CE 3305 Engineering Fluid Mechanics
Exercise Set 6
Summer 2018 – GERMANY

Purpose : Application of static pressure to find forces on submerged plates.
Assessment Criteria : Completion, plausible solutions, use **R** as a calculator.

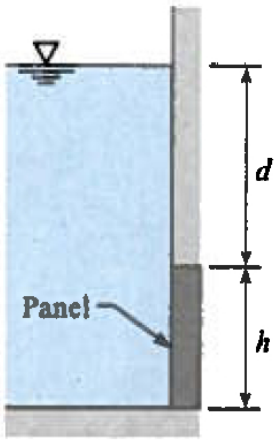
Exercises

1. (Problem 3.70 pg 103) Figure 1 is a schematic of a panel at the bottom of a tank filled with water. The panel is square. The distance from the free surface to the top of the panel is $d = 1$ m, and $h = 2$ m.

   a) Calculate the depth of the centroid.

   b) Calculate the resultant force on the panel.

   c) Calculate the distance from the centroid to the center of pressure (CP).



PROBLEM 3.70

Figure 1: Panel at bottom of a tank

2. (Problem 3.74 pg 104) Figure 2 is a schematic of a hinged gate with the hinge at the waterline. The gate is 4 ft high and 8 ft wide. The specific weight of water is 62.4 lbf/ft^3 Find the required force (in lbf) applied at the bottom of the gate to keep it shut.

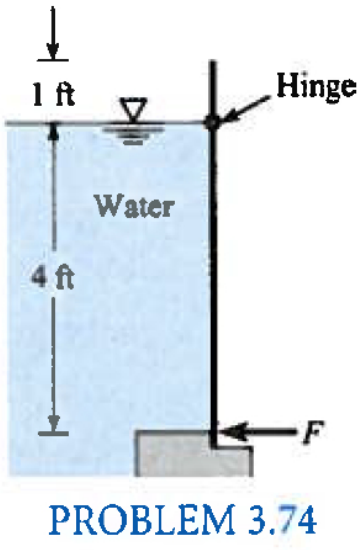


Figure 2: Hinged gate.