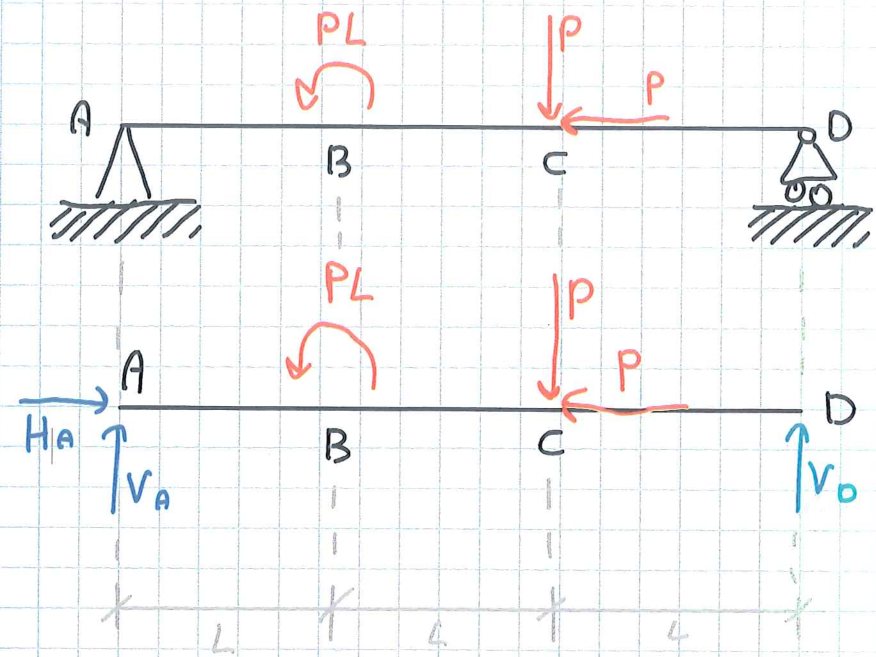
ESERCIZIO



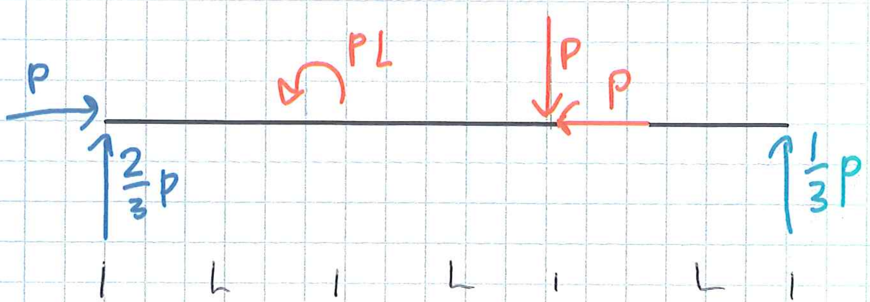
$g.d.l. = 3$

$g.d.v. = 2(A) + 1(B) = 3$ } isostatico.

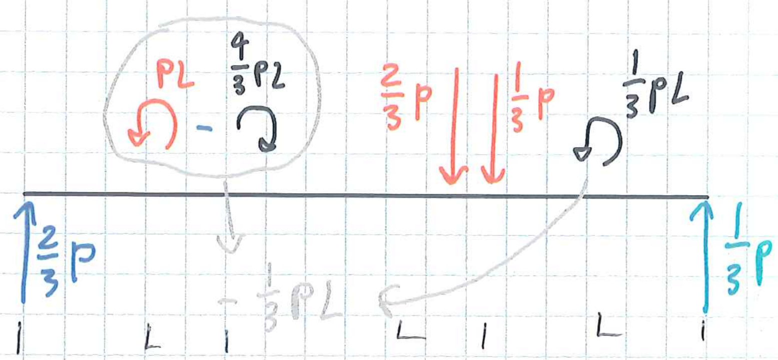
$$\begin{cases} R_x = 0 \\ R_y = 0 \\ M_z = 0 \end{cases} \qquad A)\begin{cases} H_A - P = 0 \\ V_A - P + V_D = 0 \\ PL - P(2L) + V_D(3L) = 0 \end{cases} \qquad \begin{cases} H_A = P \\ V_A = \frac{2}{3}P \\ V_D = \frac{1}{3}P \end{cases}$$

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

↳ $\det(A) = 1 \neq 0$ → non labile



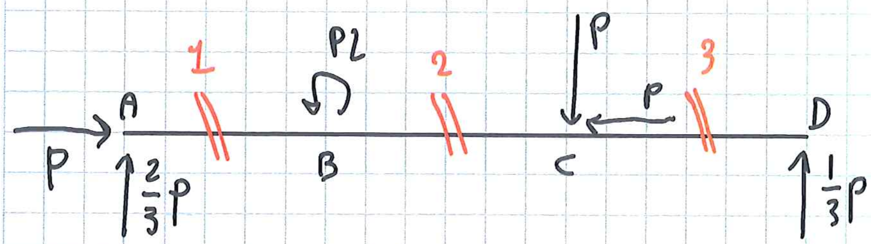
EQUILIBRIO GRAFICO : $P = \frac{1}{3}P + \frac{2}{3}P$



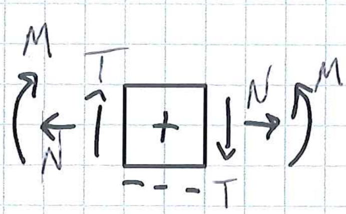
$$\frac{2}{3}P \cdot 2L = \frac{4}{3}PL$$

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

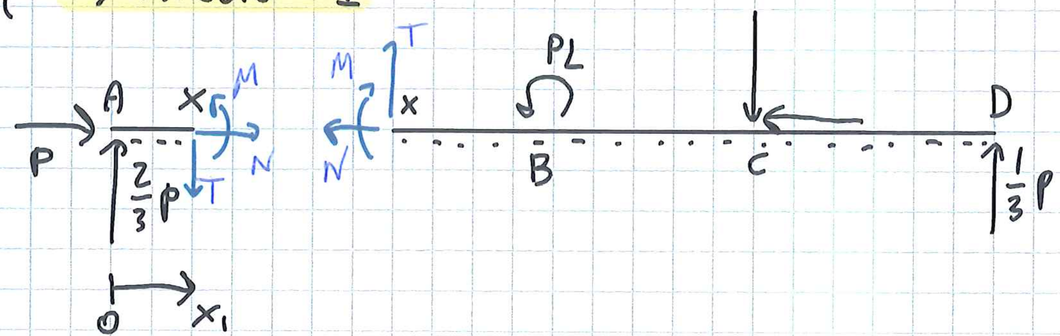
POSIZIONI DEI TAGLI



CONCIO RIFERIMENTO



→ TAGLIO 1



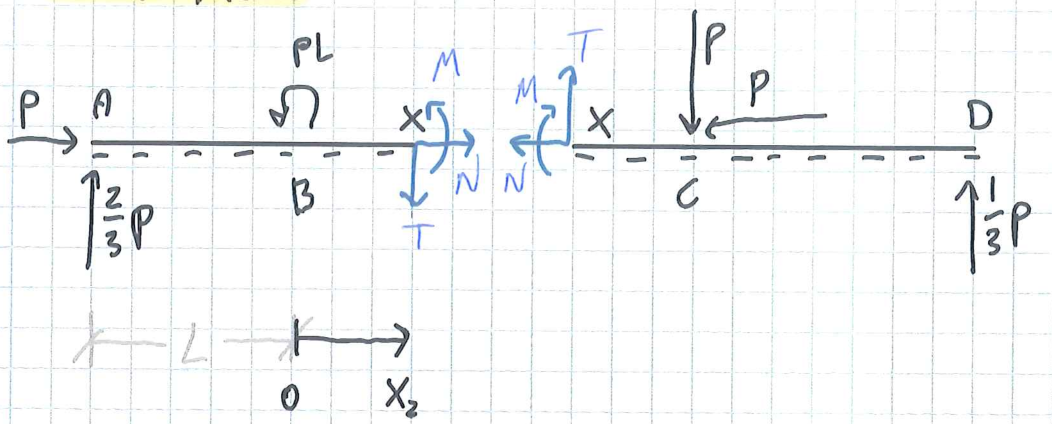
$$\begin{cases} A \rightarrow B \\ 0 < x_1 < L \end{cases}$$

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

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

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

→ TAGLIO 2

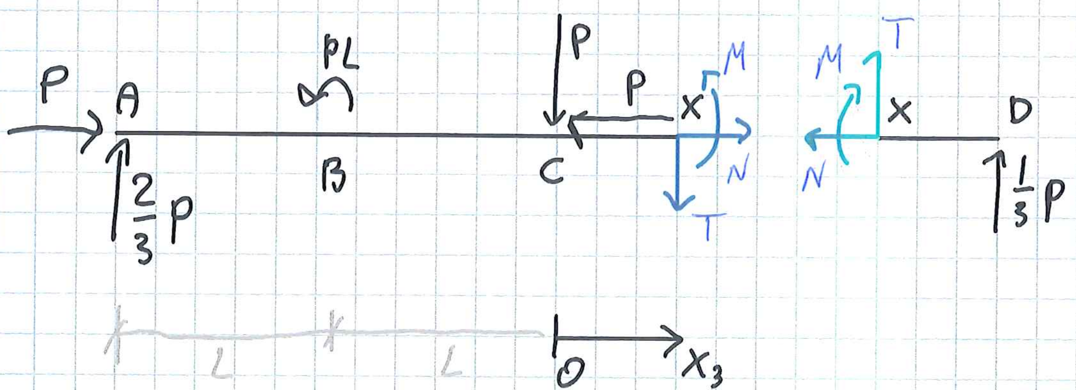


$$\begin{cases} B \rightarrow C \\ 0 < X_2 \, L \end{cases}$$

$$\begin{array}{l} \rightarrow \\ \uparrow \\ \circlearrowleft \end{array} \begin{cases} P + N(X_2) = 0 \\ \frac{2}{3}P - T(X_2) = 0 \\ -\frac{2}{3}P[L + X_2] + PL + M(X_2) = 0 \end{cases} \qquad \begin{cases} N(X_2) = -P \\ T(X_2) = \frac{2}{3}P \\ M(X_2) = \frac{1}{3}P[2X_2 - L] \end{cases}$$

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

→ TAGLIO 3



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

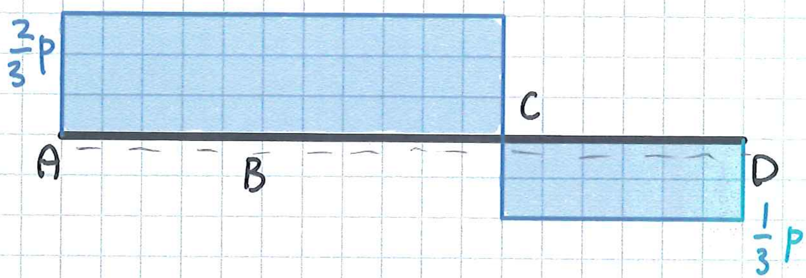
$$\begin{array}{l} \rightarrow \\ \uparrow \\ \circlearrowleft \end{array} \begin{cases} P - P + N(X_3) = 0 \\ \frac{2}{3}P - P - T(X_3) = 0 \\ -\frac{2}{3}P[2L + X_3] + PL + P[X_3] + M(X_3) = 0 \end{cases} \qquad \begin{cases} N(X_3) = 0 \\ T(X_3) = -\frac{1}{3}P \\ M(X_3) = \frac{1}{3}P[L - X_3] \end{cases}$$

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

RISULTATI

$$\begin{cases} N(x_1) = -P \\ T(x_1) = \frac{2}{3}P \\ M(x_1) = \frac{2}{3}Px_1 \\ 0 < x_1 < L \end{cases} \qquad \begin{cases} N(x_2) = -P \\ T(x_2) = \frac{2}{3}P \\ M(x_2) = \frac{1}{3}P[2x_2 - L] \\ 0 < x_2 < L \end{cases} \qquad \begin{cases} N(x_3) = 0 \\ T(x_3) = -\frac{1}{3}P \\ M(x_3) = \frac{1}{3}P[L - x_3] \\ 0 < x_3 < L \end{cases}$$

DIAGRAMMA SFORZO TAGLIANTE T ↑ + ↓

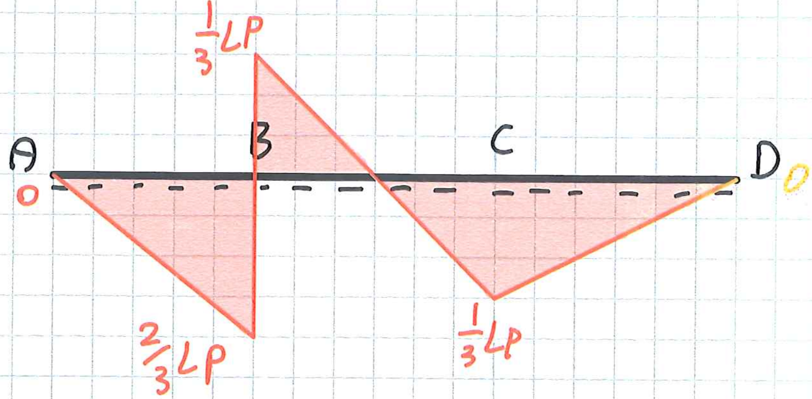


il salto in C equivale al modulo della forza perpendicolare all'asse della trave applicata in C

DIAGRAMMA SFORZO NORMALE N ← + →

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

DIAGRAMMA SFORZO FLESSIONALE M (DALLA PARTE DELLE FIBRE TESE)



il salto in B equivale al modulo della coppia di momento PL applicata in B