

Design, Analysis and Development of Two Stroke Gasoline Direct Injection Engine



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Keywords: Two Stroke Engine, SI Engine, Direct Injection

Abstract:

Two stroke engine is more powerful, often provide high **power-to-weight ratio**, usually in a narrow range of operating speeds called the "power band". Compared to 4-stroke engines, they have a great reduced number of moving parts, more compact and significantly lighter. Overlap of induction and exhaust strokes make it more difficult to achieve complete combustion and more power output in two-stroke engines. Direct injection of fuel to the engine is one of the possible solution in order to achieve complete combustion and more power output.

This project deals with the idea of development of test rig based experimental investigations to determine the performance characteristics of a two stroke spark ignition direct injection engine. Micro squirt ECU was used for Engine Management System (EMS). This EMS is a standalone engine management, which gives full control of the electronic fuel injection and ignition system for the cycle. Tuner studio software was used for tuning engine. Basic tuning of engine was done with proper ignition from spark plug and spray from injector. Engine was mapped with electronic throttle body and crank sensor.

Gasoline direct injection was effectively used to minimize fuel losses in a single cylinder two stroke spark ignition engine. Engine was mapped with electronic throttle body and crank sensor. The basic configuration of fuel injection system was selected and bench test to determine optimum injection pressure was carried out. Crank angle sensor with the necessary electronic circuits to generate signals at each degree of crank shaft rotation and reference signals for start and control of injection was developed. The existing two stroke engines in market can be redesigned with direct fuel injection system instead of existing carburetor system. In future, tuning of engine will be carried out on test bench to validate the engine operating condition.



Engine test bench



Modified engine parts



Tuner Studio results and fuel injector