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TURBO CHARGER FOR TWOWHEELER

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Abstract: Turbocharger is a device that increases the overall performance of engine by reusing the exhaust heat to drive the turbine. A two wheeler engine with turbocharger increases the power of engine and with reusing of exhaust gas which results of less fuel consumption. The immediate objective of this report project is to develop and upgrade two wheeler for commercial purpose as well as racing purpose. The emphasis today is to provide feasible engineering solution to manufacturing economics and "greener" road vehicle. It is because of this reason that turbocharger are now becoming more popular in automobile applications. Effect, design and installation of turbo charger in SI engine are available. Turbo charger in two wheelers is used to increase the efficiency of engine. Supercharger works on engine power while turbo charger works on exhaust gases.

Turbochargers are used throughout the automotive industry as they can enhance the output of an internal combustion (IC) engine without the need to increase its cylinder capacity. The emphasis today is to provide a feasible engineering solution to manufacturing economics and "greener" road vehicles. It is because of these reasons that turbochargers are now becoming more and more popular in automobile applications. Small modification is done on vehicle to improve efficiency and also control the exhaust gas emission level. The aim of this project is to increase to volumetric efficiency and also control the emission level of "TWO WHEELERS".

We have designed and fabricated a prototype of the Turbocharger was implemented in Two- wheeler, In which the efficiency of the Engine can beincreased. KEYWORDS: Gasoline Engine, Exhaust Manifold, Intake Manifold, Turbocharger, Nozzle, Flanges, K & N Air Filter, Carburetor, Turbine, Compressor. Volumetric Efficiency of a S.I. Engine is increased by providing combustion chamber with maximum amount of air. This is achieved by installation of Turbocharger or Supercharger. Supercharger uses engine power to run itself whereas a Turbocharger doesn't utilize any engine power it runs by Exhaust gases. In present work we'll be increasing the volumetric efficiency of a 125cc single cylinder bike by installation of turbocharger. To start with, a study on the effect of turbocharger on a single cylinder is made. The design and installation of turbocharger in a single cylinder isavailable in this literature.

Keywords: Accident avoidance, Pneumatic punching machine, Safety system, NodeMCU, Pneumatic cylinder, Solenoid valve

I. INTRODUCTION

A turbocharger or turbo is a forced induction device used to allow more power to be produced for an engine of a given size.

The key difference between a turbocharger and a conventional

Supercharger is that the latter is mechanically driven from the engine often from a belt connected to the crankshaft, whereas a turbocharger is driven by the engine's exhaust gas turbine.

A turbocharged engine can be more powerful and efficient than a naturally aspirated engine because the turbine forces more intake air, proportionately more fuel, into the combustion chamber than if atmospheric pressure alone is used.

Turbo are commonly used on truck, car, train and construction equipment engines. Turbo are popularly used with Otto cycle and diesel cycle internal combustion engines.

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1.1 TURBO CHARGER

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 car makers 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.

1.2 MOTORCYCLE TURBOCHARGER

Motorcycle Turbo Charger using turbochargers to gain performance without a large gain in weight was very appealing to the Japanese factories in the 1980s.The first example of a turbocharged bike is the 1978 Kawasaki Z1R TC. It used a Ray jay ATP turbo kit to build 0.35 bar (5 lb) of boost, bringing power up from 90 hp (67 kW) to 105 hp (78 kW). However, it was only marginally faster than the standard model. In 1982, Honda released the CX500T featuring a carefully developed turbo (as opposed to the Z1-R's bolt-on approach). It has a rotation speed of 200,000 rpm. The development of the CX500T was riddled with problems; due to being a V-twin engine the intake periods in the engine rotation are staggered leading to periods of high intake and long periods of no intake at all.

II. LITERATURE REVIEW

FABRICATION AND PERFORMANCE TEST OF TURBOCHARGER FOR TWO WHEELER

BY: B Jnana Deepak, N Krishna Priya, B Revanth, K S Jaya Prakash, and B Hemanth Kumar 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. The authors have mainly aimed to increase the air: fuel ratio therefore all the requirements were fulfilled by this process.

Turbochargers are used throughout the automotive industry as they can enhance the output of an internal combustion (IC) engine without the need to increase its cylinder capacity. The emphasis today is to provide a feasible engineering solution to manufacturing economics and "greener" road vehicles. It is because of these reasons that turbochargers are now becoming more and more popular in automobile applications. The new turbocharger is coupled to an air-water intercooling system to Decrease the inlet air temperatures. This project analyzed the Intercooling system and tested the final design in the vehicle. The results show that the Cooling system components purchased are adequate for this system. The aim of this paper is to provide are view on the techniques used in turbo charging used in two stroke single cylinder petrol engine by this to increase the engine output and reduce the exhaust emission levels. This paper is to analyze a turbocharger system in a two stroke petrol engine. The ideal turbocharger design would be smaller than the system purchased. The paper will also create speed sheets for use in calculating the necessary parameters for another turbocharger system, or to modify the current system.

TURBOCHARGING OF IC ENGINE

BY:

MohdMuqeem and Dr. Manoj Kumar

Turbo chargers are used throughout the automotive industry as they can enhance the output of an internal combustion (IC) engine without the need to increase its cylinder capacity. The application of such a mechanical device enables automotive manufacturers to adopt smaller displacement engines, commonly known as "engine downsizing". Historically, turbo chargers were often used to increase the potential of an already powerful IC engine. The emphasis today is to provide a feasible engineering solution to manufacturing economics and "greener" road vehicles. It is because of these reasons that turbochargers are now becoming more and more popular in automobile applications. The aim of this paper is to provide a review on the techniques used in turbo charging to increase the engine output and reduce the exhaust emission levels.

III. DESCRIPTION OF EQUAPMENTS

3.1 TURBO

Energy provided for the turbine work is converted from the enthalpy and kinetic energy of the gas. The size and shape can dictate some performance characteristics of the overall turbocharger. Often the same basic turbocharger assembly is available from the manufacturer with multiple housing choices for the turbine, and sometimes the compressor cover as well.This lets the balance between performance, response, and efficiency be tailored to the application. It uses the heat and pressure of the exhaust gas to rotate the compressor. In short it is used to give drive to the compressor with the help

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of pressure of the exhaust gas which rotates the turbine.It is driven by the turbine. It inhales the air from the atmosphere and compresses it at high pressure for the next suction stroke. The compressor increases the mass of intake air entering the combustion chamber. The compressor is made up of an impeller, a diffuser and volute housing. The operating range of a compressor is described by the "compressor map".

3.2BEARING

A bearing is a device to permit constrained relative motion between two parts, typically rotation or linear movement. Bearings may be classified broadly according to the motions they allow and according to their principle of operation. Low friction bearings are often important for efficiency, to reduce wear and to facilitate high speeds. Essentially, a bearing can reduce friction by virtue of its shape, by its material, or by introducing and containing a fluid between surfaces. By shape, gains advantage usually by using spheres or rollers. By material, exploits the nature of the bearing material used. Sliding bearings, usually called bushes bushings journal bearings sleeve bearings rifle bearings or plain bearings. rolling-element bearings such as ball bearings and roller bearings. Jewel bearings, in which the load is carried by rolling the axle slightly off-center. fluid bearings, in which the load is carried by a gas or liquid magnetic bearings, in which the load is carried by a magnetic field. Flexure bearings, in which the motion is supported by a load element which bends. Bearings vary greatly over the forces and speeds that they can support.

Forces can be radial, axial (thrust bearings) or moments perpendicular to the main axis. Bearings very typically involve some degree of relative movement between surfaces, and different types have limits as to the maximum relative surface speeds they can handle, and this can be specified as a speed in ft/s or m/s.The moving parts there is considerable overlap between capabilities, but plain bearings can generally handle the lowest speeds while rolling element bearings are faster, hydrostatic bearings faster still, followed by gas bearings and finally magnetic bearings which have no known upper speed limit.

3.3 PNEUMATIC CYLINDER:

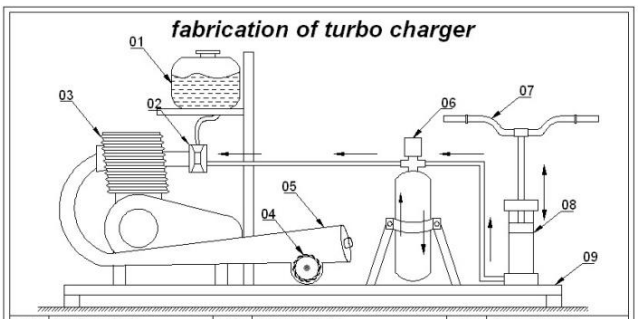
All the strange names and terms around pneumatics have evolved through about 100 years of their use in manufacturing. Double acting, four way, quick connect are all terms that were invented to describe (as best as could be) the difference between the parts. Don't let the names discourage you. They're just names. I've used quite colorful terms myself when working with pneumatics, most of which i won't use here...The first thing to remember is: Pneumatics is easy... really! It’s all the different names and parts that seem to be overwhelming. But enough about that.. on to the fun stuff.

3.4. SPRING

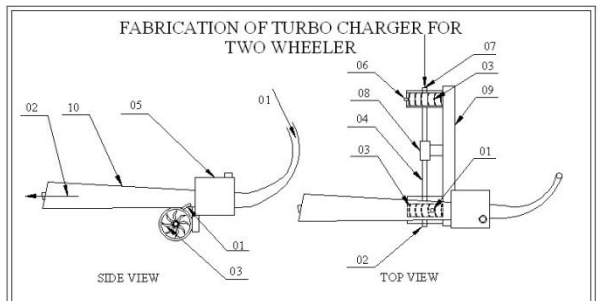
The automobile chassis is mounted on the axles not direct but through some form of springs. This is done to isolate the vehicle body from the road shocks which may be in the form of bounce, pitch, roll or sway. These tendencies give rise to an uncomfortable ride and also cause additional stress in the automobile frame and body. All the parts which perform the function of isolating the automobile from the road shocks are collectively.

A Springing device must be a compromise between flexibility and stiffness. If it is more rigid, it will not absorb road shocks efficiently and if it is more flexible it will continue to vibrate even after the bump has passed so we must have sufficient damping of the spring to prevent excessive flexing.

IV. DRAWING FOR TURBO CHARGER FOR TWOWHEELER



S.NO	PART NAME	S.NO	PART NAME	S.NO	PART NAME
01	fuel tank	04	turbo charger	07	handbar
02	carburetor	05	exhaust	08	pneumatic cylinder
03	engine	06	air accumulator	09	base



S.NO	PART NAME	S.NO	PART NAME	S.NO	PART NAME	S.NO	PART NAME
01	EXHAUST AIR IN	04	SHAFT	07	AMBIENT AIR IN	10	SILENCER
02	EXHAUST AIR OUT	05	TANK	08	BEARING		
03	TURBINE	06	COMPRESSED AIR OUT	09	SUPPORTING FRAME		

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V. WORKING PRINCIPLE

A turbocharger is a small radial fan pump driven by the energy of the exhaust gases of an engine. A turbocharger consists of a turbine and a compressor on a shared shaft.The turbine converts heat to rotational force, which is in turn used to drive the compressor. The compressor draws in ambient air and pumps it in to the intake manifold at increased pressure, resulting in a greater mass of air entering the cylinders on each intake stroke.A turbocharger is basically an air pump. Hot exhaust gases leaving the engine after combustion are routed directly to the turbine wheel side of the turbocharger to make it rotate. That turbine wheel is connected by a shaft to a compressor wheel. As the turbine wheel spins faster and faster, it causes the compressor wheel to also spin quickly. The rotation of the compressor wheel pulls in ambient air and compresses it before pumping it into the engine's chambers.

The objective of a turbocharger is the same as that of a supercharger, to improve an engine's volumetric efficiency by solving one of its cardinal limitations. A naturally aspirated automobile engine relies mostly on the downward stroke of a piston to create an area of low pressure in order to draw air into the cylinder through one or more intake valves. The pressure in the atmosphere is no more than 1 atm (approximately 14.7 psi, or 1 bar), so there ultimately will be a limit to the pressure difference across the intake valves and thus the amount of airflow entering the chamber. Since 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. The presence of additional air mass in the cylinder makes it possible to create a bigger explosion if more fuel is injected, increasing the power and torque output of the engine. A turbocharger is a small radial fan pump driven by the energy of the exhaust gases of an engine. A turbocharger consists of a turbine and a compressor on a shared shaft. The turbine converts a heat and rotational force, which is in turn used to drive the compressor. The compressor draws in ambient air and pumps it in to the intake manifold at increased pressure, resulting in a greater mass of air entering the cylinders on each intake stroke.

The objective of a turbocharger is the same as a supercharger; to improve the engine's volumetric efficiency by solving one of its cardinal limitations. 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 into the cylinder through the intake valves. Because the pressure in the atmosphere is no more than 1 atm (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. 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. The additional oxygen makes it possible to add more fuel, increasing the power and torque output of the engine. Because the pressure in the cylinder must not go too high to avoid detonation and physical damage, the intake pressure must be controlled by controlling the rotational speed of the turbocharger. The control function is performed by a waste gate, which routes some of the exhaust flow away from the exhaust turbine. This controls shaft speed and regulates air pressure in the intake manifold.

VI. MERITS AND DEMERITS

6.1 MERITS:

- Pollution can be controlled easily
- Maintenance cost is less
- Simple in construction
- Most effective and cheapest way.
- Low cost–The SI engine is the lowest cost engine because of the huge volume currently produced.
- High Thermal efficiency.
- Better Volumetric efficiency.
- High speed obtained.
- Better average obtained.
- Eco-friendly

6.2 DEMERITS:

- Cleaning the filter is must
- Turbocharger for a 100cc motorcycle is not feasible.
- Turbo failure can cause engine damage to a severe extent.
- Bike cost will increase.
- Engine weight will increase.
- If there will be improper maintenance then there will be problem in turbo such as turbo lag.

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VII. APPLICATION

- Increased engine power output (in the region of 50%increase).
- Improved fuel consumption on (improved pressure balance across the engine.
- Altitude compensation.
- Duringhalfthrottlingabout90%ofscooters and 93%ofmotorbikes were found emitting HC within the prescribed national standard of 2000PPM.
- Duringfullthrottlingabout52%ofscootersand 47%ofmotorbikeswerefoundemittingHC not within the prescribed national standard of 2000PPM.
- It was observed that the Carbon monoxide emissions from two wheel vehicles increased from two to three times at the full acceleration engine conditions.
- It was observed that the Hydrocarbon emissions from two wheel vehicles increased from two to four times at the full acceleration engine conditions.
- By the use of turbo charging in two wheelers the power can be enhanced. A properly tuned turbo engine can produce 20% + more power compared to stock but expect an increase in fuel consumption.
- More power compared to the same size naturally aspirated engine.

VIII. CONCLUSIONS

The project carried out by us made an impressing task in all industries like the manufacturing, chemical etc.., It is used to protect the atmosphere from the pollution.This project will reduce the cost involved in the concern. Project has been designed to perform the entire requirement task at the shortest time available.

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