Report Attachments for CE Lab Reports

Revised 1/12/2015

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 results
  - An attachment to the report will normally be required to summarize the key results of the conditions tested and the results of the results
  - The report requirements specified for each assigned lab report module shall be used to determine which quantitative or qualitative results must be included in the summary of results.
  - If a specific *Summary of Results* template is provided for you to use then you must use that template as instructed.
  - If a *Summary of Results* template is not provided, then you should create one. In most cases the format as shown in Example 1 should be used, but with suitable changes for the specific experiment covered.

- ☐ Sample calculations (see Example 2)
  - Include a sample of each type of 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.
  - The computation process must be logical and directly address the results sought.
  - The numerical quantities used (both in the input data and computed results) in the sample calculations must be in substantial agreement with the data provided elsewhere in the report body or attachments. Use your actual test data 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.).

    IMPORTANT: For each entry in the Summary of Results, highlight and label the source of that information in the data tables or the Sample Calculations. You should use the alphanumeric identifiers shown on the left side on the Summary of Results page for each parameter. These marks should be neatly hand-written.

  - 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 appropriate number of significant figures for each numeric value.
  - 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 note indicating how you arrived at the final unit(s) for the computed result.
  - Unless specified otherwise, sample calculations should be typed (e.g., using a word processor, Microsoft Equation, MathCad, or similar program) for a clean, professional appearance.

- The end result for each calculation should be clearly identified, such as underlined or enclosed in a box.
- 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

Instrumentation

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

Cylinders

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

Regression equations

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 (NOTE: For some lab reports, use a specific form if one is provided as part of the assignment.)

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

Soil description: light brown silty clay

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

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

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

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: $A = \dfrac{A_0}{1-\varepsilon} = \dfrac{0.0425\ ft^2}{1-0.138} = \underline{0.0493\ ft^2}$

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

Compute the maximum cohesion: $c_u = \dfrac{q_u}{2} = \dfrac{3914\,\frac{lbs}{ft^2}}{2} = \underline{1957\,\dfrac{lbs}{ft^2} \Rightarrow 1960\,\dfrac{lbs}{ft^2}}$

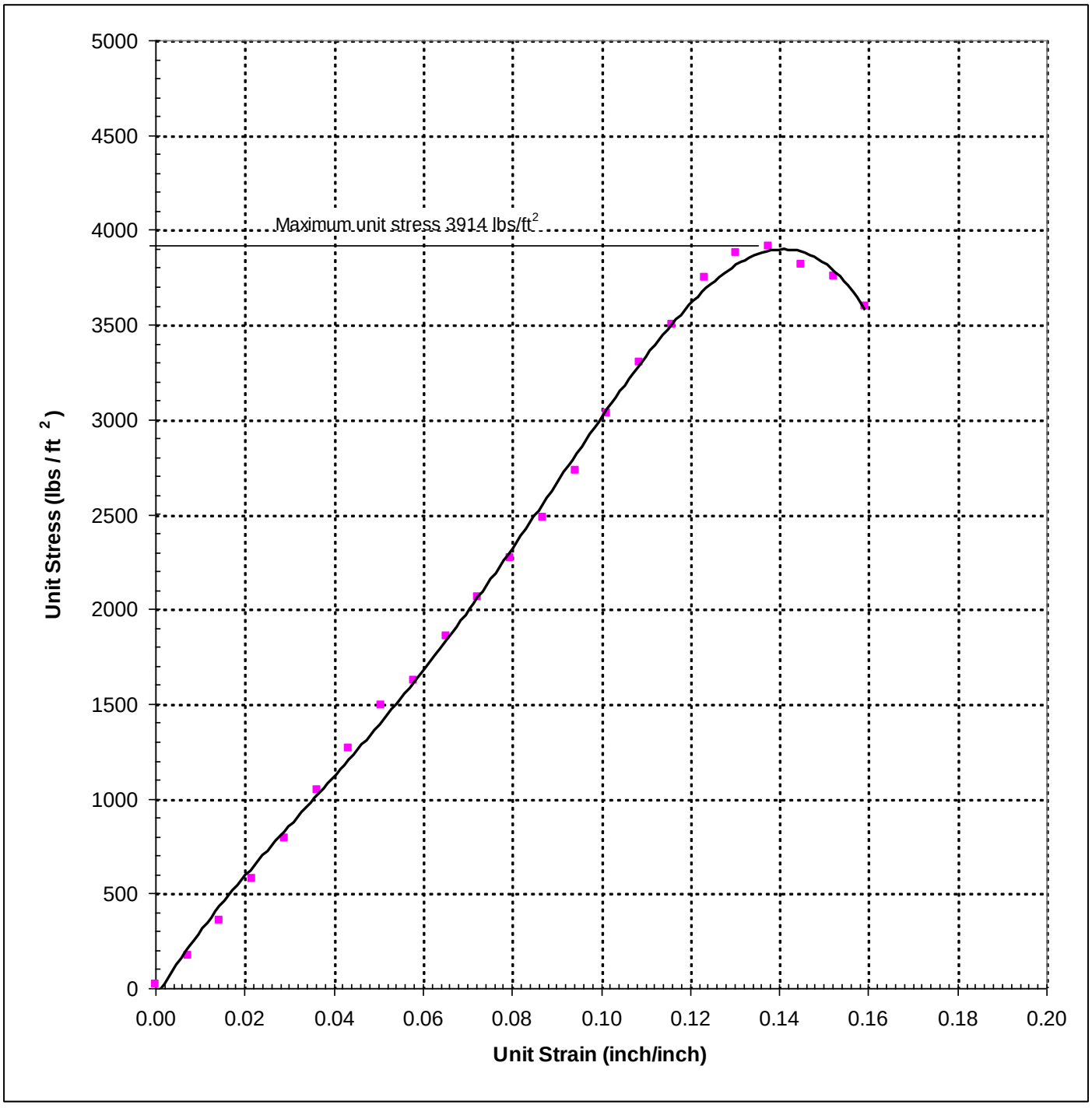
Example 2 - Sample Calculations should be typed UNLESS specifically instructed to be done by hand.

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		*ft²*
	Deformation	**Load**	**Unit Strain**	**Area**	**Load per Unit Area**
	(inch)	*(lbs)*	*(inch/inch)*	*(ft²)*	*(lbs/ft²)*
	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	1040
	0.240	56.2	0.043	0.0444	1270
	0.280	66.9	0.051	0.0447	1500
	0.320	73.3	0.058	0.0451	1630
	0.360	84.3	0.065	0.0454	1860
	0.400	94.5	0.072	0.0458	2060
	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	2730
	0.560	143.4	0.101	0.0472	3040
	0.600	157.2	0.109	0.0476	3300
	0.640	168.2	0.116	0.0480	3500
	0.680	181.4	0.123	0.0484	3750
	0.720	189.4	0.130	0.0488	3880
	0.760	192.7	0.138	0.0492	3910
	0.800	189.4	0.145	0.0497	3820
	0.840	188.1	0.152	0.0501	3760
	0.880	181.7	0.159	0.0505	3600

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