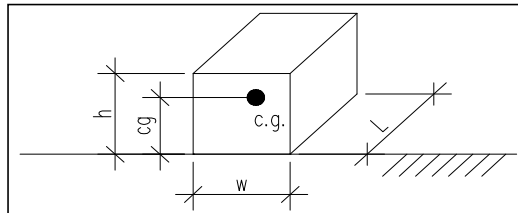## IE2-399 BOILER SEISMIC ANCHORAGE (ASCE 7-05)
Slab on Grade Applications Only

Equipment Parameters:

weight, W_p = 309.00 LBS.
w = 23.600 in.
L = 23.600 in.
h = 45.670 in.
cg = 23.310 in.

Seismic Parameters:

S_S = 1.798 ASCE 7-05 Figure 22-1)   Site Class = B

a_p = 1.000 (ASCE 7-05 Table 13.6-1)

I_p = 1.000 (ASCE Table 11.5-1)   Seismic Use Group = II

R_p = 2.500 (Default value for Anchorage per ASCE 7-05 Table 13.6-1)

F_a = 1.000 (ASCE 7-05 Table 11.4-1)

$S_{MS} = F_a * S_s$ = 1.798 (ASCE 7-05 Eqn. 11.4-1)

$S_{DS} = 2/3 * S_{MS}$ = 1.199 (ASCE 7-05 Eqn. 11.4-3)

Seismic Design Category = D

Seismic Force:

$F_p = (0.4 * a_p * S_{DS} * W_p)/(R_p/I_p)$ = 59.3 LBS. (ASCE 7-05 Eqn. 13.3-1)

Upper Limit: $F_{pMAX} = 1.6 * S_{DS} * I_p * W_p$ = 592.6 LBS. (ASCE 7-05 Eqn. 13.3-2)

Lower Bound: $F_{pMIN} = 0.3 * S_{DS} * I_p * W_p$ = 111.1 LBS. (ASCE 7-05 Eqn. 13.3-3)

$F_{p, DESIGN}$ = 111.1 LBS.

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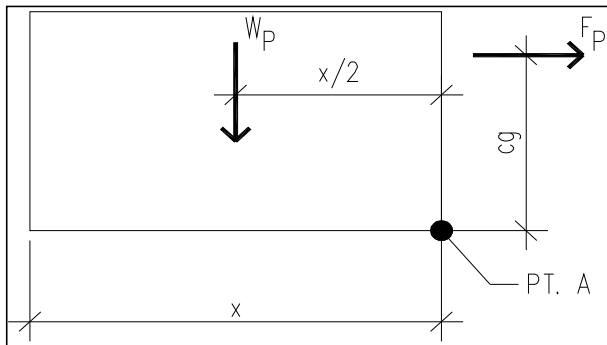Date: 5/5/2015
Engineer: XXX

IE2-399 BOILER SEISMIC ANCHORAGE (ASCE 7-05)

Design Anchorage Force:

Horizontal Shear Force Per Anchor:

$$R_H = F_p/4 = \boxed{27.8} \text{ LBS.}$$

Overturning Resistance About Point A:

$$x = \boxed{23.60} \text{ in.}$$
$$x = \text{lesser of L or W}$$

$$M_{OT} = F_p * cg = \boxed{215.8} \text{ LBS.-FT.}$$

$$M_{RES} = W_p * x/2 = \boxed{303.9} \text{ LBS.-FT.} \quad \textbf{OK, No Uplift}$$

Vertical Acceleration: assume $\rho = 1.0$

$$E_v = \rho * F_p + 0.2 * S_{DS} * W = \boxed{101.9} \text{ LBS. (ASCE Section 13.3.1)}$$

$$R_{VNETUP} = (M_{OT}/(2*x)) - (W_p/4) + (E_v/4) = \boxed{0.0} \text{ LBS.} \quad \textbf{No Uplfit}$$

Force Summary Per Corner:
     Component Anchorage:

$$R_{HNET} = \boxed{27.8} \text{ LBS.}$$
$$R_{VNETUP} = \boxed{0.0} \text{ LBS.}$$

    Anchors Embedded in Concrete or CMU:

$$1.3 * R_p * R_{HNET} = \boxed{90.3} \text{ LBS.}$$
$$1.3 * R_p * R_{VNETUP} = \boxed{0.0} \text{ LBS.}$$