

# Bulldozer Damage Lessons Learned Review

Idaho Falls District BLM  
August 11, 2016



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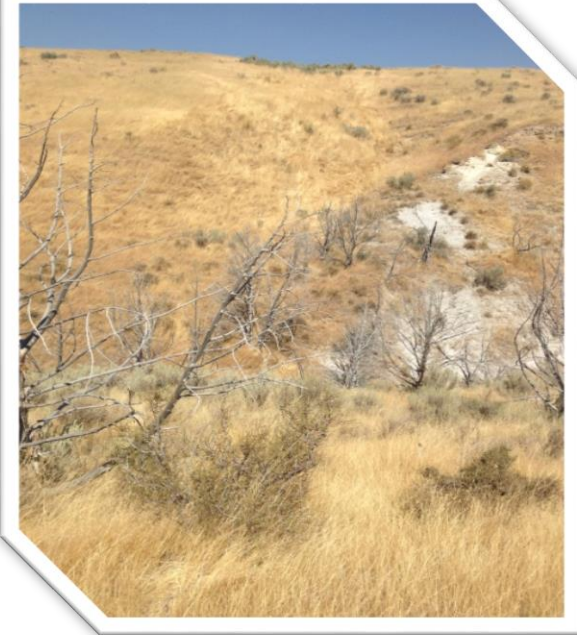
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## 1. Executive Summary

At approximately 0200 on August 11, 2016, a BLM Type 2 Caterpillar D6TLX bulldozer received moderate damage when it became stuck at the bottom of a drainage on Division X-ray of the Power Line Fire near American Falls, Idaho. There were no injuries to personnel during the event or in the recovery efforts of the equipment. The following information is based on statements and interviews from those involved in the accident. Their lessons learned in hindsight should help their peers mitigate this kind of accident in the future.

## 2. Operations Leading Up to the Dozer Getting Stuck

The Power Line Fire started around 1500 on August 10<sup>th</sup> and spread rapidly in grass, brush and juniper to about 3,000 acres. With substantial aircraft assistance until sunset, ground resources stopped the forward progress by around 0100 on the 11<sup>th</sup>. Hearing that the weather predicted for the day was favorable for additional fire growth, the decision was made to run four dozers through the night in an effort to get the entire fire lined before morning.



View of the fuel and topography adjacent to where Dozer #1 constructed direct fireline.

Knowing that fatigue management is a high priority, the IC also made it very clear that he wanted all other resources to try and get at least four hours of rest. The two dozers on the south side of the fire were able to tie-in their lines fairly quickly. Due to concerns about fallen power poles and lines in the vicinity of their transports, the operators slept in their dozers. All other resources and most of the overhead were able to pull off the line and bed down around 0130.

Dozer #1 (the dozer that would eventually sustain damage) and Dozer #2 were working the north side of the fire with an Engine Captain who is a qualified HEQB. The HEQB scouted a good line upslope through some junipers to the top of and across a plateau. At this time the HEQB told the dozer operators he needed to bed down as requested. He informed the operators that it would be easy pushing except coming off the backside where they may have to do some indirect line because of rocks and steep slope.

Dozer #1 and Dozer #2 pushed line across the top of the plateau to the north where the fire edge went down an approximate 57% slope on the northwest side. Dozer #1 stopped and talked with Dozer #2, asking his opinion about going down the slope. Dozer #1 and Dozer #2 shined their lights into the drainage to assess the intended line. Both operators felt it was a little steep; however, they could see the bottom of the drainage and the fire edge on the opposite side, so they agreed they would push direct line downslope and up the other side. Dozer #1 took the lead and started pushing line. Once he was about mid-slope, Dozer #2 followed to widen the line.



Dozer line leading into the drainage where Dozer #1 got stuck.

When Dozer #1 was about ten feet from the bottom of the drainage the operator felt the dozer “nose down.” Having little to no visibility through the dust and smoke, but feeling the motion of the dozer, the operator engaged the brake. As the dozer continued to slide downslope, the operator pushed the blade down to help him stop—but the dozer was already committed to what would later be found as a nearly vertical cutout from erosion in the bottom of the drainage.

The operator quickly reacted by bracing himself with his arms against the frame of the front window as the dozer came to rest in the bottom of the drainage, nose first. The dozer had not tipped or rolled and was still on the tracks with the blade resting against the far side of the eroded bank.

After Dozer #1 came to rest, the operator called Dozer #2, told him what happened, and advised him not to proceed down the rest of the slope. Division X-ray overheard the radio conversation and informed the IC of the stuck dozer. Dozer #2 pushed line to the north so he could position his dozer up drainage and prepare for retrieval efforts. Both operators started figuring out how to safely secure the stuck dozer

before making it operational again.

### 3. Retrieval and Property Damage

The operators decided the safest method would be to level out the slope behind Dozer #1, allowing the dozer to sit flat and mitigating any potential for tipping. After leveling the slope, Dozer #2 tried to pull Dozer #1 out with a strap, but the strap broke. The operators then tried pushing Dozer #1 with Dozer #2. In the process, Dozer #1’s left blade angle ram broke because the blade was stuck in the ground and had been buried by debris from the leveling work. The blade tilt ram was also broken and the trunnion ball pivot was separated from the blade. Additionally, Dozer #2’s blade was damaged from pushing on Dozer #1.

At that point the retrieval mission was stopped until morning when Dozer #3 was requested to help with the operation. Ultimately, Dozer #1 was successfully retrieved without further damage by using the winch on Dozer #3.

### 4. Lessons Learned

#### Operating Without an HEQB to Scout Line

We had been using a HEQB to scout line for the two dozers on the north side of the fire even though they are experienced operators (one is DZIA qualified). However, pulling the HEQB left these two very experienced operators the burden of scouting their own line at night in moderate to steep terrain. It is extremely hard and very time consuming for dozer operators to stop and scout ahead, walk back, punch more line, stop again, and so on. If we really needed to go direct, there are things we could have done better, such as:

- Left the HEQB to scout for the dozers all night,



Dozer line leading into the drainage where Dozer #1 got stuck.

- Shut down one dozer and have that operator scout to at least create a single line by morning,
- Assign an entire engine crew to stick with the dozer operators to scout line and fire out any indirect chunks of line if needed, or
- Shut down dozer operations until daylight.

**By Going Indirect Rather Than Direct Might Have Greatly Reduced Firefighter Exposure**

We had already stopped the fire spread; we just did not have line around the entire fire. Often, it seems very counterproductive to stop the advancement of a fire just to add a chunk of indirect line and burn it out. We put a lot of effort into going as direct as we could for a variety of reasons. However, in this case, we may have reduced firefighter exposure greatly by progressing north with the dozers off the plateau, around the entire drainage, and burning out that section.

This would have eliminated the need to put dozer line on the slope, eliminated the need to hike firefighters into the drainage for mop-up, and eliminated the need to have a dozer go back and rehab a steep section of line. This indirect operation would have only added about 40 acres to the 3,104 acre fire. Another option would have been to punch in some hand line.

**Wait Until Daylight—When the Adrenaline has Worn Off—to Initiate Recovery Ideas**

Dozer operators tend to be very driven individuals with a desire to succeed, especially when it comes to putting dozer line around a fire. When the dozer got stuck, they put their experienced minds together to figure out a way to free the dozer and complete the line as requested. However, their efforts to get the dozer unstuck ended up causing unforeseen adverse consequences. All of the damage to both dozers and the resource damage to the drainage bottom was done in the recovery phase of the operation. The lesson here is that as long as the equipment and personnel are in a safe spot, wait until daylight, then order the right recovery equipment and get recovery ideas collected when the adrenalin from the incident has worn off.



This is the pad that was leveled in the recovery efforts, not the drop-off that the dozer went over.



Dozer #1's left blade angle ram as well as its tilt ram were both broken.



Dozer #1's trunnion ball pivot was separated from the blade.