Sim Limb / Top Drop

Falling Tree Top / Limb Simulation Exercise

Paul Chamberlin, Aerial Fire Depot

January, 2006

Introduction

The best story is told by Winston Rall (USFS R-6). The Swamper / Lookout was to watch for falling limbs and debris, and if necessary alert the Sawyer by throwing a pinecone at him. Halfway into the cut a limb crashed to the ground, just missing the sawyer. Irritated, and wondering what was wrong with his lookout, the sawyer turned to look, just in time to have his face smashed by the pinecone.

Purpose

Utilizing a flag pole, dummy soft limb, and trip line, years of close-call experiences will be compressed to an hour. This exercise will demonstrate the speed limbs, tops, and debris fall from trees and snags. Out-door and interactive, the presentation promotes safe practices; suitable for everyone going to the woods. Employee buy-in is achieved through collective problem solving. Fortunately, most public facilities sport a flag pole.

Problem and How It Should Be

Snags and defective live trees, particularly those weakened by fire, kill or seriously injure forest workers and firefighters every year. Contrary to our best teacher's efforts, people continue to focus the majority of their attention on the base of the tree, the saw, or the ground.

National saw experts direct sawyers to be 'looking up', only occasionally checking the saw and kerf. Even when not sawing, seasoned woods workers habitually look up, seeming distracted from polite conversation.

A Brief Description

This attention-grabbing demonstration reveals the actual timing of a falling limb or top. As portrayed in the introductory story, the notion of a lookout still has credence, and many have a naïve sense of how quickly things happen. Our debate tends to focus on the number of people at the stump, *versus the focus of their attention.*

> Here's another true pinecone story. The fellow remembers being extra thorough by holding a second pinecone in his left hand- just in case he missed with the first!

A soft ‘limb’ is hoisted up the flag halyard and a sawyer operates a chainless saw, pretending to fell the pole; the saw motor is running. The first demonstration has a lookout assigned to shout when the dummy ‘limb’ is released. When the ‘limb’ is released, everyone watching immediately learns how quickly events happen. The limb is a fabric tube stuffed with crumpled newspaper, released by a slip knot (or fitting) and trip line.

Throughout this exercise, participants scrutinize these critical few seconds, and have opportunity to try every mitigation and combination of mitigations. It becomes apparent a lookout cannot shout over the saw motor. The time required for a lookout to notice the falling material and then verbalize a warning, and then for the sawyer to hear, react and move, is beyond the time available. The direction the sawyer moves is an issue, requiring more reaction and processing time.

Whistles, horns, tag-lines, swamper at the ready, will all be assessed, at each unit. Radio communications with a helmet mounted headset tested by MTDC may be replicated. The workforce may derive novel techniques, but, most will learn the only way to avoid falling debris is to be personally looking up.

Equipment

All participants working at the base of the flagpole will wear typical PPE. PPE makes the demonstration real and also offers protection if the soft-limb makes a direct hit.

The dummy limb falls like a real limb, but is incapable of causing injury. The prototype is a 6 foot sock made of canvas and stuffed with crumpled newspaper. A similar length of fire hose will work, as will a ski bag or rifle scabbard stuffed with newspaper.

The trip line is chord secured to the halyard by a ring or loop, and attached to the soft-limb by a quick release knot (See attached page). A special fitting may work, but avoid any hardware on the falling soft-limb.

While a tower (such as a smokejumper exit tower) will work, a flag pole is more commonly available and better resembles a tree.

Reduce risk by removing the chain from a power saw. When demonstrating crosscut saws, try a cardboard or wooden mock-up, or a real saw with the guard in place. There may be other realms to explore, but in every case, think through the presentation and minimize the chance of an accident.

Technique

We should not intentionally hit anyone, even with a soft 'limb'. For the first demonstration, position the sawyer and 'limb' on opposite sides of the flagpole. Lookouts for saw operations are integrated into our culture; therefore, seek 'buy-in' from the crowd, and conduct the demonstration consistent with their expectations and past practices. The first lookout will communicate with a shout. The PPE equipped sawyer will fire up the saw and pretend to cut the pole. If the sawyer is properly trained, he / she will be looking up; however for this exercise, ask them to focus their attention on the saw bar, utilizing the eyes and shout of the lookout.

Have an assistant hold the flag halyards back out of the way, with the soft-limb under the ropes. This prevents the soft-limb and trip-line from fouling in the halyard. As the sawyer 'saws', pull the trip line and drop the limb. The lookout will shout, but will not be heard over the saw.

The soft-limb hitting the bar will be the sawyer's first indication that the limb has been released***. This is the most powerful moment, when everyone immediately understands the timing reality of falling limbs and tops, and the absurdity of trying to-out shout a chainsaw.***

Participants bring their ideas and experience with them. For the rest of the period, run additional trials, resetting the soft limb, and evaluate their suggestions in real time. As many of these techniques are well known, have the obvious props available. For example, people will suggest a light limb to poke the sawyer; so have an appropriate stick available and give it a try. Pinecones, stones, tag lines, air horns and whistles are all a part of our culture, even appearing in handbooks. At one point the Missoula Technology and Development Center devised hardhat compatible headphones for the sawyer. While this device is not available, local innovation may be able to create one, and then prove or disprove this system.

Drop the limb from various heights, and use the halyards to move the limb out from the base; most accidents occur within ten feet of the stump.

Many fine sawyers use a buddy system where a swamper / partner will be at the tree base, with their hand on the sawyer. Generally, the swamper will be watching for falling debris, and the sawyer will watch the saw. The falling soft-limb exercise is an excellent opportunity to determine the usefulness of this strategy. Most likely, the sequence including recognizing, communicating, reacting, and moving in an appropriate direction will take longer than the limb's fall.

Experts advocate looking up. Period. This exercise is perfect for comparing the actual times and safety margins. The lone individual will be able to side step a falling limb or top, but the margin is measured in a very few feet. Any extra steps for recognition, communication and reaction quickly negate that margin.

Another pivotal discussion relates to the number of people at the tree base. Clearly, two or more people scrambling away from a falling snag or limb will complicate, and maybe negate the escape. Go ahead and set up a falling soft limb exercise to make this point. ***The bottom-line is that everyone must be looking up.***

Escape Routes

This last point brings to light the other half of a clean escape- the escape route. If people are looking up, tracking the falling debris, it is more important than ever that their escape route be clean, and practiced. Challenge participants with balls, sleeping bags and other simple props. Practice cleaning out the escape route, and repeatedly model positive behaviors.