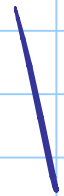


COMPRESSIONE

Titolo nota

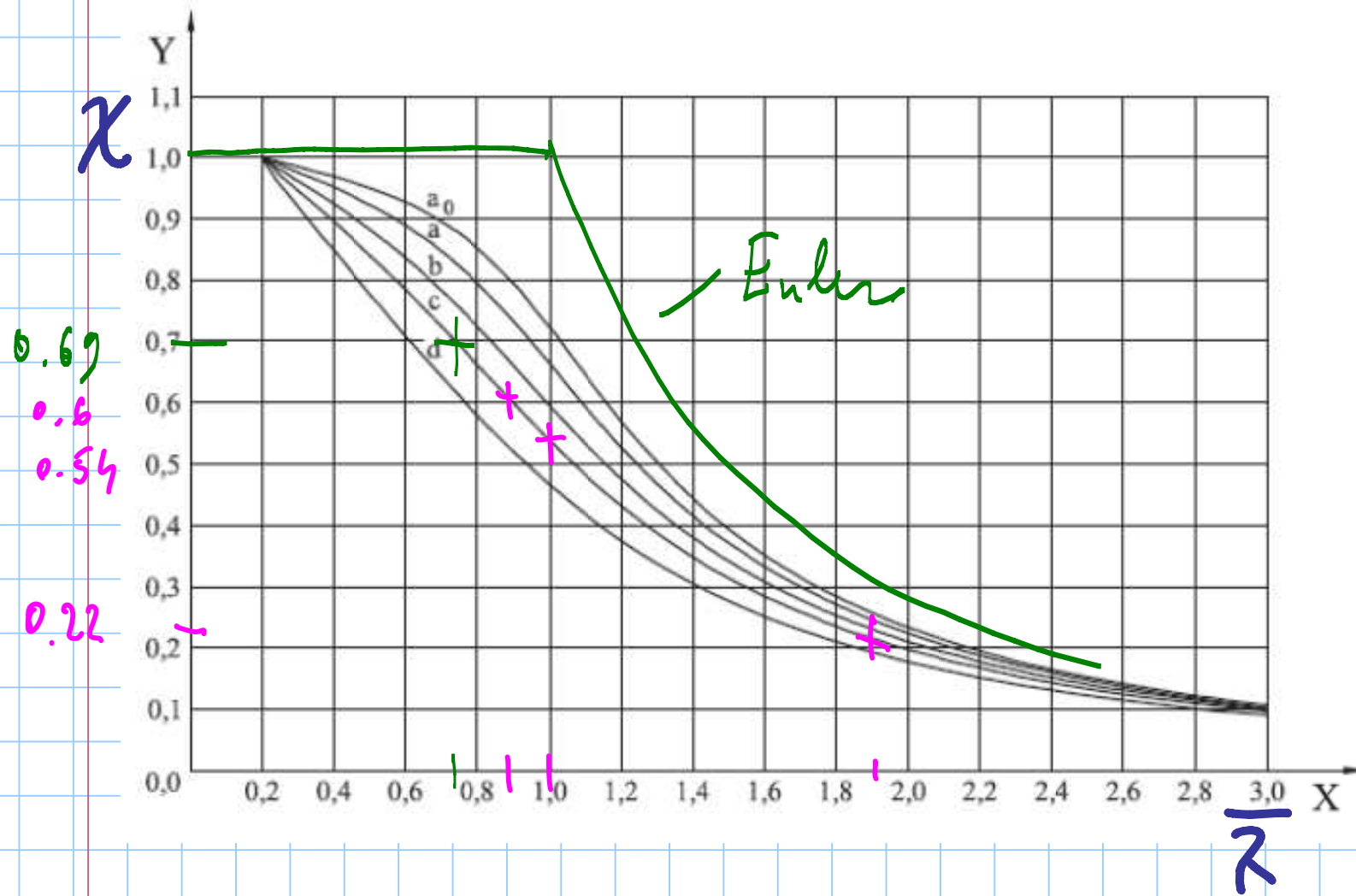
20/11/2012

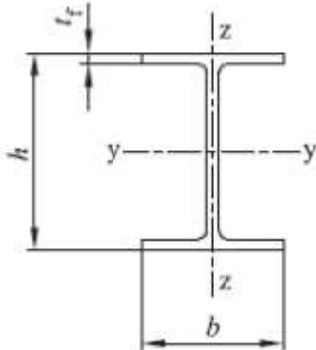
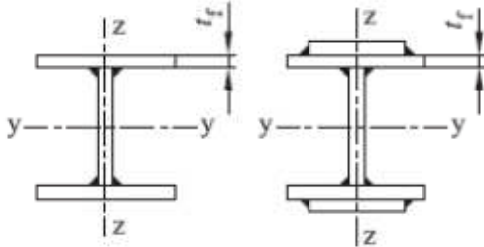
$$N_{b,rd} = \chi A \frac{f_y}{\gamma_{M1}}$$



buckling = INSTABILITA'


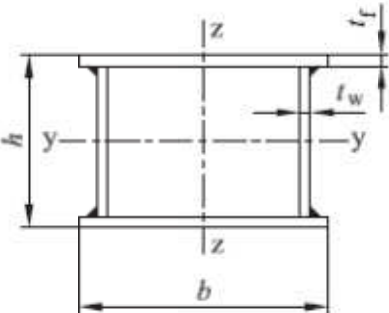
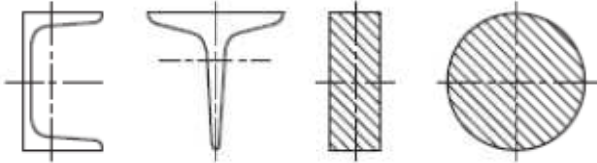
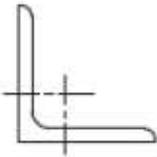
X Snellezza adimensionale \bar{v}
Y Coefficiente di riduzione χ

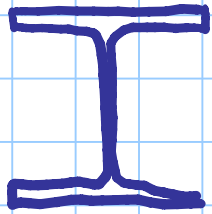


| Sezione trasversale | | Limiti | | Instabilità intorno all'asse | Curva di instabilità | |
|---------------------|--|--------------------------|---|------------------------------|----------------------------------|----------------|
| | | | | | S 235 S 275 S 355 S 420 | S 460 |
| Sezioni laminate |  | $Hb > 12$ | $t_f \leq 40 \text{ mm}$ | y-y z-z | a b | a_0 a_0 |
| | | | $40 \text{ mm} < t_f \leq 100 \text{ mm}$ | y-y z-z | b c | a a |
| | | $Hb \leq 12$ | $t_f \leq 100 \text{ mm}$ | y-y z-z | b c | a a |
| | | | $t_f > 100 \text{ mm}$ | y-y z-z | d d | c c |
| Sezioni al saldate |  | $t_f \leq 40 \text{ mm}$ | | y-y z-z | b c | b c |
| | | $t_f > 40 \text{ mm}$ | | y-y z-z | c d | c d |

curve a_0 a b c d

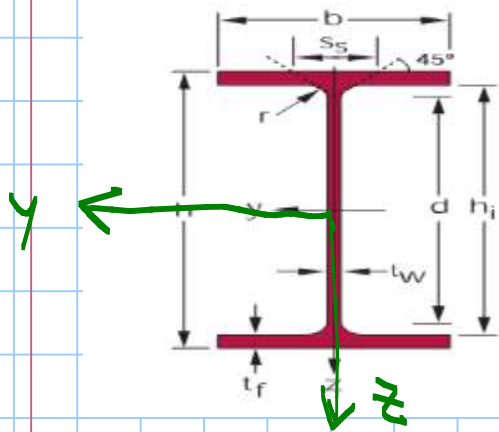
α 0.13 0.21 0.34 0.49 0.76

| | | | | | |
|--------------------------------|---|---|-----------|-----|-------|
| Sezioni tubolari |  | Laminate a caldo | qualunque | a | a_0 |
| | | Formate a freddo | qualunque | c | c |
| Sezioni a cassone saldate |  | In generale (ad eccezione di quanto riportato sotto) | qualunque | b | b |
| | | Saldature spesse: $a > 0,5 t_f$ $b/t_f < 30$ $h/t_w < 30$ | qualunque | c | c |
| Sezioni a U, T e sezioni piene |  | | qualunque | c | c |
| Sezioni a L |  | | qualunque | b | b |



HEB 240

S 275



$\bar{\lambda}$

$$l_0 = 10.00 \text{ m}$$

l_0

i

$$\lambda = \frac{l_0}{i}$$

λ_1

$$\bar{\lambda} = \frac{\lambda}{\lambda_1}$$

$$I_y = 11260 \text{ cm}^4$$

$$i_y = 103.1 \text{ mm}$$

$$I_z = 3923 \text{ cm}^4$$

$$i_z = 60.8 \text{ mm}$$

$$A = 10600 \text{ mm}^2$$

$$\lambda_{\max} = \frac{l_0}{i_{\min}} = \frac{10\,000}{60.8} = 164.5$$

$$\lambda_1 = \pi \sqrt{\frac{E}{f_1}} = 3.1416 \sqrt{\frac{206\,000}{275}} = 86.0$$

$$\bar{\lambda} = \frac{\lambda_{\max}}{\lambda_1} = \frac{164.5}{86.0} = 1.91$$

dal grafico

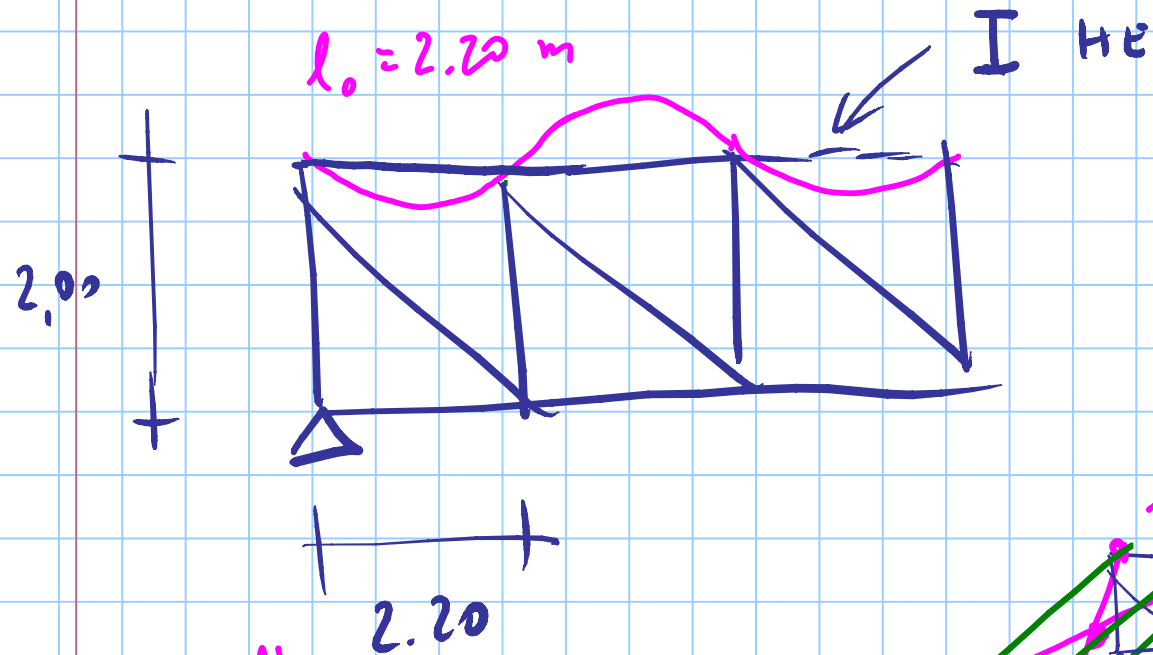
curva C
 $\bar{\lambda}$ 1.91

$\Rightarrow \chi \approx 0.22$

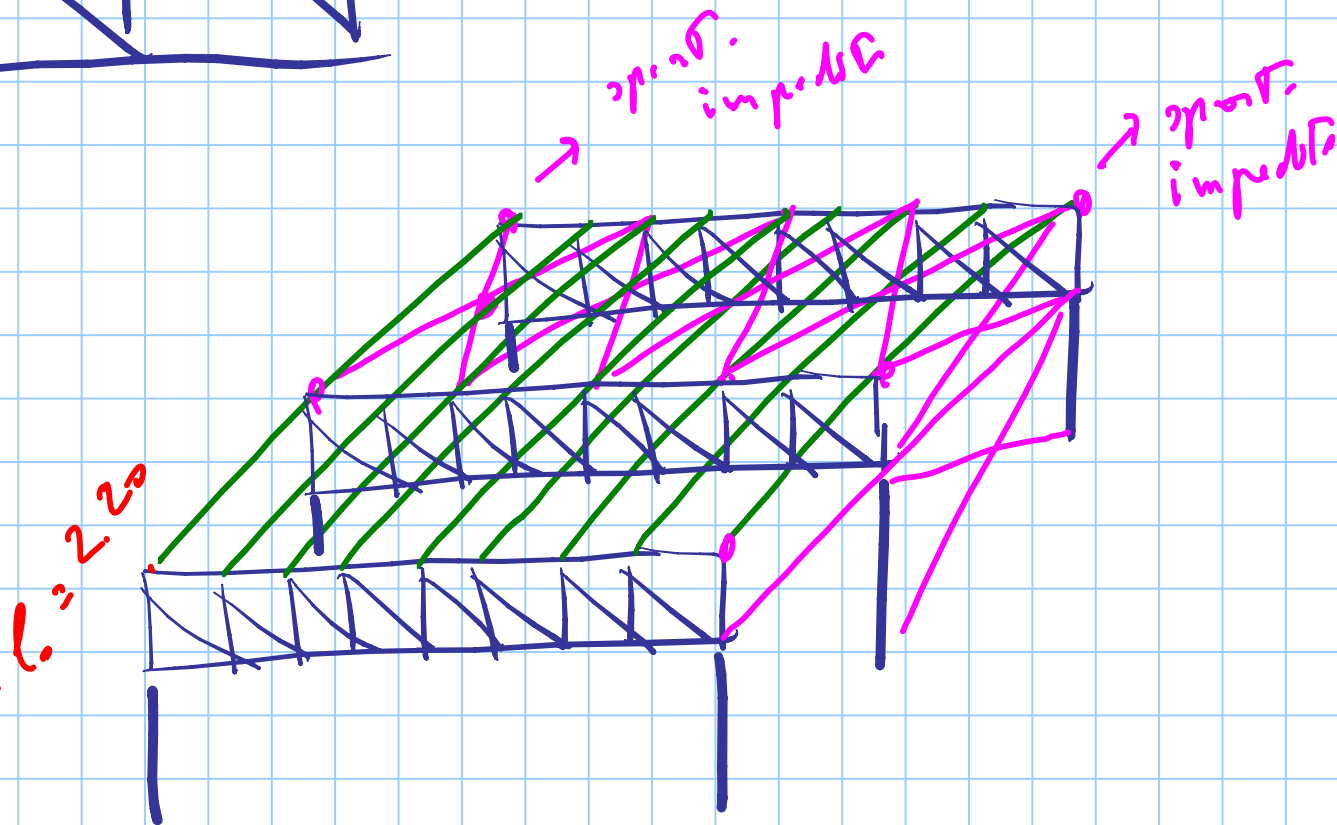
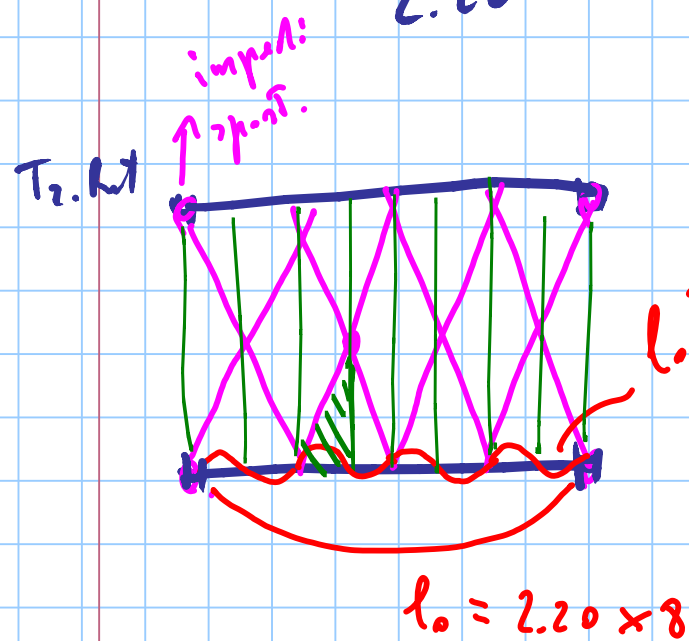
$$\phi = \frac{1}{2} [1 + \alpha(\bar{\lambda} - 0.2) + \bar{\lambda}^4] = \frac{1}{2} [1 + 0.49(1.91 - 0.2) + 1.91^4] \\ = 2.743$$

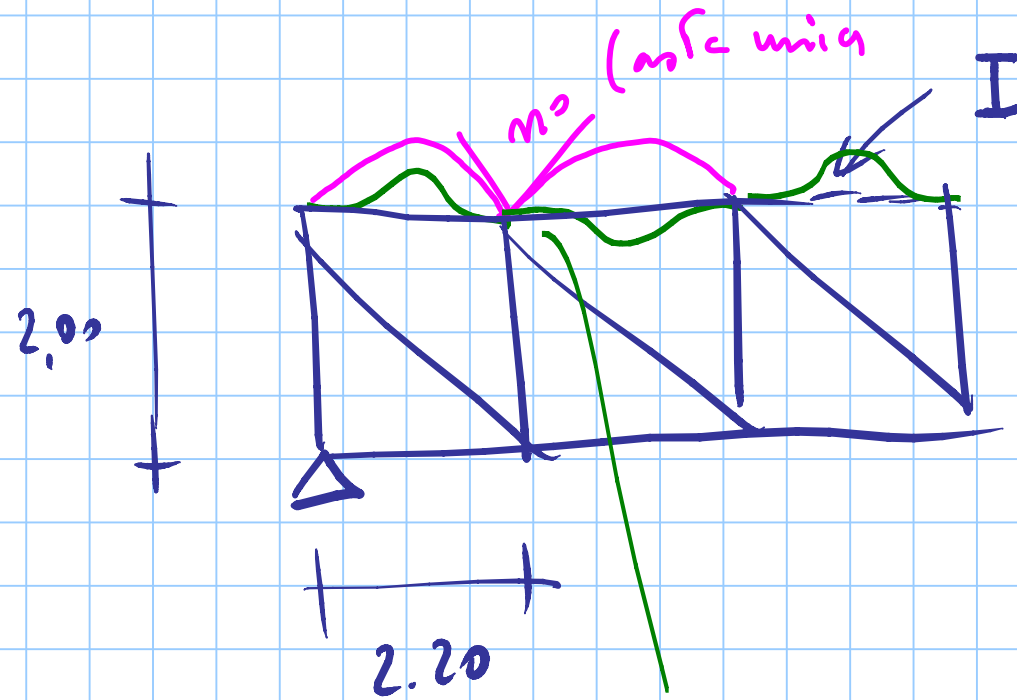
$$\chi = \frac{1}{\phi + \sqrt{\phi^2 - \bar{\lambda}^2}} = \frac{1}{2.743 + \sqrt{2.743^2 - 1.91^2}} = 0.212$$

$$N_{b,R1} = \chi A \frac{f_y}{\gamma_{m1}} = 0.212 \times \frac{10600}{10^3} \times \frac{275}{1.05} = 588.6 \text{ kN}$$



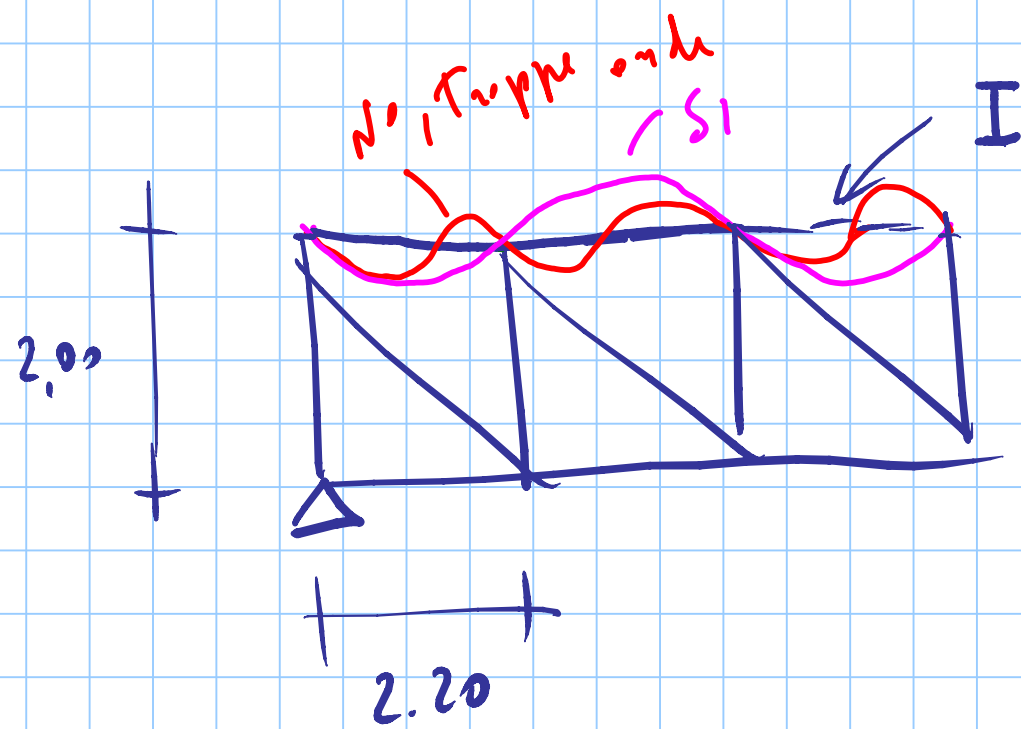
$$N_{Ed} = 350 \text{ kN}$$





nod. bloccati alle rotazioni

No anche sotto car. deform. flessionale.



DIMENSIONAMENTO

$$N_{Ed} = 350 \text{ kN} \quad S275$$

$$l_0 = 2.20 \text{ m}$$

χ di tentativo, in base all'esperienza

$$\text{Es. } \chi = 0.5$$

$$N_{Ed} \leq N_{b,Rd} = \chi A \frac{f_y}{\gamma_{M1}} \Rightarrow A \geq \frac{N_{Ed} \gamma_{M1}}{\chi f_y}$$

$$A \geq \frac{350 \times 10^3 \times 1.05}{0.5 \times 275} = 2673 \text{ mm}^2 = 26.73 \text{ cm}^2$$

x m. HE

HE 120 B

$A = 34.0 \text{ cm}^2$

HE 140 A

$A = 31.4 \text{ cm}^2$

$i_{\min} = 35.2 \text{ mm}$

$$\lambda = \frac{2200}{35.2} = 62.5$$

$$\bar{\lambda} = \frac{62.5}{86.0} = 0.727$$

$$N_{b,Rd} = 0.69 \times \frac{31.4 \times 10^2}{10^3} \times \frac{275}{1.05} = 567 \text{ kN}$$

$$N_{Ed} = 350 \text{ kN} < N_{b,Rd} \quad \text{OK}$$

$$\chi = 0.69 \rightarrow A \geq \frac{350 \times 10^3 \times 1.05}{0.69 \times 275} = 1937 \text{ mm}^2 = 19.37 \text{ cm}^2$$

| | | | |
|----------|-------------------------|------------------|-------------------------|
| HE 120 A | $A = 25.3 \text{ cm}^2$ | $i_{min} = 30.2$ | $\bar{\lambda} = 0.847$ |
| HE 100 A | 21.2 | 25.1 | 1.019 |