

USDA Forest Service National Sawyer Training: Developing Thinking Sawyers



Instructors Guide

**USDA Forest Service National Sawyer Training:
Developing Thinking Sawyers**

Module 3.3: Crosscut Saw Directional Felling

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USDA Forest Service National Sawyer Training: Developing Thinking Sawyers

Module 3.3: Crosscut Saw Directional Felling

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Module 3.3: Crosscut Saw Directional Felling




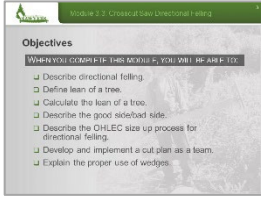
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Module 3.3: Crosscut Saw Directional Felling

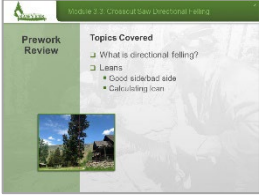
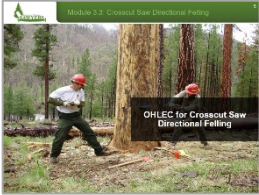
Module 3.3: Crosscut Saw Directional Felling

This module covers the basic concepts of how to fell trees using a crosscut saw.

Slide/action	Content
 <p><i>Slide 1: Crosscut Saw Directional Felling</i></p> 	<h3>Welcome and Introduction</h3> <p>Time: 143 minutes</p> <p>Note: Do not read the slides to the students; speak in a conversational tone and use the slides to actively engage the students in two-way conversation. Add the occasional brief story or anecdote from your experience to illustrate key concepts.</p> <p>DISPLAY FIRST SLIDE</p> <h3>Introduction</h3> <p>Say:</p> <p>Directional felling is the process of establishing a series of cuts to construct a hinge that guides the tree toward a specific objective (where you want the tree to go). When felling a tree, it is necessary to correctly construct a hinge (the uncut portion of fiber between the undercut and the backcut). The hinge is critical to guiding and controlling the tree into the objective. Directional felling requires planning and involves multiple steps before any cutting begins.</p> <p>DISPLAY NEXT SLIDE</p>
<p><i>Slide 2: Module Topics</i></p> 	<h3>Module Topics</h3> <p>REVIEW</p> <p>Review the module topics listed on the slide.</p> <p>DISPLAY NEXT SLIDE</p>
<p><i>Slide 3: Objectives</i></p> 	<h3>Objectives</h3> <p>REVIEW</p> <p>Review the objectives listed on the slide.</p> <p>DISPLAY NEXT SLIDE</p>

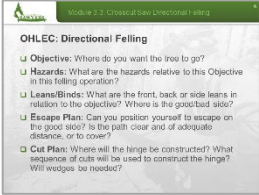
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Module 3.3: Crosscut Saw Directional Felling

Slide/action	Content
<p><i>Slide 4: Prewrite Review</i></p> 	<h3>Prewrite Review</h3> <p>REVIEW</p> <p>Review the topics covered in the prework packet.</p> <p>Say:</p> <p>We will cover some of these topics again here in the classroom because they are important for safety or have more details you need to know. The rest we will review now.</p> <p>INSTRUCTOR NOTE:</p> <p>Allow students a few moments to answer the questions in the student guide, then discuss the answers. Confirm the correct answers and address any misconceptions.</p> <h3>Review Questions</h3> <p>Q: What is directional felling?</p> <p>A: Directional felling is the process of establishing a series of cuts to construct a hinge that aims and guides the tree to the ground.</p> <p>Q: What is the definition of the natural lean of a tree?</p> <p>A: Where gravity would take the tree if it were to naturally fall on its own.</p> <p>Q: What is the definition of the calculated lean of a tree?</p> <p>A: The amount of front-to-back and/or side-to-side lean expressed in feet relative to the objective.</p> <p>DISPLAY NEXT SLIDE</p>
<p><i>Slide 5: OHLEC for Crosscut Saw Directional Felling</i></p> 	<h3>OHLEC for Crosscut Saw Directional Felling</h3> <p>Say:</p> <p>First, we will discuss how to develop a cut plan using OHLEC to safely direct a tree in a specific direction.</p> <p>Understanding the relationship of the undercut, the hinge, and the backcut is key to your ability to successfully direct a tree into the intended lay.</p>

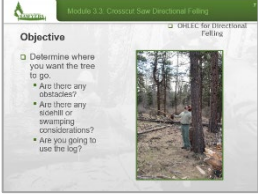

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Module 3.3: Crosscut Saw Directional Felling

Slide/action	Content
<p data-bbox="233 558 521 617"><i>Slide 6: OHLEC: Directional Felling</i></p> 	<p data-bbox="578 331 743 363">Transition:</p> <p data-bbox="578 394 1398 464">Do you remember the meaning of each letter of OHLEC? (Allow students to answer before displaying the next slide.)</p> <p data-bbox="578 495 789 520">DISPLAY NEXT SLIDE</p> <p data-bbox="578 541 954 573">OHLEC: Directional Felling</p> <p data-bbox="578 604 643 636">Say:</p> <p data-bbox="578 667 1398 737">During a felling operation, you will consider the following when doing your OHLEC size-up:</p> <ul data-bbox="613 762 1414 1203" style="list-style-type: none">▪ Objective: Where do you want the tree to go?▪ Hazards: What are the hazards relative to this objective in this felling operation?▪ Leans/binds: What are the front, back, or side leans in relation to the objective? Where is the good/bad side?▪ Escape plan: Can you position yourself to escape on the good side? Is the path clear and an adequate distance from the stump or to a place of cover?▪ Cut plan: Where will you construct the hinge? What sequence of cuts will you use to construct the hinge? Will you need wedges? <p data-bbox="578 1230 789 1255">DISPLAY NEXT SLIDE</p>




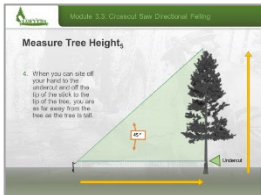
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Module 3.3: Crosscut Saw Directional Felling

Slide/action	Content
<p><i>Slide 7: Objective</i></p>  <p>Objective</p> <ul style="list-style-type: none">□ Determine where you want the tree to go.<ul style="list-style-type: none">▪ Are there any obstacles?▪ Are there any sidehill or swamping considerations?▪ Are you going to use the log? <p>CHECK for Directional Felling</p>	<p>Objective</p> <p>Say:</p> <p>First, we'll look at identifying the objective during a felling operation.</p> <p>Objective: Where do you want the tree to go? This is the heart of felling. Directional felling requires you to have a plan for where you want the tree to land (intended lay) and involves multiple steps before any cutting begins.</p> <p>Ask yourself:</p> <ul style="list-style-type: none">▪ Is the intended lay free from obstacles?▪ Are there sidehill considerations?▪ Are there swamping considerations?▪ Am I going to use the log? <p>Transition:</p> <p>To help you answer these questions, you need to understand how to measure tree height.</p> <p>DISPLAY NEXT SLIDE</p>
<p><i>Slide 8: Measuring Tree Height</i> 1</p>  <p>Measure Tree Height,</p> <p>Measure by projecting a right isosceles triangle (a triangle with angles measuring 45, 45, and 90 degrees and with two sides having the same length) using your arm, a stick, and your line-of-sight.</p>	<p>Measuring Tree Height 1</p> <p>Say:</p> <p>You can measure the height of tall objects such as trees by projecting a right isosceles triangle (a triangle with angles measuring 45, 45, and 90 degrees and with two sides having the same length) using your arm, a stick, and your line-of-sight.</p> <p>While not necessary on every tree, knowing the height of a tree can be beneficial when felling trees around structures or other obstacles, such as fence lines, roads, or streams. Knowing a tree's height is also beneficial for maintaining cutting area control.</p> <p>DISPLAY NEXT SLIDE</p>

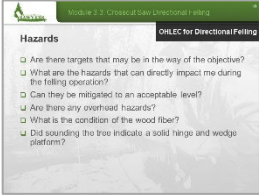
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Slide/action	Content
<p>Slide 9: Measuring Tree Height 2</p>  <p>Measure Tree Height, 1. Hold a straight stick or an ax handle in your cheek.</p>	<p>Measuring Tree Height 2</p> <p>Say:</p> <p>This is the procedure:</p> <p>Step 1: Hold a straight stick or an ax handle up to your cheek.</p> <p>DISPLAY NEXT SLIDE</p>
<p>Slide 10: Measuring Tree Height 3</p>  <p>Measure Tree Height, 2. Flip it up so that it is perpendicular to the ground.</p>	<p>Measuring Tree Height 3</p> <p>Say:</p> <p>Step 2: Flip the stick up so that you are holding it perpendicular (90 degrees) to the ground. This creates a triangle in which the distance from your eye to your hand is equal to the distance from your hand to the tip of the stick. Be diligent about maintaining a 90-degree angle between your line-of-sight to the undercut and the stick.</p> <p>DISPLAY NEXT SLIDE</p>
<p>Slide 11: Measuring Tree Height 4</p>  <p>Measure Tree Height, 3. Move toward or away from the tree until you align the tip of the stick to the top of the tree. Be diligent about maintaining a 90-degree angle between your line-of-sight to the undercut and the stick.</p>	<p>Measuring Tree Height 4</p> <p>Say:</p> <p>Step 3: Move toward or away from the tree until you align the tip of the stick to the top of the tree and the top of your hand to the location where you plan to make the undercut.</p> <p>Note:</p> <ul style="list-style-type: none">Wherever you stand, only move your eyes to sight off your hand or the tip of the stick, rather than moving your entire head. <p>DISPLAY NEXT SLIDE</p>
<p>Slide 12: Measuring Tree Height 5</p>  <p>Measure Tree Height, 4. When you can sight off your hand to the undercut and off the tip of the stick to the top tip of the tree, you are as far away from the tree as the tree is tall.</p>	<p>Measuring Tree Height 5</p> <p>Say:</p> <p>Step 4: When you can sight off your hand to the undercut and off the tip of the stick to the top tip of the tree, you are as far away from the tree as the tree is tall. You have formed an isosceles triangle.</p>

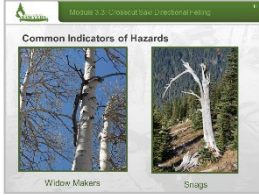
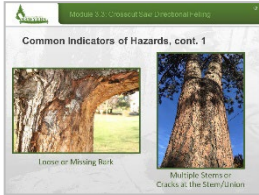
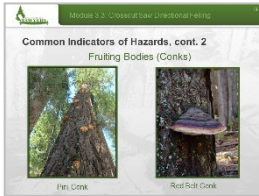
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Module 3.3: Crosscut Saw Directional Felling

Slide/action	Content
<p data-bbox="282 940 467 968"><i>Slide 13: Hazards</i></p> 	<p data-bbox="578 331 654 359">Note:</p> <ul data-bbox="662 390 1404 695" style="list-style-type: none">▪ If you need to know the height of the tree in feet, you can pace the tree’s height or use a logger’s tape to measure the distance.▪ This method for determining tree height works best when you stand on a similar elevation as the tree. If felling up or down steep slopes, it is best to gauge the tree’s height on a sidehill first and then pace out toward the objective. <p data-bbox="578 726 743 753">Transition:</p> <p data-bbox="578 785 1325 856">Next, we will consider potential hazards during our felling operation.</p> <p data-bbox="578 888 789 915">DISPLAY NEXT SLIDE</p> <p data-bbox="578 947 691 974">Hazards</p> <p data-bbox="578 1005 643 1033">Say:</p> <p data-bbox="578 1064 1401 1171">When sizing up hazards for a felling operation, think in terms of what hazards can directly impact you during the operation. Ask yourself:</p> <ul data-bbox="613 1203 1398 1528" style="list-style-type: none">▪ Are there targets that may be in the way of the objective?▪ What are the hazards that can directly impact me during the felling operation?▪ Can I mitigate the hazards to an acceptable level?▪ Are there any overhead hazards?▪ What is the condition of the wood fiber?▪ Did sounding the tree indicate a solid hinge and wedge platform? <p data-bbox="578 1560 743 1587">Transition:</p> <p data-bbox="578 1619 1341 1646">Next, we will discuss common hazards and their indicators.</p> <p data-bbox="578 1677 789 1705">DISPLAY NEXT SLIDE</p>

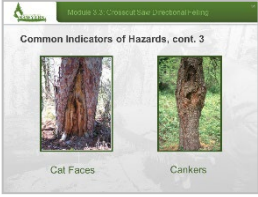
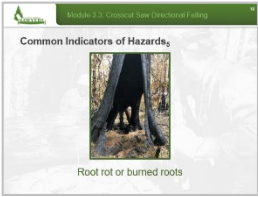

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Module 3.3: Crosscut Saw Directional Felling

Slide/action	Content
<p>Slide 14: Common Indicators of Hazards 1</p> 	<h3>Common Indicators of Hazards 1</h3> <p>Say:</p> <p>Some examples of hazards are:</p> <ul style="list-style-type: none">▪ Widowmakers: Widowmakers are limbs that are no longer attached and hang loose in a tree canopy. They can fall from the canopy and potentially strike you.▪ Snags: Snags are dead or dying trees that pose a risk because wind or vibration can cause them to fall unexpectedly. <p>DISPLAY NEXT SLIDE</p>
<p>Slide 15: Common Indicators of Hazards 2</p> 	<h3>Common Indicators of Hazards 2</h3> <p>Say:</p> <ul style="list-style-type: none">▪ Loose or missing bark: Loose bark (particularly on trees with thick bark) can pose a significant hazard if it strikes you.▪ Multiple stems or cracks at the stem/union: Multiple stems (schoolmarms) can pose a risk to you due to the weak union where the stems meet and split apart. <p>DISPLAY NEXT SLIDE</p>
<p>Slide 16: Common Indicators of Hazards 3</p> 	<h3>Common Indicators of Hazards 3</h3> <p>Say:</p> <ul style="list-style-type: none">▪ Fruiting bodies (conks): Fruiting bodies on the trunk or bole of the tree can be an indicator of rot. Rot can compromise the strength of the hinge and/or the wedging platform. <p>DISPLAY NEXT SLIDE</p>

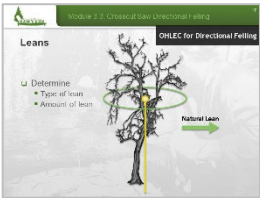
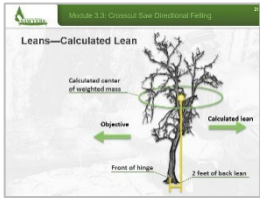
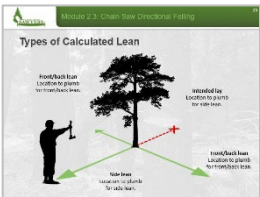
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Slide/action	Content
<p>Slide 17: Common Indicators of Hazards 4</p> 	<h3>Common Indicators of Hazards 4</h3> <p>Say:</p> <ul style="list-style-type: none">▪ Cat faces: A cat face is a defect that may limit the hinge location, wedging platform, or felling direction.▪ Cankers: Cankers frequently occur on the stems and branches of pines and hardwoods. Canker fungi cause top-kill, branch death, or stem malformation. Stem malformations can be infected and subsequently decayed by other fungi, thus increasing the likelihood of stem breakage, especially during felling. <p>DISPLAY NEXT SLIDE</p>
<p>Slide 18: Common Indicators of Hazards 5</p> 	<h3>Common Indicators of Hazards 5</h3> <p>Say:</p> <ul style="list-style-type: none">▪ Root rot or burned roots: As the tree's center of gravity starts to move due to cutting, wedging, or because the tree itself is starting to fall, compromised roots can fail and the tree may fall toward its naturally weighted lean (regardless of the hinge placement). <p>DISPLAY NEXT SLIDE</p>
<p>Slide 19: Common Indicators of Hazards 6</p> 	<h3>Common Indicators of Hazards 6</h3> <p>Say:</p> <ul style="list-style-type: none">▪ Uplifted roots: Uplifted roots or a majority of exposed roots are indicators of an unstable tree. The roots could fail and cause the tree to fall prematurely. <p>Note: If the hazard assessment continues to support the objective, move on to assess leans.</p> <p>DISPLAY NEXT SLIDE</p>


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Module 3.3: Crosscut Saw Directional Felling

Slide/action	Content
<p>Slide 20: Leans—Natural Lean</p> 	<h3>Leans—Natural Lean</h3> <p>Say:</p> <p>It is important to determine the type and amount of lean to develop the cut plan. Factors that influence lean include the location and size of limbs and the shape of the canopy. The two types of lean are natural lean and calculated lean.</p> <p>Natural lean is not relative to an objective; it is the direction that gravity would take a tree if the tree were to fall naturally on its own. It is where the combined mass of the bole, limbs, and foliage is located relative to the center of the base of the tree. Weight distribution higher up in the tree has more influence on the natural lean than weight lower in the tree.</p> <p>Transition:</p> <p>Next, we will discuss calculated lean.</p> <p>DISPLAY NEXT SLIDE</p>
<p>Slide 21: Leans—Calculated Lean</p> 	<h3>Leans—Calculated Lean</h3> <p>Say:</p> <p>Calculated lean is the amount of front-to-back and/or side-to-side lean (expressed in feet) relative to the objective. You use it to build the cutting and wedging plans that will place the tree into the objective.</p> <p>DISPLAY NEXT SLIDE</p>
<p>Slide 22: Types of Calculated Lean</p> 	<h3>Types of Calculated Lean</h3> <p>Say:</p> <p>Determine front-to-back lean by standing on one side of the tree or the other perpendicular to the objective (intended lay) and a tree length away, if possible. If the tree has back lean, you will need a wedging plan to overcome the lean or will need to change the objective.</p> <p>Determine side-to-side lean by standing in line with the objective, either in the intended lay or directly opposite the</p>


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Slide/action	Content
<p data-bbox="203 611 493 638"><i>Slide 23: Determining Lean</i></p> 	<p data-bbox="578 348 1382 495">intended lay. When plumbing the tree, you will get the most precise measurement from a tree length away, if possible. Beneath the side lean of the tree is considered the “bad side,” as this is where the tree will fall if you fully sever the hinge.</p> <p data-bbox="578 520 789 548">DISPLAY NEXT SLIDE</p> <p data-bbox="578 611 831 646">Determining Lean</p> <p data-bbox="578 674 643 709">Say:</p> <p data-bbox="578 737 1373 842">There are many ways to determine the lean. You can use a straight-handled ax, a plumb bob, or your hands. The method you use will depend on your preference and proficiency.</p> <p data-bbox="578 869 1414 940">To determine the lean of a tree, stand far enough away from the tree so that you can see the entire canopy.</p> <ul data-bbox="618 968 1406 1864" style="list-style-type: none">▪ If using a plumb bob, hold the top of the string in line with the center of the top of the tree and locate the spot where the bottom of the line intersects with the ground or bole of the tree. The distance away from the center of the tree is the amount of lean.▪ If using an ax, hold the ax by the handle with the head down. Grasp the ax as far from the head as practical and in such a manner that the ax can swing side to side. Sight down one side of the handle until it is in line with the center of the top of the tree and locate the spot on the bottom where the handle intersects with the ground or bole of the tree. The distance away from the center of the tree is the amount of lean.▪ If using your hands, make a window by holding the index fingers and thumbs of both your hands together. Adjust your hands until you can visualize the bulk of the canopy through the window framed by your hands. Make sure the window encompasses the tips of every branch. Next, find where the combined mass of the bole, limbs, and foliage is located, then visualize splitting the mass in half by projecting a straight line to the ground. The distance from the center of the tree to the spot on the ground determines the amount of lean.



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Slide/action	Content
<p>Slide 244: Good Side/Bad Side</p> 	<ul style="list-style-type: none">▪ If using a hand and plumb bob combination, use your thumbs to hold the plumb bob to eliminate visual error from the hand method. <p>Regardless of the method you use, with some practice and experience, being able to determine a tree's lean will soon become second nature.</p> <p>Note: If the lean assessment supports your objective, move on to the escape plan.</p> <p>DISPLAY NEXT SLIDE</p> <p>Good Side/Bad Side</p> <p>Say:</p> <p>The concept of the good side and the bad side of a tree is a function of tree lean and is directly associated with your safety.</p> <p>The bad side of a tree refers to the side under the naturally weighted lean of the tree where the tree could fall if the hinge breaks or is unintentionally severed. Whenever possible, you should work from the good side of the tree.</p> <p>Transition:</p> <p>Next, we will look at an escape plan for felling operations.</p> <p>DISPLAY NEXT SLIDE</p>

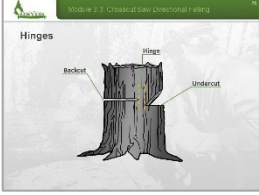
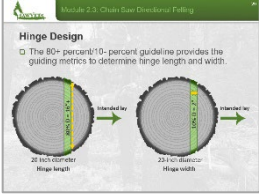
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Slide/action	Content
<p>Slide 27: Video: OHLEC for Directional Felling</p>  A slide thumbnail for 'Video: OHLEC for Directional Felling'. It features a black clapperboard with 'OHLEC Video' and 'Preheats' written on it. The slide title is 'Video: OHLEC for Directional Felling' and the video title is 'OHLEC Video: Preheats'.	<p>Video: OHLEC for Directional Felling</p> <p>Say:</p> <p>We have taken an in-depth look at the OHLEC size-up process over the last few modules. Now I'd like to show you this video that pertains more specifically to felling.</p> <p><i>Video Debrief</i></p> <p>Ask if there are any concerns or questions from the video. Answer and discuss as needed.</p> <p>Transition:</p> <p>Next, we will discuss each step of OHLEC as it relates to felling.</p> <p>DISPLAY NEXT SLIDE</p>
<p>Slide 28: Cut Plan Development</p>  A slide thumbnail for 'Cut Plan Development'. It shows a close-up of a tree trunk with orange safety lines marking the cut plan. The slide title is 'Cut Plan Development'.	<p>Cut Plan Development</p> <p>Say:</p> <p>The elements for developing the cut plan are the hinges, undercut, wedging plan, and backcut.</p> <p>DISPLAY NEXT SLIDE</p>

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Module 3.3: Crosscut Saw Directional Felling

Slide/action	Content
<p data-bbox="289 346 462 373"><i>Slide 29: Hinges</i></p>  <p>The diagram shows a tree stump with three cuts: a backcut on the left, an undercut on the right, and a hinge at the top. Labels 'Backcut', 'Hinge', and 'Undercut' point to their respective parts.</p>	<h3 data-bbox="578 361 673 394">Hinges</h3> <p data-bbox="578 420 641 453">Say:</p> <p data-bbox="578 478 1385 625">There are several ways to form a hinge and fell a tree, but all follow the same basic principles and anatomy of a hinge. Here we see the undercut, the hinge, and the placement of the backcut.</p> <p data-bbox="578 651 1409 798">The length and width of the hinge aids in holding the bole to the stump as the tree falls. The fiber must be strong enough to hold the bole to the stump, yet flexible enough to bend, allowing the tree to move into the undercut as it falls into the objective.</p> <p data-bbox="578 823 1401 928">A hinge that is too wide will not bend, and the tree will be difficult to move and may require a lot of wedging. A hinge that is too thin may break and cause a loss of control.</p> <p data-bbox="578 953 787 980">DISPLAY NEXT SLIDE</p>
<p data-bbox="256 1043 495 1071"><i>Slide 30: Hinge Design</i></p>  <p>The diagram shows two circular stumps. The first is labeled '26 inch diameter Hinge length' and has a vertical line across its diameter labeled '80+%' with an arrow pointing to the second stump. The second is labeled '22 inch diameter Hinge width' and has a vertical line across its diameter labeled '10-%' with an arrow pointing to the right.</p>	<h3 data-bbox="578 1043 760 1077">Hinge Design</h3> <p data-bbox="578 1102 641 1136">Say:</p> <p data-bbox="578 1161 1409 1392">When constructing a hinge, it is helpful to use the 80+ percent/10- percent guideline. The 80+ percent/10- percent provides guiding metrics to initially determine the desired hinge length and width required during a felling operation. The 80 percent refers to the hinge length (distance across the stump) and the 10 percent refers to the hinge width (front to back).</p>

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You express these metrics as a percentage of the tree diameter at breast height (DBH, 4 ½ feet above the ground).

Targeting a minimum hinge length of 80 percent of the DBH reduces the chance of overcutting the diameter of the bole and allows for a greater margin of error when trying to match cuts.

You should bring the backcut (which sets the back of the hinge) forward to a point where the remaining unsevered fiber is a maximum width of 10 percent of the DBH. Both these metrics depend on tree conditions and you may need to change them, depending on tree species, wood fiber condition, and lean. On trees with a side lean, you may need a longer hinge length (more than 80 percent) to support the weight of the tree.


Hinge placement in relation to the tree diameter can also play a role when wedging. A hinge located more on the front of the bole will provide a longer wedging platform with more mechanical advantage. A hinge located closer to the middle of the bole will require more effort to lift the tree.

Considerations for placing a hinge:

- **Shape of the bole:** The bole of a tree is seldom perfectly round. Considering the shape of the bole when placing the hinge can increase cutting efficiency by reducing the amount of cutting needed to obtain the minimum 80 percent hinge length. Locating for maximum hinge length can also be useful for increasing hinge holding power.
- **Stobs:** Stobs are trees with missing and broken off tops. The challenge with stobs is that they have little to no mass or weight, so thinning the hinge in conjunction with a deeper undercut helps to fell the tree. Sawyers almost always fell stobs in the direction of the natural lean. A deeper undercut (near 100 percent hinge length) is preferable to using excessive wedging to fell a stob. The deeper undercut also moves the center of gravity forward (toward) the objective.
- **Lean:** A side lean is generally more difficult to control than a front or back lean. Always plan to increase the hinge length with a side-leaning tree. With a front or back lean, it is generally best to design the hinge closer


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<p data-bbox="253 682 500 709"><i>Slide 31: Video: Hinges</i></p> 	<p data-bbox="675 348 1386 457">to 80 percent to either maximize room for wedging (neutral or back lean) or slab size for a triangle backcut (forward lean).</p> <ul data-bbox="630 470 1373 579" style="list-style-type: none">▪ Live or dead tree: Dead fiber is generally less flexible than the fiber in a live or green tree. Expect less hinge control with dead trees. <p data-bbox="581 592 789 619">DISPLAY NEXT SLIDE</p> <p data-bbox="581 682 776 716">Video: Hinges</p> <p data-bbox="581 745 646 779">Say:</p> <p data-bbox="581 806 1377 873">Let's watch a short video to get a better understanding about how the hinge works.</p> <p data-bbox="581 907 789 934">INSTRUCTOR NOTE:</p> <p data-bbox="581 963 1122 997">Answer any questions the class may have.</p> <p data-bbox="581 1020 789 1047">DISPLAY NEXT SLIDE</p>


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Slide/action	Content
<p data-bbox="215 344 537 373"><i>Slide 32: Fiber Characteristics</i></p>  <p>The slide titled 'Fiber Characteristics' contains the following bullet points:</p> <ul style="list-style-type: none">Species<ul style="list-style-type: none">Tensile strengthFlexibilityDecay profiles vary by speciesTwo methods to determine fiber quality<ul style="list-style-type: none">SoundingBoringDecay profile characteristics<ul style="list-style-type: none">LeanLive or dead trees	<h3 data-bbox="578 344 873 380">Fiber Characteristics</h3> <p data-bbox="578 407 643 443">Say:</p> <p data-bbox="578 468 1390 615">Fiber tensile strength and flexibility vary greatly by species. Knowing the characteristics of the tree fiber you are working with is critical to constructing the hinge. The decay profiles for the boles of different species are also a relevant consideration.</p> <p data-bbox="578 640 708 676">Sounding</p> <p data-bbox="578 701 1406 810">Sounding the tree after removing the bark can help provide you with specific hinge fiber quality information at the anticipated hinge corners.</p> <p data-bbox="578 835 1398 909">Note that different tree species will sound different because of their differing fiber densities:</p> <ul data-bbox="630 934 1341 1094" style="list-style-type: none">▪ A loud crack indicates sound or good fiber.▪ A softer crack or dulled thump indicates weakened, punky, or rotten fiber.▪ An echo indicates a void or hollow. <p data-bbox="578 1108 1333 1144">Remember! Observe overhead hazards and look up often.</p> <p data-bbox="578 1152 1382 1302">Though sounding is a valuable tool for the sawyer, developing the skill to apply this knowledge effectively takes practice and experience. Become familiar with decay profile characteristics and the species you work with.</p> <p data-bbox="578 1329 789 1360">DISPLAY NEXT SLIDE</p>



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Slide/action	Content
<p data-bbox="272 344 480 369"><i>Slide 33: Undercuts</i></p> 	<h3 data-bbox="578 359 724 390">Undercuts</h3> <p data-bbox="578 417 643 449">Say:</p> <p data-bbox="578 476 1382 659">An undercut is the removal of a wedge-shaped section on the front part of the tree that you plan to fell. The undercut forms an opening (notch) in the bole to set the front portion of the hinge. The three types of undercuts are conventional, Humboldt, and open.</p> <ul data-bbox="630 690 1398 1272" style="list-style-type: none"><li data-bbox="630 690 1398 953">▪ Conventional undercut: An undercut made with a 45-degree opening with the sloping cut on the top. This method originally came from using axes to chop out the undercut. The conventional undercut is the hallmark of crosscut sawyers because the crosscut saw cuts across the grain and the ax cuts at a 45-degree angle, thus creating the conventional undercut.<li data-bbox="630 968 1398 1150">▪ Humboldt undercut: An undercut made with a 45-degree opening with the sloping cut on the bottom. Sawyers often use this method when working on steep ground. This method can also make removing large undercuts easier when felling large-diameter trees.<li data-bbox="630 1165 1398 1272">▪ Open-face undercut: An undercut made with a 70-degree or greater opening angle. A wider undercut enables the tree to stay attached to the stump longer. <p data-bbox="578 1289 789 1314">DISPLAY NEXT SLIDE</p>


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Slide/action	Content
<p data-bbox="224 344 529 373">Slide 34: Step or Stump Shot</p>  A diagram of a tree trunk showing a crosscut saw cut. The cut is a horizontal line across the trunk, slightly above the apex of a notch. A label 'Stump shot' points to the cut. The diagram is titled 'Stump Shot' and is part of a presentation slide with the USDA logo and 'Module 3.3: Crosscut Saw Directional Felling'.	<h3 data-bbox="578 344 854 380">Step or Stump Shot</h3> <p data-bbox="578 407 643 443">Say:</p> <p data-bbox="578 468 1414 730">Step or stump shot: The Occupational Safety and Health Administration (OSHA) requires the use of a step (stump shot) when the undercut is less than 70 degrees. You create a stump shot by making the backcut slightly above the apex of the notch. The intent is to prevent the bole of the tree from sliding back over the stump. The height of the step depends on the size of the tree and the conditions of the tree.</p> <p data-bbox="578 753 789 783">DISPLAY NEXT SLIDE</p>
<p data-bbox="207 842 545 898">Slide 35: Compensating for Side Lean</p>  A diagram showing two trees. The left tree is leaning to the right. A label 'Intended Location' points to the base of the tree. A label 'Actual Location' points to the base of the tree, which is shifted to the left. The right tree is leaning to the left. A label 'Intended Location' points to the base of the tree. A label 'Actual Location' points to the base of the tree, which is shifted to the right. The diagram is titled 'Compensating for Side Lean' and is part of a presentation slide with the USDA logo and 'Module 3.3: Crosscut Saw Directional Felling'.	<h3 data-bbox="578 856 1000 892">Compensating for a Side Lean</h3> <p data-bbox="578 919 643 955">Say:</p> <p data-bbox="578 980 1398 1119">To compensate for a side lean, first determine where you want the top of the tree to land, then plumb the tree to determine the amount (in feet) of side lean present. You will use this distance to offset your aim.</p> <p data-bbox="578 1150 1390 1297">Example: If the tree leans 2 feet to the right of the intended objective, you must face the undercut to aim the tree 2 feet to the left of the objective. Be sure to make the backcut on the good side of the tree when possible.</p> <p data-bbox="578 1329 789 1358">DISPLAY NEXT SLIDE</p>


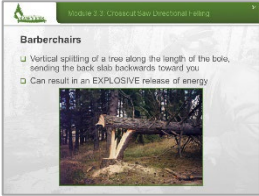
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Slide/action	Content
<p data-bbox="250 346 503 373"><i>Slide 36: Wedging Plan</i></p> 	<h3 data-bbox="578 359 773 394">Wedging Plan</h3> <p data-bbox="578 417 643 453">Say:</p> <p data-bbox="578 476 1344 548">The wedging plan will contain the number, kind, and size of wedges needed and the sequence for setting the wedges.</p> <p data-bbox="578 575 1419 684">Sawyers use wedges to drive the kerf apart and guide the bole of the tree into the objective. They typically carry two or more wedges with them, depending on the task at hand.</p> <p data-bbox="578 711 1414 898">The wedging platform(s), or the area(s) you intend to place wedges, must be solid. If rot or thick bark are present where you intend to insert the wedges, the fibers will compress and the wedge will not be able to lift the tree. This could allow the tree to sit back on the saw or not fall into the objective.</p> <p data-bbox="578 926 1377 1035">Planning to place wedges adjacent to each other and striking them alternately is an efficient wedging method that uses the least amount of effort.</p> <h3 data-bbox="578 1062 870 1098">Wedging Techniques</h3> <ul data-bbox="630 1125 1409 1549" style="list-style-type: none"><li data-bbox="630 1125 1409 1388">▪ Crossing/stacking wedges: In situations where you need more than one wedge to overcome a back lean, stacking wedges becomes necessary. It is a common practice to cross wedges to lessen the likelihood of a wedge popping out when struck. Stacking two 1-inch wedges doubles the amount of lift. Do not create a wedging plan where you need to stack more than two wedges.<li data-bbox="630 1402 1409 1549">▪ Indicator wedges: You can place a wedge in the kerf of the backcut to help visualize tree movement. This is known as an indicator wedge. Planning for an indicator wedge is useful when you have a forward lean. <p data-bbox="578 1562 789 1589">DISPLAY NEXT SLIDE</p>

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Slide/action	Content
<p data-bbox="212 346 540 373"><i>Slide 37: Trees with Back Lean</i></p> 	<h3 data-bbox="578 346 883 380">Trees with Back Lean</h3> <p data-bbox="578 407 643 441">Say:</p> <p data-bbox="578 468 1360 537">You can use wedges and cutting techniques to redirect trees that lean opposite the intended felling direction.</p> <p data-bbox="578 562 1386 632">Wedges lift the back of the tree and redistribute the weight or center of gravity of the tree toward the undercut.</p> <p data-bbox="578 657 1409 806">In general, once you initiate a backcut and there is sufficient room, you will insert a wedge. After you have carried out the backcut to the desired point, you can remove the saw and strike the wedge until the tree begins to fall.</p> <p data-bbox="578 831 1412 980">When felling trees with back lean, it is very important to realize that you will be operating from the bad side of the tree for most of the felling process. Remember to factor in this consideration when you reassess your plan with the OHLEC size-up process.</p> <p data-bbox="578 1005 789 1033">DISPLAY NEXT SLIDE</p>
<p data-bbox="258 1100 495 1127"><i>Slide 38: Barberchairs</i></p> 	<h3 data-bbox="578 1100 760 1134">Barberchairs</h3> <p data-bbox="578 1161 643 1194">Say:</p> <p data-bbox="578 1222 1330 1291">A barberchair is an explosive release of wood fibers under tension and results in a vertical split of the tree bole.</p> <ul data-bbox="613 1316 1403 1671" style="list-style-type: none"><li data-bbox="613 1316 1403 1507">▪ The dynamic splitting motion launches the straightening fiber slab upward and/or outward from the bending fiber in an uncontrolled release of energy. This can sometimes completely sever the stem and even project the freed slab many feet away from the original stump location.<li data-bbox="613 1518 1276 1587">▪ It is very difficult to develop an escape plan for a barberchair.<li data-bbox="613 1598 1377 1667">▪ Heavy forward leaners or a poorly constructed undercut can cause a barberchair.

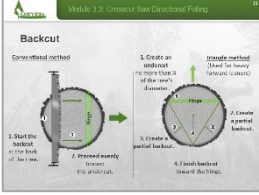
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Slide/action	Content
	<p data-bbox="578 344 971 380"><i>Considerations/Mitigations</i></p> <p data-bbox="578 405 1390 512">Reducing the amount of wood fiber under tension reduces the likelihood of a barberchair. Two methods for reducing wood fiber under tension are:</p> <ul data-bbox="613 541 1365 695" style="list-style-type: none"><li data-bbox="613 541 1333 611">▪ Wrap the trunk with heavy rope or chain above the undercut to prevent the tree from splitting vertically.<li data-bbox="613 625 1365 695">▪ Use the triangle method (we will talk about the triangle method shortly). <p data-bbox="578 709 789 737">DISPLAY NEXT SLIDE</p>


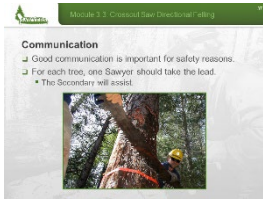
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Slide/action	Content
<p data-bbox="284 346 470 373"><i>Slide 39: Backcut</i></p>  <p>The diagram illustrates two methods for performing a backcut on a tree. On the left, the 'Conventional method' shows a tree with a backcut starting at the back and moving forward. On the right, the 'Triangle method' shows a tree with a backcut that forms a triangular shape. Both diagrams include numbered steps: 1. Start the backcut at the back of the tree. 2. Proceed evenly toward the undercut. 3. Create an undercut (or a heavy forward lean). 4. Finish backcut toward the hinge.</p>	<h3 data-bbox="578 346 695 380">Backcut</h3> <p data-bbox="578 409 646 443">Say:</p> <p data-bbox="578 472 1404 619">The backcut is the final cut to isolate the hinge and fell the tree. There are different methods for executing a backcut. You will base the method you use on individual tree characteristics and the various conditions you may encounter.</p> <ul data-bbox="613 640 1396 1302" style="list-style-type: none">▪ Conventional backcut: The conventional backcut is the most common backcut used with a crosscut saw. Plan to use this backcut when the calculated lean is back, side, or neutral. Start the backcut at the back of the tree and proceed evenly toward the undercut. Make sure you construct the cut parallel to and slightly above the undercut's hinge to create the necessary stump shot for this method.▪ Triangle backcut: This is a special form of backcut that sawyers use when felling trees with significant forward calculated lean to help prevent the chance of a barberchair. The triangle backcut is effective in providing additional safety by allowing you to cut quickly to the desired hinge thickness. Because this backcut involves additional complexity and skill, you should master the conventional backcut first, and then work with a qualified sawyer to master the triangle backcut. <p data-bbox="578 1323 1404 1396">In either case, focus on the goal of constructing a hinge with the desired width evenly across the stump.</p> <p data-bbox="578 1417 714 1444">TRANSITION:</p> <p data-bbox="578 1470 1242 1501">Next, we will talk about implementing the cut plan.</p> <p data-bbox="578 1533 820 1564">DISPLAY NEXT SLIDE</p>



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Slide/action	Content
<p data-bbox="207 401 545 457"><i>Slide 40: Implementing the Cut Plan</i></p> 	<h3 data-bbox="578 520 1024 558">Implementing the Cut Plan</h3> <p data-bbox="578 583 643 621">Say:</p> <p data-bbox="578 642 1393 789">We will discuss the implementation of the cut plan, which includes communication, body positioning, making the undercut, aiming for the objective, making the backcut, driving wedges, and escape.</p> <p data-bbox="578 814 789 840">DISPLAY NEXT SLIDE</p>
<p data-bbox="240 905 513 930"><i>Slide 41: Communication</i></p> 	<h3 data-bbox="578 919 800 957">Communication</h3> <p data-bbox="578 982 643 1020">Say:</p> <p data-bbox="578 1041 1393 1188">A hallmark of any good crosscut sawyer or saw team is fun, effective, and efficient communication. The work is often challenging, so keep your attitude light but serious and in team with each other.</p> <p data-bbox="578 1209 1393 1356">If communication breaks down due to fatigue, dehydration, hunger, lack of understanding, disagreement, etc., you should cease all sawing operations until you can restore good communication and team.</p> <p data-bbox="578 1377 1406 1650">It is the primary sawyer's responsibility to maintain cutting area control and aim the cut. The primary sawyer should be the last sawyer to leave the tree as it commits to the lay. For a tree with a forward lean, the primary sawyer will remove the saw during the escape. For a tree with a back lean, the secondary sawyer escapes with the saw just before the primary sawyer drives the wedges to complete the felling operation.</p> <p data-bbox="578 1671 1406 1818">The primary sawyer should also establish the zero marks on the tree for hinge width and any tick marks deemed necessary to facilitate smooth communication to complete the backcut. The need for tick marks depends on the comfort level of the</p>


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Slide/action	Content
<p data-bbox="235 884 516 915"><i>Slide 42: Body Positioning</i></p> 	<p data-bbox="578 348 1409 417">sawyers, but they are always a good idea to maintain consistent communication.</p> <p data-bbox="578 447 1398 632">The secondary sawyer should assist with good feedback and communication, while striving to provide additional eyes for safety and cutting area control. The secondary sawyer is critical to aiming the tree and must hold the saw in place while the primary sawyer determines the sight lines.</p> <p data-bbox="578 661 1382 770">Depending on tree size, both sawyers can take turns chopping out the undercut, usually with the primary sawyer making the final adjustments as the saw team completes the undercut.</p> <p data-bbox="578 795 789 823">DISPLAY NEXT SLIDE</p> <p data-bbox="578 884 813 919">Body Positioning</p> <p data-bbox="578 947 643 982">Say:</p> <p data-bbox="578 1010 1409 1157">Both sawyers should strive to maintain good body position to orchestrate smooth, even pulls on the saw and develop a comfortable back-and-forth rhythm using their legs and torso as much as possible.</p> <p data-bbox="578 1184 1403 1409">Ideally, both sawyers should be about the same height and size. When this is not possible, the sawyer with longer limbs must accommodate shorter pulls and position themselves to take advantage of any slope (if possible). Both sawyers should be proficient at sawing or chopping with either hand to reduce overuse injury risk and increase stamina.</p> <p data-bbox="578 1436 789 1463">DISPLAY NEXT SLIDE</p>
<p data-bbox="253 1528 500 1556"><i>Slide 43: The Undercut</i></p> 	<p data-bbox="578 1541 773 1577">The Undercut</p> <p data-bbox="578 1604 643 1640">Say:</p> <p data-bbox="578 1667 1403 1885">To start an undercut, make a horizontal cut and aim it toward the intended lay. Do this by holding the saw so that the teeth in the center point directly away from the aim point. Aim the saw a couple of times without cutting to set your footing, saw elevation, and the pulling distance between you and the other sawyer. Ensure that the center of the saw passes equal</p>

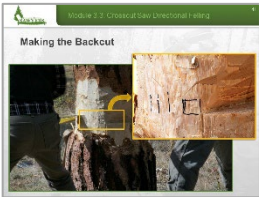
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Slide/action	Content
<p data-bbox="248 804 505 863"><i>Slide 44: Aiming for the Objective</i></p> 	<p data-bbox="578 348 1370 420">distances on either side of the tree's center and that you and the other sawyer can keep the saw level at the cut.</p> <p data-bbox="578 447 1409 556">Begin cutting with very light pressure until the saw establishes a kerf deep enough to hold the teeth. Now is the time to stop and check your aim.</p> <p data-bbox="578 583 1414 688">In special circumstances when overhead hazards may be sensitive to vibrations from chopping out the undercut, consider sawing out the undercut instead.</p> <p data-bbox="578 716 792 741">DISPLAY NEXT SLIDE</p> <p data-bbox="578 821 932 856">Aiming for the Objective</p> <p data-bbox="578 877 643 913">Say:</p> <p data-bbox="578 940 1398 1045">Aiming for the objective is the way you fell a tree using a crosscut saw. Aiming a tree correctly requires you to choose an objective to aim for.</p> <p data-bbox="578 1073 1398 1333">The most effective way of aiming with a crosscut saw is to flip the saw in the aiming cut, stand about 5 to 7 feet behind the tree, and look down the teeth on the right and left sides of the tree. The teeth on the right will face to the right of the aim/target. The teeth on the left will face to the left of the aim. Take the average of the two sighted aims to determine the aiming sight.</p> <p data-bbox="578 1360 1349 1465">Example: Assume a straight tree where the top of the tree aligns with the center of the bole and estimate the distance from the center of the bole to the aiming site.</p> <p data-bbox="578 1493 1382 1682">The distance you determine will become the same offset distance you will use to identify an aim point parallel and adjacent to the intended lay. When possible, the aim point should be roughly as far away from the base of the tree as the tree is tall.</p> <p data-bbox="578 1709 1398 1780">Aiming, in conjunction with forming a hinge when felling a tree, will provide the direction in which the tree will fall.</p>

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Slide/action	Content
	<p>While sighting, it is critical that the saw remain in contact with both corners of the cut, and that the secondary sawyer maintain this contact.</p> <p>If the secondary sawyer thinks the saw has slipped, you can check the position by gently rocking the saw side to side in the cut while holding slight pressure against the tree. The saw will pivot from either corner as it makes contact, allowing the secondary sawyer to gauge full contact with both corners.</p> <p>The primary sawyer can then determine the true aim point by taking the average of the two sighted aims. If you aim the cut correctly, the teeth on the right will be aimed to the right of the aim point the same distance that the teeth on the left will be aimed to the left of the aim point.</p> <p>Continue cutting and repeating the aiming process until the front of the hinge is set with the desired hinge length.</p> <p>Chop or saw out the remaining portion of the undercut, taking care not to chop deeper than the aiming cut, until both cut surfaces meet exactly along the length of the hinge.</p> <p>DISPLAY NEXT SLIDE</p>
<p><i>Slide 45: Making the Backcut</i></p> 	<h3>Making the Backcut</h3> <p>Say:</p> <p>Begin the backcut in a similar manner to the undercut. Elevate the saw slightly above the aiming cut to allow for a stump shot.</p> <p>As a saw team cuts, they will talk to let each other know where they are in relation to their desired hinge.</p>


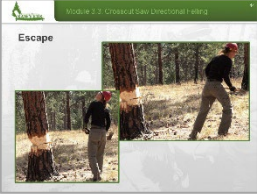
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	<p>Example:</p> <p>Secondary sawyer: “2 inches until zero.”</p> <p>Primary sawyer: “3½ inches to zero, hold your place and we will cut on my side until I catch up.”</p> <p>This enables the saw team to come into the designated hinge at the same time. The saw team stops cutting at the predetermined spot that follows the 80+/10- guideline. The desired hinge thickness is the zero mark on the tree.</p> <p>Both sawyers must use the same terminology and cut mirrored portions of the tree during the backcut. Creating marks (knife, marker, grease pencil, etc.) behind the hinge can be helpful because the sawyers can only see one side of the tree.</p> <p>The saw team will continue this communication until the tree falls with an even hinge or until both sawyers hit their predetermined zero mark. If the operation requires wedges, the secondary sawyer walks away with the saw, and the primary sawyer wedges the tree into the objective.</p> <p>As you progress making the backcut, look and listen to detect changes in the tree as you create the hinge. Placing a long indicator wedge in the center of the backcut to detect subtle movement is a good idea.</p> <p>You may hear loud cracking noises as gravity or wind start to move the tree. This noise and/or the beginning of steady indications of wedge movement are your clues to glance down your intended escape path for the last time to orient your next move.</p> <p>Note: If backcutting solo, you should pay special attention to the offside of the tree so that you do not inadvertently cut off the hinge or leave it too wide. Become familiar with using the saw’s teeth and handles to help align the backcut while periodically stopping to double check for accuracy.</p> <p>DISPLAY NEXT SLIDE</p>


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<p data-bbox="240 346 511 373"><i>Slide 46: Driving Wedges</i></p> 	<h3 data-bbox="578 359 797 394">Driving Wedges</h3> <p data-bbox="578 417 643 453">Say:</p> <p data-bbox="578 476 1386 625">Follow your wedging plan as you begin to place and drive your wedges. Drive wedges by striking them squarely on the head with the poll of your ax, but drive them carefully to prevent them from flying out of the kerf when you strike them.</p> <p data-bbox="578 653 1417 919">As you drive a wedge into the kerf, the force that develops effectively lifts the back of the tree and moves (rotates on the hinge) the top of the tree forward. This redistributes the center weight of the tree forward into the objective. To facilitate this movement, you should time the cadence of your strikes with the forward rocking of the tree. Take special care to watch for limbs, bark, or tops which you may knock loose:</p> <ul data-bbox="630 940 1409 1249" style="list-style-type: none"><li data-bbox="630 940 1409 1089">▪ If crossing/stacking wedges, it is a common practice to put sawdust or duff/dirt between the wedges to lessen the likelihood of the wedges shooting out when you strike them.<li data-bbox="630 1100 1409 1249">▪ If using an indicator wedge, as soon as possible, place just the tip of the wedge into the kerf. Continue with the backcut. A wedge that starts to drop indicates that the kerf is opening and the tree is beginning to fall. <p data-bbox="578 1289 789 1316">DISPLAY NEXT SLIDE</p>
<p data-bbox="289 1381 462 1409"><i>Slide 47: Escape</i></p> 	<h3 data-bbox="578 1381 675 1417">Escape</h3> <p data-bbox="578 1440 643 1476">Say:</p> <p data-bbox="578 1499 1398 1612">Once the tree is committed to moving, make a quick but methodical retreat along the predetermined escape path. Keep an eye on the moving canopy during your escape.</p> <p data-bbox="578 1640 1406 1829">Remember, the primary sawyer should be the last sawyer to leave the tree as it commits to the lay. For a tree with a forward lean, the primary sawyer will remove and carry the saw during the escape. For a tree with a back lean, the secondary sawyer will escape with the saw before the primary sawyer completes</p>

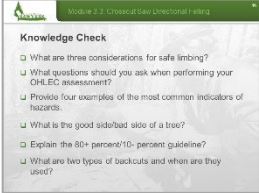
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<p data-bbox="245 533 509 625"><i>Slide 48: Operational Complexity: Putting it All Together</i></p> 	<p data-bbox="578 348 1396 420">the felling operation. If the saw hangs up in the kerf as the tree commits to the lay, leave the saw behind during your escape.</p> <p data-bbox="578 447 789 474">DISPLAY NEXT SLIDE</p> <h3 data-bbox="578 533 1260 569">Operational Complexity: Putting it All Together</h3> <p data-bbox="578 594 1369 743">Complexity is a characterization of the cutting operation and the elements you must manage while implementing it. The complexity will also determine the level of knowledge, skill, experience, and certification you will need.</p> <p data-bbox="578 770 1409 919">Complexity is not managing the risks of the operation, but rather how you will manage all aspects of the sawing operation. While determining complexity is subjective, it is one of the most important processes for you to understand and implement.</p> <p data-bbox="578 947 1393 1096">Managing the complexity of a cutting operation is like driving a car. Many different elements influence the complexity of a driving situation. For example, when driving a car, you may ask yourself:</p> <ul data-bbox="630 1123 1203 1287" style="list-style-type: none">▪ Is it sunny, raining, or snowing?▪ Is it nighttime or daytime?▪ Is the vehicle in good working condition?▪ Is it rush hour or is there light traffic? <p data-bbox="578 1302 1364 1409">The driver's decision of where and when to drive can vary considerably, but the driver must ultimately make an honest assessment of the situation and decide whether to proceed.</p> <p data-bbox="578 1436 1127 1467">As a sawyer, you must do the same thing.</p> <p data-bbox="578 1495 1404 1686">Once you have completed the OHLEC size-up process, you must determine if you have the knowledge, skill, and experience, to manage the complexity of the cutting operation. If the complexity does not align with your abilities, go back and reassess your objective.</p> <p data-bbox="578 1713 1386 1820">Even if you think you have the knowledge and experience to implement the cut plan, now is also the time to do a gut check and see if your head is in the game.</p>

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<p data-bbox="233 436 521 464"><i>Slide 49: Knowledge Check</i></p> 	<p data-bbox="578 348 789 375">DISPLAY NEXT SLIDE</p> <h3 data-bbox="578 436 870 474">Knowledge Check</h3> <p data-bbox="578 499 643 537">Say:</p> <p data-bbox="578 558 1235 596">Q: What are three considerations for safe limbing?</p> <p data-bbox="578 617 894 655">A: Answers may include:</p> <ul data-bbox="630 680 1162 974" style="list-style-type: none">▪ Location and presence of spring poles▪ Where hazards are located▪ Where you want the piece to go▪ Location of your escape path▪ Cutting sequence/plan▪ Type of tree fiber▪ The best tool to use <p data-bbox="578 989 1414 1058">Q: What questions should you ask when performing your OHLEC size-up assessment?</p> <p data-bbox="578 1083 1333 1121">A: Consider the following when doing your OHLEC size-up:</p> <ul data-bbox="630 1146 1409 1625" style="list-style-type: none">▪ Objective: Where do you want the tree to go?▪ Hazards: What are the hazards relative to the objective in this felling operation?▪ Leans/binds: What is the front, back, or side lean in relation to the objective? Where is the good/bad side of the tree?▪ Escape plan: Can I position myself to escape on the good side? Is the path clear and of adequate distance or to cover?▪ Cut plan: Where will I construct the hinge? What sequence of cuts will I use to construct the hinge? What type of backcut will I use? Will I need wedges? <p data-bbox="578 1734 1179 1772">Q: Provide four examples of hazard indicators.</p> <p data-bbox="578 1797 894 1835">A: Answers may include:</p>



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	<ul style="list-style-type: none">▪ Widowmakers▪ Snags▪ Loose or missing bark▪ Schoolmarms▪ Fruiting bodies▪ Cat faces▪ Cankers▪ Root rot or burned roots▪ Cracks or cavities in the bole▪ Uplifted roots <p>Q: What is the good/bad side of a tree?</p> <p>A: The bad side of a tree refers to the side under the naturally weighted lean of the tree where a tree could fall if the hinge breaks or is unintentionally severed.</p> <p>Q: Explain the 80+ percent/10- percent guideline.</p> <p>A: The 80+ percent/10- percent provides the guiding metrics to initially determine the desired hinge length and width needed during a felling operation.</p> <p>80 percent refers to hinge length (distance across the stump) and 10 percent refers to hinge width (front to back).</p> <p>Q: What are two types of backcuts and when do sawyers use them?</p> <p>A: Answers should include:</p> <ul style="list-style-type: none">▪ Conventional backcut: normally used▪ Triangle backcut: used on heavy forward leaners <p>DISPLAY NEXT SLIDE</p>

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Slide/action	Content
<p><i>Slide 50: Summary</i></p>  A presentation slide titled "Summary" with a list of learning objectives. The slide includes a small USDA logo and the text "Module 3.3 Crosscut Saw Directional Felling". <ul style="list-style-type: none">Describe directional felling.Define lean of a tree.Calculate the lean of a tree.Describe the good side/bad side.Describe the DTH, LEC size up process for directional felling.Develop and implement a cut plan as a team.Explain the proper use of wedges.	<h3>Summary</h3> <p>REVIEW</p> <p>Review the summary objectives listed on the slide.</p> <p>DISPLAY NEXT SLIDE</p>
<p><i>Slide 51: Questions?</i></p>  A photograph of two loggers in a forest. One logger is standing near a large tree trunk, and the other is partially visible. The word "QUESTIONS?" is overlaid in white text at the bottom of the image.	<h3>Questions</h3> <p>Are there any questions about felling trees with a crosscut saw?</p> <p>Answer appropriately.</p>

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