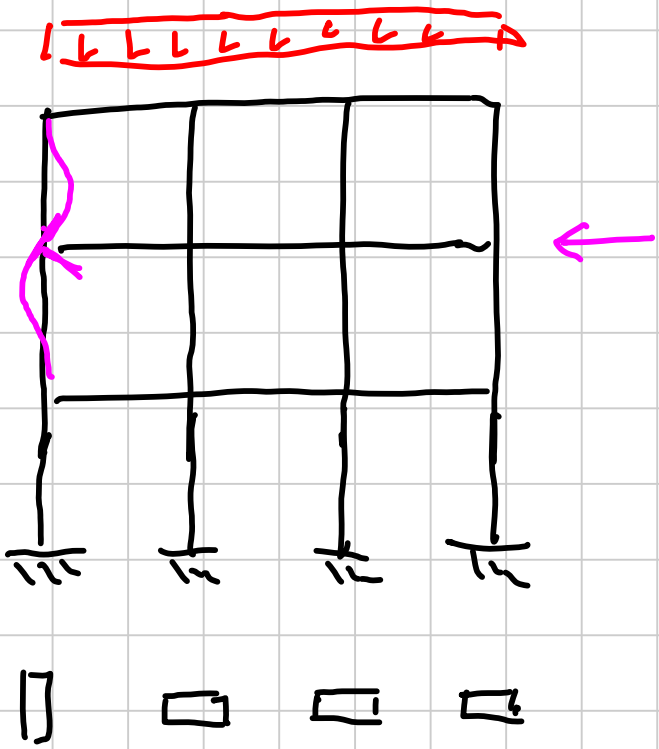
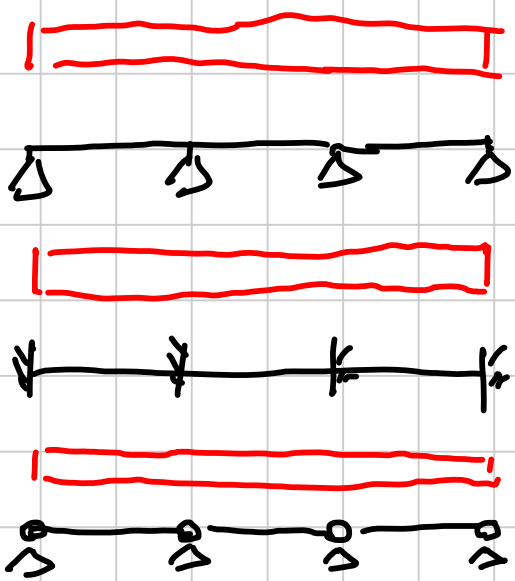
PROGETTO DELLA TRAVE

Titolo nota 04/05/2015

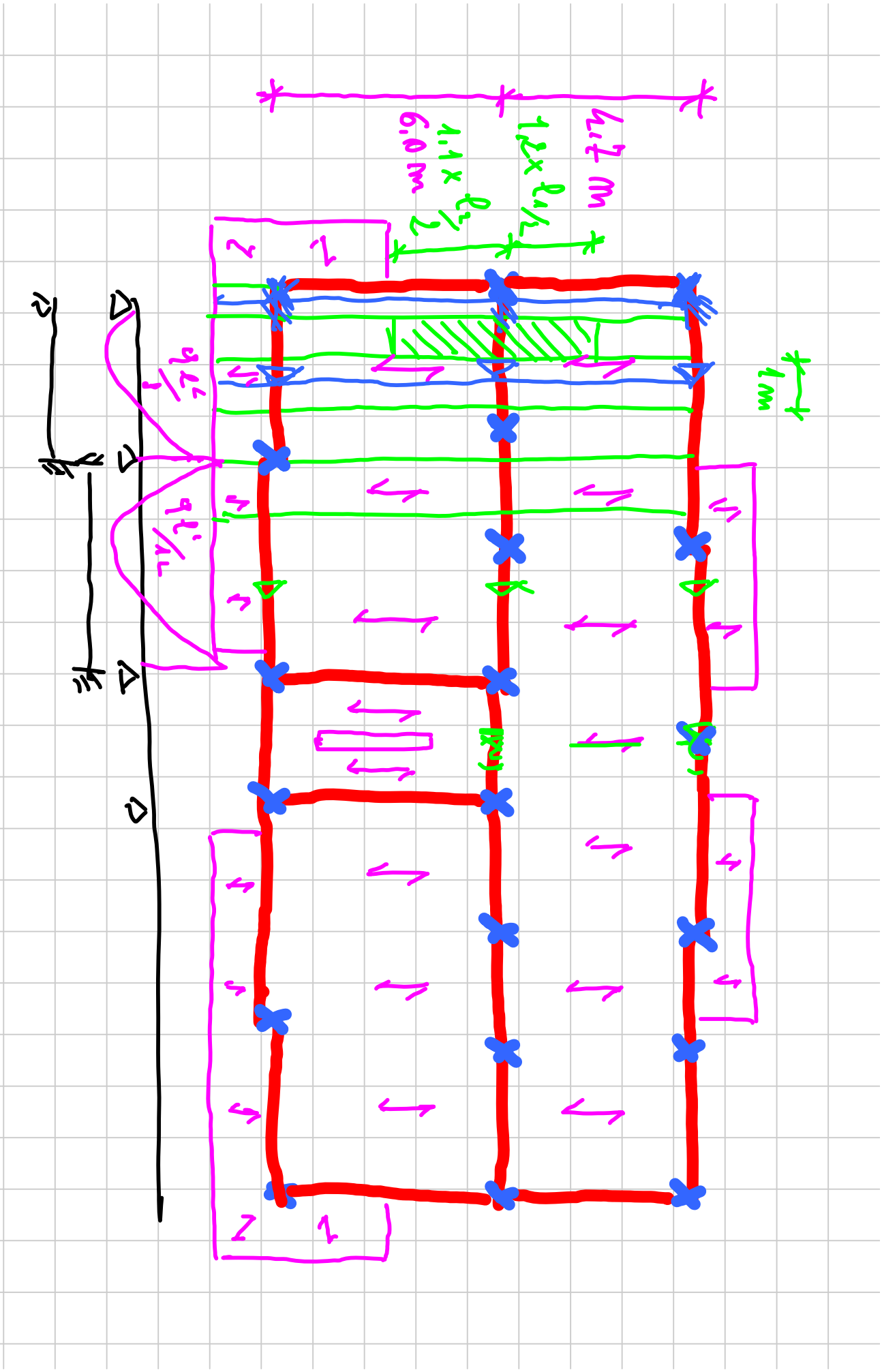


Combinazioni per SLU

più combinazioni di carico



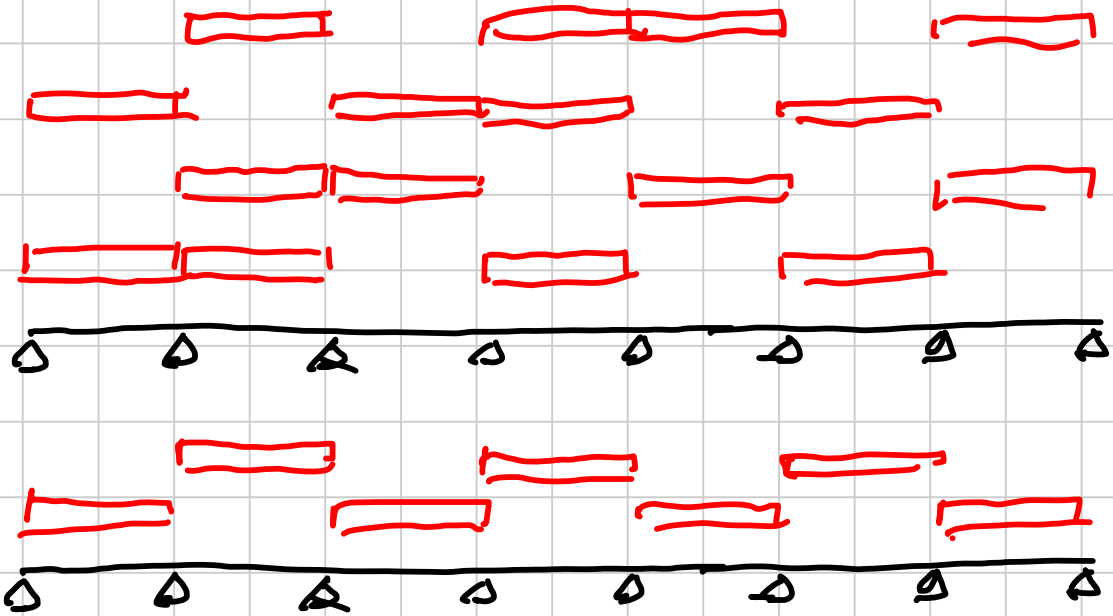
$\frac{G_d + Q_d}{l}$


6.0 m
1.1 x 2 = 2.2 m
1.2 x 2 = 2.4 m
4.7 m
1 m

Carico delle travi

L_i

		G_{2d}	Q_d
Solaio	$1,2\frac{l_1}{2} + 1,1\frac{l_2}{2} =$	6.07×6.1	$5,4 \times 6,1$
	$= 1,2 \times \frac{4,7}{2} + 1,1 \times \frac{6}{2} =$	$37,0$ kN/m	$32,9$ kN/m
	$= 6,1$ m		
Trave		$3,7$ kN/m	
		$40,7$ kN/m	$32,9$ kN/m



Momenti massimi agli appoggi

Momenti massimi in campata

$$M_{Ed} \leq M_{Rd} \quad (30 \times 50)$$

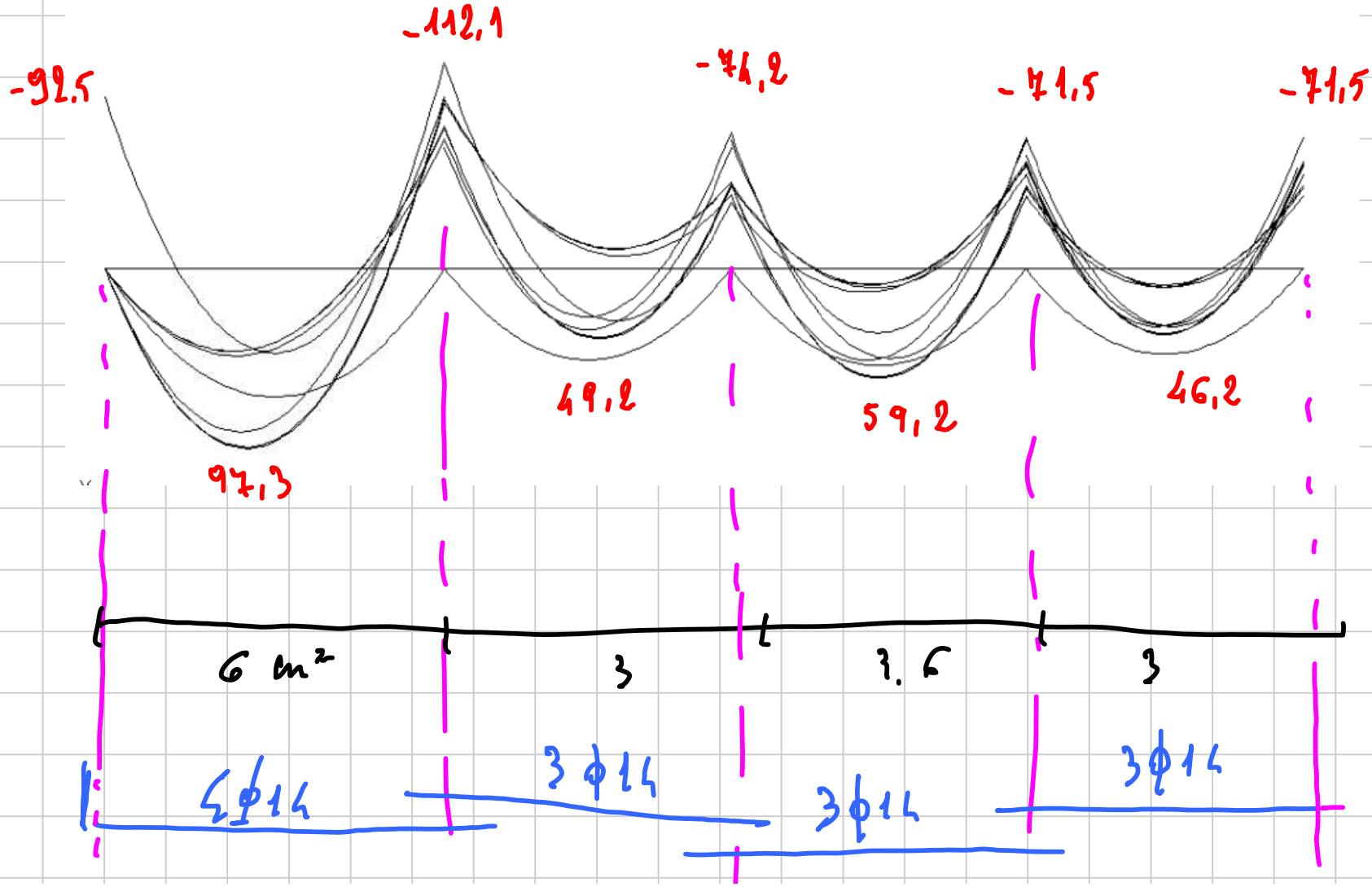
$$M_{Rd} = \frac{b\,d^2}{2 \cdot 2} = \frac{0{,}3 \times 0{,}46^2}{0.018^2} \simeq 195.9\ kN\,m$$

Trem e Jumor

$$M_{Ea} = \frac{q\ell^2}{12}$$

$$M_{Ea} = \frac{b \cdot x'^2}{2,2}$$

$$\Rightarrow b = \frac{2,2 \cdot M_{Ea}}{x'^2}$$


-92,5
-112,1
-74,2
-71,5
-71,5
97,3
49,2
59,2
46,2
6 m²
3
3,6
3
4ϕ14
3ϕ14
3ϕ14
3ϕ14

$$A_{s,min} = \frac{0.26}{f_{yk}} f_{ctm}\, b\, d = 0,26 \times \underbrace{\frac{2,56}{450}}_{0,0015}\, b\, d$$

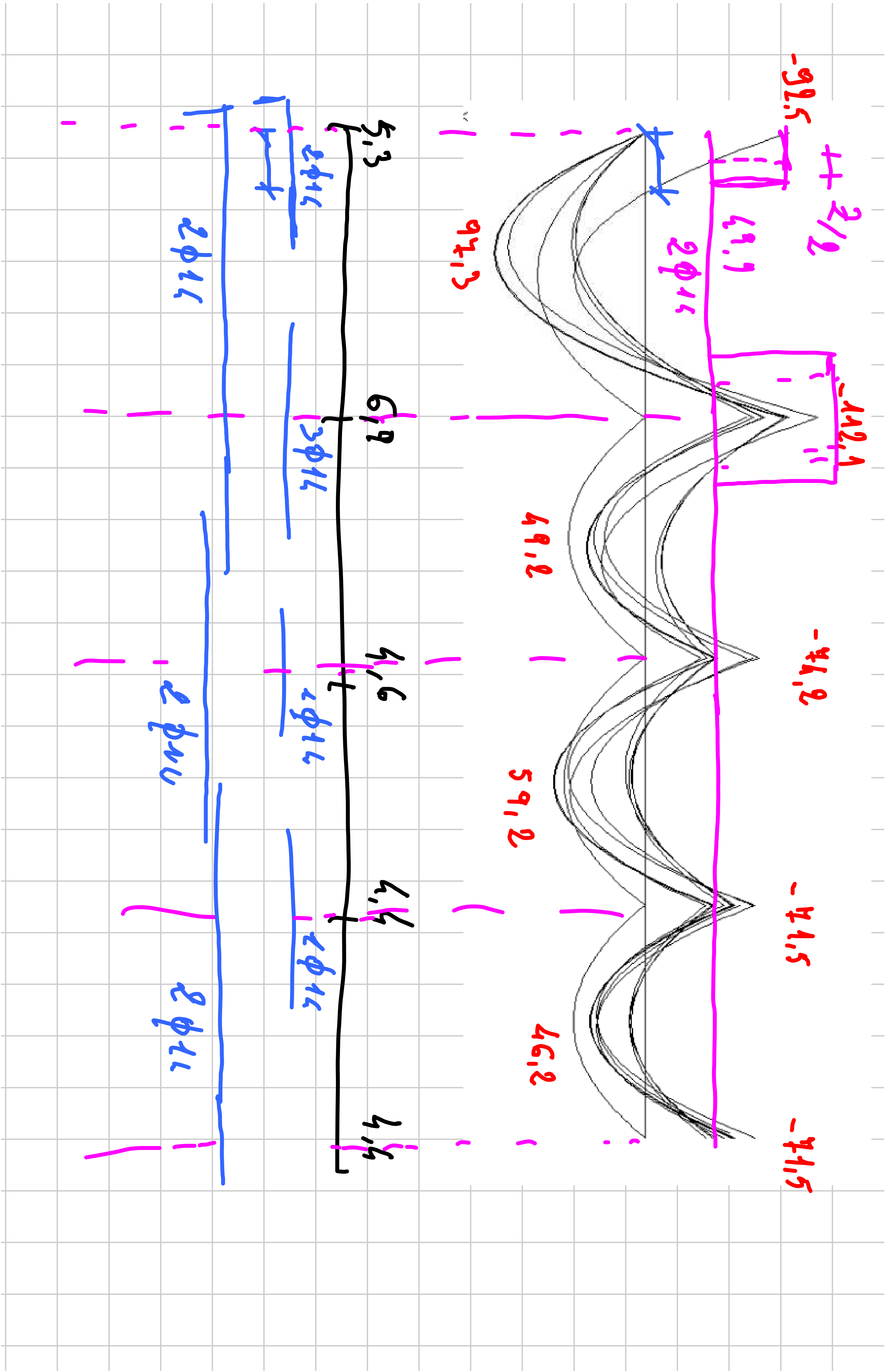
$$A_{s,min} = 0,0015 \times 30 \times 46 = 2,1 \text{ cm}^2$$

$2\phi 14 \quad A_s = 3,08 \text{ cm}^2$

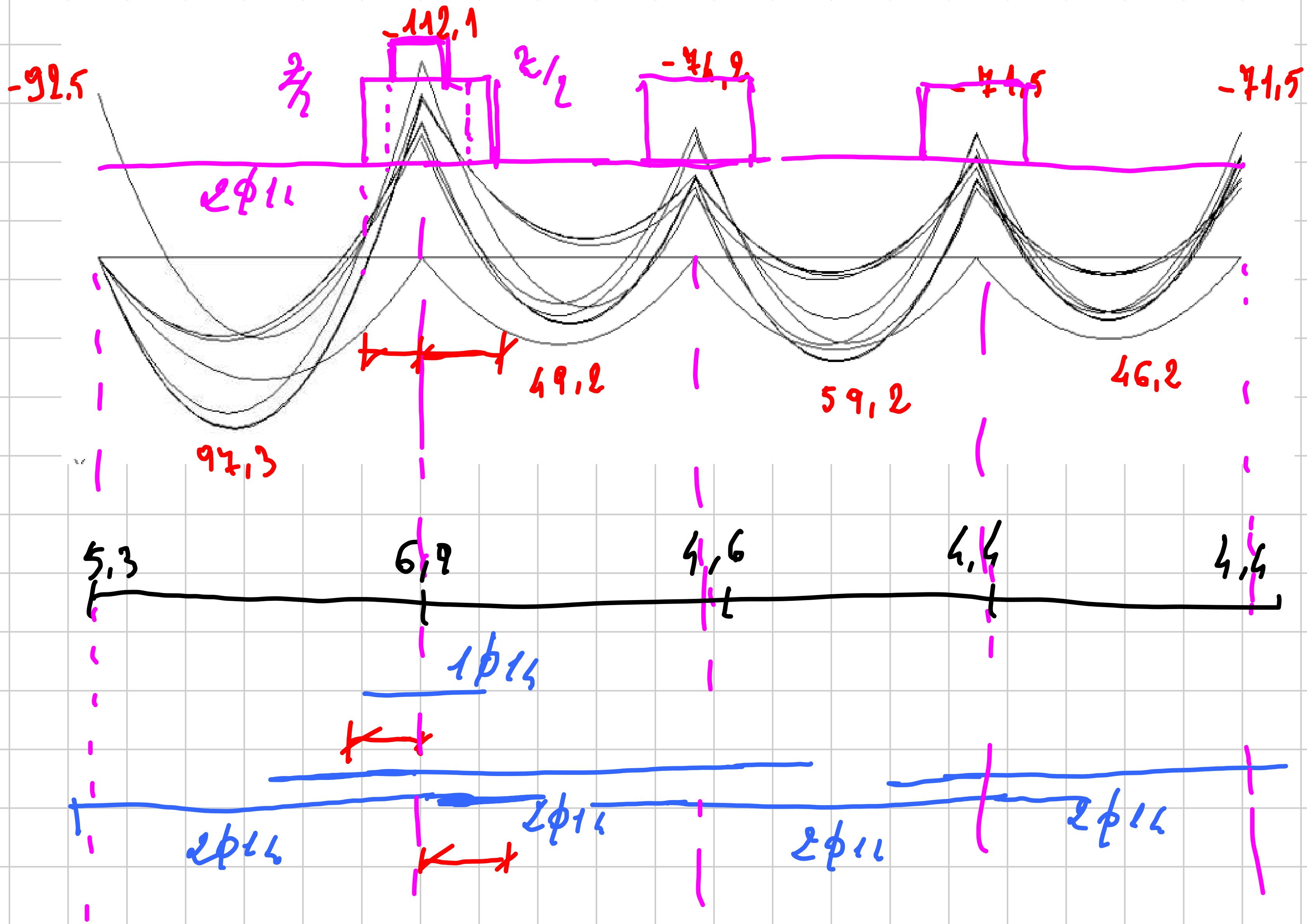
Armature inferioare

Cadre	M_{Ed}	d	A_s
1	97.3	0,46	6 cm²
2	49.2	=	3 cm²
3	59.2	=	3.6 cm²
4	46.2	=	3 cm²

$$A_s = \frac{M_{Ed}}{0,9\, d\, f_{yd}} = \frac{97,3 \times 10}{0,9 \times 0,46 \times 391,3} =$$



-92,5
97,3
-112,1
49,8
-74,8
59,2
-71,5
46,2
-71,5
5,3
6,8
4,6
4,4
4,4
2Φ16
3Φ16
2Φ14


-92,5
2/2
-112,1
2/2
-71,9
-71,5
-71,5
2ϕ11
97,3
49,2
59,2
46,2
5,3
6,9
4,6
4,4
4,4
1ϕ11
2ϕ11
2ϕ11
2ϕ11
2ϕ11

Flexion composée : section quelconque

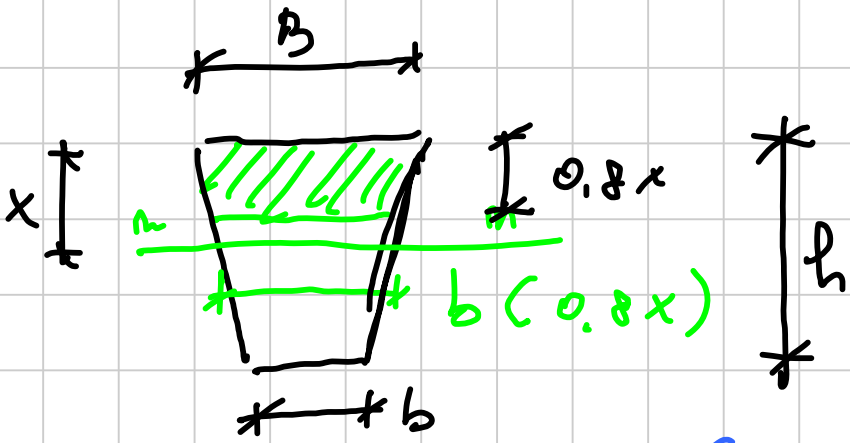
$$\frac{B + 2\,b(0{,}8x)}{B + b(0{,}8x)} \cdot \frac{0{,}8x}{3}$$

$$N_c = -A_c f_{cd}$$

$$\varepsilon'_s = -\frac{x - e}{x} \varepsilon_{cu} \quad \Rightarrow \quad \sigma'_s \quad \Rightarrow \quad N'_s = A'_s \sigma'_s$$

$$\varepsilon_s : \frac{d - x}{x} \varepsilon_{cu} \quad \Rightarrow \quad \sigma_s \quad \Rightarrow \quad N_s = A_s \sigma_s$$

$$N_c + N'_s + N_s = N_{Ed}$$

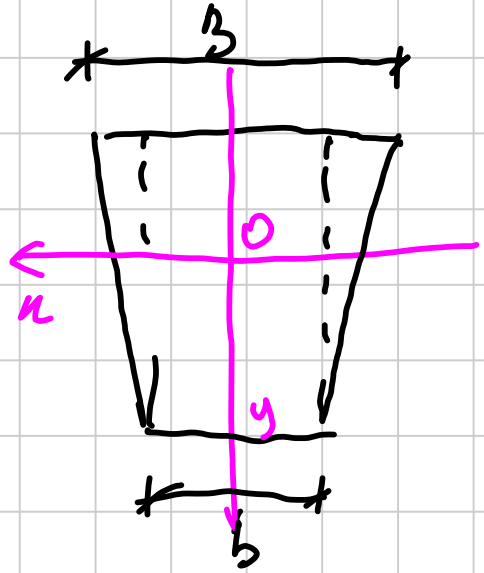


$$b(0{,}8x) = B + (b - B)\frac{0{,}8x}{h}$$

$$A_c = \left[B + b(0{,}8x)\right]\frac{0{,}8x}{2} \qquad N_c = -A_c f_{cd}$$

$$M_{Rd} = -N_c\left(d_{0,sup} - d_{G,sup}\right) - N'_s\left(d_{0,sup} - c\right) +$$

$$+ N_s\left(d_{0,inf} - c\right)$$



$$d_{0,sup} = \frac{B+2b}{B+b}\,\frac{h}{3} = \frac{B+2b}{B+b}\,\frac{h}{3}$$

$$d_{0,inf} = h - d_{0,sup}$$

$$S_0 = \frac{3bh^2}{6} + (B-b)\frac{h^2}{6} = (B+3b-b)\frac{h^2}{6} = (B+2b)\frac{h^2}{6}$$

$$A = (B+b)\frac{h}{2}$$

$$f_1 = f_y \left[1 - 0{,}2 \left(1 - \eta_{min} \right)^2 \right]$$

$$\eta_{min} = \frac{\varepsilon_{c,min}}{\varepsilon_{su}}$$

f_y ; f_1

$$\varepsilon_s' = -\varepsilon_{c2}\left[\eta_{min} + \frac{d}{\frac{\xi}{2}h}\left(1-\eta_{min}\right)^2\right]$$

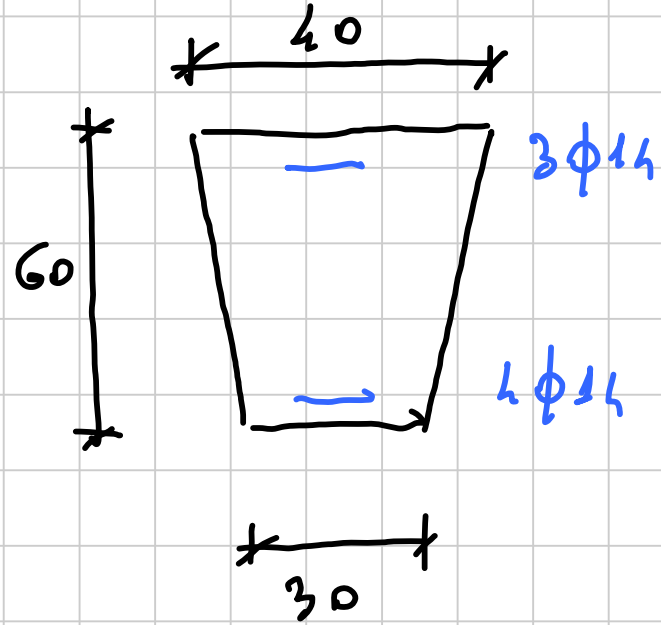
$$\varepsilon_s = -\varepsilon_{c2}\left[\eta_{min} + \frac{c}{\frac{\xi}{2}h}\left(1-\eta_{min}\right)^2\right]$$

$$\varepsilon_s', \varepsilon_s \Longrightarrow \sigma_s', \sigma_s \Rightarrow N_s' + N_s$$

$$N_c = -A_c f_{cd}$$

$$N_c + N_s' + N_s = N_{Ed}$$

$$M_{Rd} = - N_c \left(d_{0,mp} - d_{G,mp} \right) - N_s' \left(d_{0,mp} - e \right) +$$
$$+ N_s \left(d_{0,img} - e \right)$$



N_{Ed} ← ↑ M_{Ed}

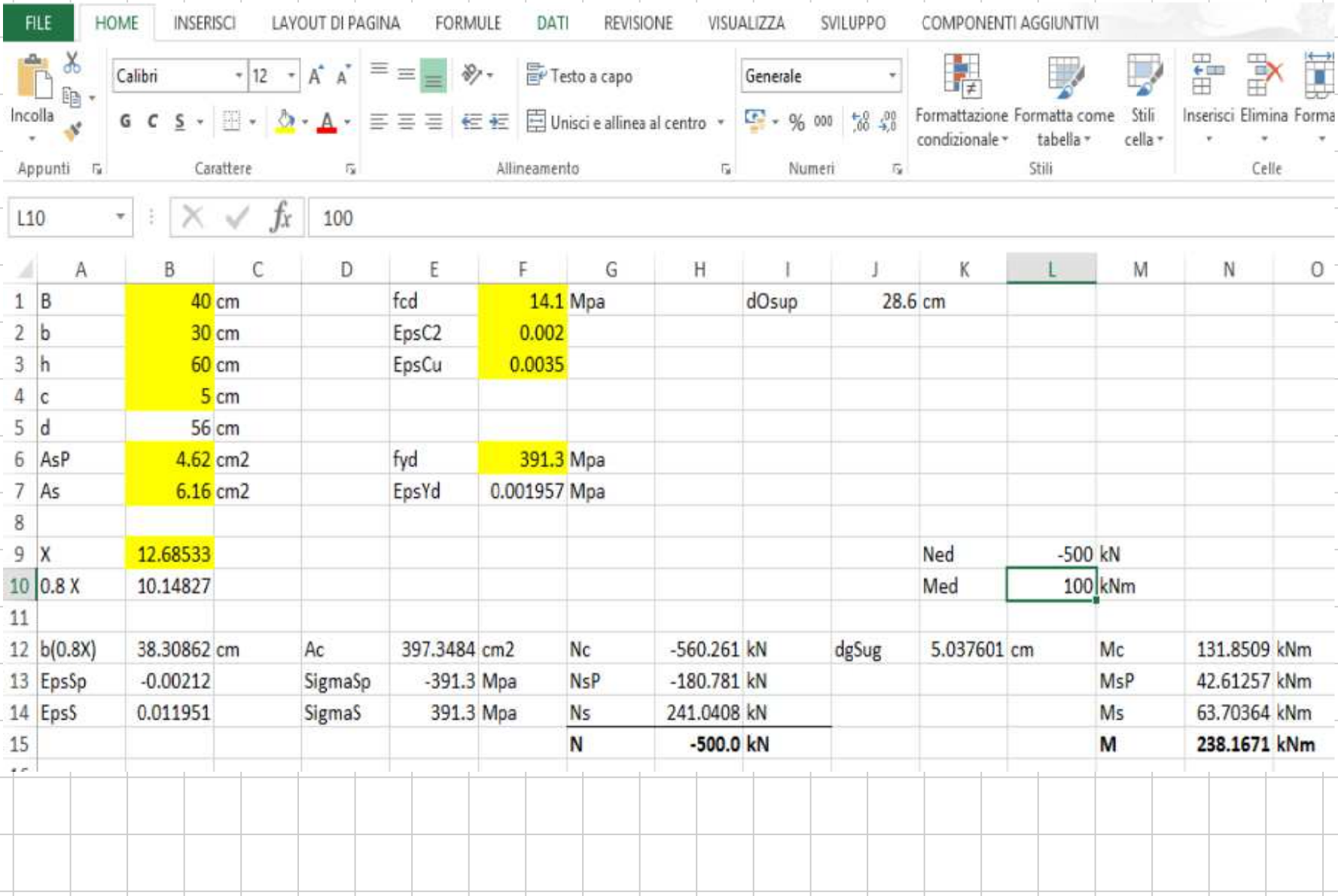
N_{Ed} : −500 KN

M_{Ed} : 100 KN m

C25/30

B450C

c = 4 cm



FILE HOME INSERISCI LAYOUT DI PAGINA FORMULE DATI REVISIONE VISUALIZZA SVILUPPO COMPONENTI AGGIUNTIVI

Incolla · Calibri · 12 · Testo a capo · Generale · Formattazione condizionale · Formatta come tabella · Stili cella · Inserisci · Elimina · Forma

Appunti · Carattere · Allineamento · Numeri · Stili · Celle

L10 · 100

	A	B	C	D	E	F	G	H	I	J	K	L	M	N	O
1	B	40	cm		fcd	14.1	Mpa		dOsup	28.6	cm				
2	b	30	cm		EpsC2	0.002									
3	h	60	cm		EpsCu	0.0035									
4	c	5	cm												
5	d	56	cm												
6	AsP	4.62	cm2		fyd	391.3	Mpa								
7	As	6.16	cm2		EpsYd	0.001957	Mpa								
8															
9	X	12.68533									Ned	-500	kN		
10	0.8 X	10.14827									Med	100	kNm		
11															
12	b(0.8X)	38.30862	cm	Ac	397.3484	cm2	Nc	-560.261	kN	dgSug	5.037601	cm	Mc	131.8509	kNm
13	EpsSp	-0.00212		SigmaSp	-391.3	Mpa	NsP	-180.781	kN				MsP	42.61257	kNm
14	EpsS	0.011951		SigmaS	391.3	Mpa	Ns	241.0408	kN				Ms	63.70364	kNm
15							**N**	**-500.0**	**kN**				**M**	**238.1671**	**kNm**

C25/30

B450C

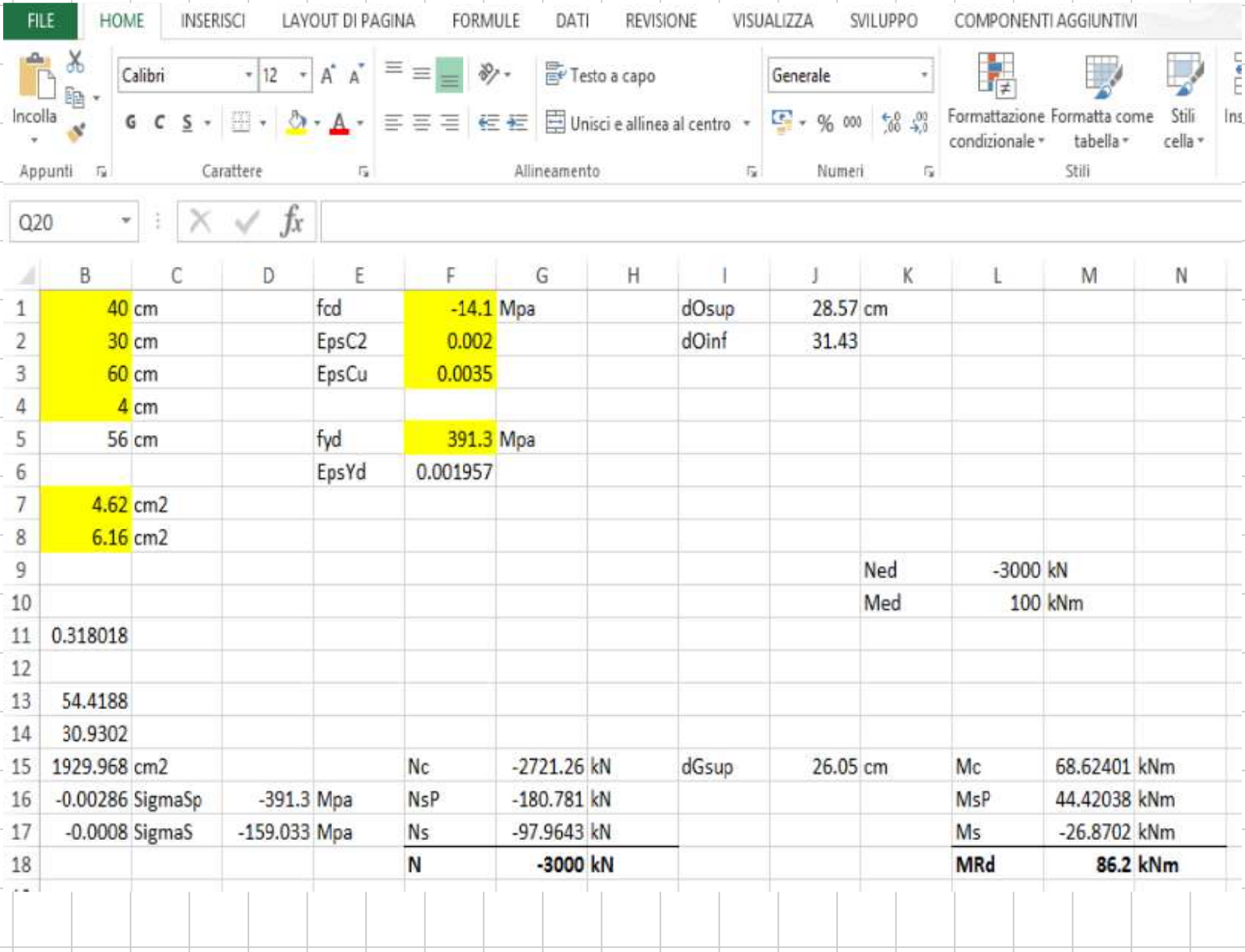
c = 4 cm

$N_{Ed} = -3000\ kN$

$M_{Ed} = 100\ kN\,m$

V_{Ed}

M_{Ed}



FILE HOME INSERISCI LAYOUT DI PAGINA FORMULE DATI REVISIONE VISUALIZZA SVILUPPO COMPONENTI AGGIUNTIVI

Incolla · Calibri · 12 · Testo a capo · Generale · Formattazione condizionale · Formatta come tabella · Stili cella · Appunti · Carattere · Allineamento · Numeri · Stili

Q20

	B	C	D	E	F	G	H	I	J	K	L	M	N
1	40	cm		fcd	-14.1	Mpa		dOsup	28.57	cm			
2	30	cm		EpsC2	0.002			dOinf	31.43				
3	60	cm		EpsCu	0.0035								
4	4	cm											
5	56	cm		fyd	391.3	Mpa							
6				EpsYd	0.001957								
7	4.62	cm2											
8	6.16	cm2											
9										Ned	-3000	kN	
10										Med	100	kNm	
11	0.318018												
12													
13	54.4188												
14	30.9302												
15	1929.968	cm2			Nc	-2721.26	kN	dGsup	26.05	cm	Mc	68.62401	kNm
16	-0.00286	SigmaSp	-391.3	Mpa	NsP	-180.781	kN				MsP	44.42038	kNm
17	-0.0008	SigmaS	-159.033	Mpa	Ns	-97.9643	kN				Ms	-26.8702	kNm
18					**N**	**-3000**	**kN**				**MRd**	**86.2**	**kNm**