

SAFETY DURING RIVER RESTORATION/LWD CONSTRUCTION

Dan Miller, PE



Construction Site Safety

- Usually the contractor's responsibility
- Make it part of the specifications
- Health and Safety Plan submittal
- However – You need to protect yourself!

Safety and health standards are promulgated by the Secretary of Labor under section 107 of the Contract Work Hours and Safety Standards Act.



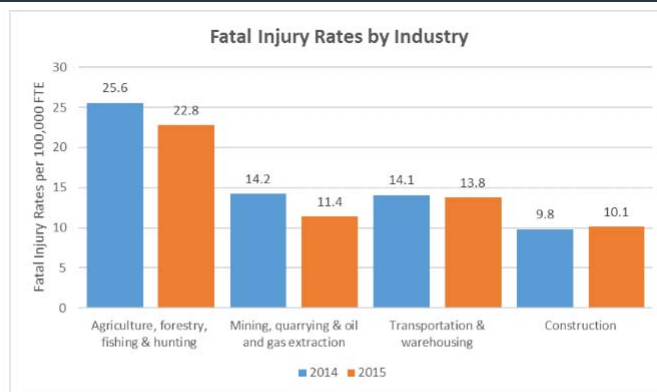
Construction Site Safety

- What if somebody falls and hurts themselves on your log jam during construction?
- Generally, designers are immune from third party lawsuits provided:
 - The designer did not contractually assume responsibility for site safety
 - The designer has not imposed means and methods on the contractor or subcontractors

Construction injuries can be serious

- Between 2-4 people are killed in construction accidents every day in the U.S.
- In 2012, over 800 people were killed in construction accidents
- Almost every accident is preventable
- Complacency, laziness and the need to be "cool" can be fatal

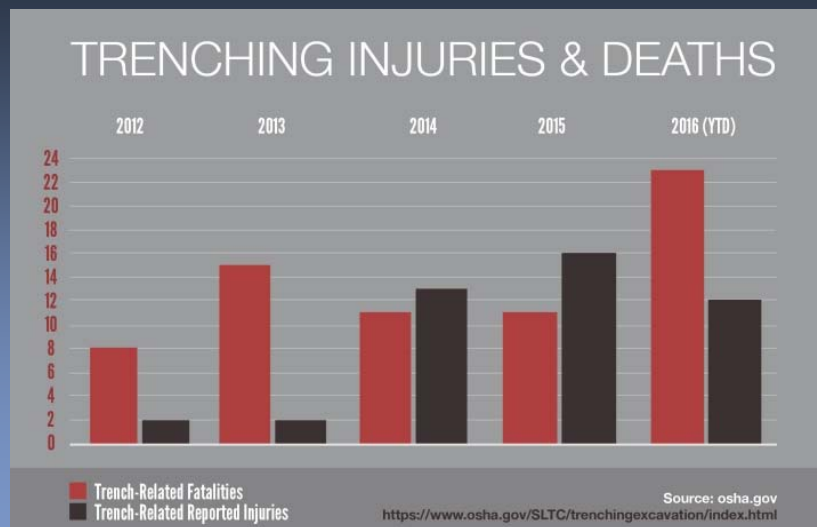
Construction injuries can be serious



The Five Deadliest Jobs in 2015 (by fatal work injury rates):

1. Logging workers - 132.7 fatal injuries per 100,000 FTE workers
2. Fishers and related fishing workers - 54.8
3. Aircraft pilot and flight engineers - 40.4
4. Roofers - 39.7
5. Refuse and recyclable material collectors - 38.8

Construction injuries can be serious



Construction injuries

- Non-illness workplace fatalities per 100,000 full time persons

Farming, fishing, and forestry occupations	24.8
Miscellaneous agricultural workers	18.3
Fishers and related fishing workers	120.8
Logging workers	129.9
Construction and extraction occupations	12.9
First-line supervisors/managers of construction trades and extraction workers	16.6
Carpenters	5.1
Construction laborers	17.8
Operating engineers and other construction equipment operators	12.1
Electricians	8.9
Painters, construction and maintenance	8.0
Pipelayers, plumbers, pipefitters, and steamfitters	6.6
Roofers	42.2
Structural iron and steel workers	37.0
Other extraction workers	46.9
Installation, maintenance, and repair occupations	7.1
First-line supervisors/managers of mechanics, installers, and repairers	10.2
Automotive service technicians and mechanics	3.4
Bus and truck mechanics and diesel engine specialists	8.0
Heating, air conditioning, and refrigeration mechanics and installers	6.1
Industrial machinery installation, repair, and maintenance workers	5.7

Most Common Construction Site Injuries

- Falls
- Run over or struck by heavy equipment (50% of serious excavation project injuries)
- Struck by car or truck (road traffic)
- Cuts from falling objects
- Heat stroke
- Repetitive stress
- Eyesight or hearing damage
- #1 injury – Any guesses?

Sun exposure

- Sunburn is the most common construction site injury, as reported by OSHA



Diesel fumes

- Long-term health effects
- Particulates, toxins, PAHs
- Always stay upwind

March 2012, U.S. government scientists showed that underground miners exposed to high levels of diesel fumes have a threefold increased risk for contracting lung cancer compared with those exposed to low levels.



Eye and Ear protection

- Wear eye protection when:
 - Chipping or breaking concrete
 - Drilling rock
 - Boulder work
- Polarized safety glasses
- Ear plugs/decibel meter



Site Safety Essentials

- Hard hat
- Won't protect you from heavy equipment, but will protect from branches, hammers, poles and other unforeseen minor contact



Site Safety Essentials

- Wear appropriate work boots
- Steel toes recommended
- You should never put yourself in a situation where you'd need steel toed waders or boots



Site Safety Essentials

- High visibility wear is essential
- Do not wear your old field vest
- Still need to pretend you are invisible



Site Safety Essentials

Judge: "Sir, were you wearing appropriate safety wear when the machinery hit you?"

You: "No, your honor."

Judge: "Sorry son, you're S.O.L. and I must therefore find for the defendant. "

Your insurance company: "Sorry son, you're S.O.L."

Your boss: "Sorry son, you're S.O.L."

Site Safety Essentials

- Specs can make the job safer
- Require specialty equipment



Site Safety Essentials

- Head on a swivel



Site Safety Essentials

- Head on a swivel
- Site traffic
- Be patient
- Look up



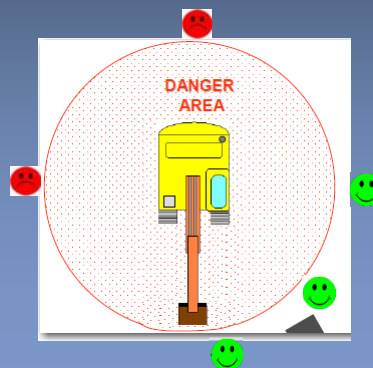
Excavator safety

- Stay to the operator's open window side or directly in front
- Stay outside the extended reach of the bucket



Approaching machinery

- Eye contact
- Only approach from the Green areas
- Make sure you get confirmation on a closed fist or some other agreed-upon sign



Excavator safety – Large Wood

- Double your effective radius when working with large wood
- Logs and rootwads bounce
- Secondary levering
- Put a tree between you and the machine
- Always have an escape route



Excavator safety

- Stay out of the extended arm range of the excavator whenever possible



FATALITY NARRATIVE

Laborer Struck by Boom of Excavator When it Tips Over*

Industry: Site preparation contractors
Task: Assisting excavator operator set concrete septic box in trench
Occupation: Laborer
Type of Incident: Struck by / Machinery

Release Date: November 3, 2010
Incident Date: September 26, 2008
Case No.: 08WA04801
SHARP Report No.: 71-96-2010

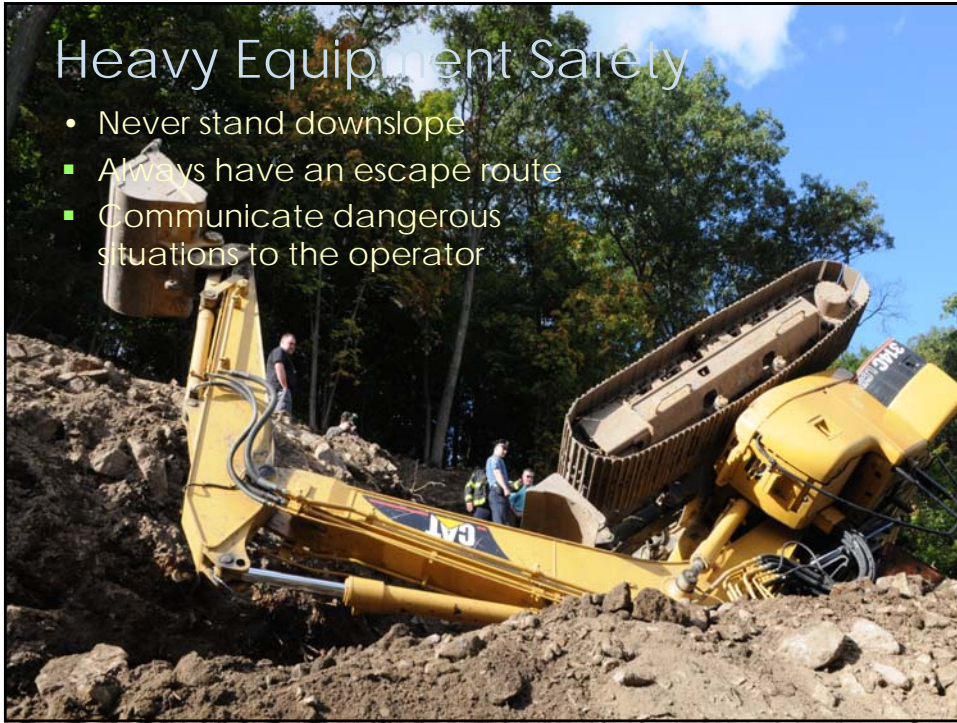
On September 26, 2008, a construction laborer died when he was struck by the boom of an excavator when it tipped over. His job as a laborer involved checking grades and ensuring that elevations were correct and guiding and spotting the excavator operator. On the day of the incident, the victim and the excavator operator were placing a concrete septic tank in an excavation at a residence. The septic tank measured 6'x6'x10' and weighed 10,290 lbs. They were working in a tight space on a mild slope with a steep slope to one side. The operator positioned the excavator to make a side lift (boom not parallel with the tracks) of the septic tank. The boom was extended about 40% during the lift and while lowering the tank into the excavation. As the operator boomed out the load, the load went over the excavator's maximum weight lifting capacity and the excavator tipped over. The boom struck the victim who was standing on the spoils pile on the other side of the excavation. The 26-year-old victim had worked for a site preparation contractor for about a year and the operator had worked with his employer for two years.



Incident scene with tipped over excavator and septic tank.

Heavy Equipment Safety

- Never stand downslope
- Always have an escape route
- Communicate dangerous situations to the operator



Heavy Equipment Safety

- Soil integrity



Heavy Equipment Safety

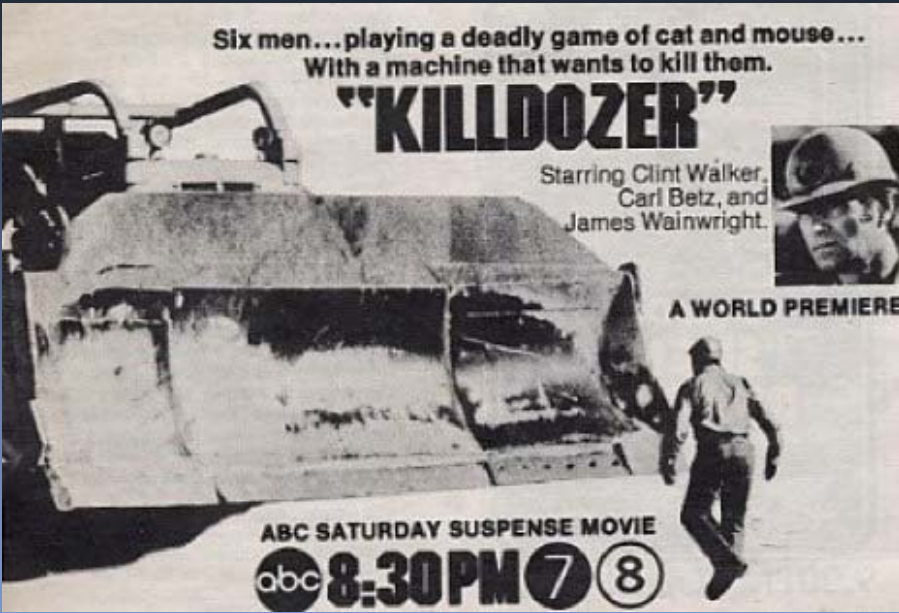
- Never walk behind heavy equipment
- Stay out of busy areas
- Pretend you are invisible



Six men... playing a deadly game of cat and mouse...
With a machine that wants to kill them.

"KILLDOZER"

Starring Clint Walker,
Carl Betz, and
James Wainwright.



A WORLD PREMIERE

ABC SATURDAY SUSPENSE MOVIE
abc 8:30PM 7 8

Heavy Equipment Safety

- GPS makes you invisible



Heavy Equipment Signals

- Review key signals with the operator
- Make up your own that work

EXCAVATOR HANDSIGNALS			
 Load Up	 Load Down	 Swing Left	 Swing Right
 Turn Left	 Turn Right	 Travel	 This Far To Go
 Everything Slow	 Stop Engine	 Stop	 Emergency Stop

Power lines

- Verify that Dig Safe was completed
- Review overheads before and during construction
- Ground potential/Voltage gradient is reduced in half for every 2-3 feet moved away from the energized source

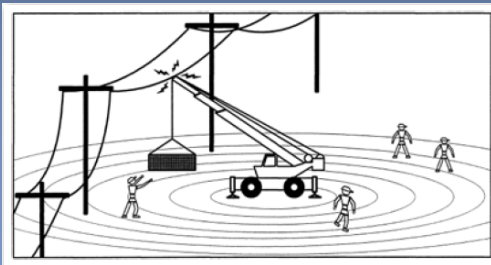


Figure 3 – Example of ground potential gradient

Holes and steep banks

- Stay away from them
- Avoid banks subject to collapse



Pawnee, IN



Large Wood Safety Quiz





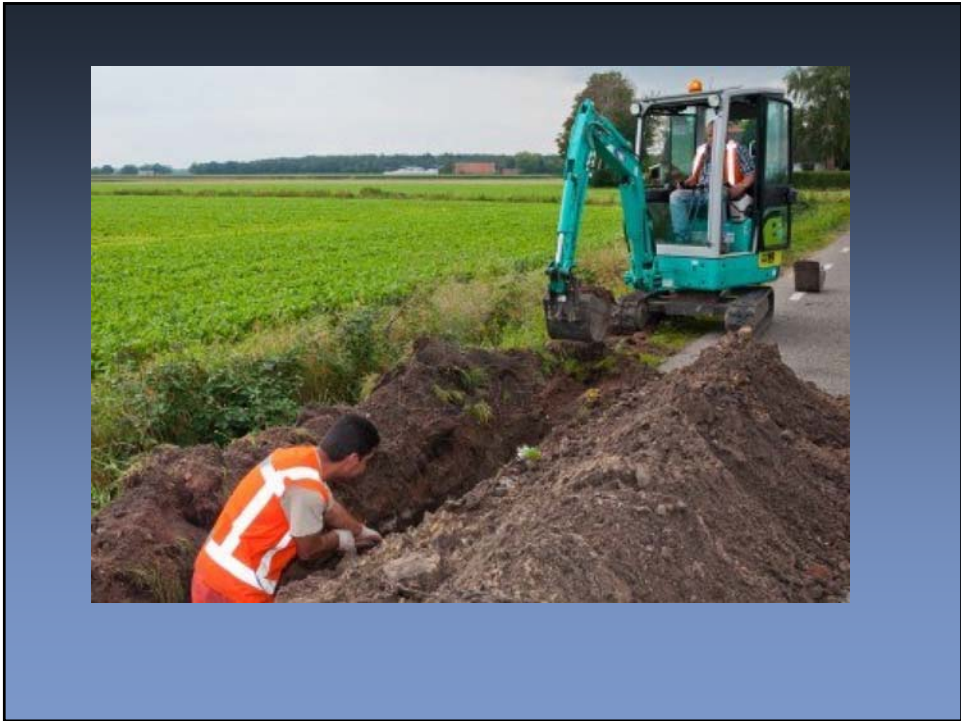














Specialized equipment can significantly improve site safety (and efficiency)





Unusual equipment

- Don't stand behind
- Watch where you step





Thank you

danmiller@interfluve.com
541-399-0979

