

VEHICLE OVER SPEED INDICATION AND CONTROLLING SYSTEM

Utkarsh Mishra¹, Mudit Sharma², Suraj Kumar³, Swetabh⁴, Mrinal Abhinav⁵, Manash Dey⁶

^{1,3,4} UG Student Department of Mechanical Engineering, JIMS Engineering Management Technical Campus Gr Noida, India

^{2,5,6} Assistant Professor, Department of Mechanical Engineering, JIMS Engineering Management Technical Campus Gr Noida, India

Abstract: - This paper analyses the design of vehicle over speed indication and controlling system. This employs centrifugal governor and proximity sensor. Centrifugal governor rotates with respect to the motion of the vehicle. Distance of the balls with respect to the centre line depends on the speed of the vehicle which is further sensed by proximity sensor.

Index Terms: - Proximity sensors, Governor, LCD display, Carburetor etc.

1. INTRODUCTION: -

Speed of the vehicle solely depends on the air-fuel mixture provided to the engine. Air-fuel mixture plays a vital role in controlling the speed as well as output of the engine. So, we require an effective air fuel mixture for the vehicle. Preparation of fuel-air mixture is done outside the engine cylinder and formation of a homogenous mixture is normally not completed in the inlet manifold. The method of mixture preparation is very necessary for spark ignition engines. The aim of carburetion is to supply a flammable mixture of fuel and air within the needed amount and quality for economical operation of the engine underneath all conditions.

The process of formation of a combustible fuel-air mixture by mixing the proper amount of fuel with air before admission to engine cylinder is called carburetion and the device does this job is called carburetion.

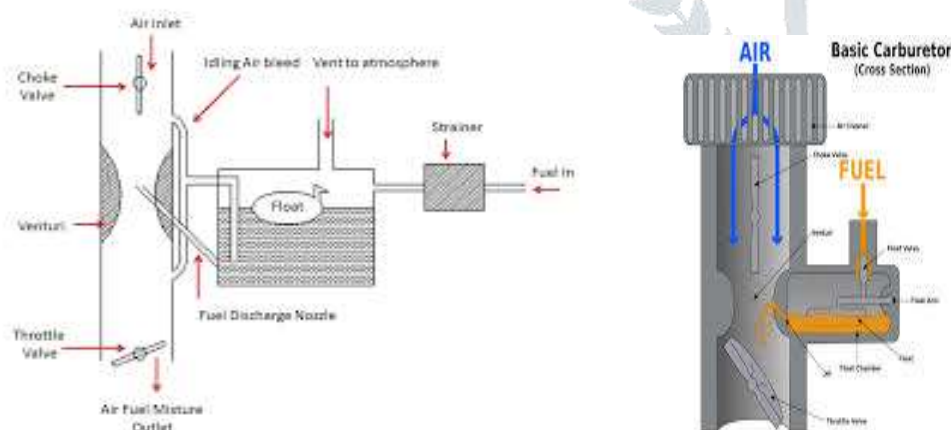


Fig. 1
The Simple Carburettor

Basic carburettor consists of parts like: -

i) **The Fuel Strainer:** -

Fuel tank strainer consists of a coarse mesh to prevent a large particle to enter the fuel system.

ii) **The Float Chamber:** -

A float chamber is a device which is used for automatically regulating the supply of a liquid to a system. It is the most typical component found in the carburetor of an internal combustion engine, where it is automatically meters the fuel supply of the engine.

iii) **The main metering and idling system:** -

Fuel used during the curb idle and low-speed operation flows through the main metering jet into the main well. A connecting idle well intersects the main well. As the throttle valve are opened further and engine speed increases, the air that flows through the carburetor also increases.

iv) **The Choke valve:** -

In an internal combustion engine, a choke valve modifies the air pressure in the intake manifold, by altering the ratio of fuel and air quantity entering the engine. Choke valves are generally used in naturally aspirated engines with carburetor to

supply a richer fuel mixture when starting the engine. Most choke valves in engines are butterfly valves mounted within the manifold upstream from the mechanical device jet to provide the next partial vacuum, that will increase the fuel draw.

v) **The Throttle Valve: -**

The speed and output of the engine is controlled by employing throttle valve. The more the throttle valve is closed it creates greater obstruction for the flow of mixtures placed in the passage and the less is the quantity of mixture delivered to the cylinders. The decreased quantity of mixture gives a less powerful impulse to the pistons and the output of the engine is reduced accordingly. As the throttle is opened, the output of the engine increases. Usually we find opening the throttle increases the speed of engine. Sometime in place of speed increment engine want more power to operate for example for climbing a hill there is may or may not increase of speed.

So, we get this increase and decrease of speed is only depends on the opening and closing throttle valve. As we know throttle valve can't do it alone. Governor is responsible for opening and closing of throttle valve.

The work of governor is to maintain the speed of an engine within speed limits whenever there is a variation of load. The speed of an engine mainly varies in two ways- during each revolution (cyclic variation) and over a number of revolutions. In the former case, its varied due to variation in the output torque of the engine during a cycle can be regulated by mounting a suitable flywheel on the shaft. In the latter case, it is varied due to variation of load upon the engine and requires a governor to maintain the speed. The operation of a flywheel is continuous whereas that of a governor is more or less intermittent. A flywheel may not be used if there is no undesirable cyclic fluctuation of the energy output, but a governor is essential for all types of engines as it adjusts the supply according to the demand.

If the load on the shaft will increase, the speed of the engine decreases unless the provision of fuel is exaggerated by gap the throttle. On the opposite hand, if the load on the shaft decreases, the speed of the engine will increase unless the fuel offer is faded by closing the valve sufficiently to slow the engine to its original speed. The throttle is operated by the governor through a mechanism for the aim.

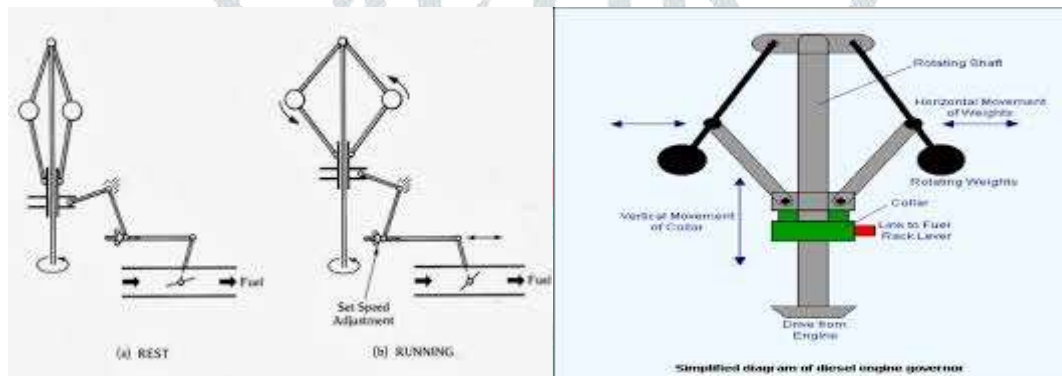


Fig.2

Centrifugal governor in rest and running position.

The action of the governor depends on the change of speed. It contains pair of masses, which is known as governor balls, which rotate with a spindle. The spindle is driven by an engine with the help of bevel gears. The action of the governor depends upon the centrifugal effects produced by the masses of two balls. With the increase in the speed, the balls tend to rotate at a greater radius from the axis. This causes the sleeve to slide up on the spindle and this movement of the sleeve is communicated to the throttle through a bell crank lever. This helps in closing of throttle valve to the required extent. When the speed decreases, the balls rotate at a smaller radius and the valve is opened according to the requirement.

Speed can be controlled by using governor but the main problem that comes in front of driver is that there is no indication of speed increment or decrement.

This paper deals with this problem. Here we apply proximity sensor which senses the speed of the vehicle and indicate this to the driver.

vi) **Proximity Sensor: -**

A proximity sensor are sensors that can detect the presence of nearby objects without any physical contact. It often emits an electromagnetic field or a beam of electromagnetic radiation (infrared, for instance), and looks for changes in the field or return signal. The object that is going to be sensed is called proximity sensor sensor's target.



Fig.3 Proximity Sensor

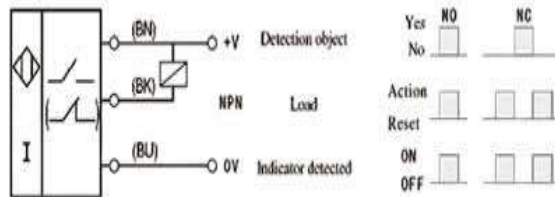


Fig.4 Circuit diagram of Proximity Sensor

vii) LCD MODULE DISPLAY: -

A liquid-crystal display (LCD) is a flat-panel display or other electronically modulated optical device which basically uses the light-modulating properties of liquid crystals. Liquid crystals do not emit light directly, instead it uses a backlight or reflector to produce images in colour or monochrome.

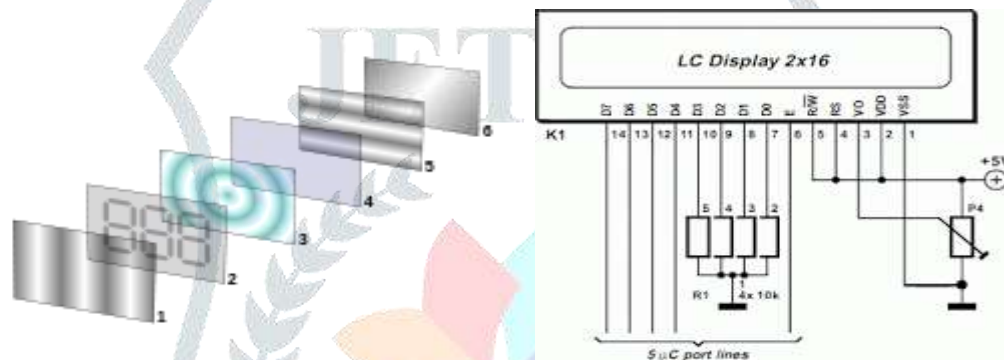


Fig. 5 L.C.D

System starts with motor starter motor speed controlled by electronic speed regulator as speed will increase the dead weight of the centrifuge governor fly's out creating the probe to slip back at over speed level the resultant gap between probe of the slider and therefore the proximity device exceeds the permissible limit that makes the relay to work and consequently the subsequent actions come about. Visual over speedometer within the sort of over speed indication lamp lights. Audio over speedometer within the sort of over speed indication hooter goes ON. Braking mechanism is motivated to work the shoe brake cam linear mechanism.

2. Literature Review: -

It gives a brief insight through the literatures which are being thoroughly read for understanding the vehicle over speed indication process and getting an idea of the work carried out by the researchers in this automobile field. A lot of literatures including text books, journals, proceedings and websites have been reviewed. Some of the important and relevant literature findings are discussed below.

This study gives an idea about analysis of various hot rolling mill parameters but the research is somewhat lacking in the field of research for vehicle over speed indication and controlling process:

Prajit, et al., 2014 has reported that the flow of fuel to the engine can be controlled using the sensors and other mechanical arrangements and this can bring the vehicle to the intended course. In this system they used photoelectric sensor, electrical power source and micro-controller for controlling the vehicle speed.

Bhavanam,et al., 2014 has observed the system of automatic speed control of vehicle and accident avoidance using eye blink sensor and ultrasonic sensor. In this system, ultrasonic sensor continuously sends signals and monitors any car or other obstacles which come in front of the car.

Vengadesh,et al.,2015 has suggested the use of RF to indicate the speed. Here speed is acquired with the help of speedometer. The controller compares the speed and alerts the driver if it exceeds the limited speed.

Khadakkar, et al., 2016 has suggested 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.

Amarnarayan, et al., 2016 has suggested to propose a system that gives an alert by LCD and buzzer if speed exceeds the limited speed. If overspeed vehicle don't get controlled manually then system controls it automatically.

Sidhartha, et al., 2017 has explained the system which will be based on RFID (Radio frequency identification) technology will replaces the traditional manual tolling system. Through this system the audio alert would be given to driver if he exceeds the speed then message will be sent to toll station through server and toll will be deducted when the car reaches at toll station.

Sakpal, et al., 2018 has suggested that when the vehicle enters the lane it acquires the specified speed limit of the lane, but sometimes driver over speeds the vehicle then the audio alert will be given to the driver. After getting the audio alert if the driver still exceeds the speed then message will be sent to the toll station through GPS.

3. Proposed Design: -

The proposed design is made by using AutoCAD software. This is shown in fig: 6, it gives information about all arrangements of various parts using in this model. It's basically based on different design of experiment, which investigates the effects of multiple variables simultaneously.

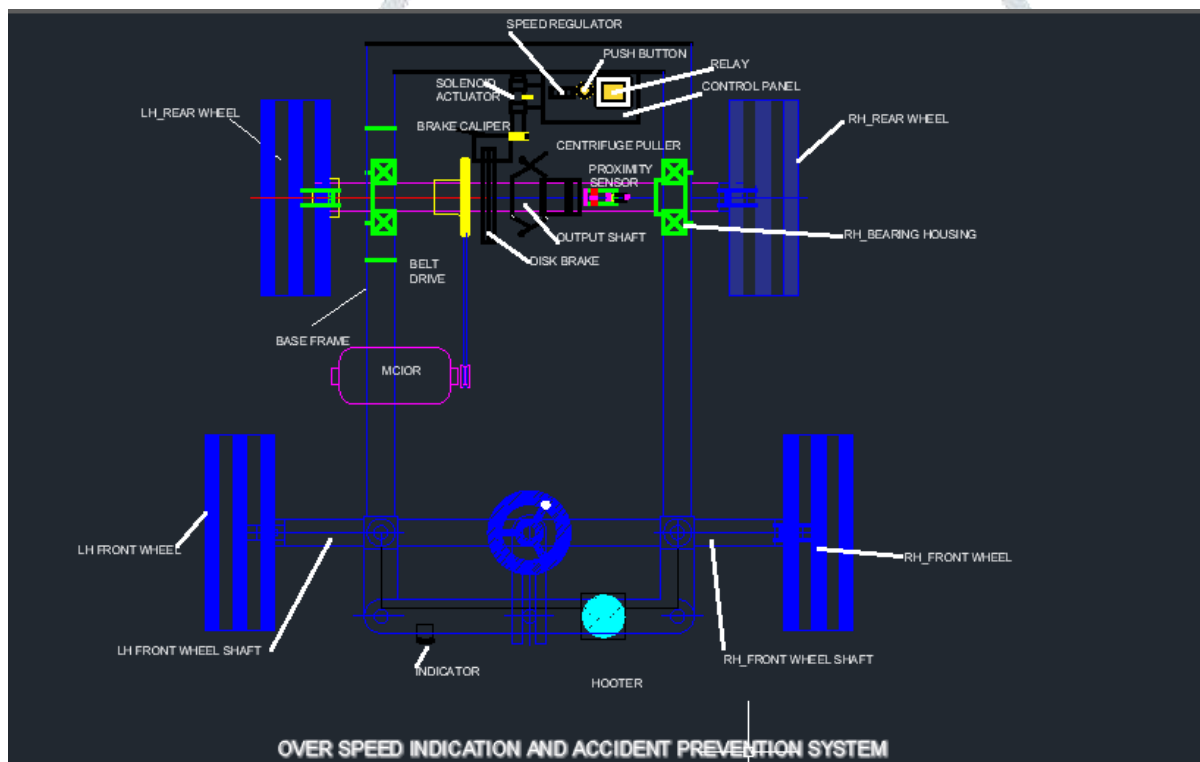


Fig.6
AutoCAD Design of final model

4. Future Scope of work: -

Over speed indication and accident hindrance system is employed as a security device in vehicle rather than exploitation centrifugal governor for indicating over speed we are able to use electronic sensors for indicating overspend. Governor is advanced, costly, and troublesome to style and fabrication. This drawback is often overcome by exploitation electronic sensors. Arrangement ought to be provided to expand the scope of labour in future. like to convert the machine motor operated; the system is often simply designed to needed one. The die & punch are often modified if needed for different shapes of notches etc.

5. Conclusion: -

An assembly of this model was carried out using finite element approach. A geometrical modelling of the assembly was done in AutoCAD & Solid works. This research work given us experience and excellent opportunities to use our limited knowledge .we also feel that research 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 dangers, while travelling in vehicle, our moral is to avoid accident, save the passenger and prevent damage to vehicle.

6. References: -

1. U Farooq, M Hasan, M Amar, A Hanif and M Asad,"RFTD Based Security and Access Control System," International Journal of Engineering and Technology, Vol 6; Issue: 4, August 2014.
2. Siddharth Sapkal, Mayuri Nawale ,Prerana Regade ,Shuchi Gupta, “Over speed Indication and Accident Prevention over Lane Using IOT,” International Research Journal of Engineering and Technology, Vol 5; Issue: 5 May 2018.
3. R.Prajit, V.Santhosh Kumar, S.Srivatsan, R.Anantha Narayanan, “Design of Automatic Speed Control System in 4 – Wheelers for Avoiding Accidents”,
4. "An Advanced Security System Integrated with RFID Based Automated Toll Collection System", Third Asian Conference on Defence Technology (3rd ACDT), 2017.”
5. Prof. V.V.khadakkar , Prof. S.M.Awhale , Prof. V.V. Brokar , “Over speed indication and accident prevention system” in Proc. IJARSE, Vol 5; Issue:9, September 2016.
6. Amarnaryan, Challa Saikumar, Chandra Mohan, Ajaykumar, Sridhar N, “ Automatic Over Speed Controlling of Vehicle,”in Proc. IJCRD ,Vol: 5; Issue: 5; May -2016

