



# **SNS COLLEGE OF TECHNOLOGY**

## **AN AUTONOMOUS INSTITUTION**



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### **DEPARTMENT OF AGRICULTURAL ENGINEERING**

**COURSE CODE & NAME: 19AGT301 & HEAT POWER ENGINEERING**

**III YEAR / V SEMESTER**

**UNIT : IV IC ENGINE PERFORMANCE AND AIR COMPRESSORS**

**TOPIC 3 :MEASUREMENT OF BRAKE POWER**



The brake power measurement involves the determination of the torque and the angular speed of the engine output shaft. The torque measuring device is called a dynamometer.

Dynamometers can be broadly classified into two main types, power absorption dynamometers and transmission dynamometer.



## **Absorption Dynamometers**

These dynamometers measure and absorb the power output of the engine to which they are coupled. The power absorbed is usually dissipated as heat by some means. Example of such dynamometers is prony brake, rope brake, hydraulic dynamometer, etc.

## **Transmission Dynamometers**

In transmission dynamometers, the power is transmitted to the load coupled to the engine after it is indicated on some type of scale. These are also called torque-meters.



## Absorption Dynamometers IC Engine Testing

These include Prony brake type, Rope brake type, and Hydraulic type.

### Prony Brake

One of the simplest methods of measuring brake power (output) is to attempt to stop the engine by means of a brake on the flywheel and measure the weight which an arm attached to the brake will support, as it tries to rotate with the flywheel.

This system is known as the prony brake and forms its use; the expression brake power has come.

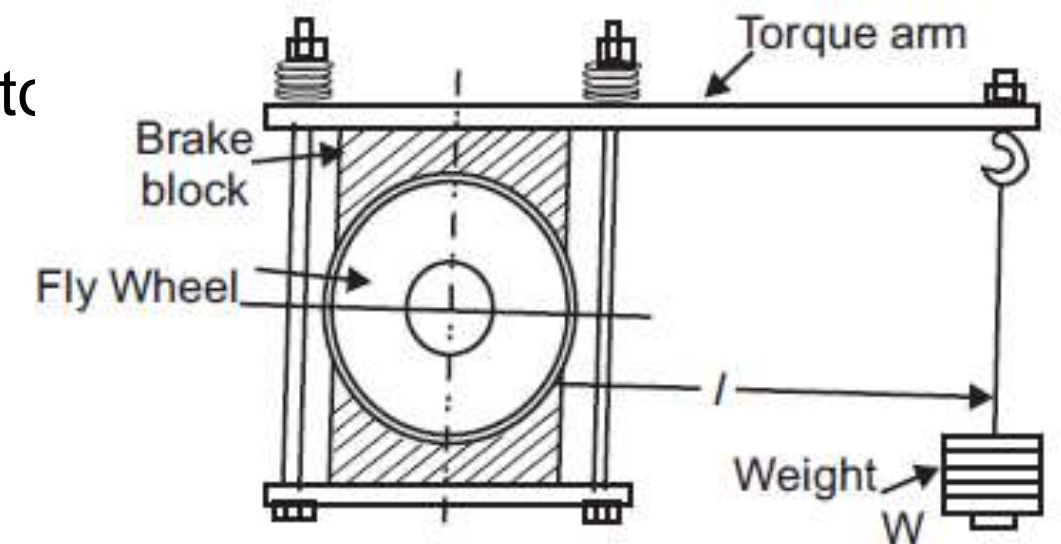


Figure 7.4 : Prony Brake



## Rope Brake

The rope brake as shown in figure is another simple device for measuring  $bp$  of an engine. It consists of a number of turns of rope wound around the rotating drum attached to the output shaft.

One side of the rope is connected to a spring balance and the other to a loading device. The power is absorbed in friction between the rope and the drum. The drum therefore requires cooling.

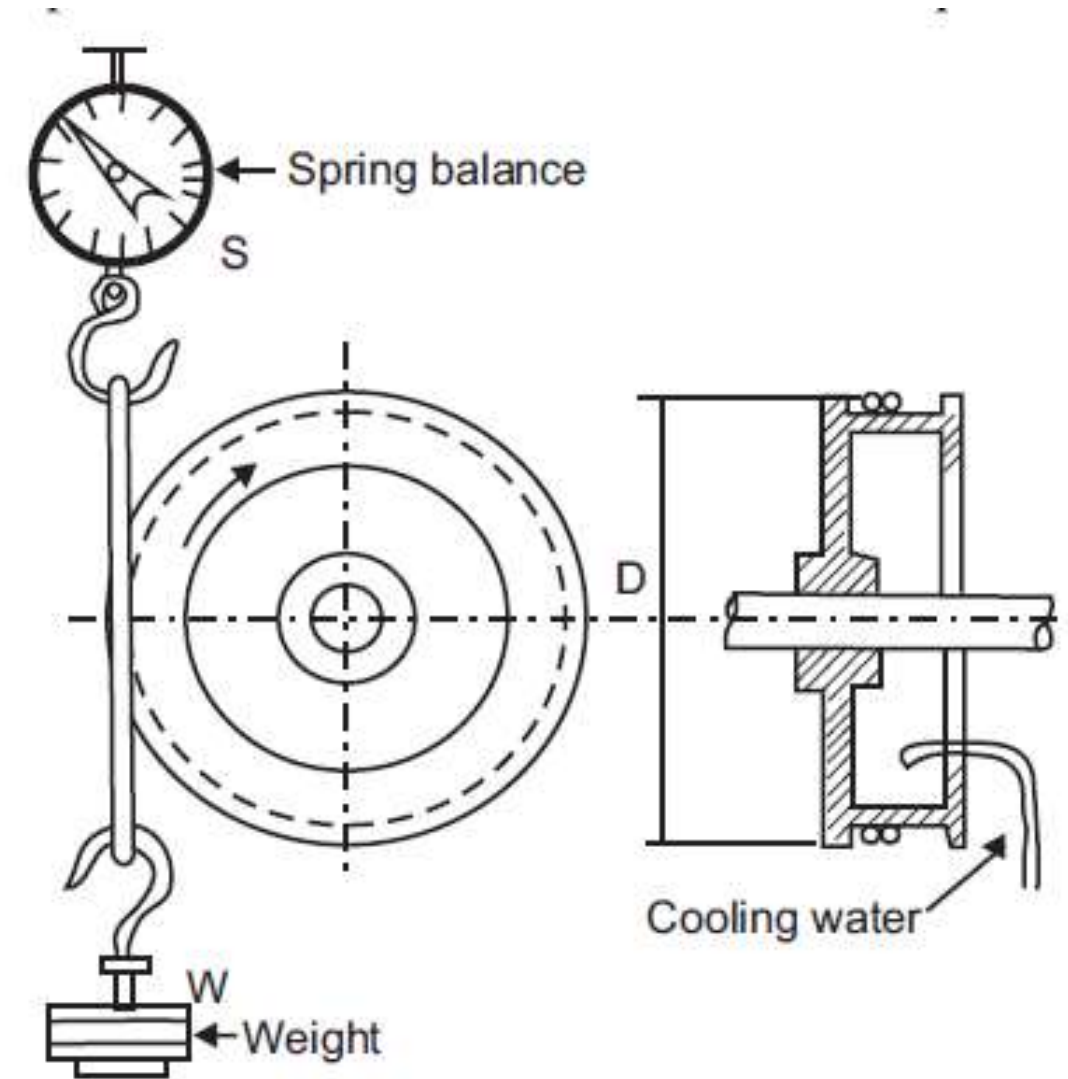


Figure 7.5 : Rope Brake





## Hydraulic Dynamometer

Hydraulic dynamometer shown in Figure works on the principle of dissipating the power in fluid friction rather than in dry friction.

- In principle its construction is similar to that of a fluid flywheel.
- It consists of an inner rotating member or impeller coupled to the output shaft of the engine.
- This impeller rotates in a casing filled with fluid.
- This outer casing, due to the centrifugal force developed, tends to revolve with the impeller, but is resisted by a torque arm supporting the balance weight.
- The frictional forces between the impeller and the fluid are measured by the spring-balance fitted on the casing.
- The heat developed due to dissipation of power is carried away by a continuous supply of the working fluid, usually water
- The output can be controlled by regulating the sluice gates which can be moved in and out to partially or wholly obstruct the flow of water between impeller, and the casing.

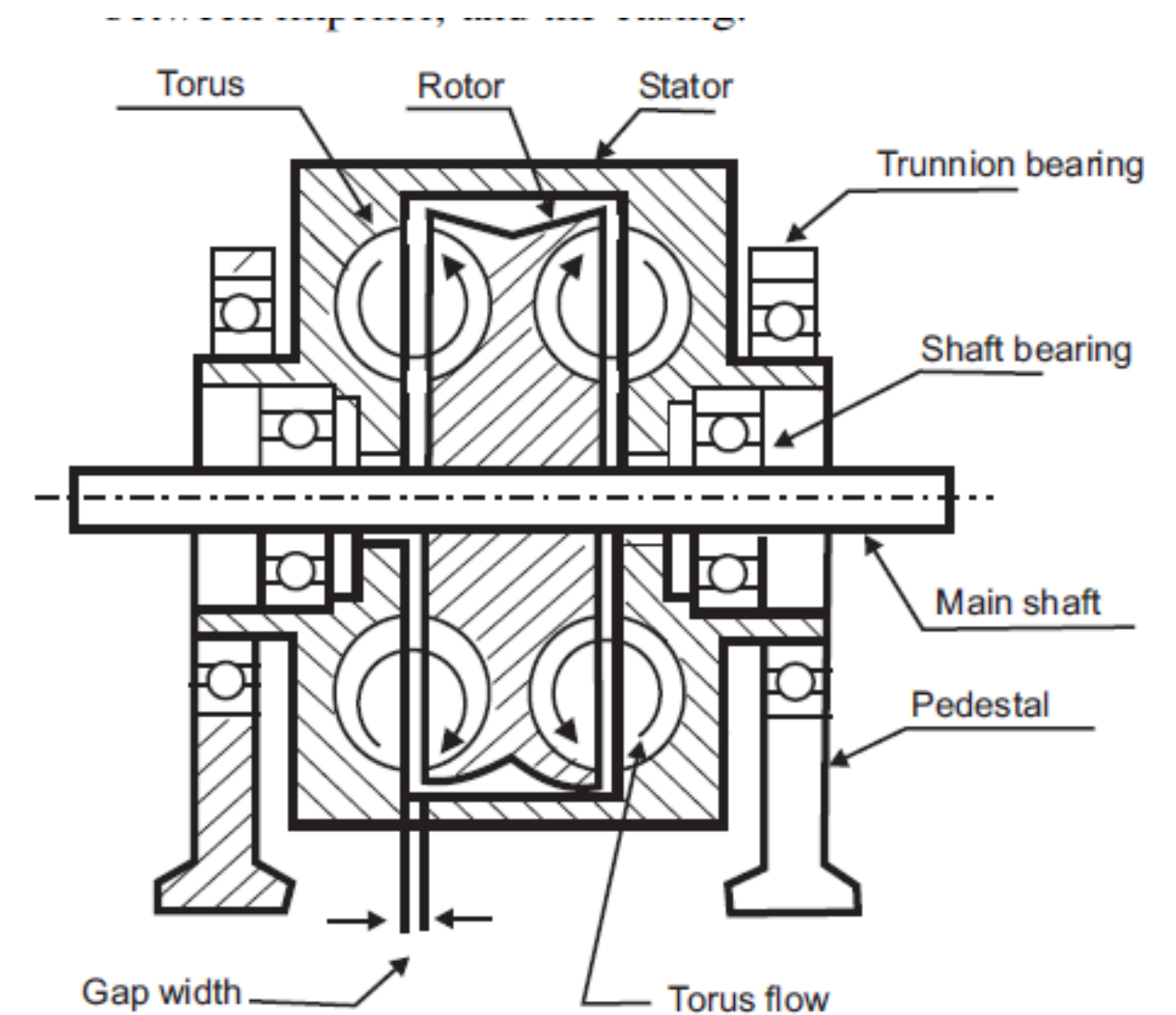


Figure 7.6 : Hydraulic Dynamometer



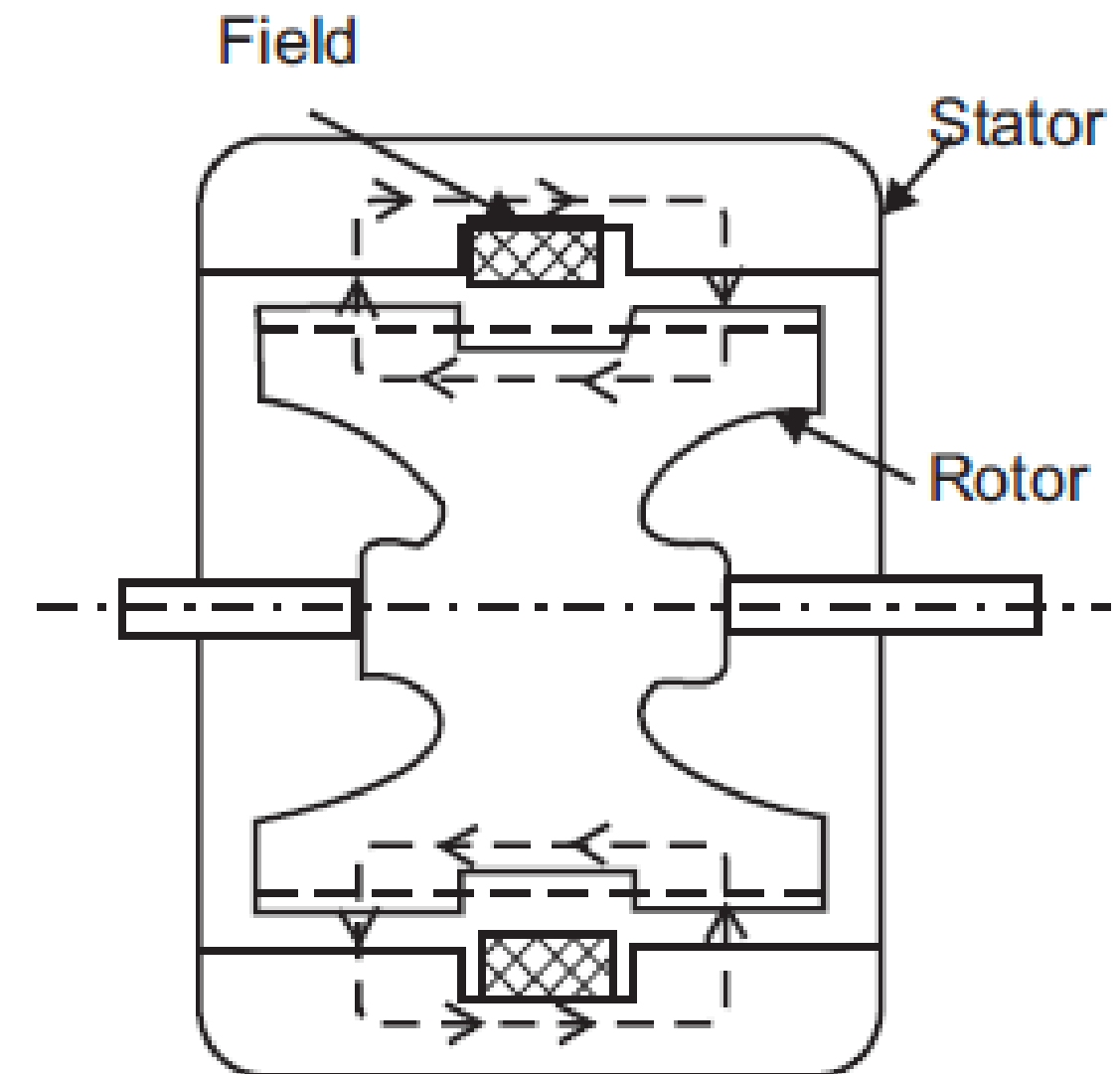
## Eddy Current Dynamometer

The working principle of eddy current dynamometer is shown in Figure.

It consists of a stator on which are fitted a number of electromagnets and a rotor disc made of copper or steel and coupled to the output shaft of the engine. When the rotor rotates eddy currents are produced in the stator due to magnetic flux set up by the passage of field current in the electromagnets.

These eddy currents are dissipated in producing heat so that this type of dynamometer also requires some cooling arrangement. The torque is measured exactly as in other types of absorption dynamometers, i.e. with the help of a moment arm.

The load is **IC Engine Testing** controlled by regulating the current in the electromagnets.



**Figure 7.7 : Eddy Current Dynamometer**



Thank You