

Brake Failure Indication and Auxiliary Braking System

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Abstract— Brakes are implemented in cars to stop the vehicle. The increase in number of deaths and accidents is due to brake failure. Brake failures mainly occur due to oil leakage and results in pressure loss. The aim of our paper is to diagnose faulty braking system and application of an auxiliary secondary braking system in case of brake failure. This project helps in ensuring the safety of the passengers before the failure occurs and helps in preventing accidents. The brake failure alarming system is empowered by electronic control unit. When the primary Electromagnetic brake fails, the sensor detects loss in connection and gives indication to the driver and also activates power supply to the secondary braking unit which is a hub motors in rear wheels. This functions as a secondary braking unit and helps the driver to stop the vehicle and thus ensures safety of the passengers. The micro-controller acts as the bridge between the sensor and relay by receiving an electrical signal from the sensors and sending the signal to the relay to the activates secondary brake .

I. INTRODUCTION

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. Vehicle safety is the avoidance of automobile accidents or the minimization of harmful effects of accidents, in particular as pertaining to human life and health. Special safety features have been built into vehicles occupants only, and some for the safety of others. We have pleasure in introducing our new project “**Brake Failure Indication with auxiliary braking system**”.

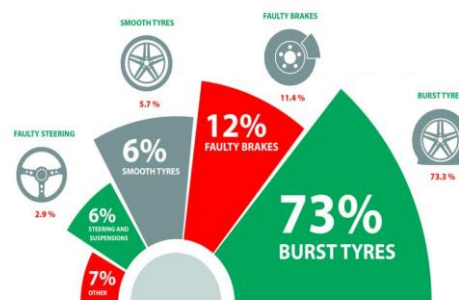


Fig.1: Accident percentage

This is equipped by sensors and auxiliary braking unit. It is genuine project which is fully equipped and designed for automobile vehicles. This forms an integral part of best quality. This product underwent test in our automobile vehicles and it is good. A brake is a mechanical device that inhibits motion by slowing down a body or by slowing it. Brakes retard the motion of a body creating friction between two working surfaces and converts the kinetic energy of the moving body into heat. Brakes are generally applied to moving as well as Tyres.

The electric signals generated by the Proximity sensor sent to the programmed Arduino. The Comparator compares the pressure value with the reference value. If the value is different from the Reference value, the value is sent to relay. A relay is an electrically operated switch. Relays are used to control a circuit by a low power unit with isolation from control circuit. The relay receives the electric signals from the comparator. The relay is connected to battery at one end and auxiliary braking unit at the other end. The relay connects the power source to the auxiliary Braking unit.

II. PROBLEM STATEMENT

We upgrade the current braking system in vehicle so that if any how brake fails the driver gets indication of it and accordingly corresponding braking system which we provided may apply.

III. OBJECTIVES

- To design circuit for brake failure indicator system.
- To design programming for Auxiliary braking system.
- To develop a system of programming code and simulate the circuit of automatic brake failure for vehicle.
- It introduces new system of braking and brake failure indicator for vehicle.
- It helps in reducing the traffic accidents and property damages.
- It helps to reduce the death and traffic injuries of pedestrians.
- Minimizes public health and growth issue of our country.

IV. LITERATURE REVIEW

In this report we can get exact idea about auxiliary braking system its types and the effectiveness of its types that how effective they are by considering some factors such as Breaking power, noise, weight, operational cost, heat generation, maintenance etc.

NFPA 1901 Standard for Automotive Fire Apparatus requires that any apparatus over 33,000 lb GVW must be equipped with an auxiliary braking system. This means a system that assists in stopping the apparatus other than the service brakes located at the wheel ends. Auxiliary braking can be accomplished through the action of the engine, the transmission, or other means acting on the apparatus drive train. This guide describes the various types of auxiliary vehicle braking systems that are available on fire apparatus along with considerations that will help in selecting the right system for particular applications.

As with any engineered system design, there are advantages and disadvantages to each system. There are many commercially available products and not every system may be covered by this guide. This guide is presented as a general informative and educational piece, as technologies do continuously evolve. The various options and auxiliary equipment may not be available from every manufacturer, and you may not be able to specify more than one system on an apparatus.

Commercially available auxiliary braking systems all use some method other than mechanical friction to help slow the vehicle. They also all work by creating a braking force on the vehicle drive line, which in turn transfers force to the tires and then to the road. They all generate heat, but they all control dissipation without heating up the service brakes.

This guide covers the benefits of the following four most common types of auxiliary braking systems:

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This guide covers the benefits of the following four most common types of auxiliary braking systems:

- Electromagnetic Retarders
- Exhaust Brakes
- Engine Compression Brakes
- Transmission Retarders

In this paper we get exact idea about circuit diagram required for our project, its working mechanism, overview of our project requirements. Also in this paper they suggests the system where we can find heat generation in our braking system due to friction of brake shoe.

The following is the content of this project: -

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This product underwent test in our automobile vehicles and it is good. The major components of the project are follows

- Frame
- Battery
- Proximity sensor circuit
- Arduino

In this Project they are using sensors to check the Brake condition. Here we are sending the signal voltage through the Brake Wire from one end to another end. At the other end in the wheel the signal conditioning unit checks that whether the signal voltage in the Brake wire is available or not.

If signal voltage in Brake wire is not available means failure of primary brake that is Electromagnetic brake which is detected by proximity sensor indicated via LED , Buzzer and automatically Auxiliary braking system gets activated which will bring vehicle to the rest position.

V. CONCLUSION

- The purpose of Brake failure indication and auxiliary braking system is to reduce damage occur due to brake failures. In this project, secondary braking system has been developed as an alternative way for failure of the primary braking system.
- In this project Auxiliary braking system is implemented on a prototype. This braking system working on primary braking system (Electromagnetic brake) if it fails then proximity sensor sense it and Auxiliary braking system automatically activates and stops the vehicle.
- In secondary braking system is a Pneumatically operated braking system it generates 4831 lbs of clamping force to retard the vehicle motion.

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