

Koraphop Kawinpolasa 2011: An Investigation into the Effects of Gasohol E0, E10 and E85 on Engine Performance, Oxides of Nitrogen Emissions and Knock Characteristic by Using a Single-Zone Engine Model. Master of Engineering (Mechanical Engineering), Major Field: Mechanical Engineering, Department of Mechanical Engineering. Thesis Advisor: Assistant Professor Ekathai Wirojsakunchai, Ph.D. 123 pages.

This study involves the development of an engine model in order to study impacts of using gasohol fuels (E10 and E85) comparing to a typical fuel (E0) on various engine operating conditions. In the model, engine performance, thermal efficiency, fuel consumption, knock characteristics, and emissions were investigated at various spark timings, engine speed, air-fuel ratio and compression ratio.

The model was first calibrated with experimental results to optimize values of m and b in Wiebe function. When increasing percentages of ethanol blends, the adjusted value of m was increased while b was decreased.

Results from the simulation showed that when increasing percentages of ethanol blends, engine torque and thermal efficiency were decreased with higher fuel consumption. However, the ethanol blends offer the benefit of allowing advanced spark timing without knock. This will help decreasing emissions and minimizing knock occurrence.

Student's signature

Thesis Advisor's signature