International Journal of Progressive Research in Science and Engineering
Volume-1, Issue-3, June-2020
www.ijprse.com

# Automatic Tyre Pressure Inflation System

**Diwakar[1], Sahil[1]**

[1]*Student, Department of Mechanical Engineering, Dronacharya college of engineering, Gurgaon, Haryana, India.*

*Corresponding Author: yadavdiwakar287@gmail.com*

**Abstract:** - All parts of an automobile are getting automated except one thing i.e. tires. To inflate a tire, the driver has to go gas station or he has to attach a pump manually. This project is aimed at removing such unwanted strain, tire wear reduction, gas mileage, increase in handling, tire performance, save time and save life. The system has a dedicated unit for filling air whenever required. Automatic tire inflation systems are designed to constantly maintain tire pressure at the proper levels. These are designed more for the slow leaks and for optimizing performance and safety than for keeping a vehicle moving on a tire that will no longer hold air. The main problems in tires are a puncture. A sudden puncture may cause the driver to lose control, culminating in an accident. During puncture, the air pressure reduces suddenly. The reduction in pressure over a time limit is identified as puncture. It warns the driver of puncture. A control unit which is microcontroller is the brain of the system. When the pressure levels are below the threshold value chosen by the driver, the system displays it. The driver then may choose to refill the air automatically. As the tire is filled with optimum air, the friction between the tire and the road is maintained properly. Hence, the tire is not much damaged and the fuel consumption is reduced. Automatic tire inflation system ensures that tires are properly inflated all times. The project is destined to be a life and money saver, and many more advantages.

**Key Words: —** ***Automatic tyre inflation, Vehicle performance, Tire pressure, Pressure switch, Solenoid valve, Vehicle efficiency.***

## I. INTRODUCTION

The mode of transport is one of the most important criterions these days. The vehicles safety is thus essential. Accidents are also increasing at quick pace. There are several factors which causes this accident. The proper inflation is one among them. According to reports, about 80 percent of the cars on the road are driving with one or more tires under-inflated. Tires lose air through normal driving, seasonal changes in temperature. When tires are under inflated, the thread wears more quickly. Under inflated tires get damaged quickly due to overheating as compared to properly inflated tires, the under inflated tire causes a small depreciation in the mileage. the vehicles running with under inflated tires can cause accidents.

Thus to rectify all these defects we are using self-inflating systems. The pressure monitoring systems in such systems helps in monitoring the tire pressure constantly. The system which contains sensors feed the information to a display panel which the driver can operate manually. The electronic unit controls all the information. The source of air is taken from the vehicles air braking system or from the pneumatic systems. Thus it helps in re-inflation of the tire to proper pressure conditions.

## II. WORKING MODEL

### *A. Function: -*

Tire inflation systems have three major points: -

- Detect when the air pressure in a tire has dropped.
- Notify the driver of the problem.
- Inflate that tire back to the proper level.

### *B. Working Principle: -*

The Automatic tire inflation system contains a compressor which is used to pass air through the rotary joint via hoses, providing the rotary motion of wheel assembly. Air is channeled through rotary joint without entangling the hoses. When pressure goes below the desired level it pumps air and tire inflates. The compressor gets power from the battery. This operation takes place when the vehicle is moving and there is a requirement of inflation of tire due to reduced tire pressure level.

### *C. Construction and Working: -*

In automatic tire inflation system one end of the Solenoid valve is attached to the compressor and another to the air hose. This hose is connected to the wheel and the switch, solenoid valve and switch also connected with each other to transmit

International Journal of Progressive Research in Science and Engineering
Volume-1, Issue-3, June-2020
www.ijprse.com

the signals from one end to another. The wheel and the components are assembled to the frame of the system.
Whenever there is a change in pressure of the tyre this pressure is sensed by the pressure sensor which is pre-calibrated, this switch gives the signal to the valve and the solenoid will energize and valve open. The compressed air will start flowing and inflating the tire and when the calibrated pressure is obtained the sensor will give the signal and the solenoid will de-energized and valve close. With this we obtained the calibrated pressure and vehicle will run smoothly without any pressure drop in the tires.

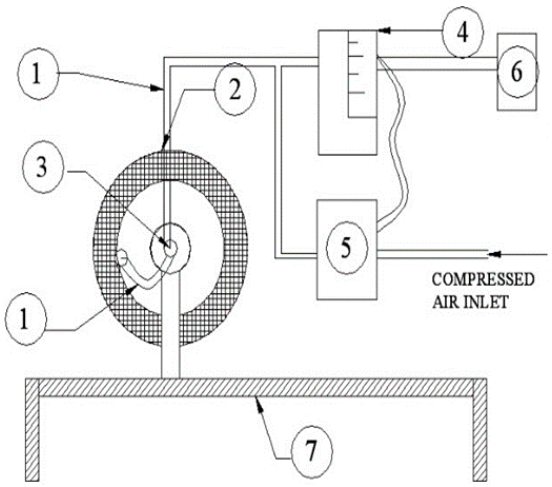


Fig.1. Working model of the project.

## III. RESULTS

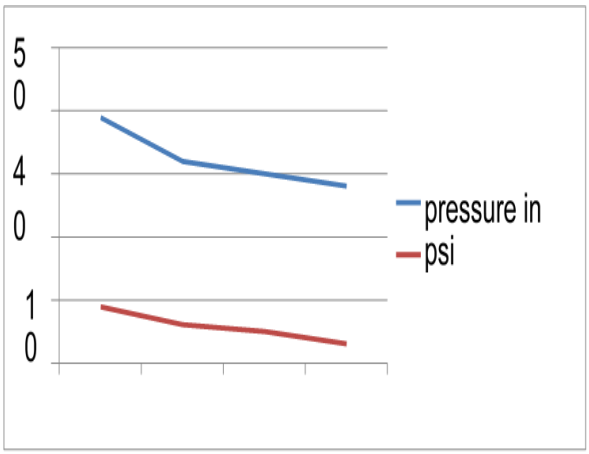


Fig.2. Before System Is Installed

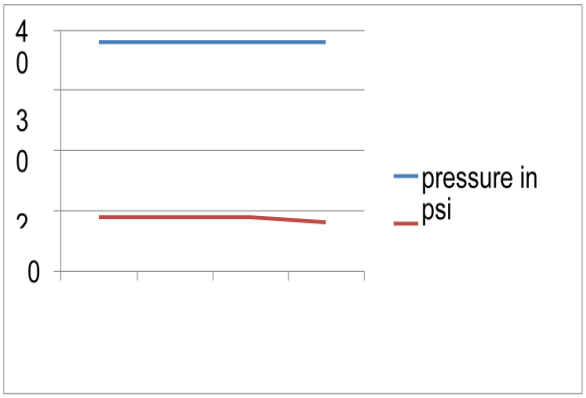


Fig.3. After System Is Installed

The two graphs show a comparison between the pressure level in tire and the life time of the tire before and after using the system
Fig.1.- Before using the system, the pressure level is not maintained properly. Due to this improper maintenance of the tire, the tire life time falls rapidly. This causes the early replacement of tire. The under inflation also causes more wear and tear of the tire. This under inflation allows punctures to occur easily.
Fig.2. After using the system, the pressure level is maintained properly. The tire is filled with optimum air. Thus the life time of the tire is maintained properly. As it is filled with optimal air the probability of puncture is greatly reduce.

## IV. ADVANTAGES

Following are the advantages of automatic tire pressure inflation system:

- Increase the vehicle efficiency.
- Increase the life span of tire.
- This will reduce the tire wear because of uniform pressure in the tires.
- The cost of the system is optimized, but increases safety, comfort and efficiency.
- The weight of the system is very less so one can use in cars, buses etc.

## V. CONCLUSION

We can conclude that this system ensures us that each and every tire is properly inflated to the proper tire pressure throughout the journey and it also improves tire life, reduces tire wear, increases fuel efficiency and also increases the overall safety of the vehicle, it also monitors the tire pressure constantly, provide us the proper inflation and deflation of the

tire, and helps in providing a comfortable ride with better mileage.

## REFERENCES

[1]. Hemant Soni, Pratik Golar, Ashwin Kherde "Design of Automatic Tyre Inflation System" Vol.1, Issue.4/April. 2014 ISSN: 2347-5420.

[2]. P. Omprakash, T.Senthil Kumar, "M.A.R.S - Mechanized Air Refilling System".

[3]. Case study on Automatic Tyre Inflation Management.

[4]. ALEXANDER VARGHESE, "Influence of Tyre Inflation Pressure on Fuel Consumption, Vehicle Handling and Ride Quality Modelling and Simulation".

[5]. John Woodrooffe, "Effects of Tire Inflation Pressure and CTI On Road Life and Vehicle Stability".