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COMPREHENSIVE DESIGN AND FABRICATION OF AN ADVANCED AUTOMATIC PNEUMATIC BUMPER SYSTEM FOR EFFECTIVE COLLISION REDUCTION

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ABSTRACT
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 developa control system based intelligent electronically controlled automotive bumper activation and automatic braking system is called AUTOMATIC PNEUMATIC BUMPER FOR REDUCING COLLISION. This project consists of IR transmitter and Receiver circuit, Control Unit, Pneumatic bumper system and pneumatic braking system. The IR sensor senses the obstacle. There is any obstacle closer to the vehicle (with in 3-4 feet), the control signal is given to the bumper activation system and also pneumatic braking system simultaneously. The pneumatic bumper and braking system is used to product The man and vehicle. This bumper and braking activation system is only activated the vehicle speed above 30-40 km per hour. This vehicle speed is sensed by the proximity sensor and this signal is given to the control unit and pneumatic bumper and braking activation system. 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

Keywords:
collision, IR sensor, pneumatic

I. Introduction
We have pleasure in introducing our project “AUTOMATICPNEUMATIC BUMPER FOR REDUCING COLLISION” 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.

1.2 Problem Statement

There are various mechanism operated for braking the system like ABS, pneumatic breaking, hydraulic breaking etc. but all this mechanism which given above its totally manually operated. Whenever the obstacle come in front of vehicle the man press the brake pedal by which the car stop that is all breaking mechanism receive input from the driver so it called manual operated. But man is fail to give power input because whenever the obstacle come in front of vehicle the man is unable to stop the car. He becomes mazy and he unable to judgment therefore the breaking mechanism is unable to work properly and the car driver is unable to decreases the car damage. Now we use the pneumatic bumper

III. Literature

India is the largest country in the use of various types of vehicles. As the available resources to run these vehicles like quality of roads, and unavailability of new technologies in vehicles are causes for accidents. Though there are different causes for these accidents but proper technology of braking system and technology to reduce the damage during accident are mainly affects 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". the work is a good solution to bridge the gates between institution and industries And able to understand the difficulties in maintaining the tolerances and also quality 7 [2] AAYUSH CHAWLA1, ABHIJEET KULKARNI 2, RUSHIKESHPURANIK3, ADARSH RAJ4 Now-a-days, accidents taking place are very frequent in India which occur mainly due to the inefficiency of driver to apply brakes at the right time. This is also because of rise in population of vehicles which if not handled properly may create difficulty in driving vehicles on road. A system must be designed to minimize accidents which may compensate for the inability of the drivers to apply brakes at the right time. Therefore our aim is to design and develop an electronically intelligent braking system which can automatically sense the objects ahead of the vehicle and applies brakes itself to avoid collision. If the collision still happens then we can add a new technology of retractable/extractable bumper which may extract in case of collision and avoids [3] Aamir Sayed, Vipin Raut, Shubham Mashankar, Shubham Lashkare, NikeshKhobragade, Shantanu Ghodeshwar. In today's world vehicle accident is a major problem. To avoid this we are have developed an automatic impact reducing system in our project. The system is based on intelligent electronically control system known as "Automatic pneumatic bumper system". Automatic pneumatic bumper system uses infrared 8 sensor (IR), which is used to sense the vehicle coming is front of our vehicle which is responsible for an accident. As soon as any object or vehicle is sensed by the sensor the sensor sends feedback signal to engine through the relay control to activate the Solenoid Valve which allows the flow of compressed air to the cylinder. During the working of Automatic Pneumatic Bumper system simultaneously the driver also try to stop the vehicle by applying brake pedal which somewhat slows down the engine. The compressed gas flowing through the solenoid valve will activate the cylinder which in turn activates the Bumper. This system provides pre-crash safety to the vehicle. [4] Shubham Pawar, Shailesh Raut, Jai Keni, Vishal Mhaisdhune, C.R. Patil. Now a day's vehicle accidents is the major problem. This breaking system used an innovative Technique 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". This system is assemble don four wheeler vehicle. Generally this system consist of two mechanisms and these are automatic braking system and pneumatic bumper system. Automatic braking system uses the infrared sensor (IR) which senses the vehicle which come in front of our system and which may be cause for accident. Then sensor gives feedback to engine through relay to stop the working of engine. During the working of Automatic braking system simultaneously the driver of vehicle that stop the vehicle by pressing brake pedal. Limit switch is provided below the brake pedal which used to activate the pneumatic bumper and disc brake simultaneously to reduce the damage our vehicle which occurs if both vehicles collapse on each other. This provide pre-crash safety for vehicle. 9 [5] Aaron Sujith Barnabas.P, Mohammed Shabirullah. The technology of pneumatics

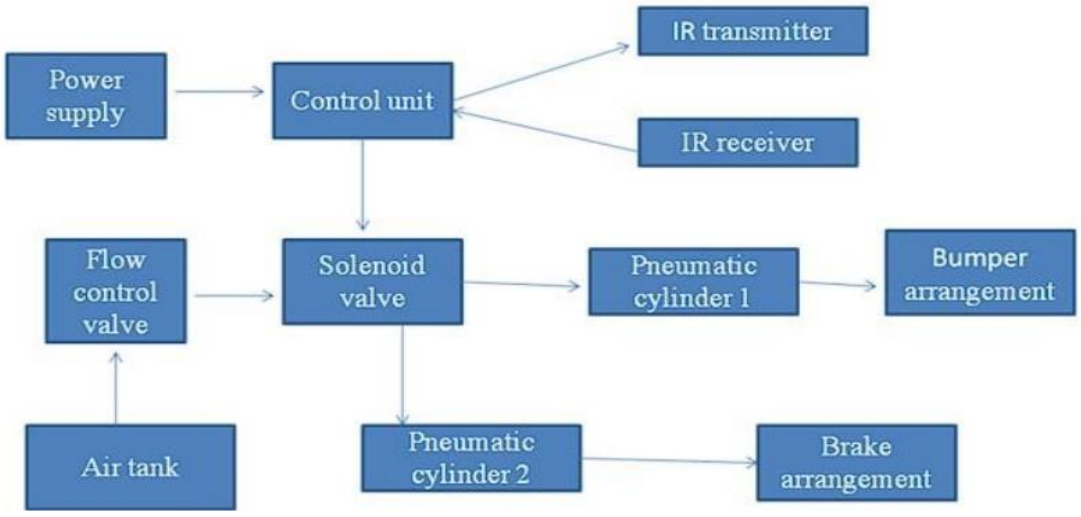
plays a major role in the field of automation and modern machine shops and space robots.. The aim is to design and develop a control system based intelligent electronically controlled automotive bumper activation and automatic braking system is called AUTOMATIC PNEUMATICBUMPER AND BREAK ACTUATION BEFORE COLLISION. This project consists of IR transmitter and Receiver circuit, Control Unit, Pneumatic bumper system and pneumatic braking system. The IR sensor senses the obstacle. There is any obstacle closer to the vehicle (with in 3-4 feet), the control signal is given to the bumper activation system and also pneumatic braking system simultaneously. The pneumatic bumper and braking system is used to product the man and vehicle. This bumper and braking activation system is only activated the vehicle speed above 30-40 km per hour. This vehicle speed is sensed by the proximity sensor and this signal is given to the control unit and pneumatic bumper and braking activation system. Key Words: IR transmitter, IR sensor, bumper, and proximity sensor

IV MATERIALS AND METHODS

The aim of the chapter is to describe various materials and methodology used to make this machine. The conceptualization, designing, analysis of the machine are dealt with this chapter. The characteristics of various components and their specifications along with their dimensions were taken into account.

Material selection

- Mild steel Bumper
- Mild steel Motor
- ¼ HP Wheel Rubber



Block diagram

Components Involved

The main components of a project are

i. Metal frame
ii. Extending bumper
iii. Motor
iv. IR Sensor
v. Circuit Board
vi. Pneumatic Cylinder
vii. Solenoid valve
viii. Wheel
ix. Pully

x. Belt

V RESULTS AND WORKING

In this chapter the operation, working, maintenance, experimental observations, results and discussion of the Automatic pneumatic bumper are discussed in detail. 4.2 Experimental Procedure As this system is used at the time of emergency during work. In normal travelling of vehicle this system can be switched of 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 infrared sensor senses the obstacle. The range of distance between the vehicle and obstacle is variable. This range is varied according to the density of vehicles or humans on road. The received signal by IR sensor is provided to the control unit. When any obstacle, humans, animals or vehicle is coming in front of the vehicle then the installed infrared sensor senses that obstacle. The range of distance between the vehicle and obstacle is variable. This range is varied according to the density of vehicles or humans on road. The received signal by IR sensor is provided to the control unit. The control unit then activates the Solenoid Valve which will allow the flow of compressed air through it. Compressed air is provided as an Input to the Solenoid Valve which has two Outputs both connected to the Double Acting Pneumatic Cylinder. This pneumatic force of the compressed air through the Solenoid Valve is transferred to the Bumper System. The pneumatic force provides forward motion to the Bumper and it also retracts the bumperslowly reducing the impact. Hence, when the external body is kept safe, there will be no chance of internal image

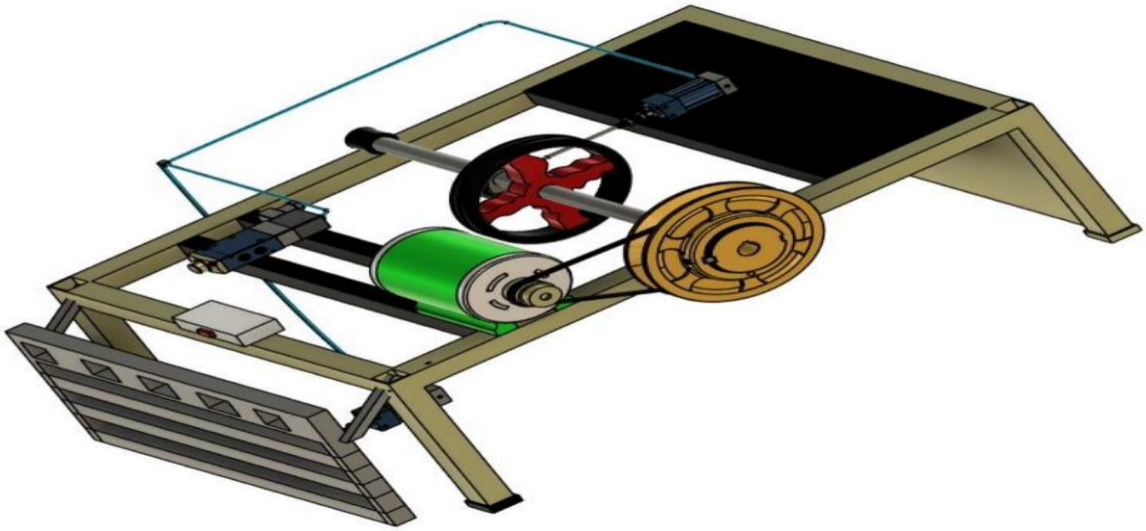


Fig.1 Working model

Conclusion

Our main aim is to improve the prevention technique of accidents and also reducing the hazard from accidents like damage of vehicle, injury of humans, etc. This project work has provided us an excellent opportunity to use our limited knowledge. We are feeling that we have completed the work within time successfully. This system can be installed in both heavy duty as well as medium duty vehicles. Hence by using this system the accidents and damage to the vehicles can be minimized.

References

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3 Aamir Sayed, Vipin Raut, Shubham Mashankar, Shubham Lashkare, NikeshKhobragade, Shantanu Ghodeshwar.

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