18SKSAE_A099

The Effects of Combustion Duration on Residual Gas and Effective Real Energy of Small SI-Engine at Full Load

Nguyen Xuan Khoa[1], Nguyen Ba Hung[1], Yujin Kang[1], Ock Taeck Lim[2]*

Graduate School of Mechanical Engineering, University of Ulsan, Ulsan, 44610, South Korea[1)]

School of Mechanical Engineering, University of Ulsan, 44610, South Korea[2)]

Key words : Combustion duration, Residual gas, Engine torque, Engine power, Effective real energy

* Corresponding Author, E-mail: otlim@ulsan.ac.kr

The purpose of this research to study how the combustion duration get effect on residual gas and the effective real energy of small SI- Engine at full load. To achieve this goal, an experimental system is installed with dynamo testing system and a simulation model is established using AVL-Boost software. The simulation model is used to determine residual gas ratio and the effective real energy. In this research, the combustion duration will be increased from 40 deg to 110 deg of crank angle and engine testing speed are 6000 rpm, 7000 rpm. The results show that: the combustion duration get big effect on residual gas ratio and effective real energy. When changing combustion duration, the residual gas ratio and effective real energy are changed with various trends. At the engine speed is 6000 rpm, the minimum residual gas ratio is 0.22% and maximum effective real energy is 0.826 KJ at combustion duration of 80 deg and 60 deg crank angles. With engine speed is 7000 rpm and 8000 rpm the minimum residual gas ratio is 0.14% and 0.15%, the maximum effective real energy is 0.831 KJ and 0.8247 KJ at combustion duration of 110 deg and 80 deg crank angles. Besides that, these results also show that, the maximum engine torque is able to achieve 23.5 Nm at 6000 rpm and combustion duration is 60 deg.

Acknowledgement

This research was financially supported by CEFV (Centre for Environmentally Friendly Vehicle) as Global Top Project of KMOE (2016002070009, Development of Engine System and Adapting Vehicle for Model 110 cc and 300 cc Correspond to EURO-5 Emis-sion). This research was supported by The Leading Human Resource Training Program of Regional Neo industry through the Nation-al Research Foundation of Korea (NRF) funded by The Ministry of Science, ICT and Future Planning (2016H1D5A1908826).