

Acetylene Used as a Fuel in SI Engine

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ABSTRACT

The petrol which is used as fuel in SI engine is replaced by acetylene gas, which contains pollutant less or negligible amount of pollutants. Due to increasing rates of petrol common people are facing difficulties, in order to overcome this difficulties we use acetylene gas which is cheap and easily available. Acetylene is a hydrocarbon compound and is the simplest form of alkyne. There are many gases such as LPG (liquefied petroleum gas), CNG (compressed natural gas), and LNG (liquefied natural gas). Which can be used as fuel to SI Engine, but acetylene is the cheapest and best gas when compared with them.

Keywords : SI engine, Carbide, Control valves, Acetylene, Alternate fuel, Exhaust emissions.

I. INTRODUCTION

The world is facing difficulties due to the rising prices of petrol and in last two centuries there was depletion of fossil fuels and degradation of environment. There must be an alternate fuel which should be ecofriendly and meet the demand of fuel. SI Engines have become a part of life for our daily needs and it is mandatory to focus on a fuel which is used in SI Engine.

Thus we found a gas (acetylene) which is ecofriendly and pocket friendly and also available easily in the market. We hope that this will helpful for the people in the present and the near future. Pollutants and harmful gases which are threats to the environment.



Figure 1. Carbide (Limestone)

There are some disadvantages by the other fuels such as produces Acetylene is the colorless gas with garlic smell produced from the calcium carbide (CaC_2).

Which is obtained from calcium carbonate (CaCO_3)? Further the calcium carbonate is heated in lime kiln at about 825°C which forms calcium oxides (lime) liberating CO_2 .

II. METHODS AND MATERIAL

A. Tank Modification

In the very first step, the upper chamber is made for the storage of water this chamber is wide as that in this area a large amount of water can be stored, up to three liters of water. it is connected to a pipe which releases water. The water is poured into this chamber from the top.



Figure 2. Designation of Tank where water to be poured.

Three liters of water. it is connected to a pipe which releases water. The water is poured into this chamber from the top.



Figure 3. Tank with nozzle.



Figure 4. Inside of carbide chamber

Fig. 3 & 4 are shown the modification of tank

The area where the carbide is stored is made in a shape of a box. In which the water reacts with carbide. About five hundred grams of carbide can be stored.

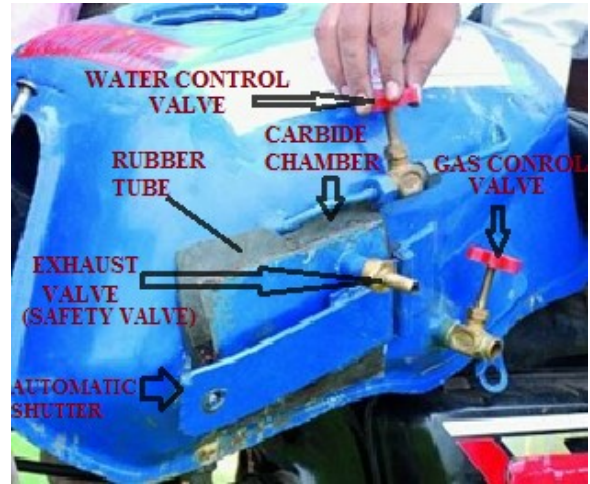


Figure 5. Tank with Carbide Chamber

During the reaction the gas production takes place in this area and this box is provided with a control valve of pipe so that the gas flows through the pipe which is further connected to carburetor. This area also contains opening so that if excess of gas is produced it flows through the openings. The carbide box is closed in such a way that the corners of the box are covered with a rubber so as to prevent the leakages of gas.

The opening relates to the area where the excess gas can be stored, when the gas produces it goes directly to the pipe through which carburetor is connected but when the excess gas is developed, this gas is stored in the empty area which is present between portion of the carbide and the water storage tank as the image shows us clearly. This is the exhaust valve which is connected to the area where the excess of gas is stored. This valve is turned to open to remove the gas as well and after the removal of gas this valve is turned to close to stop the flow of gas.

B. Carburetor

The carburetor is modified in such a way that the gas which flows from the tank contains a little amount of moisture. This moisture content of gas will reduce the combustion process. The proper combustion in the engine doesn't take place.



Figure 6. Modification of carburetor

This will cause several problems inside the engine to avoid this effect the carburetor is provided with a filter so as to remove the moisture content of gas. Only gas flows to the engine and proper combustion process takes place. Carburetor is provided with a filter so as to remove the moisture content of gas, only gas flows to the engine and proper combustion process takes place. As mentioned earlier, acetylene is the outcome of calcium carbide.

Similarly, calcium carbide is the outcome of calcium carbonate. According to Krishna Devas, senior divisional metallurgical engineer at Department of Mines and Geology, Nepal has a billion tons and proven reserves of 210 million tons. This indicates that Nepal has an abundance of calcium carbonate which is the key factor for the production of acetylene. This seems to be one of the fruitful aspects in the development of acetylene gas in our own country, hereby reducing the maximum use of gasoline.

III. RESULTS AND DISCUSSION

In this experiment we have used Acetylene and water as our main purpose. In which Acetylene is used as a gas by taking Acetylene in a carbide box so as to prepare a gas by using water which is present in tank and it consist of hole in a carbide box to pour droplets of water in carbide box so as to form a gas and this gas is passed through a pipe which is fixed with rubber tube to the carburetor and to perform engine.

Properties of Petrol and Acetylene.

Table 1. Properties of Petrol and Acetylene

Sr.no	Properties	Petrol	Acetylene
1.	Formula	C4 to C12	C ₂ H ₂
2.	Density	0.71-0.77	1.092
3.	Auto ignition temperature	247--280	305
4.	Stoichiometric air fuel ratio	14.7	13.2
5.	Upper Flammability limits	7.1--65	2.5—81
6.	Lower calorific value	44400	48225
7.	Higher calorific value	47300	50636
8.	Max deflagration speed	0.9	1.5
9.	Ignition speed	0.005	0.019
10.	Lower Flammability Limit	1.2—2.0	0.3—9.6

IV. CONCLUSION

The study highlights the use of acetylene as a fuel for SI engine, this fuel can be used with conventional S.I. engine with minor fabrication and manipulations. As acetylene has wide range of merits on environmental as well as economic grounds. It produces only carbon dioxide during combustion and is less costly than conventional fuel as acetylene is produced from calcium carbonate which is in abundance. Acetylene have proved out to be better fuel due its non-polluting nature and more economic

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