MAE150L – Mechanics of Structures Lab

Activity #2
Measurement of the Young’s modulus of Aluminum via a desktop-type tensile test

Lab Report

Submitted by: Group # Subgroup #

Students Names

1. Objective of the experiment

The goal of this experimental activity is the measurement of the Young’s modulus of 6061 Aluminum. Load the bar in uniaxial tension via the application of a series of loads of increasing magnitude and measure the corresponding strain with the strain gage data acquisition system that you have configured in the past weeks. Perform the offset nulling and calibration procedures that were described.

2. Sample Preparation

2.1 Materials
6061 Aluminum. Present textbook properties (Young’s modulus and yield strength) and quote sources.

2.2 Specimen geometry

Detail of bar

![Diagram of bar dimensions]

2.3 Strain gages
Briefly describe the principle of strain gage operation and a schematic description of the electronic read-out scheme (including offset nulling, calibration, etc...)
Based on the electronic circuit (in particular the chosen gain), estimate the minimum strain that can be measured.

3. Description of the testing procedure

Explain how the experiment was run and what raw data was extracted. How did you measure the stress? How did you measure the strain?
4. **Data Analysis**

Explain how the Young’s modulus can be extracted from the raw data.

5. **Results**

   5.1 *Stress-Strain Curves from all experiments*
   Plot a stress-strain plot, with error bars on each data point derived from subsequent measurements.

   5.2 *Extraction of materials properties*
   Extract the Young’s modulus from the stress-strain plots depicted in 5.1. Present an error bar on the modulus.

6. **Discussion**

Compare your findings with the textbook data extracted in sec. 2.1. Comment on reproducibility, experimental errors and issues, etc…