

PV - Tie Rods

Bolt Safety

10/25/13

Req: Find size, number & tensile stress in Tie Rods
for PV.

Given: $\frac{1}{2}$ - 20 UNF Tie Rods $\Rightarrow A_t = .1599 \text{ in}^2$

Assume: 6 ea & 5:1 safety factor

Sol: $\phi 5.931$ End Cap Subject To Pressure.

Force on end Cap @ 150 psi

$$F = (150 \text{ psi}) \frac{\pi}{4} (5.931)^2 = \underline{\underline{4,144 \text{ lbf}}}$$

Stress in Tie Rod

$$\sigma_t = \frac{F}{NA_t} = \frac{4,144}{6(.1599)} = 4,319 \text{ psi}$$

@ 5:1 $\Rightarrow \underline{\underline{21,598 \text{ psi OK}}}$