

Effect of Injection Timing on the Engine Performance and Exhaust Emissions of a Dual-Fuel Compression Ignition Engine

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Abstract

The investigation of available alternative fuel to meet high efficiency and more stringent emission controls for compression ignition engine is very challenge. Di-Methyl Ether (DME) is a very interesting fuel of choice in the evolution of alternative fuel due to the physical and chemical properties that matches with conventional diesel fuel. DME combustion also emits overall low emissions especially, particulate matter (PM). The aims of this study was to demonstrate and evaluate the feasibility of the engine performance improvement with lower fuel consumption by optimising the injection timing. The experimentation was conducted on different injection timing (e.g. 15.5°, 13.5° and 17.5° BTDC (before top dead center)). The retard injection timing (13.5° CAD) at high engine load with EGR addition was able to improve engine performances and reduced the level of NO_x emissions however this can be effect on higher black smoke. Therefore, the optimisation of injection timing for dual fuel (DME additions together with diesel engine) engine is required for different operating conditions.

Keywords : Alternative fuel , Di-methyl ether, Injection timing, Engine performance, Compression ignition engine dual fuel

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