Recitation 004

09/20/2024

GSI Info

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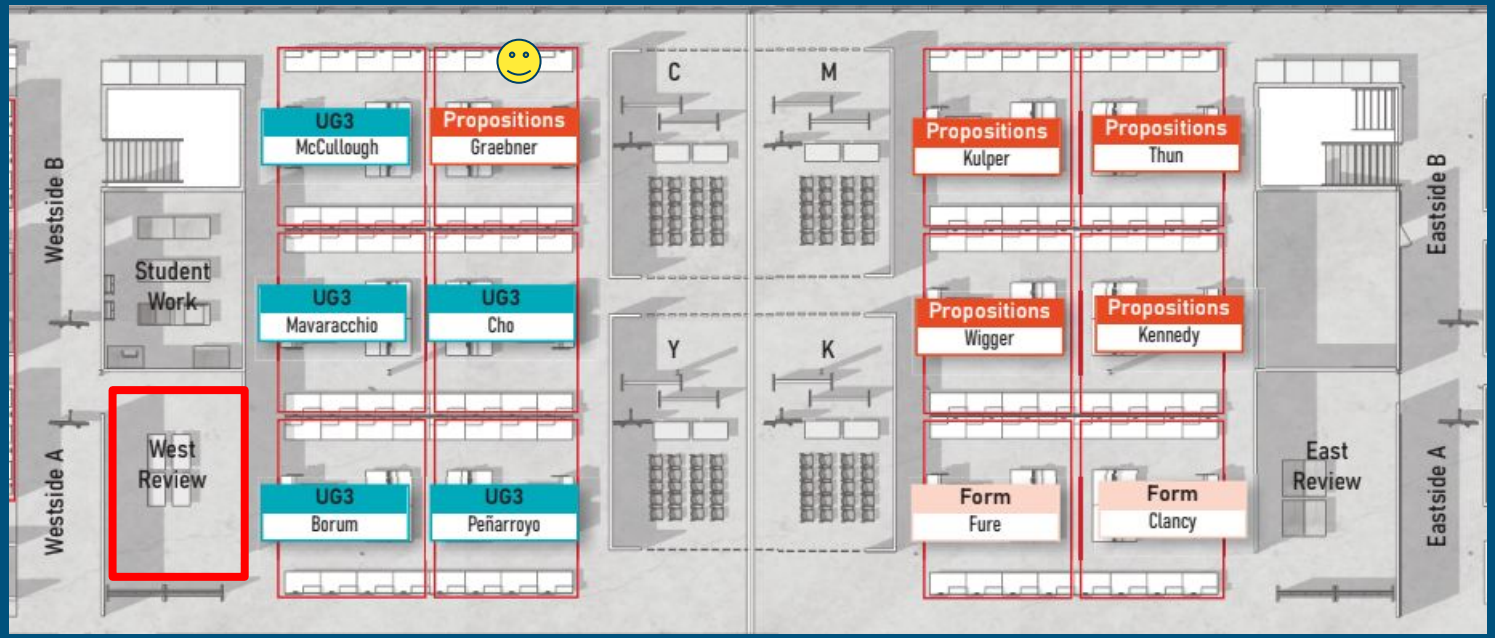
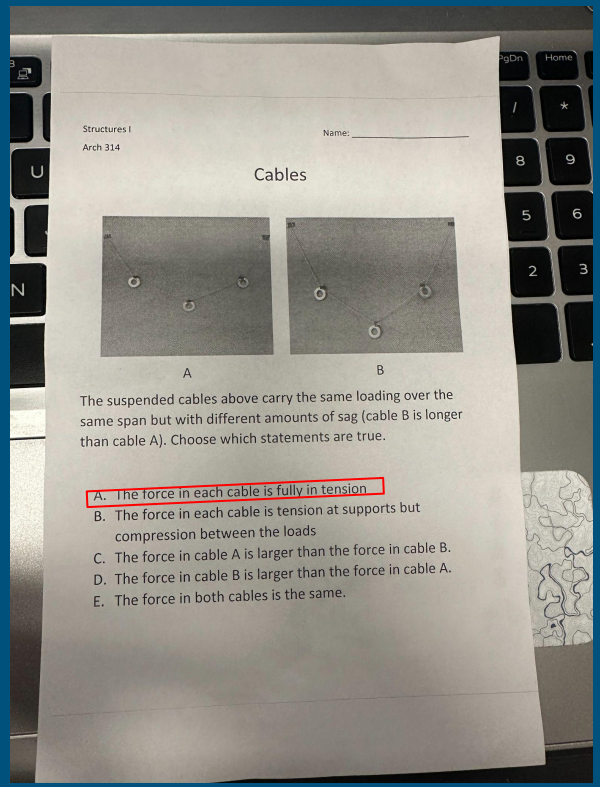


Questions

09/16/24 In-Person Lecture Quiz



Structures I
Arch 314

Name: _____

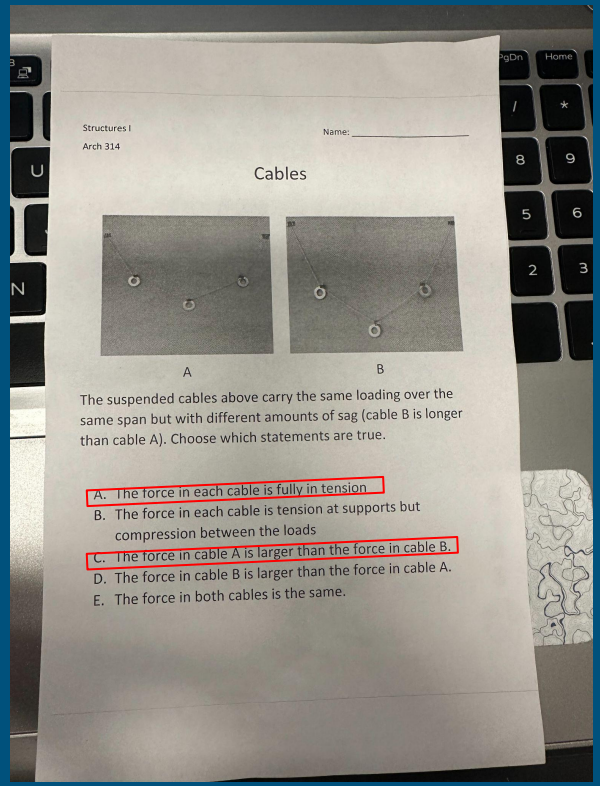
Cables

A B

The suspended cables above carry the same loading over the same span but with different amounts of sag (cable B is longer than cable A). Choose which statements are true.

A. The force in each cable is fully in tension
B. The force in each cable is tension at supports but compression between the loads
C. The force in cable A is larger than the force in cable B.
D. The force in cable B is larger than the force in cable A.
E. The force in both cables is the same.

09/16/24 In-Person Lecture Quiz



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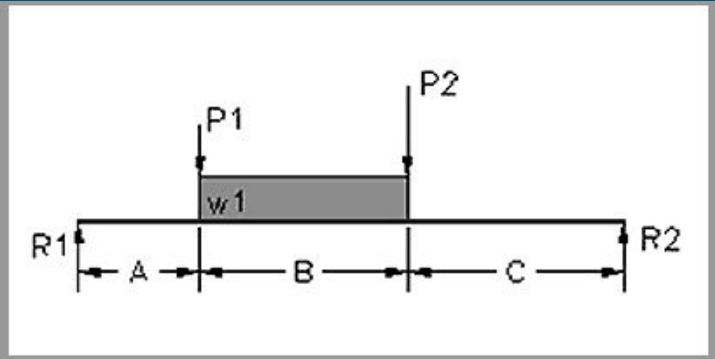
HW #4

determine the end reactions of the parallel force system shown. Check that the sum of vertical forces is zero.

DATASET: 1 -2- -3-

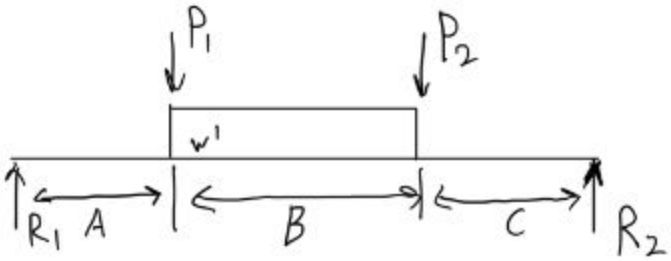
Distance A	12 FT
Distance B	12 FT
Distance C	8 FT
Force P1	5 KIPS
Force P2	2 KIPS
Force w1	0.82 KLF



Your answer was correct.
You scored 5 points.

#	Question	Your Response	Correct Answer	Score
1	Total force from distributed load: W1	9.84 KIPS	9.84 KIPS	5
2	Distance of total load W1 from left reaction	18 FT	18 FT	5
3	Total applied downward force	16.84 KIPS	16.84 KIPS	5
4	Left End Reaction (R1)	7.93 KIPS	7.93 KIPS	5
5	Right End Reaction (R2)	8.91 KIPS	8.91 KIPS	5

Due 9/22/24



w/= 0.82 KLF

A= 12'

B= 12'

C= 8'

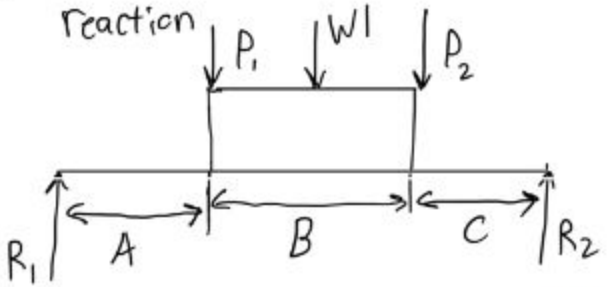
P_1 = 5 kips

P_2 = 2 kips

1.) Total force from distributed load: W1

$W = w_1 \times B = 0.82 \frac{kips}{} \times 12' = 9.84$ kips

2.) Distance of total load W1 from left reaction



$$D = A + \frac{B}{2} = 12' + \frac{12'}{2} = 18'$$

3.) Total Applied Downward force

$$\Sigma F = P_1 + P_2 + W1 = 5\text{ kips} + 2\text{ kips} + 9.84\text{ kips}$$
$$= 16.84\text{ kips}$$

4.) Left End Reaction (R1)

$\Sigma F = 0$ (+)

$\Sigma M = 0$ (−)

$$M_{R_1} = 0 = +P_1(A) + W1\left(A + \frac{B}{2}\right) + P_2(A+B) - R_2(A+B+C)$$

$$R_2 = \frac{+P_1(A) + W1\left(A + \frac{B}{2}\right) + P_2(A+B)}{(A+B+C)}$$

$$= \frac{+5(12') + 9.84\left(12' + \frac{12'}{2}\right) + 2(12'+12')}{(12' + 12' + 8')}$$

$R_2 = 8.91$ kips

5.) Right End Reaction (R_2)

$$\Sigma F_v = R_1 + R_2 - P_1 - P_2 - W1$$

$$R_1 = P_1 + P_2 + W1 - R_2$$

$$= 5\text{ kips} + 2\text{ kips} + 9.84\text{ kips} - 8.91\text{ kips}$$

From #4.

$$R_1 = 7.93\text{ kips}$$

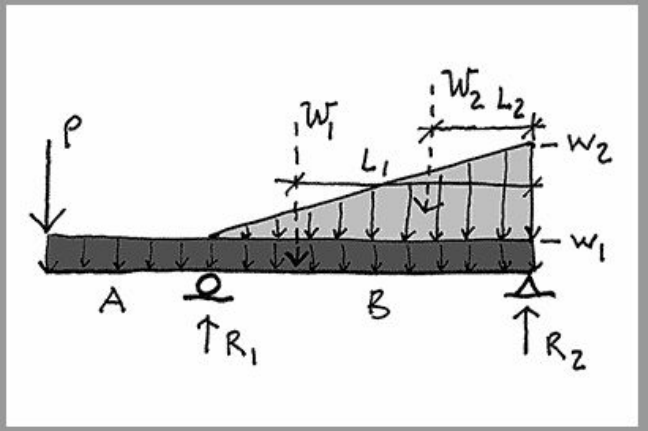
HW #5

5. Equilibrium of Rigid Bodies

Determine the support reactions at A and B that will hold the beam in equilibrium.

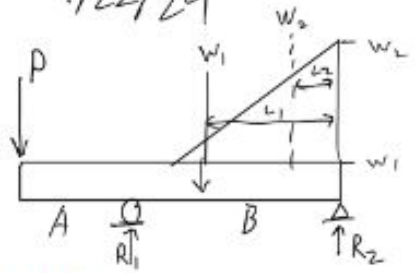
DATASET: 1 -2- -3-

Point Load, P	1.2 KIPS
Uniform Load, w1	32 PLF
Triangular Load, w2	58.7 PLF
Length A	8.4 FT
Length B	21 FT



#	Question	Your Response		Correct Answer	Score
1	TOTAL force of the uniform load: W1		KIPS	SUBMIT	
2	Distance from centroid of the uniform load to R2: (L1)		FT	SUBMIT	
3	TOTAL force of the triangular load: W2		KIPS	SUBMIT	
4	Distance from centroid of the triangular load to R2: (L2)		FT	SUBMIT	
5	TOTAL load on the member		KIPS	SUBMIT	
6	Reaction force: R1 (down is - : up is +)		KIPS	SUBMIT	
7	Reaction force: R2 (down is - : up is +)		KIPS	SUBMIT	

Due 9/22/24



A = 8.4'
B = 21'
P = 1.2 kips
W_1 = 32 PLF
W_2 = 58.7 PLF

1.) Total force of Uniform load W1

$W1 = w_1 \times (A+B) = 32\ PLF \times (8.4' + 21') =$

$\frac{940.8}{1000} = 0.9408$

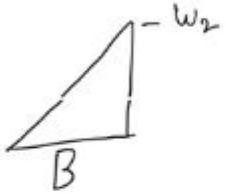
↳ convert to kips

2.) Distance from Centroid of uniform load to R2

$L_1 = \frac{A+B}{2} = \frac{8.4' + 21'}{2} = 14.7'$

3.) Total force of the triangular load W2

$W_2 = w_2 \times B \times 1/2 = 58.7\ PLF \times 21' \times 1/2 =$

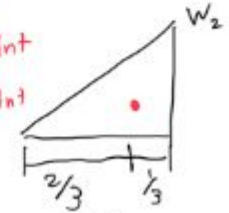


$\frac{616.35\ lbs}{1000} = 0.6164\ kips$

↑ Convert to KIPS

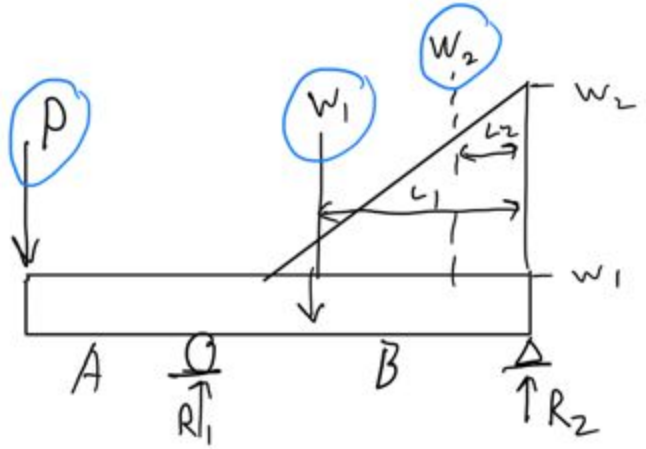
4.) Distance from centroid of triangular load to R_2

Triange = 1/3 from highest Point
2/3 from lowest Point



$L_2 = 1/3\,(B) = 1/3\,(21') = 7'$

5.) Total Load on Member



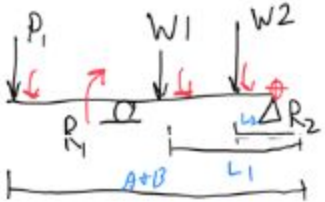
Load = P + W1 + W2 = 1.2 kips + 0.9408 kips + 0.6164 kips =

2.7572 kips

From #1

From #3

6.) Reaction force: R1



$\Sigma M = 0$

$$\Sigma M = 0 = +P_1(A+B) + W_1(L_1) + W_2(L_2) - R_1(B)$$

$$R_1 = \frac{P_1(A+B) + W_1(L_1) + W_2(L_2)}{B}$$

From #1 · From #2 · From #3

$$R_1 = \frac{1.2\ \text{kips}\,(8.4' + 21') + 0.94\ \text{kips}\,(14.7') + 0.62\ \text{kips}\,(7')}{21'}$$

From #4

$R_1 = 2.544$ kips

7.) $\Sigma F_v = 0$

$\Sigma F_v = -P - W1 - W2 + R_2 + R_1$

$-R_2 = -P - W1 - W2 + R1$

From #6

$-R_2 = -1.2k - 0.94k - 0.62k + 2.544$

$-R2 = -0.2132$

Cancel

$R2 = 0.2132$ kips

LAB