

New Granite Gravity Retaining Wall Calculations - 39 Oaklawn Rd Peaks Island Page 1

New Granite Gravity Retaining Wall

- Assumptions:
- 1,500 psf Bearing Pressure (Allowable)
 - 40 pcf Eg. Fluid pressure on ret. walls
 - 0.60 Coeff of friction - Granite to Granite
 - 0.50 Coeff of friction - Granite to Cr. stone
 - 160 pcf = weight of Granite
 - 300 pcf = Passive soil pressure

→ Wall Fully backfilled ⇒ Wave force not considered

Granite block Dimensions = 18" x 30"

⇒ Weight of block = 1.5' x 2.5' x .160 kcf = 0.6 kcf

Weight of wall 6 blocks high = 3.6 kcf

W/total stone load @ heel of base

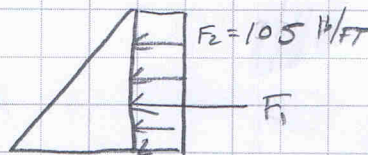
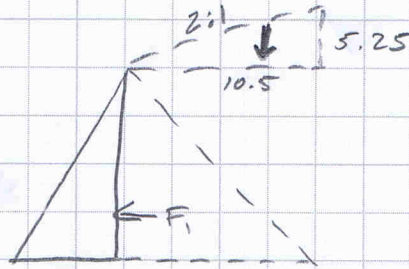
stone = 3.6 kcf @ 2.5' width

⇒ 3.6 / 2.5 = 1.44 ksf

SLIDING CHECK

$$F_1 = (10.5)^2 (.5) (40) = 2205$$

$$F_{2,10.5} = (10.5)(5.25)(.5)(40) = 1103$$



@ 1.5' below top

$$SR = (600 \text{ p/f})(.6) = 360 \text{ p/f}$$

$$F = (1.5)^2 (.5) (40) + 1.5(105) = 158.6 \text{ p/f}$$

$$\frac{360}{1.5} = 240 \geq 158.6 \Rightarrow \text{OK}$$

@ 3' Below Top

$$SR = 2(600)(.6) = 720$$

$$F = (3)^2 (.5) (40) + 3(105) = 495$$

$$\frac{720}{1.5} = 480 \leq 495 \Rightarrow \text{PIN}$$

@ 5.5' Below Top

$$SR = 3(600)(.6) = 1080$$

$$F = (5.5)^2 (.5) (40) + 5.5(105) = 1183$$

$$\frac{1080}{1.5} = 720 \leq 1183 \Rightarrow \text{PIN}$$

@ 9' Below Top

$$SR = 6(600)(.6) = 2160$$

$$F = (9)^2 (.5) (40) + 9(105) = 2565$$

$$\frac{2160}{1.5} = 1440 \leq 2565 \Rightarrow \text{PIN}$$

@ 10.5' Below Top

$$F = (10.5)^2 (.5) (40) + 10.5(105) = 3308$$

$$\Rightarrow SR \geq 3308(1.5) = 4962$$

New Granite Gravity Retaining Wall Calculations - 39 Oaklawn Rd Peaks Island Page 3

Rear Stone $L = 4'$

$$SR = [7(600) + 960 + 3263](.5) = 4212.16$$

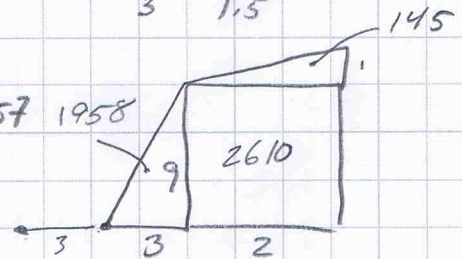
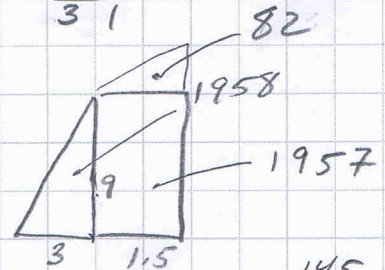
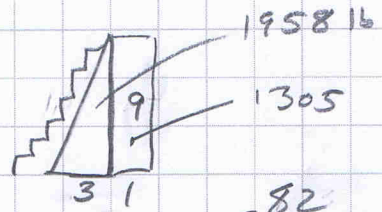
$L = 4.5'$

$$SR = [7(600) + 1080 + 3996](.5) = 4638$$

$L = 5'$

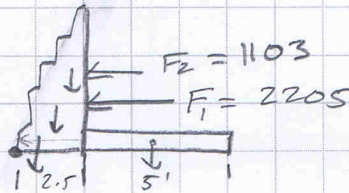
$$SR = [7(600) + 1200 + 4713](.5) = 5057$$

$$\frac{5057}{1.5} = 3371 \geq 3308 \Rightarrow \text{OK}$$



Check overturning @ toe

$$OTM = (3.5)(2205) + (5.25)(1103) = 13,508 \text{ FT-LB}$$



$$R_m = 600(1.25 + 1.75 + 2.25 + 2.75 + 3.25 + 3.75 + 4.25) + 1200(5) + 1958(8) + 2610(7) + 145(7.3) = 52,243$$

$$\frac{52243}{1.5} = 26271 \geq 13,508 \Rightarrow \text{OK}$$

Check Bearing Pressure

Allowable 1,500 p.s.f

Weight of wall = 10,114 lb
with 7.5' base:

$$\text{Bearing Pressure} = \frac{10,114}{7.5} = 1,348 \text{ p.s.f} \leq 1,500 \Rightarrow \text{OK}$$