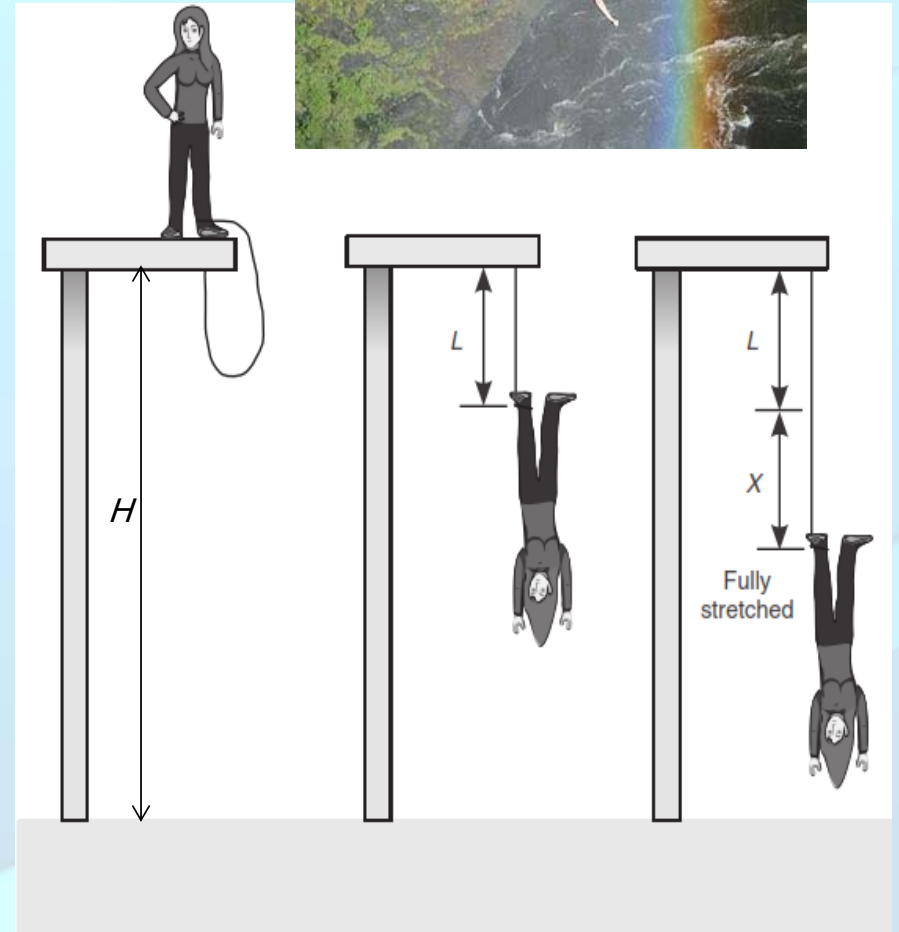


Bungee Jumping Design.

As displayed in the figure. At full stretch, the elastic rope of original length L stretches to $L + X$. For a person whose weight is W [N] and a cord with a stiffness K [N/m], the extension X [m] is given by the following formula:

$$X = \frac{W}{K} + \sqrt{\frac{W^2}{K^2} + \frac{2WL}{K}}$$

1. If the height of the tower H is 50 m, $K = 100$ N/m, $L = 15$ m, and the person's weight W is 700 N, will the person be able to bungee jump safely? Support your answer by giving the final value for $L + X$.
2. What's the jumper's weight limit?



3. If the height of the tower is 60 m, and the weight of the person is 800 N, and the unstretched length $L = 20$ m, find a value of K that enables this person to stop exactly 2 m above the ground.

4. Determine the height of the tower H , if $K = 80$ N/m, $L = 22$ m, and the person's weight W is 1000 N, and if the person must stop exactly 3m above the ground

5. Determine L the length of the rope, if $K = 80$ N/m, $H = 64$ m, and the person's weight W is 1000 N, and if the person must stop exactly 3m above the ground.

