Testing of Torque, Power, and Exhaust Emissions on a 125cc 4-Stroke Matic Motorcycle Using a Wet Cell Type HHO Generator with NaHCO3 Catalyst

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ABSTRACT

This study aims to analyze the effect of using HHO gas with Sodium Bicarbonate ($NaHCO_3$) catalyst on engine performance (torque and power) and exhaust emissions of a 125cc 4-stroke automatic motorcycle. The HHO generator utilized is a wet cell type with stainless steel electrodes, and the primary fuel used is Pertalite RON 90. The research employs a quantitative experimental method, comparing the standard engine condition to the engine after the addition of HHO gas through dyno tests and gas analyzer testing.

The results indicate that the addition of HHO gas causes a decrease in the engine's maximum performance, with maximum torque dropping by 2.10% (from 9.03 Nm to 8.66 Nm). This decrease is suspected to occur because the HHO gas enters outside of the ECU's control, causing the air-fuel mixture to become too lean at high RPM. Nevertheless, there is an increasing trend in torque within the low to medium engine speed range (4000-6000) The emission test results show a decrease in carbon monoxide (CO) and hydrocarbon (HC) levels, as well as an increase in carbon dioxide (CO_2) levels after the addition of the HHO generator. This proves that HHO gas is capable of improving combustion quality to become more complete in the combustion chamber.

Keywords: HHO Generator, $NaHCO_3$ Catalyst, Torque, Power, Exhaust Emissions.