A REVIEW PAPER ON ANTI-LOCK AND AUTOMATIC BRAKING SYSTEMS

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ABSTRACT

This paper presents an Anti-lock and Automatic Braking system using ultrasonic sensors. . If the speed of the vehicle is above a set velocity for a predefined safety distance, then the microcontroller based system performs the actuating mechanism to bring back the vehicle to a safe speed thereby minimizing the chances of accidents. An Automatic Braking System (ABS) combines Advanced Driver Assist systems and Electronic Stability Control to slow down the vehicle and potentially mitigate the severity of an impact when a collision is inevitable. The advantages of AEBS over conventional braking system are explained along with the future developments which may be possible in this field. Vehicle technology has increased rapidly in recent years, particularly in relation to braking systems and sensing systems.

INTRODUCTION

Automatic Braking is a technology for automobiles to sense an imminent collision with another vehicle, person or obstacle; or a danger such as a high speed approach to a stop sign and to respond with the braking system by either pre-charging the brakes or by applying the brakes to slow the vehicle without driver input. Antilock Braking System (ABS) is used in advanced automobiles to prevent slip and locking of wheels after brakes are applied. It is an automobile safety system in which the controller is provided to control the necessary torque to maintain optimum slip traction. The

Introduction of Anti-lock Braking System (ABS) has provided building blocks for a wide variety of braking control systems.

Additional hardware allows brake pressure to be increased or reduced as per demand. Additional software control algorithms and sensors allow traction control (TC), electronic brake force distribution (EBD), brake assist (BA) and electronic stability control (ESC) functions to be added. Automatic Over speed Control System (A.O.C.S.) is a concept that stresses on preparing a control system that is based on automatic braking for a motor-cycle. ABS control is highly nonlinear due to the complicated relationship between its components and parameters. The research that has been carried out in ABS control systems covers a broad range of issues and challenges. Many different control methods for ABS have been developed and research on improved control methods is continuing.

Some of the most common reasons why drivers fail to apply the brakes on time are distraction, inattentive, sleepiness, lack of concentration while driving, visibility, road surface quality, weather condition, time of day, sudden road obstructions from other motorist and environment, and including seizures/heart attacks. the AEB sys tem will automatically apply emergency brakes with different levels of force using its intelligent algorithm for speed, trajectory, momentum, and other factors to avoid or at least lessen the impact of the collision. Some models will deploy or activate the restraint system ready for impact. Driving is a compulsory activity for most people. People use their car to move from one place to other place. The number of vehicles is increasing day by day. Nowadays, accidents are increasing and are uncertain. Accident will occur every time and everywhere and cause worst damage, serious injury and even death. These accidents are mostly caused by delay of the driver to hit the brake.

ADVANTAGES

1. A totally driverless car can be made using this technology and further extending it to automatic steering system.

2. Crashes reduced to a negligible impact speed – AEB has the potential to reduce the impact speed, and hence the severity, in pedestrian crashes, right turn crashes, head on crashes, rear end crashes and hit fixed object crashes. it appears that they may have little or no effect on right angle crashes, but secondary effects that improve drivers ‟ abilit ies to avoid collisions may be important in this case. Potential benefits appear to be greatest in pedestrian crashes, rear-end crashes and head on crashes.

3. A study in the USA has shown clearly that cars fitted with AEB are involved in fewer crashes than comparable cars without. The frequency of claims was significantly lower for bodily injury, first party (own car) damage and for third party (other car) damage .The biggest benefit seen was in third party injuries - typically whiplash - where there was a 50% reduction in the number of claims from cars equipped with AEB

4. Reduced car insurance premiums. Motor cover providers see AEB-equipped vehicles as less likely to have a crash and therefore a less risky prospect to cover. In theory, this means cheaper car insurance for the end user – you, the motorist.

DISADVANTAGES

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LITERATURE REVIEW

Safety Consideration in Cars

There are various safety consideration involve to make passenger comfortable while traveling, and it has been modified as generation of automobile goes by. Here are some area the modification has been take place:

Strong Chassis

In old days the chassis were made of wooden floor and not good enough to sustain the load. But now days the chassis is made of alloy of lightweight aluminum and strong cast iron to give chassis immense strength such that it withstand load and sustain in accident.

Dash Board Modification

The Dash board is modified and simplified in recent days such that it can be user friendly. Ergonomics (the relation between man & machine) of dash board include various sensors and meters to make it comfortable.

Implementation of Air Bags

Airbags (passive restraints) have saved many lives and reduced injuries in vehicle crashes, there are accidents where they have been the cause of injury and/or death. Knowledge of the history of airbag systems and how they work is important in understanding if they are a factor in an occupant's injury or death. An overview of these subjects is presented in this paper. In addition, potential airbag defects are defined.

Power Braking, ABS, Power starring, TRC

Today many path braking technologies and brake components such as brake boosters, brake cylinders, brake hydraulic valve, brake lines, etc., lend a braking system high efficacy. They are also the key behind advanced braking systems such as the anti-lock braking system. The following are some braking systems and their components.

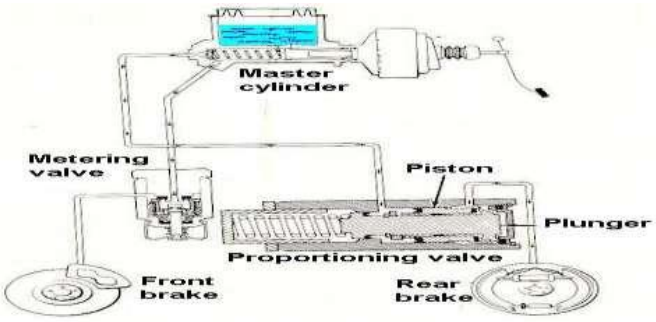
PRINCIPLES

Collision avoidance - Sensors detect a potential collision and take action to avoid to it entirely, taking control away from the driver. In the context of braking this is likely to include applying emergency braking sufficiently early that the vehicle can be brought to a standstill before a collision occurs. In future, this could also include steering actions independent of the driver. This Category is likely to have the highest potential benefits but is the highest risk approach because a false activation of the system has the potential to increase the risk to other road users.

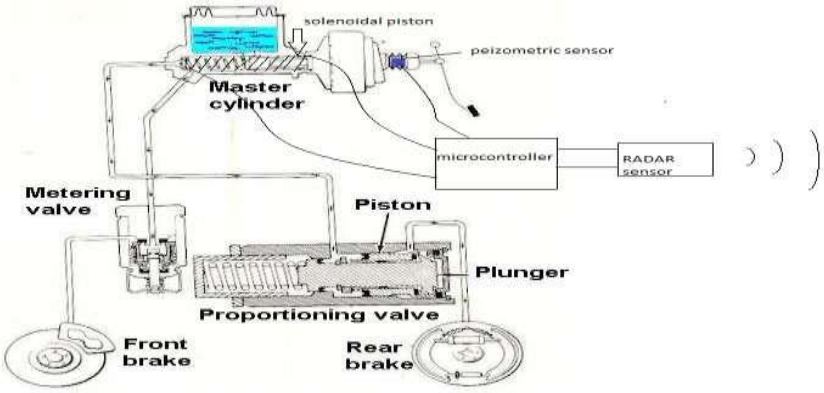
Collision Mitigation braking systems (CMBS): Sensors detect a potential collision but take no immediate action to avoid it. Once the sensing system has detected that the collision has become inevitable regardless of braking or steering actions than emergency braking is automatically applied (independent of driver action).

Forward collision warning

Sensors detect a potential collision and take to a warn the driver, This is the least risky options since false detection of a collision only has impacts on the drivers reaction to and perception of, the system. This type of system could also be used to optimize restraints. This type of system has been sold on some EU vehicles since 1999.



Normal Braking System



Braking System with proposed design AEBS

CONCLUSION

1. If we can reduced the Driving Interference of Braking and Give the Responsibility To Intelligence Sensor which will Take decision and initiate the Response To give Warning alarm

First and if Distance of impact is Closing it will Apply brake Automatically and Stop the Vehicle in advanced.

2. Such that Distraction Driving is a Major Contributor to Accident death, thus by implementing this System we can reduced the Close impact Potential Accident.

3. By dragging the front seat at opposite direction to Impact and increase the Distance And Time Of Direct Impact the death can be minimized and safety of vehicle also can improved, and also it can add the new feature to the car which will attract the customer who prefer safety while traveling.

4. The results of the simulations showed that by using an energy absorbing seating system, crash deceleration can be effectively attenuated and occupant injuries significantly reduced in comparison to conventional seating systems. In future, physical crash tests will still be required as the final certification method for approval of a particular crashworthy mechanical system. However during the development process the application of computer simulation methods as presented in this paper show that it is possible to reduce development costs.

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