EXHAHUST GAS ANALYSIS OF 70-CC ENGINE RUNNING ON MIXTURE OF HHO & PETROL

Hameed Ullah Mughal, Naseem Abbas*, Nasir Hayat, Syed Fiaz Hussain Shah and Muhammad Sajid Kamran
Department of Mechanical Engineering, University of Engineering and Technology
Lahore, Pakistan
*Corresponding Author,
Email: Naseem.engr@gmail.com
Ph: +92-3328509795

ABSTRACT: Fossil fuels are being used to run the vehicles all over the world. But unfortunately their reservoirs are depleting continuously. In the present situation the developing concern of the individuals living in all aspects of society is the continually expanding cost of fuel and the unsafe impacts brought on because of more elevated amount of toxins in the climate. The mixture vehicle endeavors to altogether expanding the mileage and lessen the emanation levels of a diesel and petrol Engines. The water half breed vehicle utilizes a HHO (Oxy Hydrogen) generator to supply hydrogen on interest by Electrolysis. The Electrolysis methodology is completed in HHO Dry Cell, when the ebb and flow begins moving through the stainless steel plates electrolysis procedure is done between the 2 terminals of the plate by which water particles get divided as HHO gas. The mix of this produces extraordinary results. The water mixture framework is an endeavor to give a reasonable low emanation fuel productive vehicle with execution measures better than the majority of the routine or Conventional Engines. The experimental investigation was conducted on a 70-cc (Honda 70cc), four stroke, air cooled and single cylinder internal combustion engine. Ultimately, the exhaust gase have been successfully controlled. CO have been reduced by 53% respectively but the engine temperature was increased about 14.5 ^{0}C.

Keywords: HHO, Petrol, CO_2, CO, NOx, HC and engine temperature.

1. INTRODUCTION:

A worldwide temperature alteration is viewed as one of the real issues the academic group needs to face. Numerous hypotheses allude to the increment of exhaust gasses focus in the environment as one of the significant reasons for the dangerous atmospheric devation [1]. Mechanical plants what's more vehicles are the significant wellspring of the fumes gasses. Since they use the force connected with oil burning as vitality source. Discharges are essentially the fumes or scraps of ignition leaving a motor. An exhaust gas test is consistently finished with a test put into the exhaust stream. Every road going vehicle has particular clean necessities that it is obliged to meet the radiation sampler, which is known as gas analyzers, measures five sorts of gasses. These gasses are HC, NOX, O_2, CO, and CO2 [2]. The concentrations of the exhaust gases are corresponding to the measure of Hydrocarbons in the fumes [3]. The concentration of HC's is additionally viewed as dangerous when breathed in. High NO_X emanation is as a rule perceived with profoundly warmed and packed air [2, 4]. The oxides of nitrogen are an alternate terrible emanation to the breadth at abnormal states. Exhaust gas O_2 which is unburned oxygen has also been measured through the exhaust gas analyzer. In spite of the fact that O_2 is clearly not terrible, it is tried to better get it the ignition attributes [4]. By calculating the rate of oxygen gas in the exhaust, the air to fuel proportion of the engine can be easily calculated as it runs. Scentless carbon mono oxide causes migraines and in the long run passing by O_2 from the body of the human being, in the event that it exists in high amounts. CO_2 is show noticeable all around in vast sums add to greenhouse impact and thusly an unnatural weather change. HC's are generally the most exceedingly awful issue for the engines of vehicle [3]. Numerous objects can deliver high Hydrocarbon emissions, for example, propelled timing and unpleasant exhaust system. NO_X is for the most part more terrible on higher pressure motors. All engines produce NOx however the use of Exhaust Gas Recirculation Valve will chill and subside off the blazing rate of the engine. This essentially cuts down NOx concentrations [4]. Carbon mono oxide (CO) needs to do with the adequacy of the smoldering in the engine moreover is exceedingly affected by the fuel to air level of the engine. CO_2 is moreover a pointer of the engines set up. Debilitate frameworks shine bigger piece of surges and need to be supplanted when they soften inside making an adversity up impact and no more effective [4]. HHO also increases the octane number of the A/F mixture and permit the fuel to ignite almost completely, thus reducing the significant amount of pollutants released in the exhaust [5]. Fuel consumption is an important factor regarding economy. HHO also reduces the fuel consumption rate [6]. Gasoline engines run at higher rates than diesels, not completely in view of their lighter barrels, Connecting poles and crankshaft (an arrangement benefit made possible by lower pressure proportion) and due to petrol seething more quickly than diesel. Since chambers in petrol engines tend to have much shorter strokes than barrels in diesel engines. Single-barrel motors are straightforward and reduced, and will frequently convey the greatest force conceivable inside a given envelope. Cooling is more straightforward than with various chambers, conceivably sparing further weight, particularly if air cooling can be utilized. Single-barrel or cylinder engines require more flywheel impact than multi-chamber motors, and the turning mass is generally vast, limiting increasing speed and sharp changes of velocity. In the fundamental plan they are inclined to vibration - however at times it might be conceivable to control this with equalization shafts. The engine specifications have been mentioned in Table.1which is given below.

The development of the power device (FC) has additionally been investigated in Automotive Center. These cells are also

called as fuel cells. Creation of oxygen-enriched hydrogen gas (HHO) relies on these energy components. This HHO contraption is totally built by the University of Engineering & Technology Lahore, Pakistan after many times of experimentation. There are many benefits which were taken out after introducing the device behind the carburetor of the gasoline engine.

2. MATERIAL AND METHODS:

In this research paper exhaust gases concentrations were calculated when internal combustion engine (ICE) was running on the 70% petrol and 30% HHO mixture. Simply, exhausts pipe of 70-cc engine was connected with the exhaust gas analyzer (EMS-5002) to analyze the exhaust gases in their prescribed units. The sensor of Exhaust gas analyzer was connected with the outlet of the exhaust pipe which sensed the exhaust gases and gives the values in their concentrations and units on the main screen of the analyzer [18]. The investigation on the FC is presently working with the principle target is to improve the energy unit execution and/or decrease the size of fuel cell [18–30]. A Connection of Exhaust pipe with Exhaust Gas Analyzer is demonstrated and drawn in Fig.1

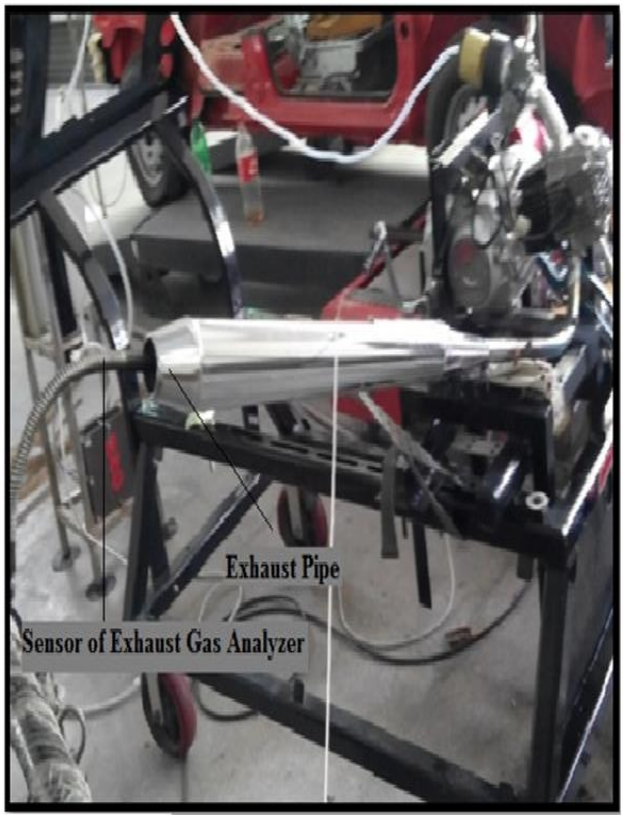

Fig. 1: Actual investigation Set-up

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The power device utilized as a part of this exploration is essentially an electrolyte cell which decays refined water into hydroxt gas (HHO). This dry sell has been designed and constructed in the Automotive Research Centre, The University of Engineering and Technology Lahore.

Adding HHO gas to the fuel/air mixture has the brief effect of growing the octane rating of any fuel. "Octane Rating" means the measure of that fuel can be compacted before it touches off [31]. Immaculate water does not direct power. Refined water and KOH is the favored electrolyte. While planning the HHO generator the taking after critical focuses ought to be taken consideration: choice of anodes, separation between two terminals, network between cathodes, choice of impetus, its level, merits and faults, determination of holder, electrical integration and plumping with gas tight course of action ,reverse discharge insurance. Every impetus has its own benefits and negative marks. According to the necessity the prerequisite the impetus is picked; else it gives more warmth with more

gas however devours more DC current from the vehicle battery. Thickness of electrolyte is straightforwardly corresponding to current utilization. The experimental setup of research has been shown in Fig.2 in which all devices are properly installed

Table.1- Engine Specifications

Manufacturer	Honda Atlas
Type	70-CC, SI Engine
Stroke and Bore	41.4 x 47.0 mm
Compression Ratio	8.8:1
No. of Cylinders	1
No. of Strokes	4
Max Speed	1700 RPM
Cooled by	Air
Start with	Kick

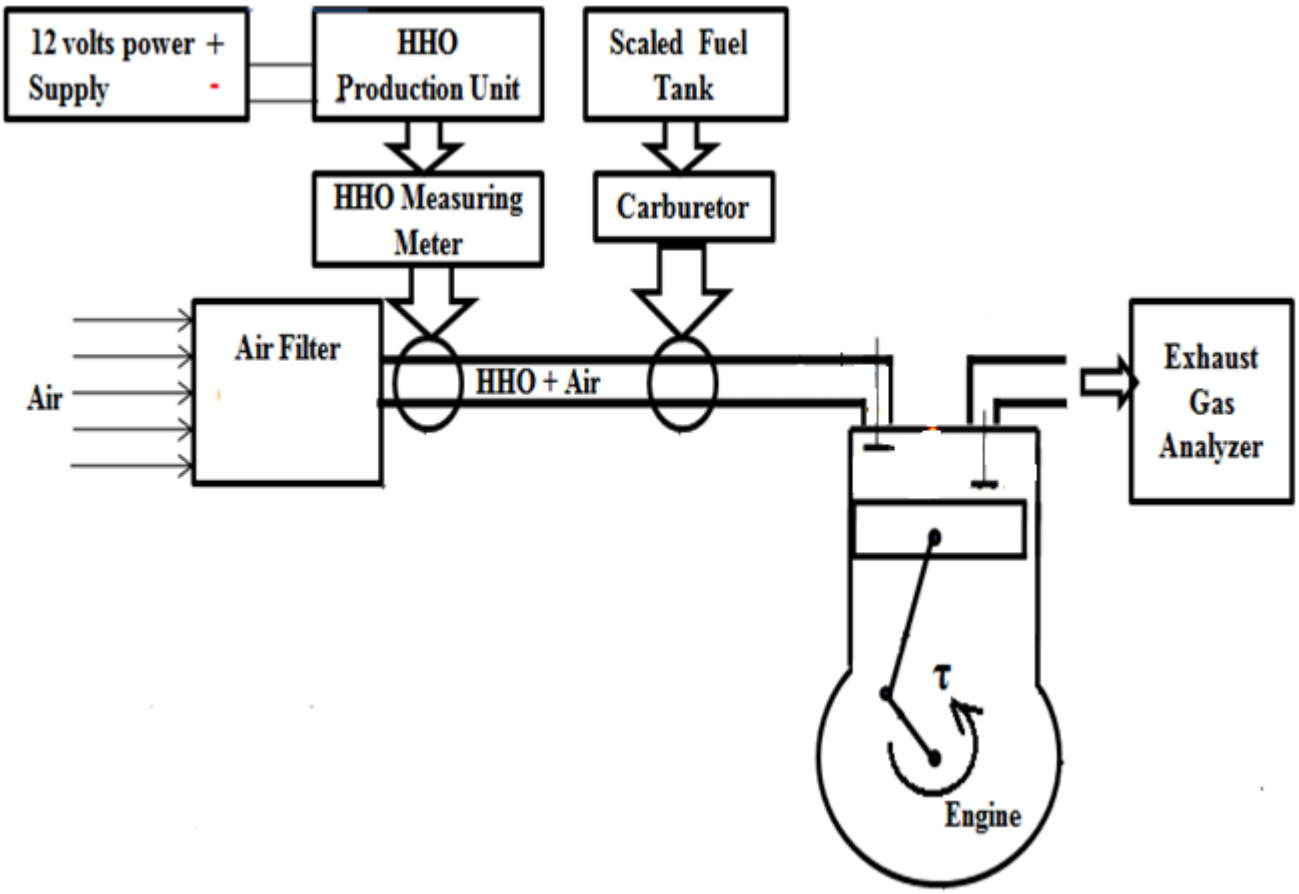

Fig.2: Schematic of Experimental Setup

3. RESULTS AND DISCUSSION

The exhaust gas anaysis of 70-cc motor bike engine running with petrol and mixture of petrol and HHO has been performed successfully. For this reason fumes gas analyzer has been utilized. On the fumes funnel, sensor of the gas analyzer was presented. The Hydro Carbon fixation has been diminished to about more or less 39.9%. So, for this experimentation the petrol & HHO engine was run in the range of 300 RPM (Revolutions per minute) to 850 RPM. The accompanying fumes gasses reults are taking into account petrol and mixture of HHO. The Hydroxy gas (oxygen advanced hydrogen) utilized for this examination is just 2- SCFH (Standarad Cubic Feet per hour). And 1-SCHF= 0.47 LPM (Liters per minute). The correlation of petrol and petrol & HHO mixture acquired for Carbon mono oxide investigation is demonstrated in fig.3.

For rich mixture Φ is more prominent than solidarity and for lean mixture it is not as much as solidarity and for stoichiometric response Φ is equivalent to unity. Φ is called as Equivalence Ratio.

CO is produced from the inappropriate oxidation of carbon dioxide; it structures when there is lacking oxygen to make carbon dioxide. For example, when working an IC-Engine in an encased space[32]. At the point when the analysis was carried out on this mixture to figure the rate of Carbon mono oxide (CO). It has been diminished around 53%.

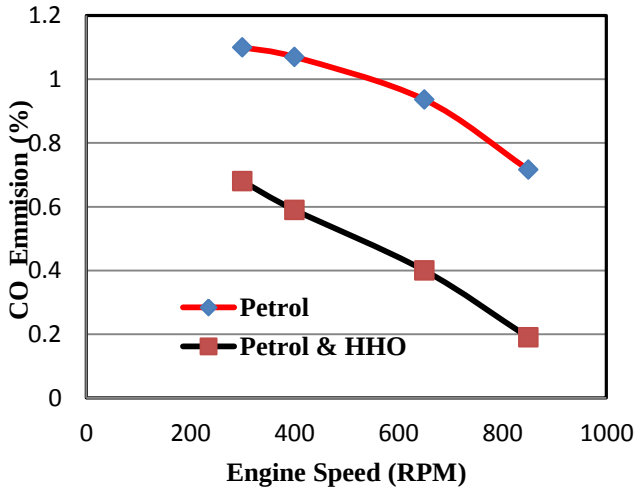

Fig.3: % of CO with Speed (RPM) variation

The Thermal efficiency (η_{th}) of the engine likewise increases.

4. CONCLUSIONS:

This research paper has covered the issues related to the CO emissions, NOx emissions and the temperature of the engine utilizing petrol & HHO as a fuel mixture. In the wake of looking at the outcomes discovered utilizing gasoline and combination of gasoline & HHO. After the investigation the following results and conclusions have been extracted.

- HHO generation framework can be effectively developed and effortlessly incorporated with the conventional gasoline engines at less cost.
- The Carbon mono oxide has been decreased 53%

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