

## Test Reflection 2

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.

- Identify and solve for different very specific industrial problems, such as, open-channel flow, cavitation, water hammer, drag, lift, forces in pipes, and learn about different instruments to measure fluid flow quantities (such as, pressure, fluid velocity, flow velocity, etc.) Also applied the principles of conservation of energy (Bernoulli's equation) and mass to fluid flow systems.

2) How your test compares against the available solution. State the mistakes you made and what you will do next time to avoid making the 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 didn't get a chance to complete the excel portion of the test. I was focused on being confident on the calculations first before attempting the spreadsheet. Throughout the test I found many similarities in calculations but all weren't denoted the same. From the first test I felt I improved on my problem solving skills. For part b for the vertical components I wasn't thinking about factoring in the length from the previous test.

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?

- Based on Rubric. Strengths- drawings and information about each problem looked good. As well as certain portions of the calculations Weaknesses - the Analysis and excel files were subpar in terms of what I expected from myself.

### WRITING RUBRIC (APPLIES TO THE WHOLE TEST, NOT TO PARTICULAR PARTS)

1. Purpose	0.5/10.0 out of 0.5/10.0
2. Drawings	1.0/10.0 out of 1.0/10.0
3. Sources	1.0/10.0 out of 1.0/10.0
4. Design considerations	1.0/10.0 out of 1.0/10.0
5. Data and variables	0.5/10.0 out of 0.5/10.0
6. Procedure	1.5/10.0 out of 2.0/10.0
7. Calculations	2.0/10.0 out of 2.0/10.0
8. Summary	0.5/10.0 out of 0.5/10.0
9. Materials	0.5/10.0 out of 0.5/10.0
10. Analysis	0.5/10.0 out of 1.0/10.0
TOTAL	9.0/10.0 out of 10.0/10.0

### PART 1)

- |                                 |                |
|---------------------------------|----------------|
| 1. Correct equation             | 1/4 out of 1/4 |
| 2. Area calculation             | 1/4 out of 1/4 |
| 3. Hydraulic radius calculation | 1/4 out of 1/4 |
| 4. Correct results?             | 1/4 out of 1/4 |

**PART 2)**

- |   |                  |
|---|------------------|
| 1. Free body diagram and correct forces | 0.5/4 out of 1/4 |
| 2. Force in x                           | 1/4 out of 1/4   |
| 3. Force in y (weight)                  | 0/4 out of 1/4   |
| 4. Correct results?                     | 0.5/4 out of 1/4 |

**PART 3)**

- |                                 |                  |
|---------------------------------|------------------|
| 1. Right equation and $A_1/A_2$ | 1/3 out of 1/3   |
| 2. C value                      | 1/3 out of 1/3   |
| 3. Correct results?             | 0.5/3 out of 1/3 |

**PART 4)**

- |   |                   |
|---|-------------------|
| 1. Water hammer                               |                   |
| 1. Wave velocity (units?) & pressure increase | 0.75/4 out of 1/4 |
| 2. Operating pressure & pipe thickness        | 0.5/4 out of 1/4  |
| 2. Cavitation                                 |                   |
| 1. Lowest pressure & compare to sat pressure  | 0/4 out of 1/4    |
| 3. Correct results?                           | 0/4 out of 1/4    |

**PART 5)**

- |  |                |
|--|----------------|
| 1. Hydrostatic force on the gate                 |                |
| 1. Magnitude                                     | 1/5 out of 1/5 |
| 2. Location                                      | 1/5 out of 1/5 |
| 2. Solve for buoy force with moment conservation | 1/5 out of 1/5 |
| 3. Using buoyancy, get sphere diameter.          | 1/5 out of 1/5 |
| 4. Correct results?                              | 1/5 out of 1/5 |

**PART 6)**

- |                            |                |
|----------------------------|----------------|
| 1. Correct area            | 1/4 out of 1/4 |
| 2. Correct velocity        | 0/4 out of 1/4 |
| 3. How $C_d$ was obtained? | 1/4 out of 1/4 |
| 4. Correct results?        | 1/4 out of 1/4 |

**PART 7)**

- |   |                   |
|---|-------------------|
| 1. Setting up the spreadsheet for all parts       | 0.33/3 out of 1/3 |
| 2. Case for flow rate when the pump power is half | 0/3 out of 1/3    |
| 3. Correct results?                               | 0/3 out of 1/3    |

FINAL GRADE:

$$9.0 + (80/7) * (4/4 + 2/4 + 2.5/3 + 1.25/4 + 5/5 + 3/4 + 0.3/3) = 60.38$$

4) Discuss the following:

- a. What issues did you encounter in completing the test? How did you troubleshoot them?
  - I encountered a time issue on this test that impacted my ability to be level headed. Through much of this test I was in sheer panic because I was simply unprepared. I just simply tried my best to make values make sense.
- b. What steps did you take to complete the whole test? Would you change something?
  - I tried to work them similarly to the homework problems, however they had additional complexity that I did not factor in. The amount of time that I gave myself to take the test is something that I would change.
- c. What new concepts have you learned?
  - How to apply applications of a water hammer to find a pipe size that can handle the immense force exerted on the pipes.
- d. Where do you think engineers use those concepts (provide specific examples)?
  - Yes, the concept of doing calculations for optimization piping size and thickness to get satisfactory results in handling forces/stress.
- e. Where do you think you will be using everything you learned?
  - On our group project where we will need to be able to design a piping system. Also during laboratory experiments that we have for fluids
- f. Do you think what you learn is important for your professional career?
  - Yes indeed, I ultimately want to be a test engineer for different subsystems of whatever I'm working on. It would be cool to apply what I learn to work
- g. How, when, where and why you might use this information or skill in the future?
  - I will be able to use skills learned during this exam to apply to finishing up our group project piping system design.
- h. Have you been able to apply concepts you have learned in the course to what you do at work or in other courses?
  - Not yet, I imagine in some future labs we will do an experiment that explores topics of this exam.
- i. What areas did you feel you were most successful, or improved the most?

- Definitely my calculations portion on the exam definitely had a lot more thought put into it than the first test.

j. How do you see this course's content intersecting with your field or career?

- Yes in the shipbuilding industry concepts of fluids and piping come up on the regular basis. Especially knowing how to examine cavitation and water hammers.

k. How much time did you spend on the test? How was the time organized? What Would you do differently? Why?

- Approximately 8 hours was used to complete this exam. I wish I could've had 1 additional day to finish off the excel portion of the test and check the test for silly mistakes.