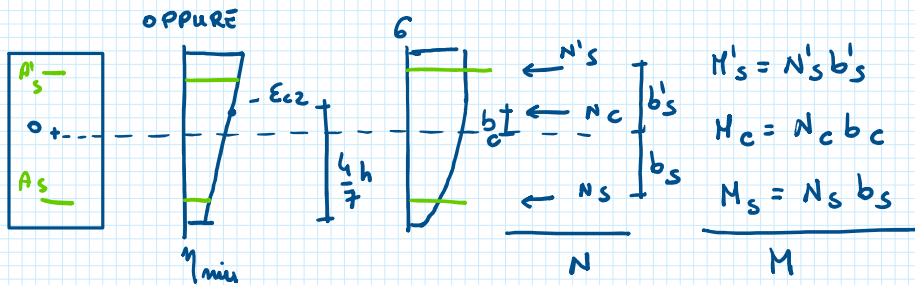
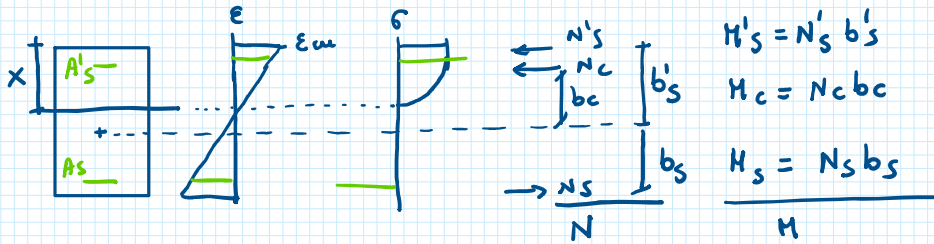
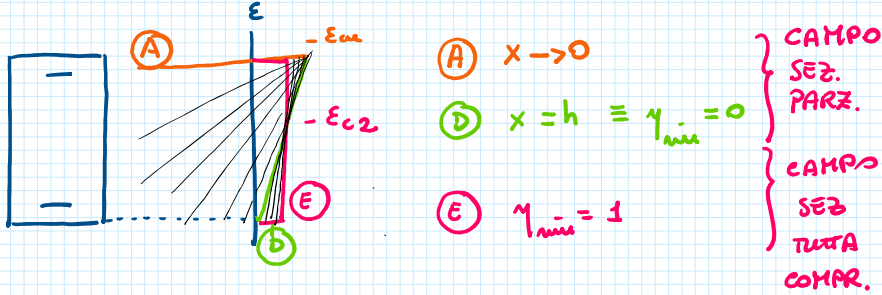


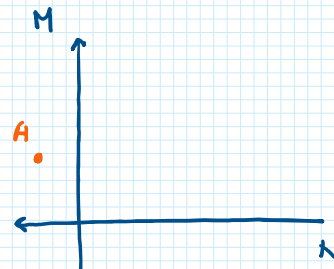
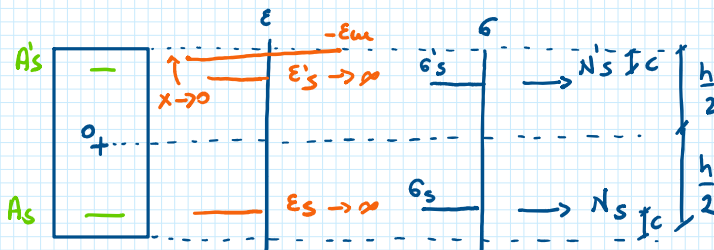
$$P \equiv (N, M)$$



OSSERVO i DIAGR. ϵ_{u1}



DIAGR. A



$$N'_s = A'_s \sigma'_s = A'_s f_{yd} +$$

$$N_c = 0 +$$

$$N_s = A_s \sigma_s = A_s f_{yd} =$$

$$\frac{N}{M}$$

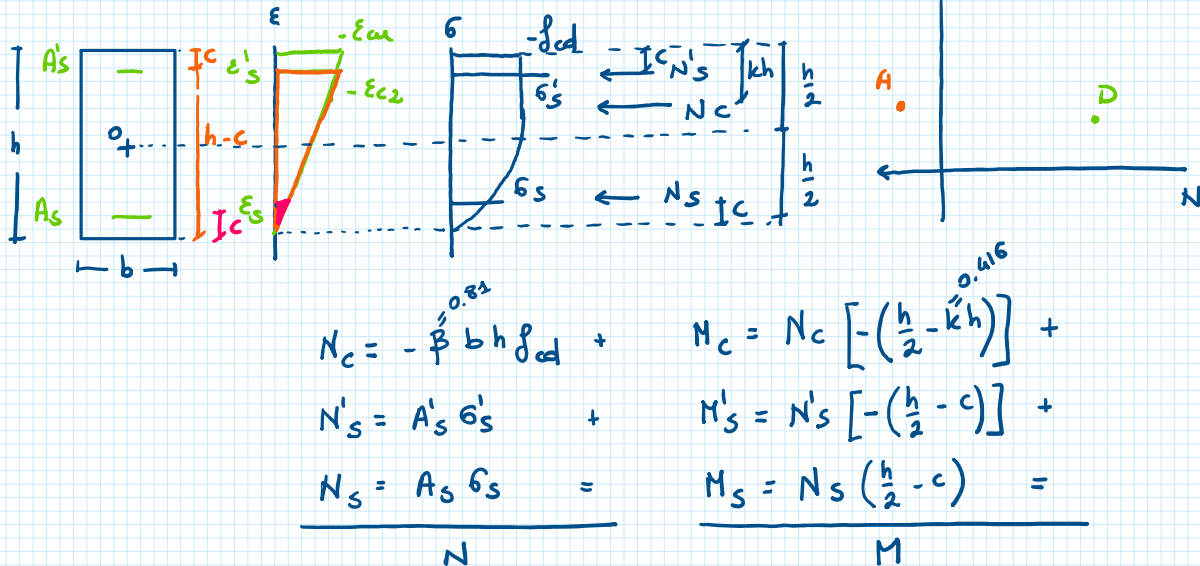
$$M'_s = N'_s \left[-\left(\frac{h}{2} - c \right) \right] +$$

$$M_c = 0 +$$

$$M_s = N_s \left(\frac{h}{2} - c \right) =$$

$$\frac{M}{N}$$

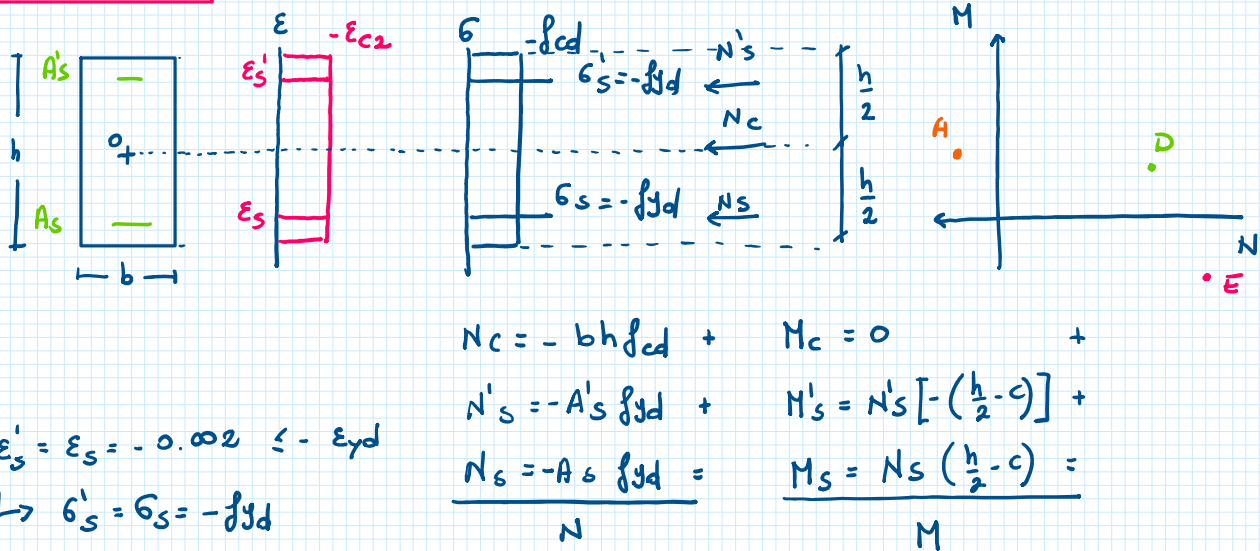
DIAGR. D



$$\sigma'_s \rightarrow \frac{\epsilon'_s}{h-c} = \frac{-\epsilon_{cu}}{h} \Rightarrow \epsilon'_s = -\frac{h-c}{h} \epsilon_{cu} \Rightarrow \sigma'_s$$

$$\sigma_s \rightarrow \frac{\epsilon_s}{c} = \frac{-\epsilon_{cu}}{h} \Rightarrow \epsilon_s = -\frac{c}{h} \epsilon_{cu} \Rightarrow \sigma_s$$

DIAGR. E

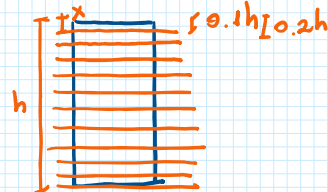
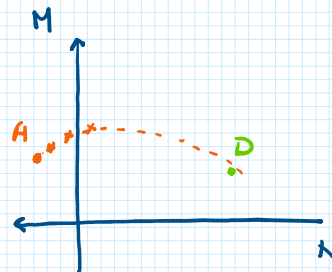
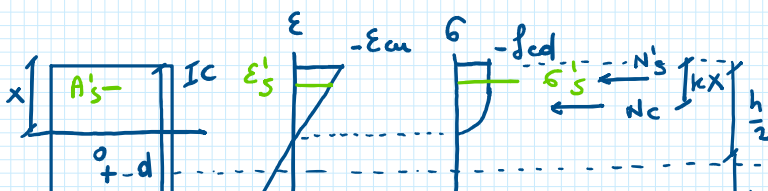


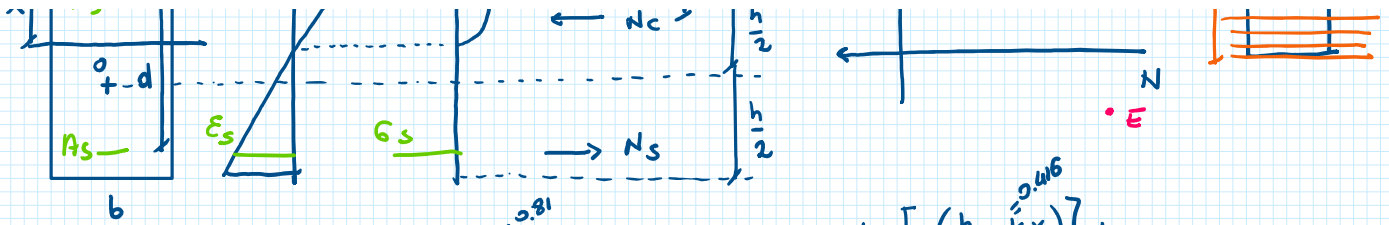
$$\epsilon'_s = \epsilon_s = -0.002 \leq -\epsilon_{yd}$$

$$\rightarrow \sigma'_s = \sigma_s = -f_{yd}$$

DEVO RAFFITTIRE I PUNTI DEL DOMINIO:

CAMPO AD \rightarrow SEZ. PARZIALIZZATA





$$N_c = -\beta b x f_{cd} +$$

$$M_c = N_c \left[-\left(\frac{h}{2} - kx \right) \right] +$$

$$N'_s = A'_s \sigma'_s +$$

$$M'_s = N'_s \left[-\left(\frac{h}{2} - c \right) \right] +$$

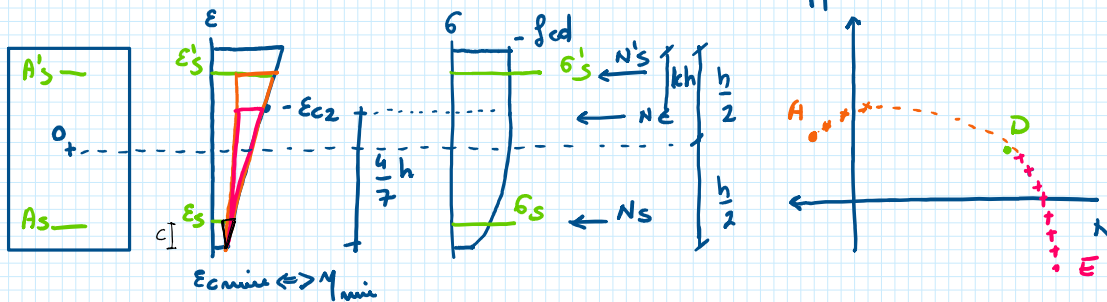
$$N_s = A_s \sigma_s = \frac{\quad}{N}$$

$$M_s = N_s \left(\frac{h}{2} - c \right) = \frac{\quad}{M}$$

$$\sigma'_s \rightarrow \frac{\epsilon'_s}{-(x-c)} = \frac{-\epsilon_{cu}}{-x} \Rightarrow \epsilon'_s = -\frac{x-c}{x} \epsilon_{cu} \Rightarrow \sigma'_s$$

$$\sigma_s \rightarrow \frac{\epsilon_s}{d-x} = \frac{x \epsilon_{cu}}{x} \Rightarrow \epsilon_s = \frac{d-x}{x} \epsilon_{cu} \Rightarrow \sigma_s$$

CAMPO DE \rightarrow SEZ. TUTTA COMPRESSA



$$\beta = 1 - \frac{4}{21} (1 - \eta_{min})^2$$

$$N_c = -\beta b h f_{cd} +$$

$$M_c = N_c \left[-\left(\frac{h}{2} - kh \right) \right] +$$

$$N'_s = A'_s \sigma'_s +$$

$$M'_s = N'_s \left[-\left(\frac{h}{2} - c \right) \right] +$$

$$k = \frac{1}{2} \frac{1 - \frac{16}{49} (1 - \eta_{min})^2}{1 - \frac{4}{21} (1 - \eta_{min})^2}$$

$$N_s = A_s \sigma_s = \frac{\quad}{N}$$

$$M_s = N_s \left(\frac{h}{2} - c \right) = \frac{\quad}{M}$$

$$\sigma'_s \rightarrow \frac{\epsilon'_s - \epsilon_{cmin}}{d} = \frac{-\epsilon_{c2} - \epsilon_{cmin}}{\frac{4}{7}h}$$

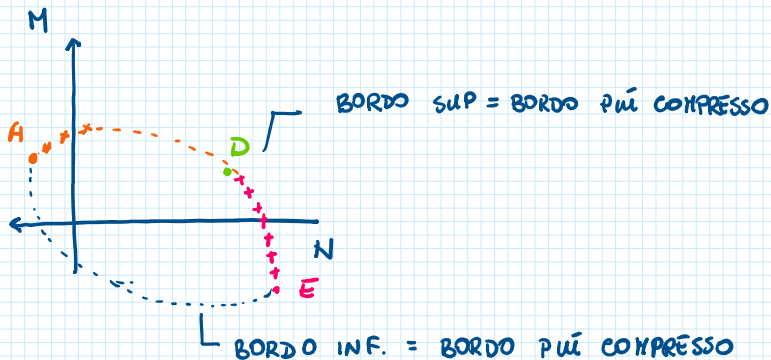
$$\epsilon'_s = \frac{d}{\frac{4}{7}h} (-\epsilon_{c2} - \epsilon_{cmin}) + \epsilon_{cmin}$$

$$\epsilon'_s = -\epsilon_{c2} \left[\frac{d}{\frac{4}{7}h} (1 - \eta_{min}) + \eta_{min} \right] \Rightarrow \sigma'_s$$

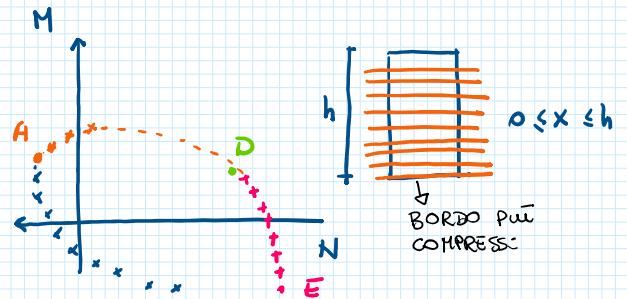
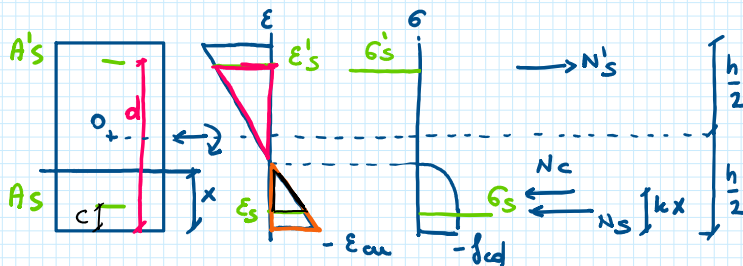
$$\sigma_s \rightarrow \frac{\epsilon_s - \epsilon_{cmin}}{c} = \frac{-\epsilon_{c2} - \epsilon_{cmin}}{\frac{4}{7}h}$$

$$\epsilon_s = \frac{c}{\frac{4}{7}h} (-\epsilon_{c2} - \epsilon_{cmin}) + \epsilon_{cmin}$$

$$\epsilon_s = -\epsilon_{c2} \left[\frac{c}{\frac{4}{7}h} (1 - \eta_{min}) + \eta_{min} \right] \Rightarrow \sigma_s$$



CAMPO AD \rightarrow SEZ. PARZIALIZZATA



$$N_c = -\beta b x f_{cd} +$$

$$M_c = N_c \left(\frac{h}{2} - kx \right) +$$

$$N'_s = A'_s \sigma'_s +$$

$$M'_s = N'_s \left[\left(\frac{h}{2} - c \right) \right] +$$

$$N_s = A_s \sigma_s =$$

$$M_s = N_s \left(\frac{h}{2} - c \right) =$$

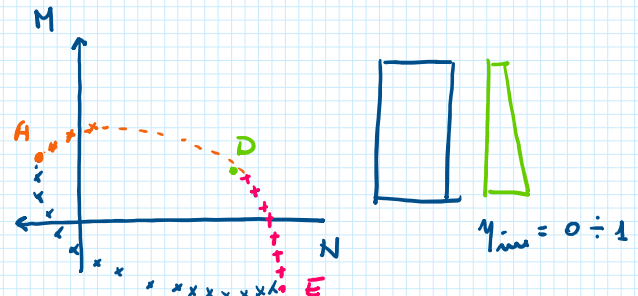
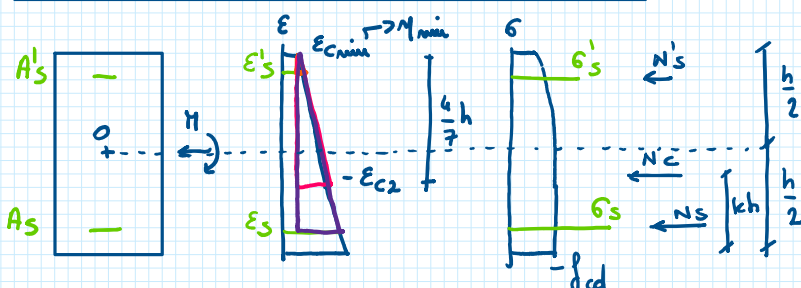
N

M

$$\sigma'_s \rightarrow \frac{\epsilon'_s}{d-x} = \frac{\epsilon_{cu}}{x} \Rightarrow \epsilon'_s = \frac{d-x}{x} \epsilon_{cu} \Rightarrow \sigma'_s$$

$$\sigma_s \rightarrow \frac{\epsilon_s}{x-c} = \frac{\epsilon_{cu}}{x} \Rightarrow \epsilon_s = -\frac{x-c}{x} \epsilon_{cu} \Rightarrow \sigma_s$$

CAMPO DE \rightarrow SEZ. TUTTA COMPRESSA



$$\beta = 1 - \frac{4}{21} (1 - \eta_{min})^2$$

$$N_c = -\beta b h f_{cd} +$$

$$M_c = N_c \left(\frac{h}{2} - kh \right) +$$

$$N'_s = A'_s \sigma'_s +$$

$$\beta = 1 - \frac{4}{21} (1 - \eta_{min})^2$$

$$k = \frac{1}{2} \frac{1 - \frac{16}{49} (1 - \eta_{min})^2}{1 - \frac{4}{21} (1 - \eta_{min})^2}$$

$$N_c = -\beta b h f_{cd} +$$

$$N'_s = A'_s \sigma'_s +$$

$$\frac{N_s = A_s \sigma_s}{N} =$$

$$M_c = N_c \left(\frac{h}{2} - k h \right) +$$

$$M'_s = N'_s \left[\left(\frac{h}{2} - c \right) \right] +$$

$$\frac{M_s = N_s \left(\frac{h}{2} - c \right)}{M} =$$

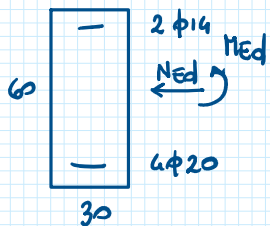
$$\sigma'_s \rightarrow \frac{\epsilon'_s - \epsilon_{cmin}}{c} = \frac{-\epsilon_{c2} - \epsilon_{cmin}}{\frac{4}{7} h}$$

$$\epsilon'_s = -\epsilon_{c2} \left[\frac{c}{\frac{4}{7} h} (1 - \eta_{min}) + \eta_{min} \right] \Rightarrow \sigma'_s$$

$$\sigma_s \rightarrow \frac{\epsilon_s - \epsilon_{cmin}}{d} = \frac{-\epsilon_{c2} - \epsilon_{cmin}}{\frac{4}{7} h}$$

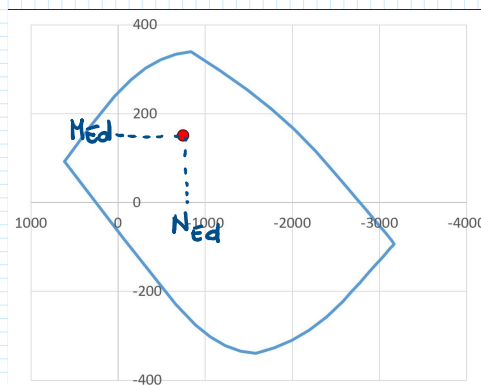
$$\epsilon_s = -\epsilon_{c2} \left[\frac{d}{\frac{4}{7} h} (1 - \eta_{min}) + \eta_{min} \right] \Rightarrow \sigma_s$$

ESEMPIO



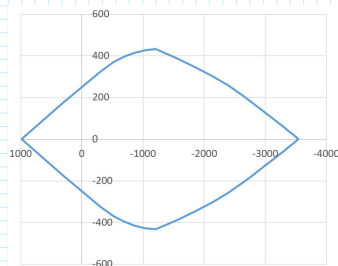
$$N_{Ed} = -750 \text{ kN}$$

$$M_{Ed} = 150 \text{ kNm}$$

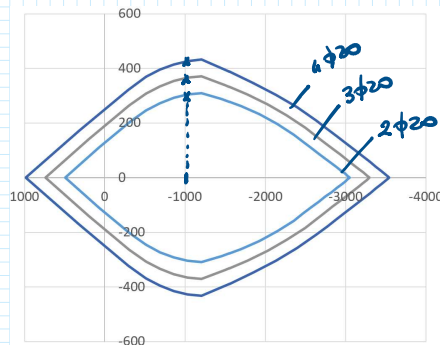


OSSERVA:

$$\text{SE } A'_s = A_s:$$



EFFETTO DELLE
ARMATURE



IN ASSENZA
DI ARMATURE

