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DESIGN AND DEVELOPMENT OF SPEED BREAKER DETECTION AND AUTOMATIC SPEED CONTROL SYSTEM IN 4 WHEELER

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Abstract— India has a large network of road throughout the country. India faces the highest number of accidents and accidental fatalities in the world. To prevent the accidents caused due to over speeding of vehicles, speed breakers are used. But, the accidents are caused due to both presence and absence of speed breakers. The traffic related accidents can have dire consequences. Traffic safety solutions of today forces heavy vehicles to slow down more than necessary. Smart Speed Breaker is a traffic safety system where speeding vehicles activate the speed breaker and raises the speed bumps above the road surface and giving the physical reminder to driver to slow down the vehicle. If the speed of the on-going vehicles is within the permissible limit then the speed bumps stay flat on road surface and vehicles pass over it comfortably. It's a modern way to keep control on speeding vehicles only and not to affect the legal speed vehicles. Further modification can also be done for emergency vehicles accessibility.

Keywords - Gyroscope-sensor, Automatic Speed Control, Speed Breaker Detection, Viper motor, Arduino Board.

I. INTRODUCTION

Today India is the most important underdeveloped 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 people who die during vehicle accidents is also very large as compared to the other causes of death. Though there are different causes for these accidents, proper technology of the Speed breaker detection system and technology to reduce the damage during accidents are mainly effects on the accident rates. So today the implementation of a proper bumping system to prevent accidents and to reduce the damage is a must for vehicles. To achieve this system modification as a goal, we design this Emergency braking system. It is the project which has been fully equipped and designed for auto vehicles. Nowadays vehicle accidents are the major problem. The purpose of this system is based on an intelligent electronically controlled automatic braking system. This system improves the response time of vehicle bumping to keep safe distance between two vehicles.

II. PROBLEM STATEMENT

In recent years, the push for safe and innovative traffic calming measures has gathered pace across the globe since speeding has been identified as the biggest single reason for road crashes and fatalities. It's an accepted fact that drivers will make mistakes. While we educate them, take measures to streamline the manner in which driving licences are doled out, we need to design automatic speed breaker detection and speed control system in 4 wheelers.

III. PROPOSED SYSTEM

We have the pleasure of introducing our new project "Speed Breaker detection and emergency braking system", which is fully equipped with an IR sensor circuit, automatic braking and Pneumatic braking activation circuit when the driver is not applying the brakes manually in case of emergency. 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 testing in our Automobile vehicles and it is good. The important components of our project are,

- 1 IR transmitter
- 2 IR receiver
- 3 Control Unit with Power
- 4 Solenoid Valve
- 5 Flow control Valve
- 6 Pneumatic cylinder

Automatic Safety System for Automobiles, from [4] –

In this paper, the need for safety of vehicles by reducing the impact of crash by applying a smooth or partial braking with the help PIC 16F877a micro controller is proposed. The driver's risk of measuring a certain object from a particular distance and failing to notice within the critical limit such conditions are met while designing this work. Once a similar situation is faced the acceleration of the automobile will be directly controlled without disturbing the safe throttle (actual throttle mechanism) of the automobile, the designed machine itself takes the control of acceleration pedal if the brake is not applied within the critical distance. The method is proposed in such a way to be applied to both low cost and existing vehicles as these were already build for the Indian roads.

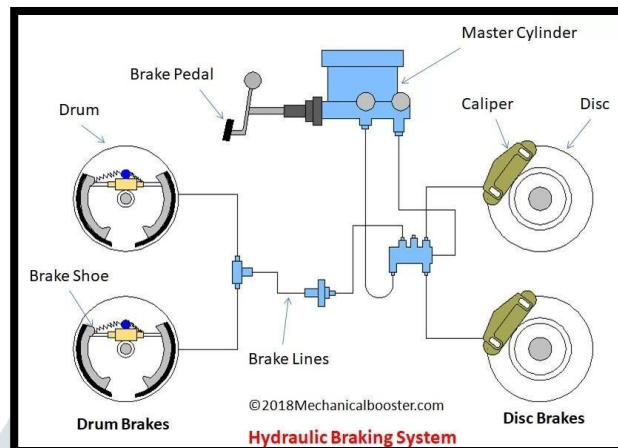


Fig 1. Proposed braking method the controlling of the rear brake

The Figure 1 is the proposed braking method the controlling of the rear brake will adjust the torque of the wheel enabling the system to control the application of brakes. The speed control will be only applied if the distance is below 45% to collide or else the driver will only have control after he applies the brake. The system will take over if it is too close this will make the brakes and accelerator pedals to be cut from the driver's control and the system will apply the brake and here the algorithm provides a smooth operation of the vehicle and sudden jerks will not be realized.

The method was simulated, the results were verified through MATLAB 2009R and the graphs are plotted. Safety and automation is the main trend of future vehicle development. In the future authors believe that safety and warning measurement will be the basic all existing vehicles. The warning and smooth braking system will not only prevent accidents but ensures comfortable travelling at the highways also. When the driver cannot operate the car effectively or vehicle unrestrained or driver doze off, it can help the vehicle slowing down on braking

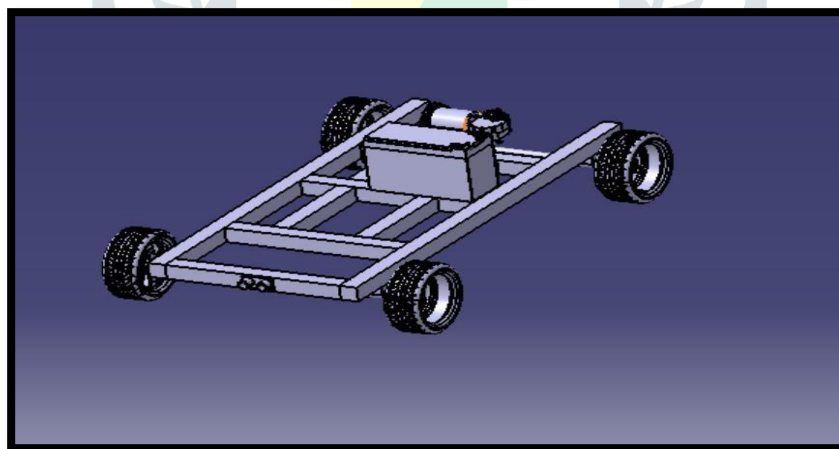


Fig 2. Proposed 3-D Model of System

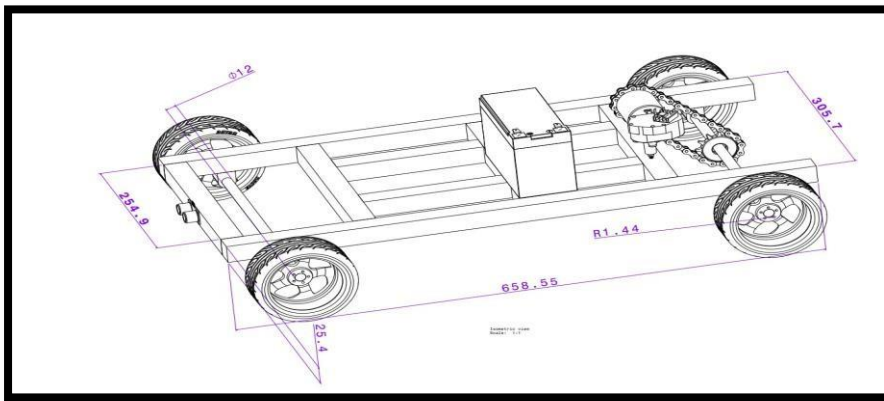


Fig 3. Drafting of 3-D Model of the System

Design and Development of Speed Breaker Detection & Automatic Speed Control System in 4 Wheeler.

Manufacturing of prototype model that explain exact idea of Speed Breaker Detection & Automatic Speed Control System

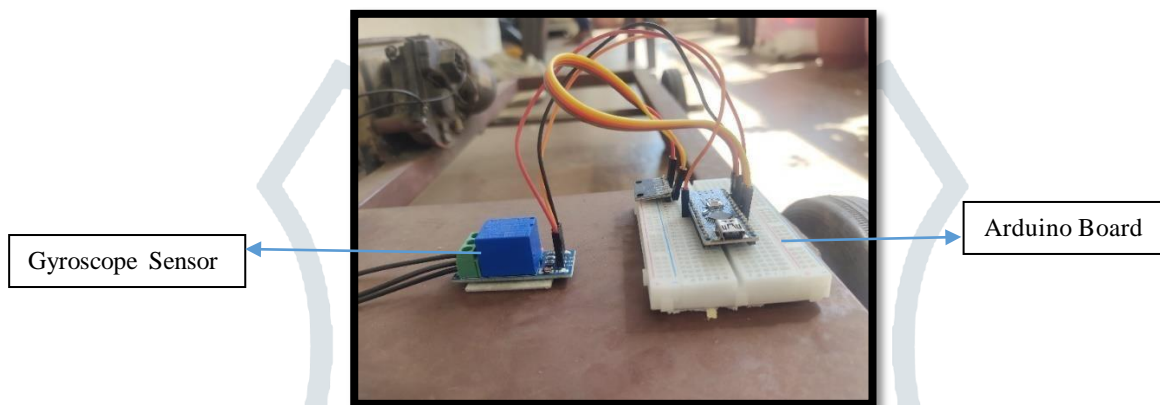


Fig 4. Gyroscope sensor and Arduino UNO Board system Setup.

A gyroscope is a device used for measuring or maintaining orientation and angular velocity. It is a spinning wheel or disc in which the axis of rotation is free to assume any orientation by itself.

IV. RESULTS

The speed breaker allows the emergency vehicle to lower the pace, but this new flat speed breaker device plays the main role in safeguarding human lives by flattening the speed breaker. Transportation is easier and more convenient for emergency vehicle. This device will be introduced in future in most emergency situations, where emergency vehicles need to reach quickly with the help of solar energy.

There is a common practice of having concrete speed breakers on the road for safety purposes, to avoid road accidents. They're found solid all the time on the road in the case of traditional concrete speed breakers. So, there is need of speed-breaker detection and automatic speed control system in vehicle to avoid jerk and accident of car.

To increase the safety of vehicles and its passengers in uncertain conditions.

- To increase the response time of the braking system.
- To improve the pre-crash safety.
- To avoid the percentage of passenger injury by using external vehicle safety.
- To reduce the requirement of internal safety devices like air bags.

V. CONCLUSIONS

This study shows the role of reducing vehicle speed automatically and its contributions to the safety of pedestrians and road users. It is found that the use of the vehicle speed control system contributes a lot in minimizing the accident rate that occurs due to the negligence of the driver to disobeying roadside signboards in special zones. Though the VSC system in a vehicle is effective, they help much in terms of improving safety, keeping both the passenger safety and the pedestrians on the roads. Considering the automatic VSC system is incorporate in school zones or hospital zones which allows the vehicle to act independently to slow down the vehicle when the vehicle comes at a higher speed which minimizes the accidents due to negligence of the driver actively and in a way more effectively. Hence it is concluded from the above study that the uses of Automatic vehicle speed control systems in restricted zones minimize unwanted accidents to a great extent compared to normal behaviour.

VI. FUTURE SCOPE

The project is combination of the mechanical and Electronics, which is fairly known as the Mechatronics. The upcoming world is full of Automation so we need to develop 'a system which is fully automatic. Now a day vehicle accident is the major problem. This braking system used an innovative project for the purpose of preventing accidents happens in the restricted roadways.

To overcome this problem, we are going to develop a system which is helpful for the reduction of road accidents. It is the project which has been fully equipped and designed for auto vehicles. The technology of pneumatics plays a major role in the field of automation and modern machine shops and space robots.

VII. ACKNOWLEDGMENT

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REFERENCES

- [1] "Design of Accident Prevention System Using QRD 1114 and CNY70 Sensors" by Apeksha S. Chavan¹, Dipali D. Pansare, Swapnil P. Kadam, Naval K. Mayekar, Kavita V. Jha, Poonam R. Bhagwa, Vol. 5 Issue 04, April-2016
- [2] "Prevention of Accident Due To Drowsy" by Using Eye Blink B. Praveen kumar, K. Mahendrakam, Vol. 3, Issue 5, May 2014
- [3] "Speed-Breaker Early Warning System" by Mohit Jain, Ajeet Pal Singh, Soshant Bali, Sanjit Kaul, *IIT-D, New Delhi, India*
- [4] "Automatic Safety System for Automobiles" by Dr. P. Poongodi PPG, P. Dineshkumar, Karpagam, (IIAIST) Vol.1, No.6, October 2012
- [5] "Fabrication of Auto-Braking System for Pre-Crash Safety Using Sensor" by Eung Soo Kim, International Journal of Control and Automation Vol. 2, No. 1, March, 2009
- [6] "A Deceleration control method of automobile for collision avoidance based on driver perceptual risk" by Takahiro Wada, The 2009 IEEE/RSJ International Conference on Intelligent Robots and Systems October 11-15, 2009 St. Louis, USA
- [7] "A Theory of Visual Control of Braking Based on Information About Time to Collision", By Lee, VL - 5, DO- 10.1068/p050437, JO - Perception
- [8] "COLLISION WARNING WITH AUTO BRAKE - A REAL-LIFE SAFETY PERSPECTIVE" Erik Coelingh LottaJakobsson Henrik Lind Magdalena Lindman Volvo Car Corporation Sweden, Paper Number 07-0450
- [9] "An Extendable and Retractable Bumper" by J. T. Wang General Motors Corporation United States Paper No. 05-0144