

AUTO HAND BRAKE USING INTELLIGENT SYSTEM ON ACTUAL VEHICLE

¹Sachin Zanje, ²Dnyaneshwar Patil, ³Khan Ahmad, ⁴Targude Kapil, ⁵Shital Gaikwad

¹Student, ²Student, ³Student, ⁴Student, ⁵Asst. Professor

¹Mechanical Engineering,

¹DYPIET, Ambi, Pune, India

Abstract- One of the most important safety features in an automobile is brake. A typical automobile consists of two types of brakes, one for retarding the speed of vehicle while it is in motion and other is to hold the vehicle in its place when standing still or parked. The latter is mostly important when the vehicle is parked on slope. It is important to engage and disengage the hand brake before starting the vehicle from rest position and for vehicle to move forward respectively. And without pulling or pushing the lever the parking break will not engage or dis-engage. Due to operator errors the brake is not getting engage, this led the brakes to become in effective and eventually they failed to serve their purpose. And also for the safety purpose the seat belt is necessary to wear but all are avoiding to wear the seat belt which is lead to major accidental death just for neglect wearing a seat belt. To overcome all the limitation of the conventional system and not wearing seat belt after the government norm we proposed the new automatic handbrake system. For safety of the vehicle and the human itself by the help of both seat belt and hand brake. This system uses electric circuit, electric motor for engaging and dis-engaging the hand brake. Engaging of hand brake takes place when ignition is off and the seat belt is removed, and dis-engaging of hand brake takes place when the ignition is ON and seat belt is fastened and also foot brake pedal is pressed.

Keywords- Seat belt, Ergonomics, Hand brake, Electric circuit, cost.

I. INTRODUCTION

A handbrake is an added braking mechanism mounted on all commercial vehicles that is completely distinct from foot pedal -operated in cars the parking brake, also called hand brake, alternative brake, or a latching brake, usually used to keep the vehicle motionless. Most commonly used to avoid the vehicle from rolling when it is parked. Automobile hand brakes consist of a cable directly linked to the brake mechanism on one end and to a lever at the driver's location. Using your handbrake to stop a moving car can damage the brake arrangement.

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 with 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. Conventional hand brake feat involves the human interference. While not pull or pushing the lever, the hand brake won't work. Also, generally as a result of negligence or in emergency conditions, we have a tendency to humans usually forget to use parking brakes.

Constant enhancements in active safety and improvements with respect to the reliability and comfort of operation mean that mechanical handbrakes are increasingly being replaced by new other systems and this giving birth to new ideas of parking brake techniques. Such as electric and pneumatic hand brake techniques. The elemental operates of the electrical hand brake (EPB) is to activate and unharness the hand brake once the vehicle is at a standstill. In 1st generation of electrical hand brake fitted, activate the control board replaces the standard handbrake lever accustomed operate the mechanical hand brake. This switch utilizes associate degree electronic management unit (ECU) to trigger mechanical device mechanisms among the wheel brakes or central actuator that operates the rear wheel brake via cable.

Seat belt is one of the primary safety features used in vehicle to avoid major injuries to the driver driving the vehicle. Even after the government norm that is wearing of seat belt is mandatory, accidental injuries increase due to negligence of occupants in vehicle of wearing seat belt. If seat belt is not buckled correctly than the chances of accidental injuries increase. To avoid these, different companies found variety of seat belt systems such as passive seat belt system, automatic seat belt system, seat belt warning system and so on.

II. WORKING PRINCIPLE

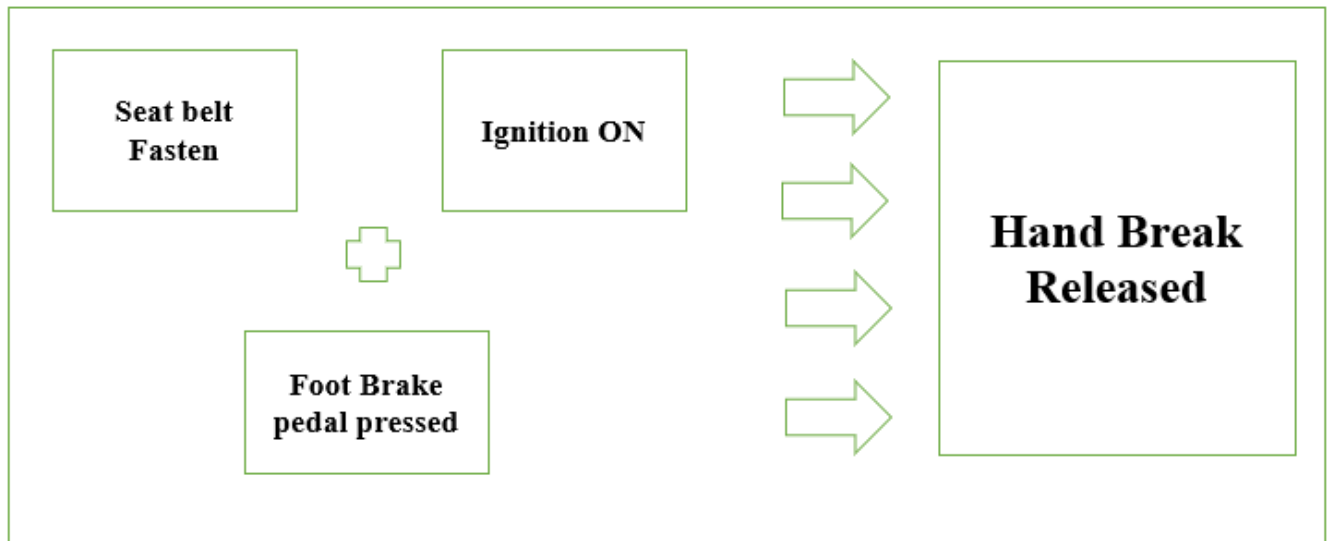


Fig. 1 Methodology for releasing hand brake

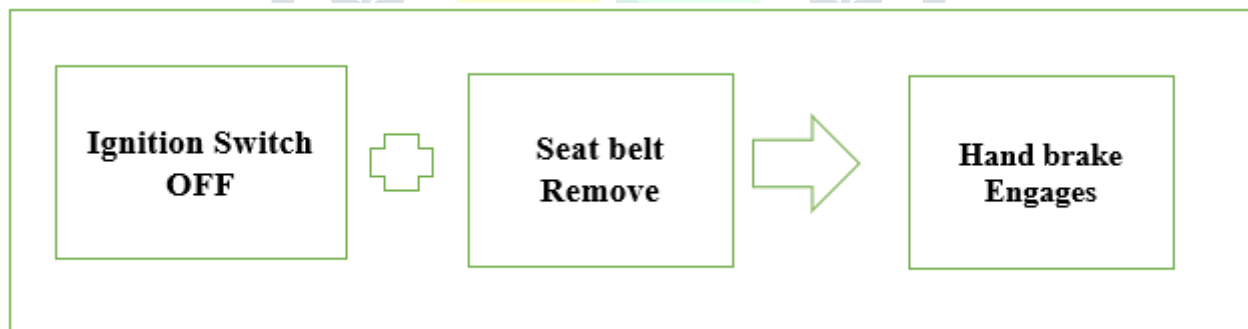


Fig. Methodology for engaging hand brake

Due to failure of above unit or concept, we decided to change the system and modify it by keeping the purpose same. The newer concept was to introduce Microcontroller along with seat belt setting which can lead to efficient as well as flexible in design and manipulate the system and improve more safety. The use of motor made our operation easy and risk free. The construction of newer circuit is much differing from primary one as the pneumatic and hydraulic system. In this, we eliminated the all Hydraulic and pneumatic parts and changing to the electric circuit with the input from Seat belt, ignition switch, and foot brake pedal to give the signal to motor to engage and dis-engage the hand brake lever.

Engaging of hand brake takes place when ignition is off and the seat belt is removed, and dis-engaging of hand brake takes place when the ignition is ON and seat belt is fastened and also foot brake pedal is pressed.

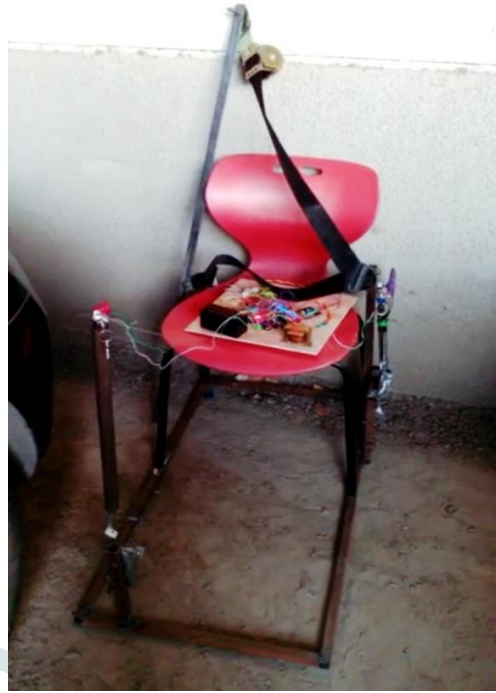


Fig 4. Single wheel pesticide spray pump with metering

III. DESIGN SPECIFICATION

- 1) Handbrake push rod force = 1kg
- 2) Displacement = 12mm
- 3) So, solenoid push button selected = 1kg-mm torque,
- 4) Displacement = 15mm, fitted in 15-12= 3mm away from push button,
- 5) Handbrake operating force required = 2kg
- 6) Motor torque selected = 3 kg-cm, rpm= 30 & 12 v dc powered
- 7) Hand lever operating angle is 45 deg. So, 30 rpm is sufficient.
- 8) Frame – 36*17.75 (M.S).

IV. CONCLUSION

- Automatic hand brake mechanism is beneficial for operator's safety by reducing accident chances as well as disengaging chances of braking. This system can also be used in commercial cars for ease of operating as well for reducing cost purpose.
- And by adding the seat belt for Moving the vehicle make system safer than ever.
- Along with it, we can also modify our system by using the spring at the power electric motor by using it as reverse purpose. Thus, our project is still a demonstration of it, no car has yet used such concept on ignition switch.
- This project gives a new idea of automatic hand braking system which can be applied in car manufacturing industries as well as companies.
- The working is quite simple and doesn't require any extra effort to operator or driver.
- Even though when any driver forgets to pull the hand brake in regular car, the driver can be in any critical situation but by using the concept of automatic handbrake system, there is no possibility of risk because by putting the ignition switch OFF, the hand brake system is automatically getting locked.
- The hand brake engages and dis engage mechanism provide safety as well as more comfort to the driver as result hassle free driving.

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