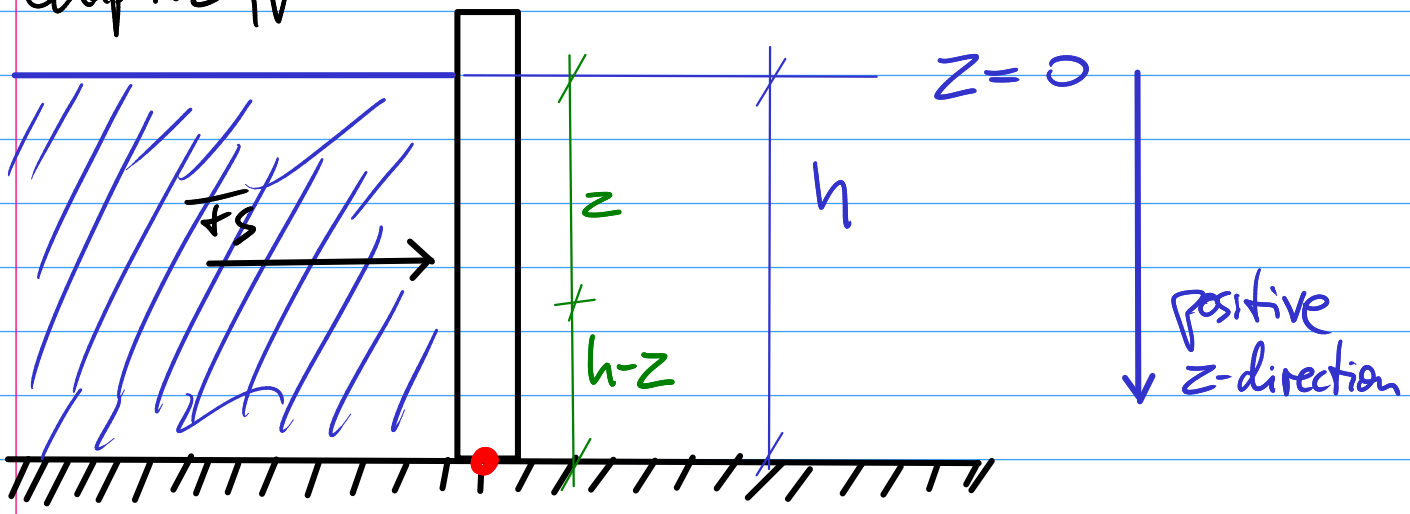
Chapt. 2, p. 26



Question: What's wrong with the calculation on page 26?

$dM = z\,dF_S$ means

z is the lever ... turning point is at the water's surface!

⇒ That's odd, if not wrong!

Correct lever with respect to (wrt.) bottom of wall! • at z=h

lever is $h-z$

⇒ $dM = (h-z)\,dF$

(please turn over leaf)

p.t.o.

Chapt 2, p.26 (continued = cont'd)

$$M_S = \int dM = \int_F (h-z)\,dF$$

$$= \int_A (h-z)\,\rho g z\,dA = \int_0^h (h-z)\rho g z \nabla B\,dz$$

$$= \int_0^h h\rho g \nabla B z - \rho g \nabla B z^2\,dz$$

$$= \left[h\rho g \nabla B \frac{z^2}{2}\right]_0^h - \left[\rho g \nabla B \frac{z^3}{3}\right]_0^h$$

$$= h\rho g \nabla B \frac{h^2}{2} - \rho g \nabla B \frac{h^3}{3}$$

$$= \rho g \nabla B \frac{h^3}{6} = \rho g A \frac{h^2}{6} = M_S$$

$$M_S = (h - z_S) F_S$$

correct lever ~~for~~ this coordinate system!
⇒ correct z-coordinate of substitution pt.

$$= hF_S - z_S F_S$$

$$\Rightarrow \frac{M_S - hF_S}{-F_S} = z_S$$

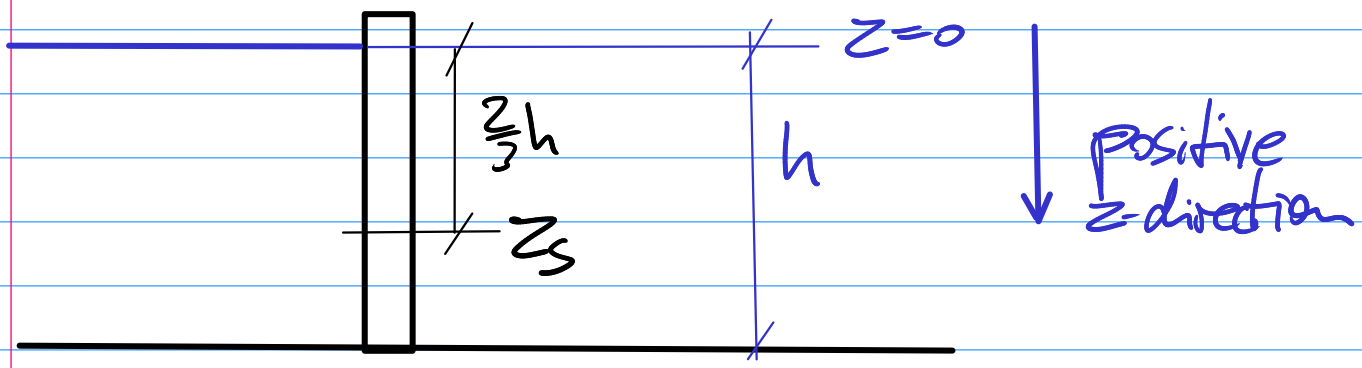
p.t.o.

Chap 2, p. 26 (cont'd)

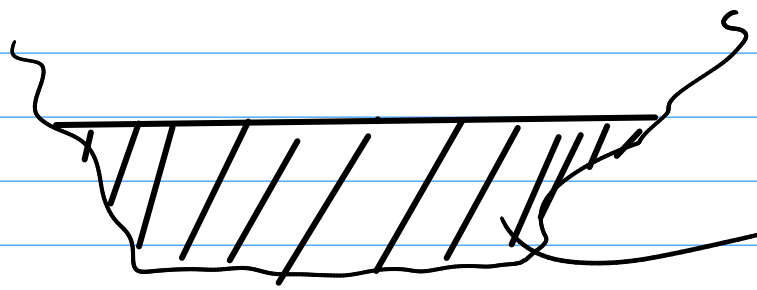
$$\frac{hF_s - M_s}{F_s} = z_s$$

$$\Rightarrow z_s = h - \frac{M_s}{F_s} = h - \frac{\rho g A \frac{h^2}{6}}{\rho g A \frac{h}{2}}$$

$$= h - \frac{1}{3}h = \frac{2}{3}h$$



Generally difficult because of the shape of the wall!



area for integration!

⇒ a mess.

Chap. 2, p. 33

$$p(z) = p_0 e^{\frac{zg}{R_i T_0}}$$

$$\Rightarrow \quad \frac{p(z)}{p_0} = e^{-\frac{zg}{R_i T_0}}$$

$$\Rightarrow \quad \ln\left(\frac{p(z)}{p_0}\right) = -\frac{zg}{R_i T_0}$$

$$\Rightarrow \quad z = -\frac{R_i T_0}{g} \ln \frac{p(z)}{p_0}$$