Review Paper Automatic Pneumatic Bumper for Four Wheeler

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Abstract— In almost all of the cases of vehicle accidents, the basic reason cited is failure to apply the brakes at the right time.If the brakes are applied at the right time the accidents can be prevented. Automation can assure higher reliability of braking as compared to fully manual braking. The use of pneumatic system can prove to be useful in automation due to its simplicity and ease of operation. So, the aim is to design and develop a system based on automatic control of vehicle so, we aim to design "Automatic pneumatic Bumper for 4 wheeler".

Key words: Automatic Pneumatic Bumper

I. INTRODUCTION

Today India is the most important under developed country in the world. 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. The number of peoples which are dead during the vehicle accidents is also very large as compared to the other causes of death. Though there are different causes for these accidents but proper technology of braking system and technology to reduce the damage during accident are mainly effects 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". We have pleasure in introducing our new project "Automatic Bumper System for Four Wheelers", which is fully equipped by IR sensors circuit and Pneumatic bumper activation circuit. It is a genuine project which is fully equipped and designed for Automobile vehicles. This forms an integral part of best quality. This product underwent strenuous test in our Automobile vehicles and it is good.

A. 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.

Now days almost all the manufacturing process is being atomized in order to deliver the products at the faster rate. The manufacturing operation is being atomized for the following reasons.

- To achieve mass production
- To reduce man power
- To increase the efficiency of the plant
- To reduce the work load
- To reduce the production cost
- To reduce the production time
- To reduce the material handling

B. Pneumatic Systems

The word 'pneuma' comes from Greek and means breather wind. The word pneumatics is the study of air movement and its phenomena is derived from the word pneuma. Today pneumatics is mainly understood to means the application of air as a working medium in industry especially the driving and controlling of machines and equipment.

C. Pneumatic Components

In engineering field, many machines make use of fluid for developing a force to move or hold an object. A number of fluid can be used in devices and system. Two commonly used fluids are oil and compressed air. A system which is operated by compressed air. A system which is operated by compressed air is known as pneumatic system.

II. FLR PACKAGE (OR) FRL PACKAGE

The air service unit is a combination of following units.

1) Compressed air filter
2) Compressed air regulator
3) Compressed air lubricator

Air Filter, regulator and lubricator are connected together with close nipples as one package.

A. Pressure Control Valve

Each hydraulic system is used to operate in a certain pressure range. Higher pressure causes damage of components. To avoid this pressure control valves are fitted in the circuits.

B. Direction control valve

Directional control valves are used to control the direction of flow. The design principle is major factor with regard to service life actuating force switching times etc.

C. Flexible hoses

The Pneumatic hoses, which is used when pneumatic components such as actuators are subjected to movement. Hose is fabricated in layer of Elastomer or synthetic rubber, which permits operation at high pressure. The standard outside diameter of tubing is 1/16 inch. If the hose is subjected to rubbing, it should be encased in a protective sleeve.

Fig. 1: Flexible Hoses

III. ACTUATORS & AIR CYLINDERS

Actuator and air cylinder designs from SMC offer innovative pneumatic cylinder design features for the automation industry. Engineers trust SMC actuators to provide long life, and reliable service. SMC products are specified in all major industrial markets. SMC actuators are created to provide you with the largest array of choices.

A. Linear: Basic Air Cylinder

Basic linear cylinders are used to provide straight-line, in/out linear movement for a variety of applications. Available as single acting (spring extend or spring return) and double acting styles with single rod or double rod configurations, non-rotating, and precision non-rotating models.

Fig. 2: Linear: Basic Air Cylinder

Body styles include crimped, round, or tie rod. Single acting cylinders develop thrust in one direction and have lower air consumption compared with the equivalent size of double acting cylinders. With a double acting air cylinder, air pressure may be alternately applied to provide force in both directions.

B. Linear: Compact Cylinders

A compact cylinder functions in the same manner as a basic cylinder with both single acting and double acting, single or double rod, and non-rotating models. However, SMC compact cylinders minimize space requirements allowing for precise, direct mounting in the least amount of space possible.

Fig. 3: Linear: Compact Cylinders

C. Linear: Roadless Air Cylinder

A rod less air cylinder differs from a basic air cylinder in that no piston rod extends outside the cylinder body. Instead, the internal piston is connected to an external carriage, by means of a magnetic or mechanical coupling system.

SMC's rod less air cylinders are ideal for long stroke applications because they are unaffected by rod overhang, bending, piston binding, and uneven seal wear, and for use in confined areas where space is a premium.

Fig. 3: Linear: Rodless Air Cylinder

D. Rotary Actuators

SMC manufactures both Rack and Pinion and Vane style pneumatic rotary actuator products. Combination rotary models combine compact linear cylinders and rotational capability. Combinations are also available that include rotary gripper capabilities. When the application calls for rotational motion less than one revolution, rotary cylinders can mount right at the equipment joint without taking up space with long stroke lengths, which would be required to do the same job with a linear cylinder. SMC's pneumatic rotary actuator units can achieve arc lengths of 90°, 180°, 190°, or even 270°, depending on the configuration. SMC offers both electric and pneumatic rotary actuator products.

Fig. 4: Rotary Actuators

IV. CONCLUSION

Behind the designing of this system, 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. We observed that our work is able to achieve all the objectives which are necessary. Initial cost of cars with air bags is always high. Usually air bags are given to high end cars. By implementing this project we can reduce cost of high end cars by giving similar kind of safety. Air bags are helpful to provide internal safety to people sitting in vehicle, whereas in our project we will be giving internal plus external safety to car from damage. Thus we will reduce initial cost of cars and also provide better safety

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