3.13 Review

- Don’t forget the pressure forces on your C.V.!

- 1-D approximation is great - are there any issues? Yes - the momentum flux correction factor.

3.13.1 Angular Momentum Example 2 – Pipe Section and Bracket Torque

Consider the following pipe section and supporting bracket:

What is the reaction torque at the bracket wall mounting point (A)? You may assume the fluid in the pipe is constant density and the surrounding environment is at atmospheric pressure.

How do we draw the control volume?

What is the equation?

What is $\sum(\vec{r} \times \vec{F})_{CV}$?

What are the pressure forces?
\[ T_A = h_2(A_2 + \dot{m}V_2) - h_1(A_1 + \dot{m}V_1) \quad \text{or since } \dot{m} = \rho Q = \rho A_1V_1 = \rho A_2V_2 \]

\[ T_A = h_2A_2(P_2 + \rho V_2^2) - h_1A_1(P_1 + \rho V_1^2) \]