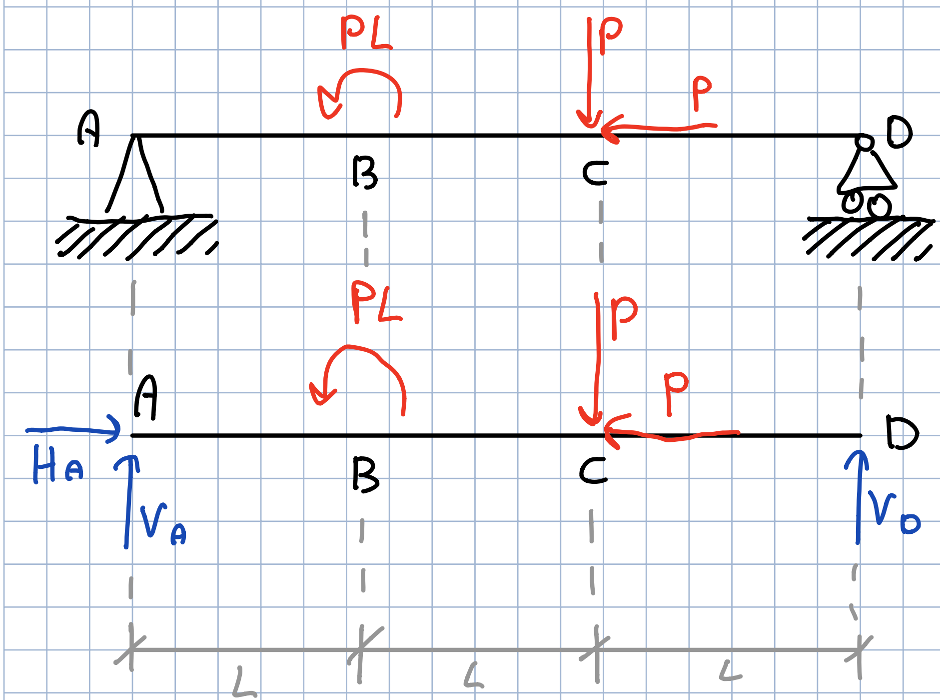
Esercizio



$gdl = 3$

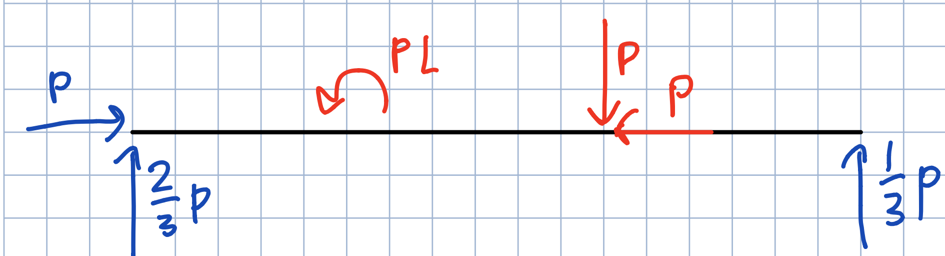
$gdv = 2(A) + 1(B) = 3$

$\left.\right\}$ isostatica.

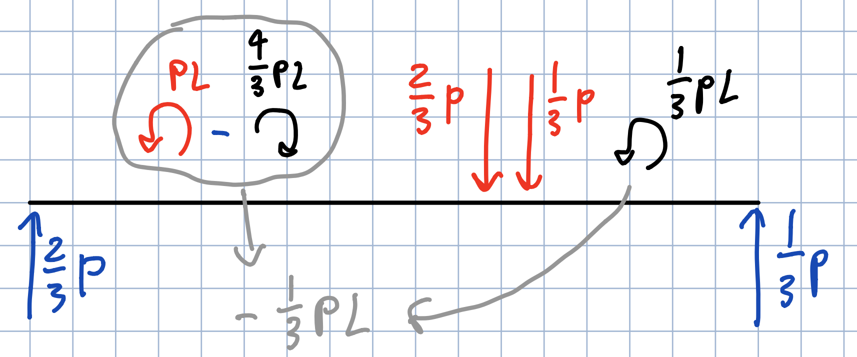
$$\begin{array}{l} \rightarrow \\ \uparrow \\ \circlearrowleft \end{array}\begin{cases} R_x = 0 \\ R_y = 0 \\ M_z = 0 \end{cases} \qquad \begin{array}{l} \\ \\ A) \end{array}\begin{cases} H_A - P = 0 \\ V_A - P + V_D = 0 \\ PL - P(2L) + V_D(3L) = 0 \end{cases} \qquad \begin{cases} H_A = P \\ V_A = \frac{2}{3}P \\ V_D = \frac{1}{3}P \end{cases}$$

$$\begin{pmatrix} 1 & 0 & 0 \\ 0 & 1 & 0 \\ 0 & 0 & 1 \end{pmatrix}\begin{pmatrix} H_A \\ V_A \\ V_D \end{pmatrix} = \begin{Bmatrix} P \\ 2/3\,P \\ 1/3\,P \end{Bmatrix}$$

$\hookrightarrow \det(A) = 1 \neq 0 \rightarrow$ non labile



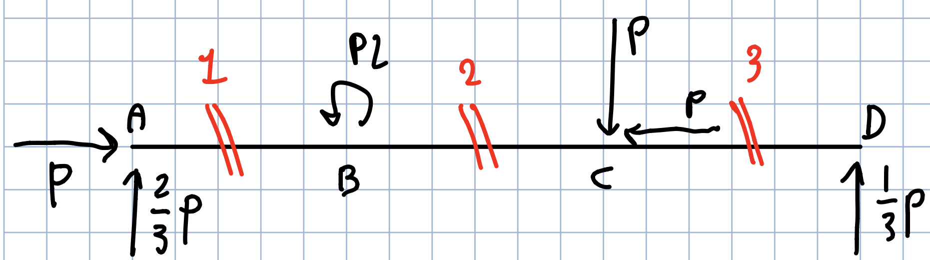
EQUILIBRIO GRAFICO : $P = \frac{1}{3}P + \frac{2}{3}P$



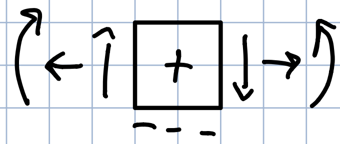
$\frac{2}{3}P \cdot 2L = \frac{4}{3}PL$

$\frac{1}{3}P \cdot L = \frac{1}{3}PL$

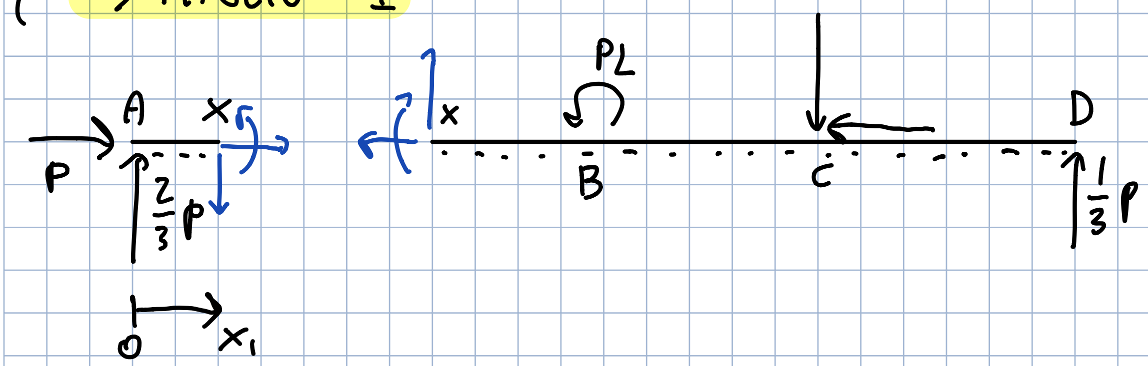
POSIZIONI DEI TAGLI



CONCIO RIFERIMENTO



→ TAGLIO 1



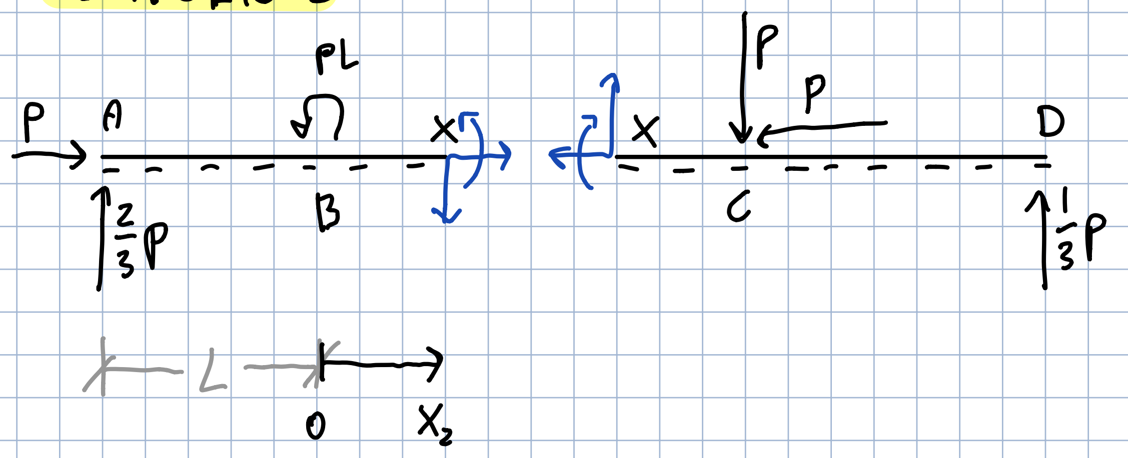
$$\begin{cases} A \longrightarrow B \\ 0 < x_1 < L \end{cases}$$

$$\begin{cases} P + N(x_1) = 0 \\ \frac{2}{3}P - T(x_1) = 0 \\ -\frac{2}{3}Px_1 + M(x_1) = 0 \end{cases} \qquad \begin{cases} N(x_1) = -P \\ T(x_1) = \frac{2}{3}P \\ M(x_1) = \frac{2}{3}Px_1 \end{cases}$$

$M(A) = M(x_1 = 0) = \frac{2}{3}P(0) = 0$

$M(B) = M(x_1 = L) = \frac{2}{3}PL = \frac{2}{3}LP$

→ TAGLIO 2



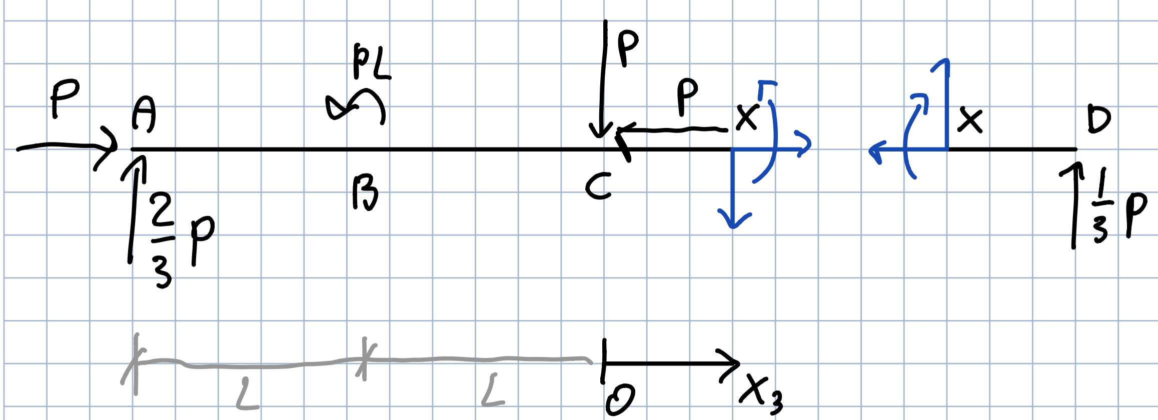
$$\begin{cases} B \to C \\ 0 < X_2 \, L \end{cases}$$

$$\begin{aligned} \rightarrow & \\ \uparrow & \\ \circlearrowleft & \end{aligned} \begin{cases} P + N(X_2) = 0 \\ 2/3 P - T(X_2) = 0 \\ -\frac{2}{3} P(L + X_2) + PL + M(X_2) = 0 \end{cases} \qquad \begin{cases} N(X_2) = -P \\ T(X_2) = 2/3 \, P \\ M(X_2) = \frac{1}{3} P(2X_2 - L) \end{cases}$$

$$M(B) = M(X_2 = 0) = 1/3 \, P(2 \cdot 0 - L) = \frac{1}{3} P(-L) = -\frac{1}{3} PL$$

$$M(C) = M(X_2 = L) = 1/3 \, P(2 \cdot L - L) = 1/3 \, PL$$

→ TAGLIO 3



$$\begin{cases} C \to D \\ 0 < X_3 < L \end{cases}$$

$$\begin{aligned} \rightarrow & \\ \uparrow & \\ \circlearrowleft & \end{aligned} \begin{cases} P - P + N(X_3) = 0 \\ 2/3 P - P - T(X_3) = 0 \\ -2/3 P(2L + X_3) + PL + P(X_3) + M(X_3) = 0 \end{cases} \qquad \begin{cases} N(X_3) = 0 \\ T(X_3) = -1/3 \, P \\ M(X_3) = \frac{1}{3} P(L - X_3) \end{cases}$$

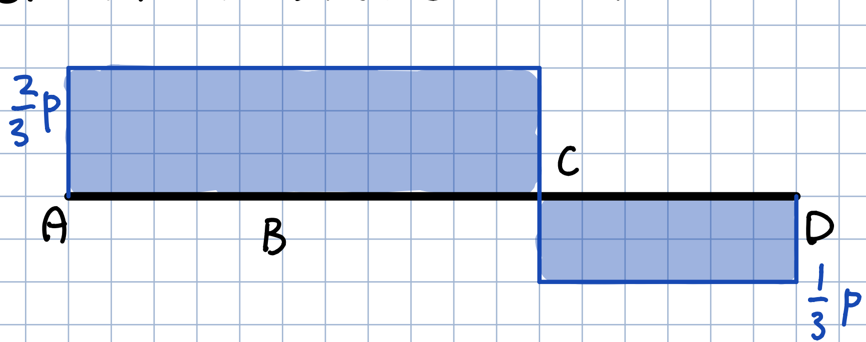
$$M(C) = M(X_3 = 0) = \frac{1}{3} P(L - 0) = \frac{1}{3} PL$$

$$M(D) = M(X_3 = L) = \frac{1}{3} P(L - L) = 0$$

RISULTATI

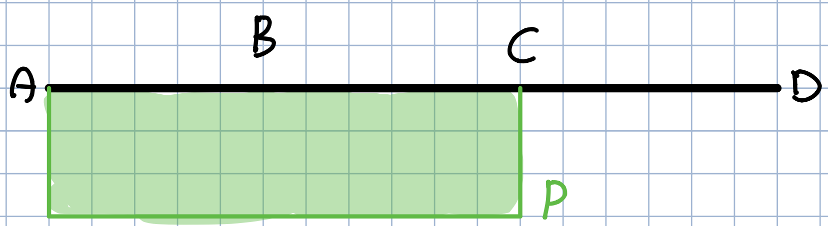
$$\begin{cases} N(x_1) = -P \\ T(x_1) = \frac{2}{3}P \\ M(x_1) = \frac{2}{3}P x_1 \\ 0 < x_1 < L \end{cases} \qquad \begin{cases} N(x_2) = -P \\ T(x_2) = \frac{2}{3}P \\ M(x_2) = \frac{1}{3}P(2x_2 - L) \\ 0 < x_2 < L \end{cases} \qquad \begin{cases} N(x_3) = 0 \\ T(x_3) = -\frac{1}{3}P \\ M(x_3) = \frac{1}{3}P(L - x_3) \\ 0 < x_3 < L \end{cases}$$

DIAGRAMMA SFORZO TAGLIANTE



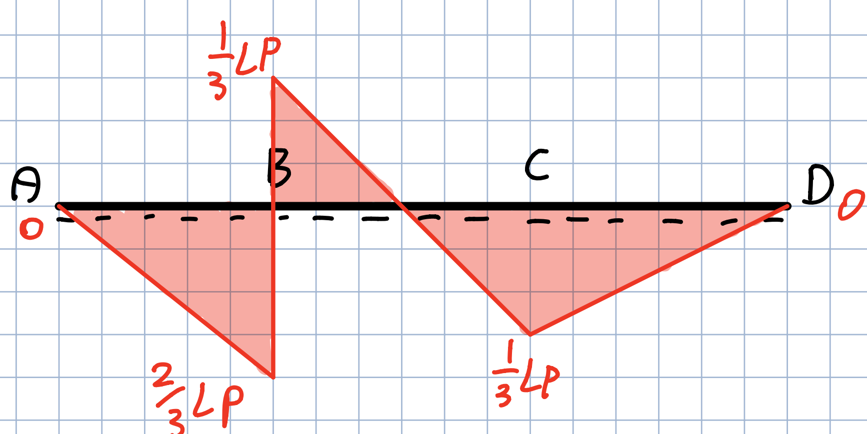
il salto in C equivale al modulo della forza in C

DIAGRAMMA SFORZO NORMALE



coerente col fatto che la compressione avviene solo tra A e C per le forze $+H_A$ e $-P$

DIAGRAMMA SFORZO FLESSIONALE



il salto in B equivale al modulo del momento in B