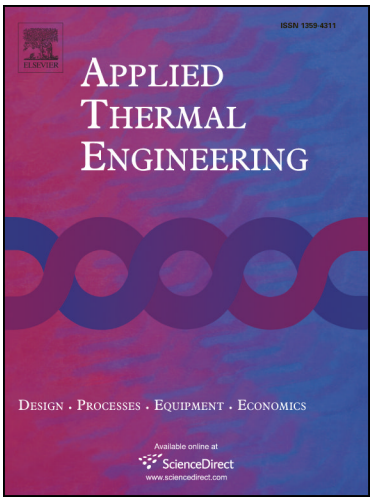

Comparative study on combined effects of cooled EGR with intake boosting and variable compression ratios on combustion and emissions improvement in a SI engine

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Comparative study on combined effects of cooled EGR with intake boosting and variable compression ratios on combustion and emissions improvement in a SI engine

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Abstract

Effects of increasing compression ratio (CR) and intake boosting when operating engine with cooled EGR are characterized and compared in a single cylinder, port-fuel injection SI engine. CR and intake pressure is independently increased form 8:1 to 10:1, and 1.0 to 1.4 bar when operating EGR from 0% to 20%. Experiments are performed at constant speed 1200 r/min, full load and stoichiometric air fuel ratio. As increase of EGR, the MBT (minimum ignition advance for best torque) spark timing has to be advanced to compensate retarded combustion phasing caused by the cooling effect of EGR. Increasing intake pressure to 1.4 bar gains more restore in maximum cylinder pressure and peak heat release rate compared with those by increasing CR to 10:1. At full load, increase of EGR produces a significant drop in IMEP. Increasing intake pressure and CR can both effectively restore egnine IMEP while achieving a reduction in ISFC (indicated specific fuel consumption) and COV_{IMEP} (coefficient of