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MET 330

11/25/2022

Test 3 - Reflection

1. This test touched on two primary course objectives; the use of Bernoulli’s equations and how it applies to serial and parallel piping systems. This section of the course reminded me a lot of AC/DC theory and how serial and parallel electrical circuits work. Appreciating that the total volumetric flow rate must be conserved regardless of how many branches a system has is incredibly insightful when solving problems of this nature.
2. I think my test compares moderately well to the available solutions in most instances, with the exception that I was not confident on how to compute the energy losses within the reducer and the expansion fitting. I also still struggle with knowing when a friction factor requires looking up numbers in a table versus computing it. If I were taking the test again, I would make sure that I understood the process, from start to finish, on how to compute the friction factor.
3. I think my grade should be at least a C, if not a C+. The weaknesses found in my test are understanding how to acquire the K and f values for a component in a piping system in general. Not knowing which chapter to look in or what table to consult is very frustrating. The strengths I brought to this test were really understanding how to set up the main Bernoulli formula for the parallel piping system.
4. Discussion:
   1. The most significant issue I encountered during the test was not understanding how to set up the iteration process in excel. Troubleshooting issues within excel was infuriating.
   2. I completed the whole test, but I also think I should’ve given myself more time to figure out why excel wasn’t giving me numbers that made sense. I also feel like it’s hard to know what values are reasonable when solving these types of problems. If I am confident that my percent difference sections are set up correctly then I think it’s safe to assume the values I am iterating through are solid. I did not feel that way when I was working in excel.
   3. The most recent concept that I have learned is how impressively complex energy losses can be and how varied they are within a single piping system.
   4. The one area that I am most familiar with where engineers use these concepts is within the reactor compartment and main propulsion units on aircraft carriers.
   5. Most likely when it comes to my work as a tool engineer at Newport News Shipbuilding, my present employer.
   6. I absolutely think what I am learning is important for my professional career.
   7. I have had to source coolant recycling units for a metal-working fluids management project at work.
   8. I have definitely been able to apply concepts from this course at work, but not so much in other courses yet.
   9. I feel I was successful in most sections of this test except when it got to creating the excel document. The iteration process was a bit challenging.
   10. Most of the time, this course will not intersect with what I do professionally. As a tool engineer, I focus more on the machining and metallurgy side of manufacturing.
   11. I probably spent about 20 hours over 4 days on the test. I made sure that I emphasized the correctness of Bernoulli's equation that I derived first and foremost. Then I moved on to the excel portion, which is where I think I really struggled. The only way I think I could’ve done better is if I had worked alongside someone and asked questions as they come up.

WRITING RUBRIC (Applied to the whole test, not to particular problems)

1. Purpose                                              0.5/10.0

0.5/10.0

1. Drawings                                            1.0/10.0

1.0/10.0

1. Sources                                               1.0/10.0

1.0/10.0

1. Design considerations                      1.0/10.0

1.0/10.0

1. Data and variables                            0.5/10.0

0.4/10.0

1. Procedure                                          2.0/10.0

2.0/10.0

1. Calculations                                       2.0/10.0

1.75/10.0

1. Summary                                            0.5/10.0

0.5/10.0

1. Materials                                            0.5/10.0

0.5/10.0

1. Analysis                                              1.0/10.0

1.0/10.0

**TOTAL                                               9.65/10.0**

PROBLEM 2

* 1. Reasonable assumptions (reductions, valve, tubing diam, lengths) 1/10

1/10

* 1. Apply Bernoulli twice or get 2 equations from Bernoulli. 1/10

1/10

* 1. Consider ALL minor losses? Handled them correctly? 2/10

2/10

* 1. Handled correctly the pipe losses? 1/10

1/10

* 1. Obtained 3 equations with 3 unknowns? 1/10

1/10

* 1. Solved system of equations correctly (Excel?) 3/10

1.5/10

* 1. Final results: 1/10

.5/10

**TOTAL                                                                                                                  10/10**

**8/10**

FINAL GRADE:

**(90)\*(10/10) = 90**

**(90)\*(8/10) = 72**