

Del B Ing 150 Lösningstipslag Vår 2021

1) $P = 4000 \times 1,7 \times 0,0981 = 667 \text{ bar} = 6670000 \text{ Pa}$
 $667 \times 14,5 = \underline{9672 \text{ psi}}$

2) a) $P_{\text{perc}} = 300 + 0,3 \cdot 2500 \cdot 0,0981 = \frac{374 \text{ bar}}{111}$
 1 sg: $\frac{374}{2500 \cdot 0,0981} \approx \underline{1,535 \text{ sg}}$

2b) 4 tommer = $4 \times 0,0254 = 0,1016 \text{ m}$

Trykkræft = $P \cdot A = 300 \cdot 10^5 \cdot \frac{\pi}{4} (0,1016)^2 = 243096 \text{ N}$

$F = \text{Trykkræft} + \text{friction} = 243096 \text{ N} + 2000 \text{ N} = \underline{245096 \text{ N}}$

$m \cdot g = F, m = \frac{F}{g} = \frac{245096}{9,81} = 24984 \text{ kg} \approx \underline{25 \text{ ton}}$

3) $P_{1250} = 120 + (1250 - 860) \cdot 0,85 \cdot 0,0981 = 152,5 \text{ bar}$
 $\rho_{\text{slam}} = \frac{(152,5 + 10)}{1250 \cdot 0,0981} = \underline{1,32 \text{ sg}}$

4) a) $\frac{P \cdot V}{T} = \text{konstant} \quad V_2 = \frac{P_1 \cdot V_1 \cdot T_2}{T_1 \cdot P_2} = \frac{150 \cdot 0,5 \cdot (30 + 273)}{(80 + 273) \cdot 1} = \underline{68,2 \text{ m}^3}$



b) Areal på riser: $\frac{\pi}{4} \cdot (19 \times 0,0254)^2 = 0,1828 \text{ m}^2$

$h = \frac{V}{A} = \frac{68,2 \text{ m}^3}{0,1828 \text{ m}^2} = \underline{373 \text{ meter}}$

5) a) $\sigma = \frac{T}{A} = \frac{316,610 \cdot 10^3 \text{ N}}{3901/106 \text{ m}^2} = \underline{929138489 \text{ Pa}} \cdot \underline{930902676 \text{ Pa}}$

(Test ~~929138489 Pa = 9291,4 bar = 9291,4 \times 14,5~~

Test $\rightarrow \text{Pa} \rightarrow \text{Psi}$

$\frac{930902676 \text{ Pa} \cdot 14,5}{10^5} \approx 134980$

$\approx \underline{135000 \text{ psi}}$

Steel grade S-135

$\approx \underline{135000 \text{ psi}}$

5b) $T = 0,9 \times T_0 - M_0 P$

$= 0,9 \cdot 316,6 \cdot 10 \cdot 10^3 \text{ N} - 70000 \text{ kg} \cdot 9,81 = 2162700 \text{ N}$

$g \cdot m \cdot b \cdot l = T$

$l = \frac{T}{m \cdot b \cdot g}$

$\frac{2162700 \text{ N}}{31,06 \cdot (1 - \frac{1,5}{7,85}) \cdot 9,81} = \underline{8775 \text{ meter}}$

5c) Bruke en 5" tom
 rørstørrelse med
 større gods tykkelse
 Føles en
 5" 25.6 Class New
 Steel grade S135.