

Tree Felling Techniques
By Ken Palmer

In my previous article, Precision Tree Felling - part two of a three part series of articles about chain saw handling, safety and productivity, we briefly reviewed the importance of carefully planning our work and skillfully working our plan in order to maximize safety and predictability with chain saw operations.

The 5 step felling plan can offer consistently predictable and measurable results:

1. Identify height and hazards
2. Assess the side lean (relative to the intended direction of fall)
3. Escape route
4. Hinge plan (face notch)
5. Back cut plan (establish and complete the hinge, then release the tree)

Next we touched on site equipment and preparation. We discussed setting and using pull lines, estimating a tree's height, the history and development of the face notch and we began to examine the vital role that the hinge plays in providing the control that makes precision tree felling work.

Remember, clear, concise, complete communication is a key ingredient for team safety as well as productive work flow. Every worker on the job must have a clear understanding of his or her role.

Now, let us continue by discussing back cut methods, completing the hinge, the release and the escape:

Back Cut on the 45-degree Notch

If you are using a traditional face notch (45-degree notch) opening, it is important to make the back cut "stepped" slightly higher (typically 2-4 inches) than the apex of the notch leaving a hinge of vertical wood fibers and to reduce the tendency of the tree to kick back off the stump toward the operator when the hinge breaks. The hinge is formed as the back cut approaches the fibers that were cut when making the face notch and leaving a predetermined hinge. Remember, when using a traditional 45-degree notch opening, the face notch will close and the hinge must break while the tree is only about half way to the ground so hinge control is lost at that point even with a perfect hinge.

It can be especially difficult to establish a predetermined hinge as you make your back cut approach toward the notch. This is because it is all too easy to cut into the hinge area or through the hinge while making the back cut if the tree or limb begins to fall as you are trying to finish your back cut!

Back Cut on the Open Face Notch

The open face notch is defined as "a face notch that is open to 70 degrees or more" and it can allow the hinge to work longer (provided sound hinge wood exists) with a greater degree of control because the hinge does not break until we want it to - if at all.

Because of this extra control, the back cut can be made level with the apex of the open face notch - unlike the 'stepped back cut' we must use with a 45 degree / common notch in order to help keep the tree on the stump after the notch has closed.

Back Cut on the Bore Cut

The bore cut is another way of making the back cut and establishing the hinge. Using the lower front quadrant of the bar and chain to 'bore/plunge' the saw into the tree, the cutter/feller can establish the felling hinge before the release cut is made. Though it does require education, training and practice, it does present some clear and distinct advantages. One advantage is that it can virtually eliminate the possibility of "barber chairing." "Barber Chair" is a term for what can take place when a tree splits vertically upward from the back cut, before the hinge is completed. The tree will typically pivot at some point up the split, causing the back section to kick back from the cut out and up toward the person felling the tree - then usually crashing to the ground in a very dangerous and uncontrolled way. Barber chairing is most likely to occur when felling a tree with heavy lean or where significant tension and compression forces exist in the marginal fibers of the tree trunk or section being cut. However structural defects (decay, cracks, etc.) and environmental factors (wind, vines, etc.) can contribute to the failure of a stem while it is being cut. So always inspect the tree carefully for structural defects, consider wind speed and direction and inspect for and remove any vines or limbs that may be interlocked with other trees during Step 1 of the felling plan, Hazards!

Another advantage of the bore cut technique is that the predetermined hinge can be completely established to the desired thickness while the tree stays locked on the stump by the back strap. Thus the integrity and condition of the hinge can be assessed before releasing the tree, giving you the opportunity to make any final adjustments before actually felling the tree. Or possibly allowing you to change your mind and start over if something is going wrong, right up until the moment of release.

Starting Corner

Before practicing the bore cut, your chain saw, bar and chain must be serviced and cutting properly. You must understand the concept of the "starting corner". The starting corner is the lower front quadrant of the tip of the bar and chain. When making a bore cut, always start cutting into the wood with the starting corner to avoid kickback.

Kickback Corner

The kickback corner is the upper quadrant of the tip of the chainsaw bar. Start cutting with the chain saw at full throttle and avoid contacting the tree with the kickback corner when beginning the cut and until the entire tip of the bar and chain have bored into the wood where it is unable to kick back.

Executing the Bore Cut

Bore into the tree (several inches) behind the apex of the notch. Be sure to start the cut at the starting corner of the chainsaw bar. Start the cut well behind the desired position of the hinge! Then, once you have bored into the wood and through the tree, carefully cut to the desired thickness of hinge leaving a strap of wood that will continue to hold the tree in place.

Always finish your cutting on the "good side" of the tree. The side toward which the tree leans is considered the "bad" side of the tree. So, if you are cutting a tree that is thicker than the length of your bar, you will want to start your cut from the bad side first (no more than 50% to avoid pinching) so that you can finish the cut on the good side of the tree. It is not necessary for the back cuts to meet exactly in the center as long as the cuts overlap the wood fiber will separate vertically.

If the tree is larger in diameter than the length of your chainsaw bar, bore cut only about 50% through from the bad side of the tree and establish your predetermined hinge thickness on that side. Then, bore cut the remainder of the way through from the 'good' side of the tree and establish your predetermined hinge thickness on that side slightly overlapping the first cut and out toward the back of the tree leaving a 'holding strap' of wood that will continue to hold the tree in place.

Now that you have established and completed the desired hinge thickness behind the apex of the face notch, and cut back from the hinge on both sides of the tree leaving a strap of wood at the back of the tree opposite the direction of fall, it is time to execute the final cut.

The final cut releases the holding strap of wood allowing the tree to fall. Turn off the saw and move away from the tree through your pre-established escape route, at a 45-degree angle opposite the felling direction to a safe position as soon as you make the final cut!

Remember to pre-check and clear the path for your escape route if necessary.

Felling Wedges

An often-overlooked tool for felling trees is the felling wedge. It is a good idea to have a couple of good wedges available whenever felling trees. Placed appropriately, a wedge can prevent the chainsaw bar from becoming pinched in the back cut, particularly if the tree has some back lean.

Lifting a tree one-inch with a wedge at the back cut can move the top of a tree several feet. The amount that the tree top can be moved depends on the height and girth of the tree.

Wedges are also very useful for bucking wood and even limbing trees with large limbs.

Summary

Using a planning process and a carefully determined felling plan is the foundation for a safe and efficient felling operation.

It is important to plan the entire felling operation before beginning to cut. Always check for hazards and obstacles that may affect the felling operation. Consider the height, spread and lean of the tree when deciding how, when and where to fell a tree.

Education and training in the use and operation of chainsaws is essential for all operators. Tree felling should be a precise operation, with little room for error. Sawing and operating techniques must be practiced before felling trees. Keeping both hands on the saw at all times unless the chain brake is engaged, walking with a running chain saw only when the chain brake is engaged and understanding the reactive forces of the bar and chain are important parts of handling a chainsaw safely.

Using pull ropes and establishing a mechanical advantage can make the difference between a routine and a difficult felling operation. Many of the intricacies of installing ropes and setting up rigging for mechanical advantage were not within the scope of this article, but do merit more in-depth study.

Learning how to estimate the height of a tree to determine where the tree will be and how far it will reach when it falls can make a big difference between a clear "drop" scenario, and having to climb and dismantle the tree in sections.

The opening size, angle and placement of the felling notch are critical in determining the felling plan. The hinge controls the fall of the tree and the back cut sets up the hinge. If you have always used the common, 45-degree notch, give the open face notch a try. It has many advantages primarily increasing control and safety in the felling operation. And, do not dismiss the bore cut as a logger's technique. Once mastered, the bore cut's many benefits will become evident.

As always, the overriding consideration when felling trees is safety. Although this is an operation that can be inherently dangerous, education, training, adherence to safety regulations and today's precision tree felling methods and best practice can all but eliminate the risk. However, if a tree is storm damaged, has extremely heavy side lean or if a tree has been let stand dead for so long it is decayed beyond the point of any remaining wood fiber for a hinge, it may be necessary to dismantle the tree by other means.

An arborist is a tree care professional that is able to diagnose a tree problem or issue, prescribe the best treatment options and/or actions, and carry out or direct the correct treatment or action.

As a professional, one of our first responsibilities is to safety and best practice. Knowing when to say no to a person with the wrong idea and then prescribing the correct treatment or action is what defines us a professional!

Please, Climb Safe, Cut Safe and Rig it Right, and I'll "See You at The Top!"

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