FACULTY OF ENGINEERING & TECHNOLOGY

Friction of Pivot and Collar Bearing

The rotating shafts are frequently subjected to axial thrust. The bearing surfaces such as pivot and collar bearings are used to take this axial thrust of the rotating shaft. The propeller shafts of ships, the shafts of steam turbines, and vertical machine shafts are examples of shafts which carry an axial thrust. The bearing surfaces placed at the end of a shaft to take the axial thrust are known as pivots. The pivot may have a flat surface or conical surface as shown in Fig. (a) and (b) respectively. When the cone is truncated, it is then known as truncated or trapezoidal pivot as shown in Fig.
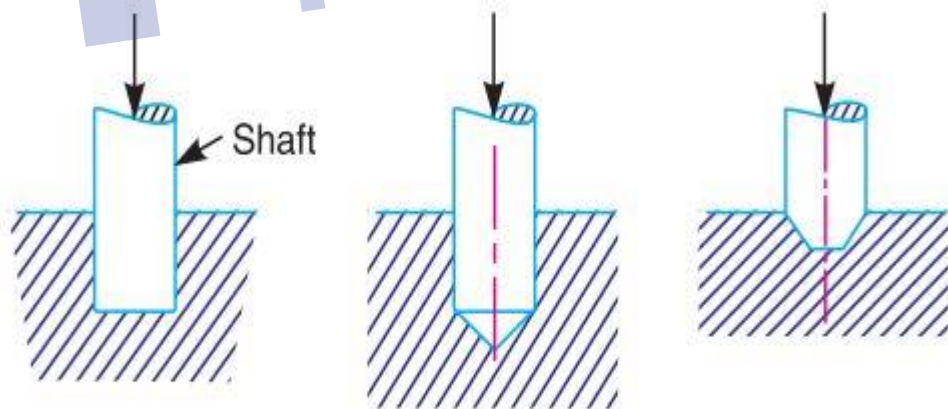
(a) Flat pivot.   (b) Conical pivot.   (c) Truncated pivot.

Dynamometer

A **dynamometer** is a device used for measuring the torque and brake power required to operate a driven machine. Dynamometers can be broadly classified into two types. They are:

•**Power Absorption Dynamometers**:

•Power Absorption 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. Examples of power absorption dynamometers are prony brake dynamometer, Rope brake dynamometer, Eddy current dynamometer, Hydraulic dynamometeretc.

•**Power Transmission Dynamometers:**

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

Prony Brake Dynamometer:

Pony Brake is one of the simplest dynamometers for measuring power output (brake power). It is to attempt to stop the engine using 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.
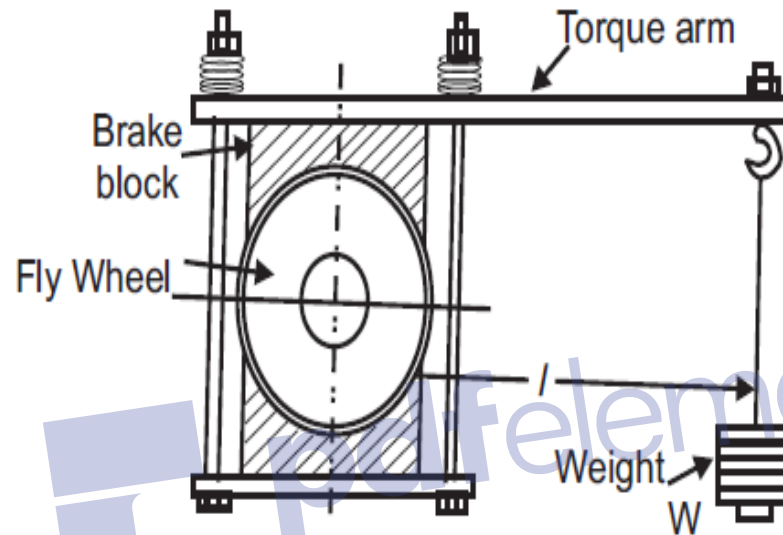
The Prony brake shown in the above consists of a wooden block, frame, rope, brake shoes and flywheel. It works on the principle of converting power into heat by dry friction. Spring-loaded bolts are provided to increase the friction by tightening the wooden block.

The whole of the power absorbed is converted into heat and hence this type of dynamometer must the cooled.

The brake power is given by the formula

Brake Power (bp) = 2π NT

Where T = Weight applied (W) × distance (l)

Rope Brake Dynamometer:

The **rope brake** as shown in below figure is another device for measuring brake power of an engine. It consists of some 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 side to a loading device. The power is absorbed in friction between the rope and the drum. Therefore drum in rope brake requires cooling.