# To Increase overall efficiency of Diesel Engine by various method

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*Abstract-* **Day by day price of Diesel is increasing as well as level of pollution is also has its sky limit . Specially Diesel Engine is generating more pollution compare to petrol Engine, So this pollution is targeted fot decreasing value for better future. To increase the overall performance of Diesel Engine by varying its parameter.. So complete combustion can reduce the level of pollution by varying different parameter of Combustion process.**

**Index Terms- Diesel Engines, Blends, Efficiency, Volume and pressure. Level of pollution.**

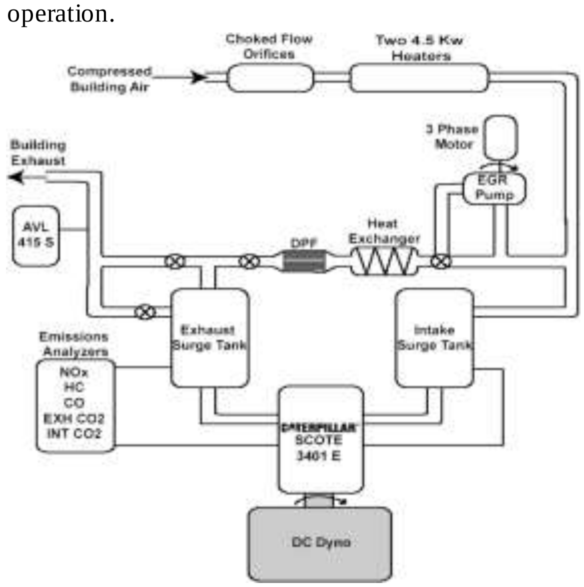
## I. INTRODUCTION

Diesel engines are widely used for transportation and power generation applications because of their high fuel efficiency. However, diesel engines can cause environmental pollution owing to their high NOx and soot emissions. Considerable effort has thus been devoted toward reducing these pollutant emissions as these have adverse effects on the environment and human health. In an effort to reduce NOx and soot emissions in-cylinder, while maintaining high thermal efficiency, many new compression ignition combustion strategies have been proposed. One of the simplest methods of achieving low NOx and soot emissions in a CI engine is HCCI combustion.

## II. DETAIL OF ENGINE

*ERC engine specifications*

In the ERC's heavy duty engine the cylinder pressure was measured with a Kistler model 6043 Asp/6061C water-cooled pressure transducer in conjunction with a Kistler model 510 charge amplifier. Acquired cylinder pressure traces were averaged for 500 cycles. Intake air flow was measured using choked flow orifices. To obtain choked flow for a variety of engine operating conditions, combinations of six different sized orifices were used to gain the desired intake air flow rate. The intake air was heated with two immersion-style heaters with PID control to ±1 _C. Both the intake and exhaust system surge tank pressures were equipped with PID control to ±0.7 kPa. PM measurements were performed with an AVL model 415S smoke meter. PM measurements of FSN, mass per volume (mg/m3), and specific emissions (g/kWh) were related with the factory AVL calibration and averaged between five samples of a 2 L volume each with paper-saving mode off. All gaseous emissions measurements were performed with a five gas emissions bench. The EGR ratewas determined through the ratio of intake CO2 to exhaust CO2 levels. Gaseous emissions were averaged for 30 s after attaining steady state operation.




The engine and injection controls were managed using the National Instruments Labview based Drivven control unit, which was equipped with the injector drivers for both direct injection (DI) of diesel fuel and port fuel injection (PFI) of gasoline. The same controller was able to simultaneously manage both injection systems while running the engine map. The Drivven system allows for full user control over engine parameters and was programmed to allow individual injection control for start-of-injection (SOI) timing, number of injection events and injection duration for each DI diesel injector, as well as injection duration

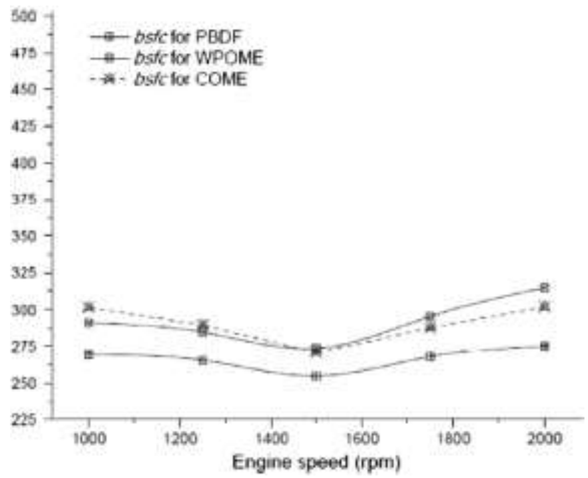
## III. COMPARASION OF TEMPERATURE

One of the major advantages of a partially premixed combustion strategy is the added control flexibility allowed by varying the direct fuel's injection timing. For both single fuel PPC and dual fuel RCCI with pump fuel, a single direct injection with DI timing closer to TDC was used, which resulted in an advance in combustion phasing at the cost of increased NOx emissions due to the lower volatility of gasoline compared to diesel fuel. As the DI timing was advanced beyond _50_ aTDC, combustion phasing control was diminished with the PRF fuel for both combustion strategies. This findingwas very consistent for single fuel PPC operation with pump gasoline. However, for RCCI operation with pump fuels, the combustion phasing continued to respond to changes in DI timing for timings earlier than _50_ a TDC, most likely due to the low volatility of diesel fuel.

## IV. DUAL FUEL OPERATION

### *A. Brake specific fuel consumption*

The outcome of the preliminary study conducted to select baseline PRF and EGR levels indicated that it is possible to improve fuel economy by optimizing the fuel reactivity for each specific operating condition. The investigations assumed a perfectly. homogeneous mixture, which is likely to be unrealistic. However, similar results were achieved using production-type hardware for this engine. Dual-fuel operation was explored using port fuel injection of gasoline and early multiple injection of diesel fuel with a conventional diesel injector. The experimental results confirmed that an extension of the PCCI operating regime was possible when optimized fuel blends were used. The operating conditions for the dual-fuel PCCI operation at 6 and 11 bar IMEP.




Because the final formatting of your paper is limited in scale, The quantity of fuel in mass per kilowatt hour (Kg/KWh) is known as the specific fuel consumption of engine. Y. He et al. performed a test on a single cylinder diesel engine type S195. Four parameters of engine like intake-valve-closing angle (α), exhaustvalve- opening angle (β), fuel-delivering angle (θ) and injection pressure (P, in 104 Pa) were taken and found out the mathematical relation of these parameter with specific fuel consumption. Rapeseed biodiesel blends with diesel in the test were used and experimentally found 30:70 was most optimized ratio in respect of engine performance. There is a relation given below that was used by the author containing both the term efficiency and specific fuel consumption as shown below. Wherege, ηe and Hu are specific fuel consumption, thermal efficiency and low calorific value respectively. It is to be seen in relation the specific fuel consumption is inversely proportional to thermal efficiency and accordingly, the efficiency will improve against the decreased specific fuel consumption. Quadratic regression was developed for orthogonal test to make the relation among four parameters and specific fuel consumption to find out the most influencing factor which would affects the thermal efficiency of engine. It was found experimentally that, the injection angle was the most influencing factor which truly employed the significantly decreased specific fuel consumption and resulted in increased thermal efficiency.

## VI. CONCLUSION

In this review, it was shown that there are so many different types of biodiesel and blends of biodiesel with diesel as alternative fuel which can be used successfully operated in different types of diesel engines such as direct, indirect, turbocharged and naturally aspirated without modifications. The following conclusion has been given from review of papers: As it has been studied from experiments conducted by various researchers and found brake power generated by engine was lower with biodiesel compared to diesel and to compensate this discrepancy bsfc was increased. In some experiments recovery of brake power was also found when engine operating under full load condition. Thermal efficiency of engine was found similar with pure biodiesel and blended biodiesel at low loads. However at high loads efficiency got decrease for pure biodiesel compared to blended one. Same result came for torque as it was for brake power of engine. Torque obtained from engine with biodiesel was found to be decreased but the increasing trend was seen as the percentage of biodiesel was increased, however it was still lower than torque produced with diesel fuel.

REFERENCES

[1] Kalam MA, Masjuki HH .Biodiesel from palmoil an analysis of its properties and potential. BiomassBioenergy 2002; 23:4719.

[2] Canakci M, Ozsezen AN. Evaluating waste cooking oils as alternative diesel fuel. GUJ Sci 2005;18(1):81–91.

[3] Knothe G, Dunn R, Bagby M. Biodiesel: the use of vegetable oils and theirderivatives as alternative diesel fuels. In: ACS symposium series no. 666: fuelsand chemicals from biomass; 1997. p. 172–208.

[4] Ozsezen AN, Canakci M, Sayin C. Effects of biodiesel from used frying palm oilon the performance, injection and combustion characteristics of an IDI diesel engine. Energy Fuel 2008;22(2):1297–305

[5] "Combustion characteristics of diesel-hydrogen dual fuel engine at low load" By W. B. Santosoa,b,*, R. A. Bakara, A. Nurba Universiti Malaysia Pahang, 26600 Pekan, Pahang Malaysiab Indonesian Institute of Sciences, Bandung 40135, Indonesia.

[6] B.B. Sahoo, N. Sahoo, U.K. Saha, Effect of engine parameters and type of gaseous fuel on the performance of dual-fuel gas diesel engines—A critical review, Renewable and Sustainable Energy Reviews, Volume 13, Issues 6–7, August–September 2009, Pages 1151-1184.