

An Approach towards Elementary Investigation on HCCI Technology

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Abstract : Here a Homogeneous Charge is used as in a spark-ignited engine, but the charge is compressed to auto ignition as in a diesel. The main difference compared with the Spark Ignition (SI) engine is the lack of flame propagation and hence the independence from turbulence. Compared with the diesel engine, HCCI has a homogeneous charge and have no problems associated with soot and Nox but HC and CO were higher than in SI mode. It was not possible to achieve high IMEP (Indicated Mean Effective Pressure) values with HCCI. The Homogeneous charge compression ignition (HCCI) is an attractive technology because of its high efficiency and low emissions. However, HCCI takes a direct combustion trigger making control of combustion timing challenging, especially during transients. To aid in HCCI engine control we present a simple model of the HCCI combustion process valid over a range of intake pressures, intake temperatures, equivalence ratios and engine speeds. HCCI a new combustion technology that may develop as an alternative to diesel engines with high efficiency and low Knox and particulate matter emissions. The homogenous charge compression ignition (HCCI) is a promising new engine technology that combines elements of the diesel and gasoline engine operating cycles. HCCI as a way to increase the efficiency of the gasoline engine. The attractive properties are increased fuel efficiency due to reduced throttling losses, increased expansion ratio and higher thermodynamic efficiency. With the advantages there are some mechanical limitations to the operation of the HCCI engine. The implementation of homogenous charge compression ignition (HCCI) to gasoline engines is constrained by many factors. The main drawback of HCCI is the absence of direct combustion timing control. Therefore all the right conditions for auto ignition have to be set before combustion starts. This paper describes the past and current research done on HCCI engine. Many research got considerable success in doing detailed modeling of HCCI combustion. This paper aims at studying the fundamentals of HCCI combustion, the strategy to control the limitation of HCCI engine.

Keywords : HCCI, diesel engine, combustion, elementary investigation

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