

Design & Development of Auxiliary Braking System for Vehicle Safety

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Abstract - In automotive vehicles, the brake are playing an important role and it acts as control system which is used to keep the vehicle stationary as well as to retard the speed of vehicle. In recent developments in automobile sector. Many safety features are developed to improve the braking efficiency. Such as Ant-locking braking system, electronic brake distribution, brake detection system using sensors and many more. This travel movement is used to push brake over travel switch and push type direction control valve which turn on the buzzer. As well as supply the pressure to the pneumatic cylinder connected to the secondary braking system and brake is applied.

Keywords: Secondary breaking system, overtravel switch, Electric circuit, buzzer.

1. Introduction

Though the world is getting modernized, we have to face so many problems. One of such problems is accidents. One of the things that everyone tried to avoid is while traveling is accidents, and sometimes it is inevitable. Now-a-days we can see accidents in every nook and corner of the world. It results in the death of thousands of lives. With the population ever climbing there are more vehicles than ever on road, which means there is a higher livelihood of the brakes giving out. In foreign countries they take remedial measures for the prevention of accidents but our country like India takes less action against the prevention of accidents. One common cause for accidents is brake failure. Accidents may occur due to brake failure. In such a situation my project brake failure indicator plays an important role in controlling accidents. Brake failure indicator circuit is a circuit that constantly monitors the condition of brake. The sensor which is attached to the circuit get the chance of a brake failure by monitoring the brake switch and reminds you of the condition of brake every time when the brake is applied. This invention is related to design and development of braking system. In which two different types of braking mechanisms are used first is hydraulic braking system which is used for normal braking purpose and wire operated mechanical drum braking system for emergency braking purpose. The normal braking system works. The single master cylinder and single brake pedal is used to operate the hydraulic braking system. The single

master cylinder and single brake pedal is used to operate the hydraulic braking system. The brake pedal over travel switch is used to identify the pedal movement because, when the braking system works normally then due to the pressure the pedal movement is defined to a specific distance. When the system losses the pressure then the brake pedals travels more distance than normal braking. This travel movement is used to push brake over travel switch and push type direction control valve which turn on the buzzer. As well as supply the pressure to the pneumatic cylinder connected to the secondary braking system and brake is applied.

2. Literature Survey

Road accidents are a common place in today's scenario. Accident prevention has been one of the leading areas of research. In Indian scenario normally vehicles are equipped with ABS, traction control, brake assist etc. for driver's safety. This paper focuses on a system known as 'Intelligent braking system' which employ several sensors to respond when emergency conditions occur. The smart braking system is designed for preventing lots of accidents. It operates automatically not manually so chances of failure of this system are less due to this the chances of accidents is also reduced. It is a combination of electronics and mechanical engineering. It is an electro-mechanical device which is designed to prevent accidents and loss of human lives.

The exhausted literature study has been carried out on various ways of Designing of Automatic braking system or intelligent braking system. On the other hand, we have found various manufacturing methods to develop this project. The findings of various scholars in the field of design, fabrication and analysis of said project have been presented below: The existing approaches in preventing accidents are: Honda's idea of ABS which helps the rider get hassle free braking experience in muddy and watery surfaces by applying a distributed braking and prevents skidding and wheel locking Volvo launched XC60 SUV which was equipped with laser assisted braking. This is capable to sense a collision up to 50 MPS and apply brakes automatically Drawbacks in the existing approaches: ABS can only help if the rider applies it in right time manually and maintains the distance calculations. ABS has its own braking distance Volvo's laser assisted

braking could not work effectively in rainfall and snowfall season and laser is easily affected by atmospheric conditions.

The basic function of a brake in a power transmission system is to stop and/or hold the load. There are many reasons to use brakes which are mostly related to improved productivity or safety. Brakes are frequently used to control deceleration, provide accurate positioning, or increase cycle rates, thereby improving productivity. Brakes can also be used for tensioning. The so called "failsafe" type brake like the cost effective Stearns spring-set electrically released disc brake has an added feature because the brake is set by shutting off electric power, it will automatically set when there is a power failure. There are many types of braking systems that can be used with a power transmission system. The Project work will include the design of the brake failure detection system, working, construction, its feature scope etc Brake detection is the system is the safety system which can provide emergency braking in the case of emergency.

3. Objectives of the Project

The main objective of this project is to avoid and reduce the accidents. Which are occurring due to brake failure in the case of heavy duty vehicles and small vehicles. There are some few objectives which are:

- 1) To save life. To avoid small number of accidents caused by brake to measure the change in hydraulic / Air pressure.
- 2) To indicate the failure of brake switch.
- 3) It can control all the moving units in the vehicle.
- 4) To identify whether the brake is working or not.
- 5) To connect the audio-visual indicator with a sensor.
- 6) To measure the fluid braking pressure. To indicate the failure of brake switch.
- 7) It can control all the moving units in the vehicle.
- 8) To identify whether the brake is working or not.
- 9) To connect the audio-visual indicator with a sensor.
- 10) To measure the fluid braking pressure.

4. Methodology of Preparation

- 1) At first we collected information about how the brake failure occurs in the vehicles.
- 2) Then we studied about the types of failure occurring in different types of vehicles.
- 3) Then we will design cad drawing for our project to visualize it and know its design.
- 4) Then we study about different types of stress occurring on it.
- 5) Then we selected proper material According to the stress on it.

- 6) We started fabrication work with the approval of our guide and started making the main project model.
- 7) After Finishing the Project we tested it for various considerations.

5. Working

Machines are widely controlled by control system. To meet the need of exploding population economic and effective control of machines is necessary. The main theme of our project is to monitor the brake system at every moment Today accidents are occurred due to lot of reasons, the one of the main reasons is brake failure, it caused to due to poor maintenance as well as product defect, in order to safe guard the valuable human for accident the accident monitoring of brake is very important thing in automobile. Though the world is getting modernized, we have to face so many problems. One of such problems is accidents. One of the things that everyone tried to avoid is while traveling is accidents, and sometimes it is inevitable.

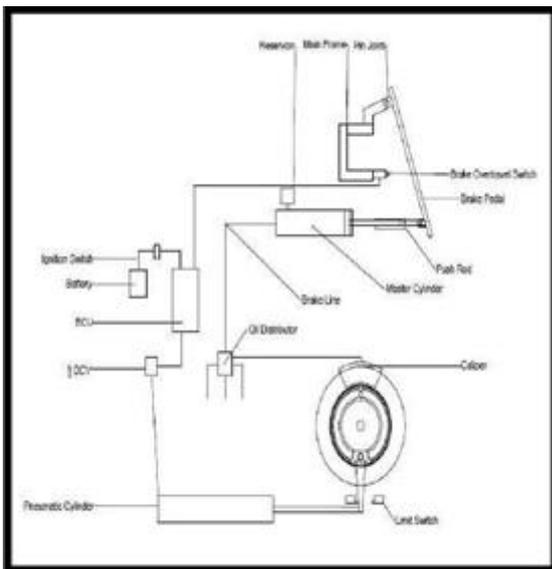
Now-a-days we can see accidents in every nook and corner of the world. It results in the death of thousands of lives. With the population ever climbing there are more vehicles than ever on road, which means there is a higher livelihood of the brakes giving out. In foreign countries they take remedial measures for the prevention of accidents but our country like India takes less action against the prevention of accidents. One common cause for accidents is brake failure. Accidents may occur due to brake failure. In such a situation my project brake failure indicator plays an important role in controlling accidents. Brake failure indicator circuit is a circuit that constantly monitors the condition of brake. The sensor which is attached to the circuit get the chance of a brake failure by monitoring the brake switch and reminds you of the condition of brake every time when the brake is applied. Most vehicles retain some degree of control over the brakes even if the main system doesn't work and most vehicles have two braking systems one acting as backup system.

Even though brake failure is relatively rare along with tire blowouts, brake failure is actually one of the top cause of accidents involving trucks and larger vehicles. The most common cause is that there is a leak in the brake line, master cylinders or wheel cylinders. All of these things can cause the brake failure. In order to solve this problem. I choose the 'Brake failure indicator' as my project. This invention is related to design and development of braking system. In which two different types of braking mechanisms are used first is hydraulic braking system which is used for normal braking purpose and wire operated mechanical drum braking system for emergency braking purpose. The normal braking system works on the Pascal's law as it is working on hydraulic

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When the system losses the pressure then the brake pedals travels more distance than normal braking. This travel movement is used to push brake over travel switch and push type direction control valve which turn on the buzzer. As well as supply the pressure to the pneumatic cylinder connected to the secondary braking system and brake is applied.

The vehicle is remains stationery until the brake over travel switch is not pressed again manually as system is applying gradual braking instead of sudden brake as applied by hand brakes the system is safe for use. This system avoids skidding of vehicle.



6. Conclusion

In this attempt of capstone of Project we all caught very good experience of making our project (brake failure detection system). While doing so we have experienced and faced various engineering aspects. Such as Selection of project, selection of material and analysing its various properties and different types. Preparing the design of the project analyzing the stress acting on the project while working and calculating the required dimensions to which the project is to be made. By using required material finding and efficient way to manufacture the project we followed and worked and by considering all the points mention above and made our project

in given time limit at last we tested and analysed and tested our project weather it meets our requirements .in this way we completed our capstone project and we prepared and soft copy and presentation of project.

7. Future Scope

The future scope is to design and develop control system based on an automotive braking system is called "Automatic Braking System. The Automatic Braking System with ultrasonic sensor would alert the driver when the distance between vehicle and obstacle is in within the sensing range zone then the brakes are applied. By making it safer, this system will provide better guarantee for vehicle's safety and avoid losses. Therefore, the safety system of vehicles will be developed and may have more market demands. With combination this indication system & Ultrasonic sensor detection system we can improve one of the safety features of vehicle. It can be further used for large type of heavy vehicles like buses, trucks, cranes, tractors, etc. We can surely get the information about the obstacle detection sense zone according to vehicle condition. It is verily useful to public sector and users. It is also avoiding the accidents in large or metropolitan cities. So, we feel it is a better idea for automatically braking & indication of vehicle with moderate cost.

- 1) Triggering or actuation mechanism for secondary braking can be changed to various means viz. using cam and follower arrangement, Magnetic arrangement, etc.
- 2) Means of actuating the secondary system can be changed from pneumatic to any energy transmitting fluid or forms of energy.
- 3) Sensor monitoring can be used instead of using mechanical systems. But this may cause failure if there is no electric supply left in vehicle or if there is no ground connection.

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