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Design of Automatic Bumper and Brake to Prevent Before Collision

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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 brakes are applied at the right time, accidents can be prevented. The aim is to design and develop a control system based intelligent electronically controlled automotive bumper activation and automatic braking system is called AUTOMATIC BUMPER AND BRAKE BEFORE COLLISION. There is any obstacle closer to the vehicle within 0.6m - 0.9m feet, the control signal is given to the bumper activation system and also pneumatic braking system simultaneously. This bumper and braking activation system is only activated the vehicle speed above 20-30 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.

Keywords: Automatic Bumper, Pneumatic Bumper, Control Unit, Proximity Sensor

I. INTRODUCTION

We have pleasure in introducing our new project "AUTOMATIC HAND BRAKE RELEASE", which is fully equipped by automatic system. It is a genuine project which is fully equipped and designed for Automobilevehicles. This forms an integral part of best quality.This is an era of automation where it is broadly defined as replacement of manual effort by mechanical power in all degrees of automation.The operation remains an essential part of the system although with changing demands on physical input as the degree of mechanization is increased.

Degrees of automation are of two types,

1. Full automation.
2. Semi automation.

1.1 AUTOMATION

In semi automation a combination of manual effort and mechanical power is required whereas in fullo automation human participation is very negligible .Automation can be achieved through computers, hydraulics, pneumatics, robotics, etc., of thesew sources; electronics form an attractive medium for low cost automation .The main advantages of all electronic systems are economy and

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simplicity. Automation plays ano 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 ando 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.

II. LITERATURE REVIEW

Numerous researchers agree that about two-thirds of all rear end crashes are Lead Vehicle Stationary (LVS) crashes as opposed to Lead Vehicle Moving (LVM) crashes (Horowitz, 1994; Knipling, Hendricks, Koziol, Allen, Tijerina, and Wilson, 1992; Mortimer, 1981). LVS crashes were also thought to be less severe but accounted for the most injuries, crashes, and fatalities. Knipling et al. (1992) found that the most common pre-crash vehicle maneuver for the striking vehicle was simply "going straight" (84 % of cases)The pattern of causal factors identified in the Tri-Level study (Treat et al., 1979) is true for both LVS and LVM crash subtypes – especially LVS. As mentioned previously, out of three categories identified by Treat et al. (1979), human error was identified as the major factor in crash causation. The other two categories included vehicle and highway design. However, Dingus, Jahns, Horowitz, and Knipling (1998) point out that these categories of causation all interact and enforce one another. As a result, preventative measures should seek to enhance the safety of vehicles (e.g., collision warning systems) and/or the environment (e.g., intelligent signaling) to compensate for driver error. Enhancing these factors would effectively reduce driver error through more positive interaction, However, the types of driver error need to be fully understood before design recommendations can be made to alleviate these crash causes.

III. METHODOLOGY

Manufacturing processes are the steps through which raw materials are transformed into a final product. The manufacturing process begins with the creation of the materials from which the design is made. These materials are then modified through manufacturing processes to become the required part. Manufacturing processes can include treating (such as heat treating or coating), machining, or reshaping the material. The manufacturing process also includes tests and checks for quality assurance during or after the manufacturing, and planning the production process prior to manufacturing. Various operations are performed in this process are

- Metal cutting
- Sawing
- Welding
- Drilling
- Final inspection and then assembly

3.1 COMPONENTS

The major parts that are effectively employed in the design and the fabrication of the automatic hand brake release with pneumatic bumper and braking system are described below:

Bearing With Bearing Cap,
AC Motor,
Belt drive,
Pulley,
Pneumatic cylinder,
Frame,
Sensor,
Control unit,
Battery,
Push button,
Spring.
Solenoid valve.

IV. WORKING PRINCIPLE

The main objective of this project is to enable and disable the hand brakes when the key is taken outand inserted respectively. This is done with the help of a pneumatic cylinder and a control unit. To show the brakingeffectively, a wheel arrangement driven by an AC motor is arranged. The power from the motor is transmitted to the wheels through the belt and the pulley arrangement. The braking arrangement is connected with a pneumatic cylinder through a cable such that when thepneumatic cylinder is actuated, the cable is pulled and the brakes are activated. When the cylinder is actuated in the opposite direction, the cable gets loosened and the brakes are released. Now when the key is inserted into the ignition slot, this sends signals to the control unit and the control unit actuates the solenoid valve such that the air enters the pneumatic cylinder and is extended. This extension of the cylinder releases the cable and the brakes are released.

On the other hand,when the vehicle is parked and the key is taken out, the control unit sends signals to the cylinder and the cylinder is actuated in the opposite direction such that the cable is pulled and the brakes are applied. Also an emergency push button is provided which activates the brakes at the time of criticalsituations. When this push button is pressed manually by the driver, the control unit sends signals to the pneumatic cylinder and the brakes are applied. This emergency button activates the brakes even though the key is not taken out of its slot. Thus it helps the drivers to stop the vehicle at emergency situations like, while having a heart attack or during major accidents, etc. Also a sensor is provided in the front of the vehicle which senses the distance between theobstacle and the vehicle all the time. If the distance becomes closer, then the brakes and the bumper are activated automatically.This prevents the heavy accidents and the life of the driver can be saved.

V. MANUFACTURING PROCESS

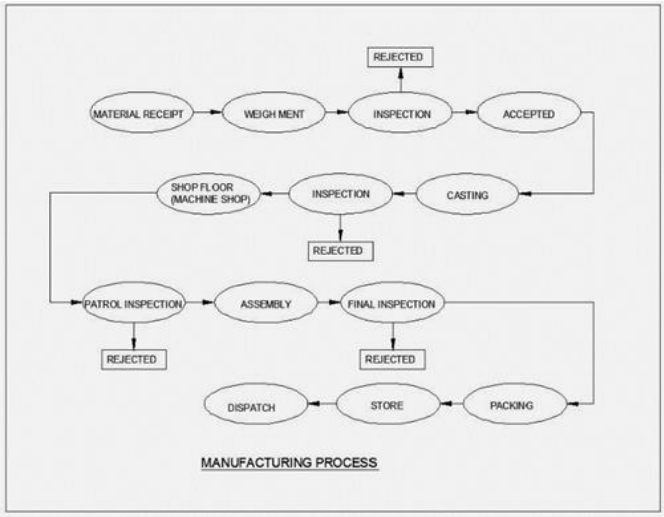

Figure 1: Manufacturing Process

ADVANTAGES:

To achieve mass production.
To reduce man power,
To increase the efficiency of the plant.

APPLICATIONS

These types of automatic hand brake release with pneumatic bumper and braking systems have a wide range of applications in the fields like, Automobile industry, In all four wheelers, In heavy vehicles.

VI. EXPERIMENTAL RESULTS AND DISCUSSION

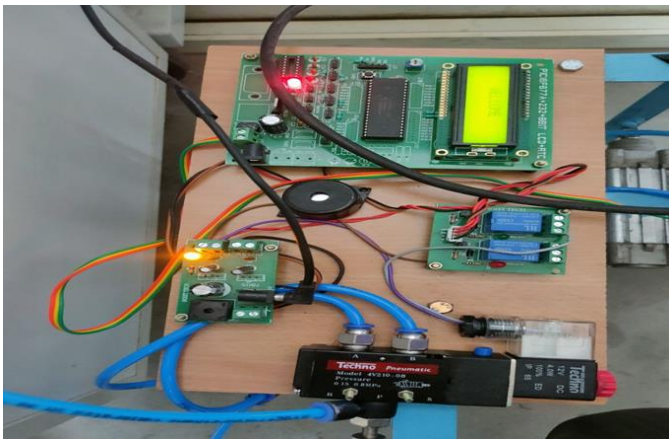

Figure 2: Electric board

Figure 3: Brake system

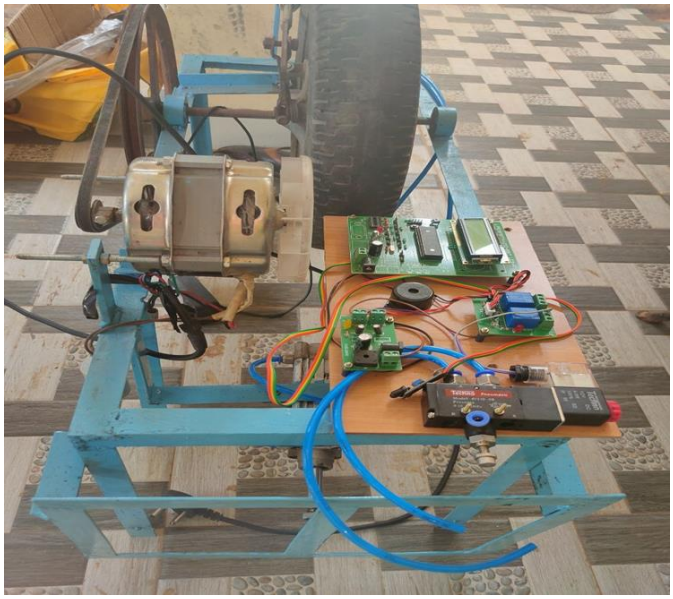

Figure 4: Bumper system

VII. Calculations

Operating power;
P= 3 bar
=300KN/m*
Area of the cylinder,
A=x/4d° , where, d= 30 mm (approx)
Area (A) = 2/4 (0.03)°
= 0.785 * 0.0009
Area (A)= 0.00071 m*
Pressure = Force / Area
F = 300 * 10° * 0.00071
F=213N
Power = Force * Velocity
Velocity (V) = Displacement/Time
= 60mm/R
V =0.03m/s
Applied force (F) = Pressure * Area
= 300*10°*0.00071
Force = 213 N
Power = 213 * 0.03
P = 6.39 watts

Calculations

Operating power;
P= 3.5 bar
=350kN/m*
Area of the cylinder,
A=w4d , where, d= 30mm (approx)
Area(A) = 7/4 (0.03)
= 0.785 * 0.0009
Area (A) = 0.00071 m?*
Pressure = Force / Area
F = 350 * 10° * 0.00071
F=248N
Power = Force * Velocity
Velocity (V) = Displacement/Time
= 60mm/R
V = 0.03m/s
Applied force (F) = Pressure * Area
= 350*10°*0.00071
Force = 248 N, Power = 248 * 0.03
P = 7.44 watts

THE BUMPER AND BRAKE GOT ACTIVATED ON THE PRESSURE OF 0.24 bar.

VIII. RESULT

All in all comments of our task work, let us add a couple of additional lines about our impression project work. Hence we have fostered an "Programmed PNEUMATIC BUMPER AND BRAKING SYSTEM" which assists with accomplishing a robotized slowing mechanism which disposes of the hindrances of the manual hand slowing mechanism with the use of effectively

accessible parts. By utilizing more strategies, they can be changed and created by the applications.

IX.CONCLUSION

This task work has given us a superb open door and experience, to utilize our restrictedinformation. We acquired a great deal of commonsense information with respect to, arranging, buying, gathering and machining while at the same time accomplishing this task work. We feel that the task work is a decent answer for span the entryways between the foundation and the ventures. We are pleased that we have finished the work with the restricted time effectively. The DESIGN OF AUTOMATIC BUMPER AND BRAKE TO PREVENT BEFORE COLLISION is working with good circumstances. We can ready to comprehend the challenges in keeping up with the resistances and furthermore the quality. We have done to our capacity and expertise utilizing accessible offices.

X. CONCLUSION

1. The perfect barrier is covered with body then no such viral affecting
2. antibody of that particular spreading collected atoms
3. reducing agents to Penetration to body power
4. the antibody is nothing but enemy of that particular viral atoms holding spreading body
5. Controlling surrounding environment of spreading viral atoms
6. Strong layer of barrier plays vital role

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