USDA Forest Service
National Sawyer Training:
Developing Thinking Sawyers

Student Guide: Prework

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Table of Contents

List of Figures

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Module 3.3: Crosscut Saw Directional Felling

Introduction

Module 3.3 covers the basic concepts of how to directionally fell trees using a crosscut saw. The instructor will first present concepts in the classroom and will follow up with demonstrations. You will then practice these techniques in the field under controlled and supervised conditions.

Prework Topics

- What is directional felling?
- Leans
  - Good side/bad side
  - Calculating lean

Objectives

When you complete the full module during training, you will be able to:

- Describe directional felling.
- Define the lean of a tree.
- Calculate the lean of a tree.
- Describe the good side/bad side of a tree.
- Describe the OHLEC size-up process for directional felling.
- Develop and implement a cut plan as a team.
- Explain the proper use of wedges.

What is Directional Felling?

Direction 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, you must correctly construct a hinge—the uncut portion of fiber between the undercut and the backcut. The hinge is critical for guiding and controlling the tree into the objective. Directional felling requires planning and involves multiple steps before any cutting begins.

Leans

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.

Types of Leans

The two types of lean are natural lean and calculated lean.

Natural lean: Natural lean is not relative to an objective; it is the direction that gravity would take a tree if the tree were to fall on its own (figure 3.3.1). 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.
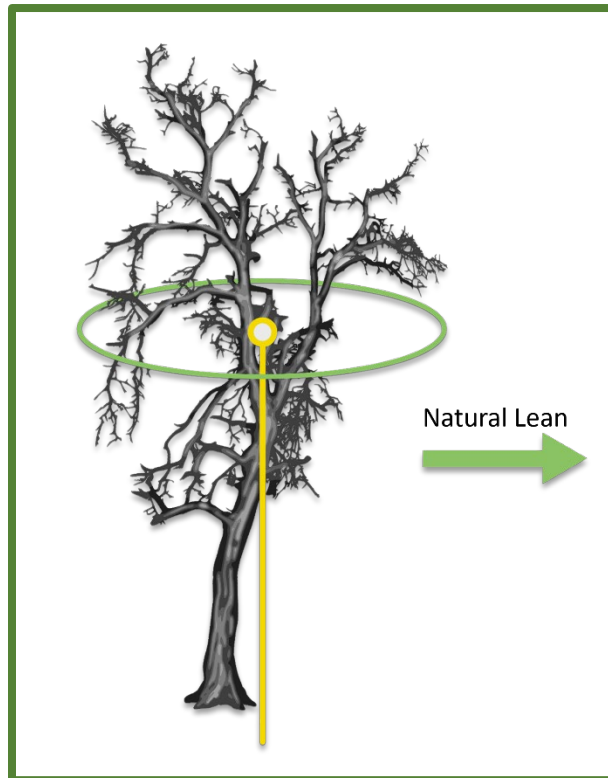

Figure 3.3.1—Natural lean.

Calculated lean: Calculated lean is the amount of front-to-back and/or side-to-side lean (expressed in feet) relative to the objective (figure 3.3.2). Sawyers use calculated lean to develop the cutting and wedging plans that will place the tree into the objective. You must determine which type of calculated lean you have before you can proceed (figure 3.3.3).
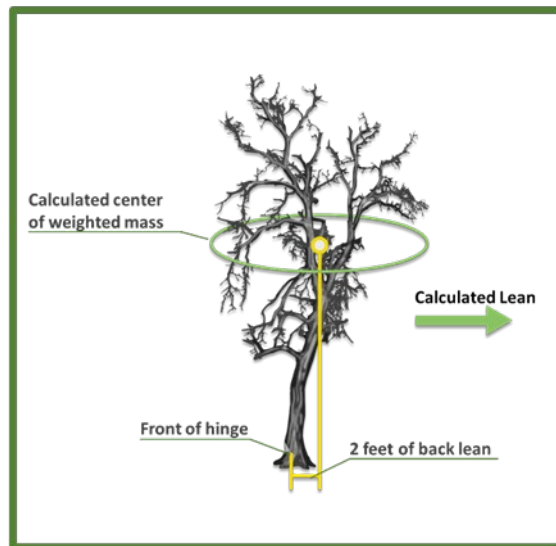
Figure 3.3.2—Calculated lean.

You determine **front-to-back lean** by standing on one side of the tree or the other perpendicular to and opposite 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.

You determine **side-to-side lean** by standing in line with the objective, either in the intended lay or directly opposite the intended lay. When plumbing the tree, you will get the most precise measurement from a tree length away (if possible). Sawyers consider beneath the side lean of the tree to be the **"bad side"**—it is where the tree will fall if you fully sever the hinge.
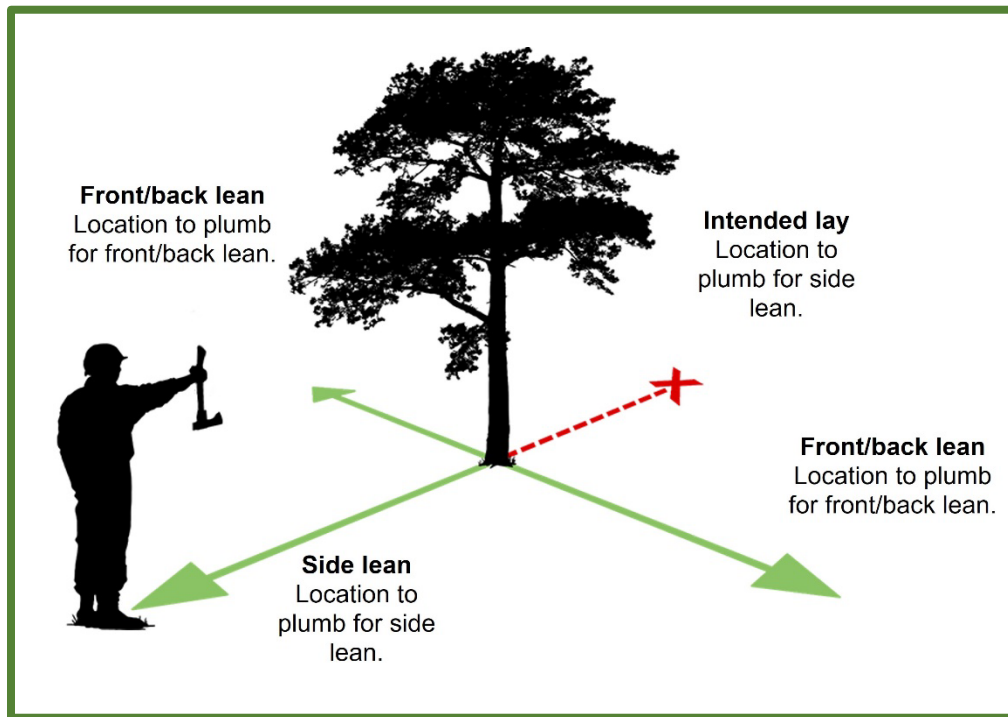
Figure 3.3.3—Types of calculated lean.

Determining the Lean

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.

To determine the lean of a tree, stand far enough away from the tree so that you can see the entire canopy.

- **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.

- **If using a hand and plumb bob combination,** use your thumbs to hold the plumb bob to eliminate visual error from the hand method.

Regardless of the method you use, with some practice and experience, being able to determine the tree's lean will soon become second nature.

Note: If the lean assessment supports your objective, move on to the escape plan.
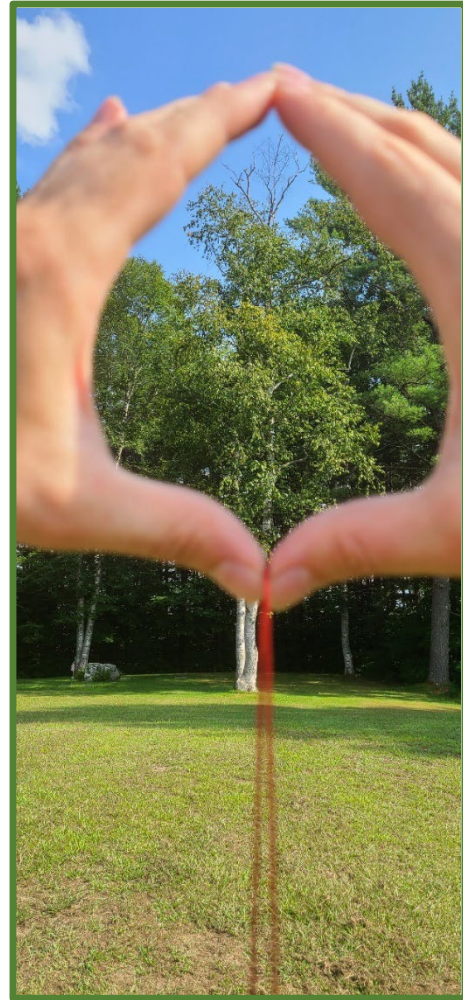

Figure 3.3.4—Hand and plumb bob combination.

Summary

In this prework packet, you learned about directional felling and leans.

This knowledge will help you to learn the material presented in Module 3.3: Crosscut Saw Directional Felling of the "Developing Thinking Sawyers" course.

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