

# Implementation of Alternative Braking System in Case of Brake Failure Situation

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**Abstract**-Now a day's transport has become the most important part of the communication. But increase in transport has increased accidents a lot. Alternative braking system will provide the driver an extra safety feature to protect the vehicle as well as save the life of occupant in case of brake failure situation of a four wheeler. In our project we have provided a kill switch behind the brake pedal which will get pressed in case of brake failure situation and then the further system will work automatically in which first a circuit will be activated which will sound a buzzer as an alertness to the driver and parking lights will be turned on as alertness to other vehicles on the road. Than engine cut-off will be done simultaneously and after an average drop of 20kmph speed the hand brake will be automatically operated which will stop the vehicle.

**Index Terms**-Kill Switch, Vertical Gear Box, Winder Motor, Pulley.

## 1. INTRODUCTION

In the 21<sup>st</sup> Century, transportation has become the core part to communicate with the world. It has brought the world closer. But this type of communication has also increased number of road accidents.[2] If we figure out all accidents, many accidents are caused due to vehicle's brake failure this gave rise to our project which has provide an alternative braking system in the car in case of hydraulic brake failure and add a safety feature in the car.

A kill switch has been provided behind the brake pedal which will get pressed when the brake of that vehicle is fail. When the switch is pressed a current is supplied to three parts of the vehicle i.e. winder motor, buzzer and parking lights.

On the basis of this system, two techniques are provided to reduce the speed of the vehicle and two techniques to give alertness to inside and outside occupants. As in today's stage safety is a thing which matters a lot while designing any product.

## 2. AIM AND OBJECTIVES

Develop a system which will increase safety feature in the vehicle and which will stop the vehicle in case of brake failure. This system will raise a buzzer when there is a situation of brake failure so that an alertness will be given to inside occupant. Parking lights will be activated so that other vehicles on the road will be alerted. Spark current will be cut off so there will be no any spark ignition in order to reduce the speed and finally

hand brake will be activated automatically which will completely stop the vehicle.

## 3. LITERARURE SURVEY

There are so many existing systems that are available in the market considering vehicle safety.[3] Recently there is an technology known as Anti-lock braking system which stops the vehicle suddenly without any skid.[4] There is also traction control system which helps the vehicle's wheel to reduce the speed especially at the time of turning.

According to a research paper on Fail-Safe system, there is a brake control system for a vehicle in which a brake pressure is generated in accordance with a signal from an electronic control unit for applying the brake pressure to vehicle wheels.

As one more technique is available, manual operation of hand brake. There are also some research which tells us about the automatic application and releasing hand brake.

## 4. PROPOSED SYSTEM

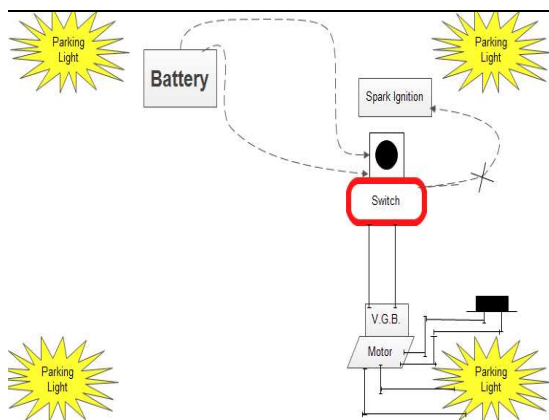
### 4.1. Outline

- When the case of brake failure occurs, the brake pedal gets completely pressed and touches the floor. There we have provided a switch named "Kill Switch" which gets pressed. The connection of switch is with the battery of the car which provides the necessary current required to run the system. The further connection of the switch is done with four

components of vehicle. (winder motor, Parking lights, buzzer, spark ignition)

- Firstly, a buzzer will sound which will gives alertness to inside occupants. Than the parking lights will turned on which will alert other vehicles travelling on the road. Than spark ignition cut-off will be done by series connection of the wire from battery to spark ignition to the switch. Due to spark cut-off, even though the fuel is supplied there will not be any spark. The ignition key will be on so the steering system of the vehicle will also be unlocked.
- A winder motor will be activated which is connected to a vertical gear box (20:1) which has a pulley in order to pull the hand brake with the clockwise rotation of the vertical gear. To operate the hand brake a pulley mechanism is used to pull it properly and gradually. The winder motor also has the ability to release the hand brake which is also an important part of our project. All this system works automatically and at a time once the switch is pressed.

#### 4.2. System Block Diagram



#### 4.3. Hardware and Requirement

- (1) Switch button
- (2) Vertical Gear box
- (3) Pulley
- (4) Buzzer
- (5) Winder Motor
- (6) Wires



4.4. Model Diagram

#### 4.5. Advantages and Disadvantages

##### Advantages

- By using this system we can many lives by reducing road accidents due to brake failure.
- This system will reduce human efforts.
- This system will provide alertness to both inside and outside peoples.

##### Disadvantages

- Aesthetic look of the interior of car gets little bit complicated.

## 5. METHODOLOGY

### 5.1. Techniques

#### 5.1.1 Pulley Mechanism:

In order to pull the hand brake up some extra force is required to pull it. To achieve this movement we have provided a pulley mechanism behind the hand brake and also a vertical gear box is used so that it can sustain the load of the hand brake. With the clockwise rotation of winder motor the hand brake is pulled up with respect to pulley and when the winder motor rotates anticlockwise the hand brake is released again.



#### 5.1.2 Buzzer and parking light activation:

The connection which comes from battery and switch is given to the buzzer as well as parking lights which when glows gives alertness to both inside and outside environment.



#### 5.1.3 Spark ignition cut-off:

The current which comes from battery is given to the switch which is initially in off condition and when the brake pedal pushes the switch, it is turned off and the supply from battery is cut off by series connection which turns off the spark to Ignite. In this way the speed of the vehicles reduced till 20kmph in 2 to 3 seconds.

### 5.2. Plan of Implementation

#### 5.2.1 Plaing of vertical gear box

Placing of the vertical gear box (20:1) was needed to be done properly as it was bigger in size and congested to fit. If proper mounting is not done, than it must have utilized extra space inside the vehicle. So we placed it in the boot space of the vehicle. This makes our design to be seen compact in size.



#### 5.2.2 Spark connection cut-off

Connect the battery terminals to that switch which is provided (kill switch) with a series connection of battery to switch and the spark ignition. When the switch is pressed the supply from battery to switch is cut-off and the vehicle decelerates suddenly due to absence of spark.

#### 5.2.3 Overall wirings done

Connection of two terminals coming from the battery is done with the kill switch and then the wires are passed to a buzzer to parking lights and the connection of the spark with battery is cut-off.

### 6. CONCLUSION

In this system, this project is implementing an extra safety feature in the vehicle. Proposed system will help to save the life of an individual or many persons by providing a safety alternative which will work automatically in case of brake failure situation. So even after the driver gets hyper in such situation the vehicle will be in control.

It would be much beneficial for racing cars as in case of brake failure situations in racing cars; it is difficult to handle the vehicle. It also has a great advantage to normal vehicle of passenger vehicles as most of the accident causing on the road are very dangerous and now a day people in the market are demanding for some extra safety feature in the vehicle.

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