MANAGING RISK IN TRAIL CONSTRUCTION ACTIVITIES

AMERICAN TRAILS WEBINAR – JANUARY 2024

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- 29 years of trail building as both a volunteer and professional contractor
- 24 years in the fire service (Volunteer, Firefighter, Training Officer, Fire Inspector, Operator, Captain)
- 5 years in industry as a Machinist
DISCLAIMER

• I’m not a lawyer and have no intention of providing legal advice

• I’m not an insurance agent and cannot explain accurately what will or won’t be covered by a policy

• Good judgement comes from experience, experience comes from bad judgement. Learn from mistakes and don’t repeat them.
OBJECTIVES

We’re going to talk about:

• Things that can hurt you
• Things that can kill you
• Things that can cost you money
IMPACTS (PHYSICAL OR MONETARY INJURY)

- You
- Your crew
- Company/Organization/Agency
- Trail users
- Adjacent residents
COMPONENTS FOR A LAWSUIT

• Standard or Duty
• Breach
• Injury
• Damages

• Anyone can sue anyone, for anything, at any time. Will it stand up in court?
SUBJECTS

- Trail Work safety protocols
- Tailgate Safety Talk
- PPE Recommendations
- Respiratory Protection
- First Aid
- Tool Safety
- Hazard Trees

- Fire Safety
- Notification Signage
- Reducing risk to users
- Theft/Vandalism/Site Security
- Operating Vehicles
- Operating Equipment
- Environmental Protection
Agency Specific

My recommendation is to utilize the USFS Job Hazard Analysis if you don’t have any others to reference.
TAILGATE SAFETY TALK

• Keep it brief but comprehensive

• It may be the only training that a new volunteer receives before picking up tools and going to work

• Follow a checklist

• For continuing projects, brief returning volunteers/employees on new hazards, weather forecasts, decision points, rally locations.

Safety Briefing (should take about 10 min, vary items not applicable)

Cost-earner warm-up, stretch before, during, or after safety briefing

Remind everyone to sign in, please notify your crew leader if you have sick

Environmental
- Weather • Wind • Heat • Cold • Snow • Rain
- Sun • Stinging • Poison weeds
- Hydration and snacks — stay hydrated and fueled up, offer where it is available

Special Hazards
- For: Dangers • Activity Levels • Terrain traps • Escape Routes
- Manual • Traps • Ride 
- Rolling objects on steep slopes
- Other Trail Users • Disguised Public
- Things that bite or sting
- Ticks, Mosquitoes, Spiders, Bees/Wasps/allergies?
- snakes, Scorpions
- Animals • Plants/Carencing/Crystal Deep
- Shooting (only mention if applicable)

PPE
- Helmet
- Gloves
- Eye Protection • Ear Protection (only mention if applicable)
- Long Sleeve Shirts
- Footwear
- Wear practical or physical limitations properly with your crew leader

Situational Awareness
- Communicate with crew
- Finger and Eye
- Wearing unused equipment (only mention if applicable)

Tool Safety
- Carry point; put away on the downside
- Keep your dines (C) running or unused
- Storing tools in the proper place, perpendicular to the tool, handle upward
- Sharp edges, wear gloves at all times when handling
- Right tool for the right job, if it’s not a rock saw or pick, don’t pry with it
- Avoid overhead scratching, or colour first
- Eye Injury: Use x-rays
- Steep tool: often
- Protect your back

Emergency Situation
- Notify Crew Leader of an injury immediately
- Identify Medical Training among crew and location of first aid kit
- Call Blaine • Contact Service
- Radio • Identify location and verify channel and who will use
- Confirm description of location of victim
- Identify who will set up 122 or return to access point to lead in emergency responders

Today’s Project — Brief description of overall project and focus for the day
Get a head count to confirm number of volunteers
PERSONAL PROTECTIVE EQUIPMENT (PPE)

• My recommendation, and requirements on many USFS districts:
  • Long sleeves
  • Long pants
  • Sturdy shoes (no crocs, sandals, flip flops)
  • Gloves
  • Hard hat or bike helmet
  • Eye protection
ADDITIONAL PPE

- Operating equipment or power tools – Ear protection
- Operating chainsaws – Chaps
- Rock Work/Armoring – Knee pads
- Rock Drilling/Splitting/Grinding – N95 respiratory protection
- Wood Preservatives/Sealer/Stain – Chemical protective gloves
RESPIRATORY PROTECTION

Provide for respiratory protection to protect airway from:

• Dust
• Smoke
• Work operations that produce airborne particulates:
  • Rock drilling/cutting/grinding
  • Airborne Silica standards
• Recommend wearing an N95 mask with exhalation valve
FIRST AID

• Training
  • When required, generally the minimum is CPR and a 4 hour First Aid class.

• Supplies
  • FAK
  • Bleeding Control
    • Tourniquet (C.A.T. is my preferred)
    • QuikClot
TOOL SAFETY

- Use the right tool, in the right way, for the right job
- CUSS
  - Carrying tools
  - Using tools
  - Storing tools
  - Safety with tools
- Inspect for damages and remove from site if necessary
POWER TOOLS

- Follow directions
- Keep work area clear
- Stable stance/Good grip
- Manage and protect power cord
- Awareness of cordless tool batteries
  - Store out of the sun
  - Keep dry
  - Avoid counterfeits and knock-offs
HAZARD TREES

• These can present a hazard anywhere you have trees:
  • Dead/Dying/Storm Damaged/Insect Damage
  • ‘Tree Strikes and You’re Out’ training document
• Minimize time under suspect trees
• Maximize distance from suspect trees
Tree Strikes You're Out

Introduction

SNAPs are dead or dying trees. Hazard trees can be dead, dying, or green trees that are unstable. Over the years many people who have worked in the wood have been killed or injured in accidents involving hazard trees. On the Phases, and elsewhere in western forests, SNAPs are becoming an ever-increasing hazard after years of drought, fire exclusion, and log kill. Because of these concerns, a committee has been formed to study this problem and develop ways to help protect people. This problem is becoming more acute of the issue.

Results of a forest survey indicate that many people have had accidents or close calls due to STAPs and other hazard trees.

This pamphlet has been developed, with information from the National SNAP Hazard Task Force and others. We hope to increase awareness and educate employees about the dangers of hazard trees and how to work safely in the woods. The information in this pamphlet will help employees to:

1. Recognize indicators that will identify hazard trees.
2. Identify what work situations could put employees in danger (Watch-out Situations).
3. Apply appropriate safety guidelines.

Fact: There are several million SNAPs on the Phases.
Fact: All these SNAPs will come down.
Question: Will you be under one when it comes down?

Hazard Tree Indicators

- Numerous downed trees.
- Leaning trees.
- Dead or beaked tops and/or limbs hanging in the trees.
- Absence of seedlings, back, or limbs.
- Presence of rot indicated by cracks, broken tops, basal scars, cut bases, numerous down limbs, sap, abundance of woodpecker holes.
- Stump holes boring in the area.
- Smokes or fire burning in the base or tops of either dead or live trees may indicate rot and/or weakening of tree.

Watch-out Situations

- Snaps are falling or have fallen in work area.
Matt Canyon Hazard Tree incident

Lake Tahoe Basin Management Unit
August 25, 2016

On Thursday, August 25 there were seven different work groups (20 volunteers) assigned to the trail segment. They had a pre-work briefing, discussed work assignments, specific tasks, safety issues/concerns and identified the highest qualified medical person (Wilderness First Responder).

"I heard a crack and saw it falling - I yelled to John but it fell too fast."

The group from the previous day went back to the snag area. Because they are not allowed to cut standing trees and knowing that asking someone from the Forest Service to come cut it would halt their progress, they prepared to pull it down using the same equipment they use to move big rocks. As John was preparing the rigging another crew member was above the snag and heard it crack. He saw the snag begin to fall and yelled at John to warn him, but the snag fell too fast. The snag hit John on the left rear side of his hard hat and shoulder. He was 35 feet away from the base of the snag.

Scuff marks on John’s hard hat

Looking back at stump from where John was struck

"The hardhat probably saved his life. We put on our hardhats as soon as we leave the vehicle."

Wilderness First Responder
FIRE SAFETY

Ways you can start a fire on a trail project:

• Metal on rock – swinging tools, pedal strike, equipment blade/bucket/tracks
• Fueling operations/Fuel leak/Hydraulic leak
• Equipment - overheating/electrical/debris buildup in the belly pan
• Hot Work – grinding/cutting/welding/blasting
HYDRAULIC FLUID LEAK IGNIITES

• https://www.youtube.com/watch?v=1Kgv8gQYE58
FIRE SAFETY

Ways to reduce the risk of starting a fire or stopping an incipient fire:

• Easy access fire extinguisher on or near any powered equipment

• Plan work around fire weather conditions
  - Do higher risk activities in the AM

• Stop work during Red Flag Warning or Industrial Fire Precaution Level Restrictions.

• Pre-wet areas around hot work, welding blankets as screens, choose better methods (Sawzall vs. grinder)

• Fire water on site or easily accessible
  - Backpack Pump/Portable tank + pump
Avoiding Fuel Geysering

Fuel geysers continue to be reported and the potential for injury is real. In 2018, there were 28 incidents of fuel geyser reported: 23 chainsaws, a leaf blower, and four Jerry cans. A fuel geyser can happen on any equipment with a fuel tank including fuel bottles and containers. Even chainsaws with two-way vents may "geyser" at high temperatures or high elevation. Users should assume all gas-powered equipment and fuel containers are pressurized.

Fuel - Know Your Fuel

- Fuel volatility changes seasonally and geographically.
- Think locally. Using fuel from a cooler climate (i.e., Texas) in a warmer climate (i.e., Texas) increases the geysering potential.
- As elevation increases, boiling point temperatures decrease. 125°F at 8,000 feet is approximately equivalent to 140°F at 1,000 feet.

Fuel Bottles and Containers

Fuel bottles (i.e., 1-gal bottles). Fuel containers (i.e., dolmars or Jerry cans) can geyser even after the cap is removed. To mitigate possible fuel geyser and/or potential injury from fuel bottles and cans, use the following procedures:

- Always open a fuel tank within 20 feet of any heat source.
- Gently shake the container to release surface tension. Too much agitation will create pressure.
- Open container slowly, pointing opening away and cover the opening with a cloth and glove.

Engine Powered Equipment

- Never use fuel that was stored in a fuel container for longer than one month. Older fuel may lead to poor engine performance and increased operating temperatures. Older fuel may also have higher volatility for the current conditions.
- Always check the fuel level in the tank before taking any action. Fuel levels above 1/2 tank are more likely to geyser.
- Never open a fuel tank within 20 feet of any heat source.
- Only after the above mitigations are completed, put the equipment in a closed area, cover the cap with a cloth or glove, and open slowly.

Example of a fuel geyser
https://www.youtube.com/watch?v=Ja9t4PtJx_Q

STIHL SAFETY Video
https://www.youtube.com/watch?v=wjSczH0Yli8&t=458s
NOTIFICATION SIGNAGE

• Much easier building new trail with minimal users present than doing maintenance along an existing trail

• Notification signage at trailhead/intersections/access points
  • Expected times and dates
  • Option for other routes

• Work area signage
  • Approaching the work site
  • Ensure good sight lines to signs
TRAIL ACCESS NOTICE

Construction activities related to trail repair and culvert replacement will be occurring on the Keystone Canyon Trail with staging of equipment and materials at the East Keystone TH.

Temporary Trail Closures and/or access/parking restrictions may be in place MON - FRI 7 am to 5 pm

Expected dates are March 17-27

ADVANCED FLOW

BICYCLES ONLY

- Experienced Riders Only
- Jumps and Drops present
- Inspect features before riding
- Do not create go-around lines or modify features to suit your riding ability. Improve your riding ability to match the features.
- Use caution in windy conditions
- Downhill travel only
- No walking on berms or jumps
- No Dogs on sculpted dirt trails
- Stay off when wet or muddy
USER SAFETY

- Introduced hazard vs. naturally occurring hazard
  - Tools left on trail
  - Borrow pit left open
  - Items placed in the fall zone (decorative rocks, sign posts, etc...)
  - Rebar
SITE SECURITY - BACKCOUNTRY

- Theft and vandalism is fortunately pretty rare on remote projects but not unheard of.
  - Animals causing damage is more likely
- My preferred method of site security is camouflage
  - Make your worksite minimally noticeable
- Trail cameras
- Cables and locks when needed
- Tool caches hidden
SITE SECURITY – FRONT COUNTRY

• Deterrents
  • Keeps the honest people honest

• Temporary fencing, Cargo containers, Jobox, Cables/Chains/Locks

• Surveillance trailers
OPERATING VEHICLES - OHV

• ATV or UTV safety training courses – online or in-person
• Hands-on orientation (OJT)
• Use PPE

• Online Course Example:
  https://safetraining.com/course/atv-utv-training-online-course/
• Probably the highest risk activity you have as a business/agency/organization

• Ways to reduce that risk:
  • Defensive driver training
  • CDL training
  • Cone course – spatial awareness

• Online Defensive Driver Training Example:
  https://www.nsc.org/safety-training/defensive-driving/courses/online
OPERATING EQUIPMENT

• Keep uninvolved people away
• Be aware of your blind spots
• Training progression
• PPE
• Restraints
• Rollover prevention
  • understand your center of gravity
OPERATOR GETS LESSON IN SEATBELT USE

• https://www.youtube.com/shorts/0yyCmOB7tb8
Bulldozer Rollover Fatality

July 14, 2018
Ferguson Incident
18-CA-SNF-000749
18-CA-MMU-014439
California Southern Region

SUMMARY

On Saturday, July 14, 2018 a CAL FIRE Bulldozer was operating on the Ferguson Incident in Marion County, California. During the early morning hours, the CAL FIRE Bulldozer experienced a rollover which resulted in fatal injuries to the Heavy Fire Equipment Operator (HFEQ-1).
Simulated movement within cab of CAL FIRE D4641 during rollover
(Note single lap belt)
ENVIRONMENTAL PROTECTION

- BMP’s
  - Sediment reduction precautions
- Spill kit on site
THANK YOU!

• Questions?

• Resources folder: