

Gjennomløsnings av søyler:

$$d_{eff} = \frac{d_y + d_x}{2} = \frac{249 + 237}{2} = 243 \text{ mm}$$

$$V_{ed} = \beta \cdot \frac{V_{ed}}{u_1 \cdot d}, \quad \beta = 1,15 \text{ (forenklet for indre søyle)}$$

$$u_1 = 4\pi \cdot d + 4 \cdot c = 4\pi \cdot 243 + 4 \cdot 350 \\ = 4454 \text{ mm}$$

Skjærkraftkapasitet i snitt 2d fra søylekant:

$$V_{rdic} = C_{rdic} \cdot k \cdot (100 \cdot \rho_L \cdot f_{ct})^{1/3}$$

$$> V_{min} = 0,035 \cdot u^{3/2} \cdot f_{ct}^{1/2} \\ = 0,035 \cdot 1,91^{3/2} \cdot 35^{1/2} \\ = 0,547 \text{ OK!}$$

$$\rho_L = \sqrt{\rho_{Ly} \cdot \rho_{Lx}} \leq 0,02$$

$$\rho_{Ly} = \frac{\phi 125110}{b_w \cdot d} = \frac{1028}{103 \cdot 243} = 4,23 \cdot 10^{-3}$$

$$\rho_{Lx} = \frac{\phi 12590}{b_w \cdot d} = \frac{1257}{1000 \cdot 243} = 5,17 \cdot 10^{-3}$$

$$k = 1 + \sqrt{200/d} = 1 + \sqrt{200/243} = 1,91 \leq 2,0 \text{ OK!}$$

$$\rho_L = \sqrt{4,23 \cdot 10^{-3} \cdot 5,17 \cdot 10^{-3}} = 4,68 \cdot 10^{-3} \leq 0,02 \text{ OK!}$$

$$V_{rdic} = 0,12 \cdot 1,91 \cdot (100 \cdot 4,68 \cdot 10^{-3} \cdot 35)^{1/3} \\ = 0,582 \text{ N/mm}^2$$

Skjærkraft i snitt 2d fra søylekant:

$$V_{ed,1} = \frac{V_{ed}}{u_1 \cdot d} \cdot \beta$$

$$= 1,15 \cdot \frac{376 \cdot 10^3 \text{ N}}{4454 \text{ mm} \cdot 243 \text{ mm}}$$

$$= 0,400 \text{ N/mm}^2$$

Største skjærkraft
fra Robot: $V_{ed} = 376 \text{ kN}$

$\therefore V_{rdic} > V_{ed,1} \Rightarrow$ trenger ikke skjærarmering!

Skjærkraftkapasitet ved søylekant:

$$\begin{aligned}V_{rd,max} &= 0,4 \cdot v \cdot f_{cd} \\&= 0,4 \cdot 0,516 \cdot 19,8 \\&= 4,09\end{aligned}$$

$$\begin{aligned}&\leq \frac{1,6 \cdot V_{ed,c} \cdot u_1}{\beta \cdot u_0} \\&\leq \frac{1,6 \cdot 0,582 \cdot 4454}{1,15 \cdot 4350} \\&\leq 2,58 \quad \underline{\text{IKKE OK!}}\end{aligned}$$

$$\begin{aligned}v &= 0,6 \cdot (1 - f_{ch}/250) \\&= 0,6 \cdot (1 - 35/250) \\&= 0,516\end{aligned}$$

$$V_{rd,max} = 2,58 \text{ N/mm}$$

Skjærkraft ved søylekant:

$$\begin{aligned}V_{ed,0} &= \beta \cdot \frac{V_{ed}}{u_0 \cdot d} \\&= 1,15 \cdot \frac{376 \cdot 10^3}{4350 \cdot 243} \\&= 1,27 \text{ N/mm}\end{aligned}$$

$\therefore V_{rd,max} > V_{ed,0} \Rightarrow$ skjærkraftkapasitet ved søylekant OK!