

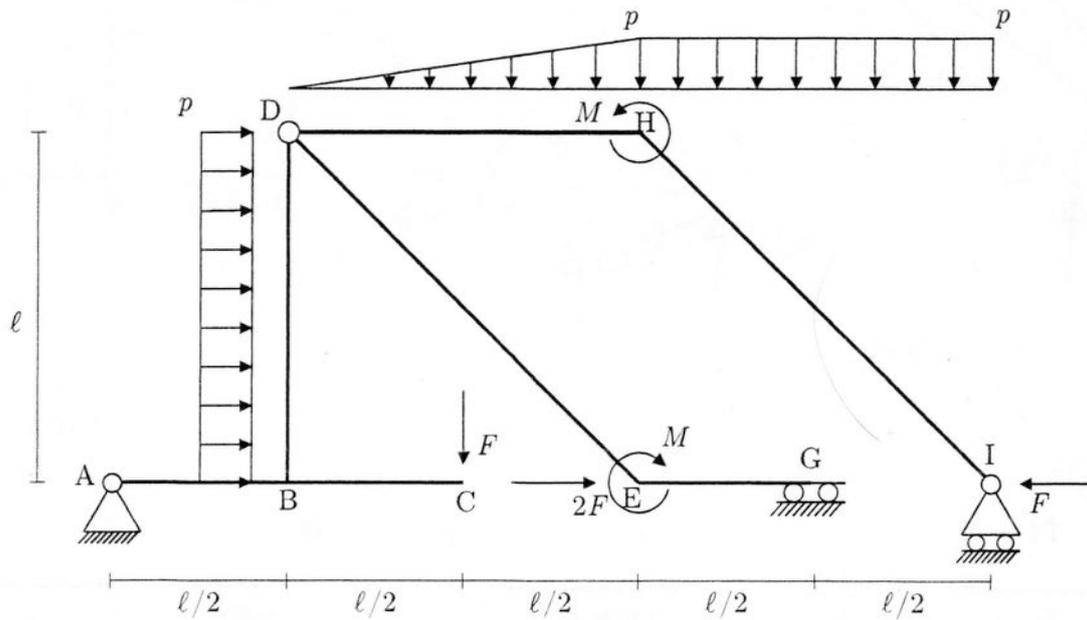
Scienza delle Costruzioni

Ingegneria Industriale

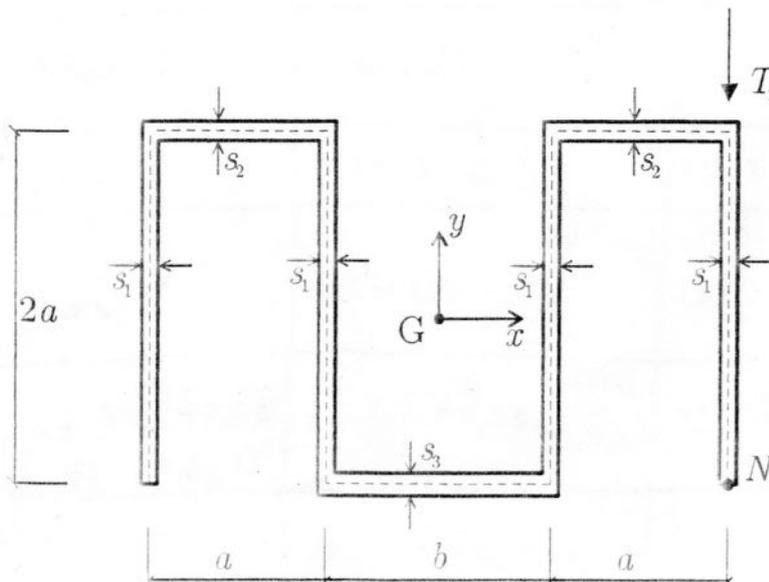
Canale B, Cognomi H-Z

Prof. Francesco D'Annibale - 26/01/2017 - durata: 3 ore

Esercizio 1: Scrivere e diagrammare le leggi di variazione delle caratteristiche di sollecitazione per la struttura in figura, nel caso in cui siano $\ell = 4$ m, $p = 15$ kN/m, $F = 30$ kN, $M = 40$ kNm.

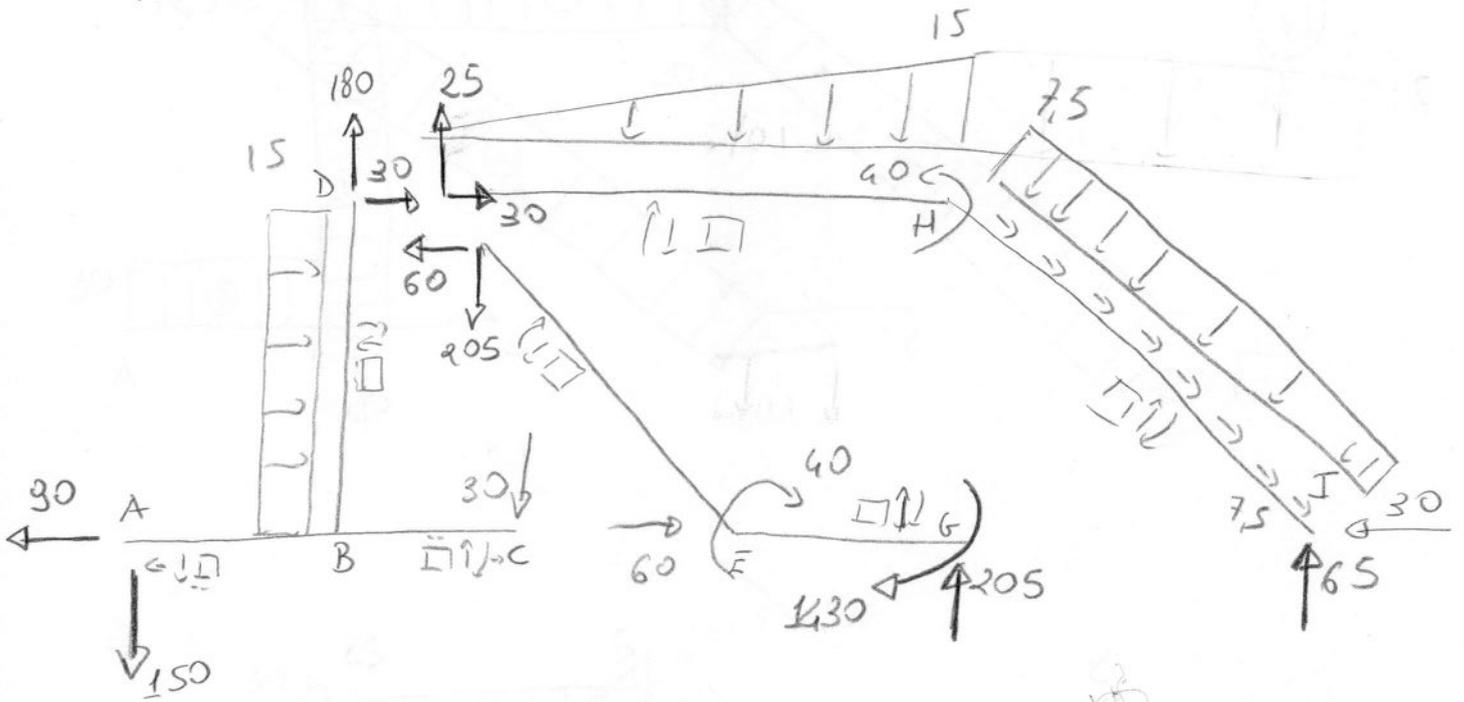


Esercizio 2: Si verifichi un solido di DSV avente la sezione rappresentata in figura, soggetto ad una forza normale $N = 50$ kN (di compressione) e ad una forza di taglio $T_y = 10$ kN. Si diagrammi l'andamento delle tensioni normali e delle tensioni tangenziali. Siano $a = 150$ mm, $b = 250$ mm, $s_1 = 5$ mm, $s_2 = 10$ mm, $s_3 = 12$ mm, $\sigma_{amm} = 260$ N/mm². Si calcoli la σ_{id} , nel punto più sollecitato utilizzando il criterio di resistenza di Tresca.



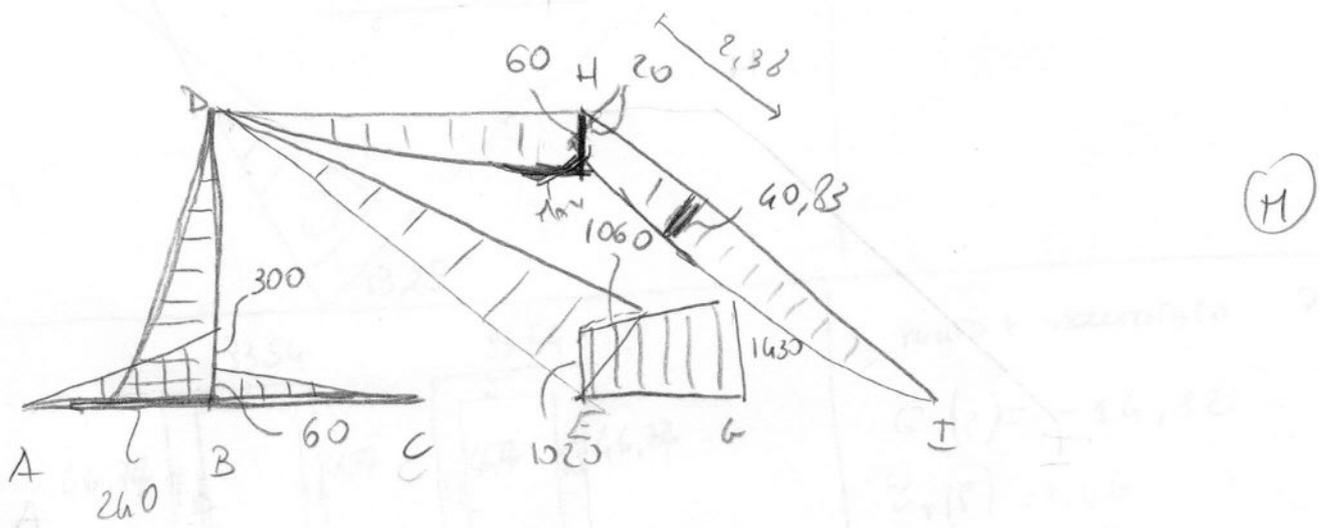
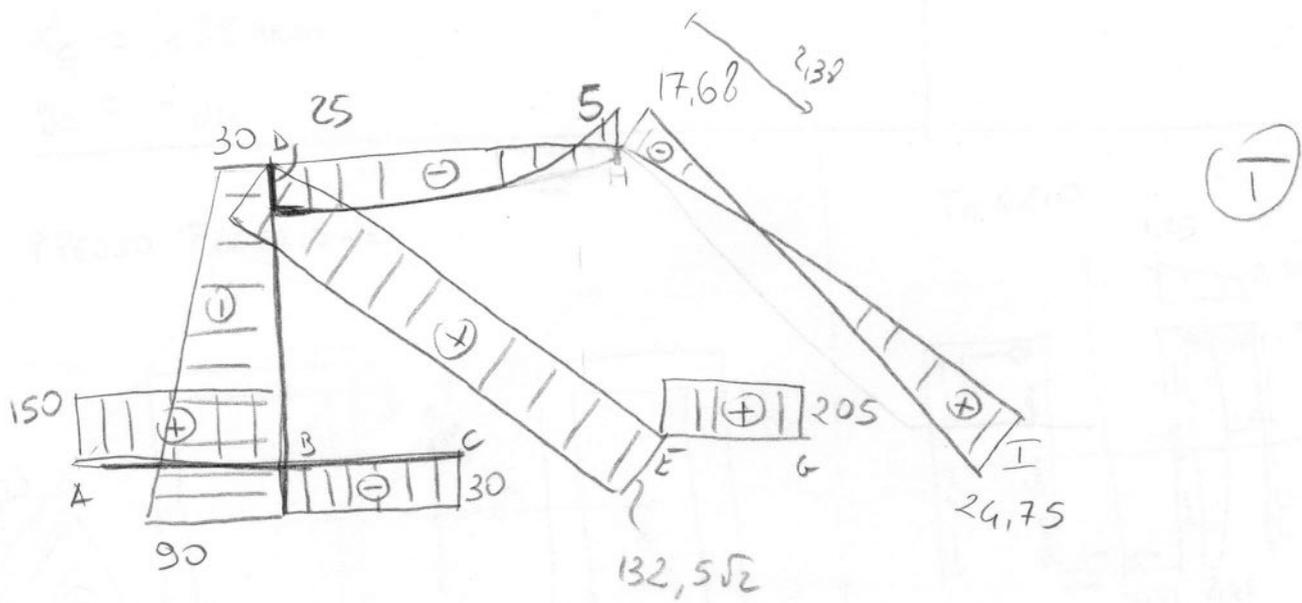
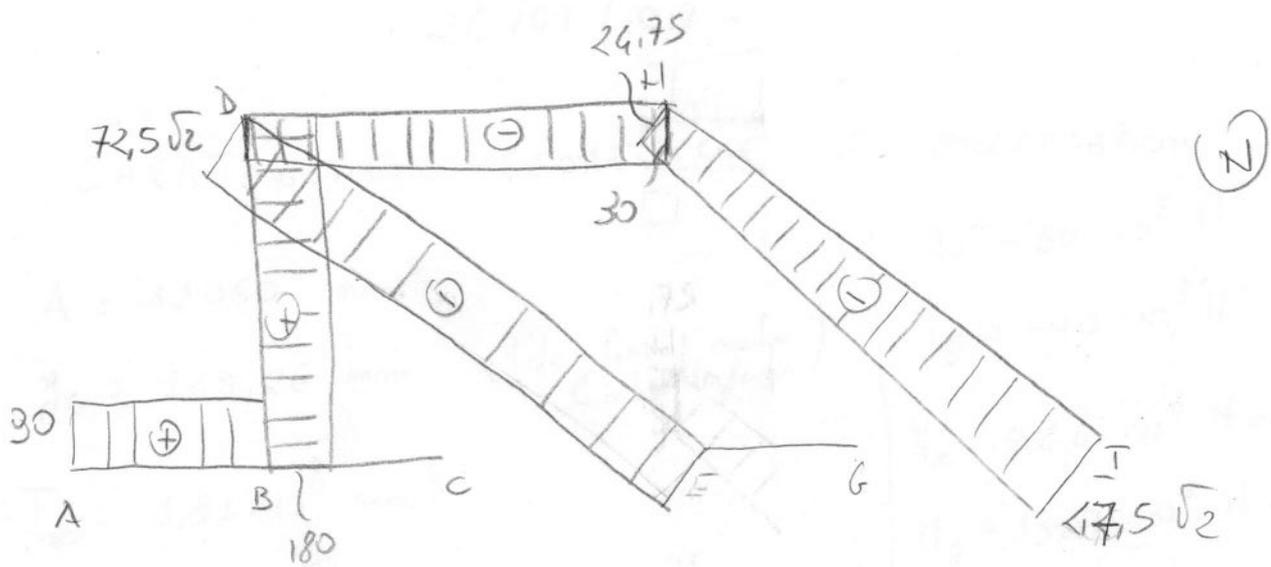
SOLUZIONE IPOTATICO
26/01/2017

ESPRIMO EQUILIBRATO



LEGGI CDS

| TRATTO | L | N | T | M |
|--------|-------------|---|--|--|
| A-B | 2 | 90 | 150 | $-150z \begin{matrix} \curvearrowright \\ \curvearrowleft \end{matrix} \begin{matrix} 0 \\ -300 \end{matrix}$ |
| C-B | 2 | 0 | -30 | $30z \begin{matrix} \curvearrowright \\ \curvearrowleft \end{matrix} \begin{matrix} 0 \\ 60 \end{matrix}$ |
| D-B | 4 | 180 | $-30 - 15z \begin{matrix} \curvearrowright \\ \curvearrowleft \end{matrix} \begin{matrix} -30 \\ -90 \end{matrix}$ | $30z + \frac{15z^2}{2} \begin{matrix} \curvearrowright \\ \curvearrowleft \end{matrix} \begin{matrix} 0 \\ 240 \end{matrix}$ |
| D-E | $4\sqrt{2}$ | $-72,5\sqrt{2}$ | $132,5\sqrt{2}$ | $-132,5\sqrt{2}z \begin{matrix} \curvearrowright \\ \curvearrowleft \end{matrix} \begin{matrix} 0 \\ -1060 \end{matrix}$ |
| G-E | 2 | 0 | 205 | $-205z + 1430 \begin{matrix} \curvearrowright \\ \curvearrowleft \end{matrix} \begin{matrix} 1430 \\ 1020 \end{matrix}$ |
| D-H | 4 | -30 | $-25 + \frac{15z}{8} \begin{matrix} \curvearrowright \\ \curvearrowleft \end{matrix} \begin{matrix} -25 \\ 5 \end{matrix}$ | $25z - \frac{5z^3}{8} \begin{matrix} \curvearrowright \\ \curvearrowleft \end{matrix} \begin{matrix} 0 \\ 60 \end{matrix}$ |
| J-H | $4\sqrt{2}$ | $-47,5\sqrt{2} + 7,5z$ $-47,5\sqrt{2}$ | $17,5\sqrt{2} + 7,5z \begin{matrix} \curvearrowright \\ \curvearrowleft \end{matrix} \begin{matrix} 17,5\sqrt{2} \\ -17,68 \end{matrix}$ | $-17,5\sqrt{2}z + 7,5\frac{z^2}{2} \begin{matrix} \curvearrowright \\ \curvearrowleft \end{matrix} \begin{matrix} 0 \\ -20 \end{matrix}$ |



SECONDO ESERCIZIO

26/01/2017

CARATTERISTICHE GEOMETRICHE E SOLLECITAZIONI

$$A = 12060 \text{ mm}^2$$

$$y_G = 148,26 \text{ mm}$$

(da linea mediana
lombo inferiore)

$$I_x = 1,81 \cdot 10^8 \text{ mm}^4$$

$$I_y = 4,25 \cdot 10^8 \text{ mm}^4$$

$$x_G = 275 \text{ mm}$$

$$y_G = -y_0$$

$$N = -50 \cdot 10^3 \text{ N}$$

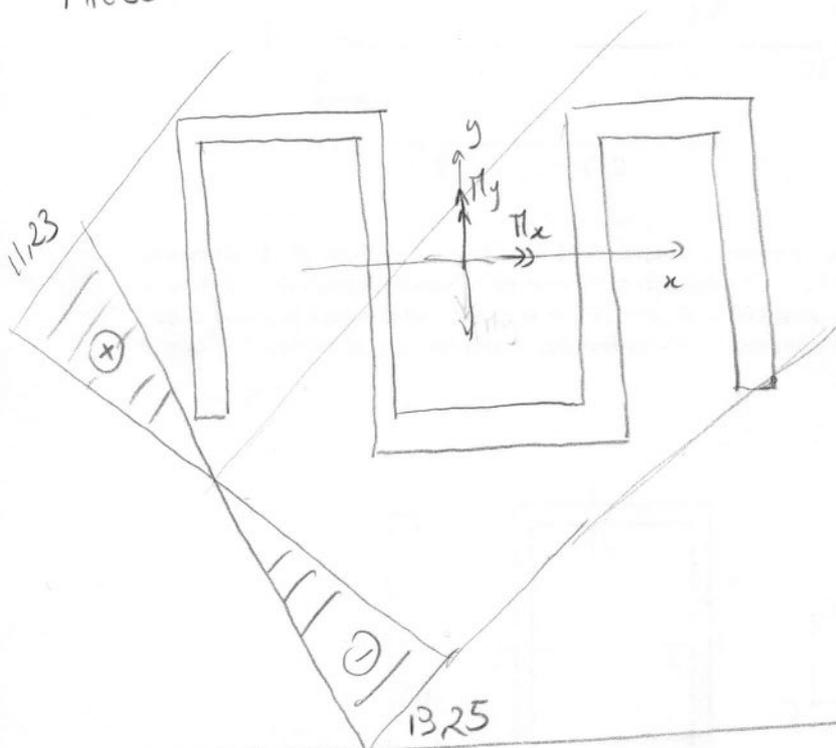
$$T_y = -10 \cdot 10^3 \text{ N}$$

$$M_x = 7,46 \cdot 10^6 \text{ N mm}$$

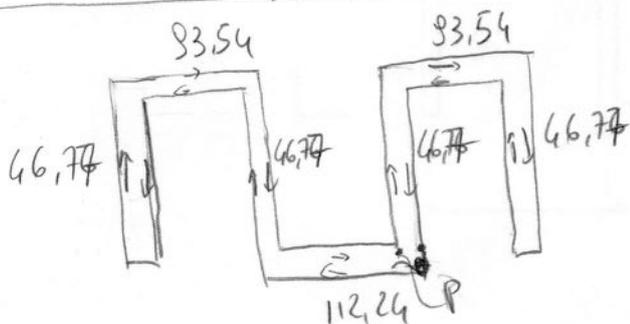
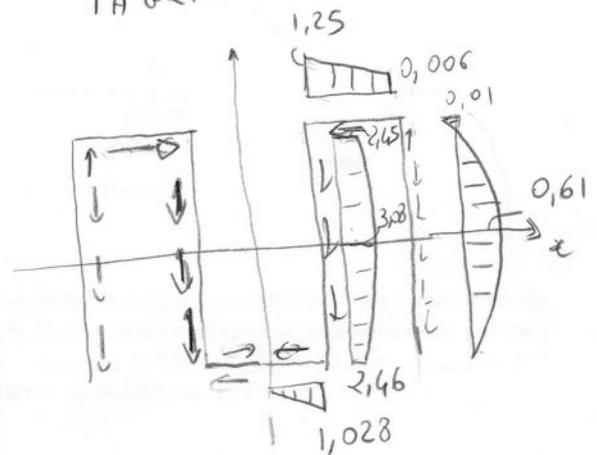
$$M_y = 13,75 \cdot 10^6 \text{ N mm}$$

$$M_z = -2,75 \cdot 10^6 \text{ N mm}$$

PRESSO FLESSIONE



TAGLIO



PUNTO + SOLLECITATO P

$$G(P) = -14,32$$

$$z_T(P) = 2,46$$

$$z_{TOR}(P) = 112,24$$

$$\sigma_{TRESCA} = 230 \frac{\text{N}}{\text{mm}^2} < \sigma_{amm}$$