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Chain Saw Safety, Training, and Best Practices
By Ken Palmer

In any profession it is vital that workers be familiar with and abide by industry regulations, safety guidelines and best practices. In order to ensure time and resources are provided for education, training, and skill development, understanding and commitment are required from the top of an organization's management.

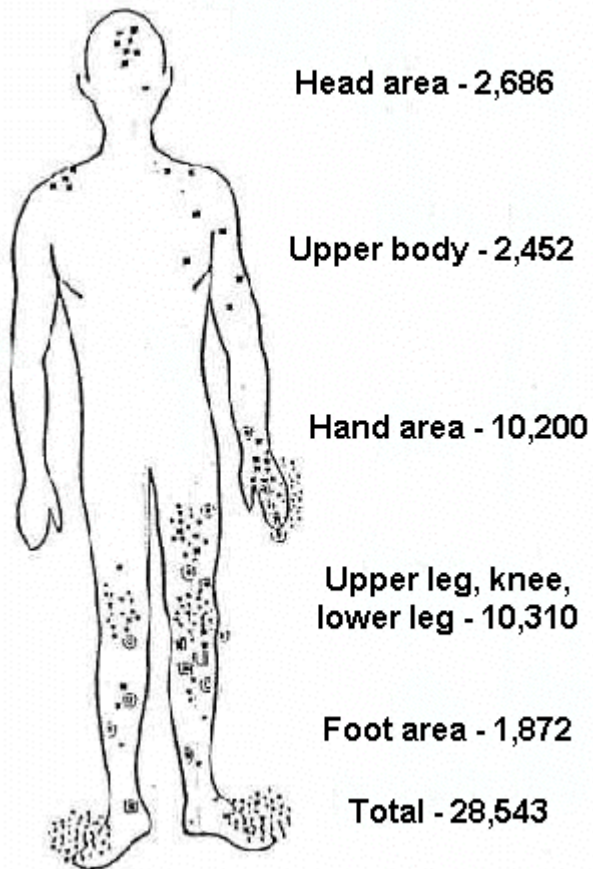
Safety, skill, and productivity are essential in order to achieve successful results in today's tree care industry. Staying up-to-date with current best practices, tools, and techniques, and actually integrating them safely and productively, can be a challenging task. From knowing the trees, the ropes, the climbing equipment, the rigging equipment, and of course the cutting equipment, there are many things to learn and many skills to develop.

Chain saw training and skill development are often overlooked and under appreciated because almost anyone can manage to get a chain saw started. The potential for injury is everywhere in the hands of a person that is not using PPE (Personal Protective Equipment), has little or no training, and has little or no time for skill development.

Facts and Figures about Chainsaw Injuries

- According to the U.S. Consumer Products Safety Commission there were over 28,500 chain saw injuries in 1999. More than 36% were injuries to the legs and knees.
- The average chainsaw injury requires 110 stitches and the average medical cost was \$ 5,600 in 1989, according to The Davis Garvin Agency, an insurance underwriter specializing in loggers insurance. In the year 2000, corresponding costs are estimated to be over \$12,000.
- About 40% of all chain saw accidents occur to the legs.
- About 35% of all chain saw accidents occur to the left hand and wrist.
- Chaps or chain saw pants and keeping both hands on the saw would reduce chain saw injuries by as much as 75% or more!
- Medical costs for chainsaw injuries based on these facts amount to about 350 million dollars per year.
- Worker's compensation costs, based on the assumption that four weeks recovery are required, can be estimated at 125 million dollars annually.
- Loss of production as well as loss of quality of life for the injured cannot be adequately quantified, but may in fact represent the single largest cost.
- There are 69,000 professional loggers in the U.S. The cost of equipping all of them with one pair of chainsaw chaps at approximately \$75 each would result in a total annual expense of 5 million dollars.
- There are few situations where safety has a more immediate payback.

Accident Location and Frequency Related to Chain Saw Use in 1999



Statistics supplied by the U.S. Consumer Product Safety Commission report on
Chain Saw Related Accidents 1999
Source: NHTSA (National Electronic Injury Surveillance System)

In order to dramatically increase safety and reach a true level of competence and proficiency, the following are vital:

- PPE
- Keep both hands on saw with thumb of left hand wrapped around forward handle
- Education and training
- Practice
- Skill
- Experience

Decision Making Process

The fact is that tree workers often base decision making on personal experiences, myth, and/or a mixture of the personal experiences of co-workers. How many times have you heard "I've done it before and it worked out fine" and "I'm not sure what went wrong!"

There are at least two problems with this type of decision making process:

1. Experience can be a very dangerous teacher. Tree workers and their families often experience too much pain and suffering just to "chalk one up for experience".
2. Critical decisions are based on what we have "gotten away with before". This is dangerous because each tree is different from the next and conditions can change significantly from one tree or worksite to the next.

Chain saw operators have to be able to think on their feet (or in the saddle) and adjust to their surroundings. Accidents can be dramatically reduced, and productivity increased, when workers have the knowledge, training, and the skill they need to operate a chain saw properly. The more they have developed the skills required to safely and productively carry out chain saw operations, the more successful and consistent the results will be.

With today's chain saw technology, safety, skill, and productivity can be attained with a thorough understanding of the:

- saw's basic design and limitations
- basic maintenance
- reaction forces
- wood fiber
- tension and compression wood
- knowledge to formulate a felling/cutting plan
- the ability to skillfully work this plan

Chain Saw Operations

Never operate a chainsaw or attempt to fell a tree alone. Always wear the appropriate personal protective equipment, which includes a hardhat, eye protection, hearing protection and approved work boots.

Leg protection, such as chaps or chainsaw pants, is required when running a chain saw on the ground and leg protection is strongly recommended when climbing with a chain saw and required in some jurisdictions/organizations.

Always be aware of the reaction forces that result when running a chainsaw. When you cut with the bottom part of the bar, the saw tends to pull away from you and into the cut. When you cut with the top of the bar, the saw tends to push back toward you and out of the cut. When the lower front quadrant of the chainsaw bar comes in contact with the wood, the reaction force is for the bar and the chain to be pulled into the wood. When the upper front quadrant (kickback quadrant) of the tip of the chainsaw bar contacts an object, the chainsaw reacts by rotating back toward you.

One reaction force can lead to another. For example, the saw can be pushed back when cutting with the top of the bar exposing the kickback corner to the wood. Or when cutting with the bottom of the bar, the saw can be pulled forward, pulling the kickback corner into the wood – in either case, causing a kickback. **Kickback occurs at a rate seven times faster than a human can react.** Dodging the saw's reaction is not an option. So, stay aware of the potential of reaction forces when you are cutting and always know where the kickback corner is.

When operating a chainsaw, stand with your feet firmly planted. Always operate the chainsaw with both hands on the saw. Your left hand should be on the upper handle with your thumb wrapped around the handle bar. Use your body to brace the saw when practical and do not get into the habit of positioning yourself directly over the chain when you are cutting, in case of an unexpected kickback. Always engage the chain brake if you must take one hand off the saw to move a limb, or when taking more than two steps with the saw running.

Five-Step Felling Plan

Daniel Webster defines an accident as an unplanned event. So, to avoid accidents, plan! When felling trees, it is vital to have and use a felling plan. A five-step felling plan that incorporates up-to-date cutting methods is widely used by professional chain saw operators worldwide. Using it will help you to achieve successful results consistently:

- 1. Identify height and hazards** – Look for tree defects, decay, heavy lean, electrical conductors, or any other characteristics of the tree that may affect the felling plan. Consider obstacles within the felling site such as structures, pavement, and outdoor furnishings. Some can be moved if necessary, others will have to be avoided. Assess the strength and direction of the wind. Decide on the felling direction.
- 2. Assess the side lean** – This often determines whether or not the hinge will hold and it also determines the “good” and “bad” sides of the tree for the feller to stand when making the final cut.
- 3. Escape route** – Always think about your escape route before you begin the felling operation. The escape route should be at a 45-degree angle opposite the felling direction. Be sure your escape route is clear of obstacles or hazards before beginning.
- 4. Hinge plan** – The face notch and hinge are critical to safe, accurate, consistent results. Plan the size, depth, and placement of the notch. Determine the desired thickness and length of the hinge.
- 5. Back cut technique** – The back cut is often taken for granted, yet is often the cause of felling accidents. Forward or back lean may determine what kind of back cut you will use: the straight forward back cut or the bore cut. The degree of forward or back lean will determine how many wedges and/or whether a pull rope will be necessary and how much power may be required to pull the tree over. Remember that if the tree is too thin there may not be enough wood for a notch, hinge, bore cut, and back/holding strap. In that case it will be necessary to use ‘the straight forward back cut’. Remember to finish the felling cut on the “good” side of the tree and use your escape route as soon as the tree begins to fall.

Next time we will look more closely and in more depth at tree felling. Until then, please, cut safely and I'll "See you at the top!"

Ken Palmer is President of ArborMaster®

Source

Chain Saw injury data from U.S. Consumer Products Safety Commission