

Automatic Brake Fluid Leakage Prevention with Safety Bypass Braking System

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Abstract— Now a day, Machines are widely controlled by control system. To meet the need of exploding population economic and effective control of machines is necessary. The aim is to design and develop a control system based an electronically controlled automatic break failure indicator. Automatic break failure indicator and auxiliary braking system is consisting of IR sensor circuit, control unit and frame. The sensor is used to detect the break wire, the control signal to the alarm unit. Similarly, the auxiliary brake is fixed to the wheel frame and this can apply the brake and stop the vehicle. A pressure transducer sensor monitors the pressure in brake lining. When the primary hydraulic disc brake fails, the sensor detects the pressure loss and gives warning signal 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 main reason 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.

Key words: Brake Fluid Leakage Prevention, Bypass Braking System

I. INTRODUCTION

A brake is a mechanical device that hinder, restrain, or prevents motion, slowing or stopping a moving object or preventing its motion. Most of the brakes generally uses friction between two surfaces pressed together to change the form of the kinetic energy of the moving object into heat, despite the fact that other methods of energy conversion may be employed for the same. For example, regenerative braking converts a large amount of the energy to electrical energy along with the heat energy, which may be stored or can be sent back to the source for later use. Some other methods convert the kinetic energy into potential energy in such stored forms as pressurized oil or pressurized air. Magnetic fields is used in Eddy current brakes to convert kinetic energy into electric current in the brake disc, fin, or rail, which is converted into heat energy. Still there are other braking methods to transform kinetic energy into different forms, for example by transferring the energy to a rotating flywheel. Today, Machines are widely controlled by automated control system. To meet the need of growing population economic, effective and reliable control of machines as well as their control system is necessary. The main objective of this project is to continuously monitor the braking system at each and every time during the operation of the vehicle. Now a days, accidents are occurring due to lot of reasons, the one of the main reason is brake failure, it caused to due to poor maintenance, improper use and product defect, in order to

safe guard the valuable human for accident the accident monitoring of brake is very important issue in automobile. The brake failure indicator circuit is a circuit that monitors constantly of the condition of brakes and provides an audio visual indication. When the brake is applied in order to slow down or to stop the vehicle the green LED blinks and the piezo buzzer beeps for about one second if the brake system is accurate and working properly. If brake system fails the red LED glows and the buzzer do not beep when the brakes are applied. In addition this system prevent the fluid leakages from brake & continue the bypass in case of primary brake line failure.

II. LITERATURE REVIEW

The purpose of this literature review is to go through the main topics of interest. The literature reviews is concerned with design of automatic control and system, breaking failure indicator, Disc brake, Pedestal bearings, Pneumatic connectors, reducer and hose collector.

A. Disc Brakes

Disc brakes make use of friction generated between the disc attached to a heel and the wheel itself, to slow or stop an automobile. Disc brakes comprise brake pads that serve as friction material and are fixed onto a device called a brake caliper. When the brake pedal is pushed by a driver the brake pads are mechanically, hydraulically, pneumatically or electromagnetically forced against both sides of the disc mounted on wheels thus regulating the speed of the vehicle or slowing down the vehicle.

B. Safety Consideration in Cars

There are various safety consideration involve to make passenger comfortable while traveling, and it has been modified as generation of automobile goes by. Here are some area the modification has been take place.

C. Pedestal Bearings

A pillow block is a pedestal used to provide support for a rotating shaft with the help of compatible bearings & various accessories. Housing material for a pillow block is typically made of cast iron or cast steel.

D. Pneumatic Connectors

Pneumadyne's precision machined pneumatic fittings are available with a variety of thread and barb sizes to fit the plumbing specifications of your pneumatic control system. Straight Connectors, Elbows and Tees feature both single and double barbs to meet individual installation preferences

III. CONCEPT OF PROJECT

Automatic break failure indicator and auxiliary braking system is consisting of pressure differential sensor circuit,

control unit and frame. The sensor is used to detect the break fluid line, the control signal to the braking valve unit.

It consists of mainly;

- 1) Frame
- 2) Double acting cylinders
- 3) Pneumatic pipe fittings
- 4) 5/2 Solenoid valve
- 5) Pneumatic connectors, reducer and hose collector
- 6) Pressure transducer
- 7) Disc brake
- 8) Pedestal bearings
- 9) Shaft
- 10) Washer
- 11) Nut and Bolt
- 12) Volt Battery

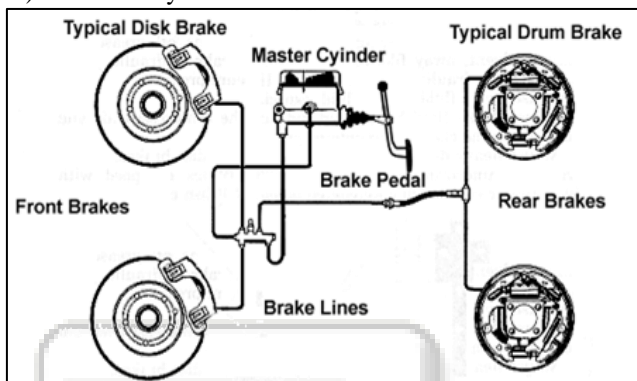


Fig. 1: Automotive Braking System

A. Statement of Project

The statement of project is "Automatic Brake Fluid Leakage Detection with safety bypass Braking System." for used in safety brakes of automobile.

B. Objectives

The main objective of this project is to avoid accidents due to brake failure. The specific objectives of this project were:

- 1) For the protection of lively hood.
- 2) To reduce accidents of vehicle due to the brake failure.
- 3) To sense the change in hydrostatic pressure difference while brake failure.
- 4) In order to indicate the failure of brake.
- 5) It can operate and monitor all the brake units in the vehicle by using auxiliary brake bypass line.
- 6) It can sense the leakage of the fuel.
- 7) To connect the indicator with a sensor to indicate the brake failure.

IV. WORKING PRINCIPLE

Similarly, the auxiliary brake is fixed to the wheel frame and as this air leakage is prevents from primary port valve automatically secondary valve can on which can apply the brake and stop the vehicle regularly. A pressure transducer sensor monitors the pressure in brake lining. When the primary air disc brake fails, the sensor detects the pressure loss and gives warning signal to the driver and also Activates power supply to the secondary braking unit which is a hub motors in wheels. This functions as a secondary braking unit and helps the driver to stop the vehicle and thus ensures safety of the passengers. The main reason 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 "Automatic Braking Fluid Leakage Detection with safety bypass Braking System". This is equipped by sensors and auxiliary braking unit. It is genuine project which is fully equipped and designed for automobile vehicles.

A. 1.5/2 Solenoid Valve

The magnetic field exerts a force on the plunger. As a result, the plunger is pulled toward the centre of the coil so that the orifice opens.

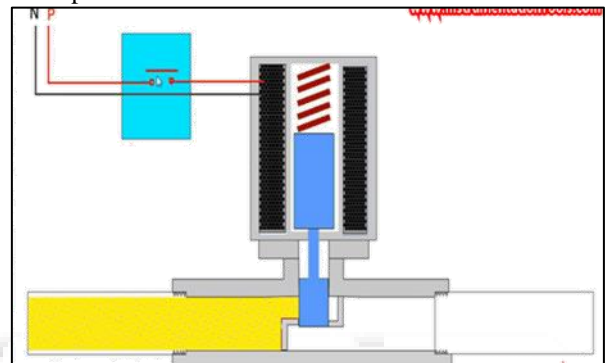


Fig. 2:

This is the basic principle that is used to open and close solenoid valves. "A solenoid valve is an electromechanical actuated valve to control the flow of liquids and gases."

B. Pressure Transducer

Pressure transducers have a sensing element of constant area and respond to force applied to this area by fluid pressure.

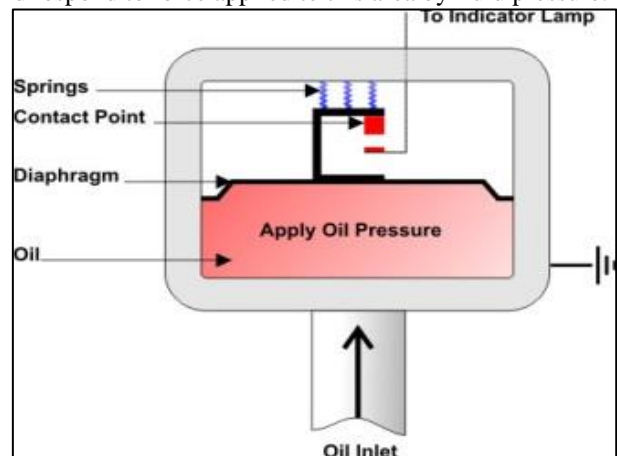


Fig. 3:

The force applied will deflect the diaphragm inside the pressure transducer. ... Most Pressure transducers are designed to produce linear output with applied pressure.

C. Disc Brake

A disc brake is a type of brake that uses calipers to squeeze pairs of pads against a disc or "rotor" to create friction. This action retards the rotation of a shaft, such as a vehicle axle, either to reduce its rotational speed or to hold it stationary.

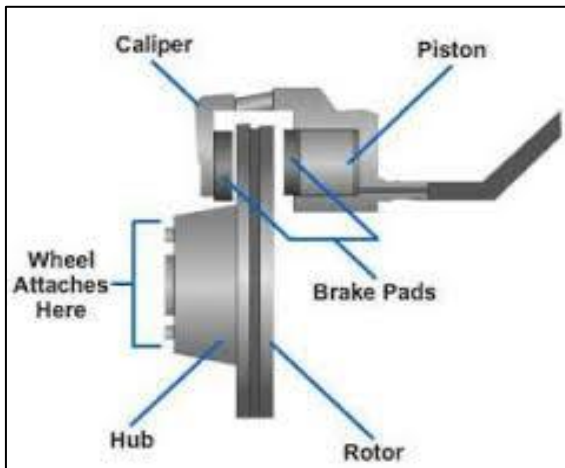


Fig. 4:

Bicycle brakes have a caliper, which squeezes the brake pads against the wheel. In a disc brake, the brake pads squeeze the rotor instead of the wheel, and the force is transmitted hydraulically instead of through a cable. Friction between the pads and the disc slows the disc down. ... Most car disc brakes are vented

- 1) This system may be applicable in all types of air brake vehicles to avoid the accidents due to the brake failure.

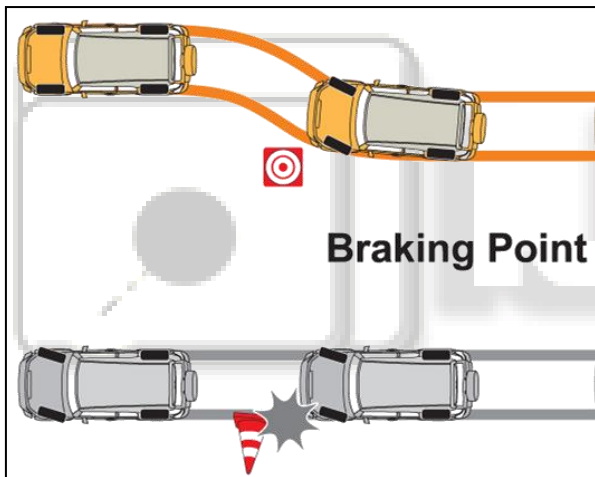


Fig. 5:

- 2) This system also successfully installed in the heavy vehicles like buses, trucks, trailers, etc..

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