ENSC-283

Assignment #2

Assignment date: Monday Jan. 19, 2009

Due date: Monday Jan. 26, 2009

Problem1: (hydrostatic force on a plane circular surface)

The 4-m diameter circular gate of Figure 1 is located in the inclined wall of a large reservoir containing water ($\gamma = 9.80\ kN/m^3$). The gate is mounted on a shaft along its horizontal diameter, and the water depth is $10\ m$ above the shaft. Determine:

(a) The magnitude and location of the resultant force exerted on the gate by the water.
(b) The moment that would have to be applied to the shaft to open the gate.

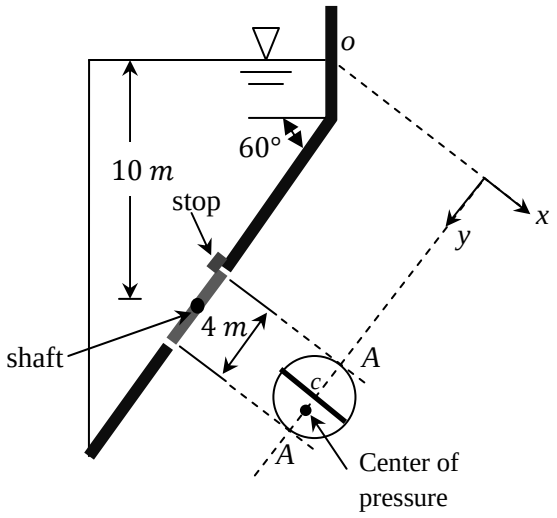

Figure 1 large reservoir of water

Problem2: (use of the pressure prism concept)

A pressurized tank contains oil ($SG = 0.90$) and has a square, $0.6\,m \times 0.6\,m$ plate bolted to its inside, as illustrated in Figure 2. The pressure gage on the top of the tank reads $50\ kPa$, and the outside of the tank is at atmospheric pressure. What is the magnitude and location of the resultant force on the attached plate?

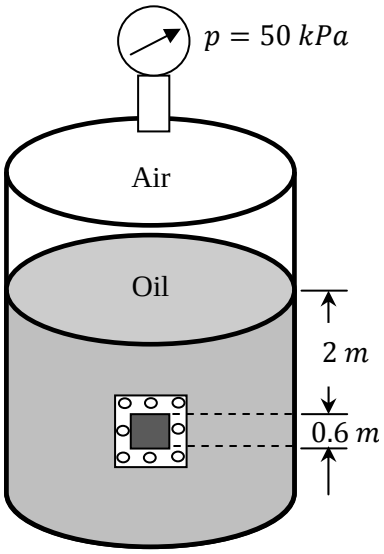

Figure 2 pressurized tank