

Badger Fire Injury and Medevac

Accident Investigation Report
Bureau of Land Management, Phoenix District



05/24/2014

Investigative Team:


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State Fire Management Officer
Arizona State Office
Team Leader

6/4/14
Date


MICHAEL SPILDE
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Arizona State Office
Team Member

6/4/14
Date


MICHAEL LARSON
New Mexico State Safety Manager
Safety Advisor

6 Jun 2014
Date

Executive Summary:

At approximately 1010 hrs. on Saturday, May 24th, 2014, an incident occurred on the Badger Fire, BLM Phoenix District, Arizona. Four members of the Weaver Mountain Helitack Crew were performing cold trailing operations on the northeast section of the fire. The crew was working in a grid formation from the bottom towards the top of a mesa, one chain in from the fire line. The crewmember working along the fire perimeter was navigating a steep terrain constriction near the top of the mesa, when he was struck by a large boulder. Fellow crew members respond immediately, taking decisive action. The patient was assessed by an EMT and the decision was made to transport by air. The Badger Fire Helibase configured for medical transport and a helispot was prepared on the top of the mesa while the patient was being stabilized. A direct result of the crew's experience and planning, the patient arrived at the hospital within 1 hour of the accident; diagnosed with a fractured humerus, of the right arm.

Narrative:

5/24/14 - 0800hrs. - Morning briefing at Badger Fire, Weaver Mnt. Helitack will work northeast corner of the fire, from bottom to the top along the east flank of the fire.

5/24/14 - 0900hrs. – 4 crewmembers from Weaver Mnt. Helitack, reach the fire line, established positions and started cold trailing to the top of the mesa, one chain from the line.

5/24/14 - 1010hrs. – Crewmember shouts “my arm, my arm is broken”.

5/24/14 - 1010hrs – Crew Foreman called Incident Commander (IC) and informed him of the situation – IC ordered an ambulance.

5/24/14 - 1012hrs – Crew Foreman and EMT arrive at the location of the injured crewmember and find him in a seated position, pack partially removed, hardhat on the ground, clutching his right arm.

5/24/14 – 1012 hrs. – Patient explains to crew members he was struck by a large boulder (approx. 42 in. x 24in.) while hiking towards the top of the mesa.

5/24/14 – 1012 hrs. – E3330 contacts Helitack Crew Forman and asked if they needed assistance. Crew Forman responds “yes, if you can be here within the next 5-10 min”. 3 members of E330 begin hiking to accident scene with medical bag.

5/24/14 - 1013hrs – Crew EMT assesses patient. Patient informed EMT that he was going into shock.

5/24/14 – 1015 hrs. – Contacted IC, then radioed the Badger Fire Helibase and informed them to configure for medical transport, if needed.

5/24/14 - 1016hrs – After assessing the patient's condition and identifying symptoms of shock, Crew Foreman and EMT decide air transportation would be best, given the location of the incident and severity of the injury.

5/24/14 – 1017 hrs. – IC contacted dispatch to cancel ambulance.

5/24/14 – 1020 hrs. – Crew Member and EMT stabilize patient with an improvised splint.

5/24/14 – 1022 hrs. – Crew assists patient from incident location, to identified helispot on the top of the mesa.

5/24/14 – 1025 hrs. – Crew Foreman called helibase to launch helicopter (7AW)

5/24/14 - 1027hrs – 7AW spooled up and was in the air.

5/24/14 - 1030hrs – 7AW lands at medevac helispot on the mesa, patient and EMT are loaded for transport.

5/24/14 - 1039hrs – 7AW launched from medevac helispot with patient and EMT onboard, in route to John C. Lincoln Trauma Center.

5/24/14 – 1044 hrs – Dispatch notified John C. Lincoln that 7AW was in route, ETA 20 min.

5/24/14 – 1058 hrs. – 7AW contacts John C. Lincoln – ETA 5 min.

5/24/14 - 1103hrs – 7AW lands at John C. Lincoln Trauma Center.

5/24/14 - 1123hrs – 7AW on the ground at Badger Fire Heibase.

Investigation Process:

A three person BLM Review Team worked in conjunction with the local unit to conduct an investigation of this accident. The local unit had already conducted an after action review, collected statements, dispatch logs, and secured the scene. The investigation included an analysis of human, material, and environmental factors related to this incident. Additionally, the process included interviews, verification of documentation, and a visit to the accident scene, site photography, slope measurements, accident reconstruction and a timeline review. The investigation team is identified on page 2 of this report.

The team assembled at the Arizona State Office at on 5/29/2014, then traveled to meet with the local unit at the Phoenix District Office (PDO). The team received a briefing from the local unit at PDO, and then traveled to the incident site. After a safety briefing and review of crew activities prior to the incident, the team and local unit began hiking to the accident site, retracing the path the crew took the day of the incident.

Throughout the hike, the team collected slope measurements; photographs observed environmental conditions and discussed fire behavior and crew actions. Arriving at the site, the team and local unit reenacted the accident using the facts available. The original orientation of the boulder is unknown. Slope angles in the area of the accident site ranged from 37-46 degrees, with large, stacked boulders. Many aspects of this area require 3 points of contact to maneuver. There was no evidence to support the burned vegetation compromised the stability of the boulder. Given the terrain constriction and adjacent cliffs, location of the fireline and fuel type, the path the crew member chose was determined to be appropriate, based on the assigned task.

Cause of accident: The angle and nature of the terrain required three points of contact, which ultimately caused the boulder to be displaced , striking the crewmember and causing the injury.

Recommendation: Rugged terrain remains one of the highest risks firefighters are exposed to in the performance of their duties. This hazard cannot be removed from the fireline environment and should be addressed through on-going field risk management process. If an area poses too much risk for mitigation, avoidance should be considered as an option.

Lessons learned, Discussion and Recommendations:

Lesson 1: Qualified Emergency Medical Technician's (EMT) within BLM- AZ are experiencing difficulties in locating, completing and securing funding for certification requirements related to currency status. This has led to a shortage of experienced EMT's within the BLM- AZ fire and aviation program.

Discussion: During the After Action Review (AAR) with incident personnel the on scene Emergency Medical Technician (EMT) stated that the Phoenix District would benefit from a program that would offer continued education and training in the emergency medical response field.

BLM Arizona does not currently have an established Emergency Medical Services program or qualified Medical Director. Individuals who are certified as EMT's are required to complete a certain amount of continued education hours in order to meet state and agency policy. An accredited EMS program that is administered by a certified Medical Director would be able to provide the following:

1. Training: Provide input for training which could cover the dynamics of emergency medical care for wildland fire operations and for employees involved in remote work projects. This training would encompass emergency medical evacuations and destination criteria as well as tactical medical training
2. Education: Attend, develop content, provide lectures, oversee practical exercises and certify continuing education requirements.
3. Subject Matter Expert (SME): Provide advice and guidance on medical issues that impact the quality of care provided at a wildland fire incident.
4. Online Medical Direction: The Medical Director will be available to answer questions and provide direction to the EMS providers in the field.

Recommendation: The Arizona Bureau of Land Management (BLM) - Branch of Fire and Aviation should seek guidance in creating a Non-Ambulatory Emergency Medical Services (EMS) program. The intent of this program is for BLM to provide quality, standardized emergency medical care for wildland firefighters working on incidents under Federal BLM jurisdiction within the State of Arizona. This program would be under the oversight of a physician medical director as well as various BLM staff located throughout the State.

Lesson 2: BLM Phoenix District is deficient in meeting BLM Safety and Occupational Health Program requirements.

Discussion: The BLM Arizona State Safety Manager position is currently vacant. The BLM New Mexico State Safety Manager is assisting the Arizona State Office, until the position can be filled. The Phoenix District does not have a full-time Safety Specialist and a Collateral Duty Safety Offices (CDSO) has not been appointed.

This accident is defined by the *Interagency Standards for Fire and Fire Aviation Operations* as a Wildland Fire Accident (Red Book, 18-7), requiring an Accident Investigation (AI) at the regional, state, or local level. Based on availability and geographic separation of the New Mexico State Safety Manager, the AI was not conducted for 5 days, following the accident. Even when the Arizona State Safety Manager position is filled, a District CDSO would be able to facilitate AIs, AAR, and similar investigations in a timely manner.

Recommendation:

The Phoenix District work with the State Safety Manager to ensure that a unit safety officer is designated, to ensure program requirements are met, as required by *BLM Safety Manual 1112-1*.

Lesson 3: The ground ambulance was canceled after deciding to transport the patient by air.

Discussion: During the AAR with on scene personnel, there was a discussion about canceling the ground ambulance before the patient was transported from the accident site. This decision was made after deciding that air transport was the best option. Air transport was successful in this incident. However, if there was a mechanical failure or incident with the helicopter, ground transportation would have been delayed.

Recommendation: The Arizona BLM - Branch of Fire and Aviation should continue to perform AAR and encourage the reporting of lessons learned. This behavior is commendable, focused on continuous improvement, preparedness and resilience.

Conclusions and Observations:

Based on the terrain and size of the displaced boulder, the injured crewmember was extremely fortunate that his injuries were not worse. A different injury or delay would have required the patient to be transported from the scene by hand, exposing other crewmembers to hazards and increasing the potential of further incident.

This incident demonstrates to all personnel engaged in fireline activities, that preparedness and planning produce the desired outcome. The Weaver Mountain Helitack Crew had an emergency response plan in place. Decisions were made by the people with experience and expertise, when they needed to be made. The Helitack Crew Forman jumped right into the role of on-scene IC without hesitation. The crew EMT was decisive, considering all aspects of the situation and potential for the patient's condition to degrade. Further, the crew of Engine 3330 seamlessly integrated into the response effort. This is a direct result of the cross-training and rapport among BLM Arizona Fire and Aviation crews – resulting in a textbook response to this accident.

Maps/Photos/Illustrations:

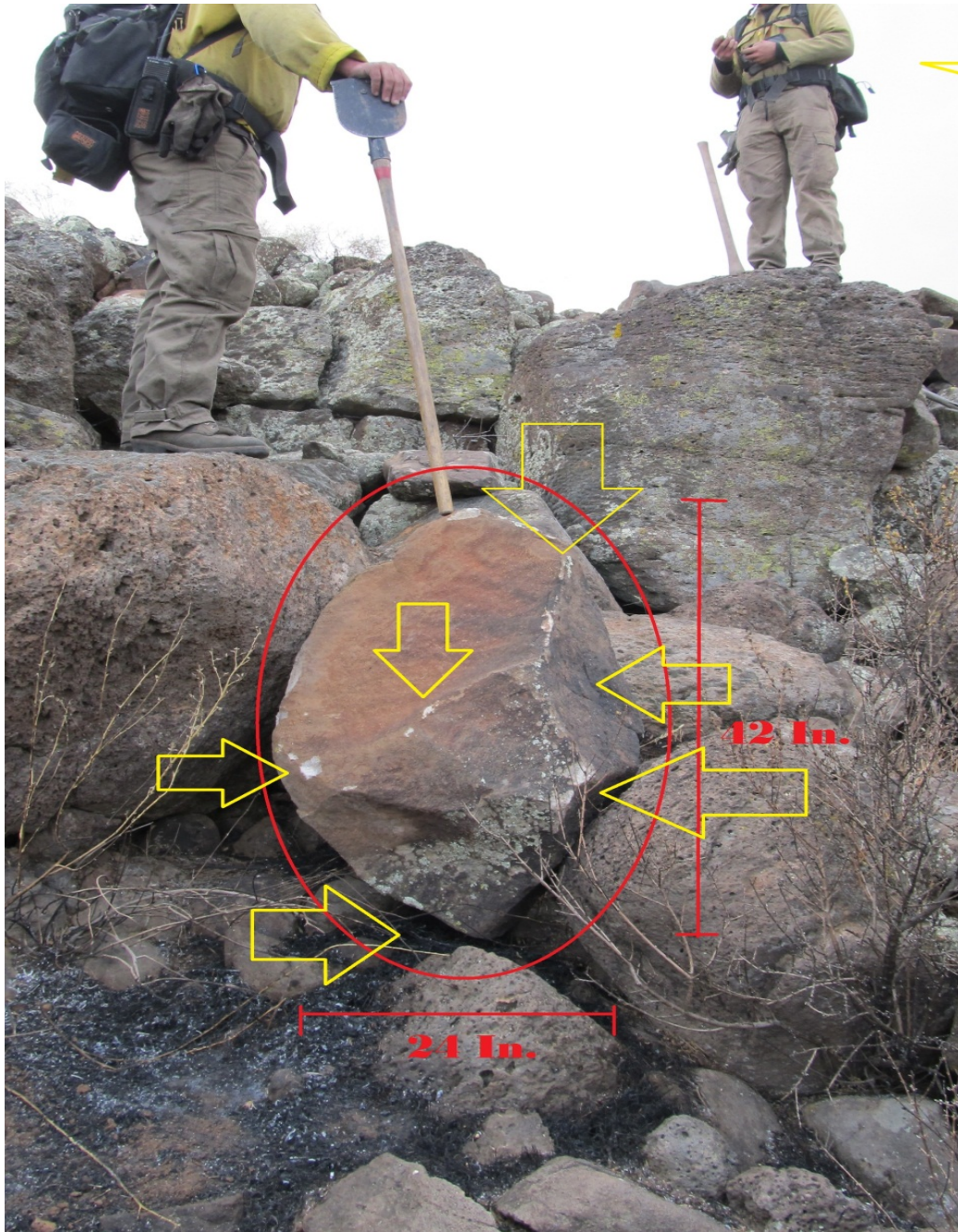


PHOTO 1: Looking toward the mesa top from the estimated path of travel. The boulder that struck the crewmember is circled in red, in its resting position, after striking the crewmember. The approximate size of the boulder is 42" in length, by 24" wide. Yellow arrows indicate impact marks from the boulders travel from its original location, to this resting position; approximately 10 feet away and 4 feet below.

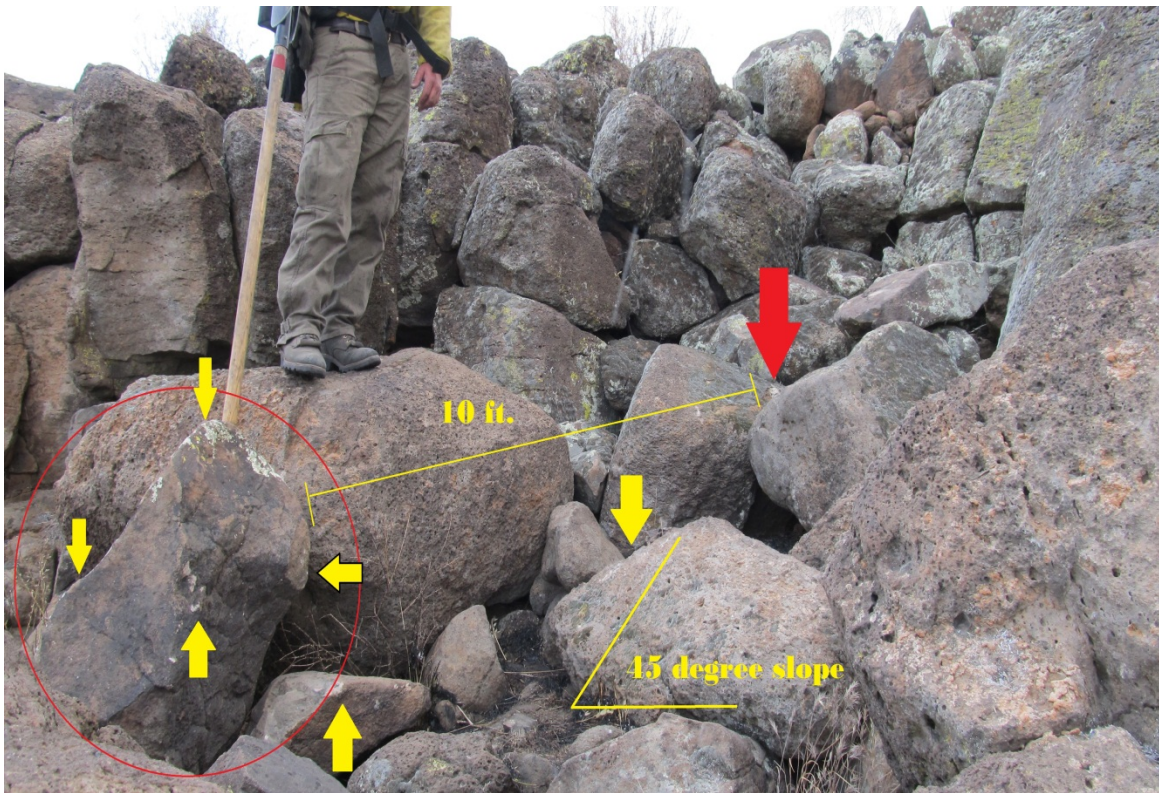


PHOTO 2: Red arrow indicates the original location of the boulder. The red circle identifies the resting position of the boulder after striking the crewmember. Yellow arrows identify impact areas from the boulders travel. The slope directly below the boulder's original location was measured by clinometer to be 45 degrees. Other slope angles at the site were measured between 37-48 degrees.



PHOTO 3: Solid red arrow shows original position of boulder and circled in its final resting position. Yellow circle shows approximate footing of crewmember and arrow indicates direction of travel.



PHOTO 4: View from the top of the mesa, the crewmembers destination, looking down at the accident site. Red arrow is original position of boulder; circle is boulder in resting position.



PHOTO 5: Original resting position of boulder. Burned vegetation not a contributing factor.



PHOTO 6: View from the top of the mesa, just above accident site, looking West/Northwest. The yellow circle identifies the location of the MEDEVAC helispot that the patient hiked to under his own power, with assistance from the crew. The yellow star identifies the location of the Badger Fire Helibase, near exit 256, Beaver Springs, on Interstate 17. The green arrow is the starting point of the crew's cold trailing operations.

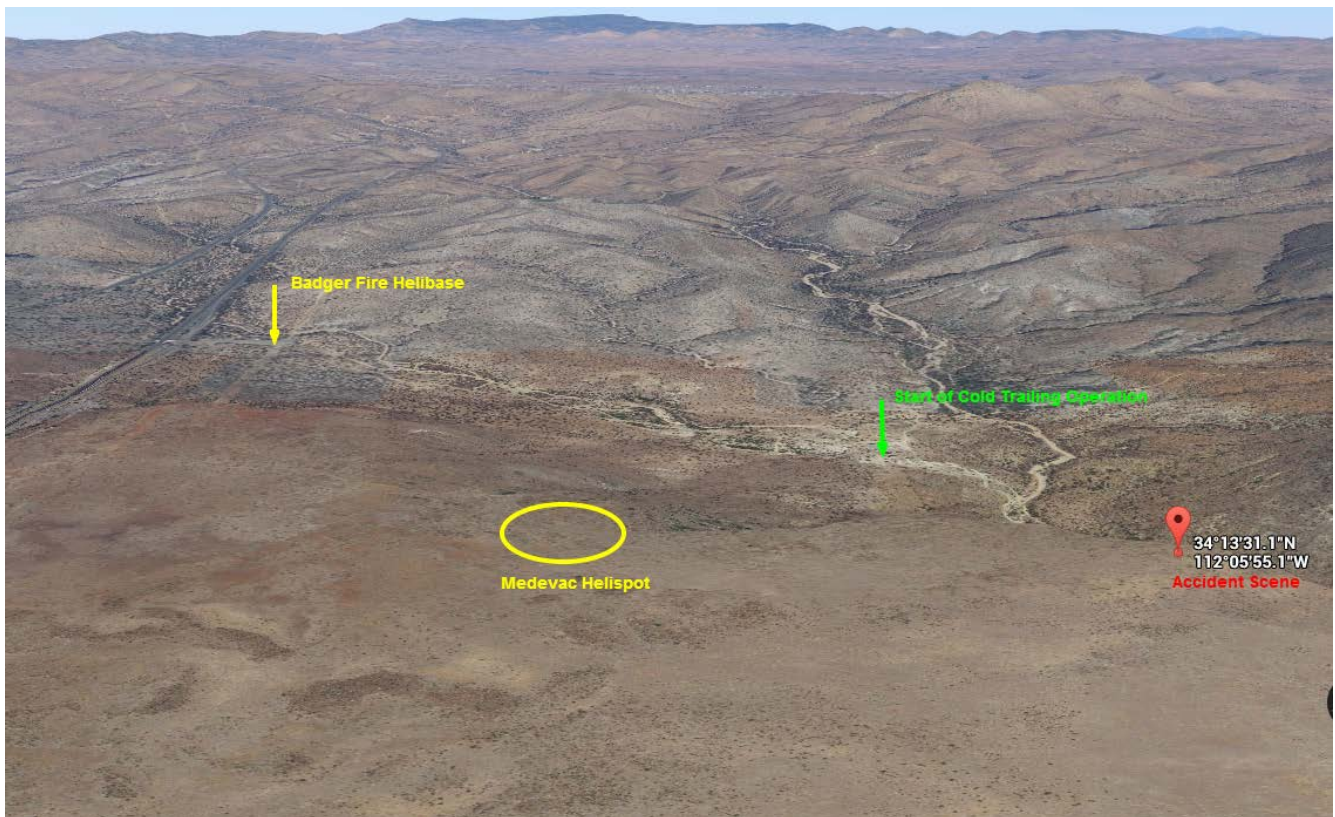


PHOTO 7: Google Maps photo with annotations, based on GPS location of accident.



PHOTO 8: Google Maps photo of Incident Location, showing approximate location of E3330 in relation to accident scene.



PHOTO 9: Google Maps satellite view, looking south.