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# FABRICATION AND IMPLIMENTATION OF TUEBOCHARGER ON TWO STROKE VEHICLE

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## ABSTRACT

In present situation everybody in this world needs to ride a high powered, high fuel efficient and less emission two wheelers. In order to meet the requirements of the people an attempt have been made this in this project to increase the power by using the exhaust gas of the engine by passing this gas on to turbine compressor arrangement. This compressor compresses the fresh air and is sent to the carburetor. Now a days the demand of the fuel is increased because of turbocharger is important to increase the performance and the fuel efficiency is increased by using turbocharger.

**KEYWORD:** Two stroke engine, Turbocharger, fuel efficiency

## INTRODUCTION

In two wheeler vehicles there are two systems to completes the power strokes.viz. two stroke and four stroke engine. in two stroke engine due to the cycles limitations fuel will not properly burn. by considering this drawback we decided to make a project which will help to increase the average or performance of engine in two stroke engine. In stroke engine the air fuel ratio is 14:1 or 16:1 but in actual practice the ratio is less because of insufficient air fuel ratio so we decided to get that air Fuel ratio by adding a new concept of turbo charger to the vehicle.

BMW was the first to use turbo-charging in a production passenger car when they launched the 2002 in 1973.turbocharging technology is today considered as a promising way for internal combustion engine energy saving and CO2 reduction. The additional device in the project is intercooler is used.

## TURBOCHARGER

The meaning of turbo charger is to give pressurized air to the engine without mounting any component to run of engine power. The turbo charger means a fan used

in unit. It direct means a air fan which rotates on the power of wind this powered wind is provided is given to us by the exhaust manifold is used to remove the burnt gas in the atmosphere the gas coming from the engine is so fast & it contains two types of energies. They are

1.Pressure energy.
2.Heat energy.

Due to the pressure & heat energy the air in the manifold gets preheated or it is very hot vapor this air contains lot of power. The power is of no use the power is just left in silencer the power wasted by the exhaust gas in the form of pressure is about approx. 30% .the efficiency of the pressure energy can be utilized. The energy means to find a component in the silencer or the manifold. It is done in mostly for four wheeler vehicles. It is a system to give pressurized air to carburetor. The carburetor adjusts the regulator valve according to the air need & the use of petrol (fuel) will be decreased. Which will increase the average by minimizing the fuel to be supplied by increasing the air fuel ratio.

## WHAT TURBOCHARGER DOES

What the turbo-charged was does is that it simply increases the volumetric efficiency of the engine. To give you an example: a 1,500 cc engine that produced, say, 60 bhp when it was normally aspirated, benefited at times with a 10- to 20-per cent power boost depending on the kind of turbo-charger used. Normally, the manufacturer would have had to resort to a bigger displacement in the engine, or design and develop an all-new engine to get more power from the same unit. In most piston engines, intake gases are "pulled" into the engine by the downward stroke of the piston (which creates a low-pressure area), similar to drawing liquid using a syringe. The amount of air which is actually inhaled, compared with the theoretical amount if the engine could maintain atmospheric pressure, is called volumetric efficiency. The objective of a turbocharger is to improve an engine's volumetric efficiency by increasing density of the intake gas (usually air). The turbocharger's compressor draws in ambient air and compresses it before it enters into the intake manifold at increased pressure. This results in a greater mass of air entering the cylinders on each intake stroke. The power needed to spin the centrifugal compressor is derived from the kinetic energy of the engine's exhaust gases. A turbocharger may also be used to increase fuel efficiency without increasing power. This is achieved by recovering waste energy in the exhaust and feeding it back into the engine intake. By using this otherwise wasted energy to increase the mass of air, it becomes easier to ensure that all fuel is burned before being vented at the start of the exhaust stage. The increased temperature from the higher pressure gives a higher Carnot efficiency. The control of turbochargers is very complex and has changed dramatically over the 100-plus years of its use. Modern turbochargers can use wastegates, blow-off valves and variable geometry, as discussed in later sections. The reduced density of intake air is often compounded by the loss of atmospheric density seen with elevated altitudes. Thus, a natural use of the turbocharger is with aircraft engines. As an aircraft climbs to higher altitudes, the

pressure of the surrounding air quickly falls off. At 5,486 metres (17,999 ft), the air is at half the pressure of sea level, which means that the engine will produce less than half-power at this altitude.

## COMPONENT AND DESCRIPTION

### TURBINE WHEEL:

The turbine wheel is made from mild steel plate. the three blades are used in the turbine wheel according to the design.

### COMPRESSOR WHEEL:

The compressor wheel is also made up of mild steel. The compressor blade is of l-shaped and three blades are used in the compressor

### B EARING:

Bearing are intended to direct the motion of shaft and forces acting on them.the motion of shaft and axles and forces acting on them .bearing is an machine element which support another moving machine element. It permits a relative motion between the contact surfaces of the members, while carrying the load. The bearing is used is the roller bearing.

### EXPERIMENTAL SETUP:

Today, the turbo charging of petrol engines 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 (CO2)emissions. Currently, the primary reason of using turbochargers is the reduced consumption and emission of harmful gases. A turbocharger, often called a turbo, is a small radial fan pump driven by the energy of the exhaust flow of an engine. A turbocharger consists of a turbine and a compressor on a shared axle. The turbine inlet receives exhaust gases from the engine causing the turbine wheel to rotate. This Rotation drives the compressor, compressing ambient air and delivering it to the air intake manifold of the engine at higher pressure, resulting in agreater mass of air entering each cylinder. In some instances, compressed air is routed through an intercooler before introduction to the intake manifold. Turbo-charging, simply, is a method of increasing the output of the engine without increasing its size. The basic principle was simple and was already being used in big diesel engines. European carmakers installed small turbines turned by the exhaust gases of the same engine. This turbine compressed the air that went on to the combustion chamber, thus ensuring a bigger explosion and an incremental boost in power. The fuel-injection system, on its part, made sure that only a definite quantity of fuel went into the combustion chamber. The objective of a turbocharger is the same as a supercharger; to improve upon the size to-output efficiency of an engine by solving one of its

cardinal limitations. A naturally aspirated a downward stroke of a piston to create an area of low pressure in order to draw air into the cylinder through the intake valves. Because the pressure in the atmosphere is no more than 1 bar (approximately 14.7 psi), there ultimately will be a limit to the pressure difference across the intake valves and thus the amount of airflow 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 manifold. It is done in mostly for four wheeler vehicles. It is a system to give pressurized air to carburetor. The carburetor adjusts the regulator valve according to the air need & the use of petrol (fuel) will be decreased. Which will increase the average by minimizing the fuel to be supplied by increasing the air fuel ratio.

**ENGINE SPECIFICATION:**

| | |
|---|---|
| fuel used | : Petrol |
| Cooling system | : Air cooled |
| Number of stroke | : Two stroke |
| Arrangement | : horizontal |
| Number of cylinder | : Single |
| Cubic capacity | : 50cc |


**Fig: Fabricated Turbocharger With Engine Arrangement**

## TRIAL & TESTING

**Table no. 1**

| Sr. no. | Fuel quantity | Trial no. | Without turbocharger | With turbocharger | Increase in average | result |
|---|---|---|---|---|---|---|
| 1. | 50 ml | 1 | 2.50 km | 2.85 km | 0.35km | 0.35 km |
| | | 2 | 2.52 km | 2.90 km | 0.38km | |
| | | 3 | 2.49 km | 2.82 km | 0.33km | |
| 2. | 100ml | 1 | 4.80 km | 5.48 km | 0.68 km | 0.71 km |
| | | 2 | 4.90 km | 5.62 km | 0.72 km | |
| | | 3 | 5.00 km | 5.74 km | 0.74 km | |
| 3. | 500ml | 1 | 25 km | 28.50 km | 3.50 km | 3.50 km |

The trial & testing shows the average of vehicle increased by adding turbocharger to the vehicle about 6 km to 7 km per liter of fuel.

## RESULT

**TABLE NO.2**

| sr. no. | fuel quantity | Increase in average |
|---|---|---|
| 1. | 50 ml | 0.35 km |
| 2. | 100 ml | 0.71 km |
| 3. | 500 ml | 3.50 km |

Average increase about 6 to 8 km per1 liter.

## ADVANTAGE

1. By adding turbo charger to the vehicle the average of the vehicle can be increased to about approximately 6 km to 8 km in this project.

2. We may conclude that the ozone depletion may be decreased due to the proper utilization of the fuel.

3. The fuel burns up to its optimum level hence decreasing the level of unburnt gases which causes the depletion of ozone layer.

4. Efficiency of the vehicle is improved.

5. Small modification is done in the vehicle.

6. Fuel consumption is less when compared to ordinary vehicle.

7. Less pollution.

8. Emissions are controlled in the Engine.

## DISADVANTAGES

• The SI engine has a few weaknesses that have not been significant problems in the past, but may become problems in the future.

• The engine is constantly fighting to draw air past the throttle, which expends energy.

• Limited compression ratio lowers efficiency - Because the fuel is already mixed with the air during compression, it will auto-ignite (undesirable in a gasoline engine) if the Compression ratio is too high. The compression ratio of the engine is limited by The octane rating of the engine.

## CONCLUSION

We have designed and fabricated a prototype of the Turbocharger was implemented in Two-wheeler, in which the efficiency of the Engine can be increased. Thus we have developed a method to increase the efficiency of the engine and at the same time to control the Emissions from the engine. The experimental setup of block diagram is shows the arrangement of turbocharger in two-wheeler. This type of engine will be more efficient than existing engines.

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