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IMPLEMENTATION OF TURBOCHARGER IN TWO WHEELER

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ABSTRACT

The main purpose of this systeme is to use the wastage exhaust gas to rotate the turbine . This turbine rotates the compressor & this compressor compress atmospheric air at high pressure & then it given to the engine cylinder through inlet manifold & use improve the thermal efficiency of the engine& also carnot efficiency of the engine.

INTRODUCTION

This set up is use for the improve the efficiency of the engine .The unit of compressor & turbine is known as the turbocharger. The setup is consist of the turbocharger engine nozzle with diameter 5 mm & connected to the exhaust port & other end is connected to the turbine this high velocity air use to run turbine as turbine run the compressor coupled with turbine is rotate & then high pressure air is obtain this high pressure air is provide to the engine . The engine is fabricated on stand perfectly.

MATERIALS AND METHODS

Fabrication Processs & Materials

In this model,turbocharger is implementing with two wheeler engine & experimental inspection were carried out. The stand is fabricate as per requirement which can accomondate vibration of the engine & hold it properly, material used make a stand is mild steel & joints in them are fused with metal arc welding. The engine is fitted to the stand with the help of temporary fasteners .The turbocharger is fitted to the exhaust port of the engine with the help of nozzle the nozzle is of 5to 6 mm diameter nozzle convert the pressure energy into kinetic energy resulting increases the speed of turbine . The flange is made such way that it is connected with exhaust of the engine &inlet of turbine , turbine runs the compressor & this compressor output is connected to the carburetor to increase the pressure of the air fuel mixture & then inject it to the cylinder which results in increasing the volumetric efficiency of the engine.

WORKING

Turbocharging of two wheeler pertrol engine is affect on the fuel consumption by reducing it &consequently it reduces the emission of harmful gases to the environment such as (co_2).

In most of the engines air is taken in engine cylinder by means of the suction stroke when the piston at bottom dead centre but in this system the air is admitted into the cylinder by forcing it. The exhaust gases which are spread out after a compression stroke this are utilize to run a turbine by reducing the area of nozzle which result in increased the velocity of the exhaust gaseous with help of this high velocity gases the turbine is run at high speed , the turbine is coupled with the compressor which rotate with turbine blades resulting the air intake from atmosphere at atmospheric pressure & convert this low pressure into high pressure air . This high pressure is provide to intake manifold of the engine cylinder. mass of the air admitted is greater, this result to entering greater mass of air into the cylinder during each intake stroke, due to this feedding back the exhaust gas energy into cylinder increase the mass of air its becomes easier to ensure that all fuel is burned before being vented at the start of exhaust stroke.The increased temperature from the higher pressure gives higher carnot efficiency. The amount of air actually inhaled., compared to the theoretical amount if the engine could maintain atmospheric pressure,is called volumetric efficiency & this volumetric efficiency is increased by increasing the density of the intake air .

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Fig 1 : setup of two wheeler engine with turbocharger

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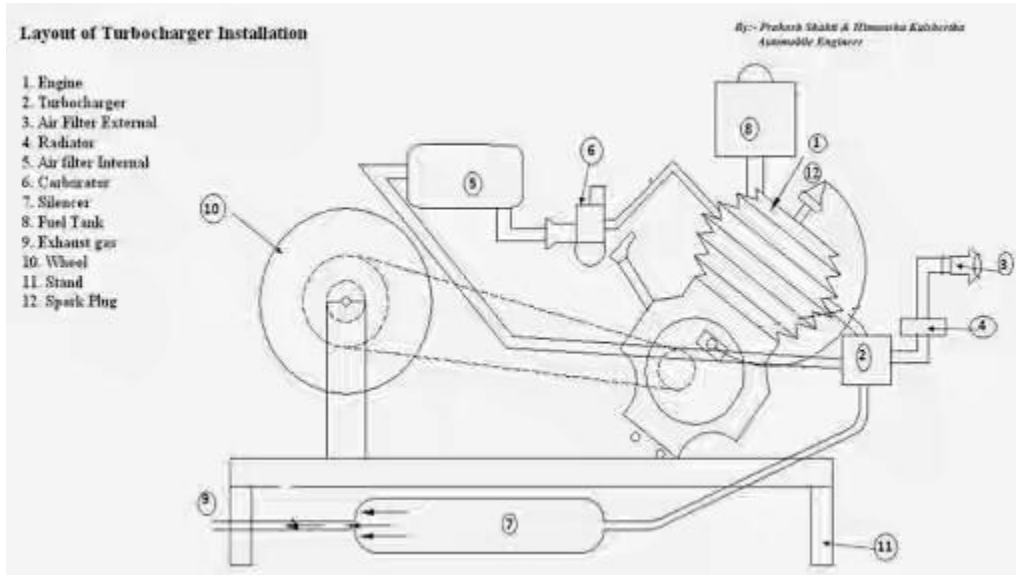**International Journal OF Engineering Sciences & Management Research**

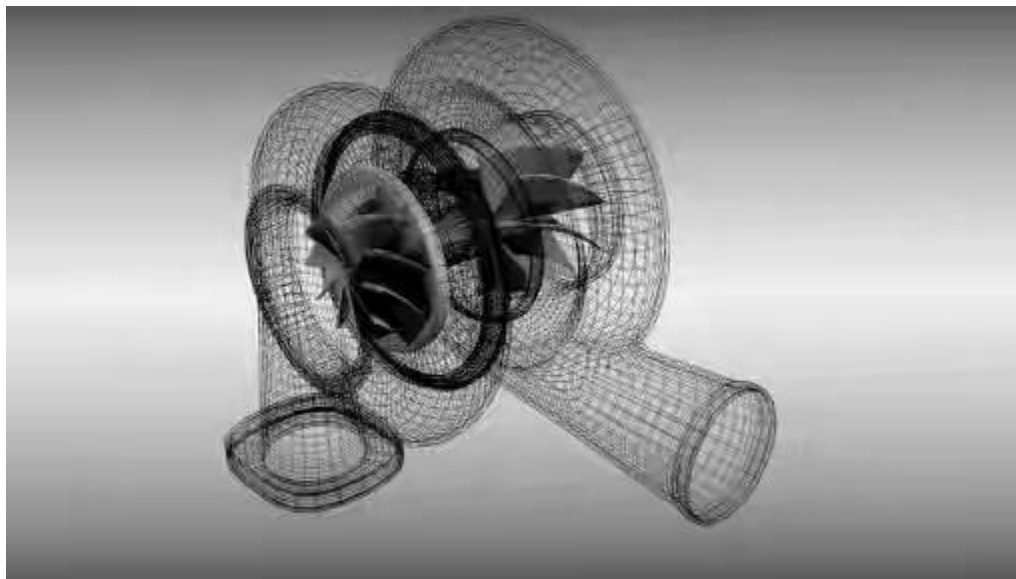*Fig 1 : setup of two wheeler engine with turbocharger*

Fig 1 : Turbocharger layout

RESULTS AND DISCUSSION

This is the one of the most effective method of achieving higher efficiency method in the two wheeler engine. There is a scope for this system that can be expected soon in the market for commercial two wheelers. When compare to present day scenario, this method is economical as it uses the kinetic energy of the waste gases. Provision of vanes on the periphery of turbine & by means of controlling it further improves the boost pressure thereby increases volumetric efficiency. Proper design of casing for two wheelers can be done based on the parameters of exhaust gas & by employing suitable manufacturing process

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Table.Performance test on 4-stroke petrol engine with turbocharger.

Sr.no	Load in (W)kg	Speed(n) rpm	Tine for 10cc fuel consumption	TFC Kg/hr	BP in KW	FP in KW	IP in KW	SFC=(TFC/BP)in Kg/KW-hr	Mech Efficiency	Overall Efficiency	Therm Efficiency
1	2	2967	33.65	0.83	0.83	0.12	0.96	1.02	86.2	8.7	9.9
2	4	2943	34,02	0.81	1.67	0.25	1.90	0.49	86.3	17.63	20,1
3	6	2876	34.75	0.8	2.43	0.36	2.8	0.33	87	26.32	30.3
4	8	2832	35.2	0.79	3.22	0.48	3.7	0.24	87	35.08	40.08

FORMULAE

Mechanical Efficiency=   BP/IP

SFC=TFC/BP

Indicated power=PLAN/2

Brake power= $(W-S)R/2\pi N60$

Friction power=IP-BP

CONCLUSION

More power compared to the same size naturally aspirated engine. Better thermal efficiency over natural aspirated engine& supercharged engine, because the engine exhaust is being used to do useful work which will be wasted.

This turbocharger can be attached to the commercial two wheeler after degning the same as per the capacity of exhaust gas flow through the nozzle.

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