SMJP 2131

LAB 1 – MECHANICS OF MACHINES

5th November 2020

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2. Introduction on the procedure
3. Briefing on each labs

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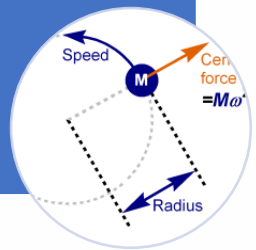
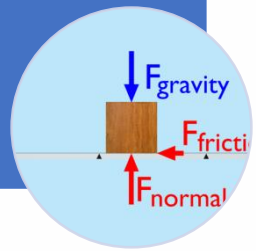
CENTRIFUGAL FORCE



FRICTION ON INCLINED PLANE



GEAR TRAINS / GEAR EFFICIENCY

OPEN-ENDED LAB vs GUIDED LAB

A requirement by EAC

Student to be creative in experimental work

After some studies, our OE lab is

Students are given information on theory and equipment and students in groups have to design the experiments based on the given objectives.

But now, having MCO, you **are given experimental data and a bit explanation on experimental procedures** and you still have to do self-study to design the experiment according to the required objectives.

The new approach will affect several things:

- Lab in experimental method – Fully guided. Lab 1 and Lab 2 are OE.
- Only 2 experiments per lab.
- In every lab:

  week 1: Briefing by lecturer and planning for experiment 1

  week 2: Conduct experiment 1

  week 3: Planning for experiment 2

  week 4: Conduct experiment 2

1. CENTRIFUGAL FORCE

The objectives of this experiment are to:

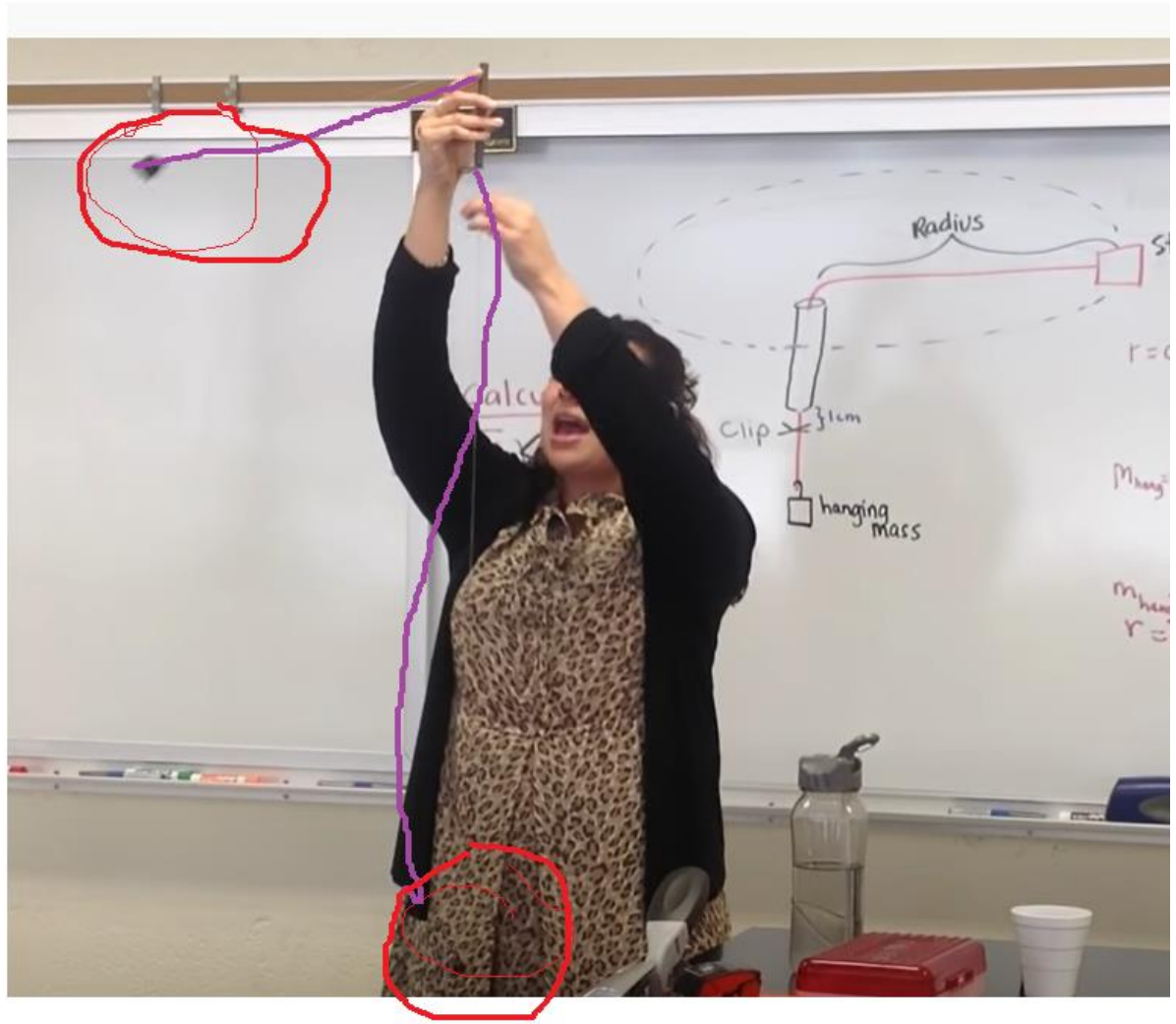
1. To determine the relationship between **centrifugal force** and **speed** of the masses.

2. To determine the relationship between **centrifugal force and distance of the masses from the axis** of rotation.

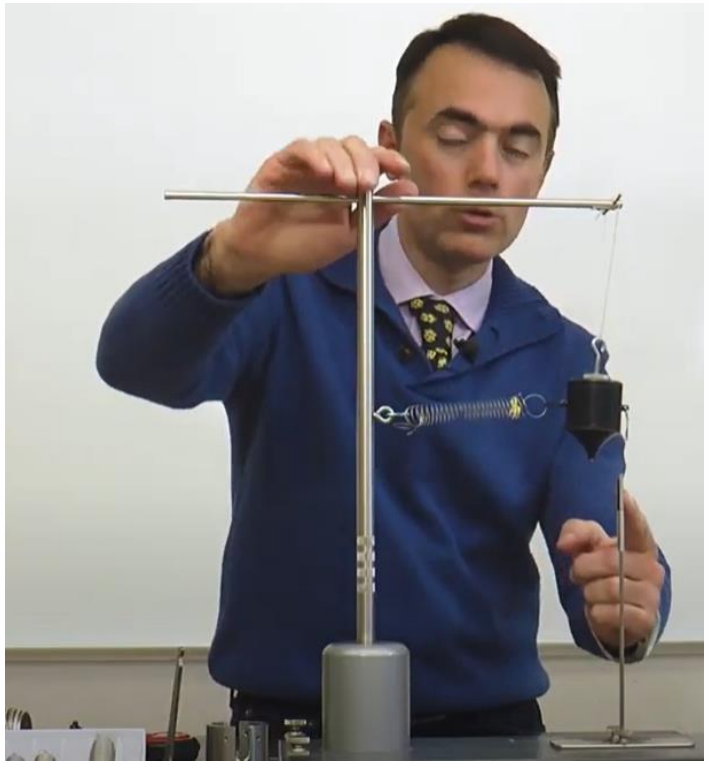
3. To determine the relationship between **centrifugal force and the mass of the rotating body**

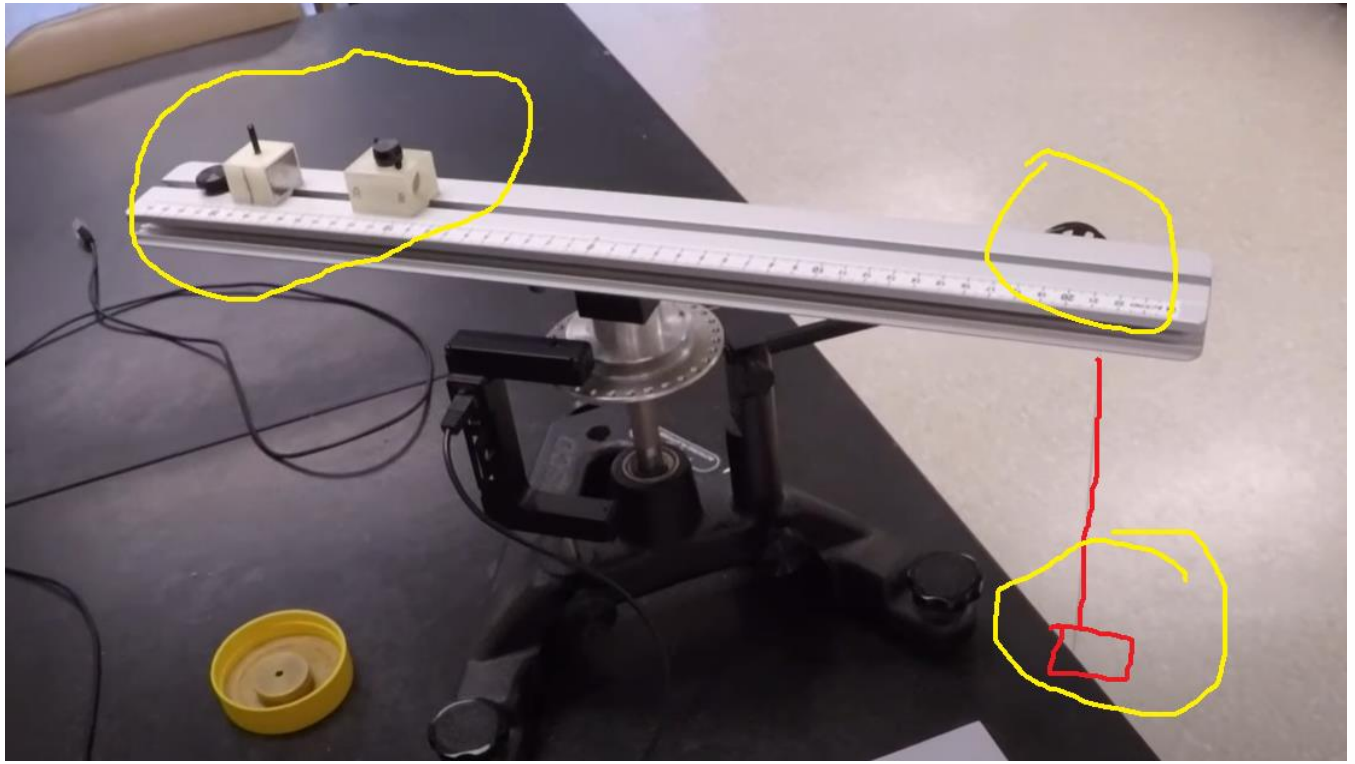
CENTRIFUGAL FORCE

- **RESULTS FROM THE 3 EXPERIMENTS OF CENTRIGUGAL FORCE**
- **https://www.youtube.com/watch?v=EB4poDIsY30**
- **https://www.youtube.com/watch?v=_q2D_Y6OA5s 1.15min**
- **https://www.youtube.com/watch?v=Y8Gdzr2AT0o 5 mins**



Different machines to find the force





2. FRICTION ON INCLINE PLANE

The objectives of this experiment are

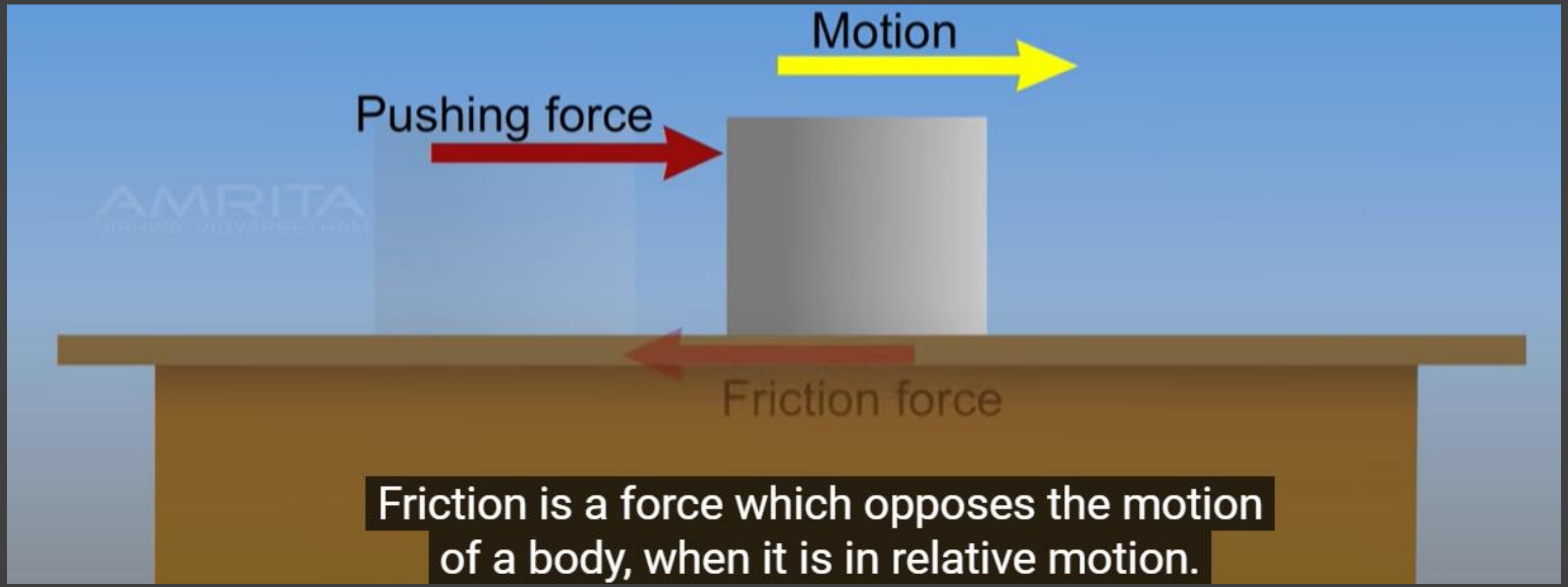
1. To determine the **static coefficient of friction between various materials** and

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

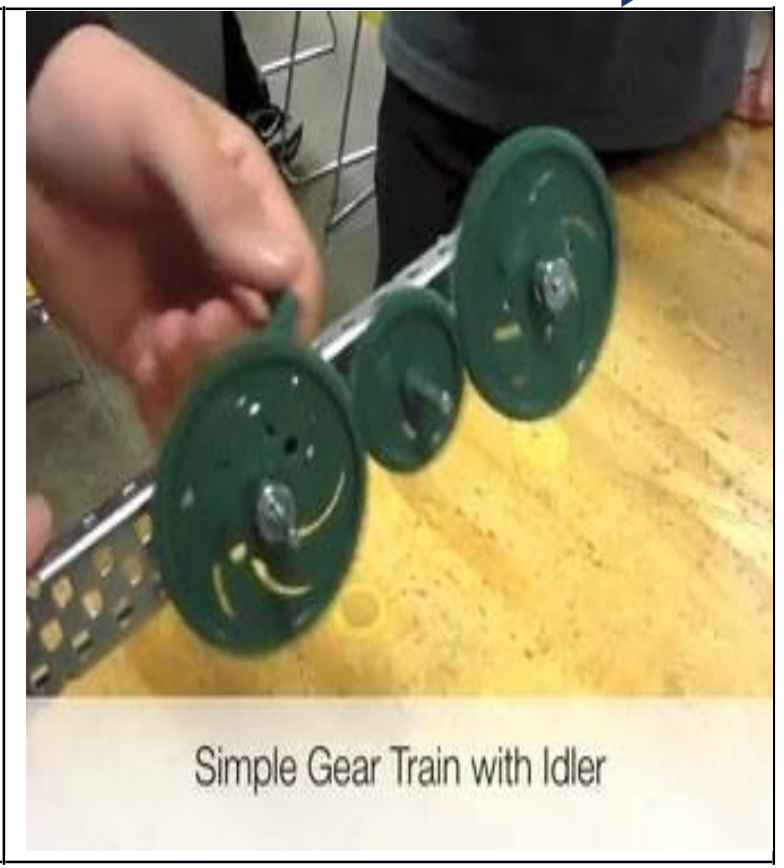


- 0.20 mins https://www.youtube.com/watch?v=ON8h8Tg65Sc

3. GEAR TRAIN/COMPOUND

The objectives of this experiment are

1) To understand the speed ratio and directions of simple and compound gear trains.



1.35min

https://www.youtube.com/watch?v=D_i3PJIYtuY

1.30 torque

https://www.youtube.com/watch?v=nYXCMs4a4BY

Example-servo motor

https://www.youtube.com/watch?v=DjMaDN3EtWc

GENERAL EQUIPMENT DESCRIPTION

Unit Gear efficiency equipment

Acrylic cover

Rotation controllerr

Energency switch

ON/OFF switch

RPM gauge

ON/OFF roatation controller

3. GEAR TRAIN/COMPOUND

RESULTS – NEXT WEEK
Report and Grading

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.

Report and grading

- **REPORT**
- Submit the FORMAL REPORT within 7 days from this experiment. One report is due per group. 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:
  - **Title**
  - **Objective**
  - **Introduction and Theory**
  - **Apparatus**
  - **Procedures**
  - **Data and results**
  - **Analysis and discussion**
  - **Conclusion**
  - **References**
- Refer to the provided front cover for the distribution of marks.

Safety Procedure

SAFETY PROCEDURES FOR SOLID MECHANICS LAB

Safety Rules for Students

1. Slippers, sandals, and open-toed shoes may not be worn when conducting practical work in the laboratory.
2. Long hair must be tidily tied up especially for female students.
3. Never leave an ongoing experiment without notifying others in the laboratory. If forced to leave anyway, ask the laboratory staff or other users in the laboratory to keep an eye on the experiment.
4. Apparatus in the laboratory must be used correctly and carefully.
5. Report any accidents in the laboratory to the lecturer or laboratory staff immediately.
6. Do not work alone in the laboratory especially if it involves dangerous materials or experiments.
7. Experiments must not be conducted without the knowledge or permission of the lecturer or laboratory staff.
8. Report every accident and broken apparatus to the laboratory staff immediately.
9. Students are prohibited from playing, running, fooling around, or making noise in the laboratory.
10. Students are prohibited from playing with the equipment and facilities in the laboratory.
11. Students should be made known the locations of the break glasses and fire extinguishers.
12. Students should be made known how to use break glasses and fire extinguishers in the case of fire.
13. Laboratory tables must be cleaned and the chairs must be tidily arranged after each practical session.
14. Bag packs should be placed on the racks prepared outside or inside the laboratory.
15. Students should use appropriate techniques to conduct experiments and give attention to all safety measures given with each experiment.

Safety Procedure

SAFETY PROCEDURES FOR SOLID MECHANICS LAB

General

1. Follow all safety measures in the laboratory at all times.
2. Unauthorized personnel are prohibited from entering the laboratory except with authorization.
3. Laboratory users must always wear appropriately in the laboratory. When running laboratory work, wear laboratory coats and enclosed shoes.
4. Use safety protection gear suited for the situation or task at hand.
5. It is prohibited from bringing and keeping food and drinks into the laboratory especially into the fridge.
6. Every corner, laboratory floor and preparation room must be free of obstructions that might hinder movement.
7. Make sure the electricity, water and gas are turned off when not in use.
8. Apparatus that have been used should be cleaned (if necessary) before being returned to their original location.
9. Any practical classes in progress cannot be left unsupervised.
10. Laboratory users who intend to conduct laboratory work outside working hours require a written approval from the Lab Manager.

Remember to help Others

when you are successful

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