

Objective

This assignment aims to improve your spreadsheet skills, experiment with the visualization of large data sets, and continue developing a section of your Project #1 report.

Part 1. Use WORD and the equation editor to develop a document that describes how the capital and operational costs are computed for our prototype water treatment system.

Part 2. Use Excel to create a spreadsheet where you can explore the relationship between system flowrate (ml/min) and coagulant dosage (mg/l) as a function of cost (\$). Rewrite your treatment cost spreadsheet to perform the entire cost calculation in one cell and develop a table of cost values for a range of coagulant dosages and system flowrates. Develop a spreadsheet using the format shown below. Use the same values shown in the spreadsheet for the variation of coagulant dosages and flowrates.

Use the data developed in this spreadsheet to plot the variation of treatment cost as a function of flowrate and coagulant dosage.

Part 3. Use the [ACI method for concrete mix design](#) to proportion 1 yd.³ of concrete. Compute the weight of each mix component by hand to meet the following specifications:

This concrete is required for an interior column. The 28-day compressive strength should be 6,000 psi. The slump should be between 1 and 2 in. The maximum aggregate size should not exceed 1 in. The properties of the materials are as follows:

- Cement: Type I, specific gravity = 3.15
- Coarse Aggregate: Bulk specific gravity (SSD) = 2.65
absorption capacity = 0.5%
dry-rodded unit weight = 96 lb./ft.³
surface moisture = 0.5%
- Fine Aggregate: Bulk specific gravity (SSD) = 2.60
absorption capacity = 1.1%
fineness modulus = 2.70
surface moisture = 1%

Follow the [homework format](#) given in class and report the weight of cement, water, coarse aggregate, and fine aggregate required per cubic yard for this application. If we were to mix this concrete in the lab using the yellow mixer (about 1 ft³ in volume), what would be the required weight of cement, water, coarse aggregate, and fine aggregate?

Part 4. Read Chapters 7 and 8 in "*A Mind for Numbers*" by Barbara Oakley.