

HW 1

Problem 1

Is an "efficient" steel beam or steel connection "economical"? Why or why not? Most steel beams are I shaped in section ("wide flange beams") – what makes these sections efficient, what is it about them that makes them not efficient but economical?

Problem 2

Read MSC article on "How Steel is Made" posted as a PDF on the class website. "We take steel beams for granted as the bones of new buildings, but how are they made?" What did you learn from this article that you did not know before? This should be a quick paragraph of text or so.

Problem 3

On website you will see link to "AISC Steel Manual 14th Ed Section Props PDF". Open it and find a wide flange beam named... W12x19. Draw this beam on your 8.5"x11" sheet of paper to 1:1 scale using the data shown bf, tf, d, etc etc. Point to what is web, what is flange, and what does the 12 and the 19 mean in the W12x19?

Problem 3

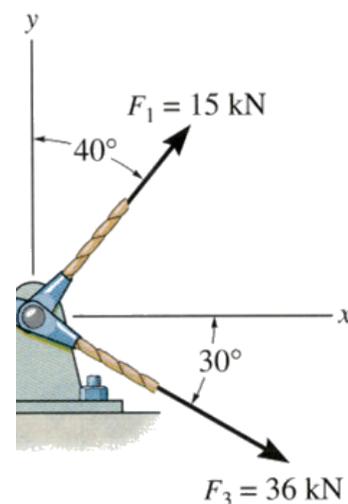
Draw the stress-strain diagram for A36 steel (note $F_y = 36\text{ksi}$) - this is what we did in class.

Problem 4

Read the info on load paths on the assigned reading on the website "AISC Architects Guide - Systems" - notice figure 2, and draw a load path of how the BEB building works structurally. To understand load paths, just imagine you are standing on the structure and describe how your weight gets transferred through the structure to the earth in discrete steps (slab to joists, joists to beam/girder/walls, etc). If you are unsure about how the column or wall loads transfer to the earth, you can assume it is on a spread footings or pile caps. Draw figures and describe each step. Also most strength of materials books will help you understand this (for example, see fig 4.15, 8.35, 13.21, 13.26, 16.13, 17.1, or 18.2 of "Understanding Structures" or figure 1.4(c) of the book "Structures" in library for an example of describing the load paths of a structure).

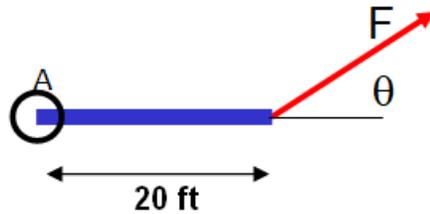
Problem 5

Statics Review: Calculate the magnitude and direction of the Resultant force on this system (answer should be a vector with magnitude and angle from horizontal)



Problem 6

Statics review: The force $F = 4$ kips and the angle shown is 25 degrees, what the moment about point A?

**Problem 7**

Statics review: What are the 2 reactions for this beam.... (hint: just the reactions, we will do moments and beam design later)

