Kelly Creek Project
A Felling Accident

Facilitated Learning Analysis

June 4, 2018

Low stumped section of felled tree

Contents

1. Narrative

On May 30, 2018, a BLM Type 2 IA Crew began working on a fuels project about six hours west-southwest of their home unit (same state). In addition to meeting the objectives of fuels projects, the superintendent historically pursues opportunities for the crew before they go out on fire assignments to emphasize additional chainsaw training, crew cohesion, scenario based training, and physical fitness. Originally, the crew was to begin project work on the Kelly Creek unit (BLM), but wet and muddy conditions at that site led to a decision to postpone work on the Kelly Creek unit. As a result, the crew shifted to the Birch Creek unit; another planned project in the nearby area with better site conditions at the time. Birch Creek is a Forest Service unit. The crew headed to the Birch Creek unit on May 30, 2018 and prepared to begin prepping line for a planned prescribed burn. As the crew approached the Birch Creek unit, they were unable to establish communications with the local dispatch center. Adamant about the importance of communication, the superintendent advised the crew to stand down while he worked to resolve the communication issue.

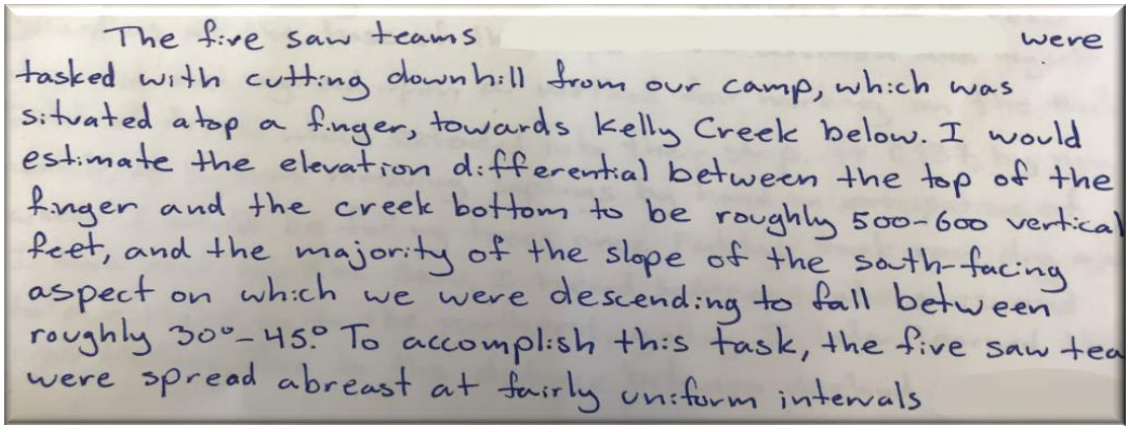
Radio Frequency Updates in Progress

Upon arrival at the local dispatch center, the superintendent was notified about an ongoing transition between 2017 and 2018 radio frequency updates. When the crew checked in with dispatch initially, they were given the correct 2017 frequencies for the Kelly Creek area repeaters, which had not yet been updated to 2018 frequencies due to weather. Repeaters in the Birch Creek area had been updated with 2018 frequencies, but the crew did not receive these when they initially checked in for the Kelly Creek project. Once they had both the 2017 and 2018 frequencies, they returned to, and completed, the planned activities on the Birch Creek unit successfully. Upon completion, the crew packed up and departed for Kelly Creek.

Kelly Creek

On June 3, 2018, the crew arrived at the Kelly Creek unit midday. They had established good communication with dispatch. The crew held a briefing, discussed their plan for the remainder of the day, and began work. They identified two helispots at Kelly Creek - one on top (H-1) and one at the base of the slope (H-2). The crew flagged and improved the route to H-2 in preparation for the felling operations that would begin the next day. Some saw work was necessary to accomplish this task.

At 0730 on June 4, 2018, the crew checked in with dispatch and completed their morning briefing before breaking out into their saw teams. The five saw teams consisted of 10 Faller 2s (FAL2), and each sawyer rotated every 45 minutes, or each tank of fuel. The five saw teams lined up from east to west (team 1 on the east end and team 5 on the west end). They began working downslope; horizontally aligned and working in vertical lanes. The prescription for the unit called for all trees smaller than 12” diameter at breast height (dbh) to be felled.


The five saw teams were tasked with cutting downhill from our camp, which was situated atop a finger, towards Kelly Creek below. I would estimate the elevation differential between the top of the finger and the creek bottom to be roughly 500-600 vertical feet, and the majority of the slope of the south-facing aspect on which we were descending to fall between roughly 30°-45°. To accomplish this task, the five saw tea were spread abreast at fairly uniform intervals

Slope description

Tree density on the slope varied. Saw teams 1, 4, and 5 had more trees meeting prescription in their lane, which created a difference in the amount of time it took for the saw teams to advance downslope. Both project lead and crew reported that there was not an emphasis on production or pace; this was an opportunity for the crew to continue saw training in the field. Taking time to learn and improve technique was emphasized, while also correcting any identified deficiencies. Saw teams took the time to stop, discuss technique and ask questions of each other. The crew believed this was an important part of their training.

Saw teams 2 and 3 progressed much faster down the slope. This created line of sight and communication issues (slope went from 30 degrees near the top to 45+ degrees at mid-slope).

Incident

Saw team 4 felled a tree on the upper slope. This left a tall stump on the slope that needed to be low stumped. The low stumped section was green and heavy; making it difficult to manage on the moderate to steep slope. Once the low stumped section was released from the stump, it got away from Team 4 and began rolling down-slope. The team began shouting "Roller!" repeatedly while running down the slope. It looked as if the log would stop in the trees below. As the sawyer on Team 4 ran far enough downslope to see the creek at the bottom of the slope, it was apparent that the log was still traveling down slope catapulting end over end at a high rate of speed toward the creek below. Saw team 2's swamper heard something, looked up, saw the log, and screamed "Roller!" to team 2's sawyer. Sawyer 2 released the trigger of the chainsaw, looked up, and received a direct hit from the stump.

Felled tree

Low stumped section of tree at accident site

"It looked like it was going to get caught in the patch of timber right below us, but as I began to run down slope yelling 'roller,' I saw that it was still going."
- Swamper, Saw Team 4

A sawyer standing at the impact site

> **"I hear: ROLLER! ROLLER! ROLLER!"**
> - Swamper, Saw Team 2

The log made impact with the chainsaw, which was held in front of the Sawyer 2's waist. Both the chainsaw and log were driven into the sawyer's body. Sawyer 2 was driven violently backwards into the ground. Sawyer 2's saw team partner witnessed the strike and immediately went to assess Sawyer 2's condition.

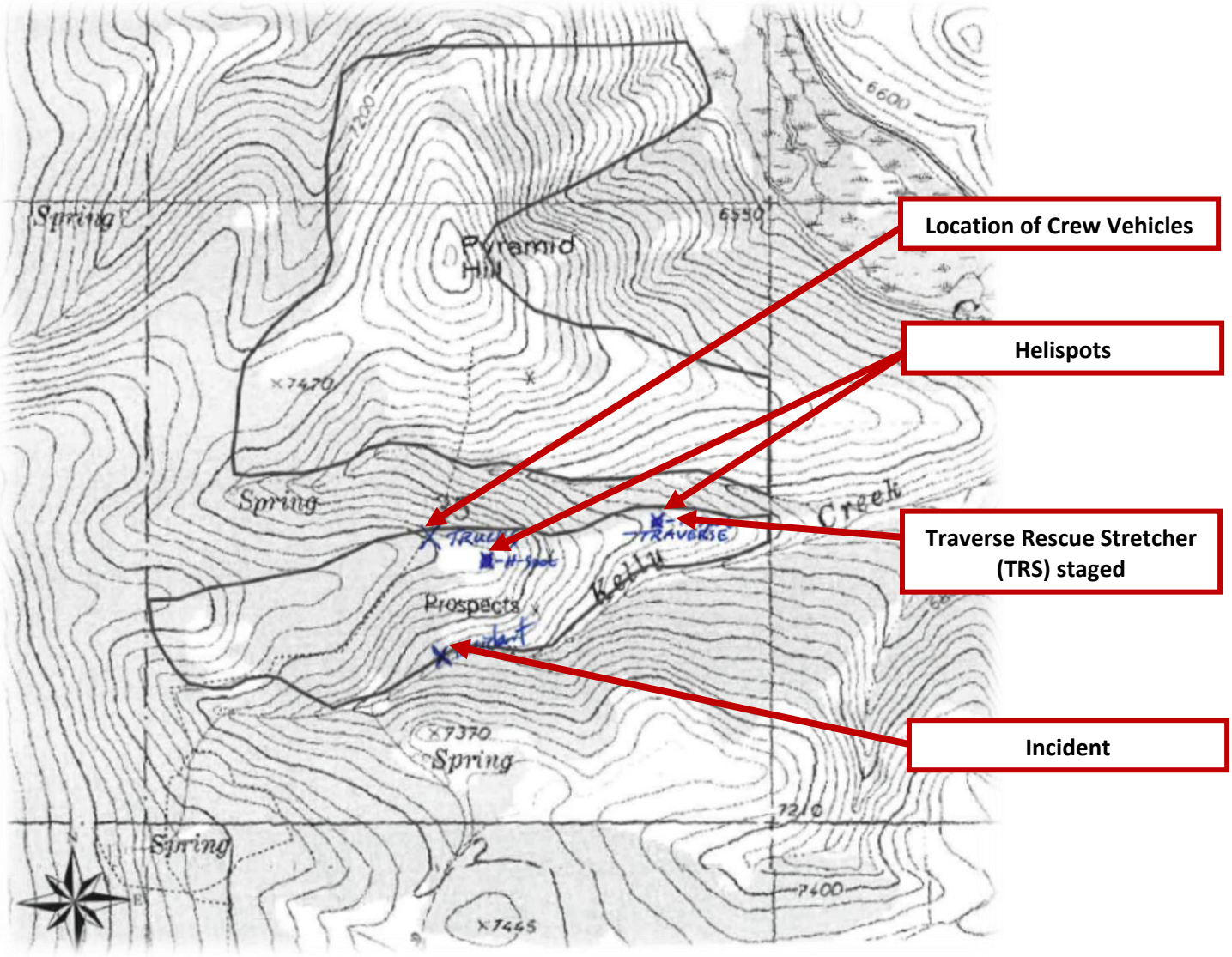
Patient Care

Four of the crew's five emergency medical technicians (EMTs) responded immediately to Sawyer 2's location and began providing care and holding c-spine (Sawyer 2 is the senior EMT on the crew and fifth EMT). Sawyer 2 was unconscious, bleeding from the head, and breathing laboriously. Within minutes, Sawyer 2 regained consciousness, appeared alert, and began breathing normally. Another crew member also arrived on scene with the trauma kit (from the top of slope), while another crewmember arrived with the Traverse Rescue Stretcher (TRS), which had been staged near H-2 on a flagged path. The crew's four EMTs performed assessments, controlled bleeding, and packaged Sawyer 2 for transport. Sawyer 2 was stabilized, bandaged, and loaded on to the TRS in less than fifteen minutes from time of impact. Sawyer 2 was transported from the bottom of the slope to the vehicle on top of the hill in 11 minutes.

> **"Everyone was familiar with the TRS. We had just ran a scenario."**
> - Crewmember

Broken front handle (see arrow)

Arrow indicates where impact with the saw occurred



Topo map with site markers

> **"It was a great response. I couldn't have been in better hands."**
> - Sawyer 2

Radio communication was seamless. The crew notified the superintendent immediately via radio and continuously provided updates until Sawyer 2 was at the superintendent's vehicle. The superintendent was on the phone with dispatch initially, who was also able to listen to radio communications. Dispatch notified local emergency medical services (EMS) for a medical response to the area. The Forest Service law enforcement officer (LEO) heard the call to dispatch on the radio, and headed towards the area. The FS LEO had good communication with the ambulance, and provided updates to EMS as they were responding. The FS LEO led the ambulance into the area, which expedited their response.

Patient Transport

Due to the remote location of the project site, poor road conditions, and urgency in getting Sawyer 2 to definitive care, the crew superintendent and one EMT planned to drive "until (we) meet the ambulance." A second truck with the remaining EMTs from the crew followed the crew superintendent's truck in the event that Sawyer 2's condition changed, or something happened to one of the vehicles while en-route. While en-route, the lead EMT continued to monitor Sawyer 2's

condition and record vital signs. Excellent radio communication was maintained between the superintendent, dispatch, and the FS LEO, who updated EMS.

At about 1045, Sawyer 2 was transferred to the ambulance and transported the remaining distance to the hospital. The lead EMT stayed with the Sawyer 2, while the two crew trucks followed the ambulance to the hospital. After imaging and a thorough examination at the hospital, Sawyer 2 was treated for injuries and released.

Looking down to Kelly Creek

2. Timeline Summary

June 4, 2018

0730 Crew checks in with Dispatch, conducts morning briefing, and commences falling operations.

0940 Low stump portion of a tree that had been felled rolled down the slope and struck another crew member at the base of the slope. Assessment and treatment of the injured sawyer begins.

0944 Crew superintendent made notification that the incident had occurred and requests ground transport by ambulance.

0955 Crew began to extract stable patient up the slope.

1006 Crew had gotten the patient to their vehicles and the top of the slope. Patient is transported from their remote location to meet the ambulance.

1045 Patient is transferred to the ambulance en route to hospital.

1125 Patient arrives at hospital to receive advanced care. (*time estimated by crew*)

1800 Following a thorough examination at the hospital, the patient was treated for injuries and released. (*time estimated by crew*)

3. Things Done Well

1. Focused on good communication with dispatch. This year, dispatch began tracking employees engaged in project work, which expedited the medical response and notification process.
2. There are not many opportunities for training prior to becoming available for fire assignments once seasonal employees complete their required training. The superintendent makes the crew unavailable until they are able to accomplish some project work. This allows them to 'work out the kinks' before they get on the fire line. This project work also helps both USFS and BLM accomplish fuels projects.
3. Five EMT's are on this crew; all having recently completing a week-long continuing education training together. The superintendent provided the time and funding necessary to build identical trauma kits on their rigs. Also, the crew frequently ran scenario based drills using their equipment. Nothing was foreign to them during the medical emergency. The crew's response was calm and focused on getting the injured to "big medicine' as soon as possible. The first EMT to the patient is always lead. All other EMTs understood that and followed the lead EMT's clear directions.
4. Calm. Communication with dispatch was clear and calm. The IA dispatcher shared that the superintendent's calmness on the phone and radio brought a sense of calm to the dispatch center.
5. The crew takes their training seriously. This allowed the response to Sawyer 2's medical emergency to occur as designed and discussed by the crew. Oddly enough, this was the worst case scenario discussed by the EMTs before they began work on Kelly Creek. Fortunately, this pre-planning led to the TRS being staged below, routes flagged, and no more than 26 minutes to pass from time of impact until transport to definitive care (don't forget the slope they had to climb).
6. Managing fatigue. This crew alternates sawyers. One tank of fuel on the saw, one tank of fuel off the saw (About 45 minutes on, and 45 minutes off).
7. Pre-positioned equipment prior to operations. Staging the TRS at the bottom of the hill was a major contributing factor to the impressive response time. The crew had a clear, flagged route to their equipment and lower helispot as well.
8. Physical fitness. This crew takes physical fitness very seriously. It also directly contributed to their ability to pack Sawyer 2 up an approximately 45 degree slope with 500 – 600 feet of vertical rise for transport. They were physically prepared for an arduous response such as this. The FLA team can imagine it felt pretty good to be capable of carrying your injured team-mate up such a slope in 11 minutes.

4. Lessons Learned by the Crew

1. The senior EMT on the crew was injured, but this did not impact an appropriate medical response because there were four additional EMT's on the crew.

   What they learned: The four additional EMT's were all necessary for this level of response to be achieved.

   Feedback from EMTs: The BLM needs to focus on an all-encompassing umbrella for medical direction.

2. The crew believes they should "tighten up safety on steep terrain."

   What they learned: Aside from observing how slope and topographical features effect heavy objects, the crew also touched on intuition. Some referenced a 'gut feeling' or thinking about the mantra: if you see something, say something – as being present in their mind. "Take ownership and say something." With the benefit of hindsight, they would have put voice to these 'gut feelings' or thoughts.

3. Take training seriously. Treat a scenario as if it were a real event.

   What they learned: Having trained on this scenario and other scenarios frequently, as well as everyone on the crew taking training as seriously, it was surprisingly smooth and calm. "Training or not, the expectation is the same." The superintendent shared that he was initially unsure whether this was a scenario medical or an actual medical. Regardless, their response was the same. One crewmember felt like their scenario training made the present moment situation more comfortable (as in not chaotic).

4. Chainsaw training.

   What they learned: More field time/trigger time is needed to increase experience and proficiency. If the superintendent didn't seek out project work, the crew wouldn't have the opportunity to cut until a fire assignment.

5. Radio communications.

   What they learned: With the 2017 to 2018 radio frequency transitions still underway, it was very important to inquire locally about the progress of this transition and what repeaters are on what frequencies. Interagency communication on this should be a priority.

5. Recommendations

1. **Chainsaw Training.**

   It is recognized that chainsaw operations are dangerous. However, it is an essential activity required to accomplish the Bureau's mission in natural resource management. While many options exist for chainsaw training, organizations have significantly reduced both accidents and near misses by advancing their State's chainsaw program; BLM Oregon and Washing provide a solid example. https://www.nwcg.gov/sites/default/files/htsc-chainsaw-blm-or-state-2007-add.pdf

   Indicators that our training may be inadequate: Both Bureau Policy (H-1112-1) and OSHA Standards (29 CFR 1910.266) clearly communicate some of the basic fundamentals for felling. Bureau policy identifies the 'secure area' as the entire downhill side on slopes where material can roll for long, unpredictable distances. OSHA standards direct all felling on slopes where rolling or sliding of trees or logs is reasonably foreseeable to be performed uphill – from, or on the same level as, previously felled trees. These are basic fundamentals, which were not observed. If the crew understood these and the reasons why they are so critical, felling operations would have looked different.

   It is important to understand that the crew believed their approach would bring efficiency and safety to the crew. If they hadn't, the plan would not have been embraced. Everyone wanted to go home safe and have a good season. The superintendent understood the importance of communication, which is why this project is a model of communication done right. If greater emphasis was placed on the BLM chainsaw training program, the Bureau would experience a significant reduction in felling accidents/incidents.

   To note: It just so happened that the low-stumped section of a tree that had recently been felled rolled down-slope. If it hadn't released when it did, it would have remained on the slope, the saw team would have advanced down slope for their next cut, while the hazard rested above them. That scenario does not exist when working upslope, and is the reason behind the standards. This note is shared to help understand the intent behind the standard. This is not the first time this event has occurred – in government or private industry.

2. **Utilize the Medical Incident Report.**

   While the response was appropriate and all necessary information was conveyed to dispatch, their success was due to an experienced dispatcher and EMTs in the field who were proficient in relaying and receiving vital patient information.

   The recommendation is to adopt the Medical Incident Report as the go-to reporting mechanism for medical emergencies. This is important to consistently communicate essential medical information, and contributes to the development of new/junior employees.

6. Kelly Creek Project Facilitated Learning Analysis Team

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