



## Department of Civil Engineering

Academic Year 2021– 2022 (Odd Semester)

Degree, Semester & Branch: III semester B.E Civil Engineering

Course Code & Title: CE8301 & Strength of Materials I

Name of the Faculty member (s): Mr.V.Ragavan

### Innovative Practice Description

Unit / Topic: Unit IV / Torsion Test on Mild Steel

Course Outcome: CO4

- **Topic Learning Outcome: TLO7**
- **Activity Chosen: Virtual Lab**
- **Justification:**

Torsion test on mild steel is a topic that involves the step by step clear testing procedure of torsion test on MS rod and also can plot the graph between torque Vs angle of Twist. Before starting problem on torsion, want to teach the torsion test on mild steel by experimental for better understanding level of the students that's why I have chosen Virtual lab for the above topic.

- **Time Allotted for the Activity:** 20 minutes
- **Details of the Implementation:**
  - The Virtual lab is a very commonly used classroom assessment technique. It really does take about 20 minutes for listening and, while usually take 10 minutes for problem solving at the end of class.
  - I asked all students to listen the virtual lab and made them to solve problems for the questions within 10 minutes.
- **CO – PO / PSO mapping:**

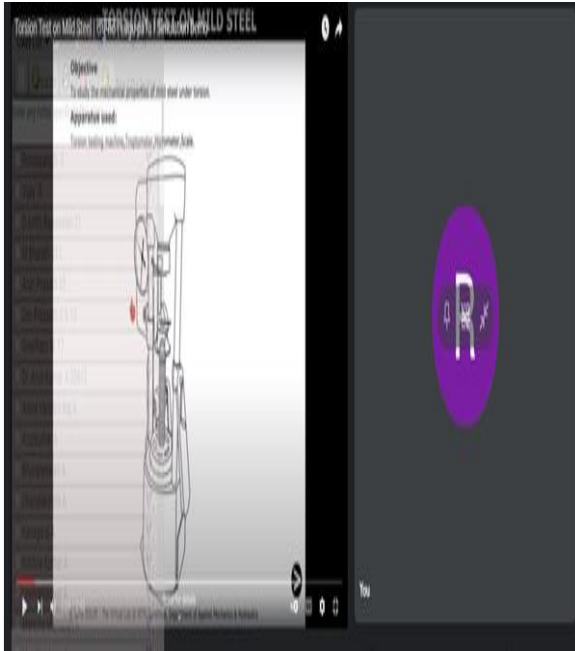
CO	PO1	PO2
CO4	3	2

(1 – Low      2 – Moderate      3 – High)

- **PO / PSO mapped:**

Innovative practice	PO1	PO2
<b>Justification for correlation</b>	Calculate the stresses and deformations of solid and hollow circular shafts using Torsion Equation with the help of applying the engineering fundamental concepts and mathematics.	Providing design solutions to springs for its maximum energy storage capacities, for various applications.

• **Images / Screenshot of the practice:**



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Virtual Lab - Problem.

In a tensile test, a test piece of 25mm diameter, 200mm gauge length and stretched 0.0975 mm under a pull of 50 kN. In a torsion test, the same rod twisted 0.025 radian over a length of 200mm when a torque of 0.4 kNm was applied. Evaluate Poisson's ratio and the elastic moduli for the material.

Given data:

Diameter,  $d = 25\text{ mm}$   
 Gauge length,  $L = 200\text{ mm}$   
 Elongation,  $\Delta L = 0.0975\text{ mm}$   
 Pull,  $W = 50\text{ kN}$   
 Twist,  $\theta = 0.025\text{ rad}$   
 Torque,  $T = 0.4\text{ kNm}$

To find,

Poisson's ratio,  $\mu = ?$   
 Young's Modulus,  $E = ?$   
 Bulk Modulus,  $K = ?$   
 Rigidity modulus,  $G = ?$

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• **Reflective Critique:**

❖ **Feedback of practice from students and other stakeholders:**

The students felt easy to remember and understand the concepts and procedures involved in the given topic which will make them to solve the problems under this topic in Internal Assessment Test.

❖ **Benefit of the practice:** (E.g.: Outcome attainment would have increased due to innovative practice over conventional practice)

- i. Virtual lab activities are an effective way of involving all students in class simultaneously.
- ii. It prompts students to reflect on the day's lesson and provides the instructor with useful feedback.

❖ **Challenges faced in implementation:**

Initially, I have planned the activity for 10 minutes but students have taken 15 minutes to solve the problem.

**References:**

- ❖ Rajput.R.K. "Strength of Materials", S.Chand and Co, New Delhi, 2015.
- ❖ Timoshenko.S.B. and Gere.J.M, "Mechanics of Materials", Van Nos Reinhold, New Delhi 1999.