

## Civil Engineering Writing Project - Mechanics Lesson 10

### Use of Figures and Tables

#### Getting the most out of figures and tables

Engineering documents often present large amounts of data. Often these data are easiest for readers to understand in a visual form: a figure or a table. To be effective, tables and figures must be easy to read and properly formatted. They must also be clearly referenced in the text of the document.

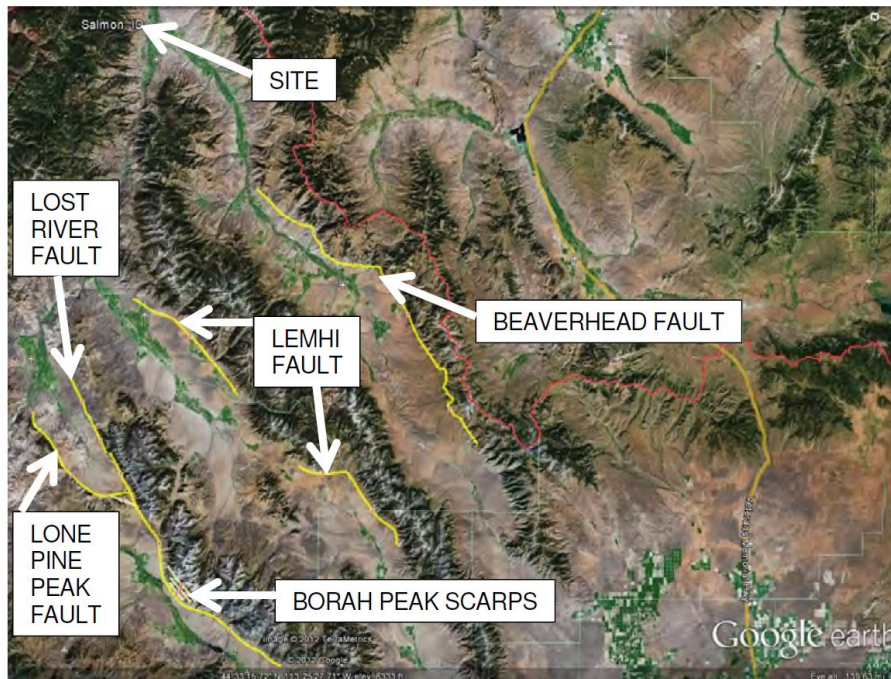
If your department, course, or firm has specific formatting requirements, follow them. This lesson covers typical requirements.

#### Guidelines for figures

Figures include graphs, charts, photographs, maps, drawings and any other visual that is not a table.

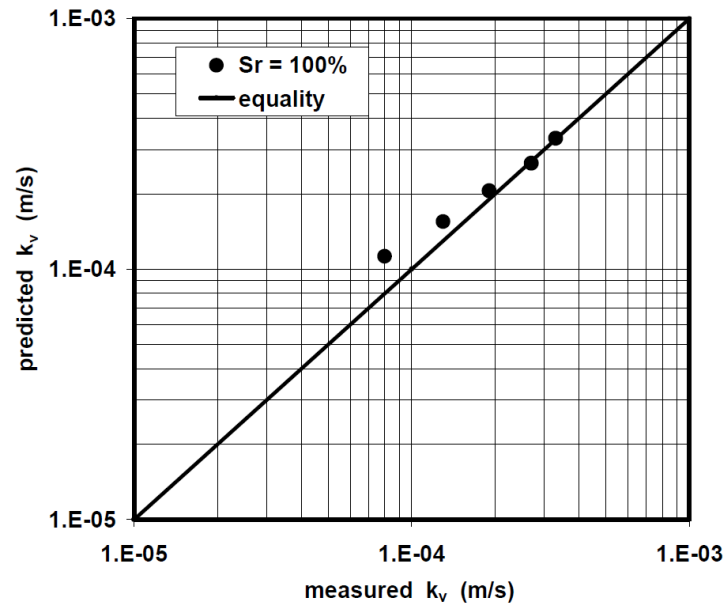
1. Below every figure there must be a number and a caption. For example:  
Fig. 1: Plan View  
Figure 3: View of typical cracking pattern at counterfort retaining wall section
2. The caption should be brief but complete.
3. If the figure is a graph, all axes must be labelled (with units as appropriate). A legend must be provided if there is more than one set of data plotted on a single graph.
4. In the text, refer to figures by their number. Do not use "in the following figure" or "in the figure on the previous page ." Always use the figure number.

**Example 1:** Image figure (from DC Engineering, 2012)



**Figure 1:** Regional Fault Map (Idaho Geologic Survey, 2010)

**Example 2:** Graph figure (from Chapuis and Aubertin, 2003)



**Figure 9:** Predicted versus measured  $k$ -values for the sand tested by Chapuis et al. (1989a) in the vertical direction after static compaction

### Guidelines for tables

A table is a list of numbers or text (words) in columns.

1. Above every table there must be a number and a title. For example:  
 Table 1: Special status species observed within the basin  
 Table 6: Water content and dry unit weight of samples retrieved from the site
2. Every column in the table must have a label.
3. Any footnotes should follow directly below the table.
  - a. Footnotes that pertain to the entire figure should start with "Note:" . For example:  
 Note: CH = crosshole; DH = downhole; SH = suspension logger
  - b. Footnotes that pertain to only part of the table should use superscript numbers or letters to identify where the notes apply . For example:  
<sup>a</sup>Year designated, <sup>b</sup>Year proposed
4. In the text, refer to tables by their number .

**Example 3:** Table of population numbers (from Vanasse Hangen Brustlin, 2004)

Table 2-1: Population Comparison, 1980-2000

Location	1980	1990	2000	Change 80-90 (Percent)	Change 90-00 (Percent)
Ossipee	2,465	3,309	4,211	43.2 %	27.3 %
Carroll County <sup>a</sup>	14,035	18,021	23,298	28.4 %	29.3 %
New Hampshire	920,475	1,109,786	1,235,786	20.5 %	11.4 %

Source: Lakes Region Demographic Profile, LPRC

<sup>a</sup>Lakes Region Portion

**Example 4:** Table of species status information (from US Army Corps of Engineering, 2013)

Table 1. Special Status Species Observed within the Basin

Common Name <i>Scientific Name</i>	Federal Status	Critical Habitat <sup>1</sup>	CDFG <sup>2</sup>	Federal Register	Date Listed
Nevin's barberry <i>Berberis nevinii</i>	Endangered	2008	2009	63:54956	13-Oct-98
Coastal California gnatcatcher <i>Poliophtila californica californica</i>	Threatened	2007 <sup>3</sup>	2008	58:16757	30-Mar-93
Least Bell's vireo <i>Vireo bellii pusillus</i>	Endangered	1994	2003 (2009 <sup>4</sup> )	51:16482	2-May-86

Source: USFWS 2010, CDFG 2010

<sup>1</sup>Year designated   <sup>2</sup>Last observed in Basin   <sup>3</sup>Year proposed   <sup>4</sup>Last observed according to Corps data



**Isn't it obvious why the table or figure is included?**

Some students work hard to create figures or tables for their documents, but then they never refer to them in the text. If you do this, you leave it up to the reader to figure out why that visual is in your document and what part it supports. This is frustrating to the reader and can cause confusion or misunderstanding.

Make sure every table and figure in your document is referenced at the appropriate place in the text. Otherwise, the table or figure might as well be removed from the document, and all that time you spent creating it will be wasted.

**Placement of figures and tables**

For coursework, tables and figures are usually placed after the paragraph where they were first referenced. If they do not fit on that page, place them on the next page. Very large visuals, such as those that require fold-out pages, may be placed at the end of the document. In workplace practice, some firms still put all the tables and figures at the end of a document. Check with your instructor or supervisor if you aren't sure about the requirements for placing figures and tables.

**Exercise**

The following data were collected during a geotechnical site investigation. Decide whether a figure or table is the most appropriate visual. Then create the visual, formatting it effectively.

- Sample 1 was taken from a depth of 3.7 feet. It had a moisture content of 13.1%, total unit weight of 105 pounds per cubic foot, and dry unit weight of 93 pounds per cubic foot.
- Sample 2 had a moisture content of 11.1%. It was taken from a depth of 5.6 feet. It had a dry unit weight of 101 pounds per cubic foot. Its total unit weight was 112 pounds per cubic foot.

- Sample 3, which was taken from a depth of 7.3 feet, had a total unit weight of 120 pounds per cubic foot. It had a moisture content of 3.7%, and dry unit weight of 113 pounds per cubic foot.
- Sample 4's dry unit weight was 98 pounds per cubic foot. It had a moisture content of 25.2%, and a total unit weight of 122 pounds per cubic foot. It was taken from a depth of 10.6 feet.

## References

- Chapuis, R. P., and Aubertin, M. (2003). *Predicting the Coefficient of Permeability of Soils Using the Kozeny-Carman Equation*. Report EPM-RT-2003-03, École Polytechnique de Montréal
- DC Engineering (2012). "Structural Observation and Seismic Evaluation: Pioneer Elementary School, 907 Sharkey Street", report prepared for Salmon School District, Salmon, ID
- US Army Corps of Engineering (USACE) (2013). "Whittier Narrows Recreation Area: Underground Storage Tank/UST Removal Whittier Narrows Flood Control Basin Los Angeles County, California Draft Environmental Assessment", Los Angeles District
- Vanasse Hangen Brustlin, Inc. (2004). "Final Feasibility Study: Ossipee Transportation Center", Report prepared for New Hampshire Department of Transportation, Concord, New Hampshire

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