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IMPLEMENTING TRIFUEL WITH VARIABLE PISTON MOTION FOR PERFORMANCE ASSESSMENT BY THE USE OF SUPERCHARGER AND TURBOCHARGER IN AN I.C. ENGINE

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ABSTRACT

The tri-fuel is assortment of diesel, turpentine mix and aliphatic compound gas. The aliphatic compound gas is created from the lime stone and therefore the turpentine oil obtained from the conifer. The performance of a tri-fuel has been analyzed through an experiment in an exceedingly single cylinder direct injection and compression ignition engine with diesel and turpentine mix as primary fuel and aliphatic compound inducted as secondary vaporific fuel it means that diesel and therefore the turpentine mix (40% turpentine and 60% diesel).

Table 1 Physical and chemical properties of turpentine & acetylene

Properties	1.Gasoline	2.Diesel	3.Turpentin	4.Hydrogen	5.Acetylene
Formula	C_4 to C_{12}	C_8 to C_{25}	$C_{10}H_{16}$	H_2	C_2H_2
Molecular weight	105	200	136	1	26.04
Density kg/m^3	780	830	860-900	0.08	1.092
Specific gravity	0.78	0.83	0.86-0.9	0.0696	0.920
Boiling point ^{0}c	32-220	180-340	150-180	- 252.8	-84.44
Latent heat of vaporization kj/kg	350	230	305	0.904	801.9
Lower heating value kj/kg	43,890	42,700	44,000	1,20,000	48,225
Flash point ^{0}c	-43	74	38	-	32
Auto ignition temperature ^{0}c	300-450	250	300-330	572	305
Flammability limit %volume	1.4	1	0.8	4	2.3

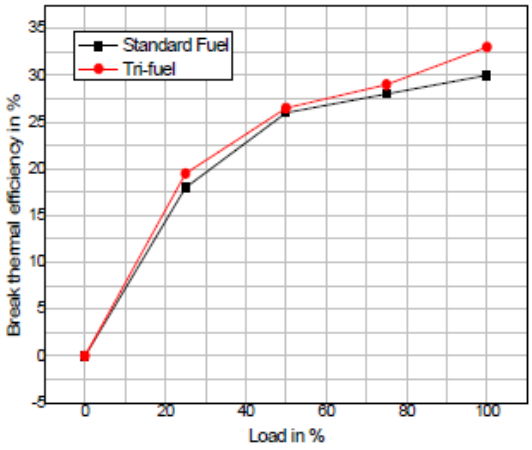
The results showed that the mix and therefore the aliphatic compound gas flow of three liters per minute (by a gas flow meter**) offered higher brake thermal potency between a hundred and twenty fifth and three than that of diesel baseline operation**. It's known that the ability outputs of associate engine will increase with increase in quantity of air or mixture within the cylinder and

Compressor plays a very important role in increasing the quantity or air. Turbochargers are used throughout the automotive trade they'll enhance the output of an inside combustion engine while not the requirement to extend its cylinder capability.

I. INTRODUCTION

Relatively low potency of today`s burning engine is that the consequence of multiple factors. First- normal spark ignition burning engines throughout running at low masses have their thermal potency remittent as a result of

the throttle that controls the engine load and by the actual fact that the compression starts at low pressure.



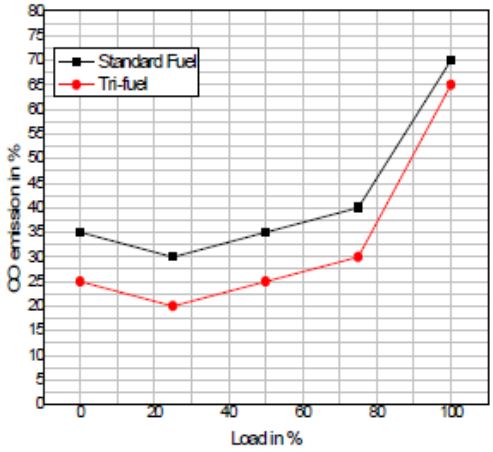


Fig.1 Load vs Break Thermal Efficiency Fig.2 Load vs co Emission of Standardfuel and Trifuel

Under half load conditions, engines use a number of the work to pump air across the partly closed throttle. one among the double ways in which for rising potency at half load is to cut back the stroke volume by selection motion of many cylinders of Associate in Nursing engine at the half load conditions. On the premise of those references an additional step created during this Paper is to create analysis of a replacement engine thought that is in a position to create variable piston motion. Variable piston motion burning engine isn't solely ready to give variable compression quantitative relation and displacement however additionally with this idea it's simple to realize dwell angle at prime dead centre and bottom dead centre. With piston dwell at heart dead purpose a lot of complete growth may be achieved.

II. VARIABLE PISTON MOTION IC ENGINE

Variable piston motion burning engine features a 2 pairs of spheroidal gears. If truth be told this feature of NCG is extremely vital for synthesis of mechanism wherever intermittent motion needed. This intermittent-motion mechanism combines circular gears with spheroidal gears during a planetary arrangement. With such planetary differential it's potential to attain terribly complicated movement, wherever solid piston movement is in a position to produce motion with variable displacement and variable compression, additionally thanks to the characteristics of spheroidal gears, piston dwell at prime position (TDC) and Bottom position (BDC) is additionally possible.

III. SUPERCHARGING

The amount of air iatrogenic per unit time is increased by increasing engine speed or increasing air density throughout suction stroke. The rise in engine speed needs rigid associated sturdy engine because the inertia load will increase speed. The engine friction and bearing masses additionally increase and volumetrically potency scale back with increasing speed of engine. Thus this is often unattainable. Currently another methodology

within which we've got to extend the suction pressure is named supercharging. Instrumentality used for this is often known as compressor.

Objective of Supercharging:

It is most popular to satisfy the subsequent requirements:

1. To beat result of high attitudes.
2. To scale back the burden of engine per kilowatt.
3. To scale back the scale of the engine to suit into restricted area.
4. To extend the facility of associate existing once the bigger power demand happens.

IV. BENEFITS OF SUPERCHARGING

1) Owing to the low meter displacement of the supercharged engine, resistance and thermal losses are less.
2) Brake power can increase concerning 30-45 % thanks to increase in supercharged pressure as most quantity of fuel are going to be burnt at intervals constant amount because the mass taken per stroke is inflated.
3) The ability to weight quantitative relation i.e. kilowatt, power output/kilograms, engine weight of the supercharged engine is far higher than that of the naturally aspirated engine.
4) The supercharged engine's installation house demand is smaller than that of a naturally aspirate engine with constant power output.
5) The high altitude performance of a supercharged engine is considerably higher. Thanks to reduced engine are smaller; it's less uproarious than a naturally aspirated engine with identical output.
6) Its terribly straightforward for top speed engine.

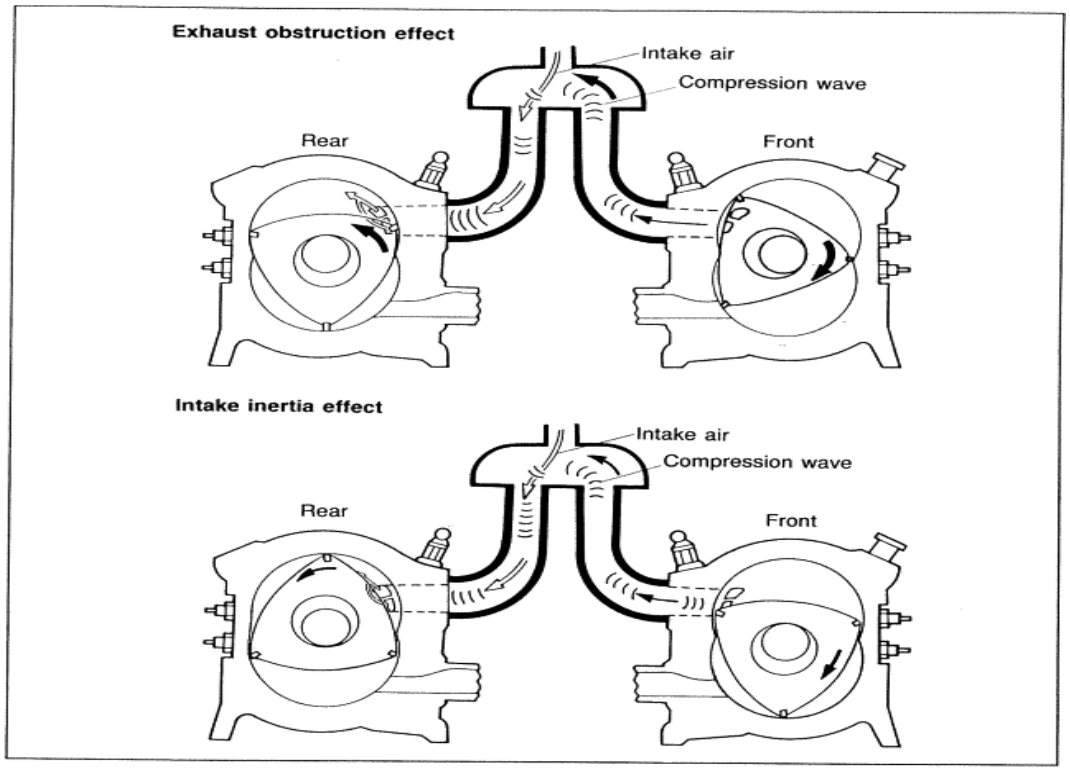


Fig. 3 Working of Supercharger

V. TURBO CHARGING

A turbocharged engine is additional powerful & economical than a naturally aspirated engine Because the rotary engine forces additional intake air proportionately additional fuel- into the combustion chamber than if gas pressure alone is employed. Its purpose is to extend the volumetrically potency of the combustion chamber.

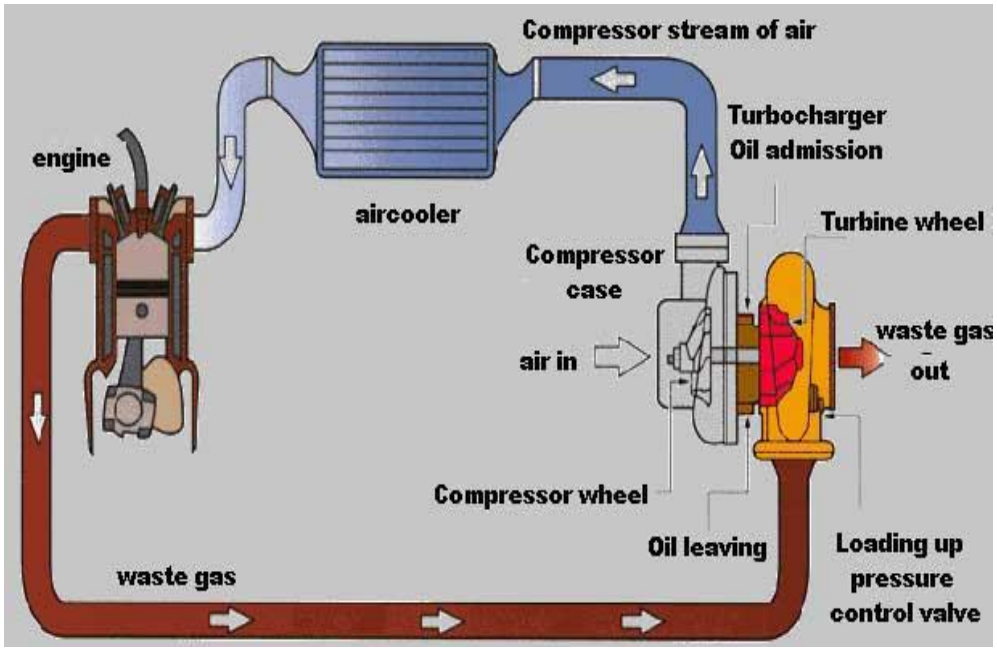


Fig.4 Working of Turbocharger

VI. BENEFITS OF TURBO CHARGING

1) A lot of power compared to constant size naturally aspirated engine.

2) Higher thermal potency over naturally aspirated engine and super charged engine as a result of the engine exhaust is getting used to try the helpful work that otherwise would are wasted.

3) Higher Fuel Economy by the means of a lot of power and force from constant sized engine. A century of development and refinement for the last century the SI engine has been developed and wide employed in vehicles.

4) Low value, the SI engine is that the lowest value engine attributable to the large volume presently created.

5) High Thermal potency.

6) Higher meter potency.

7) Continual development of this technology has created associate degree engine that simply meets emissions and fuel economy standards. With current laptop controls and reformulated gas today's engines are rather more economical and fewer polluting than those designed twenty years ago.

8) High speed obtained.

9) Higher average obtained.

10) Eco-friendly.

VII. CONCLUSION

The presence of turpentine within the mix causes longer ignition delay and quick combustion. Throughout longer ignition delay engine accumulates a lot of fuel before the commencement of combustion and releases a lot of fraction of warmth throughout the premixed part of combustion. This ends up in higher cylinder pressure. The improved volatility, accrued enthalpy and improved air entrainment could be the opposite reasons for higher thermal potency these are also the explanations for higher brake thermal potency. The maximum brake thermal potency obtained during a tri-fuel thought is thirty two attempt to its third on top of that normal of ordinary of normal fuel operation that the CO emission of tri-fuel thought with standard fuel operation. It shows that the CO emission of tri-fuel is a smaller amount than that of ordinary fuel the least bit masses. This is often because of complete burning of the fuel and reduction in overall carbon/hydrogen (C/H) quantitative relation of the full inducted fuel. Correct fuel admission and effective fuel utilization area unit the opposite reasons for low CO emission the least bit masses. The CO emission of tri-fuel the least bit load is five-hitter below customary fuel.

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