CVE 381
TWP

8-47

KNOWN FIG 8-47
15x15 mat x 1'
$\Delta\sigma$ = 76 kPa
σ_p = 130 kPa
C_c = 0.40
C_r = 0.03
Neglect any settlement in the sand layer

SAND ρ = 1.9 MG/m3
CLAY ρ_{SAT} = 1.8 MG/m3
w_N = .42
ASSUME $\rho_{CONC} = \rho_{SAND}$

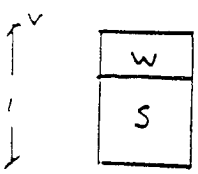
REQ'D ESTIMATE S_c of clay layer

SOL'N S_c = 0.231 m

Boussinesq Case

CALCS

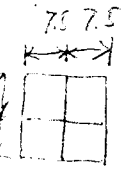
at mid-layer $\sigma'_{v_0} = 5(1.9) + 5(1.8-1.0)$
$= 9.5 + 4.0$
$= 13.5$ MG/m2
$= (13.5)(9.807)$
$= 132.39$ kPa $\approx \sigma_p'$
→ Normally Consolidated



If V_T = 1 m3
ρ_{SAT} = 1.8 MG/m3

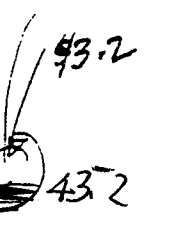
M_T = 1.8 MG
= .42 M_S + M_S
M_S = 1.27 MG
M_W = 0.53 MG
$S = 100\% - V_V = V_W$ = 0.53 m3
$V_S = V_T - V_W$
= 1 − 0.53
= 0.47
e_0 = 1.13 = V_V/V_S
$S_c = \frac{10m}{1+1.13}(0.40)\log$

$S_c = C_c \cdot \frac{H_0}{1+e_0} \log \frac{\sigma'_{v0}+\Delta\sigma_v}{\sigma'_{v0}}$ = 0.231 m



X = 7.5
Y = 7.5
Z = 10
m = X/Z = .75
n = Y/Z = .75
Iσ = 0.142 → $\sigma_z = q \cdot I_\sigma$ = Δ
$\sigma_z = \frac{\Delta\sigma_z}{4}$ = 10.8 →
$\Delta\sigma_1 = \Delta\sigma_z$ = 43.2

WRONG!
MUST DISTR. FIG PRESS



CVE 381
TWP 11/95
8.48

P 8-48 1/2

KNOWN FIG P8-48

$\sigma_0' = p_c' = 110\ kPa$

$e_0 = 0.50 = C_c$

$e_r = 0.02 = C_r$

REQ'D

S_c = ? in clay layer under center of middle loaded area

Soln $S_c = 0.08\,m \approx 10\ cm$

CALCULATIONS

Approximate pressure distribution with 2:1 method to find $\Delta\sigma'$

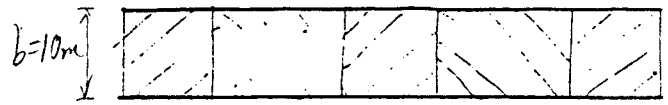
1.) Consider long strip load

$b = 10\,m$

$z = 11.5\,m$

$q_0 = 100\ kPa$

$I_\sigma = .505$



$\sigma_z = 50.5\ kPa$ +

2) Subtract unloaded region −

$b = 5\,m$

$y = 20\,m$

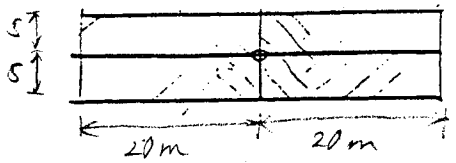
$z = 11.5$

$q_0 = 100\ kPa$

$I_\sigma = .126$

$\sigma_z = 4(100)(.126)$

$= 50.4\ kPa$ * note small influence of side fill on stress



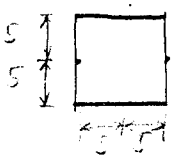
3) Add Center Region +

$b = y = 5\,m$

$z = 11.5\,m$

$\sigma_z = 4(100)(.072)$

$= 28.8\ kPa$



→ 1) − 2) + 3) ≈ 28.8 kPa

$\Delta\sigma_1 \approx 28.8\ kPa$