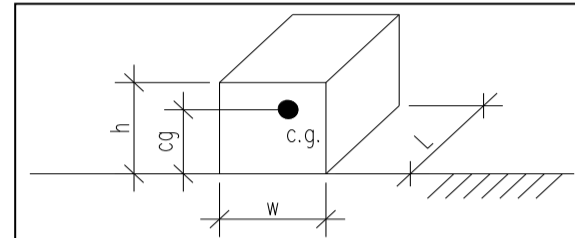Project: XXX
Date: 6/23/2020
Engineer: XXX

RBI TORUS 3000 INDOOR DUAL FUEL VERTICAL - SEISMIC ANCHORAGE (ASCE 7-16/IBC 2000)
Slab on Grade Applications Only

Equipment Parameters:

weight, W_p =	2091.98	LBS.
w =	44.06	in.
L =	86.72	in.
h =	92.03	in.
cg =	34.00	in.

Seismic Parameters:

S_S =	1.800	ASCE 7-16 Figure 22-1 using 84th percentile value
a_p =	1.000	(ASCE 7-16 Table 13.6-1)
I_p =	1.500	(ASCE 7-16 Table 13.1.3)

Site Class = D

Seismic Use Group = IV

R_p =	1.500	(Default value for Anchorage per ASCE 7-16 13.6-1)
F_a =	1.032	(ASCE 7-16 Table 11.4-1)
$S_{MS} = F_a * S_s$ =	1.858	(ASCE 7-16 Eqn. 11.4-1)
$S_{DS} = 2/3 * S_{MS}$ =	1.239	(ASCE 7-16 Eqn. 11.4-3)

Seismic Design Category = **D**

Seismic Force:

|		
$F_p = (0.4 * a_p * S_{DS} * W_p)/(R_p/I_p)$ =	1036.7	LBS. (ASCE 7-16 Eqn. 13.3-1)
Upper Limit: $F_{pMAX} = 1.6 * S_{DS} * I_p * W_p$ =	6220.4	LBS. (ASCE 7-16 Eqn. 13.3-2)
Lower Bound: $F_{pMIN} = 0.3 * S_{DS} * I_p * W_p$ =	1166.3	LBS. (ASCE 7-16 Eqn. 13.3-3)

$F_{p, DESIGN}$ = 1166.3 LBS.

RBI TORUS 3000 INDOOR DUAL FUEL VERTICAL - SEISMIC ANCHORAGE (ASCE 7-16/IBC 2000)

<u>Design Anchorage Force:</u>

Horizontal Shear Force Per Anchor:

$$R_H = F_p/4 = \boxed{291.6} \text{ LBS.}$$

Overturning Resistance About Point A:
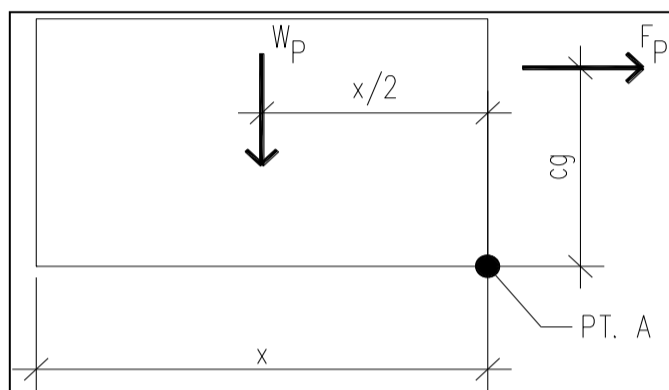
$$x = \boxed{86.71875} \text{ in.}$$
$$x = \text{lesser of L or h}$$

$$M_{OT} = F_p*cg = \boxed{39655.1} \text{ LBS.-FT.}$$

$$M_{RES} = W_p*x/2 = \boxed{90706.9} \text{ LBS.-FT.} \quad \textbf{OK, No Uplift}$$

Vertical Acceleration: assume $\rho = 1.0$

$$Ev = \rho*Fp + 0.2*S_{DS}*W = \boxed{809.9} \text{ LBS. (IBC Eqn. 1617.1.1)}$$

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

<u>Force Summary Per Corner:</u>
    <u>Component Anchorage:</u>

$$R_{HNET} = \boxed{291.6} \text{ LBS.}$$
$$R_{VNETUP} = \boxed{0.0} \text{ LBS.}$$

    <u>Anchors Embedded in Concrete or CMU:</u>

$$1.3*R_p*R_{HNET} = \boxed{568.6} \text{ LBS. (IBC 1617.1.7 #2)}$$
$$1.3*R_p*R_{VNETUP} = \boxed{0.0} \text{ LBS. (IBC 1617.1.7 #2)}$$