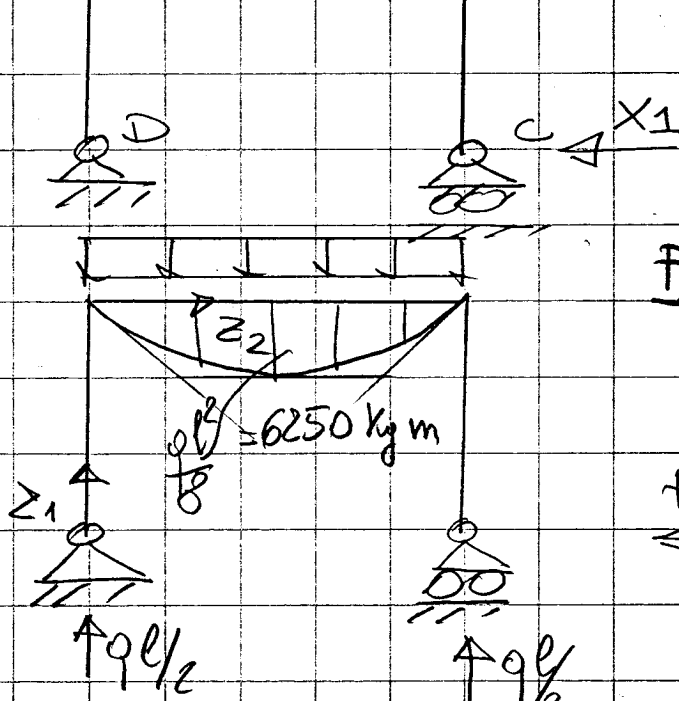
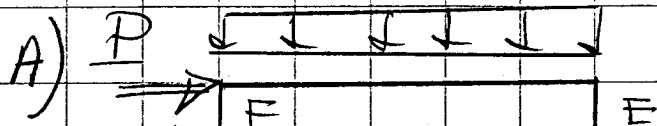
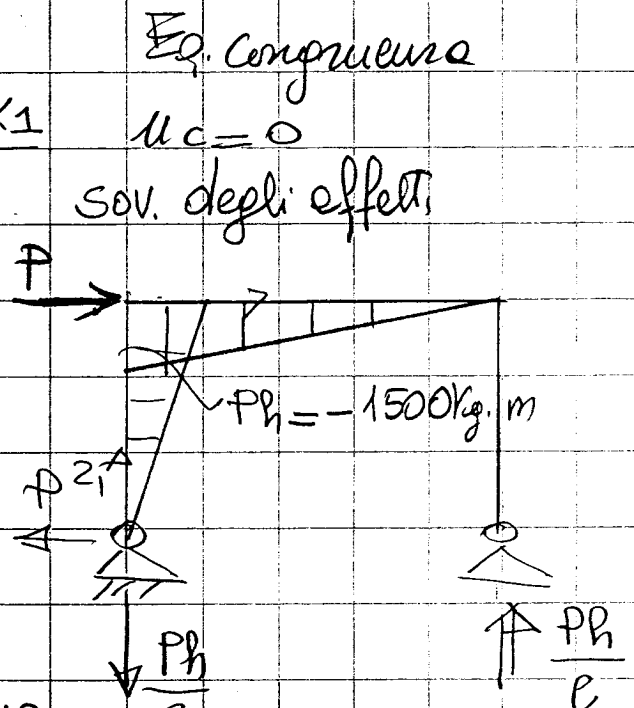


Scienze delle Costruzioni II

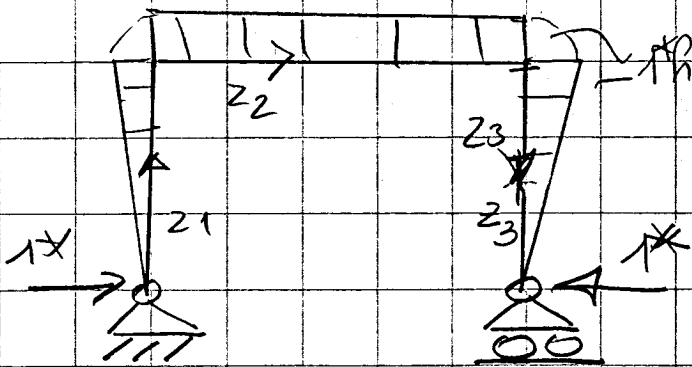
prime prove in "itinerare".



$$M_{02} = \frac{0.1}{2} Z_2 - \frac{0.1}{2} Z_2^2$$



$$\begin{cases} M_p^0(z_1) = pz_1 \\ M_p^0(z_2) = Ph - \frac{Phz_2}{l} \end{cases}$$



$$\begin{cases} M_1^*(z_1) = -1^* z_1 \\ M_1^*(z_2) = -1^* h \\ M_1^*(z_3) = (-h + z_3) 1^* \end{cases}$$

$$M(z) = M_0^0(z) + M_1^0(z) - X_1 M_1^*(z)$$

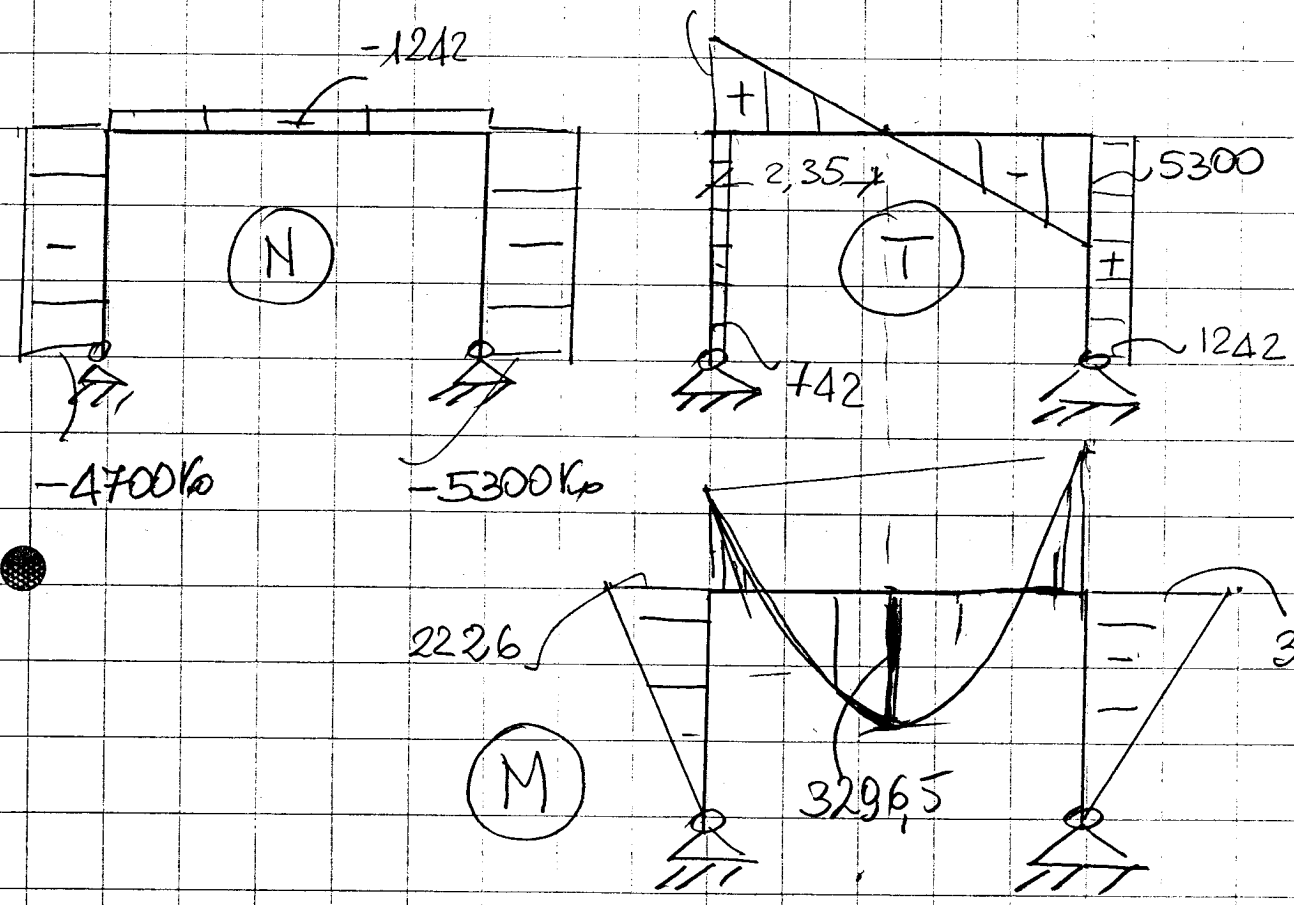
$$M_{10} = \frac{1}{EI} \left[ \int_0^l -\left(\frac{ql}{2}z_2 - \frac{qz_2^2}{2}\right) \cdot h \, dz_2 + \int_0^l -Ph\left(1 - \frac{z_2}{l}\right) h \, dz_2 + \int_0^h -z_1^2 \cdot P \, dz_1 \right] = \frac{1}{EI} \left[ -\frac{ql^3}{4}h + \frac{ql^3}{6}h - \frac{Ph^2l}{2} - \frac{Ph^3}{3} \right] =$$

$$\frac{1}{EJ} \left[ -\frac{q l^3 h}{12} - \frac{P h^2 l}{2} - \frac{P h^3}{3} \right] = \frac{1}{EJ} \left[ -9,3125 - P(22,5 + 9) \right] =$$

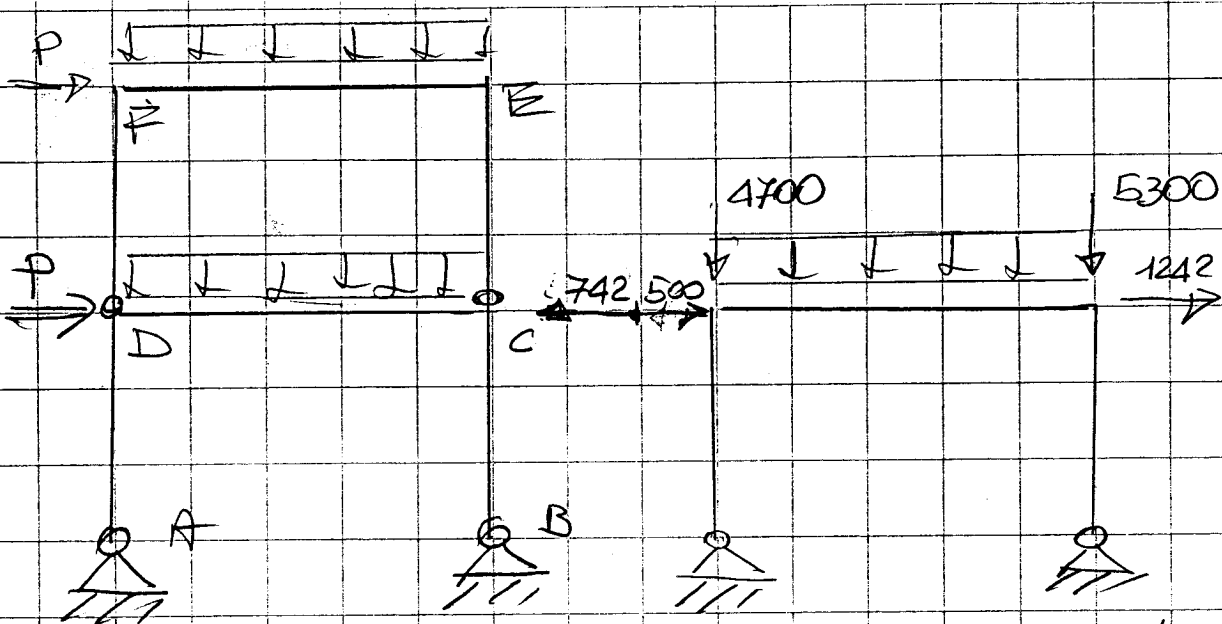
$$= \frac{78250}{EJ} \text{ m}$$

$$M_{11} = \frac{1}{EJ} \left[ 2x \int_0^h z_1^2 dz_1 + \int_0^l h^2 dz_1 \right] = \frac{1}{EJ} \left[ \frac{2}{3} h^3 + l h^2 \right] = \frac{63}{EJ} \text{ Kg}$$

$$X_1 = -\frac{M_{10}}{M_{11}} = 1242,06 \text{ Kg}$$

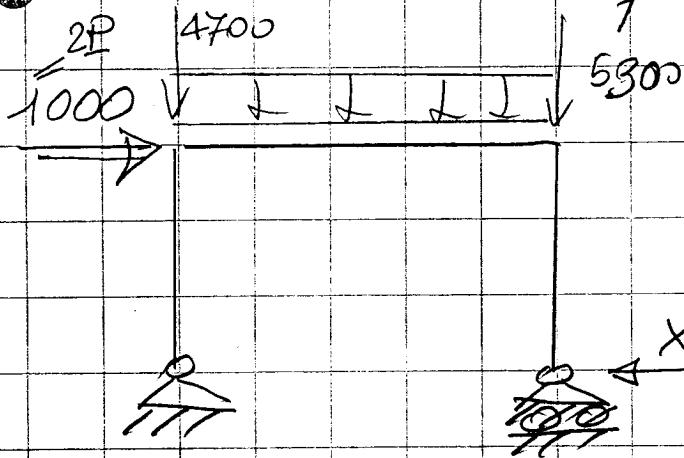


$$W_{\geq} \frac{M_{MAX}}{\sigma_{adm}} = 155,25 \text{ cm}^3 \Rightarrow \text{HEB 140 } W=216 \text{ cm}^3$$



(Si applicano al portale inferiore le reaz. vincolari combinate di segno)

Se si trascurano le deformazioni assiali.

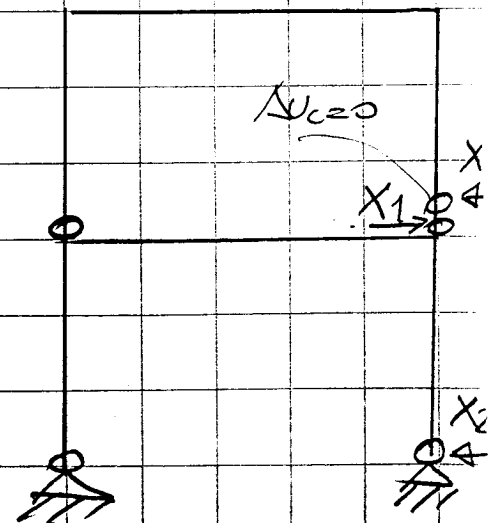


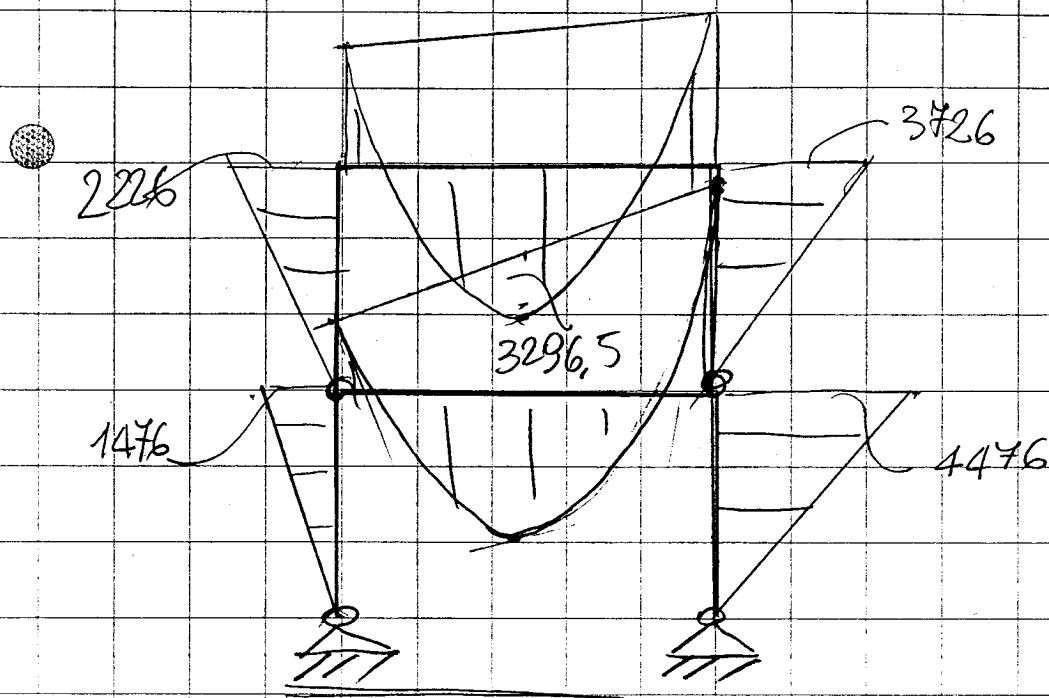
Eq. Cong.  
 $M_B = 0$

$$M_{10} = \frac{1}{EI} [-9 \times 31,25 - 2P \times 31,5] = -\frac{94'000}{EI}$$

$$M_{11} = \frac{63}{EI} \Rightarrow X_2 = 1492,08$$

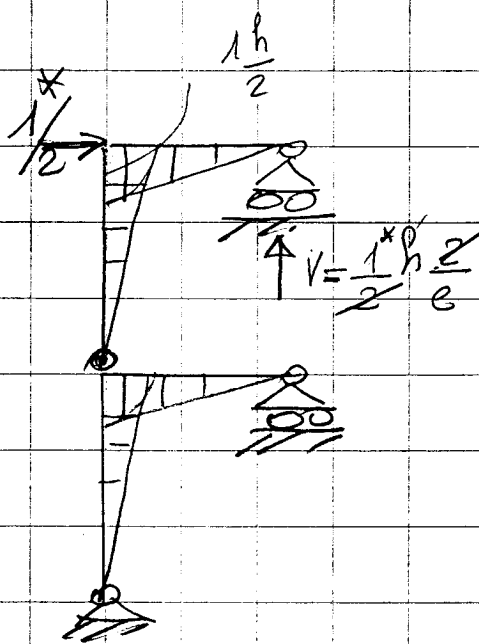
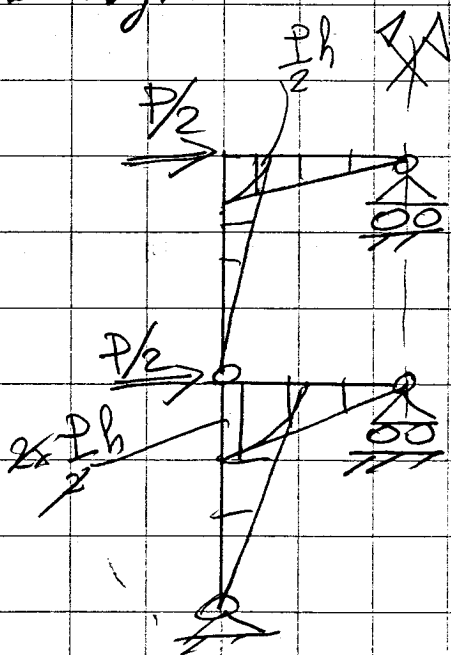
La struttura è 2 volte iperstatica  
ma procedendo come consigliato  
il sistema delle 2 equazioni  
di congruenza è disaccoppiato





c) Si trascurino le deformazioni assiali.

Il carico può essere decomposto in una parte sym che non contribuisce allo spostamento, ed in una out.sym.



$$\Delta^* u_E = 2 \times \frac{1}{EJ} \cdot \left[ 3 \times \int_0^{h/2} \frac{P(h-z)^2}{2l} dz + 3 \times \int_0^h \frac{Pz^2}{2} dz \right] = \frac{3P}{EJ} \left[ \frac{h^3}{3} + \frac{hl^2}{24} \right] =$$