

24-261 Statics, Fall 2001
Laboratory #6

In this lab, each group will run a tension test of the three materials supplied:

- ?? 1020 cold rolled steel
- ?? 6061-T6 Aluminum
- ?? Teflon

Test Procedure:

1. Measure the length, width and thickness of each specimen.
2. Place the specimen into the testing machine grips so that at least $\frac{3}{4}$ of the grip section of the specimen is actually in the grips.
3. Load the specimen to failure, monitoring load and displacement, and observing the specimen.
4. Remove the fractured specimen and repeat as necessary for the other specimens.

Data Analysis:

For each of the three specimens:

1. Enter the force and displacement data from your tests into the spreadsheet package EXCEL. In later columns, calculate the stress and strain. Then, use EXCEL to plot the stress-strain curve (including axis labels).
2. From your stress-strain curve, determine:
 - ?? Young's Modulus
 - ?? Results for yield stress (0.2% offset stress)
 - ?? Nominal ultimate strength
3. Compare the values with tabulated values (mention your source). Often, you will not get an accurate value for Young's Modulus, why?
4. Describe the shape of the fracture surface for each of the specimens.

Report:

Each student should submit a brief, neat report, including the following:

- ?? Title
- ?? Date of experiment
- ?? Experimental Setup (brief description of testing machine, drawing of specimen with dimensions).
- ?? Data analysis (tables, curves, etc.), including explanations of how quantities are determined from the raw data of force and displacement.
- ?? Values determined and responses to questions above.

The laboratory report should be handed in during class on the Thursday of the week following the week in which the laboratory was conducted. Students during the last week may hand in lab on Thursday after Thanksgiving.