

# IT'S HELD ROYALTY, ROCK STARS, FILM ICONS AND A 46 TON TREE

At 3:22 a.m. on Monday, November 27th 2006, a wind-driven snowfall brought Capilano Suspension Bridge its biggest guest yet – a 46 ton, 300 year old Douglas fir tree traveling at approximately 100 km/h.

Since 1889 visitors from every country on earth have come to Capilano Suspension Bridge to take in its swaying views and hang on to its steel cables with all their might. Celebrities, dignitaries, icons and average folk alike have wobbled their way across its 450-foot span. It has raised the heart rate of such notables as Bruce Springsteen, Margaret Thatcher, Walter Cronkite, Marilyn Monroe and the King of Yugoslavia.



Fig 1:- A month with 351 mm of rain, a night of 18 cms of wet snow and a gust of 80 km wind was too much for scores of Lower Mainland trees.

And then came the tree. Vancouver has long been the butt of many a snowfall joke. Drivers flail in a few centimetres, schools close, lattes get spilled. Perhaps the reputation is deserved, but one may wonder, how does 18 centimeters of the white stuff knock down a tree that has survived 300 years of storms, blizzards and soakings? The answer lies in another Vancouver cliché. Rain. Vancouver's average November rainfall level is a sodden 151 mm. But even that damp statistic evaporates against the 351 mm that fell last November.



Fig 2:- Like the world's biggest weed trimmer, 46 tons of tree meets steel cable at about 100 km/hr.

A soaking like that can have a profound effect on the forest. Deep saturation carries the double effect of softening the soil that holds tree-roots in place while over-weighting branches. That night 18 cm of heavy, wet snow, driven by 80 km/h winds fell hard on the already drenched forest. By 3:22 a.m., one very large Douglas fir had had enough.

Engineers estimate that the tree struck with the force and velocity of a fully loaded gravel truck at highway speeds (est. 100km/h). For all that, the bridge's cables remained undamaged and the bridge stayed in place. The tree on the other hand, didn't fare so well. It snapped on impact, the top third coming to rest in the canyon below. The remainder, about 17 tons of it, wound up on the bridge.

Now you may ask, "How did the bridge stay up?" There is a two-part answer here. First, the elastic quality of steel cables allows them to take an impact, stretch and spring back into place. Secondly, Capilano Suspension Bridge's anchors are designed to shift on heavy impacts. In this case, the west anchor, weighing 13 tons shifted by about 2 metres.



Fig 3:- Cables strong enough to lift two fully loaded 747s should be able to stop a flying tree. Turns out they did.

Although the cables, with their 123-ton breaking strength (enough to lift two loaded 747s), were undamaged, there came the question of removing the tree. When 17 tons of downward force is applied to steel cables, similar force is exerted upward. Quick removal would create a "slingshot effect" that could cause the entire tree to spring skyward along with whoever would be cutting it. Instead, small slices were removed while a system of tree-supported cables and pulleys worked to carefully lift and swing the remaining tree from its perch. At the same time, the west cable anchors have been replaced with even heavier anchors and re-set.

Now that everything has been painstakingly tested and inspected, Capilano Suspension Bridge is open for another naturally thrilling season. The remnants of the fallen tree will be left in place to act as a nurse log for future trees and forest life.



Fig 4:- 17 tons of downward force means a lot of upward cable force. Quick removal would create a "slingshot effect" propelling everything onboard skyward.

Over its 118-year history millions have taken in the vertiginous view and swayed their way across the bridge at Capilano. Maybe it's time you gave it a try. After all, it takes you to the unique and fascinating Treetops Adventure for a squirrels-eye view of the upper reaches of a coastal rainforest.



Fig 5:- Part of the weight of the remaining trunk is taken up by shims placed near the root ball.

And of course you can get a first-hand look at the result of the storm, the tree-fall and the restoration efforts. You'll also find First Nations wood carving demonstrations, forest walks, trout ponds and BC's most abundantly absorbing gift shop and gallery.

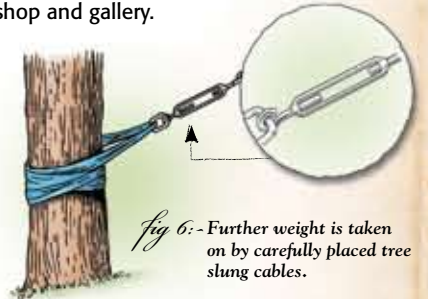


Fig 6:- Further weight is taken on by carefully placed tree slung cables.

For BC residents, one day's admission comes with an annual pass for a whole year of wobbly crossings, Treetop Adventures and walks at the canyons edge.

After all, having hosted Royalty, News Anchors, Rock Stars, Movie Icons and one huge tree, isn't it time Capilano Suspension Bridge welcomed you?



Fig 7:- Weight is gradually removed in small slices. The tree is cut in half lengthwise followed by a series of small crosscuts.

The measurements...We don't know about you but we know our weight in lbs, how fast we're driving in km/h and the temperature in Celsius. That's why the weights and measurements used here use a mix of both systems. Hope you don't mind.



Bring in this coupon before May 31, 2007 and two BC adults can enter for the price of one\*.

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