ACETYLENE USED AS ALTERNATIVE FUEL IN PETROL ENGINE

Project Reference No.: 40S_B_BE_103

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INTRODUCTION: As we are well informed about the extinction of fossil Fuels and its deteriorating effect on environment Causing: Global warming, Ozone depletion, Respiratory ailments and Acid rain Due to the noxious exhaust produced during the combustion during the combustion of this conventional hydrocarbon But, due to a absence of a compatible and more eco-friendly fuel we are still depend on these hydrocarbon based fuel (Petrol, Diesel etc.). Acetylene which can be a better replacement for their fuels Acetylene is produced by mixing calcium carbide with water in on-board tank. This acetylene on combustion burns to give carbon dioxide with water vapors. But as it has high ignition temperature certain engine modification are required. In this calcium carbide reacts with water to produce acetylene and calcium hydroxide. Small amount of aluminum oxide is mixed to enrich the reaction

OBJECTIVE: In the present days where fossil fuel is on the verge to exhaust, the need of the hour is to search for an Alternative fuel and we have many choices like LPG, CNG with their drawbacks. So the main purpose of our project is to run the petrol engine by using acetylene gas which is more cost effective than petrol. By using acetylene gas as fuel in petrol engine, we can get less emission as compared to other fuels, so we can call it as eco-friendly. The project is to investigate the changes required to be done for running an IC engine on acetylene produced on-board by a decomposition reaction of calcium carbide with water in presence of aluminum oxide as catalyst.

METHODOLOGY:
In the present work water and calcium carbide are added in the ratio of 2:1 to the reaction tank and small amount of aluminum oxide is used as catalyst to enrich the chemical reaction due to reaction the acetylene gas is generated, and it stored in the storage tank.

\[ \text{CaC}_2 + 2\text{H}_2\text{O} \rightarrow \text{C}_2\text{H}_2 + \text{Ca(OH)} \]

Calcium carbide + water → acetylene + calcium hydroxide

The acetylene gas is passed in pressure about 20 psi. The acetylene gas passed to the air filter and acetylene gas was aspirated in the intake manifold through air filter. The SI engine will start with petrol being the ignition source, after that the performance and emission characteristics are compared with baseline petrol

SCHEMATIC DIAGRAM OF THE EXPERIMENTAL SETUP

APPLICATIONS:
1. A good replacement for gasoline and petrol.
2. It can be used in place of LPG directly with minor manipulation in engine.
3. As it emits CO\(_2\), so it is more eco-friendly thus its use can be beneficial in countries like India where in year 2050 fossil fuel will get depleted (shown by studies).

ADVANTAGES:
1. Emission is non-polluting as only carbon dioxide and water vapours are emitted.
2. Homogenous mixture is formed due to which complete combustion.
4. It is very cheap and available in abundance.
5. It uses same handling system which is used in CNG and LPG cylinders.
6. It has very low Photochemical Ozone creation Potential (POCP).
7. An engine operated on such a fuel can be interchangeably utilized for indoor and outdoor
8. Operations without environmental concerns
9. The need for a three-way catalytic converter or other EGR device is eliminated
10. Due to reduced operating temperatures, there are fewer tendencies for viscosity
11. Breakdown of engine lubricants and less component wear
12. Due to cleanliness of the combustion process, build up of carbon- and sulphur
13. Compounds are eliminated thereby substantially extending the time intervals between routine maintenance.

DISADVANTAGES:
1. Knocking possibilities.
2. Decrease in power of engine.
3. It cannot be available everywhere because there are no filling station as it is a new initiative.