

Supporting Information

Contents:

- Table: Tree Strike Accidents and Incidents, 2000 - 2014
- Mindmap: Action/Decision to Build Line Where They Did
- Mindmap: Firefighter Views (quotations)
- Methods Used to Develop the Saddleback Learning Review
- Reference List

Tree Strike Accidents and Incidents, 2000 - 2014

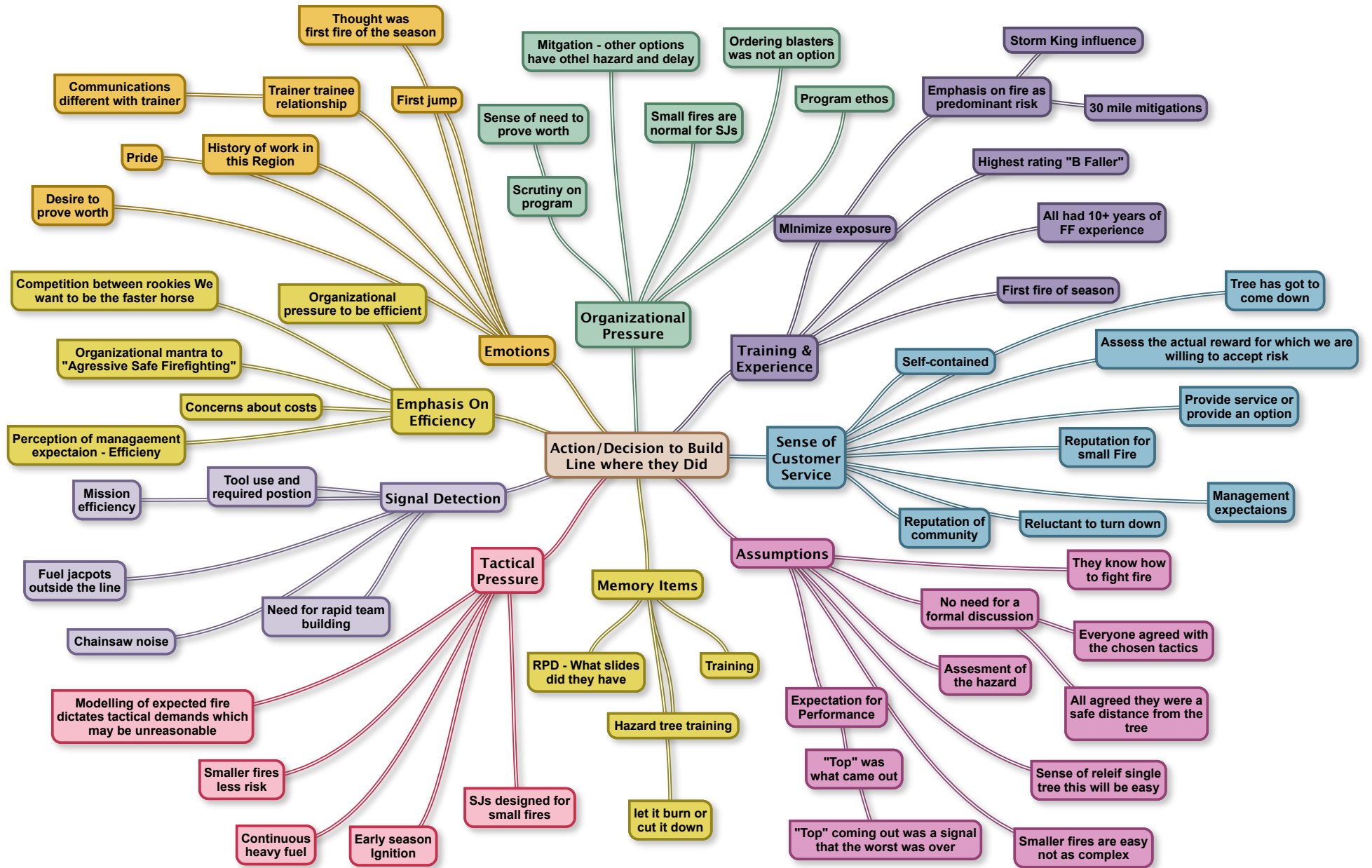
Incident / Accident	Year	Injury / Fatality	• Highlights of Lessons Learned & Recommendations
Cowles Bog Accident, IN	2013	Injury Root ball gave way	<ul style="list-style-type: none"> • Remove dead and down prior to operations • Be aware of weather conditions such as a freeze-thaw cycle
Saddleback Fire, CA	2013	Fatality	<ul style="list-style-type: none"> • Hit by snag while building line • Learning Review pending
Deschutes NF, OR	2013	Fatality + injury	<ul style="list-style-type: none"> • Two fallers hit by snag. One injury, one fatality • Contract firefighters • Report pending
Florida Training Exercise	2012	Injury	<ul style="list-style-type: none"> • Trainee hit by snag during training felling field exercise
Circle Meadow Prescribed Fire, CA	2012	Injury	<ul style="list-style-type: none"> • Jumped out of way of falling snag and injured ankle • Analyze risk-to-reward • Consider tactical pause; beware of tactical fixation • Consider how/when to protect special 'named trees' (which have become important to the public)
Gold Pass Fire, ID	2012	Injury	<ul style="list-style-type: none"> • Hit by snag during mop-up • Firefighters should never assume that "all" snags have been removed from an area after a felling procedure
Lockheed Incident, CA	2012	Injury CAL FIRE Greensheet	<ul style="list-style-type: none"> • Inmate firefighter struck by felled tree • Ensure that no one is within two times the tree falling length
Marble Yard/Daniel Boone Forest Incidents, KY	2012	Injury (FLA)	<ul style="list-style-type: none"> • During mop up phase, one firefighter hit by snag • Suppress activities during high wind events • Be aware of timing (such as if the fire has had time to burn longer/smolder in trees)
Sunflower Fire Incident, AZ	2012	Injury (FLA)	<ul style="list-style-type: none"> • Hit by tree during hazard tree felling • Always have adequate personnel when doing falling operations

Incident / Accident	Year	Injury / Fatality	• Highlights of Lessons Learned & Recommendations
Chips Fire, CA	2012	Injury (FLA)	<ul style="list-style-type: none"> • Contract faller hit by limb, while felling a tree • Minimize pounding on snags with overhead hazards • Ensure sawyers practice on the ground risk management to avoid unnecessary exposure. • Consider alternative methods to hand falling snags in high risk situations
Steep Corner Fire, ID	2012	Fatality	<ul style="list-style-type: none"> • Hit by falling tree, while building line • Biggest concern on fire were hazard trees a “common” foe
Bagley Fire, CA	2012	Injury	<ul style="list-style-type: none"> • Hit by ‘tree debris’ • Even ‘safe’ locations can present a hazard
Scotts Chapel Road Fire, KY	2011	Fatality	<ul style="list-style-type: none"> • Firefighter hit by burning snag • Follow hazard tree SOP’s
Buckhorn Tree Felling, CA	2011	Injury (CAL FIRE Greensheet)	<ul style="list-style-type: none"> • Sawyer struck by falling limb while felling tree (inmate firefighter)
Chittenden Felling Operation, MI	2011	Injury (FLA)	<ul style="list-style-type: none"> • Sawyer struck on head by tree, while exiting along escape route • Learn about tree species and characteristics
Hastings Fire, AK	2011	Injury (FLA)	<ul style="list-style-type: none"> • Hotshot struck by tree during mop-up • Risk can only be managed, not eliminated
Northern Region Occ. Safety & Health Fire (?)	2011	Injury	<ul style="list-style-type: none"> • Sawyer hit by bole of tree during felling
Crystal Lake Felling Operation, CA	2011	Injury (FLA)	<ul style="list-style-type: none"> • Sawyer hit during tree felling • The instructor/leader needs to take control of the operation when it goes beyond a learning environment • When feeling anxious or stressed take a tactical pause to reevaluate the situation
Snow Gate, OR	2011	Injury	<ul style="list-style-type: none"> • Firefighter struck by burning snag while constructing line • Empower individuals to voice concerns and communicate hazards
Sequoia National Forest, CA	2011	Injury (FLA)	<ul style="list-style-type: none"> • Hit by tree during felling • Learn tree species and recognize tree characteristics before cutting • Do not assume your size-up is flawless

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Project Work Tree Strike, CA	2011	No Injury (FLA)	<ul style="list-style-type: none"> • Hit by tree during felling • Sawyers need to take command of their area of operations
Birthday Fire, MT	2010	Injury (BIA)	<ul style="list-style-type: none"> • Firefighter struck by a limb
Pat Creek Fire, AK	2010	Injury	<ul style="list-style-type: none"> • A gust of wind blew over one tree, which hit another, then the third tree – which struck the firefighter • Crews cannot assume that all hazard trees have been removed after felling activities • Only 72 hour report available
Crandall Felling Accident, WY	2010	Injury (APA)	<ul style="list-style-type: none"> • Sawyer struck by snag during tree felling
Jesse Fire, ID	2010	Injury (FLA)	<ul style="list-style-type: none"> • Firefighters hit by snag during line construction • This injury occurred just after a briefing that identified snags as a problem in the area – the Banner Fire incident had happened the day before • Recommendations suggested updating existing training material on snags
Banner Fire, ID	2010	Injury (FLA)	<ul style="list-style-type: none"> • Firefighter struck by snag during fire management
Meadow Creek Fire, CO	2010	Injury (APA)	<ul style="list-style-type: none"> • Firefighter hit by tree
Freeman Reservoir, CO	2009	Fatality	<ul style="list-style-type: none"> • Firefighter hit by section of tree, during training exercise
Little Grass Valley, CA	2009	Injury (FLA)	<ul style="list-style-type: none"> • Firefighter hit during tree felling operation
Dark Ridge Tree Felling Incident, KY	2009	Injury	<ul style="list-style-type: none"> • Tree fell on firefighter during felling • Only 72 hour report available
Bull Run, OR	2009	Fatality	<ul style="list-style-type: none"> • Firefighter hit by snag that may have been knocked over by helicopter rotor-wash
Volusa County Fire Services, FL	2008	Fatality	<ul style="list-style-type: none"> • Sawyer cut tree, swamper hit by tree as it was falling
South 1 Fire, NC	2008	Injury	<ul style="list-style-type: none"> • Snag hit firefighter during mop-up • Only 24 hour report available
Rattle Fire, OR	2008	Injury (HRO Review)	<ul style="list-style-type: none"> • Sawyer hit by snag from a different tree than he was falling • Pay attention to weak signals

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Lime Complex, CA	2008	Injury	<ul style="list-style-type: none"> • During tree felling, a snag broke into multiple sections and one piece rolled into two National Guardsmen
Camel Hump Incident, WA	2008	Injury (FLA)	<ul style="list-style-type: none"> • Rappeller struck by snag that had been cut during falling operation • Focus on hazard tree risk management SOP's
Dutch Creek Fire, CA	2008	Fatality	<ul style="list-style-type: none"> • Firefighter struck by tree during felling operation • Crew was assigned to cut trees outside their falling qualifications
Trapper Ridge, ID	2007	Injury	<ul style="list-style-type: none"> • Hotshot struck by hazard tree that fell as they were constructing fireline • Only 24 hour report available
Rombo Fire, MT	2007	Injury (FLA)	<ul style="list-style-type: none"> • Hotshot struck by snag after he felled a green tree • Do not engage in the fire, unless necessary • Before cutting the target tree, look around for other trees/hazards that may affect current operations/safety and clear the workspace first • Design sand table exercises around tree falling accidents/training
Stanley Accident, TN	2006	Fatality	<ul style="list-style-type: none"> • Forestry technician struck by falling tree, which was pushed over during dozer line construction
Missouri Ridge Fire, ID	2005	Injury	<ul style="list-style-type: none"> • Sawyer struck by snag, which broke while he was cutting it
Powerhouse Fire, CA	2004	Injury	<ul style="list-style-type: none"> • Swamper hit by falling limb • Only 24 hour report available
Holmes Hazard Tree Fatality, CA	2004	Fatality	<ul style="list-style-type: none"> • Firefighter hit by snag as he transitioned from tree size-up to hose relocation • Falling snag was from a white fir tree • Confusing policy surrounding hazard tree mitigation needs to be rectified in S-212, the IRPG, and the Fireline Handbook • Fire policy including SEKI JHAs are not adequate to provide firefighter safety for hazard trees
Inyo National Forest, CA	2003	Fatality	<ul style="list-style-type: none"> • Dead tree fell and struck victim, who was sleeping in tent • Only 24 hour report available
Borrogo, NM	2002	Injury?	<ul style="list-style-type: none"> • No reports available
Missionary Ridge Fire, CO	2002	Fatality	<ul style="list-style-type: none"> • Faller was struck from behind by an aspen whose root system had been weakened by fire, while walking in woods • Only 24 hour report available (very sparse)

Incident / Accident	Year	Injury / Fatality	• Highlights of Lessons Learned & Recommendations
East Fork, WY	2002	Injury?	• No documents available
Labor, MT	2001	Injury?	• No documents found
Holyoak Accident, UT	2001	Injury	<ul style="list-style-type: none"> • Hit by falling snag during burn project • Sparse 'letter-style' report
Poplar Log Fire, KY	2001	Injury	<ul style="list-style-type: none"> • Snag hit firefighter, while he was building fireline • Develop training for individuals not familiar with Eastern Tree Species when coming from the West to the East • Have qualified personnel scout for snags prior to constructing line
Whitley County, KY	2000	Injury?	• No documents found
Concow fire, CA	2000	Injury	• Firefighter hit by falling snag





Methods Used to Develop the Saddleback Learning Review

Data Collection Team

Using the Coordinated Response Protocol and the Draft Learning Review Guide, a Data Collection Team (DCT) was assembled to gather information from the Saddleback fatality accident, to support the creation of a narrative of events and determine the key decisions involved. This team went to the accident site, took photos, and interviewed individuals who were directly, or indirectly involved in the event.

The DCT focused on information that could lead to a greater understanding of the context in which the events at Saddleback unfolded. The data and stories collected at the site were then given to an off-site Sensemaking Team, who would create the final analysis and learning products.

Sensemaking Team

A Sensemaking Team (ST) was assembled, as described in the Draft Learning Review Guide, to map/understand the connections between pieces of information gathered by the Data Collection Team and to create multiple learning products. The ST engaged in dialogue and sensemaking exercises around actions/decisions at Saddleback and considered key events, the event narrative, standard operating procedures, and organizational policy. In addition, the ST drew on information from previous Investigations, Accident Preventions Analyses and Facilitated Learning Analyses. Over 100 reports were read, in an effort to determine the commonalities between tree strike events and to map potential organizational efforts toward prevention of this type of accident.

Follow up interviews were conducted with Saddleback participants, as needed. Firefighters and fire leadership from outside the event were also engaged for their views. The scope of inquiry was then extended to an academic field of experts, drawing from specialties like signal detection, sensemaking, resilience engineering and high reliability organizing.

The ST team realized that the Learning Review report would serve an informational function for the organization and the field, but that an additional Field Learning Product was needed to help prevent similar accidents. The basic question emerged:

“How can we present a short learning product to wildland firefighters, to help them understand the concepts of signal detection, Margin of Maneuver, and Sensemaking, and apply these to real world situations?”

Focus groups were assembled, which consisted of wildland firefighters, pilots, Staff Officers, and Line Officers. These sessions resulted in support for the concept of MOM and suggested the need to further develop critical thinking skills in the field. They also highlighted the important role of the organization in creating space for critical thinking and the development of a work improvement process.

The final Learning Review consists of an Organizational Report, recommendation for additional reviews, and a practical Field Learning Product.

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