

EXCAVATION SAFETY & UTILITY AVOIDANCE

2024 NGA Gas Operations School And Exhibit

June 4, 2020

Virtual Presentation

PRESENTERS

- Tom Fournier
 - 11 Years Experience as a Utility Field Employee, including Foreman level leadership
 - 6 Years Experience as a Safety Officer with RH White

TRAINING SESSION OBJECTIVES

- Basic Understanding of OSHA Regulations
 - Excavation Definitions
 - DigSafe – First Things First
 - Minimum excavation requirements
- Excavation Hazards
- Soil Classifications
- Excavation Protective Systems
- Excavation Requirements
 - Pre-Excavation Checklist and Utility Damage Reporting
- Temporary Traffic Control



EXCAVATION DEFINITIONS - *EXCAVATION*

- "Excavation" means any man-made cut, cavity, trench, or depression in an earth surface, formed by earth removal.



EXCAVATION DEFINITIONS - TRENCH

- "Trench (Trench excavation)" means a 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).



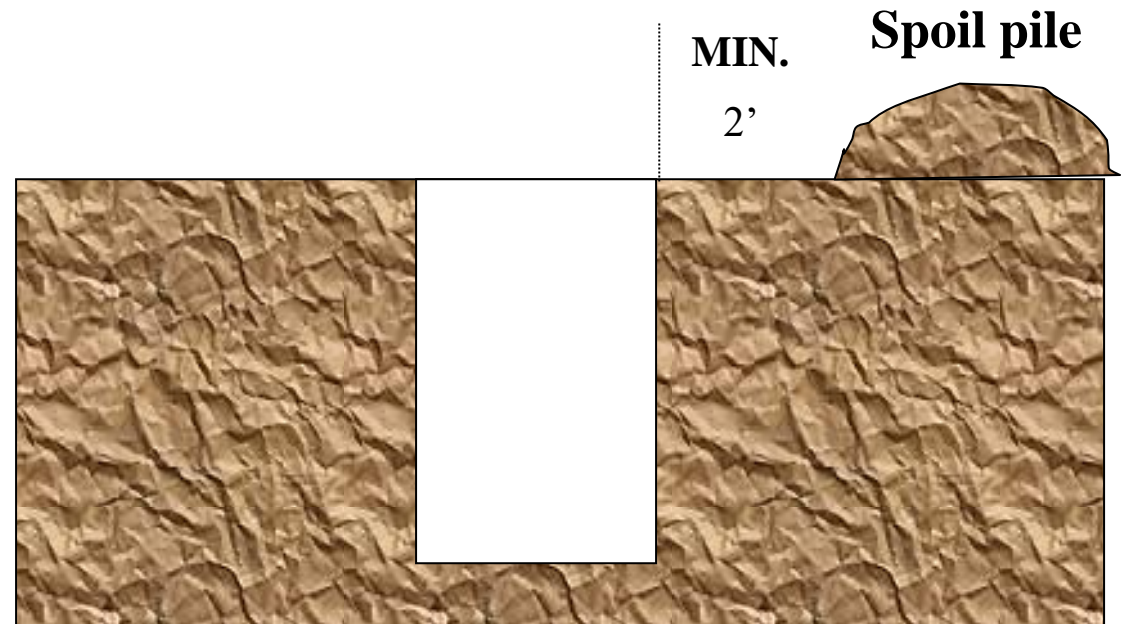
EXCAVATION DEFINITIONS – *COMPETENT PERSON*

- "Competent person" means one who is:
 - capable of identifying existing and predictable hazards in the surroundings, or working conditions which are unsanitary, hazardous, or dangerous to employees,
 - who has authorization to take prompt corrective measures to eliminate them.



EXCAVATION DEFINITIONS – “SPOILS”

- Spoils – the earth material that is excavated from the ground while excavating



EXCAVATION DEFINITIONS – CAVE IN

- "Cave-in" means separation of a mass of soil or rock material from the side of an excavation, or the loss of soil from under a trench shield or support system, and its sudden movement into the excavation, either by falling or sliding, in sufficient quantity so that it could entrap, bury, or otherwise injure and immobilize a person.
- One cubic yard of soil can be equivalent to 3,000 lbs.



EXCAVATION DEFINITIONS – PROTECTIVE SYSTEM

- "Protective system" means a method of protecting employees from cave-ins, from material that could fall or roll from an excavation face or into an excavation, or from the collapse of adjacent structures. Protective systems include support systems, sloping and benching systems, shield systems, and other systems that provide the necessary protection.



DIGSAFE – FIRST THINGS FIRST



What is DigSafe?

- Non profit company that notifies participating utility companies of your plan to dig. In turn, those utilities (*or contractors*) respond to mark out location of their underground utilities.
- Free service funded by member utilities

What does DigSafe do?

- Creates Digsafe ticket (*required by law*)
- Sends ticket to member utilities
 - Gas
 - Electric
 - Telecommunications
 - Cable Television
 - Private Water Companies

RED	ELECTRIC
YELLOW	GAS, OIL, STEAM
ORANGE	COMMUNICATIONS
BLUE	POTABLE WATER
PURPLE	RECLAIMED WATER
GREEN	SEWER / DRAINAGE
PINK	SURVEY MARKS
WHITE	PROPOSED EXCAVATION



Municipalities are not required to protect water, sewer and drainage lines through Dig Safe.

DIGSAFE – FIRST THINGS FIRST



- What about Connecticut?
 - Call Before You Dig is the 811 service in the state of CT

DIGSAFE – FIRST THINGS FIRST

- What DigSafe (or Call Before You Dig for CT) process do I need to follow at WW/RHW?
 - Pre-mark your proposed excavation with white pre-mark paint – include excavator ID “RHW” “WW”
 - Call 811 72 hours prior to the planned excavation
 - Notify non-member utility companies (water and sewer most common)

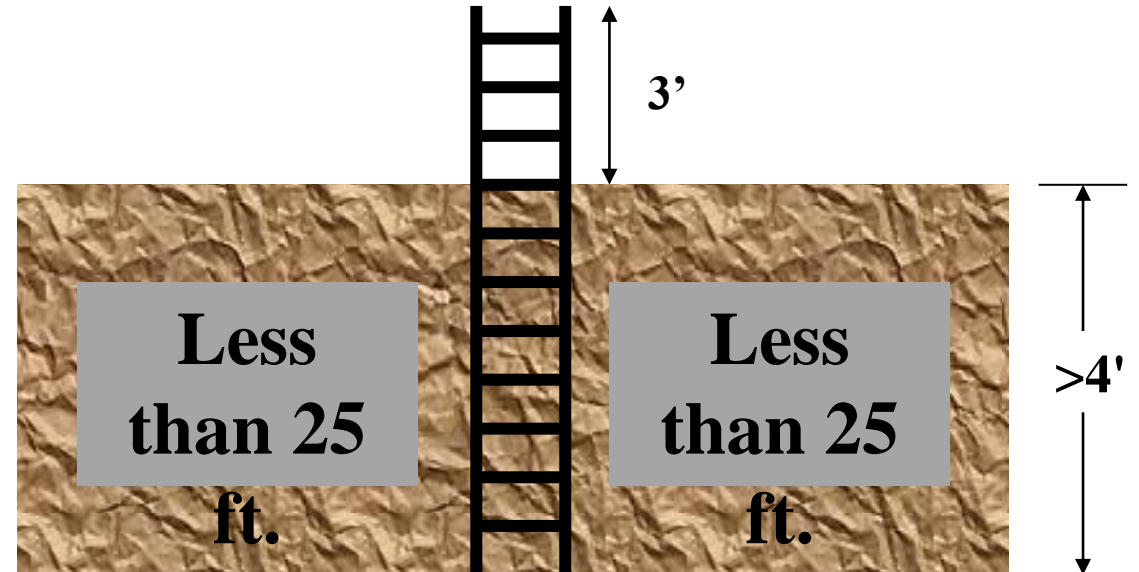


Request Number: 20152004489 Date: 05/12/2015 Time: 06:15		
Latitude: Longitude:		
State: MASSACHUSETTS Municipality: WORCESTER		
Address / Intersection: CATALPA ST		
Nearest Cross Street 1: BISHOP AVE Nearest Cross Street 2:		
Additional Information: ON CATALPA ST FROM THE INTER OF BISHOP AVE TO THE INTER OF MONTAQUE-PLEASE		
MAKE ALL INTER APPROX 35 FT		
Nature Of Work: GAS MAIN RELAY & SERVICE		
Area Of Work: WORKING STREET & STREET TO HOUSES		
Area Is Premarked: YES Start Date: 06/01/2015 Start Time: 07:30		
Caller: PATTY ZELESKY Title: GAS OPS CLERK Return Call: VM		
Phone#: 508-368-6711 Fax#: 508-368-6725 Alt. Phone#:		
Email Address:		
Contractor: NSTAR GAS		
Address: 25 QUINSIGAMOND AV City: WORCESTER State: MA Zip: 01608		
Excavator Doing Work: EVERSOURCE/RH WHITE		
Member Utility List		
Code	Abbreviation	Name
* AB	AT&T	AT&T TRANSMISSION
* CP	NSTGAS	NSTAR GAS
X FB	VERIZN	VERIZON
* GW	CHART	CHARTER COMMUNICATIONS
X MW	NGRDEL	NATIONAL GRID ELECTRIC-MASS ELEC
* ON	ONTARG	ON TARGET LOCATING
* RJ	VERIZN	VERIZON
* TEST	TEST	DIG SAFE TESTING ONLY

- There may be non-member utilities in the area that you need to notify.
- Electric and other companies may not mark lines they don't own or maintain. You may want to contact them for more information.
- The excavator is responsible to maintain markings placed by member utilities...

MINIMUM EXCAVATION REQUIREMENTS

- Every active excavation must have a competent person
 - The competent person must make a daily inspection of the active excavation
- Excavations that are greater than 4' in depth must have safe access and egress
 - Access and egress must be within 25' of lateral travel for employees
 - Ladders must extend 3' out of the excavation



MINIMUM EXCAVATION REQUIREMENTS



- All spoils and tools must be kept 2' from the edge of the excavation
- Shoring box must extend 18" above grade, if materials/tools cannot be prevented from falling in
- All accumulated or accumulating water in an excavation must be controlled
 - If water cannot be controlled protection from a cave-in must be implemented
- All excavations that exceed 4'6" (5' per OSHA) must have an adequate protective system in place before employees may enter (Shielding, Sloping, Shoring)
 - Benching is not allowed at RHW as a means of protection, as all soils are classified Type C
- Excavations that exceed 20' in depth must have a protective system designed by a registered professional engineer

EXAMPLES OF TYPES OF SHORING



EXAMPLES OF TYPES OF SHORING



SOIL CLASSIFICATIONS

Stable Rock

- Natural solid mineral material that can be excavated with vertical sides and remain intact while exposed. Examples are granite and sandstone.
- Determining whether a deposit is stable rock may be difficult unless it is known whether cracks exist and whether or not the cracks run into or away from the excavation.

SOIL CLASSIFICATIONS

Type A

- Cohesive soils with an unconfined compressive strength of 1.5 tons per square foot [tsf]
 - Clay, silty clay, sandy clay
- No soil is type A if;
 - Fissured
 - Subject to vibration
 - Previously disturbed
 - Seeping water
 - Part of a sloped or layered system of four horizontal to one vertical



SOIL CLASSIFICATIONS

Type B

- Cohesive soils with an unconfined compressive strength greater than 0.5 tsf (tons per square foot) but less than 1.5 tsf
- Silt, silt loam, angular gravel
- Soils that are fissured, or subject to vibration

Type C

- Cohesive soils with a unconfined compressive strength of 0.5 tsf or less
 - Gravel, sand, loamy sand, submerged soil, soil from which water is freely seeping

SOIL CLASSIFICATIONS

- The competent person must make at least one visual and one manual soil test as a basis for soil classification.

Unless the soil is tested it will be considered to be 'Type C' and treated as 'Type C'



SOIL CLASSIFICATIONS



EXCAVATION PROTECTIVE SYSTEMS – SHIELDING – “TRENCH BOXES”

- Shield systems shall not be subjected to loads exceeding those which the system was designed to withstand – Tabulated Data
- Shields shall be installed in a manner to restrict lateral or other hazardous movement of the shield in the event of the application of sudden lateral loads – “Glove Fit”
- Employees shall be protected from the hazard of cave-ins when entering or exiting the areas protected by shields – Enter the shield via a ladder
- Employees shall not be allowed in shields when shields are being installed, altered, removed, or moved vertically
- Excavations of earth material to a level not greater than 2 feet (.61 m) below the bottom of a shield shall be permitted, **BUT ONLY** if the shield is designed to resist the forces calculated for the full depth of the trench, and there are no indications while the trench is open of a possible loss of soil from behind or below the bottom of the shield.

EXCAVATION PROTECTIVE SYSTEMS – SHIELDING – “TRENCH BOXES”

Model # of shield

MODEL		SERIAL NUMBER			
REFERENCE TO OCCUPATIONAL SAFETY AND HEALTH ADMINISTRATION RULES AND REGULATIONS, VOL. 54, NO. 209, 1031-69, PART 1926, SUBPART P					
SHIELD SIZE		PSF RATING	MAXIMUM ALLOWABLE DEPTH OF CUT (FEET)		
HEIGHT (FEET)	LENGTH (FEET)		SOIL TYPE TO BE EXCAVATED		
		MAXIMUM LATERAL EARTH PRESSURE CAPACITY AT TRENCH BOTTOM IN POUNDS PER SQUARE FOOT	TYPE A	TYPE B	TYPE C
			Stiff, cohesive soil. 25 PSF per foot of depth.	Medium cohesive to granular soil. 45 PSF per foot of depth.	Soft cohesive submerged sand. 60 PSF per foot of depth.
8'	16'	1167	47'	26'	19'
LIMITATIONS IN USE OF TABLE			DESCRIPTION	DESCRIPTION	DESCRIPTION
<ol style="list-style-type: none"> TRENCH SHIELD TO BE ASSEMBLED AND INSTALLED AS SHOWN AND IN ACCORDANCE WITH MANUFACTURER'S INSTRUCTIONS. BANK ABOVE TOP OF SHIELD TO BE LAID BACK ACCORDING TO OSHA REGULATIONS. CONSULT MANUFACTURER WHEN BOTTOM OF SHIELD IS NOT AT TRENCH BOTTOM. ADDITIONAL SHIELDS MAY BE STACKED WITH NO PENALTY IN DEPTH OF CUT. DEPTHS OF CUTS SHOWN ARE BASED ON EXAMPLES OF VARIOUS SOIL CONDITIONS. VERIFY ACTUAL SOIL PRESSURES PRIOR TO EACH USE. ANY MODIFICATIONS OR ALTERATIONS NOT ALLOWED UNLESS APPROVED IN WRITING BY EFFICIENCY PRODUCTION, INC. DEPTH CERTIFICATION IS BASED ON SHORT TERM EXPOSURE WITH EXCAVATION OPEN A PERIOD OF TIME EQUAL TO 24 HOURS OR LESS. CONSULT THE MANUFACTURER SHOULD LONG TERM EXPOSURE BE REQUIRED. 			Clay, silty clay, sandy clay, clay loam, unconfined compressive strength of 1.5 tons per square foot or greater. (See Note 9 on reverse side).	Clay with unconfined compressive strength greater than .5 TSP but less than 1.5 TSP, cohesionless gravel, silt, silt loam or sandy loam. (See Note 9 on reverse side).	Clay with unconfined compressive strength less than .5 TSP, submerged sand, fractured rock that is in place. (See Note 10 on reverse side).
			<p>SLOPE ACCORDING TO OSHA REGULATIONS</p> <p>1'-6" MIN.</p>		
			CERTIFIED BY:		
			MANUFACTURED UNDER ONE OR MORE OF THE FOLLOWING U.S. PATENT NUMBERS: 4,090,365-4,114,363-4,259,029 ONE OR MORE OF THE FOLLOWING CANADIAN PATENT NUMBERS: 1,062,883-1,062,884 USE THIS PRODUCT ONLY IN ACCORDANCE WITH APPLICABLE FEDERAL, STATE, OR LOCAL LAWS		

Serial # of shield

Soil type

Max. depth

Soil description

Limitations

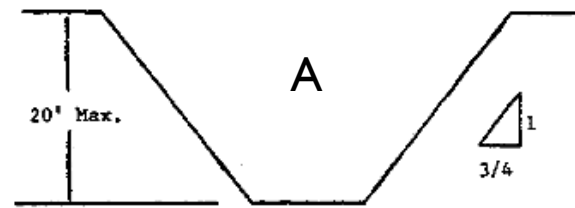
Must be certified by RPE



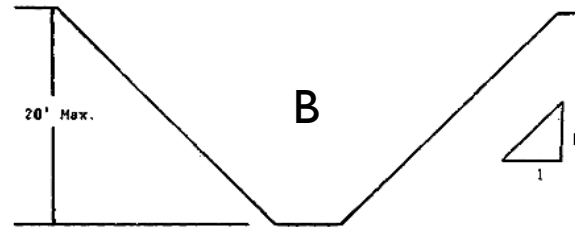
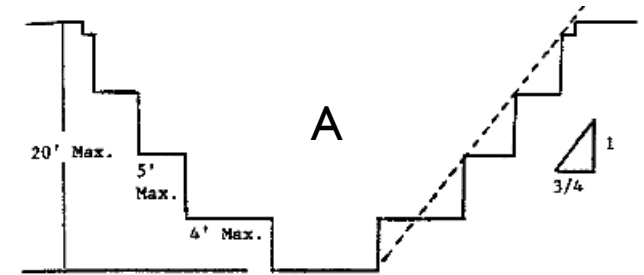
EXCAVATION PROTECTIVE SYSTEMS – SLOPING AND BENCHING

- Minimum slopes must be met for each type of soil
- Type C soil **CANNOT** be benched

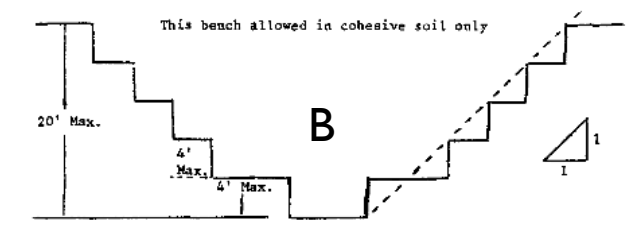
Soil type	Height/Depth ratio	Slope angle
Stable Rock	Vertical	90°
Type A	3/4:1	53°
Type B	1:1	45°
Type C	1 1/2:1	34°



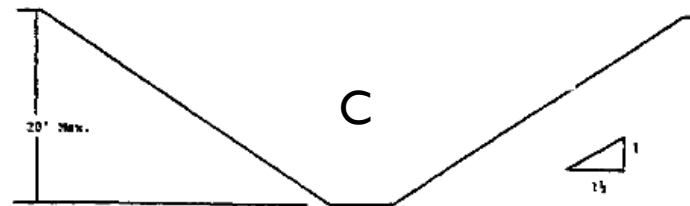
SIMPLE SLOPE -- GENERAL



SIMPLE SLOPE



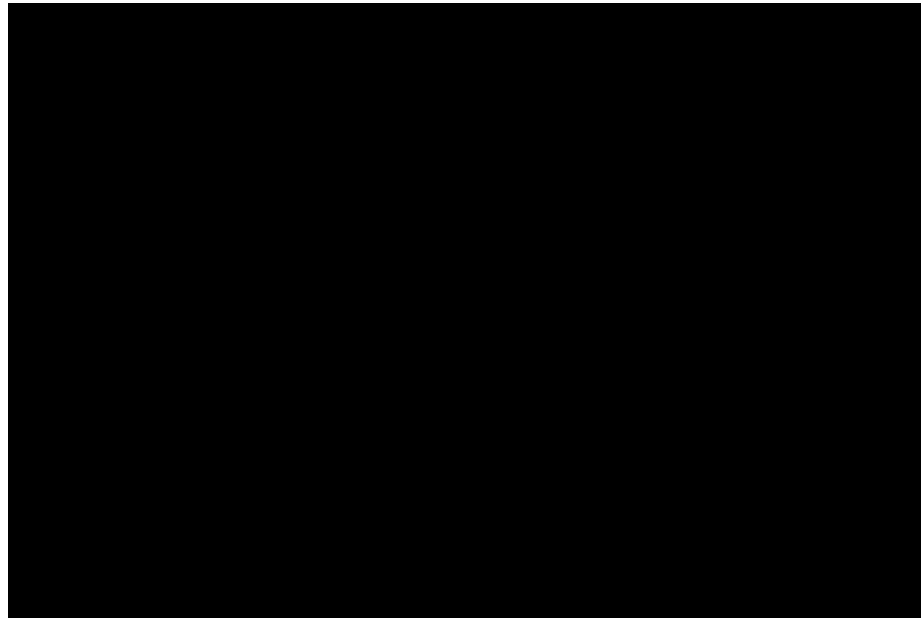
MULTIPLE BENCH



SIMPLE SLOPE

EXCAVATION PROTECTIVE SYSTEMS – *SHORING*

Aluminum Hydraulic Shoring



COMPANY SPECIFIC EXCAVATION REQUIREMENTS

- All excavations that exceed **4'6"** MUST be shielded/shored/sloped/benched.
- **ALL** soil is classified as type **C** soil.
- A pre-excavation checklist must be completed and pre-excavation video must be taken prior to beginning the excavating
- Any damage to underground utilities must be reported immediately.

PRE-EXCAVATION CHECKLIST

Crew Foreman J. McGraw DIG SAFE Ticket # 2012 1924 15-N/O # 44549 Date 5-21-13

Complete a pre-excavation walk-out of the entire job site. Your objective is to visually inspect the dig area to ensure all utilities are marked. Look for signs of utilities that may not be marked such as above-ground pedestals, gas meters, manhole covers, drains, or utility poles with cable risers. If you find these indicators and suspect that there is an unmarked utility DO NOT PROCEED. Notify DIG SAFE that an unidentified line has been discovered.

When you have completed your walk-out, complete the following checklist:

- 1) Verify that the One-Call ticket covers the 'Scope of work' and 'Work to begin' date:
 - ◆ I have verified the Dig Safe ticket covers the 'Scope of work'
 - ◆ I have verified the DIG SAFE ticket 'Work to begin' date
- 2) What marked utilities did you observe?
 - Gas (yellow) Electric (red) Telephone (orange)
 - Cable TV (orange) Water (blue) Sewer (green)
- 3) Based on visual observation, did you see signs of any unmarked utilities? Yes No
 - ◆ If yes, please identify.
 - Gas (yellow) Electric (red) Telephone (orange)
 - Cable TV (orange) Water (blue) Sewer (green)
 - ◆ I have notified DIG SAFE of the unmarked utility
- 4) Photograph the entire proposed work area including all locate marks.
 - ◆ I have photographed the entire site prior to excavation
 - ◆ I have photographed existing locate/markings
- 5) Advise your crew members of the following: If they have to cross a marked utility they must HAND DIG ONLY within 18" of the locate marks plus half the diameter of the buried facility. RESPECT THE MARKS!
 - ◆ I have advised my crew of the 18" hand dig rule

IN THE EVENT OF DAMAGE

- Notify DIG SAFE and your supervisor
- Complete the reverse side of this form
- Photograph entire area and damage location

PHOTOGRAPHY TIPS

- Make sure the correct date & time stamp is active on your camera
- Photograph the excavation itself (damage location)
- Take photos from multiple vantage points and of surrounding area (360 degrees)
- If the utility was mismarked, photograph the locate marks/flags (include tape measure in photo)
- If the utility was not marked, photograph the entire area and approaches to the cut site
- Show a quantifiable location/address (street sign, house number, mail box number, etc.)
- Facility depth (include tape measure in photo)
- Remember!! You can never take too many photos

UTILITY DAMAGE REPORT

MAY 23 10:51 AM '13
5/23/13
TOM WILL BEING IN PHOTOS

Part A - Date and Location

Date of Damage 5-21-13 Street Address Tequesta Ave
City New London State CT
Nearest Intersection Roosevelt

Part B - Affected Utility

Electric Natural Gas Sewer Water Telephone Cable TV
What type of service?
 Service/Drop Main Fiber Optic Depth of damaged facility _____

Part C - Locating and Marking

Was the DIG SAFE Center notified? Yes No If yes, provide the locate ticket number _____
Were facility marks visible in the area of excavation? Yes No
Were facility marks accurate? Yes No NO MARK
What were facilities marked with? Paint Flags Paint & Flags
What type of painted locate marks were present?
 Duct Back (Diamond Pattern) Single Line (With Buffer) Single Line (Without Buffer)
Have you taken photos (required)? Yes No What is the distance between the locate marks? 20.3 19.2 15.2

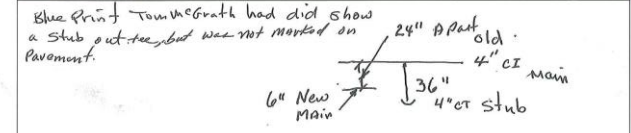
Part D - Excavation Information

Type of Excavation Equipment?
 Backhoe/Track hoe Boring Auger Trencher Directional Drill Drilling
 Hand Tools Popping Device
Type of Work performed?
 Installing Gas Pipeline Installing Electric Cable Joint Trench Installing Telephone
 Installing Cable TV Installing Poles Installing Anchors Other, please specify _____
Location of dig site Private Property Utility Easement Road right-of-way

Part E - Describe how the incident occurred

While excavating to install new 6" gas main we hit a stub off a existing 4" C.I. main, creating hole in main
Stub was not marked w/ the rest of the existing gas.

Part F - Diagram



Foreman Name/Emp # T. McGraw 1588 Operator Name/Emp # Dick Head III 2030

COMPANY SPECIFIC EXCAVATION REQUIREMENTS

Liberty Utilities DIGSAFE # 2015-3
DATE 9/22/15

8840-0001004613 EXP DATE _____
8/25/2015 ENTERED _____ SO# _____
Andy Morgan
6 Amy Way - Lot 51
~~Concord~~ **PEN**
Reginald
235-3575

Address _____
Name _____
Phone _____
of Main _____
Material _____
of Service _____
Size So
Material 1/2"
PL
Connecting to 1/2" PL Stub
Size requested 250
7"
250

Requirements _____

EXCAVATION HAZARDS



EXCAVATION HAZARDS

- Cave-ins/Collapses
 - Protective Systems – Shielding, Sloping, Benching, Shoring
- Uncontrolled water
 - Pumping, Draining, Flow Shutoff
- Hazardous atmospheres
 - Atmospheres must be tested in 4' excavations where it is reasonable to expect a hazardous atmosphere (landfill, hazardous waste site, treatment plants)
- Falls
 - Fall protection/prevention “is not required” at 6’
 - Best practices suggests fall protection/prevention
- Suspended/Overhead Loads
 - Never stand under a suspended load or with in the “fall zone”
 - Always use a tag line
- Heavy Equipment Blind Spots
 - Always wear high visibility apparel
 - Always maintain eye contact with the operator

Any other hazards?



Patrick Walters, 22, Cincinnati

EXCAVATION HAZARDS



EXCAVATION HAZARDS



OSHA NEWS RELEASES

June 8, 2016

OSHA cites two excavation contractors for exposing workers to trench cave-in hazards at a Tallahassee job site

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Employer's names: Allen's Excavation Inc.
Capital City Contracting LLC

Inspection site: 2037 Eastgate Way, Tallahassee, Florida 32308.

Citations issued: The U.S. Department of Labor's [Occupational Safety and Health Administration](#) issued citations to Allen's Excavation Inc. for one [willful](#) and one other-than-serious safety violation and Capital City Contracting received one willful and three [serious](#) safety violations.

On Nov. 17, 2015, an OSHA inspector saw workers in an excavation without protection and initiated an inspection as part of the agency's National Emphasis Program on [Trenching and Excavation](#). Allen's Excavation is a general contractor that subcontracted Capital City to install concrete casting to upgrade an underground drainage system.

Investigation findings: OSHA issued Allen's Excavation a willful citation for allowing employees to work in an excavation up to 9-feet deep without [cave-in](#) protection. The agency requires that all trenches and excavation sites 5-feet or deeper be protected against collapse. Protection may be provided through shoring of trench walls, sloping or benching of the soil at an acceptable angle or by using a protective trench box. The employer was also cited for not having an operating manual for a protective trench box onsite.

Capital City's willful citation was issued for allowing employees to work in an excavation up to 9-feet deep without cave-in protection.

The serious citations relate to the employer:

- Exposing workers to electrical hazards from [frayed electrical](#) cords.
- Not ensuring workers in the excavation wore [protective](#) helmets.
- Not providing a safe means to [enter and exit](#) the excavation.

Proposed penalties: \$108,500

- 9' Deep Without Protection
- 2 Violations
- No Ladders For Exit
- \$108,500 in Fines

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OSHA NEWS RELEASES

July 28, 2016

Houston contractor found violating serious trench hazards for sixth time in 10 years; faces \$124K in OSHA penalties
Oscar Renda Contracting ignores fatal risks in unprotected excavations

Employer name: Oscar Renda Contracting Inc.

Inspection Site: Subdivision on Shepherd Street, Houston, Texas

Citations issued: July 28, 2016

Investigation findings: The U.S. Department of Labor's [Occupational Safety and Health Administration](#) investigator witnessed workers performing trench and excavation work unsafely at a subdivision in Houston and initiated an inspection on Feb 11, 2016. As a result, the agency has cited Oscar Renda Contracting Inc. for allowing employees to work unprotected in excavations and permit required confined spaces. Without using a trench box or proper benching or sloping techniques, trench walls may collapse - crushing and burying workers. A cubic yard of soil can weigh almost 3,000 pounds, the weight of a small automobile, which makes escape difficult or impossible for workers. Each year, dozens of workers die in trench collapses and hundreds more are injured often seriously.

OSHA issued citations for [one willful](#), [11 serious](#) and two other violations. The willful violation was cited for exposing workers to cave-ins. The agency has investigated Oscar Renda Contracting six times in the past 10 years and cited the company each time for similar violations.

This inspection falls under the agency's National Emphasis Program on [Trenching and Excavations](#).

Inspectors identified the following serious violations as the company:

- Allowed unnecessary material and unsupported equipment within 2 feet of the excavation's edge.
- Failed to train employees in the safe performance of their duties.
- Did not verify that permit-required spaces were safe for entry.
- Failed to provide rescue and emergency equipment.
- Did not ensure that the required supervisor checked all appropriate entries on the permit before allowing employees to enter.

Proposed Penalties: \$124,300

Quote: "Six times in 10 years, we have found Oscar Renda Contracting risking the lives of its employees in underground trenches. Imagine the fear of working below ground when thousands of pounds of soil begin to fall on you and the likelihood that you will be buried alive because your employer valued a contract more than your life," said Mark Briggs, OSHA's area director in the Houston South office. "OSHA remains firm in its commitment to hold employers accountable for their actions when fundamental common sense and humanity are not enough to make them change."

- Unprotected Trenches
- 14 Violations
- Six Trench Violations in 10 Years
- \$124,300 in Fines

ouis Construction of Texas Ltd for [two serious](#) Houston. The agency initiated the inspection in reviously for exposing workers to cave-in

safety practices and such repeated negligence to find and fix hazards in the workplace."

- Unprotected Excavation, Repeat Offense
- 3 Violations, \$52,100 in Fines

OSHA NEWS RELEASES

U.S. Department of Labor | October 4, 2016

**Excavation contractor's failure to protect workers led to trench collapse
that killed two workers, badly hurt a third in Boise**
OSHA cites Hard Rock Construction with serious, willful violations

BOISE, Idaho - A Boise excavation contractor could have prevented the deaths of two workers and serious injuries suffered by a third after a trench collapse if the company had not allowed federal safety standards to be ignored at a Northwest Boise work site in May.

U.S. Department of Labor [Occupational Safety and Health Administration](#) inspectors responded to the scene after the Boise Police Department alerted them that a trench between 9- and 11-feet deep had caved-in and buried three workers employed by Hard Rock Construction, Inc. The collapse killed the crew's foreman and another worker, and hospitalized the third laborer with serious injuries. The men were doing underground utility work for the Meridian-based contractor when the incident occurred May 3, 2016, on Gary Lane.

Each year, dozens of workers die and hundreds suffer injury when trench walls collapse and bury them in soil and rock - sometimes weighing several thousand pounds. In fact, one cubic yard of soil can be equal to the weight of a small automobile, about 3,000 pounds. Excavation cave-ins are among the most common causes of fatalities in the construction industry.

OSHA inspectors found Hard Rock failed to provide cave-in protection systems or a ladder to enter or exit the trench, did not have a competent person conducting inspections and failed to train its employees on the hazards and dangers in working in trenches. The agency issued three serious citations and one willful citation, and assessed penalties of \$77,319 to the company today.

"The tragic loss of these men's lives and serious injuries suffered by their co-worker were preventable -which makes this incident even more tragic," said David Kearns, area director of OSHA's Boise office. "Our investigation found Hard Rock Construction made almost no effort to protect its workers, or even to understand the right ways to avoid the common hazards in this line of work. Hiring workers and assuming they know how to protect themselves is a sure path to tragedy."

Hard Rock employs about 24 employees in excavation, grading and underground utility installation. The company has 15 business days from receipt of its citations and penalties to comply, request an informal conference with OSHA's area director, or contest the findings before the independent [Occupational Safety and Health Review Commission](#).

- On March 28, 2016, a four-man crew on a job site in the 1036 Washington Blvd. in Oak Park was working in a five and one-half foot-deep trench without cave-in [protection](#) and a means to enter and exit the trench. In addition, inspectors found workers not wearing hard hats.
 - On March 29, 2016, inspectors found the same crew working in a six-and-one-half-foot deep trench at 1035 Randolph St. in Oak Park without cave-in [protection](#) and a means to enter and exit the trench. After the investigator left the site, employees were seen re-entering the unprotected trench. As the investigator approached the trench the second time, the employees scrambled out of the trench. Shortly after this, a large section of the trench wall collapsed into the area of the trench where the employees were working.
 - On March 10, 2016, OSHA inspectors observed a crew installing water lines in a trench about six-feet deep at 1632 N. Western Ave., in Chicago, without cave-in protection. OSHA [issued](#) penalties of \$69,300 to the company on April 25, 2016, for one willful and one repeated safety violation following its inspection.
- 9-11' deep trench, buried three workers. Two fatalities.
 - No cave in protection, no ladder, no inspections, no training
 - 4 citations, \$77,319 in fines.

ATLANTIC DRAIN



ATLANTIC DRAIN

April 12, 2017

BOS 2017-028

Employer in fatal Boston trench collapse did not provide safety training and basic safeguards for employees, OSHA finds *Atlantic Drain Service Co. Inc. cited for 18 violations*

BOSTON - Robert Higgins and Kelvin Mattocks died on Oct. 21, 2016, in Boston, when the approximately 12-foot deep trench in which they were working collapsed, breaking an adjacent fire hydrant supply line and filling the trench with water in a matter of seconds.

An investigation by the U.S. Department of Labor's [Occupational Safety and Health Administration](#) found that their employer, Atlantic Drain Service Co. Inc., failed to provide basic safeguards against collapse and did not train its employees - including Higgins and Mattocks - to recognize and avoid cave-in and other hazards.

"The deaths of these two men could have and should have been prevented. Their employer, which previously had been cited by OSHA for the same hazardous conditions, knew what safeguards were needed to protect its employees but chose to ignore that responsibility," said Galen Blanton, OSHA's New England regional administrator.

OSHA's inspection determined that Atlantic Drain and owner Kevin Otto, who oversaw the work on the day of the fatalities, did not:

- Install a support system to protect employees in an approximately 12-foot deep trench from a cave-in and prevent the adjacent fire hydrant from collapsing.
- Remove employees from the hazardous conditions in the trench.
- Train the workers in how to identify and address hazards associated with trenching and excavation work.
- Provide a ladder at all times so employees could exit the trench.
- Support structures next to the trench that posed overhead hazards.
- Provide employees with hardhats and eye protection.

As a result, OSHA has cited Atlantic Drain for a total of 18 willful, repeat, serious and other-than-serious [violations](#) of workplace safety standards and is proposing \$1,475,813 in penalties for those violations. OSHA cited Atlantic Drain trenching worksites for similar hazards in 2007 and 2012. The full citations can be viewed [here](#).

In February, a Suffolk County grand jury [indicted](#) Atlantic Drain and company owner, Kevin Otto, on two counts each of manslaughter and other charges in connection with the deaths. OSHA and the department's Regional Office of the Solicitor worked with the department's Office of the Inspector General, the Boston Police Department's Homicide Unit and the Suffolk County District Attorney's Office during the course of this investigation.

- 12' Deep Trench, Unprotected
- 2 fatalities
- 18 Violations, \$1.5M in Fines
 - Repeat violations
- Owner willfully ignored the responsibility to protect his employees.
- Owner is charged with two counts of manslaughter, and other charges including forgery.

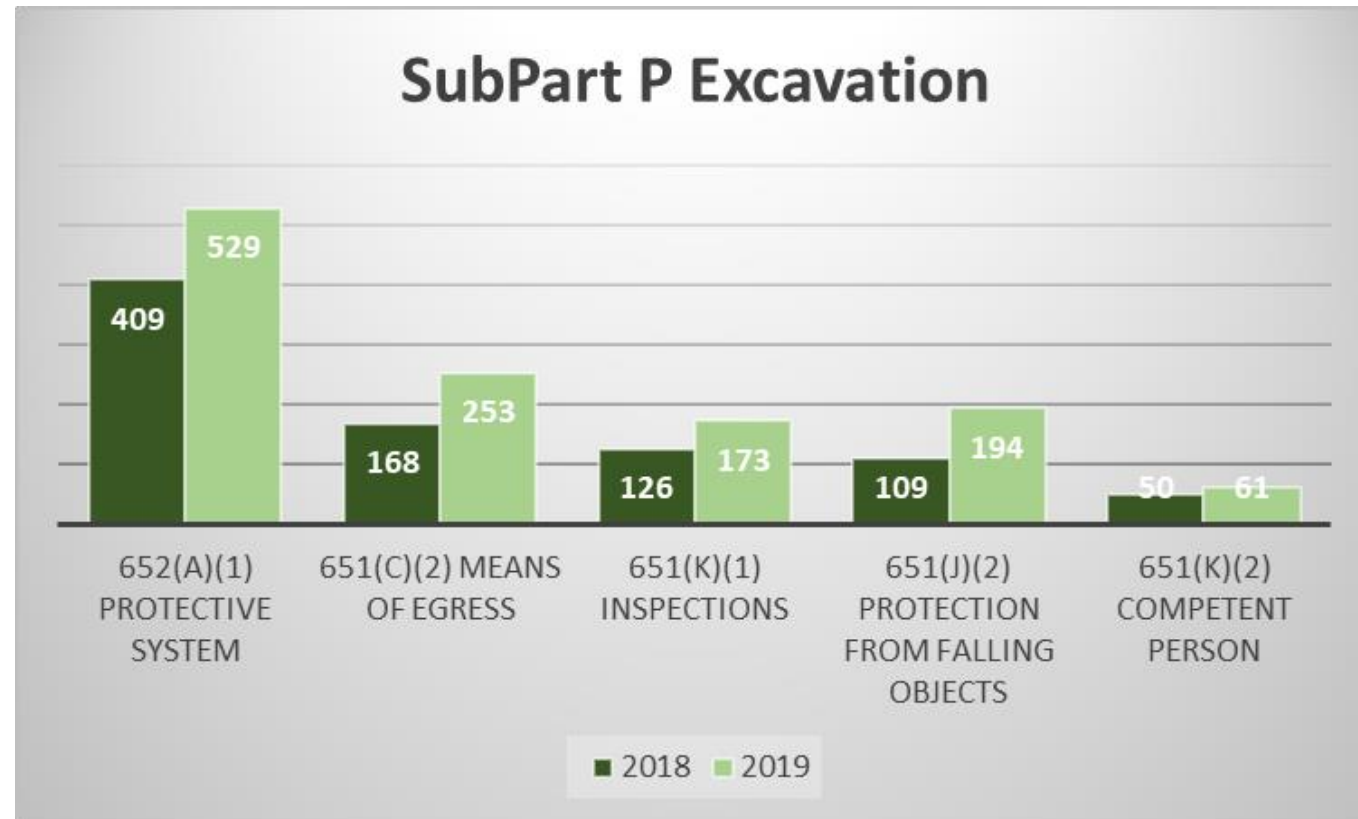
ATLANTIC DRAIN



ATLANTIC DRAIN



OSHA SUBPART P - CITATIONS



UNDERGROUND INSTALLATIONS

- Must be located prior to digging
- Determine the utilities exact location **by hand digging, or any means that limits use of equipment in the tolerance zone!**
- Support, protect, or remove utilities in open excavations
- Contact utility company or facility owner for help

UTILITY AVOIDANCE (OPTIONS TO HAND DIGGING)

Utility Air Spade 4000



- Harnesses the power of compressed air to safely uncover underground utility lines without harm.
- High-performance, patented supersonic nozzle generates a laser-like jet that moves at twice the speed of sound for faster, more effective digging.
- Non-sparking nickel aluminum bronze blend nozzle, brass components, electrically insulated 4' barrel rated to 300kV
- Lightweight, ergonomic handle, maximizes jobsite safety while minimizing operator fatigue. Dead-man trigger ensures safe operation and trigger guard prevents accidental activation.

WHY WORRY ABOUT AVOIDING UTILITIES

- Safety!
- Liability
- Equipment damage
- Business interruption
- Indirect costs (fines, investigation, schedule, insurance premiums)





PRE-EXCAVATION PROCEDURES

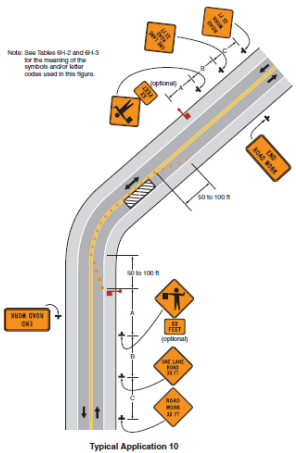
- Complete a Pre-Excavation Checklist
- Document type of utilities marked out within excavation area
- Verify that offsets of mark outs have been completed
- Document mark outs with digital/video camera prior to excavation (also surrounding environment)
- Locate upstream & downstream gate valves for mains (ensure you have proper key)
- Complete pre-excavation toolbox meeting with crew and operator (walk the job with crew & operator – ensure everyone's on the same page)
- Use of locating equipment



HAND DIGGING REQUIREMENTS

- Tolerance Zone (*Safe Zone*) around utilities – state dependent, and company policy
 - Typically 18”
 - RHW Air Spade Tolerance Zone – 18”
- Must locate all utilities by hand, use of Air Spade (limited use of equipment)
- Shortcuts = Hits

TEMPORARY TRAFFIC CONTROL



Notes for Figure 6H.10 – Typical Application 10
Lane Closure on a Two-Lane Road Using Flaggers

Option:

- For low-volume situations with short work zones on straight roadways where the flagger is visible to road users approaching from both directions, a single flagger, positioned to be visible to road users approaching from both directions, may be used (see Chapter 6E).
- The ROAD WORK AHEAD and the END ROAD WORK signs may be omitted for short-duration operations.
- Flashing warning lights and/or flags may be used to call attention to the advance warning signs. A BE PREPARED TO STOP sign may be added to the sign series.

Guidance:

- The buffer space should be extended so that the two-way traffic taper is placed before a horizontal (or crest vertical) curve to provide adequate sight distance for the flagger and a queue of stopped vehicles.

Standard:

- At night, flagger stations shall be illuminated, except in emergencies.

Guidance:

- When used, the BE PREPARED TO STOP sign should be located between the Flagger sign and the ONE LANE ROAD sign.
- When a grade crossing exists within or upstream of the transition area and it is anticipated that queues resulting from the lane closure might extend through the grade crossing, the TTC zone should be extended so that the transition area precedes the grade crossing.
- When a grade crossing equipped with active warning devices exists within the activity area, provisions should be made for keeping flaggers informed as to the activation status of these warning devices.
- When a grade crossing exists within the activity area, drivers operating on the left-hand side of the normal center line should be provided with comparable warning devices as for drivers operating on the right-hand side of the normal center line.
- Early coordination with the railroad company or light rail transit agency should occur before work starts.

Option:

- A flagger or a uniformed law enforcement officer may be used at the grade crossing to minimize the probability that vehicles are stopped within 15 feet of the grade crossing, measured from both sides of the outside rails.

Temporary Traffic Control Plan Selection

Utility Work On Shoulder with Minor Encroachment (Low Traffic Volume and Low Speed)

Unit Selected	Feet
A (Distance Between Signs)	100
L/3 (Taper Length)	60
Taper Cone Spacing	30
Tangent Cone Spacing	60

Option One

Lane Closure on Two Lane Road with Unrestricted Visibility (Low Traffic Volume, Low Speed Where Traffic cannot Self-regulate Without the Use of Flaggers)

Unit Selected	Feet
A (Distance Between Signs)	100
L (Taper Length)	120
Taper Cone Spacing	30
Tangent Cone Spacing	60

Option Two

Right Lane Closure on Near Side of Intersection

Unit Selected	Feet
A (Distance Between Signs)	100
L (Taper Length)	120
Taper Cone Spacing	30
Tangent Cone Spacing	60

Option Three

Utility Work in Center of Road (Low Traffic Volumes)

Unit Selected	Feet
A (Distance Between Signs)	100
L/2 (Taper Length)	60
Taper Cone Spacing	30
Tangent Cone Spacing	60

Option Four

Sketch Other Temporary Traffic Control Plan Option Not Seen Above

I drove through my temporary traffic control setup and it is effective for my jobsite YES NO

- Guided by the Manual for Uniform Traffic Control
 - 2009 MUTCD with Revisions 1 and 2, May 2012
- Traffic control layout is dictated by the speed of the road and where on the road the work is taking place
- Traffic control must be the first task completed
- Exposure to vehicular traffic requires high visibility apparel and temporary traffic control
 - Class 1 - roads with speeds less than 25 mph
 - Class 2 – roads with speeds between 25 mph and 50 mph
 - Class 3 – roads with speeds greater that 25 mph



Class 2 Vest



Class 3 Vest



Questions?