Esercitazione

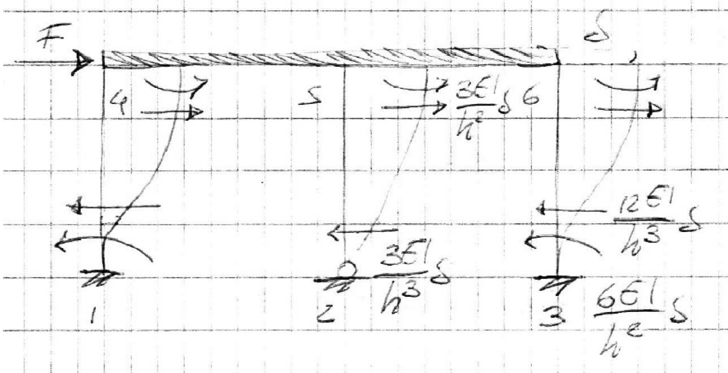
Analisi delle Sollecitazioni di Telai Piani

Telai con Traversi Infinitamente Rigidi (Shear-type)

BOZZA

ESEMPIO NUMERO 1

Risoluzione di un telaio con traversi infinitamente rigidi a 2 Campate



Eq alla Traslazione

$$F = T_1 + T_2 + T_3$$

$$F = K_1\delta + K_2\delta + K_3\delta$$

$$F = \delta \cdot \sum_{i=1}^{3} K_i \qquad \begin{cases} K_1 = \frac{12EI}{h^3} \\ K_2 = \frac{3EI}{h^3} \\ K_3 = \frac{12EI}{h^3} \end{cases}$$

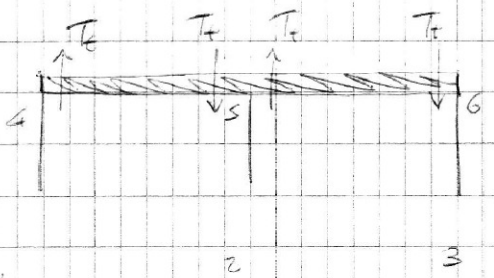
$$\Downarrow$$

$$\delta = \frac{F}{\sum_{i=1}^{3} K_i}$$

Noto δ si possono determinare i tagli e i Momenti

$$\begin{cases} T_1 = K_1\delta \\ T_2 = K_2\delta \\ T_3 = K_3\delta \end{cases} \qquad \begin{cases} M_{14} = M_{41} = \frac{T_1 h}{2} \\ M_{36} = M_{63} = \frac{T_3 h}{2} \end{cases} \qquad \begin{matrix} M_{25} = 0 \\ M_{52} = T_2 h \end{matrix}$$

Calcolo delle sollecitazioni sul traverso



Momenti

$M_{45} = M_{41}$

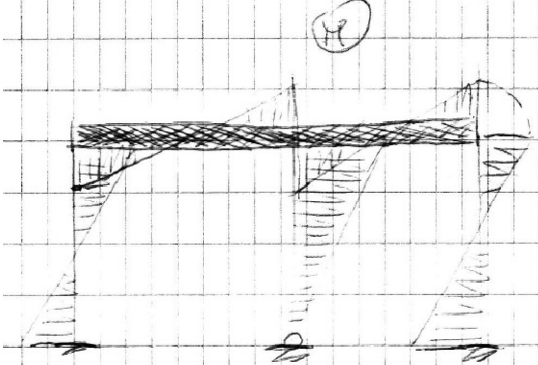
$M_{65} = M_{63}$

$M_{54} + M_{56} + M_{52} = 0$

(Taglio T_t costante) pendenza costante del diagramma del momento

$$T_t = \frac{M_{45} + M_{52} + M_{65}}{L_1 + L_2}$$

$\Downarrow$

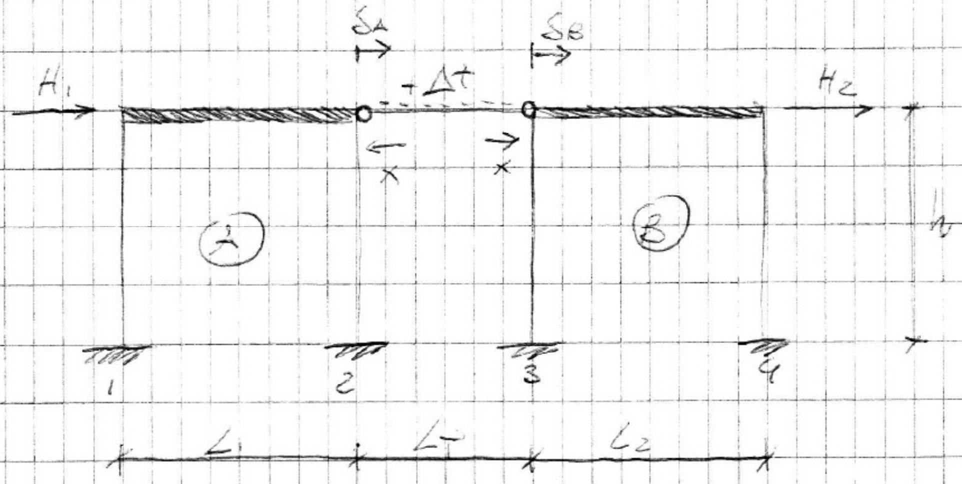


$$\begin{cases} M_{54} = M_{45} + T_t \cdot L_1 \\ M_{56} = M_{65} + T_t L_2 \end{cases}$$

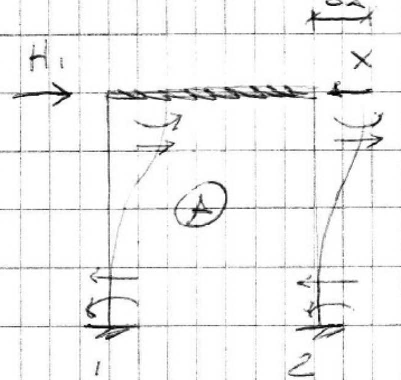
Lo sforzo normale si determina come equilibrio ai nodi.

ESEMPIO NUMERO 2

Telaio con traversi infinitamente rigidi con pendolo deformabile e distorsione termica

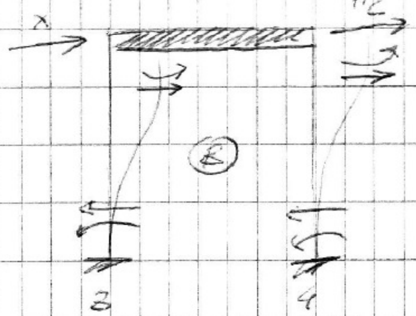


Incognite = δ_A, δ_B, X



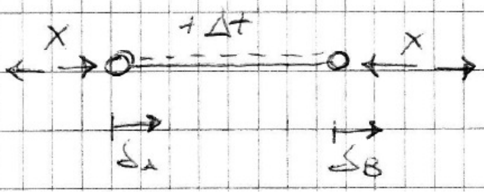
1) $H_1 - X = K_A \delta_A$

$$K_A = \frac{12EI_1}{h^3} + \frac{12EI_2}{h^3}$$



2) $H_2 + X = K_B \delta_B$

$$K_B = \frac{12EI_3}{h^3} + \frac{12EI_4}{h^3}$$



3) $\delta_B - \delta_A = \alpha \Delta t L_T - \frac{X L_T}{E A_P}$