



PERFORMANCE AND EMISSION ANALYSIS OF MAGNETIC FUEL ENERGIZER FOR MOTORCYCLES

Niraj N. Petkar¹, Pravin K. Khamkar²

^{1,2}Department of Mechanical Engineering, Dr. JJMCOE, Jaysingpur, Maharashtra, (India)

ABSTRACT

The Fuel Energizer has been tested and developed by considering a vehicle's performance is often affected by the level of adulteration in the fuel used. The present study about the experimental investigates on the Performance and Emission Analysis of Magnetic Fuel Energizer for Motorcycles. The influence of magnetic field on the engine performance parameters such as average of motorcycle, exhausts emissions etc. by applying the magnetic field along the fuel line immediately before carburetor. The strong permanent magnet of strength 3000 gauss is applied to fuel line for magnetic field. At constant speed condition the experiment is conducted. An exhaust gas analyzer is used to measure the exhaust gas emissions such as CO and HC. With the application of magnetic field the percentage increase in average is 10% at 50kmph, the percentage reduction in CO and HC is about 36% and 13% respectively. The CO emission gets reduced with the application of magnetic field at economic speed. The magnetic ionization of the fuel also helps to dissolve the carbon build-up in carburetor jets, fuel injectors and combustion chambers and thus keeping the engine in a cleaner condition.

Keywords: BTU, Diamagnetic, Efficiency, Paramagnetic, Magnetic Fuel Energizer etc.

I. INTRODUCTION

In India, the use of vehicles increases in huge amount over the last decades. In internal combustion engine, generally fuels are use in the form of liquid and they do not combust until they are vaporized and mixed with air. In internal combustion engine, decrease in efficiency, clogs stalling, and loss of horsepower due to fossil fuels that leave a natural deposit of carbon residue [3].

Generally a fuel for internal combustion engine is compound of number of molecules. Each and every molecule consists of a number of atoms made up of number of nucleus and electrons, which orbit their nucleus. Molecules of fuel have not been realigned; so that fuel is not actively interlocked with oxygen during combustion. Molecules have positive and negative electrical charges. Magnets are the prime source that control of the position of electrons. Therefore, magnets change the orientation of electron in orbit and molecules of fuel have been realigned and ionized. In motorcycles sudden acceleration and braking takes place which lead to lower the efficiency and produce tremendous amount of pollutants such as CO, HC etc. due to incomplete combustion of fossil fuel. There are so many different methods used to improve the performance but we tackle this problem by use of Magnetic Fuel Energizer.

1.1 Key Features Of Fuel Energizer

- Increase fuel economy per liter.
- Higher initial torque.
- Reduced knocking & detonation.
- Decrease smoke emission.
- No fuel wastage.
- Smooth running & long term maintenance free engine.

II. THE HYDROCARBON FUEL

The simplest of hydrocarbons, methane, (CH₄) is the major (90%) constituent of natural gas (fuel) and an important source of hydrogen. Its molecule is composed of one carbon atom and four hydrogen atoms, and is electrically neutral. Hydrogen occurs in two distinct isomeric forms one is para which is normally occurs in fuels, second is ortho which achieved by applying magnetic field. These two forms are characterized by the different opposite nucleus spins. The ortho state can be achieved by applying strong magnetic field along the fuel line [1]. In the para Hydrogen molecule, which occupies the anti-parallel rotation, the spin state of one atom relative to another is in the opposite direction, therefore it is diamagnetic. In the ortho molecule, which occupies the parallel rotational levels, the spin state of one atom relative to another is in the same direction, therefore, it is paramagnetic [2].

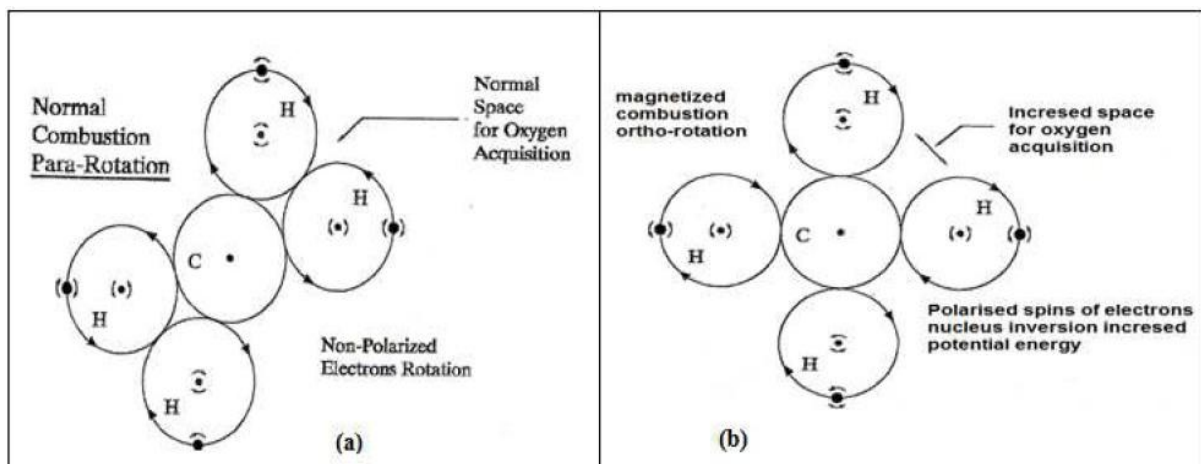


Fig.1 Schematic view of (a) Para state of Hydrogen and (b) Ortho state of Hydrogen

When the fuel passes through a magnetic field, created by the strong permanent magnets, due to that magnetic field hydrocarbon change their orientation and convert from para state to ortho state as shown in Fig.1. In ortho state inter molecular force is considerably reduced and increase space between hydrogen. This hydrogen of fuel actively interlocks with oxygen and producing a more complete burn in the combustion chamber. The magnetic field helps to disperse oil particles and to become finely divided. Figure.1 shows the schematic view of para state and ortho state of Hydrogen of clusters of hydrocarbons changed with the influence of magnetic field and they are more dispersed.

Hence the application of the Magnetic fuel energizer's intense & focused magnetic field which converts fuel molecules to a positive charge. It sets them in order, which increases the attraction of negatively charged air molecules, boosted by the Magnetizer.

III. PROPERTIES OF MAGNET

Neodymium Magnets also known as Neo magnet which is most widely used type of rare earth magnet and in bright silver colour as shown in Fig.2. This is a permanent magnet which made from alloy of neodymium, iron and boron and this magnet considered to be the strongest magnet type among other permanent magnet. This magnet widely used in electronic based companies and also as motor in cordless tools. The magnetic strength is 3000 gauss.



Fig.2 Photographic view of magnetic fuel energizer

IV. INSTALLATION OF FUEL ENERGIZER

The magnetic flux density to be imparted to fuel widely varies depending upon fuel, air or steam, and combustion equipment and conditions. In general, the preferred range of magnetic flux density is from 1000 to 3500 Gauss. The optimum range will be determined through experimental runs. The field strength is a function of the engine size based on fuel consumption. In this experiment we installed the fuel energizer just before the carburetor on inlet pipe of petrol as shown in Fig. 3 to get maximum effect.

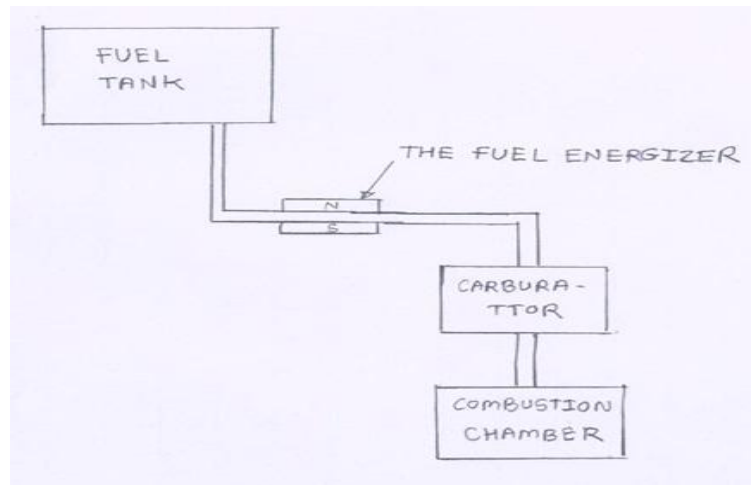


Fig.3 Schematic view of installation of Fuel Energizer

V. EXPERIMENTAL SET UP

The performance tests were carried out on a single cylinder, four stroke air cooled Petrol engine of HERO HONDA CD100SS. The setup consists of an engine of motorcycle, an eddy current dynamometer and an external exhaust gas analyzer as shown in Fig. 4.



Fig.4 Photographic view of two wheeler chassis dynamometer

VII. PROCEDURE

We conduct two tests that are before and after the installation of fuel energizer and results were compared. In the first test motorcycle was prepared to run on dynamometer and petrol is used as a fuel during all tests. There is no any modification did on the motorcycle while conducting this test. We took average test as well as an exhaust gas test. But in the second test we installed the fuel energizer on the inlet pipe of petrol just before the carburetor as shown in Fig. 5 and motorcycle was prepared

to run on dynamometer and petrol is used as a fuel during all tests. Similarly we took average test as well as an exhaust gas test.



Fig.5 Photographic view of installation of magnet for average test

The fuel system is designed to facilitate for accurate measurement of the fuel flow rate. The fuel consumption is measured directly by using the burette method. The fuel consumption was measured at a speed of 50 kmph with loading conditions and exhaust gas measured by Exhaust gas analyzer. The exhaust gas analyzer is used to measure exhaust emissions from the engine during experimental tests. It is measures gases such as HC and CO at each test.

VII. RESULTS AND DISCUSSION

7.1 Effect on Fuel Average

The experimental results show that the fuel consumption of motorcycle was less when the engine with magnet than that without fuel magnet at 50 KMPH. Always less amount of fuel was consumed with the fuel with magnetic field. Following graph Fig. 6 shows that at same fuel consumption rate average of the engine increases by 10%.

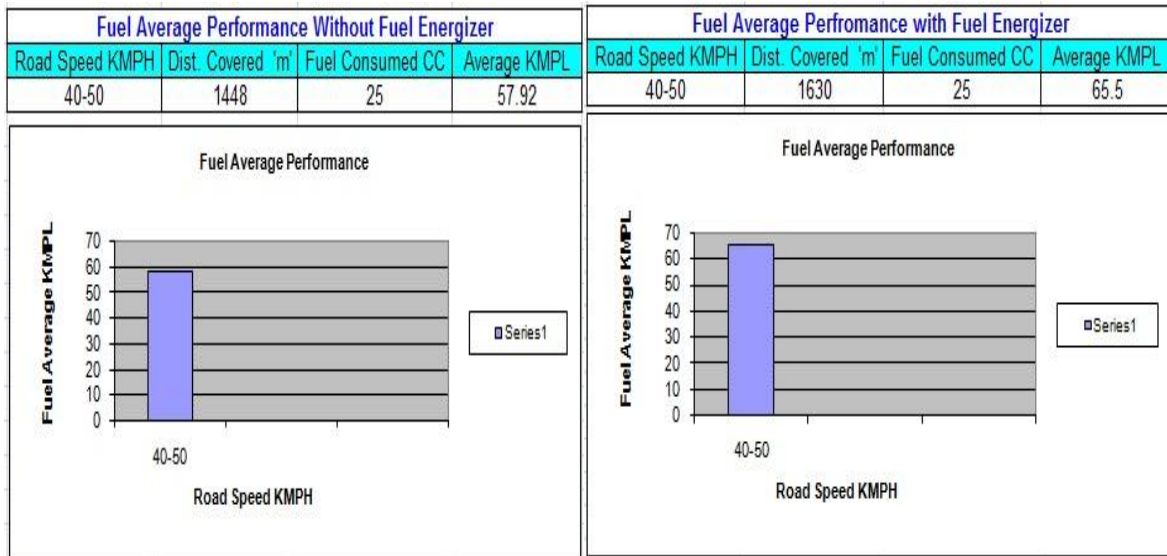


Fig.6 Variation of Fuel Average without (a) and with (b) magnetizer

7.2 Effect on Exhaust Emission

7.2.1 Effect on CO

With the application of magnetic field CO emissions gets reduced as compared to the CO emissions without magnetic field. Fig. 7 clearly shows the effect of magnetic field on CO emissions and the CO emission reduces up to 36% as load increases.

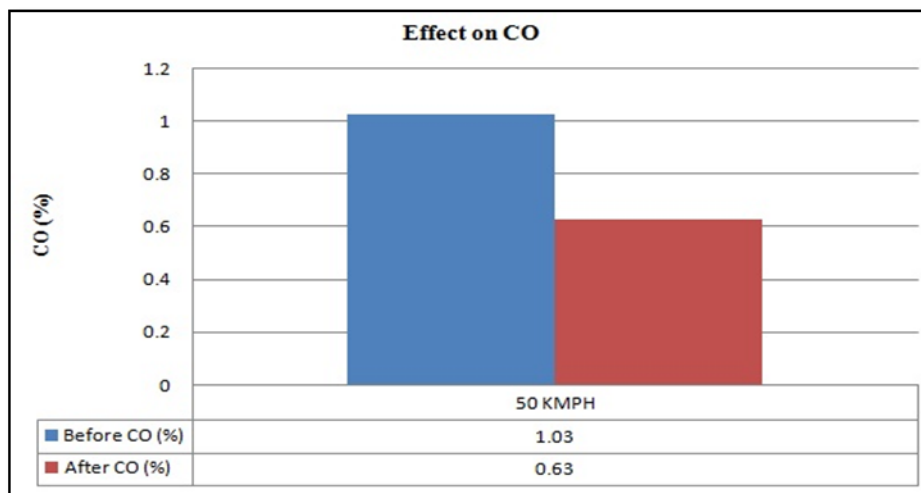


Fig.7 Variation of CO (%) with magnetizer

7.2.2 Effect on HC

Fig.8 clearly shows the effect of magnetic field on HC emissions, and the percentage reduction of HC. The HC emissions are decrease around 13 % at economical speed. The variation of HC emissions is as shown in fig.8

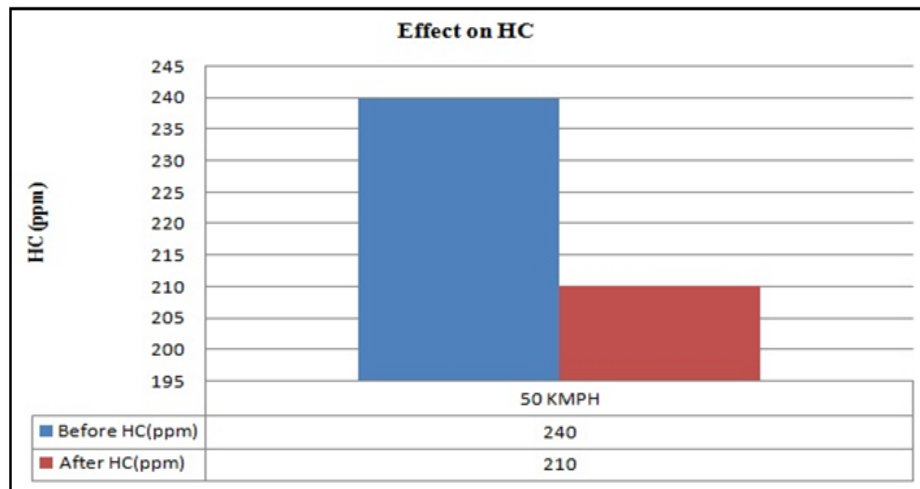


Fig.8 Variation of HC (ppm) with magnetizer

VIII. CONCLUSION

From the above experimental results the following conclusions were made,

- It is clear from the experiment result that the fuel average increases due to the reduction of fuel consumption at economical speed and there is significant reduction in the exhaust emissions.
- The experiments results show the magnetic effect on fuel consumption reduction was up to 10% at 50 KMPH. The CO emission gets reduce at economic speed and effect on CO emissions reduces range up to 36%. The reduction of HC emissions was range up to 13%.
- As the proper fuel combustion takes place due to effect of magnetic field it also helps into increase in the acceleration of the vehicle.

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