

ACCIDENT AVOIDING BUMPER SYSTEM

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Abstract - The aim is to design and develop a control system based intelligent electronically controlled automotive bumper activation and automatic braking system called **AUTOMATIC ACCIDENT AVOIDING SYSTEM (FOR BUMPER CAR)**. This project consists of Control Unit, Pneumatic bumper system and pneumatic braking system. The Ultrasonic sensor senses the obstacle. There is any obstacle closer to the vehicle the control signal is given to the bumper activation system and also braking system simultaneously. The bumper and braking system are used to protect the person and vehicle. Some of the automotive manufacturers already use shock absorption system that consist passive damper located between the bumper and the vehicle chassis. However, by using this system most of the force will be dissipate by transmitting all the impact energy through the compression of the damper and the remaining force will be transferred to the vehicle chassis. This system normally has very high static damping coefficient and cannot dissipate higher speed collision force. In this project, dampers were used to provide dynamic damping coefficient and reduced the crash impact and lowering the transmission of the remaining force to the vehicle body. The present work is an attempt to develop a concept to make a shock proof accident avoiding system which can meet out the requirement of safe journey. The objective of bringing down the rate of accidents which are increasing day by day is almost achieved in present work within the limitation of work as mentioned.

1. INTRODUCTION

Now a day's vehicle accident is the major problem. This system use an innovative project for the purpose of preventing accidents happens in the restricted roadways. The purpose of this system is based on an intelligent electronically control with automatic bumper activation system is known as "Automatic accident avoiding bumper system". This system is assembled on four wheeler vehicles.

Ultrasonic sensor is used to sense obstacle distance in front of vehicle and proximity sensor is used to sense speed. Whenever vehicle is moving in high speed and if it detects the obstacle (another vehicle on road) it will automatically activate the bumper to reduce the damage our vehicle which occurs if both vehicles collapse on each other. This provides pre-crash safety for vehicle. As well as this system improve the response time of vehicle braking to keep safe distance between two vehicles. By using this system we control the speed of vehicle in small distance.

2. OBJECTIVE

In conventional vehicles there are different mechanism operated for 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 manually 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 is not occurs. Also the driver may not able to pay the full attention during night travelling so there are many chances of 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 we have to design the Automatic Braking System with Pneumatic Bumpers which have following objectives:

- To increase the sureness of braking Application.
- To increase the response time of braking system.
- To improve the pre-crash safety.
- To avoid the percentage of passenger injury by using external vehicle safety.

To reduce the requirement of internal safety devices like air bag.

3. NEED FOR AUTOMATION

Automation can be achieved through computers, hydraulics, pneumatics, robotics, etc., of these sources, pneumatics form 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 packaging. Materials can also be repeatedly transferred from the moving conveyors to the work place and vice versa. Nowadays almost all the

manufacturing process is being atomized in order to deliver the products at a faster rate.

4.CONSTRUCTION AND WORKING:

As this system is used at the time of emergency during work. In normal travelling of vehicle this system can be switched off with the help of a switch and it will not affect the normal working of the vehicle When any obstacle, human, animal or vehicle comes in front of the vehicle then the installed ultrasonic sensor senses the obstacle. The range of distance between the vehicle and obstacle is variable.

Here used microcontroller AT89C51 because of the number of input and output pincount.As well studied about it.

- **DOUBLE ACTING PNEUMATIC CYLINDER:**

The cylinder is a double acting cylinder,which means the air pressure operates onthe forward and backward strokes. the air from the compressor is passed through the solenoid valve which controls the pressure to the required amount by adjusting its knob.



Fig. Double acting pneumatic cylinder

- **RELAY:**

Relays are simple switches which are operated both electrically and mechanically. Relays consist of an electromagnet and also a set of contacts.the switching mechanism is carried out with the help of the electromagnet. Relay control unit acts as the sensor signal to activate the bumper with the help of compressed air through the solenoid valve.

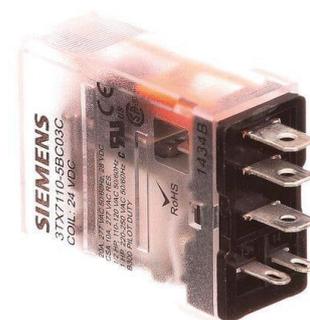


Fig. Relay

- **SOLENOID VALVE:**

The solenoid valve control device used in pneumatic system to change the direction of air flow. it is used in automatic bumper system due to control of compressed air towards the pneumatic cylinder during extraction of bumper. here we used, 5/2 solenoid valve. it means 5 port two position valve.

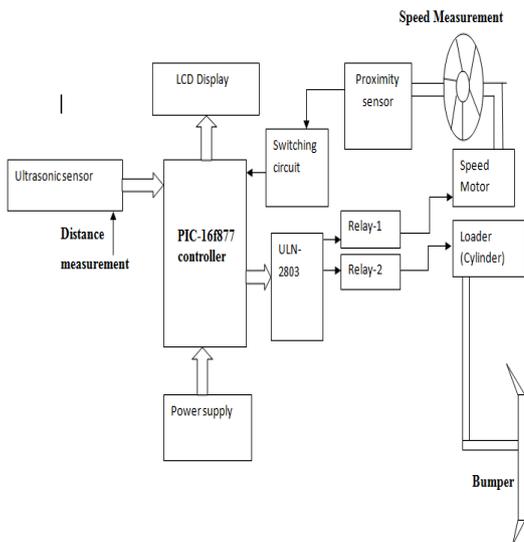


Fig. Block Diagram

range is varied according to the density of vehicles or humans on road. The received signal by ultrasonic sensor is provided to the control unit. The control unit then activates the Relay. When relay will ON that time loader (Cylinder) activate. The pneumatic force provides forward motion to the Bumper and it also retracts the bumper slowly reducing the impact. Hence, when the external body is kept safe, there will be no chance of internal damage.

5.COMPONENT AND DESCRIPTION:

- **MICROCONTROLLER 89C51:**



Fig. Microcontroller IC



Fig. Solenoid Valve

• **PROXIMITY SENSOR:**

The sensor will detect the object without touching it. it will help to measure the speed of the vehicle as the wheel of vehicle rotates proximity sensor will detect it and we will get output as the pulse.



Fig. Proximity Sensor

6.WORKING MODEL OF THE PROJECT:



Fig. Prototype Of the system

All the components are assembled at their own position. And the proper mounting method is used to mount the

components. the system will also provide the automatic braking to the vehicle.

7.ADVANTAGES AND LIMITATION

Advantages :

- 1) Simple construction of the prototype vehicle.
- 2) It provides safety to passengers in the vehicle as well as to the vehicle body.
- 3) It reduces accident intensity and impact.
- 4) This system increases the response time of vehicle braking by keeping safe distance between two vehicles.
- 5) The design also increases the crashing distance by providing extra space due to extension of the bumper, decreasing the chances of injuries to commuter.

Limitations :

- 1)IR sensor range is small.
- 2)Due to random reasons sensor may stop working.
- 3)Proximity sensor may sense obstracle due to presence of dirt.

8.CONCLUSIONS:

Behind the designing of this system, the main aim is to improve the technique of prevention of accidents and also reducing the hazard from accidents like damage of vehicle, injury of humans, etc. This project work has provided an excellent opportunity and experience to us to gain the knowledge. In conclusion remarks of project work, an “ACCIDENT AVOIDING BUMPER SYSTEM” which helps to achieve low Impact damage has been developed. We have also observed that the prototype manufactured is working with satisfactory conditions and our work is able to achieve all the objectives which are necessary.

9.REFERENCES

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