MET330 Fluid Mechanics Test 3 Reflection Robert Morris 11/23/2022

Course objectives

The goal of this test was to assess the knowledge of how to compete parallel and series piping problems. This is important, as parallel or branching systems are common in both homes and industries. This test also handled minor losses in friction and in joints of pipes.

Comparison

Starting with the first question, this question wanted to know the velocity of the water going to the sprinkler head in a series-piping diagram. I started with the correct idea, of sectioning off the three main sections of the system. There was a small misunderstanding of how the dimensions were set up though. This is however, where I made my mistake. Looking at the test solutions, the entire system was treated as one object, instead of three separate sections. While I had the right idea in finding the flow rate, my execution of finding the flow rate was not correct. While my math was off, I did suggest the correct answer to one of the follow up questions. I stated that the flow rate between the two sprinklers was close enough that there would be no point in modifying the system. I also did not use excel for this problem as I did not think it was necessary.

Problem two was a problem with an A and B section. The first section wanted to know the pressure drop along a single pipe. I had the correct initial idea of using Bernoulli's equation to find the pressure difference. My error came when I selected the version that did not factor in head loss. I used the flow rate and area to calculate velocity, then calculated pressure drop through that. I believe the general process was correct, but the exact process was wrong. The test solution also put these numbers into metric from imperial. I found my answer to be 288.681 psi, which calculated to kpa, is 1576.699, which is far off from the 437.06 kpa that was the correct answer. Part B was more complicated, as it add in a parallel pipe that would increase the flow rate of the system. I did not understand what this question was asking, as the same amount of water was going through the system at the same rate, but found a similar problem in the notes to work through it. The test solutions used multiple head loss equations, where I tried to utilize Kyle's method in excel. I feel like this procedure was going well enough as this time I factored in Reynolds number and did iterations of the "f" coefficients. Doing rough calculations to convert GPM to m3/s, the increase is orders of magnitude smaller than the correct answer. Going by the rubric on the test, here is how I think I did:

Technical Writing Rubric

	Score	Percentage
Purpose	10	5%
Drawings	10	10%
Sources	10	5%
Design Considerations	4	10%
Data/ Variables	10	5%
Procedure	4	25%
Calculations	4	20%
Summary	10	5%
Materials	10	5%
Analysis	10	10%

Question Rubric

	Score	Percentage
Reasonable assumptions	0	10%
Apply Bernoulli twice or get 2 equations from Bernoulli	0	10%
Consider ALL minor losses? Handled them correctly?	0	20%
Handled correctly the pipe losses?	0	10%
Obtained 3 equations with 3 unknowns?	0	10%
Solved system of equations correctly (Excel?)?	0	30%
Final results	0	10%

This test used a different rubric than the previous two, and only one of the two problems was necessary to do. Using this new rubric, I feel like I did nothing right on this test, on either question.

Discussion

Looking back on this test, I really did not do what I was supposed to. I felt that I was doing the correct steps and trying to follow the book and examples in my notes, but clearly, I missed something in those examples and notes. Initially using the rubric with the test, I figured I would follow the trend I usually had, but evidently, I was wrong in that assumption. I failed to read the first page because I assumed it was similar instructions to the first two tests. I feel I did okay on the technical writing, but that was not the focus nor the grading point.