

SUMMARY

Purna Satria Nugraha, Department of Mechanical Engineering, Faculty of Engineering, Brawijaya University, January 2017, *Effect of Electrostatic Capacitor Capacitance Variation on Capacitor Discharge Ignition to 6 Stroke Engine Performance*. Academic Supervisor: Eko Siswanto and Bayu Satriya Wardhana.

Nowdays the internal combustion engine is widely used in motor vehicles, industries, and power generation. 4 stroke internal combustion engine is the most frequently used than the motor 2 stroke engine. The main reason 4 stroke engine more desirable than 2 stroke engine is the excellence of performance and fuel frugality. However with the development of science and technology, has a lot of development done to improve the efficiency of reciprocating engine, one of the development is 6 stroke engine. Siswanto (2014), bring the 6 stroke concept by adding two stroke additional steps in 4 stroke engine, to increase the duration of mass diffusion and thermal diffusion, so that combustion occurs perfectly. The results, that 6 stroke engine has a greater engine power than the 4 stroke engine. Therefore, the 6 stroke engine can be a potential development in the future.

This research was conducted with developing the ignition system 6 stroke engine using a capacitor discharge ignition (CDI), where previously they use conventional ignition (contact breaker), to get a better performance. CDI is one type of electronic ignition systems on motorcycles that principle works is by utilizing the quick discharge by the capacitor to provide voltage on the primary coil ensuing high-voltage electrical induction in the secondary coil. The high voltage power from the secondary coil then flows into the spark plug to provide a spark jumps in the combustion chamber with a high energy. High energy for spark, is one of the criteria in the ignition system so that the engine can work optimally.

This research aims to determine the effect of variations in electrostatic capacitance of the capacitor on the CDI engine torque, engine power, specific fuel consumption and thermal efficiency of 6 stroke engine. The use of capacitors with larger capacitance value can increase the energy that can be stored capacitor, so that the energy supply to the combustion becomes larger, and the formation of sparks occur more easily and makes combustion of fuel-air mixture more better. Best performance obtained on a 2.2 μF capacitor use, with a torque value of 0.4037 (kg m) at 4200 rpm engine speed, the value of the effective power of 2.63 (hp) at 5600 rpm engine speed, SFCe value of 0.1733 ($\text{kg} \cdot \text{hp}^{-1} \cdot \text{hour}^{-1}$) at 5600 rpm engine speed and thermal efficiency value of 30.45 (%) at 4200 rpm engine speed.

Keywords: CDI, 6 stroke engine, engine performance, capacitor, capacitance