

Manufacturing of Automatic Pneumatic Bumper to Prevent Car Damage

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Abstract – The aim is to design and develop a control system based on intelligent electronically controlled automotive bumper activation system called, “**AUTOMATIC PNEUMATIC BUMPER TO PREVENT CAR DAMAGE**”. This system consists of IR transmitter and receiver circuit, control unit, pneumatic bumper system. The IR sensor is used to detect the obstacles. If there is any obstacle closer to vehicle (within 4 feet), the control signal is given to the bumper activation system. The pneumatic bumper system is used to protect the man and vehicle. This bumper activation system is only activated when the vehicle speed is above 40-50 km/hr. This vehicle speed is sensed by the proximity sensor and this signal is given to the control unit and pneumatic bumper activation system.

Key Words: Automatic Braking System, Pneumatic Bumper, Infrared Sensor, Pre-crash Safety, Response time of braking and Electro mechanical system.

1. INTRODUCTION

Automation can be achieved through computers, hydraulics, pneumatics, robotics, etc of these sources, pneumatics from an attractive medium for low cost automation. The main advantages of all pneumatic systems are economy and simplicity. Automation plays an important role in mass production. For mass production of the product, the machining operations decide the sequence of machining. The machines designed for producing a particular product are called transfer machines. The components must be moved automatically from the bins to various machines sequentially and the final component can be placed separately for packing. Materials can also be repeatedly transferred from the moving conveyors to the workplace and vice versa. Nowadays almost all the manufacturing process is being atomized in order to deliver the product at faster rate. 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, we design this Automatic Braking with Pneumatic Bumper System.

1.1 LITERATURE REVIEW

The existing approaches in preventing accidents are Honda's idea of ABS (Antilock braking system) which helps the rider get a hassle free braking experience in muddy and watery surfaces by applying a distributed braking and prevents skidding and wheel locking. Volvo is all set to launch its new XC60SUV which will sport laser assisted braking which will be capable to sense a collision up to 50 mph and apply brakes automatically.

1.2 PROBLEM STATEMENT

In conventional vehicles there are different mechanism operated for braking system like hydraulic, pneumatic, mechanical, etc. But all these braking mechanisms receive the signal or input power directly from the driver so it is totally manual operated. When the driver saw the obstacle or any vehicle in front of his driving vehicle, he was irritated or becomes mazy.

Due to this the driver fails to give the proper input to braking system and proper working does not occur. Also the driver may not be able to pay the full attention during night travelling so there are many chances to accidents. After the accidents occur, 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 accidental force is very high then the passengers. So this system never reduces the damage of both vehicle and passengers. To overcome this unwanted effects design the Automatic Pneumatic Bumper is important.

2. SCOPE

- 1) This system may be applicable in all types of light vehicles like cars, tempos, etc.
- 2) This system also successfully installed in heavy vehicles like buses, trucks, etc.
- 3) System able to increase the pre-crash safety.
- 4) To avoid the percentage of passenger injury by using external vehicle safety.
- 5) To reduce the requirement of internal safety devices like air bags.

LIST OF PARTS

Sr.no	Parts name	Qty
1	Single acting pneumatic cylinder	2
2	wheel	4
3	Flow control valve	1
4	Solenoid valve	1
5	IR sensor	1
6	Disk brake	1
7	frame	1

RAW MATERIAL



Fig -1: Raw Material

ACTUAL MODEL



Fig -2: Model

3. FUTURE SCOPE

Our future work deals with incorporating this system with various different features to provide enhanced protection by the intelligent braking system in real time application. For that, some of the possible changes are:

- 1) Regular bumpers can be replaced by hydraulic bumpers.
- 2) Infrared sensors can sense eye blinking and give signal to solenoid valve when driver sleeps.
- 3) Limit switch can be used to limit the minimum speed above which the system gets triggered.
- 4) PIC can be implemented in system for further modifications like gradual slowdown of vehicle.
- 5) Bumper design can further be enhanced to act as external air bags.
- 6) With some modifications, the project can be used with timer circuits so as to apply brakes and extend the bumper after a delay of few milliseconds so that the bumper does not extend unless the vehicle just reaches the crashing distance.

4. CONCLUSION

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. We are proud that we have completed the work with the limited time successfully. The **PNEUMATIC BUMPER FOR FOUR WHEELER** 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 pneumatic bumper, 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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