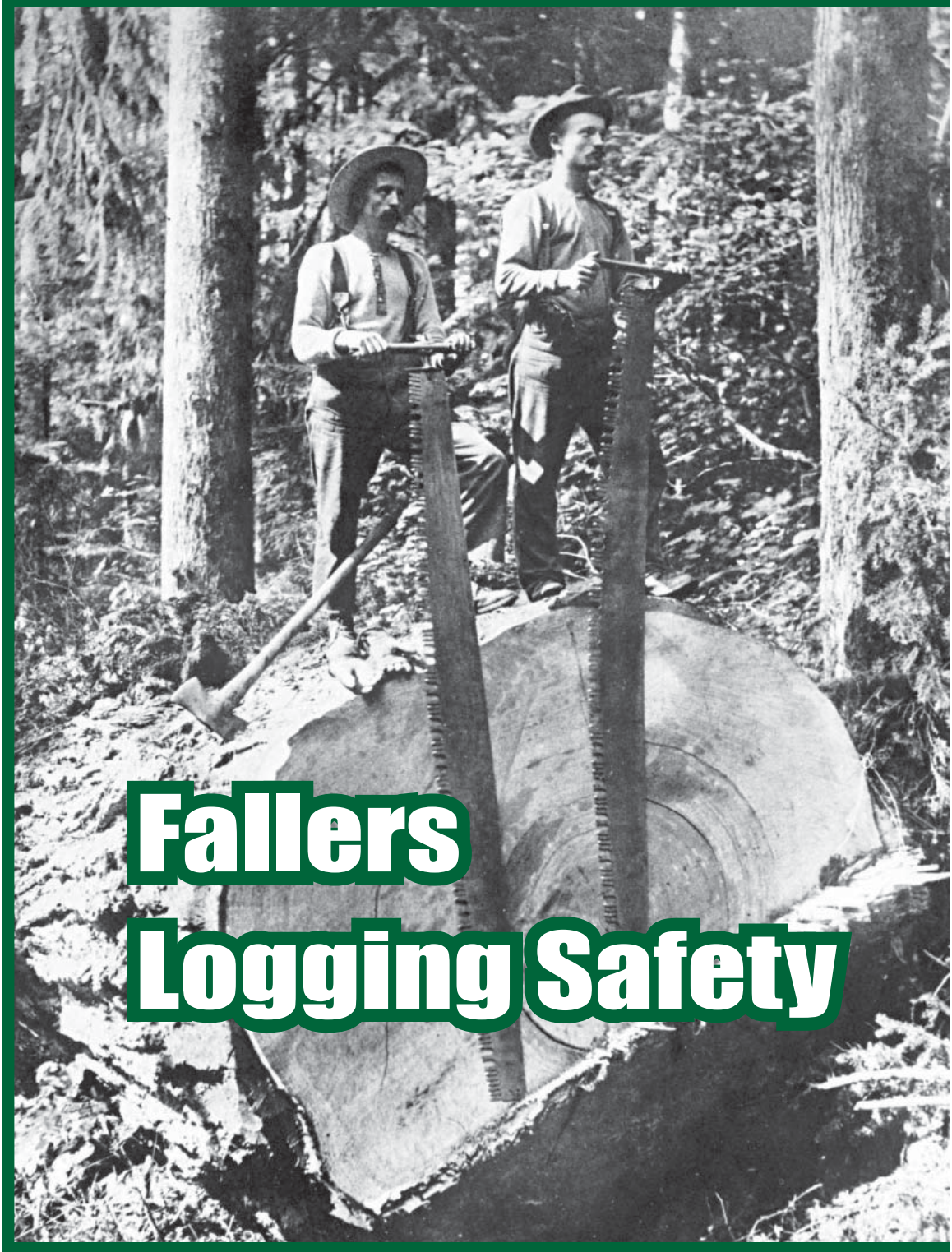
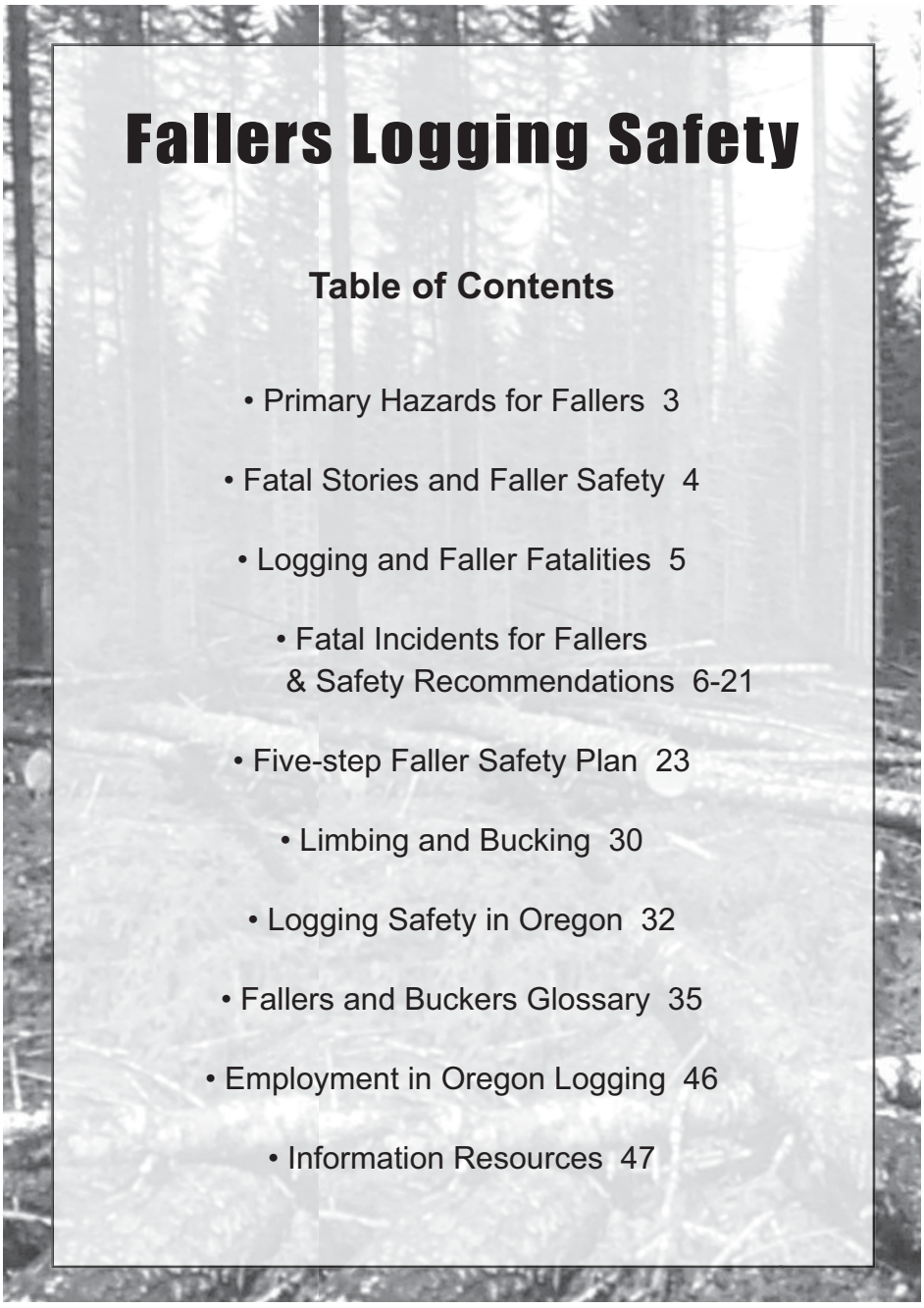


Fallers Logging Safety

Oregon Fatality Assessment and Control Evaluation



Fallers Logging Safety

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This logging safety manual is intended to help train new fallers. Working as a faller is the most dangerous job in Oregon, and safety training is vital. This manual may help both trainers and trainees to cover safety issues completely, and remember key points to bring down a tree safely every time. Written materials, though, cannot replace hands-on training in the field with an experienced faller.

Be sure to train before you work in the woods.

Safety training is generally available directly from employers in the logging industry. Additional training is available from the Student Logging Training Program, for college students, in the Forest Engineering Department at Oregon State University in Corvallis. Training Program Manager Jeff Wimer developed the Five-step Faller Safety Plan featured in this manual.

For more information

OSU Student Logging Safety Training Program
Website: www.cof.orst.edu/cof/fe/KollerWebSite
Telephone: 541-737-5044

Oregon Fatality Assessment and Control Evaluation
Website: www.ohsu.edu/croet/face
Telephone: 503-494-2281

Find other information resources listed on p. 47.

Oregon Fatality Assessment and Control Evaluation
Center for Research on Occupational and Environmental Toxicology
Oregon Health & Science University
2007

Primary Hazards for Fallers

1. Snags – A dead or dying tree that is still standing.

Dead treetops, branches, and trunks are unstable. Snags must be identified and removed prior to beginning work in an area.

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2. Kickback – A tree that jumps back over the stump toward the faller.

Kickback is usually the result of impacts as a tree falls, or insufficient hinge wood on the stump.

---

3. Falling Zone – At least one and a half tree lengths from the base of a falling tree is a danger zone.

Most faller injuries occur at the stump when a tree unexpectedly falls in the wrong direction, but fallers also need to remain aware of danger anywhere in the falling zone, both for themselves and others.

For additional definitions of terms, see the Fallers and Buckers Glossary on p. 35.

INTRODUCTION

Fatal Stories and Faller Safety

This logging safety manual for fallers includes the story of each of the 11 fatal incidents involving fallers in Oregon over three years, 2003-05, and provides a comprehensive five-step Faller Safety Plan, which may be useful in training new fallers and refresh the knowledge of experienced fallers.

The five-step Faller Safety Plan covers the following crucial steps to safely address a tree.

1. Assess the area
2. Assess the tree
3. Establish a safe work area
4. Fall the tree
5. Get in the clear

These five steps are based on years of observation of professional fallers with exemplary safety records. Most experienced cutters follow these steps to some degree, but may not have stepped back to analyze the process they use.

Timber cutting involves numerous detailed steps to get a tree on the ground, and as traditional routines are passed on to new fallers, some steps may eventually be overlooked or forgotten, or misinterpreted in the passage of time. This faller safety manual offers a written plan and helpful reminder to correct bad habits that workers or trainers may have developed over the years.

TREES KILL

The stories of faller fatalities in Oregon highlight critical safety lessons. In a few incidents, the victim was a novice, unprepared for the dangers. In other instances, an experienced faller had developed bad work practices. In others, the victim was an experienced faller that apparently did everything right. Safety recommendations are provided for each incident. The recommendations are discussed in more detail in the Faller Safety Plan.

Fatal incidents for fallers indicate three types of hazard: snags, kickback, and falling zone. Snags were the most common factor, involved in 5 of the 11 fatalities. Other fallers were killed by a kickback of the log butt, or got caught in the zone of a falling tree.

We aim here to illustrate the dangers in falling and provide a safety plan to help you stay alive and uninjured. Information in this manual does not replace hands-on training in the field with an experienced cutter, which is the only effective way to train for timber falling.

PERSPECTIVE

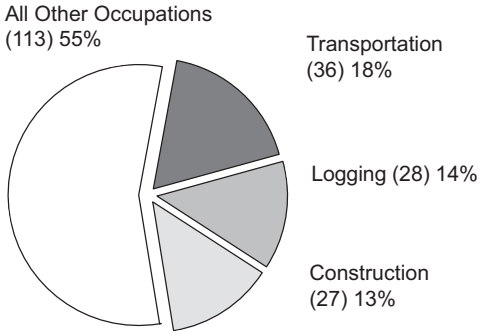
Logging and Faller Fatalities

Jobs in logging are extremely hazardous, involving a high number of fatal injuries among a small number of workers. In three years in Oregon, 2003-05, 28 workers were killed in logging (including equipment operators and log truck drivers), making 14% of all worker fatalities in the state for a group of workers that comprise only one-half of 1% of the total labor force.

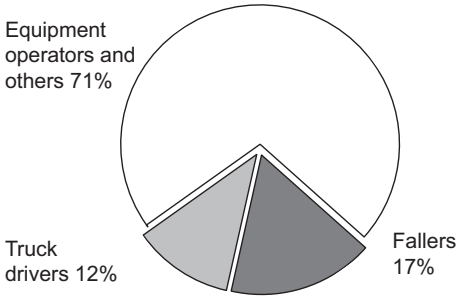
At least 8,000 workers are involved in direct logging operations in Oregon (see appendix for detailed employment figures). Fallers comprise about one-sixth of all the workers in direct logging operations, but fallers are involved in over one-third of the fatalities in logging.

Working as a faller is by far the most hazardous job in the state. The annual fatality rate for fallers in Oregon, 2003-05, was 258 per 100,000 workers. The average rate of occupational fatalities for all workers, during the same period, was about 4 per 100,000 workers. A fatal incident for a faller is about 65 times more likely than for workers in general, and 3-5 times more likely than for other loggers.

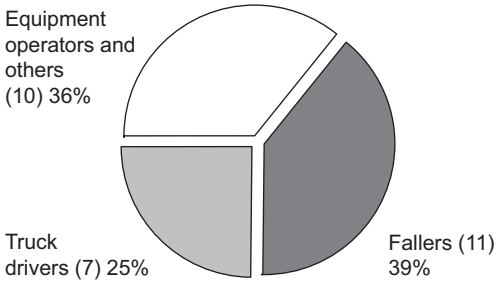
Occupational Fatalities and Top Three Hazardous Occupations, Oregon 2003-05



Distribution of Logging Occupations, Oregon 2003-05



Distribution of Logging Fatalities by Occupation, Oregon 2003-05



OREGON 2003-2005

Fatal Incidents for Fallers

SNAGS

pages 8-13

Bucking near a snag

Dead treetop

Hung tree

Swinging snag

Thrown branch

KICKBACK

pages 14-17

Log kickback

Partner with tree wedge

Amateur logging

FALLING ZONE

pages 18-21

Bucking in falling zone

Novice clearing brush

Tree falls wrong way

FALLERS LOGGING

Safety Recommendations

- Assess potential failure zones
- Use extra caution when falling or working around snags
- Remove hung-up trees in a falling zone
- Never work under a hung tree
- Never turn your view away from a falling tree
- Watch for impacts
- Make backcut higher than face-cut
- Watch for impacts!
- Get away from the stump
- Plan before you cut
- Train before you cut
- Protect your hinge
- Get a definite OK signal from the faller before entering a falling zone
- Periodically check the whereabouts of coworkers or unexpected visitors
- Coordinate work activities with other workers in the area
- Cutters must communicate
- Be prepared for emergencies
- Plan your escape route
- Train before you cut!

SNAGS 1-2

Bucking near a snag

Washington County - May 9, 2003

A 52-year-old logger, working as a faller, was killed when the dead top of a snag broke off and fell on him. The faller had over 30 years of experience falling trees. He was working with two others in a thinning operation, and had cut two trees near an old-growth snag that was 40 ft tall and 36 in. diameter. He was delimbing and bucking the fallen trees about 35 ft from the snag. The trees rested against the base of the snag and the vibrations evidently caused the top 20 ft of the snag to break off.

Dead treetop

Clackamas County - Jun 9, 2003

A 45-year-old logger, working as a faller, was killed when the dead top of the tree he was falling snapped back after hitting a danger tree. The crew was working in a USFS old-growth thinning operation, where the only trees to be cut had been pre-marked. The 50 ft treetop of the faller's 170 ft tree sprang with considerable force about 150 ft to reach his position. His view of the oncoming treetop may have been obstructed by a shorter, intervening tree. The victim had over 20 years of experience and was well known as a careful faller.

Recommendations

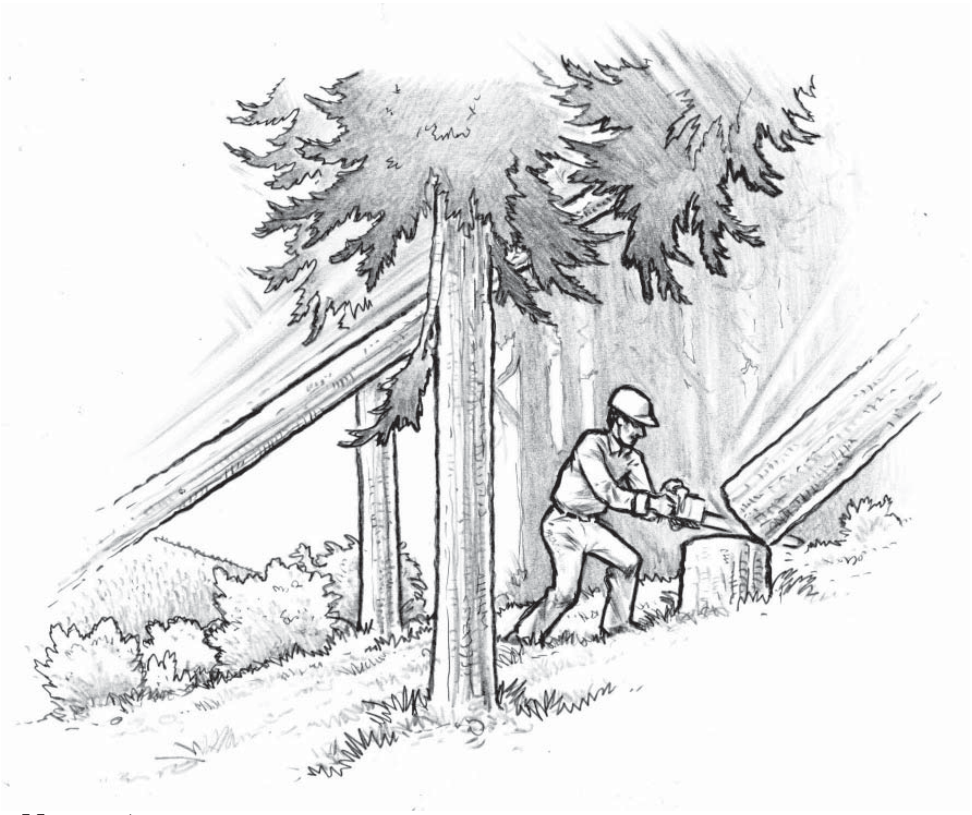
ASSESS POTENTIAL FAILURE ZONES

When working around snags or danger trees, assess the potential failure zones of the hazards and arrange work so it does not occur within those areas. If there is no detectable lean, but signs of stress within a tree, then the entire circumference around the tree must be assumed to be a failure zone. Never let your guard down. Even the perfect tree falling can turn into a dangerous situation.

USE EXTRA CAUTION WHEN FALLING OR WORKING AROUND SNAGS

Where possible, remove felled trees from a potential failure zone before bucking and limbing. Remember, snags are notorious as "silent killers." They can fall without warning and without making a noise. If you are running a saw, you will not hear it coming. Snags are unpredictable, and removal is a dangerous operation. If a snag must be removed, consider the use of heavy equipment or skylines. Only an experienced cutter should remove a snag manually, together with a spotter. Fall snags in the direction of the natural lean, and make a face-cut large enough so wedges will not be needed. Pounding on wedges can send vibrations up the tree and dislodge large amounts of bark, or cause a broken top to fall.

SNAGS 3



Hung tree

Tillamook County - Sep 28, 2004

A 58-year-old timber faller was killed by a small fir tree hung up in a larger tree he was falling. Cutting a strip with his partner, the pair were working their way uphill, and days earlier had cut a 6 in. diameter fir, about 45 ft tall, that had lodged in an adjacent tree. The partners had walked by this "hung" tree going in and out to their vehicle for several days. The victim decided on his own to fall the larger tree that the smaller tree was hung into. As the larger tree fell, the small fir tree also fell down, striking the faller along the neck and shoulder. The victim was found by his partner about 45 min. later. The partner was able to throw off the tree. The victim was transported to paramedics and confirmed dead.

Recommendations

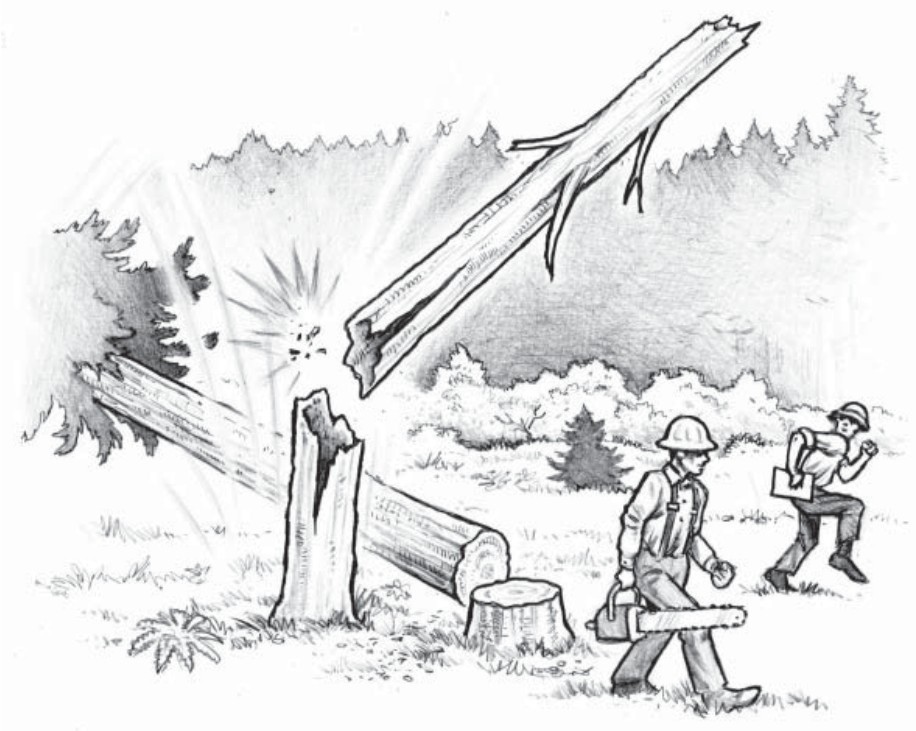
REMOVE HUNG-UP TREES IN A FALLING ZONE

Hung-up trees are especially hazardous. Never attempt to cut the tree supporting a hung tree. If possible, find a larger tree and fall it across the hung tree to dislodge it, keeping well out of reach of both trees as they fall. Most cutters take pride in a job well done and do not like to leave a mess for other loggers, but it is better to leave a hazardous situation than to die or be seriously injured trying to correct a situation that is better left to the rigging crew. Always place a bright-orange hazard-identification ribbon around a hazardous area if it must be left.

NEVER WORK UNDER A HUNG TREE

Hung trees can be dislodged without warning. A gust of wind, vibrations from a running saw, a tree hitting the ground, or gradual shifting over time can cause a hung tree to fall. If you are running your saw, you will never hear it coming, and even if you do notice, you will probably not have time to avoid being struck.

SNAGS 4-5



Swinging snag

Jackson County - Nov 5, 2004

A 65-year-old logger, working as an independent faller, was killed when a snag tree swung back, broke, and struck him. The faller was working with a spotter. He cut an 80 ft pine tree, and the branches caught another tree as it was falling. The snag, diameter about 13 in., bent in the direction of the fall, then swung back and broke. The spotter ran and avoided the tree, but then found the faller on the ground near the tree, seriously injured. His hard hat was found nearby with a large dent in the back of the helmet. By the time emergency responders arrived, the victim was dead at the scene. Reportedly, the initial cut of the fallen tree appears to have been performed correctly to avoid the snag.

Thrown branch

Deschutes County - Mar 14, 2005

A 48-year-old timber faller was hit by a falling branch, and died 4 days later. The faller cut a large tree that struck another smaller tree approximately 75 ft away. As the cutter was heading away from the tree by his escape route, a branch was thrown in his direction. The branch was 8-12 in. diameter and 4 ft long. The victim was transported by helicopter to a hospital within an hour. He was pronounced dead after 4 days in intensive care.

Recommendations

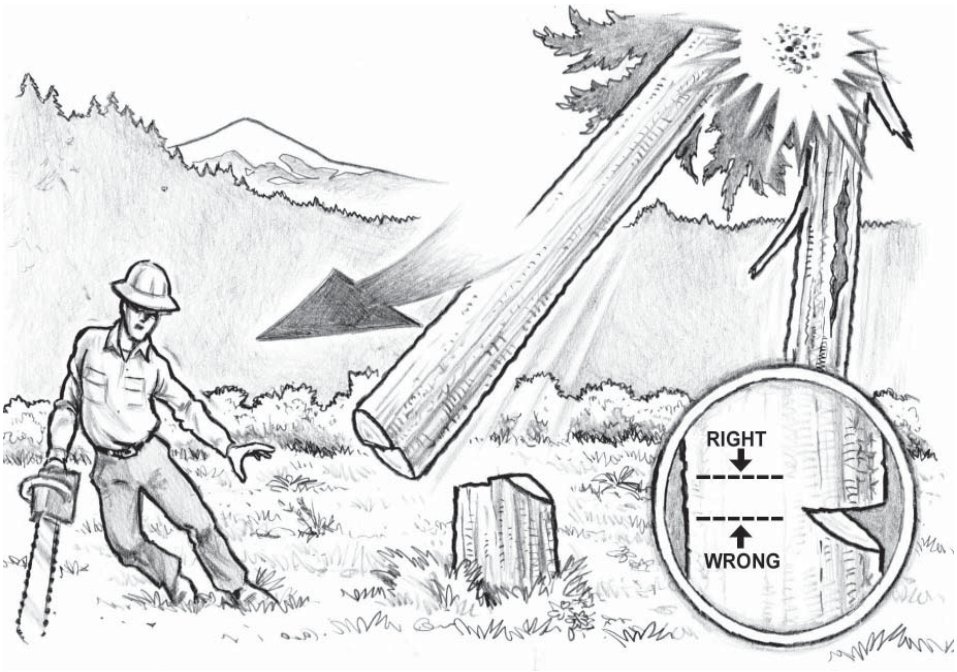
NEVER TURN YOUR VIEW AWAY FROM A FALLING TREE

Trees do not always go where intended. Many factors determine where a tree will fall once cut, including hinge thickness, head weight, limb mass, lean, rot, wind, and so on. Any one factor can change the direction enough to cause a hazardous situation. Even experienced cutters can miss their intended lay. You can do everything right and still face a hazardous situation. Utilize your escape route right away, and keep your eye on the falling tree.

WATCH FOR IMPACTS

The results of a falling tree hitting another tree or obstacle can produce unexpected results. In addition to getting out of the way and keeping your eyes on the tree as it falls, also watch for impacts and the results. Watch for a kickback, a snag springing back, or debris that could be flung in your direction.

KICKBACK 1



Log kickback

Jefferson County - Aug 11, 2003

A 55-year-old logger, working as a faller, was struck and killed by the tree he was falling. The tree struck a snag on the way down and the butt-end sprung 12 ft into the faller's work zone. The faller was using a standard Humboldt face-cut, but the backcut was too low, giving the butt an insufficient step to push off, which is known to increase the risk of a kickback.

Recommendations

MAKE BACKCUT HIGHER THAN FACE-CUT

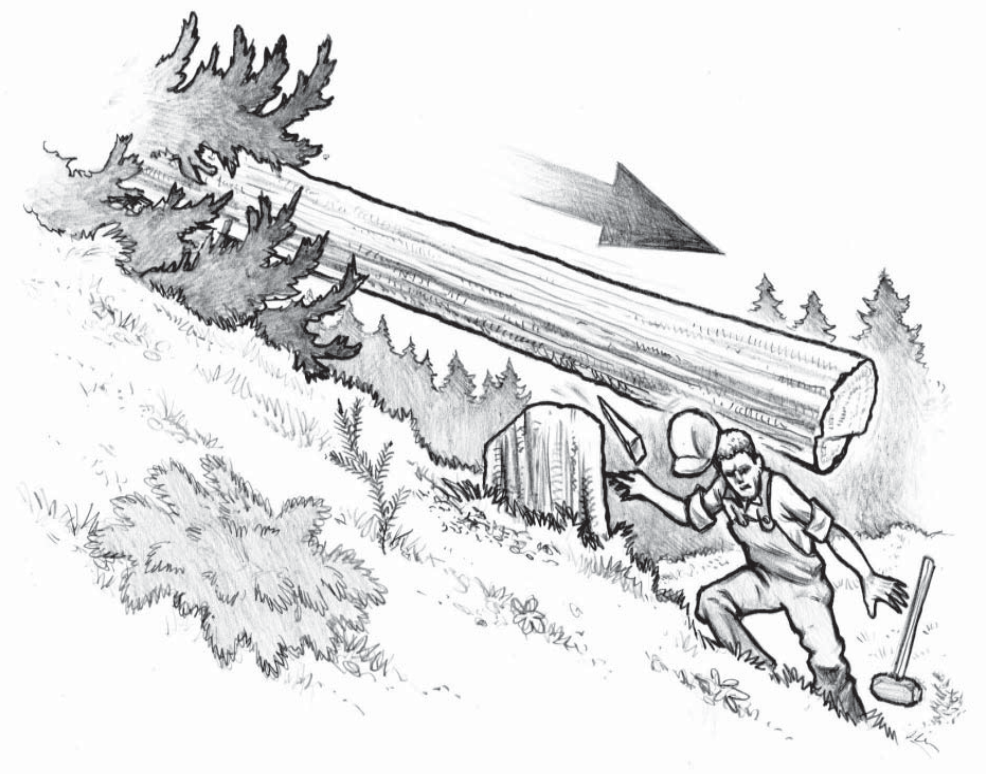
The backcut, also known as the safety cut, needs to be higher than the point where the flat and slanted cuts of the face-cut meet inside the tree. The higher backcut helps to prevent the base of the tree from jumping off the stump and coming back into the work zone on the way down. Specialty cuts for certain situations should be used only by experienced fallers.

WATCH FOR IMPACTS!

GET AWAY FROM THE STUMP

An estimated 90% of falling injuries occur at the base of the tree. As soon as the tree is committed to fall, immediately set down your saw and get away by your escape route. Move as far back as possible before the tree hits the ground. Keep an eye out for flying debris. Never turn your back to a falling tree.

KICKBACK 2-3



Partner with tree wedge

Jackson County - Oct 15, 2003

A 24-yr-old novice logger, working as a faller, was killed by the kickback of a tree while helping an experienced faller. The tree was a 65 ft pine, 23 in. diameter. The novice faller was responsible for hammering a wedge into the tree to make it fall uphill. The experienced faller saw the tree was beginning to fall and yelled twice for his partner to get away. Busy driving the wedge, the victim moved too late. The butt of the tree rose over his head and struck him.

Amateur logging

Clackamas County - Dec 13, 2005

A 63-year-old amateur logger, falling a 100 ft Douglas fir on his 18-acre property, was killed when the tree fell on him. The logger and his 28-year-old son were falling the tree together, taking turns making the face-cut and backcut. The son was handling a wedge and his father had the chainsaw when the tree started to fall. The tree spun at its base, dropped from the stump, and fell quickly as the victim was trying to escape. He was pronounced dead at the scene.

Recommendations

PLAN BEFORE YOU CUT

Communication in advance is always a critical feature of working safely, more so with inexperienced workers and difficult circumstances. Even for experienced loggers, advance planning and communication help to keep work partners alert to hazards. At the tree, a sudden hazard may require immediate action to escape. Prepare signals in advance, stay alert to signals from your partner, and be ready to move immediately.

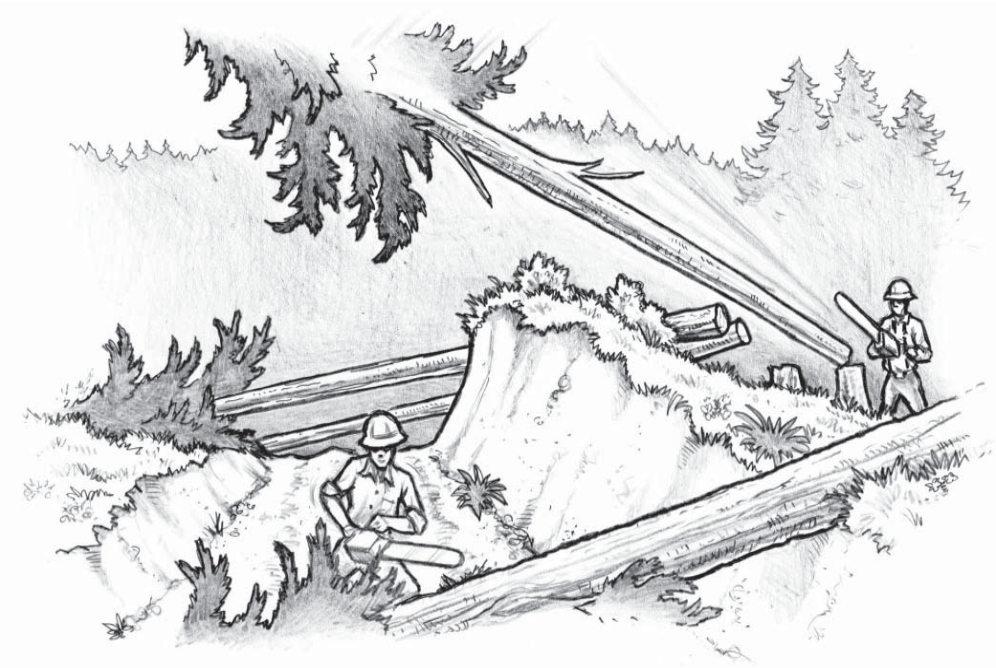
TRAIN BEFORE YOU CUT

Tree falling is by far the most dangerous occupation in Oregon. Mastery of a chainsaw and other equipment is only the first step for facing the immense power of a standing tree. Training is vital. New fallers should be aware of special conditions – as in felling trees uphill, where there is a very high risk the tree will travel downhill when it strikes the ground or an object on the way down.

PROTECT YOUR HINGE

The hinge created by the relative positioning of the face-cut and backcut is crucial to avoid kickback. Keep your hinge wood one-tenth the diameter of the tree. As an additional precaution, avoid working in the zone directly at the back of the tree.

FALLING ZONE 1



Bucking in falling zone

Lane County - Sep 5, 2003

A 50-yr-old logger, working as a faller, was killed by a falling tree. The faller, with over 25 years of experience and part owner of the logging firm, was in the falling zone of a coworker who was unaware of his presence. The faller told the coworker he was going to check a site further up the road. The coworker had fallen six trees before being signaled by the skidder operator to the road where the first tree had fallen. The absent faller had returned to the site and was bucking the first fallen tree when the branches of the second tree struck him as it fell nearby. The victim did not notify anyone when he returned. The second tree was located behind a ridge where the coworker could not see the road.

Recommendations

GET A DEFINITE OK SIGNAL FROM THE FALLER BEFORE ENTERING A FALLING ZONE

Watch for falling activity before entering a work area. Get the attention of a faller before entering his falling zone and be sure he is aware of your presence. Small handheld radios are ideal for coordinating activities with coworkers.

PERIODICALLY CHECK THE WHEREABOUTS OF COWORKERS OR UNEXPECTED VISITORS

Fallers working together should stay at least two tree lengths from one another. Other workers or individuals out in the woods can unexpectedly enter your work area without being aware of the hazard. Periodically look and listen. Be sure no one is endangered by your falling activities.

COORDINATE WORK ACTIVITIES WITH OTHER WORKERS IN THE AREA

Before starting non-normal tasks, it is important to brief all workers on the method of operation. When every worker knows their task and the tasks of the people working around him, accidents can be minimized or eliminated.

FALLING ZONE 2-3

Tree falls wrong way

Lake County - Jan 26, 2004

A 76-year-old self-employed logger, working as a faller, was killed by the branches of a juniper that apparently fell in the opposite direction from the way it had been cut to fall. The faller's partner discovered him at lunch time with no apparent signs of life. The victim's chainsaw was lying near the stump of the fallen tree. The fallers were in a remote location with a poor road, and the victim's partner placed the body in the victim's pickup and drove back to his residence before calling for help. The medical examiner reported a crushed chest and concluded the victim was already dead at the scene.

Novice clearing brush

Lane County - Aug 23, 2005

A 24-year-old male inmate on a prison work crew was killed during brush-clearing operations when a tree he cut fell in the wrong direction. The inmate was not instructed, nor trained to fell the tree.

Recommendations

CUTTERS MUST COMMUNICATE

Although cutters must work at least two tree lengths from each other, they must also remain within sight of each other and be able to talk by natural unassisted voice contact. Cutters need to occasionally listen for a partner's saw running. If time goes by without hearing the other saw, you may want to check on it.

BE PREPARED FOR EMERGENCIES

Cutters are required to carry a shrill whistle for emergency contact. All cutters must also know first aid. Every worksite must be able to call for an ambulance. Know how to contact emergency responders, and know your location to pass on to them. Time wasted with a serious injury can be deadly.

PLAN YOUR ESCAPE ROUTE

Clear an escape route in advance, extending at least 25 ft from the base of the tree being felled, best at a 45-degree angle behind the tree. Also plan and clear a second route and possibly others as emergency exits. As soon as the tree begins to fall, set down your chainsaw and move away in the opposite direction.

TRAIN BEFORE YOU CUT!

Fatal Hazards for Fallers

Fatalities among fallers in Oregon indicate primary hazards involve snags, kickback, and getting caught in the falling zone of a felled tree.

Lack of training and experience was a factor in several fatal incidents. Many incidents, however, involved experienced fallers, emphasizing the vital importance of advance planning, communication, and constant vigilance.

Certain kinds of terrain and standing trees pose additional hazards. A cutting plan should take into account the special circumstances of each job.

FIVE-STEP PLAN

Faller Safety Plan

Safe falling involves the following five basic steps.

1. Assess the area
2. Assess the tree
3. Establish a safe work area
4. Fall the tree
5. Get in the clear

Safe fallers generally follow the plan outlined in these five steps. They may not know they are following these steps and may not follow them exactly in the order laid out here, but through careful observation, the fallers who have the best safety records do indeed follow these very important steps.

Details in this five-step Faller Safety Plan are outlined below. Unfortunately, even if you follow every step perfectly, we cannot assure you will never get injured. Moving the massive force of a tree is unavoidably hazardous. A good safety plan can increase your odds of getting out alive.

1. ASSESS THE AREA

Most injuries in timber falling occur in and around the tree being felled. Before you attempt to fall a tree, it is important to identify hazards and eliminate or minimize their potential to cause harm. Look for all of the following hazards.

Danger trees – Establish work processes so that workers do not enter the potential failure zone of any tree or snag, or other hazard as listed in the several items below. If a danger tree or snag has a perceptible lean, do not work in this zone. Do not fall trees so that your work will enter this zone. If a tree has to be felled into the zone, remove the felled tree before limbing and bucking. Avoid vibrations, which can release and throw a dead treetop or branch a considerable distance.

Snags (standing dead trees) – Snags should be felled before attempting to fall other trees in the snag's failure zone. Snags are dangerous, and use of machinery to get them on the ground is recommended to reduce worker exposure. If a faller must personally drop a snag, use a deep face-cut and fall with the natural lean to avoid using a wedge. The vibration of hitting a wedge could cause the snag to fall. Always use a spotter when working on a snag. In some instances it may be safer to leave a snag standing, and avoid it, rather than attempt to cut it.

Widowmakers (limbs hanging in trees) – Look closely for widowmakers in the tree canopy and plan your work in advance to avoid positions directly beneath. Be sure to assess the situation again after the tree is on the ground. The falling action of the tree can produce new hazards.

Faller Safety Plan (continued)

Be sure to assess the situation again after the tree is on the ground.

Broken or rotten tops – Avoid working beneath rotten or broken tree tops. Reassess the situation after each tree fall.

Hung trees – Never fall a tree that is holding up a leaning tree, which can easily dislodge and strike the faller below. Many fallers have been injured or killed by hung trees. Try to drive down the leaning tree by falling another tree into it. Or use machinery to topple the tree. If no such means are available, leave the hung tree and holding tree for the rigging crew. Make sure to mark the trees as a hazard before leaving the area.

Power lines – only qualified individuals should work on trees that have power lines running through them or are close enough to fall within 15 ft of a power line. Contact the power company, and let them handle work within this hazard area

Additional hazards – Other hazards include steep ground, rocky or broken terrain in the direction of fall, roads, structures, and many other particular and sometimes peculiar hazards. Always identify and plan for specific hazards. If in doubt, contact a professional who can handle the situation.

2. ASSESS THE TREE

Calculate the falling direction – Before cutting into a tree, determine the lean, canopy weight, and other forces that will influence the falling direction. Most experienced cutters can determine the natural lean of a tree in a glance. You can also use your axe to plumb the tree: hold your axe by the end of the handle and let the head dangle below, line up the edge of the handle with the edge of the tree, and note any difference in the line of the tree from the line of the axe. Canopy weight is also important in falling direction. The weight of the crown of the tree can offset the lean of the trunk. Look at all the forces in the tree to avoid unpleasant surprises.

Find an opening – Look for natural openings to place the tree and pick the opening that best fits the falling pattern for the unit you are working. Try to utilize the natural lean of the tree to place it in an opening. If this is not possible, you may need to fall the tree against the lean.

Assess the impact – Look for a good bed to set the tree. Broken ground, other logs, or falling over a ridge can cause the falling tree to react violently. The butt of the tree can spring into the air and hurtle back down just as quickly. Also, other logs hit by a falling tree can be thrown around. Be sure those logs will not hinder

your escape route or impact other workers or individuals that may be in the area.

Avoid an uphill fall – Falling a tree up a steep hill is a dangerous procedure and should only be left to very experienced cutters. Many cutters have been injured or killed while falling timber uphill. If the ground is steep enough, once the tree hits the ground the tree can come racing back downhill like a "freight train." If you must fall a tree uphill, make sure to get into a safe place as soon as the tree starts to fall. The safest place is a side hill away from the tree, placing standing trees or stumps between you and the tree being felled. You must be careful that the falling tree does not dislodge other felled timber and send it downhill toward you.

Stay alert for flying debris – Look for potential impacts that may cause flying debris. As a tree falls, it can strike other trees and branches, and send debris flying. Impacts on the ground can be equally dangerous, sending logs or limbs flying in any direction. Avoid the potential of flying debris by putting other trees, logs, or branches on the ground wherever necessary. Even with the best preparations, stay alert. Never turn your back on a falling tree.

Do not cut in high winds; it is just too dangerous.

Assess the wind – Cutting weakens a tree, and the wind can blow it over in a totally different direction than intended. Once you have started your cut, do not leave the base of the tree until the tree starts to go over. Cutters have been killed by walking away from a cut up tree to get their axe or wedges, or because they forgot to fuel up their saw and ran out of gas half way through. Once you begin, you are committed. If the wind is blowing hard enough, you should probably quit for the day or wait for the wind to die down. Do not cut in high winds; it is just too dangerous. When you cut in windy situations, be extra concerned for falling limbs, tree tops, and other flying debris.

Discuss danger trees – If your assessment of a tree and its fall poses hazards you cannot solve to your satisfaction, talk to a competent cutter who may be able to help you get the tree on the ground safely. No tree is worth getting hurt or killed for it. Listen to your doubts, and take the time to talk about suspected dangers and get help from a competent person. Likewise, take seriously the perceived hazards presented by others whenever you are consulted. Only qualified cutters should remove danger trees.

Faller Safety Plan (continued)

3. ESTABLISH A SAFE WORK AREA

Clear the area around the tree – Remove any brush or limbs that can hamper your ability to safely fall the tree. A cleared area will make it easier to move and will not distract the cutter when working on the tree.

Establish escape routes – Plan at least one escape route, with an alternative route in case the tree being felled does not go in its intended direction. An escape route needs to be cleared a minimum of 25 ft away from the base of the tree to be felled. The best escape route is back and to the side, and preferably uphill of the tree.

Keep a safe distance – Make sure to maintain two tree lengths distance from other fallers. On steep slopes, never work directly below another faller.

Ensure the safety of others – Look for other people before falling any tree, You can work for days in the woods and not see another individual within your work site; it only takes one unexpected intrusion to result in tragedy. Ensure a clear area within two tree lengths of the tree to be felled. Most individuals do not understand fully the hazards of timber falling, and it is up to the faller to personally account for others who may enter the falling zone.

Work as a team – Never face up a tree when the person you are working with is away from the tree or whose attention is elsewhere. Many buckers have been killed this way. Also, cutters must work within voice range of another worker. Each cutter must carry a shrill whistle or other device to communicate in the event of an emergency. Make sure the whistle is carried on the body.

Approaching a falling zone – Make visual contact with a cutter before entering his work zone. This is imperative. Individuals have been injured or killed when walking in on a cutter working on a tree. Never approach a cutter from the downhill side. The majority of the time he will be falling across or down a hill.

Working next to roads – Where a road cannot be completely closed, cutting operations need to have a flagger to stop all traffic. Flaggers must have high visibility vests and Stop/Slow paddles. Warning signs must be used where falling activities could create a hazard on the roadway. Specifications for sign size, shape, color, and placement are covered in OR-OSHA Div. 7 437-007-0515. A road also increases the chance of encountering hikers or other persons out in the woods for recreation. When working next to a road, take extra time to ensure the safety of your falling zone.

4. FALL THE TREE

Only, after assessing the area, the tree, and the safety of the falling zone for you and others can you feel ready to begin work on the tree. Before you start, lay out your axe and falling wedges so they are immediately available, preferably on the ground behind the tree. Once you begin the cut, remember, you need to stay with the tree. Never face a tree when your partner is away from the tree or is busy on something else.

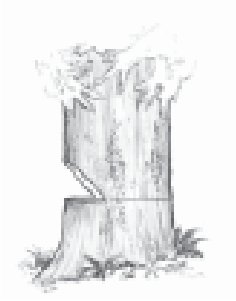
There are three steps to falling a tree.

1. Face-cut
2. Backcut
3. Place Wedges

Choose a face-cut – All trees over 8 in. diameter are required to be felled using a face-cut. Three types of face-cuts are most commonly used: conventional, Humboldt, and open face.

There is no particular face-cut to be used in a specific situation. Different face-cuts are used in different regions of the USA. The Humboldt face-cut is most common in the west, the conventional and open face-cuts are more common in the east.

The conventional and open face-cuts are the easiest to learn, but waste the most timber. The Humboldt face-cut wastes the least amount of wood, because the sloping cut is taken from the stump.



Conventional Face

Humboldt Face

Open Face

Face-cut illustrations from Oregon OSHA, *Cutting trees, pre-commercial thinning and slashing (*437-007-0810). Available online: www.cbs.state.or.us/osha/pdf/rules/division_7/div7_i.pdf

Faller Safety Plan (continued)

Make the face-cut – The top and bottom cut of the face-cut must meet on both sides of the tree, leaving no obstructions remaining in the face area. The face-cut must be clean to prevent the tree from "barber chairing" or reacting unexpectedly as it falls. The depth of the face-cut should be a minimum of one-fourth the diameter of the tree and no more than one-third. The height of the face-cut should be no more than one-fifth of the diameter of the tree.

Make the backcut – Sometimes referred to as a safety cut, the backcut produces a hinge to control the pivot of the tree as it falls. The backcut should be level, about one-tenth the diameter of the tree, and above the apex of the face-cut. A 20 in. tree should have a backcut about 2 in. higher.

Protect the hinge – Never cut the hinge wood all the way through. The thickness of the hinge should be about one-tenth the diameter of the tree. With a good hinge the tree will fall perpendicular to the front face of the hinge.

Wedging – All trees bigger than 15 in. diameter must have a wedge placed into the backcut as soon as possible to prevent the tree from sitting back onto your saw bar, and also ensure the tree falls in the intended direction. Most cutters carry more than the required two wedges. Bring the saw back to idle before attempting to place a wedge. Workers have been injured when placing wedges in the backcut for themselves or their partner while the saw was cutting.

Working with a partner – When working with a partner to fall a tree (called double jacking), make sure your partner is fully aware of your plan of action at all times. Never face up or fall a tree when your partner does not have full attention on what you are doing. Even the best cutters have trees go over sideways or backwards. If your partner's attention is on something else or is running his saw, he may not be able to see or hear a warning signal in time to avoid injury.

Never face up or fall a tree when your partner does not have full attention on what you are doing.

Windy Conditions – Wind adds pressure on the base of the tree and encourages it to twist unexpectedly. Leave extra hinge wood in windy conditions to reduce the chance the tree will "barber chair" before it hits the ground. Other tips include the following.

- Get your wedges in as quick as possible when cutting in windy conditions. The wedges will help prevent the tree from leaning backwards, falling backwards, or pinching your saw in the backcut.

- Keep your wedge pounded in close to the saw bar, which will help keep the tree from blowing back on the stump.

- Never fall trees if the wind is blowing too hard.

Heavy leaners – Trees with a heavy lean are especially prone to the barber chair effect when being felled. The tree breaks the fibers in the cut before the saw can cut them. There are techniques for falling heavy leaners that help to prevent the barber chair problem, but these techniques should be left to timber cutters with expert knowledge.

Hardwoods – Most hardwoods do not grow straight and true like the majority of softwoods, and therefore pose more risk to the timber faller than softwoods. The lean of hardwoods and the intersection of branches with adjacent trees are unique in each case. Be particularly careful to understand the forces involved before attempting to fall a hardwood. Initial experience with softwoods is recommended. When in doubt, call in a professional cutter with competence in falling hardwood trees.

5. GET IN THE CLEAR

Most injuries among fallers occur at the stump. Never stand directly behind a tree being felled. As soon as the tree is committed to fall, get away from the stump immediately by your prearranged escape route. When leaving the tree, always keep an eye on it, and never turn your back on it completely.

Be prepared for the unexpected. As a tree falls, it can go over backwards, tops can break off, limbs can fall, and flying debris can be hurtled in your direction. Other trees can act as a spring and send the tree back at you. Impacts on the ground repeat all of the same hazards.

As soon as the tree is committed to fall, get away from the stump immediately by your prearranged escape route.

FIVE-STEP PLAN

Limbing and Bucking

1. ASSESS THE AREA

Evaluate where a log to be bucked will shift and roll, and determine if anyone or anything will be struck by the movement. This is especially important on steep slopes as a log being bucked can travel quite a distance. If there is a road or trail below the buck, be sure to block access to that area.

2. ASSESS THE LOG

A faller needs to learn to read a tree before bucking cuts are made. The tree may lie secure on a hillside, but when a buck is completed, part or all of the tree can roll down the hill. Always look to see how a tree is supported before attempting any bucking cuts. Determine if the intended cut will upset the balance of the tree and place you in danger.

Almost every tree will have pressure in the area to be bucked. Some trees can come under extreme pressure, especially wind-thrown trees, and should be left for experienced cutters. There are five common types of bind in the buck area: no-bind, top-bind, bottom-bind, side-bind, and end-bind.

- No-bind is actually a tree that has no bind in the buck area. This is most common when working on flat ground.

- Top-bind occurs when the tree is supported on each end and the center is hanging free. This causes the top of the log to pinch your saw as you cut down in from the top.

- Bottom-bind occurs when the end of the log is hanging. This causes the bottom of the log to pinch your saw as you cut up from the bottom of the log.

- Side-bind usually occurs when one end of the tree is pulled to the side, either by other timber or stumps. This causes the side of the log to pinch your saw as you cut up from the side of the log. It is very important in this situation to be aware that one of the logs being cut can spring at you with a violent reaction.

3. ESTABLISH ESCAPE ROUTES

Before making your bucking cuts, always know where you are going to go if things start moving. Plan for movement in an unexpected direction. If there is no clear means of escape, be sure to make one. The escape route needs to direct you well away from the path of the moving log.

4. BUCK THE LOG

Always attempt to position yourself above the log being bucked. If you need to work below the log, make sure you have good footing and stand in a safe position. Block or secure the log before making the cut.

5. GET IN THE CLEAR

Get in the habit of stepping back from every bucking cut. Bucked logs can shift and roll in unexpected ways.

Some felled trees come under extreme pressure, especially wind-thrown trees, and should be left for experienced cutters.

Common Hazards in Limbing and Bucking

Working on the same log – Use caution when working as a team on the same downed tree. Logs can roll or shift as the result of the limbing and bucking process. Make sure your partner is aware of your intentions.

Windfall trees – Only qualified cutters should attempt to buck trees that are on the ground as a consequence of being blown over. Most wind-thrown trees can have extreme tensions within the tree.

Limbing – Before limbing logs, determine whether the log is being held in a stable position by the limbs, or the log is resting against a stump or other stable object. Be careful to avoid cutting limbs that affect the stability of the log or tree being bucked.

Kickback – Saw kickback (the violent reaction when the tip of the saw comes into contact with the wood) is a serious and potentially dangerous situation that can occur without warning. Discussion of saw handling is beyond the scope here. Good guides are available on kickback and saw handling from Stihl and Oregon Cutting Systems.

WORK RULES

Logging Safety in Oregon

Oregon OSHA provides safety rules for loggers under its Division 7, Forest Activities Standard, which was thoroughly updated in 2003. The state rules stipulate five areas where loggers must employ safe practices.

- Safety and Health Plan
- Training
- Personal Protective Equipment
- Planning and Communication
- Hazard Elimination

Each of these areas is summarized below. Oregon's Forest Activities rules apply to all operators working in the state, even when performed for a federal agency.

SAFETY AND HEALTH PLAN

Every employer operating in forest activities must establish a safety and health program for all employees, including the following components.

- Management commitment
- Accountability
- Employee involvement
- Hazard identification and control
- Accident investigation
- Education and training
- Program evaluation

TRAINING

Adequate training is required to prepare new fallers to identify and eliminate hazards. Training takes time and money, but one injured employee can cost much more.

Most training of new loggers occurs in the field. A tailgate meeting should be held before starting any task. All steps should be reviewed with the new faller in advance, and necessary tools should be laid out before making the cut.

Supervisors should continue to pay close attention during work activities. Most new loggers will not truly understand the hazards they face.

Be careful to avoid passing on bad habits during training. Most experienced cutters, for example, can eyeball a tree and see the potential lean or direction of fall without plumbing the tree; but new workers should learn how to calculate the falling direction and be sure for themselves.

PERSONAL PROTECTIVE EQUIPMENT

The list below shows personal protective equipment required by Oregon safety rules that must be supplied by the employer (except the caulk boots). Workers should check their equipment every day before work to be sure everything is in good

working order. Faulty equipment should be repaired or replaced immediately.

Hardhats – Must be worn when there is a hazard of falling or flying material.

High-visibility color – Hardhat and upper body must be a highly visible color.

Eye and face protection – Required when there is a danger of flying chips or debris.

Hand protection – Gloves must be worn.

Leg protection – Must be worn when using a chainsaw, covering the entire leg from the top of the boot to the top of the thigh. If any cuts in the leg protection penetrate deeper than the first layer, the chaps must be replaced.

Foot protection – Caulk boots are required when walking or working on logs. They must be made of a cut-resistant material, provide ankle support, and must be waterproof when conditions require it.

Hearing protection - Required whenever noise level exceeds an average of 85 db. Few saws operate at less than 85 db. Comfort is an important consideration to be sure hearing protection is used.

Shrill whistle – Necessary when working alone to make immediate contact with others in case of emergency.

Wedges – Oregon OSHA requires only two wedges for use in falling trees over 15 in. diameter. An extra wedge may be necessary when falling a heavy leaner or a tree that sits back on your saw. More than two wedges may also be necessary when two wedges must be stacked to tip a tree farther than normal, and one wedge is already in the tree. The first wedge must be left in place to keep the tree stable.

PLANNING AND COMMUNICATION

Workers should establish a work plan in advance and talk through the plan. If the plan changes later, all workers should be involved and informed.

In addition to controlling hazards on the ground, a work plan also helps to prevent a work activity from overlapping into an adjacent work area. Fallers, for example, must coordinate so they remain at least two tree lengths apart.

Good communication can also help prevent injuries. Inexperienced workers in a crew need to be taught to stay alert and understand the significance of signals, whistles, and other forms of communication from coworkers. Some cutting contractors now use small portable radios, but hand signals are still commonly used in logging, due to the noise of operating equipment.

Logging Safety in Oregon (continued)

HAZARD ELIMINATION

Ideally, a faller should drop all snags and heavy leaners prior to a felling operation, but in some instances state or federal agencies pre-mark the trees to be cut. In such cases, a faller must plan carefully and avoid the failure zones of danger trees that remain standing. Contractors should negotiate with agencies to allow a faller to occasionally drop a snag for safety.

Oregon's forest rules establish the following procedures related to fallers.

Site plan – Prior to a logging operation, an employer must inspect the site to identify hazards, hold a safety meeting with workers to discuss conditions and hazards, and must document the safety meeting in writing.

Hazard identification – Known hazards must be identified with a ribbon of a standard size and color.

Checking system – A specific person must check the well-being of all workers at the end of each work shift.

Work teams – At least two crew members must work together when using a chainsaw, and in yarding and loading.

Emergency medical service – All fallers must be trained in first aid and CPR. Every worksite must be able to communicate with an ambulance service.

Danger trees – A competent person must evaluate danger trees and other unstable objects in a work area, and develop a plan to eliminate or minimize the hazards.

Power lines – A tree may not be cut if it may fall within 15 ft of a power line. Notify the power company if closer work is needed.

Fallers and Buckers

Glossary

AUTHORIZED PERSON: A person approved or assigned by the employer to perform a specific type of duty or to be at a specific location at a certain time.

AXE: A part of the faller's safety equipment, serving many pounding and chopping functions. Can also be used to plumb the lean of a tree and gauge the height of the tree.

BACKCUT: The last of the three cuts required to fall a tree, located on the opposite side of the tree from the face and minimally 1 in. above the horizontal cut of the face. The 1 in. of holding wood is referred to as stump shot and prevents the tree from kicking back over the stump toward the faller. The backcut must never be continued to a point at which no holding wood remains. Following are three backcut variations.

- *Face-boring Backcut:* A procedure for particular trees, such as those which are large or leaning heavily. Face-boring reduces the amount of wood remaining to be cut prior to the final backcut. For experienced fallers only.
- *Side-boring Backcut:* A procedure to prevent loss of control of a tree or barber-chairing. Reduces the amount of holding wood required to fall a tree. The nose of the bar is pushed into the tree behind the face and 2 in. above the horizontal cut.
- *Side-notching Backcut:* An alteration of standard backcutting to prevent loss of control or barber-chairing. Reduces the amount of holding wood remaining to be cut by cutting each side prior to the final backcut.

BACK LEAN/SIDE LEAN: Weight of tree is opposite or opposed to the intended felling direction.

BAR/BLADE: That part of the chain saw upon which the cutting chain travels. Long, thin projection of the chain saw upon which the saw chain travels. Improper use of the bar results in kickbacks and saw cuts. It is the extreme top and bottom of the bar's nose that is sensitive.

BARBER-CHAIR: Vertical split of a tree during the falling procedure. Generally a

Based on Occupational Safety & Health Administration (U.S. Department of Labor)
www.osha.gov/SLTC/etools/logging/glossary/glossary.html

Fallers and Buckers Glossary (continued)

result of improper facing or backcutting. Characterized by a portion of the fallen tree being left on the stump.

BASE OF TREE: Portion of a natural tree not more than 3 ft above ground level.

BEAVER-TAILING: Burying the whole bar of the saw while cutting.

BED: The intended position in which a tree will be felled.

BIND/BOUND: Pressures in a felled tree resulting from terrain, or objects such as stumps or windfalls that prevent the tree from lying flat on the ground. Compression and tension are the two major components of bind. These directional pressures determine the procedures for bucking. Following are five bind positions commonly encountered in bucking.

- *No-bind:* Usually found in flat terrain.
- *Top Bind:* A tree compressed on top and tensioned on the bottom.
- *Bottom Bind:* A tree tensioned on the top and compressed on the bottom.
- *Side Bind:* A tree compressed on one side and tensioned on the other.
- *End Bind:* On steep terrain, the force of gravity closes the bucking cuts.

BLOW-DOWN: Trees that have been blown down as a result of wind.

BORING: Using the nose or tip of the bar to saw into the tree.

BOTTOM BIND: (see Bind)

BRUSH-OUT/SWAMP-OUT: To clean out brush and other material around the base of trees to be felled or logs to be bucked. Gives protection against saw kickback and provides safe footing.

BUCK/BUCKING: To cut a felled tree into sections, called logs. The length of the log depends on the species of tree and the intended product.

BULLBUCKER: A foreman or supervisor of falling and bucking operations.

BUTT: Bottom of a felled part of a tree.

BUTT LOG: Portion of a felled tree from the butt to the first bucking cut.

BYPASS: (See Dutchman)

CAULK BOOTS: Heavy leather boots containing numerous steel calks or spikes. A part of the fallers safety equipment used to promote secure footing.

CAT-FACE: Scar or deformed section at the base of a tree caused by rot or fire.

CLEARCUT: An area in which all of the trees have been or will be felled, bucked, and skidded in one operation. When all trees in a given area are felled.

CHOCK: A block, often wedge shaped, which is used to prevent movement (e.g., a log from rolling, a wheel from turning).

COMPETENT PERSON: One who is capable of identifying hazards in the surrounding or working conditions which are unsanitary, hazardous or dangerous.

CONVENTIONAL FACE: (See Face-cut)

CORNER-NIPPING: Special technique of partially cutting the extreme outside holding wood corners to prevent root pull, slabbing and alteration of the desired falling direction.

CORNERS: (a) Left and right side of the holding wood; (b) Corner of the falling face.

CROSSING THE LEAD: Intentional or unintentional falling of a tree across the established lead of falling direction. Although crossing the lead may be caused by wind, it generally is a result of improper falling technique.

CULL: A tree or log which is considered unmerchantable because of defects.

CUT-UP: Tree or log left standing or suspended with the falling or bucking cuts almost completed. This is a very hazardous condition.

CUTTER: One whose primary job is to fall, buck or limb trees before they are moved to the landing area.

DANGER TREE: A standing tree that presents a hazard to employees due to conditions such as, but not limited to, deterioration or physical damage to the root system, trunk, stem or limbs, and the direction and lean of the tree.

Dbh: Diameter of tree at breast height.

DECK: A stack of trees or logs.

DOGS: A metal plate containing 3 to 5 points or fingers which are located in front of the chain saw protruding parallel with the bar. Dogs allow the saw to be pivoted while falling or bucking.

DOMINO FELLING: The partial cutting of multiple trees, which are then left standing and pushed over with a “pusher” tree. Domino falling is a dangerous, unacceptable practice.

DOUBLE ENDED LOGS: Two logs end to end on the same lay.

DUTCHMAN: A special falling technique with variations to intentionally alter the relationships of the face, holding wood, and backcut to solve a particular falling problem. For experienced fallers only.

Fallers and Buckers Glossary (continued)

END BIND: (See Bind)

ESCAPE ROUTE/RETREAT PATH: A predetermined path of exit used by fallers when falling or bucking. Essential features of an escape route are (a) selection of the desired direction and distance, and (b) a well-cleared path.

EXTREME WEATHER CONDITIONS: Unsafe weather for logging includes the following common conditions.

- *Strong Winds:* Wind velocity that blows limbs from standing trees, causes windfalls, or prevents cutters from felling trees in the desired direction.

- *Impaired Vision:* Falling snow, sleet, mist, fog, rain, dust, or darkness that substantially impairs visibility, so workers cannot clearly see signals, moving vehicles, equipment and lines, falling trees, or other hazards.

- *Hazardous Snow or Icing:* Snow or ice that prevents escape from hazards such as falling trees, moving logs, vehicles, or similar hazards.

FACE-CUT: A section of wood sawn and removed from a tree's base that allows the tree to fall and assists in directing where it will fall. The face is comprised of two separate cuts, with constant relationships: (a) the depth of the horizontal cut must be at least one-third the diameter of the tree, (b) the sloping cut must be angled to allow a wide opening, and (c) the two cuts must not cross each other. Following are three commonly used types of face-cut.

- *Conventional Face:* The sloping cut is in the butt of the tree, above the horizontal cut. Generally for small-diameter trees.

- *Humboldt Face:* The sloping cut is in the stump, below the horizontal cut.

- *Open Face:* Both top and bottom cuts are diagonal, generally forming a 90-degree angle. Best used on small-diameter trees.

FALLER: Specialist who falls and bucks trees in a safe manner while utilizing as much of the tree as possible. In some areas the faller only cuts the trees down and a bucker saws them into logs.

GRADE: (See Slope)

GUNNING/SIGHTING: Technique of aligning the handle bars or gunning mark with the desired falling direction. Since the gunning mark and handle bars are at a 90-degree angle to the bar, exact position of the face, in relation to the desired falling location, can easily be established.

HANG-UP: Situation in which a tree is lodged in another tree and prevented from falling to the ground; results from a number of causes such as improper facing and/or backcutting and wind. A hung tree can be very dangerous.

HAZARDOUS FALLING AREA: The area within a circle centered on the tree being felled and having a radius not less than twice the height of that tree.

HEAD LEAN: One of the two natural leaning forces found in most trees. Head lean is the most prominent outward slant or lean of a tree in reference to its base.

HOLDING WOOD: Section of wood located between the face and the backcut. Its purpose is to prevent the tree from separating from the stump until it has been committed to the face. It also helps direct where the tree will fall. The holding wood must never be completely sawn off.

HORIZONTAL FACE-CUT: First of the two cuts required to face a tree, minimally one-third the diameter of the tree in depth.

HUMBOLDT FACE: (See Face-cut)

HUNG/LODGED TREE: (See Hang-up)

HYDRAULIC JACK: A mechanical device powered by internal pressure, used to control the direction a tree falls.

IN THE CLEAR: A position within the work area where the probability of hazardous contact with falling trees, moving logs, rootwads, chunks, material, rigging and equipment is minimized by distance from the hazards and/or use of physical barriers, such as stumps, trees, terrain or other objects providing protection.

JACK-POT: An area where trees have been felled without a lead or direction. A result of poor falling technique.

KERF: Space resulting from the cutting of a saw chain. The width of a cut is referred to as the kerf.

KICK-BACK: A strong thrust of the saw back toward the faller, generally resulting from improper use of the nose of the bar or the pinching of the bar in a cut. Kickback causes loss of control of the saw, and is a common source of injury. Kick-back also refers to a tree jumping back over the stump toward the faller. This kind of kick-back generally results from a tree being felled into standing timber or lack of stump-shot.

KICKER: A wedge cut from the face, or an equivalent object, placed in one side of a face-cut to pull the tree from its lean as it falls.

LANDING: Any place where logs are laid after being yarded and before transport to the worksite.

Fallers and Buckers Glossary (continued)

LAY: Refers to either the position in which a felled tree is lying or the intended falling place of a standing tree.

LEAD: The established direction in which all trees in a quarter or strip are to be felled, usually governed by the terrain of the area, or its general slope or skid road system.

LEAN: Refers to the directional tilt of a tree away from its vertical position. Many times two lean forces may be in play in the same tree. They are referred to as head lean and side lean. The lean, or leans, of a tree can be easily established with the use of a plumb-bob or axe handle.

LEG PROTECTOR: Ballistic nylon pad attached to one or both pant legs to protect the leg from contact with the saw chain. It can be attached to either the inside or outside of the pant leg.

LIMB LOCK: A series of cuts made on limbs to release back or side pressure and create a stay in the limb that will prevent the limb from either kicking back and striking the logger or pinching the saw.

LIMBING: To cut branches off felled trees.

LODGED TREE (See Hang-up).

LOG: A segment sawed or split from a felled tree, such as, but not limited to, a section, bolt, or tree length.

LOGGING OPERATIONS: Operations to fell and move trees and logs from the stump to the point of delivery, including marking danger trees and trees/logs to be cut to length, felling, limbing, bucking, debarking, chipping, yarding, loading, unloading, storing, road building, and transport of logs, equipment, or personnel to and from logging sites.

LONG-BUTT: After a tree is felled a section of the butt-end may be sawn off because of rot.

MECHANIZED FALLING: Falling of standing timber by a self-propelled mobile wheeled or tracked machine equipped with a shear or other powered cutting device.

NO-BIND: (See Bind)

OFFSIDE: (a) Side of tree opposite to which the faller stands when falling or bucking; (b) Side of body opposite to that normally used to hold saw.

PIE/WEDGE: A section sawn from a tree during bucking to allow for the directional pressures of various bind situations.

Splits, slabs and excessive wood-pulling are minimized by sawing a wedge.

PLUMB: To gauge or assess the various types of lean in a tree.

PLUMB-BOB: Special tool to determine the outward lean or slant of a tree in relation to its base. Generally a lead weight attached to piece of string is used.

PUSHING: When a tree has been undercut and backcut and will not fall, the faller may as a last resort "push" this tree by falling another into it.

RIGGING CREW: Crew and equipment that drags logs to an area called a deck or landing. From the deck, logs are loaded onto trucks for transport.

ROLLWAY: Any place where logs are dumped and they roll or slide to their resting place.

ROOT PULL: The pulling out of a portion of a tree's root system. Generally a result of not cutting up the corners of the holding wood close enough on a large or heavily leaning tree.

ROOTWAD: The ball of a tree root and dirt that is pulled from the ground when a tree is uprooted.

RUNAWAY: A tree that has rolled or slid downhill below previously felled and bucked timber.

RUSSIAN COUPLING: An incomplete bucking cut as a result of an unsafe bucking situation, when the faller only partially cuts through the tree. This situation can be very dangerous to the rigging crew. If a Russian coupling is left, the tree should be marked and supervisors notified.

SAW LOG: Logs taken to be manufactured into lumber.

SCALER: The person who measures the diameter and length of the logs determines specie and grade, and makes deductions for footage calculations.

SCHOOL-MARM: A tree stem that branches into two or more trunks or tops.

SERVICEABLE CONDITION: A state or ability of a tool, machine, vehicle or other device to operate as it was intended by the manufacturer to operate.

SET: Combination of two fallers, or one faller and one bucker working together.

SET-BACK: Occurs when a tree settles back opposite to the intended direction of fall; hazardous situation when the faller loses control of a tree.

SHALLOW NOTCHES: An undercut that has not been sawn deeply enough into the tree.

SHOULDER PAD: Leather, canvas or felt pad threaded throughout the suspenders

Fallers and Buckers Glossary (continued)

on one shoulder to protect the body from contact with a saw being carried.

SIDE BIND: (See Bind)

SIDE-BORING BACKCUT: (See Backcut)

SIDE LEAN: One of the two natural leaning forces found in many trees. Compared to head lean, side lean is the lesser pronounced lean.

SIDE-NOTCH: Additional side saw cuts made prior to the backcut to prevent barber-chairing or to facilitate sawing large trees into logs.

SIDEWINDER: A limb or sapling that is bent under a tree that has been felled. Unintentionally cutting them is extremely dangerous. In some areas sidewinder refers to the falling of a tree in an unintended direction. See Spring Pole.

SINGLE-JACK: A faller who falls and bucks trees in an area by himself.

SIT-BACK: Refers to a tree that settles back on the stump closing the kerf of the backcut. Generally a result of improper determination of the tree's lean and/or of wind.

SKYBOUND: A tree that fails to fall after being faced and backcut. Generally a result of picking the wrong lean.

SLABBING: Generally a result of improper technique and/or sequence of bucking cuts which result in a lateral split of a log.

SLOPE / GRADE: Increase or decrease in altitude over a horizontal distance, expressed as a percentage. For example, a change of altitude of 20 ft over a horizontal distance of 100 ft is expressed as a 20% slope.

SLOPING FACE-CUT: The second of the two cuts required to face or undercut a tree. It must be angled sufficiently to allow a wide mouthed face opening.

SNAG: A dead or dying tree that is still standing. Snags must be felled prior to beginning work on an area. Special procedure must be observed when falling snags.

SNAP TOP: Broken off top of a tree as a result of wind and/or rot.

SNIPE: (See Trim)

SPIKE TOP: A live tree that has a dead barkless top. Usually occurs in cedar.

SPRING POLE: A tree, segment of a tree, limb, or sapling that is under stress or tension due to the pressure or weight of another object.

STAGGED PANTS: The faller's trousers are maintained without cuffs or hem, and are shortened to prevent tripping hazards.

STINGER: Metal nail-like affair attached to the end of a logger's measuring tape. After inserted, it will secure one end of the tape allowing the faller to proceed down the tree to accurately determine the desired length of the log.

STRIP / QUARTER: Designated area of trees established by natural boundaries (roads, streams, etc.), or ribbons within which fallers are assigned.

STRIP LAYOUT: Refers to the best method of falling the trees of an area in relation to themselves and the terrain. Strip layout is the faller's first consideration in the falling sequence.

STUB: A standing dead tree characterized by a broken off top and very few or no remaining branches.

STUMP-SHOT: Two inches or more in height difference between the horizontal cut of the face and the backcut. The difference in height establishes an anti-kick step that prevents a tree from jumping back over the stump toward the faller.

SWAMP-OUT: (See Brush-out)

SWING CUT: A backcut in which the holding wood on one side is cut through. For experienced fallers only.

TANG: Sharp or pointed end of a chainsaw file.

TEEPEE: Unintentional lodging of two or more trees in another standing tree generally caused by improper or poor falling technique.

THROW BACK: Portions of trees or limbs propelled back toward the timber faller by the action of a tree falling through other standing trees.

TIN PANTS AND JACKET: Outside clothing generally made of canvas material that is water-proofed.

TONGUE AND GROOVE: Bucking technique used to hold logs in place after bucking cuts are made. Used where trees can slide or roll after bucking.

TOP BIND: (See Bind)

TREE LENGTHS: An overlength log that creates a hazard by exceeding the safe perimeters of the landing.

TREE PULLING: A method of falling trees in which the tree is pulled down with a line.

TRIM / SNIPE: An allowance of length added to the desired length of a log. (Example: desired length 17 feet, actual length cut 17 feet 6 inches).

Fallers and Buckers Glossary (continued)

TURN: Any log or group of logs attached by some means to power and moved from a point of rest to a landing.

UNDERCUT: A notch cut in a tree to guide the direction of the tree fall and to prevent splitting or kickback.

WEDGE: A plastic or metal tool used by a faller to prevent a tree from falling backwards, redistribute a tree's weight to a desired direction and to prevent the bar from being pinched while bucking.

WIDENING / DAYLIGHTING: Taking an additional strip of timber off the right-of-way or quarter after the road is in.

WIDOW MAKER: Any loose overhead debris such as limbs or tree tops that may fall at any time. Widow makers are extremely dangerous and present the faller with a continual source of danger. Limb or other loose material dropped or thrown from a tree toward the faller as the tree is felled.

YARDING: The movement of logs from the place they are felled to a landing.

CAUTION

Definitions in this glossary help to illustrate the many details involved in falling and bucking operations. The definitions do not provide a guide for actual practice. Hands-on training in the field with an experienced logger is essential.

Train before you cut.

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Notes

Employment in Oregon Logging

Direct Logging Occupations in Oregon, 2004 including self-employed (30% of total)	# workers	Avg # fatalities per year 2003-05	Fatality rate per 100,000
Fallers	1,421	3.7	258
Equipment operators and others	5,962	3.3	56
Truck drivers	976	2.3	239
TOTAL	**8,359**	9.3	112

Source: Oregon Labor Market Information System (OLMIS) Employment Projections. Available online (Dec 18, 2006): www.qualityinfo.org/olmisj/OIC

The number of Oregon workers in direct logging occupations is calculated here based on data from the Oregon Labor Market Information System (OLMIS). The most recent data for 2004 is the midpoint of the three years of OR-FACE data on occupational fatalities, 2003-2005, and is used to calculate average fatality rates for the period.

The category of "equipment operators and others" includes listed logging occupations for excavating, loading machine, and dragline operators; hoist and winch operators; construction equipment operators; riggers; commercial pilots; and logging workers (all others). The number of logging first-line supervisors is allocated proportionally to the category here for fallers (19%), or equipment operators and others (81%).

Using OLMIS employment data for specific occupations focuses on direct logging operations in the woods, resulting in a lower total than employment data for the logging industry provided by Workers' Compensation or the U.S. Census. The logging "industry" includes many occupations that are not involved in direct logging operations. In the 2004 Oregon Population Survey, for example, at least 35% of those identified in Forestry/Fisheries industries were in administrative positions. Injury or fatality rates based on industry totals will underestimate the actual risk for workers out in the woods.

Conversely, state employment data exclude those who are self-employed, and this category of workers is added to the totals here as an estimated 30% of all loggers. The proportion is suggested from two sources. An OLMIS report on fallers estimated 28% of all fallers are self-employed (Stevenson, 2005). The proportion is similar to the 2000 U.S. Census, where self-employed males in Agriculture/Forestry/Fishing are 31.6% of all employed males in those industries. Other industries, in contrast, show a combined proportion of 12.4% self-employed.

The adjusted count for fallers shown here (1,421) is much higher than the 2003 count for fallers in Oregon (550) by the U.S. Bureau of Labor Statistics. In 2004, BLS stopped reporting the number of fallers all together. Even the higher number here may seem too low. Seasonal fluctuations create peak periods when the number of loggers rises above the annual average.

Information Resources

Center for Research on Occupational and Environmental Toxicology (Oregon Health and Science University). *Logging and Forestry*: www.croetweb.com/

Fatality Assessment and Control Evaluation (National Institute for Occupational Safety and Health). Search "faller" for fatality investigation reports: www.cdc.gov/niosh/face

Helmkamp, J.C., Bell, J.L., Lundstrom, W.J., Ramprasad, J. & Haque, A. (2004). Assessing safety awarenwess and knowledge and behavioral change among West Virginia loggers. *Injury Prevention, 10*; 233-238.

National Timber Harvesting and Transportation Safety Foundation.
– *Chain saws and manual felling:* www.loggingsafety.com/lsr-chain.htm
– *Safety alerts online*: www.loggingsafety.com/fsa.htm
– *Logging safety resource guide*: www.loggingsafety.com/lsr.htm

Occupational Safety and Health Administration (U.S. Dept of Labor). *Regulations (Standards - 29 CFR): Logging operations. - 1910.266.* Available online: www.osha.gov/pls/oshaweb/owadisp.show_document?p_table=STANDARDS&p_id=9862

Oregon Labor Market Information System. *Tools: Occupation explorer: Farming, Fishing, and Forestry.* Available online: www.qualityinfo.org/olmisj

Oregon OSHA. (n.d.). *Division 7 – Forest Activities.* Available online: www.orosha.org/standards/div_7.html

Stevenson, D. (2005). *Occupational profile: Fallers.* Oregon Labor Market Information System. Available online: www.qualityinfo.org/olmisj/ArticleReader?itemid=00004257

U.S. Forest Service [and Washington state agencies and associations]. (2006). Guidelines for selecting reserve trees. Available online: www.lni.wa.gov/ipub/417-092-000.pdf

Worksafe BC. *Injury Prevention Resources for Forestry - Falling and Bucking*: www2.worksafebc.com/Portals/Forestry/FallingAndBucking.asp

The material in this manual is public information

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To order a free copy of this report, or for more information, contact Oregon Fatality Assessment and Control Evaluation

OR-FACE/CROET L606
Oregon Health & Science University
3181 SW Sam Jackson Park Rd
Portland OR 97239-3098

Telephone: 503-494-2281
e-mail: orface@ohsu.edu
Website: www.ohsu.edu/croet/face

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Jeff Wimer, logging safety consultant
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Phil Fehrenbacher, illustrations

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Five-step Faller Safety Plan

1. Assess the area

- Danger trees
- Snags
- Widowmakers
- Broken or rotten treetops
- Hung trees
- Power lines
- Additional hazards

2. Assess the tree

- Calculate the falling direction
- Find an opening
- Assess the impact
- Avoid an uphill fall
- Stay alert for flying debris
- Assess the wind
- Discuss danger trees

3. Establish a safe work area

- Clear the area around the tree
- Establish escape routes
- Keep a safe distance
- Ensure the safety of others
- Work as a team
- Approaching a falling zone
- Working next to roads

4. Fall the tree

- Choose a face-cut
- Make the face-cut
- Make the backcut
- Protect the hinge
- Wedging
- Working with a partner
- Windy conditions
- Heavy leaners

5. Get in the clear

- Watch for impacts