"AUTOMATIC AIR FILLING MACHINE ON 4-WHEELER: A REVIEW"

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ABSTRACT: *Filling air in automobile wheel's tire is a primary need of vehicle operation and it is widely done by compressor. But sometimes maintain pressure in both wheel become very difficult due to puncture in tire or reduction of air wheel. Puncture in tire in that case, more chance to accident, about 70% to 80% accident because of puncture of tire sometimes these occurred on the area where there is no availability of air filling arrangement on that place. Overcome this problem, we work on our project which is automatic air filling in 4-wheeler. The name indicated that all system is automatic which will fill the air in all wheels and also maintained the pressure in every wheel with the help of compressor system*.

***Keywords*:** Air compressor, Distribution box, Pressure gauge, Control valve

1. INTRODUCTION

Tyres are the second-highest cost for the trucking industry. A tire is a cushion provide with an automobile wheel. It consists of mainly the outer cover, i.e. the tire proper and the tube inside. The tire tube assembly is mounted over the wheel rim. It is the air inside the tube that carries entire load and provide the cushion.

This project deals with the automatic air filling in four wheeler. It consists of compressor, which supplies air and air tank is used to stored air at constant pressure. This pressurize air can be filled into the tyres through flexible ducting with the help of rotary bearing. The pressure conditions are achieved by pressure gauges.

Tires are flexible, they flatten at the bottom when they role. This contact patch rebound to its original shape once it is no longer in contact with the ground .This rebound creates a wave of motion along with some friction. When there is less air in the tire, that wave is larger and the friction created is greater and friction creates heat. If in a heat is generated, the rubber that holds the tyre's cords together being to melt and the tire fails. The extra resistance under inflated tyre has when it rolls; car's engine has to work harder. The tyre under inflated by a little as 2 psi reduce fuel efficiency .by 10 percent .Proper tire inflation pressure improves fuel efficiency, breaking distance, improve handling, and increase tire life, while under inflation create overheating and can lead to accidents the main cause of under inflation is natural leakages, temperature changes and road hazards. The safety system is concentrated over the wheels .In Texas in August 2008, a bus accident occurs due to tire puncture. 17 were killed and 39 were injured. This incident set an alarm among the various automobile companies to concentrate on the tires

2. PROBLEM IDENTIFICATION

I. INFLATION

The tire must be inflated according to the specification of the original vehicle manufacture.

The main effect over inflation are : the rapid wear of tire tread in center only increased tendency for concussion break and also decreasing of air and developing of the crack.

When tyres are under inflated, the thread wears more quickly. This equates to 15 percent fewer miles you can drive on them for every 20 percent that they are under inflated. Under inflated tyres also overheat more quickly than properly inflated tyres, which cause more tyre damage.

II. MANNER OF DRIVING

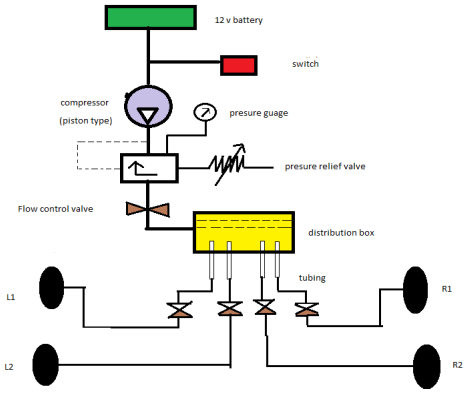
When the vehicle is driven, the main affected issue is the tire life, excessive speeding, quick start and sudden stop all causes faster thread wear.

3. METHODOLOGY

This project starts with discussion with project guide and group member about Design and Manufacturing. This discussion covering project overview, title, design, concept and method. Before that important point to get the best idea of project. We start study and make a lot of investigation about automatic air filling in four wheeler system. The method is same as uses in stationary wheels but we are using a system which fills air into the wheel during running condition. This system uses compressor to get the air from atmosphere, compress it and deliver it to the tire.

It automatically checks the tire's pressure using the pressure gauge. The switching of the circuit will take place using electronic circuits.

4. CONSTRUCTION



- Battery
- Air Compressor
- Pressure gauge
- Flow control valves
- Distribution block
- Tubing
- Bearings
- Mechanical pipes
- Nuts and Bolts
- U-cups seal
- Revolving block Tires

5. WORKING

In the process of automatic tyre Inflation system, the compressor is used to compress the air. The air is taken from the atmosphere and compressed it at required pressure. There is ducting which is used connect to the compressor outlet port and one end of the rotary joint. The compressed air is supplied to the rotary joint through the ducting. Two Pedestal bearings are used to support the axle of the assembly. Bearings are fixed to the rigid supports via nuts and bolts. The axle is rotate on which wheel or rim is mounted on one end. One end of coupler is connected to axle and other end is connected to rotary joint. There are electronic sensors are used to detect the tire pressure with the help of pressure gauge. When the pressure in the tire reduced below the required level then he sensors senses the pressure level and send feedback signal to compressor for maintaining pressure level of the air in the tire .

6. RESULT

It will increase the life of tire .After fabrication of automatic tire inflation system, the result obtained that if the system utilization will be executed in proper by taking and concerning all the relevant according to the project demand the process time, cost and human efforts can be reduce in a great manner .

7. CONCLUSION

We applied all these techniques to reduce the process time and human efforts. The system helps to reduce cost and friction between surface of tyre and road so that will reduce the wastage of tyre material. The analysis showed clearly that our system improve the life span of the tire and also provide a smooth ride. It also increases the fuel efficiency. The pressure monitoring and automatic air filling system is a key in reduction of accident due under inflated tire. By applying tire pressure and automatic air filling system properly it is easy for driver to monitor the pressure and temperature on each tire. The dynamically-self –inflecting tire system would be capable of succeeding as a new product in the automatic supplier I industry. Its specifically addresses the need of consumers by maintaining appropriate tire pressure. Most significantly the self in floating tire system would be a successful product because of its economic benefit to investors. As speed of vehicle is increases, the pressure of tire also increases accordingly to reduce rolling resistance and to limit damage due to increased frequency of tire profile deflections. Since highways are typically smoother than local roads, increasing the tire pressure will not negative impact ride quality in terms of noise and vibration. This system beneficial to safety because when properly inflated tire increase car stability and danger of blowouts. They also ensure a car's proper breaking distance and overall vehicle handling and maneuverability. The vehicle fuel economic correct tire pressure leads to lower rolling resistance, significantly improving fuel efficiency, proper inflation considerably improves a tire's lifespan.

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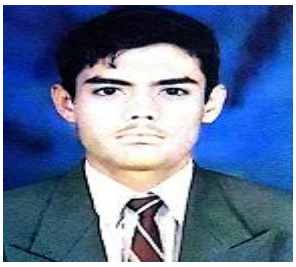	**Rahul Rade** pursuing the bachelor of Engineering in Mechanical Engineering from Shri Shankarprasad Agnihotri College of Engineering Wardha, India
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