Test 1 Reflection

The course objection that first test of this course covered was applying the principles of Bernoulli's equation and computing head loss to design a pipe system to deliver gasoline from a tank to truck. The test also coved designing a u-tube manometer using the change in pressure for static fluids equation. Using volumetric geometry to solve how big the tank needed to be to fit certain parameters.

Part 1A:

When calculation the velocity with the flow rate equation I calculated the area by using the area of a circle equation, and the solution has the flow area of the pipe from the tables from the book therefore I got a similar but different velocity than the solutions. The next mistake I made was calculating for "f" in the pipe friction equation. I used Reynolds number and relative roughness to get the friction factor from the moody chart. The solution solved for "f" using the friction factor for turbulent flow therefore I got a different friction factor for pipe friction. With the different friction factor, velocity, and length of the pipe estimated it to be a little bit longer) the head loss for pipe friction was about 6.5% different. For the head loss of the elbow, I choose to use K constant for the 90 degrees long radius elbow (20ft) the solution is the K constant for the 90 degrees elbow (30ft) therefore giving a 6.2% different calculated value for minor losses. When solving for "h" with the Bernoulli's equation I did not account for the 0.5m length going down. Therefore, I got a value with a 7.4% difference for the depth of the gasoline for the fluid to flow at a rate of 400gmp. Things I would do differently is use the property for flow area, calculation the friction factor using the equation to get a more accurate value instead of using the moody chart and have a better understanding of which pipe fitting are being used. I could have asked question to clarify which type of elbow fitting was being used. Next time I will not neglect the vertical distance when computing for "h".

Part 1B:

I did not account how low the manometer needed to be from the tank. I used the gamma(gasoline)(h) equation to calculate the pressure at the bottom of the tank. Then I used the pressure at the bottom of the tank to figure out the maximum height different the mercury would create. I made the right side of the manometer length little bit long so it would not overflow out of the tubing. Used the volume equation to figure out how much mercury would be needed and converted it to mL. to prevent this mistake, I will account for the location of the u-tube manometer.

Part 1C:

Because I got a different value for my depth in part 1A I got a different tank diameter value than the solutions. To prevent this next time, I will use the property of flow area.

Part 2:

Some mistake I made or thing I would do different the next time would be. Graph needed more point and get better at making them. Make the excel sheet more organized. I definitely made it more complicated than it needed to be. Practice using excel more often. Remember the $ trick in excel (make life easier).

Grading I'd give myself is: 10+(80/4)*((4/8)+(3/6)+(3/4)+(4/8))=55

Issues I encounter during the was understanding what the test was asking for. To solve that issue, I got clarification from the professor.

Steps I took to complete the whole test was read the test twice. The 1st time to get an idea of what the test was asking the 2nd time was to break it down into small steps to prevent myself from getting overwhelmed. at each step I looked at what was being asked for then thought about the concept and principles that was happening how I could use them to get the desired answered.

New concept that I learned was getting a better idea how to apply what I learn in class to a real word problem.

Engineer uses this concept anytime they are designing a pipe system that needs to carry fluid for one point to another.

There is a good chance I will use this in my future since fluids are everywhere. How and when I will use this information, I can't exactly say right now since mechanical engineering is a broad topic, but doing something in fluid mechanics is one of my top choices.

I have not been able to apply Fluid Mechanics topics in my job since I am a designer for hull structure. But I have seen similarities in the course with others like thermodynamics and strength and material.

I feel like this test helped me improve my confidence in applying what I learned in class to the real word not just solve the academic problem textbook give.

I see this course intersecting in my career if I'm going to have to design system that deals with fluids.

I spent about 16 hours on the test over the course of 3 days. The process if the test in general took some time to think about and write out. The most time was trying to connect what I learned in class and how it could be used on this test. I believe the time that was used on this test was organized. Not sure what I would do differently as far as time for the test. One thing I could do is limit the amount of distraction by locking my cats out of the room or have a be more familiar of were the properties are in the book.