MET 330

Test 2 Reflection

Due: 3/34/22

Test 2 covers the next few course objectives listed in the syllabus. They are: computing forces associated with stagnant fluid, determining buoyancy and stability, solving for different industrial problems (such as open channels, cavitation, drag/lift), and fluid dynamics in pipes and fittings. The test required that we use these several topics in conjunction with each other in order to work towards the ultimate goal of designing an open channel. I believe that my approach to solving the problems were mostly correct in the beginning stages, though for some problems I would incorrectly do intermediate steps for omit them.

An example of this would be when calculating the forces on the blind flange, I did not factor in the force from the pressurized tank. I also hadn't computed weight of the system in part b. Overall, I was able to apply the principles in order to find an answer for each part, but they were often didn't match the solution provided. I believe if I were to take this test again, I would ask for clarification on certain parts.

I graded myself on the rubric provided:

Writing:

Purpose: 0.5/0.5

Drawings: 1/1

Sources: 1/1

Design Considerations: 1/1

Data + Variables: 0.5/0.5

Procedure: 2/2

Calculations: 2/2

Summary: 0.5/0.5

Materials: 0.5/0.5

Analysis: 1/1

Final:10/10

Problem 1:

a,1 – Correct Equation: 1/2

a,2 – Area + Hydraulic Radius: 1/2

b,1 – FBD and Correct Forces: 1/3

b,2 – Force in x: 1/3

b,3 – Force in y: 0.6/3

c,1 – Size: 1/2

c,2 – Stable?: 1/2

d,1 – Right equation + A1/A2: 1/2

d,2 – C value: 1/2

e,1 – Wave velocity: 0.6/2

e,2 – Pressure increase: 1/2

f,1 – Correct area: 0.5/3

f,2 – Correct velocity: 0.5/3

f,3 – How was Cd obtained: 1/3

g,1 – Magnitude on flange: 0.7/2

g,2 – Location: 0.7/2

h – Final actual values: 0.5/1

Final:14.1/17

Based on this evaluation, I assigned myself a grade of 62.3 out of 90 points, which is approximately a 69%. I gave myself partial credit for answers that were answered but were numerically incorrect. My biggest weakness of my test results is in applying the appropriate problem-solving protocol throughout the problem. I feel as though I could be better about analyzing the problems and adjusting my approach when I encounter something I've never done before, too. The strengths of my tests are in its organization.

The biggest issue while encountering the test would have been in part c. I had drawn my diagram for part c in the “opposite” way as the solution provided. I had interpreted “barely floating” in the problem statement to mean that most of the log was submerged (as opposed to the bottom almost touched the channel but mostly unsubmerged), which affected my calculations for the rest of the problem. Something I had done for this problem was approximate a size of the log cross section using the calculated depth of the channel found previously. For taking the whole test, I followed the rubric provided as best as I could. I had also done all my calculations in English units like in the previous test, but I have found them too unwieldly to keep track of and convert. Next time, I would like to do my computations in standard metric units, and if necessary, convert them to English units at the very end.

During this unit, some new concepts I had learned were about how open channels function. Particularly, while it makes sense why these would come up in discussions on fluid mechanics, it was new to me just how many variables go into making them operate properly. These are a common piece of infrastructure, that can by used to mitigate flooding, in sewers, and other applications. These concepts would be especially important for anyone studying to become a civil engineer. Outside of infrastructure, mechanical engineers can often utilize the concepts of pressurized environments and material analysis in other fields, especially in manufacturing.

Outside of work, I can use this knowledge in my other classes. Though they are applied in different ways, I can see some of these concepts in Thermal Applications, where flow rate, the measurement of flow, and pressure are critical pieces of data. These concepts are usually done with air and vapor as the working fluid, as opposed to the liquids that are normally used in MET330.

Since taking the first test, I believe I am more comfortable applying Bernoulli’s principles. It was definitely something I wasn’t entirely confident in, but I don’t think I should have any issues with it going forward. While it is hard to say exactly where and how I will use this information in my career (I don’t have any field experience at this time), I do think that what we learn in this course can have applications outside of just the realm of fluid mechanics. I think that if I decide to pursue the fields of aeronautics or HVAC, the concepts of drag/lift and flow measurement would be especially pertinent. I would estimate that I spent 10 hours on this test. It was spread between three days, which is an improvement from my time management from the first test. In general, even though I scored myself lower than on the first test, I felt more confident while completing this test.

I don’t expect my completion time to improve, but I am hoping I can further spread out my time working on the next one.