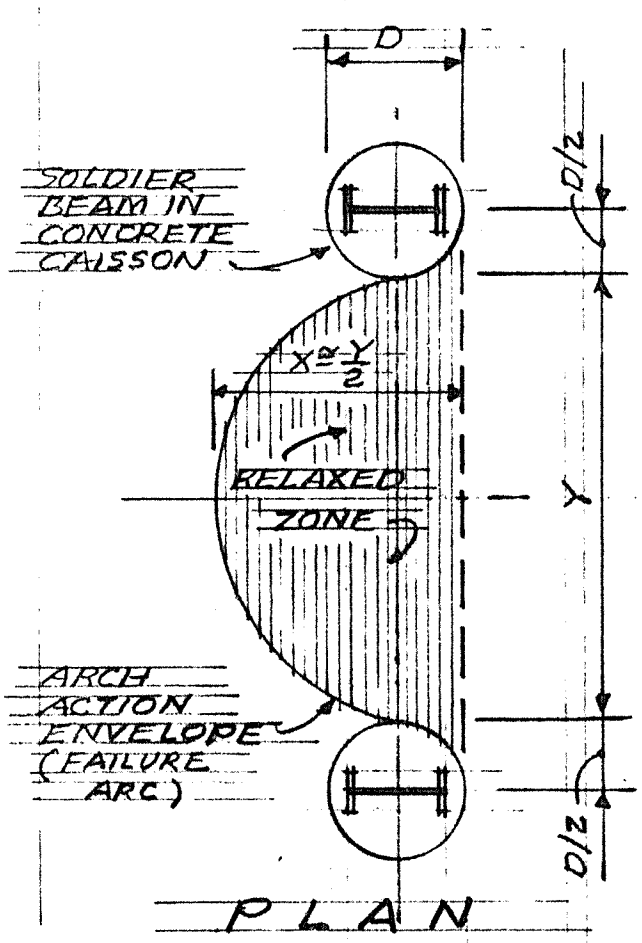
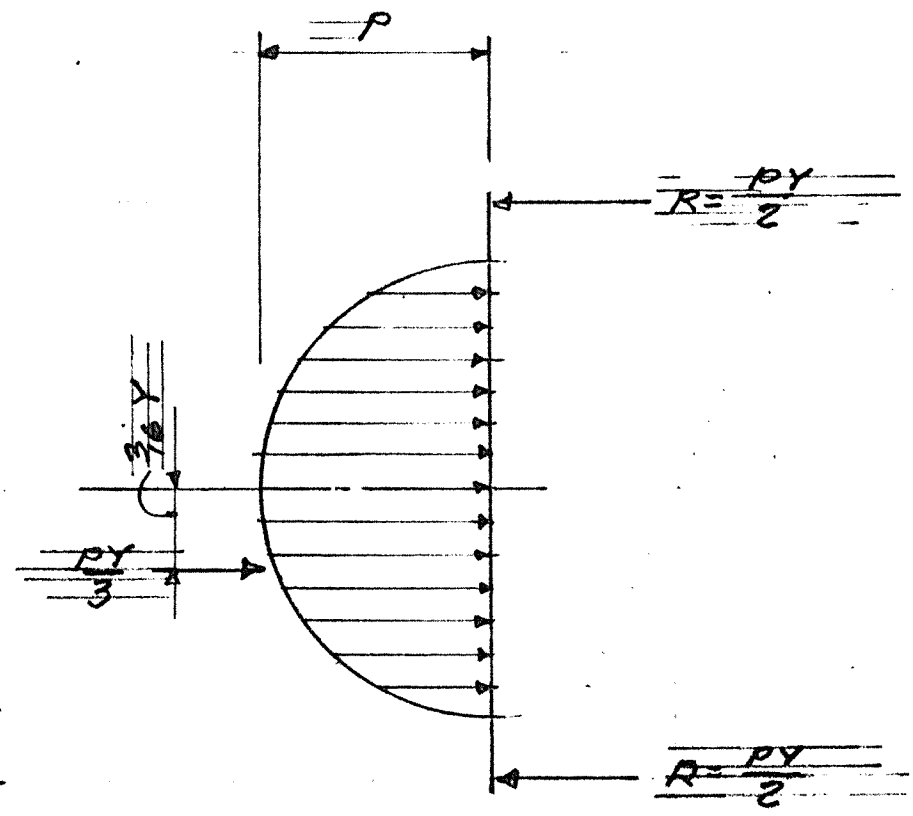
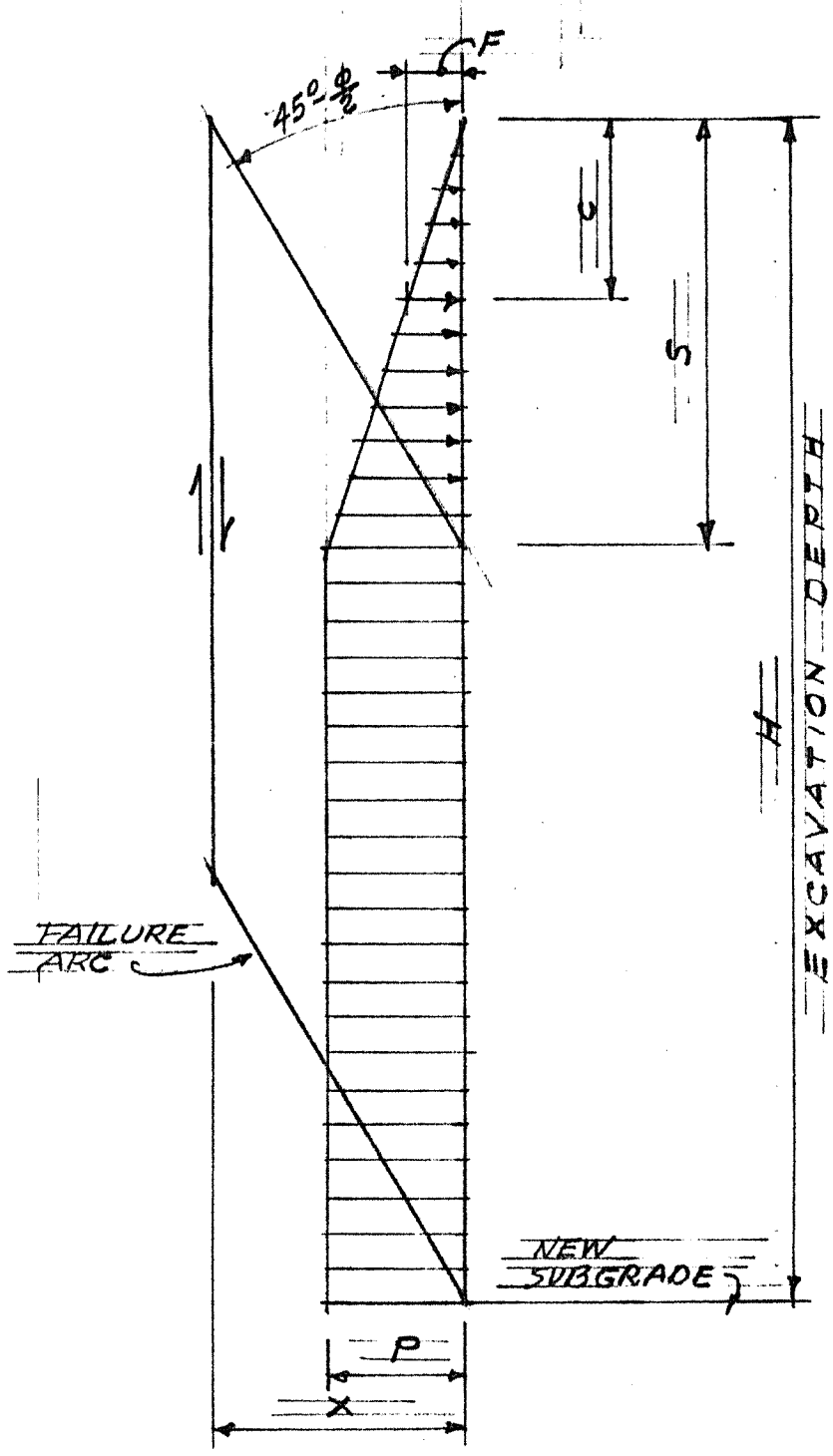
ORCHID/SCHWAB SHORING



PLAN



PRESSURE DIAGRAM



SECTION

THEORY

MAX MOMENT

$$M_{\ell} = \frac{PY}{3}\left(\frac{Y}{2} + \frac{D}{2} - \frac{3Y}{16}\right)$$

$$= \frac{PY}{3}\left(\frac{5Y}{16} + \frac{D}{2}\right)$$

FORCE

$$\frac{X}{C} = \tan\left(45 - \frac{\Phi}{2}\right) \quad \therefore \quad C = \frac{X}{\tan\left(45 - \frac{\Phi}{2}\right)}$$

NATIVE SOIL $\Phi = 20°$ $C = 100$ PSF
γ = SOIL UNIT WEIGHT = 125 PCF

$$F = \gamma X\left[\tan^2\left(45 - \frac{\Phi}{2}\right)\right] - 2c\tan\left(45 - \frac{\Phi}{2}\right)$$

$$F = (\gamma X - 2c)\tan\left(45 - \frac{\Phi}{2}\right)$$

STRESSES

LOADS & SPANS

8'-0" - 0'-4" = 7'-8" = 7.67 FT
D = 2'-0" (DRILL) Y = 7.67 - 2.00 = 5.67 FT
X = Y/2 = 2.84 FT

NATIVE SOIL BACKFILL

$$P = \left[125(2.84) - 2(100)\right]\tan 45 - \frac{20}{2} = 109 \text{ LBS}$$

BENDING

$$M = \frac{(109)(5.67)}{3}\left[\frac{5(5.67)}{16} + \frac{2.00}{2}\right] = 571 \text{ FT-LB}$$

LAGGING SIZE

$$S \text{ REQ'D} = \frac{571(12)}{800} = 8.6 \text{ IN}^3$$

3 X 12 ROUGH (F_b = 800 PSI MIN)

$$S = \frac{bd^2}{6} = \frac{12(3)^2}{6} = 18.0 \text{ IN}^3 \quad \text{OK}$$

SOLDIER BEAM
LAGGING