عنوان مقاله:

Theoretical Investigation of Combustion Process in Dual Fuel Engines at Part Loads Considering the Effect of Exhaust Gas Recirculation

محل انتشار:

پنجمین همایش موتورهای درونسوز (سال: 1386)

تعداد صفحات اصل مقاله: 19

نویسندگان:

R Khoshbakhti Saray - *Faculty of Mechanical Engineering, Sahand University of Technology Tabriz*

V Pirouzpanah - *Faculty of Mechanical Engineering, University of Tabriz*

خلاصه مقاله:

The dual fuel engines at part loads inevitably suffer from lower thermal efficiency and higher carbon monoxide and unburned fuel emission. This work is carried out to investigate combustion characteristics of a dual fuel (diesel- gas) engine at part loads, using a single zone combustion model with detailed chemical kinetics for combustion of natural gas fuel. The authors developed software in which the pilot fuel is considered as a subsidiary zone and a heat source which is deriving from two superposed Wiebe's combustion functions to account for its contribution to ignition of gaseous fuel and rest of total released energy. Chemical kinetics mechanism is consisted of 112 reactions with 34 species. This quasi-two zone combustion model is able to establish the development of the combustion process with time and the associated important operating parameters, such as pressure, temperature, heat release rate (H.R.R) and species concentration. Also, this model is able to calculate accumulated heat release, ignition delay and combustion duration of gaseous fuel air mixture. Therefore this paper is an attempt to investigate the combustion phenomenon at part loads and using hot exhaust gas recirculation (EGR) to improve the above mentioned drawbacks and problems. By employing this technique, it is found that, lower percentages of EGR and considering its thermal and radical effects have the positive effect on performance and emission parameters of dual fuel engines at part loads. Predicted values show good agreement with corresponding experimental values in a special engine operating .condition (1/4 load, 1400 rpm). Implications will be discussed in details

کلمات کلیدی:

Quasi-Two Zone Combustion Model, Chemical Kinetics, Natural Gas, Dual Fuel Engines, Exhaust Gas Recirculation ((EGR