

Brake Failure Monitoring & Conditioning

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Abstract— The main theme of our project is to monitor the brake system at every moment. Today accidents occur due to lot of reasons, the one of the main reasons is the brake failure. It caused to due to poor maintenance as well as product defect. In order to save the valuable human life from accidents, the monitoring of brake is an essential 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. The braking system of a car is undoubtedly one of its more important features. The aim of this work is to create a better braking system with indicator. Automatic brake failure detector consists of pressure and LVDT sensor circuit, control unit and the wheel and the brake arrangement. The sensor is used to detect the brake failure and indicate to the driver.

Key words: Brake Failure

I. INTRODUCTION

The hydraulic brakes are applied by the liquid pressure. The pedal force is transmitted to the brake shoe by means of a confined liquid through a system of force transmission. The force applied to the pedal is multiplied and transmitted to brake shoes by a force transmission system. This system is based upon Pascal's principle, which states that "The confined liquids transmit pressure without loss equally in all directions". It essentially consists of two main components – master cylinder and wheel cylinder the master cylinder is connected by the wheel cylinders at each of the four wheels. The system is filled with the liquid under light pressure when the brakes are not in operation. The liquid is known as brake fluid, and is usually a mixture of glycerin and alcohol or caster-oil, denatured alcohol and some additives Spring pressure, and thus the fluid pressure in the entire system drops to its original low valve, which allows retracting spring on wheel brakes to pull the brake shoes out of contact with the brake drums into their original positions. This causes the wheel cylinder piston also to come back to its original inward position. Thus, the brakes are released. Car 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 car's occupants only, and some for the safety of others. We have pleasure in introducing our new project "automatic head light dim/bright controller and engine over heat alarm" which is fully equipped by sensors circuit, dim/bright light and engine over heat alarm circuit. It is genuine project which is fully equipped and designed for automobile vehicles

II. DESIGN

A. Frame

This is made of mild steel material. The whole parts are mounted on this frame structure with the suitable arrangement. Boring of bearing sizes and open bores done in one setting so as to align the bearings properly while assembling. Provisions are made to cover the bearings with grease.

B. Brake Oil

Brake fluid is a type of hydraulic fluid used in hydraulic brake and hydraulic clutch applications in automobiles, motorcycles, light trucks, and some bicycles. It is used to transfer force into pressure, and to amplify braking force. It works because liquids are not appreciably compressible in their natural state the component molecules do not have internal voids and the molecules pack together well, so bulk forces are directly transferred to compress the fluid's chemical bonds.

C. Brake Drum/Disc

The brake drum is generally made of a special type of cast iron that is heat-conductive and wear-resistant. It rotates with the wheel and axle. When a driver applies the brakes, the lining pushes radially against the inner surface of the drum, and the ensuing friction slows or stops rotation of the wheel and axle, and thus the vehicle. This friction generates substantial heat.

D. Pressure Sensor

A pressure sensor is a device for pressure measurement of gases or liquids. Pressure is an expression of the force required to stop a fluid from expanding, and is usually stated in terms of force per unit area. A pressure sensor usually acts as a transducer; it generates a signal as a function of the pressure imposed. For the purposes of this article, such a signal is electrical.



Fig. 1:

E. Buzzer

A piezoelectric element may be driven by an oscillating electronic circuit or other audio signal source, driven with a piezoelectric audio amplifier. Sounds commonly used to indicate that a button has been pressed are a click, a ring or a beep. A piezoelectric buzzer/beeper also depends on acoustic cavity resonance or Helmholtz resonance to produce an audible beep.

F. Display

To show the warning and monitoring result of brake, a small display is used to indicate. We can use LED also to indicate the break status.

G. Brake Shoe

A brake shoe is the part of a braking system which carries the brake lining in the drum brakes used on automobiles, or the brake block in train brakes and bicycle brakes. The brake shoe carries the brake lining, which is riveted or glued to the shoe. When the brake is applied, the shoe moves and presses the lining against the inside of the drum. The friction between lining and drum provides the braking effort. Energy is dissipated as heat.

H. Low Air Pressure

A series of tests were conducted with the air compressor motor disconnected from the power source to determine the number of times the rope brake could stop the elevator from the stored pressurized air in the compressor tank. The test were conducted with no car load in the upward direction.

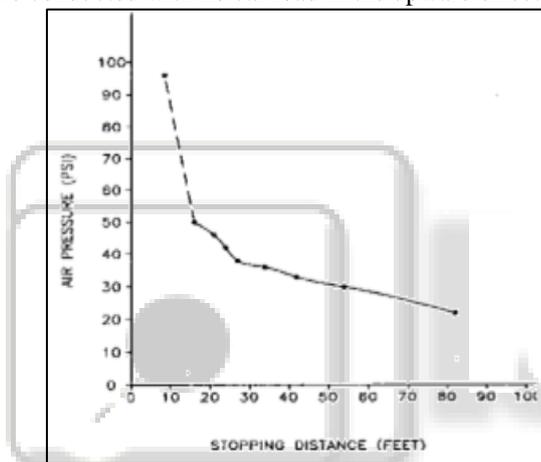


Fig. 2:

I. Working Principle

When the brake is applied, the green LED blinks and the piezo buzzer beeps for around one second if the brake system is intact. If the brake fails, the red LED glows and the buzzer stop beeping. The circuit will work only in vehicles with negative grounding. It also gives an indication of brake switch failure. When the brake is applied, the green LED blinks and the piezo buzzer beeps for around one second if the brake system is intact. If the brake fails, the red LED glows and the buzzer stop beeping. Very simple and easily available components are used in this project for the purpose of fabrication. This consists of a braking system, an LVDT sensor, Pressure sensor and a control unit. When the pressure is not sufficient, the buzzer/LED/display shows the status of brake system. Two inputs from the two sensor are given to the arduino mega. The program is loaded to the arduino microcontroller and if the pressure is decrease or not sufficient the microcontroller sends the signal to the display and buzzer, therefore the driver get message. We can use PCB board with microcontrollers and other devices to minimise the structure and easy communications.

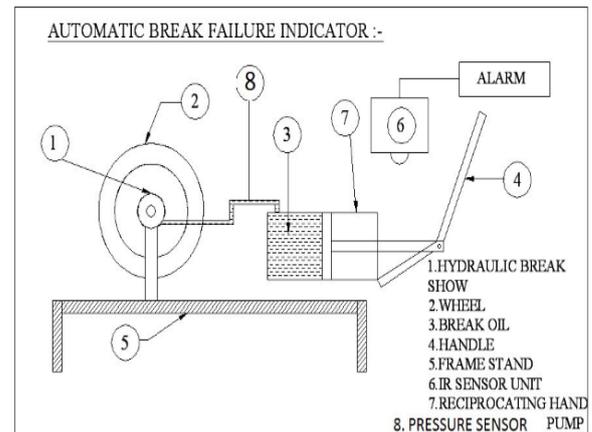


Fig. 3:

III. TECHNICAL DATA

A. Double Acting Cylinder

1) Specification

Stroke length : cylinder stroke length 100mm =0.1m
 Piston rod : 10mm =10 X10⁻³m
 Quantity : 1
 Seals : Nitride (Buna-N) Eastover
 End cones : Cast iron
 Piston : EN-8
 Media : Air
 Temperature : 0-80°C
 Pressure Range: 8N/m²

B. Pressure Sensor

1) Specification

Male thread M10 x 1
 Wrench size 27 mm
 Installation torque 22 Nm in steel
 32.5 Nm in aluminum
 Weight w/o wire 35.2 g
 Sealing sealed cone
 Power supply US 4.75 to 5.25 V
 Max power supply US max 16

IV. SCOPE OF THE PROJECT

The brake failure indicator circuit is designed for avoiding accidents due to brake failure. If you can grasp the necessary force and the durability that brakes require to stop tones of moving metal, you can understand how brake malfunctions can occur. So many things can cause brake failure. There are something that we all take for granted, the brake on our vehicles. It is very unusual for a vehicle to suffer total failure of the braking system. Though it has so many limitations, this equipment is very effective to detect brake failure and it will find great scope in future.

V. CONCLUSION

We are proud to express our delight as the project we embarked upon is successfully finished within the target date. The project gave us more confidence that we will be able to put in practice, whatever theoretical knowledge. We gained during our course of study till now. If really persuades us to do more and more, perhaps in better way in our future. Brake

failure indicator is an early warning system. It constantly monitors the condition of the brake and give audio visual indication. This brake failure module is researching area in this we can identify the errors or fault in the braking system in automobiles. By this we can stop the accidents and other destruction in the vehicle. So implementation of this idea in real world can stop the deaths in accidents and also it is one of the development feature in automotive electronics

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