

# USDA Forest Service National Sawyer Training: Developing Thinking Sawyers



## Student Guide: Prework

**USDA Forest Service National Sawyer Training:  
Developing Thinking Sawyers**  
Module 2.3: Chain Saw Directional Felling

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## Module 2.3: Chainsaw Directional Felling

### Overview

This module teaches the basic concepts of how to directionally fell trees using a chain saw. The instructor will present concepts in the classroom, followed by demonstrations. You will then practice these techniques in the field under controlled and supervised conditions.

### Pework 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:

- Explain directional felling.
- Describe the OHLEC size-up process for directional felling.
- State how you identify the objective of a felling operation.
- Identify common hazards for directional felling.
- Identify the natural lean of a tree.
- Explain the good side/bad side of a tree.
- Identify the calculated lean of a tree.
- Describe the importance of the escape plan.
- Develop a cut plan.
- Describe the proper use of wedges.

### What is Directional Felling?

**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).

Understanding the relationship between the undercut, the hinge, and the backcut is key to your ability to successfully direct a tree into an intended lay.

### Leans

It is important to determine the type and amount of lean to develop a cut plan. The location and size of limbs and the shape of the canopy are factors that influence lean.

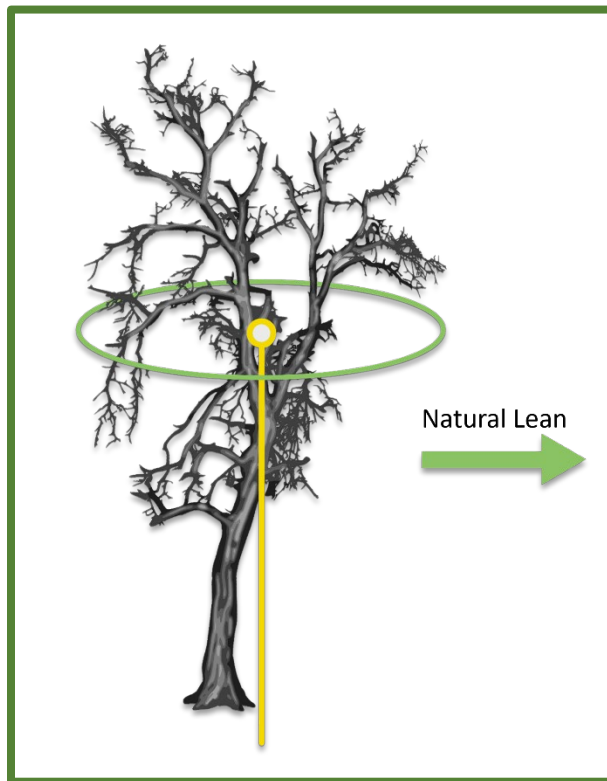
### Types of Leans

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

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**Natural lean** (figure 2.3.1) is not relative to an objective, but is rather the direction that gravity would take a tree if the tree were to fall over naturally. It is the location on the tree 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 2.3.1—An example of natural lean.**

**Calculated lean** (figure 2.3.2) is the amount (expressed in feet) of front-to-back and/or side-to-side lean relative to the objective. Sawyers use calculated lean to build the cutting and wedging plans that will place the tree into the objective.

You determine **front-to-back lean** by standing on one side or the other of the tree, perpendicular (90 degrees) 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 you 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, your measurement will be most precise from a tree length away, if possible. Beneath the side lean of the tree is considered the **bad side** because this is where the tree will fall if you fully sever the hinge.

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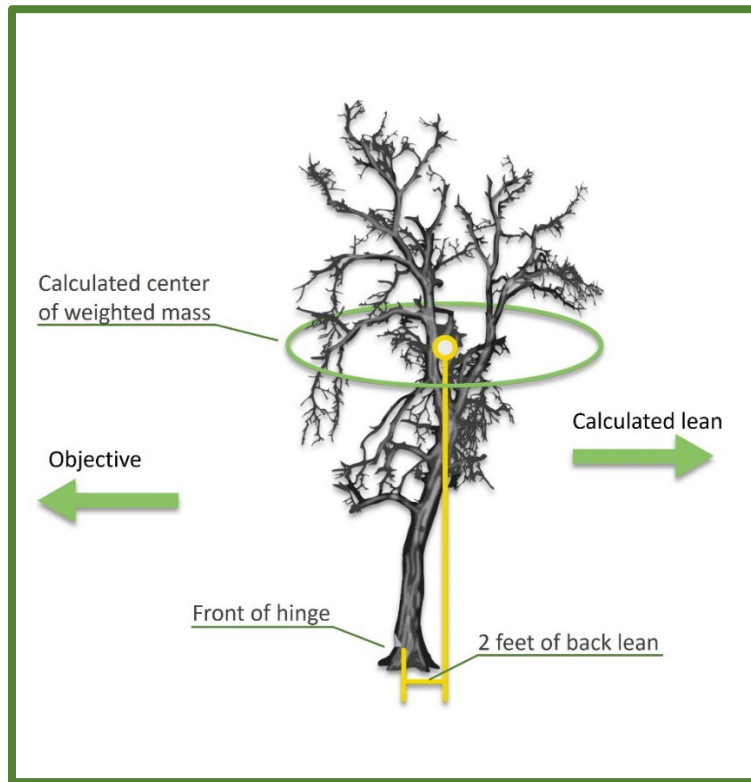


Figure 2.3.2—An example of calculated lean.

### Determining the Lean

There are many ways to determine lean. You can use a straight-handed axe, 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 you use 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 you use an ax** (figure 2.3.3), 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 aligns 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.

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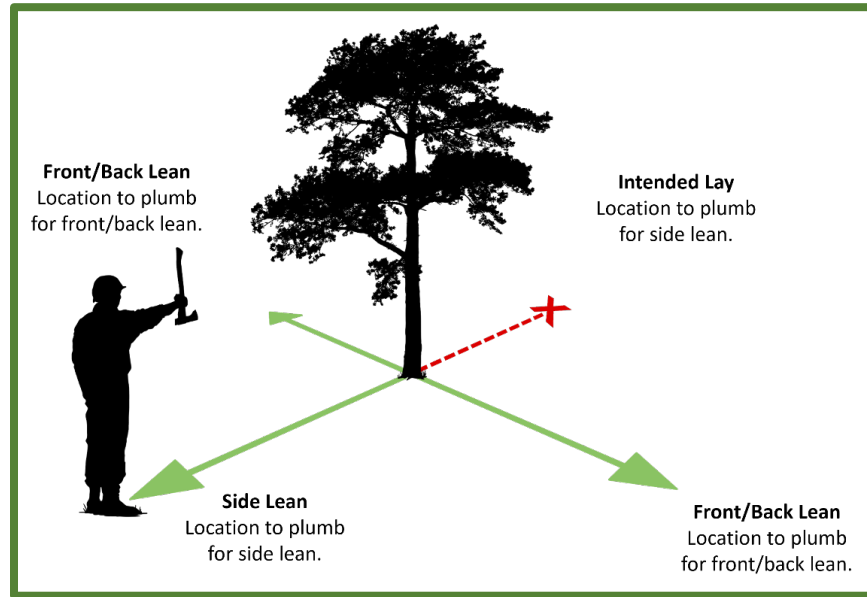


Figure 2.3.3—Determining types of lean.

- **If you use 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 indicates the amount of lean.
- **If you use your hand in combination with a plumb bob** (figure 2.3.4), hold the plumb bob with your thumbs to eliminate visual error from the hand method.

Regardless of the method you use, with some practice and experience, determining a tree's lean will soon become second nature.

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

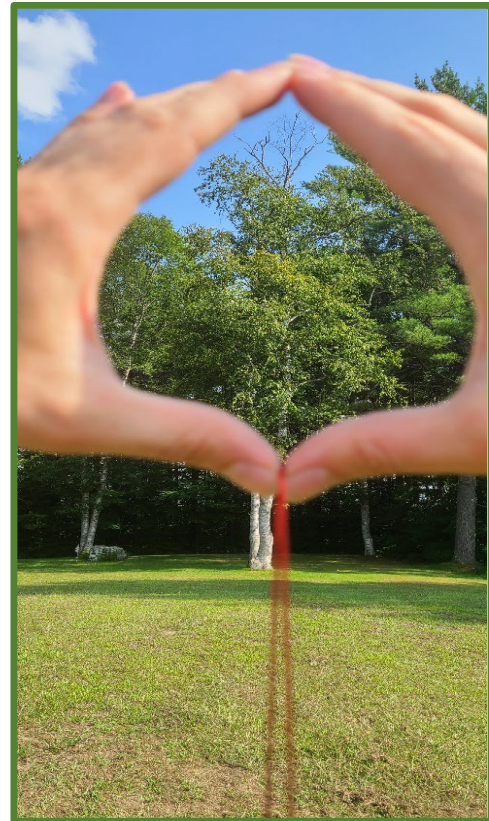


Figure 2.3.4—Determining lean using a hand-and-plumb bob combination.



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*Good Side/Bad Side*

The concept of the good side and the bad side of a tree is a function of tree lean and directly affects your safety.

The bad side of a tree is the side under the naturally weighted lean where the tree could fall if the hinge breaks or if you unintentionally sever it. You should work from the good side of a tree whenever possible.

**Summary**

In this prework packet, you learned about the basic concepts of how to directionally fell trees with a chain saw.

This knowledge will aid you in learning the material presented in module 2.3 of the “Developing Thinking Sawyers” course.

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