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MET 330

Test 3 Reflection

1. The test requires the use of principles such as Bernoulli's equation, continuity equation, and energy losses due to friction and minor losses in pipes and fittings. This demonstrates an understanding of how fluid pressure, flow rate, and pipe dimensions interplay. The test involves a real-world problem of determining the pressure drop in a piping system and then assessing the effect of a system modification on the flow rate. By calculating the pressure drop and predicting the change in flow rate due to modifications, the understanding of how energy is lost in fluid systems due to friction and minor losses is demonstrated.

2. For the first part, I applied Bernoulli's between points A and B in the single pipe in order to get the pressure drop. For the second part, when applying Bernoulli's, it produces 2 separate equations. One considering the energy losses through branch B and another considering the energy losses through branch C. After doing this I combined the first 2 equations with the $Q_1 = Q_2 + Q_3$ equation which us 3 equations with 3 unknowns. One mistake I made was not using excel accurately and following the step-by-step assumption process by testing different numbers until the new "Q_1" is equal to the previous one.

3. <u>GRADING RUBRIC</u>
PROBLEM 2

1.	Reasonable assumptions (reductions, valve, tubing diam, lengths)	1/10 out of 1/10
2.	Apply Bernoulli twice or get 2 equations from Bernoulli	1/10 out of 1/10
3.	Consider ALL minor losses? Handled them correctly?	2/10 out of 2/10
4.	Handled correctly the pipe losses?	1/10 out of 1/10
5.	Obtained 3 equations with 3 unknowns?	1/10 out of 1/10
6.	Solved system of equations correctly (Excel?)?	1/10 out of 3/10
7.	Final results	0.5/10 out of 1/10
TOTAL		**7.5/10 out of 10/10**

FINAL GRADE:

(90)*(7.5/10) = 67.5

4. Completing this test presented a challenging exercise that strengthened my understanding of fluid dynamics. Initially, I encountered issues with accurately calculating the pressure drop and flow rates, particularly when considering minor losses in the modified piping system. To troubleshoot, I revisited course materials and referenced standard loss coefficients to ensure precision. The steps taken included a systematic application of the Bernoulli equation and the Darcy-Weisbach formula, reassessing assumptions where necessary. This test introduced me to the practical implications of pipe loop systems and the impact of design modifications on flow dynamics, concepts that engineers frequently utilize in HVAC systems, water distribution networks, and industrial fluid transport systems. I anticipate applying this knowledge in my career, particularly in roles involving system design and optimization. Understanding these principles is undoubtedly vital for a professional engineer, as they form the foundation for ensuring efficiency and sustainability in fluid systems. The course content intersects with my career ambitions by providing a theoretical basis for real-world applications I may encounter, such as optimizing flow in manufacturing processes. I dedicated a substantial amount of time to this test, organizing it into stages of problem comprehension, calculation, and review. Reflecting on this, being more proficient with using programs like excel and how to better use it to accurately iterate and solve for the correct answer. This experience strengthens my confidence in applying fluid mechanics to both theoretical and practical problems, a testament to my growth and the relevance of this course to my engineering pursuits.