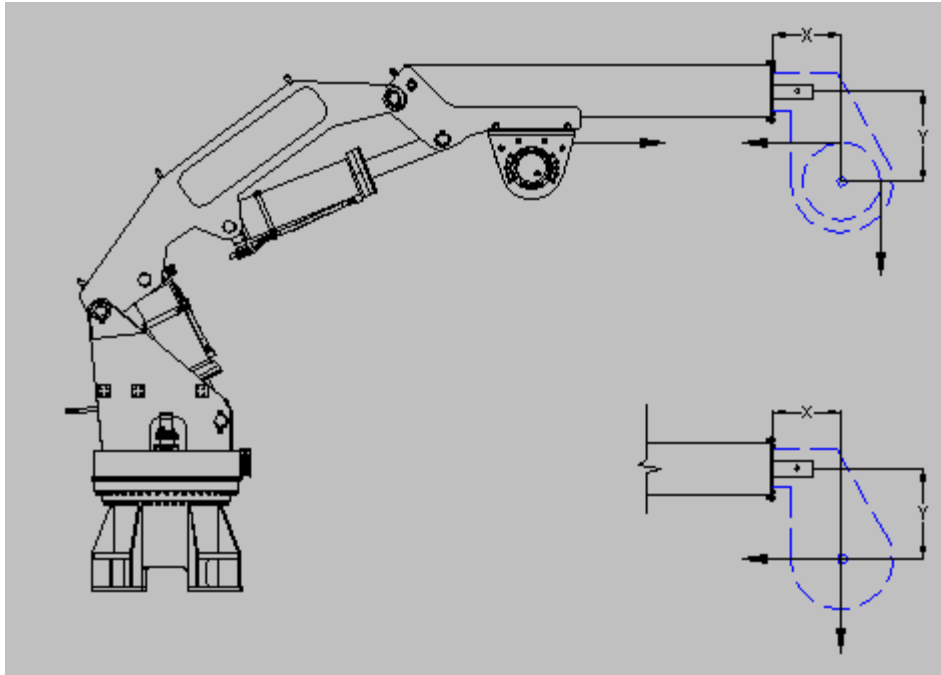


DOCKING HEAD MOUNTING CALCULATIONS

CALCULATIONS BY: JOEL DILLE
FEB 4, 2009

GIVEN:



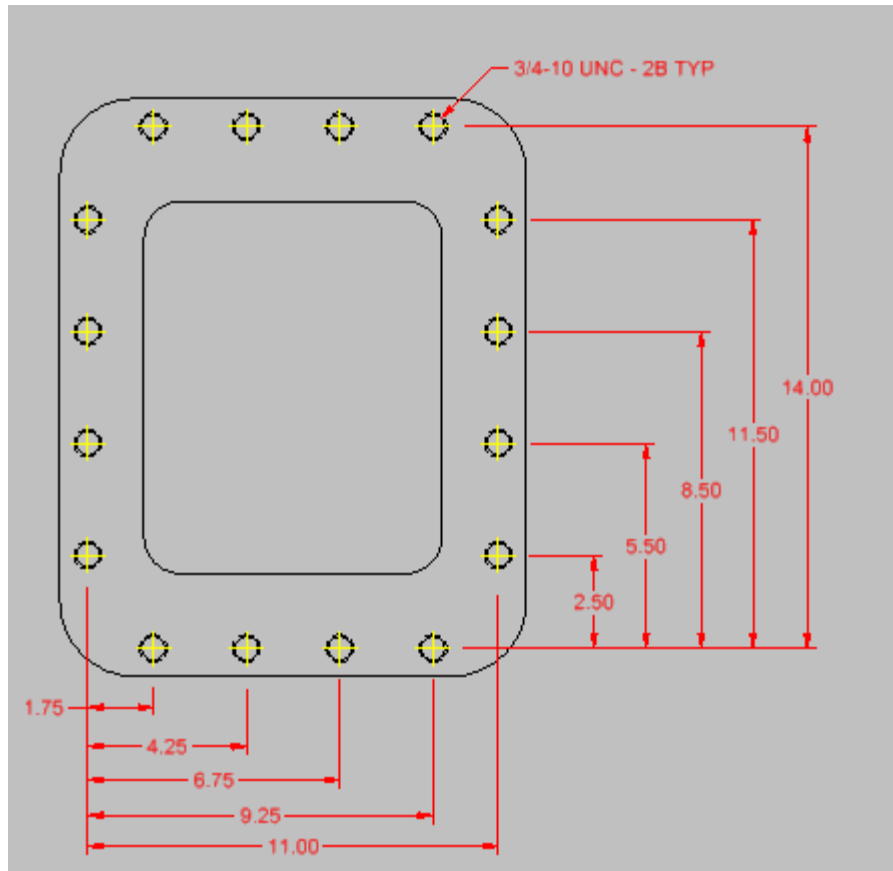
$X := 9 \cdot \text{in}$

$Y := 29 \cdot \text{in}$

$\text{HEAD_WEIGHT} := 2300 \cdot \text{lbf}$

$\text{LINE_TENSION} := 23780 \cdot \text{lbf}$

TASK -- REPLACE THE STUB WITH A BOLT ON FLANGE



$$\text{MOMENT_FLANGE} := \text{LINE_TENSION} \cdot Y + (\text{LINE_TENSION} + \text{HEAD_WEIGHT}) \cdot X$$

$$\text{MOMENT_FLANGE} = 924340 \cdot \text{in} \cdot \text{lbf}$$

$$\text{CLAMP_LOAD} := 30300 \cdot \text{lbf}$$

clamp load of a 3/4"NC grade 8 hex head capscrew
lubricated torque = 340 ft-lbf
Never Seize torque = 230 ft-lbf

$$\text{FACTOR_OF_SAFETY_CAPSCREWS} := \frac{\text{CLAMP_LOAD} \cdot [4 \cdot (14 \cdot \text{in}) + 2 \cdot 11.5 \cdot \text{in} + 2 \cdot 8.5 \cdot \text{in} + 2 \cdot 5.5 \cdot \text{in} + 2 \cdot 2.5 \cdot \text{in}]}{\text{MOMENT_FLANGE}} = 3.7$$

$$\text{INERTIA_WELD} := (.375 \cdot \text{in}) \cdot \left[\frac{(12 \cdot \text{in})^2}{6} \cdot ((3 \cdot 9 \cdot \text{in} + 12 \cdot \text{in})) \right] = 351 \cdot \text{in}^4$$

$$\text{WELD_STRESS} := \frac{\text{MOMENT_FLANGE} \cdot 6 \cdot \text{in}}{\text{INERTIA_WELD}} = 15801 \cdot \text{psi}$$

$$\text{FACTOR_OF_SAFETY_WELD} := \frac{70000 \cdot \text{psi}}{\text{WELD_STRESS}} = 4.4$$