Dealing with Difficult Tree Removals

BY MARK CHISHOLM, CTSP

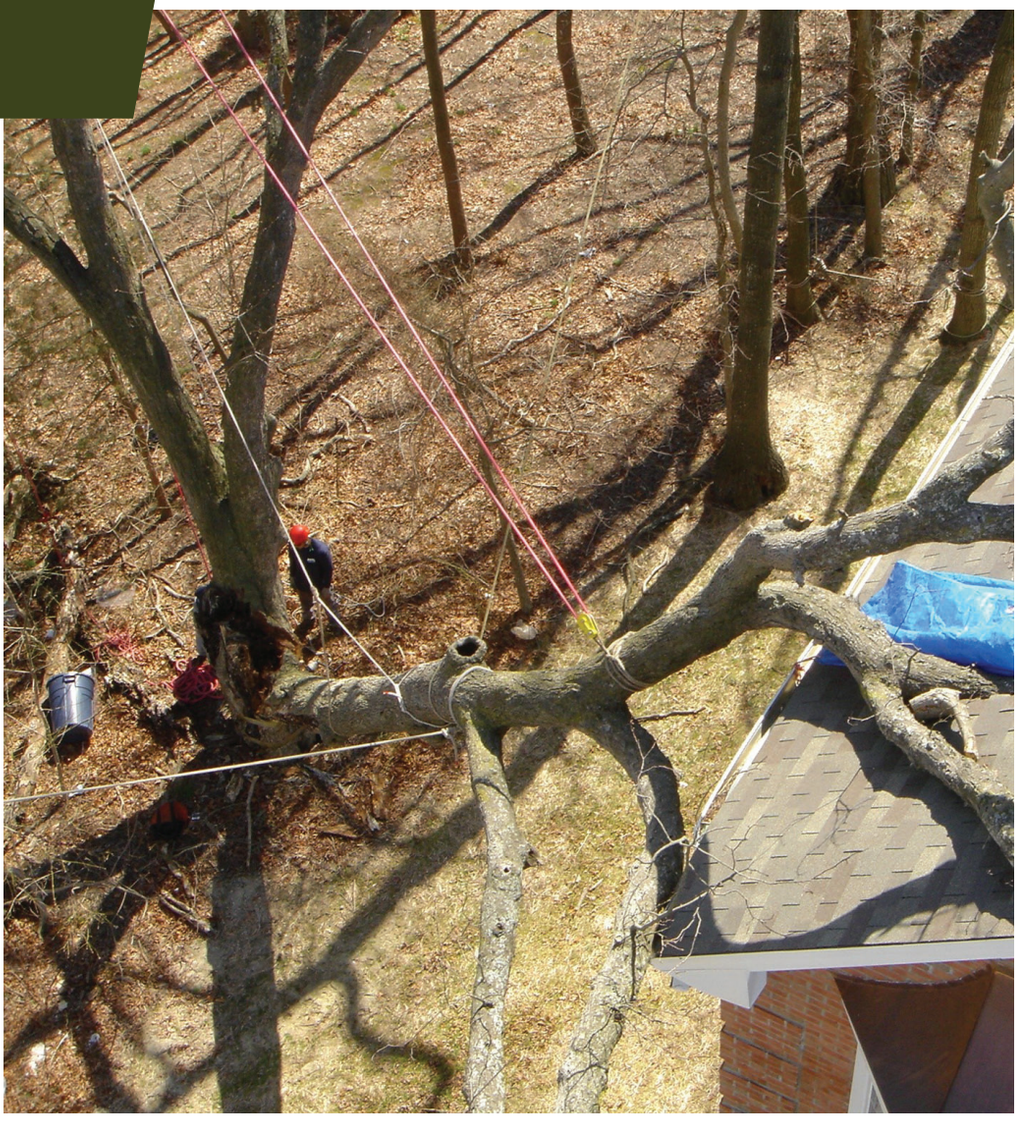


Photo 1: Double-whip technique with the red line provides mechanical advantage to lift a large piece. It was used here to remove a hickory from the roof of a house. Photos courtesy of the author.

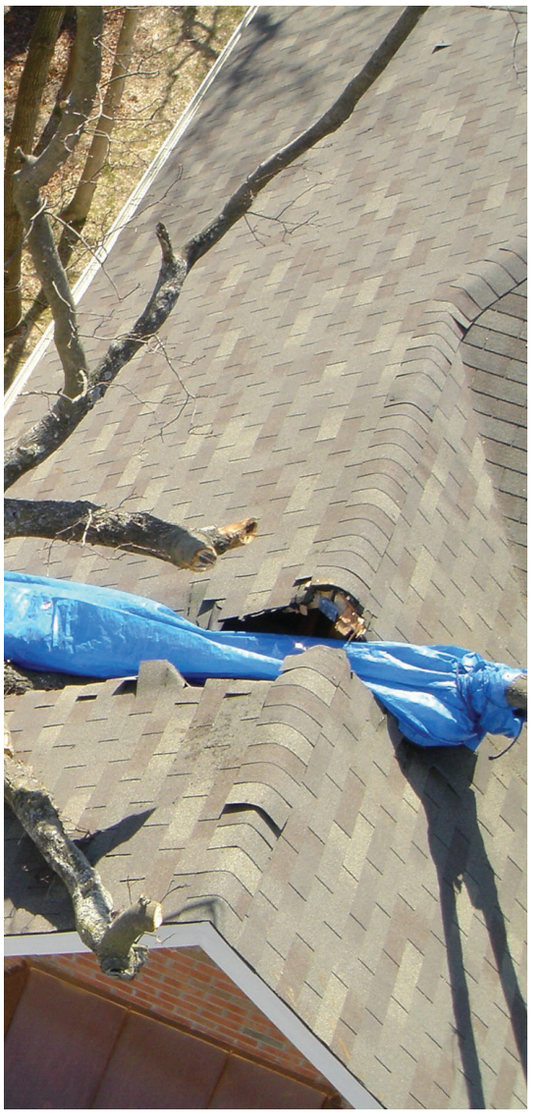
There is nothing more difficult and exhilarating than being challenged to remove a tree that doesn't fit the norm. The biggest risk I see with this proposition would be not giving the situation the level of thought, creativity and focus it requires. Attempting to perform the task by doing things the way "they've always been done" could be a mistake with the worst repercussions, ones that could risk personal safety.

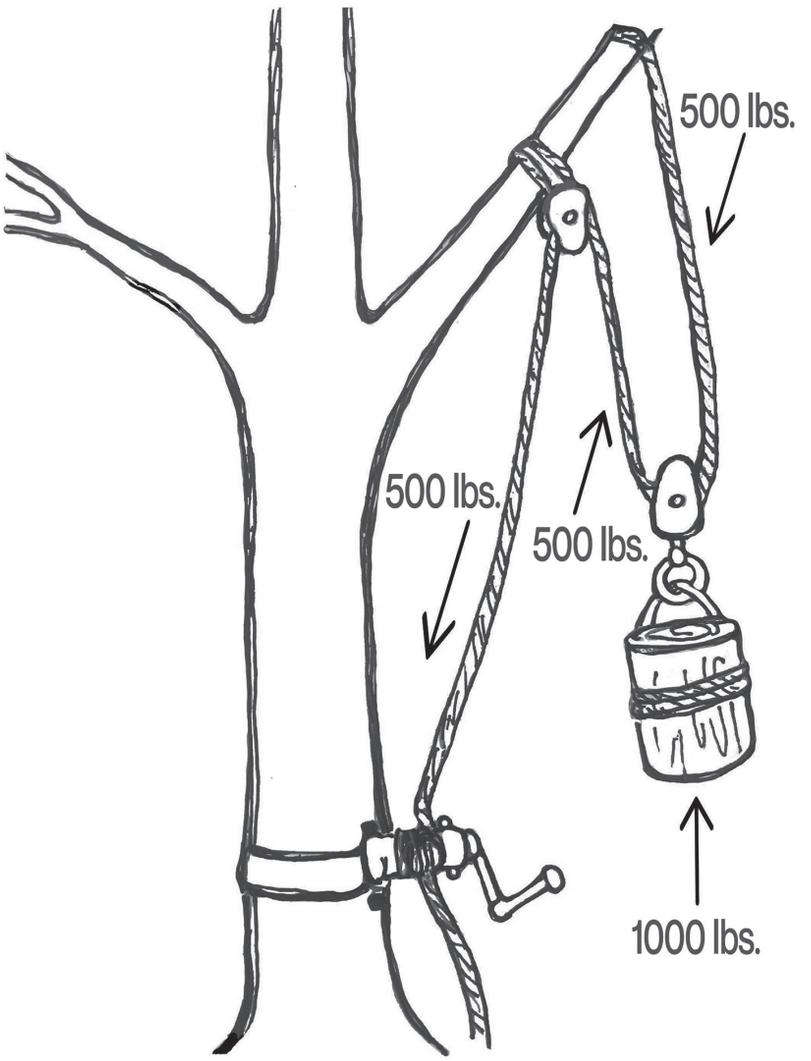
Formulate a plan before tackling difficult trees

The first step in approaching a difficult tree should be to formulate a feasible plan that accounts for every known bit of data gathered during the assessment and includes input from the entire team. This is the time to verbalize potential obstructions, obstacles, probable outcomes and risks perceived.

Then, combat each with the proper action to eliminate any issues found. This plan should be understood by all and agreed upon before being put into action. Every person on the team must feel empowered to speak up without worrying about bruising any egos.

One of the greatest things I have learned from years of difficult tree removals is that previous experiences and





Double-whip tackle explained: Starting at the working end of the line: 1) The rigging line is tied to a lateral, just below where the cut will be made; 2) From there, the rigging line runs through a suitable block or other device anchored on the butt end of the piece being cut; 3) Next, the rigging line runs through another block/device anchored around the lateral just below where the end of the line was anchored; 4) Finally, the rigging line runs through a friction device anchored at the base of the tree. TCIA graphic by Susan Stehfest.

knowledge, paired with an open mind and two open eyes, is the cheat code. If you do not have the luxury of years of experience in this discipline, you must find a mentor you can call on to add valuable input rather than just going for it. To paraphrase my good friend, Dr. John Ball, "Experience is a horrible teacher, since it gives the test before it teaches the lesson."

Once you have the knowledge to draw upon and the ability to make changes, both subtle and drastic, there's no limit to what you can do in even the most difficult scenarios.

Analyze rigging techniques

Rather than go through tons of scientific explanations of how force can be manipulated to aid in reducing the risk of failure, I will jump right into some of the most useful techniques I have learned or created to solve these puzzles. I will say, however, that you should spend time learning how to analyze forces created by different rigging techniques. You also should learn how to reduce these forces when needed, and how to change the direction of these forces so as not to expose an inherent structural flaw.

The double-pendulum technique

One such technique that comes to mind is referred to as "double-pendulum rigging." Though this is a technique I have used for quite some time, it was never called this until I listened to my good friend, Graeme McMahon, give a presentation on it. McMahon took the analytics associated with its use to a whole new level. The simplest way to describe this method is to use two overhead anchor points similar in distance to the size of

Photo 2: Double-pendulum rigging being used during a rigging workshop in Bergen, Norway.

the tree or section being removed, and sharing the load between each with similar amounts of tension. (Photo 2)

This technique makes perfect sense when available as an option, for many reasons. Not only does it add lots of control to the operation, but also it will reduce the forces displaced on the overhead anchor points. One way it does this is simply by sharing the load between two anchors instead of just one. Another way it helps is that you do not add as much dynamic force, since you pre-tension the lines and do not let the load fall into the rigging, as conventional negative rigging does. This means larger sections can be removed with less risk of overloading or failure, which is the ideal outcome to strive for daily.

Drifting loads from one location to another also can add more control and lessen peak forces than single-line rigging or even tip- and butt-tie rigging. When using drifting as a way to move a load across a tree or into a remote anchor, the load is controlled and then shifted across gradually into a second or even third

point. This will lessen the drop effect seen with traditional negative rigging alone.

Double-whip tackle

When I really think back on the largest tree removals or ones where I had to support the most weight using ropes and rigging, I always remember times when double-whip tackle (DWT) was in play. This may be the single best technique I learned in my entire career to help me achieve the ability to handle the largest rigging situations. For those who are unfamiliar with the term DWT, allow me the opportunity to add tremendous value to your rigging future!

The easiest way to share this method is for me to say look at Photo 1 and the accompanying sketch for more information. If you look at the picture, you will see that a rigging block or ring is typically used to replace a termination knot on the tree/section being removed. In doing so, you reduce anchor loads, gain mechanical advantage, if needed, and gain added security by sharing the load between two points, just like with the double-pendulum rigging.

The reduction of force witnessed by the anchor point comes from one thing – splitting the load between two parts of rope and then terminating one side at the anchor point. This option is used rather than turning the rope over and heading 180 degrees in the other direction. If we think in terms of a "perfect world," we see the load halved by the rope. One leg is terminated with that half, while the other half does turn 180-degrees to be controlled at ground level. The sum of all forces (in a static environment) would equal 1.5 times the load rather than two times the load in a conventional system.

The side effect that reduces risk is that we now strengthen our rope by 100%. How is this? Simple. We now split the load between two parts, which halves the load. Doing this will ultimately increase the working load limit (WLL) of our rigging line by two times. The negative in this situation is, we now need 33% more rope and could potentially run out of rope during lowering if we failed to calculate this out correctly.

Conclusion

All in all, rigging can be the most challenging task we face in the world of arboriculture. Continue to learn new techniques, utilize new gear and pair it with traditional methods that have been time tested for decades in real-world situations. In doing this, we enable ourselves not only to complete these tasks, but we can do them more simply and with a greater margin of safety if done right. Stay a student for life and – work harder *and* smarter!

Mark Chisholm, CTSP, is director of operations with Aspen Tree Expert Co. Inc., a dual-accredited, 36-year TCIA member company based in Jackson, New Jersey. He also is a spokesperson for Stihl Inc. and an ambassador for Teufelberger and Kask.

This article was based on his presentation on the same topic during TCI EXPO '22 in Charlotte, North Carolina. To listen to an audio recording created for that presentation, go to TCI Magazine *online at tcimag.tcia.org. Under the Resources tab, click Audio. Or, under the Current Issue tab, click View Digimag, then go to this page and click here.*