REVIEW OF ETHANOL-GASOLINE PETROL ENGINE PARAMETERS BY EXPERIMENTAL & MINITAB TOOLS

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ABSTRACT:

The aims of this work are to obtain the characteristics and the performance optimization of the spark-ignition engine and single-cylinder by using the gasoline-ethanol fuel blend in composition 15%-80% . The engine operates on different engine speeds in the range 2000–7000 RPM (increment 1000 RPM), ignition timing in interval 12–28 BTDC (increment 4 BTDC) and compression ratio in range 12–13 (increment 0.5). All the performance engine parameters better than gasoline engine performance except for specific fuel consumption and thermal efficiency that is worse than. Those results will be obtained when the engine parameters work on the compression ratio, 16-20 BTDC (before top dead center) of ignition timing, and higher than 4000 RPM (revolution per minute). Meanwhile, the optimization of the engine performances has been done by using Box Behnken design of response surface methodology. The result of this study has revealed that at optimal parameters the values of the brake power, brake torque, thermal efficiency, mean effective pressure, specific fuel consumption,

Keywords

Ethanol-Gasoline Blend; Response Surface Methodology; Spark Ignition; Performance Optimization

1. INTRODUCTION:

Future of automobile is also based on optimization by soft tools because experimental approaches are limited and quite expensive compared to simulation. Simulation and soft computing can be repeated again and again without complete setup rearrangement, it provides a versatile environment where implementation is quite effortless approach. Design, assembly, and simulation environment for an automobile are available from CAD (Computer Aided Design, Computer Aided Manufacturing, Computer Aided Engineering etc.); apart from it some more dedicated soft tools available for this purpose.

Concluding the above statements, introduction divided in 6 major areas where the theme of this literature will in progress. The following divisions are as follows:

1. Internal Combustion Engine
2. Important terms in IC engine
3. Fuel Blending
4. Software deals with Automobile Engineering
5. MINITAB
6. Optimization Techniques

2.LITERATURE REVIEW:

It is standard that the longer-term availability of energy resources, as well as the need for reducing CO2 emissions from the fuels used has enhanced the need for the utilization of regenerative fuels. This research is done taking commercial petrol as reference that is originally blending with 5% ethanol. Hence, 5%, 10%, 15%, 20% ethanol blending with petrol initially was tested in SI engines. Reduction in exhaust gases like HC, O2, CO, CO2 and increase in Brake Thermal efficiency on blending. The result using 100% ethanol blend is simplest and can utilize it for any use in SI engines with little constraint on material used to sustain little increase in pressure. [7]

A four cylinder, four stroke, varying revolution per minute, gasoline engine connected to dynamometer based on eddy current was run on blends containing 5%, 10%, 15%, 20% ethanol and performance characteristics were evaluated. The higher blends will replace petrol in a SI engine, results showed that there is a reduction in exhaust gases and increase in Mechanical efficiency, Specific Fuel Consumption and air fuel ratio on mixing. We are able to conclude from the result that using 100% ethanol blend is most effective and that we can utilize it for any use in SI engines with little constraint on material used to sustain little increase in pressure. [8]

The performance parameters are investigated for one cylinder, four-stroke, SI engine with variable speed (1200 to 1750 rpm) and uses the blends of fuels. The result also shows that indicated power, brake power, friction power, and IMEP and exhaust temperature will increase with the rise in engine speed for all the tested fuels. AT 5% of ethanol Indicated power, IMEP and friction power was highest. [9]

Experimental investigation done on MPFI engine to observe the consequences of petrol-ethanol blends on lubrication properties. In this experimental study of blended fuel with 10%, 20%, 30% of ethanol in blended fuel by volume. In this experiment, the lubricating properties was examined like viscosity, foaming characters, kinematic viscosity, iron content, stability of oxidation, lubricating capacity, carbon residue and flash purpose are below when 20% of ethanol blended fuel used. AAS and IS standards used to examine the lubricating properties. [10]

3. CONCLUSION:

ANOVA table for fuel flow, which shows the factor degree of freedom, the sum of f- value and percentage contribution, mean square, square,.

For calculating the degree of freedom;

Degree of freedom = level- 1

Supplementary factors are calculated using mathematical expression describe in previous chapter. Here major factor which having importance in % contribution. Fraction contribution means parameters contribution on BFCE. In this case 10% ethanol has been highest contribution on BFCE (Brake fuel conservation efficiency).

Source	DOF	Sum of squares	Mean square	F value	% contribution
10% ethanol	1	30.7221	30.7221	42.14	56.76
20% ethanol	1	4.2720	4.2720	0.59	0.79
Gasoline	1	0.0917	0.0917	31.51	42.44

Table 5.6: Analysis of variance for fuel flow

Break Fuel Conservation Efficiency of gasoline, 10% ethanol & 20% ethanol w.r.t. Fuel flow rate factor gives % contribution of 42.44%, 56.76% & 0.79% in analysis of variancy. Practically also observed same contribution of analysis of variance with 5.8 % base variation.

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