Titolo nota 22/11/2017

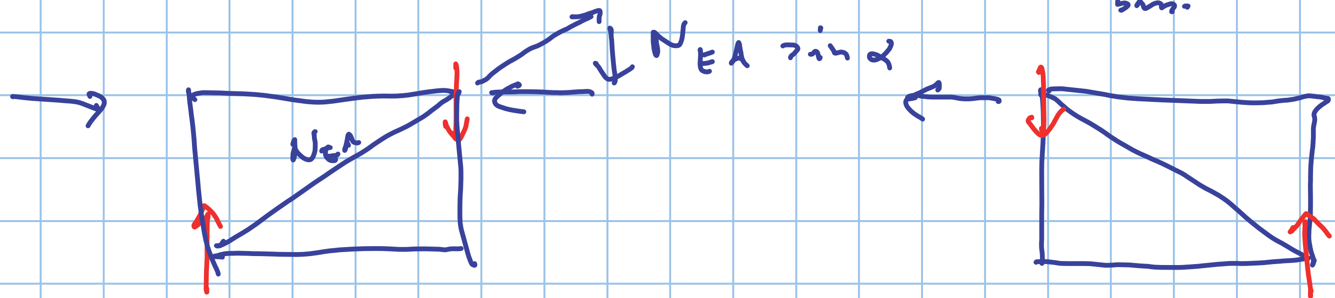
COLONNA PERIMETRALE

idem, adiacente al controvento y

tratto in HN

car. vert.	N_{Ed}	N_{diag}	$N_{sin\alpha}$		c.v. + trasv.	N_{Ed}
175.7	175.7	119.3	54.0		229.7	229.7
404.3	580.0	349.4	158.1	54.0	562.4	792.0
404.3	984.3	565.8	255.9	158.1	660.2	1452.2
404.3	1388.6	763.2	345.3	255.9	749.5	2201.7
404.3	1792.9	930.0	420.7	345.3	825.0	3026.7

verso il basso | verso l'alto



COLONNA INTERNA

contenuti NO

	N_{Ed}
↓ 344.8	344.8
↓ 672.7	1017.6
↓ 672.7	1690.3
↓ 672.7	2363.0
↓ 672.7	3035.8

dimensionamento con $N = 3036\ kN$

$$N_{b,Rd} = \chi A \frac{f_y}{\gamma_{M0}}$$

$$N_{Ed} \leq N_{Rd} \rightarrow N_{Ed} \leq \chi A \frac{f_y}{\gamma_{M0}}$$

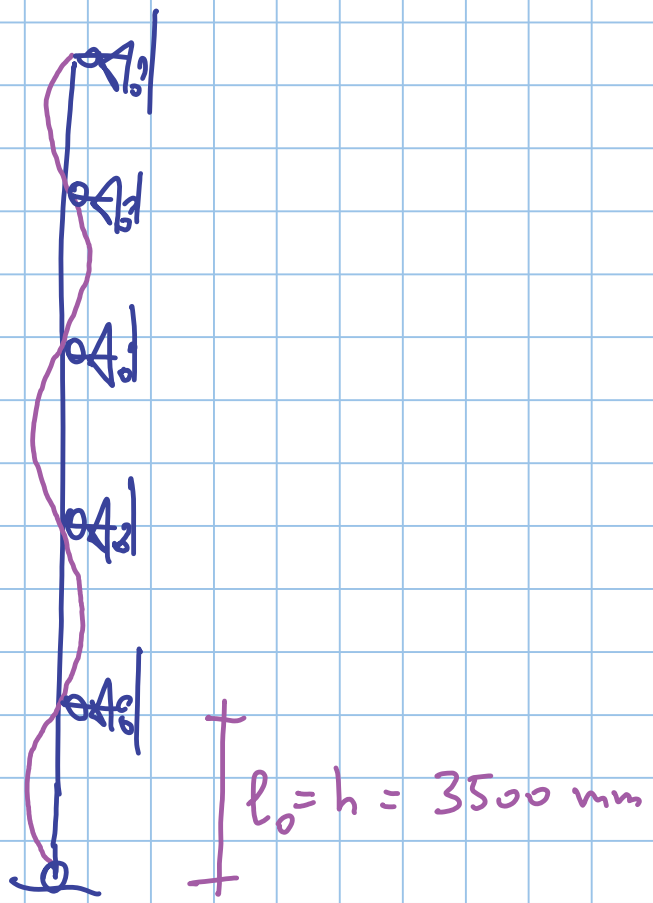
$$A \geq \frac{N_{Ed}\,\gamma_{M0}}{\chi f_y}$$

Es. $\chi = 0.8$

acciaio S275

$$A = \frac{3036 \times 10^3 \times 1.05}{0.8 \times 275} = 144.9 \times 10^2\ mm^2$$

HE 300 B



$A = 149.1 \times 10^2$ mm^2

$i_y = 12.95 \times 10$ mm

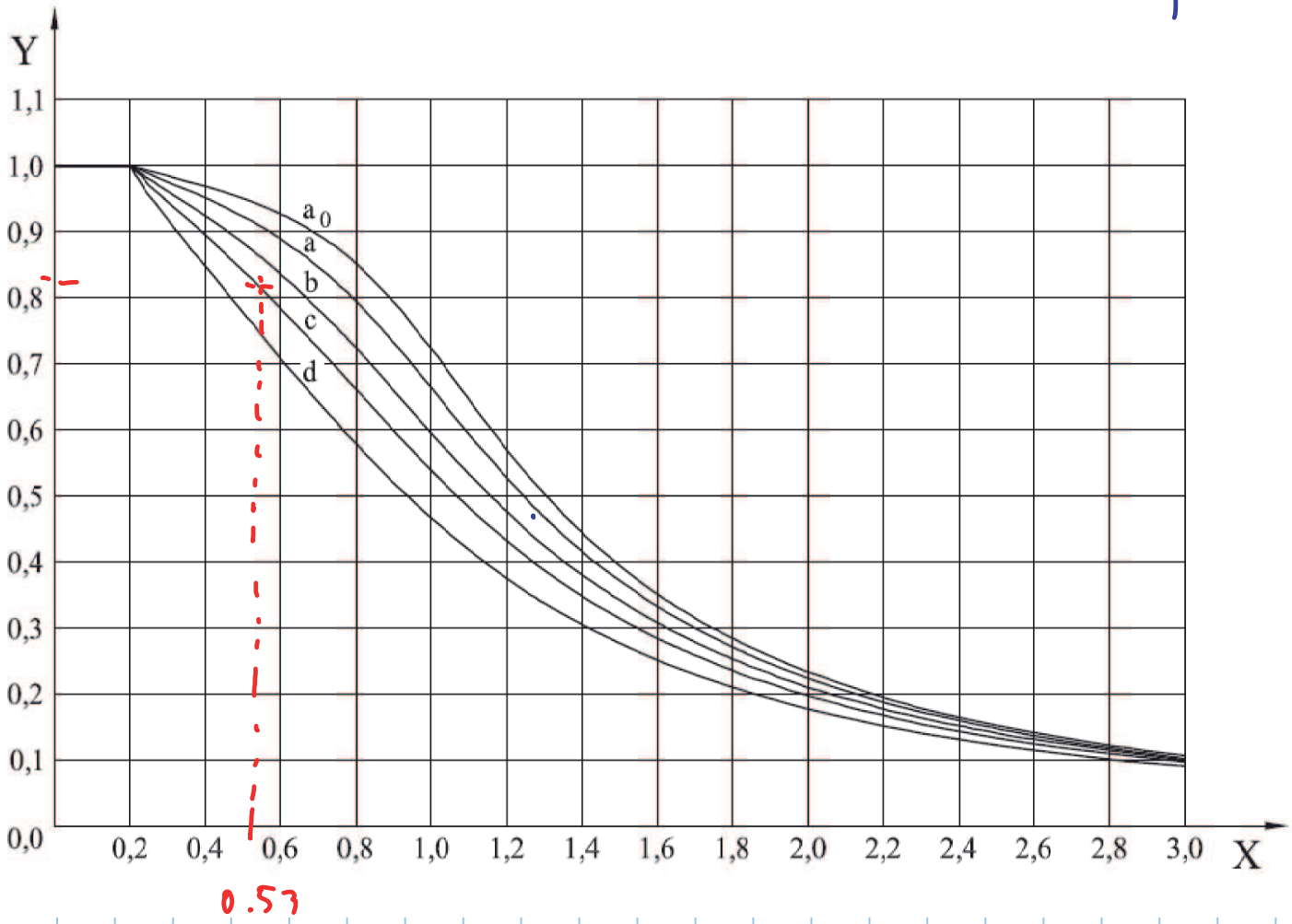
$i_z = 7.58 \times 10$ mm

$$\lambda_{max} = \frac{l_0}{i_{min}} = \frac{3500}{75.8} = 46.17$$

$$\overline{\lambda} = \frac{\lambda}{\lambda_1} = \frac{46.17}{86.8} = 0.532$$

$$\lambda_1 = \pi \sqrt{\frac{E}{f_y}} = 86.8$$

curva c ;



0.82

0.57

$\chi = 0.82$

$$N_{b,Rd} = 0.82 \times 149.1 \times 10^2 \times \frac{275}{1.05} = 3202\ kN$$

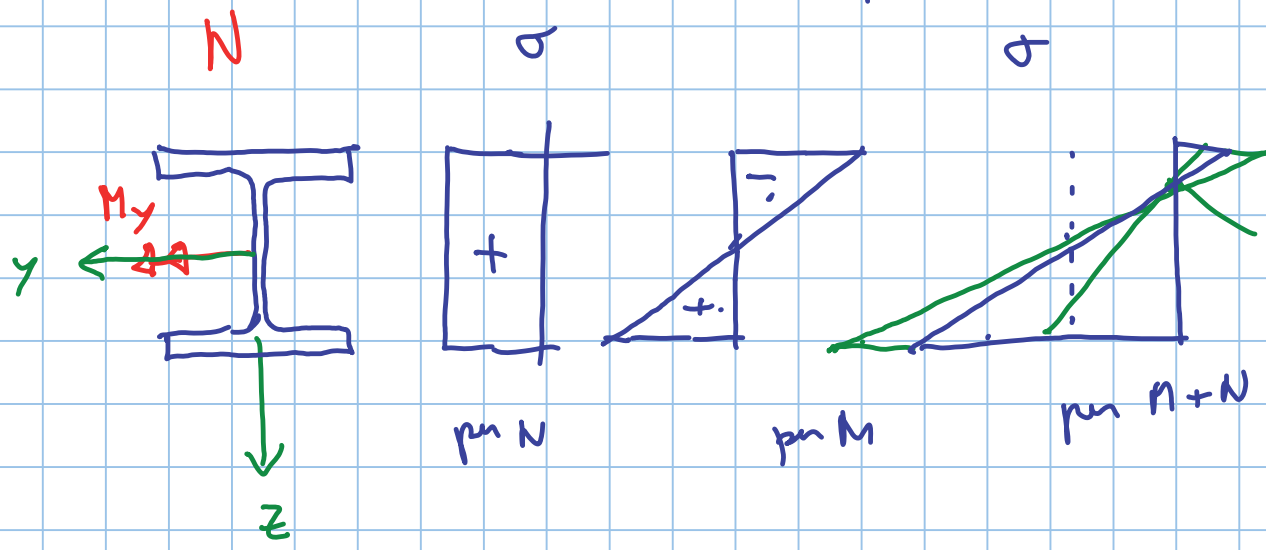
ok

FLESSIONE COMPOSTA

N, M_y, M_z — deviata T_c

N, M_y — retta T_c

m. della linea



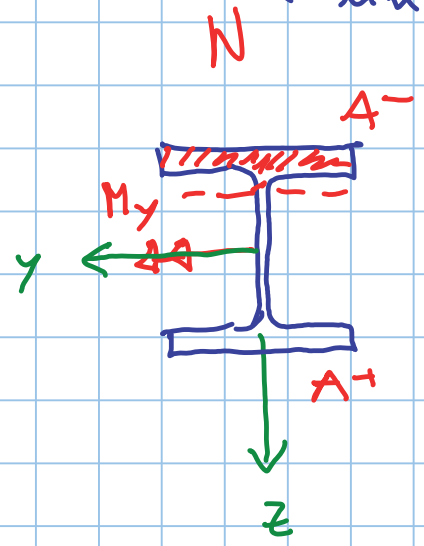
se M, N variano proporzionalmente

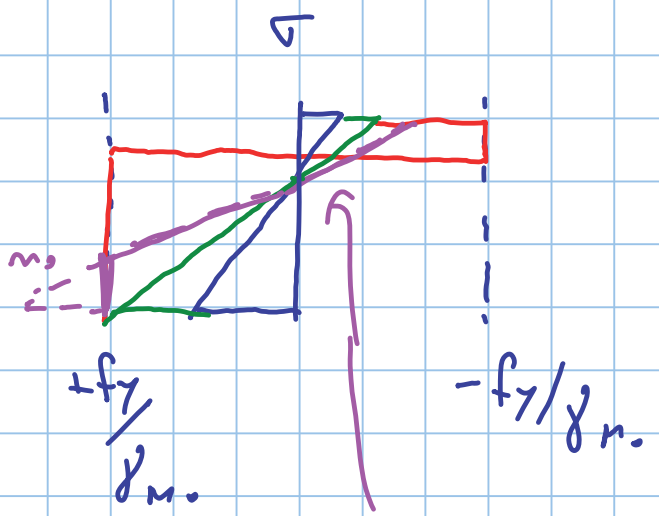
mant. di nulla non cambia

$$\sigma = \frac{N}{A} + \frac{M_y}{I_y} z \leq \frac{f_y}{\gamma_{M_0}}$$

vale per sezioni in classe 3

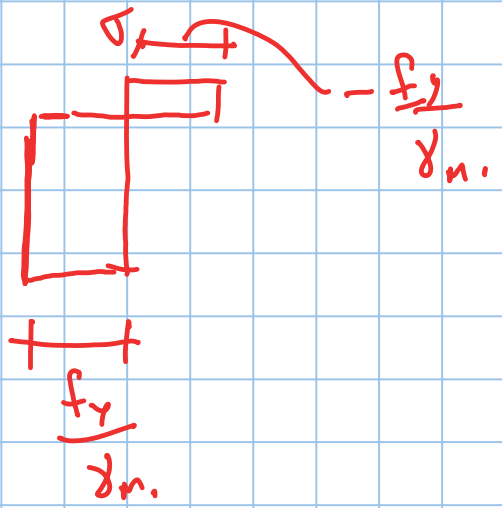
modello non lineare





l'asse neutro si sposta un po' verso l'alto

M, N variano in proporzione



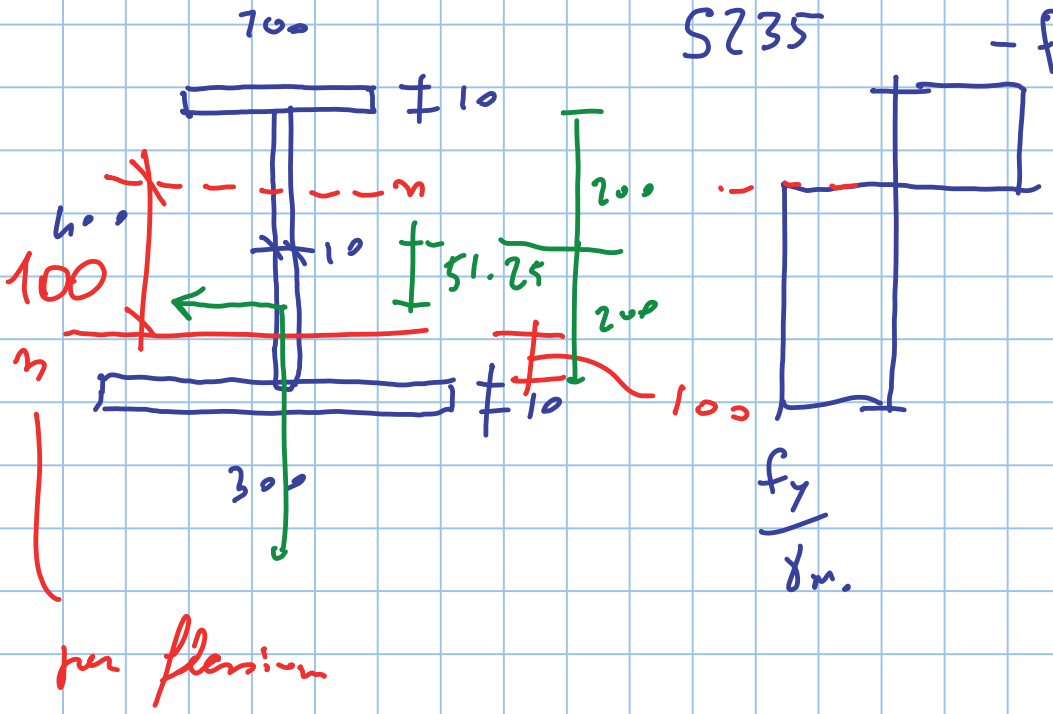
$$N = \int \sigma \, dA$$

$N_{applicato}$

$$N = \int \sigma \, dA = N^+ + N^- = \frac{f_y}{\gamma_{M_0}} A^+ - \frac{f_y}{\gamma_{M_0}} A^- = (A^+ - A^-) \frac{f_y}{\gamma_{M_0}}$$

$$N^+ = \int_{A^+} \frac{f_y}{\gamma_{M_0}} \, dA$$

$$N^- = \int_{A^-} -\frac{f_y}{\gamma_{M_0}} \, dA$$



S235

$N_{Ed} = 447.6$ kN

$M_{Ed} = 100.0$ kN m

per flessione

$$N = (A^+ - A^-)\frac{f_y}{\gamma_{M0}}$$

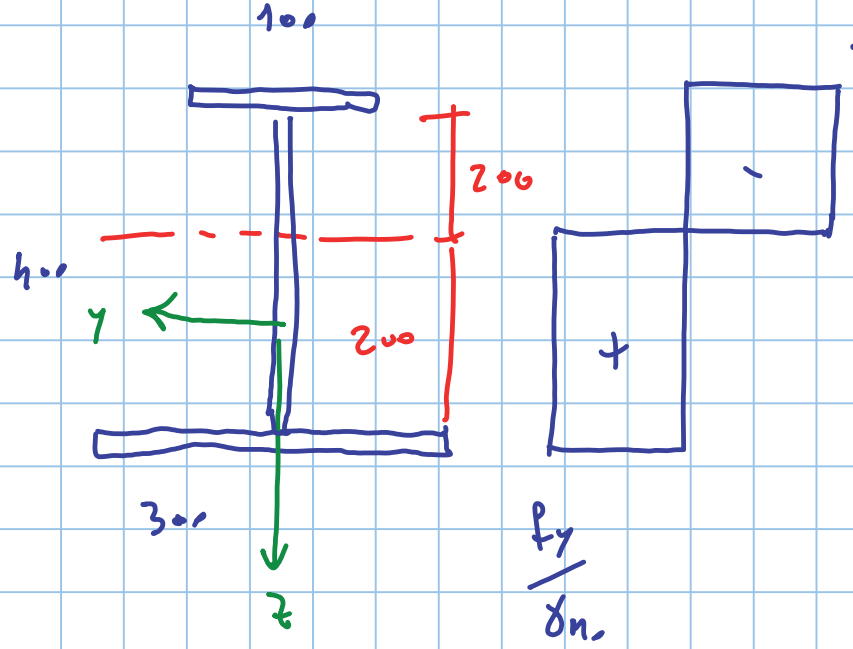
$$(A^+ - A^-) = \frac{N\,\gamma_{M0}}{f_y} = \frac{447{,}6 \cdot 1{,}05}{235} = 2000$$

$A^+ - A^- = 2000$ mm²

$A^+ + A^- = 8000$ mm²

$2A^+ = 10000$

$A^+ = 5000$



$$N = \int \sigma \, dA$$

$$M_y = \int \sigma z \, dA$$

$$M_y = \int_{A^+} \frac{f_y}{\gamma_{M0}} z \, dA + \int_{A^-} -\frac{f_y}{\gamma_{M0}} z \, dA =$$

$$= \frac{f_y}{\gamma_{M0}} \int_{A^+} z \, dA - \frac{f_y}{\gamma_{M0}} \int_{A^-} z \, dA$$

$$M_y = \left[S_{A^+} - S_{A^-} \right] \frac{f_y}{\gamma_{M0}} = 2 S_{A^+} \frac{f_y}{\gamma_{M0}} \quad \Big| \; S_{A^+} + S_{A^-} = 0 \Rightarrow S_{A^-} = -S_{A^+}$$

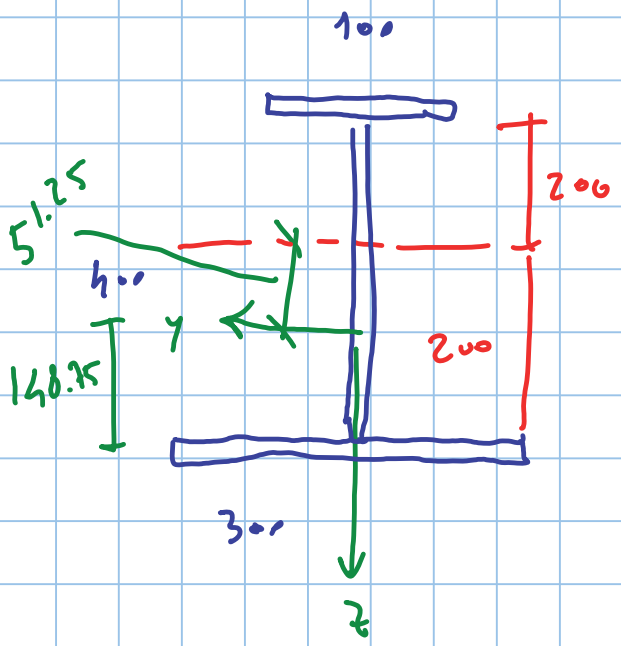
$$M_{Rd} = 2\, S_{A^+}\, \frac{f_y}{\gamma_{M0}}$$

S_{A^+} = momento statico dell'area tesa rispetto all'asse baricentrico

QUESTO VALE

per flessione semplice → area tesa = metà della sezione

per flessione composta → area tesa dipende da N

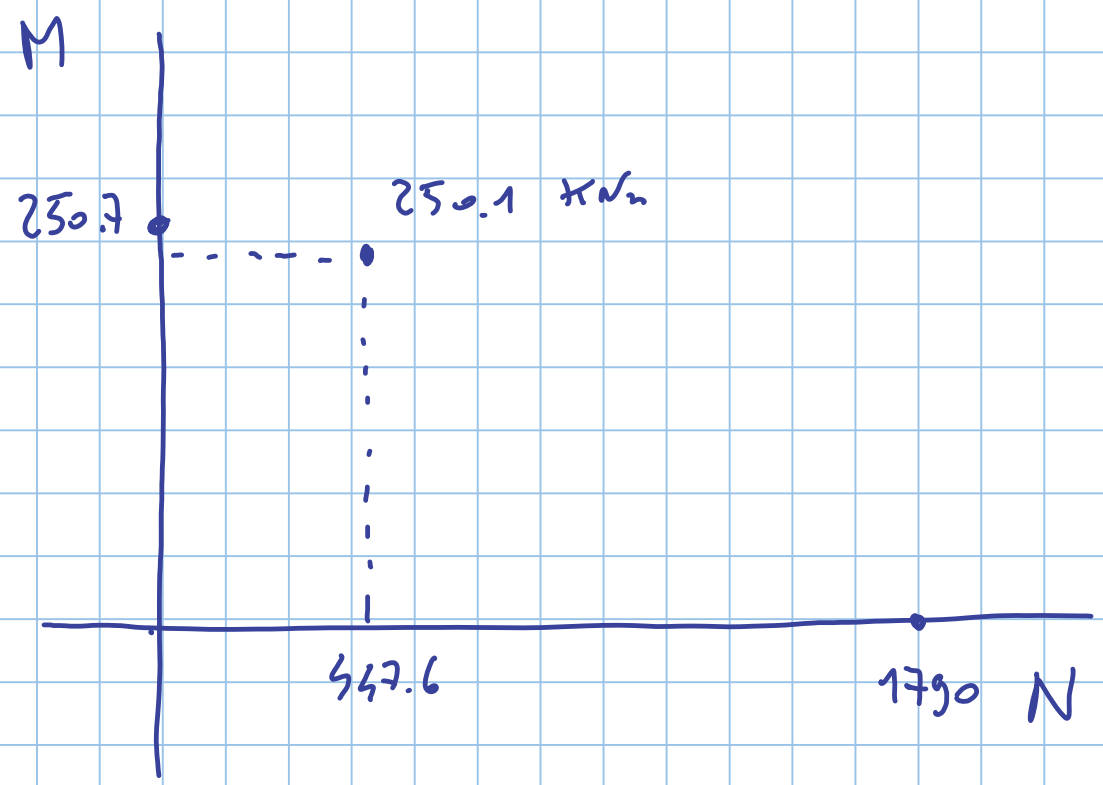


$$S_{A+} = 300 \times 10 \times 153.75 + 200 \times 10 \times 48.75 =$$

$$= 558.75 \times 10^3 \ mm^3$$

$$M_{Rd} = 2 S_{A+} \frac{f_y}{\gamma_{M0}} = 2 \times 558.75 \times 10^3 \times \frac{235}{1.05} =$$

$$= 250.1 \ kNm$$



$A = 80 \times 10^2 \ mm^2$

$N_{Rd} = \frac{80 \times 10^2 \times 235}{1.05} =$

$= 1790 \ kN$

per $N = 0$ $\quad M_{Rd} = 250.7 \ kNm$

per $N = 547.6 \ kN$ $\quad M_{Rd} = 250.1 \ kNm$

per $N = 1790 \ kN$ $\quad M = 0$