CVL CONSULTANTS

Project Name/Number NFPA 24 T.B. Calcs

Date 11/06/19

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Telephone Log

Meeting Record

Calculations

Other

$A_b = (h)(b) = \frac{T(S_f)}{(S_b)}$

A_b = required block area (ft^2)
h = block height (ft)
b = block width (ft)
T = thrust force (lb)
S_f = safety factor 1.5
S_b = bearing strength (lb/ft^2)

Per table A.10.6.1(a), NFPA 24
6" PIPE @ 100 psi:
T = 3,739 lbf
Dead end/TEE

$T_{90°}$ = 5,288 lbf

$T_{45°}$ = 2,862 lbf

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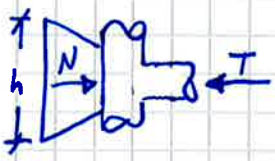
S_b = 2,000 lb/ft^2 per geotech report p.10 by Pickering Cole + Himes 12/15/16

TEE

PER NFPA 24 A.10.6.1a



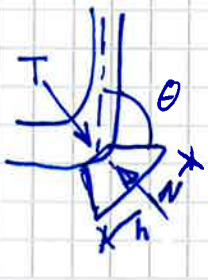
$N = S_b(h^2) \geq T$ $A = h^2 = \frac{T(S_f)}{S_b}$

$2000\ lb/ft^2 (h^2) = 3,739\ lb$

$h^2 = 1.87\ ft^2 \times S_f{=}1.5 = 2.8\ ft^2$ USE $3.0\ ft^2$

$h = 1.73$ ft

90°



$T = 5,288$ lb S_f = Factor of safety = 1.5

$N = S_b(h^2) \geq T$

$2,000\ lb/ft^2 (h^2) = 5,288$ lbf

$h^2 = 2.64 (S_f) = 3.97\ ft^2$ USE $4\ ft^2$

$h = 2$ ft

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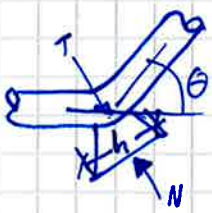
45°



Per NFPA 24 A.10.6.1(a)

$T = 2,862$ lb

Per NFPA 24 A.10.6.1a

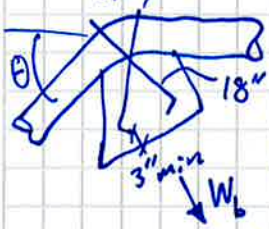
$A = h^2 = \frac{T(S_f)}{S_b} = \frac{2862^{lb}(1.5)}{2000\ lb/ft^2} = 2.15\ ft^2$ use $2.25\ ft^2$

$S_f = 1.5$ safety factor

$S_b = 2,000\ lb/ft^2$ per geotech report

$h = 1.5$ ft

45° Gravity

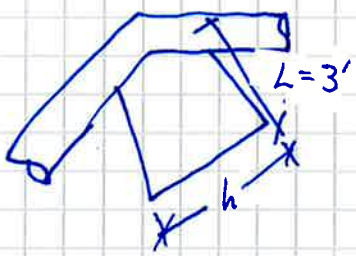


#5 Epoxy coated rods w/ 4" L" Anchor over Fabry embedded 18" in Concrete gravity thrust block

Min strength concrete of 3,000 psi

$\gamma_{conc} = 150\ lb/ft^3$

$W_b \geq T$



Per NFPA A.10.6.1c

$V_g = \frac{S_f P A \sin\theta}{W_m} = \frac{1.5(100\ lb/in^2)(28.27\ in^2)\sin 45}{150\ lb/ft^3} = 24.1\ ft^3$

V_g = block volume ft^3

S_f = safety factor 1.5

P = Water pressure, assume 100 psi

A = area of pipe $= \frac{\pi D^2}{4} = 28.27$ in

γ_{conc} = density of concrete 150 lb/ft^3

use $27\ ft^3$ or 1 CY

L = 3' h = 3'

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