

MR

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مدرس خصوصي

حضورى

اونلاين

لجصل الطالب علي

مقاطع فيديو هات لشرح المقرر بشكل وافي

ملخص للمادة Pdf للمذكرة واطراجة

محاضرات مباشرة علي برنامج زووم

مناقشة الأجزاء الغير مفهومة

تواصل مستمر مع معلم المادة

للتواصل

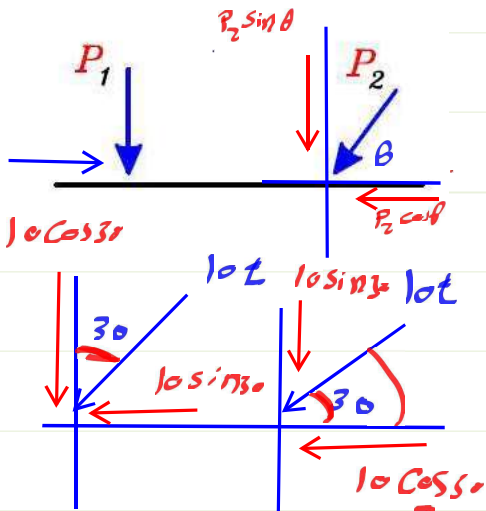
0567630097

0565657741



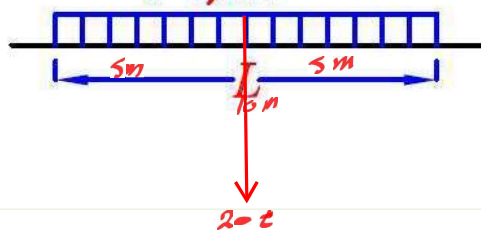
Loads الاحمال

concentrated load
الحمل المركز

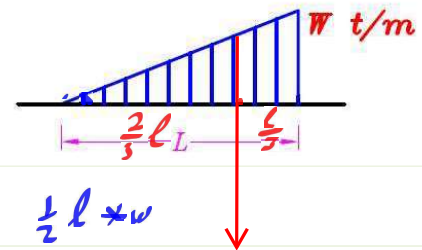


distributed load
الحمل الموزع

الحمل الموزع بانتظام
uniform distributed
 $W \text{ t/m}$

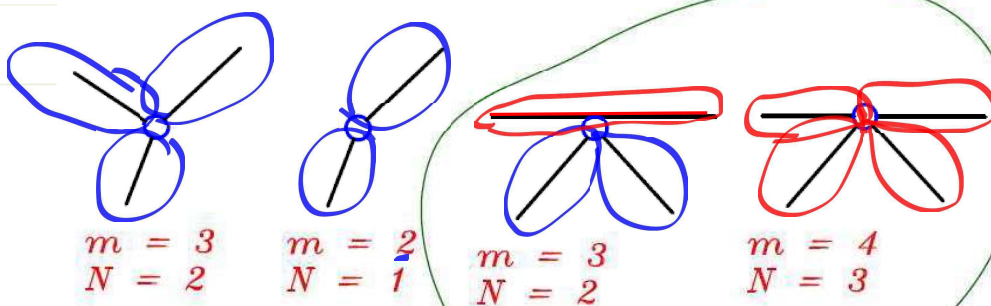
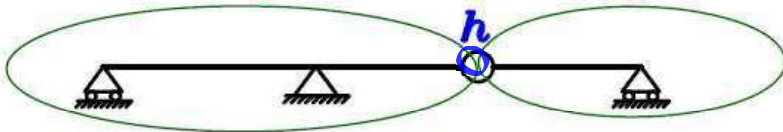


الحمل الموزع غير انتظام
non uniform distributed



Intermediate Hinge (I.H.)

$$\Sigma M_h \text{ left} = 0 \quad \Sigma M_h \text{ right} = 0$$



LINK MEMBER

هو *member* له مواصفات خاصة

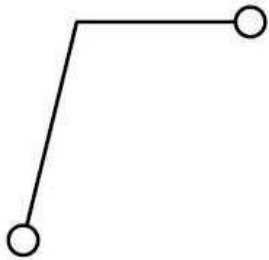
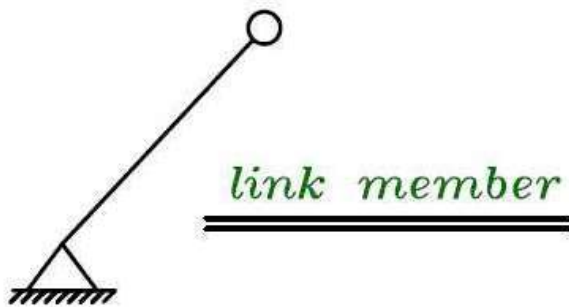
١- أوله و آخره *Hinges*

٢- عبارة عن خط مستقيم

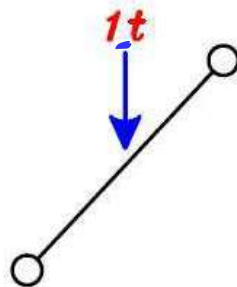
٣- لا يوجد عليه أى *Loads* أو *moments* بين ال *Hinges*

إذا توافرت بال *member* هذه الشروط يكون *Link member*

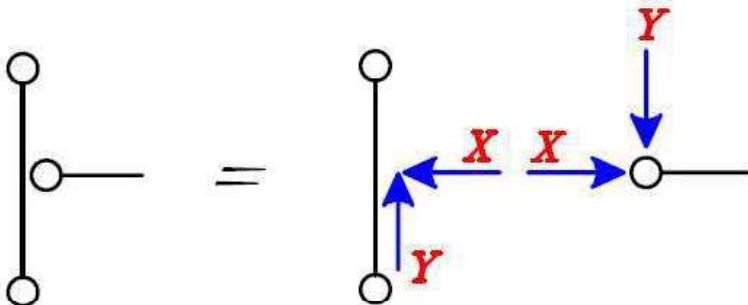
و بالتالى يكون هذا ال *member* به *Force* واحدة فقط فى اتجاهه.



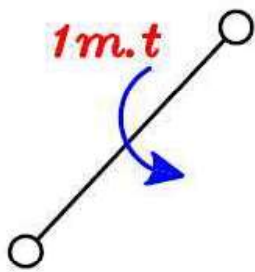
Not a link member



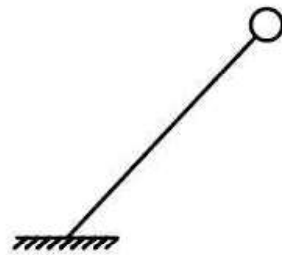
Not a link member



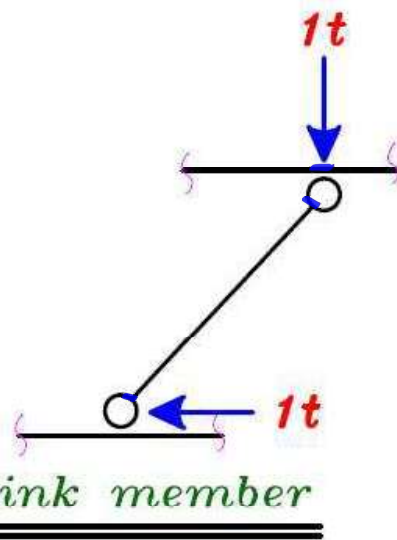
Not a link member



Not a link member



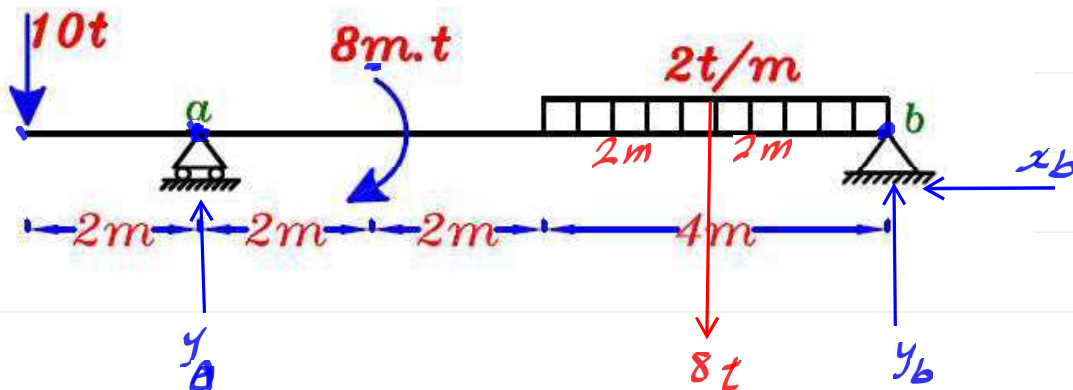
Not a link member



link member

Example :

Calculate the reactions for the shown beam .



$$\sum F_x = 0$$

$$\sum F_x = x_b = 0$$

$$\sum M = 0$$

$$-10 \times 2 + 8 + 8 \times 6 - y_b \times 8 = 0$$

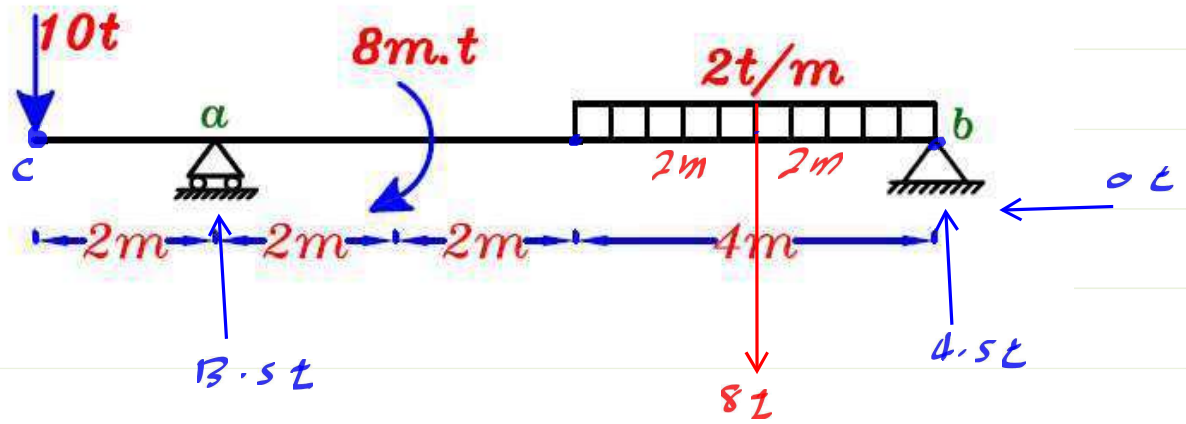
$$y_b = 4.5t \uparrow$$

$$\sum F_y = 0$$

$$-10 + y_a - 8 + 4.5t = 0$$

$$y_a = 13.5t$$

check



$$\sum \delta_x = 0$$

✓

$$\sum \delta_y = 0$$

$$-10 + 13.5 - 8 + 0 = 0$$

$$= 0 \quad \checkmark$$

$$\sum M_c = 0$$

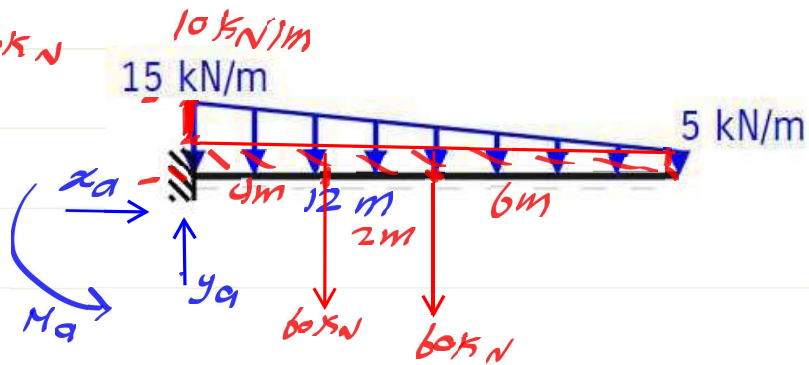
$$= -13.5 \times 2 + 8 + 8 \times 8 - 4.5 \times 10 = 0$$

✓

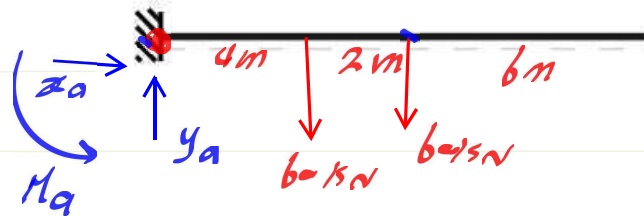
Example :

Calculate the reactions for the shown beam .

$$\frac{1}{2} \times 12 \times 10 = 60 \text{ kN}$$



Σ $f_x = 0$
Σ $f_y = 0$
Σ $M_a = 0$

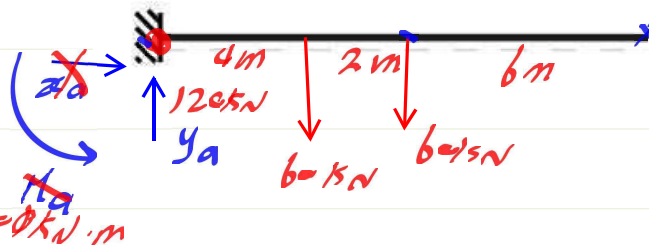


$$\sum f_x = 0$$
$$x_a = 0$$

$$\sum M_a = 0$$
$$M_a - 60 \times 4 - 60 \times 8 = 0$$
$$M_a = 600 \text{ kN.m} \curvearrowright$$

$$\sum f_y = 0$$
$$y_a - 60 - 60 = 0$$
$$y_a = 120 \text{ kN} \uparrow$$

Check



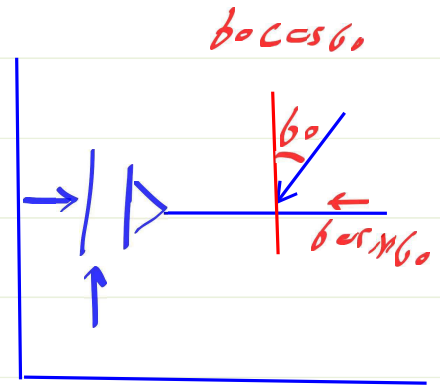
$$\sum f_x = 0$$

$$\sum f_y = 120 - 60 - 60 = 0$$

$$60 \times 6 + 60 \times 8 - 120 \times 12 + 600 = 0$$

Example :

Calculate the reactions for the shown beam .



$$\sum F_x = 0$$

$$x_a - 60 \cos 60 = 0$$

$$x_a = 30 \text{ kip}$$

$$\sum M = 0$$

$$- 60 \sin 60 \times 10$$

$$+ y_b \times 14 - 50 = 0$$

$$y_b = 40.7 \text{ kip}$$

$$\sum F_y = 0$$

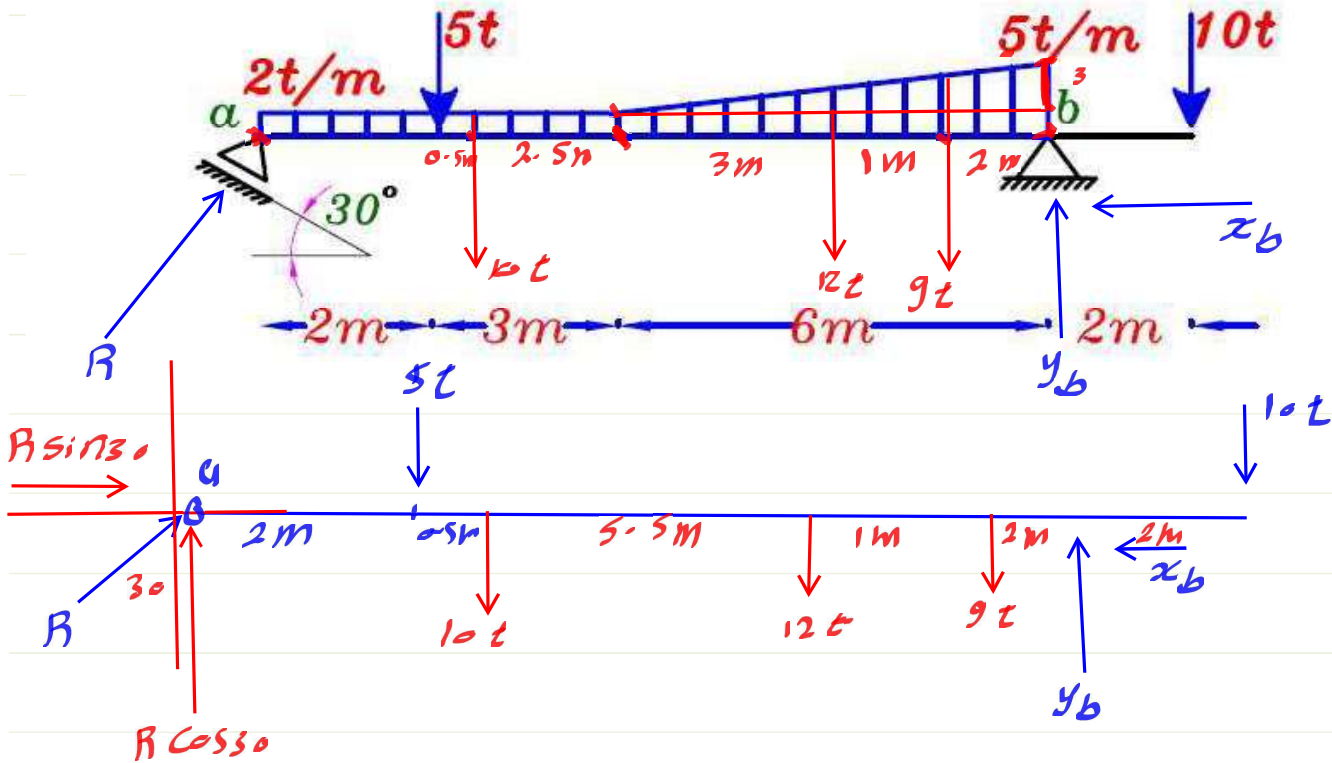
$$y_a - 60 \sin 60 + 40.7 = 0$$

$$y_a = 11.26 \text{ kip}$$

check

Example :

Calculate the reactions for the shown beam .



$$\sum F_x = 0$$

$$\sum F_y = 0$$

$$\sum M_a = 0$$

$$17.22 \sin 30 = x_b$$

$$R \cos 30 = 5 + 10 + 12 + 9$$

$$= 5 \times 2 + 10 \times 2.5 + 12 \times 8 + 9 \times 9$$

$$x_b = 8.61 \text{ t} \leftarrow$$

$$+ 31.09 - 10 = 0$$

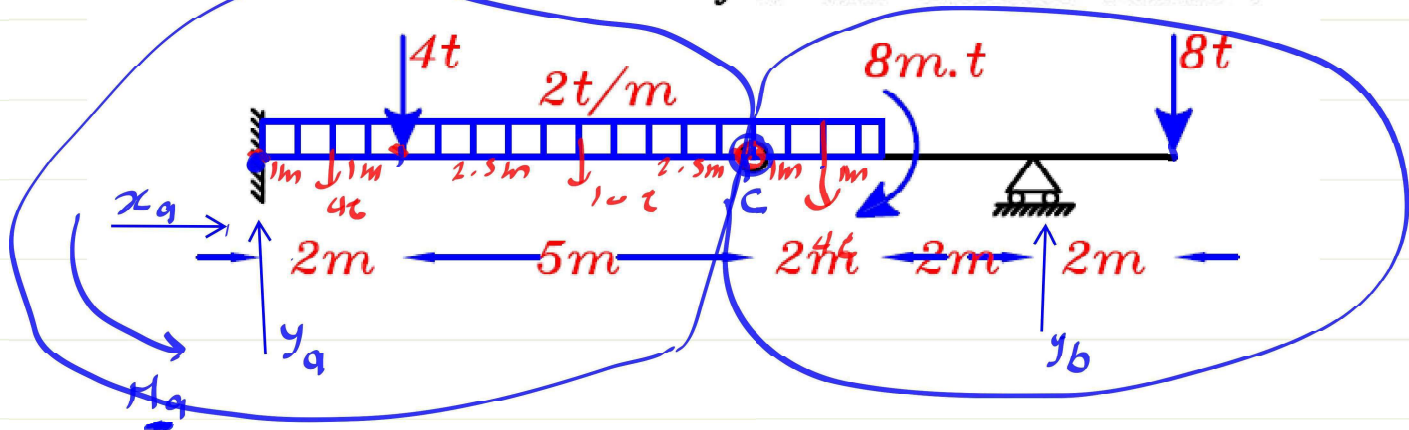
$$-y_b \times 11 + 10 \times 13 = 0$$

$$R = 17.22 \text{ t} \nearrow$$

$$y_b = 31.09 \text{ t} \uparrow$$

Example :

Calculate the reactions for the shown beam .



$$\begin{array}{l|l|l} \sum f_x = x_a = 0 & \sum \overset{CF}{M} = 4 \times 1 + 8 - y_b \times 4 & \sum f_y = y_a - 4 - 4 - 10 \\ & + 8 + 6 = 0 & - 4 + 15 - 8 = 0 \\ & y_b = 15 \text{ t} & y_a = 15 \text{ t} \uparrow \end{array}$$

$$\sum M_{C_{left}} = -10 \times 2.5 - 4 \times 5 - 4 \times 6 + y_a \times 7 - M_a = 0$$

$$M_a = 36 \text{ m.t}$$

check