Balance Rock Accident Investigation Team

Accident Investigation
Factual Report
Balance Rock Rollover
Engine E2421

Bureau of Land Management
Twin Falls District, Idaho

August 21, 2006

I. INTRODUCTION

A. BLM Heavy Fire Engine, with a crew of three was returning from a routine re-supply run in Twin Falls, Idaho to the Juniper Butte guard station when the driver lost control of the vehicle, resulting in a roll-over accident.

II. SUMMARY

On August 14, 2006, at approximately 1830 hours an accident occurred resulting in injuries to three fire fighters. The front seat crew passenger was transported by air-evacuation to a local hospital in Twin Falls, Id. This individual was further evaluated, and then air-evacuated to a hospital in Boise, Id., with non-life threatening injuries to the back and pelvis. The driver and third crew member were transported by ground ambulance to a local hospital in near by Twin Falls, Id., where they were treated and released.

III. Narrative

Fire Engine E2421 was returning from Twin Falls to the Juniper Butte Guard Station, west bound on Balanced Rock Road, traveling approximately 35-40 mph. Approximately 11 miles west of Castleford the engine came over a rise and the road turned slightly to the right. Crew members reported that the vehicles rear-end started to slide to the outside of the curve. The operator then attempted to correct the “fish tail” by slightly turning the steering wheel to the right. The operator then over-corrected the vehicle causing the engine to head to the right side of the road; again the operator attempted to regain control of the engine, over-corrected and temporarily departed the road bed.

In an attempt to avoid impacting the rocks along the left side of the road, the operator then applied the brakes, and steered to the right, back towards the road. After impacting one large rock with the driver side rear tire, the engine began to lean to the driver side and then made a three-quarter roll. The engine then came to rest on the passenger side lying perpendicular in the road (See Sketch and Photo 1 below).

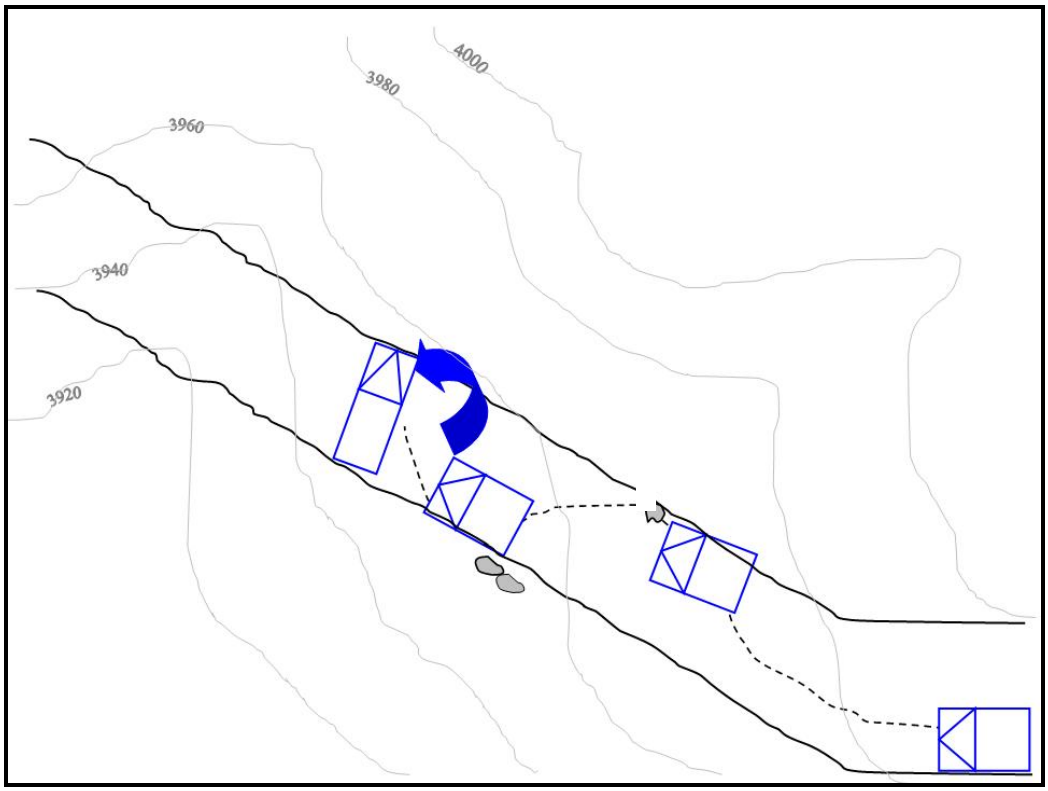


Photo taken by County Sheriff of E-2421, after accident.
Note a portion of the Cab has been cut open to extricate trapped occupants

Photo 1

E2420 and the Engine Module Leader's (EML) chase vehicle were following E2421 on the gravel road, and arrived on the scene within minutes of the accident. The EML then took charge of the situation by: assessing the scene, determining injuries, and contacting the South Central Idaho Dispatch center for emergency assistance from the Twin Falls Sheriff's Department, as well as the ambulance and Life Flight Air Service.

At approximately 1900 hours, the fire department, ambulance and Life Flight arrived on scene. The driver of E2421 had already exited the vehicle and was being treated along side the road by the emergency medical service (EMS) team. The local fire department used the "Jaws of Life," to extract the two remaining crew members from the wreckage. All three crew members were stabilized at the scene. Two crew members were transported to the local hospital where they were treated and released with minor injuries. The other one was air- lifted to the local hospital, further evaluated, and then transported to St. Alphonsus Hospital in Boise, Id. for surgery.

IV. Witness Statements/Interviews

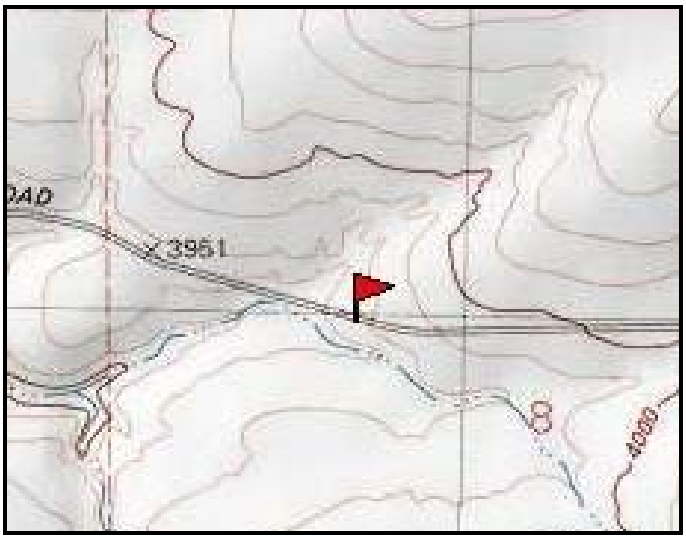
Initial Witness Statements were taken and interviews were conducted on site by BLM Law Enforcement and the County Sheriff, August 14th, 2006. This interview process continued over the next three days, with the last interviews being completed by the Investigation Team at the Shoshone Field Office on the afternoon of August 17, 2006.

A Twin Falls County Sheriff's Deputy conducted the initial accident investigation upon arrival at the scene. Two BLM Rangers took additional statements from the Engine Module crewmembers at the Twin Falls District Office, after their release from the hospital. An Idaho Special Agent interviewed the most seriously injured occupant of E2421, the Engine Boss, at St. Alphonsus Regional Medical Center in Boise, Id. on the afternoon of August 16, 2006 (See Attachment B).

V. Site Investigation

Latitude: 42° 36. 2.16"

Longitude: 115° 25. 25.67"



Balanced Rock Rollover Site Map

The accident occurred on Balanced Rock/Crows Nest Road, approximately 11 miles West of Castleford. This is a BLM owned gravel road, which is maintained by cooperative agreement by Owyhee County, Idaho (see Attachment F).

For the area of the road where the accident occurred, the road conditions are characterized as moderately rough, with a slight decline and “wash board” type bumps and ruts. Two and three foot diameter rocks are present on both sides of the road.

Investigation of the accident site confirmed that the wheel tracks from E2421 are consistent with the engine operator’s statement on when the engine began to “fish tail,” and eventually left the road (see Photo 2 below).

Photo is looking west along the Balance Rock road;
note the “fish tail” tracks on the right side of the road left by E2421.

Photo 2

As the Engine “fish tailed” to the right the Operator overcorrected, and as Photo 3 shows, the engine then departed the road bed on the left side of the road.

“Fish tail” tracks from E-2421, where the Engine begins to leave the roadbed near to where the investigator is walking.

Photo 3

When the Engine left the road bed, the operator attempted to regain control of the engine and avoid a group of rocks. Unable to avoid the largest, the rear of the engine impacted that rock, causing damage to the rear driver side tire rim. This impact also dislodged the rock from its location and caused it to roll approximately 20 feet away (see Photos 4 and 5 below).

Photo of the hole made when rock was hit and moved.
The large rock is in the center of the photo, just to the left of the investigator.

Photo 4

Photo of rear tire rim that impacted the rock.

Photo 5

VI. Work Rest History

According to crew time reports on file at the Shoshone Fire Office both the Engine Module leader and the entire crew of engine E2421 were within the 2:1 work/rest ratio guidelines set forth in the *Interagency Standards for Fire and Fire Aviation Operations.*

VII. Qualifications

The following personnel qualifications have been verified with documentation:

Engine Boss

- Fully Qualified Engine Boss and Engine Operator
- Fully Qualified Firefighter Type 1 (FFT1)
- Fully Qualified Firefighter Type 2 (FFT2)
- Fully Qualified Commander Type 4
- Current valid Idaho Commercial Drivers License (CDL)
- Has attended a Defensive Driving Training course within the last 3 years

Engine Crew Member 1 (Operator at the time of the accident)

- Fully Qualified Firefighter Type 2 (FFT2)
- Trainee Firefighter Type 1 (FFT1)
- Current valid Idaho Driver's License
- Has attended a Defensive Driving Training course within the last year

Engine Crew Member 2

- Fully Qualified Firefighter Type 2
- Current valid Idaho Driver's License
- Has attended a Defensive Driving Training course within the last year

VIII. Findings

Direct Causes

E2421 was traveling too fast for the conditions of the road.

- In the initial accident report from the Twin Falls Deputy Sheriff, the official finding was that the vehicle was operating too fast for the road conditions. (See Attachment C).
- In the findings of the Investigation Team, it was also determined that the road conditions and speed were a direct cause of the accident, based on the sheriff's report, site inspection, and interviews conducted.

Indirect Cause

Driver's inexperience on handling the engine on this type of roadway was an indirect cause of the accident.

- During the interview with the Investigation Team, the driver stated that she had turned the wheel of the vehicle towards the road (to keep the vehicle on the road), when she should have turned the vehicle into the direction of the fish tail to stabilize the vehicle.
- The Driver stated to the Investigation Team, they were traveling in Drive (5^{th} gear). Engine compression to slow the vehicle would not be sufficient once the fuel pedal was released considering the loose gravel, topography, wash board and rutted conditions on the road. The engine was not able to make the turn and maintain position on the road.

Other Findings:

BLM/State/CDL requirements and vehicle mechanical readiness:

- According to the Statement given from the Engine Boss after the accident, the decision to allow the operator to drive at the time of the accident was based on his belief that the operator "does not need a Commercial Drivers License (CDL) to drive a heavy engine on a gravel road." He also stated that the driver was "in training to become an engine operator."

- The Balance Rock Road is a BLM owned gravel road, maintained by Owyhee County by agreement. The Investigation Team found no policy or waiver that exempts BLM from CDL requirements based on road jurisdiction or type of road. In order to be compliant with Idaho State Law, at minimum, the Operator "in training" needed to have a Class B restricted permit to drive E2421.

- It is the finding of the Investigation Team that the mechanical condition of E2421 did not contribute to the accident. Maintenance records were current, indicating no issues with drive train or chassis and repairs to deficiencies were performed. According to interviews and statements, E2421 was one of their best engines and drove very well. It was also found that the engine was full of water at the time of the accident. General appearance of the other engines, both heavy and light within the fleet, is good to excellent. Vehicles are clean, organized and a spot check showed that pumps start readily.

IX. Recommendations

The Balanced Rock Accident Investigation Team recommends the following:

- All drivers are required to follow *BLM Manual Handbook 1112-2, Safety and Health for Field Operations and Interagency Standards for Fire and Fire Aviation Operations (The Red Book),* as stated in the citation page below.
- All fire personnel who will be operating any fire vehicles need to successfully complete *S216 Driving for Fire Service.*
- All fire personnel required to drive engines and 4x4 vehicles, need to complete the Agency's 4x4 operation training course, as stated in the *BLM Manual Handbook 1112-1, Safety and Health Management* requirements as stated in the citation page below.
- Fire Management for Twin Falls District should ensure that all Idaho CDL requirements are followed for any BLM vehicle exceeding 26,000 lbs. gross vehicle weight (GVW).
- Fire leadership at all levels should provide appropriate oversight and accountability to ensure that safety protocols are adhered to, such as, but not limited to the use of seatbelts.

Discussion Questions

1) **Were there any violations of BLM driving policy, if so list them?**

2) **What were the direct and indirect causes of the accident?**

3) **What are the lessons learned from this accident?**

4) **List any recommendations to prevent similar accidents?**

Inskip Fire Engine Rollover Review

July 23, 2006

Executive Summary
At approximately 22:20 on July 20, 2006, an engine rollover accident occurred in the BLM Winnemucca Field Office, Nevada. While returning home from the Inskip Fire, Engine 2946 (Winnemucca District engine) attempted to miss a black cow on State Highway 400, skidded for 196 feet, departed the roadway and rolled over onto its side. The three crewmembers, Joshua Henry (ENGB), Lindsey Swensen and Brady Charles were given first aid on scene by the crew of Engine 2943 which was following Engine 2946 at the time. All crewmembers were then transported to Humboldt General Hospital, treated and released with minor injuries.

Narrative
7/20/06 22:03- Engine 2946 departs Inskip Fire returning Winnemucca.
7/20/06 22:24- 2902 (Mike Fettic) reports an engine accident, no injuries, requests accident investigator and tow truck. Will transport crew to hospital for check up.
7/20/06 22:39- 2902 states 2946 crew is being transporting to Humboldt General Hospital.
7/20/06 23:03- Nevada Highway Patrol and A-1 Towing in route to accident scene.
7/21/06 00:58- Engine 2946 crew released from Hospital, everyone is OK.

Investigative Process
A three person BLM Investigation Team conducted the investigation. The investigation included an analysis of human, material and environmental factors. The process included interviews, verification of documentation, visit to the accident site, skid mark analysis, examination of Engine 2946 and timeline review. The investigation team consisted of the following individuals:
Tom Romanello (Team Lead), BLM Office of Fire and Aviation, Fire Management Specialist
Jeff Birrell, BLM Elko District Office, Fire Operations Supervisor
Nate Gogna, BLM Silver State Hotshots, Crew Supervisor and Acting AFMO Carson City District.

Findings
Finding #1: BLM work/rest and incident operations driving duty day policies were adhered to.
Discussion: The crew had worked a shift of approximately 14 hours when they were released from the incident and the drive home was about 1 hour. The crew had taken a day off 5 days prior to the accident and been working an average of 10 hour days since the day off. This is within policy limitations.

Finding #2: The State Trooper who investigated the accident stated he felt that Engine 2946 was traveling at speeds that were excessive for the conditions.

Discussion: Conditions at the time of the accident were very dark. The area adjacent to the accident scene is open range for free roaming cattle. The crew and driver had worked a long shift of over 14 hours. The crew had received a radio warning, from the lead vehicle in the convoy, concerning cows on the roadway. Based on evidence at the scene and interviews with personnel the investigation team was unable to conclude that excessive speed was a contributing factor. The team felt that the speed at the time of the accident was likely between 55-60mph. The posted speed limit is 70mph.
Recommendation: FMO's should ensure that all fire vehicle operators meet BLM drivers training requirements and that additional tailgate and 6-minute for safety training sessions are conducted regularly. These sessions should include identification of incident driving hazards and determination of safe driving speeds for commonly encountered road conditions. Safe driving speeds are sometimes significantly less than posted speed limits.

Finding #3: None of the crewmembers on Engine 2946 were wearing seatbelts at the time of the accident.
Discussion: The State Trooper who investigated the accident stated he would have issued citations for lack of seatbelt use except for a Nevada law that does not require seatbelt use for occupants of vehicles in excess of 10,000 lbs. gross vehicle weight.
Recommendation: All fire vehicle operators should ensure that every passenger in their vehicle is wearing a seatbelt at all times per the *Interagency Standards for Fire and Fire Aviation Operations* page 06-5 and the *Safety and Health for Field Operations Manual Handbook 1112-2* page 39. State and Field Office FMO's and Field Office Managers should ensure that all employees are educated regarding BLM/Government policy on mandatory seatbelt use.

Conclusions and Observations
The crew of Engine 2946 was returning home from a routine Initial Attack fire and was within policy requirements for work/rest and driving duty day limitations. They unexpectedly encountered a black cow on the roadway in open range country at night. They were extremely fortunate that the engine did not depart the roadway sooner than it did or at a higher rate of speed. Due to the fact that none of the crew were wearing seatbelts the potential for severe injury or death would have been high. Driving, and especially night driving, remains one of the highest risk activities firefighters undertake in the accomplishment of their jobs. This incident should serve as an important lesson learned to all personnel engaged in driving activities.

Discussion Questions

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