

WORK-ENERGY-POWER

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How to Climb a Coconut Tree



INTRODUCTION: This application goal is to find average horsepower this 130 lb. international coconut tree climbing champion produces.

QUESTIONS: (a) Find work done by this tree climber ?, (b) Find horsepower (in ft. lb./s.) needed by this climber to climb 26.5 ft. tree in 4.6 s.? (c) Convert ft. lb./s. to HP?, (d) Comment on Ans.?

HINTS: $W = F \times d$, $\text{Power} = \text{Work}/\text{time} = W/t$
 $550 \text{ ft. lb./s.} = 1 \text{ HP}$

ANSWERS: (a) 3,445 ft. lb. , (b) 748.91 ft. lb./s.,
(c) 1.36 HP, (d) More than a horse! Outstanding!

“Don’t wear shoes,” says Ellio Fiapa’i, who retrieves coconuts daily for tourists at the Polynesian Cultural Center on Oahu. Forgo slippery rubber treads; instead, grip opposite sides of the tree with the soles of your bare feet. The only equipment you’ll need is a short piece of strong cloth or rope tied in a circle. Make a figure-eight shape and put a loop around each ankle; the rope keeps your feet together and close in, allowing your knees to splay apart and preventing your legs from wrapping around the tree. “Always check your knot,” Fiapa’i says. Hop up. To propel yourself upward, bend your knees into a frog-like squat and then repeatedly leap, feet together. Use your dominant hand to help pull your body up while your other hand hugs the tree to keep you from falling. Once at the top, secure your stance before pulling the coconuts free. If you’re climbing for fronds, you’ll need to carry a machete blade between your teeth (dull side in). Descending is particularly difficult; practice sliding down in a slow, controlled way. As a boy in American Samoa, Fiapa’i, now 24, scrambled up palm trees to drink from the young fruit. In 2016, **he won an international championship in Honolulu by climbing 26.5 feet in 4.6 seconds.** Over time, his body has become accustomed to the barefoot, bowlegged posture, but it doesn’t come naturally. “Beginners will feel their feet shake at first,” he says. **To climb a coconut tree is to risk a dangerous fall. In a survey of 220 professional coconut pickers in southern India, researchers found that over 40 percent of those in the profession for 30 years or more had experienced a fall. In one township on the Solomon Islands, a review of three years of hospital-intake records revealed that the *single most common cause of traumatic injury was what researchers called “coconut-tree trauma.”*** The International Coconut Genetic Resources Network has committed to developing dwarf coconut varieties that could protect pickers from the hazards of high falls. Always consider your safety. “Don’t show off,” Fiapa’i says. “Just be focused.”