Report Attachments for CE Lab Reports

The purpose of this document is to describe and illustrate many of the common elements that you should include as attachments to reports submitted for lab reports in CE207L, CE330L, CE354L and CE415L. Always refer to the course requirements to know whether certain elements must be added to or omitted from the following list.

The elements to include will normally be:

- ☐ Summary of the results (see Example 1)
  - Make it generally like the example shown, but with suitable changes for the specific experiment covered
- ☐ Sample calculations (see Example 2)
  - Include a sample of each calculation performed in your analysis so that the reviewer can understand your analysis process. All intermediate spreadsheet calculations must also be demonstrated with a corresponding sample calculation.
  - Use your <u>actual test data</u> to work through the calculations. You should mention where each numerical value used in the calculation comes from and whether it represents a typical value or is for a specific relevant condition or case (i.e, at a maximum or minimum point, for a particular flowrate, a particular moisture content, a specific temperature, etc.).
  - If you include a constant or numerical value in a calculation you must indicate where it came from and why you included it.
  - Use the number of significant figures appropriate for each numeric value.
  - Unless specified otherwise, sample calculations must be typed (e.g., using a word processor, Microsoft Equation, MathCad, or similar program) for a clean, professional appearance.
  - Include relevant units for all numerical values (except unitless numbers). If it is not readily apparent how the units cancel or combine through the calculation process you should include a simple note indicating how you arrived at the final unit(s) for the computed result.
  - The end result for each calculation must be clearly identified.
  - Be sure the reviewer of your work does not have to guess how you found the results that you did. If they do have to guess they may guess wrong or conclude that you have not adequately supported your result(s).
- ☐ Data tables (see Example 3)
  - Label each table with a table number, title, date, and include appropriate units in the table heading.
  - Show the appropriate number of significant digits.
- ☐ Graph plots (see Example 4)
  - Show data points on all plots unless noted otherwise.
  - Plotted line/curves should be drawn for a best-fit representation of the curvilinear nature of the data -- do not simply connect-the-dots using line segments. You may use a French curve if fitting a curve by hand or may use a software smoothing function that does not simply connect points with curves.
  - If you use color, be sure to use shades that will copy using a photocopier.
  - Label each plot with a figure number, title, date, your name, appropriate axis ranges and units.
  - Unless noted otherwise, each plot should cover about one-half of an 8½ x11-inch page. Font size may be varied more than that specified for the report body – strive to keep the report format clean.

SUMMARY OF RESULTS (example)
FLUID PRESSURE MEASUREMENT CALIBRATIONS – WATER COLUMNS
CE207L Group 4 Report 2
student name
1/11/2010

<u>Instrumentation</u>

Pressure transducer model .... Durham E-120
Pressure transducer serial number 100
Signal conditioner/display model MM50
Signal conditioner/display serial number... 12

<u>Cylinders</u>

Cylinder A diameter... 1.9 inch
Cylinder B diameter... 1.0 inch
Cylinder C diameter... 0.6 inch

<u>Regression equations</u>

Note: P= calibrated pressure (psi); V= transducer signal output (mV);
H= water column height (inch)

Part A, Calibration ....P = 0.503*V+0.043
Part B, cylinder A ....P = 0.153*H+0.048
" , " B...P = 0.150*H+0.053
" , " C...P = 0.152*H+0.033
Part C, cylinder A ....P = 0.151*H+0.043
" , " B...P = 0.152*H+0.035
" , " C...P = 0.153*H+0.038

Example 1 – Summary of Results

Sample Calculations	CE354L Unconfined Compressive Strength Test	1/9/2009	name	1 of 1

Soil description: light brown silty clay

Average initial sample height: $h_0 = \frac{(5.52 + 5.50 + 5.54)\ inch}{3} = \underline{5.52\ inch}$

Average initial sample diameter: $d_0 = \frac{(2.72 + 2.83 + 2.81)\,inch}{3} = \underline{2.79\,inch}$

Initial cross-sectional area: $A_0 = \frac{1}{4}\pi d_0^{\,2} = \frac{1}{4}\pi\left(\frac{2.79\,inch}{\frac{12\,inch}{1\ ft}}\right)^2 = \underline{0.0425\ ft^2}$

Compute the axial unit strain, ε, at a given load level (the remaining calculations correspond to the maximum load level recorded):

Axial load applied, P = 192.7 *lbs*

Axial deformation, Δh = 0.760 *inch*

$$\varepsilon = \frac{\Delta h}{h_0} = \frac{0.760\,inch}{5.52\,inch} = \underline{0.138}$$

Compute the corresponding cross-sectional area: $A = \frac{A_0}{1-\varepsilon} = \frac{0.0425\ ft^2}{1-0.138} = \underline{0.0493\ ft^2}$

Compute the corresponding unit stress: $q_u = \frac{P}{A} = \frac{192.7\,lbs}{0.0493\ ft^2} = \underline{3910\frac{lbs}{ft^2}}$

Compute the maximum cohesion: $c_u = \frac{q_u}{2} = \frac{3914\frac{lbs}{ft^2}}{2} = \underline{1957\frac{lbs}{ft^2}}$

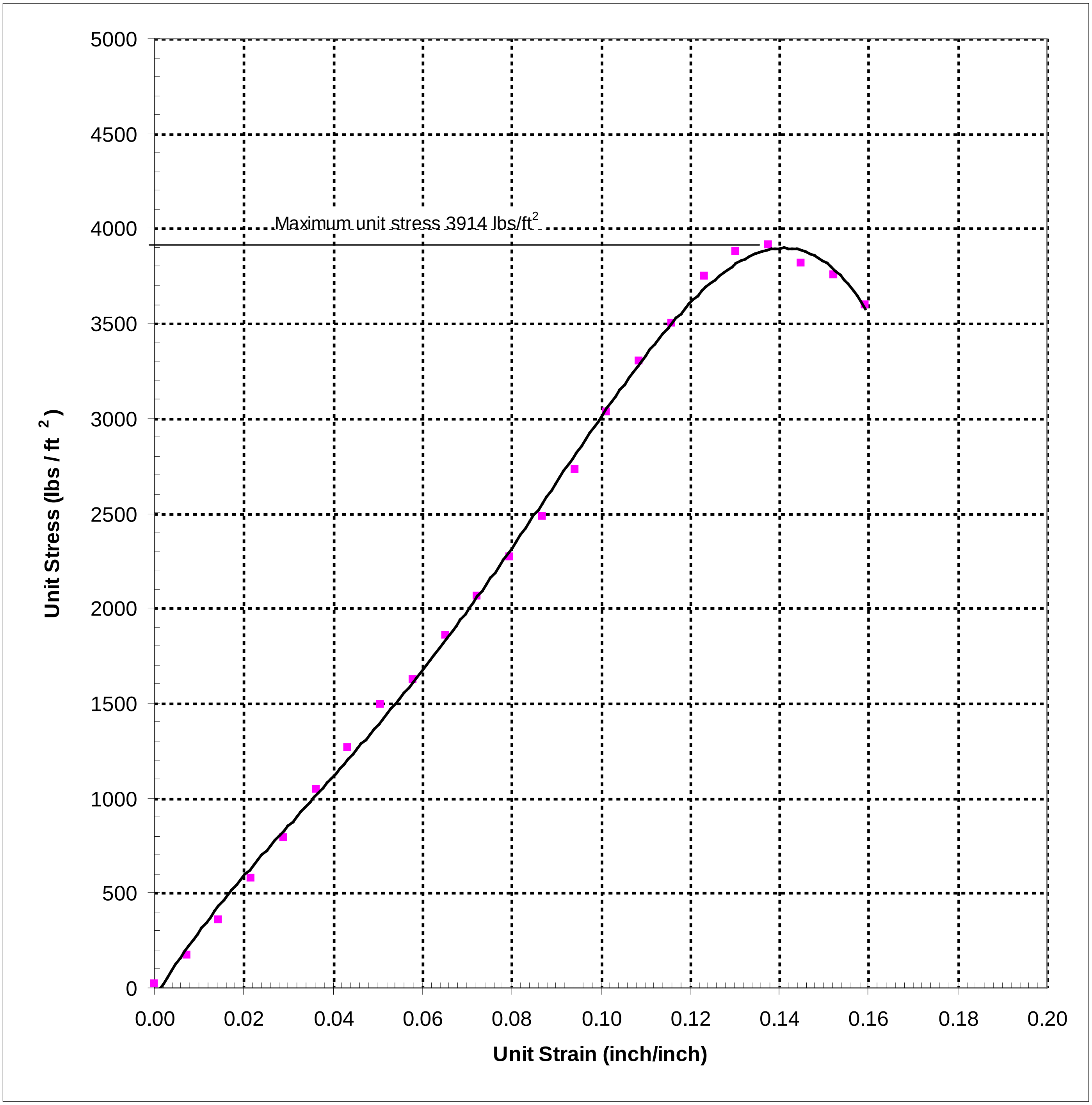
Example 2 - Sample Calculations

Table 1. Unconfined Compressive Strength Data
CE354L Group 4
Date of Test: 1/11/2010
Clay E. Sample

		Initial sample height, h_0	5.52		*inch*
		Initial sample diameter, d_0	2.79		*inch*
Initial cross-sectional area, A_0			0.0425		*ft^2*
	Deformation	**Load**	**Unit Strain**	**Area**	**Load per Unit Area**
	(inch)	*(lbs)*	*(inch/inch)*	*(ft^2)*	*(lbs/ft^2)*
	0.000	1.0	0	0.0425	24
	0.040	7.4	0.007	0.0428	173
	0.080	15.5	0.014	0.0431	360
	0.120	25.2	0.022	0.0434	581
	0.160	34.6	0.029	0.0437	791
	0.200	46.0	0.036	0.0441	1044
	0.240	56.2	0.043	0.0444	1266
	0.280	66.9	0.051	0.0447	1496
	0.320	73.3	0.058	0.0451	1626
	0.360	84.3	0.065	0.0454	1856
	0.400	94.5	0.072	0.0458	2065
	0.440	104.7	0.080	0.0461	2270
	0.480	115.3	0.087	0.0465	2480
	0.520	127.9	0.094	0.0469	2729
	0.560	143.4	0.101	0.0472	3035
	0.600	157.2	0.109	0.0476	3300
	0.640	168.2	0.116	0.0480	3502
	0.680	181.4	0.123	0.0484	3746
	0.720	189.4	0.130	0.0488	3879
	0.760	192.7	0.138	0.0492	3914
	0.800	189.4	0.145	0.0497	3815
	0.840	188.1	0.152	0.0501	3756
	0.880	181.7	0.159	0.0505	3597

Example 3 – Table of Test Data

Figure 2. Unit Stress vs. Unit Strain
Unconfined Compressive Strength Test
Test Date: 1/10/2010
Clay E. Sample



Example 4 – Plot of Test Data

