MPE Open Ended Laboratory Sheet for Mechanics of Machines Lab

1.0 TITLE

Friction of inclined plane

2.0 OBJECTIVES

The objectives of this experiment are

1. To determine the static coefficient of friction between various materials and steel.
2. To determine the Kinetic Coefficient of friction between the various materials and steel.
3. To measure the force required to move a body up an inclined plane against gravity and friction

3.0 THEORY

The angle of friction

Fig.1 represents a body A supporting a load W and free to slid on a body B bounded by the stationary horizontal surface XY. Suppose the motion of A is produced by a horizontal force P, so that the forces exerted by A on B are P and the load W. conversely, the forces exerted

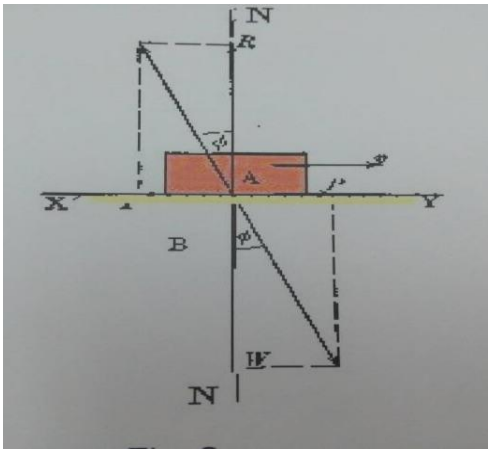


Figure 1 : free body diagram

By B on A are the frictional resistance F opposing motion, and the R. then at the instant when sliding begins we have by definition:

Static coefficient of friction = μ = F/R (1)

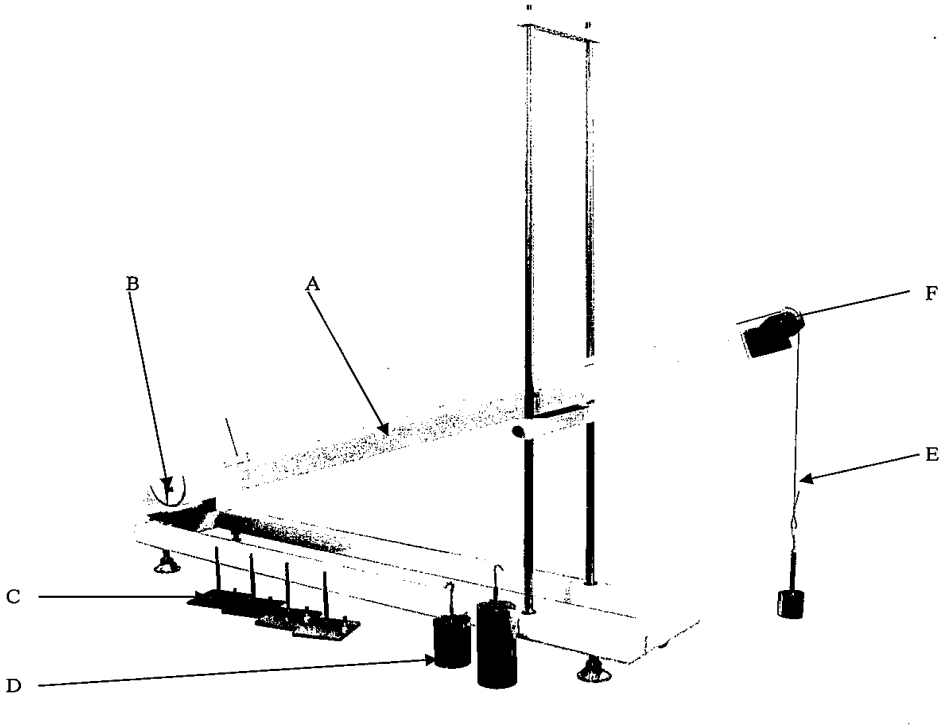
Combining F with R, and P with W the inclination of the "resultant" force exerted by A on B or vice versa, to the common normal NN is given by

Tan φ = F/R = P/W = μ (2)

Since F=P and R=W

4.0 GENERAL EQUIPMENT DESCRIPTION

4.1 Unit Friction of inclined plane equipment



LEGEND

A. Incline plane.
B. Incline angle indicator.
C. Test specimens
D. Set of weights.
E. Pulley cord
F. Pulley

Figure 2: Centrifugal force equipment

5.0 EQUIPMENT OPERATING PROCEDURE

5.1 General Start-up Procedure before starting experiment

Before conducting any experiment, it is necessary to do the following checking to avoid any misused and malfunction of equipment.

1. The student should always be alert to experimental procedures which may be a hazard to the operator or to be injurious to the equipment.
2. Every control device and switch has a specific operational application. Be certain that all connections and control settings are carefully managed. No setting should be made indiscriminately.
3. Students performing the experiments should be supervised or monitored by lecturer/ Technician/ lab officer/ teaching assistance.

IMPORTANT:

1. Student should never have allowed to operate devices without supervised by lecturer/ Technician/ lab officer/ teaching assistance.

6.0 EXPERIMENT

Design the experiments in order to meet the given objectives.

7.0 RESULTS AND DISCUSSION

Show the results appropriately in the form of table, graph or others. Conduct the appropriate analysis and discuss the finding.

Data taken from the experiment need to be stamped by lab officer.

8.0 REPORT

Submit the FORMAL REPORT within 7 days from this experiment. Report must be typed. Similarity test will be conducted using Turnitin where similarity index of 20% is considered passing mark. Formal report must contain the following standard content:

1. Title
2. Objective
3. Introduction and Theory
4. Apparatus
5. Procedures
6. Data and results
7. Analysis and discussion
8. Conclusion
9. References

Refer to course information for the distribution of marks.