

**CVEN 3161: Mechanics of Materials I**

**Laboratory #2: Report Guidelines for the Torsion Test**

Expectation:

- Understand the torsion test procedure.
- Understand the differences in material properties of cast iron and mild steel.
- Interpret the results.
- Plot the results.
- Calculate Shear Modulus, Shear Stress, Shear strain, and Torsion yield stress.
- Analyze results

***The report must be done in a computer. Times New Roman 12-point font, single or double spaced. Do not exceed 5 pages (Cover Page and Appendices apart).***

**1) Cover page**

**2) Summary (10%)**

The abstract is a ***one paragraph (4-5 sentences)*** description of what is contained in the report.

- What was the purpose of the test?
- What did you do?
- What equipment did you use?
- What were the results
- Conclusions

**3) Introduction (20%)**

- Explain the theory behind the experiment.
- Include a brief description of the materials used.
- Define (i) major terms, (ii) objective(s) of the lab, and (iii) assumptions, if any.

**4) Experimental Procedure (10%)**

- List the steps followed in the lab.

**5) Results (40%)**

**a. For both specimens (steel and cast iron) graph:**

**1) Applied torque vs Angle of twist 2)**

**Shear stress vs Shear strain**

**b. Calculations**

**c. Make a small table showing**

<b>Steel</b>	<b>Cast Iron</b>
Diameter, $d$	Diameter, $d$
Length, $L$	Length, $L$
Polar moment of inertia, $I_p$	Polar moment of inertia, $I_p$
Shear modulus, $G$	Shear modulus, $G$
Torsion yield stress, $\tau_y$	Torsion yield stress, $\tau_y$

**d. Sketch the fractured specimens from the torsion tests clearly indicating the direction of torque and the inclination of the fracture.**

**6) Analysis & Conclusion (15%)**

- Explain what your results (and the differences between cast iron and steel) mean.
- Compare the behavior of the two materials. Do they fail along the same planes? Is their ductility similar?

**7) Appendices (5%)**

- Include data received from the tests.
- Include all **sample calculations** in this section for any equations that you used in the report if you did not include them in the other sections.

**GENERAL GUIDELINES**

- The report should be word-processed (writing portions)!
- Appendices can be used for
  - Raw data (include only a sample if data is lengthy);
  - Sample calculations (if written by hand **MUST** use engineering paper);
  - Computer outputs, if a particular program is used.
- Reference the appendix as appropriate in the actual lab write-up portion.
- Be organized!
- Do not forget to label units (if writing a sample calculation, units for intermediate steps are not necessarily required, but recommended)!

**Required Data for Lab Report:**

	Cast Iron	Steel
Length		
Radius		
Torsion Rate		
ITLL Torsion Machine		