



Facilitated Learning Analysis



EXCAVATORS AND INTERSTATE OVERPASSES DON'T MIX

Incident Date: January 12, 2011

Note: This accident was reviewed using the Draft February 2011 Facilitated Learning Analysis (FLA) Implementation Guide as an option to an After Action Review (AAR) or Serious Accident Investigation (SAI).

Type of Event: Motor vehicle accident with excavator/bridge strike and no personal injury.

Summary:

Two Forest Service (FS) road crew employees were tasked from one National Forest (NF) to travel to another nearby NF, pick up an excavator for a flood damage repair project on their Forest. One member would be the transporter driving a FS conventional tractor flatbed trailer combination with the excavator on it, and the other employee would be chase vehicle operator.

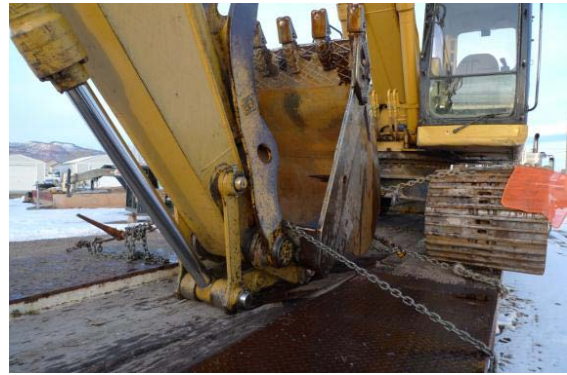
The day started out normally with both the employees having plenty of crew rest the previous evening, completing a tailgate safety meeting to discuss the day's task, and traveling approximately two and one half hours to their neighboring National Forest. The local engineering team had prepared the excavator, a Cat 320 CL, and upon arrival with trailer in tow, the receiving NF employees loaded the excavator, secured it to their trailer and drove off.

This crew had routinely transported an excavator and this task, other than using a borrowed excavator, appeared to be no different. As the crew was preparing to travel under both the east and west interstate overpasses and make a turn onto the west bound lane of the interstate, the excavator hauler slowed down from the road's 45 miles per hour speed to approximately 20 miles per hour or slower, the chase vehicle operator noticed that the excavator boom appeared to be too high for the 15 foot 8 inch height of the overpass. Before the chase vehicle driver could react the excavator "reach boom" hit the east bound side of the overpass. The noise and shock felt by the driver startled him into thinking someone had hit him from behind at first. By the time he realized what had happened and was able to stop, he was through both overpasses. Realizing the accident, he made his turn and pulled over to a safe position on the side of the interstate access ramp, came to a complete stop and initiated accident notification procedures.

Local NF response, State Department of Transportation (DOT) and State Highway Patrol arrived soon after to start an investigation. There was no citation given, damages to the overpasses were certified by state DOT to not be structural in nature, however, some cosmetic damage repair is required to prevent degradation and concrete spalling.

Sequence of Events and Outcome:

- Employees loaded excavator on flatbed trailer in the same manner as accustomed. There were no discussions about the specifics of this equipment during transfer. This included ensuring the deck was clear, and leveling the load. The excavator was then secured by chaining both the front and back in a criss-cross fashion from the outboard side of the tracks to the opposite sides of the deck. Finally, the bucket was pulled up against the front-end tie-down chains and secured with another chain. After leaving the equipment yard enroute to their home Forest, the chase vehicle operator noticed the excavator boom barely clearing a phone cable across the road. The employee attempted to contact the transport operator by radio; without success. "I've not felt like the radio system is reliable enough to feel comfortable with it." Employee made no attempt to further communicate this issue.



- As the transport vehicle approached the interstate overpasses, the chase vehicle operator noticed that the excavator boom appeared to be too high for the 15 foot 8 inch height of the overpass. Before he could warn his fellow employee the excavator reach boom hit the overpass.



- Before coming to a complete stop the transport with excavator passed under and collided with both overpasses.

"It was all over before I really registered what happened. I was probably through the first bridge and at first I thought someone hit me. By the time I was able to shut totally down, I was through the bridges."

- The driver pulled out of the way on the north side of the bridges, stopped and called their supervisor. The DOT, USFS Fleet Manager, USFS Safety Officer, and the State Highway Patrol were called to review the situation.
- The initial assessment of the DOT was that no structural damage occurred to the bridge. They scheduled their bridge inspector to review the damage the next day which confirmed no structural damage. The Highway Patrol did not issue a citation to the driver but indicated the event would be passed onto the County Solicitor.
- Damage to the excavator appears to include the "stick" ram and hydraulic hoses. The trailer deck where the bucket was resting was also damaged.
- The transport driver and chase vehicle driver were secured for the day. Arrangements were made to pick up and return both employees back to their home forest.
- Because there was no citation given or reasonable suspicion by on scene State Highway Patrol Officer or FS officials, no alcohol or controlled substances testing were conducted.

Lessons Learned / Recommendations – Participants:

- If it looks like you can get it lower, get it lower. Bring the bucket in tight as possible and then chain it the way you must to secure the load.
- Sometimes we dwell on one thing too much, i.e., securing the equipment with crossed chains and don't pay attention to other details, like the height of the boom.
- Have a grade rod to measure boom height available in all transports.
- There needs to be communication of the different sizes and quirks of equipment particularly at transfer. Maybe put a "sticker" inside the cab and in an obvious place for operator to see; with anomalies for the particular equipment. For example: "Reach boom" installed with 14 ft. stick vice 9 ft. stick (which would affect the height of the boom).
- This particular machine has always been hauled on a commercial low-boy trailer which is at least 18 inches to 2 feet lower than the flatbed trailer used. A suggestion would be for adjoining Forests to hire an individual whose sole responsibility is to transport equipment. In addition to providing consistency, only one transport would be needed; providing cost savings. In this case three National Forests could participate.
- Re-establish the Regional construction and maintenance workshops for all operators. These workshops would be to discuss and use all the applicable FS types of equipment and manufacturer operating procedures and techniques.
- If you loan a piece of equipment consider sending the regular operator with it if possible; especially if you are getting into more of an equipment sharing mode.
- Operators need to become familiar with operator's manual, which should be with the piece of equipment.
- The transport driver is responsible for all aspects of the transport.
- Normally we treat every project separately when developing a job hazard analysis and conducting our tailgate safety talks. Due to the normalcy of transporting this equipment, we didn't treat it separately from the project we would be using it on. Maybe we should have treated it as a separate project.
- Equipment checklists are on all our vehicles/equipment, however, this checklist does not include loading and securing for transport. It may be beneficial to add this.
- Equipment is continually getting bigger, even the same models are different, making it visually impossible to determine the difference in sizes unless the equipment is side-by-side.
- There is no consistently structured heavy equipment licensing program to identify who or what the qualifications are.
- The heavy equipment examiner program is broken. Forest examiners are using draft National guidelines and trying to make it work.

Lessons Learned / Recommendations – Facilitators:

- With continuous changes in equipment, a developed agency wide heavy equipment qualifications program for both operators and examiners is recommended.
- Education and hands on workshops to share knowledge and techniques between operators should be offered a minimum of every two years.
- Ensure operators know the location and what is in the manufacturer's Operation and Maintenance Manual.
- Ensure chase vehicle and transport have a reliable and prearranged communication plan prior to departure and during the transport. Use them in compliance with existing regulations.