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Air Bag System in Two-Wheeler Vehicle System

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Abstract: *The Airbag system was first presented in 4-wheeled vehicles however this research gives data about the presentation of the airbag system that can be utilized in the bikes (bicycles). The concept of airbag system is "To decrease the injury to a rider while affecting with an opposing vehicle and additionally restricting article in frontal impacts by retaining rider kinetic energy and by reducing ride separation velocity from bike the forward way." This should be possible with the assistance of ANGLE sensor, an edge marker and feeling of the crash and the expansive recurrence vibration for to open the air bag. The research will likewise include the working, development, establishment and the issues with respect to airbags. A portion of the confinements saw in conveying airbags are that bike riders are less inclined to be in a settled area regarding the airbag at the purpose of effect and the absence of supporting surface. The idea of such effects will be analyzed in the simulation for a proposed airbag system to assess the head increasing speeds when the initial contact with the airbag is during the arrangement stage*

I. Introduction

The concept of this airbag system is "To reduce the injuries to a rider while affecting with an opposing vehicle as well as restricting object in frontal crashes by absorbing rider kinetic energy and by decreasing rider detachment speed from motorcycle the forward way." With the help of the ANGLE sensor with an angle indicator and feeling of the impact and the vast large vibration for to open the air bag. The Airbag system was first introduced in 4-wheelers. This paper gives information about the introduction of the airbag system can be used in the two wheelers(bikes). This paper shows the working, construction, installation of this system and problems that can occur in this system. Accidentinvolving two wheeler are assuming a significant social cost and there dynamics is really more complex and diversified than accident involving only car and there occupant .since the kinematics of biker body can influenced by a wide range of variable ,so motorcycle air bag must be compliant with far more specification than an automotive one and need a more careful and accurate design often also totally different design approach is required there are two different kind of air bag for motorcyclist mounted on vehicle or fitted in bikers garment. The inflation of the device mounted on the motorbike is activated by one or more accelerometer put on the vehicle or even the wheel mount, to get earlier information when a frontal impact occurs. the bag itself is generally quite big (150liter) and to obtain acceptable inflation time a pyrotechnic inflator is used.

II. Problem Definition

1. When accident is occurring in India in two-wheeler, highest injury occurs to human.
2. Some research paper indicated about real data analysis regarding traffic control and avoiding accident in city area.
3. There is possibility of work in direction two-wheeler vehicle drive in safe mode so for that to develop airbag system for such kind of vehicle.

Design with required instruments

The followinginstruments are utilized for the 2 wheeler Airbag system -

1. Air bag (leather material with grasp innovation)
2. Chemical chambers for discharging the air or gas
3. Sensors (edge sensor and crash sensor)
4. Fitting cage
5. Inflator

Air bag (leather material with grip innovation)

Airbags are stretchable textures or different materials that are firmly packed in different areas all through your vehicle. These bags are compacted and kept in a small area. At the point when there is a accident,

the airbags top off with air very rapidly to give a cushioning system to the general population on the motorcycle so they are not tossed around in case of an accident. . While this does not necessarily prevent total injury or death, it can be very helpful in cushioning the passengers in many caseins many cases.

Chemical reaction behind opening of airbag

Actual opening of air bag is due to the chemical reaction occurred in between two chemical cylinders which are fit at the bottom of bike. When an external force or collision of two objects with bike occur then the chemicals in those two chemical cylinders mix with each other and the chemical reaction takes place inside the cylinder. In 2-wheeler vehicle system, the air bags are fit in both sides of the bike. Figure shows the position of the air bag system to be fitted so that the total protection of the vehicle can be covered hence they pedestrian safety can be achieved.

Sensors (angle sensor and crash sensor)

The most important parts behind the success of the airbag system are the sensors. These are small pieces of electronics that are designed to tell when the vehicle has been damaged in an accident. They react to a few distinct arrangements of improvements, including sudden stopping, expanded weight as bits of the bike are moved because of the power of the impact, and edge between road surface and feels worn out on bike. Different type of sensors estimating wheel speed, situate tenant status, brake weight and impact, and other vehicle status indicators are checked by the airbag control unit situated in the front segment of the cabin.

Fitting cage

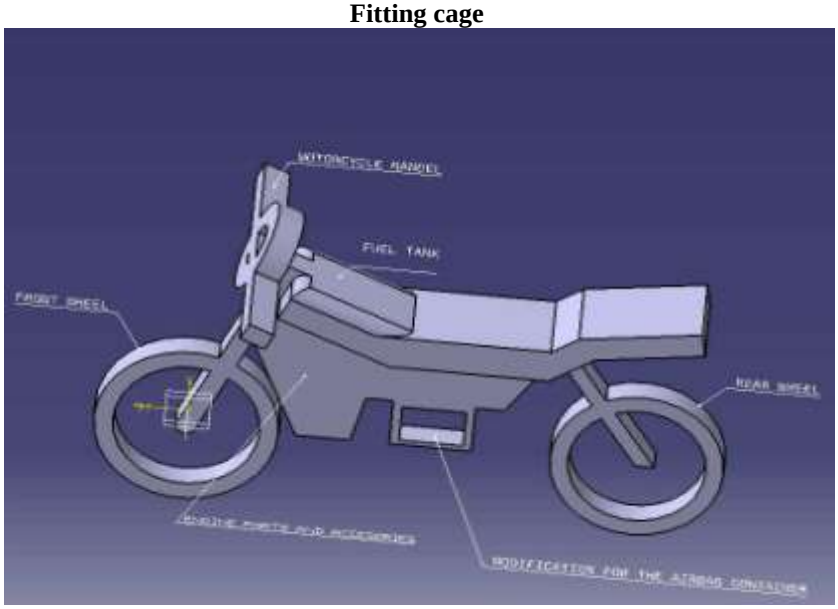


Figure 1 - Modification for the airbag container

Figure 1 shows that the change is required for the capacity of airbag. This cage is comprised of metal strips with two openings for airbag.

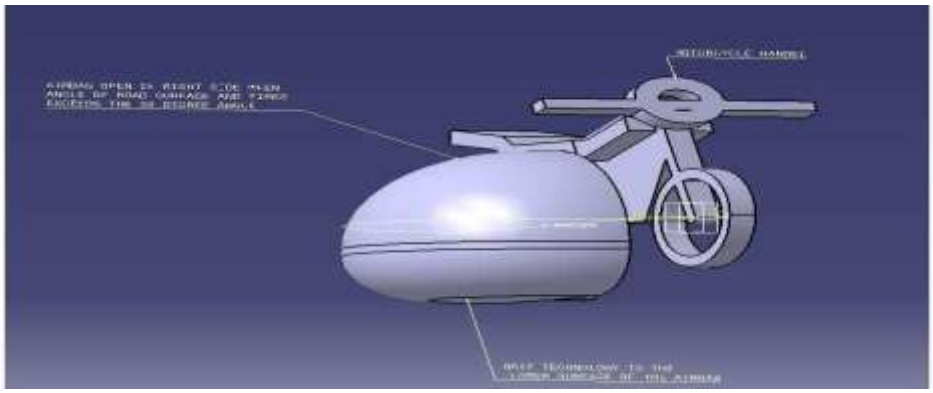


Figure 2 -Airbag opens up on the right side of bike as the angle exceeds 30 degrees.

From figure 2 The angle between road surface and motorcycle tyres exceeding 30 degrees is detected by using an angle sensor, hence as given above chemical reaction takes place and airbag opens up on right side of the motorcycle.

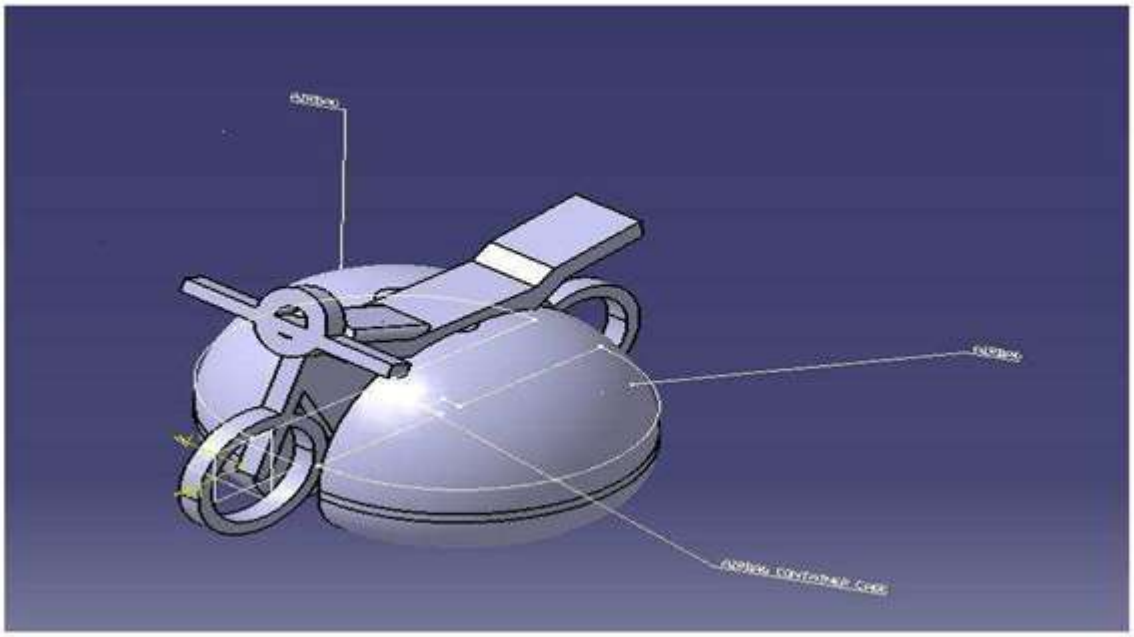


Figure 3-airbag opens up in both directions when any object collapses to the motorcycle. When any object collides with the motorcycle, at that time the airbag opens up in both directions to protect the passenger who is riding.

Inflator

When the control unit decides there is an accident, it sends a single to the inflator system. The inflator sets off a synthetic charge, creating a blast of nitrogen gas, topping off the airbag. As the airbag tops off, it blasts through the framing that contains it so as to ensure you. This occurs in a moment, more often than not inside 25 or 50 milliseconds. That means just about 200 miles for each hour. The airbag then will empty itself all alone once it gets sent.

How air bag system protects the human body parts??

The provision of air bags on motorcycles is more complex than installation in cars, because the dynamics of a motorcycle crash are more difficult to predict. But we discussed the following points on accident. These characteristics leads to act with very short reaction time and fast inflation but only if the motorcycle is involved in the accident. Limitation of this system is that they work properly only under particular conditions, especially the rider must remain on the motorcycle during the accident and the impact dynamics must lead him to hit exactly the part of his vehicle protected by airbags.

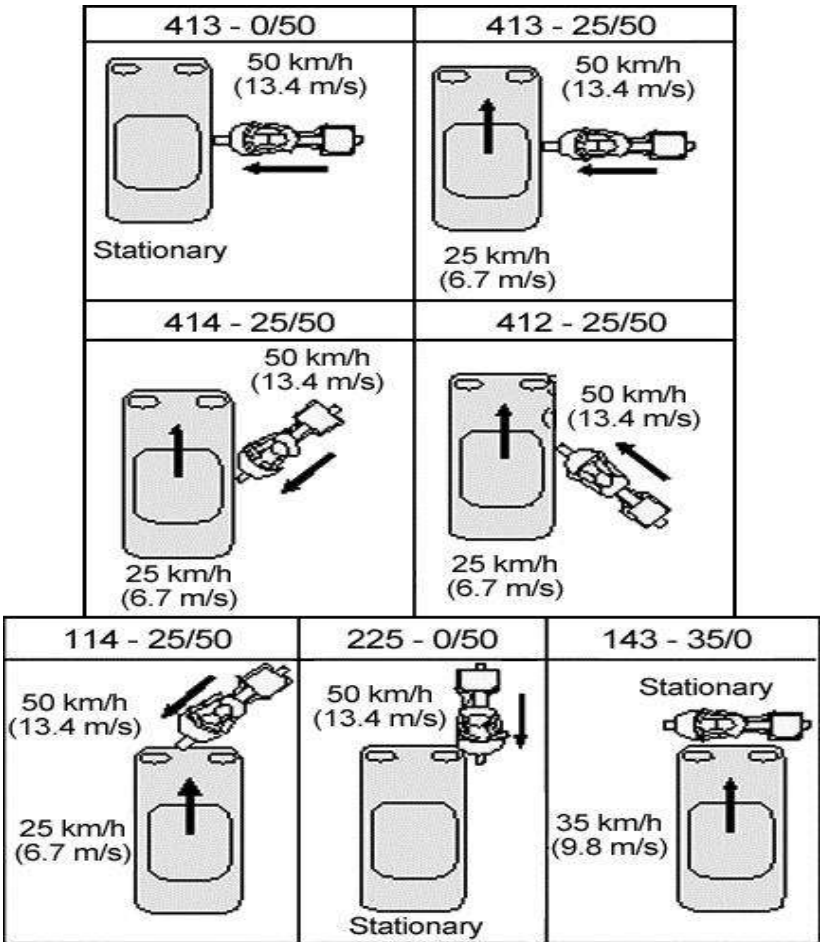
Normally, following kinds of bodily harms occur in the accident

-Hand/leg Cracks or fractures

-Head injury

-Bleeding from body parts

-Getting thrown from bike



The passenger can be protected from the above-mentioned bodily harms as described as, the air bag system opens from the bottom to the left or right side of bike; hence we can avoid hand/leg cracks or fractures. The diameter of the air bag when opened is more than height of the bike and that of the rider, hence head injury is avoided as the material used in the air bag construction is light weight strong leather the chances of bike skidding or slipping is diminished and external injuries like scratches are avoided. The chances of the rider being thrown from the bike are avoided as the leather belts are provided on both sides of the bike to secure the legs of the rider.The material used for manufacturing these belts is similar to those used for manufacturing seat belts of cars.

III. Conclusion

By giving absolute security to the bike rider by embedding the airbags on the two sides of the bike as notice in this article, we will decrease the casualty rate by 20% to 30%. By using this technology there is not only a reduce in death rate but also gives the total protection to the rider as well as motorcycle.

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