
Quiz 1

Problem 1 The 4-m-diameter square gate shown is located in the inclined wall of a large

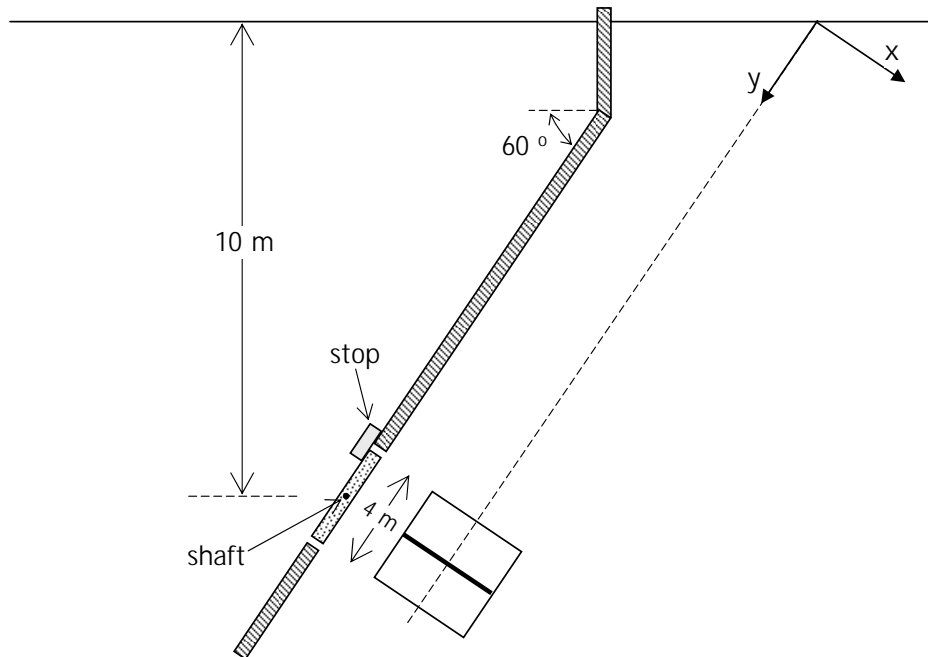


Figure 1: Problem 1.

reservoir containing water ($\gamma = 9.8 \text{ kN/m}^3$.) The gate is mounted on a shaft along its horizontal axis. For a water depth of 10 m above the shaft, determine:

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

Problem 2 Water flows through a horizontal, 180° pipe bend as shown above. The flow

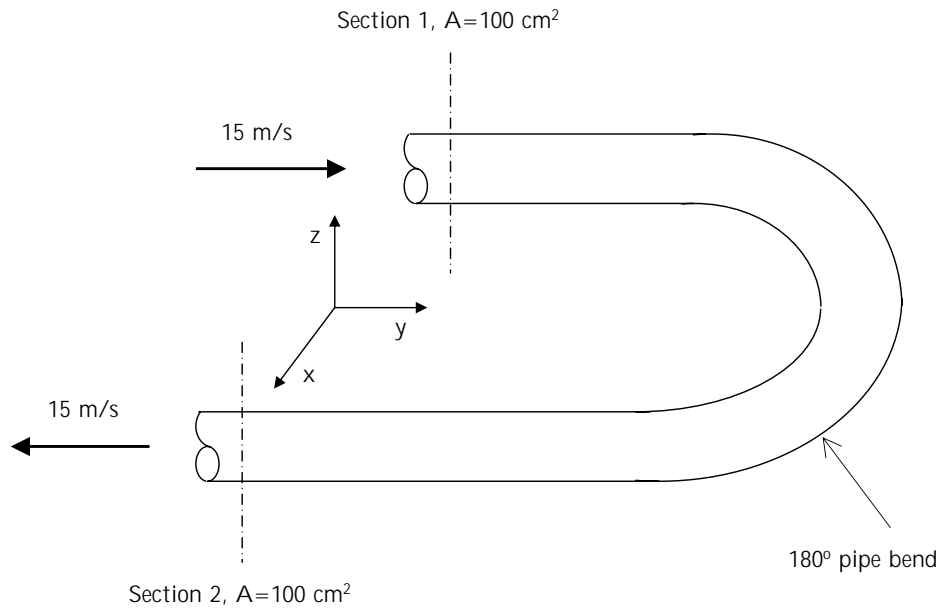


Figure 2: Problem 2.

cross-sectional area is constant at 100 cm^2 through the bend. The flow velocity everywhere in the bend is axial and 15 m/s . The absolute pressures at the entrance and exit of the bend are 207 kPa and 165 kPa respectively. Calculate the horizontal (x, y) components of the anchoring force required to hold the bend in place.