

Impact of Magnetic Field on Pollutant Emissions in Four stroke engine

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Abstract - This experiment mainly focuses on pre-combustion process to increase fuel burning efficiency, and decrease fuel consumption and also reduces pollutant emissions. Pollutant emissions CO and HC are analysed. In the experiment we make the use of permanent magnets (Neodymium) with different gauss powers. We fix the magnetic casing in between the carburetor and fuel filter, before the fuel passes to the four stroke engine for combustion process.

Key Words: Pollutant Emissions, Magnetic Field, Precombustion Process, Parastate, Orthostate

1. INTRODUCTION

As when we talk about the thing hydrocarbon, we firstly get to know about that the pollutant emissions coming from the vehicle are so much harmful for the environment, and that can also cause pollution or some bad effect to the life of humans, these emissions generally contains nitrogen oxides, carbon monoxide, particulate matter, also some amount of hydrocarbons they contains, hazardous air pollutants that is oxides are also the major pollutants effecting the environment. Green house gases are one of the pollutants in affecting the environment. In the petrol hydrocarbons are present and when the petrol gets burned the harmful emissions comes out from the vehicle, which can harm the surrounding air and can pollute the environment, so for these prevention of these emissions are mandatory, for these permanent magnets are used to control the flow of the petrol before passing it to the engine, thus when the petrol is ignited to the engine it passes from fuel filter, carburetor and then to the engine, so by using or creating a magnetic field between the fuel filter and carburetor, the hydrocarbons present in the petrol gets separated and burns separately thus due to these the harmful pollutants gets reduced also the increase in fuel efficiency and fuel consumption reduces and also torque improves as well as the vehicle gets some lesser maintainance over future. And also we know the no. of vehicles are more in numbers hence due to these so much harmful emissions are been reduced.

1.1 Problem statement

When we look through the Maharashtra transport infrastructure, the no. of vehicles in 1952 to 2016 is 21,910,23,409. Total vehicles number goes in maharashtra in

1952 to 2015 is 2,88,52,202. In the overall total 15,55,79,846 is two wheelers. Also the price of the fuel is rising consistently.

Ingovernment states that the main cause of the global warming are the green house gases which not the different one, but the human only are emitting these things in different ways. From all these, the emissions coming from the Automobiles are the most as compared to the other ones. The emissions occurs from the incomplete combustion, some are carbon dioxide, sulphur dioxide, nitrogen dioxide. These mainly contributes in the hazardous environment.

1.2 Objective

The main objective of the experiment is to control the emissions which comes from the vehicle and to increase the efficiency also to decrease the fuel consumption and reduce the pollutant emissions. With the help of the neodymium magnet we separates the hydrocarbon and then passes it to the engine.

1.3 Main features

1. It reduces the emissions.
2. It reduces the fuel consumption.
3. There's no maintainance required.
4. It increases fuel burning efficiency.
5. It also improves the torque.

2. LITERATURE REVIEW

The essential thing behind these, literature review is that we should get to know about the previously experimented things on these topic as well as to work more on that to do something more efficient than the previous one hence there are some of the previously recorded experimental papers which we will be discussing further. [1] The experiment shows that how much the emissions have been reduced from the IC engine. As, used the permanent magnets with the different intensities and showed as per in the experiment that how much emissions gets controlled with amount of power of magnet we use as per the gauss. [2] The next one which is been experimented was the effect of magnetic field on four stroke engine, what they have done in these, is as the same thing which have been done by the previously explained one, as the fuel passes through the magnetic

bracket the hydrocarbon present in that gets separated and then burns individually. [3] The experiment been performed was done on the two stroke engine, as used the fuel of Iraqi gasoline for their research the magnets they have used are of 2000, 4000, 6000, 9000 gauss which they have assembled on the flowline. [4] In these experiment, effect of magnetic field on the emissions are been examined with the help of some process, the precombustion process, in these there are two states para state and ortho state, the passing through the magnetic field the molecules are in the parastate that is in between them there is a intermolecular force of attraction.

3. METHODOLOGY

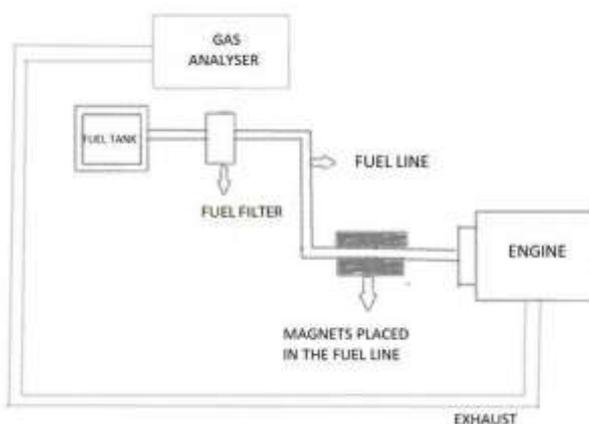


Fig -1. Experimental Setup

From the previous research we can justify the method and should be well known about how the process is, but then to for minimization of CO % is also a mandatory thing. So for these we have an experimental setup first as shown in figure. In the figure as shown the position of the magnet at which it is been located between the fuel filter and carburetor. When the fuel from the fuel tank passes to engine, further the combustion process occurs but when create the magnetic field on flowline or on the tube before the fuel passes to the engine, then the hydrocarbons present in the fuel gets separated and thus burns separately, these not increases the fuel efficiency but also improves the torque and controls the emissions without increases more% of CO. As the gas analyzer is there to absorb the light of thr emissions over there. The magnet which is been placed plays an important role as we can use any of the magnets but we choose the neodymium as it was the strongest permanent magnet of the time till now, the magnets needs a strong casing on above which can be in the layers like the outer layer would be of thermal resistant material and then again for the thermal resistant material layer and then for the magnetic conduction a rubber layer is used. thus design of bracket (casing) is to be done, these casing therefore helps to control the flow and creates a strong magnetic field.

3.1 Physical theory

Due to magnetic field the electrons gets aligned, as the cluster structure breaks the bonding between them and break in to fine particles. the fine particles are none other than the H and C, now they are with the contact of magnetic field which tends them to emit more electrons, hence oxidation increases and due to these consumption also increases, reducing the pollutants.

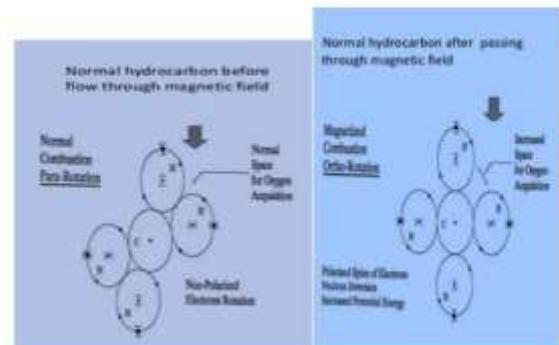


Fig - 2 Physical theory

3.2 Chemical theory

As we know particles are made up of atoms, and in the figure as shown there are equal no. of electrons and protons which are in neutral charge, greater the no. of electrons we obtain we get negative charge and if we reversed these thing we get positive charge, as we all are familiar with these things

Each electrons consists of two movements 1) spin 2) orbit

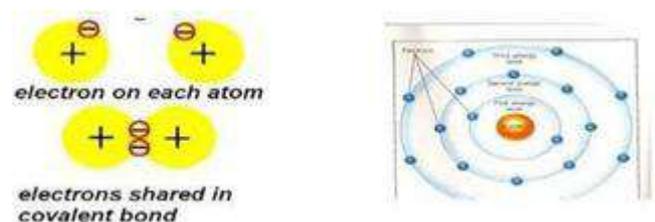


Fig -3 Chemical bonding

4. Why only NEODYMIUM MAGNET ?

As these are the strongest permanent magnets. In this experiment we create the magnetic field using permanent magnets i.e. Neodymium magnets, because they have:

- Higher remanence
- Higher coercivity
- Higher energy product than ferrite magnet.

4.1 Specifications of magnet

Item weight -3.2 ounces
 Gauss power -4000 and 8000
 Coated with -Ni Cu Ni (Triple layer coated)
 Grade N45-38.5lb

4.3 Specification of engine

Engine type – Air cooled , four stroke cylinder
 Displacement -97.2
 Max.Power : 5.5 kw (7.5 Ps) At 8000 Rpm
 Max.Torque : 7.95 Nm At 5000 Rpm
 GearBox : 4 Speed Constant Mesh

5. RESULTS

5.1 Fuel consumption test

Day	Fuel Used		Average Time	
	(in ml)		without Magnet	With Magnet
1	75 ml		14.25 min	15.27 min
2	75 ml		14.44 min	16.56 min
3	75 ml		14.58 min	17.39 min
4	75 ml		15.21 min	18.53 min
5	75 ml		15.47 min	22.06min

5.2 Pollutant under control test

Gases	Before	After
HC	55 ppm	30ppm
CO	0.089%	0.053%
CO2	13.57%	11.45%
O2	1.69%	3.23%

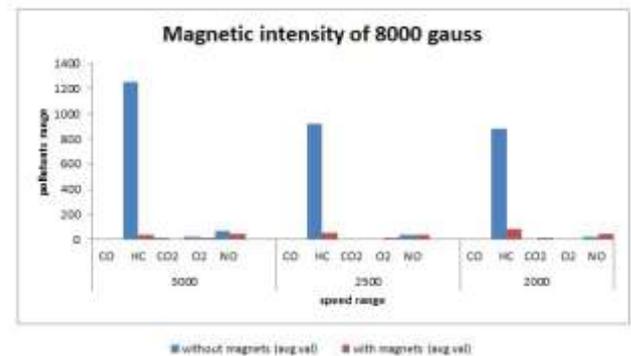


Chart-1 Magnetic intensity with 4000gauss

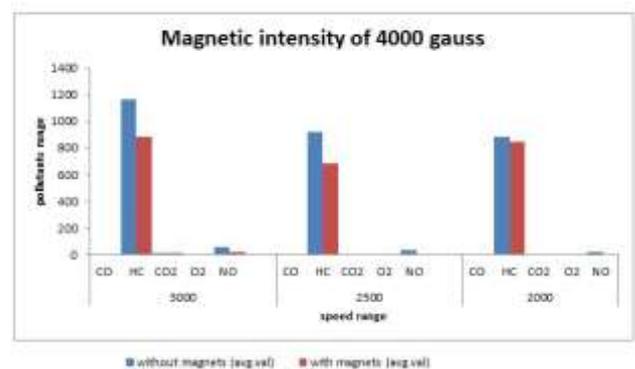


Chart- 2 Magnetic intensity with 8000 gauss

6. CONCLUSION

As from all the experimental setups as well as the results we hereby can conclude that the emissions are controlled as per our observation as well as the efficiency of fuel also have increased and fuel consumption being less, we also came to know that creating a magnetic field over the setup nevertheless creates a great passage from which good efficiency and improved torque obtained from it. Creating a strong magnetic field makes the hydrocarbons present in the fuel to separate from each other and burn individually controlling the emissions. Engine gets improved torque after these experiment also efficiency of the fuel gets adorably increased. Also there will be no maintenance issue with it. It also saves the fuel with these.

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