A Comprehensive Study on a Hydroxy Gas Boosted Internal Combustion Petrol Engine

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In this study, hydroxy gas (Hydrogen + Oxygen) was produced by an electrolysis process in a cell (hydrogen generator). Hydroxy gas was used as a supplementary fuel in a four cylinder, four stroke, petrol, Internal Combustion (IC) engine without any modification and without the need for storage tanks. Its effects on exhaust emissions and engine performance characteristics were investigated. Experiments showed that the constant hydroxy gas flow rate at low engine speeds (under the critical speed of 1500 rpm for this experimental study), resulted in knocking of the engine. Investigations demonstrated that hydroxy gas flow rate had to be diminished in relation to engine speed due to the variation of opening times of intake manifolds at various speeds. Therefore, an electronic control unit was used to decrease hydroxy gas flow rate by decreasing voltage and current. The flow rate of hydroxy gas was measured by using various amounts of KOH (catalyst), variation of the expose surface area of the plates and variation of the number of plates in the cell. The catalyst was added into water to diminish hydrogen and oxygen bonds because it increases the ionic conductivity of the medium rapidly. It was observed that when the concentration by weight of KOH in solution reached 22%, electrical current supplied from the car battery was maximised.

The effect of adding hydroxy gas as a supplementary fuel to the IC engine was measured in five categories, namely, Fuel economy, Specific Fuel consumption (SFC), Torque, Horsepower and Emission. To measure the fuel economy, the car was driven in similar driving conditions with and without the addition of hydroxy gas and the volume of petrol being used at each drive was averaged to obtain the final result. It was observed that the fuel economy had an average increment of 32.33%. Then the SFC was measured at different engine speeds for both the systems. It had a decrement of 15.96%. Also the torque at the back driving wheels and the horsepower that the car produced were measured for both systems. The torque was increased by 15.83% and the horsepower by 16.08%. Finally the car was tested for emissions in a Laugfs- Eco Sri emission testing facility. There was a decrement in CO emission by 19.01%, CO_2 emission by 4.75% and HC emission by 5.96%.