IMPACT REDUCING BUMPER SYSTEM

[1]Kiran Prajapati,[2]Mr. Bhaumik Bhandari and [3]Dr. Dipesh Patel
[1]Student, [2]Assistant Professor and [3]Head of the Institute
Department of Mechanical Engineering
D.A.Degree Engineering & Technology
Mahemdabad, Gujarat, India

Abstract

With increase in number of vehicle accidents which is a major problem. To avoid or prevent it to turn out severe we have developed an automatic impact reducing system in our project. The system is based on intelligent electronically control system known as "Impact Reducing-bumper system".

Impact Reducing bumper system uses Sonar sensor, which senses the vehicle or obstacle arriving in the way such that it is responsible for an accident. As soon as any object or vehicle comes in close proximity of the automobile, it is detected by the sensor and the sensor sends feedback signal to engine to activate the Valve allowing the flow of compressed air to the cylinder.

The compressed gas flowing through the solenoid valve will activate the cylinder which in turn activates the Bumper. This system aforementioned provides pre-crash safety to the vehicle. Additionally, it improves the response time of vehicle braking to keep safer distance from the vehicles. By using this system, we can obtain control over the speed of vehicle in short distance.

Keywords: Sensor, Automatic, Compressed, Cylinder.

Introduction

The main function of a bumper system is to protect the car body and passengers during impact collision. In frontal bumper system consists of three main components called the fascia, the absorber and the bumper beam.Figure shows three main component of a common bumper system.
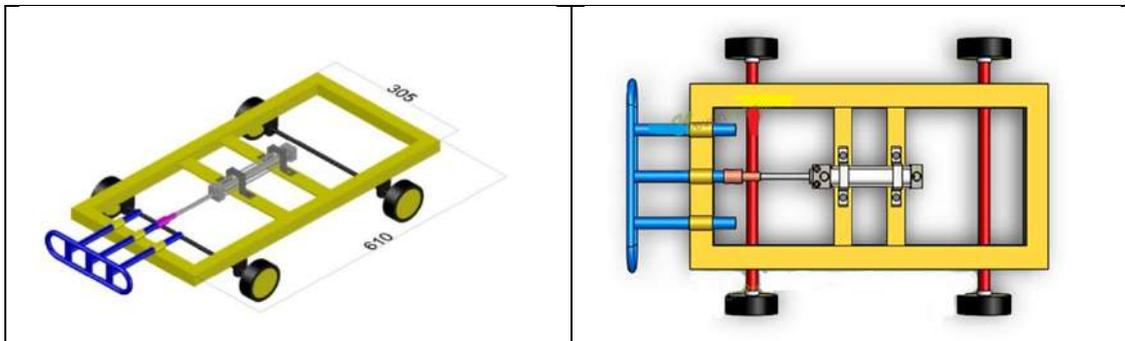
Figure

The fascia is usually used for aesthetics and for decreasing the aerodynamic drag force. It cannot tolerate to impact energy;thus, it is considered a non-structural component. The absorber is designed to dampen a portion of the kinetic energy from a collision. The bumper beam is a key structure that helps to absorb the kinetic energy from a high-impact collision and to provide bending resistance in a low-impact collision. Bumper beam will absorb the impact collision energy in a controlled manner before the energy gets transferred to the passenger compartment.

Truck accidents account for a sizeable percentage of the total number of accidents in New South Wales. Truck involvement in fatal accidents account for 15.5 to 21.3% of the total, for the period 1982 to 1993. Throughout Australia, 398 people on average are killed and 1800 on average are injured in accidents with trucks. From this study and other Australian studies, the occupant most at risk is the car occupant (also pedestrian). Very rarely is the truck occupant physically injured in these types of collisions. Head-on or frontal collisions have been identified as the most common accident configuration. Analysis is of the accident configuration shows that from 1986 to 1993 between 18-36% of the total fatalities, in NSW involving trucks, involved the truck and car colliding head-on.

Literature Review

The Bumper of a vehicle plays an important role for the safety of the pedestrians in case of impacts at lower speeds. The design of bumper also decides the aesthetics looks of a vehicle. The main function of bumper is to sustain low speed impacts and protect various components of vehicle such as, headlamps, hood (bonnet), parking lights, trunk door, tail lamps, radiator, etc. however its contribution becomes insignificant at higher speeds.

Problems related to traditionally used simplified crash models of the car based on one mass with an associated mass reduction are presented in the project. Models of the car subjected to crash load cases used to verify the performance of a bumper system is created that improves the prediction of the response. The methodology also gives knowledge of how model parameters shall be adjusted based on the properties of the car under development.

Scope of the project

A roller is used to impregnate the fiber with resin. Another resin and reinforcement layer is applied until a suitable thickness builds up. It is very flexible process that allows the user to optimize the part by placing different types of fabric and mat materials. Because the reinforcement is placed manually, it is also called the hand lay-up process. Though this process requires little capital, it is labor intensive.

Aims and Objectives

* To ensure the braking of vehicle in time.
* To increase the crashing distance during accident.
* To increase the safety during pre-crash.
* To ascent external safety to vehicle body.
* To decrease the level of passenger injury by use of external vehicle safety device.
* To reduce the requirement of internal safety devices like air bags

Result and Discussion

We have carried out both the "White box" & "Black Box" testing for our project. Since our project is mainly for residential, industries, offices, etc. Based users we easily got our system tested in our labs. For the white box testing we have approached our external guide to test our device and we got his reviews. For the black box testing we asked various students and friends to use our device and we got various reviews from them.

Once source code has been generated, software must be tested to uncover all the possible errors before delivery to your customer. Software tested from two different perspectives:
 1. Internal programming logics are exercised with the use of "white box" test case designing techniques.
 2. Software requirements are exercised with the use of "Black Box" test case designed techniques. In both cases, the intent is to find the maximum number of errors with correspondence to minimum amount of effort and time.

Attributes of good test are

* A good test has high probability of finding an error.
* A test is said to be good if it is not redundant.
* A good test must be "best of breed"
* A good test should neither be too simple nor too complicated.

Conclusion

The result shows that the objective of this work is fulfilled by reducing the transfer of impact energy through energy absorbing bumper under collision. It also reduced the deformation of beam as well. So, it is concluded that energy absorber not only reduce the transfer of impact force but also promises the reduction in damage cost, in case of collision of a vehicle.

* Automation of the entire system improves the efficiency.
* The system works efficiently and has ubiquitous applications round the world.
* The system's aim to protect driver and the resources or people outside it is successfully accomplished with intelligently controlled automotive bumper system.
* Updating of information becomes much easier and quick process.

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