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OVER SPEED INDICATION AND ACCIDENT PREVENTION SYSTEM

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ABSTRACT

The object of this project is to detect the speed of the vehicle and cut off the fuel if it exceeds set speed .this project designed with micro controller proximity sensor as a speed and driver circuit with relay and keypad. In this project we are using proximity sensor as a speed detector .a proximity sensor can detect object without physical contact .A proximity sensor often emits an electromagnetic field or beam and look for changes in the field .the object being sensed is often refer to as the proximity sensor target .here is an inductive proximity sensor, requires a metal target. This system is used to monitor speed of the vehicle and to avoid the accident by using the proximity sensors. This over speed indication and automatic accident avoiding system senses the opposite vehicle by the proximity detector and stops both engines and applies auto braking thus preventing the accident this system is used to read and control the data from the vehicle .and then process it by using microcontroller .the LCD module displays the rpm and the speed of the vehicle .for over speed the alarm raises and alerts the driver.[3] This contains, Accident sensing module and RPM monitoring system.

***Keywords:* Electromagnetic Field, LCD Display, Proximity Sensor, Speeds Of The Vehicle, Rpm.**

I. INTRODUCTION

There are different systems as applied to automobiles such as Emergency Brake Assist, Dynamic Stability And Traction Control, Electronic Brake Distribution, Anti-Lock braking system, Blind Spot Information System, Night Vision etc, & these are extremely costly as they compulsorily need a computer for their implementation and in most of the cases GPS is mandatory. More over all these systems are singular problem oriented, hence there is a need of a cost effective low end technology or device that can perform the function of over-speed indication –alarm-and brake control with minimal use of high end technology, suitable for low budget commercial vehicles.

The Over speed indication and accident prevention system is a answer to the above problems where in the following features have been incorporated; Over speed sensing using a simple centrifuge and inductive proximity sensor ,Over-speed indication using flashing LED or hooter. Braking –using Disk brake to ensure optimal braking force and minimum braking distance. Electromagnetic actuation using solenoid. Making the operation fully automatic. Braking (Nature similar to the anti-lock braking) i.e., intermittent and gradual

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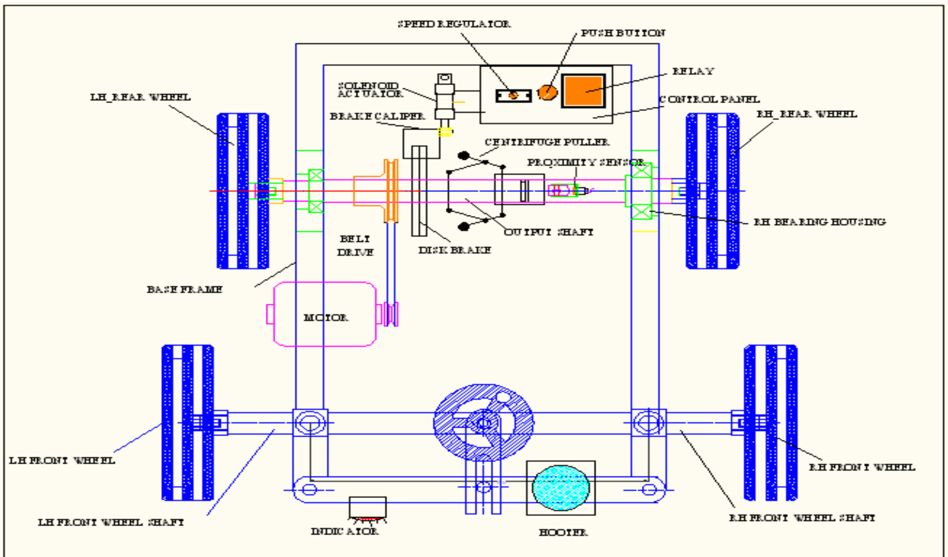
braking. Power regulation of the prime mover (in our case of model ---Single phase variable speed motor) to avoid power loss and excessive brake wear. [8]

II. OVER SPEED INDICATION AND ACCIDENT PREVENTION SYSTEM



OVERSPEED INDICATION AND ACCIDENT PREVENTION SYSTEM

2.1 Working

System starts with motor starting…motor speed controlled by electronic speed regulator….as speed increases the dead weight of the centrifuge governor fly's out making the probe to slide back…at over speed level the resultant gap between probe of the slider and the proximity sensor exceeds the permissible limit…which makes the relay to operate and ..consequently the following actions take place…Visual over speed indicator in the form of over speed indication lamp lights .Audio over speed indicator in the form of over speed indication hooter goes ON . Braking mechanism is actuated to operate the shoe brake cam linear actuator mechanism [7]

III. DESIGN AND FABRICATION

3.1 Design

Design consists of application of scientific principles, technical information and imagination for development of new or improvised machine or mechanism to perform a specific function with maximum economy & efficiency .Hence a careful design approach has to be adopted. The total design work, has been split up into two parts; System design, Mechanical Design.

3.2 Design of Belt Drive

Selection an open belt drives using V-belt;

Reduction ratio = 5

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Planning a 1 stage reduction;

A) Motor pulley (ϕ D1) =20mm

B) Main shaft pulley (ϕ D2) =100mm

INPUT DATA

Input power = 0.05KW

Input speed=1000 RPM

Center distance = 210 MM

Max belt speed = 1600 M/MIN = 26.67 M/SEC

Groove angle (2 β) = 400

Coefficient of friction = 0.25

Between belt and pulley allowable tensile stress= 8 N/mm2

3.3 Design of Input Shaft

Motor Torque

$$P = \frac{2 \Pi N T}{60}$$

$$T = \frac{60 \times 60}{2 \Pi \times 6000}$$

T = 0.095 N-m

Ball Bearing Selection

Series 60

P = XFr + Yfa.

Where ;

P=Equivalent dynamic load, (N)

X=Radial load constant

Fr= Radial load (H)

Y = Axial load contact

Fa = Axial load (N)

In our case;

Radial load FR= T1 +T2=

Fa = 0

P= 140.4 N

⇒L= (C/p) p

Considering 4000 working hours

3

$$L = \frac{60 \text{ n L h}}{106} = 336 \text{ mrev}$$

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$$\Rightarrow 336 = \left(\frac{C}{140.4}\right)$$

$\Rightarrow$ C = 976 N

AS; required dynamic of bearing is less than the rated dynamic capacity of bearing ;

$\Rightarrow$ Bearing is safe.

3.4 Design of Governor

Here the approach is to select the spring directly as per geometrical constrains and calculate the mass of the centrifugal bob weights to deflect the spring according to requirements of the governor set-up,

Assuming minimum cut off speed for model = 60 kmph

Wheel diameter = 300 mm

Hence speed of wheel shaft =1060 rpm

Radial speed = ω = 111 rad/sec

According to the Geometry of setup the spring used in the governor setup is mounted on the wheel shaft, hence minimum diameter = 16 mm, assuming rod diameter = 1.2 mm and no. of turns to be 10, both end ground, free length = 20mm.

The function of the spring is to maintain the gap between the sensor and the probe below 3mm, hence in order to cut-off to occur the spring has to be deflected by at least 4mm.

Hence specifications of spring selected:

Type: Helical compression spring:

End condition: Both end ground

Rod dia. = 1.2 mm

Inner diameter of spring = 16mm

Outside diameter of spring = 18.4

Mean coil dia. = 17.2

Free length = 20mm

No of turns = 10mm

Hence solid length = 12mm

Maximum deflection possible = 8 mm

Spring index =15

Maximum permissible stress = 420 N/mm2

Modulus of rigidity = 84 KN/mm2

$$Fs = \frac{K \times 8\,Wc}{\Pi\, d2}$$

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$$420 = \frac{1.123 \times 8 \times W \times 15}{\Pi X\ 1.22}$$

W = 14.09 N

This is the load in the axial direction to be applied by the flying bob weight as centrifugal force, so also the fiction in linkages and shaft sliding bearing has to be overcome by the mass system hence,….the load is taken to be 2 times required

W= 2 x 14.09 = 28.18

W = mω2r---------This is because two bob-weights are used.

m = 28.18 / ω2r

m =28.18 / 1112 x 0.025 = 0.092 N

m = (0.092 /9.81) x 1000 =9.4 gms

IV. ADVANTAGES AND APPICATIONS

4.1 Advantages

- The over speed indication and accident prevention system offers the following advantages:
- The system eliminates the over-speeding which considerably reduces the chances of accidents due to over-speeding
- Ensures safety of the driver and or passengers …as automatically speed is reduced Reduces brake wear and tear as no need of excessive braking force to keep vehicle speed in control
- System components involve simple and cost effective components hence simple production.
- Low system cost as low level electronics is used.
- No computing / /microprocessor involved…keeps the system cost effective.
- Can be easily implemented in both commercial LCV/MCV/HCV.
- Minimal space requirements. Hence modifications in conventional system is reduced further increases the adaptability of system
- Visual indication in the form of indication lamp.
- Audio indication in the form of hooter…increases operator vigilance and safety.

4.2 Application

- Small Cars
- SUV and commercial cars
- Medium to heavy duty transport vehicles
- Cargo trucks and Public transport vehicles etc.

V. CONCLUSION

This project work given us experience and excellent opportunities to use our limited knowledge .we also feel that project work is the good solution to fill gap between industry and institute.

Thus, we studied the “over speed indication and accident prevention system “indicate the over speed and prevent the accident automatically. This system is implemented in to vehicle. Now a day’s accident is one of the danger, while traveling in vehicle, our moral is to avoid accident, save the passenger and prevent damage to vehicle

We would also like to add few words, while working on this project we gain lot of practical knowledge regarding, purchasing designing and fabricating the model. We are also proud to complete this project successfully within a given limit.

VI. FUTURE SCOPE

Over speed indication and accident prevention system is used as a safety device in vehicle instead of using centrifugal governor for indicating over speed we can use electronic sensors for indicating overspend .governor is complex ,costly ,and difficult to design and fabrication. This problem can be overcome by using electronic sensors.

Arrangement should be provided to expand the scope of work in future. Such as to convert the machine motor operated; the system can be easily configured to required one. The die & punch can be changed if required for other shapes of notches etc.

Height of Machine from Ground

For ease and comfort of operator the height of machine should be properly decided so that he may not get tired during operation. The machine should be slightly higher than the waist level, also enough clearance should be provided from the ground for cleaning purpose.

Weight of Machine

The total weight depends upon the selection of material components as well as the dimension of components. A higher weighted machine is difficult in transportation & in case of major breakdown; it is difficult to take it to workshop because of more weight.

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