

# USE OF TURBOCHARGER ON TWO STROKE VEHICLE

Shinde A.H.<sup>1</sup>, Mr. Deorukhkar Sairaj R.<sup>2</sup>, Mr., Mr. Salunkhe M.R.<sup>3</sup>, Mr. Khair S.S.<sup>4</sup>

*1(Ast. Prof. Auto. Department, Sahyadri poly Sawarde, India),  
2(M.E. Student Finolex acadami of manegment & Technology, India),  
3(HOD of Auto. Sahyadri poly Sawarde, India),  
4(Ast. Prof. Auto Department, Sahyadri poly Sawarde, India),*

## 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:** Turbocharger, fuel efficiency, two stroke engine

## I. INTRODUCTION

In two wheeler vehicles there are two systems to complete the power strokes viz. two stroke and four stroke engines. In two stroke engine due to the cycle's 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 CO<sub>2</sub> reduction. The additional device in the project is intercooler is used.

## II. 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?

### III.WHAT TURBOCHARGER DOES

What the turbo-charged 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.

### IV.COMPONENT AND DESCRIPTION

#### 1) TURBINE WHEEL:

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

#### 2) COMPRESSOR WHEEL:

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

#### 3) BEARING:

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 a 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.

### V.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 (CO<sub>2</sub>) 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 a greater 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.

#### ENGINE SPECIFICATION:

Fuel used: Petrol

Cooling system: Air cooled

Number of stroke: Two stroke

Arrangement:horizontal  
 Number of cylinder:Single  
 Cubic capacity:50cc



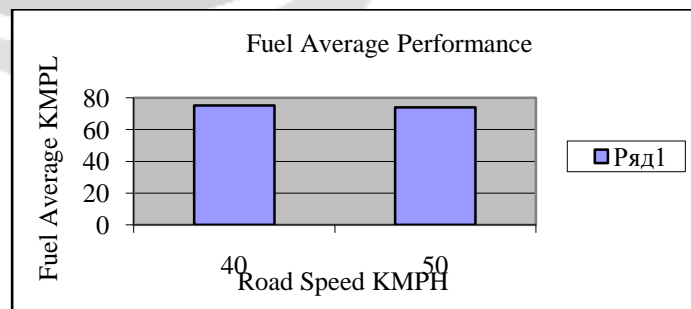
**Fig: Fabricated Turbocharger with Engine Arrangement**  
**METHODOLOGY:**

Although vehicle exhaust emissions of air pollutants are generally decreasing, it has not been possible to reduce air quality problems in cities in the past 10 years. In particular, the concentrations of particulates and ozone are too high, causing severe health effects. Besides improving the local air pollution situation, the reduction in global warming due to greenhouse gas emissions is of great importance for the mobility sector, in view of increasing worldwide mobility and demand for transportation. Finally, numerous established researchers are predicting bottlenecks in energy supply for the next few decades, pointing to the importance of clean biofuels. The requirement for future motor vehicles is therefore very clear: emissions of toxic pollutants such as particulates and ozone precursors have to decrease to near zero, greenhouse gas emissions have to be reduced far more than in recent years and the introduction of biofuels has to be enabled on a large scale. Exhaust emission measurements on motor vehicles are often performed using the official European driving cycle. This is a practical test cycle for type approval purposes, but allows limited comparability with real-world driving. Few exhaust gas and particulate emission data are available from modern motor vehicles representing a real-world driving pattern.

**VI.RESULT**

**1)Fuel Average Test(On Road):**

Road Speed KMPH	Dist. Covered 'm'	Fuel Consumed CC	Average KMPL
40	1681	25	67.24
50	1675	25	67



**1) Emission Result:**

From this experiment we study the emission of vehicle (two wheeler) will be decreased to a great extent. See the readings which give from "AUTO EXHAUST MULTIGAS ANALYSIS MODEL NPM-MGA" for petrol engine vehicle. Emission table given follows.

**Table 1.**EmissionwithoutTurbocharger:

Gases	Content
Hydrocarbon	1145ppm
Carbon monoxide	1.430 %
Carbon dioxide	1.70 %
Oxygen	14.95 %

**Table 2.**EmissionwithTurbocharger:

Gases	Content
Hydrocarbon	70 ppm
Carbon monoxide	0.032 %
Carbon dioxide	2.80 %
Oxygen	15.92 %

**VII.ADVANTAGE:**

1. By adding turbo charger to the vehicle the average of the vehicle can be increased to about approximate 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 unborn 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.

**VIII.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.

**IX.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

This work is an attempt to reduce our dependency on foreign oil and reduce the tailpipe emission from automobiles and this was an attempt to design and implement this new technology that will drive us into the future. Use of production turbo charger will reduce smog forming pollutants over the current national average. The first hybrid on the market will cut emissions of global-warming pollutants by a third to a half and later modes may cut emissions by even more.

**X.REFERENCES:**

1. Davis E and Perkins-Davis D (2001), *Supercharging, Turbocharging and Nitrous Oxide Performance Handbook*, St. Paul: MBI,
2. Ebisu M *et al.* (2004), "Mitsubishi Turbocharger for Lower Pollution Cars", *Technical Review*, [On-line].
3. Frey H C, Roupail N M, Unal A and Colyar J D (2001), "Measurement of on- road tailpipe CO, NO and hydrocarbon emissions using a portable instrument", *Proceedings of the Annual Meeting of the Air and Waste Management Association*, pp. 24-28.

4. Gamas E D, Diaz L, Rodriguez R, Lopez- Salinas E and Schifter I (1999), "Exhaust emissions from gasoline and LPG-powered vehicles operating at the altitude of Mexico City", *J. Air and Waste Management Assoc.*, Vol. 49, pp. 1179-1189.
6. GM/LBST (2002), "Well-to-Wheel Analysis of Energy Use and Greenhouse Gas Emissions of Advanced Fuel/Vehicle Systems: A European Study".
7. Graskow B R, Kittelson D B, Abdul-Khalek I S, Ahmadi M R and Morris J E (1998), "Characterization of exhausts particulate emissions from a spark ignition engine", *Society of Automotive Engineers*, paper No 980528.
8. [www.tpup.com](http://www.tpup.com)
9. [www.visionengineer.com](http://www.visionengineer.com)
10. *Ignition (HCCI) Using Isooctane, Ethanol, and Natural Gas . A Comparison With Spark*
11. *Ignition Operation*,.SAE Paper 972874.

