iJRASET
International Journal For Research in Applied Science and Engineering Technology

INTERNATIONAL JOURNAL FOR RESEARCH

IN APPLIED SCIENCE & ENGINEERING TECHNOLOGY

Volume: 4 **Issue:** I **Month of publication:** January 2016

DOI:

www.ijraset.com

Call: 08813907089 | E-mail ID: ijraset@gmail.com

Volume 4 Issue I, January 2016
ISSN: 2321-9653
International Journal for Research in Applied Science & Engineering Technology (IJRASET)

Variation of Performance on A 4s Single Cylinder Diesel Fuel Compression Ignition Engine for Variable Compression Ratio-A Review

N.Karthikeyan[1], R.Dinesh[2]
[#]*Mechanical engineering, SVS College of Engineering, Anna University, Chennai.*

Abstract: ***The aim of this paper is to study the effect of compression ratio on the internal combustion engines and its influences on brake power, brake thermal efficiency, volumetric efficiency, Specific fuel consumption etc.. These parameters are improved for the increases in compression ratio up to certain limit. Further increases in compression ratio the performance are decreasing due to knocking and high friction between the cylinder lining and piston rings.***
Key words: Compression ratio, Diesel engine, Power,Thermal efficiency, BSFC.

I. INTRODUCTION

Diesel engines are widely using in heavy vehicles for transportation such as lorry, trucks and also for agricultural purpose like tractors due to its high torque at low speed and its economy. Diesel engines are inevitable same time it is necessary to reduce the fuel consumption and to increasethe brake power, brake thermal efficiency, volumetric efficiency. This can be obtained by increasing the compression ratio[3],[4] air fuel mixture, injection pressure[3]. In this paper the variation of performance parameters are discussed with various compression ratio and recommended the optimum value by considering all performance parameters.

II. EXPERIMENTAL SETUPS

A different four stroke single cylinder diesel engines are studied, which operates between the compression from 5.1 - 23.5 and capable to develop 2.2KW - 7.5 KW of power. Brake torque, fuel consumption, engine RPM, temperature of gases, smoke opacity, Co_x and No_x of the exhaust gas are measured by using the appropriate equipments as stated in the published papers[1-5]. The specifications of the diesel engines are tabulated in table 1.

Description	Ferryman	Legion Brothers	Legion Brothers	Kirloskar
Number of cylinders	1	1	1	1
Bore x Stroke	90X120	80X110	80X110	70X110
Compression ratio	9.5-23.5	5-20	5.1-20.1	13.2-20.2
Power(kw)	7.5	5 HP	3-5HP	3.75

Table 1: Specification of 4S Diesel Engines

III. RESULTS AND DISCUSSION

The results are taken from various journals and compared their compression ratios with their power, Brake thermal Efficiency, Specific fuel consumption, Exhaust gas temperature And smoke opacity.

Volume 4 Issue I, January 2016
ISSN: 2321-9653
International Journal for Research in Applied Science & Engineering Technology (IJRASET)

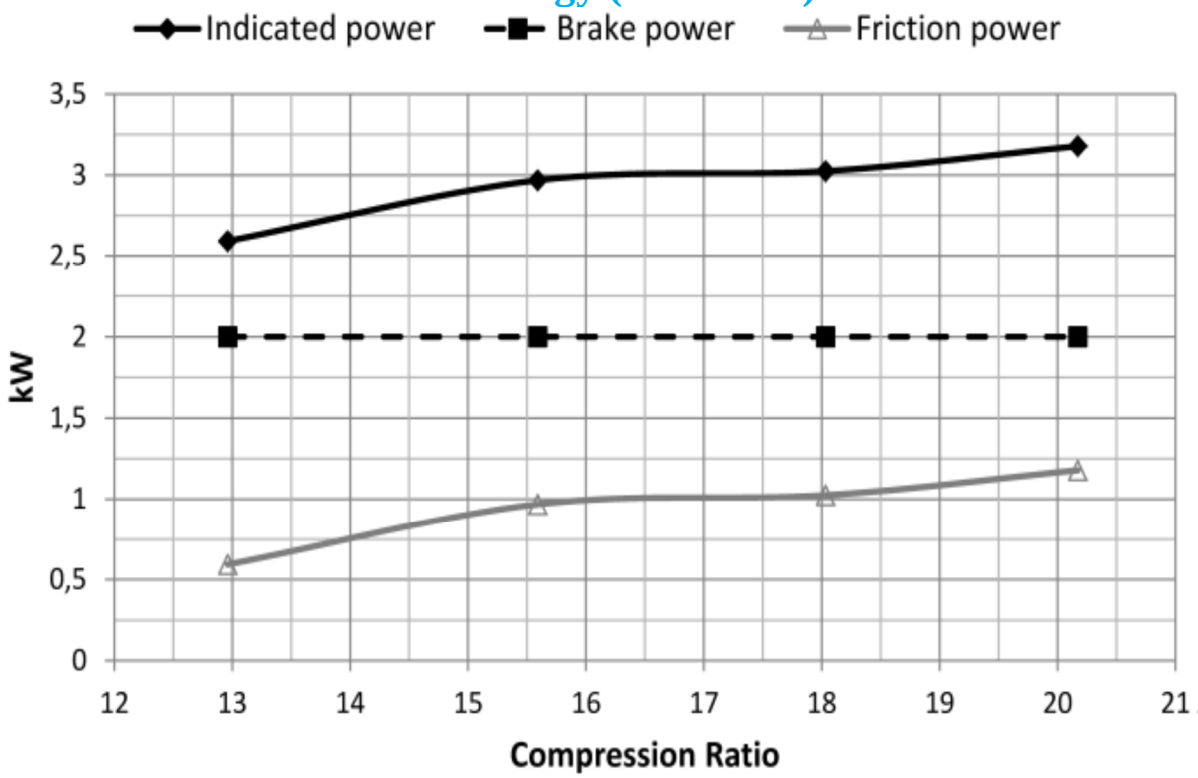


Fig 1: Compression ratio Vs power

A. It is clearly viewed that the power is directly proportional to the compression ratio from the Fig 1.

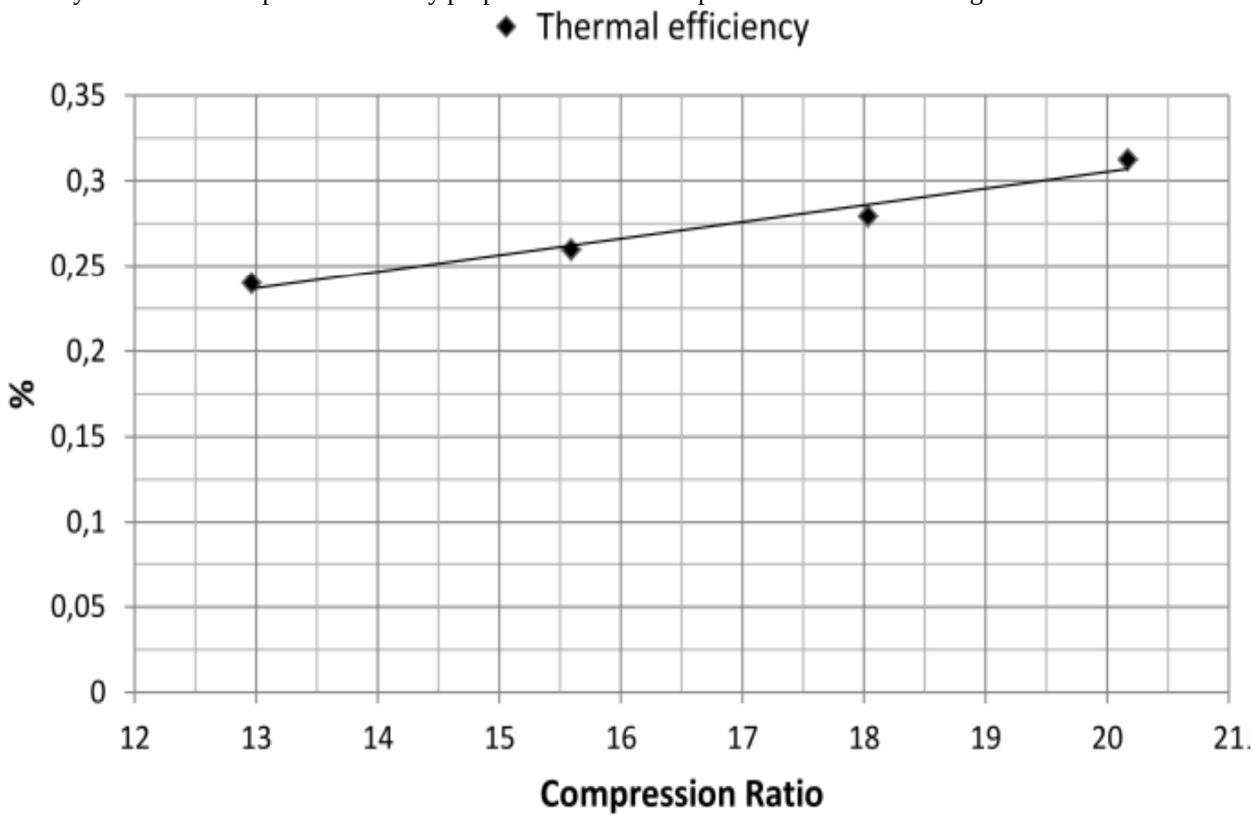


Fig2: Compression ratio Vs Brake Thermal Efficiency

Volume 4 Issue I, January 2016
ISSN: 2321-9653
International Journal for Research in Applied Science & Engineering Technology (IJRASET)

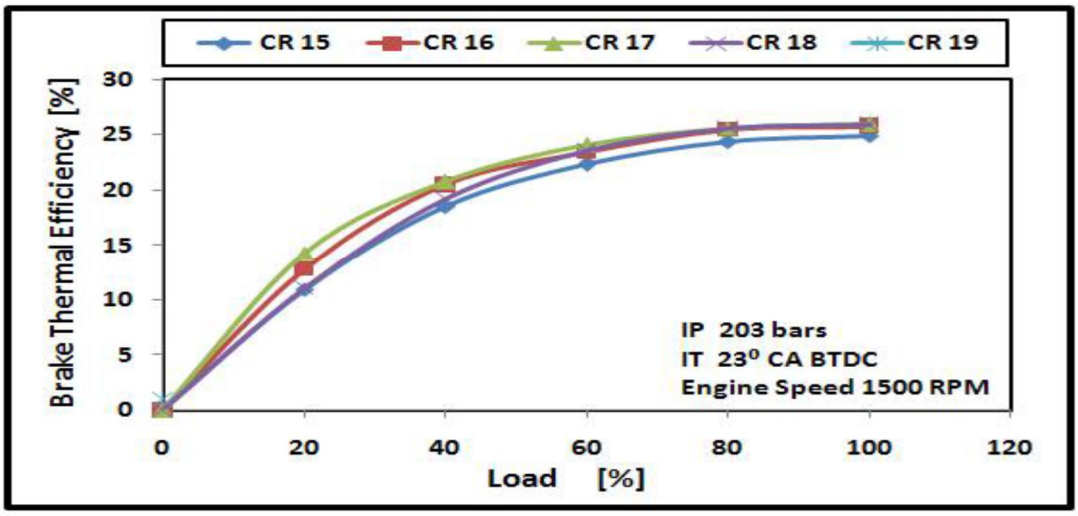


Fig 3: Compression ratio Vs Brake Thermal Efficiency

B. From the Fig 2 and 3 for the increase in compression ratio the brake thermal efficiency is also increased.

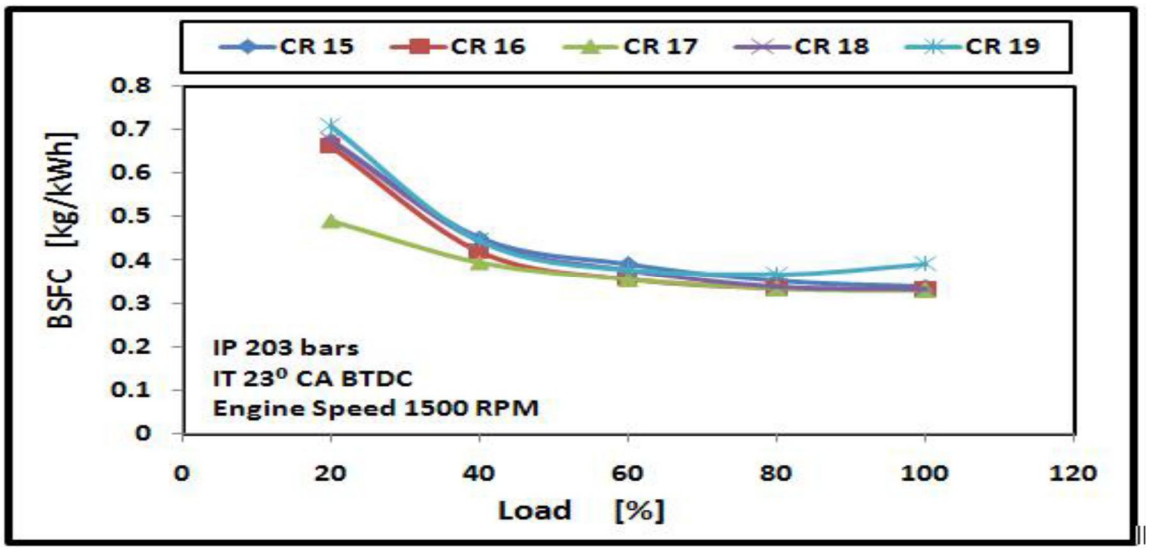


Fig 4: Load Vs Brake Specific Fuel Consumption

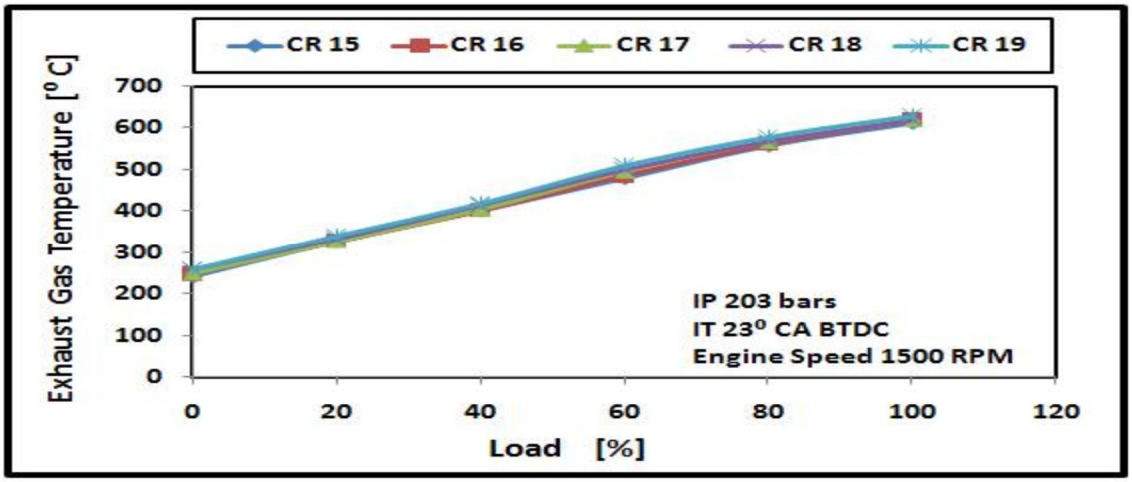


Fig 5: Load Vs Exhaust gas temperature

Volume 4 Issue I, January 2016
ISSN: 2321-9653
International Journal for Research in Applied Science & Engineering Technology (IJRASET)

C. From the Fig 4 and Fig 5 its ic shown that the for increase in load the BSFC is decreased and exhaust gas temperature is increased. Decrease in BSFC is appreciable but increase in temperature is to be reduced but it is not possible so we have to select the appropriate load, power, compressible ratio where the allowable temperature meets these data.

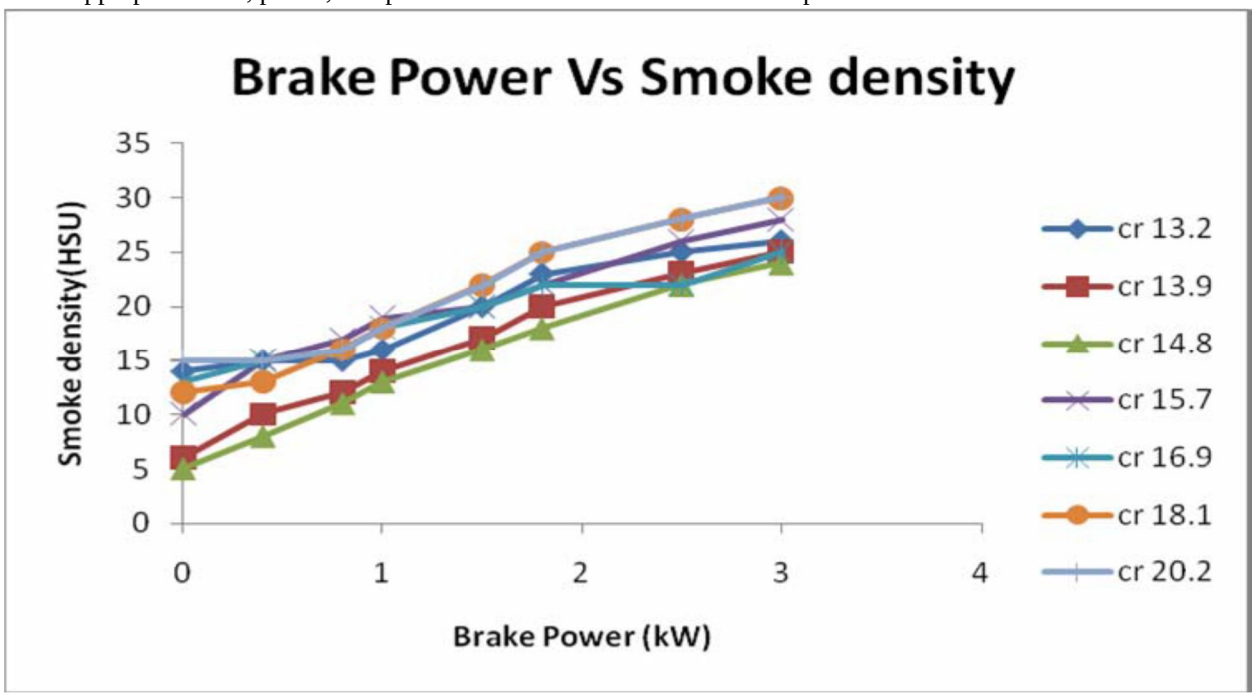


Fig 6: Brake power Vs Smoke Density

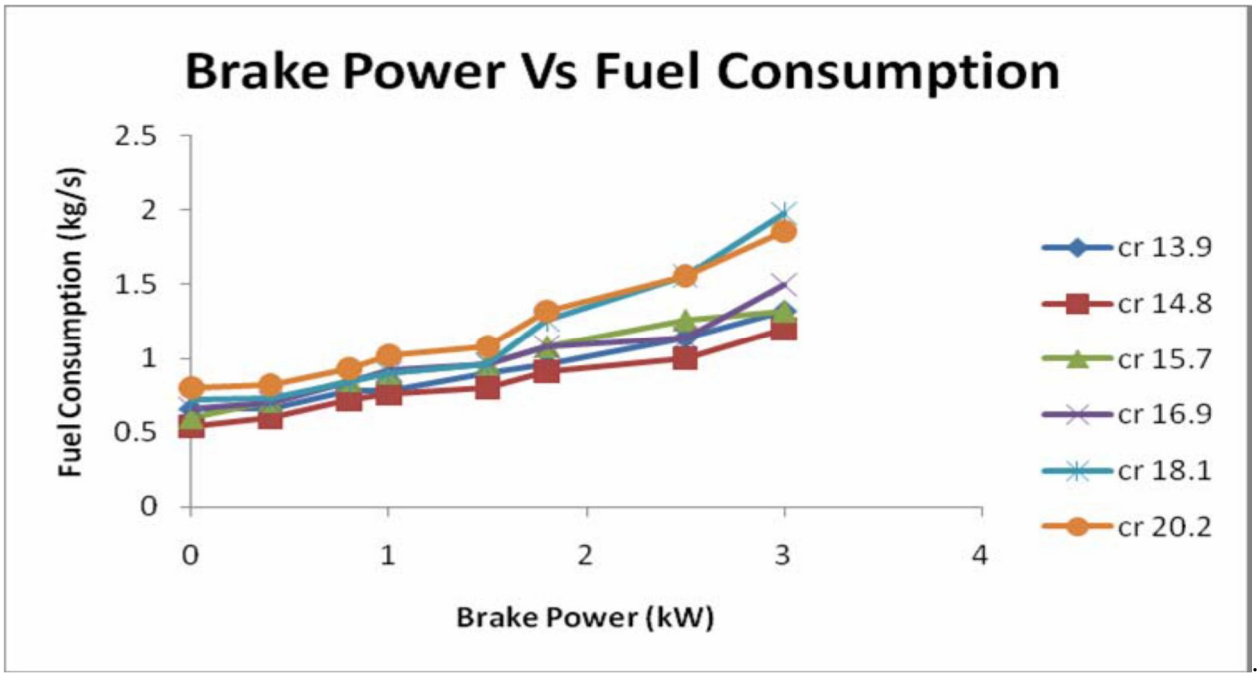


Fig 7:Brake power Vs Fuel Consumption

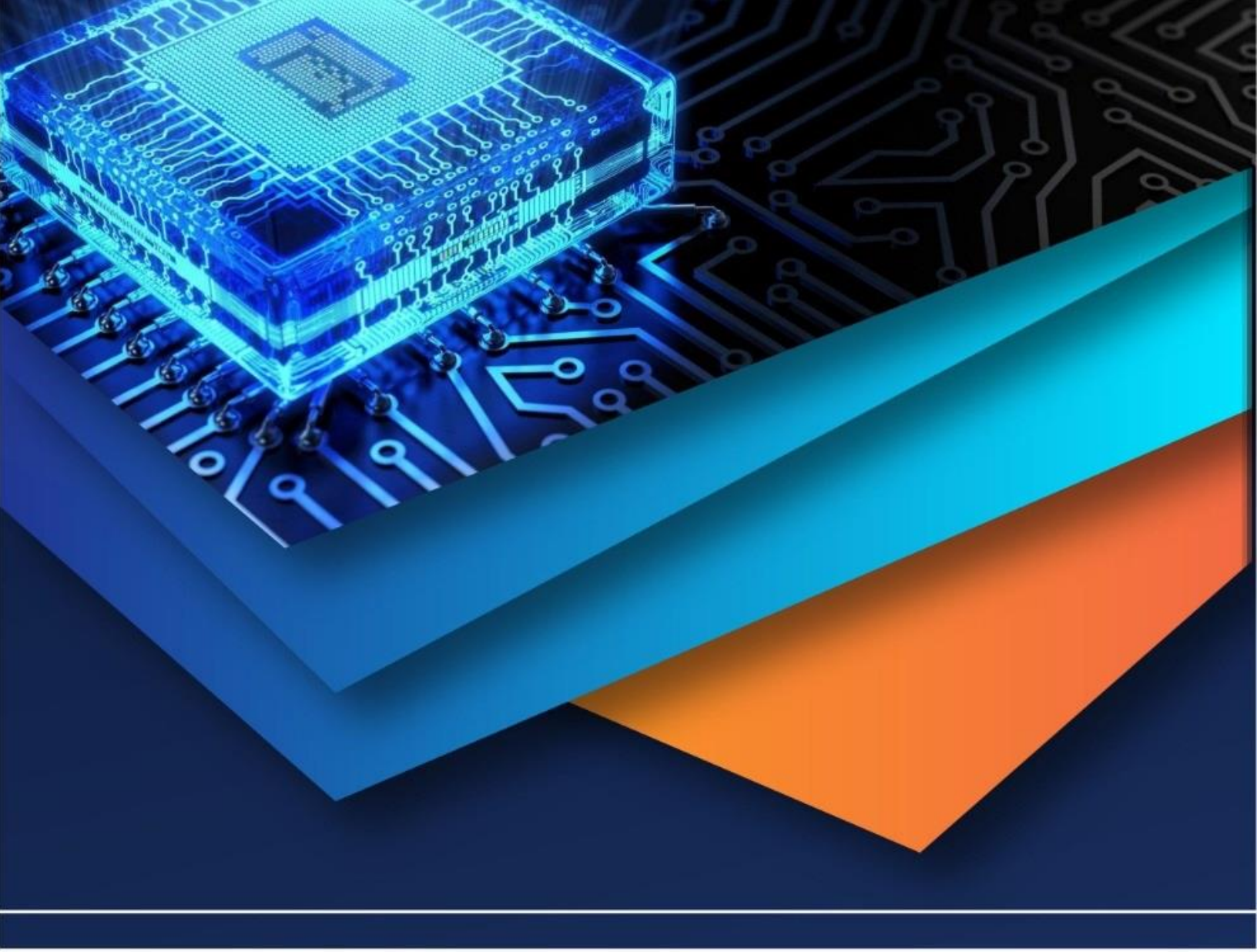
D. The smoke opacity is increasing for increase in power and these also have characteristic like exhaust gas temperature for increase in load. so the increase in smoke opacity and exhaust gas temperature are not able to avoid for some extent.

IV. CONCLUSION

Fig 7 shows the specific fuel consumption is increased for increase in brake power. Due to which the average compression ratio is selected to limit the specific fuel consumption. The optimum value of power, thermal efficiency has to be selected and their respective compression ratio has to be finalized.

REFERENCES

[1] Studying the effect of compression ratio on an engine fueledwith waste oil produced biodiesel/diesel fuel.Mohammed EL_Kassaby*, Medhat A. Nemit_allah
[2] Determination of Optimum Compression Ratio:A Tribological AspectL. Yüksek a, O. Özener a, H. Kaleli a
[3] Effects of Compression Ratio and EGR on Performance,Combustion and Emissions of Di Injection Diesel EngineN. Ravi Kumar*, Y. M. C. Sekhar, and S. Adinarayana
[4] Influence of compression ratio on the performance characteristics of a sparkignition engineAina T., Folayan C. O. and Pam G. Y.
[5] Optimization of Compression Ratio of Diesel Fuelled Variable Compression Ratio Engine Y. B. Mathur1, M. P. Poonia2, A. S. Jethoo3, R. Singh4
[6] Optimising the compression ratio of diesel fuelled C.I engine GVNSR RatnakaraRao[1], V. RamachandraRaju[2] and M. MuralidharaRao[3]



10.22214/IJRASET

45.98

IMPACT FACTOR: 7.129

IMPACT FACTOR: 7.429

INTERNATIONAL JOURNAL FOR RESEARCH

IN APPLIED SCIENCE & ENGINEERING TECHNOLOGY