Event Type: Bulldozer Fire
Date: March 22, 2026
Location: Ouachita National Forest, Region 8

Ouachita National Forest Bulldozer Fire Facilitated Learning Analysis

"It was very humbling that we were three grown men with 77 years of combined experience and there was nothing we could do." **-RXB2**

Photo 1: Burned John Deere 450 J Fire Tractor Crawler on the Ouachita National Forest

Background:

On March 21st, 2026, a district accomplished a high priority 39-acre site prep burn in the heart of the Ouachita National Forest in Arkansas. Greenup was just starting, with mid-story and understory fuels beginning to show the first hints of spring color. It had been a dry late winter and spring with below average rainfall. Prime burning season is typically late February through April but had begun in mid-January this year. The burn unit is comprised of mainly shortleaf pine with scattered oak and hickory. It had been logged approximately one year previously, so personnel were familiar with its layout. During the day's final checks, containment lines were secure, and no issues were detected. Due to forecasted high winds, the Type 2 Burn Boss (RXB2) decided not to burn the following day.

The RXB2 arrived at 0730 on March 22nd to check the unit and found a small slop over of approximately two acres smoldering with minimal spread. He texted the Heavy Equipment Boss (HEQB) and Dozer Operator Initial Attack (DZIA), who responded from the Work Center, approximately 11 miles away.

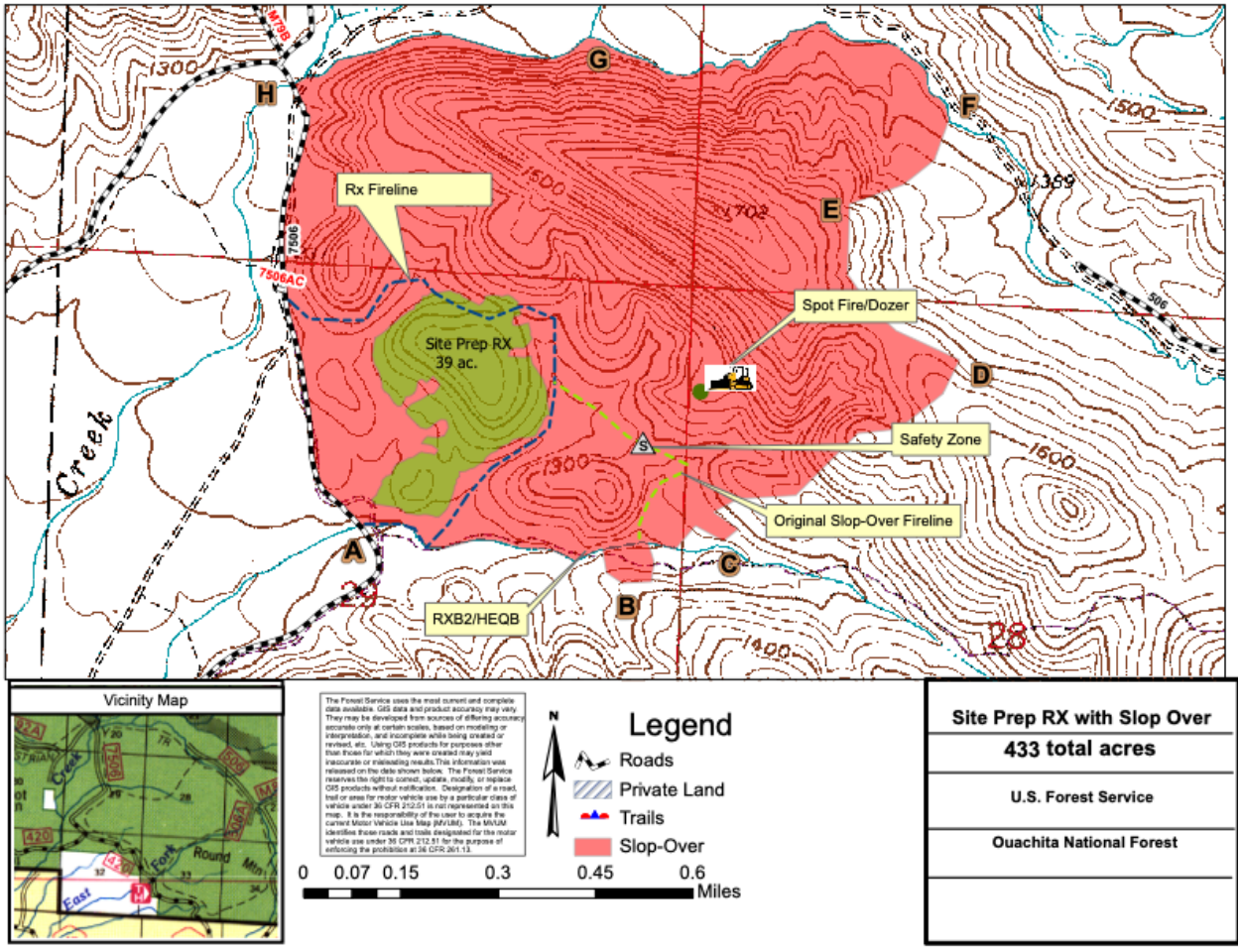

Figure 1: Map of Burned Area

Narrative:

The situation was nothing out of the ordinary for the DZIA. He has been running dozers for over 20 years, having worked with this machine, a John Deere 450 J Fire Crawler Tractor, since 2009. He provided the specifications when the dozer was initially ordered, including narrow tracks for maneuverability on this area's rocky terrain and the "ripper," large teeth-shaped spikes that dig in where blades aren't effective. "*It was exactly what I wanted*," he noted. This machine was well maintained and used frequently not only for fire suppression, but also for culvert removal and other road work. The DZIA was proud of this dozer, having taken it off-forest for fires where he operated it handily in extreme conditions that challenged other, less experienced dozer operators.

Photo 2: Dirt and Rock Ramp in Front of Snag

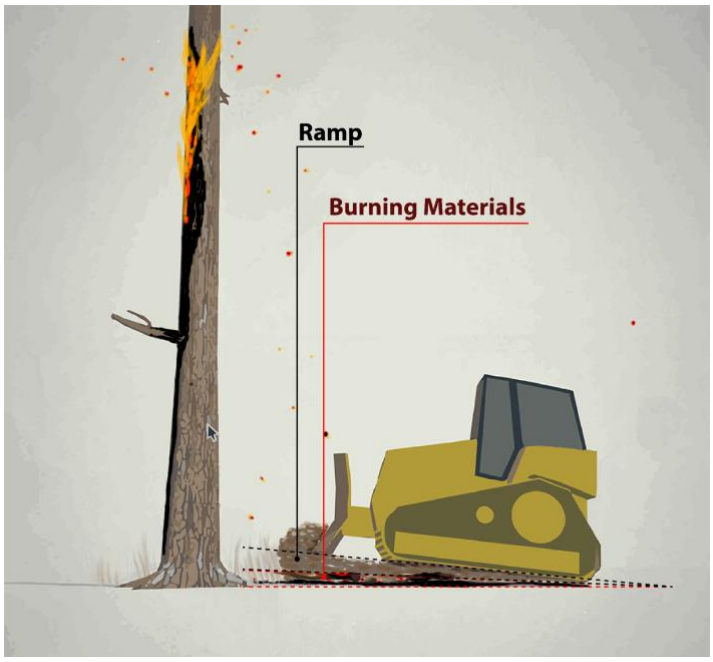

Figure 2: Diagram of "Ramping"

Upon arrival with the HEQB to the unit, the DZIA used the dozer to open an old road on the north side of the slop over, stopping within 30 yards of the creek to the southeast of the initial spot fire. The HEQB cleared a portion of the area between the old road and the creek until the RXB2 requested him on a spot on the south side of the creek. At this time, the DZIA walked the remaining 30 yards down to the creek, clearing the control line by hand in the braided, riparian zone. The DZIA then walked back uphill to his dozer, where he saw a spot fire of about 20 by 20 feet in a draw above him. He engaged with the dozer, intending to keep this fire from spreading into the rough terrain uphill by removing a burning snag along the north edge within the spot. He "ramped" the area leading up to the snag by pushing dirt and rocks downhill to create a nonflammable platform on which the dozer could sit while he pushed the snag. As he pushed the flaming snag, burning embers floated and fell.

Photo 3: View from dozer down cleared skid trail to safety zone.

At this elevated vantage point, the DZIA observed multiple spot fires upslope from his location. He determined that with the number of spots, the terrain, and the fuel type, a different strategy was necessary. He decided to disengage and to move the dozer to a safer place where he could meet with the HEQB and RXB2 to develop a new plan.

As he was backing the dozer, it abruptly died. He exited the machine and noticed a small fire under the dozer. He extinguished the fire quickly with the fire extinguisher from the dozer but while doing so noticed a fire inside the engine compartment. He swiftly crawled onto the uphill side of the dozer and opened the top of the motor compartment, emptying the remains of the fire extinguisher into the compartment around the air filter housing. When this failed to extinguish the fire, he retrieved the fire extinguisher from a UTV that was parked about 70 yards downhill from him in the safety zone. This also failed to put out the fire. While the DZIA would have liked to extract the burning air filter, the heat and flames made it unsafe to do so. The DZIA made the extremely difficult decision to leave the dozer and retreat on foot to a safe location to the south. *"It was a terrible feeling,"* he reflected. While walking down the skid trail to the safety zone, the DZIA did not feel his personal safety was at risk at any time. The decision to leave the dozer, however, weighed heavily upon him. He notified the RXB2 and HEQB as he watched the motor fire overtake the dozer within minutes. Said the DZIA "*I tried as hard as I could with what I had…this all happened so quick…was there something else I could have done*?"

The RXB2 contacted the Duty Officer, requesting additional resources and referring to the dozer as "burned over." He later reflected that he wished that he had used more accurate terminology to describe the situation, since the dozer had burned up but had not in fact been burned over.

Photo 4: Access Point to Air Filter Housing

The fire was contained at 433 acres that same evening with the help of additional Forest firefighting resources. The strategy maximized the use of natural features and contained the fire both within the project area and National Forest System lands. It is outside the scope of this analysis to determine the cause of the fire in the dozer motor compartment. Given the DZIA's observations of the fire within the air assembly, however, it is probable that an ember was drawn into the air intake of the dozer.

Lessons Learned and Shared:

1. **Fire-Resistant Upgrades**

To understand this process, consider first the anatomy of a dozer air filter assembly. The factory-installed air cleaner assembly is made of a plastic composite material which contains both inner and outer paper filters. All items are combustible. The air cleaner assembly functions just like a standard automobile but is more robust with a two-filter system providing the clean air necessary for engine combustion.

While the DZIA followed best practices to minimize the danger of an ember entering the air filter, the fact remains that this is a volatile environment. One expert likened the motor to a "backwards leaf blower" as the engine sucks in air and feeds the components of the engine through the air filter assembly. If an ember reaches the filter, the fire can intensify quickly—much like blowing on dry paper in a campfire. Replacing the flammable components of the filter with non-flammable components can mitigate this vulnerability.

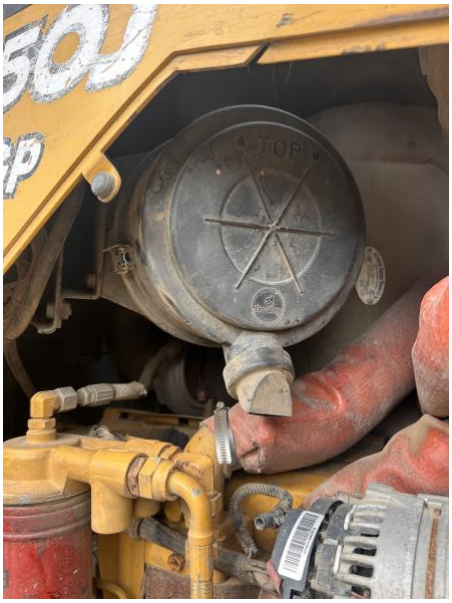

Photo 5: Air Cleaner Assembly


Photo 6: Outer Air Filter


Photo 7: Inner Air Filter

While options exist for after-market replacement of combustible items, the process for requesting these items is currently approved on a case-by-case basis. The Vehicle Modification Request process starts with operators informing their Fire Management Officers (FMO) of a Modification Request. The FMO completes the Vehicle Modification Form (VMF) and submits it to the Forest Fleet Manager (FFM). The FFM then coordinates with the Regional Fleet Manager. The VMF serves as a communication document throughout the process.

Photo 8: Fire-Resistant Air Filter

Photo 9: Metal Air Filter Housing

Streamlining and standardizing this after-market equipment on all Region 8 (R8) dozers would take a significant burden off the shoulders of equipment operators. The R8 Mobile Fire Equipment Committee (MFEC) has been discussing the installation of flame-resistant air filters and pre-cleaners. The firefighters interviewed supported R8's initiative to implement these improvements. Region 5 has successfully implemented these changes on their dozers and can advise on best practices for sourcing and installing these after market components.

Photo 10: Metal Pre-Cleaner

Photo 11: Metal Pre-Cleaner, Inside View

Note: Pre-cleaners use centrifugal force to spin out heavier dust and debris from the air intake system before they can reach the air filter system.

2. The Weight of Words

While coordinating resources on-scene and enroute, the RXB2 also made notifications about the situation. He said to the Fire Duty Officer and Agency Administrator, “We had a dozer burned over,” instead of, “Our DZIA is fine, but we had a dozer burn up.” In this instance, the miscommunication led administrators to believe they were dealing with a much more severe human emergency.

The core lesson from this event is that precise language is vital during high-stress incident reporting because specific terms carry heavy connotations that can trigger outsized organizational response. The choice of this phrase was an issue because:

- **"Burned over" vs. "Burned Up":** While saying a dozer "burned up" describes equipment loss, using the term "burned over" implied a life-threatening event where personnel were potentially trapped by fire.
- **Psychological Association:** the phrase "burned over" is psychologically linked to a “burnover” and associated traumatic events and potential injuries, like the ones firefighters see in annual fire shelter refresher videos.

3. “It’s Not Just a Dozer”

This was not just a piece of equipment. Said the DZIA gravely, “*in this country, these dozers put out fires*.” Its loss impacts the district’s scope of work substantially. Moreover, the DZIA had worked with this piece of equipment for 17 years, maintaining it meticulously and operating it expertly in the toughest conditions. It was ready for whatever the mission: road work, sale prep, tornado recovery, prescribed fire, and, of course, wildfire. While no one was hurt, the loss of this dozer felt intensely personal to its operator. The RXB2 also referred to the event as a “shadow” on his reputation and record. Two weeks later, it was evident this loss still burdened those involved. Recognizing this experience for what it is--a sense of loss--and prioritizing steps to prevent this from happening again may build trust and allow firefighters to recover more quickly from the experience.

4. “It Happened So Fast”

When a dozer catches fire, things happen quickly. Fortunately, the DZIA was well-prepared for the unexpected. His familiarity with the equipment allowed him to quickly diagnose the severity of the situation and move to safety. Others who work with dozers may not have this same familiarity and could benefit from going through an annual refresher reviewing compartment access, air filter, and fire extinguisher locations.

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