

# AUTOMATIC PNEUMATIC BUMPER SYSTEM

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## Abstract

*Aim of the project is to design and develop a control system based an intelligent electronically controlled automotive bumper activation system is called "AUTOMATIC PNEUMATIC BUMPER". This system is consists of IR sensor, Control Unit, Pneumatic bumper system. The IR sensor is used to detect the obstacle. There is any obstacle closer to the vehicle (within 90 cm), the control signal is given to the bumper activation system and with the help of IR sensor pneumatic bumper actuate and brake is applied. In today's world accident are increasing day by day so to reduce accident to a certain level the sensor arrangement is applied to the bumper as when the obstacle will come in front of the sensor the brake can be applied and prevention of accident can be done.*

**KEYWORDS:** *Pneumatic Bumper, IR sensors, braking system, wheels, Piston, Solenoid valve.*

## 1. INTRODUCTION

We are pleased to introduce our project i.e. Automatic pneumatic bumper system which is equipped with IR sensor, Control Unit, Pneumatic bumper system. As the vehicles are increasing day by day so as the accidents are also increasing rapidly. There are different causes for these accidents but proper technology of braking system and technology to reduce the damage during accident are mainly effects on the accident rates. So today implementation of proper braking system to prevent the accidents and pneumatic bumper system to reduce the damage is must for vehicles. To achieve this system modification goal, design this "Automatic Pneumatic Bumper system". This is fully equipped by IR sensors circuit and Pneumatic bumper activation circuit. It is a genuine project which is fully equipped and designed for Automobile vehicles. This forms an integral part of best quality. This product underwent strenuous test in our Automobile vehicles and it is good.

## 2. PROBLEM STATEMENT

There are different braking system like hydraulic, pneumatic, air, mechanical, etc. But all these braking mechanisms receive the signal or input power directly from the driver so it totally manual operated. When the driver saw the obstacle or any vehicle in front of his driving vehicle, driver becomes hopeless and may forget to apply the brakes immediately. Due to this the driver fails to give the proper input to braking system and proper working is not occurs. Also the driver may not able to pay the full attention during night travelling so there are many chances to accidents. After the accident occurs, there is no any provision to minimize the damages of vehicles. In currently used vehicles generally bumpers used are of rigid types. These bumpers have specific capacity and when the range of the accidental force is very high then the bumpers are fails and these force transferred towards the passengers. So this system never reduces the damage of both vehicle and passengers. To overcome these unwanted effects design the Automatic Pneumatic Bumpers is important.

## 3. OBJECTIVES

1. It helps in increasing the response time of braking system.
2. It increases the sureness of system.
3. It helps in reducing the number of accidents.

4. It helps in reducing the need of airbags.
5. It helps in reducing the pre-crash of the vehicle.

#### 4. LITERATURE SURVEY

The aim is to design and develop a control system based on pneumatic braking system of an intelligent electronically controlled automotive braking system. Based on this model, control strategies such as an 'antilock braking system' (ABS) and improved maneuverability via individual wheel braking are to be developed and evaluated. There have been considerable advances in modern vehicle braking systems in recent years. For example, electronically controlled ABS for emergency braking, electronically controlled hydraulically actuated individual brake-by-wire (BBW) systems for saloon cars and electronically controlled pneumatically actuated systems for heavy goods vehicles. The work of recent years shall form the basis of a system design approach to be implemented. The novelty of the proposed research programmed shall lie in the design and evaluation of control systems for achieving individual wheel motion control facilitated by BBW. In the case of BBW the brake pedal is detached from the hydraulic system and replaced by a 'brake pedal simulator'. The simulator provides an electrical signal for the electronic control system. Preliminary modeling and simulation work considers a quarter cars initially followed by a natural progression to the half car and full four wheel station cases. The model is to be constructed in modular form thus allowing the replacement / interchange of the various blocks and their associated technologies. Upon completion of the full vehicle braking model, sensitivity analyses will be carried out. Once the preliminary simulation model has been thoroughly benchmarked and existing control system strategies evaluated, an audit of the technology used is to take place and this will provide a basis for comparison of iterative technologies / techniques. The final phase of the new modern vehicle shall include:

- Development of improved ABS control systems
- Development and assessment of an electrohydraulic-BBW (EH-BBW) system
- Individual wheel braking combined with traction control
- Assessing sensor failure and fault tolerant control system design
- Preliminary studies into an electrically actuated system

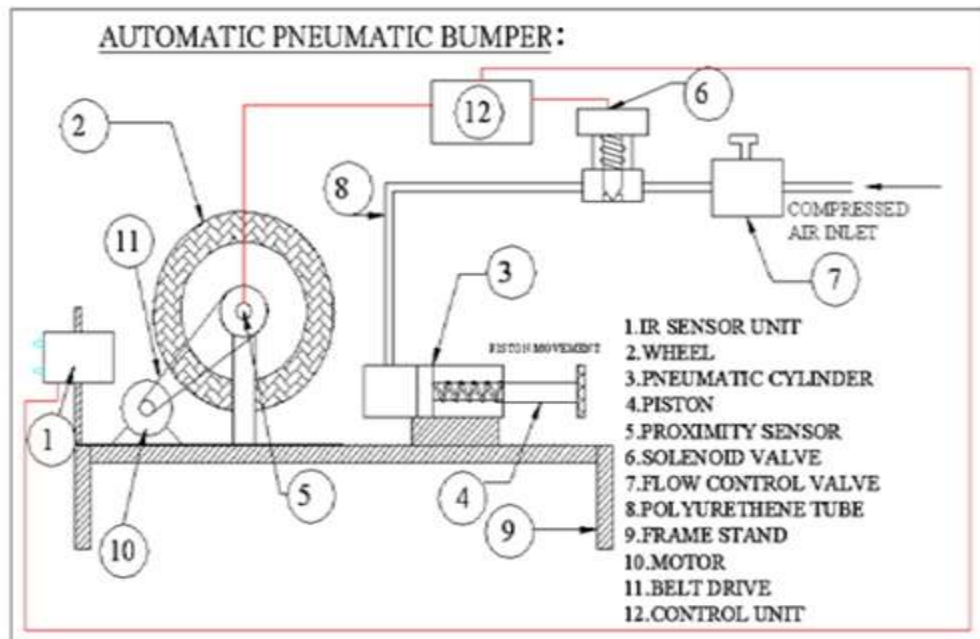


Fig 1. Design of System.

## **5. COMPONENTS USED**

### **• IR Sensor Circuit**

An infrared sensor is an electronic device that emits in order to sense some aspects of the surroundings. An IR sensor can measure the heat of an object as well as detects the motion. These types of sensors measures only infrared radiation, rather than emitting it that is called as a passive IR sensor.

### **• Tier**

Tier is a ring shaped covering that fits around a wheel rim to protect it and enable better vehicle performance. A tire is made up of synthetic rubber, natural rubber, fabric with carbon black and other chemicals compounds. Specifications:-

Wide of tire:-20mm

Diameter of tire:-70mm

Diameter of shaft hole:-6mm

### **• Pneumatic Cylinder**

Pneumatic cylinder are mechanical devices which use the power of compressed gas to produce a force in a reciprocating linear motion. Like hydraulic cylinders, something forces a piston to move in the desire direction.

### **• Piston**

A piston is a component of reciprocating engines, reciprocating pumps, gas compressors and pneumatic cylinders, among other similar mechanisms. It is the moving component that is contained by a cylinder and is made gas-tight by piston rings

### **• Proximity Sensor**

A proximity sensor is a sensor able to detect the presence of nearby objects without any physical contact. A proximity sensor often emits an electromagnetic field or a beam of electromagnetic radiation (infrared, for instance), and looks for changes in the field or return signal.

### **• Solenoid Valve**

A solenoid valve is an electromechanically operated valve. The valve is controlled by an electric current through a solenoid in the case of a two-port valve the flow is switched on or off; in the case of a three-port valve, the outflow is switched between the two outlet ports.

## **6. APPLICATIONS**

- In Cars
- Industrial Application.

## **7. ADVANTAGES**

- The chances of damage are reduced.
- Installation is simplified very much.
- Human life is safe.
- This type of mechanism eliminates the accident chances.
- Both the driver and car is safe.

## **8. CONCLUSION**

Through this papers the author wants to say that by using this system the number of accidents on the roads can be reduced and the damage that occur in cars.

## **9. REFERENCES**

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