

Engine Speed Governors | Speed Control Governor | Speed Limiters

Speed Governor

The governor is a device which is used to controlling the speed of an engine based on the load requirements. Basic governors sense speed and sometimes load of a prime mover and adjust the energy source to maintain the desired level. So it's simply mentioned as a device giving automatic control (either pressure or temperature) or limitation of speed.

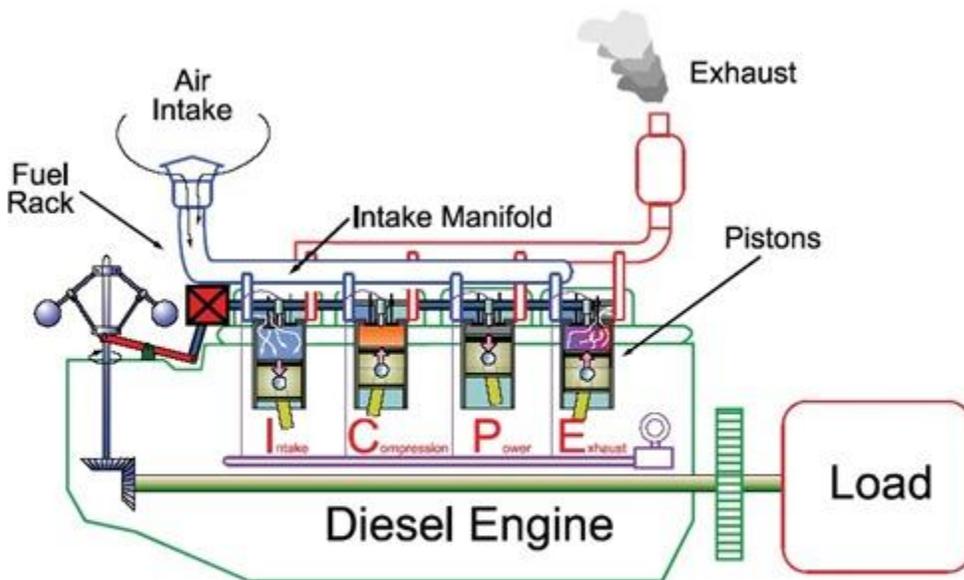


The governors are control mechanisms and they work on the principle of feedback control. Their basic function is to control the speed within limits when load on the prime mover changes. They have no control over the change in speed (flywheel determines change in speed i.e. speed control) within the cycle.

Take an example:

Assume a driver running a car in hill station, at that time engine load increases, and automatically vehicle speed decreases. Now the actual speed is less than desired speed. So driver increases the fuel to achieve the desired speed. So here, the driver is a governor for this system.

So governor is a system to minimise fluctuations within the mean speed which can occur as a result of load variation. The governor has no influence over cyclic speed fluctuations however it controls the mean speed over an extended period throughout that load on the engine might vary. When there's modification in load, variation in speed additionally takes place then governor operates a regulatory control and adjusts the fuel provide to keep up the mean speed nearly constant. Therefore the governor mechanically regulates through linkages, the energy provided to the engines as demanded by variation of load, so the engine speed is maintained nearly constant.



Speed Governor Installed on Four Stroke Diesel Engine

Types of Governor:

The governor can be classified into the following types. These are given below,

1. Centrifugal governor
 - a) Pendulum type watt governor
 - b) Loaded type governor
 - i) Gravity controlled type
 - Ø Porter governor
 - Ø Proell governor
 - Ø Watt governor
 - ii) Spring controlled type
 - Ø Hartnell governor

Ø Hartung governor

2. Inertia and fly-wheel governor

3. Pickering Governor

Purpose of governor:

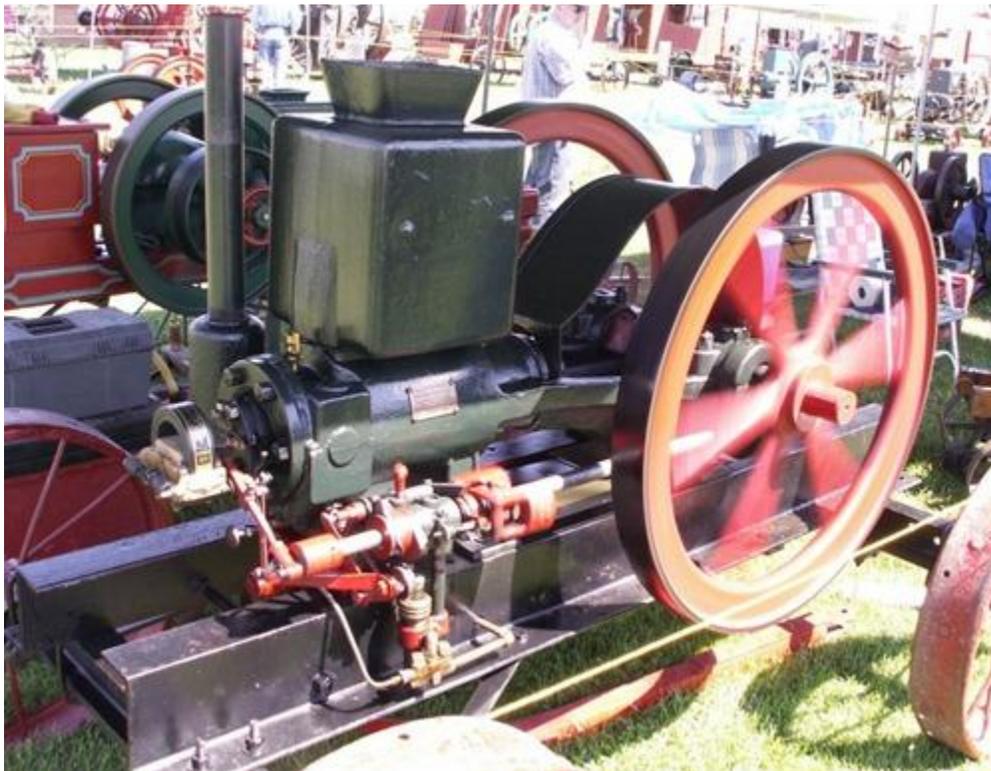
1. To automatically maintain the uniform speed of the engine within the specified limits, whenever there is a variation of the load.

2. To regulate the fuel supply to the engine as per load requirements.

3. To regulate the mean speed of the engines.

4. It works intermittently i.e., only there's modification within the load

5. Mathematically, it can express as ΔN .



Terminology used in the governor:

1. Height of the governor (h):

Height of the governor is defined as the vertical distance between the centre of the governor ball and the point of the intersection between the upper arm on the axis of the spindle. The height of the governor is denoted by 'h'.

2. Radius of rotation (r):

Radius of rotation is defined as the centre of the governor balls and the axis of rotation in the spindle. The radius of rotation is denoted by 'r'.

3. Sleeve lift (X):

The sleeve lift of the governor is defined as the vertical distance travelled by the sleeve on spindle due to change in equilibrium in speed. The sleeve lift of the governor is denoted by 'X'.

4. Equilibrium speed:

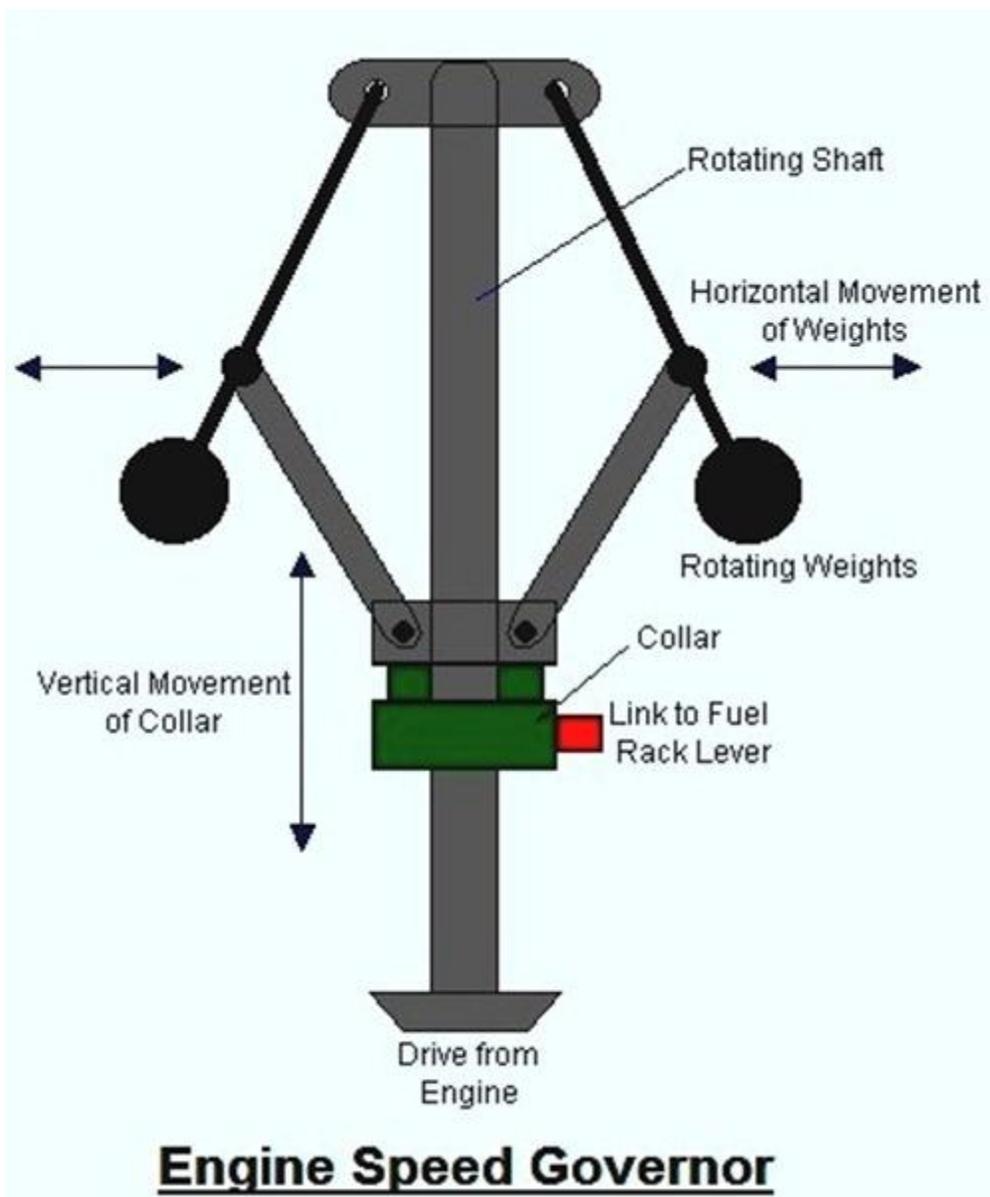
The equilibrium speed means, the speed at which the governor balls, arms, sleeve, etc, are in complete equilibrium and there is no upward or downward movement of the sleeve on the spindle, is called as equilibrium speed.

5. Mean Equilibrium speed:

The mean equilibrium speed is defined as the speed at the mean position of the balls or the sleeve is called as mean equilibrium speed.

6. Maximum speed:

The Maximum speed is nothing but the speeds at the maximum radius of rotation of the balls without tending to move either way is called as maximum speed.



7. Minimum speed:

The Minimum speed is nothing but the speeds at the minimum radius of rotation of the balls without tending to move either way is called as minimum speed.

8. Governor effort:

The mean force working on the sleeve for a given change of speed is termed as the governor effort.

9. Power of the governor:

The power of the governor is state that the product of mean effort and lift of the sleeve is called as power of the governor.

10. Controlling force:

The controlling force is nothing but an equal and opposite force to the centrifugal force, acting radially (i.e., centripetal force) is termed as controlling force of a governor. In other words, the force acting radially upon the rotating balls to counteract its centrifugal force is called the controlling force.

Source:

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