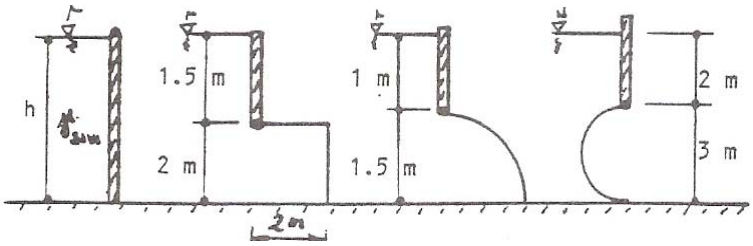
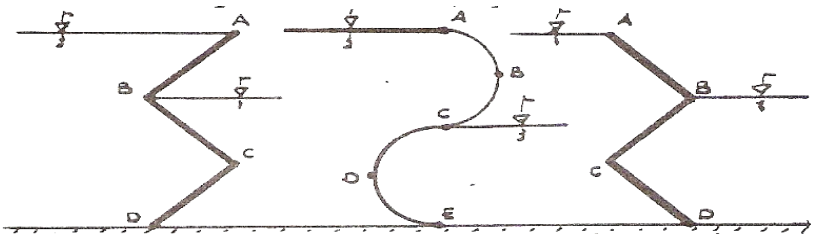
Hydrostatic Pressure Forces

Exercise 1: Determine the horizontal and vertical forces acting on the surfaces below the joints (Computations will be made for the unit width of the wall).

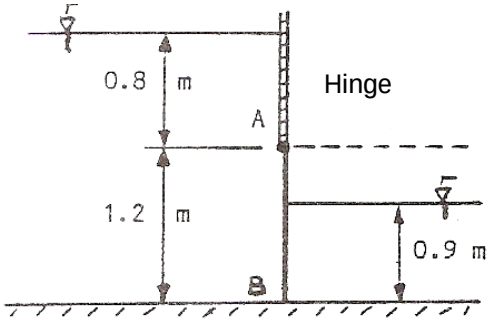


Exercise 2: Show on the figure below, the horizontal and vertical forces acting on the surfaces ABCD and ABCDE.



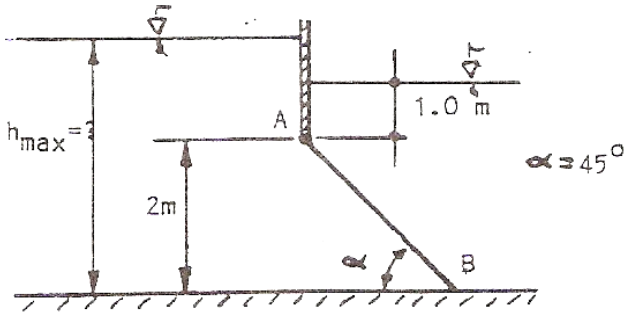
Exercise 3: Gate AB shown in the figure below is 2 m wide and hinged at the point A. Determine the magnitude and direction of the force that is exerted at the point B in order to hold the gate closed for the cases listed below.

- Left and right parts are filled with water.
- Left and right parts are filled with oil (γ_{oil}=0.8 t/m^3).



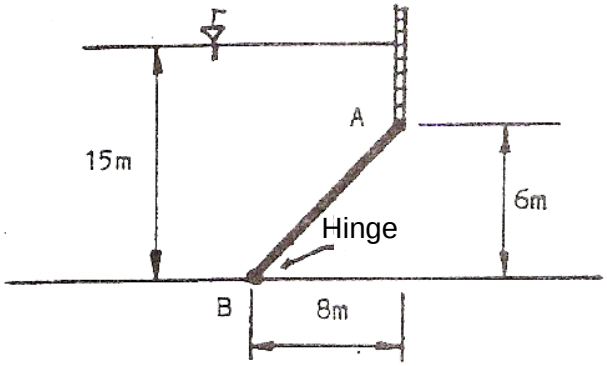
Exercise 4: The gate AB with a weigth of 40 t, shown in the figure on the right, is 4 m wide and hinged at the point A.

Determine the maximum water height at the left side of the gate that will keep its lower edge at the point B.



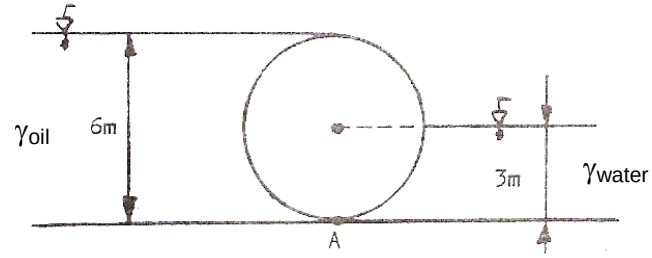
Exercise 5: The gate AB, shown in the figure on the right, has a width of 5 m. It is hinged at the point B and is supported by the smooth wall at the point A.

- Determine the magnitude and application point of the resultant pressure force.
- Determine the reaction force at the point A.

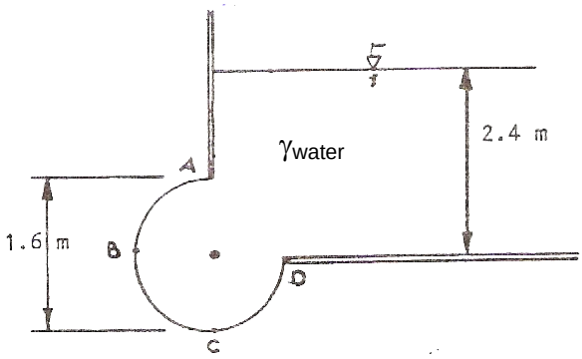


Exercise 6: A cylindrical barrier blocks a certain volume of oil (γ_{oil}=0.8 t/m³) as shown in the figure. Considering that the width of the cylinder is 1 m:

- Compute the vertical and horizontal components of the hydrostatic pressure force acting on the cylinder.
- Determine the resultant force and the coordinates of its application point relative to the point A.



Exercise 7: Determine the vertical and horizontal components of the hydrostatic force acting on the curved ABCD surface shown in the figure below by taking its width as 3 m.



Exercise 8: Compute the components of the net force acting on the semicylindrical ABC surface shown in the figure below. The width of the system is for a 5 m.