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Address: - Dr. Ashak Hussain Malik House No. 221 Gangoo, Pulwama, Jammu and Kashmir, India - 192301, Cell: 09086405302, 09906662570, Ph. No: 01933-212815,
Email: nairjc5@gmail.com, nairjc@nairjc.com, info@nairjc.com Website: www.nairjc.com

MAGNETIC FUEL SAVER

(MR. BHUSNAR SAGAR) [1], (MR. MALGHE RAHUL) [2], (MR. RAWALKESHAV) [3], (MR. ROKDE ASHOK) [4], & (MR. SAMAL LUNA SANTOSH KUMAR) [5]

Department of Mechanical Engineering, P.K. Technical Campus Chakan, Pune 410 501

ABSTRACT

A comprehensive experiential study on the effect of electromagnetic field on the ionization and combustion of fuel in an internal combustion engine is presented. The major aim is for the user economy and environmental friendly especially as it may affect climate change. The experimental set up consist a HGA 200 computerized exhaust gas analyzer, one cylinder 4 stroke engine, a copper wire wound round a hollow cylindrical rod which is connected to a DC 12 V battery. The exhaust product was channeled to the HGA 200 for proper analysis of the exhaust constituent .The set up was allowed to run for one hour without the electromagnetic device to serve as a base line for comparison. Series of test runs were conducted using the device along the fuel line of the engine. Results obtained during the test, gave a 50% reduction in the hydrocarbon constituent of the exhaust product in PPM and 35% reduction in the carbon monoxide. These results clearly indicate that the introduction of an electromagnetic field within the fuel line of an I.C engine enhances the combustion process thereby economizing fuel consumption and reducing gas emission making it environmental friendly engine. They study suggest that the materials for the inlet manifold and the top cylinder of the engine be made from a magnetic material. This will create a permanent magnet around the combustion chamber for proper mixing and the burning of the fuel.

KEYWORDS: ***Ionization, exhaust gas analyzer, emission control, economic design project etc.***

INTRODUTION

In recent years, there are so many efforts towards the improving power output and emission of internal combustion engines per fuel, so that the products of combustion exhausted from internal combustion (IC) engines environmental friendly, and also beneficial for cost. The use of diesel engines have been increase day by day, due to their high thermal efficiency and low pollutant formation characteristics but it has a serious drawback of having a comparative larger amount of emission which is larger than that of a gasoline engine.

Over the last decades in India, there has been a tremendous increase in number of automobiles industries. Currently, the motor vehicle population in India is about 80 million. Even though the transport sector plays pivotal role in the economic development of any country, it brings an unavoidable specter of environmental deterioration along with transportation. This creates a huge problem for developing country like India. Combustion of fossil fuel in mobile sources for transportation has led to widespread release of pollutants such as CO, HC, NOx, SPM and many other harmful compounds in the environment, which results in air quality deterioration and health effects especially in urbanized areas.

Hence, an integrated approach for reducing emissions from mobile sources is the most desirable

in urban transportations and also availability of fuel will no longer meet the growing demand. Today's hydrocarbon fuels leave a natural deposit of carbon residue that clogs stalling, loss of horsepower and greatly decreased mileage on cars are very noticeable. The same is true of home heating units where improper combustion wasted fuel (gas) and cost, money in poor efficiency and repairs due to build-up. Most fuels for internal combustion engine are liquid, fuels do not combust until they are vaporized and mixed with air. Most emission motor vehicle consists of unburned hydrocarbons, carbon monoxide and oxides of nitrogen. Unburned hydrocarbon and oxides of nitrogen react in the atmosphere and create smog. Smog is prime cause of eye and throat irritation, noxious smell, plat damage and decreased visibility. Oxides of nitrogen are also toxic. Even when fuel is still clear and bright, microscopic fuel components agglomerate forming larger clusters and organic compounds. (I.e. chaotic form)

This continuous process affects combustion and engine performance which causing loss of power, excessive fuel consumption, smoking engines, damage to injection systems and carbon soot build up in lube oil, emission filters and catalytic converters. There are different methods (MPFI, EGR, PCV, catalytic) used which not only gives proper combustion of fuel in engine but also minimize the rate of emission through I.C. engine. One new modern technique to reduce the emission & gives proper combustion is use of MAGNETIC FUEL SAVER.

LITERATURE REVIEW

- **Parameter of MFS :**

Various parameters which affect the efficiency of fuel combustion are listed below.

Installation Position:

It is just before the carburetor or injector on inlet pipe or housing for maximum alignment & maximum effect.

Polarity of magnet:

Fuel line is magnetized by South Pole and air line is magnetized by North Pole. Such type of opposite polarity burns more completely, producing higher engine output, better fuel economy, and more power and most important reduces the amount of pollutants. The main benefit of such opposite polarity dissolves the carbon built up in carburetor jet, spark plug electrode, injector nozzles and combustion chamber help to clean up the engine parts and maintains the clean condition. Therefore the life of engine parts also increases.

Diameter of MFC device:

Maximum result is being obtained, if diameter is same or close to the system piping.

Length of MFC device:

It will depend upon the volume of fluid to be treated and intensity of treatment. It is generally varied from 12 to 48cm.

Magnetic flux:

Magnetic flux density which is varies differently on flat surface, core surface. It is observed that maximum effect at center.

Selection of permanent magnet:

The magnet should have a curie temperature sufficiently high that they retained their magnetic characteristic at the operation temperature to which they are exposed. Permanent magnet shows positive result up to its optimum peak, afterwards it will vary.

Magnetic strength:

The strength of magnet depends on engine size. The magnetic flux density to be imparted to fuel widely varies depending upon fuel, air or stream, combustion equipment & its condition. In general the preferred range of Magnetic flux density is from 1000-1800 Gauss. Most preferred range for multi-cylinder is 1400-1800 Gauss. The field strength is a function of engine size based on fuel consumption. In order to protect magnet from effect of heat generated by engine magnet should provide insulation of aluminum, copper or plastic to block radiant energy a layer of thermal insulation (neoprene) to prevent heating & radiation. Considering the above parameter few experiments on engine were done which are as follows: Experimental Methodology (Case Study)

Test Location:

Properties of MFC Device: The ferrite magnets (Magnetic flux density is from 1000-1800) are most cost effective & withstand with the temperature of engine inlet line for treating the fuel. Engine- Single Cylinder, vertical, water cooled self governed diesel engine developing 5 HP at 1500 rpm. Brake- Rope brake dynamometer with spring balance & loading screw. Brake Drum diameter = 0.270m

Installation in DIESEL engine

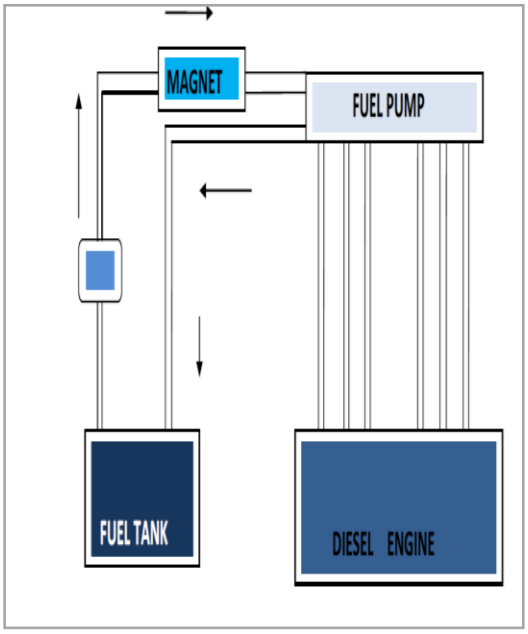

Fig.1 Installation in DIESEL engine

METHODOLOGY

In figure 2 is shown flowchart of the considered work. First of all it is designed the fuel saver which is based on electromagnetic and then it is produced according to the determined specification. Speed of the engine, diameter of the wire winding, core materials, and number of coil of winding of fuel saver are chosen as the testing variables. The performance of fuel saver, which has produced, is tested in the laboratory of the internal combustion engine rig. Performance of the produced fuel saver which is installed in the fuel line of internal combustion engine rig is compared to the performance of the standard internal combustion engine rig (without installing fuel saver in the fuel line).Performance of the produced fuel saver is compared to the performance of the permanent magnet fuel saver, which has sold in the market. And then results of the work are discussed and finally the conclusions are drawn.

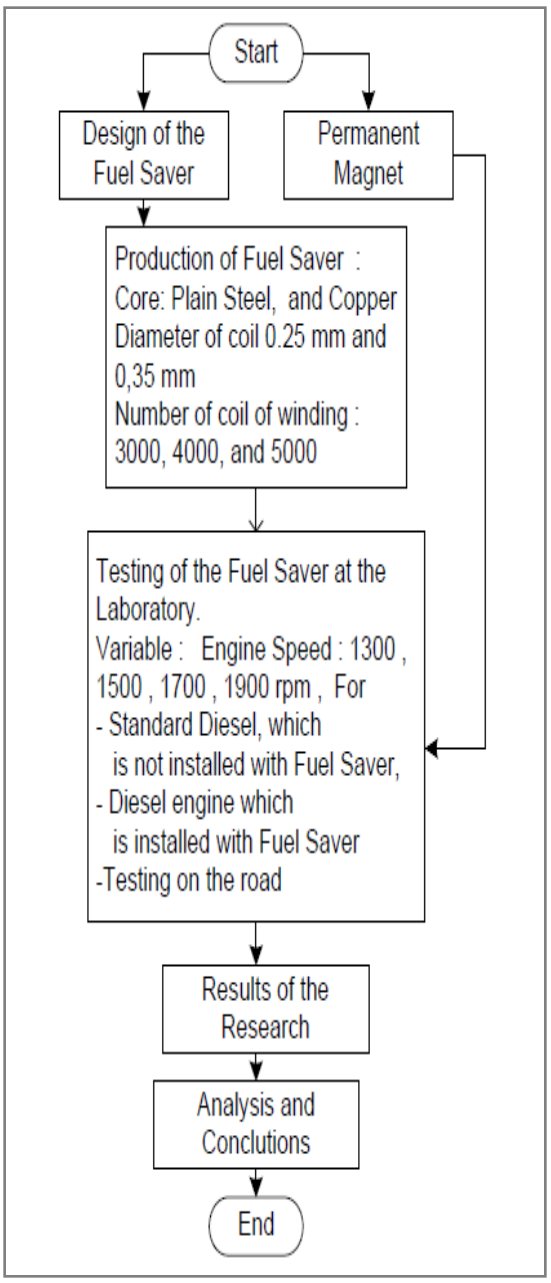

Fig.2 Flowchart of Process

APPLICATIONS OF MFC

MFC has been widely applied in various vehicles such as 2- wheeler, Auto-rickshaw & Heavy vehicles & also in aviation for combustion of fuel. It has also been used in various applications other than automobiles. Different types of MFC's are available in market for various applications. Magnetizer, Fuel Energizer, ALGAE-X, Fuel magic, Power-mag, Fuel-MAX, Max-power, Fuel-Saver-Pro, Mag-tek, Mag-well, Fluid Force & Fuel conduit etc are being used in Total fuel management system.

Potable water can be safely treated with magnetic. Mag-Tek M.F.C.'s do not introduce any foreign contaminates which would alter the purity. Normal blow down of the storage tank will reveal a residue of crystal deposits being discharged from the bottom drain. Scheduled blow down of the hot water storage tank should not be neglected. By monitoring, you will note an increase in temperature of the return hot water line. You will also note a shorter recovery time. This indicates a more efficient heat exchanger. Sectioning a piece of the water line at a remote location will provide a method to visibly inspect the removal rate. Water flow rates will increase at all points in the system.

Mag-Well's Magnetic Fluid Conditioner (MFC) is a proven treatment for removing and preventing the build-up of solid scale and paraffin deposits in oil wells, and is currently being used in over 1,300 wells worldwide.

RESULTS AND DISCUSSION

The experimental results for the present study are presented in fig 2-5 (see appendix). Fig 2 shows the HC constituents measured by the exhaust gas analyzer without the magnetic device. This figure serves as a baseline for comparison between the introduction of the magnet device, and when it is not in use. The reason for the present study is to evaluate the appropriateness of the device to reduce tailpipe emission. The evaluation of the difference between the data collected will serve as a yard stick for comparison. Fig 3 is the emission of CO with the device in place. Fig 4 is the comparison between the HC emitted with and without the device; a closer

look shows at alltime that the emission without the device is higher than with the device. This is a clear indication that magnetic field effects the combustion of fuel. Similarly, in fig 5, the variation between the CO emitted with and without the device, shows a similar trend like the HC constituent in fig 4. By using the mean deviation analysis, a 50% reduction in the HC was obtained, while 35% reduction was obtained for the CO constituent.

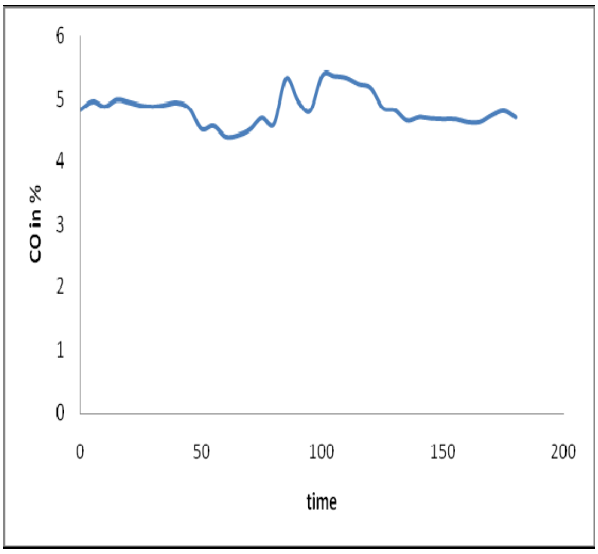

Fig. 3: CO constituent without the device

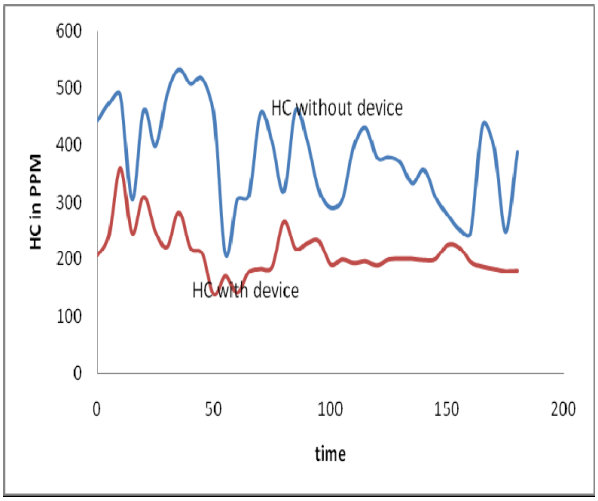

Fig.4: Comparison of HC with and without device

CONCLUSIONS

This present work has shown that complete combustion of fuel may be obtained using a magnetic field around the fuel line of an internal combustion engine. It is scientific way of reducing fuel intake in an engine design project, making it fuel economy and reducing the rate of gas emission to the environment from engine combustion. The result from the experiment described in this paper, shows that the fuel consumption of the engine used for the same period are not the same. At the end of the three hours that this experiment lasted, the amount of fuel remaining in the tank were not the same though they were at the beginning. This paper concludes by suggesting that both the inlet manifold and the top cylinder be made of magnetic material in future engine design projects.

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