

AN INTELLIGENT VEHICLE AUTOMATIC BREAK FAILURE INDICATOR AND COMBI BREAK

Mohammad Abbas Khan¹, Mohammed Asif Kattimani², Mohd Ishaq³, Syed Faisal⁴, Mir Mustafa Sultan⁵
^{1,2,3,4,5}**Department of Mechanical Engineering, LIET, Hyd-91, India**

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 developed control system based an electronically controlled automatic break failure indicator by using IR Sensor and combi brake system. Automatic break failure indicator and auxiliary braking system is consists 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 ensure safety of the passengers. The brake fluid leaks out causing pressure loss and hence the brake shoes do not apply the required pressure on the discs.

The pressure loss can be detected by a pressure sensor. Pressure sensor functions as a transducer. Transducers produce electric signals as output. The output from the pressure transducer goes to the comparator. The comparator has a reference value of the pressure. The electric signals generated by the pressure transducer are a function of the pressure. 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 is used to control a circuit by a low power unit with isolation from control circuit as well as the controlled 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.

***Index Terms*—I R Sensor ,Rear Wheel ,Battery.**

I. INTRODUCTION

Vehicle safety is the avoid 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 for years, some for the safety of vehicles occupants only, and some for the safety of others. We have pleasure in introducing our new project

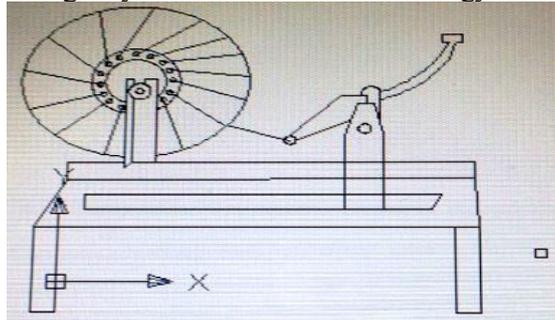
This forms an integral part of best quality. This product underwent strenuous test in our Automobile vehicles and it is good. Man has needed and used energy at an increasing rate for its sustenance and wellbeing ever since he came on the earth a few million years ago. Primitive man required energy primarily in the form of food. He derived this by eating plants or animals, which he hunted.

Subsequently he discovered fire and his energy needs increased as he started to make use of wood and other bio mass to supply the energy needs for cooking as well as agriculture. He added a new dimension to the use of energy by domesticating and training animals to work for him.

With further demand for energy, man began to use the wind for sailing ships and for

Driving windmills, and the force of falling water to turn water wheels. Till this time, it

Would not be wrong to say that the sun was supplying all the energy needs of man either directly or indirectly and that man was using only renewable sources of energy.



II. FABRICATIONS METHODOLOGY

A. Working Principle

Fabrication is defined as the process of converting raw material into finished product. It is also defined as joining two or more elements to make a single part are termed as a fabrication process. A fairly large number of industrial components are made by fabrication process. Common examples are aircraft and ship bodies building trusses bridges welded machine frames sheet metal parts etc. The fabrication is often the most economical method and relies on raw material obtained from one of the primary manufacturing process such as rolling and extrusion. It may be called as secondary process.

The fabrication of the device is one of the important works which is to be perfect for proper working of the device. The fabrication is done to give each part the required dimension and finishing. If little error occurs in any dimension then the assembly of the parts cannot be done perfectly. So this is the major problem generally we encountered in our device fabrication. The various parts in our device which we fabricated encountered problems and the solutions are as follows.

- Frame stand
- Brake
- Shaft
- Wheel
- IR Sensor
- Buzzer
- Battery
- Relay Cable
- Brake Cable
- Disc Drum

B. Frame Stand

First we calculated the height of the set up later we cut the raw material for required dimension. By arranging them properly we joined those parts by welding. After welding we removed welding marks and sharp edges. Above this frame stand wheel and breaking arrangement will arranged.



C. Brake

A brake is a mechanical device that hinders, 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 are 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.

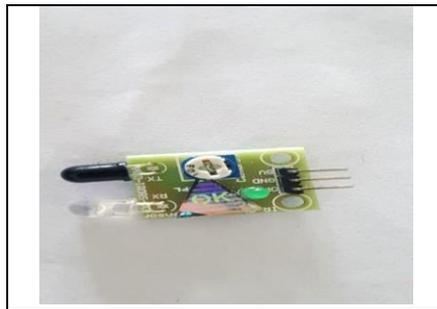
D. Wheel

Wheels are made to cope with radial and axial forces. They also provide a way of mounting other critical components such as the brakes, final drive and suspension. Wheels, and anything directly connected to them, are considered to be unsprung mass. Traditionally motorcycles used spoked wheels with inner tubes and pneumatic tires. Although cast wheels were first used on a motorcycle in 1927, it would not be until the 1970s that mainstream manufacturers would start to introduce cast wheels on their road going motorcycles. Spoked wheels are usually made with steel spokes and steel or aluminum rims. Cast wheels are predominantly made from aluminum or an alloy of but can also be made from more exotic materials such as magnesium or carbon fiber.



E. IR Sensor

An infrared sensor is an electronic device, that emits in order to sense some aspects of the surroundings. An IR sensor can measure the heat of an object as well as detects the motion. These types of sensors measures only infrared radiation, rather than emitting it that is called as a passive IR sensor. Usually in the infrared spectrum, all the objects radiate some form of thermal radiations. These types of radiations are invisible to our eyes that can be detected by an infrared sensor. The emitter is simply an IR LED (Light Emitting Diode) and the detector is simply an IR photodiode which is sensitive to IR light of the same wavelength as that emitted by the IR LED. When IR light falls on the photodiode, the resistances and these output voltages, change in proportion to the magnitude of the IR light received



F. Buzzer

A buzzer or beeper is an audio signaling device, which may be mechanical, electromechanical, or piezoelectric. Typical uses of buzzers and beepers include alarm devices, and confirmation of user input such as a mouse click or keystroke.

G. Battery

A lantern battery is a rectangular battery, typically an alkaline or zinc, carbon primary battery, used primarily in flashlights or lanterns. Lantern batteries are physically larger and consequently offer higher capacity than the more common torch batteries. Lantern batteries comprise multiple cells inside housing.

The most common variant in the US is the 6 volt square-base battery with spring terminals. In Europe the most common is the 4.5 volt flat-pack types

H. Relay cable

A relay is an electrically operated device. It has a control system and (also called input circuit or input contactor) and controlled system (also called output circuit or output contactor). It is frequently used in automatic control circuit. To put it simply, it is an automatic switch to controlling a high-current circuit with a low-current signal.

The advantages of a relay lie in its lower inertia of the moving, stability, long-term reliability and small volume. It is widely adopted in devices of power protection, automation technology, sport, remote control, reconnaissance and communication, as well as in devices of electro mechanics and power electronics. Generally speaking, a relay contains an induction part which can reflect input variable like current, voltage, power, resistance, frequency, temperature, pressure, speed and light etc. It also contains an actuator module (output) which can energize or de-energize the connection of controlled circuit. There is an intermediary part between input part and output part that is used to coupling and isolate input current, as well as actuate the output. When the rated value of input (voltage, current and

temperature etc.) is above the critical value, the controlled output circuit of relay will be energized or de-energized.

NB: input into a relay can be divided into two categories: electrical quantities (including current, voltage, frequency, power etc.) and non- electrical quantities (including temperature, pressure, speed, etc.)



III. RESULT

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

- For the protection of lively hood.
- To reduce accidents of vehicles due to the brake failure.
- In order to indicate the failure of brake switch.
- To connect the audio visual indicator with a sensor.

IV. Discussion

The main purpose of this project is to provide such a device to vehicles operator so that any harmful damage and accidents cause by failure of brake switch can be easily prevented by the proper indication of working condition of brake switch. There are many aims of this project describe as:-

- To indicate the proper working condition of brake switch
- To prevent small number of accident occurs in roads by the failure of brake switch
- To gives the audio visual indication when there is a mistake in braking system. Audio visual indicator attached with sensors

V. CONCLUSION

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 a early warning system. it constantly monitors the condition of the brake and give audio visual indication. This setup reduces the accidents and prevents loss of life. Auxiliary braking gives additional capability to the driver and to ensure prevention of damage to life and property

VI. References

- [1] U.S.Patent no-5176429 Date of patent-Jan 5,1993 FAILURE DETECTION Toshihiro Hamada, both of Shizuoka, Japan Assignee: Nissinbo Industries, Inc., Tokyo,Japan,App.No.: 621,459 Filed: Nov. 29, 1990
- [2] DC ELECTRIC MOTOR CONTROL SYSTEMS by Rader,Oris L. Langer, Thomas. Patent application Number .

- [3] Zutao Zhang, Jiashu Zhang, “A Novel Vehicle Safety Model: Vehicle speed Controller under Driver Fatigue”, “IJCSNS International Journal of Computer Science and Network Security”, VOL.9 No.1, January 2009
- [4] M. Bertozzi, A. Broggi, M. Cellario, A. Fascioli, P. Lombardi, and M. Porta, “Artificial vision in road vehicles,” Proceedings of the IEEE, vol. 90, no. 7, pp. 1258–1271, 2002.
- [5] S. Tsugawa and Sadayuki, “Vision based vehicle on japan: Machine vision systems and driving control systems,” IEEE Trans. on Ind. El.???, vol. 41, no.4, pp. 39–405, 1994.
- [6] Vehicle -highway automation activities in the United States. U.S. Dept of Transportation, 1997
- [7] Electronics for you by, Dr. mohankumar, EFYAMG.COM Circuit ideas, june- 2005
- [8] Light Vehicle Brake Systems, revised as of October 1, 2004, and the Final Rule published in the Federal Register on June 30, 2005
- [9] Railway technology today-7 (edited by kanji wako) Braking Systems. By Izumi hasegawa and seigouchida.
- [10] Carl Svard, Division of Vehicular Systems Department of Electrical Engineering Linkoping University SE-581 83 Linkoping, Sweden Part A: Systems and Humans c2010 IEEE.