MET 330 Spring 2019
Test 2 Reflection
Al McClenney
April 18, 2019

1) How and why the test demonstrates your work toward one, or more, of the course learning objectives. Be specific on the course objectives you decide to mention.
In considering the eight MET 330 Course Objectives (from our syllabus), I will give them letters a-h:

a. *Describe the nature of fluids and define different fluid properties, such as viscosity and pressure*
b. *Compute pressure and the forces (magnitude, location, and direction) that are associated with them in a stagnant fluid.*
c. *Discuss what buoyancy is and determine object stability while floating or submerged in a fluid.*
d. *Explain the fluid dynamics in pipes and fittings.*

Per Chapter Six, both of our problems dealt with moving fluids, with a primary emphasis placed on the flow of fluids through pipes or tubes.

e. *Apply the principles of conservation of energy (Bernoulli's equation) and mass to fluid flow systems.*

Per Chapter Six, we considered the concept of the volume flow rate, Q, which is the volume of fluid flowing past a given section per unit time. We were able to apply Bernoulli's equation, which is based on the conservation of energy. Thus we could track the three kinds of energy in a system: kinetic energy due to the motion of the fluid, potential energy due to the elevation of the fluid, and flow energy, energy content based on the pressure in the fluid and its specific weight.

f. *Compute friction losses in pipes for a variety of configurations (series, parallel, network, etc.).*

Per Chapter Twelve, our problems on this exam considered parallel and branching pipeline systems. Both of the exam problems involve those systems where the fluid could take more than one path, as it flowed from a source to a destination point.

g. *Identify and solve for different very specific industrial problems, such as open-channel flow, cavitation, water hammer, drag, lift, forces in pipes. Learn about different instruments to measure fluid flow quantities (such as pressure, fluid velocity, flow velocity, etc.).*
h. *Explain how fluid-machinery works (focused on pumps)*
i.

Course objectives d, e, and f were directly assessed in the exam

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2) How your test compares against the available solution. State the mistakes you made and what you will do next time to avoid making same mistakes. Please point out exactly where you made the mistake, say why you made the mistake, and how you should have done it. If you were taking this test again, what advice would you give yourself to ensure that you had a successful test?

I spent a lot of time reviewing notes from class 4/3/19 and the online PowerPoint about Hardy Cross. Chapter Twelve taught that the analysis of parallel piping systems is based on the energy equation, as we used in Chapters 7 to 11, but with some additional observations and considerations. I totally understand that when the flow rates split at a junction, that the important thing to determine how much fluid flows into each branch and how much pressure drop occurs as the fluid completes the circuit and ends up at the destination.

The text describes considers a software called PIPE-FLO to analyze parallel and branching pipeline systems, due to the tedious nature of required calculations. Determining the amount of flow that occurs in each branch of a two-branch pipeline system used Method A and Method B. Method A solution is for systems with two branches when the total flow rate and description of branches are known. Method B is used for systems with two branches when the pressure drop across the system is known and the volume flow rate in each branch and the total volume flow rate are to be computed.

I went with the Method A, as I began the first problem. I came up with a bunch of Resistant Coefficients, that was for sure.

The text describes the Hardy Cross technique to be used for a system with three or more branches-networks.

I tried to understand why we were using Hardy Cross, when clearly, we did not have three branches. I worked and re-worked the problem from class.

I made it more difficult for myself!

Also, I kept putting in positive guesses for Q, when my drawing clearly had the direction of the one pipe going negative! This lost me time, since I was so far from zero for the Hardy Cross, that I came close to calling Professor Ayala again.

Then, a miracle occurred and I reversed the sign for the one pipe and eureka! The numbers started to get lower, till I achieved the zero required!

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Briefly, the second problem was just too long. I think this should have been given separately from the first problem, since we had the Hardy Cross issue to work through.

Anyhow, I was on the right track, but had issues finding K. Given more time, I would have been able work everything out.

3) What your grade should be. Base it on the writing rubric provided in the test and the correctness of your solution. What are the strengths and weaknesses of your test?

The Problem Solution Rubric that was used in the last exam seemed logical and straight-forward. Thus, I used this same strategy for Test 2:

- ***Purpose***
- ***Drawings & Diagrams***
- ***Sources***
- ***Design Considerations (assumptions, safety, cost, etc.)***
- ***Data and variables***
- ***Procedure***
- ***Calculations***
- ***Summary***
- ***Materials***
- ***Analysis***

Since, I followed the rubric, I should at least get a grade of B. Solutions were computed with the correct steps, but calculations may have been off. As long as you are on the correct path, this is what is important in assessment. That is, you know what you have to do to figure out the solution to the problem.

4) Discuss the following:
a. What issues did you encounter in completing the test? How did you troubleshoot them?
I feel that being able to listen to the Hardy Cross presentation would have been great. Maybe it can be filmed and put online for the future.

b. What steps did you take to complete the whole test? Would you change something?

In completing the whole test, I was able to allow for certain time after work. I do work 40-60 hours at a full-time job and take two other ODU Mechanical Engineering classes. I took as much time as I was able to devote to this task.

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c. What new concepts have you learned?
It was amazing to learn techniques for analyzing real pipeline problems, in which several types of flow system components exist.
d. Where you think engineers use those concepts (provide specific examples)?
The sprinkler system for fire protection in a building such as a hospital or school is an excellent real-world example for delving into the parallel and branching pipeline systems.
e. Where do you think you will be using everything you learned?
There is not a week that goes by, that I do not use what I have learned in class.
f. Do you think what you learn is important for your professional career?
Absolutely! I work in a very old building with lots of old pipes and valves. My fluid mechanics knowledge is helpful in much troubleshooting.
g. How, when, where and why you might use this information or skill in the future?
At my present and future position in the workforce.
h. Have you been able to apply concepts you have learned in the course to what you do at work or in other courses?
The lab associated with this course is excellent in bringing the concepts to a better level of understanding.
i. What areas did you feel you were most successful, or improved the most?
I can go on forever about Bernoulli...
j. How do you see this course's content intersecting with your field or career?
As a child and now, as an adult, I have always been intrigued by how things work.
I have been so excited to have been able to explore so much in fluid mechanics.