

# A Study on Design and Fabrication of Tensionless Bike

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**Abstract**— An automobile is a wheeled motor vehicle used for transporting passengers, which also carries its own engine or motor. But normally two wheelers are used most of the people which is economical. Motorcycles are one of the most affordable forms of motorized transport in many parts of the world and, for most of the world's population; they are also the most common type of motor vehicle. There are around 200 million motorcycles (including mopeds, motor scooters and other powered two and three-wheelers) in use worldwide, or about 33 motorcycles per 1000 people. While people choose to ride motorcycles for various reasons, those reasons are increasingly practical, with riders opting for a powered two-wheeler as a cost-efficient alternative to infrequent and expensive public transport systems, or as a means of avoiding or reducing the effects of urban congestion. In places where it is permitted, lane splitting, also known as filtering, allows motorcycles to use the space between vehicles to move through stationary or slow traffic. In this motorcycle, major accidents occur due to the carelessness. Some of them forgot to take the side stand and they start driving with that side stand. This leads to an accident. Sometimes if we are going to a long drive there is a chance of air leakage in our bikes or our bike may get puncher. In that time there is no puncher shop nearby us. So we get into trouble.

**Keywords**—Automobile, compressor, speed, ignition, testing

## I INTRODUCTION

While people choose to ride motorcycles for various reasons, those reasons are increasingly practical, with riders opting for a powered two-wheeler as a cost-efficient alternative to infrequent and expensive public transport systems, or as a means of avoiding or reducing the effects of urban congestion. In places where it is permitted, lane splitting, also known as filtering, allows motorcycles to use the space between vehicles to move through stationary or slow traffic. In this motorcycle, major accidents occur due to the carelessness. Some of them forgot to take the side stand and they start driving drive there is a chance of air leakage in our bikes. In that time there is no puncher shop with that side stand. This leads to an accident. Sometimes if we are going to a long nearby us. So we get into trouble.

Many engineers found out solutions for reduce the tension of bike. But it will not so much effective than our discovery. our aim is to reduce the tension of one who is driving the vehicle. Because some of the carelessness leads to a death. So every time we always aware of that. So our mini project helps a little bit to reduce those kinds of incidents. Our objective is to inflate the tire in some emergency conditions where there is no helping hand. This

method is one of the easiest methods and also the cheapest methods.

Our project consists of two things:

1. Side Stand Indicator Modulation
2. A Compressor of Less Weight

These two things are most important for all the bikes. All the bike riders knew how important these two things are. We are doing some of the alterations in the bike to make a successful of these two.

## II SIDE STAND

The side stand is the one of the most nice founded thing of our senior engineer and attached to bike instead of the centre stand most of the times people use only side stand in their bike because it easy to use compare to centre stand.



Fig.1 side stand

### A. PROBLEM

Many of the people forget to take the side stand of their bike while taking their bike to drive from parking. Because of this the side stand remains in the same position as how it was in parking.

### B. CAUSE OF NOT TAKING THE SIDE STAND:

Due to this small forgiveness it lead to

1. Leads to accident
2. Leads to death
3. Leads to loose of their any organ of the body

### C. TILL NOW EXISTING SOLUTION:

Many of our senior engineers have thought over this problem and under gone many ideas and they implemented it and tested. But in that two things came into success. They are

- 1) In one private company (TVS Scooty Pep) bike they have introduced a system it consist of a beep sound will be heard.
- 2)



Fig: 2 parts of two wheeler which enables beep sound

- 3) In the other case in another private company (Bajaj Pulsar) bike they have introduced a system i.e. they have kept a sensor (or) indicator near the speedometer which indicates that if it blinks the side stand is put (or) being used if the light does not blinks the side stand has been taken (or) the side stand is not in use.



Fig: 3 Bajaj pulsar indicator

**D. DRAW BACKS IN TILL NOW EXISTING SOLUTION:**

The draw backs in our senior engineer solutions are that the exiting model is that both the two cases are connected to the battery of the bike. If the battery is been low (or) dead they would not work. They may work lightly in this condition but its not useful. More or less the beep sound disturbs the driver as well as the near by persons standing while taking the bike.

**E. OUR SOLUTION REGARDING THIS PROBLEM:**

Our solution is based on the principle of the key and lock present in bike i.e. when the side stand is been used the bike cannot be started until the side stand is taken. Then if we take the side stand and use the starter to start the bike then it will start this is the new method of us found apart the existing one.

**F. OUR MECHANISM IN THIS SOLUTION:**

We have added a additional circuit to the existing circuit. We have taken a wire or looped a wire from the ignition system and connect it to a plate. In the mean while the other wire is looped from earth or from ground and it is

connected to the other plate. Now these wire are been kept in the side stand switch.

Now in case of switch the knob or the pointer present in the switch is in pressed condition i.e. when the side stand is being used the bike cannot be start. When the side stand is taken the pointer comes out of the switch and the bike can start. In case of plates one plate acts as ground and the other one is in the ignition system. Now the side stands mechanism works.

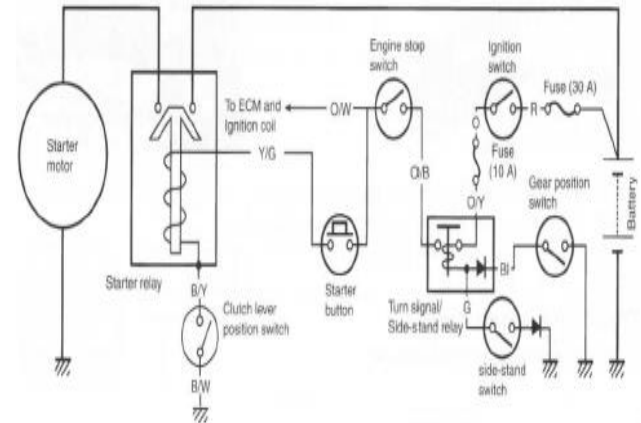


Fig: 4 circuit diagram for indicator

**III. COMPRESSOR IN BIKE**

Puncher in is commonly occurring thing bike. Nowadays most of Motorbike Company introduces the tubeless tires. It decreases the air slowly if the wheel gets punched has been occurred. Anyway this will also need air to move some distance. In the same way in the normal tube present in the tires also. But in this normal tube using tiers the air will leaking out very rapidly than compare to tubeless tiers.

**A. CAUSES OF HAPPENING PUNCHER:**

In case of tube using tyres while the bike is been driven at very high speed on the road if sudden sharp things present in the road it leads to punchers the bike and the air get leaked out fully. Because of this sudden leakage of air the bike may become uncontrolled by the driver due to this the back coming vehicles get confused and accident occurs due to it.

The main cause of the puncher occur in middle of road (or) by road side in two wheeler leads to accident and the driver of the vehicle loses his life in it

**B. TILL NOW EXISTING SOLUTION:**

The automobile company found their solution that they kept a stepney (or) a additional wheel in bike if our bike got punched we can change the other wheel kept in it . look of the bike. Other solution is the tube less tires .This is the good invention by the senior engineers a tire without a tube. In this the air is been directly stored in the tire. Most of the peoples do not like it because this reduces the

**C. NORMAL COMPRESSOR:**

After thinking of for a long time we got a good solution for this problem that is we had a question that “why can’t we set a compressor in bike “ While going for a compressor we found that in compressor there are many parts made up of cast iron which will consist of more weight due this more weight and size it will not be suitable for keeping bike. More are less the other draw back in a normal compressor is that it should have a storage tank for a storing the compressed air. So it’s also an additional weight to the bike because it is also made up of cast iron. We cannot fit it into our bike due to its weight the driver may get disturbed. After thinking a long while we got a idea to use a two stroke engine as a instant compressor that is it will intake the air and compress and send it out immediately by doing some modification we can do it.

**IV. ENGINE**

The first half of the 20th century saw a trend to increasing engine power, particularly in the American models. Design changes incorporated all known methods of raising engine capacity, including increasing the pressure in the cylinders to improve efficiency, increasing the size of the engine, and increasing the speed at which power is generated. The higher forces and pressures created by these changes created engine vibration and size problems that led to stiffer, more compact engines with V and opposed cylinder layouts replacing longer straight-line arrangements.

**A. ABOUT TWO STROKE ENGINE**

The most commonly used engine in bikes now a day is two strokes and four stroke engines. For our purpose (or) for our solution we take two stroke engines. A two-stroke engine is an internal combustion engine that completes the process cycle in one revolution of the crank shaft (an up stroke and a down stroke of the piston, compared to twice that number for a four-stroke engine). This is accomplished by using the beginning of the compression stroke and the end of the combustion stroke to perform simultaneously the intake and exhaust (or scavenging) functions. Two-stroke engines continue to be commonly used in high-power, handheld applications such as string trimmers and chainsaws. The light overall weight, and light-weight spinning parts give important operational and even safety advantages. Only a two-stroke running on a gasoline-oil mixture can power a chainsaw running in any position. These engines are still used for small, portable, or specialized machine applications such as outboard motors, high-capacity motorcycles, mopeds, underbones, scooters, tuk-tuks, snowmobiles, karts, ultralights, model airplanes (and other model vehicles) and lawnmowers. The two-stroke cycle is used in many diesel engines, most notably large industrial and marine engines, as well as some trucks and heavy machinery. After this study of the two stroke engine we came to a conclusion that we are taking a TVS 50 engine for the modification. Then we are doing some machining like milling, surface grinding etc for that TVS

50 engine to reduce the weight of the engine. We are taking only the TVS 50 engine boar, head, piston, crankcase etc of the engine parts. We have selected this two stroke engine because it’s small in size and compact for fitting.

**B. TVS 50 ENGINE SPECIFICATIONS**

Table.1 Engine specifications

Type	2 stroke single cylinder
Bore x Stroke (mm)	46 x 42
Displacement (cc)	69.9
Max. power	2.61 Kw(3.5 Bhp) @ 5000 rpm
Dimensions (LxWxH)	1750 x 700 x 930mm
Torque (Nm)	5.0 @3750 rpm

**V. ALTERATIONS IN TVS 50 ENGINE**

We are using the engine as a compressor. So in order to reduce the weight of the engine we decided to remove the fins. Because by using as a compressor there s less heat will produce. How to remove fins from the engine. By using the vertical milling machine fins can be removed easily. Fins had been removed one by one, because it is a two stroke engine. In the two stroke engine bottom side of cylinder is in large size than the top side. This is because of the transfer port present in the two stroke engine. First by using balsa cutting we are remove the fins somewhat correctly. Then by using the vertical milling machine we are removing and reducing the weight excaustly. Now the engine weight is been reduced from 6kgs to 3.5kg we are going to fit this engine in a bike bumper. So we reduce the unwanted things which are not used for the compressor purpose. In this transfer port and exhaust port is closed. Carburetor filter is used to intake the air then the spark plug opening is used to make the exhaust of the compressed air. We are also fitting a 3 inch pulley in the shaft extended out of the TVS 50 engine.

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**B. OUR MODIFIED COMPRESSOR IN BIKE**

We are using a TVS Suzuki bike to explain our project. When we removed the outer case of the engine that is on the gear side we can find a round magnetic axial present there. This magnet is connected and used in the ignition system. This magnet can be removed by a tool called puller. To fit this tool in the magnet there is some thread present inside the magnet now we are utilizing this thread for holding a shaft which consists of a 2 inch cast iron pulley. The shaft is designed in such a way that while this magnet is on or in running condition it should not remove or come out of it. So by using some designing software we designed the shaft and using some analyzing software we analyzed it correctly.

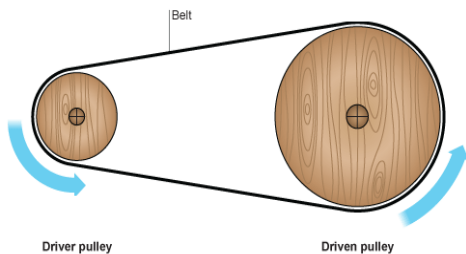


Fig.5 pulleys

This is the pattern of the pulley going to be present in our bike the driver pulley is 2 inch and the other one i.e. the driven pulley is 3inch and the belt size is A20 belt

**C. PULLER:**



Fig.6 puller

This the tool which is used to remove the ignition magnet from the engine

**D. MAGNET:**



Fig.7 magnet

This is the ignition magnet present in the engine .We have made the shaft diameter according to the thread present in the hollow space at the centre and we have cutted thread in that shaft After the analysing about the shaft we selected a weight less material of diameter (32mm) for the shaft. Now using lathe machine we are doing operations like facing,turning,thread cutting etc. Now we are cutting a step by using step cutting operation to hold a pulley on it. To tight this we are making a thread on the shaft by changing the gear pattern in the lathe and we are tightening the nut in it. On the other side of the shaft we measure the thread diameter and number of thread present in the magnet and by using thread cutting operation we cut the thread in the shaft. Other than this we put a spaner plange in the shaft to tight the shaft with the ignition magnet.

**E. OUR ENGINE Vs COMPRESSOR:**

- 1) Compressor will be more weight than our modified TVS 50 engine.
- 2) Compressor will decrease the rpm of the engine when it transmitted to the pulley. It will also require a large size pulley. If the engine rpm is 1400 means it will give only 700rpm in the compressor.
- 3) Compressor Cost is high while compare to our modified engine.
- 4) Compressor needs a storage tank for storing the compressed air but our modified engine is a instant compressor.
- 5) Our engine is in less weight compare to the compressor.

Due to these reasons only we choose an engine rather than a compressor.

**E. ADVANTAGES:**

- For the side stand we provide a manual setup.
- If the battery becomes the charge less battery sensors will not produce the beep sound properly, but our set up will not like this.
- If we are in helpless to inflate the tyre our setup will helps a lot.
- It can also be done by a person having basic knowledge of automobiles.
- Cost is less.
- Less maintenance required.

## VI. CONCLUSION

The primary goal of this mini project is to find out some useful things which makes us feel less tension while we driving a two wheeler. Thus we find out the things which makes useful for many people. In this busy world we have lots of work to do. In this busy schedule, it will happen to forgot small things. So we hope that our project helps a little bit to the people. Our future aim is to fit these compressors inside the engine guard. Some of the bikes like Yamaha, fazer and most of the sports bike have this engine guard. If we will fit this compressor in this engine means it will helps a lot.

## REFERENCES:

- [1] Newton, steeds and Garet, "Motor vehicles", Butterworth Publishers, 1989
- [2] Joseph Heitner, "Automotive Mechanics," , Second Edition, East-west Press, 1999
- [3] Martin W. Stockel and Martin T Stockle, "Automotive Mechanics Fundamentals," The Goodheart –Will cox company Inc, USA, 1978
- [4] Heinz Heisler, 'Advanced Engine Technology,'"SAE International publications USA, 1998
- [5] Ganesan V.."Internal combustion Engines", Edition, Tata Mcgraw-Hill, 2007