# USDA Forest Service National Sawyer Training
## Developing Thinking Sawyers
### Module 1: Introduction to Saw Operations

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Overview

As a Forest Service (FS) Sawyer, you must be aware there are laws and standards that must be met before you operate a chainsaw or crosscut saw. This module will also provide safety and risk management information.

This module-based training focuses on “Developing a Thinking Sawyer” and emphasizes risk management, human factors, and sawyer safety. Completion of the training program does not guarantee certification. The evaluation process may be separate from this training to allow new Sawyers the time to practice their skills under the supervision of a qualified USFS Saw Instructor.

Purpose of Course

The USDA Forest Service National Sawyer Training course outlines and describes the operational procedures for implementing policy found in FSM 2358. These operational procedures are considered best practices that have been designed to protect Sawyers from accidental injury, illness, or death during saw operations.

All Sawyers must be trained, evaluated, and certified through a training program that meets the intent of Forest Safety Manual (FSM) 2358.03 Policy. To engage in sawing activities, Sawyers must have a current National Sawyer Certification Card, and hold certification in first aid and CPR. The National Sawyer Certification Card is issued with a three-year expiration date, which can be subject to review any time prior to expiration. Crosscut Sawyers must be at least 16 years old.

Course Goal

The Developing Thinking Sawyers course is designed for basic to intermediate crosscut saw users. The course is designed to provide the technical knowledge that employees and volunteers will need to use these tools safely and effectively.

At the completion of training, a Sawyer evaluation determines whether you demonstrate proficient use and care of a saw by applying learned knowledge and skill.

Sawyer Certification Preparation

Use this checklist to ensure you have completed everything you need to successfully become a certified Sawyer.

<table>
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<tr>
<td>Be at least 16 years of age to operate a crosscut saw</td>
</tr>
<tr>
<td>Receive first aid training and be current in cardiopulmonary resuscitation (CPR)</td>
</tr>
<tr>
<td>Complete an approved, nationally recognized Sawyer training curriculum (NRSTC) from an authorized instructor</td>
</tr>
<tr>
<td>Successfully complete a field evaluation</td>
</tr>
<tr>
<td>Possess a National Sawyer Certification card that is signed by an authorized certifying official</td>
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</table>
Levels of Certification

A Level Sawyer – Bucking only. May limb and buck in least complex situations.

A Level Sawyer – Felling & Bucking. May limb, buck and fell in least complex situations.

B Level Sawyer – Bucking only. May limb and buck in moderately complex situations.

B Level Sawyer – Felling & Bucking. May limb, buck and fell in moderately complex situations.

C Level Sawyer – Bucking only. May limb and buck in most complex situations.

C Level Sawyer – Felling & Bucking. May limb, buck and fell in most complex situations.

Objectives

When you complete this module, you will be able to:

- Identify guiding documents for the Forest Service Saw Program.
- Identify requirements for Sawyer certification.
- Identify levels of Sawyer certification.
- Identify PPE requirements and correct use.
- Discuss how human factors affect Sawyer operations.
- Identify and discuss components of the OHLEC size-up process.
- Discuss operational complexity and its relationship to a Sawyer’s knowledge and skill.

Overarching Federal Regulations

The Occupational and Safety Health Act of 1970 is a US law that enforces workplace standards that ensure that employees are protected from hazards that compromise their safety and health.

The USDA Forest Service National Sawyer Training course falls within the regulatory authority of the Federal Office of Safety and Health Administration (OSHA) under 29 CFR 1910.266—Logging Standard.

Program Policy

The Forest Service Manual (FSM) 2358 addresses program requirements. This policy applies to the use of both chainsaws and crosscut saws on National Forest System lands by all employees, volunteers, training consultants, and cooperators. It does not apply to interagency fire management cooperators or contractors. FSM 2358 defines administrative responsibilities for the program as well as Sawyer responsibilities and requirements for safety, training, and proficiency evaluation and reevaluation.

Safety

Safety is the most critical concern; this includes your personal safety and that of your coworkers, and the visiting public. Safety should be a part of every plan you prepare and every action you take. Careful study and practice of saw operations will improve your abilities and help you identify your limitations.
You have the obligation to say "NO" and walk away from any situation you determine to be an unacceptable risk.

Sawyer safety comes down to three key concepts: situational awareness, risk management, and proper use and fit of personal protective equipment.

**Personal Protective Equipment**

Personal protective equipment (PPE) is meant to protect the Sawyer in the event of a mishap. All Sawyers are required to wear the appropriate PPE outlined in Forest Service Handbook (FSH) 6709.11.

### Table 1: PPE Requirements

<table>
<thead>
<tr>
<th>PPE</th>
<th>Crosscut Saw Operations</th>
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<tr>
<td><strong>Head Protection</strong></td>
<td>Helmet meeting ANSI Z89.1</td>
</tr>
<tr>
<td><strong>Eye Protection</strong></td>
<td>ANSI Z87.1 (clear safety glasses, as a minimum) or equivalent</td>
</tr>
<tr>
<td><strong>Hearing Protection</strong></td>
<td>None required</td>
</tr>
<tr>
<td><strong>Hand Protection</strong></td>
<td>Slip resistant gloves appropriate for the weather conditions</td>
</tr>
<tr>
<td><strong>Shirt</strong></td>
<td>Long sleeved optional</td>
</tr>
<tr>
<td><strong>Pants</strong></td>
<td>Well fitting, long pants</td>
</tr>
<tr>
<td><strong>Leg Protection</strong></td>
<td>None required</td>
</tr>
<tr>
<td><strong>Foot Protection/Boots</strong></td>
<td>Boots that provide ankle support and have nonskid soles</td>
</tr>
</tbody>
</table>

PPE should be clean and in good working order. PPE should appropriately fit the individual Sawyer.

*Head protection:* All helmets should be designed to provide protection from impact and penetration hazards from falling objects. Inspect shells daily for signs of dents, cracks, penetration, or any other damage that might compromise protection. Suspension systems, headbands, sweatbands, and any accessories also should be inspected daily.

*Eye and face protection:* Appropriate protection (including side protection) is needed when employees are exposed to eye or face hazards such as flying particles, chemical gases or vapors, or potentially injurious light (such as ultraviolet light).

*Hand protection:* Ensure that hand protection protects employees from the specific hazards that will be encountered. Gloves often are relied on to prevent cuts, abrasions, burns, and skin contact with chemicals that can cause local or systemic problems.
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Shirt: For the crosscut saw long sleeved is optional but recommended.

Pants: Long Pants are required for any Sawyer operation. Pants should fit comfortably but not be overly loose.

Boots: Sturdy boots with nonskid soles and adequate ankle support are required for crosscut use.

First Aid Kit

OSHA logging standard (29 CFR 1910.266(d)(2)(i)) mandates a first aid kit at each work site where trees are being cut (e.g., felling, bucking, limbing), at each active landing, and on each employee transport vehicle.

The number of first-aid kits and the content of each kit must reflect the degree of isolation, the number of employees, and the hazards reasonably anticipated at the work site. At a minimum, a kit must contain supplies adequate for small sites with two to three employees. Each kit must contain the following items:

- Gauze pads at least 4x4 inches
- Two large gauze pads at least 8x10
- Box of adhesive bandages (band-aids)
- One package gauze roller bandage at least 2 inches wide
- Scissors
- One blanket
- Tweezers
- Adhesive tape
- Two triangular bandages
- Wound cleaning agent such as sealed, moistened towelettes
- Latex gloves
- Resuscitation equipment such as a resuscitation bag, airway, or pocket mask
- Two elastic wraps
- Splint
- Directions for requesting emergency assistance

Situational Awareness

Situational awareness (SA) is the identification of threats and opportunities, and the allocation and use of resources to increase the probability of success, avoid hazards, minimize consequences, and provide for recovery.
A Sawyer’s situational awareness is not only the perception of the situation around you, but also an awareness of your personal mental state at any given moment.

Human Factors

Understanding how thoughts and memories apply to safety is critical. When you are unaware of the thoughts and memories that are driving your actions and decisions, your actions can have negative consequences that can become a safety hazard for yourself or others around you.

When you make mistakes in front of others, it is a natural response for your thoughts to race. Adrenaline starts flowing, the heart rate increases, there is increased reactivity, and decreased awareness. This decreases the ability to take in and process information, decreasing the quality of your decision making.

Developing Thinking Sawyers

*Mental toughness* is becoming aware of and monitoring your thoughts so you know where your attention is and what is driving your decision making at any time; it is understanding how memories can put you at risk through distraction or emotional reactivity. In developing mental toughness, you learn to manage your memories and thinking to maximize cognitive function. Mental toughness requires that you understand what it means to stay in team and that you learn how to get back in team when needed.

In becoming more aware of your own thoughts and being able to monitor those thoughts, you are better able to engage in the present and the task at hand. You become more situationally aware, leading to safer operations.

Risk Management

Being able to assess your mental state and remain aware of your surrounding situation are the beginning of managing the risks the Sawyers take. While situational and mental awareness are separate of risk management, risk management cannot occur without the two. By its very nature situational awareness identifies the opportunities and threats of a situation and seeks to determine the allocation and use of resources to increase the chance of success.

Addressing the types of questions asked during risk assessment is an essential element of risk management, defined as a “set of coordinated processes and activities that identify, monitor, assess, prioritize, and control risks that an organization faces.”

Risk management is iterative, is responsive to change, incorporates learning and feedback, is intentional about processes and practices, explicitly addresses uncertainty, and focuses on decision quality and corresponding outcomes.
It is important to remember that risk management is a continuous process where you are always evaluating your situation, to include the job site, and your mental state throughout the entire process. A tool that you should use in this process is OHLEC: Objective, Hazards, Leans, Escape Plan, and Cut Plan. If you cannot mitigate unacceptable risk of an operation, you must reassess the objective of the operation.

**OHLEC: The 5 Step Size-up**

OHLEC is a systematic 5-step process where you identify an objective, consider hazards or obstacles related to the objective, determine leans relative to the objective, develop the escape plan, and develop the cut plan. At any point during the process, your analysis may reveal conditions or hazards which cause you to reevaluate or change the objective. When the objective changes, the process immediately starts over because a different objective may present different hazards, leans/binds, escape routes, or cutting plan.

When mastered, OHLEC takes only thirty seconds to run through. OHLEC also lets the trail crew become more involved in the cutting process, adding another way to reduce risk.

**Objective**

The *objective* is a statement of the purpose of the operation and conveys what you intend to do. When you state what you see and what the plan is, the rest of the trail crew now knows what to expect. If you start getting into a bad situation the trail crew will recognize a deviation from the stated plan and voice their concerns.

When analyzing the objective determine where you want the cut piece to end up.

- If felling, identify the intended lay of the tree.
- If bucking, plan where you want the bucked log or round to land.
- If limbing, determine sequence and direction for large branches when cut.
- If brushing, particularly in thick brush, plan how you will remove the brush when it is cut.

Once you have determined the objective of the cutting operation, all other steps in the OHLEC size-up process should be in relation to this specific objective.

**Hazards**

*Hazards* include a standard analysis and summary of relevant risks and hazards. The Sawyer identifies these items and determines what actions, if any, can be taken to mitigate or eliminate the hazards.

Develop a plan to identify the hazards/obstacles. Some things to consider are:

- What is overhead (fire, rotten top, widow makers, and loose bark).
- What is inside the wood being cut (fire, rot and hinge wood integrity, hollow, bar/saw length compared to diameter, bees, or poison plants).
Buildings, equipment, or other trees you do not want damaged.
Are there any hazards associated with cutting area control?
You must control the cutting area to eliminate hazards to others. You must consider other workers or bystanders, the public, access points, and steep slopes. The size of the area you must control depends on the operation.

Leans/Binds

Leans or binds are assessed to determine if alterations need to be made to the objective and also inform others of your analysis of hazards, escape routes and cut plans. When felling, the lean is assessed by the tilt of a tree away from its vertical position. Potential binds are identified and assessed. The two major components of bind are compression and tension. Bind identification will determine the technique and procedure for bucking.

- Predict binds based on bearing points and lie of log.
- Determine the reactionary forces when the log is cut.

Escape Plan

You must develop an escape plan that is purposeful and resilient enough to position yourself in a safe area when the tree or log releases. An escape plan has a minimum of two escape paths. The escape paths are cleared of obstructions to a reasonable degree to ensure safety.

Escape paths are predetermined paths where you can escape once the tree is committed to fall or has been bucked.

Escape Path

With the desired felling direction in mind, determine escape paths and safe areas that are 90 to 135 degrees from the direction of intended fall. Consider the side of the tree where you will make your final cut and select a path that will take a safe distance away, but not directly behind the stump.

When bucking stay on the uphill side and determine any reactive forces from side bind or pivot points

- Look for a large solid tree or rock for protection.
- Prepare two escape paths in case you switch your location on the final cut.
- Practice the escape paths, making sure that debris that could trip you is cleared.
- Reexamine the escape paths and be sure that your chosen routes will be the safest escapes—before you begin to cut.

The plan need to be flexible enough to account and adapt for the unexpected.

- Determine the “good” and the “bad” side of the cutting operation.
- Determine the safe area to work and clear the escape route if needed.
You REALLY need an escape path when things go bad.

- We make mistakes, and that is okay. The sawyer needs to develop an escape plan that can accommodate mistakes.
- Time is compressed once the tree or log releases. Have a good plan.
- Once the tree or log releases, the sawyer no longer has control and can only react to the situation; split-second decisions are essential.

Cut Plan

The cut plan is the last stage of the cutting operation size up and determines the type and sequence of cuts which will ultimately guide the tree or log segment into the intended lay. The results of the cut plan will determine the ultimate complexity of the operation. Your evaluation of the complexity of the assignment must be thorough and honest to answer the question: “Should I cut this or not?”

The cut plan accounts for the objective, hazards, leans/binds, and escape plan. The cut plan is the final step in OHLEC and is how you tie the plan together. Develop the cut plan for the cutting operation.

- Determine the cutting sequence.
- Determine the type of cuts required.
- If the cutting plan is going to require the use of wedges, then you must develop a wedging plan before initiating the cut.

The wedging plan will consider:

- Number, kind, and size of wedges needed.
- Sequence of setting wedges.

Operational Complexity

Taking into consideration all the steps analyzed during the OHLEC process, you should conduct an honest assessment of the cutting operation to determine if you have the knowledge, skills, and qualification to manage the overall complexity of the operation.

What is complexity? Complexity is the characterization of the factors needing to be managed to complete cutting operation. It is rooted in the individual sawyers experience level.

Putting it All Together

The results of the cut plan will determine the ultimate complexity of the operation. Your evaluation of the complexity of the assignment must be thorough and honest in order to answer the question: “Should I cut this or not?”
The complexity of the cut plan that you develop must be within your ability, skill, and qualification before you proceed. If the cut plan is too complex, then you must reassess the objective and develop another plan or walk away.

Figure 1: Operational Complexity Flow Chart
**Cutting Operation Complexity**

<table>
<thead>
<tr>
<th>Low</th>
<th>Moderate</th>
<th>High</th>
</tr>
</thead>
<tbody>
<tr>
<td>Objective is easily accomplished</td>
<td>Objective may be difficult to accomplish and/or high consequence of failure</td>
<td></td>
</tr>
<tr>
<td>Hazards are minimal, and understood</td>
<td>Hazards are present, and understand</td>
<td>Hazards are numerous, not totally understood and/or unstable</td>
</tr>
<tr>
<td>Leans or binds do not require wedging or sequence of cuts</td>
<td>Leans or binds may require wedging</td>
<td>Lean or binds of log require significant wedging plan</td>
</tr>
<tr>
<td>Escape path is clear</td>
<td>Escape path may be limited</td>
<td>Escape path limited</td>
</tr>
<tr>
<td>Cut plan is simple</td>
<td>Cut plan requires sequence of cuts and/or wedging plan</td>
<td>Cut plan requires modified sequence and/or wedging plan</td>
</tr>
</tbody>
</table>