

A MODEL OF PNEUMATIC HAND BRAKE SYSTEM

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INTRODUCTION

The one of most significant part in the car is the hand brake which is otherwise called a parking brake. It is utilized for the most part when the vehicle is left, in this way the parking name i.e., leaving brakes is utilized to keep the vehicle fixed additionally called as car brakes. The most widely recognized utilization of a parking brake is to keep the vehicle still when it is left. Vehicle parking brakes have a fastener bolting for the most part comprise of a link straightforwardly associated with the brake component this will keep them drawn in until a parking instrument button is squeezed by the driver.

Car security specialists prescribe the utilization of the two frameworks to immobilize a left vehicle, and the utilization of the two frameworks is legally necessary in certain spots yet numerous people utilize just the "Parking centre" position on the programmed transmission and not the parking brake. It's comparative with manual transmission vehicles: They are prescribed consistently to be left with the handbrake drawn in, working together with their most reduced apparatus (as a rule either first or reverse). The utilization of the two frameworks is likewise legally necessary in certain wards. In any case, when stopping on level ground, numerous individuals either just connect with the handbrake (gear switch in unbiased), or just select an apparatus (handbrake discharged). On the off chance that leaving on a slope with just a single framework brings about the vehicle rolling and harming the vehicle or other property, insurance agencies in certain nations, for instance in Germany, are not required to pay for the harms.

Hand brakes are likewise used to aid slope begins on vehicles with manual transmissions. Utilization of the handbrake liberates the two feet for use on the quickening agent and grip pedals, permitting the vehicle to get off without moving back by any means.

Our task includes an electric circuit which comprises microcontroller and two position sensors. In the wake of turning on the start and consequently discharges the hand brake and when the start switch kills it naturally draw in the hand brake.

PROBLEM DEFINITION

1. At the point when any driver neglects to pull the hand brake in ordinary vehicle while leaving. This may prompt coincidental circumstance. Be that as it may, by utilizing the idea of programmed handbrake framework, there is no chance of hazard on the grounds that by killing the start switch, the hand stopping mechanism consequently gets bolted.

2. And furthermore when driver neglects to expel the hand brake and drives the vehicle then it makes harm the slowing mechanism of vehicle. In any case, by utilizing the idea of programmed handbrake framework, there is no chance of this hazard on the grounds that by turning ON the start switch, the hand stopping mechanism consequently gets opened.

DRAWING ASSEMBLY

Assembly Design on Frame

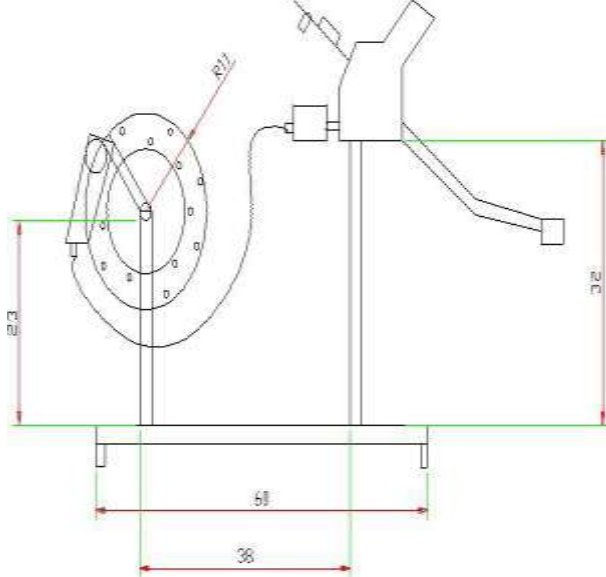


Fig : Assembly of Project Design

DESIGN AND CALCULATIONS

Design of Frame

The Casing manufactured for our venture which is comprised of M.S. It is welded likewise for course of action of the framework parts. The Edge alongside measurement is appeared in figure beneath:

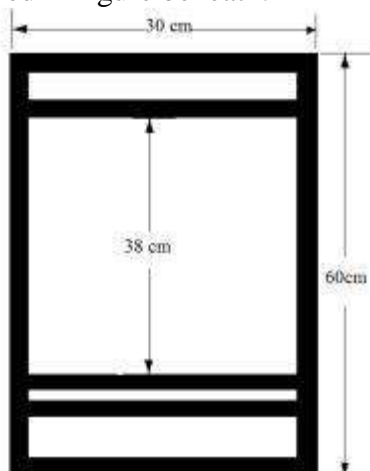


Fig: Frame Construction

Frame Specification:

- Size of Frame: 60 x 30 mm
- Material of Frame: Mild Steel
- Unloaded Weight of Frame: 2.65 kg
- Loaded weight of frame: 9.7 kg

Force Calculation

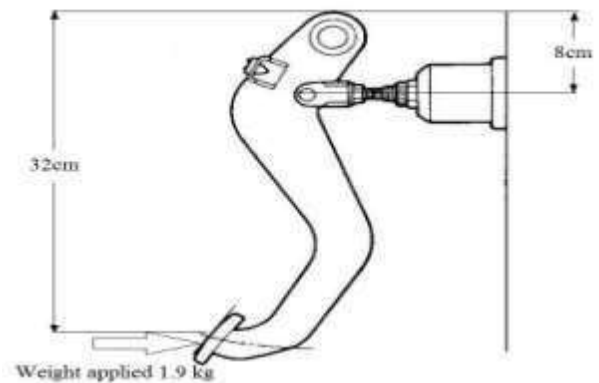


Fig : Dimension and Force applied

By lever principal:

$$32 \times 1.9 = 8 \times A$$

$$60.8 \div 8 = A$$

$$A = 7.6 \text{ kg}$$

$$A = 74.556 \text{ N.}$$

Applying Pascal's law:

i.e., "Pressure exerted on a confined liquid is transmitted undiminished in all directions and acts at right angles with equal force on all areas of the container".

$$P = F \div A$$

$$P = 74.556 \div [(\pi/4) \times (12.7)^2] P = 0.588 \text{ N/mm}^2$$

The intensity of pressure is constant throughout system, for calliper:

There are two cylinders in calliper. Therefore, force for one cylinder is: $F = P \times A$

$$F = 0.588 \times [(\pi/4) \times 252] F = 288.63 \text{ N.}$$

But the force is applied by two cylinders, so force developed by 2 cylinders is: $288.63 + 288.63 = 577.20 \text{ N.}$

In case of handbrake, generally only 60% of handbrake we use while braking instead of total brake. So force required for handbrake is 60% of total.

Therefore, 60% of total brake is, $0.6 \times 74.55 = 44.73 \text{ N}$

Now, for our automatic handbrake system, we have to choose an actuator which will produce nearby 45 N of force.

CONCLUSIONS

1. Programmed hand brake discharge system is gainful for administrator's wellbeing by decreasing mishap risks just as withdrawing odds of slowing down. This framework can likewise be utilized in business vehicles for

simplicity of working also for lessening cost reason. Alongside it, we can likewise change our framework by utilizing the spring at the force actuator by utilizing it as opposite reason. Hence, our undertaking is as yet a showing of it, no vehicle has yet utilized such idea on start switch.

2. This task gives another thought of programmed hand slowing mechanism which can be applied in vehicle fabricating businesses just as organizations.

3. The working is very straightforward and doesn't require any additional push to administrator or driver.

4. Despite the fact that when any driver neglects to pull the hand brake in normal vehicle, the driver can be in any basic circumstance yet by utilizing the idea of programmed handbrake framework, there is no chance of hazard in light of the fact that by putting the start switch OFF, the hand slowing mechanism is consequently gets bolted.

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