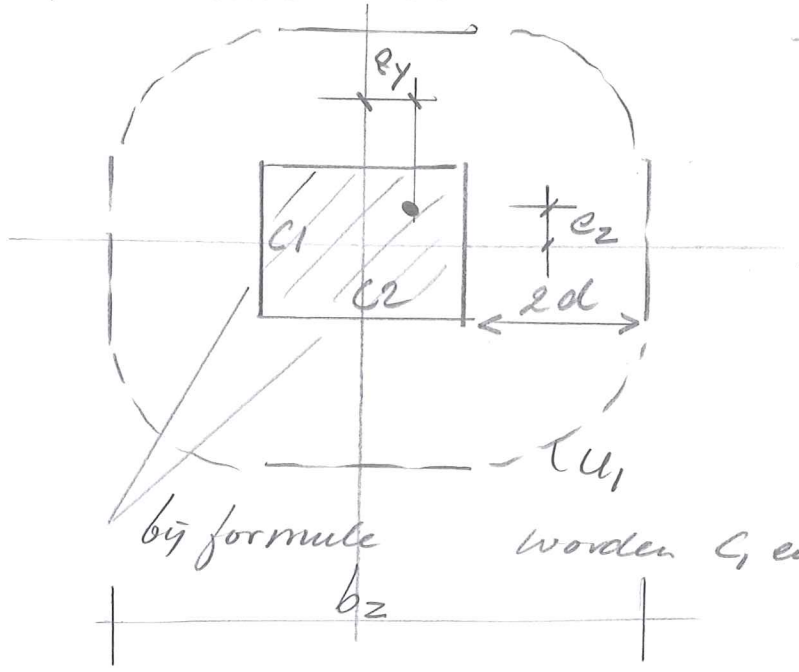
Berekening lengte periferie

rechthoekige kolom

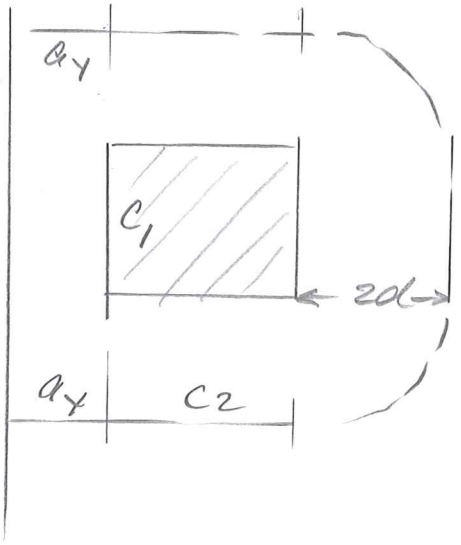


$$u_1 = 2(c_1+c_2) + 4\pi d$$

$$A = \tfrac{1}{4}\pi(4d)^2 + c_2(c_1+4d) + c_1(4d)$$

bij formule worden c_1 en c_2 benaming verwisseld!

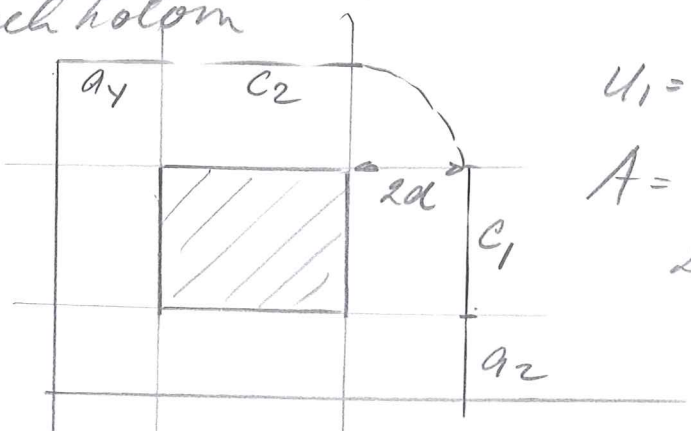
rand kolom



$$u_1 = 2a_y + 2c_2 + c_1 + 2\pi d$$

$$A = (a_y + c_2)(c_1 + 4d) + c_1 2d + \tfrac{1}{8}\pi(4d)^2$$

hoek kolom



$$u_1 = a_y + a_2 + c_1 + c_2 + \pi d$$

$$A = (a_y + c_2)(a_2 + c_1 + 2d) + 2d(a_2 + c_1) + \tfrac{1}{16}\cdot\pi(4d)^2$$

ronde kolom

$$u_1 = \pi D = \pi(c+4d)$$

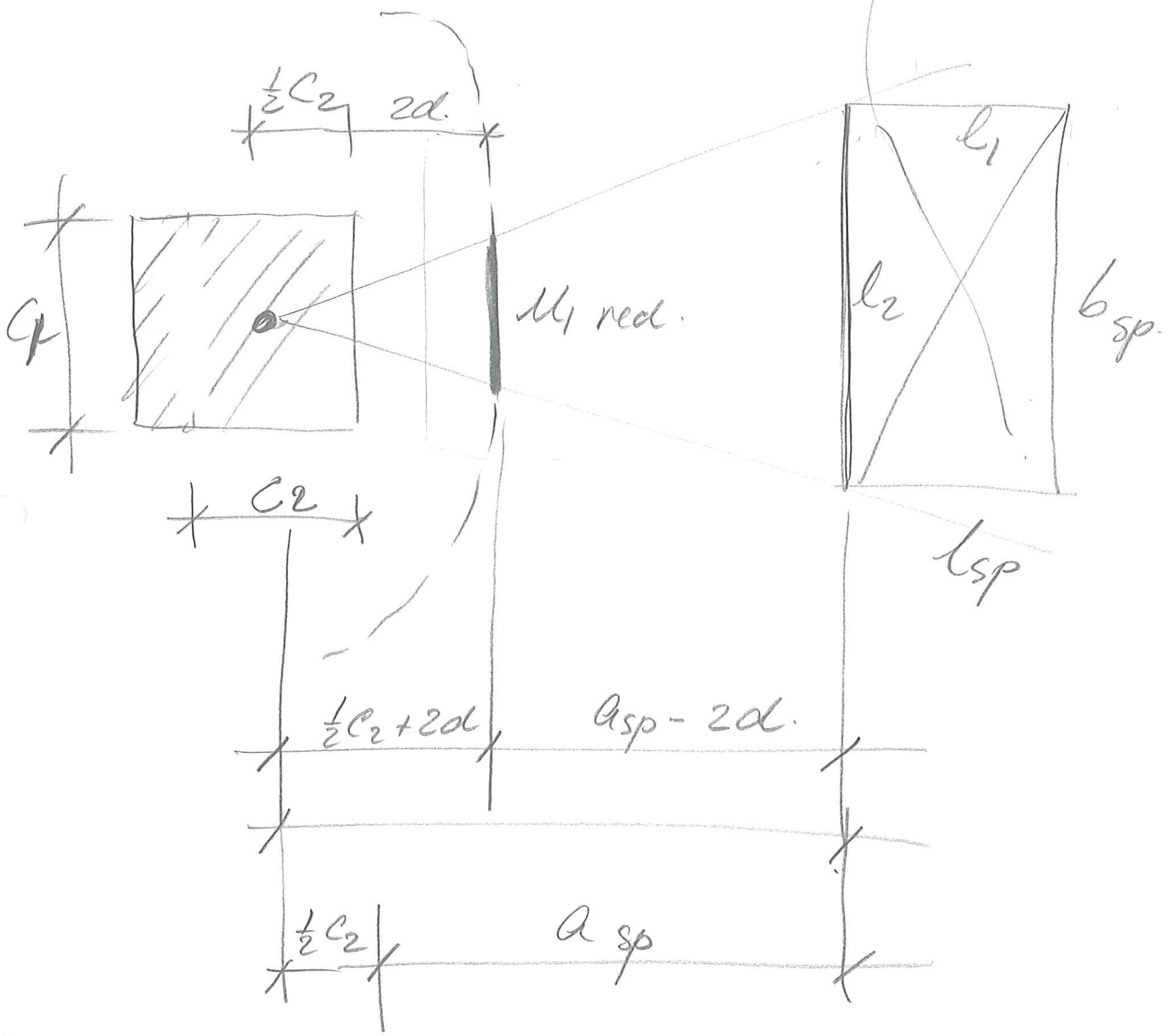
$$A = \tfrac{1}{4}\cdot\pi\cdot(c+4d)^2$$

1/6

Beton – Pons

reductie periferie t.g.v. sparing

of $\sqrt{l_1 l_2}$



$$\frac{\frac{1}{2}c_2 + 2d}{u_{1red}} = \frac{\frac{1}{2}c_2 + a_{sp}}{l_{sp}}$$

$$u_{1red} = \frac{\frac{1}{2}c_2 + 2d}{\frac{1}{2}c_2 + a_{sp}} \times l_{sp}$$

Schuifspanningen

Beton - Pons

$$V_{Ed} = 0{,}75\, V_{Rd,c} + V_{Rd,s}$$

Invoer S_r
S_t

$$V_{Ed} = 0{,}75\, V_{Rd,c} + V_{Rd,s}$$

$$V_{Rd,s} = \frac{F_s}{u_1 \cdot d_{eff}}$$

$$F_s = A_s\, f_{y,wd,ef}$$

$$f_{y,wd,ef} = 250 + 0{,}25\, d \leq f_{y,wd} \quad d \text{ in mm}$$

$$V_{Rd,s} = \frac{1{,}5 \cdot \left(\frac{d}{s_r}\right) \cdot A_{sw} \cdot f_{y,wd,ef}}{u_1 \cdot d}$$

s_r = radiale afstand tussen perimeters beugels

$s_r < 0{,}75\, d$

$$A_{sw,min} = \frac{0{,}08 \cdot s_r \cdot s_t \cdot \sqrt{f_{ck}}}{1{,}5\, f_{yk}}$$

Grenswaarde dwarskracht

$z = 0{,}9\,d$

$$(6.9)\quad V_{Rdw} = \alpha_{cw} \cdot b_w \cdot z \cdot \nu_1 \cdot \frac{f_{cd}}{\cot\theta + \tan\theta}$$

uitgangspunt $z = 0{,}9\,d \rightarrow \frac{z}{d} = 0{,}9$

$\frac{z}{d}$

$$V_{Rd\,max} = \frac{V_{Rd\,max}}{b_w \cdot d} = \alpha_{cw} \cdot 0{,}9 \cdot \frac{\nu_1 \cdot f_{cd}}{\cot\theta + \tan\theta}$$

$\alpha_{cw} = 1{,}0$ voor niet voorgespannen constructies.

Wapening

$$\left(V_{Rd,s} - 0{,}75\,V_{Rd,c}\right) = 1{,}5 \cdot \frac{d}{s_r} \cdot A_{sw} \cdot f_{ywd} \cdot \frac{1}{u_1 \cdot d} \sin\alpha$$

dit is een oppervlak!

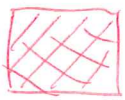
$$A_{sw} = \left(V_{Ed} - 0{,}75\,V_{Rd,c}\right) \cdot \frac{s_r \cdot u_1 \cdot d}{1{,}5\,d \cdot f_{ywd} \cdot \sin\alpha}$$

begrenst!

per perimeter met een hoh afstand s_r

4/6

rechthoek **Lengte Hoog en x_{out}** Beton - B Pons EC

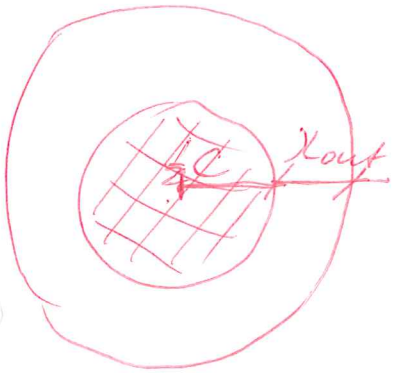


$$U_{out} = 2(C_1 + C_2) + 4\pi d$$

$$U_{out} = 2(C_1 + C_2) + 2\pi \cdot (2d)$$

x_{out}

$$x_{out} = \frac{U_{out} - 2(C_1 + C_2)}{2\pi}$$



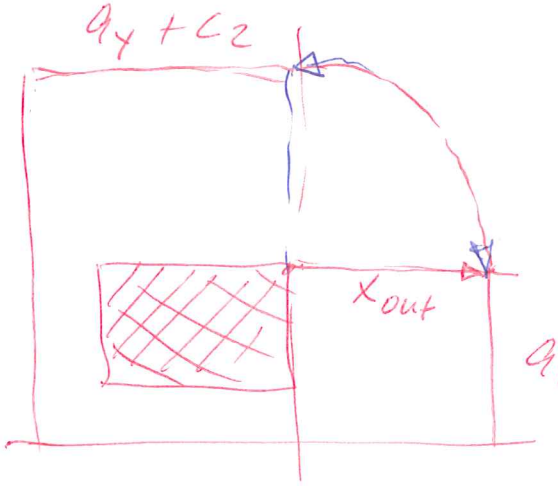
omtrek $= \pi \cdot D$

$$U_{out} = \pi (C + 2x_{out})$$

$$U_{out} = \pi \cdot C + 2\pi \cdot x_{out}$$

$C + 2x_{out}$

$$x_{out} = \frac{U_{out} - \pi \cdot C}{2\pi}$$

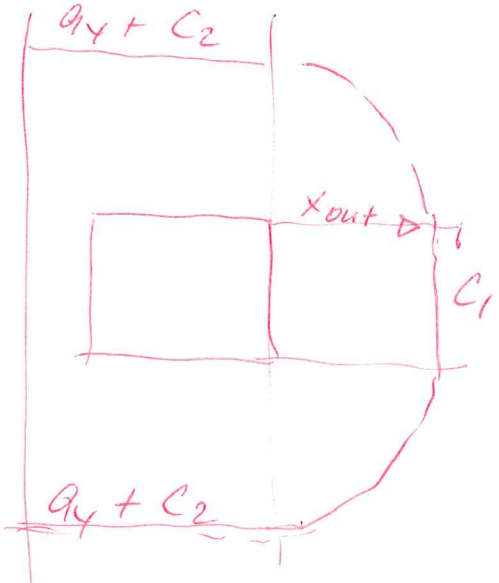


omtrek boogstuk $= \frac{1}{4}\pi D$

$\frac{1}{2}\pi \cdot x_{out}$ $\quad D = 2x_{out}$

$$U_{out} = q_4 + q_2 + c_2 + c_1 + \tfrac{1}{2}\pi x_{out}$$

$$x_{out} = \frac{(U_{out} - q_4 - q_2 - c_2 - c_1) \cdot 2}{\pi}$$



omtrek $= \frac{1}{2}\pi D = \frac{1}{2}\pi \cdot 2x_{out} = \pi \cdot x_{out}$

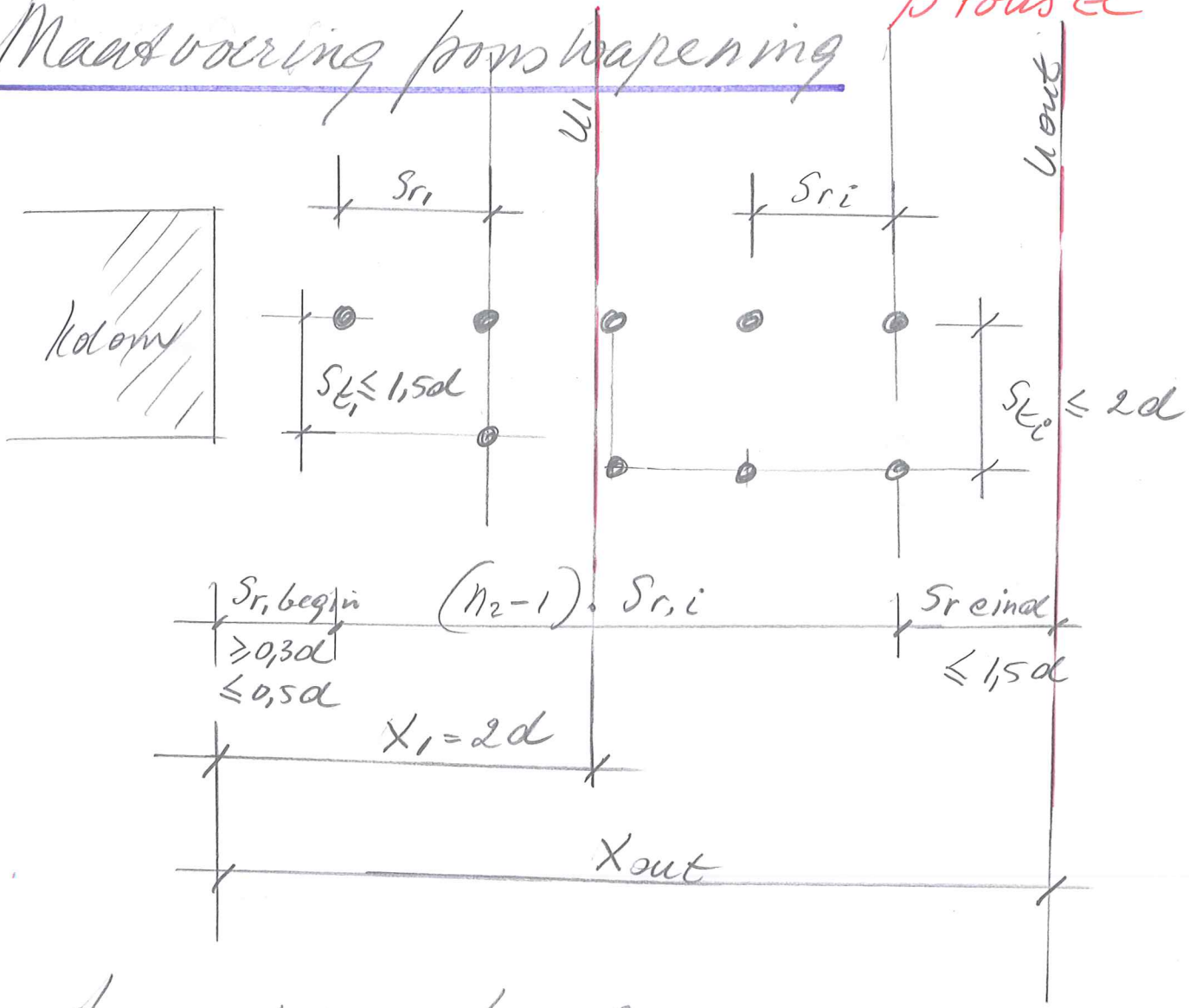
$$U_{out} = 2q_4 + 2c_2 + c_1 + \pi \cdot x_{out}$$

$$x_{out} = \frac{U_{out} - 2q_4 - 2c_2 - c_1}{\pi}$$

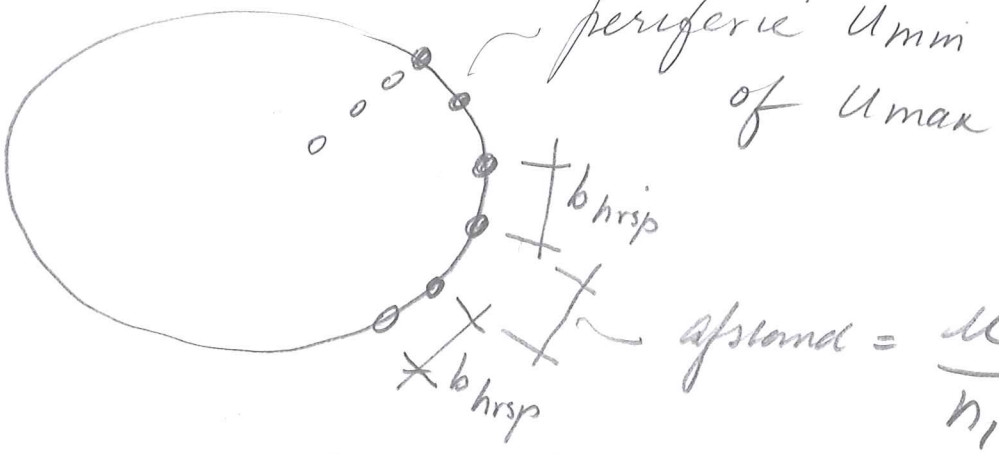
5/6

Maatvoering positionering

B Pous EC



Aussenafstand beugels



n_1 = aantal beugels (dubbelsnedig) per periferie (omtrek)