

Fabrication of Pneumatic Bumper And Braking System

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Abstract- The technologies are developed in the field of automation that integrates heavy growth of vehicles for public transport. According to Indian road transport situation the Accident are major problem to the Vehicles, to avoid this we developed Anti-collision system especially for four wheelers. The system is based on intelligent electronically control system. This system activates brake as well as extends the bumper from its initial position to reduce the damage caused during collision. The infrared sensor (IR), which is used to sense the colliding object (Obstacles / Human / Any Vehicles in specified range of distance) which is responsible for accident. Then sensor sends feedback signal to the control unit, there by activating the solenoid valve for an activation of system. During the working of Automatic braking system simultaneously the driver can also try to stop the vehicle by pressing brake pedal. Extended bumper with the help of pneumatic pressure reduces the damage to vehicle which occurs in accidents. This system provide pre-crash safety to the vehicle. As well as it improves the response time of vehicle braking to keep safe distance between the vehicles. By using this system we can obtain control the over speed vehicle in short distance.

I. INTRODUCTION

We have pleasure in introducing our project “ANTI-COLLISION SYSTEM FOR FOUR WHEELERS”. Which is fully equipped by IR sensors circuit and Pneumatic bumper and braking activation circuit. It is the project which has been fully equipped and designed for auto vehicles. The technology of pneumatics plays a major role in the field of automation and modern machine shops and space robots. The aim is to design and develop a control system based on intelligent electronically controlled automotive bumper activation system is called “automatic pneumatic bumper and break actuation before collision”. The project consists of IR transmitter and Receiver circuit, Control Unit, Pneumatic bumper system. The IR sensor senses the obstacle. There is any obstacle closer to the vehicle (within 1feet), the control signal is given to the bumper and break activation system. This bumper activation system is activated when the vehicle speed above 80-100 km per hour. The speed is sensed by the proximity sensor and this

signal is transfer to the control unit and pneumatic bumper activation system.

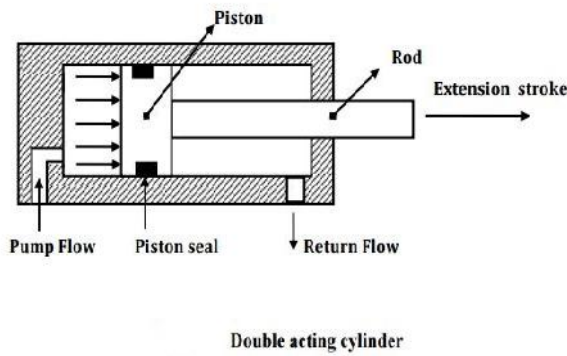
II. MAJOR COMPONENTS

1. Pneumatic Cylinder
2. Wheel
3. Solenoid Valve
4. Frame
5. Bearing
6. Shaft
7. Metal Strip
8. D C Motor
9. Battery
10. Hose And Connector
11. Circuit;
 - Ir Sensor
 - Relay
12. Compressor

III. STUDY OF AVAILABLE MECHANISMS

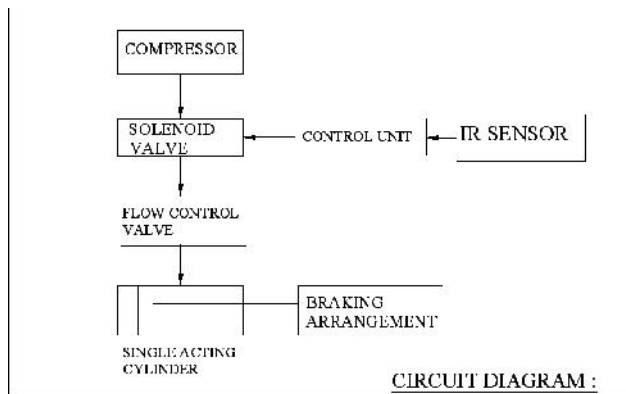
Based on the cylinder action

Based on cylinder action we can classify the cylinders as single acting and double acting. Single acting cylinders have single air inlet line. Double acting cylinders have two air inlet lines. Advantages of double acting cylinders over single acting cylinders are. In single acting cylinder, compressed air is fed only on one side. Hence this cylinder can produce work only in one direction. But the compressed air moves the piston in two directions in double acting cylinder, so they work in both directions. In a single acting cylinder, the stroke length is limited by the compressed length of the spring. But in principle, the stroke length is unlimited in a double acting cylinder. While the piston moves forward in a single acting cylinder, air has to overcome the pressure of the spring and hence some power is lost before the actual stroke of the piston starts. But this problem is not present in a double acting cylinder

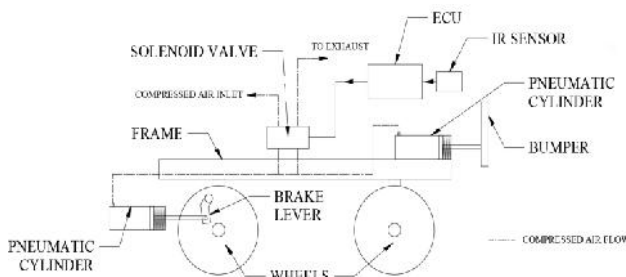


To achieve forward motion of the cylinder, compressed air is admitted on the piston side and the rod side is connected to exhaust. During return motion supply air admitted at the rod side while the piston side volume is connected to the exhaust. Force is exerted by the piston both during forward and return motion of cylinder. Double acting cylinders are available in diameters from few mm to around 300 mm and stroke lengths of few mm up to 2 meters Construction of Double acting cylinder.

CIRCUIT DIAGRAM



BLOCK DIAGRAM



WORKING OPERATION

The important components of our project are,

- IR transmitter
- IR receiver
- Control Unit with Power supply
- Solenoid Valve
- Flow control Valve
- Air Tank (Compressor)

The IR TRANSMITTER circuit is to transmute the Infra-Red rays. If any obstacle is there in a path, the Infra-Red rays reflected. This reflected Infra-Red rays are received by the receiver circuit is called “IR RECEIVER”.

The IR receiver circuit receives the reflected IR rays and giving the control signal to the control circuit. The control circuit is used to activate the solenoid valve.

IV. LITERATURE SURVEY

SAFETY SYSTEM:

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. This project work has provided us an excellent opportunity and experience, to use our limited knowledge. We gained a lot of practical knowledge regarding, planning, purchasing, assembling and machining while doing this project work. We feel that the project work is a good solution to bridge the gates between institution and industries.

V. CONCLUSION

We are proud that we have completed the work with the limited time successfully. “AUTOMATIC

PNEUMATIC BUMPER SYSTEM” is working with satisfactory conditions. We are able to understand the difficulties in maintaining the tolerances and also quality. We have done to our ability and skill making maximum use of available facilities.

In conclusion remarks of our project work, let us add a few more lines about our impression project work. Thus we have developed an “**AUTOMATIC PNEUMATIC BUMPER SYSTEM”** which helps to know how to achieve low cost automation. The application of pneumatics produces smooth operation. By using more techniques, they can be modified and developed according to the applications.

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- [6] illustration does not show any space for plunger travel.
- [7] <http://www.sirai.com/inglese/serieD/parti.php>Illustration showing parts of solenoid valve. Warning:
- [8] illustration does not show any space for plunger travel.
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