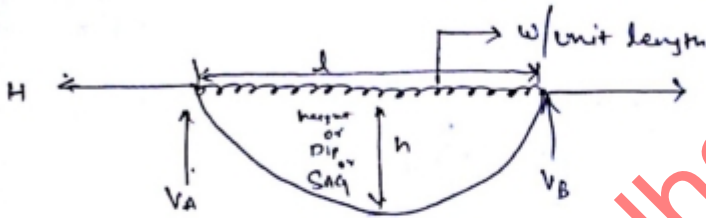
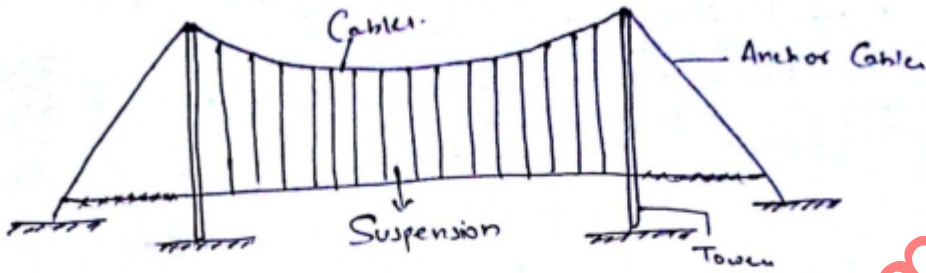


STRUCTURAL ANALYSIS - II

CABLES AND SUSPENSION BRIDGES



$$V_A = V_B = \frac{wl}{2}$$

where, w = weight of span
 l = length of span.

$$H = \frac{wl^2}{8h}$$

Here, H = force
 w = weight of span
 l = length of span
 h = height of span.

$$T = \sqrt{V^2 + H^2}$$

$$\therefore V_{\max} = \frac{wl}{2}$$

$$\text{then } T_{\max} = \sqrt{V_{\max}^2 + H^2}$$

where T_{\max} = maximum Tension.

STUDENTSUVIDHA.IN

$$y = \frac{4wn(l-n)}{2l}$$

Here, $y \rightarrow$
 $n \rightarrow$ Sag
 $l \rightarrow$ length
 $w \rightarrow$ Area of which thing to be covered.

$$\text{length of Cable (L)} = l + \frac{8n^2}{3l}$$

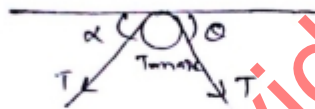
Here $l =$ length of Span
 $H =$ height of Span

SUPPORTS

PULLEY

ROLLER OR SADDLE

① PULLEY



where $T_1 = T$

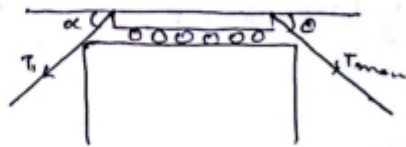
$$\Sigma V = T \sin \theta + T \sin \alpha$$

$$\Sigma H = T \cos \theta - T \cos \alpha$$

$$\text{B.M of Tower} = \Sigma H \times \text{Height of Tower}$$

② ROLLER OR SADDLE

$$T_{\max} \times \cos \theta = H \quad \text{— for finding } \theta$$



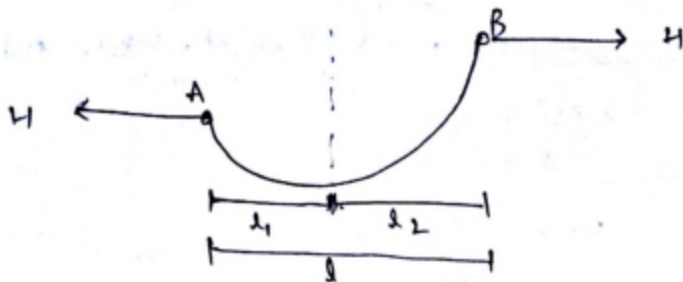
$$T_{\max} \cos \theta = T_1 \cos \alpha$$

$$\Sigma H = 0$$

$$\Sigma V = T_{\max} \sin \theta + T_1 \sin \alpha$$

Rajar
 aka
Rusty

END OF CABLE AT DIFFERENT LEVEL



$$y = w \left(\frac{x^2}{2H} \right)$$

$$l_1 = l \left[\frac{\sqrt{h_1}}{\sqrt{h_1} + \sqrt{h_2}} \right]$$

$$l_2 = l \left[\frac{\sqrt{h_2}}{\sqrt{h_1} + \sqrt{h_2}} \right]$$

$$H = \frac{w l^2}{2(\sqrt{h_1} + \sqrt{h_2})^2}$$

left $\Sigma M_c \Rightarrow V_A \times l_1 - H \times h_1 - \frac{w l_1^2}{8} = 0$

right $\Sigma M_c \Rightarrow V_B \times l_2 - H \times h_2 - \frac{w l_2^2}{8} = 0$

length of cable (L) = $l + \frac{2}{3} \frac{h_1^2}{l_1} + \frac{2}{3} \frac{h_2^2}{l_2}$