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A Review on Automatic Brake Failure Detection with Emergency Braking System

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Abstract:Automobiles are now very important in our day-to-day life. The use of automobiles is increased in the last ten years, but accidents are also increased in the last ten years. Many peoples losing their life because of this reason.The main reason for brake failure is poor maintenance and improper working of brakes in an automobile. To safeguard against these accidents and saving human's valuable life, there is a need of monitoring the braking system.The idea of this project is the detection of brake failure and provide emergency braking when failure of brake takes place in an automobile. The entire system deals with making a circuit model, it continuously checks the condition of brake wire, sending audio-visual signals to driver by buzzer and Led indication on the dashboard of vehicle with the emergency braking system.

Keywords:Accidents,Brake,emergency braking system(EBS),

Introduction

A brake is a very important component in automobiles to slow down or to stop the vehicle. Today most accidents occur due to brake failure which leads to the loss of life of humans. The life of a human is one of precious thing, which is to be saved from this brake failure problem while driving. The reasons for brake failure are poor maintenance, fluid leakage, worn-out of brake pads, product defects, overheated brake pads, etc. To save the life of a human from accidents and minimize the harmful effects of accidents, we have pleasure introducing our new concept "Automatic brake failure detection with the emergency braking system"

The system consists of the buzzer, LED light, and Emergency Braking system (EBS). When the brake failure occurs in a vehicle the sensor will sense that and it will give the indication to the driver with a sound of buzzer and Red-colored LED indication on the dashboard of a vehicle. When the red-colored indication occurs this activates EBS. The wheel will get start rotating at an angle of 90 degrees by motor, the hydraulic system will lower the emergency wheels to reach the road surface to adjust with the velocity of a vehicle. Now the driver has to activate the emergency brakes which are attached to these wheels in addition to pressing the clutch so the engine will not supply power to that vehicle. This will slow down the vehicle speed and the vehicle will stop at a certain point. The system provides overall safety to the vehicle and driver ensuring proper application of braking.

Literature Review

[1]The braking system is very important in automobile systems which ensures the safety of vehicle drivers and passengers. The main reason for the accident is increased stopping distance and insufficient brake power applied. The work of the model begins with detection of brake failure then secondary braking system. It is consists of an IR sensor circuit, control unit, and frame. The sensor continuously checks the brake wire and control signal to alarm the buzzer. when the primary pneumatic disc brake fails the sensor will detect the oil leakage and pressure loss. It will give the signal to the driver with the sound of a buzzer. After this signal, the power supply is started to the secondary braking unit which is a hub motor in the rear wheels. The hub motor will get a power supply from the battery and the hub motor will start rotating in opposite direction to the running wheels. The hub motor provides a negative torque to wheels, this will slow down vehicle speed and stops the vehicle. This hub motor in-wheel acts as a secondary braking unit in a vehicle and ensures the safety of the vehicle and driver.

[2]The vehicle system safety is avoidance of accidents and minimization of the harmful effects of it. This is done by providing a special safety feature or safety system in an automobile. For doing this an experimental setup is created with a drum brake and required components that can be equipped in any automobile. When the is running without brake failure there will be green light LED indication on the dashboard. The monitoring of the brake wire is continuously done by supplying a signal voltage from one end of the brake wire to another end. When brake fails due to any reason like worn-out brake pads, overheat of brake pads, cut in brake wire after longer use of automobile. The diameter of the brake wire goes on decreasing and at some point, it will start elongating, before it gets cut the limit switch will get activates and give supply to the buzzer and LED circuit. The red color LED will start to blink and the buzzer will give an audio indication to the driver before the brake wire gets cut. So this will ensure the safety of vehicles and drivers while driving.

Proposed model diagram

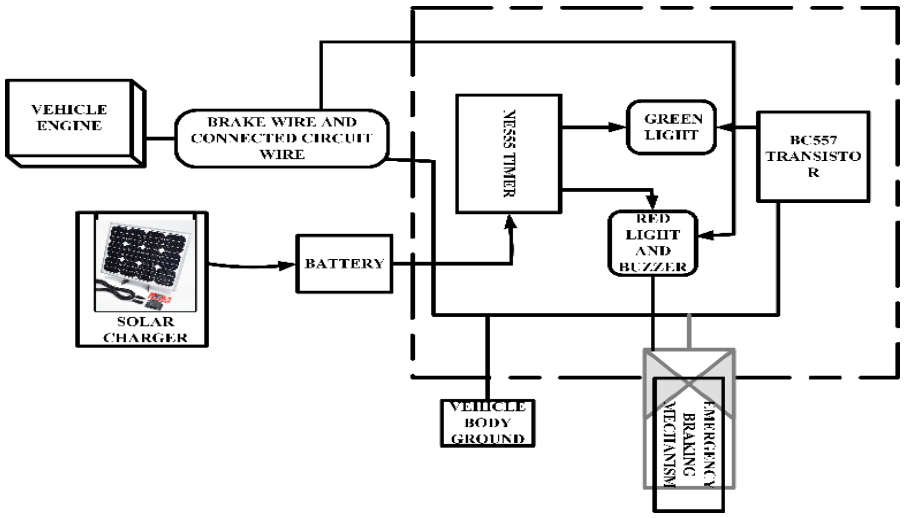

Fig.1 Proposed model block diagram

The main purpose of the model to efficiently find the fault in the system and to on the alarm buzzer with Emergency Braking System. Whenever there is a brake failure occurs this circuit will get starts to work.

Emergency Braking System

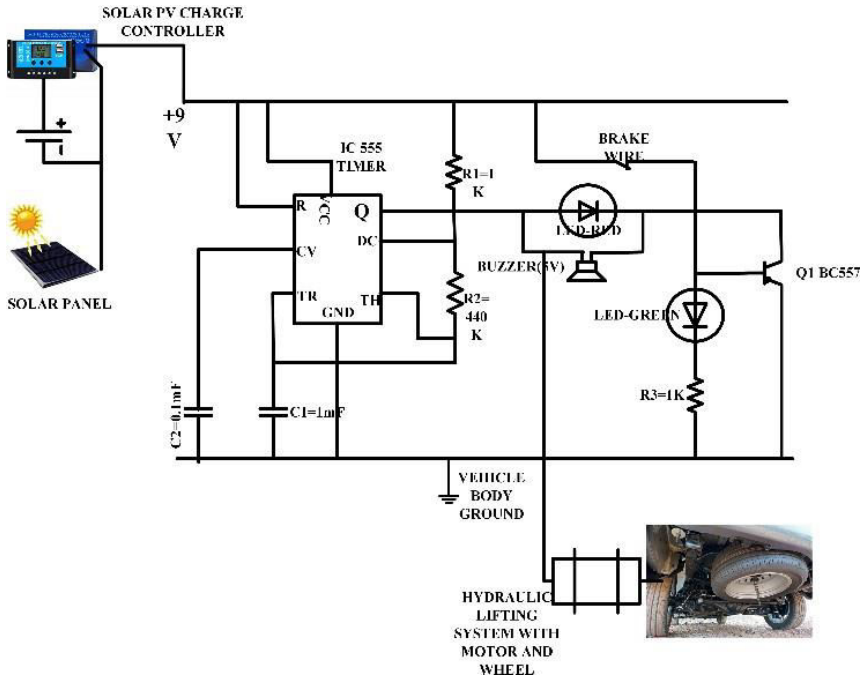

Fig.2 Circuit diagram for the proposed model

The detailed circuit diagram and EBS are shown in the above diagram. When brake failure occurs the system starts to work with an indication of buzzer LED and emergency braking system (EBS).

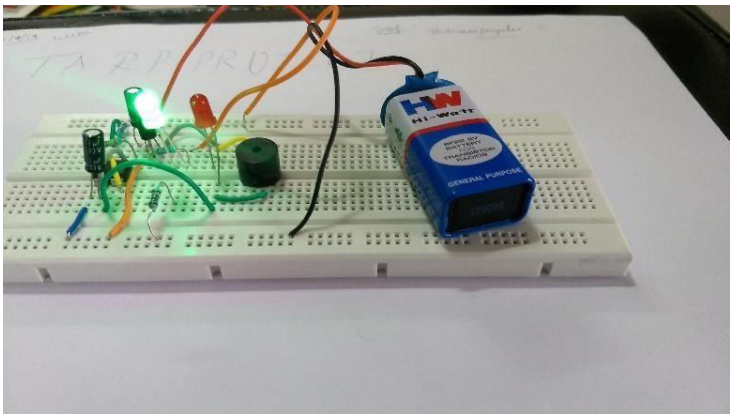

Fig.3 Before the brake failure occurs

When brake wire condition is very good and there is no brake failure occur in the system, the green color LED is on and red color LED is off also buzzer is not activated.

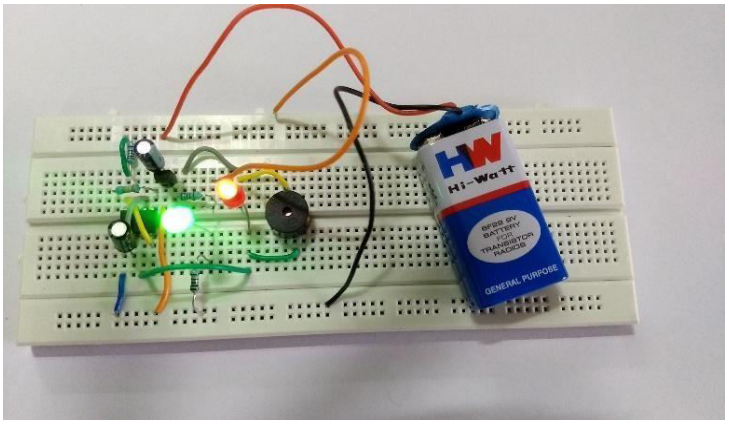

Fig.4 After the brake failure occurs

When the brake wire condition is slightly damaged then the red light gets on along with the green light. When the wire gets cut or brake failure occurs in the system the only red color LED indication gets on and the sound buzzer is also get activated. Emergency braking system (EBS) gets automatically activated.

Future Scope

1)Ultrasonic sensor can be used in the system to sense the obstacle and vehicle distance according to that EBS can be activated.
2) System can be made effective by using the aurdino and sensor monitor
3) This method can be equipped in various automobiles by making the system more compact

Conclusion

The method can be used for increasing braking system efficiency. The project helps to minimize accidents and their harmful effects on human life. An Emergency braking system ensures the full safety of the vehicle and driver. The system continuously monitors brake wire conditions and gives an audiovisual signal on the dashboard of the vehicle with Emergency Braking Unit(EBS). EBS can be implemented in any automobile to protect from accidents and to save a life. The proposed model is activated before any accident could happen and gives safety to humans as well as the vehicle.

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