

UNITED STATES DEPARTMENT OF AGRICULTURE

FOREST SERVICE

SNAG FELLING

With Hand and Power Saws

North Pacific Region

1943



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SNAG FALLING

With Hand and Power Saws

Introduction

A fire burning in a tall snag is difficult to extinguish, and if the snag is not felled quickly, the fire is sure to spread to other snags. Burning snags must be felled to control a fire, as it is little use to stop spread on the ground if the fire continued to spread overhead.

On many occasions one man, a smokechaser, has been sent to a snag fire alone. To control the fire he had to chop the burning snag down with an ax or a Pulaski. It may take several hours to fall a large sound snag in this way, but it can be done with ease after practice.

On all large fires and a few small ones snags are usually felled with regular falling equipment: (1) the well-known hand falling outfit, or (2) chain saws powered with a gasoline engine or an electric motor.

The Job of Falling a Snag

For training purposes, the job of falling a snag may be broken down into five rather distinct operations or things to be done: (1) size up the snag and determine direction to fall, (2) clear out working space, (3) put in the undercut, (4) put in the backcut, (5) wedge over. The first two operations are common to both hand and power equipment. Because there is some difference in technique between the use of hand and power equipment in the last three operations, they are covered under separate headings.

Sizing Up the Snag and Determining Direction of Fall

Fallers don't walk up to a snag and begin chopping or sawing. They take time to look it over before deciding where and how they will fall it. The direction in which it can be felled will depend on its lean and whether the base wood is sound or rotten. As a general rule, snags are felled in the direction they lean, so little if any wedging is necessary to prevent pinching the saw or to tip the snag over. This practice also eliminates the jar due to driving the wedges, which may cause loose bark, burning limbs, or a weakened top to fall.

An extremely rotten snag must always be felled in the direction it leans because the wood is too soft for wedging and cannot be depended on for holding. Snags with deep fire scars also must be felled in the direction they lean, because there is no opportunity to wedge them.

A sound snag with moderate lean, and free from limbs or other material that might fall, can be cut and wedged to fall to either side of the direction of lean if there is reason to do so. Sound snags without lean can be felled in any desired direction if a strong adverse wind is not blowing.

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When a snag is on fire it should be felled in the direction where there is the least danger of its starting new fires or adding to the control job, preferably (1) into the fire area, (2) into an opening away from concentrations of inflammable fuels, or (3) crosswise of the slope to eliminate roll or end sliding that would scatter fire.

On snag breaks, roadside cleanup, and similar projects, the direction in which snags should be felled is dependent on local conditions and will be provided for in project plans or determined by the foreman in charge.

In sizing up a snag, first attention is given to determining whether it leans and in which direction. Most fallers use an ax or a Pulaski for a plumb bob if the lean cannot be determined readily by observation. The tool is held at arm length and loosely between the thumb and first finger about 10 inches from the end of the handle. The weight of the head tends to hold the handle in a vertical position. Sights are taken from two or three positions about 15 to 20 feet back from the snag, as illustrated in Figure 1.



Fig. 1

Some fallers prefer to use a plumb bob made by tying a lead sinker or a similar weight to a piece of cord 2 to 3 feet long.

While the fallers are deciding in which direction to fall the snag, they are also looking around and sizing up possible hazards. The most important things to keep in mind and guard against are:

1. Bark, limbs, pieces of wood, or a weak top, which may burn off or be jarred loose by the wedging and fall.
2. Possibility of the snag striking a live tree when falling, in which case a piece of the snag may be broken off and hurled back toward the fallers by the whip of the live tree.
3. Danger of the falling snag striking another standing snag and causing it to fall in an unexpected direction.
4. Nearby logs or poles on the ground which might be flipped in almost any direction if struck by the falling snag.
5. Possibility of the snag twisting on the stump because of rotten wood, lean, or wind.

Fallers size up all potential hazards and plan in advance just what they are going to do and where they are going to go to get in the clear quickly if necessary.

Up to this point the fallers have looked the snag over, determined its lean, and decided on the direction it is to be felled. At the same time, they have noted the potential hazards and whether or not the snag is rotten. They agree on a plan of action.

Clearing a Work Space

Before attempting to do any work on a snag, all brush, overhanging branches, and other material should be cleared away for a sufficient distance around the snag to allow a full swing of the falling axes and a full stroke of the saw (Fig. 2). Failure to take time to do this results in lost time later and may cause a serious injury if an ax should be caught and deflected by even a small branch. Preparing a level and solid place to stand makes sawing less tiresome and affords a better opportunity to jump clear if necessary. If the brush is heavy, a line of retreat should be cleared. Material on the ground that might cause the fallers to trip should be thrown to one side.



Before Clearing



After Clearing

Fig. 2

In using an ax to cut brush, it is easier and safer to hold the brush with one hand and chop with the other. A short "hack" rather than a swing should be used (Fig. 3).

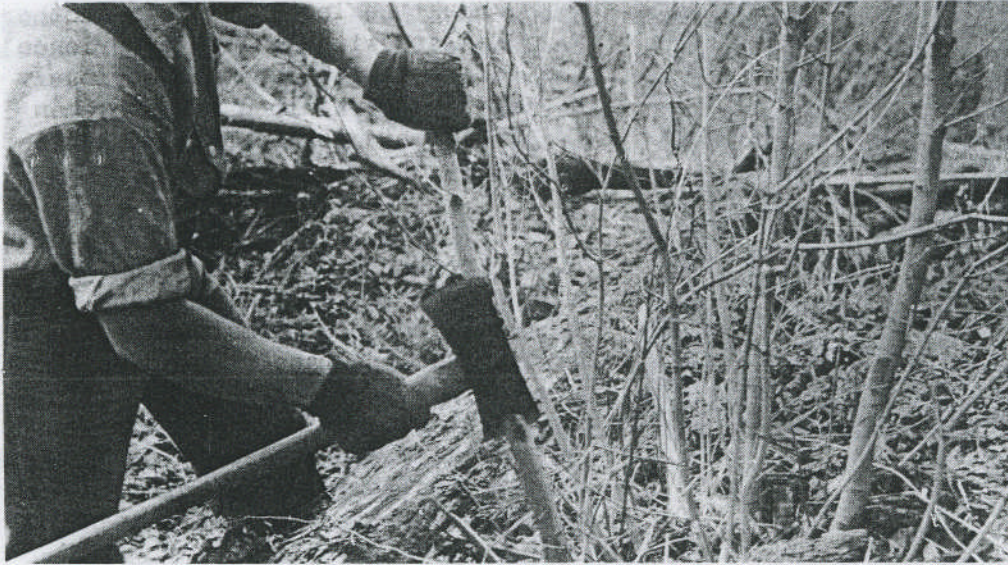


Fig. 3

Heavy Bark on Snags

Thick, heavy bark on snags, particularly Douglas-fir, creates a special problem which must be taken into consideration by the fallers. If the bark is tight it is good practice to chop off a ring of bark about a foot wide all around the snag at the level where the cut is to be made. This enables the fallers to tell whether the snag is sound or rotten, it prevents dulling the saw on gritty material which tends to lodge in the bark, there is less chance for the saw to plug up with sawdust, and if wedging is necessary the wedges can be started in solid wood instead of using a part of their length to get through the bark before starting to hold or lift the snag.

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Fig. 4

If the bark is loose, it should be removed before attempting to ring or fall the snag; otherwise it is likely to fall unexpectedly and may injure the fallers or damage the saw. A light, strong pole can be used to remove bark with comparative safety, provided it is pried loose from an angle (Fig. 4). Extreme care must be used to avoid having the pole act as a skid and direct the loosened bark on the faller. Occasionally a snag can be felled so as to strike and knock the loose bark off another snag. Fallers with limited experience should not attempt to remove obviously dangerous bark alone if a foreman is available to supervise or assist in the work.

If a snag to be felled is on fire, it should be cooled down to a height of 6 to 8 feet with dirt or water. Burning material or hot ashes around the base should be scraped away. If the ground is uncomfortably hot, a place to stand while working should be provided by shoveling in cool dirt or building a solid platform of materials conveniently at hand.

Snag Falling with Hand Equipment

The Undercut, as shown in Figure 5, is a notch cut across the side of the snag, facing the exact direction in which the snag is to be felled.



Fig. 5

By use of the undercut in combination with the backcut and wedging, fallers are able to fall a fairly straight snag in any desired direction or to fall a sound snag with a moderate lean some distance to either side of its direction of lean.

A straight snag is well balanced in all directions and tends to resist falling until overbalanced by some outside influence. Its center of balance is located at the point shown in Figure 6(a). When the undercut and backcut are made as described below, a number of things happen which, in combination, enable the fallers to fall the snag in a predetermined direction with precision and safety.

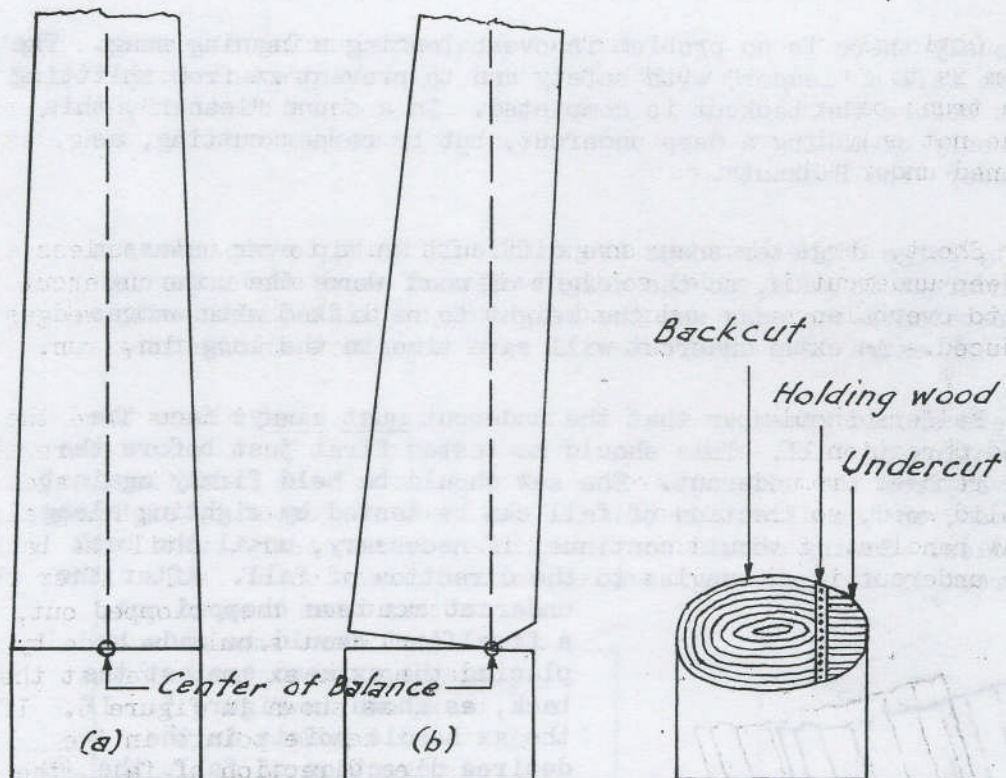


Fig. 6

The undercut weakens the wood structure and leaves an overhang of weight which exerts a pull on that side of the snag. The strip of undercut wood (called holding wood) between the undercut and the backcut acts as a hinge between the snag and the stump and prevents the snag from twisting on the stump. When the wedges are driven into the backcut, the center of balance is moved to the point shown in Figure 6(b). When the weight of wood on the undercut side of the center of balance is sufficient to overbalance the weight on the backcut side and to break off the holding wood, the snag will fall.

Some experienced hand fallers prefer to chop out all of the undercut with falling axes. Men with limited experience will find it faster to saw the bottom of the undercut to the desired depth and chop out the V. The bottom of the undercut, as shown in Figures 5, 8, and 13, should be horizontal and the V should be chopped out to form an angle of about 45 degrees.

The depth of the undercut varies with the amount of lean. As a rule it should be cut back to $1/5$ the diameter on a fairly straight snag, and $2/5$, or in some cases up to almost $1/2$, the diameter on a sound, heavy "leaner". In other words, if the snag is 50 inches in diameter, the center of the undercut would be about 10 inches deep on a straight snag, 20 inches on one with a moderate lean, and almost 25 inches on a heavy "leaner".

Obviously there is no problem in overbalancing a leaning snag. The problem is to fall a "leaner" with safety and to prevent it from splitting up the trunk before the backcut is completed. In a sound "leaner", this is done not only by making a deep undercut, but by corner cutting, as explained under "The Backcut".

Short, large diameter snags are difficult to tip over unless a very deep undercut is made, so the weight of wood above the undercut helps to overbalance the snag and the weight to be lifted with wedges is reduced. An extra deep undercut will save time in the long run.

Fallers should remember that the undercut must always face the desired direction of fall. This should be tested first just before the saw is removed from the undercut. The saw should be held firmly against the solid wood, so the direction of fall can be tested by sighting along the saw handles. Sawing should continue, if necessary, until the back of the undercut is at right angles to the direction of fall. After the undercut has been chopped out, a final test should be made by placing the ax head against the back, as shown in Figure 5. If the ax handle points in the desired direction of fall, the undercut is satisfactory; if not, it should be re-sawed and re-chopped until it is properly located.

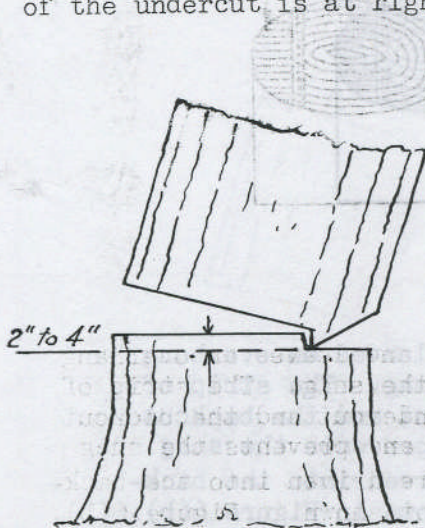


Fig. 7

The Backcut is started on the side of the snag directly opposite and from 2 to 4 inches higher than the bottom of the undercut. This leaves a step on the stump which prevents the snag from kicking back when it begins to fall (Fig. 7).

It is important to start and keep the backcut horizontal in both directions (Fig. 8). Unless this is done the backcut will end too high or too low in relation to the undercut on one or corners.

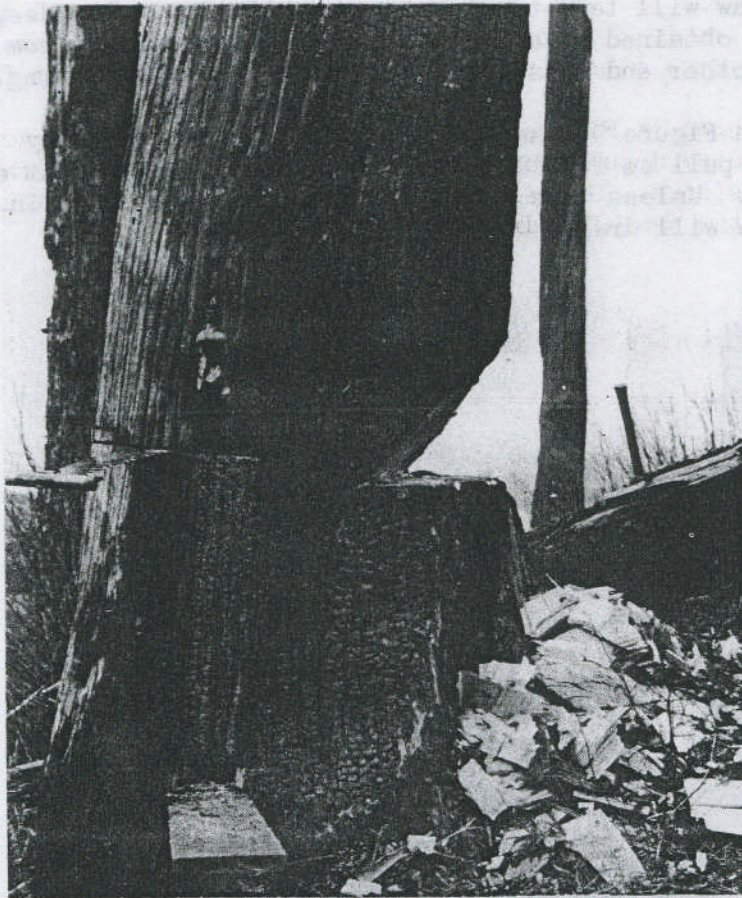


Fig. 8

There are "tricks of the trade" in using a falling saw which can best be acquired by firsthand instruction from an experienced faller, and practice. The more important things to keep in mind are:

1. The most comfortable height for sawing the backcut is about hip height or a little below. This should be kept in mind when putting in the undercut.

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2. When starting the backcut, the back of the saw should be raised slightly above what appears to be level. Unless this is done the cut will slant in an upward direction.

3. Because the saw has a curved cutting edge, it is pulled back and forth with a rocking motion, each faller pulling in turn. Any attempt to push the saw will tend to kink it and make it cut too deep. The rocking motion is obtained by slightly pulling the saw away from the cut and allowing the other end to swing into the cut without forcing.

4. As shown in Figure 9, the handle of the saw is gradually raised on the outward pull so it will be above the level of the cut at the end of the stroke. Unless this is done, the cut will be high in the center and the saw will drag and pull hard.



Fig. 9

On fairly straight, sound snags up to 40" in diameter, the backcut may be sawed directly towards the undercut. The fallers should be careful not to saw clear through to the undercut on either corner. At least 2 inches of holding wood should be left for controlling the direction of fall and the snag should be wedged over if necessary to make it fall.

Corner Cutting is used in sawing the backcut on large snags, unsound snags, and snags that lean. As illustrated in Figure 10, line 1,

Corner Cutting

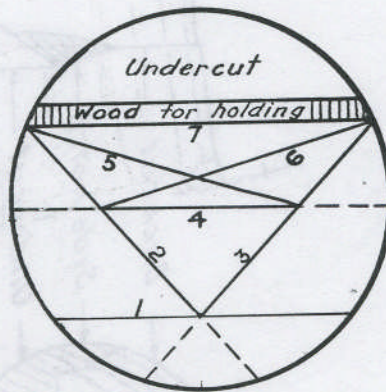


Fig. 10

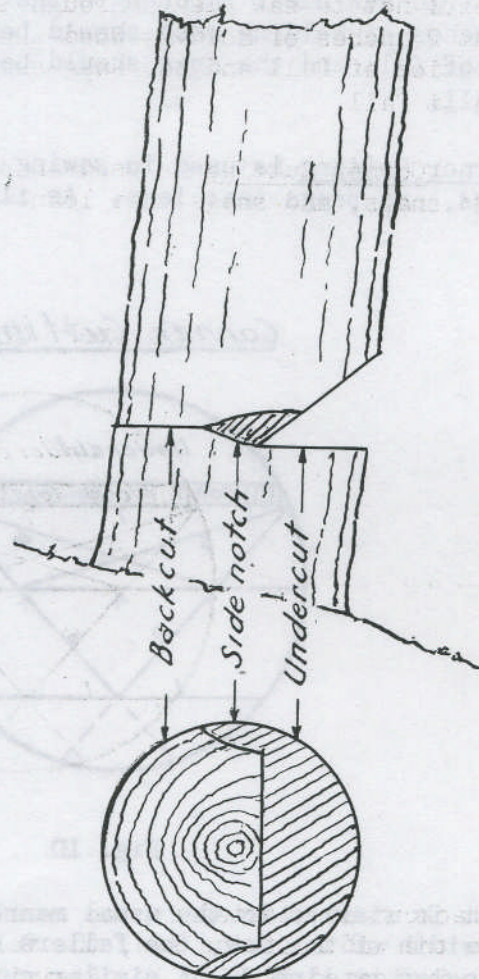
the backcut is started in the usual manner. After sawing in to about twice the width of the saw, the fallers shift around and saw to a point indicated by line 2. A similar cut is then made on the opposite side as shown by line 3. (In cuts 2 and 3 and subsequent cuts it is important not to saw into the wood which is to be left for holding). The fourth cut is straight across, the fifth and sixth are corner cuts, and the last cut is made straight across the remaining flat triangle until the weight of the snag, plus wedging if necessary, breaks it off. It should be understood the size of the snag will determine the number of times the sawcut is shifted.

Corner cutting not only helps to control the direction of fall, but it makes sawing easier. There is less wood to pull the saw through and more clearance is provided for releasing the sawdust. The saw should be held in a horizontal position for all cuts or some of the wood will be sawed twice.

Side Notching.

Snags with a heavy lean are corner cut as outlined above, and in addition are side notched, as illustrated in Figure 11. The purpose of side notches is to prevent the outer shell of the wood left for holding from splintering when the snag falls. Side notches are cut with a falling ax, level with the bottom of the undercut and about 6 to 8 inches high, as wide as the wood intended to be left unsawed on each corner for controlling the direction of fall, and deep enough to cut through the outer shell of sap wood, about 4 to 6 inches.

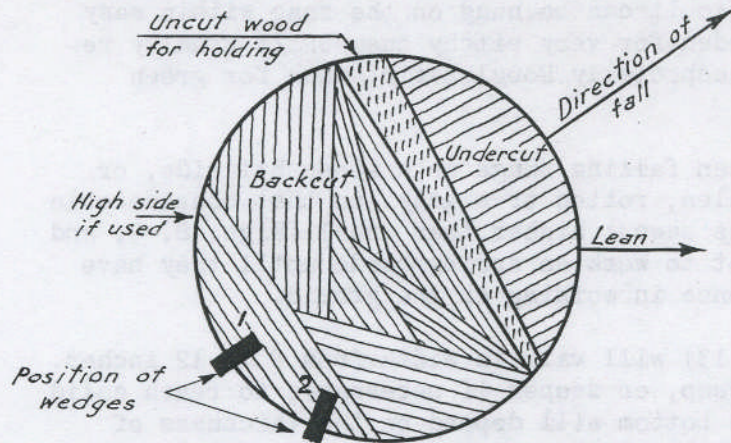
It is sometimes necessary to side-notch large snags to furnish space to pull a saw that is otherwise too short. In this case, the side notch is put in somewhat similar to the undercut.



*Corner Cutting and Side Notching
a Snag with Heavy lean.*

Fig. 11

When a leaning snag is sound (no ground or stump rot) and there is no danger of a weakened top breaking off or loose bark or limbs falling on account of wedging, it can be felled to either side of its direction of lean. This is accomplished by leaving more wood for holding on the corner opposite the direction of lean, as illustrated in Figure 12, and wedging the snag over.



As a general rule fallers allow an extra $\frac{1}{2}$ " of holding wood for each foot of top lean. Additional "side-throw" can be secured by placing both the undercut and the backcut at an angle, with the high side opposite the lean, or roughly at right angles to the center line of the snag.

Fig. 12

The backcut on rotten snags, and those which have been partially burned off on one side or all around the base, can be made with a saw if the snag has a definite lean. But if the snag stands fairly straight and there is some question as to which direction it might fall, it is better practice and safer to put in the backcut with an ax. While one faller is chopping, his partner should closely watch the snag and signal if something starts to fall.

Wedging. Falling wedges are used for two purposes: (1) to prevent pinching the saw when the weight of the snag causes it to settle, and (2) to tip the snag in the selected direction of fall when sawing has been completed. For tipping the snag, the first wedge is driven into the backcut about opposite the undercut. On fairly straight snags the second wedge is placed a few inches on either side of the first; on "side leaners" it is moved nearer to the undercut to lift against the direction of lean (Fig. 12).

Pinching may occur when sawing either the backcut or a deep undercut, and wedging will be necessary to free the saw. Occasionally a snag will settle and pinch the saw before a wedge has been started. If this happens, it may be necessary to chop a slit in order to start the wedge.

Wedges should never be struck while a snag is being sawed, as there is always a chance that the jar will cause loose or burning material to drop on the fallers. To minimize jar, wedges should not be struck harder than is necessary.

Saw Oil. Regular saw oil or a mixture of kerosene and light lubricating oil is used on the saw as needed to reduce friction and to cut the pitch which tends to stick to the saw. Many fallers rig a fairly sharp hook on the oil can or bottle, so it can be hung on the snag within easy reach. A liberal supply is needed for very pitchy snags. It usually requires more saw oil for snags, especially Douglas-fir, than for green timber.

Springboards are used when falling snags on a steep hillside, or when the base of a snag is swollen, rotten or pitchy, so that considerable work can be saved by placing the sawcut higher than usual (Figs. 8, 9, and 13). Fallers should not attempt to work on springboards until they have gained a fair amount of experience in working on the ground.

Springboard holes (Fig. 13) will vary in width from 8 to 12 inches. They should be about 5 inches deep, or deeper if necessary, to reach solid wood. The distance from top to bottom will depend on the thickness of the springboards. Ordinarily it should be about 4 inches at the front, tapering to about 2 inches at the back. The bottom of the hole should be horizontal or have a slight downward slope toward the back.



Fig. 13

Safe Practices: A third man, if available, should be designated as watchman when falling a burning snag, and when wedging any snag where there are indications of a weak top or danger of falling bark, limbs or chunks. It is his job to keep a sharp watch on the snag and warn the fallers the instant any material begins to fall. He should be back some distance from the snag and should center his attention on the potentially most dangerous overhead material. He may find it more comfortable to sit down or lean back against something to avoid getting a kink in his neck; physical discomfort may cause him to take his eyes off the snag.

When the snag begins to fall, the fallers should move back a safe distance from the stump, and at the same time keep a close watch on the falling snag and the surrounding snags, trees and windfalls, until it is down. It is never safe to stand on or near a down log or pole that might be struck directly or indirectly by the falling snag.

The fallers should agree in advance as to who is to carry the saw back in the clear. In an emergency it may be necessary to leave the saw on the stump.

Timber-r-r is the warning cry given three times by the fallers. The first warning is given several minutes before the snag is ready to fall. The second warning includes direction of fall: "Timber - down the hill", or "across the hill". The third call: "Timber - here it comes."

Steel wedges and sledges should be turned in for redressing or condemnation when the striking surfaces show signs of beginning to chip or curl over, so as to prevent injury from pieces of flying steel.

When any of the falling tools are not in use, they should be laid back out of the way so as to avoid any chance of accidental injuries. At such times, axes and Pulaskis should not be driven into the snag being worked on or in nearby stumps or logs.

Fallers working in rough country or on springboards should wear calked shoes or boots if available. The next best is shoes with composition soles.

It is good practice for fallers to wear hard hats to lessen the danger of head injuries.

Snag Falling with Power Chain Saws

The foregoing instructions as to sizing up the snag, determining the direction of fall, and clearing a working space apply equally to falling with power saws, but putting in the undercut and backcut and wedging over involve some differences in technique. Special instructions for handling the power equipment are also needed.

The successful chain saw operator is the one who learns to take care of his machine, and this does not mean taking it apart out of curiosity or on a wild guess as to what is wrong. The manufacturer's and other instructions for the care and operation of the engine and chain should be followed. The instructions herein apply to the use of the chain saw in the woods.

Carrying the Saw: Before the saw is moved to the job or from one snag to another, unless the distance is less than 25 feet on level, unobstructed ground, the engine should be stopped and the cutter bar turned to a vertical position. Stopping the engine will prevent setting dry debris afire and accidental movement of the chain. Turning the cutter bar to a vertical position will prevent kinking, relieve strain on the transmission case, and reduce the danger of injury. As a rule, the man carrying the outer end of the saw should walk in the lead.

Preparation for Falling: After the snag has been sized up, the direction of fall decided on, and a working space cleared, the saw is moved around so as to give the engine operator the best position at the snag. If possible, gasoline-powered saws should be placed on level ground before being started. The clutch should be disengaged without fail before attempting to start the engine.

After the engine has been started, the cutter bar should be swiveled to the position where the teeth of the chain will pull the engine against the snag and deposit the sawdust at the engine end. If convenient, the cutter bar should be swiveled so the transmission case is below the saw, as this prevents oil from leaking out of the case.

The Undercut: In placing the saw in position, the operator raises his end to the proper height and, if possible, places his knee in position to take the weight of the engine, as shown in Figure 14. This leaves his arms free to balance the engine and operate the controls. The man at the outer end levels the cutter bar and, when ready, signals the operator to engage the clutch and start the chain. The operator should never start the saw chain until he is signaled to do so by the faller on the outer end of the saw. In starting the cut, the blade is so maneuvered that the chain next to the engine makes first contact with the snag. After the engine end of the chain has cut into the wood two or three inches, the faller on the outer end of the saw gradually pulls his end towards the snag until the cut is started across the face. Unless this procedure is followed, the sag in the cutter bar tends to start a cut which is low in the center and high on both ends. If first contact is made against the snag with the center of the cutter bar, there is a tendency for the chain to snap out of the cutter bar groove.



Fig. 14

The top cut of the undercut should be sawed first, after which the saw is lowered about four inches, depending on the size of the snag, for the second cut. This procedure permits the operator to match the lower with the upper cut without having the engine and cutter bar obscure his vision (Fig. 15).

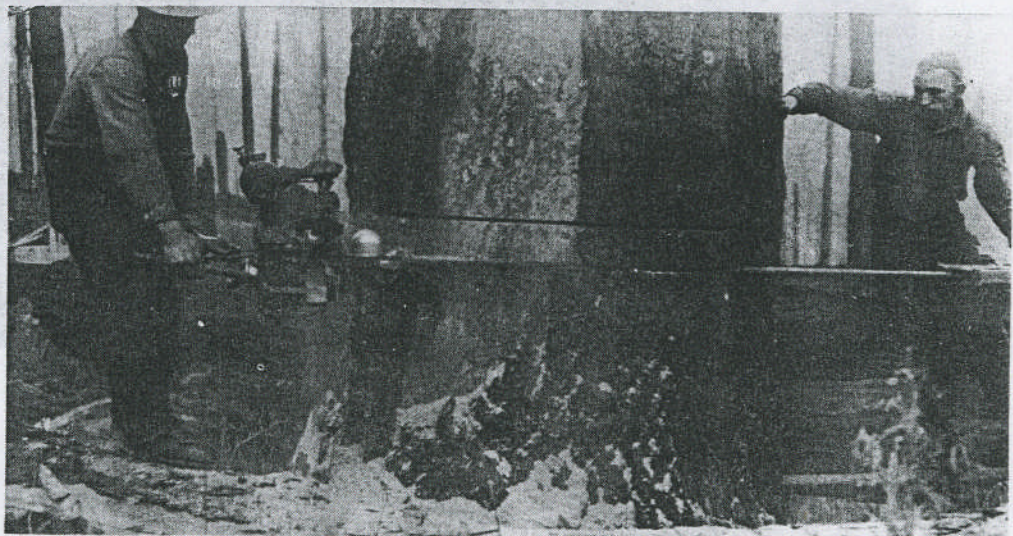


Fig. 15

If a heavy "leaner" should pinch the saw when the first cut of the undercut is being made, the saw should be pulled out and the lower cut started. The lower cut should be sawed until pinching starts, then the cuts should be sawed alternately until the desired depth is obtained.

When removing the saw from any cut, the chain should be kept in operation until half the cutter bar has emerged from the cut.

A Pulaski with the hoe blade ground to a width of about two inches has been found to be the most efficient tool for removing the undercut block (Fig. 16). The block will usually come out in one piece if the ax blade of the Pulaski is first driven into the top and then the bottom kerf. On twisted, tough snags it may be necessary to split the block vertically in its approximate center. Most of the two pieces will then slip out and any remaining material may be chopped out with the hoe blade of a Pulaski.

Note: To prevent the hoe blade of the Pulaski from bending or breaking off, it has been found that a fillet with about a one-inch radius welded in the shank of the hoe will strengthen this weak point.



Fig. 16

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When the ground is level and free from obstructions, time will be saved if, after completing the undercut, the saw is carried around the snag and the backcut started and sawed in to about twice the depth of the cutter bar. The engine is then stopped while the undercut block is removed. This procedure saves placing the saw on the ground and provides a good solid rest for starting the engine when the fallers get ready to start the backcut.

The Backcut should be made about two to three inches above the bottom level of the undercut (Fig. 17), following the same general procedure, including corner cutting as explained for hand-falling equipment.

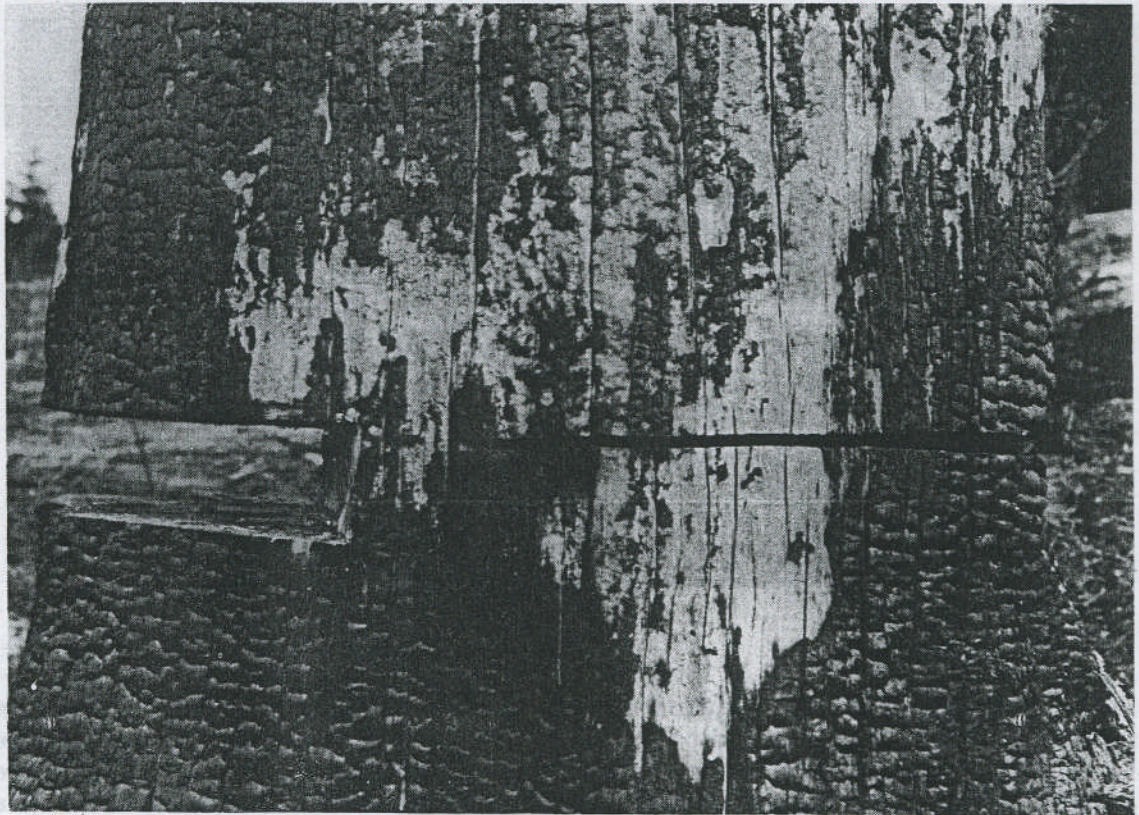


Fig. 17

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Wedging: If there is any tendency for the snag to settle back on the saw, wedges should be used as early as possible. It is easier to hold up the weight of the snag with wedges than to lift it after it has settled.

Since the saw cuts a $7/16$ " kerf it is approved practice to use two $3/16$ " wedge plates with the common falling wedge (Fig. 18). Two wedges, one on top of the other and without wedge plates, may be used. The saw chain should be stopped while the plates and wedges are being driven into position, to avoid any possibility of their coming in contact with the revolving saw chain.



Fig. 18

When the snag begins to fall, the wedges should be removed immediately and the engine stopped. The saw may be moved to the outer edge of the stump and left there if there is no danger of its being damaged by falling materials. The engine must be placed close to the stump so the cutter bar will balance it. When ground conditions are suitable and sufficient time is available, it is better practice to remove the saw from the stump and to place the engine end next to the stump with the cutter bar extending in the opposite direction from the line of fall.

Safety Precautions: Gasoline taken out on the job should be contained in a substantial capped can painted red and labeled "gasoline"



Fig. 19

likelihood of falling materials, a third man must be designated as watchman. The signal or warning to be given must be agreed on, and also where each man will go to get in the clear. The warning must be loud enough to be heard above the noise of the engine; a police whistle will serve the purpose. The watchman should stand back from the snag and find a comfortable position as previously outlined.

Dangerous snags, those with other snags leaning on them, or those in dangerous locations, should be felled with a hand falling saw and, if possible, under the close supervision of the crew foreman.

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(Fig. 19). The can should have a suitable spout for pouring gasoline into the engine tank, or a funnel should be provided for this purpose. Under no circumstances should the gasoline tank be replenished while the engine is running. Any gasoline spilled on the tank or engine should be carefully wiped off before starting the engine. A forest fire may be started if gasoline is used carelessly or is spilled.

Operators should never take hold of the chain when the engine is running. If the chain slips out of the cutter bar groove, the clutch should be disengaged and the chain pushed in place with a stick. If the manufacturer's recommendations for chain tension are followed, no hazard will be created by chain breakage; the chain will only travel a few inches and stop.

When chain saw operators work under conditions where there is a

Suggestions on the Care and Operation of Chain Saw with 2-Cycle Engine

Engine Lubrication

Use a lubricating oil which contains a solvent agent. It prevents the formation of excess carbon on the cylinder head, pistons, piston rings, and spark plugs. McMillian Ring Free Oil is recommended by the engine manufacturer and may be obtained from the regional warehouse. Use S.A.E. 50 for summer and S.A.E. 40 for winter operation. Mix one pint of oil with one gallon of gasoline for the first 20 hours of operation, thereafter 3/4 pint per gallon. Oil and gasoline should be mixed thoroughly before being poured into the tank. Stoppages in the fuel line and carburetor will be avoided if the gasoline and oil mixture is strained through a chamois or an old felt hat.

Ignition

The magneto can be tested by removing one spark plug wire and holding it 1/4 inch from the cylinder head. The spark should jump this gap when the engine is given a fast spin. If the spark will jump only 1/8 inch, the magneto probably needs professional attention.

Spark Plugs

Clean and check daily. Adjust the gap to not less than .015 nor more than .017 unless otherwise directed in the manufacturer's instructions. Use a gauge.

Carburetor Adjustment

If the gasoline and oil mixture is strained to eliminate foreign substances, little or no carburetor trouble will be encountered. After a carburetor is once adjusted, the best policy is to leave it alone. If it is known that the carburetor is out of adjustment, an engine equipped with a Zenith will start if the idling screw is opened 3/4 of a turn. The main jet adjustment on a Tillotson should be opened about one turn.

Starting

A cold engine takes more choking than would usually be considered enough. No two engines are alike and just how much to open the throttle and how much choking is needed must be determined by trial.

The engine will start more easily if the flywheel is turned as far off compression as possible and given a sharp firm pull with the starting rope. A slow pull may cause backfire, which will pull the rope and handle out of the operator's hand; this is sometimes painful. The clutch should be disengaged without fail before attempting to start the engine.

Engines equipped with down-draft carburetors have a tendency to flood. To avoid flooding, close the gas line petcock immediately after stopping the engine. When the engine has been run and is still warm, start it first and then open the gas line petcock. Placing the engine on a level spot on the ground helps to prevent accidental flooding.

If an engine is flooded it won't start until excess gas has been removed from the crankcase. This condition in a warm engine can be detected if gas fumes are coming from the exhaust pipes. Usually if the gas line petcock is closed and the engine is turned over with three or four pulls on the starting rope, the excess gas is removed. If this does not work, open the petcock on the bottom of the crankcase or take out the spark plugs and revolve the engine again.

Lubricating the Chain Groove

Use any ordinary lubricating oil, about S.A.E. 30 to 40. The addition of a little penetrating oil or solvent oil is desirable where pitch is excessive. Too much oil will do no harm, and the operator should give the running chain a good squirt before it goes into the cut and one or two squirts while it is in the cut. A dry chain groove causes excess friction and wastes needed power. It also causes excessive wear on the chain and groove. In the absence of first-class oil, any low grade oil is better than none.

Common Terms Used in Falling

Barber chair - A snag that splits out before the backcut is finished and leaves a large splinter attached to the undercut side of the stump. Caused by too shallow undercut, failure to corner cut, heavy lean.

Widowmaker - Limbs which are broken off when a snag or tree falls and hang in adjacent trees until they fall without warning.

Sidewinder - A tree that falls sidewise from the direction intended. Caused by stump rot, undercut in wrong location, sawing one corner clear through to undercut.

Stump shot - Where the tree being felled takes part of the stump with it, or where slivers are pulled out of the snag and left on the stump.

Russian drive - When the tree or snag being felled is used to knock down other trees or snags.

Schoolmarm - A forked-top snag.

Fool-killer - A snag which leans on the one being felled.

Gunning - Use of saw handle or ax for sighting direction of fall.

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