Influence of low hydrocarbon fuel addition on exhaust characteristics for small gas engines

Hong Yan1*, Hisashi Matsunaga1, Tadashige Kawakami 2 Hosei University Kajino-cho, Koganei, Tokyo 184-8584 Japan

1 27th ICDERS Extended Abstracts

In recent years, including petroleum, the reduction of fossil fuels is a serious problem. Natural gas and petroleum gas have attracted attention as environmentally friendly fuels_o In terms of fuel shift from coal to natural gas , including not only passenger cars but also generators, both production and share rates are increasing compared to other alternative fuels_o Due to the shale gas revolution in the United States, shale gas is noticed as a new fuel replacing petroleum, based on data of world oil consumption in 2000. Shale gas will become the main fuel, in addition, the price gap between oil and gas has shrunk and the linkage between markets has dramatically increased. So it is expected that demand will expand for practical use. Applications include natural gas vehicles, cogeneration systems, etc. Gas fuel is expected to penetrate daily life in a wide range from commercial to home use. And it is a research using a large gas engine for industrial use. There are a few research examples using small gas engines for domestic use. This study has investigated the combustion characteristics of a small gas engine, the effect of the addition rate and the combustion characteristic on the reduction effect of combustion products (NOx, CO and HC) by adding low hydrocarbons to fuel.

The main conclusions are as follows: 1) By adding a low hydrocarbon fuel to the small gas engine, there is an effect on reducing NOx. 2) In small gas engines, the addition rate of low hydrocarbon fuel is limited to about 15%. 3)CO emissions decrease with increased engine load. 4)The results are linked to the CO results, and it is confirmed that CO₂ emissions are increasing under the condition that the complete combustion ratio increases.