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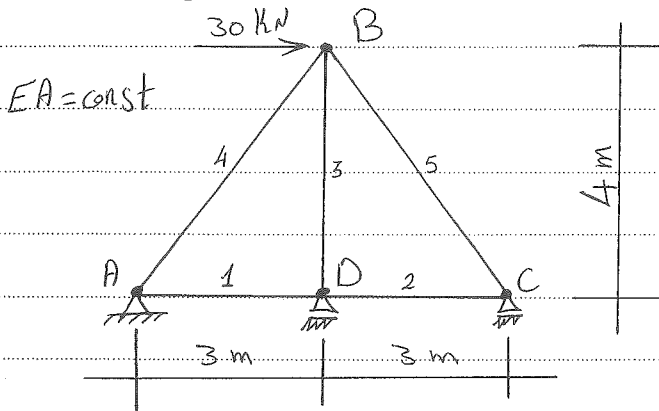
إشادته (1)  
المعز والكتابة  
عليه

الدكتور: الطويل  
عدد الصفحات: 7  
التاريخ: 11/11/2012

We Build your Life

عياقة الهندسة المدنية

Analysis of statically indeterminate structure:



Find the forces in the members:

$$S.I = m + r - 2j$$

$$m: \text{member} = 5$$

$$r: \text{reactions} = 4$$

$$j: \text{joints} = 4$$

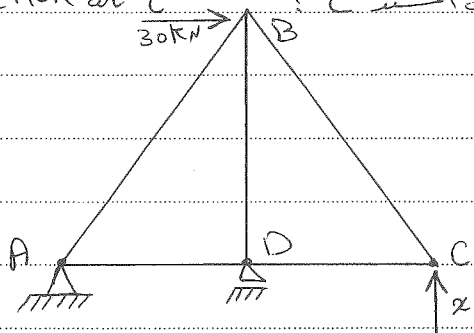
$$S.I = 5 + 4 - 4 = 1$$

د/ع عم إقرار الكوني

remove the reaction at C

نقر المنشأ بحذف السند C

$$\sum_{i=1}^n P_i x_i = 0$$



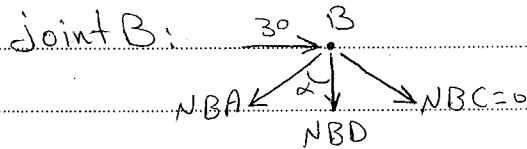
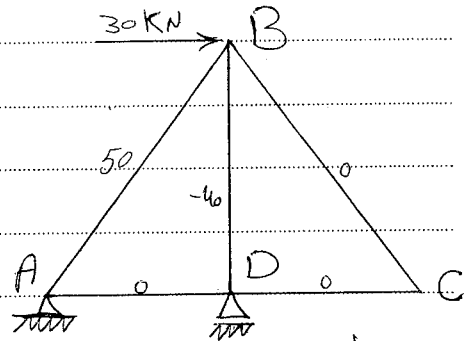
(1)

<https://www.facebook.com/groups/Civil.Genuieses>

مكتبة عياقة الهندسة المدنية

$$\delta_{10} = \sum \frac{N_0 M_1 L}{EA}$$

$$f_{11} = \sum \frac{N_1^2 L}{EA}$$



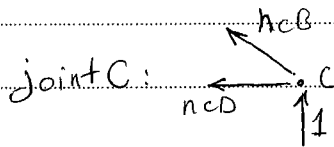
$$\sin \alpha = 0,6 \quad , \quad \cos \alpha = 0,8$$

$$\leftarrow + \sum x_i = 0 \quad NBA \sin \alpha - 30 = 0$$

$$NBA = \frac{30}{0,6} = 50 \text{ kN}$$

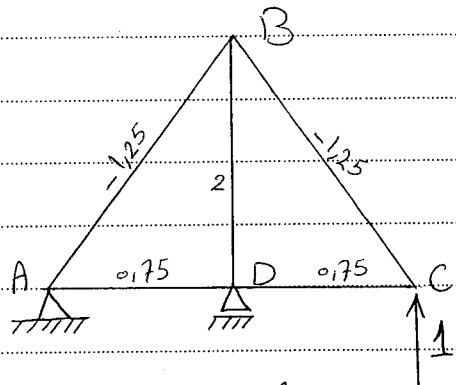
$$+\uparrow \sum y_i = 0 \quad NBD + NBA \cos \alpha = 0$$

$$NBD = -50(0,8) = -40 \text{ kN}$$



$$+\uparrow \sum y_i = 0 \quad nCB \cos \alpha + 1 = 0$$

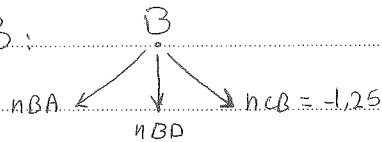
$$\Rightarrow nCB = \frac{-1}{0,8} = -1,25$$



$$\leftarrow + \sum x_i = 0 \quad nCB \sin \alpha + nCD = 0$$

$$nCD = -(-1,25) 0,6 = 0,75$$

joint B:



$$+\sum x_i = 0 \quad n_{BA} = n_{BC} = -1,25$$

$$+\uparrow \sum y_i = 0 \quad 2n_{BC} \cos \alpha + n_{BD} = 0$$

$$n_{BD} = -2(-1,25) \cdot 0,8 = 2$$

$$\delta_{10} = \sum \frac{N_0 n L}{EA} = \frac{1}{EA} (0 + 0 + 0 - 40(2)(4) - 50(1,25)(5))$$

$$\delta_{10} = \frac{-632,5}{EA}$$

$$P_{11} = \sum \frac{n^2 L}{EA} = \frac{1}{EA} \left[ (2)(1,25)^2(5) + (2)(0,75)^2(3) + (2)(4)^2 \right]$$

نوع آخر من العناصر (0) لأنه نفس قيمة التمدد الصغير

$$P_{11} = \frac{35}{EA}$$

$$\delta_{10} + P_{11} x_1 = 0 \Rightarrow \frac{-632,5}{EA} + \frac{35}{EA} x_1 = 0$$

$$(4c) \quad x_1 = 18,1 \text{ KN}$$

$$N_{\text{final}} = N_0 + n x_1$$

$$N_{BC} = 0 + (-1,25)(18,1) = -22,6 \text{ KN}$$

$$N_{CD} = 0 + (0,75)(18,1) = 13,6 \text{ KN}$$

$$N_{DA} = 0 + (0,75)(18,1) = 13,6 \text{ KN}$$

$$N_{BD} = -40 + 2(18,1) = -3,9 \text{ KN}$$

$$N_{BA} = 50 + (-1,25)(18,1) = 27,41 \text{ KN}$$

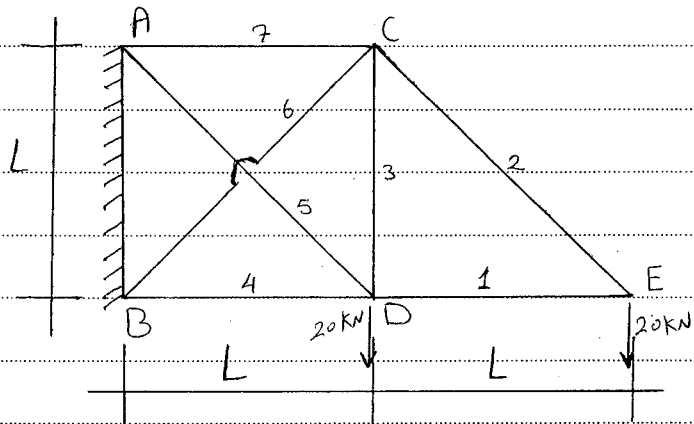
$$S.I \text{ (Externally)} = m + r - 2j$$

د. ص. ع. م. الق. ب. ا. م.

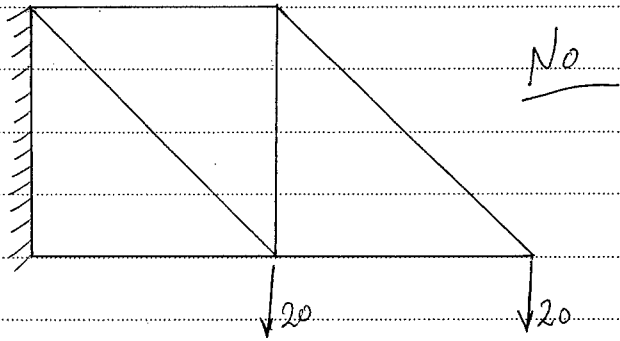
$$S.I \text{ (Internally)} = m + 3 - 2j$$

د. ص. ع. م. الق. ب. ا. م.

Find the forces in the members of this truss:



Remove the member (6):



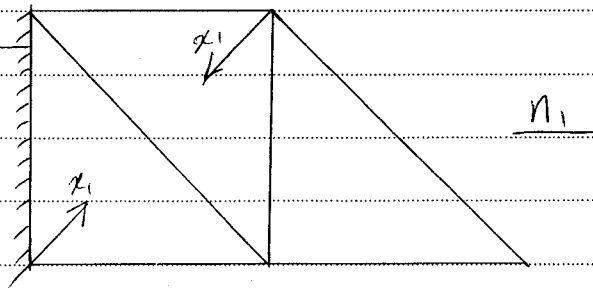
هذه ليست وثيقة ولكن يمكن أن يكون الخلل ملحق بجدار

من مادة آخرنا على مادة الخيز

فنتبرون هذا الصلح غير موجود عند الزاوية

لأنه لا يحمل أو أنه قد ينقل (لأنه ملحق

بجدار) فله يمكن أن لا يمر له



member	L	$N_0$	$n_1$	$N_0 \cdot n_1 \cdot L$	$n_1^2 L$	$N_{Final}$
1	L	-20	0	0	0	-20
2	$L\sqrt{2}$	$20\sqrt{2}$	0	0	0	$20\sqrt{2}$
3	L	-20	$-\frac{\sqrt{2}}{2}$	$10\sqrt{2} L$	$\frac{1}{2} L$	0
4	L	-60	$-\frac{\sqrt{2}}{2}$	$30\sqrt{2} L$	$\frac{1}{2} L$	-40
5	$L\sqrt{2}$	$40\sqrt{2}$	1	$80 L$	$\sqrt{2} L$	+28,3
6	$L\sqrt{2}$	0	1	0	$\sqrt{2} L$	-28,3
7	L	20	$-\frac{\sqrt{2}}{2}$	$-10\sqrt{2} L$	$\frac{1}{2} L$	40

$$\sum = 122,4L \quad \left\{ \begin{array}{l} 4,3L = \sum \end{array} \right.$$

$$\delta_{10} = \sum \frac{N_0 n_1 L}{EA} = \frac{122,4 L}{EA}$$

$$F_{11} = \sum \frac{n_1^2 L}{EA} = \frac{4,3 L}{EA}$$

$$\delta_{10} + F_{11} x_1 = 0$$

$$122,4 + 4,3 x_1 = 0 \quad \text{اعترضها EA و L في الصيغة.}$$

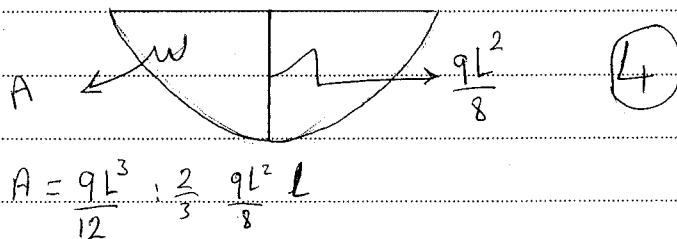
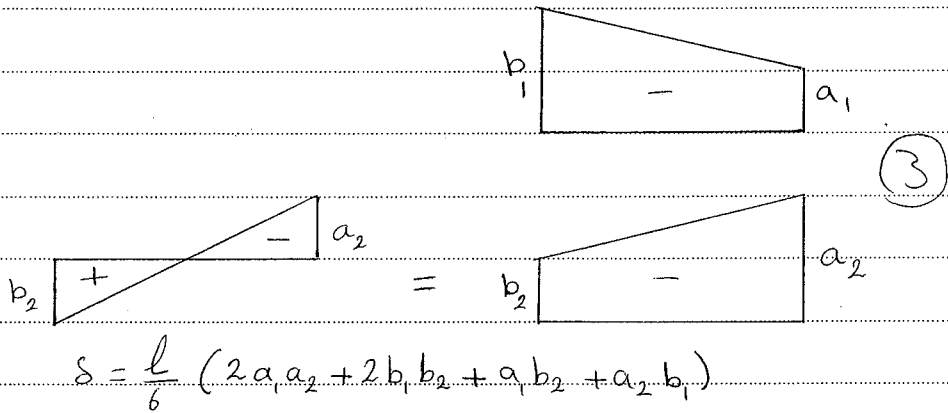
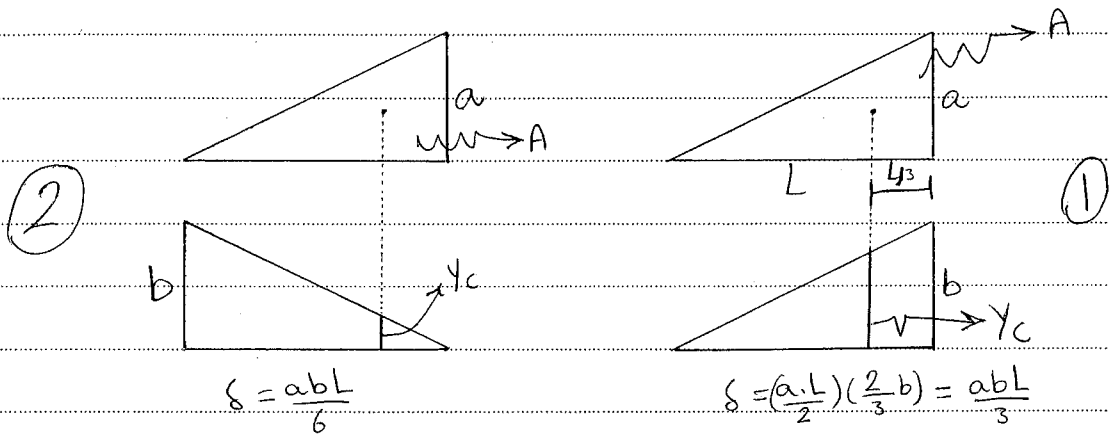
$$\Rightarrow x_1 = -28,3 \text{ kN}$$

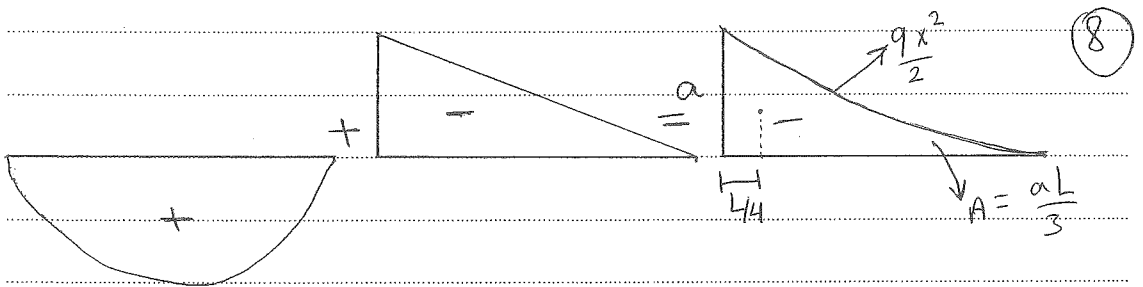
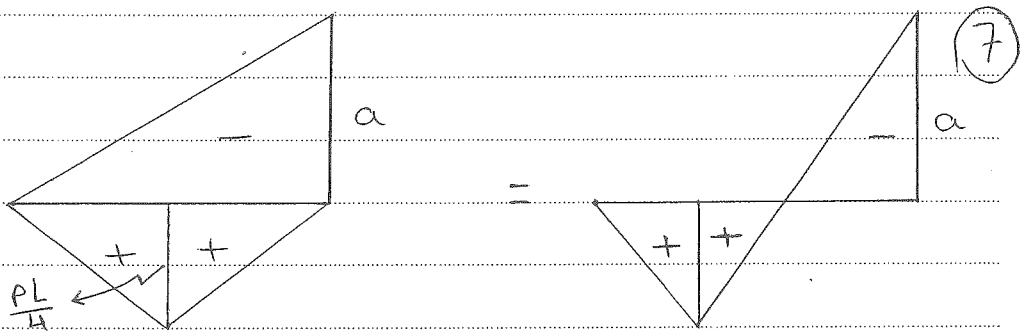
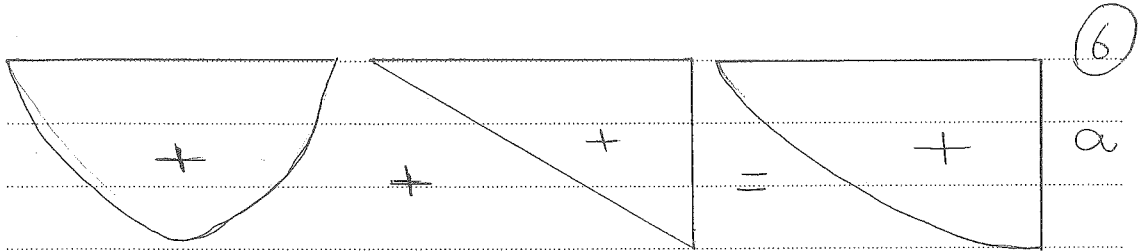
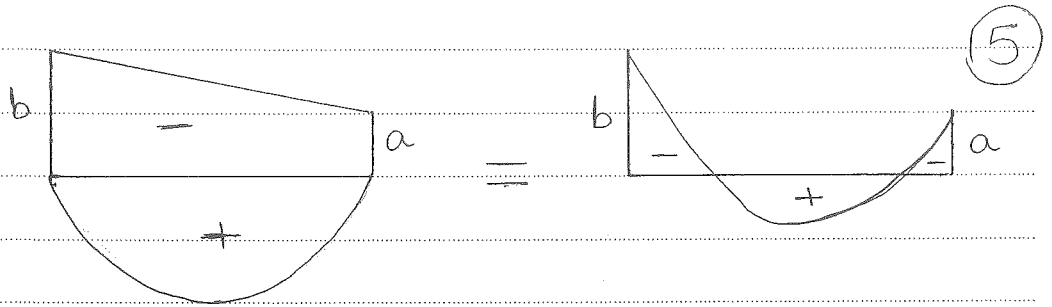
$$N_{Final} = N_0 + n_1 x_1 \quad \text{معادلة العمود الأخرى الجرد}$$

# Beams and Frames : $\delta = \int \frac{M_o m}{EI} dx$

(Mo.) المومنت الاليد  $S = A \cdot \bar{y}_c$

Mo المومنت الاليد (m) المومنت الاليد  $\bar{y}_c$





انصتوا لطاير

على راس

0938408492

