

Mongkol Salad 2010: Effects of Diesel Injection Strategies on Diesel Dual Fuel Engine Operations under Low Load Conditions. Master of Engineering (Mechanical Engineering), Major Field: Mechanical Engineering, Department of Mechanical Engineering. Thesis Advisor: Mr. Tanet Aroonsrisopon, Ph.D. 146 pages.

The use of dual fuels is an alternative operation for a diesel engine. In such an engine, natural gas is injected into the intake system and mixed with the air. Diesel fuel is directly injected into the combustion chamber. As reported in previous literatures, one of the challenges in diesel dual fuel (DDF) engines is poor low load operation characteristics, i.e. low engine efficiency and high emissions.

The current research investigated the operating characteristics of a DDF engine in a single cylinder, fourstroke, engine under low load operations at 1600 and 2400 rpm. The timings and the amounts of diesel injections were varied to examine changes in the combustion and the engineout emissions.

Data indicated that the timing of diesel injection had significant effects on the combustion processes. Different injection strategies resulted in different timings of combustion, rates of energy release and emissions. Moreover, the optimum operating points based on optimum efficiency and emissions were summarized under selected engine conditions. The findings from this study helped provide fundamental understanding into combustion control strategies and perspectives for further DDF engine conversion applications.

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