

Energy Absorption in Arborist Rigging

When rigging trees for limb or top removal, care must be taken to avoid failure in any part of the system, including the limbs and hardware that support you in the tree. Perhaps the most important tools are the ropes that provide your way in and out of the tree, keep you safe while in the tree, and assist with the work you do to the tree.

The strength of rope is based on the maximum load or force it can withstand without failure. However, when selecting rope for a given job you must take into consideration that the actual load placed on the rope can be more than the weight of the object being suspended.

For example, when a tree-rigging operation is setup for the purpose of limb removal and the rigging point is below the load, the portion of the tree being cut will fall a significant distance. The rope will reach its peak load and be shock loaded when it catches the limb and brings it to a stop. The type of rope, or fiber content of the rope involved, will determine whether or not the rope fails under the forces at work in this situation. A rope made of 100% polyester, such as Stable Braid, has lower elongation than a rope made with a blend of polyester and nylon, such as Nystron. A rope made of 100% nylon has extremely high elongation and is not recommended for this application.

To absorb the amount of energy it takes to stop a falling limb using a rope with higher elongation will result in lower peak forces than using a rope with lower elongation. Ropes with high elongation, such as Nystron, have a number of advantages when compared to a less elastic rope, such as Stable Braid:

- > Reduced peak loading
- > Reduced risk of system failure due to:
 - Less stress on the rope*
 - Less stress on rigging hardware*
 - Less stress on the tree*
 - More energy absorption by the rope*

As a result of the reduced risk of failure in the rigging system the margin of safety increases.

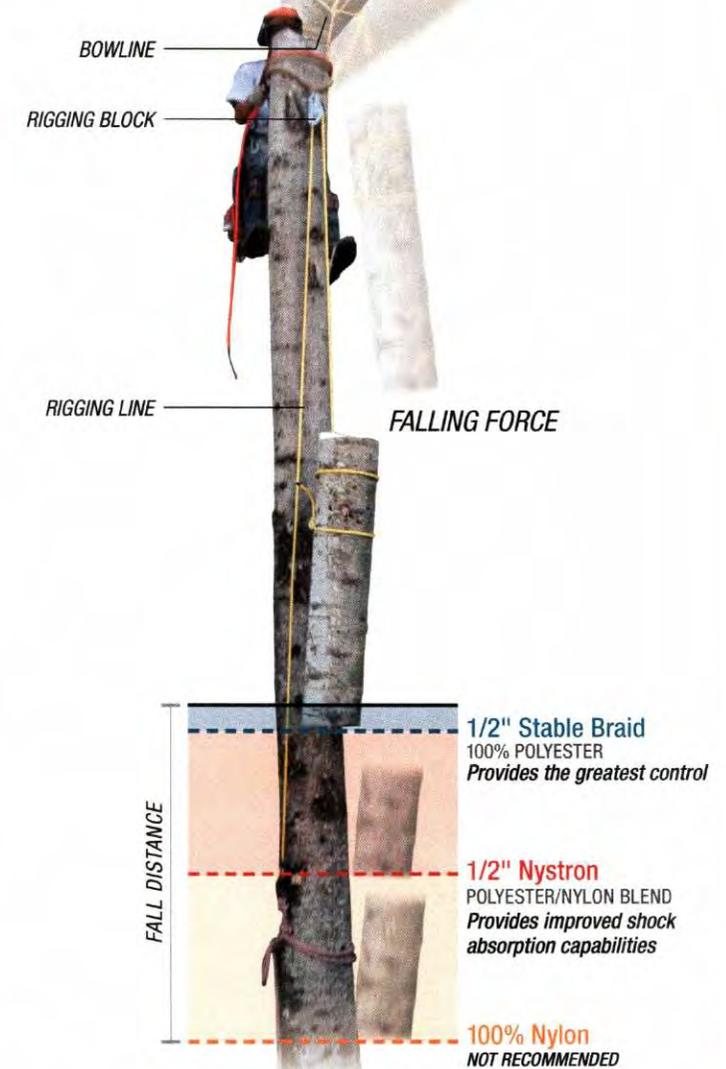
- > The disadvantages of using a rope with higher elongation include:
 - Reduced control of the position of the object*

We recommend that the arborist use the right tool for the job:

- > For top roping and dropping loads in tight spaces:
 - Stable Braid provides the greatest control for rigging of objects.*
- > Rigging objects above the anchor point and dropping in open spaces:
 - Nystron provides improved shock absorption capabilities and reduces the chance of failure with a dropped load.*

The load vs. elongation curves of two ropes with similar breaking strengths. The shaded area beneath each of the curves represents the energy absorbed as the rope stretches. The two areas shown are equal representations of the same energy absorption or the catching of the same falling load. As shown, Nystron absorbs the energy while reaching the lowest load, but stretching the farthest.

EQUAL LOAD Falling 40 Feet



Distances and measurements are for illustration purposes only.

LOAD VS. ELONGATION OF RIGGING LINES

