

Engine 492 Rollover

Facilitated Learning Analysis (FLA)



USDA Forest Service

Medicine Bow – Routt National Forest &

Thunder Basin National Grassland

Douglas Ranger District

Near Wright, Wyoming

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Executive Summary

On Thursday, August 8, 2013 Medicine Bow-Routt National Forest and Thunder Basin National Grasslands Engine 492, a 2013 KME Type 4 engine was involved in a rollover accident along Wyoming State Highway 450. The accident occurred around noon, as Engine 492 was responding to the Osage Fire, in mutual aid assistance to Weston County, Wyoming. The accident occurred near mile marker 40, or approximately 10 miles east of the Thunder Basin Work Center.

The engine left the highway, veered slightly to the right side of the road hitting a paved apron to a side gate, with the driver seeking to decelerate and regain control of the engine. The engine returned to the road, with the engine brakes being heavily applied, then redirected back to the highway, which resulted in crossing the center line and going to the opposite road edge. Engine 492 rolled over a few times before coming to rest on its wheels (up-right).

At the time of the accident all three members of Engine 492 were wearing their seatbelts. Use of seatbelts and the integrity of the engine cab are likely the principal reasons for the survivability of this accident. All three crew members were hurt in the accident and the Type 4 engine was a total loss. Two of the crew members were transported by ambulance to Newcastle, Wyoming and the third member was transported by ambulance to the high school practice field in Wright, Wyoming where he was transferred to, and then transported by helicopter to the hospital in Casper, Wyoming. The two crewmembers that were transported to Newcastle, Wyoming were released later the same day. However, the injuries sustained by the third member resulted in a longer stay in Casper and release from the hospital on Saturday, August 10th.

The Wyoming Highway Patrol conducted an investigation of the accident. In addition, the Forest Service Law Enforcement Officer (LEO) conducted an internal investigation and much of the FLA documentation is the result of the LEO report. Photographs were collected from a

variety of locations and have been selectively utilized in this report to help the reader more fully understand the conditions and outcomes of the incident.

On Friday, August 9th, a Facilitated Learning Analysis (FLA) was assigned and composed of a team leader, lead facilitator, subject matter expert, human dimensions expert and coach. The FLA team was in-briefed on Monday, August 12th in the Regional Office in Golden, CO. The FLA team visited the accident site, conducted interviews, and assessed a composite of information to develop this document. Timeline information was collected by the FLA team from Casper Dispatch and interviews with knowledgeable individuals.

Interviews with the crewmembers included a site visit to the accident location, followed by a small group dialogue at the Thunder Basin Work Center. The crewmembers provided information including: perspectives on the work day, seasonal fire conditions, events leading into the rollover, and memories post-accident. The crew also provided data on the engine performance, crew experience, and training. To note, the site visit was the first opportunity for the crew to interact face-to-face and reconnect as a group after the accident.

Information in the FLA report will acknowledge the solid and productive working relationship between the Thunder Basin National Grasslands fire personnel and adjacent Campbell and Weston County Fire Organizations. Additionally, the FLA will cover lessons learned, emerging issues and additional questions to be considered by the U.S. Forest Service and cooperating wildland fire organizations. However, nothing compares to the importance associated with the health and well-being of the Engine 492 crew. The FLA team is sincerely appreciative of Engine 492's engagement and honesty. The logistical support from the R2 Regional Office plus the Medicine Bow-Routt National Forest and the Thunder Basin National Grassland was truly appreciated. Everyone involved in the FLA process has our sincerest gratitude.

Chronology of Events

Just before noon, on August 8, 2013, personnel from Engine 492 were listening to the Weston County dispatch and heard there was grass fire along the railroad tracks, near Osage, Wyoming. So the engine crew went to the map and found that the fire was close to their response area. The crew got ready and drove Engine 492 out toward the fire.

1158-The crew was notified by Casper Interagency Dispatch about the fire in Osage in Weston County.

1203-Engine 492 was traveling on Highway 450, near mile marker 40, when the engine was involved in a single vehicle accident causing the engine to roll. Some motorcyclists saw the accident and stopped to help, including one who was a nurse. The motorcyclists called 911. They helped the engine crew get out of the vehicle and started treatment and stabilization.

1207-Division Chief 4 was dispatched by Campbell County to a vehicle accident on highway 450. Approximately twenty minutes later he arrived on scene and saw that it involved Engine 492.

1229-Weston County called Casper Dispatch and said that the fire was a small railroad fire and it was taken care of and Engine 492 could return home if they wanted to. Weston County would get the fire report to them later. Casper dispatch tried to contact Engine 492, via radio communications, and was unable to contact the Engine. They continued trying to get a hold of Engine 492, yet were unable to make direct contact.

1237-Casper calls 492 Engine Captains cell phone and left a message telling them that Engine 492 could return home if they want to and Weston County would get a fire report back to them. (*Note: due to the accident, the message was not received by the captain until Sunday, August 11th*). Division Chief 4 could still hear Casper dispatch trying to reach Engine 492. He got on the radio and contacted Casper Dispatch, notifying them of the accident. He informed Casper Dispatch that Engine 492 had been in a one vehicle rollover on Highway 450, approximately 10 to 15 miles east Black Thunder Mine turnoff. The three subjects involved

were all wearing seat belts and were awake talking to him. Emergency medical personal responded to the accident.

1306-Three patients were transported. Two were en route to Newcastle, WY Medical Clinic by ambulance. One en route to Wright, Wyoming to be air lifted to Casper Medical Center.

1800-Later that day, two were released from the Newcastle Medical Clinic.

Saturday August 11th-The third crew member was released from the Casper Medical Center.

Lessons Learned and Recommendations by FLA Participants

To note, this section contains both lessons learned and questions for further consideration by the U.S. Forest Service and the wildland firefighting community.

1. Seasonal conditions can change the integrity of roadway conditions and subsequently the handling capabilities of heavy vehicles:

“You would figure a road is a solid road. You just figure it will be in good condition”- Engine Driver.

Employees recognized the area was experiencing an atypical fire season. In previous years there was high expectation for the engine crew to have worked on many initial attack incidents with dry conditions and little rain fall. During the 2013 season, the Thunder Basin area had experienced approximately a month with substantial rainfall occurring several days in a week. Numerous personnel with the Forest Service commented on never having seen the surrounding vegetation “this green” during the summer time. In addition to unusual fuel conditions, the rainfall had softened the substrate at the shoulder of the highway. The collapsing of the road shoulder contributed to a lack of vehicle control as noted by the engine driver: “I could see the vehicle was on the road but it felt as if I were off in the ditch.” For future operations, significant rainfall and saturated soil conditions have the potential to alter both off-road and highway conditions.

2. Standardization of U.S. Forest Service Engines

“[Should we] go back to older designs on engines where the tanks are down lower... change the center of gravity?” – Fire Division Chief for Local County Fire Response.

The engine involved with the rollover accident was a newer standard Type 4 model for the U.S. Forest Service. The engine crew seemed satisfied with the new equipment as noted by the engine captain: “It’s a functional engine... nothing fancy... nothing overboard... basic and functional.” The standardization of engine design offers the firefighting community assurance that equipment and operating capacity will be consistent throughout the U.S. Forest Service regions. A drawback to the standardization is equipment with features and configuration not always suitable to local geographic conditions, as noted by the Engine Captain:

“An engine in the grass lands needs a spray bar... versus a forest engine doesn’t need this... You don’t need clearance in the grassland but it’s not the same as in Utah. We need an engine that best fits us. For the grasslands and highway roads, you can drop the center of gravity on the engine.” A consideration in the development of firefighting equipment is to potentially offer engines with standard capacities but different design packages to suit local geographic conditions.

3. Post-accident response: location and access of emergency contact information to assist providing medical care.

“The accident occurred during lunch hour... unfortunately the folks with access to personal information were not available at the time” – District Fire Management.

In the event of future medical incidents, the fire management staff recognized the need to have personal information, including updated emergency contact names and phone numbers for all Forest Service employees. The information should be stored in a secured location at the local ranger district and interagency dispatch office. The establishment of a

chain-of command and access procedures help to ensure quick access to this information and successfully providing for the best possible care for employees and their families.

4. Providing the interagency dispatch center with the specific names of individuals staffing engines and other equipment.

The Resource Staffing Section of a Daily Operations Fire Plan should contain the names of all individuals assigned to specific equipment. Past practice only had the crew lead plus the number of crew members, e.g. Smith +2. During fire season 7 day-a-week coverage requires crew members to be assigned to variety of equipment. In addition, agency work-rest policy will often change pre-season planning for specific days off. Including every name avoids confusion or delays in having to find and to confirm this information for both daily operations and in emergency situations.

5. The need for timely dissemination of accurate information during emergency situations.

“There is no easy way to quickly get information to a family... It can be 8 hours to cross the Forest.” – Forest Fire Management.

The accident occurred during the time period where other fire staff was engaged in work at locations across the forest. Initial information of the incident to both interagency dispatch office and forest fire management staff was through the Fire Division Chief from the local county. This individual arrived at the accident site and relayed information via the Forest repeater frequencies. The Fire Division Chief recollected that HIPAA considerations constrained his ability to provide detailed information to the dispatchers: “I didn’t know how far and what to do? In my world HIPAA is everything.” HIPAA – Health Insurance Portability and Accountability Act of 1996 – establishes conditions under which certain healthcare groups, organizations, or businesses handle individually identifiable health information. Regardless of actual policy contained within HIPAA, perceptions of possible violations influenced the release of information to the interagency dispatch center, the

forest fire staff, and family member of the engine crew. An examination of HIPAA policy and direct correlation to the release of employee medical condition/status during an emergency situation is warranted by the U.S. Forest Service and cooperating agencies.

6. Reality of training simulation for low probability – high consequence events.

“[You] have to have SA (situational awareness) with the engine. [You] have to look at the speed... at the radio... look in the mirrors. Never taking eyes off the road is not realistic.” – Engine Operator.

To note: All three crew member had a CDL (Commercial Driver’s License), a U.S. Forest Service policy to have the Captain and Assistant to retain CDL. The Engine Captain had attended the R2 Engine Academy and utilized lessons from the academy in the training of the engine crew.

Part of normal driving operations is to scan the interior gauges of a vehicle plus reference side and rear-view mirrors. FLA discussions did consider whether any training would have assisted in handling the engine once the deteriorated road conditions hampered the driver’s corrections.

The engine crew captain was doubtful - “You can’t put someone in a simulator... The accident happened in less than a second... What good would this do?”

Currently, the USFS does not have resources to duplicate in a simulator, or in a physical environment, the conditions experienced by this engine crew. High stress training does exist in a few areas, such as, Smokejumper training for parachute malfunctions and simulation exercises for ICT3 trainees (no longer a requirement). There is no “magic bullet” to training for such incidents as the engine rollover. The U.S. Forest Service is faced with a tradeoff of expenses and resources necessary to possibly produce a different outcome in a low probability yet high consequence event.

7. Determining the requirement for T4 engine driving qualifications.

The following bullet statement was generated from the debriefing between the FLA team and the R2 Deputy Regional Forester and Staff.

“For Forest Service employees, what are the operational tools needed, to be successful and have the capability to perform at an acceptable level?” – FLA Team Leader

At issue for future consideration is how to determine requirements for driving a T4 engine. Many engine drivers/operators are seasonal or permanent seasonal employees who return to employment within a few weeks of having to work operationally on the fireline. Time in the pre-season is often spent covering multiple training requirements, including, the Work Capacity Test, RT-130, CPR, First Aid, Chainsaw Refresher, Civil Rights and EEO, plus other criteria dictated under agency policy. During a demanding fire season, there may be potentially limited time for personnel to become familiar or re-familiarized with equipment. The following bullets were points of discussion among the group in how to address providing quality training for driving T4 engines:

- Attendance to the Region 2 Engine Academy was offered as a place to acquire skills in engine operation, including driving proficiency. In Region 2 there is no requirement for engine personnel, either permanent or seasonal, to attend this academy. The Forest FMO noted there were many 10+ year engine captains in the Region that have not been through an engine academy.
- Currently, there is no permanent line item in the annual fire preparedness budget to fund the R2 Engine Academy. The past academies have been accomplished through short-term, multiple funding sources and creative fiscal maneuvering. Suggestion to make funding available on a consistent basis, particularly if

attendance to an engine academy becomes a requirement of employment and operation/driving of a T4 engine.

- Questions for consideration included: What matrixes would be used to determine a qualified engine driver for T4 engines? – Do you set a base number of hours? – Attendance to an engine academy? – A set of exercise to be completed and evaluated on an annual basis? – Will this standard be consistent and enforced across US Forest Service Regions?
- Consistent with the ongoing safety commitment, the Rocky Mountain Region of the Forest Service has determined they will facilitate a group of stakeholders to review this report and make recommendation for change, where appropriate and practical, in hopes of a greater chance of preventing similar accidents and subsequent issues in the future.

Facilitated Learning Analysis

Team Members

Team Leader: Earl Stewart,

R-3, Coconino NF,

Forest Supervisor

Lead Facilitator: Jennifer Martynuik,

R-9, Chequamegon-Nicolet NF,

Zone Assistant Fire Management Officer

Subject Matter Expert & Facilitator: Wade Stoddard,

R4, Uinta-Wasatch-Cache NF,

Type 4 Engine Captain

Human Factors Consultant: Jim Saveland,

Rocky Mountain Research Station,

Human Dimensions

FLA Coach: Randy Draeger,

R4, Regional Office,

Safety & Wellness Manager









North side of Wyoming Hwy 450 – extensive shoulder slough from substrate destabilization.
First rollover initiated to the East of the slough.