DIESEL ENGINE ALTERNATIVES

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ABSTRACT

There are basically three different modes of combustion possible for use in reciprocating engines. These include: diffusion burning, as occurs in current diesel engines; flame propagation combustion, such as is used in conventional spark ignition engines; and homogeneous combustion, such as is used in the Southwest Research Institute homogenous charge compression ignition (HCCI) engine.

Diesel engines currently offer significant fuel consumption benefits relative to other powerplants for on- and off-road applications; however, costs and efficiency may become problems as the emissions standards become even more stringent.

This presentation presents a discussion of the potentials of HCCI and flame propagation engines as alternatives to the diesel engines. It is suggested that as the emissions standards become more and more stringent, the advantages of the diesel may disappear.

The potential for HCCI is limited by the availability of the appropriate fuel. The potential of flame propagation engines is limited by several factors, including knock, exhaust gas recirculation tolerance, high BMEP operation, and throttling. These limitations are discussed in the context of the potential for improvement of the efficiency of the flame propagation engine.