ISSN:2348-2079

Volume-7 Issue-2

International Journal of Intellectual Advancements and Research in Engineering Computations

Fabrication of PNEUMATIC bumper in four wheeler

R. Arjunraj[1], D. Karthick[2], R. Karuppusamy[2], K. C. Naveen kumar[2], J. Nizamdeen[2]

[1]Assistant Professor, [2]UG Students

Department of Mechanical Engineeing, Nandha Engineering College, Erode - 52.

TamilNadu. India.

ABSTRACT

Indians faced many accidents in past 10 years. Accidents are the major problem in India. This project is made to reduce such a mishaps. In our project we using a high speed indication is given and automatic bumper is moved front of the vehicle setup with help of pneumatic system when the setup speed is exceeded. In our project, we have using solenoid valve and a control circuit. It is very important to attached in every vehicle. Mainly it is used for night drive.

Keywords: Pneumatic cylinder, Bumper, Solenoid valve, Sensor.

INTRODUCTION

A bumper is the front or rear part, of design to allow the car to sustain an impact without damage to the vehicle's safety systems. Wide range of flow rates and pressures. The Compressed air was expelling by primitive man to give glowing emberssing sufficient oxygen to allow them to flare up into a fire. During this process, the temperature increases as the pressure increases. The present invention relates to energy absorbing bumpers specifically, a light weight bumper presenting a soft collision interface to objects on impact, and having a relatively wide, effective angle of collision acceptance. Although various fluids may be employed in such bumpers, the utilization of air as the working fluid not only produces a lighter weight assembly, but also obviates the need for seasonal maintenance which is necessary in some climates with liquids [1].

LITERATURE SURVEY

- ✓ Aayush chawla, Abhijeet kulkarni et. al, investigated to Automatic pneumatic bumper and braking system. The accidents taking place due to vehicle collision certainly contributes to the major portion of deaths. Though there are different causes for these accidents but a very common cause is inefficiency of the driver to apply brakes at the right time. So designing and implementing of an automatic bumper and braking system is must for vehicles to prevent the accidents. To achieve this system, we developed an Automatic Pneumatic Bumper and Braking System.
- ✓ Jugendra Singh et.al, investigated to study on pneumatic bumper, the technology of pneumatics has gained tremendous importance in the end of workplace rationalization and automation from old-fashioned timber works and coal mines to modern machine shops and space robots. It is therefore important that technicians and engineers should have a good knowledge of pneumatic system, air operated valves and accessories. The aim is to design and develop a control system based an intelligent electronically controlled automotive bumper activation system is called “automatic

Author for correspondence:

Department of Mechanical Engineeing, Nandha Engineering College, Erode - 52. TamilNadu. India.

pneumatic bumper". This system is consists of IR transmitter and Receiver circuit, Control Unit, Pneumatic bumper system. The IR sensor is used to detect the obstacle.

- ✓ Katore S.R. et. al, investigated to an Automatic braking with pneumatic bumper system. The breaking system used an innovative project for the purpose of preventing accidents happens in the restricted roadways. The purpose of this system is based an intelligent electronically control with automatic bumper activation system is known as Automatic braking with pneumatic bumper system.
- ✓ Momin husen shanshuddin et.al, studied to a Pneumatic Bumper with Automatic Braking System. In this system we are used IR sensor. By using this sensor which can sense or detect the vehicle coming from in front of our vehicle. The IR sensor sends this signal to the engine by using relay control valve as well as this stops the working of engine. During the working of braking system the limit switches are placed below the pedal of brake. The brake pedal activates the pneumatic bumper which reduced the damage of vehicle during the accident.
- ✓ Swapnil patil, Suraj mohite et.al, investigated an Automatic pneumatic bumper in 4 wheeler vehicle. The technology of pneumatics plays a major role in the field of automation and modern machine shops and space robots. An extendable and retractable bumper (E/R bumper) is presented in this project. The aim is to design and develop a control system based intelligent electronically controlled automotive bumper activation is called automatic pneumatic bumper system [2].

COMPRESSOR

Compressor is the air producing machine. The air was taken through the atmosphere during the machine is running. Air compressors are used to raise the pressure of a volume of air. Air compressors are available in so many configurations will operating over a very wide ranging of flow rates and pressures.

PNEUMATIC CYLINDER

An air cylinder is an operating device in which the state input energy of compressed air in pneumatic power is converted into mechanical Output power, by reducing the pressure of the air to that atmosphere [3-5].

Single acting cylinder

Fig. 1 Single acting cylinder

Single acting cylinder is an capable of performing an operation in only one direction. Single acting cylinders added with one inlet for the operating air pressure, can be production in several fundamentally different designs. Single cylinders Develop power in one direction only.

Double acting Cylinder

Fig. 2 Double acting cylinder

A double acting cylinder is employing in control the systems with the full pneumatic cushioned and it is essential when the cylinder itself is required to retard heavy messes. This can be done only at the end positions of the piston stroke. In all intermediate position a separate externally mounted a derive most be provided with the damping feature.

SOLENOID VALVE

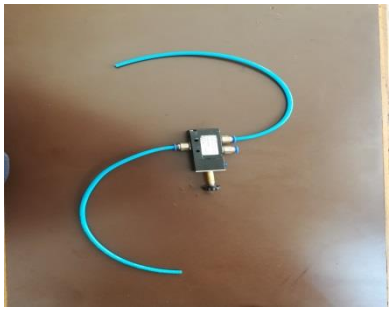

Fig .3 Solenoid valve

The directional valve is one of the important parts of a pneumatic system. Commonly known as DCV this valve is used to control the air flow direction in the pneumatic system. The directional valve done this by the position changing of its internal movable parts.

This valve was selected for speedy operation and reducing the manual effort and also for the modification of the machine into automatic machine by means of using a solenoid valve.

WORKING PRINCIPLE

The sensor senses the speed of the vehicle and the signals are sent. The According to the speed value set in the control unit the pneumatic cylinder is actuated and retracted. The signals are received by the microcontroller. These signals are used to operate the solenoid valve automatically. The control unit gets the corresponding signal from the sensor and it activates the solenoid valve to supply the air through the pneumatic cylinder, and it pushes the bumper front, the sensor gives the signal to the control unit and it deactivates the solenoid valve, by this process pneumatic cylinder will move in reverse direction.

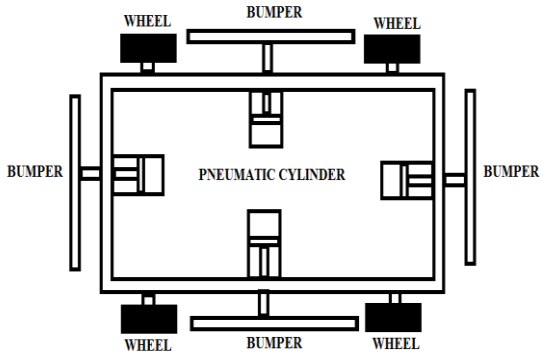

Fig. 4 Pneumatic bumper

ADVANTAGES

1. Easy to fitting the arrangement in vehicle
2. Low cost
3. Maintenance is easy
4. Power can be easily transmitted

METHODOLOGY

Problem Identification

↓

Literature review

↓

Making model and testing

↓

Fabrication of bumper

↓

Result and discussion

↓

Documentation and Result

CONCLUSION

Behind the designing of this system, our main aim is to improve the prevention technique of accidents and also reducing the damage from accidents like damage of vehicle, injury of humans, etc. We observed that our work is necessary to achieve all the objectives.

REFERENCES

[1]. Aayush Chawla, Abhijeet Kulkarni, Rushikesh puranik, Adarsh raj, Automatic pneumatic bumper and braking System, e-ISSN: 2395-0056, p-ISSN: 2395-0072, 2018, 1059-1065.
[2]. Junendra singh, Shivamraj, Saurabh kr., Study of pneumatic bumper, | ISSN - 2250-1991, 6, 2017.
[3]. Katore S.R, katlag s.c,mane p.v, pawar g.v, londhe b.c Automatic Braking and pneumatic bumper system. ISSN 2320-883X, 3, 2015.
[4]. Momin husen shanshuddin, Mistry Arbit Harendra, Taskar ganesh Vishnu, Pneumatic bumper with automatic braking system. E-ISSN: 2321-9637, 2017.
[5]. Swapnilpatil, Suraj mohite, Mahesh motkar, Omkar kurlekar, Krushna raut, Automatic pneumatic bumper in four wheeler vehicle, ISBN: 978-93-87793-19-4, 2018.