

Progetto: armatura a V della trave

TRAVE \Rightarrow PROG. ARMATURA A V ✓

TAVOLA ✓

CARPENTERIA \Rightarrow TAVOLA ✓

SOLAIO \Rightarrow VERIFICA A V ✓

PROG. ARMATURA A V

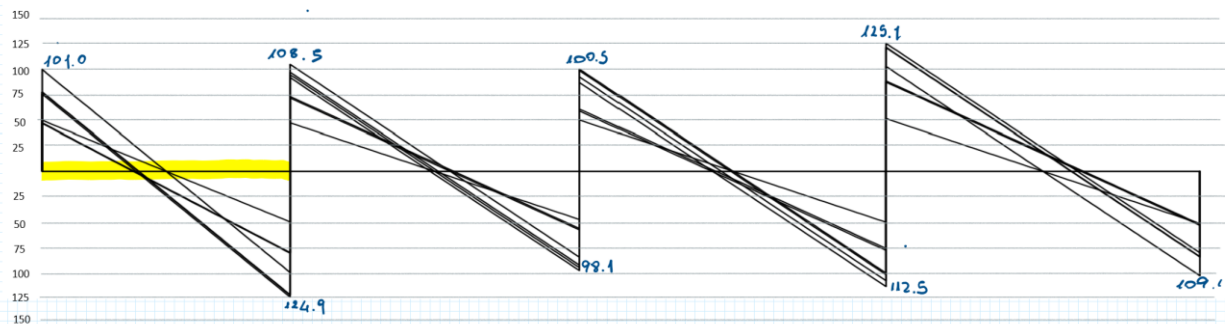
- 1) CALCOLARE V_{ed}
- 2) VERIFICA DELLA SEZ. IN CLS
- 3) PROG. LE STAFFE

1) V_{ed}

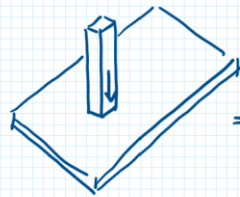
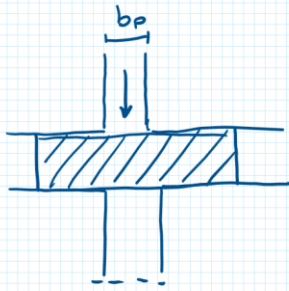
\Rightarrow INVILUPPO DEI DIAG. DI $M_{ed} \Rightarrow$ TRAVE CONTINUA (TRAVE CON)
+ SCHEMA CON INCASTRATI
+ SCHEMA CON CERNIERE
(NON CAD)
 $1 \text{ cm} = 25 \text{ kN}$
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SCALA LUNGHEZZE 1 : 20

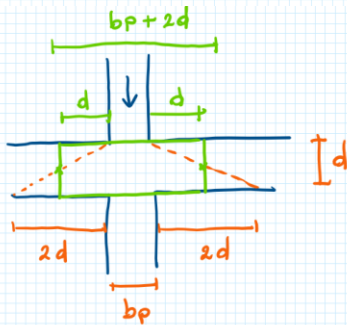
SCALA DEI V 1 cm = 25 kN



2) VERIFICA DELLA SEZ. IN CUS



=> PUNZONAMENTO

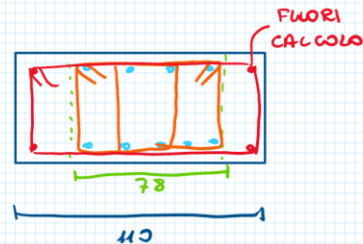
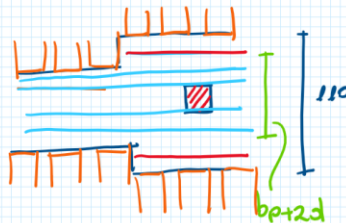
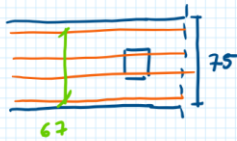


AI FINI DEL TAGLIO $b_w = b_{pL} + 2d$

SE $b_{TS} < b_{pL} + 2d \Rightarrow b_w = b_{TS}$

SE $b_{TS} > b_{pL} + 2d \Rightarrow b_w = b_{pL} + 2d$

CONCENTRARE LE ARMATURE IN $b_w \Rightarrow$ IN CASO AGGIUNGO FERRI FUORI CALCOLO



NEL MIO CASO: TRAVE SPESSORE 75×23

$$b_{pL} + 2d = 30 + 18.5 \times 2 = 67 \text{ cm}$$

$$d = 23 - 4.5 = 18.5$$

NELLA TRAVATA DI STUDIO: 30×50
 75×23
 (67)

TRAVE EMERGENTE: $V_{rd, max} = 0.9 \times 45 \times 30 \times 0.5 \times 14.17 \times \frac{1.0}{10} \times \frac{2.5}{1 + 2.5^2} = 296.8 \text{ kN} > V_{Ed}$

$$\cot \theta = 2.5$$

$$d = 50 - 5 = 45 \text{ cm}$$

OK!

TRAVE A SPESSORE: $V_{rd, max} = 0.9 \times 18.5 \times 67 \times 0.5 \times 14.17 \times \frac{1.0}{10} \times \frac{2.5}{1 + 2.5^2} = 272.5 \text{ kN} > V_{Ed}$

$$\cot \theta = 2.5$$

$$d = 23 - 4.5 = 18.5$$

OK!

3) PROGETTO ARMATURE A V

DA NORMATIVA: $\frac{A_{sw}}{s} > 1.5 \frac{b_w}{mm} \Rightarrow \frac{mm^2}{m}$

$$s \leq 33 \text{ cm}$$

$$s \leq 0.8 d$$

$$(s \leq 12 \phi_{\min, \text{LONG}} \Rightarrow \text{IN PROSSIMITA' DEGLI APPOGGI RAFFITTO S})$$

TRAVE EMERGENTE

1) $\frac{A_{sw}}{s} > 1.5 b_w$

$$\frac{A_{sw}}{s} > 1.5 \times 300 = 450 \frac{mm^2}{m} = 4.5 \frac{cm^2}{m}$$

$$A_{sw} = 0.5 \times 2 = 1.0 \text{ cm}^2$$

↓ ↓
A1φ8 BRACCI

$$s \leq \frac{1.0}{4.5} = 0.22 \text{ m} \Rightarrow 22 \text{ cm}$$

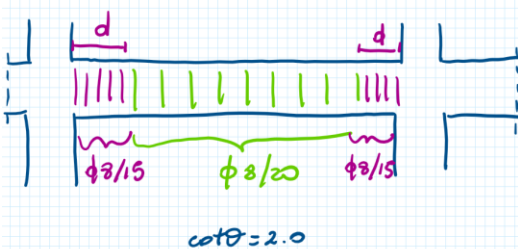
2) $s \leq 33 \text{ cm}$

3) $s \leq 0.8 d = 0.8 \times 45 = 36 \text{ cm}$

[4) $s \leq 12 \times 14 = 168 \text{ mm} = 16.8 \text{ cm}$]

$$\Rightarrow s \leq 22 \text{ cm}$$

$$(\Rightarrow \text{vicino gli appoggi } s \leq 16.8 \text{ cm})$$



TRAVE A SPESSORE

1) $\frac{A_{sw}}{s} > 1.5 b_w$

$$\frac{A_{sw}}{s} > 1.5 \times 670 = 1005 \frac{mm^2}{m} = 10.05 \frac{cm^2}{m}$$

$$A_{sw} = 0.5 \times 4 = 2.0 \text{ cm}^2$$

↓ ↓
A1φ8 BRACCI

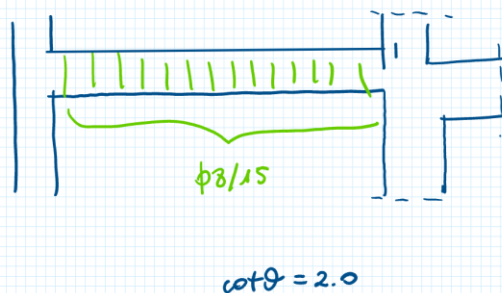
$$s \leq \frac{2.0}{10.05} = 0.20 \text{ m} = 20 \text{ cm}$$

2) $s \leq 33 \text{ cm}$

3) $s \leq 0.8 d = 0.8 \times 18.5 = 14.8 \text{ cm}$

$$(s \leq 0.8 \times 19 = 15.2)$$

$$\Rightarrow s \leq 14.8 \text{ cm} \Rightarrow 15 \text{ cm}$$



$$V_{RdS} = 0.9 d \frac{A_{sw}}{s} f_{yd} \cot \theta$$

$$V_{RdS} = 0.9 \times 45 \times \frac{2 \times 0.5}{s} \times 391.3 \times \frac{2.0}{10}$$

$$V_{RdS} = \frac{3469.5}{s} \text{ kN}$$

$$s = 20 \text{ cm} \rightarrow V_{RdS} = 158.5 \text{ kN}$$

$$s = 15 \text{ cm} \rightarrow V_{RdS} = 211.3 \text{ kN}$$

$$s = 10 \text{ cm} \rightarrow V_{RdS} = 316.9 \text{ kN}$$

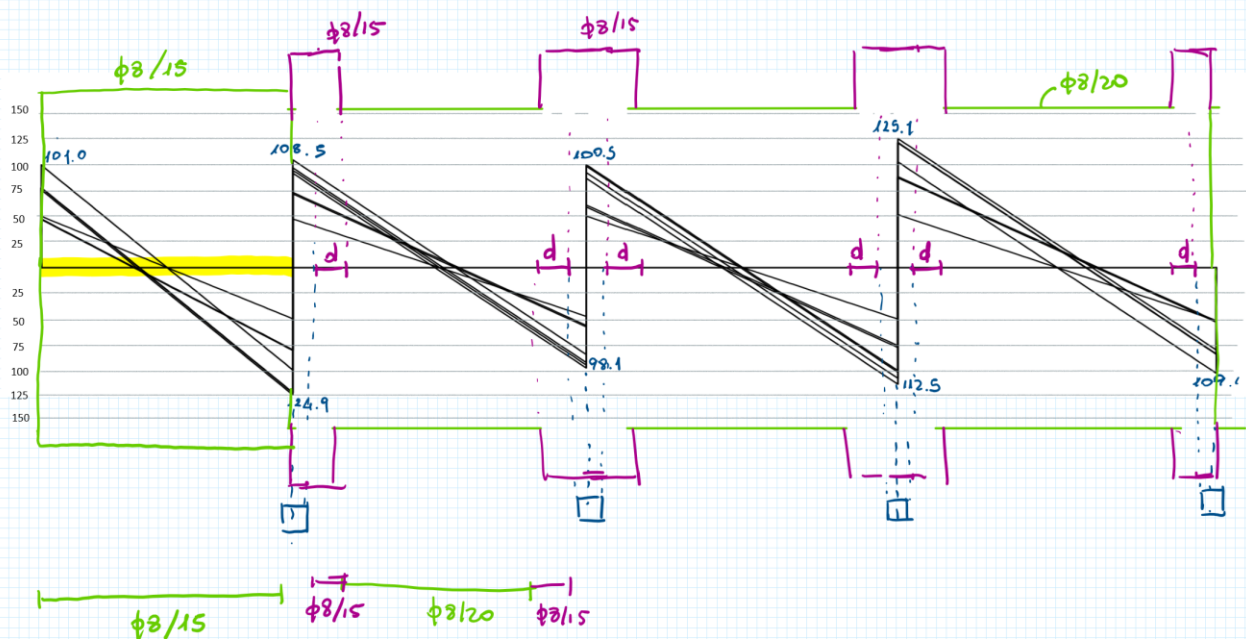
$$V_{RdS} = 0.9 d \frac{A_{sw}}{s} f_{yd} \cot \theta$$

$$V_{RdS} = 0.9 \times 18.5 \times \frac{4 \times 0.5}{s} \times 391.3 \times \frac{2.0}{10}$$

$$V_{RdS} = \frac{2606}{s} \text{ kN}$$

$$s = 15 \text{ cm} \rightarrow V_{RdS} = 173.7 \text{ kN}$$

$$s = 10 \text{ cm} \rightarrow V_{RdS} = 260.6 \text{ kN}$$



ARMATURA DI PARETE \Rightarrow TRAVE EMERGENTE

HO FATTO TRASLAZ. DEL DIAGR. DI M \Rightarrow FUORI CALCOLO

