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COMPARATIVE ANALYSIS OF DIFFERENT FUELS IN TWO-STOKE PETROL ENGINE

[1]Tusar M Limbachiya, [2]Vishalkumar M. Bhimda, [3]Prashant B. Bhatt,
[4]Rajnikant V. Parmar, [5]Ankit N. Panchal

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Abstract :- ***India is developing country with an increase in work force as a large part of transportation are depends on I.c engine. I C Engine is the most important in power generation. we have selected our project comparative fuel analysis of 2-stroke petrol engine because of the shortage of petrol occurs in nearby future and the pollution produce is controlled by using different fuel.***

Analysis on the different parameter like specific fuel consumption, Efficiency, power output, torque output, Quick response, Environment effect, cost. And checkout which fuel is best for the 2-stroke petrol engine.

Keyword: Two-Stroke Petrol Engine, I.C Engine, Petro, Power Petrol, Ethanol, Petrol + Ethanol, Power Petrol + Ethanol

INTRODUCTION

As the time passes, it is believed that the petrol will be not enough and will be costly. Various researches are going on for the improvement of fuel economy of engines. However as the demand and availability for petrol is somewhat unbalanced and there is a need to balance since that is mainly happened due to large increase in number of vehicles.

If the same situation continues that time the petrol will be more costly and limited. With increased use and the depletion of fossil fuels, today more emphasis is given on the alternate fuels. There is an essential need of alternate fuels in a way or other. Today intensive search for the alternative fuels for spark ignition (SI) engine.

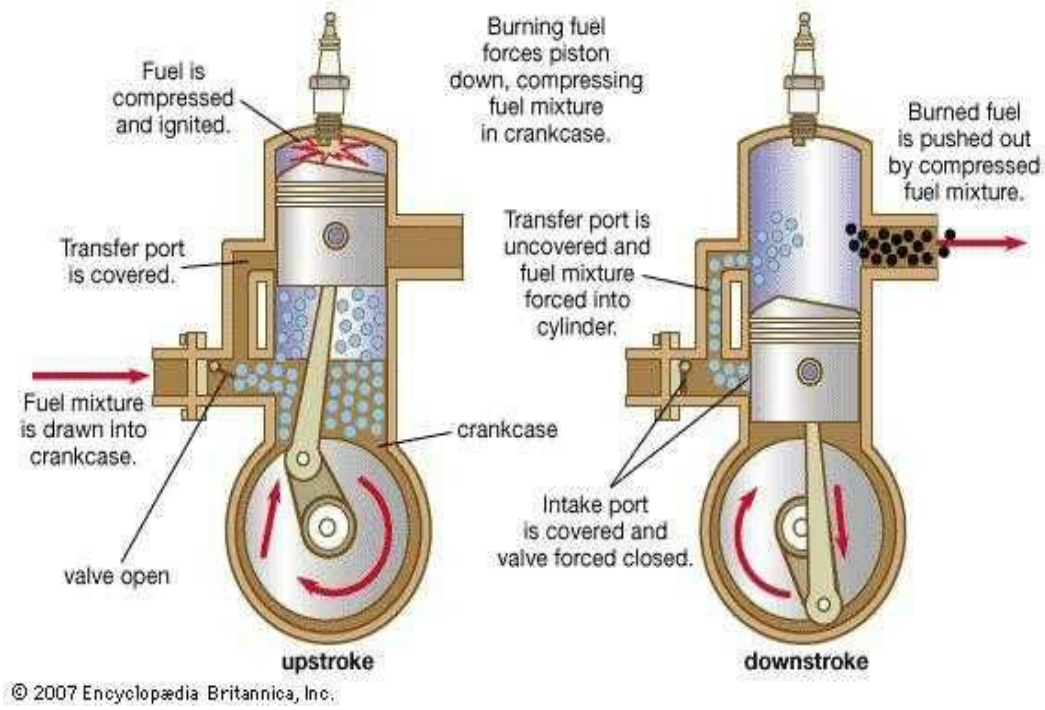
It has been found out that the Petrol Bland fuels are suited for the alternate fuels. In spark ignition engines fuels like Power petrol and Ethanol Bland are the suitable substituent for the petrol. They can be blended with petrol over a wide range of percentage according to the requirement.

Another reason for the need of alternate fuels for IC engines is the emission problems. Combined with other air polluting factors, the large number of automobiles is a major contributor to the air quality problems of the world.

Two - Stroke I C Engine

1st Stroke (Upward stroke):

The piston is at the bottom of the cylinder. A pipe at the left side is opened and lets the fuel mixture, which is already compressed a bit, flow from the lower to the upper part of the cylinder. The fresh gases expulse now the exhaust through an ejection pipe, which is not closed by the piston at this moment.



2nd stroke (Downward stroke):

After being hurried upward, the piston now covers the pipe on the left side and the ejection pipe. Because there is no way out any more, the upper, fresh gas mixture gets compressed now. At the same time in the part below fresh gas is taken in by the piston driving upward through the open suction pipe.

At the upper dead-center, the compressed fuel mixture is ignited by the sparking plug, due to explosion the piston is pressed downward while it compresses the fresh gas below at the same time. The process begins again as soon as the piston arrives at its lowest point.

Experimental Set Up

Component of Experimental Set Up

- Engine pulley
- Two-Stroke I.C Engine
- Rope Brake Dynamometer
- Tachometer

CALCULATION

Given Data

Diameter of pulley (D) = 16cm
Rope diameter (d) = 2 cm
Pipe diameter = 2.5cm
$R_{effective}$ = 9cm
Calorific value = 42000kj/kg
Density = 750kj
Head = 1cm
Time = 92 sec
Mass = 1 kg
Speed = 176

Calculation

- Torque (T) = $9.81 \times m \times R_{eff}$
  $= 9.81 \times 1 \times .09 = 0.88$ Nm
- Brake power (B.P)= $\frac{2\pi NT}{60000}$
  $= (2 \times 3.1415 \times 176 \times .88)/60000$
  $= 16.21$ w
  $= 0.0162$ kW
- Discharge (Q) = volume / time taken

Volume= h×a
Height = 1 cm

$V = h \times \pi/4 \times d^2$
$= 1 \times \pi/4 \times (2.5)^2$
$= 4.90$ cm3

- Discharge (q) = 4.90 / 92
  $= 0.066$ cm^3/sec
  $= 6.66 \times 10^{-8}$ m^3/sec

- Mass flow rate $m_f = \varrho \times g$
  $= 750 \times 6.66 \times 10^{-8}$

- Heat supply (q_s) = $m_f \times cv$
  $= 4.95 \times 10^{-5} \times 42000$
  $= 2.079$ kW
- Specific fuel consumption = $m_f \times 3600$ / brake power
  $= 4.95 \times 10^{-5} \times 3600 / 0.016$
  $= 11$ kg/kw.hr

Different Fuels

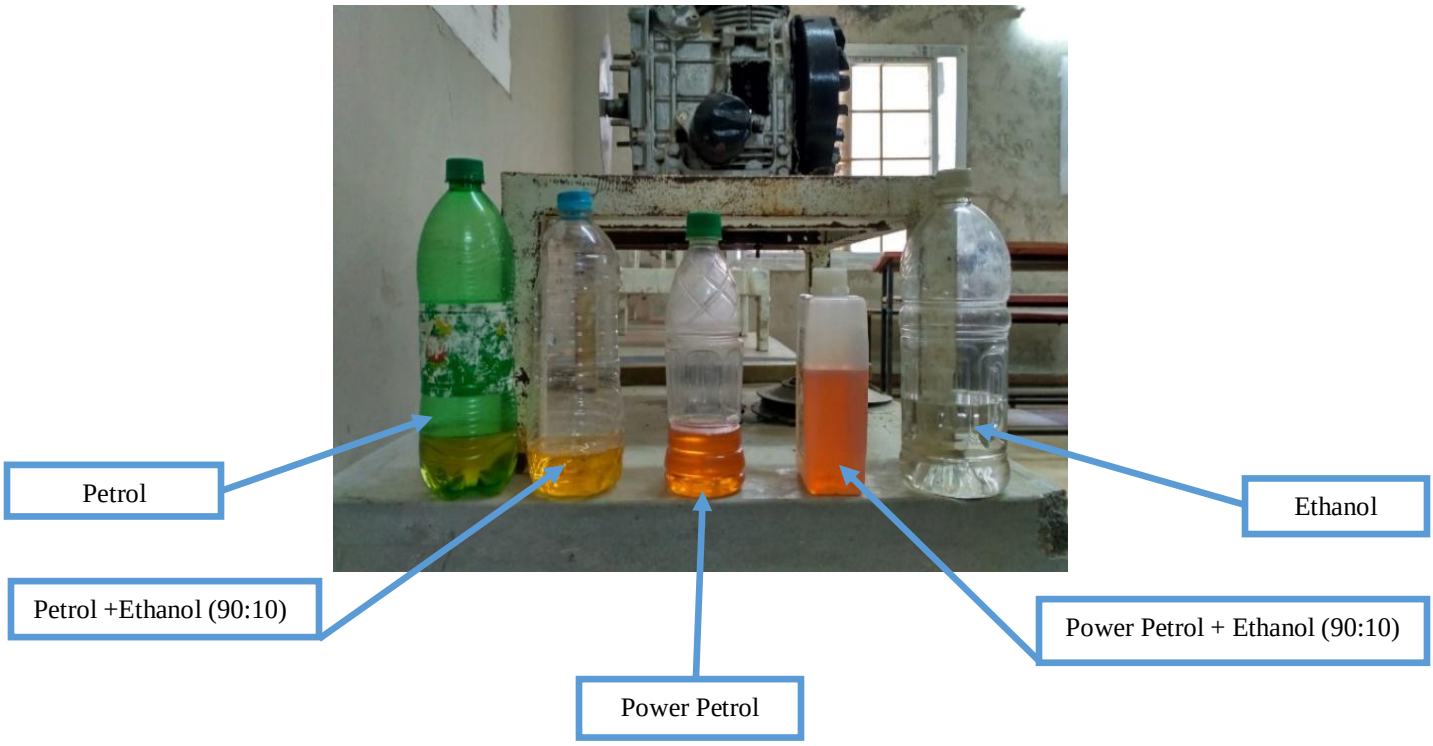


TABLE - 1 READING OF DIFFERENT PARAMETER FOR PETROL

Mass (Kg)	Torque (N-m)	Speed(N) RPN	B.P (KW)	Time (Sec)	Q (M^3/Sec)	Mf (Kg/Sec)	Qs (KW)	η(%)
1	0.0882	176	0.016	92	5.33E-08	3.99E-05	1.678	0.970
2	3.531	171	0.063	86	5.70E-08	4.27E-05	1.795	3.524
3	7.946	167	0.138	74	6.62E-08	4.97E-05	2.086	6.662

TABLE - 2 READING OF DIFFERENT PARAMETER FOR POWER - PETROL

Mass (Kg)	Torque (N-m)	Speed(N) RPN	B.P (KW)	Time (Sec)	Q (M^3/Sec)	Mf (Kg/Sec)	Qs (KW)	η(%)
1	0.0882	179	0.017	85	5.76E-08	4.44E-05	1.909	0.867
2	3.531	172	0.064	83	5.90E-08	4.55E-05	1.955	3.254
3	7.946	168	0.140	78	6.28E-08	4.84E-05	2.080	6.721

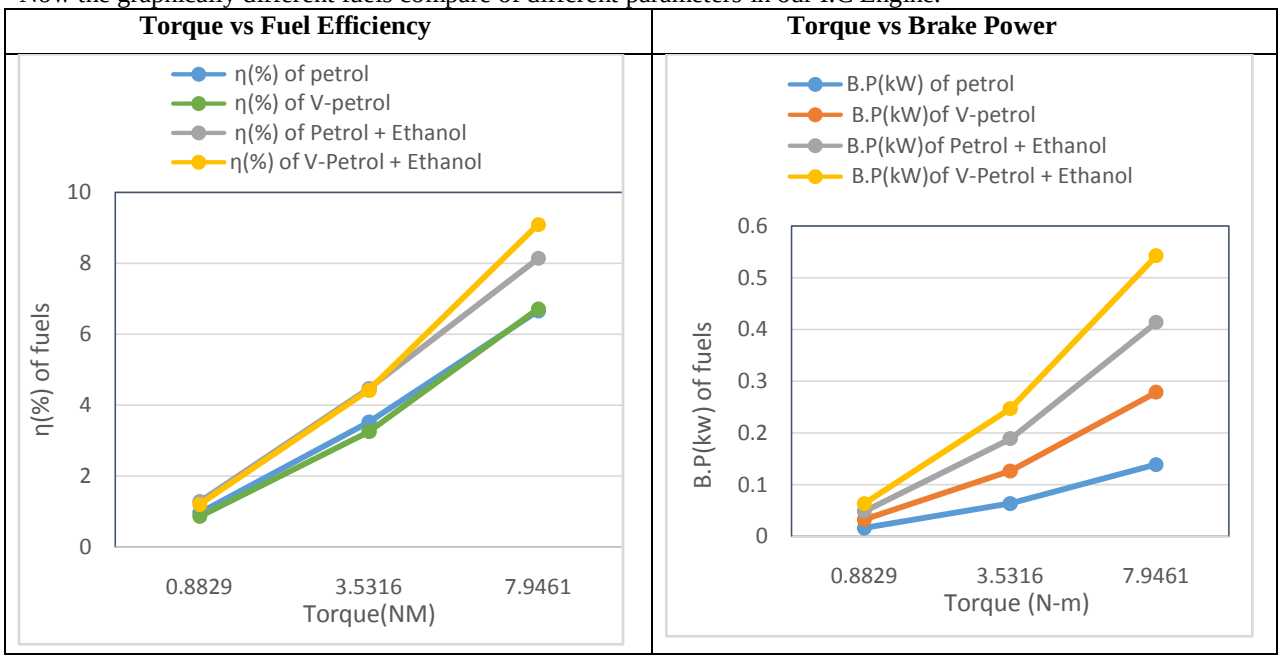
TABLE - 3 READING OF DIFFERENT PARAMETER FOR PETROL+ ETHANOL BLAND

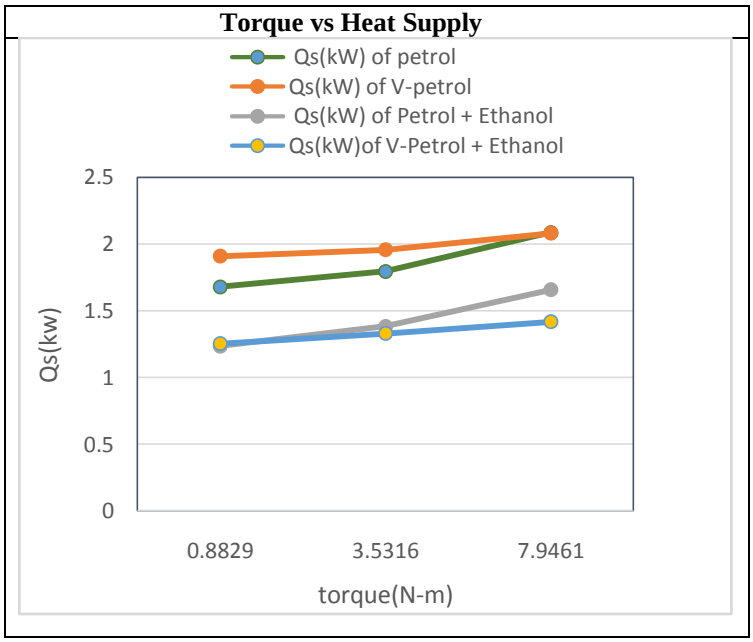
Mass (Kg)	Torque (N-m)	Speed(N) RPN	B.P (KW)	Time (Sec)	Q (M^3/Sec)	Mf (Kg/Sec)	Qs (KW)	η(%)
1	0.0882	172	0.016	122	4.02E-08	3.03E-05	1.236	1.287
2	3.531	167	0.062	109	4.50E-08	3.39E-05	1.383	4.466
3	7.946	162	0.135	91	5.38E-08	4.06E-05	1.656	8.138

TABLE - 4 READING OF DIFFERENT PARAMETER FOR V- PETROL+ ETHANOL BLAND

Mass (Kg)	Torque (N-m)	Speed(N) RPN	B.P (KW)	Time (Sec)	Q (M^3/Sec)	Mf (Kg/Sec)	Qs (KW)	η(%)
1	0.0882	163	0.015	120	4.08E-08	3.15E-05	1.252	1.204
2	3.531	159	0.059	113	4.34E-08	3.35E-05	1.330	4.422
3	7.946	155	0.129	106	4.62E-08	3.57E-05	1.417	9.099

Now the graphically different fuels compare of different parameters in our I.C Engine.





- Here 90% Petrol and 10% ethanol
- Here 90% V-Petrol and 10% ethanol

Conclusion

- As shown in torque vs fuel efficiency and brake power graph performance of power Petrol + Ethanol is better than other and petrol is lower.
- As shown in torque vs heat supply graph performance of v-petrol is better and V-Petrol + Ethanol is lower.

Future scope

- At that time it is used in our reading parameter the mixture of ethanol and petrol as 10:90 and in future it can be used 15:85, 20:80 for the analysis.
- We are take reading for load to limited a 3kg in future we increase.
- In engine as a fuel use methanol and alcohol in nearby future but it's dangerous**.**

Reference

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- Research paper
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