

five equations in five unknowns!

17 August 2010

load intensity: $w(x) = 0$

shear: $V(x) = A_y \langle x-0 \rangle^0 + C_y \langle x-1448 \rangle^0 - 27.23 \langle x-1601 \rangle^0 + B_y \langle x-2848 \rangle^0$

moment: $M(x) = A_y \langle x-0 \rangle^1 + C_y \langle x-1448 \rangle^1 - 27.23 \langle x-1601 \rangle^1 + B_y \langle x-2848 \rangle^1$

rotation: $\theta(x) = \frac{A_y}{2} \langle x-0 \rangle^2 + \frac{C_y}{2} \langle x-1448 \rangle^2 - \frac{27.23}{2} \langle x-1601 \rangle^2 + \frac{B_y}{2} \langle x-2848 \rangle^2 + 0$

deflection: $\delta(x) = \frac{A_y}{6} \langle x-0 \rangle^3 + \frac{C_y}{6} \langle x-1448 \rangle^3 - \frac{27.23}{6} \langle x-1601 \rangle^3 + \frac{B_y}{6} \langle x-2848 \rangle^3 + 0$

boundary conditions: support reactions are $\delta(x) = 0 \Rightarrow \delta(x=0) = 0 \quad (rxn A)$
 $\delta(x=1448) = 0 \quad (rxn C)$
 $\delta(x=2848) = 0 \quad (rxn B)$

$$\frac{A_y}{6} \langle x-0 \rangle^3 + \frac{C_y}{6} \langle x-1448 \rangle^3 - \frac{27.23}{6} \langle x-1601 \rangle^3 + \frac{B_y}{6} \langle x-2848 \rangle^3 + 0 = 0$$

$$\delta(x=0) = 0 \Rightarrow \beta = 0$$

$$\delta(x=1448) = 0 \Rightarrow \frac{A_y}{6} - (1448) + d(1448) = 0 \Rightarrow 349451 A_y + d = 0$$

$$\delta(x=2848) = 0 \Rightarrow \frac{A_y}{6} (2848) + \frac{C_y}{6} (1400) - \frac{27.23}{6} (1247) + d(2848) = 0$$

$$(3.85 \times 10^9) A_y + 4.573 \times 10^8 C_y + 2848 d = 8.76 \times 10^9$$

$$A_y + C_y + B_y = 27.23$$

$$2848 A_y + 1400 C_y = 35,901.15$$

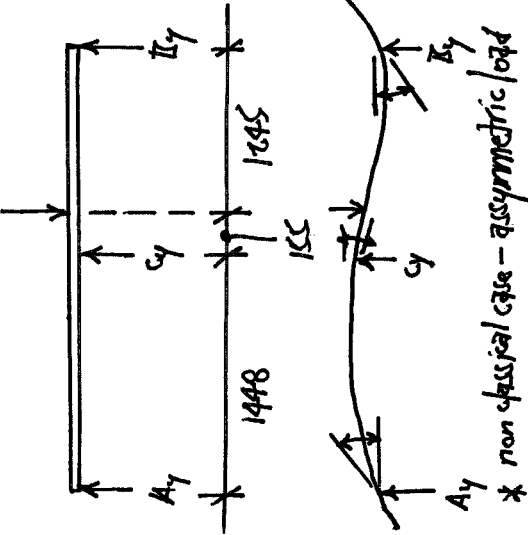
XEQ MATRIX - HP-41C X
XEQ SIMPL

$$\begin{bmatrix} 1 & 0 & 0 & 0 & 0 \\ 0 & 1400 & 0 & 0 & 0 \\ 0 & 0 & 0 & 1 & 0 \\ 0 & 0 & 0 & 0 & 1 \\ 2848 & 1400 & 0 & 0 & 0 \end{bmatrix} \begin{bmatrix} A_y \\ C_y \\ B_y \\ d \\ d \end{bmatrix} = \begin{bmatrix} 0 \\ 0 \\ 0 \\ 0 \\ 8.76 \times 10^9 \end{bmatrix}$$

$$\begin{aligned} A_y &= -1.2617 \\ C_y &= 26.6597 \\ B_y &= 1.7727 \end{aligned}$$

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27.23T



* non classical case - asymmetric load

