## Answer on Question \#72804-Physics-Other

A 100 N traffic light is supported at the midpoint of a 20 m length of cable between two poles. Find the tension in each cable segment if the cable sags a vertical distance of 0.5 m

## Solution

For the equilibrium:

$$
W=2 T \sin \alpha
$$

The tension in each cable segment is

$$
\begin{gathered}
T=\frac{W}{2 \sin \alpha} \\
\sin \alpha=\frac{h}{\frac{l}{2}}=\frac{2 h}{l}
\end{gathered}
$$

Thus,

$$
\begin{gathered}
T=\frac{W}{2 \frac{2 h}{l}}=\frac{W l}{4 h} \\
T=\frac{(100)(20)}{4(0.5)}=1000 \mathrm{~N}
\end{gathered}
$$

Answer: 1000 N.

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