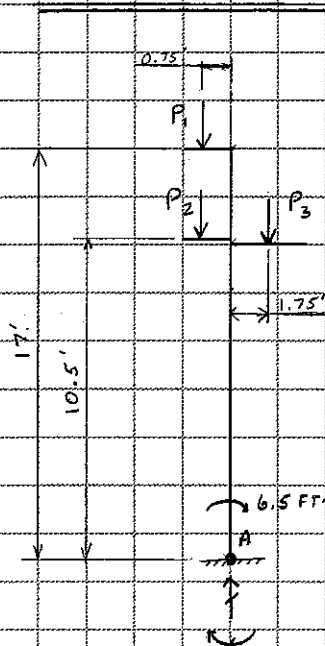




PART B PS-61809

B.1 DESIGN LOADS/REACTIONS

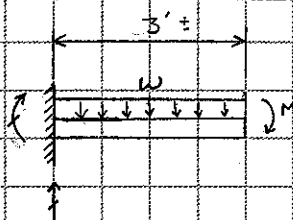


ITEM	DESCRIPTION	PIPE	FLUID	INSUL	TOTAL	x SPA	TOTAL
P ₁	6" Ø	19	-	-	19	17	323#
P ₂	2" Ø W/1" INSUL	4	1	1	6	17	100#
P ₃	14" Ø W/4" INSUL	63	-	10	73	17 + 1240#	
							ΣV = 1663#
							≤ 1.7"

$$\Sigma H = 0 \text{ (NO WIND, INSIDE BLDG)}$$

$$\Sigma M_A = -0.323(17') - 0.1(10.5) + 1.24(10.5) = 6.5 \text{ FT-K}$$

B.2 BEAM DESIGN



$$W = 1.24 \text{ K} / 3' = 0.413 \text{ K/FT}$$

$$M_{max} = WL^2/8 = 0.413(3^2)/8 = 0.47 \text{ FT-K}$$

$$F_b = 0.6 F_y = 0.6(36) = 21 \text{ KSI}$$

$$S_{REQ'D} = \frac{M}{F_b} = \frac{0.47 \times 12}{21} = 0.27 \text{ IN}^3$$

TRY L4x4x3/8

$$S = 1.50 \text{ IN}^3$$

$$f_b = \frac{M}{S} = \frac{0.47(12)}{1.50} = 3.76 \text{ KSI} \leq F_b = 21 \text{ KSI} \text{ OK} \checkmark$$

BY INSPECTION, USE FOR ALL BEAMS

USE L4x4x3/8

B.3 COLUMN DESIGN

$$P_{max} = 1.7" + (27.41" \times 17') = 2.2"$$

$$M_{max} = 6.5 \text{ FT-K}$$

SLENDERNESS RATIO

$$\frac{KL}{r} = 2.1(17)(12)/2.28 = 188 < 200 \text{ OK} \checkmark$$

$$f_a = \frac{P_{max}}{A} = \frac{2.2}{7.58} = 0.29 \text{ KSI}$$

$$F_a = 4.25 \text{ KSI}$$

$$f_b = \frac{M}{S} = \frac{6.5(12)}{13.2} = 5.91 \text{ KSI}$$

$$F_b = 0.6 F_y = 0.6(46) = 27 \text{ KSI}$$

$$(f_a/F_a) + (f_b/F_b) \leq 1.0$$

$$0.07 + 0.22 \leq 1.0$$

$$0.29 \leq 1.0 \text{ OK} \checkmark$$

TRY HSS 6x6x3/8

$$S = 13.2 \text{ IN}^3$$

$$A = 7.58 \text{ IN}^2$$

$$r = 2.28 \text{ IN}$$

USE HSS 6x6x3/8