

SEAT BELT ASSISTED HAND BRAKE SYSTEM

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Abstract: In cars, the parking brake, additionally known as emergency brake, hand brake, or brake, is a latching brake sometimes used to keep the vehicle stationary. It's generally additionally accustomed prevent a vehicle from rolling once the operator desires each foot to work the clutch and throttle pedals. Automobile hand brake sometimes contains a cable directly connected to the brake mechanism on one finish and to a lever or pedal at the driver's position. The mechanism is usually a non-automatic lever (hence the emergency brake name), on the ground on either aspect of the motive force, or a pull handle situated below and close to the wheel column, or a (foot-operated) pedal situated way with the exception of the opposite pedals. Although generally called a hand brake, using it in any emergency wherever the footbrake continues to be operational is probably going to badly upset the brake balance of the automotive and immensely increase the probability of loss of management of the vehicle, for instance by initiating a rear-wheel skid. To boot, the stopping force provided by using the handbrake is tiny and wouldn't considerably aid in stopping the vehicle.

I. INTRODUCTION

Automobile hand brakes sometimes contain a cable directly connected to the brake mechanism on one finish and to a lever or pedal at the driver's position. The mechanism is usually a non-automatic lever (hence the emergency brake name), on the ground on either aspect of the motive force, or a pull handle situated below and close to the wheel column, or a (foot-operated) pedal situated way with the exception of the opposite pedals. Although generally called a hand brake, using it in any emergency wherever the footbrake continues to be operational is probably going to badly upset the brake balance of the automotive and immensely increase the probability of loss of management of the vehicle, for instance by initiating a rear-wheel skid. To boot, the stopping force provided by using the handbrake is tiny and wouldn't considerably aid in stopping the vehicle. The hand brake operates totally on the rear wheels that have reduced traction whereas braking however in some cases, hand brake operates on front wheel, as wiped out most Citroens manufactured since the tip of World War II.

The emergency brake is instead supposed to be used just in case of mechanical failure wherever the regular footbrake is inoperable or compromised. Trendy brake systems square measure usually terribly reliable and equipped with dual-circuit hydraulics and lowbrake fluid sensing element systems, which means the handbrake is never accustomed stop a moving vehicle. 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. This could result in rolling of auto just in case of slopes and collision with different vehicles in park. Constant enhancements in active safety and enhancements with relation to the dependableness and luxury of operation mean that mechanical handbrakes are progressively being replaced by mechanical device systems. This gave birth to concepts of electrical hand brake techniques. The elemental operate 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 a Bowden cable.

Any, for reducing driver's effort and reminding for application of hand brake, there was a requirement for a very machine-controlled hand brake system, which can be consummated by the future concepts of mechatronic. This paper is predicated on the event of such system, involving the ideas of automobile, mechanical and natural philosophy, called mechanical device hand brake. Seats belts play a vital role in the safety of passengers. Seat belts are designed to keep the passengers from being thrown from the car. They are also designed to absorb the impact of a crash. Seat belts also stretch slightly so our body doesn't stop abruptly, and they prevent us from colliding with a part of the car or another person. Death as a result of ejection of unrestrained occupants from the vehicle is the major cause of fatalities in vehicle crashes. However, the importance of wearing a seat belt is often overlooked. An automatic seatbelt system can go a long way in ensuring usage of seatbelts. Automatic seat belts have been introduced as early as 1975 but there is no such arrangement in the industry at present. Such belts were discarded because of various disadvantages.

Also, it gets in the way of side curtain air bags. Why passengers fail to use seat belt? Major cause of fatalities in road is due to non-usage of seatbelt by passengers which can be attributed to various reasons like Carelessness and forgetfulness of the passengers. Absence of concrete legislative laws for wearing seat belts. Ignoring the importance of seat belts. Importance of seat belt Ejection from the vehicle is one of the most injurious events that can happen to a person in a crash.

The clearly shows that more than 70% of the injuries incur to passengers of trucks and automobiles. The percentage of injurie Fatality to injury ratios for occupants using seat belt and not using seat belt by age as the age of the occupant increases, the fatalities per 1000 injuries also increases This can be attributed to the fact older the occupant higher the mortality rate. According to the National Highway Traffic Safety dministration (NHTSA) in fatal traffic crashes about 79% of passengers who were totally ejected from the vehicle were killed and about 60 percent of passengers who were not wearing safety belts were killed. The percentage of drivers and passengers wearing seatbelts from use of seat belt by drivers has increased from 45% to 77% and the use of seat belt by passengers has increased from 37% to 68%. Research has found that lap/shoulder seat belts, when used, reduce the risk of fatal injury to front-seat passenger car occupants by 45 percent and the risk of moderate-to-critical injury by 50 percent. For light truck occupants, seat belts reduce the risk of fatal injury by 60 percent and moderate- to-critical injury by 65 percent. Cumulative estimated number of lives saved by seat belts shows the cumulative number of lives saved by using seat belts. Studies by road safety authorities conclude that seat belt legislation has reduced the number of casualties in road accidents. Experiments using both crash test dummies and human cadavers also indicated that wearing seat belts should lead to reduced risk of death and injury in car crashes.

II. LITERATURE SERVEY

1. Rohan E.Dalvi, Ramesh G.Sutar Design and Development of Hand Brake Release System May2017.
2. Dinesh Kumar, C Subramanian M. Automotive Braking System for Passenger Vehicle to Enhance Safety.
3. The brake system is designed to slow down and halt the motion of the vehicle Various components are used in braking system to convert the momentum.
4. R. Prakash Automatic Seat Belt for Passenger Vehicle. The system consists of a ring gear setup which lies below the seat. The seat belt is mounted on the ring gear which is meshed with a pinion driven by a motor. Provisions are made to adjust the ring gear setup based on the position of the buckle which can be
5. Altered according to the convenience of the passenger.
6. Akash D. Singh, Siddhesh P.Rahat International Research Journal of Engineering and Technology (IRJET) Mar-2018 In road vehicle the parking brake also called as hand brake, emergency brake or brake is used to keep the vehicle stationary. In normal vehicles a hand brake is consist of a cable connected to two-wheel brakes at one end and the other end to a pulling mechanism which is operated by human with hands.
7. Naveen Kumar, Lokesh Raj, Design of Seatbelt Activated Hand brake System In Cars Oct.-2014. The main purpose of this paper is to ensure drivers safety through a modified handbrake in car. A handbrake is an additional braking mechanism installed on all commercial vehicles that's completely separate from foot pedal-operated In cars the parking brake, also called hand brake, emergency brake, or brake, is a latching brake, usually used to keep the vehicle stationary.

III. PROJECT DESIGN & COMPONENTS

3D Design: CATIA V5R20:

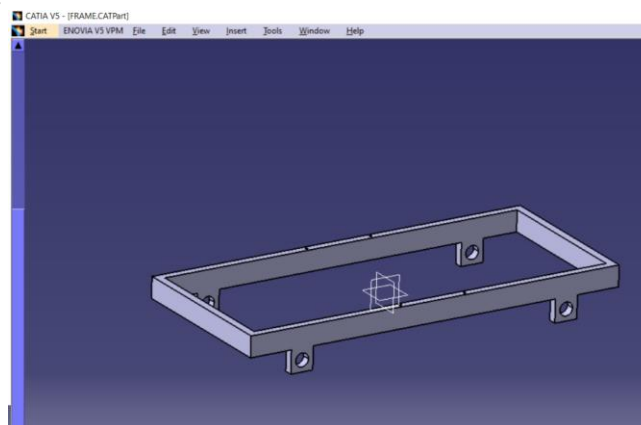


Fig No: Design of Frame.

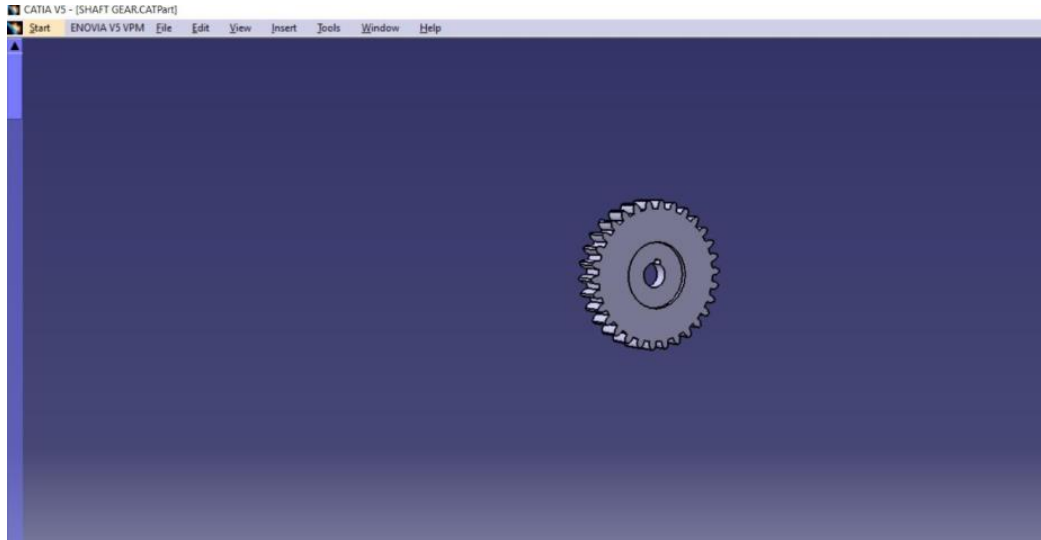


Fig No: Design of Gear.

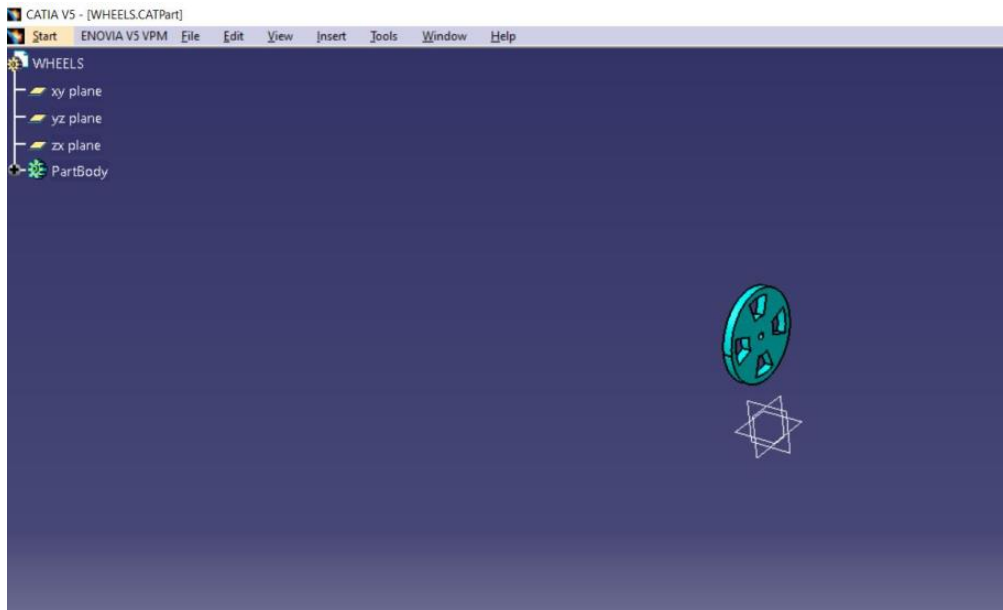


Fig No: Design of Wheel.

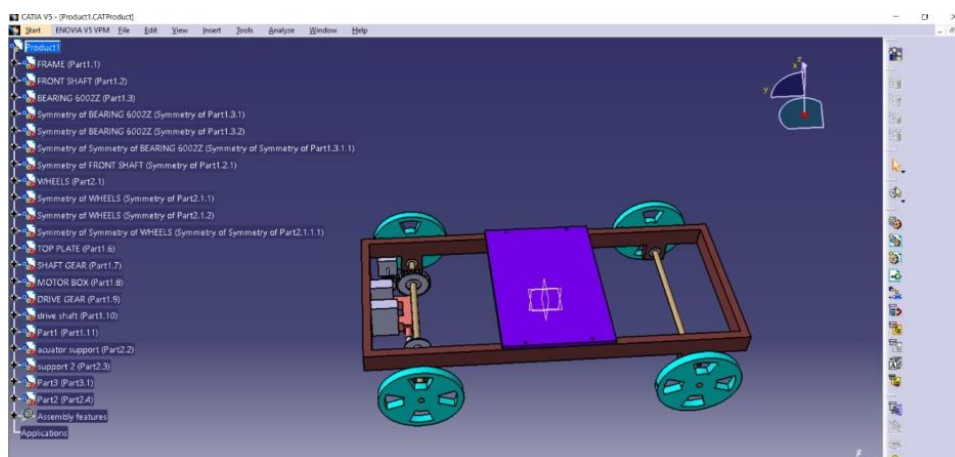


Fig No: Assembly Of SBAHS

IV. MATERIAL REQRUMENT**Motor Selection**

This section describes certain items that must be calculated to find the optimum motor for a particular application. Selection procedures and examples are given.

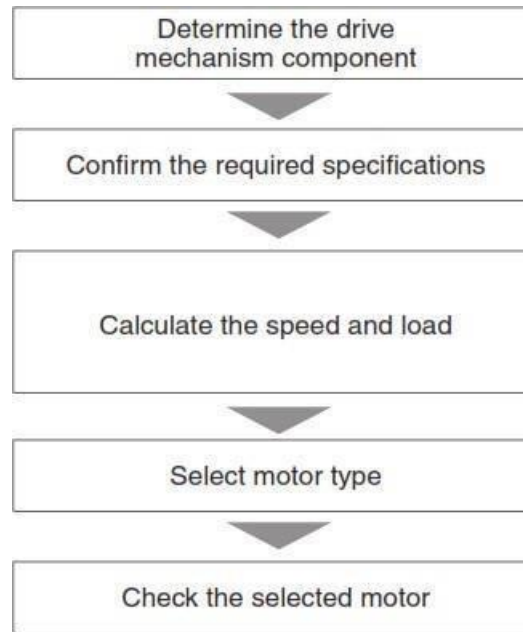
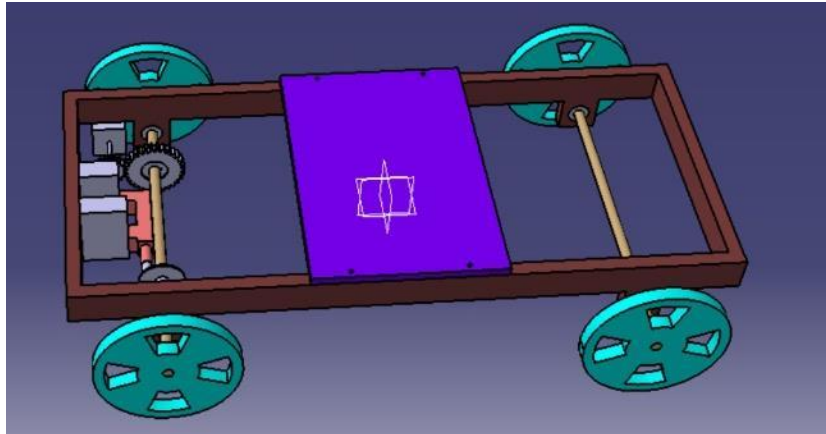


Fig No: Flow Chart of Material Selection

first, determinertain features of the design, such as drive mechanism, rough dimensions, distances moved, and positioning period. Confirm the required specifications for the drive system and equipment (stop accuracy, position holding, speed range, operating voltage, resolution, durability, etc.) Calculate the value for load torque, load inertia, speed, etc. at the motor drive shaft of the mechanism. Refer to page 3 for calculating the speed, load torque and load inertia for various mechanisms. Select a motor type from AC Motors, Brushless DC Motors or Stepping Motors based on the required specifications. Make a final determination of the motor after confirming that the specifications of the selected motor/gearhead satisfy all of the requirements (mechanical strength, acceleration time, acceleration torque etc.

PRINCIPLE OF OPERAION

SEAT BELT ASSISTED HAND BRAKE SYSTEM” is nothing however one in every of the braking systems in automobile at the time of auto turn off condition. During this braking system motorized operated one. During this project, the management unit is received the signal from the key. The key switch is ‘ON’ at the time of auto begins condition. The primary time clutch is applied so the motor is rotating in forward direction for two sec to unharness the brake (Already wheel is on braking condition). The key switch is ‘OFF’ the motor is rotating in reward direction for two sec to applying the brake. “SEAT BELT ASSISTED HAND BRAKE SYSTEM” is nothing however one in every of the braking systems in automobile at the time of auto switches off condition. During this braking system motorized operated one

**Fig No: Design of SBSAH**

V. CONSTRUCTION AND WORKING

DC Motor Type:

12-volt geared DC motor: A DC motor is any of a category of electrical machines that converts electricity wattage into mechanical power. The foremost common varieties have confidence the forces made by magnetic fields.

**Fig No: Volt DC Motor**

Arduino Uno

Microcontroller Arduino is AN open-source physical computing platform supported a straightforward I/O board and a development setting that implements the Processing/Wiring language. Arduino is accustomed develop complete interactive objects or is connected to software system on your laptop (e.g. Flash, Processing, MaxMSP). The ASCII text file IDE is downloaded for gratis (currently for waterproof OS X, Windows, and Linux).

**Fig No: Arduino Unit**

Power Actuator

We have used power door actuator as Power Actuator. A small electric turns a series of spur gears that serve as a gear reduction. The last gear drives a rack-and pinion gear set that is connected to the actuator rod. The rack converts the rotational motion of the motor into the linear motion needed to move the lock. In this mechanism the motor can turn the gears as well as move the latch. This is accomplished by a clutch that is connected to the gear and engaged by the motor.

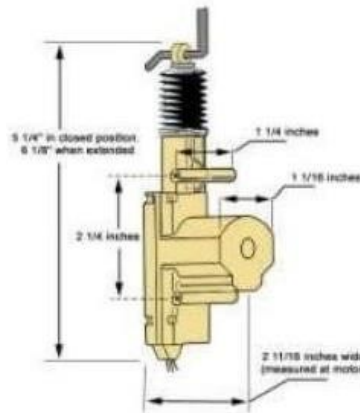


Fig No: Power Actuator

Metal frame

Frame Specification:

- Size of Frame: 920*400 mm
- Material of Frame: Mild Steel
- Unloaded Weight of Frame: 2.65 kg
- Loaded weight of frame: 9.7 kg

VI. CONCLUSION

From our concept we ensure that driver compulsorily wears seat belt while driving. If he tries to run without wearing the seat belt the handbrakes could not be disengaged. By this driver's safety is ensured. The "SEAT BELT ASSISTED HAND BRAKE" mechanical device brake facilitate with automatic brake application supported engine ignition condition. This may give safe braking is assured in slopes and hill starts with the assistance of "HOLD" perform. The operating of project is as per expected because the brake is applied by shift off the key and brake is free once keys on. This may reduce human efforts and human errors whereas parking or beginning the vehicle. This technique has complete automatic operation for straightforward drivability and safety. This system additionally gets some advanced choices like hold perform in head to go traffic and inclined roads, which might promise the drivers and vehicle owners with a secure pleasure drive and stops. The system has bigger relative blessings over the traditional parking system and can realize most application within the future as a result of its significance. The system is a smaller amount pricey and more practical therefore are often tailored to any vehicle.

VII. REFERENCE

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