PERFORMANCE OPTIMIZATION OF SINJAI BI-FUEL ENGINE GASOLINE AND COMPRESSED NATURAL GAS (CNG) WITH VARIATION OF INLET PRESSURE AND IGNITION DEGREES

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ABSTRACT

Compressed Natural Gas (CNG) is one type of hydrocarbon that can replace the role of gasoline, but when the engine using CNG fuel a decline in performance in the form of torque and power significantly. This is because CNG is characterized by a density of 0.72 kg/m$^3$, and the laminar burning velocity of CNG by 0.43 m/sec, where both of these characteristics have a lower value than gasoline fuel characteristics.

Improved engine performance when using CNG fuel, it can be done by increasing the number of gasoline fuel supply by changing the amount of pressure into the combustion chamber and the magnitude of the degree of change in the engine ignition. In this study using the test machine Sinjai 2-cylinder engine of 650 cc single fuel which is modified into bi-fuel intake system with port fuel injection.

Research results when engines using fuel CNG obtained optimum pressure in CNG fuel of 2.5 bar with degrees ignition $14^0$ Before Top Dead Centre (BTDC) and the engines of 3500 rpm, where as on the position of the torque generating 48.8 Nm, power of 19.38 kW, BMEP of 946.7 kPa, AFR of 16.46, volumetric efficiency of 48.28% and SFC amounted to 0.26 kg/kWh. In addition, the emission values CO being of 0.4 % and HC of 60 ppm.

Kata kunci: Compressed Natural Gas, Sinjai engine, power, torque, emission
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