MET 330 Test 3 Reflection Due 4/12/22

Exam 3 is focused primarily on one goal from the syllabus: Computing friction losses in pipes for a variety of configurations. The test asks us to look at a system that is either in parallel or series, and then determine specific parameters which are found largely by finding minor energy losses. For Test 3, we were required to answer only one of the two possible problems, and I am choosing to write my reflection on Problem 1. Overall, my final answers for flow rate at each sprinkler closely match the given solution. The solution provided chooses to compute all known values before iteration, while I chose to organize my equations by keeping them in variable notation and then calculate or plug in known numbers in excel. One difference in my test that is worth pointing out is in my analysis portion. The solution says that because the flow rates of each sprinkler are so close in value, there is no need to modify the system. I assumed one would need to modify it, so I listed possible adjustments to the system that would decrease the precent difference of the two sprinklers.

While completing the test, I did have some difficulty while attempting problem 2. At one point, it seemed that the results I was getting differed too much from what the problem statement was asking. In my explanation, I kept the mistake and attempted to rework my approach by editing my equations.

Based on the criteria given, I would grade myself on **Problem 1** as such:

- 1) Reasonable assumptions (reductions, valve, diameters, length): 1/10
- 2) Apply Bernoulli twice: 1/10
- 3) Consider ALL minor losses + handle them correctly: 2/10
- 4) Handled correctly pipe losses: 1/10
- 5) Obtained 3 equations with 3 unknowns: 1/10
- 6) Solved system of equations correctly: 3/10
- 7) Final Results: 0.75/10

(90)*(9.75/10) = 87.75 out of 90

For this exam, my strengths would be its thoroughness. This however may have caused my spreadsheet to be hard to follow, so it is somewhat weak in its organization. I

attempted to follow the method used in class as closely as possible, and since my final results were fairly close to the solution, I would not change anything.

This test in a way involved utilizing concepts covered in previous units. I did however, learn how to solve problems with several unknowns in a way that is easier than iterating by hand multiple times. Engineers likely encounter scenarios where one or more variables are either unknown or need to be assumed. In this case, the aim was to calculate flow rate at several points of a sprinkler system. This is probably a common situation that would require several initial assumptions. Outside of that, systems that involve delivering fluids in parallel or series systems are common, especially in the petroleum industry for example. This problem-solving methodology explored that was explored this exam might also come in handy in my future professional career, and likely has other applications outside of finding parameters for fluid systems.

So far, I cannot think of any immediately similar applications in other courses I have taken. This test, I did take a different approach where I used the metric system to do my calculations instead of using English units which I found helpful. I made it easier to keep my conversion factors in order. This was something that threw me off in the previous tests, so I'm glad I was able to see some improvement. At this point, I'm still not quite sure what kind of focus I want to have in my engineering career, so it is hard to say how specifically this unit would be applied. Finally, I would estimate that I spent a significant amount of time attempting both problems. I am confident it was more than 15 hours. I did this test over the course of 2 consecutive days. Unfortunately, I did have other large assignments that were due the same day as this exam, so I was more or less forced to ration my time in order to do well on all of these assignments. In the end, I was successful and my work was not rushed unlike in the previous tests, so I would not change what I did.