

**VEHICLE EMISSION REDUCTION TECHNOLOGIES,
TODAY AND TOMORROW: A TECHNICAL REVIEW**

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Abstract

Vehicle emissions contribute by a great deal to air pollution. These emissions can be reduced by carefully controlling at the source and after the source. Vehicle manufacturers are engaged in continuous research in low or zero emission vehicles. In the case of internal combustion (IC) engines that is fitted in more than 90% of the vehicles, emissions are reduced by controlling combustion by various means and treating the exhaust gases. Other alternatives are to use hybrid drives, alternative fuelled engines and electric or pneumatic engines.

The present paper reviews the engine technology today in the emissions perspective and the alternative technologies that are used to vehicular related emissions. The design and construction of conventional engines are discussed and techniques that are used to reduce emissions are compared. The practical relevance of these techniques and the suitability of these techniques to Sri Lanka are assessed. Some of these techniques are modern engine head design, engine management and post combustion emission control. Diesel particulate filters and catalytic converters fall into this category. Diagnostic and analytical techniques, fuel technology and modelling and simulation of combustion and emission dispersion are important in emission reduction.

Alternative energy applications in motor vehicles are compared for their performance sustainability and suitability. Electric drives, clean fuelled engines, hybrid vehicles and fuel celled fall into this category. However, the technique has to be assessed for the overall improvement in emission reduction. An electric car for example, has an overall

power conversion efficiency of about 30% compared to that of an IC engine car of about 22%. The electric car emits zero emissions in the place that is used. The adequacy of Sri Lankan emission standards and importation policies are also briefly reviewed in a scientific and technological perspective.