

Professor My explains the technique of climbing walls with bamboo pole of Vietnamese task force

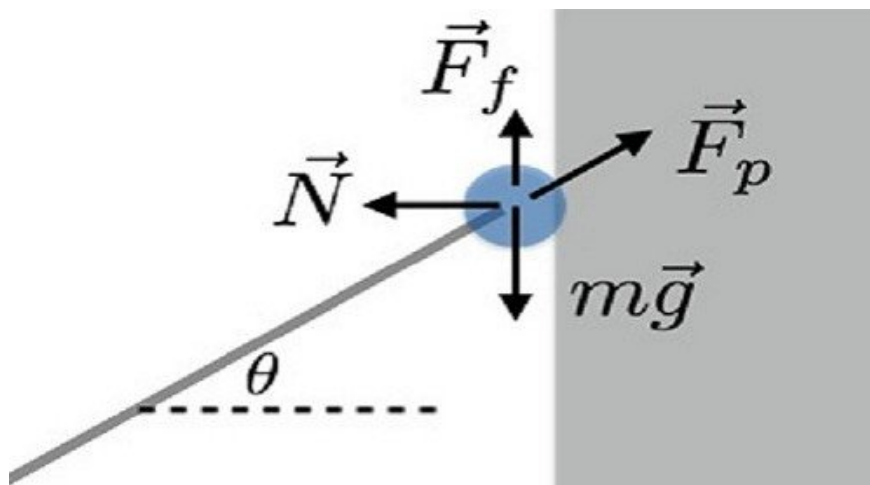
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The video climbed the wall with the bamboo pole of the Vietnamese police task force shared by Sadam account on YouTube on March 2, attracting more than 96,000 views, according to Wired. The task force in the video impresses with virtuosity, strength, speed, accuracy in each movement. However, the physical mechanism behind this particular technique is a topic of interest to international scientists.

" *What is this? Undoubtedly, they have done it. But how?* " Rhett Allain, professor of physics at Southeastern Louisiana University, USA, exchanged in Wired magazine. To explain this phenomenon, Professor Allain set up a diagram of force distribution on bamboo poles. He assumes that Vietnamese task forces move slowly enough so that the total force put on them is considered balanced.

The total force acting on the soldier climbing on the wall is shown in Figure 1.



Represents the total force acting on the soldier climbing on the wall.(Photo: Wired).

These forces include the mg gravity in which m is the mass of the task force, g is the gravitational acceleration. The remaining three forces include thrust of bamboo pole, force of N wall, and friction force F_f .

Under equilibrium conditions, the force in the horizontal and vertical directions must be zero. That means satisfying the system of equations:

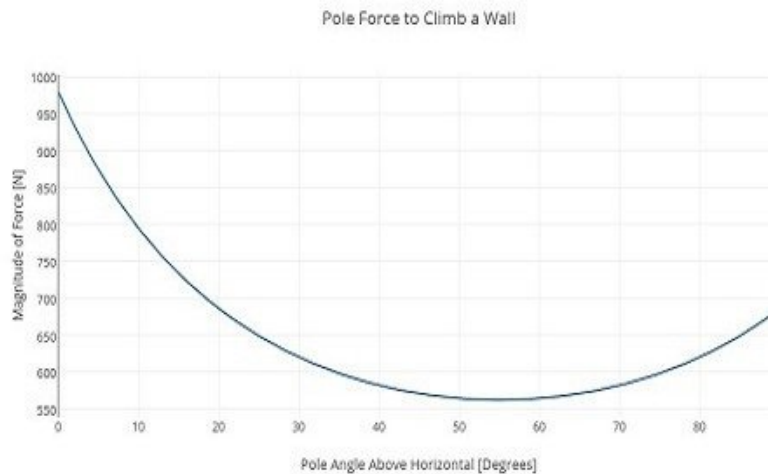
$$F_p \cos \theta = N$$

$$F_p \sin \theta + F_f = mg$$

From here, it can be seen that the thrust of the bamboo pole has both vertical and horizontal components depending on the contact angle of the bamboo rod to the ground. With the assumption that static friction force is proportional to the magnitude of the reaction force $F_f = \mu_s N$, the thrust of the bamboo rod can be rewritten as follows:

$$F_p = mg / (\sin \theta + \mu_s \cos \theta)$$

Assuming the fighter has a weight of 70kg and a friction coefficient of $\mu_s = 0.7$, Professor Allain demonstrates the necessary thrust according to the angle of incidence of the bamboo bar (Figure 2).



The necessary thrust follows the angle of incidence of the bamboo rod.(Photo: Wired).

The results show that we need an initial force that is only slightly larger than the weight of the climber (about 1000 Newtons with 70kgs) when the bamboo bar is almost parallel to the ground. When the soldier starts climbing the wall, this force decreases to an angle of 50 ° because the vertical component of the thrust increases. At higher angles, repulsive force increases due to reduced friction. At 90 ° angle, thrust is equal to the weight of the soldier.

Thus, the technique of climbing walls with bamboo bars seems to be very unworkable and is carried out by Vietnamese task force based on completely reasonable scientific calculations.

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