Titolo nota 03/11/2016

SLU COMPRESSIONE

$$N_{Rd} = A_c f_{cd} + A_{s,tot} f_{yd}$$

$$N_{Ed} \leq N_{Rd}$$

ma c'è anche M_{Ed} (spesso piccolo)

per portare M_{Ed} raggrimento

(1.15)

$$1.2\ N_{Ed} \leq N_{Rd}$$

$$\underbrace{A_c f_{cd}}_{N_{Ed}} + \underbrace{A_{s,tot} f_{yd}}_{0.2\ N_{Ed}} \geq 1.2\ N_{Ed}$$

$$A_c \geq \frac{N_{Ed}}{f_{cd}}$$

$$A_{s,tot} \geq \frac{0.2\, N_{Ed}}{f_{yd}}$$

indicazioni di normative

$$A_{s,tot} \geq 0.003\, A_c$$

norme "vecchie"

$$A_{s,tot} \geq 0.006\, A_{c,mc}$$

$$0.008\, A_{c,mc}$$

norma NTC 08

$$A_{s,tot} \geq \frac{0.1\, N_{Ed}}{f_{yd}}$$

C25/30 B450C

$$\frac{A_{s,tot}}{A_{c,nec}} = \frac{\frac{0.2\ N_{Ed}}{f_{yd}}}{\frac{N_{Ed}}{f_{cd}}} = \frac{0.2\ f_{cd}}{f_{yd}} = \frac{0.2 \times 14.17}{391.3} = 0.0072$$

Esempio: $N_{Ed} = 2800$ KN (compressione)

$$A_c \geq \frac{N_{Ed}}{f_{cd}} = \frac{2800 \times 10^3}{14.17} \times 10^{-2} = 1976\ cm^2$$

40 x 50

30 x 70

circolare $d = 50$ cm

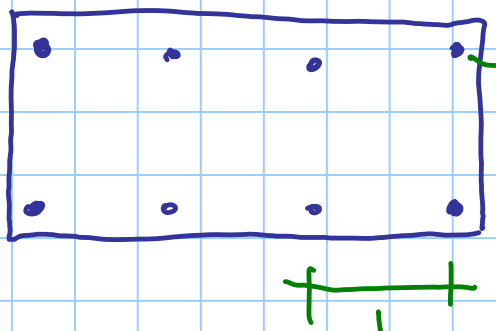
$$A_{s,tot} \geq \frac{0.2\ N_{Ed}}{f_{yd}} = \frac{0.2 \times 2800}{391.3} \times 10 = 14.3\ cm^2$$

Es. 10 ϕ 14 oppure 8 ϕ 16

per evitare instabilità delle barre (se salta il ricoprimento)

- STAFFE
- diametro > 10 mm

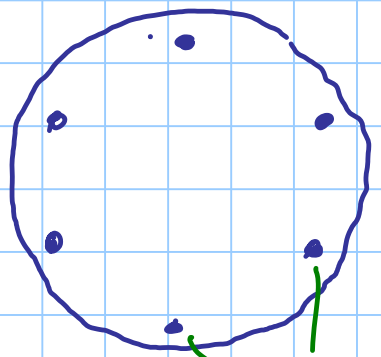
disposizione barre longitudinali



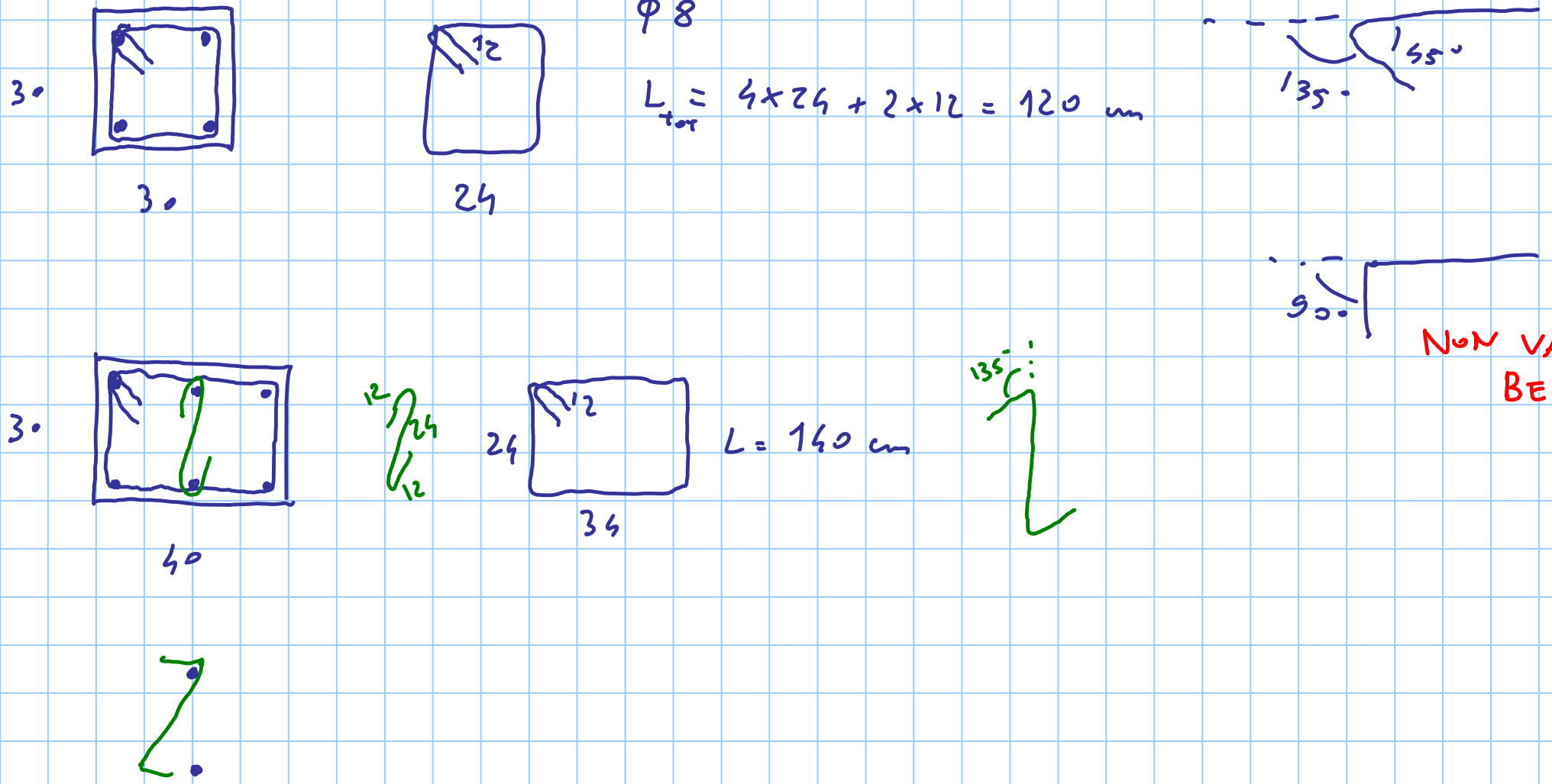
1 barra ogni spigolo

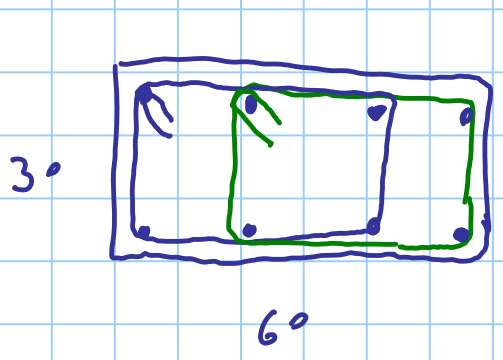
se diametri diversi
le maggiori nelle spigole

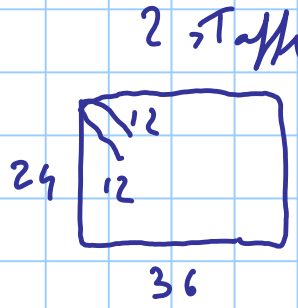
distanza ≤ 25 (meglio $15 \div 20$) cm

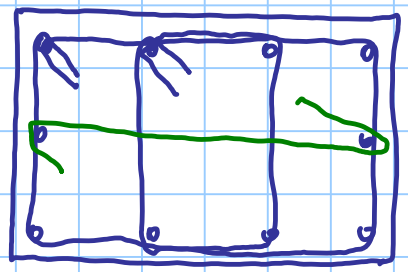


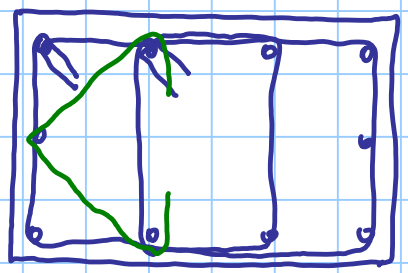
almen. 6

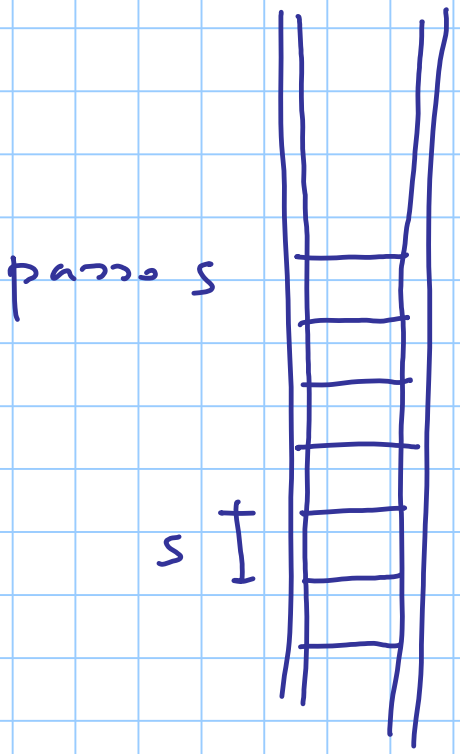

30
30
12
24
ϕ 8
$L_{tot} = 4 \times 24 + 2 \times 12 = 120$ cm
135°
135°
90°
NON VA BENE
30
40
12
24
12
24
12
34
L = 140 cm
135°











$s \leq 12\,\phi_{min}$

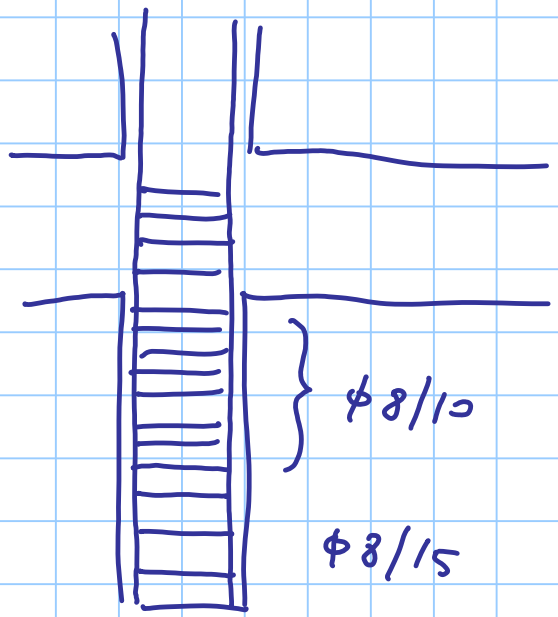
$s \leq 25$ cm

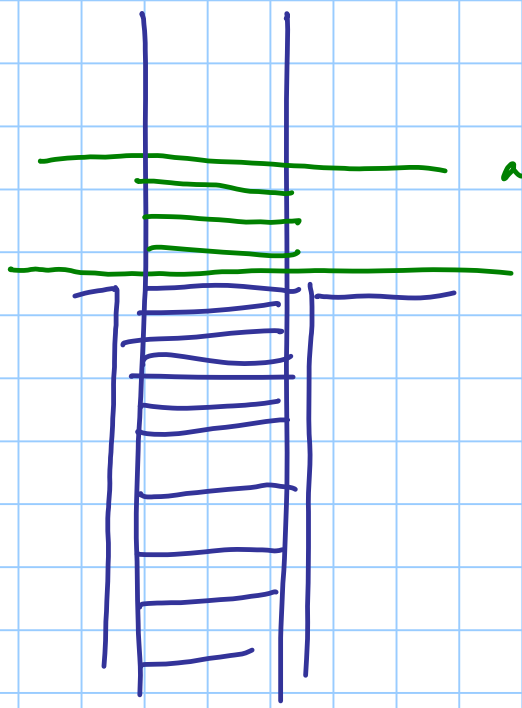
barre $\phi 14$

$s \leq 12 \times 1.4 = 16.8$ cm

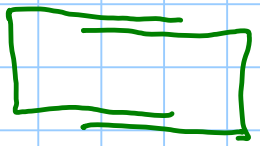
$\phi 8/15$

$\phi 8/10$ all'estremità e nel nodo

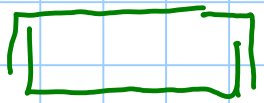


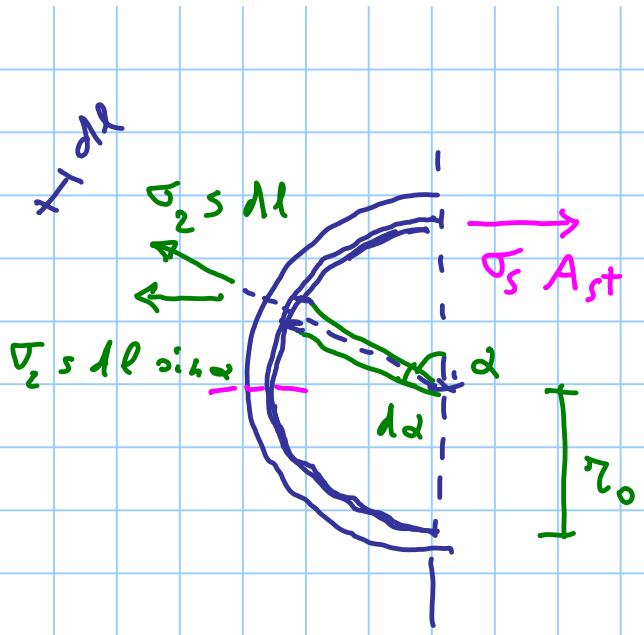


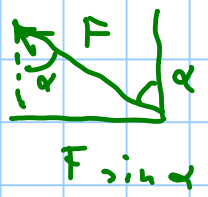
ancoraggi travi

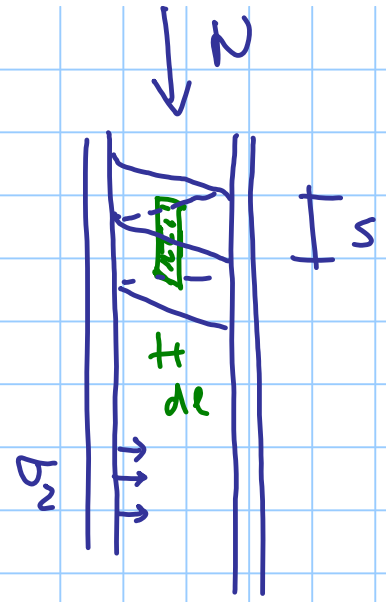


possibili staffe nel nodo









$A = dl \cdot s$

$$dl = r_0 \, d\alpha$$

$$\int_0^{\pi/2} \sigma_2 \, s \, dl \sin\alpha = \sigma_s \, A_{st}$$

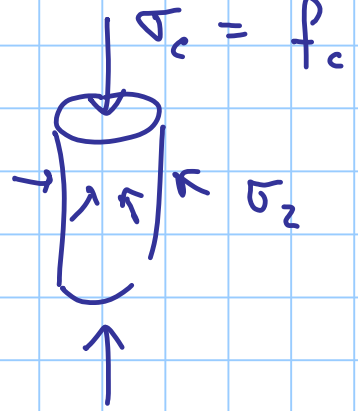
$$\int_0^{\pi/2} \sigma_2 \, s \, r_0 \, \sin\alpha \, d\alpha = \sigma_2 \, s \, r_0 \int_0^{\pi/2} \sin\alpha \, d\alpha = \sigma_2 \, s \, r_0 \left| -\cos\alpha \right|_0^{\pi/2} = \sigma_2 \, s \, r_0$$

$$\sigma_2 \, s \, r_0 = A_{st} \, \sigma_s$$

$$\sigma_2 = \frac{A_{st}}{s \, r_0} \sigma_s = 0.5 \, \rho_{st} \, \sigma_s \qquad \sigma_s \le f_{yd} \qquad \sigma_2 \le 0.5 \, \rho_{st} \, f_{yd}$$

$$\rho_{st} = \frac{A_{st} \, 2\pi \, r_0}{s \, \pi \, r_0^2} = 2 \, \frac{A_{st}}{s \, r_0}$$

$$\omega_{st} = \rho_{st} \, \frac{f_{yd}}{f_{cd}} \qquad \sigma_2 \le 0.5 \, \omega_{st} \, f_{cd}$$



grandezza σ_2

f_c resistenza non confinata

f_c^c resistenza confinata

$$f_c^c = f_c + \Delta f_c$$

$$\Delta f_c = t\,\sigma_2$$

$$\Delta f_c = 5\,\sigma_2 \quad \text{per } \sigma_2 \le 0.05\, f_c$$

$$0.25\, f_c + 2.5\left(\sigma_2 - 0.05\, f_c\right)$$