

Experiment no 09.

AIM: To conduct experiment of trifilar suspension.

APPARATUS REQUIRED: Main frame, Trifilar suspension, Weights, Stopwatch, Thread.

INTRODUCTION:

Trifilar Suspension (Torsional Pendulum) :- It is also used to find the moment of inertia of a body experimentally. The body (say a disc or flywheel) whose moment of inertia is to be determined is suspended by three long flexible wires A, B and C, as shown in fig.-b. When the body is twisted about its axis through a small angle θ and then released, it will oscillate with simple harmonic motion. Trifilar suspension is a disc of mass m (weight w) suspended by three vertical cords, each of length l , from a fixed support. Each cord is symmetrically attached to the disc at the same distance r from the mass of the disc.

THEORY:

The disc is now turned through a small angle its vertical axis, the cords become inclined. On being released the disc will perform oscillations about the vertical axis. At any instant

Let: θ = angular displacement of the disc

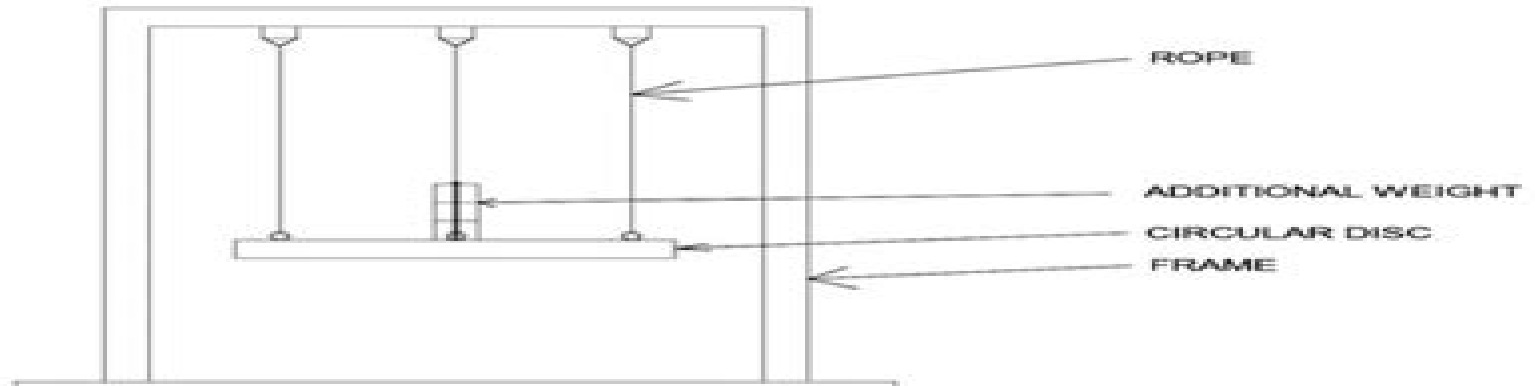
F = tension in each cord $= w/3$

Inertia torque $= I \times \alpha$

Restoring torque $= 3 \times \text{horizontal component forces of each string} \times r$

Inertia torque = restoring torque

TRIFILAR



Mechanical Vibration Lab Manual

D Keegan



Mechanical Vibration Lab Manual:

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