

# Design and Fabrication of Anti Collision System for Four Wheelers

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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 a 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 provides precrash 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.

**KEYWORDS:** Pneumatic bumper, sensor, obstacles, feedback, solenoid valve.

## 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 1 feet), 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.

### *1. RADAR COLLISION SYSTEM*

RADAR Based Vehicle Collision Avoidance System used Four-Wheeler Automobile segments. The Vehicle collision avoidance system in an automobile is used to prevent the accidents and ensure the vehicles safety and reliability. This system can make the job of driving vehicles easier and ensures to manage traffic efficiently with road safety. The proposed system uses Radar sensors placed at its front; these vehicles can detect presence of moving objects in their path. Using hydraulic actuator it's slower than pneumatic actuators. This completed system Can be fitted on the dashboard of a vehicle and

Effectively used for automatic control of braking system. The system can control only the braking system, otherwise opposite object or vehicle damage the vehicle.

## 2. WORKING PRINCIPLE

When the infrared sensor senses the colliding object it sends the feedback signal to the control unit there by activating the solenoid valve to send the compressed air from the compressor which is coupled to it at one end to the two pneumatic cylinders which is connected on its other end. Due to these two pneumatic cylinders gets activated there by extends the bumpers from its original portion to certain distance and also activates the brake simultaneously to reduce the impact

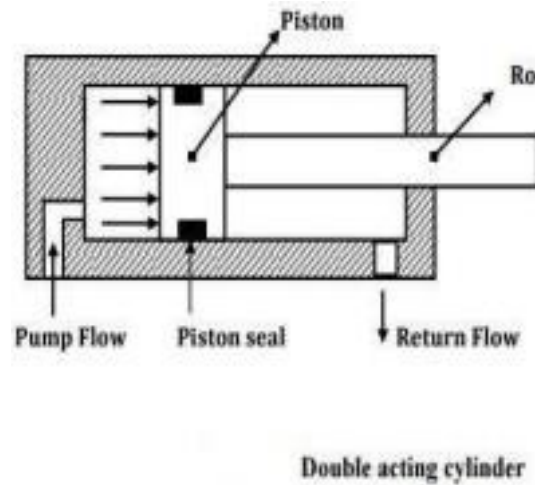


Fig 4.1

### DOUBLE ACTING PNEUMATIC CYLINDER:

- Piston : EN – 8
- Media : Air

Temperature: 0-80 ° C

- Pressure Range: 8 N/m<sup>2</sup>.

## 3. PNEUMATIC CYLINDER

Pneumatic cylinders can be used to get linear, rotary and oscillatory motion. There are three types of pneumatic actuator:

1. Linear Actuator or Pneumatic cylinders
2. Rotary Actuator or Air motors
3. Limited angle Actuators

Pneumatic cylinders are devices for converting the air pressure into linear mechanical force and motion. The pneumatic cylinders are basically used for single purpose application such as clamping, stamping, transferring, branching, allocating, ejecting, metering, tilting, bending, turning and many other applications.

### II. 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

1. 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

2. 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.

### III.FLOW CONTROL VALVE

This valve is used to control the speed of the piston movement and also it acts as a one – way restriction valve which means that the air can pass through only one way and it can't return back. By using this valve, the time consumption is reduced because of the faster movement.



Fig 6.1

### IV.DIRECTIONAL CONTROL VALVE

Directional control valves control the way the air passes and use for controlling the commencement, termination and

Direction of air flow. Depending on the number of paths the air is allowed to take, directional valves are termed as two-way, three way, and four way or multi way valves. The different number of ways by means the number of controlled connections of the valve, inlet connections to the compressed air supply. The Outlet connection is given to the air consumer and exhaust connection is given to the atmosphere

Direction valve control



Fig 7.1

#### *ADVANTAGES*

- It able to Increase the surenessin braking system.
- Braking system able to givefast response.
- System able to increase thepre-crash safety.
- System able to provide moresafety to the passengers.

#### *APPLICATIONS*

- This system may be applicable in all types of light vehicles like cars, Rickshaws, Tempos.
- This system also successfully installed in the heavy vehicles like buses, trucks, trailers, etc.

IV. MATERIAL USED

S.No	DESCRIPTION	QTY	MATERIAL
1	FRAME, SHAFT, METAL STRIP	AS PER REQUIREMENT	MILD STEEL
2	PNEUMATIC CYLINDER	2	ALUMINIUM
3	D C MOTOR, BATTERY	1	ELECTRICAL
4	WHEEL	4	RUBBER
5	SOLENOID VALVE	1	PLASTIC
6	HOSE AND CONNECTOR	2METRE AND 5	PLASTIC AND STAINLESS STEEL
7	BEARING	4	STAINLESS STEEL
8	CIRCUIT	1	ELECTRICAL
9	RELAY, IR SENSOR		

V. D LAYOUT MODEL

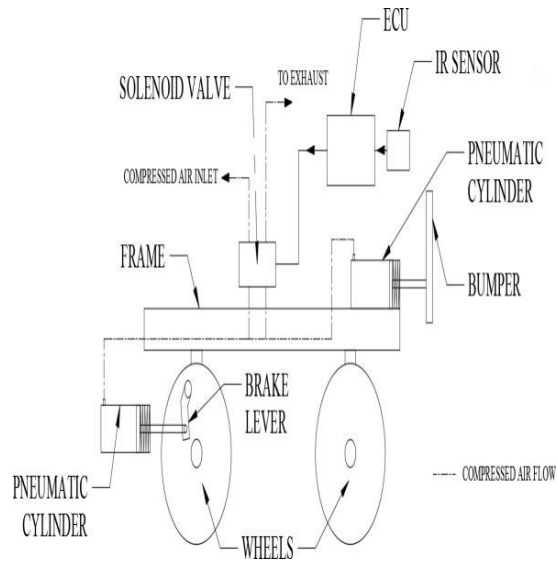


Fig.9.1

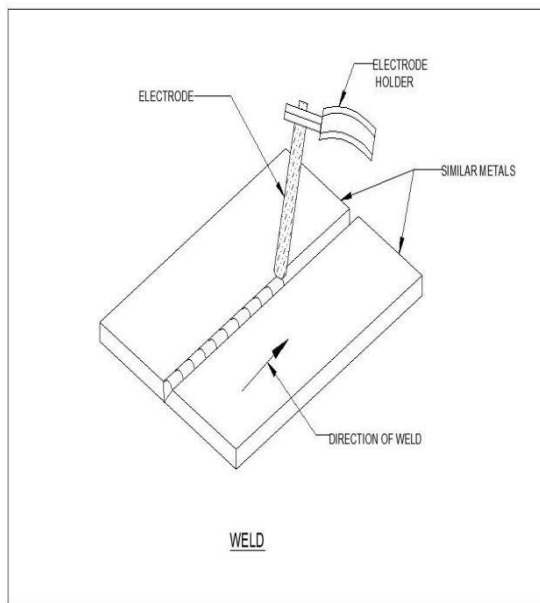


Fig. 9.2

## V.CONCLUSION

Anti-Collision Device (ACD) is a fully integrated Electronic Control System designed to minimize collisions and increase safety on Vehicles. The technologies are developed in the field problem to the Vehicles, to avoid this we developed Anti-collision system especially for four wheelers. The is based on intelligentsystem brake as well as extends the bumper from its initial position to reduce.

The damage caused during collision of automation that integrates heavy growth of vehicles for public transport. According to Indian road transport situation the Accident are major.

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