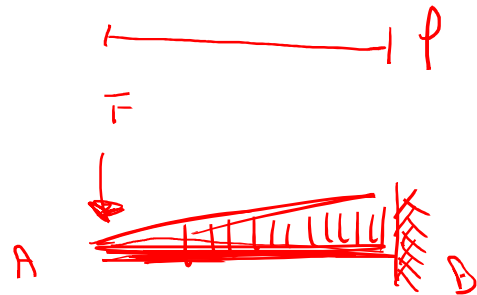
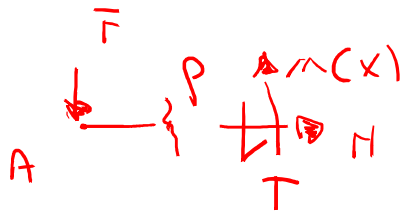
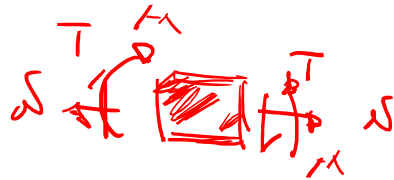


$$1. \frac{d^2 g}{dx^2} = \frac{m(x)}{EI}$$

$$2. \frac{d^4 g}{dx^4} = - \frac{q(x)}{EI}$$



deformazione dell'ASSA
 $g(x)$?



$$\text{O/P} : m(x) = - F \cdot x$$

$$\frac{d^2 y}{dx^2} = \frac{\Delta \Delta(x)}{EI} = -\frac{F}{EI} x = -kx$$

$$\frac{dy}{dx} = \int (-kx) dx$$

$$\frac{dy}{dx} = -\frac{kx^2}{2} + C_1$$

$$y = \int \left(-\frac{kx^2}{2} + C_1 \right) dx = -\frac{kx^3}{6} + C_1 x + C_2$$

$$\left. \frac{dy}{dx} \right|_{x=0} = 0 \quad (\theta_B = 0) ; \quad y \Big|_{x=l} = 0 ;$$

$y \rightarrow$ INCLINAZIONE

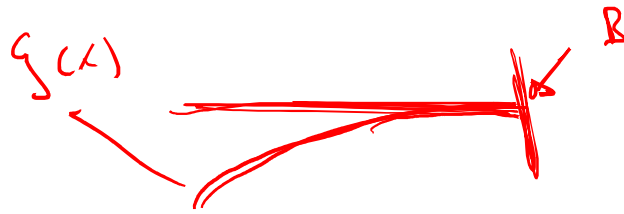
$$\bullet \frac{dy}{dx} = -\frac{kx^2}{2} + C_1, \quad \frac{dy}{dx} = 0 = -\frac{k l^2}{2} + C_1 \Rightarrow C_1 = \frac{k l^2}{2} \quad \text{I.C.C}$$

$$\bullet y(x) = -\frac{kx^3}{6} + C_1 x + C_2, \quad y(l) = -\frac{k l^3}{6} + \frac{k l^3}{2} + C_2 = 0 \quad \text{I.C.C}$$

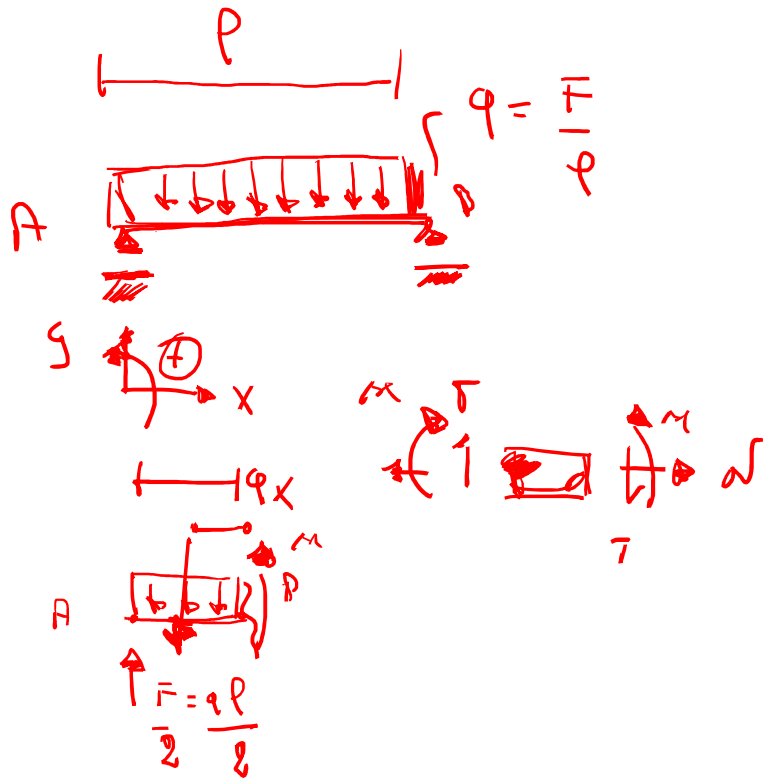
$$\Rightarrow C_2 = -k l^3 \left(\frac{3-1}{6} \right) = -\frac{1}{3} k l^3$$

$$y(x) = -\frac{kx^3}{6} + \frac{k l^2}{2} x - \frac{1}{3} k l^3; \quad k = \frac{\bar{F}}{EI}$$

$$y(l/2) \left| \begin{array}{l} E = 20 \text{ kPa} \\ p = 2 \text{ mm} \\ F = 2 \text{ N} \\ \square \quad b \rightarrow 2 \text{ mm} \\ \quad \quad a \rightarrow 1 \text{ mm} \end{array} \right.$$



II

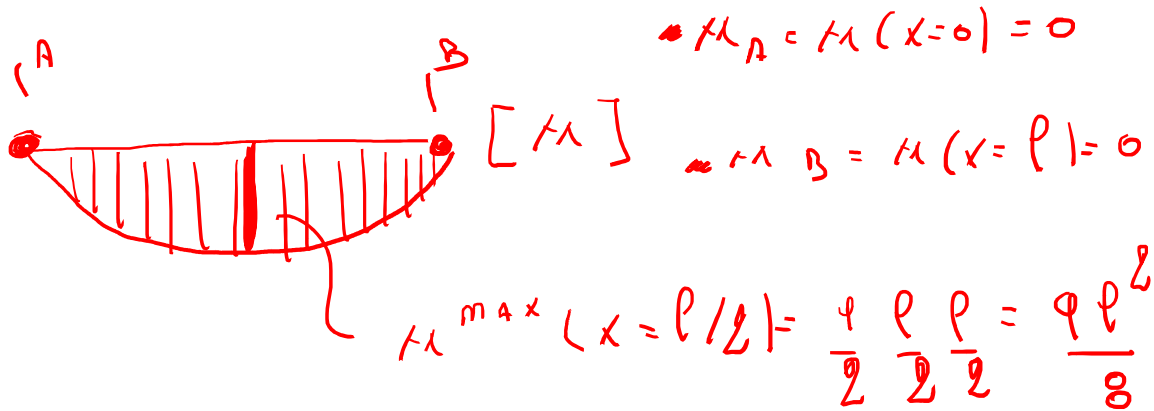
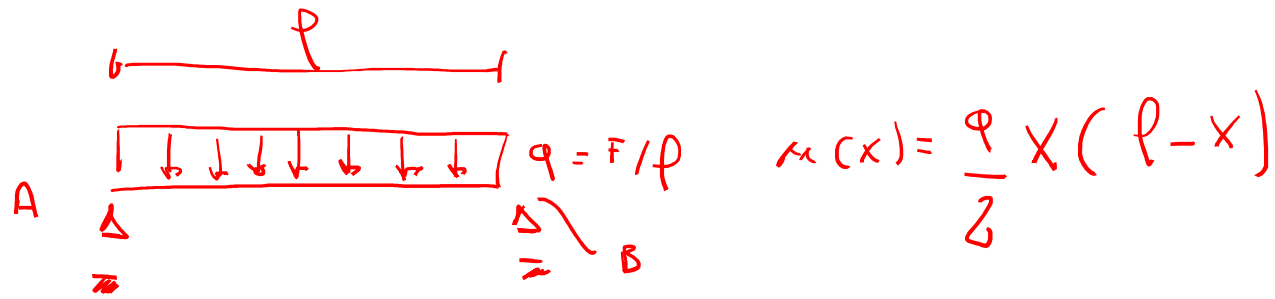


$y(x) ?$

$$\frac{d^2 y}{dx^2} = \frac{M}{EI}$$

rig. dezza fless. sola

$$0 \mid \varphi : M(x) - \frac{\bar{F}}{2} x + q x \frac{x}{2} = 0 \Rightarrow M = \frac{q x l}{2} - \frac{q x^2}{2} = \frac{q}{2} x (l - x)$$



$$y(x); \quad \frac{d^2 y}{dx^2} = \frac{q}{2} \frac{x(l-x)}{\epsilon I} = \kappa x(l-x); \quad \kappa = \frac{q}{2 \epsilon I}$$

$$\frac{d^2 y}{dx^2} = (\kappa l x - \kappa x^2) \Rightarrow \frac{dy}{dx} = \frac{\kappa l}{2} x^2 - \frac{\kappa x^3}{3} + C_1$$

$$\frac{dy}{dx} = \frac{\kappa p x^2}{2} - \frac{\kappa x^3}{3} + c_1$$

$$y = \frac{\kappa p x^3}{6} - \frac{\kappa x^4}{12} + c_1 x + \cancel{c_2} \quad \left| \begin{array}{l} c_1 \\ c_2 \end{array} \right. \Rightarrow \text{C.C.}$$

$$y_A = y(x=0) = 0 = c_2 \Rightarrow \boxed{c_2 = 0}$$

$$y_B = y(x=l) = 0$$

$$\Rightarrow \frac{\kappa p^4}{6} - \frac{\kappa p^4}{12} + c_1 p = 0 \Rightarrow c_1 = \frac{\kappa p^3}{12} - \frac{\kappa p^3}{6} \\ = -\frac{\kappa p^3}{12}$$

$$y(x) = \frac{\kappa l x^3}{6} - \frac{\kappa x^4}{12} - \frac{\kappa l^3 x}{12}$$

$$= -\frac{\varphi}{24EI} (x^4 - 2lx^3 + l^3x)$$

$$x=l, y(x)=6$$

$$x=0, y(x)=0$$

$$y|_{x=\frac{l}{2}} = -\frac{\varphi}{24EI} \left(\frac{l^4}{16} - \frac{2ll^3}{8} + \frac{l^4}{2} \right)$$

$$= -\frac{\varphi l^4}{24EI} \left(\frac{1}{16} - \frac{1}{4} + \frac{1}{2} \right) = \left(\frac{1}{16} - \frac{4}{16} + \frac{8}{16} \right) = -\frac{5\varphi l^4}{16 \cdot 24EI}$$

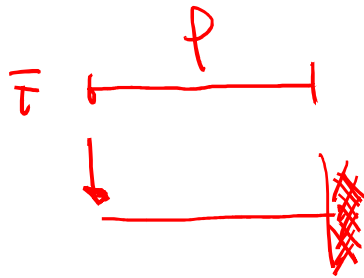
$$y_{\max} = - \frac{\varphi l^4 \bar{\epsilon}}{16 \cdot 24} \frac{\rho}{EI}$$

$$y_{\max} \left\{ \begin{array}{l} \varphi = F / \rho \\ F = 1 \text{ N} \\ \rho = 2 \text{ mm} \\ \bar{\epsilon} = 5 \text{ m Pa} \\ I \rightarrow \text{circle} \end{array} \right.$$

$\phi = 0.5 \text{ mm}$

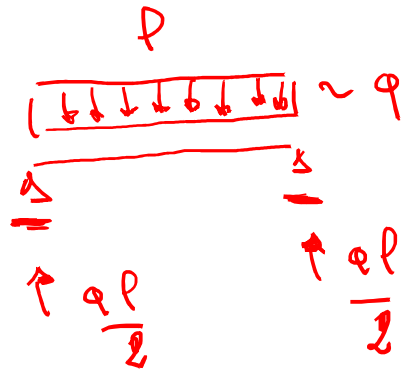
$$E \left\{ \begin{array}{l} \text{Assolb. } \kappa \eta \\ \text{in corrispondenza} \\ \text{di una sezione } A \end{array} \right. = \frac{1}{2} \frac{M^2}{EI} = E_A(x) = E_A(x)$$

1. E_{TOTALE}



$$\bullet E_{TOTALE} = \int_0^l E_A(x) dx$$

2. E_{TOTALE}



$$\bullet E_{TOTALE} = \int_0^l E_A(x) dx$$