

Rapid Lesson Sharing

Event Type: Bulldozer Low Water Crossing Submersion

Date: April 6, 2022

Location: Sand Creek Fire,
Amarillo, Texas

*"I did not want to get stuck, but I was going nowhere.
The water started to rush in."*

Dozer Operator Trainee

Report Summary

On Wednesday, April 6, 2022, the State of Texas deployed multiple fire resources from across the state to engage in initial attack and wildland fire responses in the Amarillo, Texas area. While working to contain the Sand Creek Fire, a bulldozer was attempting to ford a seemingly safe, low-water "rip-rap" structure crossing when it became unstable and the dozer was quickly submerged. The Dozer Operator, with help from the Task Force Leader, narrowly escaped drowning in the dozer.

An RLS "Learning Team" was convened to assist the Texas A&M Forest Service with reviewing this event and sharing any lessons learned from the incident. After evaluating the actions surrounding the event, the team determined that although there was an unplanned event, the decisions made by those involved reflected a solid and capable fire program. Resources were within policy and training regarding this wildland fire and acted reasonably and professionally during all phases of the operation.

The key lessons learned from both this incident's participants as well as the RLS Learning Team are shared in this report.



**The dozer submerged in the water
after the "rip-rap" gave way.**



**Image shows the vehicle tracks at the "rip-rap"
low water crossing. In the distance, the dozer
can be seen starting to cross the waterway.**

The Sand Creek Fire Bulldozer Operation

Firefighting resources consisting of a Task Force Leader Trainee (TFLD[t]), Dozer Operator (DZOP) with a D6 Dozer, Dozer Operator Trainee (DZOP[t]) with a D5 Dozer, and a Type 6 Engine Crew arrived at 0800 to the 1321 Road. The TFLD(t) and DZOP(t) were assigned to go north to construct fire line and an anchor point at the heel of the fire.

At 1030, the area south of the 1321 Road "woke up" when fire activity that had been suppressed the previous evening began to burn actively again. The TFLD(t) scouted ahead for the DZOP(t) to find the best route to get to the fire.

A private landowner had placed a concrete "rip-rap" crossover, which previous vehicle traffic had used to access the area across a drainage. (Rip-rap is human-placed material used to protect streambeds and shorelines from wave damage and erosion). The TFLD(t), who was a Heavy Equipment Boss, walked across the drainage and found the concrete sturdy. It appeared to be between eight to ten feet wide, with the water level at shin-deep across the filled-in area.

There were also previous vehicle tracks, indicating the rip-rap concrete that was pushed in by the landowner had been solid enough for heavy equipment to cross. As the TFLD(t) walked across the rip-rap, the shin-high water was still and clear. There were no concerns about the dozer's

ability to safely drive across this path. *"I felt extremely comfortable that he could come across,"* said the TFLD(t).

"I Had No Doubt It was Solid to Cross"

The DZOP(t) had just finished pushing a fire line above the drainage to protect a barn where the night crew had been working. *"The day was smooth, and I was having a good day,"* said the DZOP(t). The DZOP(t) saw the heavy smoke on the other side of the creek and headed toward the TFLD(t) for further instruction. *"I saw him standing on the other side of the water crossing. I could see the water at the crossing was not even knee-high,"* said the DZOP(t). *"I had no doubt it was solid to cross."*

The TFLD(t)—an experienced Initial Attack Dozer Operator and Heavy Equipment Boss—began giving the DZOP(t) hand signals to keep him centered as he made his way across the rip-rap. The TFLD(t) noticed that the DZOP(t) was slightly left of center of the rip-rap and began to signal for him to center the dozer. At about that same time, the DZOP(t) began to feel the bulldozer starting to sink. The DZOP(t) placed the dozer in reverse and felt the end raise up as the tracks began to cut the rip-rap away. He remembers the feeling when he saw the water at the window line. *"I did not want to get stuck, but I was going nowhere,"* he said. *"The water started to rush in."*

"I hollered on the radio. Get out! Get out! Get out!"

Task Force Leader Trainee

The TFLD(t) saw the front end of the bulldozer raise up and then come back down. This see-saw motion was an indication that the dozer was sliding deeper into the water. *"I hollered on the radio. Get out! Get out! Get out!"* explained the TFLD(t). *"I started chunking my gear, and the next thing I remember is I was standing on the side of the dozer."*

As Water Rushes In—Will the Door Open?

As more water rushed inside, the DZOP(t) took off his seatbelt and attempted to open the door. He remembers thinking: *"I know this is happening fast, but it seems like it is taking a long time."* The DZOP(t) saw the TFLD(t) on top of the bulldozer, trying to open the door.

For a moment—as water continued to spill into the cab—the operator had a sense of panic that the door would not be opened in time to escape.

Both men paused briefly to figure out how to work together to open the door. Finally, when the water level pressurized in the cabin, the DZOP(t) was able to push on the door as the TFLD(t) pulled it open.

After Their Harrowing Escape

After a harrowing escape to get out of the bulldozer, and then paddling through the water to the shore, the TFLD(t) and the DZOP(t) took a moment to recognize this near-miss and process their emotions.

They immediately called their supervisors to report the event.

The TFLD(t) realized that both he and the DZOP(t) were visibly shaken and needed some more time to process their experience. They decided it might help them to best process this event if they took care of themselves by putting on dry clothes and getting something to eat.

After the supervisor reviewed the incident he requested Critical Incident Stress Management (CISM) support, which was provided the next day by the Texas A&M Forest Service.



Picture taken from the "rip-rap" where the TFLD(t) jumped in to assist the DZOP(t).

Lessons and Suggestions

1. **When crossing near or over areas of water with the potential for the equipment to become submerged, keep the doors open and your seatbelt on.** The doors are extremely heavy, and if they are closed when you become submerged, they will be nearly impossible to open—just as they were in this incident. Even in normal conditions, when on a moderate angle, the bulldozer doors are cumbersome and hard to open due to their heavy weight. You should not take your seatbelt off, as it will keep you oriented and safer when the dozer rolls or slides into the water.
2. **Always have a designated swamper or spotter when operating in adverse terrain or near water.** You will need this extra set of hands and eyes to spot risks. If a dozer becomes submerged with the door closed, an extra person is needed to help open the heavy doors due to the added suction of the water.
3. **When crossing areas with unknown water depth on the sides of the travel path, mark the edges with flagging.** Although the TFLD(t) was guiding the dozer across the low water crossing, had the route been marked with flagging, this would have provided the operator a visual path to follow.
4. **When suddenly facing the unexpected: Stay Calm. Take a deep breath, think about your actions and decisions before you make them.** Although both the Dozer Operator Trainee and Task Force Leader Trainee tried independently to open the door at different times—it was necessary for them to work together to finally open the door. Critical seconds can be saved by remaining calm and coordinating your actions.
5. **Deploying a CISM Team immediately after an event is beneficial and the correct thing to do for people who have just experienced a traumatic event.** A near miss or an extraordinary event can be traumatic and require peer support and further resources. An event does not have to include an injury (physical or emotional) to cause trauma. By having professional resources there early, immediate care can be provided rapidly by resources trained to identify the signs of stress and mental health challenges—and recommend further treatment.

*The RLS Team would like to give a special thanks to Texas A&M Forest Service.
Their hospitality and professionalism provided a beneficial atmosphere
for ensuring a learning and just culture.*



This RLS was submitted by:

**Jeremy Brand
and
Amy Evans**



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