systems and reduced vehicle road-loads are necessary in order to make significant gains in motor vehicles energy. The aim of the project is to develop a waste energy harvesting electromagnetic hybrid engine. The engine is expected to yield the best efficiency in the range of 65-75% at stable operation speed of 4000rpm and reduce emission about 70-80%. The additional component electro-supercharged associated with the waste heat recovery system of the engine will be used to supply the high pressure air to the engine combustion chamber for creating the massive turbulence effect of air-fuel mixture and burn the 100% mixture in shortly. In overall, it is expected that the light duty motor vehicle car travel about 30-45km by using 1 litre of petrol. A pilot study has been conducted on the development of a small scale hybrid engine by using a 120cc internal combustion SI engine with the financed of IIUM. The engine has been tested with a 2.5 kN car and found that car travel 85 km with speed of 60 km/hr by using 1 litre of petrol.