

ABSTRACT

THE EFFECT OF VARIATION OF WATER AND ACTIVATION TEMPERATURE IN PELLETIZED FLY ASH ON THE PERFORMANCE AND EXHAUST GAS EMISSIONS OF A FOUR-STROKE PETROL MOTORCYCLE

By

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Advance in technology resulted in increasing machines usage, along the human activities. The increasing number of vehicles that still uses fossil fuels as a primary fuel causes running low reserves of fossil fuels. With this condition, the government has reduced fuel subsidies and planned to impose restrictions on the fuel consumption of vehicles. So it needs to perform the research regarding to fuel economy and low exhaust gas emmissions. One is to utilize solid waste of coal (fly ash) to treat combustion air, in order to obtain oxygen-rich combustion air. Oxygen-rich combustion is able to improve the performance of the motorcycle.

Testings were done to observe fuel consumption, acceleration, and emissions of the motorcycle. Fuel consumption testing was done with two variations, road test (operated at an average speed of 50 km/h for a distance of 5 km) and idle test (at 8500 rpm). Acceleration testing was done at 0-120 km/h and 40-120 km/h and at 1500 and 8500 rpm for emissions testings.

Pelletized fly ash used in this experiment was 10 mm in diameter of 10 mm and 3 mm in thickness. Variation of water (mineral water, aquades, and borehole water), activation temperature and activation time (200 °C, 150 °C for 1 h, and 200 °C, 150 °C for 2 hours) and the adhesive mass variation. These pelletized Fly Ash were packed in a frame and put them in the air filter of 1500 cc Yamaha vixion motorcycles. So, before air entered into the combustion chamber, the air was firstly contacted with the pellets.

In this research, the pelletized fly ash were able to save fuel consumption by up to 28.8 % at road test, and 25.5% at idle test of 8500 rpm. In the acceleration testing of 0-120 km/h, it increased by 7.3%, and 6% at acceleration of 40-120 km/h. These pellets could also reduce CO levels by up to 26.7 % at 1500 rpm and 45.5 % at 8500 rpm. Meanwhile, HC levels could reduce by 34.8 % at 1500 rpm, and 30.4 % at 8500 rpm rotation.

Keywords: 4-stroke petrol engine, coal fly ash, and pelletized fly ash adsorbent.