

Experimental Project #1
Spring 2011
Due: Wed February 2, 2011 at 2:00PM in class

Title: How long should I keep a cylinder immersed in a cold medium?

Weighting: 3% of overall grade

A hollow steel cylinder trunnion for a large bascule bridge lying in a room is immersed in ice/water mixture for purpose of contracting its diameter for a shrink-fit process. You need to answer the following question: What is the minimum time (in minutes) you should leave the cylinder in the ice/water mixture so that it reaches close to steady-state temperature (that ensures close to maximum contraction)?

The above is the only data given to you – so you will have to assume some data (e.g., length of cylinder, etc) while finding some data (e.g., density of cylinder, etc) from other resources (e.g. textbook, handbooks).

The motivation for not giving you the data is simple: real-life engineering is not a set of given data values and plugging into formulas. Watch this talk.

http://www.ted.com/talks/dan_meyer_math_curriculum_makeover.html

Report:

1. Write a short-typed report that you would give to your real-life boss. See <http://mmorris.public.iastate.edu/ie361/write.pdf> for guidance.
2. You need to enumerate clearly how you went about formulating/choosing the mathematical model and data, solving the problem, and finding your answer.
3. Data that needs to be assumed should be pragmatic numbers, while data from sources should be referenced by following the guidelines at <http://mmorris.public.iastate.edu/ie361/write.pdf>. List the references as a separate section of the report.
4. Equations should be typed in a professional manner (refer to the course textbook for examples) using the Equation editor 3.0 in MS Word (<http://office.microsoft.com/en-us/word-help/insert-an-equation-HP005190247.aspx>) or equivalent (<http://office.microsoft.com/en-us/word-help/write-insert-or-change-an-equation-HA001230361.aspx>).
5. You are required to use MATLAB to solve the problem, and the code should follow good programming practice – comments, inputs and outputs, use of fprintf and disp statements, cells, etc. See this link for an example <http://numericalmethods.eng.usf.edu/blog/html/rootinfinite.html>. Make the “published version” of the code part of the report. See a tutorial on this at <http://www.youtube.com/watch?v=f1pzVW71rLI>