CFD study several injection timing on homogeneous charge compression ignition hydrogen diesel dual fuels

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ABSTRACT

Among the alternative fuels, hydrogen shows great potential as fuel and energy carrier. Hydrogen fuel is a renewable fuel with low emissions, odourless, non-toxic and has a wide align flammability in internal combustion engine. The combination between hydrogen diesel dual fuels with Homogeneous Charges Compression Ignition (HCCI) as a new combustion technology was observed in this paper. One of the problems of HCCI is combustion auto ignition control of the mixture of fuel used and the high heat release produced. In recent years, several studies about the HCCI method with dual fuel is that it requires new infrastructure to supply two fuels at once to the combustion engine. For this reason, it is endeavored to use multiple fuels into one fuel (using reforming parts) before injecting to internal combustion engine. The results of CFD study several injection timing on HCCI with dual fuel hydrogen diesel fuel, the highest pressure value in the combustion chamber was achieved at 107 bar pressure 360 degrees CA. Whereas by using the conventional method only obtained a pressure of 72 bar 363 degrees CA. In addition, the rate of heat release value with the HCCI method was 127 J / deg. at 10 deg. BTDC, compared to the conventional method which only reaches 32 J / deg. at 1 deg. ATDC. It is clear that there is heat transfer to BTDC before TDC, due to the homogeneity of the fuel in the HCCI method.

KEYWORDS

CFD; Dual fuel; HCCI; Hydrogen; Injection timing

ACKNOWLEDGMENT

This research work supported by LIPI and the authors thank all researchers of the Internal Combustion Engine Laboratory for their support.