Rapid Lesson Sharing

Event Type: Dozer Tip-Over

Date: August 23, 2020

Location: Baboon Fire, Utah

The Story and Lessons from a Dozer Tip-Over Incident

"While starting to slide, I tried to turn downhill and was unable to. I continued to slide until I slid off the rocks and with that momentum it tipped the dozer onto the side."

Dozer Operator

Narrative

On August 23 at approximately noon, an agency owned and operated 486C Caterpillar dozer tipped over onto its side while constructing fire line on the Baboon Fire near Minersville, Utah. The operator was unharmed and able to safely exit the dozer after the rollover occurred. Damage to the equipment was mostly cosmetic, denting the side panel and diesel tank.

The operator had just returned to work from days off. After receiving a dispatch to the Baboon Fire, he arrived on scene at approximately 0900 that morning. Upon arrival, he was instructed to build dozer line around the fire's southwest flank.

The fire was actively burning in an area with grass, brush and some pinyon and juniper trees that had previously been burned and rehabilitated several years earlier. The operator was constructing fire line just outside of the tree line where the rehabbed vegetation intersected, thus making line construction more efficient.

The operator had constructed approximately one mile of line when he noticed the terrain was getting more rocky and steeper. At that point, the operator decided to turn downhill and cross over the drainage onto a lower part of the ridge next to where the fire was actively burning. This line of operation reduced the slope to a more manageable grade.

After proceeding just over midway up the hill along this new line of attack, the operator turned the dozer along the tree line to transverse the hill for about 60 to 70 feet. The slope at this point was estimated to be between 25% and 30%.

The operator felt very comfortable operating at this percentage. "*It was like other fires I had worked as well as less steep than in areas I had already passed through earlier that day*," he said. This section of terrain had substantial basalt mixed throughout the soil and vegetation.

Photo shows the first and second fire lines ascending the ridge.

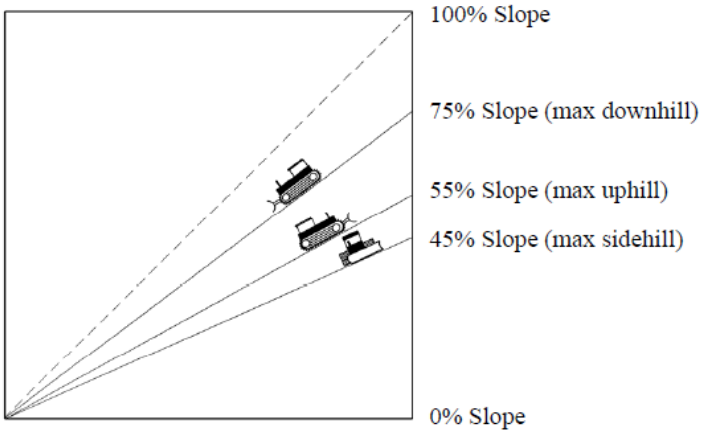
FIRE LINE AS THE OPERATOR BEGAN TO TRANSVERSE THE HILL

It was at this point the rollover incident took place. The operator reported: "*What happened was the fire line took a dogleg upslope. There was a tree in the bottom on the dogleg. I pushed this tree over, then backed up to pick my line back up and construct line uphill. I believe that with traveling on this section of line twice broke up the rock stability underneath me. As I started to push line where I had just drove twice, the rocks and the dozer started to slide. While starting to slide, I tried to turn downhill and was unable to. I continued to slide until I slid off the rocks and with that momentum it tipped the dozer onto the side*."

There are many factors to consider when determining the maximum percent slope for dozer operation. Type and size of dozer, terrain, weather conditions and operator experience can all be determining factors regarding limits of the equipment.

The U.S. Forest Service's Dozer Boss Pre-Course Work training course, Appendix D states: *"As with any piece of specialized equipment, the dozer has limitations. As a general guideline, dozers should not be operated across slopes (sidehill) greater than 45 percent, uphill slopes greater than 55 percent or downhill on slopes greater than 75 percent (see Figure 1)."*

Figure 1 – Guideline for Maximum Percent Slope Dozer Operation



All sections of dozer line were under these general guidelines for operation. However, the rock accumulation presented a hazardous situation and an angle beyond the stability point of the dozer as it slid off the rocky bed.

Second Dozer Responds to Tip-Over

After exiting the dozer, the operator radioed the Dozer Boss, who was working with the county dozer on the fire's east flank and reported that the dozer had tipped.

A crew nearby, along with the county dozer, responded to the incident and worked to create line between the overturned equipment and the fire.

Once that line was secured, the county dozer created a pad and up-righted the agency dozer. A mechanic was called and arrived on scene the next day to assess the damage.

It was determined that the dozer could be started and walked off the hill to the transport where it was loaded and delivered to an equipment shop for further assessment.

The overturned dozer.

The county dozer responded to the agency dozer tip-over incident, created line between the overturned dozer and the fire, then up-righted the dozer.

Dozer Operator Qualifications

Relevant to this assignment – HEQB, DOZP and DZIA. Additional fire qualifications – ENGB, CRWB, FIRB, FFT1, ICT4 and ENOP.

Lessons

- The operator had constructed dozer line on multiple fires in similar terrain and slope without issue. This situation seemed to be like these past experiences. However, the amount and structure of the rock created a buildup of loose material, decreased traction, and caused the machine to slide during forward movement. The operator felt that if faced with a similar situation, taking a deeper bite with the blade to remove rock accumulation and reduce the loose rocky travel surface might have produced a more successful outcome. While this idea is contrary to only taking vegetation and keeping disturbance light for environmental purposes, it may be necessary for providing safety.

- Although the slope of the hill was not extreme, adding various-sized material to the surface can increase the equipment's operating angle. This could be material such as rocks, trees or other debris that can cause the dozer to slide and/or to tip.

The up-righted dozer.

Other Notable Findings

- The area had been previously treated and chained using dozers. This work was done across the same area without incident during emergency stabilization and restoration treatments.
- Good communications on the fire and having various personnel working near the dozer resulted in a quick response to this incident. Having a second dozer and crews nearby to build line around the dozer likely reduced the probability of additional damage to the equipment from the fire.
- The operator changed course prior to the incident when he noticed the terrain becoming steeper and rockier.

This RLS was submitted by:

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