Dario Baxter

Test 2 Reflection

This test demonstrates my work towards learning the fluid dynamics in pipes and fittings, how to apply the principles of conservation of energy (Bernoulli's equation) and mass to fluid flow systems, and how to compute friction losses in pipes for a variety of configurations (series, parallel, network, etc.).

On problem 1, unfortunately I did not account for the K_{ent} but did account for all other losses. I initially tried to treat the whole thing as one system but decided to treat it as two separate systems which looks to have been the right idea. I was correct in using $Q_3 = Q_2 + Q_1$ but did not assume Q_3 and compared. My final answer ended higher than the correct answer had I accounted for K_{ent} I believe my answer would have been much closer.

On problem 2, I started out ok by using the correct equations to calculate the flow rate leaving the annulus and used the correct equation for $h_{annulus}$, but I did not treat it as a regular pipe. I used the correct equation to try and find the PVC pipe needed for the system but selected the wrong velocity to use which led to me selecting a small pipe. When determining energy loss, I failed to account for all losses and used the correct information to determine friction coefficient but tried to use the friction coefficient formula instead of the Moody chart and the coefficient I did use was written down wrong with one too many zeros. This led to my power needed being higher than the correct answer.

Most of the mistakes I made during this this test were made due to not paying closer attention to the ALL the homework solutions that are posted. After looking through those I saw that there were similar situations to these problems on this test that could have added me in not making the mistakes that I did, such as when determining which pipe to use for the fountain or including the additional friction losses that I missed. If I was taking this test again, I'd tell myself to look through all the homework solutions.

PROBLEM 1)

1. Correct application of 2 Bernoulli's + Conservation of mass? 2.5/12
2. Were all minor losses handled? 1.5/12
3. Have the equations worked out with numbers? 1/12
4. Was there an iterative procedure to solve system of eqs? 2/12
5. Was the velocity criterion checked? 1/12
6. Are the results correct? 0/12

TOTAL **8/12**

PROBLEM 2)

1. Used Bernoulli's to determine velocity to then compute Q? 2/12
2. Was the pipe sized using velocity criterion? 2/12
3. Was the pump head computed from Bernoulli's eq? 1/12
4. Were ALL energy losses included? .5/12
5. Was the annulus energy loss handled with hydraulic diam? 1/12
6. Was the pump power computed? 1/12
7. Are the results correct? 0/12

TOTAL **7.5/12**

FINAL GRADE:
(if everything is correct)
(90/2)*(8/12 + 7.5/12) = 58.125

I did not encounter any issues with completing this test. To ensure I was able to complete this test I downloaded it the day it was made available and looked it over. I started it the next day and worked on it a little everyday and reading through the book as I went along. If I could change anything it would be asking the professor more questions. There were a few parts that I did not fully understand and if I asked for clarification my test grade would have likely been much better. During this module I've learned how to calculate friction in a piping system, calculate power needed to move fluids, and calculate the flow rate of a system of pipes. Engineers use the concepts in many industries such as energy production, fire suppression systems, and plumbing. I currently work in the power industry mainly on hydro electric power plants so this knowledge will help me further understand the systems around me. I think everything I've learned so far will be very important for my professional career as my career currently involves moving lots of water. I have not yet been able to apply the concepts in work or other classes yet. I was most successful in calculating friction and friction losses though I neglected to add one in each problem, unfortunately I seemed to have regressed when compared to the first test overall. I will likely be using this course's content when installing new piping systems in hydroelectric dams. I spent a lot of time on this test, the only thing I would do differently is ask questions much sooner and not wait till the day of the due date to start questioning myself.