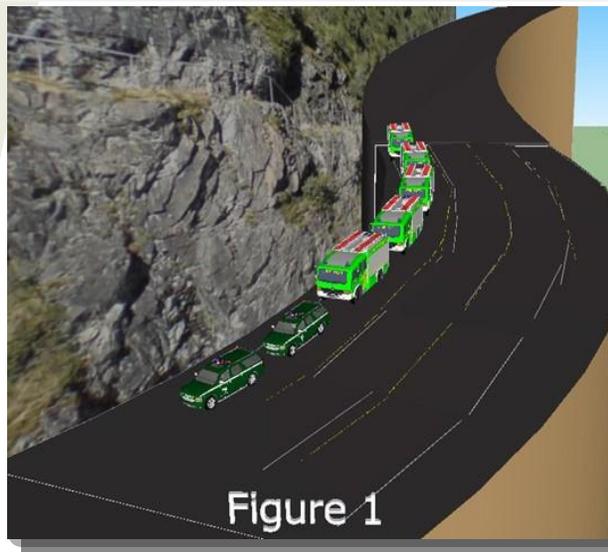


Facilitated Learning Analysis Runaway Fire Engine on the Mountain!

On August 5, 2013 at 1419 hours a strike team of engines was driving downhill on Hwy 168 after departing the Aspen incident on the Sierra National Forest. They were en route to the Power incident on the Stanislaus National Forest. The caravan of vehicles consisted of the Strike Team Leader (STEN) trainee and a firefighter driving a utility vehicle in the front, followed by a Ford Expedition driven by the STEN, and then five Type 3 engines (Figure 1). The lead engine was equipped with a manual transmission with two-speed differential, built in 1998 with 84,408 miles. Of the 272



Type 3 fire engines in service in Region 5, only 13% are manual split shift transmissions and of these, most are swing engines (used Intermittently while the primary engine is out of service).

The Strike Team traveled 28 miles from the Incident Command Post of the Aspen Incident to the town of Cressman with an elevation loss of approximately 2,600'. However, half of this elevation loss occurred within a 2 mile stretch just above the town. The highway then becomes a 4 lane about ¼ mi below the town with an elevation loss of 1,200' for the next 4.5 miles.

The lead engine was being driven by the Assistant Fire Engine Operator (AFEO). Upon entering the four lane area, the AFEO began to downshift, and when applying the brakes, he then noticed that the brakes were not working nor were the dashboard gauges. The engine began to pick up speed. Gears were not engaging as the AFEO attempted to downshift to slow the vehicle.

The Fire Engine Operator (FEO) notified the STEN of the situation via the R5 project frequency. All vehicles turned on their emergency red lights. Smoke was noticed coming from underneath the engine. The low air warning alarm for the brakes began to sound off. The AFEO continued to attempt to slow the engine, trying all gears but it would not engage. The vehicles began to approach a logging truck in the slow lane. The STEN trainee pulled over to the right shoulder. Both the STEN and the engine moved to the fast lane, passing the logging truck (Figure 2). The STEN trainee merged back on the highway behind the engine. All three then moved back into the slow lane.

“My speedometer was not working, brakes felt like a rock, and I lost my clutch!”

“I am going to try to slow you down,” stated the STEN.

The STEN later stated to the FLA team that he had 2 options...“let them go by, or try to stop them...and the first option was not acceptable.” He continued, “I felt they were out of options...smoke was coming out of the back and they had no brakes”. The FLA Team noted that a sharp curve towards the bottom of the mountain probably would not have been negotiable by the engine had they continued on.

“We began to creep on the STEN vehicle and told him to move out of the way,” stated the FEO.

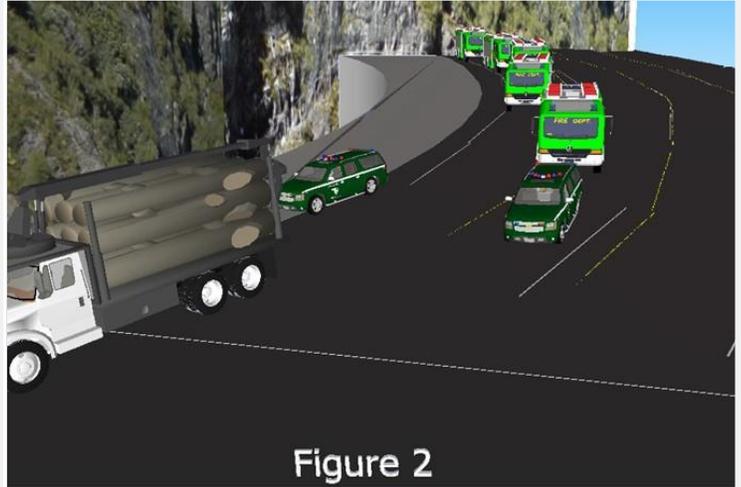


Figure 2

“I began to look ahead to see where I needed to put the truck,” said the AFEO.

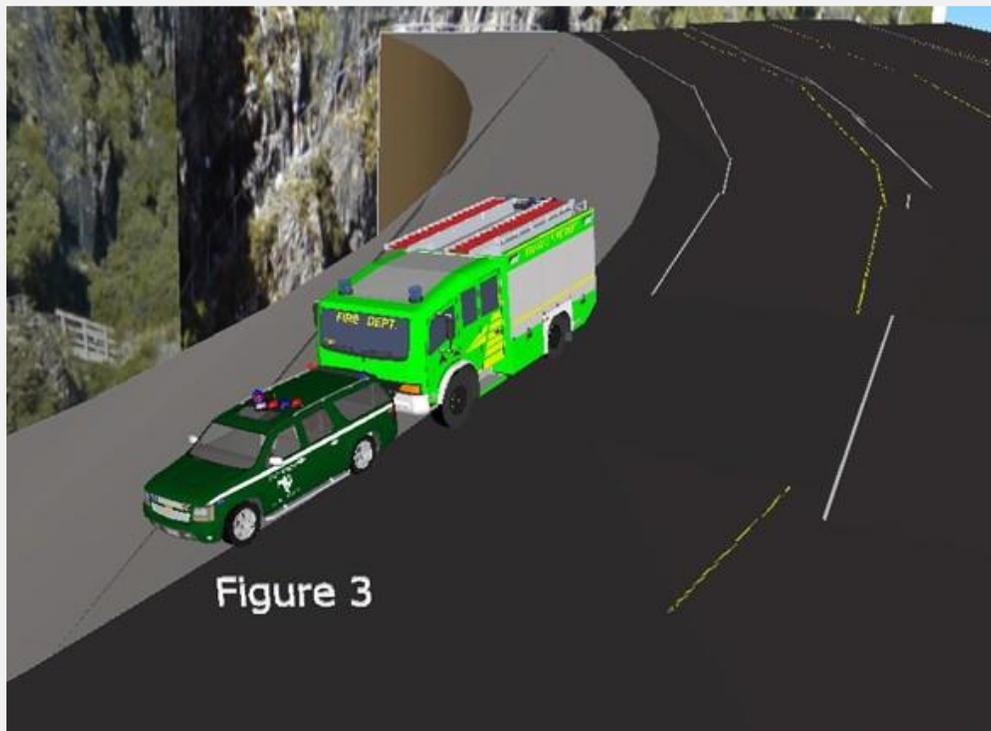


Figure 3

“My mind was racing with all the repercussions of what could happen next...and I was also thinking of what could happen if I damaged this vehicle...would I get in trouble,” stated the STEN.

As the FEO and AFEO continued to figure out how to slow the engine, they realized nothing was working.

“I figured our last options were to ride it out, or jump out” said the FEO .

At this point, the engine was estimated to be going 60 mph.

“Stress level was to infinity and beyond,” stated the AFEO.

“It never occurred to me to pull the emergency brake...I was too focused on everything else,” said the AFEO

After passing the logging truck and creating a safe distance from it further down the mountain, the STEN began to slow his vehicle allowing the engine to creep up to it until contact was made he began to apply his brakes gently. The STEN remembers feeling a jolt and hearing what sounded like the fiberglass of his vehicle shearing apart. He recalls it took about 5 seconds to bring the engine to a stop on the right shoulder (Figure 3). Impact with the Ford Expedition was estimated at 63 mph. Figures 4-5 show what it would have looked like when both vehicles made contact with each other.

“I thought about pulling the emergency brake, but I was afraid it might cause the engine to slide and then tip over...we were never trained for this,” stated the FEO.



Figure 4

No injuries were reported to any of the 5 firefighters in the engine nor the STEN. Notifications were made. Traffic control measures were put in place until law enforcement and tow trucks arrived. Both vehicles were towed to an auto shop. Upon inspection of the engine by the FLA Fleet mechanic and shop mechanic, they found that the brakes and clutch were still in good shape. The Expedition was repaired within 5 days of the incident.

The following link was created to show the path of the engine during the incident as described by crew members to the FLA team: http://youtu.be/ZKITpGj_ygQ

Lessons Learned

- Maintain clear & concise communications between essential parties.
- Maintain calmness and teamwork.
- Utilize red lights to warn others and keep traffic back.
- Use gears to slow the vehicle at all times. Use engine brake to enhance service brake system.
- Know how to operate vehicle when engine brake is out. Pumping air brakes reduces pressure in an air brake system and overall effectiveness of braking force.
- Continue post-academy training on the aspects of air brake systems, and during emergency situations on home units.
- Hands on training for vehicles equipped with 2 speed differentials is no longer provided at the Engine Academy. Units must ensure drivers have the training, experience, and qualifications necessary to operate vehicles they are driving.
- Use of vehicles for stopping run-away Engines and other vehicles on mountain highways and roads is not recommended.
- Maintain a safe and paced operational tempo between reassignments from one incident to another.
- Recommend San Dimas Technology and Development Center (SDTDC) conduct tests with Fire Engines on the application of parking brakes at varying speeds and potential consequences when used.

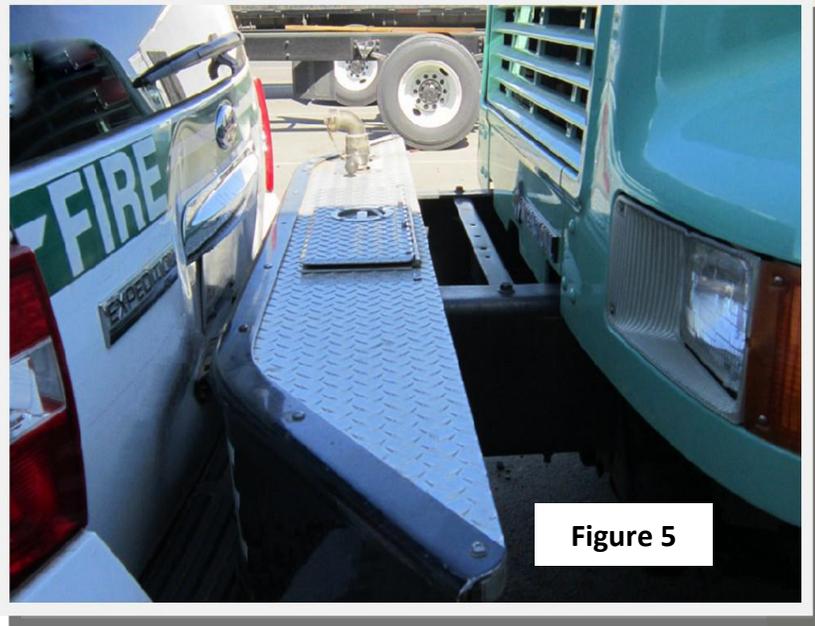


Figure 5

FLA Team Members:

Eduardo Olmedo, Mendocino N.F., District Ranger
Tony Martinez, Los Padres National Forest Safety Officer
Scott Alguire, Los Padres N.F. Fleet Manager
Van Arroyo, Sierra N.F. Deputy Fire Management Officer

Assistance with graphics was provided by YCC/Generation Green crewmember Patricio Sanchez, Reedley High School, Reedley, CA
Technical support provided by Elizabeth Sousa, Mendocino National Forest—Information Officer.