IMPLEMENTION OF TURBOCHARGER AND INT ERCOOLER TO THE TWO WHEELER ENGINE

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Abstract : The turbo charging of petrol engine is no longer primarily seen from the performance perspective, but is rather viewed as a means of reducing fuel consumption and consequently environmental pollution on account of lower carbon dioxide emissions. A turbocharger, often called a turbo, it is a small radial fan pump driven by the energy of the exhaust flow of an engine. Turbo charging simply is a method of increasing the output of the engine without increasing its size. A naturally aspirated automobile engine uses only the downward stroke of a piston to create an area of low pressure in order to draw air in to the cylinder through the intake valves. Because the pressure in the atmosphere is no more than 1 bar, there ultimately will be limit to the pressure difference across intake valves and thus the amount of air flow entering the combustion chamber. This ability to fill the cylinder with air is its volumetric efficiency. Because the turbocharger increases the pressure at the point where air is entering the cylinder, a greater mass of air (oxygen) will be forced in as the inlet manifold pressure increases. It means the turbocharger increases the volumetric efficiency of the engine.

Keywords – Turbo intercooler, Forced charged, Turbo, Forced induction, Future Technology.

a) INTRODUCTION

In the present scenario, the vehicle fuel prices are going higher and the rate of fuel consumption by the vehicle is also higher. At the presen t days many automobile companies are trying to reduce the fuel consumption rate. There is a need to develop an engine which will reduce t he fuel consumption without compromising with the performance. More efficient engine can be fitted only for the new vehicles manufactu red by the company. In order to reduce the fuel consumption of the existing vehicles, a new method to improve the fuel consumption has to be implemented. One of the methods to fulfill this criterion is to turbocharger & intercool the engine. So we are fitting the turbocharger an d intercooler to the HORO HONDA HUNK PETROL ENGINE. The power output of an engine depends upon the amount of air inducted per unit time, the degree of utilization of this air and the thermal efficiency of the engine. The amount of air inducted per unit time can be i ncreased by increasing the engine speed or by increasing the density of the air at intake.

I. description of component

Turbocharger

A turbocharger is main component of our project.

A turbocharger or turbo is an air compressor used for forced-induction of an internal combustion engine. A turbo charger is basically an ex haust gas driven air compressor and can be best understood if it is divided into its two basic parts, the exhaust gas driven turbine and its hou sing, and the air compressor and its housing. The exhaust gas driven turbine is coupled with a common shaft to the compressor.

Fig.1: Turbocharger

Intercooler

An intercooler is any mechanical device used to cool a fluid, including liquids or gases, between stages of a multi-stage compression proces s, typically a heat exchanger that removes waste heat in a gas compressor. They are used in many ways, including air compressors, air cond itioners, refrigeration, and gas turbines, and automotive engines. Here they are widely known as an air-to-air or air-to-liquid cooler for force d induction (turbocharged or supercharged) internal combustion engines to improve their volumetric efficiency, which they do by increasin g intake air density through nearly constant cooling.

Fig.2: Intercooler

Fig. 3: EasyVR Shield 3.0

II. WORKING PRINCIPLE

In turbocharged engines, the combustion air is already pre-compressed before being supplied to the engine. The engine aspirates the sa me volume of air, but due to the higher pressure, more air mass is supplied into the combustion chamber. Consequently more fuel can be bu rnt, so that the engine power output increases related to the same speed and swept volume.

A turbocharger or turbo is an air compressor used for forced-induction of an internal combustion engine. Like a supercharger, the purp ose of a turbocharger is to increase the mass of air entering the engine to create more power. However, a turbocharger differs in that the co mpressor is powered by a turbine driven by the engine's own exhaust gases. A turbo charger is basically an exhaust gas driven air compress or and can be best understood if it is divided into its two basic parts, the exhaust gas driven turbine and its housing, and the air compressor a nd its housing. The exhaust gas driven turbine is coupled with a common shaft to the compressor. The compressor rotating at very high spe ed sucks the air compresses it and is sent to the intake of the engine. As more mass of air is inducted, more fuel can be burnt and thus produ cing more power.

The internal combustion engine is an air consuming machine. This is because the fuel that is burned requires air with which it can mix to complete the combustion cycle. Once the air/fuel ratio reaches a certain point, the addition of more fuel will not produce more power , but only black smoke or unburned fuel into the atmosphere. The denser the smoke, the more the engine is being over fueled. Therefore inc reasing the fuel delivery beyond the air/fuel ratio limit results in excessive fuel consumption, pollution, high exhaust temperature (diesel) or low exhaust temperature (gasoline), and shortened engine life.

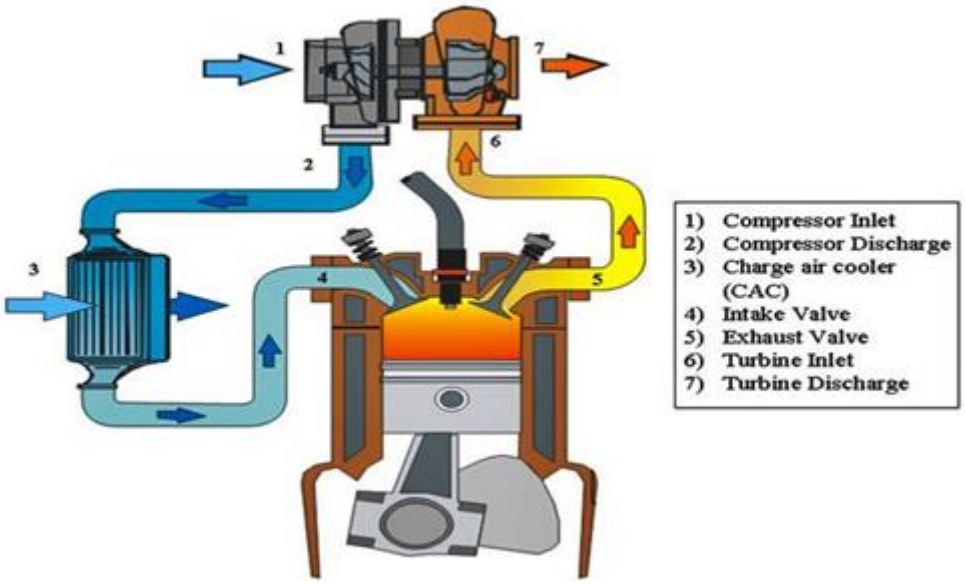

Fig.4: Block diagram

III. FUTURE STUDY

To fit the turbocharger to the Honda Unicorn Two Wheeler Engine, several modifications were done. These include reducing the carbu retor adjustment, fitting modified air filter. Every modification is done in the view of getting better results. Instead of modifying, an attempt can be done with minimum modifications to get the better results. The analysis is carried out only with petrol. The same analysis can be car ried out by using different fuels.

The Brake Power is also calculated by using instrument called Dynamometer. Brake Power is calculated by using formula.

B.P = (W x N) / C in KW

Where, W =Load in Kg

N = Speed of the engine in RPM

C= Dynamometer constant

Volumetric Efficiency of the engine is calculated by using Dynamometer. It is calculated by using formula.

ηv = Actual Volume / Swept Volume = [(Va / Vs) x 100]

Va = cd x Ao x[√(2g Ha)] x 60 in m3

Where, cd = Coefficient of discharge

Ao = Area of orifice = πdo2 /4 in m2

Ha = (∂w / ∂a) x Hw in m

Where, Hw = Manometer Reading in m.

Vs = {(πD2LN) / (4x2)} m3

Where, D = Bore Diameter in m

L = Stroke Length in m

N = Speed of the engine in RPM

IV. CONCLUSION

We have designed and fabricated a prototype of the Turbocharger and intercooler was implemented in Two wheeler, in which the efficienc y of the Engine can be increased. Thus we have a developed a method to increase the efficiency of the petrol engine and at the same time to control the emissions from the engine. This type of engine will be more efficient than existing engines.

This work is an attempt to reduce our dependency on foreign oil and reduce the tailpipe emission from the automobiles and this wa s an attempt to design and implement this new technology that will drive us into the future. Use of turbocharger will reduce smog forming p ollutants over the current national average.

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