

Assignment 8

Geosc 597-003
Techniques of Geophysical Experimentation

Due: 30 April

Determine Granite Compressive Strength

In this activity you will combine many of the topics covered in the course to determine the compressive strength of Westerly granite using the Biaxial deformation apparatus. Work with your classmates to plan and carry out the experiment. You will be given one Westerly granite core to determine the compressive strength.

Planning:

Here are some questions and pointers to help you plan your experiment.

- Which load cell gain is appropriate? Consider the voltage range, and theoretical compressive strength of granite.
- Which DCDT gain is best suited? Why?
- What safety precautions should be considered?
- Take measurements of the sample.

Experiment:

Here are some goals for the experiment.

- Safety: use plexiglass as a barrier between you and the experimental apparatus.
- Load and unload the sample – investigate hysteresis. Does loading rate have an effect?
- Apply load until sample yields, fractures.
- Use a reasonable recording rate.
- Completely fill out the runsheet (including Notes, Purpose/Description/, Hydraulics temps/press).

Analysis:

- Scan your runsheet and save as a pdf.
- Use pylook to reduce the data (convert from bit to physical units, set zero points, remove offsets) This needs to be commented.
- Include scripts (if not also included in your pylook code) for producing figures.

Results/Discussion:

Use concise language to address the following points. One page should be more than enough for text and place figures on separate pages.

- Briefly describe the point of this experiment and the experimental methodology.
- How force and displacement are measured?
- What is *compressive strength*, what is the experimental value, and how did you arrive at this? Is this a reasonable value? Cite source(s)
- What is Young's Modulus, what is the experimental value, and how did you calculate it? Is this a reasonable value? Cite source(s)
- Produce figures of the following:
 - Full experiment (Stress vs. Time)
 - Load/Unload
 - Side-by-side comparison of loading rates
 - Full experiment (Stress vs. Strain). Label relevant events on plot. Include slope for determining Young's Modulus.

What to upload to Canvas

You should upload the following with *consistent file names*:

- Filled out runsheet – **15 pts**
- Working pylook and any other code – **30 pts**
 - **Fully comment your code(s)!**
- README – **5 pts**
- Results/Discussion
 - Concise & accurate discussion – **25 pts**
 - Figures with labels and captions – **25 pts**
- *Zip directory and upload to Canvas. (hw8_username.zip)*