Increasing Awareness of Factors that Influence Trench Safety

Moderator: Eileen Betit, CPWR’s Research to Practice (r2p) Director

Presenters:
• Scott Ketcham, Director, OSHA Directorate of Construction
• Joe Wise, Regional Customer Training Manager at United Rentals Trench Safety
• Dr. Alan Echt, Sr. Industrial Hygienist, NIOSH Office of Construction Safety and Health

For Technical Difficulties:
Chat with host, Jessica Bunting
or email jbunting@cpwr.com

If you have trouble hearing through your computer, call in via phone:
415-655-0003
Access code: 669 810 997
OSHA Excavation and Trenching: Agency Priority Goal

Scott C. Ketcham MPA, CSP
Director, Directorate of Construction
Occupational Safety and Health Administration
Agenda

- Trenching and Excavation – Top 10 Construction Violations
- Inspection Stats
- Focus 4
- Excavation Incidents
- OSHA’s Trenching Initiative
- Agency Priority Goal
- Top Excavation Violations
- Trench Safety Summits / Stand Down
- Trenching and Excavation Resources
OSHA at 50

- 50th anniversary of the OSH ACT
- Landmark legislation: establishing OSHA and providing federal workplace safety and health protections.
Top 10 Violations in Construction

1. Fall Protection – General Requirements (1926.501)
2. Scaffolding (1926.451)
3. Ladders (1926.1053)
4. Fall Protection – Training (1926.503)
5. Eye and Face Protection (1926.102)
6. Specific Excavation Requirements (1926.651)
7. General Safety and Health Provisions (1926.20)
8. Head Protection (1926.100)
9. Aerial Lifts (1926.453)
10. Fall Protection Systems Criteria and Practices (1926.502)

SOURCE: OIS
As of 9/30/19
<table>
<thead>
<tr>
<th>Standard</th>
<th>Total Violations</th>
<th>Serious Violations</th>
<th>Willful Violations</th>
<th>Repeat Violations</th>
</tr>
</thead>
<tbody>
<tr>
<td>1926.501 - Fall Protection</td>
<td>6,881</td>
<td>5,557</td>
<td>164</td>
<td>1,008</td>
</tr>
<tr>
<td>1926.451 - Scaffolding</td>
<td>3,169</td>
<td>2,885</td>
<td>14</td>
<td>158</td>
</tr>
<tr>
<td>1926.1053 - Ladders</td>
<td>2,708</td>
<td>2,406</td>
<td>5</td>
<td>130</td>
</tr>
<tr>
<td>1926.503 - Fall protection Training</td>
<td>2,015</td>
<td>1,549</td>
<td>8</td>
<td>100</td>
</tr>
<tr>
<td>1926.102 - Eye and Face Protection</td>
<td>1,618</td>
<td>1,435</td>
<td>7</td>
<td>124</td>
</tr>
<tr>
<td>1926.651-.652 - Specific Excavation Requirements</td>
<td>1,500</td>
<td>1,173</td>
<td>35</td>
<td>81</td>
</tr>
<tr>
<td>1926.20 - General Safety and Health Provisions</td>
<td>1,007</td>
<td>834</td>
<td>0</td>
<td>48</td>
</tr>
<tr>
<td>1926.100 - Head Protection</td>
<td>933</td>
<td>833</td>
<td>1</td>
<td>36</td>
</tr>
<tr>
<td>1926.453 - Aerial Lifts</td>
<td>783</td>
<td>719</td>
<td>3</td>
<td>27</td>
</tr>
<tr>
<td>1926.502 - Fall Protection Systems Criteria and Practices</td>
<td>758</td>
<td>653</td>
<td>4</td>
<td>24</td>
</tr>
</tbody>
</table>

SOURCE: OIS
As of 1/14/20
Top Violations in Excavation Work: FY 2019

<table>
<thead>
<tr>
<th>STANDARD</th>
<th>Conditions Cited</th>
</tr>
</thead>
<tbody>
<tr>
<td>1926.652(a)(1) - Protection of employees in excavations.</td>
<td>805</td>
</tr>
<tr>
<td>1926.651(c)(2) - Means of egress from trench excavations.</td>
<td>396</td>
</tr>
<tr>
<td>1926.651(j)(2) - Protection of employees from loose rock or soil</td>
<td>330</td>
</tr>
<tr>
<td>1926.651(k)(1) - Daily inspections of excavations</td>
<td>302</td>
</tr>
<tr>
<td>1926.651(k)(2) - Where the competent person finds evidence of a situation that could result in a possible cave-in</td>
<td>106</td>
</tr>
<tr>
<td>1926.651(h)(1) - Protection from hazards associated with water accumulation.</td>
<td>49</td>
</tr>
</tbody>
</table>
The actual breakdown of the causes of fatalities on construction sites in 2018 is as follows (numbers are a percentage of the 1,008 total construction-related fatalities that occurred in 2018):

- Falls: 338 (33.5%);
- Struck by object: 112 (11.1%);
- Electrocutions: 86 (8.5%);
- Caught in/between: 55 (5.5%).

Note: These "Fatal Four" were responsible for more than half (58.6%) the construction worker deaths in 2018, BLS reports. Eliminating the Fatal Four would save 591 workers' lives in America every year.
“Focus 4” Outreach Training Program

https://www.osha.gov/dte/outreach/construction/focus_four/index.html
Why Focus on Trenching?
Excavation Fatalities

- 2012 through 2014 average: 17 fatalities
- 2015: 25 fatalities
- 2016: 37 fatalities
- 2017: 24 fatalities
- 2018: 17 fatalities

Source: Bureau of Labor Statistics (BLS)
## Where are trenching incidents happening?

<table>
<thead>
<tr>
<th>Type of Construction</th>
<th>Number</th>
<th>Percent</th>
</tr>
</thead>
<tbody>
<tr>
<td>single family or duplex dwelling</td>
<td>29</td>
<td>24%</td>
</tr>
<tr>
<td>pipeline</td>
<td>19</td>
<td>16%</td>
</tr>
<tr>
<td>highway street road</td>
<td>16</td>
<td>13%</td>
</tr>
<tr>
<td>commercial building</td>
<td>10</td>
<td>8%</td>
</tr>
<tr>
<td>other heavy construction</td>
<td>10</td>
<td>8%</td>
</tr>
<tr>
<td>sewer/water treatment plant</td>
<td>9</td>
<td>8%</td>
</tr>
<tr>
<td>other building</td>
<td>8</td>
<td>7%</td>
</tr>
<tr>
<td>multi-family dwelling</td>
<td>7</td>
<td>6%</td>
</tr>
<tr>
<td>bridge</td>
<td>4</td>
<td>3%</td>
</tr>
<tr>
<td>powerline transmission</td>
<td>4</td>
<td>3%</td>
</tr>
<tr>
<td>excavation landfill</td>
<td>2</td>
<td>2%</td>
</tr>
<tr>
<td>manufacturing plant</td>
<td>1</td>
<td>1%</td>
</tr>
<tr>
<td>power plant</td>
<td>1</td>
<td>1%</td>
</tr>
<tr>
<td></td>
<td>120</td>
<td>100%</td>
</tr>
</tbody>
</table>

Note: Out of 156 total incidents, for which 36 end use unspecified.
Source: OSHA OIS Accident Investigation Report, FY 2013 - FY 2017
DOL’s Strategic Plan identifies trenching hazards as an agency priority.

OSHA’s goal is to increase the number of corrected trenching hazards through enforcement and consultation.
OSHA’s Trenching Initiative
OSHA Trenching Initiative Goals

• Increase safety awareness in trenching and excavation work;
• Reinforce the value of using proven protective measures … sloping, benching, shoring and shielding; and
• Prevent future trenching injuries and fatalities through balanced Enforcement and Compliance Assistance
Achieving Trenching Goal

• Enforcement
  – Increase of hazards corrected
  – National Emphasis Program Inspections
    • A revised OSHA National Emphasis Program for Trenching became effective on October 1, 2018
      • Enforcement
      • Compliance Assistance
    • Compliance Assistance
      – Consultation Program requests
      – Area Office Outreach programs
      – Online tools
Agency Priority Goal

- **Worker Safety**: Reduce Trenching and Excavation Hazards
- **Goal Leader**: Loren Sweatt, Deputy Assistant Secretary for Occupational Safety and Health
- **Deputy Goal Leader**: Scott Ketcham, Director, Directorate of Construction
- **Goal Statement**: By September 30, 2021, increase trenching and excavation hazards abated by 12% compared to FY2017 through inspections and compliance assistance at workplaces covered by the Occupational Safety and Health Administration.
**APG FY 2019 Report**

As of May 21, 2020  
Source: OIS

<table>
<thead>
<tr>
<th>Year</th>
<th>Goal</th>
<th>Total</th>
</tr>
</thead>
<tbody>
<tr>
<td>FY 2020</td>
<td>2,619</td>
<td>TBD</td>
</tr>
<tr>
<td>FY 2019 (Final)</td>
<td></td>
<td>2,710</td>
</tr>
<tr>
<td>FY 2018 (Final)</td>
<td>None</td>
<td>2,324</td>
</tr>
</tbody>
</table>
OSHA Trenching Outreach Activities

OSHA is working with trade associations to increase trenching and excavation hazard awareness that include the North American Excavation Shoring Association (NAXSA), the National Utility Contractor Association (NUCA) and the Association of Equipment Manufacturers (AEM).
Trench Safety Summits

- The cities picked to host the 2020 NAXSA/OSHA Safety Summits are:
  - Boston
  - Orlando
  - Los Angeles
  - Denver
  - Seattle
Trenching Safety Stand-Down

June 15-19, 2020

Approximately 50,000 participants in 2019
JUNE IS TRENCH SAFETY MONTH!

Safety Training and Protective Systems Save Lives

Trench Safety Stand Down Week
June 15–19, 2020

Make plans for your company to participate in this year's NUCA Trench Safety Stand Down Week. Being a part of our popular 3rd annual TSSD Week will help educate your employees on trenching hazards at the jobsite.

OSHA’s National Emphasis Program on Trenching and Excavation is a high priority agency priority. NUCA and OSHA have teamed up again this year for our annual trench safety program. Almost 40,000 industry and NUCA member company employees participated in last year’s TSSD.

Every company or organization that holds a TSSD will receive a certificate of participation, as well as a hard hat sticker for every employee who participated. Recognition will also be given in NUCA publications.

For more details and TSSD materials: nuca.com/tssd  #TSSD20  #TrenchSafetyMonth

Also sponsored by NUCA's Safety Ambassadors Club

NUCA

OSHA

Arlin L. Press Contracting
Alto Excavating
Buckie Utilities
Cost Construction Company
Cubicle Inc.
Dennis Construction
Criso’s Inc.
Cros’s Trenching
Clyde B. Walker

St. Louis Solid Waste

Cros’s Trenching Association

Oshkosh Body

Hoffman Equipment Company

For more details and TSSD materials: nuca.com/tssd  #TSSD20  #TrenchSafetyMonth

Also sponsored by NUCA’s Safety Ambassadors Club

NUCA

OSHA

Arlin L. Press Contracting
Alto Excavating
Buckie Utilities
Cost Construction Company
Cubicle Inc.
Dennis Construction
Criso’s Inc.
Cros’s Trenching
Clyde B. Walker

St. Louis Solid Waste

Cros’s Trenching Association

Oshkosh Body

Hoffman Equipment Company

For more details and TSSD materials: nuca.com/tssd  #TSSD20  #TrenchSafetyMonth
Trenching and Excavation Resources

Trenching and Excavation Toolkit

Revised OSHA 2226 Excavation
2019 Trench Survey

OSHA-NIOSH-CPWR r2p Working Group

OSHA Construction Directorate
NIOSH Office of Construction Safety and Health
CPWR Research to Practice (r2p) Program

Ruth Ruttenberg & Associates
United Rentals
Speed Shore, Inc.
<table>
<thead>
<tr>
<th>Sample</th>
<th># Surveyed</th>
<th># Responses</th>
<th>Response Rate</th>
</tr>
</thead>
<tbody>
<tr>
<td>United Rentals</td>
<td>461</td>
<td>411</td>
<td>89.2%</td>
</tr>
<tr>
<td>CPWR Outreach Database (convenience sample)</td>
<td>3,162</td>
<td>226</td>
<td>7.1%</td>
</tr>
<tr>
<td>Total</td>
<td>3,623</td>
<td>637</td>
<td>17.6%</td>
</tr>
</tbody>
</table>
Participants by current position

Perform Trench Work - “Industry” Group = 60.6%

“Safety & Health” Group = 35.2%
Construction establishments by employment size compared to the size of survey participants’ employers

Construction Industry

- 1-19: 9%
- 20 or more: 91%

Survey Participants

- 1-20: 20.3%
- 21 or more: 79.7%

Source: CPWR Quarterly Data Report; 3rd Q 2018, Figure 1
Participants’ industry experience

Years in the industry

- <1: Industry: 2.9%, S & H: 1.4%, All: 2.4%
- 1-5: Industry: 14.9%, S & H: 10.1%, All: 13.2%
- 6-10: Industry: 13.3%, S & H: 11.4%, All: 12.3%
- >10: Industry: 69.0%, S & H: 77.2%, All: 72.2%
Do you qualify as a competent person for trench work?

<table>
<thead>
<tr>
<th></th>
<th>Industry</th>
<th>S &amp;H</th>
<th>All</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Yes</strong></td>
<td>66.0%</td>
<td>81.7%</td>
<td>71.7%</td>
</tr>
<tr>
<td><strong>No</strong></td>
<td>22.1%</td>
<td>15.1%</td>
<td>19.5%</td>
</tr>
<tr>
<td><strong>Not Sure</strong></td>
<td>11.9%</td>
<td>3.2%</td>
<td>8.8%</td>
</tr>
</tbody>
</table>
How often do they see no protection …

- **Frequently/Always**
  - **All**: 22.3%
  - **S & H**: 23.3%
  - **Industry**: 20.4%

- **Occasionally**
  - **All**: 55.0%
  - **S & H**: 58.6%
  - **Industry**: 54.0%

- **Never**
  - **All**: 22.7%
  - **S & H**: 18.1%
  - **Industry**: 25.6%
Is there a competent person trained in trenching on the jobsite?

Always: 43.1% Industry, 32.2% S & H, 38.7% All
Frequently: 26.1% Industry, 27.7% S & H, 27.0% All
Occasionally: 28.0% Industry, 36.6% S & H, 31.2% All
Never: 2.9% Industry, 3.5% S & H, 3.1% All
Do you see incidents where new workers are exposed to trench/excavation work without proper competent person supervision?
Are there any parts of OSHA’s Trench Standard that may be confusing to those required to comply?

If yes, which of the following parts of the standard are confusing?

- **57.7%** - Trench sloping and benching safety measures (depth and width requirements)
- **43.4%** - Protective systems
- **33.7%** - Competent Person’s role and responsibilities
- **18.3%** - Access and Egress
How often do you have trouble with proper installation, understanding manufacturers’ tabulated data, and use of trench safety equipment?
Which of the following do you believe are the biggest contributors to trench incidents or collapses?

<table>
<thead>
<tr>
<th></th>
<th>Industry</th>
<th>Safety &amp; Health</th>
<th>Total</th>
</tr>
</thead>
<tbody>
<tr>
<td>Lack of training on trench safety (i.e., inspections, hazards)</td>
<td>66.6%</td>
<td>67.6%</td>
<td>67.0%</td>
</tr>
<tr>
<td>Trying to stay on schedule/production</td>
<td>65.2%</td>
<td>67.1%</td>
<td>66.0%</td>
</tr>
<tr>
<td>Indifference (i.e., it won’t happen on my watch)</td>
<td>50.6%</td>
<td>70.5%</td>
<td>58.1%</td>
</tr>
<tr>
<td>Lack of knowledge of the OSHA 1926.650 trenching and excavation standard (i.e., requirements, soil analysis, and protective system solutions)</td>
<td>48.3%</td>
<td>58.6%</td>
<td>52.2%</td>
</tr>
<tr>
<td>Tight budgets (i.e., didn’t estimate into job costs)</td>
<td>29.0%</td>
<td>43.8%</td>
<td>34.5%</td>
</tr>
<tr>
<td>Language barriers</td>
<td>18.8%</td>
<td>26.2%</td>
<td>21.3%</td>
</tr>
<tr>
<td>Other</td>
<td>6.9%</td>
<td>10.0%</td>
<td>8.4%</td>
</tr>
</tbody>
</table>
What we learned...

- More pre-planning is needed
- Trenches often are unprotected
- Trench projects often do not have a competent person on site
- Incidents often involve contractors who are inexperienced or new to trench work, or new workers without proper competent person supervision
- There is a need to increase training and education on the standard and safe practices
Alternatives to Trenching

CAPT Alan Echt, DrPH, CIH
NIOSH Office of Construction Safety and Health

Increasing Awareness of Factors that Influence Trench Safety
May 28, 2020

Photo credit: Scott Haviland, Oregon Occupational Safety and Health
Alternatives to trenching

- Substitution
- Use alternative methods
- Some still require limited trenching or excavation
- Not without their own hazards
Directional boring

- No excavation
- Drill to target
- Attach swivel and pipe
- Pull drill pipe, reamer, swivel and product pipe
Relining using cured-in-place pipe

- No excavation
- Popular for water and sewer repair
- Chemicals and processes may create new hazards

Photo credit: U.S. Air Force photo/Lea Johnson
Pipe ramming

- Trenching or excavation may be required
- May be faster than other methods
- Can’t be used in solid rock

Utility tunneling and pipe jacking

- Excavation required
- Concrete slab supports equipment
- Thrust wall may be needed

References


Disclaimers

The findings and conclusions in this presentation are those of the author(s) and do not necessarily represent the official position of the National Institute for Occupational Safety and Health, Centers for Disease Control and Prevention.

Mention of any company or product does not constitute endorsement by NIOSH, CDC. In addition, citations to websites external to NIOSH do not constitute NIOSH endorsement of the sponsoring organizations or their programs or products. Furthermore, NIOSH is not responsible for the content of these websites. All web addresses referenced in this presentation were accessible as of the presentation date.
QUESTIONS?