Prospect Rock ATV Rollover FLA

All Terrain Vehicle Accident Facilitated Learning Analysis

U.S. Forest Service – PSW Region 5 - October 2011

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Summary

This Facilitated Learning Analysis studies an event involving an All Terrain Vehicle (ATV) rollover on October 31, 2011. The ATV was being used to patrol a Forest Service prescribed burn in a non-industrial capacity.

At about 1330 hours, while patrolling on one of the ATVs, the employee ATV rider attempted to ride up a hill on a control line, which was later estimated at being approximately a 40% grade. Before reaching the top of the grade, the ATV began to tip over backwards after striking a rock with a front tire. The rider jumped off to the left, striking his shoulder on the ground, sustaining a broken collarbone. The ATV flipped over backwards completely (once), landing upright on its wheels. It did not strike the rider and sustained minimal damage so it was able to be driven back to the station. The rider radioed his crew members for assistance and they arrived within minutes, although none of them actually witnessed the accident. They brought their engine to the closest road to the injury site while the Lead Emergency Medical Technician (EMT) hiked downslope to where the rider was lying on the ground. The EMT did an initial assessment, made a sling for the rider's arm and with help from another crew member assisted the rider (who was ambulatory) about 267 feet up the slope to the road where the engine was waiting. The Duty Officer was notified by cell phone and radio of the injury. The crew members then shuttled the rider in two different smaller Patrol and Utility vehicles away from the burn site to the ranger station and then to the hospital where he[1] was treated for the broken collarbone and released the same evening.

- The employee was licensed and authorized to drive the government-owned ATV, had current refresher training and was familiar with the area.
- The employee was not overly tired and had received adequate rest before the accident.
- The weather was not a factor
- The employee was wearing all required PPE.
- The ATV was almost new and in good repair, although a Fire Prevention Technician (FPT) noted one of the rear tires seemed to be underinflated just prior to the accident.

- *FSH 6709.11*

13.21 Qualifications

2. Only authorized and certified employees shall operate ATV/UTVs (sec. 13.21).

4. Forest Service ATV operators shall successfully complete the ATV Safety Institute (ASI) ATV Rider Course training or equivalent training, that is approved by the forest supervisor, assistant director, or line officer having responsibility for the task/project.

A condition leading to this accident appears to be the extreme slope of the hill and the speed needed to ascend successfully. Upon striking a rock, the front end of the ATV lost traction and became airborne, with the subsequent momentum flipping it backwards into a rollover. The reported under-inflation of a rear tire may also have been a factor as well. This event illustrates how, in a split second, a situation can occur which thankfully did not have devastating consequences. Due to training and experience the rider jumped off in time to avoid a more serious injury.

The pronouns "he/his/him" are neutral; they are used in the document purely for readability and do not denote gender in any way.

What was planned

The "Prospect Rock" prescribed burn was planned and executed on the National Forest in late October, 2011. This was a Forest Service Type II prescribed burn. The weather was fair, temperatures in the mid 70's with light winds. A JHA for seasonal prescribed burn projects was in place.

The engine module was comprised of a Supervisory Fire Engine Operator (SFEO), an Asst. Fire Engine Operator (AFEO), and two apprentice fire fighters, to patrol control lines on the burn looking for "spotting." They were familiar with much of the area, having patrolled it several times in the past few days. The SFEO was the designated "Holding Boss," in charge of the crew and had already "put about 200 miles on the quad out there on the burn units" prior to this incident. The AFEO and one of the Apprentice fire fighters are also trained Emergency Medical Technicians (EMT), with the AFEO assigned as "Lead EMT." Two members of the crew were patrolling on foot while two were riding four-wheeled ("quad") ATVs. A Fire Prevention Technician (FPT) was off site attending to a brief errand, intending to join the crew later in the morning.

This area is fairly remote and rough, at an elevation of over 4000 feet. This area had been scouted about two days prior by the Lead EMT (AFEO) to assess the relative risk. The AFEO determined it could be safely navigated on ATVs, therefore both ATVs were utilized in that area that day. The control lines were old handline and skid trails, surrounded by a treated area that was dry, somewhat rocky, covered with some low brush, duff, and downed branches, with trees and stumps here and there, but not that close together.

What actually happened

At about 0930 on October 31, 2011, this particular crew held a briefing to determine which units they would be patrolling that day. At about 1330 hours, while patrolling a control line on one of the ATVs, the SFEO decided to ride up a fairly steep hill, later estimated at 40% slope. He stopped the ATV and scouted the hill on foot, deciding he could navigate it safely. He "had to jockey the quad around to get a straight shot," and headed up the hill. Just before he got to the top the ATV hit a rock and flipped over backwards. The SFEO jumped off the ATV to the left, landing on the ground and was not hit by the ATV before it came to rest right side up just below him. The SFEO was carrying a pack behind his seat to "center" weight distribution, and a tool in the rear basket of the ATV.

The SFEO called for help on his handheld radio twice and his crew located him after the second call, once they recognized his voice. His first radio transmission for help was not clearly understood. They all knew each others' general locations and located the SFEO fairly quickly. By then they had organized themselves and

decided who would get the engine, where to move it and who would hike over to where the SFEO was and begin medical aid. The Lead EMT was the first to reach the SFEO and render aid, radioing for a medical bag from the engine. At that point the FPT had just arrived from his errand and brought the medical bag down the hill. The Lead EMT suggested calling for an ambulance, but the SFEO declined, requesting their assistance to hike up the up the hill to the engine. The district Battalion Chief (BC) happened to be nearby cutting wood on his day off and was able to assist by helping to shuttle crew members around to facilitate transportation of the injured SFEO, the other crew members and the ATVs. After seeing and speaking to the injured SFEO, the BC instructed the Lead EMT to take the injured SFEO to the hospital. The BC also contacted the Duty Officer and reported on the condition of the injured SFEO.

The injured SFEO was shuttled from the engine to a couple smaller more comfortable vehicles, and eventually made it down to their station. By then the injured SFEO had spoken to the Duty Officer by phone, explained what had happened and reiterated that he only wanted to be taken to the hospital by one of the crew members. From the station he was driven to the district office where they met the BC and Admin. Coordinator, who began the SHIPS reporting process. The Lead EMT finished transporting the injured SFEO to the local hospital where they arrived at about 1600 hours and remained until about 1830 after diagnosing and treating the broken collarbone. The injured SFEO was given a sling and a strap to immobilize his right arm. He was not given any analgesic stronger than ibuprofen and was advised to see an orthopedist specialist as soon as possible.

During that period the Lead EMT and the FPT had spoken by phone and had planned together to take the SFEO back to the station to retrieve his personal vehicle, drive him home and return to their station. However, once they reached their station, the SFEO insisted on driving his personal vehicle home himself and did so. The Lead EMT is subordinate to the SFEO. “Chain of Command” is ingrained in most crews, so based on the Lead EMT’s evaluation of the health of the SFEO at the time – “alert and oriented” – the Lead EMT yielded to the SFEO’s desire to self transport.

April 2010
“Emergency Response Plan”

“All field related accidents and injuries shall be reported immediately to the Emergency Command Center (ECC) via radio, cell phone or landline.”

“The policy on the forest is to transport all seriously injured employees and volunteers by private ambulance or cooperator paramedic unit to the hospital. This specifically applies to cases where we do not know the extent of injuries suffered by the employee or volunteer. This does not apply to instances where it is obvious the employee does not have a life threateningly serious injury, but still requires medical attention and cannot manage to get medical attention on their own.”

The SFEO resides over 70 miles from the station on some roads which can be narrow and challenging. It takes at least 1.5 hours or more to make the drive. He called the BC enroute and told the BC he was driving himself home. The BC questioned whether he had taken any strong analgesics which may inhibit his ability to drive, and learned about the non-narcotic ibuprofen. The BC did not feel he could “order” the SFEO not to drive his personal vehicle when he was not “in duty status.”

Earlier, at about 1530 the Duty Officer called the District Ranger (DR) (who was on leave) to report the injury. The DR inquired about the condition of the employee and felt he was being cared for adequately given the nature of the injury and the knowledge that transportation to the hospital and the injury reporting process (OWCP and SHIPS) was well in hand by his staff. The DR did not report the injury to the Forest Supervisor. No one called Dispatch and they were completely unaware of the incident.

The following day the Duty Officer called the Forest Safety Officer and reported the incident. Unable to reach each other directly by phone they left messages playing phone tag for much of the day. Once they were able to make contact the Duty Officer explained the situation and the safety officer arranged to travel to the site to take photographs of the ATV and the accident site. However, overnight the winds had picked up significantly in the area of the prescribed burn, eventually causing some "slop over."

Flat left rear tire on ATV

Available members of the module were reassigned to assist a neighboring district's prescribed burn nearby, which was also showing signs of being affected by the increased wind activity. As the safety officer arrived at the station where the recovered ATV had been parked, a couple of the crew members were able to meet the safety officer briefly to unlock the doors to the building before hurriedly leaving to go to the nearby burn project. The safety officer examined the ATV and took photographs. Originally, the safety officer was to travel to a junction near the first prescribed burn and radio for an escort into the area to access the accident site. After navigating the perimeter roads, noting the second burn and having very little information about what was occurring on either one, the safety officer did not feel it prudent to interrupt their work given the increasing wind activity affecting the burns. It was not critical to see the accident site that day, especially since the ATV had already been moved. The firefighters had a job to do managing the burns and the safest, most sensible decision was to leave them alone to do that job and come back a different day when the weather had calmed down. From 1200 hours to 2400 hours November 1, 2011, the wind steadily increased from 19 mph to 35 mph.

In the meantime, the safety officer made contact with the injured SFEO, interviewed him, assisted with the OWCP process and reported the incident to the Acting Regional Safety Manager. A forest level FLA was authorized and the Forest Supervisor notified. The injured employee has since received specialist medical care and placed on light duty. In the following days the weather changed again, covering the accident site with snow, and the crews went on their days off. The BC was able to get to accident site November 5, 2011, to photograph and measure the site.

On November 7, 2011, an FLA meeting took place and all the involved parties participated except the injured employee, who was still off due to his injury, and the Duty Officer who was on leave. All participants were open and engaged. Of some concern was whether Dispatch should have been contacted, and also if the injured employees should have driven himself home 1.5 hours immediately after sustaining a rather serious injury. This was a topic of some discussion, and given the "ingrained" nature of "chain of command," it became apparent this was not an "easy fix."

Once the SFEO became injured he was no longer in charge of the operation - supervision defaulted to the AFEO. In this situation, since it was a medical emergency, the Lead EMT (AFEO) was in command of the patient because of his EMT training and by virtue of his position as next in command. Since the injury was not so serious as to require an ambulance, transporting the SFEO to the hospital by Agency personnel was precisely the right call, as per our "Emergency Response Plan" (previously distributed as the "Golden Hour Evacuation Guide"), and the Lead EMT had the training to make that decision. However, once the "emergency was over," the question then arose who could instruct the injured employee whether he had the right to drive his personal vehicle home? It was obvious that there was some hesitation by peers and subordinates alike to challenge the SFEO's decision to drive himself home after the accident.

- ***Could this employee have taken more precautions?***
- ***Could this accident have been avoided?***
- ***Post-accident, did the entire crew show good sense, situational awareness, cooperation and willingness to share their experience with others?***
- ***Can other employees learn from this accident and this FLA?***
  - Absolutely.
  - In hindsight, most accidents, after analysis, can be a learning tool.

It should be noted the Duty Officer and safety officer both discussed this action with the SFEO in the following days and strongly advised him that his action to drive himself was probably not the best decision. Given the fact that his right arm was essentially immobilized, and his post-accident response times and actions were most likely limited. He was not a good candidate for driving a motor vehicle for an hour and a half immediately after suffering a broken bone and dealing with all the post accident trauma. Had an emergency situation occurred during his drive home, e.g., a deer in the road or another driver swerving into his lane, his overall physical and mental responses were most likely restricted, placing himself and other drivers at risk. The SFEO agreed and stated it would not happen again.

Photographic Chronicle

Skid trail/control line Prospect Rock Rx burn

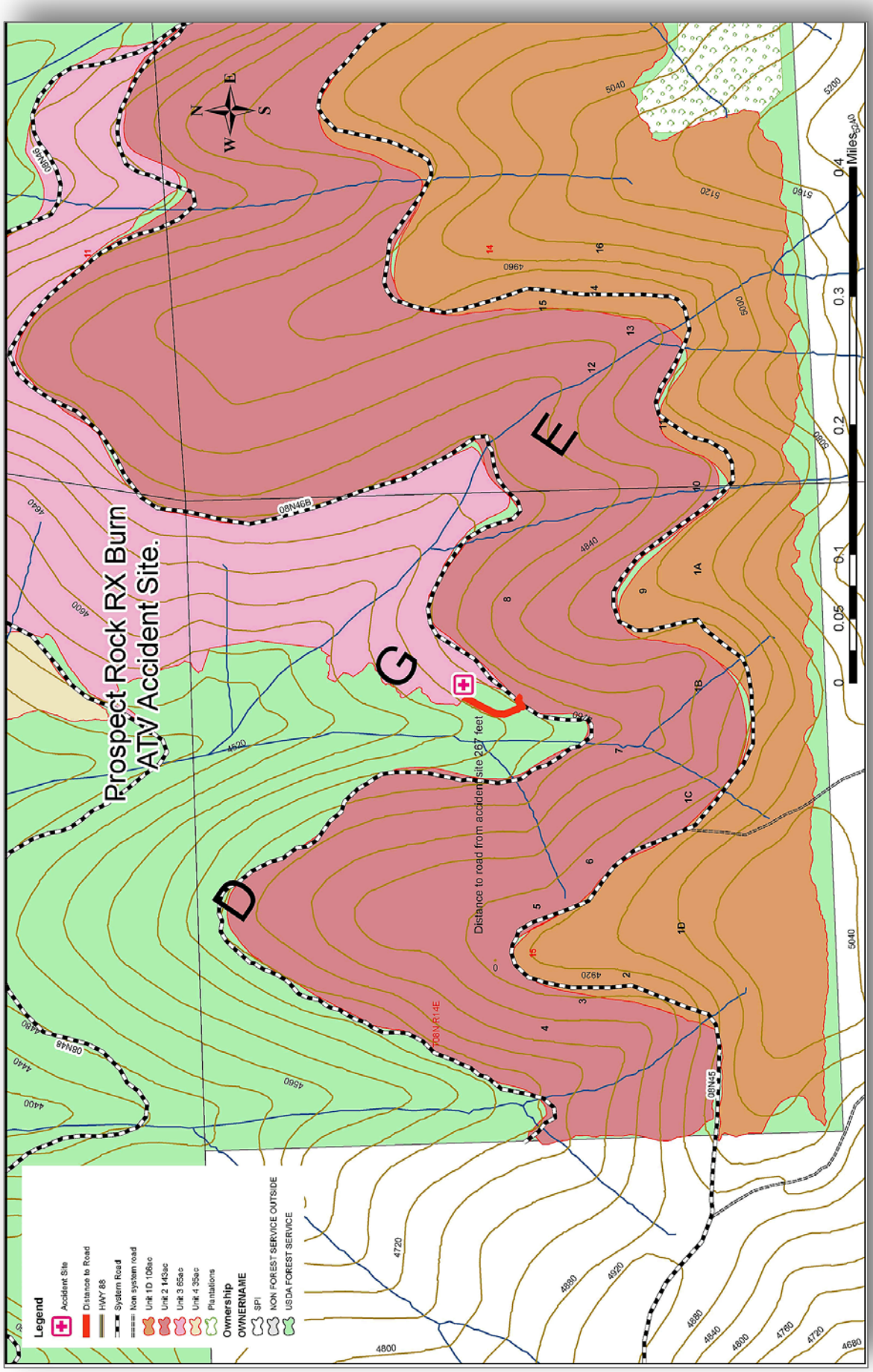
Minor damage to right front fender of ATV

Down slope view of skid trail

Upslope of skid trail with crew member standing at top for perspective. Rock shown that ATV struck.

Lateral aspect of slope where ATV overturned, with crew member standing for perspective.

More lateral views of slope where ATV overturned, with crew member standing for perspective


Prospect Rock RX Burn
ATV Accident Site.
Distance to road from accident site 267 feet
Legend
Accident Site
Distance to Road
HWY 88
System Road
Non system road
Unit 1D 108ac
Unit 2 143ac
Unit 3 85ac
Unit 4 35ac
Plantations
Ownership
OWNERNAME
SPI
NON FOREST SERVICE OUTSIDE
USDA FOREST SERVICE
08N46B
08N48
08N45
08N R14E
N
E
S
W
Miles

Why did it happen?

While patrolling a control line on an ATV, an employee rode up a fairly steep hill, estimated at 40% slope. Just before reaching the top the ATV hit a rock and flipped over backwards, possibly because of improper weight distribution, speed, the possible under-inflation of one tire, or a combination of some or all of these factors.

Successes

- The employee was wearing all required PPE which most likely prevented further injury.
- The employee had the required training and experience to react in a way that also prevented more serious injury.
- The crew responded as a cohesive unit; quickly and decisively locating the employee, providing him with the necessary medical care and retrieving the ATV and other vehicles in an orderly fashion.

What have we learned-What might we do differently?

During the FLA dialogue session the following lessons-learned were shared.

- Every vehicle requires pre-ride/drive examination, including tire pressure checks if it appears to be inadequate.
- Look for alternate ways to get the job done; continuously re-evaluate all hazards.
- Ensure notification of Dispatch as soon as possible so upward notifications are made in a timely and consistent manner.
- A medical doctor should be consulted on questions of a patient's ability to drive a motor vehicle immediately after treatment for a vehicle-caused injury.

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