Staying Safe When Digging: Trenching & Excavation Basics

Wednesday, August 30th

Welcome: Kevin Cannon, CSP, ARM, Senior Director, Safety and Health Services, Associated General Contractors of America (AGC)

Q&A Moderator: Nicholas DeJesse, Assistant Regional Administrator – Cooperative and State Programs, OSHA Philadelphia Regional Office

Panelists:

- **Douglas Trout, MD, MHS**, Medical Officer, Office of Construction Safety and Health, National Institute for Occupational Safety and Health (NIOSH)
- **Phillippe Falkner**, Safety Director, Project Management, and Business Services Specialist, Ed Bell Construction Company
- **Perry Silvey, CHST**, Safety Manager, BT Construction

CPWR THE CENTER FOR CONSTRUCTION RESEARCH AND TRAINING

OSHA

CDC CENTERS FOR DISEASE CONTROL AND PREVENTION

NIOSH National Institute for Occupational Safety and Health

AGC THE CONSTRUCTION ASSOCIATION

ED BELL CONSTRUCTION

THINK INSIDE THE BOX

BTC GENERAL CONTRACTORS HENDERSON, COLORADO

Previous CPWR Webinar…

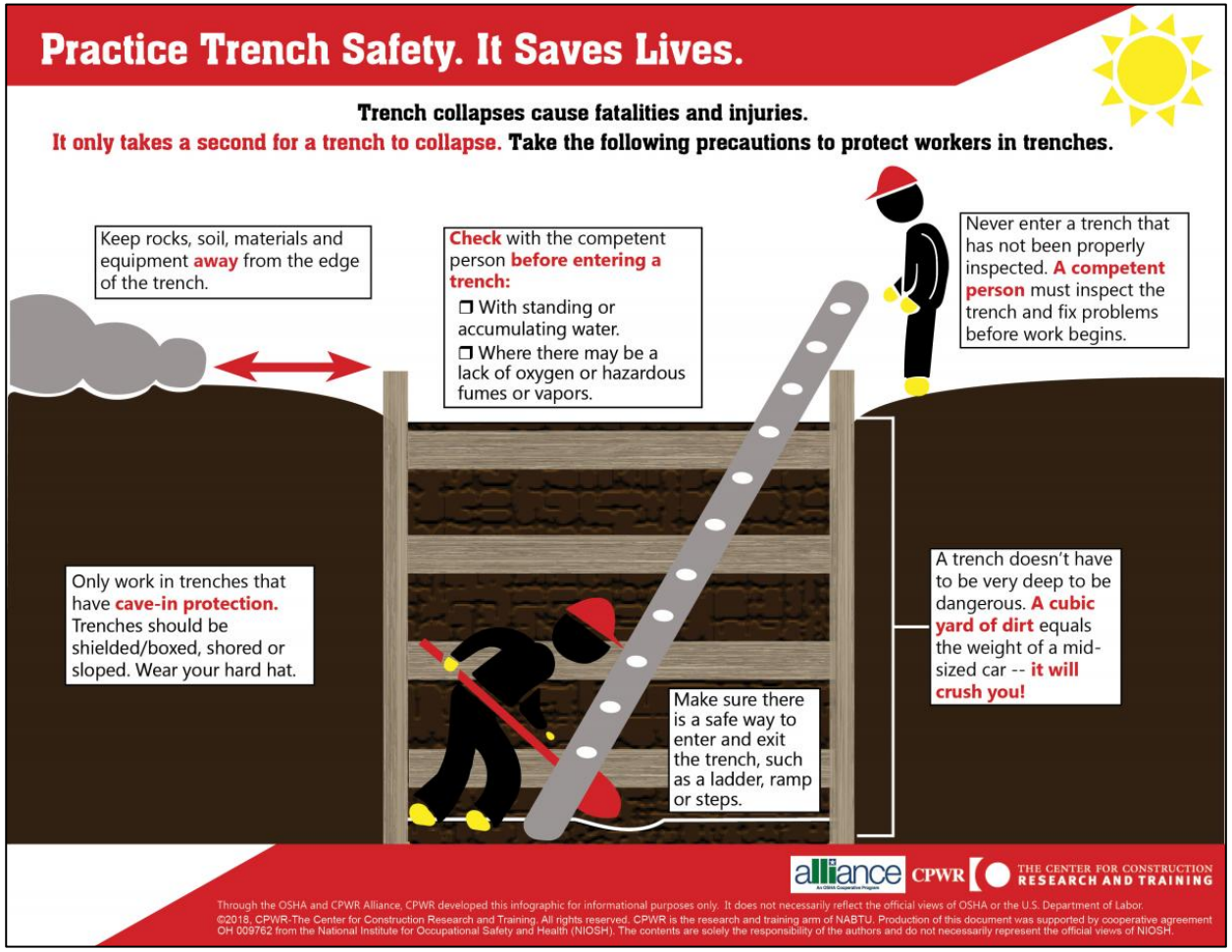
Increasing Awareness of Factors that Influence Trench Safety

(Thursday, May 28th, 2020)

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

Play Recording & Download Presentation



Staying Safe When Digging: Trenching & Excavation Basics

Introduction

CPWR Webinar Series

August 30, 2023

Douglas Trout, MD

NIOSH Office of Construction Safety and Health

Staying Safe When Digging: Trenching & Excavation Basics

Introduction - Outline

- Brief review – data, OSHA standard including several definitions
- Case report from 2022
- NIOSH Document- “Preventing Worker Deaths from Trench Cave-ins”
- Other Resources
- Prevention – NIOSH work addressing issues with trenching alternatives

Trench Collapse Fatalities

Workers are at risk of death or serious injury if they enter an unprotected trench

- 2017: 24 fatalities
- 2018: 13 fatalities
- 2019: 21 fatalities
- 2020: 18 fatalities
- 2021: 15 fatalities
- 2022: 39 fatalities
- 2023: 8 fatalities (as of 8/7/23)

Source OSHA Information System (Trench Collapses Only, Fed & State), Calendar Year

The OSHA standard for excavation and trenching

- **29 CFR* 1926 Subpart P, describes the precautions needed for safe excavation work.**
- Definitions in the standard include:
  - Excavation - means any man-made cut, cavity, trench, or depression in an earth surface, formed by earth removal
  - Trench (Trench excavation) … narrow excavation (in relation to its length) made below the surface of the ground. In general, the depth is greater than the width, but the width of a trench (measured at the bottom) is not greater than 15 feet (4.6 m)….

https://www.ecfr.gov/current/title-29/subtitle-B/chapter-XVII/part-1926/subpart-P

OSHA – Trenching and Excavation Web Page

https://www.osha.gov/trenching-excavation

- Regulations
- Directives
- Videos
- eTool
- Publications

OSHA Resources Include:

- Trenching and Excavation Safety Publication - ~ 20 pages
  - Introduction (including definitions)
  - Preplanning
  - Protective Systems
  - Additional Hazards and Protections

https://www.osha.gov/sites/default/files/publications/osha2226.pdf

- Trenching and Excavation Safety Fact Sheet – 2 pages

https://www.osha.gov/sites/default/files/publications/trench_excavation_fs.pdf

WASHINGTON State FACE Program
Fatality Assessment & Control Evaluation

CONSTRUCTION
FATALITY NARRATIVE

FACE

Contractor and Laborer Buried in Trench Collapse

INCIDENT FACTS

REPORT #: 71-240-2023s

REPORT DATE: May 29, 2023

INCIDENT DATE: July 4, 2022

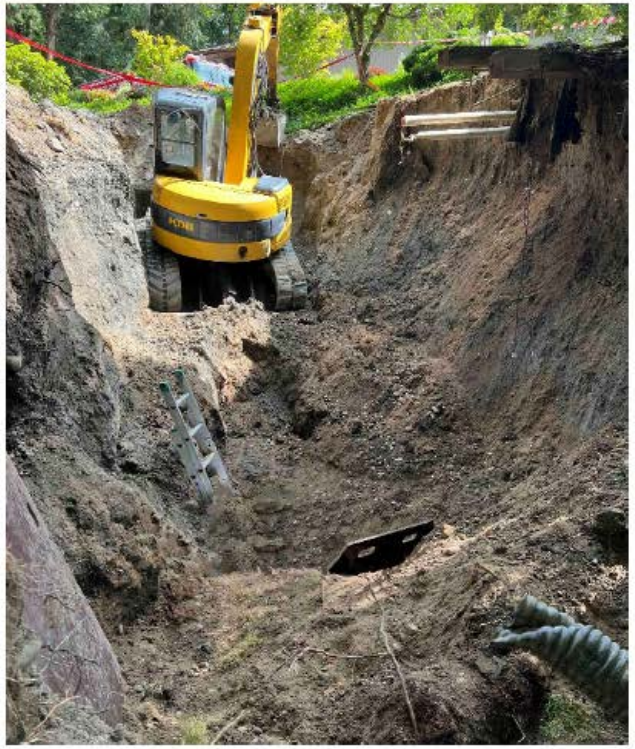
WORKERS: 66 and 32 years old

INDUSTRY: New Single-Family Housing Construction

OCCUPATIONS: Contractor and laborer

SCENE: Residence

EVENT TYPE: Trench collapse



SHARP Safety & Health Assessment & Research for Prevention

Washington State Department of Labor & Industries

https://lni.wa.gov/safety-health/safety-research/files/2023/71_240_2023_TwoBuriedInTrenchCollapse.pdf

WASHINGTON State FACE Program
Fatality Assessment & Control Evaluation

FATALITY NARRATIVE

FACE

- A 66-year-old contractor and a 32-year-old laborer died when the trench they were working in collapsed, burying them.
- The contractor and three employees had been working at a residence for a week to replace a sewer line. The contractor was the competent person on the site.
- To replace the sewer line they used an excavator to dig a trench that was 26-feet long and 24-feet deep. It was 24-feet wide at the top and 8-feet wide at the bottom.
- The sides of the trench were steep and nearly vertical.

WASHINGTON State FACE Program
Fatality Assessment & Control Evaluation

FATALITY NARRATIVE

FACE

- They dug the trench in unstable Type C soil and did not use protective systems such as shoring, shields, trench boxes or sloping and benching of the sides. The day before the incident, the trench collapsed after a rainstorm.
- On the morning of the incident, one of the workers used the large excavator to scoop out the collapsed soil. Another worker used a smaller excavator to push the spoils pile back from the trench edge.
- The contractor and a laborer then used an extension ladder to enter a 10-feet deep ditch in the larger trench.
- The contractor located the sewer line. He then told the other workers he was going to replace a section of the old line.
- A few moments later, the trench wall collapsed, burying him and the laborer.

WASHINGTON State FACE Program
Fatality Assessment & Control Evaluation

FATALITY NARRATIVE

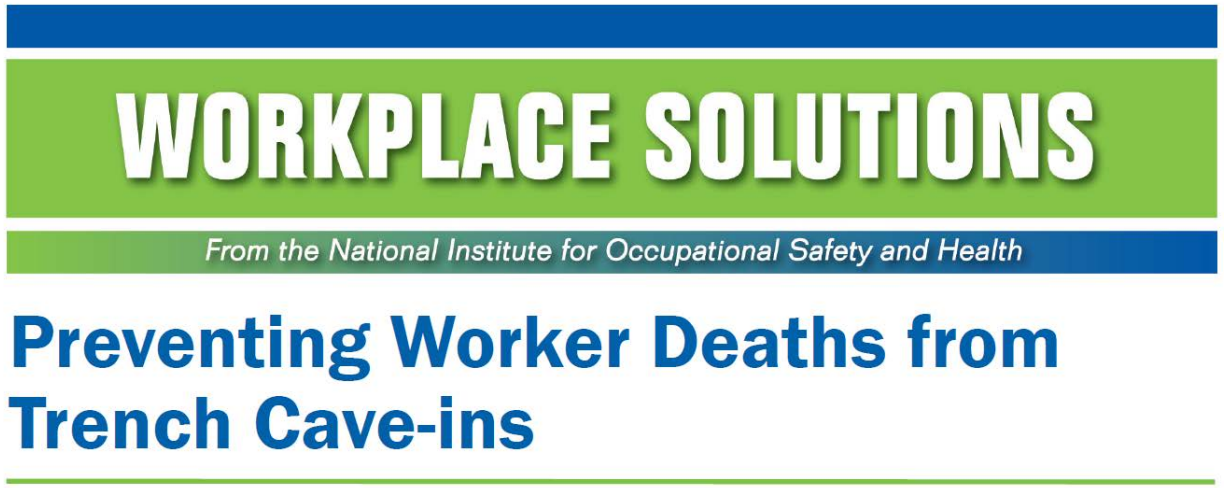
Photos 2 and 3. Two views of the incident scene. The yellow circles show where workers were in a 5-foot wide, 10-foot deep ditch at the bottom of the trench.

WASHINGTON State FACE Program
Fatality Assessment & Control Evaluation

FATALITY NARRATIVE

FACE

- The report lists a number of requirements based on WA State Standard:
  - WAC 296-155-657:
- FACE investigators also made recommendations to help prevent similar occurrences:
  - Never enter a trench or excavation that does not have an adequate protective system in place.
  - Inspect the trench or excavation before entering.
  - Do not assume there will be a warning sign before a cave-in or that you will have time to escape.



- Employers - Pre-job Planning Before the Job Begins**
- Safe Operations During the Job
- Workers
- Owners and Clients

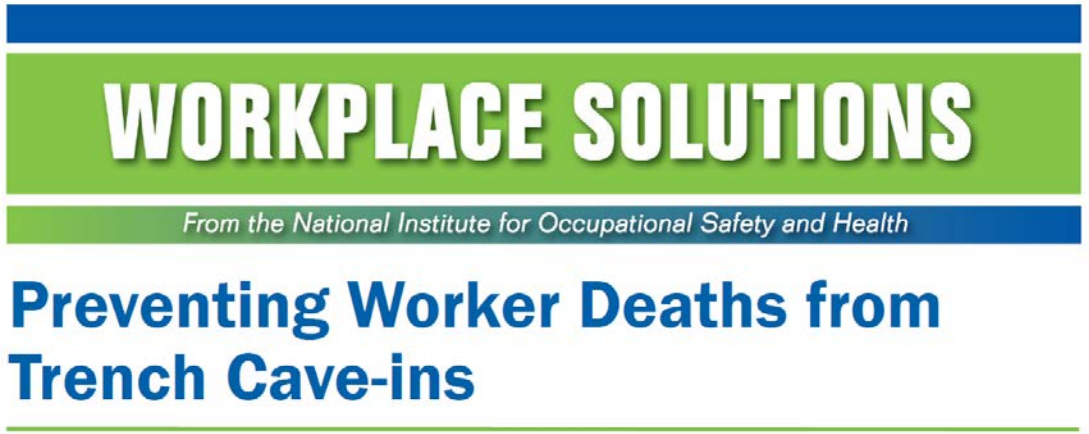
- https://www.cdc.gov/niosh/docs/wp-solutions/2011-208/pdfs/2011-208.pdf?id=10.26616/NIOSHPUB2011208

Planning Before the Job Begins

- Employers should:
  - Train and designate a competent person.
  - Call 811 before digging so that utility lines can be marked and located
  - Have a competent person evaluate the soil to determine its stability.
    - OSHA standard (Appendix A of Subpart P) provides techniques for evaluating soil
  - Plan the job layout to identify safe locations (away from the trench) for spoil piles and heavy equipment routes.

Planning Before the Job Begins

- Employers should (continued):
  - Have competent person determine what type of protective system will be used for the job and schedule the steps needed to be in place.
    - Trenches greater than 20 feet deep can be more complex.
  - Ensure that:
    - none of the workers for entry into the trench are < 18 y.o.
    - workers involved in the job are trained in a language that they understand and at the appropriate literacy level.
  - Develop a trench emergency action plan.



Selected Other Recommendations

- Safe Operations During the Job
  - Competent person must inspect the excavation, adjacent areas, and protective systems each day before work, as needed throughout the shift, and after every rainstorm.
- Workers
  - Do not enter an unprotected trench, even for a short task.
  - Do not assume there will be a warning sign before a cave-in or that you will have time to move out of the way.
- Owners and Clients
  - Insist on trench safety practices when you commission work

Other Resources – other web pages

- NIOSH - Trenching and Excavation
  - https://www.cdc.gov/niosh/topics/trenching/default.html
- CPWR – Trench Safety
  - https://www.cpwr.com/research/research-to-practice-r2p/r2p-library/other-resources-for-stakeholders/trench-safety/

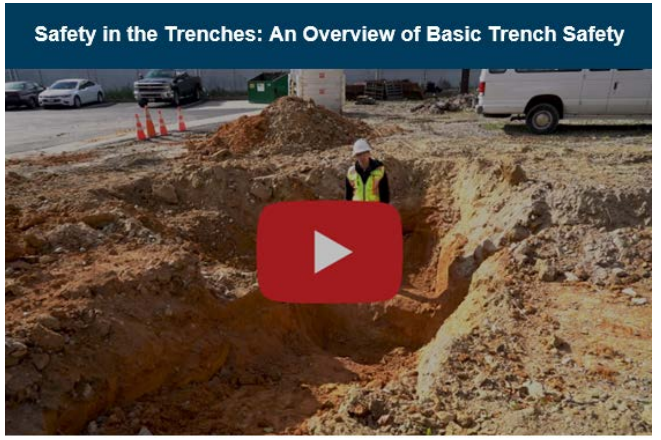
Other Resources – infographic

- ‘Before You Dig It, Plan It’
- ‘When You Dig It, Use Caution’
- ‘If You Work in a Trench’

- https://www.cdc.gov/niosh/construction/pdfs/TrenchSafety_Final3-508.pdf

Other Resources - videos

- “Safety in the Trenches: An Overview of Basic Trench Safety”
- 2023 - Laborers' Health & Safety Fund of North America
- https://www.youtube.com/watch?v=ICiuDWO_PCs



- “No New Year – Trench Collapse”
- 2004- CPWR, based on NIOSH FACE report
- https://www.youtube.com/watch?v=iFahlN0ueTI

Other Resources – NIOSH Science Blogs

Preventing Trenching Fatalities

June 6, 2019 by CAPT Alan Echt, DrPH, CIH; Scott Earnest, PhD, PE, CSP; and CDR Elizabeth Garza, MPH, CPH

https://blogs.cdc.gov/niosh-science-blog/2019/06/06/trenching/

Alternatives to trenching

- One way to prevent trench collapse and in turn, trenching fatalities, is to use alternative methods where feasible.
- Among the many alternatives to digging a trench are directional boring, relining the pipe (including the technique known as cured-in- place pipe)*, pipe ramming, and utility tunneling and pipe jacking
  - Previous NIOSH Science Blog on CIPP

https://blogs.cdc.gov/niosh-science-blog/2017/09/26/cipp/

Cured-in-place pipe (CIPP) liner preparation and installation - NIOSH Health Hazard Evaluation

Ryan F. LeBouf, Dru A. Burns, Anand Ranpara, Lisa Kobos
Respiratory Health Division, National Institute for Occupational Safety and Health
https://www.cdc.gov/niosh/hhe/reports/pdfs/2019-0080-3379.pdf

- Why is CIPP used?
  - Less or no need to dig – faster
  - Reduced labor/equipment costs – cheaper
  - Less disruption to community – simpler
  - Quicker process, less equipment – safer? – NIOSH HHE and research
    - Confined space entry
    - Chemical exposure

2024 Trench Safety Stand Down

- Safety Stand Down - opportunity for employers to talk directly to employees and others about safety
- Mid-June 2024 - final dates TBD
- June 2024 will be fifth annual "Trench Safety Month"

NUCA
We Dig America

https://www.nuca.com/tssd

Questions?

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CAPT Elizabeth Garza, MPH, CPH
202-245-0668 EGarza@cdc.gov

Doug Trout, MD DTrout@cdc.gov
513-515-5053

For more information, contact CDC
1-800-CDC-INFO (232-4636)
TTY: 1-888-232-6348 www.cdc.gov

https://www.cdc.gov/niosh/construction/

BEST PRACTICES FOR TRENCHING & EXCAVATION

PHILLIPPE FALKNER
SAFETY DIRECTOR, ED BELL CONSTRUCTION
AGC OF AMERICA AND AGC OF TEXAS MEMBER

APPROPRIATE PROCESSES FOR SOIL CLASSIFICATION.

- The determination of soil classification and what type of system is necessary should occur BEFORE the crew is moments from digging.
- Provide trained support to your team to help determine the correct protective measures.
- Rock and Type A soil are not as common as you think, especially in urban areas.

WHEN DOES IT GO BAD? AT THE START OF EACH OPERATION? OR AS WE GO ALONG?

- Too often we allow just enough time to check the operation as we get started. It needs to be evaluated each time it moves or changes.
- The competent person and the foremen must be cognizant of other operations impacting their safety in the excavation.
- There's always time to stop.

WHO DO YOU TRAIN?

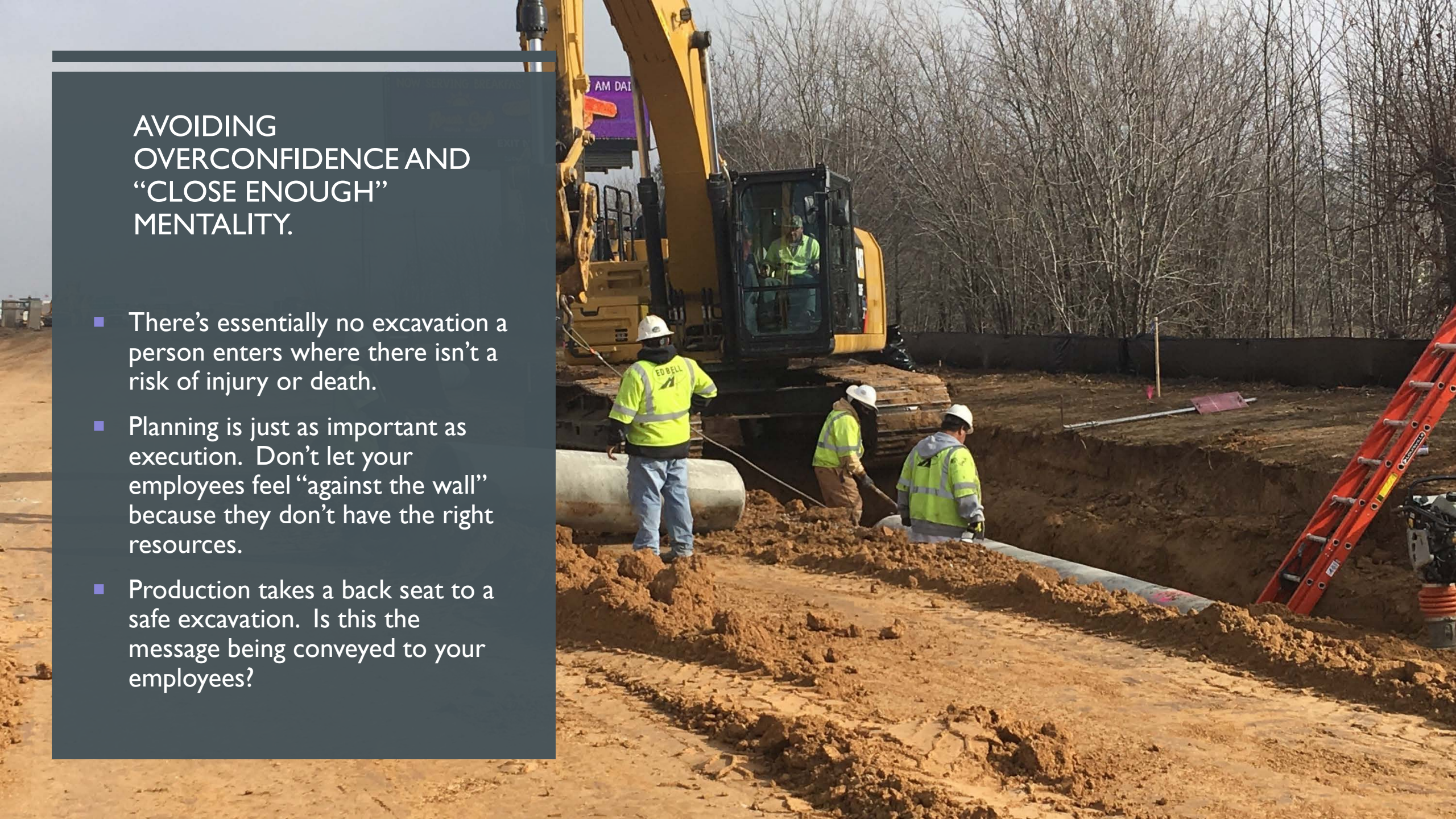
- Don't try to just check the box by having "someone on-site" trained.
- Every employee expected to go into a trench or excavation should have training regarding safety and procedures for this scope.
- Provide ongoing training regularly and communicate expectations and resources effectively.

FOREST FOR THE TREES: DON'T FORGET THE OTHER HAZARDS.

- It's easy to focus so much on preventing a collapse, that we don't check everything else.
- Atmospheric hazards are always a potential.
- Be mindful of your lifting plan for materials in a trench; escape routes are limited.
- Place fall protection where applicable.

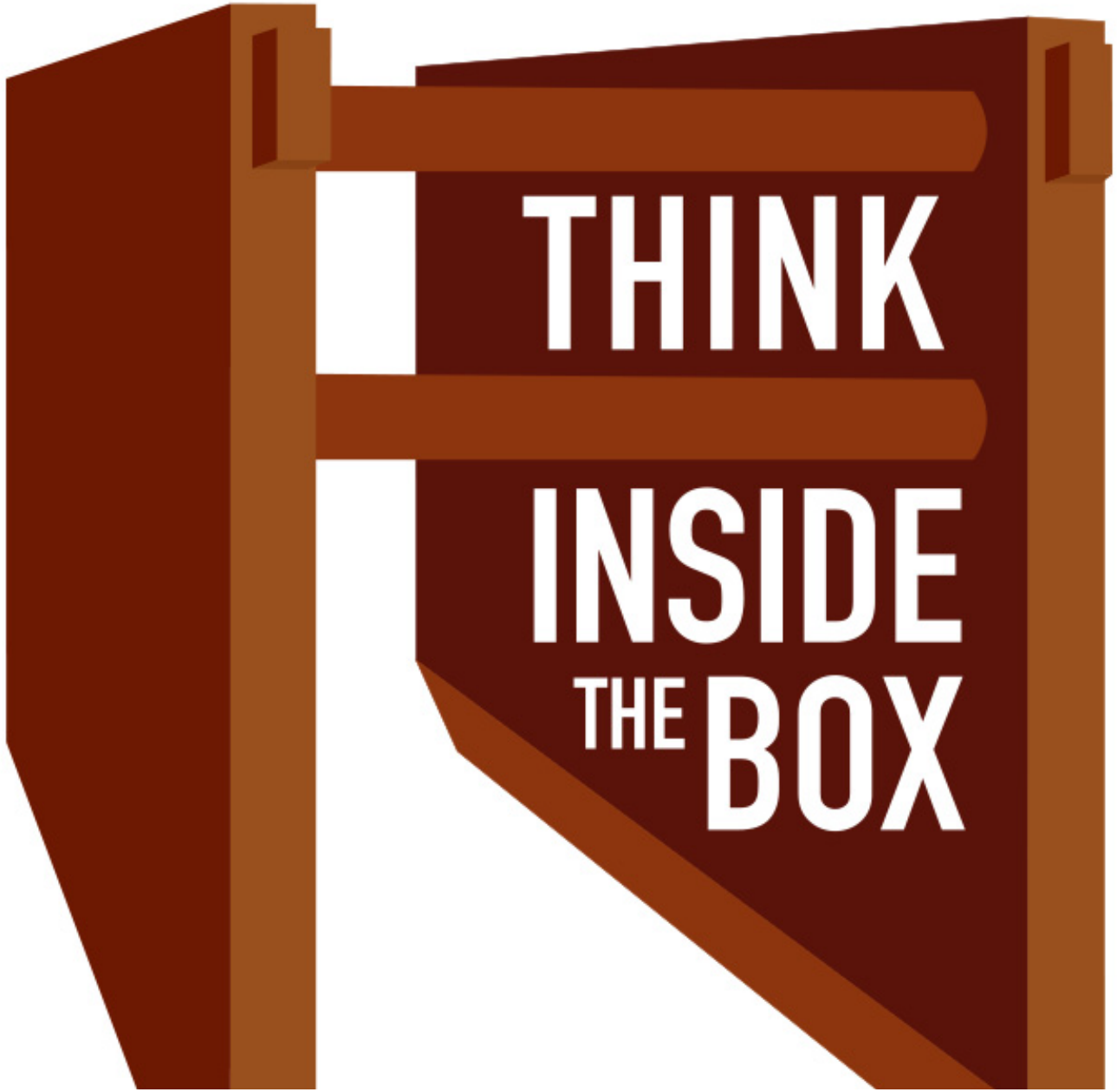
AVOIDING OVERCONFIDENCE AND "CLOSE ENOUGH" MENTALITY.

- There's essentially no excavation a person enters where there isn't a risk of injury or death.
- Planning is just as important as execution. Don't let your employees feel "against the wall" because they don't have the right resources.
- Production takes a back seat to a safe excavation. Is this the message being conveyed to your employees?



YOU HAVE A PROTECTION SYSTEM…BUT IS IT THE RIGHT ONE?

- Understanding the conditions onsite are critical to ensuring the right protection system is used.
- Depth, soil conditions, existing utilities, ground water, access, exposure to public and jobsite traffic are just some of the components of the data needed for a successful plan.
- If it gets complex, seek experienced help.
- Making things work even if not correct with a "this is what we have" mentality will always catch up with you.



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TEST

TRENCHING AND EXCAVATION SAFETY TASKFORCE

Today's Presentation

- Introduction to TEST
  - Answering the What, Why, Who, When, and Where

Trenching and
Excavation
Safety
Taskforce

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What is T.E.S.T.

Source: https://www.cbsnews.com/colorado/news/contractors-buried-alive-in-trench-collapse-at-housing-development/

Trenching and Excavation Safety Taskforce

What We Do

- The Trenching Excavation Safety Taskforce was started to bring more awareness to trenching and excavation safety and prevent injuries and fatalities

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Our Mission

- Create industry awareness and drive insight into trenching and excavation safety, collaborating without organizational or geographic boundaries in an effort to improve day-to-day safety for field workers. #ThinkInsideTheBox

Why TEST Was Started

Tuesday, April 16, 2019 Windsor, Colorado trench collapse

26-year-old Cristopher Ramirez, of Boulder, and 41-year-old Jorge Valadez, of Denver

- "…workers on scene were able to quickly get a PVC pipe to one of the construction workers and were using that to communicate with him for several hours after the collapse. His family members were also able to speak with him before he died. Emergency responders were not able to contact the other victim"

  *–Coloradoan.com Published Apr. 16, 2016 | **Updated Apr. 18, 2019***

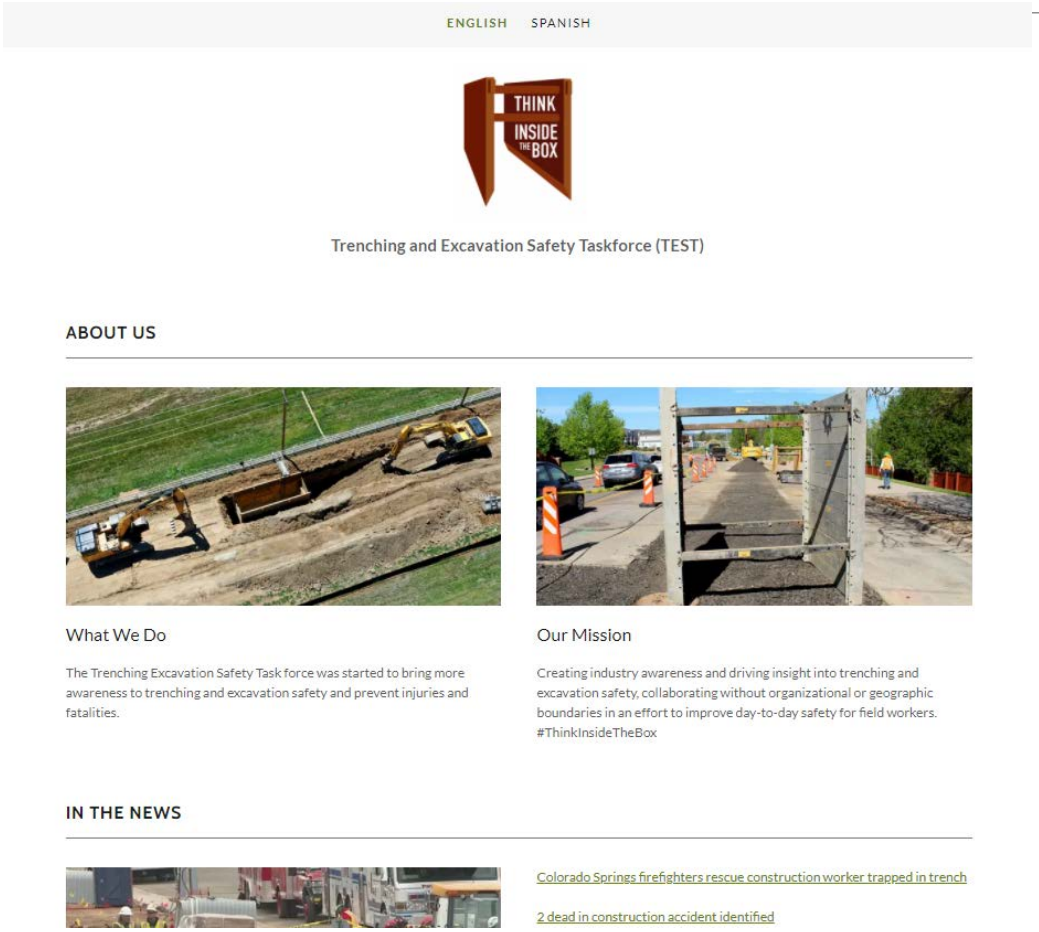
Tuesday, April 23, 2019 AGC Safety Council.

Video Source: 9NEWS https://youtu.be/QamzUw8rZBg

The Message

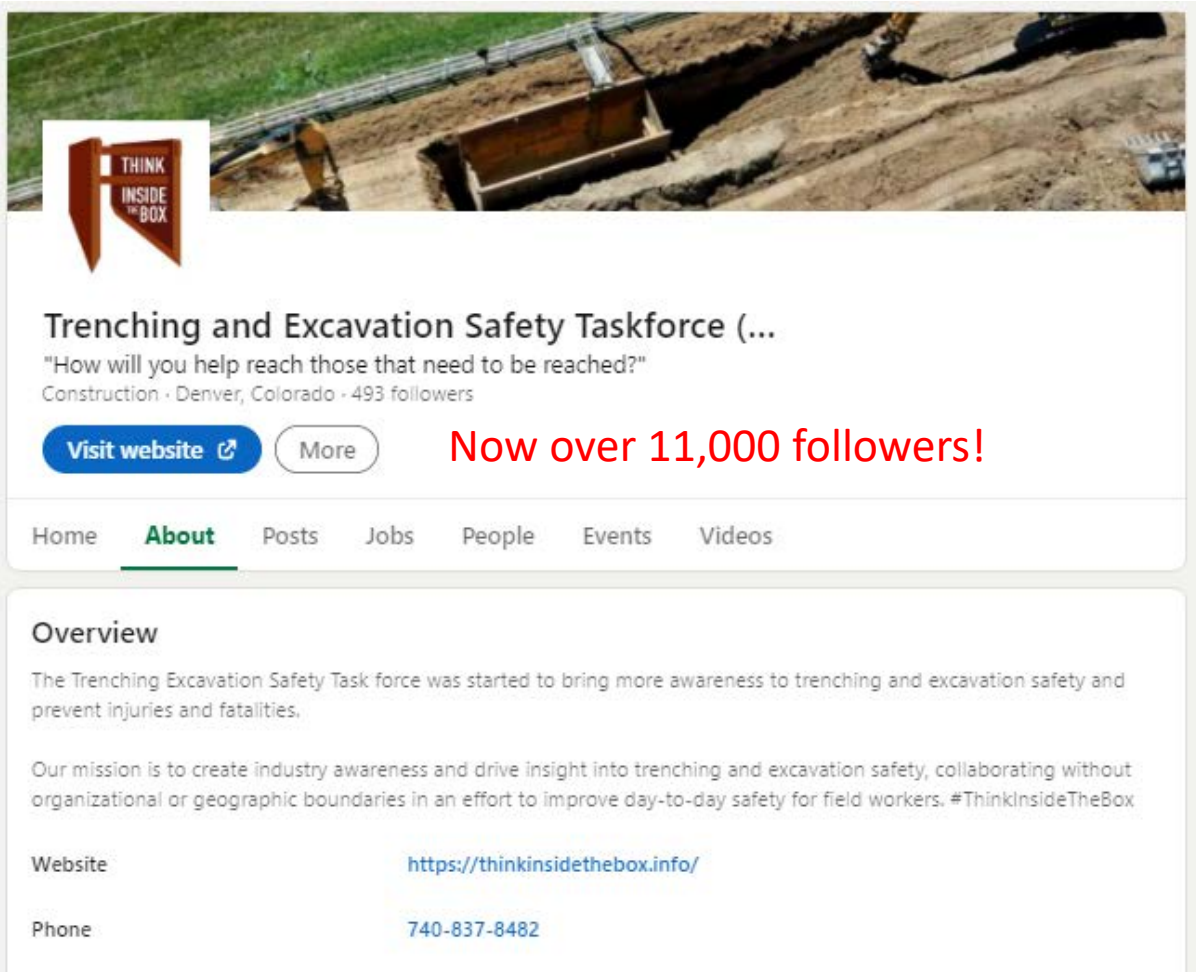
- Catchy phrase for those that need to hear it
- Rust is universal
- Identifiable safety device

ThinkInsideTheBox.info Where are we?



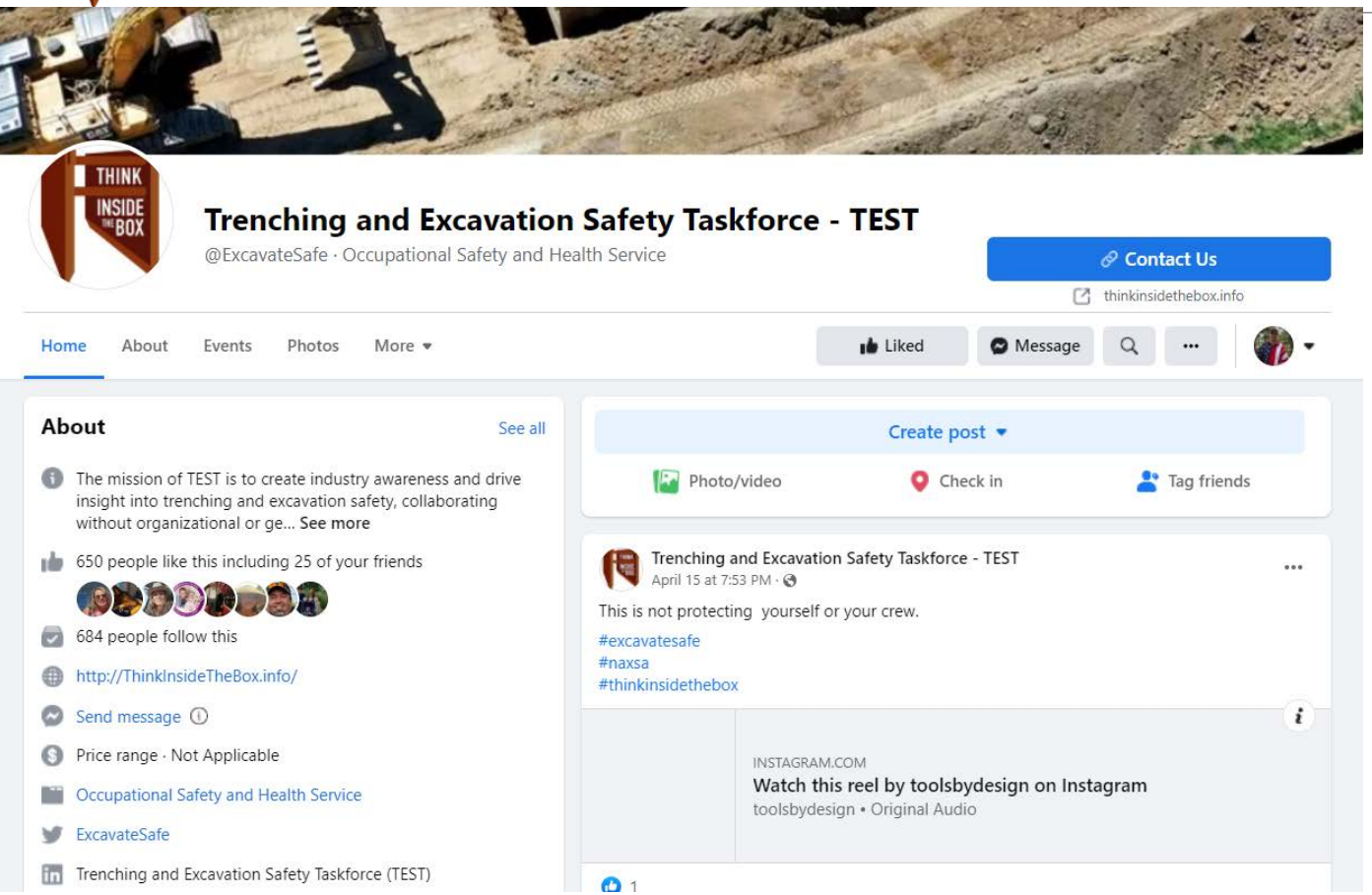
Where are we?

linkedin.com/company/trenching-excavation-safety-taskforce



Where are we?

facebook.com/ExcavateSafe



Where are we?

Email us at ThinkInsideTheBoxInfo@gmail.com

Call us at (740) 837-8482

Trenching Excavation Safety – Think Inside The Box

8 3 7 8 4 8 2

Who are we?

We are passionate about trenching and excavation safety

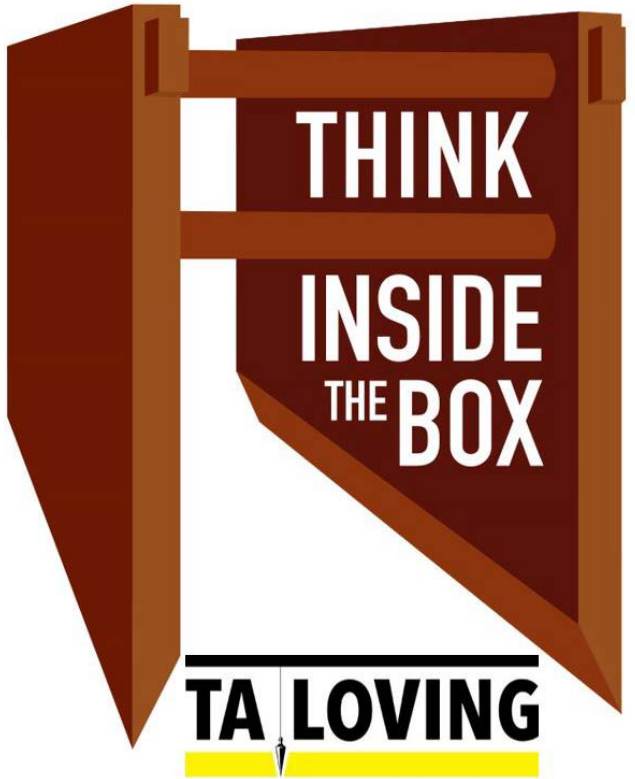
Countless folks from across the country and now around the world

Not bound by organizational or geographic boundaries.

What's New?

Spanish website mirrors the main site
ThinkInsideTheBox.info/Spanish

Your Logo Here



HARDHAT STICKERS

NUCA/TEST Merger

- National Utility Contractors Association and Trenching and Excavation Safety Taskforce join forces
- Help from NUCA's national resources so we can take the trench safety message to the next level!

NUCA

TRENCHING & EXCAVATION SAFETY TASKFORCE

Thank you!

QUESTIONS?

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