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Automatic Braking System

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Abstract: In the present work, it is investigated that the tremendous growth has continuously risen in demand for automobile and automotive sector. In the view of this, we need to advance our technology regarding light and heavy duty vehicles. The necessity of automatic breaking system is designed and implemented by pneumatic principle.

Automatic brake with the pneumatic bumper system is an additional safety to heavy vehicles with a passenger car. It is easy to make such a system in heavy air brake vehicles. An emergency switch is provided for emergency uses.This switch avoids the driver to stand from his seat.

The project carried out by us made an impressing task in the field of automobile manufacturing industries. It is very useful for the workers work in the lath and small scale industries.

This project will reduce the cost involved in the concern. The project has been designed to perform the entire requirement task at the shortest time available.

Keywords: Compressor, FRL Unit, Receiver etc.

1. INTRODUCTION

In cars, the hand brake (also known as the emergency brake, e-brake, or parking brake) is a latching brake usually used to keep the car stationary. Automobile e-brakes usually consist of a cable (usually adjustable for length) directly connected to the brake mechanism on one end and to some type of mechanism that can be actuated by the driver on the other end. The mechanism is often a hand-operated lever on the floor on either side of the driver, or a pull handles located below and near the steering wheel column, or a (foot-operated) pedal located far apart from the other pedals.

Although sometimes known as an emergency brake, using it in any emergency where the footbrake is still operational is likely to badly upset the brake balance of the car and vastly increase the likelihood of loss of control of the vehicle, for example by initiating a rear-wheel skid. Additionally, the stopping force provided by using the handbrake instead of or in addition to the footbrake is usually small and would not significantly aid in stopping the vehicle, again because it usually operates on the rear wheels; they suffer reduced traction compared to the front wheels while braking. The emergency brake is instead intended for use in case of mechanical failure where the regular foot brake is inoperable or compromised, hopefully with the opportunity to apply the brake in a controlled manner to bring the vehicle to a safe, if gentle halt before seeking service assistance. Modern brake systems are typically very reliable and engineered with fail-safe (e.g. dual-circuit hydraulics) and failure warning systems, meaning the handbrake is no longer often called on for its original purpose.

The most common use for an automobile emergency brake is to keep the vehicle motionless when it is parked, thus the alternative name, *parking brake*. Car emergency brakes have a ratchet locking mechanism that will keep them engaged until a release button is pressed. On vehicles with automatic transmissions, this is usually used in concern with a parking pawl in the transmission. Automotive safety experts recommend the use of both systems to immobilize a parked car, and the use of both systems is required by law in some jurisdictions, yet many individuals use only the "Park" position on the automatic transmission and not the parking brake. It is similar to manual transmission cars: These are recommended always to be left with the handbrake engaged, in concert with their lowest gear (usually either first or reverse). The use of both systems is also required by law in some jurisdictions. However, when parking on level ground, many people either only engage the handbrake (gear lever in neutral), or only select a gear (handbrake released).

There is any obstacle closer to the vehicle (within 4 feet), the control signal after pressing the extra break switch is given to the bumper activation system.

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The pneumatic bumper system is used to product the man and vehicle. This bumper activation system is only activated the vehicle speed above 40-50 km per hour. This vehicle speed is sensed by the proximity sensor and this signal is given to the control unit and pneumatic bumper activation system.

2. PROPOSED EXPERIMENTAL SETUP & EXPERIMENTAL PROCEDURE

2.1 brake System

In cars, the hand brake (emergency brake, e-brake, parking brake) is a latching brake usually used to keep the car stationary, and in manual transmission vehicles, as an aid to starting the vehicle from stopped when going up an incline - with one foot on the clutch (to disengage it smoothly), the other on the accelerator (to avoid stalling from the increased torque required by the incline), a third limb is needed for the brake (to avoid rolling backwards while moving a foot from brake to accelerator). Automobile e-brakes usually consist of a cable (usually adjustable for length) directly connected to the brake mechanism on one end and to some type of mechanism that can be actuated by the driver on the other end. The mechanism is often a hand-operated lever (hence the *handbrake* name), on the floor on either side of the driver, or a pull handle located below and near the steering wheel column, or a (foot-operated) pedal located far apart from the other pedals.

Although sometimes known as an emergency brake, using it in any emergency where the footbrake is still operational is likely to badly upset the brake balance of the car and vastly increase the likelihood of loss of control of the vehicle, for example by initiating a rear-wheel skid. Additionally, the stopping force provided by using the handbrake instead of or in addition to the footbrake is usually small and would not significantly aid in stopping the vehicle, again because it usually operates on the rear wheels; they suffer reduced traction compared to the front wheels while braking. The emergency brake is instead intended for use in case of mechanical failure where the regular foot brake is inoperable or compromised, hopefully with the opportunity to apply the brake in a controlled manner to bring the vehicle to a safe, if gentle halt before seeking service assistance. Modern brake systems are typically very reliable and engineered with failsafe (e.g. dual-circuit hydraulics) and failure-warning (e.g. low brake fluid sensor) systems, meaning the handbrake is no longer often called on for its original purpose.

The most common use for an automobile emergency brake is to keep the vehicle motionless when it is parked, thus the alternative name, *parking brake*. Car emergency brakes have a ratchet locking mechanism that will keep them engaged until a release button is pressed. On vehicles with automatic transmissions, this is usually used in concert with a parking pawl in the transmission. Automotive safety experts recommend the use of both systems to immobilize a parked car, and the use of both systems is required by law in some places, yet many individuals use only the "Park" position on the automatic transmission and not the parking brake. It's similar to manual transmission cars: They are recommended always to be left with the handbrake engaged, in concert with their lowest gear (usually either first or reverse). The use of both systems is also required by law in some jurisdictions. However, when parking on level ground, many people either only engage the handbrake (gear lever in neutral), or only select a gear (handbrake released). If parking on a hill with only one system results in the car rolling and damaging the car or other property, insurance companies in some countries, for example in Germany, aren't required to pay for the damages.

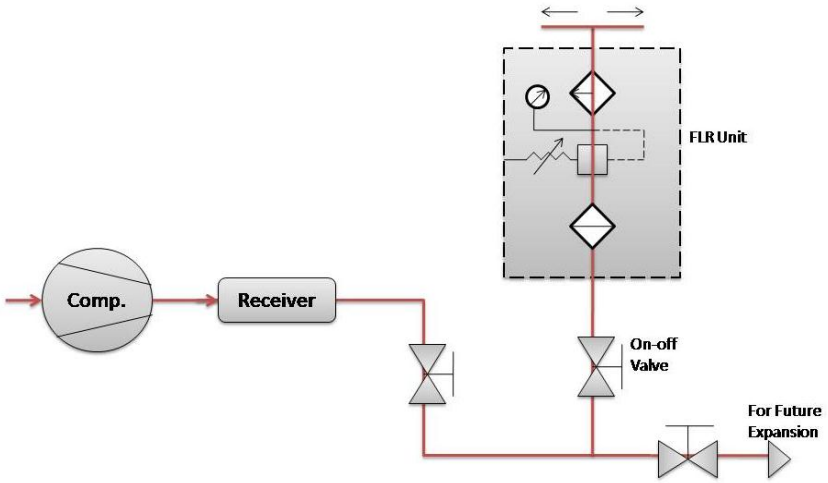

Fig. 2.1 Basic Pneumatic System

2.2 Construction and Working Principle

1) Compressed air is used as force medium of this project operation. This compressed air can be easily taken from the air cylinder of the vehicle used air brake system.
2) The control unit consists of a relay circuit. It is a photovoltaic sensor switch. It has outputs. The solenoid valve unit consists of ½ solenoid valves. ½ indicates two ports and one-way operation. Compressed air enters through a first solenoid valve and expelled to atmosphere through a second solenoid valve.
3) When the driver is in the seat. At that time, the photovoltaic sensor is in open mode. So current cannot passes to relay circuit through the switch. When driver stands from his seat, photovoltaic sensor senses and sends electric current to relay circuit. One of the relay output sends out a voltage to the first solenoid valve and now it is in opened position so the compressed air enters to break chamber. And these time delays stop the current engine coil or motor current.
4) An additional emergency switch is provided in case of emergency. If the driver needs a bumper, then the emergency switch can be used.It too gives the bottom of break paddle and provides voltage to the solenoid valve. So the urgent

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brake is applied .moment gives extra of paddle these tiny limit switch is on and pneumatic bumper is operated forward direction This can be used in the case of extreme condition

3. ADVANTAGES

- Any other system needs a manual operation.
- Electronic brake has complicated electronic control, whereas automatic brake has simple electronic control unit.
- The presence of emergency switch to compensate for an emergency situation.
- Needless electric current than electrical brake system.
    - The absence of mechanical linkages.
    - Less cost as compared to electrical and electronic brake systems.
    - Risk less driving.
    - Simple in construction.
    - Separate air compressor or compressed air reservoir is not needed.
    - Components are readily available in market

REFERENCES

Journals / Conference Papers

1) Prof. Mujumdar: "Pneumatics – Study Material"
2) R. S. Khurmi & I. K. Gupta : "A Textbook or Machine Design"
3) Prof. H. G. Patil : "Machine Design Data Hand Book (SI Metric)"
4) Hajra Choudhary: "Workshop Technology Vol. – II"
5) Website: www.d&tonline.com/pneudef/"
6) For Safety Driving. http://www.mydigitallife.info/2008/02/13/toyota-develops-automatic-brake-system-assisted-by-gps-technology-for-safety-driving/
7) The Volvo Owners Club: New Collision Warning with Auto Brake helps prevent rear-end collisions. http://www.volvoclub.org.uk/press/releases/2007/collision_warning.shtml
8) howstuffworks.com: How Pre-Collision Systems Work. Types of Pre-collision Systems. http://auto.howstuffworks.com/car-driving-safety/safety-regulatory-devices/pre-collision-systems2.htm
9) Kanarachos, Stratis (2009). "A new method for computing optimal obstacle avoidance steering maneuvers of vehicles". International Journal of Vehicle Autonomous Systems. 7 (1): 73–95. doi:10.1504/IJVAS.2009.027968. Retrieved 29 July 2015.
10) "U.S. DOT and IIHS announce the historic commitment of 20 automakers to make automatic emergency braking standard on new vehicles". U.S. Department of Transportation National Highway Traffic Safety Administration. 17 March 2016. Retrieved 17 March 2016.
11) "Automakers agree to make auto braking a standard by 2022".
12) "UNECE works on new standards to increase the safety of trucks and coaches".
13) Olney R.D.; et al. (November 1995), "Collision Warning System Technology", Intelligent Transport Systems World Congress, Yokohama, Japan

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