krilna sonda (tipska): $c_u = \dfrac{6 \cdot M_\tau}{7 \cdot \pi \cdot D^3}$, $S = \dfrac{c_u^{max}}{c_u^{min}}$

žepni penetrometer: $c_u = q_u / 2$

CPT: $\varphi = 29 + 2{,}5\sqrt{q_c}\,[MPa]$; $D_R = -0{,}98 + 0{,}66 \cdot \log\left(q_c / \sqrt{\sigma'_{V0}}\right)$[t/m²],

$c_u = \left((q_c - \sigma_{V0})/16{,}3\right)$, $E_{oed} = 2{,}5 \cdot (q_c + 3{,}2)$, $E_{oed} = \alpha \cdot q_c$ [MPa];

f_s/q_c<0.025...nekoh.zem., f_s/q_c>0.035...gline, 0.02<f_s/q_c<0.04...melji

SPT: $(N_1)_{60} = N \cdot c_e \cdot \lambda \cdot c_N \cdot c_S$, $c_S = \left(15 + 0{,}5(N - 15)\right)/N$

$c_e = \dfrac{ER_r}{60}$,

dolžina drogovja (m)	3 – 4	4 – 6	6 – 10	>10
korekcijski faktor λ	0,75	0,85	0,95	1,00

Vrsta peska	Relativna gostota	C_N
Normalno konsolidiran	40 do 60 %	200 / (100+σ'_v)
	60 do 80 %	300 / (200+σ'_v)
Prekonsolidiran		170 / (70+σ'_v)

gostota	zelo rahlo	rahlo		srednje		gosto	zelo gosto
$(N_1)_{60}$	0	3	8	15	25	42	58
D_r (%)	0	15	35	50	65	85	100
φ (°)		28	30	33	36	41	44

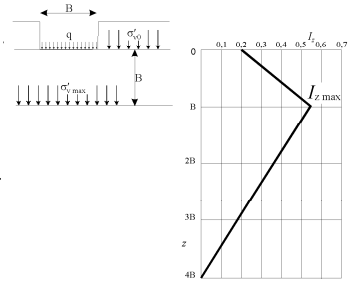
Posedek iz CPT:

$I_{z\,max} = 0{,}5 + 0{,}1\sqrt{\dfrac{(q' - \sigma'_{v0})}{\sigma'_{v\,max}}}$ $C_1 = 1 - 0{,}5\dfrac{\sigma'_{v0}}{(q' - \sigma'_{v0})} \geq 0{,}5$

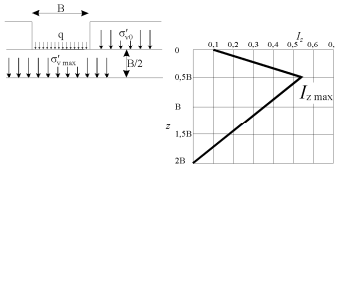
$E = 2{,}5 \cdot q_c$ ... za kvad.tem., $E = 3{,}5 \cdot q_c$ ... za pas. temelj

$C_2 = 1{,}2 + 0{,}2 \log t$ $s = C_1 C_2 (q' - \sigma'_{v0}) \sum \dfrac{I_z}{E} \Delta z$

PASOVNI TEMELJ



KVADRATNI ALI KROŽNI TEMELJ



Proctor: $\gamma = \dfrac{(W_0 + W_m) - W_0}{V}$ $\gamma_d = \dfrac{W_s}{V} = \dfrac{W}{V(1+w)} = \dfrac{\gamma}{1+w}$

Vertikalne drenaže: $n = R/r_0$, $U_R = 1 - e^{-8T_R/\mu}$,

$n^2(\ln n - 0{,}75) = \dfrac{-8c_r \cdot t}{4 \cdot r_0^2 \cdot ln(1 - U_R)}$, $\mu = \ln n - 0{,}75$,

$c_r = \dfrac{k \cdot E_{oed}}{\gamma_w}$, $T_v = \dfrac{k \cdot E_{oed} \cdot t}{\gamma_w \cdot h^2}$, $a_\Delta = R/0{,}525$,

$a_o = R/0{,}564$, $\rho_\infty = A_\infty / E_{oed}$, $\rho_t = U_t \cdot \rho_\infty$,

$T_R = \dfrac{k \cdot E_{oed} \cdot t}{\gamma_w \cdot 4 \cdot R^2}$, $U = 1 - (1 - U_V)(1 - U_R)$

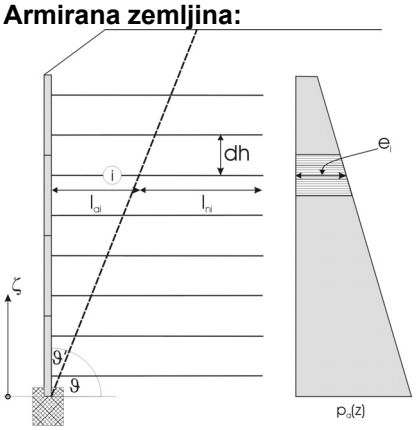
Posedek iz SPT: $N_{KOR}^{BB} = N \cdot c_e \cdot \lambda \cdot c_S$,

$s_i = \left(q' - 2/3 \cdot \sigma'_{V0}\right) \cdot B^{0,7} \cdot I_c$, $I_c = 1{,}71 / \left(N_{KOR}^{BB}\right)^{1,4}$,

$f_s = \left(\dfrac{1{,}25 \cdot (L/B)}{(L/B) + 0{,}25}\right)^2$, $f_t = 1 + R_3 + R_t \cdot log\,\dfrac{t}{3}$, $s_t^s = s_i \cdot f_s \cdot f_t$

R_3=0,3 in R_t=0,2 za statično obtežbo ter R_3=0,7 in R_t=0,8 za dinamično obtežbo

Armirana zemljina:



$\vartheta = 45^o + \varphi/2$, $\vartheta' = 45^o - \varphi/2$,

$e_i = p_a\,(z_i) = \sigma_v\, k_a - 2\,c\,\sqrt{k_a}$,

$E_{i,d} = dh\; e_i * \gamma_G$, $n_i = E_{i,d} / P_d$,

$l_i = l_{ai} + l_{ni}$, $l_{ai} = \zeta_i \tan \vartheta'$,

$l_{ni} = \dfrac{E_{i,d} \cdot \gamma_{R;h}}{n_i 2\check{s}(\sigma_{vi} tg\varphi' + c')}$

Podporne konstrukcije: $G = A \cdot \gamma_{kon.}$

$k_a = tg^2\left(45 - \varphi/2\right)$, $k_p = tg^2\left(45 + \varphi/2\right)$, $k_0 = 1 - \sin\varphi$

$K_a = \left[\dfrac{\cos\beta - \sqrt{\cos^2\beta - \cos^2\varphi}}{\cos\varphi}\right]^2$, $p_a = p_b \cdot K_a - 2 \cdot c \cdot \sqrt{K_a}$, $p_b = \sigma'_v \cdot \cos\beta$,

$K_A = \dfrac{\cos^2(\varphi - \alpha)}{\cos^2\alpha \cdot \cos(\alpha + \delta) \cdot \left[1 + \sqrt{\dfrac{\sin(\delta + \varphi) \cdot \sin(\varphi - \beta)}{\cos(\alpha + \delta) \cdot \cos(\alpha - \beta)}}\right]^2}$

$p_a = \sigma'_v \cdot k_a - 2 \cdot c \cdot \sqrt{k_a}$

$p_p = \sigma'_v \cdot k_p + 2 \cdot c \cdot \sqrt{k_p}$

Kontrole:

- prevrnitev: $M_{prev} \leq M_{odp}$, - lega rezultante: $e = M^c / V$, $e_{jp} = 2b/6$,

$\sigma_{1,2} = \dfrac{V}{A} \pm \dfrac{M}{W}$, $\sigma_r = \dfrac{2V}{3x}$, $x = b - e$, b=B/2, $p(x) = \dfrac{V}{A} \pm \dfrac{M}{I} \cdot x$

- zdrs pod temeljem: $H \leq V \cdot tg\varphi$,

- nosilnost temeljnih tal: $p_d \geq V/2b - 2e$

Vkopi: $h_{mej} = \dfrac{2c}{\gamma} \dfrac{\sin\beta\cos\varphi}{\sin^2\dfrac{\beta - \varphi}{2}}$, $h_{mej}(\beta = 90°) = \dfrac{4c}{\gamma} ctg\left(\dfrac{\pi}{4} - \dfrac{\varphi}{2}\right)$

Težišče trapeza: $y_a = \dfrac{h}{3} \dfrac{a + 2c}{a + c}$

Togost temelja: $K = \dfrac{E_b}{12E_s}\left(d/B\right)^3 < 0{,}4 \Rightarrow$ temelj je podajen

PLITVO TEMELJENJE

$B' = B - 2 \cdot e_B$ $\boxed{R_d > V_d}$

$L' = L - 2 \cdot e_L$ $e_B = M_B / V$

$\boxed{A' = B' \cdot L'}$ $e_L = M_L / V$

$N_{q,c,\gamma}$-faktorji nosilnosti
$s_{q,c,\gamma}$-korekcija zaradi oblike
$i_{q,c,\gamma}$-korekcija zaradi naklona sile
$b_{q,c,\gamma}$-kor. zaradi naklona temelja α
$d_{q,,\gamma}$-korekcija zaradi oblike (za B-H)

Brinch-Hansen: $R/A' = \gamma \cdot B'/2 \cdot N_\gamma \cdot s_\gamma \cdot i_\gamma \cdot b_\gamma + (q + c \cdot ctg\varphi) \cdot N_q \cdot s_q \cdot i_q \cdot b_q \cdot d_q - c \cdot ctg\varphi$

$N_q = e^{\pi \cdot \tan\varphi} tg^2\left(45° + \dfrac{\varphi}{2}\right)$	$s_q = 1 + \left(\dfrac{B'}{L'}\right)\sin\varphi$	$i_\gamma = (1 - 0.7\chi)^5$	$b_q = e^{-2 \cdot \alpha \cdot tg\varphi}$
$N_\gamma = 1.5(N_q - 1)tg\varphi$	$s_\gamma = 1 - 0.4\left(\dfrac{B'}{L'}\right)$	$i_q = (1 - 0.5\chi)^5$	$b_\gamma = e^{-2.7 \cdot \alpha \cdot tg\varphi}$
		$\chi = \dfrac{H}{V + A' \cdot c \cdot ctg\varphi}$	

$d_q = 1 + 2tg\varphi(1 - \sin\varphi)^2\left(D/B'\right)$ **za** $D/B' \leq 1$ **ali** $d_q = 1 + 2tg\varphi(1 - \sin\varphi)^2 arctg\left(D/B'\right)$ **za** $D/B' > 1$

Evrokod 7: $R/A' = c \cdot N_c \cdot b_c \cdot s_c \cdot i_c + q \cdot N_q \cdot b_q \cdot s_q \cdot i_q + \gamma \cdot B'/2 \cdot N_\gamma \cdot b_\gamma \cdot s_\gamma \cdot i_\gamma$

Nedrenirani pogoji (φ=0°):
$R / A' = (\pi + 2) \cdot c_u \cdot s_c \cdot i_c \cdot b_c + q$

$N_q = e^{\pi \cdot \tan\varphi} tg^2\left(45° + \frac{\varphi}{2}\right)$

$N_c = (N_q - 1) ctg\,\varphi$

$N_\gamma = 2(N_q - 1) tg\varphi$

$s_q = 1 + \left(\frac{B'}{L'}\right)\sin\varphi$

$s_c = \frac{s_q N_q - 1}{N_q - 1}$

$s_\gamma = 1 - 0.3\left(\frac{B'}{L'}\right)$

$i_q = \left(1 - \frac{H}{V + A' \cdot c \cdot ctg\varphi}\right)^m$

$i_c = i_q - \frac{1 - i_q}{N_c \tan\varphi}$

$i_\gamma = \sqrt[m]{i_q^{m+1}}$

$b_\gamma = b_q$

$b_q = (1 - \alpha \cdot \tan\varphi)^2$

$b_c = b_q - \frac{1 - b_q}{N_c \cdot tg\varphi}$

$s_c = 1 + 0{,}2\,(B'/L')$

$i_c = \frac{1}{2}\left(1 + \sqrt{1 - \frac{H}{A' c_u}}\right)$

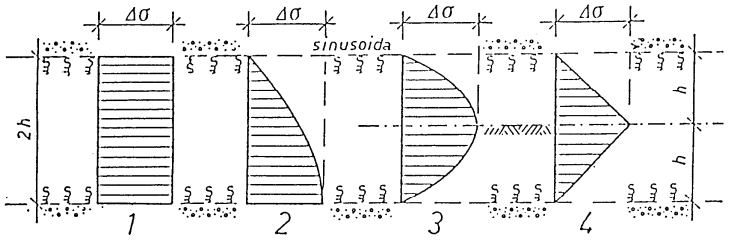
$b_c = 1 - 2\alpha/(\pi + 2)$

$m = m_\theta = m_L \cos^2\theta + m_B \sin^2\theta$, $m_B = \frac{2 + B'/L'}{1 + B'/L'}$, $m_L = \frac{2 + L'/B'}{1 + L'/B'}$

(θ je kot, ki ga v tlorisu oklepa horizontalna komponenta H s smerjo L)

$q = \Sigma \gamma_i (z_{sp,i} - z_{zg,i}) - u$ (D_w nivo talne vode, D globina temelja)

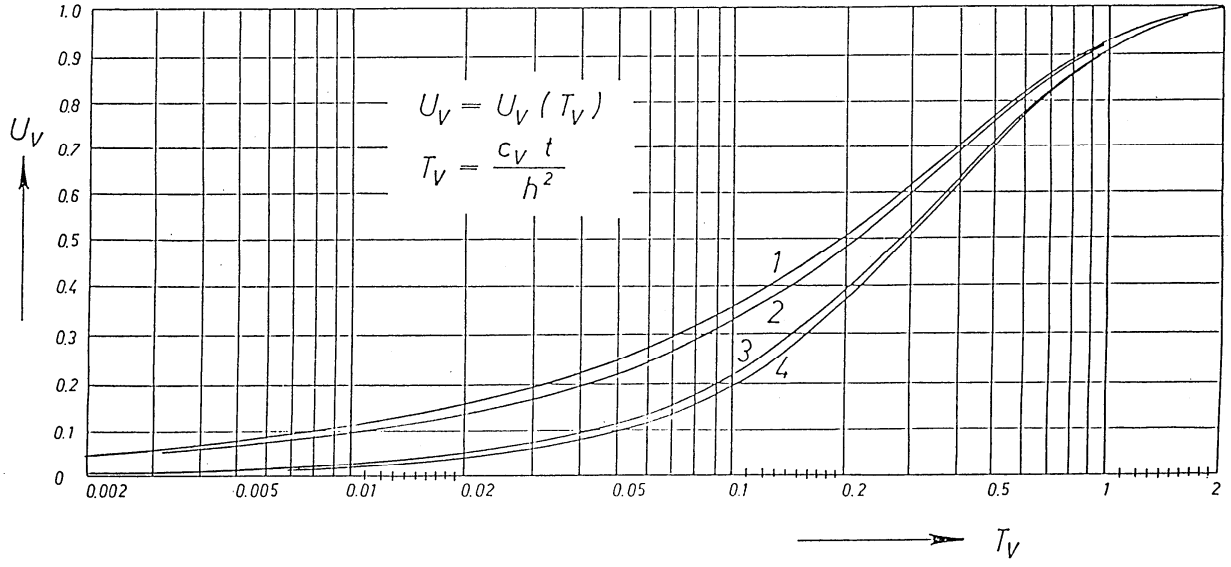
$\gamma_d = \gamma - \gamma_w$ **za** $D_w \le D$, $\gamma_d = \gamma$ **za** $D_w \ge D + B'$, $\gamma_d = \gamma - \gamma_w + (D_w - D) \cdot \gamma_w / B'$ **za** $D < D_w < D + B'$

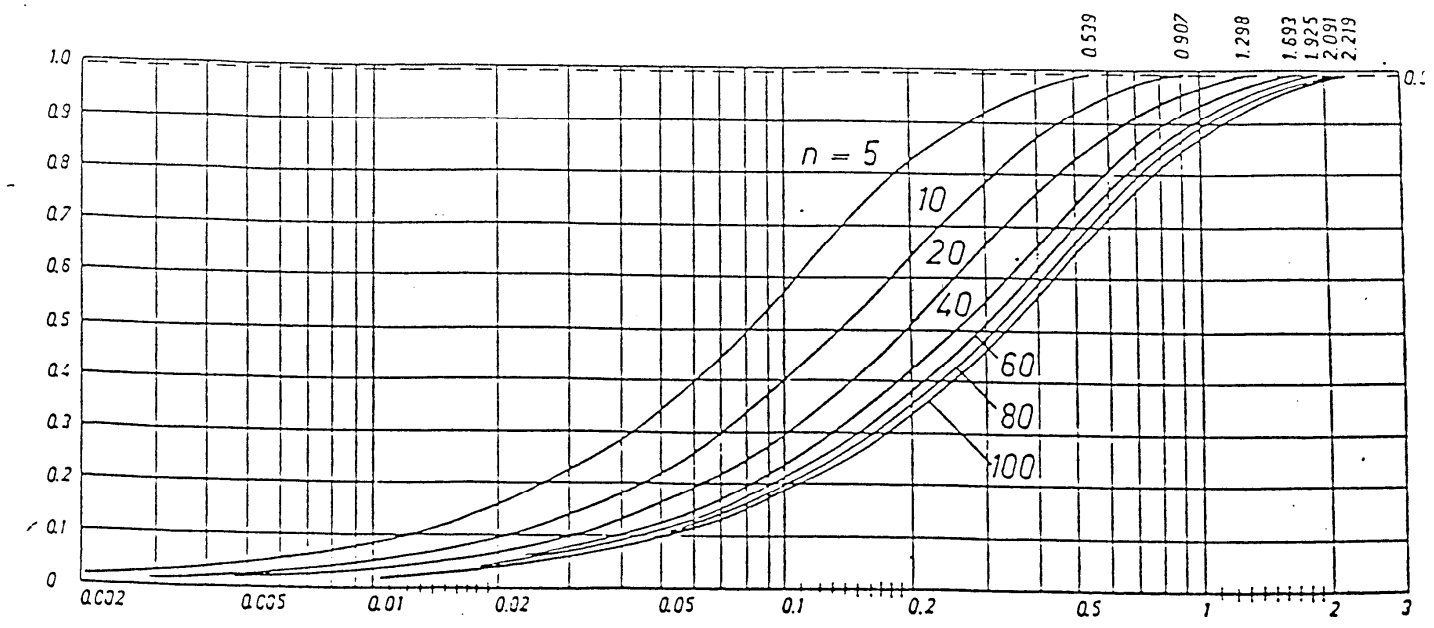


Predobtežba, preobtežba:

$\rho_\infty = A_\infty / M_V$, $U_V = \rho(t) / \rho_\infty$,

$T_V = \frac{k \cdot M_v \cdot t}{\gamma_w \cdot H_d^2}$.





$U_R = U_R (T_R)$, $T_R = (c_R * t)/4 * R^2$