Str. An. 01: Find the deflection in the y-direction at "P".

\[ E = 200 \times 10^6 \text{ kPa} \]
\[ A = 2,580.6 \text{ mm}^2 \]
(all members)

\[ 4,448 \text{ N} \]
Str. A102. Find $R_B, R_c, V_{max}, M_{max}$.

$W = 5N/m$

$R_B$

$R_A = 18.75N$

$3m$

$3m$

$R_c$
Str. An.03. Find the cable tension and the reaction at "B".
Str. An. 04. Find the reaction at "C".

\[ W = 20 \, \text{kN/m} \]

\[ l_m \]

\[ 4 \, \text{m} \]

\[ 15 \, \text{m} \]

\[ 10 \, \text{m} \]
Str. An. 05. Find the maximum moment in the beam.

\[ 12 \text{ kN} \]
\[ 3.5 \text{ m} \]
\[ 1.5 \text{ m} \]
Str. An. O/b. The reaction at "B" is most nearly:

a) 30 kN
b) 45 kN
c) 50 kN
d) 62.5 kN
Str. An. 07. Find the midspan deflection.

a) 16 mm  
b) 38 mm  
c) 22 mm  
d) 8 mm  

\[ \frac{20 \text{KN}}{w' = 4 \text{kn/m}} \]

\[ 3.5 \text{m} \quad 0.5 \text{m} \]

\[ E = 200 \text{ GPa} \quad I = 3 \times 10^6 \text{ mm}^4 \]
Str. Des. 01. Find the req'd moment capacity for LRFD-based design.

\[ W_D = 10 \text{ kN/m} \]
\[ W_L = 15 \text{ kN/m} \]
\[ W_S = 12 \text{ kN/m} \]
Str. Des. 02. Find the req'd LRFD axial load, $P_w$.

<p>| | |</p>
<table>
<thead>
<tr>
<th></th>
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<tbody>
<tr>
<td>a</td>
<td>$390 \text{ k}$</td>
</tr>
<tr>
<td>b</td>
<td>$402 \text{ k}$</td>
</tr>
<tr>
<td>c</td>
<td>$287 \text{ k}$</td>
</tr>
<tr>
<td>d</td>
<td>$172 \text{ k}$</td>
</tr>
</tbody>
</table>

$P_d = 150 \text{ k}$

$P_L = 70 \text{ k}$

$P_W = 95 \text{ k}$

$P_E = 140 \text{ k}$
Str. Des. 03. Find the design moment capacity.

\[ A_s = 12.43 \text{ in}^2 \]

\[ f_c' = 60 \text{ksi} \]

\[ f_y = 60 \text{ksi} \]

\[ 12'' \]

\[ 36'' \]

\[ 3.5'' \]
Str. Des. 04. Does the "compression" steel yield at ultimate moment?

12"

3.5"

36"

4"

3.5"

3#7 $f_c = 4$ ksi

$4#8 f_y = 60$ ksi

4#8

DT-1420 (Structures Design Form 3)
Str. Des. 05. Find the axial capacity of the short, tied column with the cross-section shown.

16"  No. 8 bars  $f'_c = 5 \text{ ksi}$

16"  $f_y = 60 \text{ ksi}$
Str. Des. 06. Is the section shown adequate to carry the given loads?

\[ P_D = 100k \]
\[ P_L = 148k \]

Tied Column
No. 7 bars
\[ f'_c = 4 ksi \]
\[ f_y = 60 ksi \]

\[ M_D = 420 \text{ in.} \cdot \text{k} \]
\[ M_L = 622 \text{ in.} \cdot \text{k} \]
Str. Des. OT. Check the moment capacity of the beam.

\[ F_y = 50 \text{ ksi} \]

\[ \begin{align*}
W_D &= 2.0 \text{ klf} \\
W_L &= 2.4 \text{ klf} \\
W_18 \times 65 &
\end{align*} \]

L = 25 ft

Flanges & web are compact.
Beam is continuously braced.
Str. Des. 08. Find $P_u$. (Neglect self-wt.)

$P_u, P_u, F_y = 50$ kips

$10', 10', 10' W21 	imes 48$

$X = \text{Lateral brace point}$
Str. Des. 09: Find the axial load capacity for:

a) fixed-fixed ends
b) pinned-pinned ends

(a) W18x50  
Fy = 65 ksi

(b) W18x50  
Fy = 65 ksi
Str. Des. 10. Find the k-factor for column "AB" in the unbraced frame. (All members are steel.)

I = 1250

I = 750

I = 750

I = 2500

I = 750
Str. Des. 11. Find the bending factor, $C_b$.

$x = \text{brace point}$
Str. Des. 12. Find the bending factor, \( C_b \).

\[ \frac{L}{2} \quad \frac{L}{2} \]

\( X = \text{Brace Point} \)
Str. Des. 13. Find the design tension capacity.

4 sp. 2" H

8" 4"

3/4" Bolts

L 8 x 6 x 3/4

$F_y = 42$ kpsi

$F_u = 60$ kpsi

$A_g = 9.94 \text{ in}^2$

2.55"
Str. Des. 14. Find the effective area of the welded plate for 3 cases:

a) $L = 8''$

b) $L = 10''$

c) $L = 12''$

[Diagram of welded plate with dimensions]