



Excavation Risk

*Part 1 – Competent Person &
12 Specific Excavation Requirements*

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Discussion Facilitator

Chad Stuart

Risk & Safety Team



Areas of Expertise:

- ✓ **Oil & Gas Transmission/Distribution**
- ✓ **Utilities, Foundations & Deep Excavations**
- ✓ **Street, Road & Traffic Control**
- ✓ **Trucking/Fleet Operations**
- ✓ **Military Facilities**
- ✓ **Environmental Management**
- ✓ **Web-portal Prequalification**

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Webinar Disclosure

Cobb Strecker Dunphy & Zimmermann's presenter, Chad Stuart has no actual or potential conflict of interests concerning any proprietary interests in any product, service or any other materials presented in this webinar.



Learning Objectives

- ✓ Define excavation competent person in practical terms.
- ✓ Breakdown efficient methods for applying the 12 specific excavation requirements in the field.

Question:

What Do You Want to Get Out of this Webinar?

Use the "Question Box" to Submit Your Response.






Competent Person

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Common Misunderstandings

- ✓ Everyone is the Competent Person.
- ✓ Training makes a Competent Person.
- ✓ Most Qualified Person is Always the Competent Person.
- ✓ Foreman has to be the Competent Person.
- ✓ There is no Clear, Measurable Definition.
- ✓ Others?

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Competent Person

One of the most Miscommunicated and Least Understood Designated Leadership Roles in the Construction Industry.

Not Limited to a Single Task

C	Safety & Health	P	Excavations
D	Health & Environmental	Q	Concrete & Masonry
E	PPE & Life Saving Equipment	R	Steel Erection
H	Material Handling, Storage Use & Disposal	S	Underground Construction, Caissons, Cofferdams
J	Welding & Cutting	T	Démolition
K	Electrical	U	Blasting & Explosives
L	Scaffolds	X	Ladders
M	Fall Protection	Z	Toxic & Hazardous Substances
N	Helicopters Hoists Elevators	AA	Construction Confined Space
		CC	Cranes & Derricks





Competent Person

More than just a Title


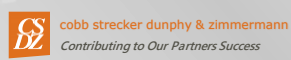
OSHA's definition of Competent Person:

1. Capability / Knowledge / Skill to **Identify Hazards**.
2. **Authority** to Take Prompt Action to *Eliminate* Hazards.
 - ✓ Authority can only be Designated by the Employer.
 - ✓ Change the Work Plan, Processes, Equipment, Tasks.

Leadership Role:

Competent Person is Designated by the Employer.

- Who's in Charge?
- Who Speaks for the Owner(s) of the Company?
- Who holds the Owners' Check Book?
- Who has the First and Final Word on Means and Methods?
- Who is Responsible for _____ ?

Competent Person: *Training & Capabilities*

To be a "Competent Person" under this standard, a person must be able to demonstrate training, experience and knowledge of:

1. **Soils Analysis.**
2. **Use of Protective Systems.**
3. **Requirements of OSHA 29 CFR 1926 Subpart P.**
4. **Ability to Detect:**
 - **Conditions that could Result in Cave-ins,**
 - **Failures in Protective Systems,**
 - **Hazardous Atmospheres,**
 - **Other Hazards including those associated with Confined Spaces.**

- ✓ Competent Persons having such training and knowledge must be capable of identifying existing and predictable hazards in excavation work and have the authority to take prompt measures to abate these hazards.

A Backhoe Operator Who would otherwise Meet the Requirements of the Definition is not a Competent Person if the Person Lacks the Authority to Take Prompt Corrective Measures to Eliminate Existing or Potential Hazards.



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Excavation Competent Person Responsibilities

Protective Systems or Equipment

- ✓ **Monitoring water removal equipment and operations.** [29 CFR 1926.651(h)(2)]
- ✓ **Inspecting excavations subject to runoff from heavy rains to determine need for diversion ditches, dikes, or other suitable protection.** [29 CFR 1926.651(h)(3)]
- ✓ **Determining cave-in potential to assess need for shoring or other protective system.** [29 CFR 1926.652(a)(1)]
- ✓ **Examining damaged material or equipment used for protective systems to determine its suitability for continued use.** [29 CFR 1926.652(d)(3)]
- ✓ **Classifying soil and rock deposits, by both visual analysis and by testing, to determine appropriate protection; re-classifying, if necessary, based on changing conditions.** [29 CFR 1926Subpart P Appendix A]
- ✓ **Determining the appropriate slope of an excavation to prevent collapse due to surcharge loads from stored material or equipment, operating equipment, adjacent structures, or traffic, and assuring that such slope is achieved.** [29 CFR 1926Subpart P Appendix B (c)(3)(iii)]

Inspecting Trench and Protective Systems

- ✓ **Authorizing immediate removal of employees from the hazardous area where evidence of possible cave-in, failure of protective systems, hazardous atmospheres, or other hazardous conditions exists.** [29 CFR 1926.651(k)(2)]

Unsafe Access/Egress

- ✓ **Designing structural ramps that are used solely by employees as a means of access or egress. Structural ramps used for access or egress of equipment must be designed by a competent person qualified in structural design.** [29 CFR 1926.651(c)(1)(i)]



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Authority is Designated.

Competency is Demonstrated, Not Certified.

No Competent Person = No Risk/Safety Plan

- The Day-to-Day Implementation of the Risk/Safety Plan is the Direct Result of the Performance or Lack of Performance by the Competent Person.
- Competent Person is Proof a Risk/Safety Plan Exists and is Executed in the Field.



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Responsibilities for Managing Safety

1926.20(b)1

It Shall be the Responsibility of the Employer to Initiate and Maintain such Programs as may be Necessary to Comply with this Part.

1926.20(b)2

Such programs Shall provide for Frequent and Regular Inspections of the Job Site, Materials & Equipment to be Made by **COMPETENT PERSONS** Designated by the Employer.

1926.16

(a) ...In No Case Shall the Prime Contractor be Relieved of Overall Responsibility for Compliance with the Requirements of this Part for All Work to be Performed Under the Contract.

(c) ...With Respect to Subcontracted Work, the Prime Contractor and any Subcontractor or Subcontractors shall be Deemed to have Joint Responsibility.



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Is there a Competent Person on Site?



Common Competent Person Determination Questions by OSHA:

- ✓ Who Designated You the CP of this Site?
- ✓ Do you have Authority to Correct Hazards?
- ✓ Describe the Training you Received to be CP?
- ✓ Do you Know the Soil Type of the Excavation?
- ✓ What type of Test did you Use to Classify Soil Type?
- ✓ How do you Know which Type of Protective System to Use of each Soil Type?



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Defining Expectations Excavation Risk



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What is Your Strategy?

Expectation → **Execution**

No amount of “*Safety*” can make up for ineffective leadership and poor project planning.

Written policies stuffed into a dusty safety manual do nothing for employees who lack knowledge & skill and do not prevent site leadership from directing employees to make wrong choices.

Do You Tolerate Problems with:

- Estimate?
- Schedule?
- Materials?
- Contract Expectations?
- Quality of Work?
- Client Expectations?
- Risk, Safety, Compliance?

**What Problems are
You Tolerating?**



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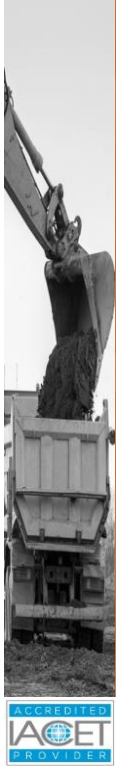
12 Specific Excavation Requirements

Subpart P – 29 CFR 1926.651

- a. Surface Encumbrances
- b. Underground Installations
- c. Access & Egress
- d. Exposure to Vehicular Traffic
- e. Exposure to Falling Loads
- f. Warning Systems for Mobile Equipment
- g. Hazardous Atmospheres
- h. Water Accumulation Hazards
- i. Stability Adjacent Structures
- j. Inspections
- k. Protection of Employees from Loose Rock & Soil
- l. Walkways



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Additional Expectations are Common during Excavation Activities

- ✓ Crane
- ✓ Fall Protection
- ✓ HAZCOM & GHS
- ✓ Ladders and Walkways
- ✓ Material Handling
- ✓ Motor Vehicles and Equipment
- ✓ MUTCD - *Temporary Traffic Control & Work Zone Protection*
- ✓ Personal Protective Equipment
- ✓ Qualified Rigger and Rigging Equipment
- ✓ Signal Person
- ✓ Storm Water Pollution Prevention Plan (SWPPP)
- ✓ Toxic and Hazardous Substances
- ✓ Utility Damage Prevention / One Call Service



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Common Understanding

Excavation

- ✓ An Excavation is any Man-made Cut, Cavity, Trench or Depression in an Earth Surface that is Formed by Earth Removal.



Trench

- ✓ A Narrow Excavation (*in relation to its length*) made Below the Surface of the Ground.
- ✓ In General, the Depth of a Trench is Greater than its Width, and the Width (*measured at the bottom*) is Not Greater than 15 feet.
 - PLEASE NOTE: If a Form or other Structure Installed or Constructed in an Excavation Reduces the Distance Between the Form and the Side of the Excavation to 15 feet or less (measured at the bottom of the excavation), the Excavation is also Considered to be a Trench.



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Inspections

1926.651(k)

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What is an Excavation Inspection?

Logical, Systematic Evaluation:
Identify and Predict Actual and Potential Hazards.

Defined Strategy:
Methods to Eliminate/Reduce/Control Hazards.
Who – Where – When – How, Emergency Response.

When Should an Excavation be Inspected?

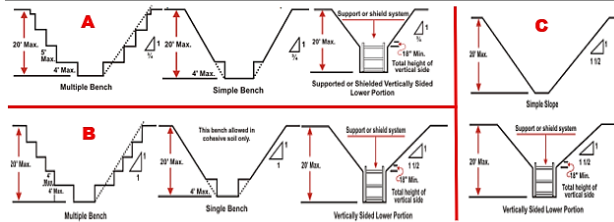
A Competent Person must Inspect each Excavation:

- ✓ Daily and Before the Start of Each Shift and as Dictated by the Work Being Performed.
- ✓ After Every Rainstorm.
- ✓ After other Events that could Increase Hazards: *Snowstorm, Windstorm, Thaw, Earthquake, etc.*
- ✓ When Fissures, Tension Cracks, Sloughing, Undercutting, Water Seepage, Bulging at the Bottom or other similar Conditions Occur.
- ✓ When there is a Change in the Size, Location or Placement of the Spoil Pile.
- ✓ When there is any Indication of Change or Movement in Adjacent Structures.
- ✓ When a Hazardous Atmosphere Exists or could Reasonably be Expected to Exist.

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1	<ul style="list-style-type: none"> Number of excavation Competent Persons onsite
2	<ul style="list-style-type: none"> Minimum distance in feet spoil pile's nearest edge must be set back from cut edge Maximum distance in feet allowed to excavate BELOW protective system support Maximum distance in feet top hydraulic vertical shore cylinder can be below grade
3	<ul style="list-style-type: none"> Minimum distance in VERTICAL feet ladder must be above the trench box or grade Minimum points of contact for climbing up or down a ladder Depth in feet when a ladder, ramp or other access/egress becomes mandatory
4	<ul style="list-style-type: none"> Depth in feet when the atmosphere must be tested if a hazardous atmosphere exists or could reasonably be expected to exist Maximum vertical distance in feet btw. hydraulic vertical shore cylinder in C soil Maximum bench height in feet allowed in type-B soil
5	<ul style="list-style-type: none"> Number of feet when a protective system becomes mandatory
6	<ul style="list-style-type: none"> Number of feet in height when fall protection/guardrails/barriers may be required
8	<ul style="list-style-type: none"> Number of feet the first bench is set back when doing multiple benches in B soil using 4-foot bench steps
10	<ul style="list-style-type: none"> At least 10 feet away from power lines with voltages up to 50kV
12	<ul style="list-style-type: none"> Number of Specific Excavation Requirements from 29CFR1926.651
18	<ul style="list-style-type: none"> Minimum required distance in inches from grade level to top of protective system when sloping a portion of the excavation sidewall
19.5	<ul style="list-style-type: none"> Level at which oxygen concentration percentage equal to and below is classified as an <i>oxygen deficient atmosphere</i>
20	<ul style="list-style-type: none"> Maximum depth in feet that OSHA allows protective systems to be used without site specific engineering
23.5	<ul style="list-style-type: none"> Level at which oxygen concentration percentage equal to and above is classified as an <i>oxygen enriched atmosphere</i>
25	<ul style="list-style-type: none"> Maximum distance in feet a worker may travel to reach a means of egress
30	<ul style="list-style-type: none"> Maximum distance in inches allowable to step across a trench before a walkway or bridge is mandatory



Inspections

Does the Subpart-P Require Documented Excavation Inspections?

NO.

*However, Keep in Mind:
Undocumented Inspections
Never Occurred.*



Underground Installations

1926.651(b)



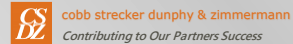


811 is Not Enough

FOCUS: Utility Damage Prevention

Question:
What are Your State's Specific One Call and Excavating Compliance Expectations?

- ✓ Limits to One Call and Locating Services Effectiveness.
 - Mismarked, Unmarked, Abandoned, Inaccurate Maps, Utility Error.
- ✓ ALWAYS have a Copy of Your Current Locate Ticket On-Site.
- ✓ NEVER Perform any Excavation Activity before Your Locate Ticket's Start Date and Time - *Never Jump the Start Date or Time!*
 - All Excavators have their Own Current Locate Ticket – No Sharing!
- ✓ Additional Locate Tickets Necessary?
 - Crossing County, Township, or City Lines, ROW & Service Lines, etc.
- ✓ Verify Accurate Marking Instructions for the Project.
 - Project Size/Scope Changes Effecting Current Locate Ticket Updated in One Call Service, may Require a New Locate Request.
- ✓ Verify Response from Facility Operator/Utility Owner.
 - Locates Present on Site, Positive Response System, Delay by Utility
- ✓ Create a Record of Your Efforts and Communication Attempts.
- ✓ Excavation Methods to Prevent Damage.



Gopher State One Call Locate Request

Ticket Number: 113220064 Old Ticket: Work Date: 11/22/2011 8:00:00 AM
 County: RAMSEY Done For: XCEL ELECTRIC

NORTH DAKOTA ONE-CALL
 Request #: 11162625 LORQ ROUTINE
 Send To: C_EMAIL Seq No: 184 Map Ref:

Original Call Date: 12/05/11 Time: 3:32 PM CT Op: webusr
 Work to Begin Date: 12/07/11 Time: 3:45 PM CT
 Transmit Date: 12/05/11 Time: 3:35 PM CT Op: webusr

Diggers Hotline, Inc. (Wisconsin) Fax/Email Confirmation

Ticket #: 20115003805 Previous Ticket #: 20115001667
 Header: STANDARD Type: UPDATE Operator: 164

Start Date : 12/12/2011 Time: 08:53:00 AM Duration: 2 Week(s)

Iowa One Call SEQUENCE NUMBER 0051 CDC = C_EMAIL
 Request # 112450100 IOC Sent: Date: 09/02/11 At: 07:44

 * COMPLIANT * Messages Sent To Office(s) as follows:

 CDT=CITY OF DES MOI/DMS=DES MOINES, CIT/DWW=DES MOINES WATE/M57=MIDAMERICAN ENE/ SOI=PAETEC-IOWA
 COM/T17=MEDIACOM COMMUN/US4=QWEST LOCAL NET/
 Beginning Work Date: 09/07/11 Time of Day: 07:45 Duration: 5 DAYS

Start Date & Time

Required Wait Times

Locate Ticket has "CLEARED" when Current Date & Time are Past the Start Date & Start Time Printed on Locate Ticket.

State-specific: 48 to 72 hours

State specific Duration!!

How Do I Know How if all Facilities on my Site are Located?

Most states require all Operators to provide verification "POSITIVE RESPONSE" of completed service by either:

- 1. Positive response marking on the ground, or**
- 2. Positive response message to One Call System.**

Count the Number of Operators on the Locate Ticket.

6 Operators

Are there 6 different types of Locates present at your site?

Code	Name	Phone Number
COMCST01	COMCAST	(612) 522-8141
MCICOL01	MCI	(800) 289-3427
METWAS01	METRO WASTE COMMISSION	(651) 602-4511
QLNMN14	QWEST	8002834237
STPLWT01	ST. PAUL WATER UTILITY	6512666868
XCELO6	XCEL ENERGY	(651) 229-2427

NOTE: Farm Taps, Military Communication Lines and Private Utilities are not located thru One Call.



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MARKING INSTRUCTIONS: FROM THE SW CORNER OF THE ABOVE INTERSECTION, MARK THE WEST SIDE OF BIRMINGHAM ST GOING SOUTH 175 FEET TO THE POWER POLE, THEN ALSO MARK FROM THE SW CORNER OF THE ABOVE INTERSECTION GOING WEST 250 FEET ALONG THE SOUTH SIDE OF FREMONT AVE TO THE END OF THE CUL DE SAC

Locate Ticket Marking Instructions = Recorded Work Plan

- 1. Define Scope/Area/Distance/Location of Work**
- 2. Documented Plan for Operator/Locator Marking**

Excavator on the Locate Ticket is Responsible to:

- ✓ Verify locate ticket covers actual location/area of work performed.
 - **Prevents blaming the locator(s) for a unmarked facility(s)**
- ✓ Report any changes to the agreed-upon work plan
 - **If a change occurs, verify the current ticket covers the change to the work area or location.**
 - **If not, call in a new locate request.....yes, you may have to wait.**



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26



White	PROPOSED EXCAVATION
Fluorescent Pink	TEMPORARY SURVEY MARKINGS
Red	ELECTRIC POWER LINES, CABLES, CONDUIT AND LIGHTING CABLES
Yellow	GAS, OIL, STEAM, PETROLEUM OR GASEOUS MATERIALS
Orange	COMMUNICATION, ALARM OR SIGNAL LINES, CABLES OR CONDUIT
Blue	POTABLE WATER
Purple	RECLAIMED WATER, IRRIGATION AND SLURRY LINES
Green	SEWERS AND DRAIN LINES



The Burning Question:

Can I Repaint Faded or Obliterated Marks?

You Accept Full Liability for Repainting any Locate Marks in the Original APWA Uniform Color Codes – *but not a “Silly” Color.*

ALWAYS Contact One Call or the Locate Service Company to Refresh/Repaint Faded or Obliterated Marks.

You may have to Call in a New Ticket = 2 to 3 Day Wait Time.

Person/Business on Locate Ticket is responsible for Maintaining & Protecting the Quality of the Locate Marks.



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Practical Solutions

Videos/Photos of Initial Locates

- Daily Record of Your Running Line.
- Pre-job Recordkeeping.

Repainting Locates

- Only Use a “Silly” Color.

Sighting Stakes

- Think Iron Sights across a Jobsite.

Offset Stakes

- Specified Distance off the Original Locate Mark.



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Utility Damage Prevention Checklist

Date: _____ State: _____ Job: _____ Supervisor: _____

Locate Meets: N/A

- Locate Meet completed. All scope of work expectations reviewed, recorded and sign-in sheet completed.
- Locate Meet completed prior to the start of work, Foreman received all information.
- Secured all local utility owners' contact information for the project.

Locate Tickets: N/A

- Confirmed START date/time and END date/time are current. Copy of Locate Ticket readily available onsite.
- Received additional Locate Tickets for crossing county / township / city lines. All copies readily available onsite.
- All excavators are working off of their own up-to-date Locate Ticket.
- Locate Ticket marking instructions are accurate for the scope of the project.
- Project size/scope changes effecting current Locate Ticket updated in One Call service. Date: _____
- Positive response received from all facility operators and utility locators. If not, which is missing: _____

Locate Marks: N/A

- Each utility listed on the Locate Ticket has their Locate Marks onsite or a Positive Response was received.
- Called for a "Refresh" of all faded or obliterated Locate Marks. Date: _____ Marks Damaged: _____
- _____ colored paint used to identify original, existing locates placed by Locator.

Private Utilities: N/A

- Circle One: DID or DID NOT meet with property owner or tenant to inform them of their responsibility to locate all private utilities on their property or hire someone to locate their private utilities.
- Facility owner or tenant DID or DID NOT sign the Private Utility Locate Responsibility Acknowledge Agreement.

Pre-Task Planning: N/A

- Onsite meeting reviewed the following special considerations: _____

Prior start of work, walk-thru inspection of active work area performed and confirmed all locates are present.

Prior to the start of work, photographed and/or videotaped all final Locate Marks.

All employees new to the work site were given a tour of the active work area to identify known utility hazards.

Tolerance Zones = 18-inches or 24-inches N/A (circle one)

- Hand-digging and/or vacuum excavating used within the Tolerance Zone.

Verifying Utility Depth: N/A

- Paralleling Existing Utilities:** verified location/depth/direction of existing utilities. Min. separation 36-inches.
- Project owner approved a variance in writing allowing less than 36-inches of separation btw. parallel utilities.
- Work near Poles, Pedestals, Pads:** verified location/depth/direction of existing utilities within 10-feet.

Crossing Over or Under Existing Utilities: N/A

- Utility owner's minimum clearance distance = _____
- All Utility Crossings marked with 2x4 stakes painted the appropriate color for the identified utility.
- Excavations at Utility Crossings:** the location, depth and direction of all utilities will be positively identified by hand-digging, vacuum excavation or other approved means.

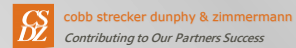
Working Near Overhead Lines: N/A

- Request submitted for Utility Company shield overhead lines. Date of Request: _____
- Spotters shall be used when equipment has a boom capable of extending within 20-feet of overhead electrical lines and/or when equipment is working within 10-feet of telecommunications lines.
- "Warning - Overhead Lines" signs set up both directions when working in close proximity to overhead lines.

Are Your Expectations for Damage Prevention clearly Defined?

- ✓ Specific
- ✓ Observable
- ✓ Measurable
- ✓ Performed Daily

How much of Your Strategy is based on Hope?



Tolerance Zone (aka - Buffer Zone)

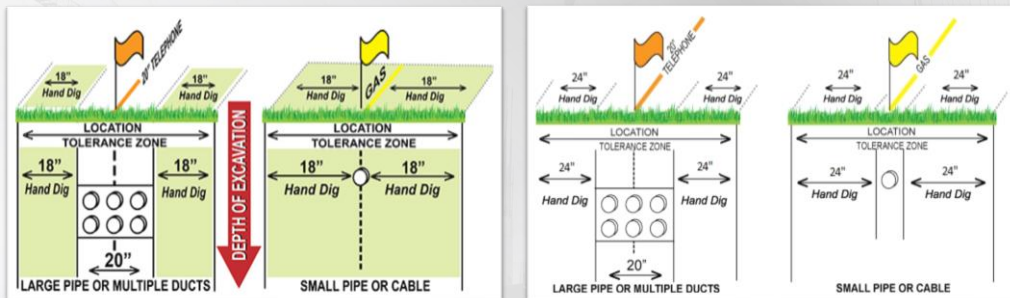


Non-Mechanical Excavating

"Hand-digging" - Vacuum Excavation

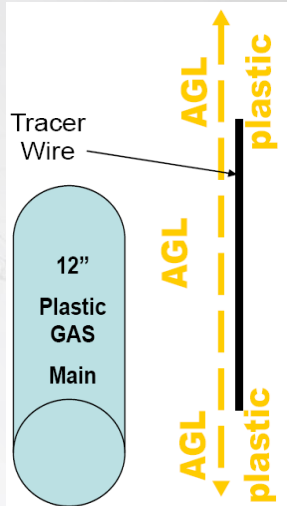
Locate marks indicate the *approximate* center-line of underground facilities

State-specific Standards





Locates May Represent Tracer Wire Location, Not the Facility




Locates May Represent Width of the Facilities.



Never Trust a Depth Reading



Trust then Verify by Daylighting or Spotting the Facility


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Exposed Utilities



1926.651(b)(4) – Underground installations shall be protected, supported or removed as necessary to protect workers.

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Any Overhead Utility Hazards?

What Exactly is Your Plan?

Clearance Distances



TABLE A—MINIMUM CLEARANCE DISTANCES

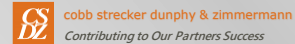
Voltage (nominal, kV, alternating current)	Minimum clearance distance (feet)
up to 50	10
over 50 to 200	15
over 200 to 350	20
over 350 to 500	25
over 500 to 750	35
over 750 to 1,000	45
over 1,000	(as established by the utility owner/operator or registered professional engineer who is a qualified person with respect to transmission and distribution).

**1926.1408
Table A**

Table T – Minimum clearance distances while traveling with no load

Voltage	Clearance
Up to 0.75 kV	4 ft
>0.75 to 50 kV	6 ft
>50 to 345 kV	10 ft
>345 to 750 kV	16 ft
>750 to 1,000 kV	20 ft
> 1,000 kV	*

1926.1411 Power line safety while traveling under or near power lines with no load.



2-day Response Requirement

October 13, 2011

Charles Kelly, Director
Industry Human Resource Issues
Edison Electric Institute
701 Pennsylvania Avenue, N.W.
Washington, D.C. 20004

Dear Mr. Kelly:

On October 6, 2010, Edison Electric Institute (EEI) filed a Petition of Review in *EEI vs. the Occupational Safety and Health Administration and Secretary of Labor (OSHA), No. 10-1311 (D.C. Circuit)* challenging various aspects of OSHA's final rule, *Cranes and Derricks in Construction (Subpart CC)*. EEI and OSHA entered a settlement agreement, dated August 22, 2011, in which OSHA agreed to clarify the two Subpart CC requirements below in a letter of interpretation. This letter fulfills that obligation.

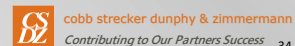
(1) 29 CFR §1926.1407(e) states:

Voltage information. Where Option (3) of this section is used, the utility owner/operator of the power lines must provide the requested voltage information within two working days of the employer's request.

Thus, §1926.1407(e) allows a utility owner/operator two working days to provide the requested information. For the purposes of this provision, working days include all calendar days except weekends and holidays. See *75 Fed. Reg. 47851 (Aug. 9, 2010)*. For example, if an electric utility receives a request for voltage information on one of its distribution lines on a Friday, it will have until the end of the business day on the following Tuesday to provide the necessary information (assuming there are no holidays in between).

(2) The provisions of §1926.1408 (Power Line Safety) allow deenergization as one option for employee protection from electrical hazards of power lines. Employers choosing this option must not proceed with this option if the electric utility does not de-energize the power line, but Subpart CC does not require utility companies to deenergize power lines.

1926.1407 Options: 1) Deenergize & Ground 2) 20-ft Clearance 3) Table A Clearance





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**PRIVATE UTILITY LOCATE RESPONSIBILITY
ACKNOWLEDGEMENT**

I, _____, acknowledge that _____
with _____ met with me on _____,
at _____, and has explained to me that
I am responsible for locating ALL private underground utilities located on
my property (or the property I manage), located at _____
before project _____
can be started by our company. I understand that the work will begin on the
following date and time: _____
I acknowledge that _____
cannot be held liable for damage to private underground utilities on this
property that are not properly located, marked or are mismarked.

_____ Property Owner/Manager's Signature	_____ Date
_____ Contractor Representative's Signature	_____ Date

NOTES FROM MEETING:

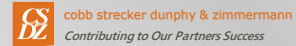
**Reducing Private
Utility Damage Risk**

QUESTION: Who is Responsible for Locating Private Facilities?

ANSWER: In Most States, the Property Owner or Tenant is Responsible to Locate All Private Facilities or Hire Someone to Locate, However.....You're the Big Bad Contractor!

Create a History of Your Actions to Inform, Warn, & Protect.

May Not be a "Legal" Document but...Can Use as Leverage to Reduce Costs.



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Surface Encumbrances

1926.651(a)

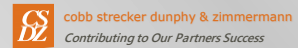
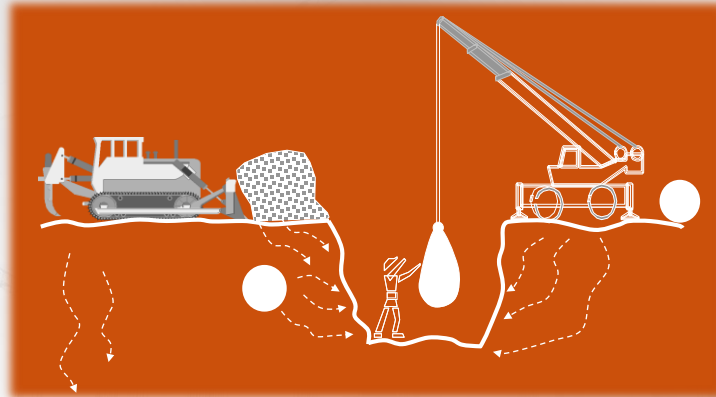


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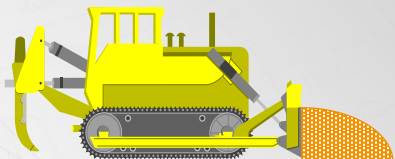
Surface Encumbrances

Any Form of Weight, Vibration or Above/Below Ground Disturbance that Affects the Stability of an Excavation Side Wall.

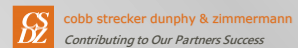


Surcharge Loading

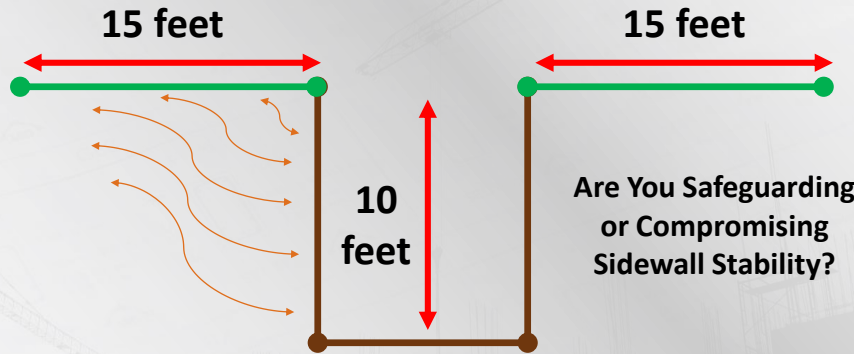
Any Load Imposed Upon the Surface of the Soil Close Enough to the Excavation to Cause a Lateral Pressure to Act on the System in Addition to the Basic Earth Pressure.



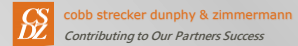
Are You Safeguarding or Compromising Sidewall Stability?



Affected Zone = 1.5 Times the Depth

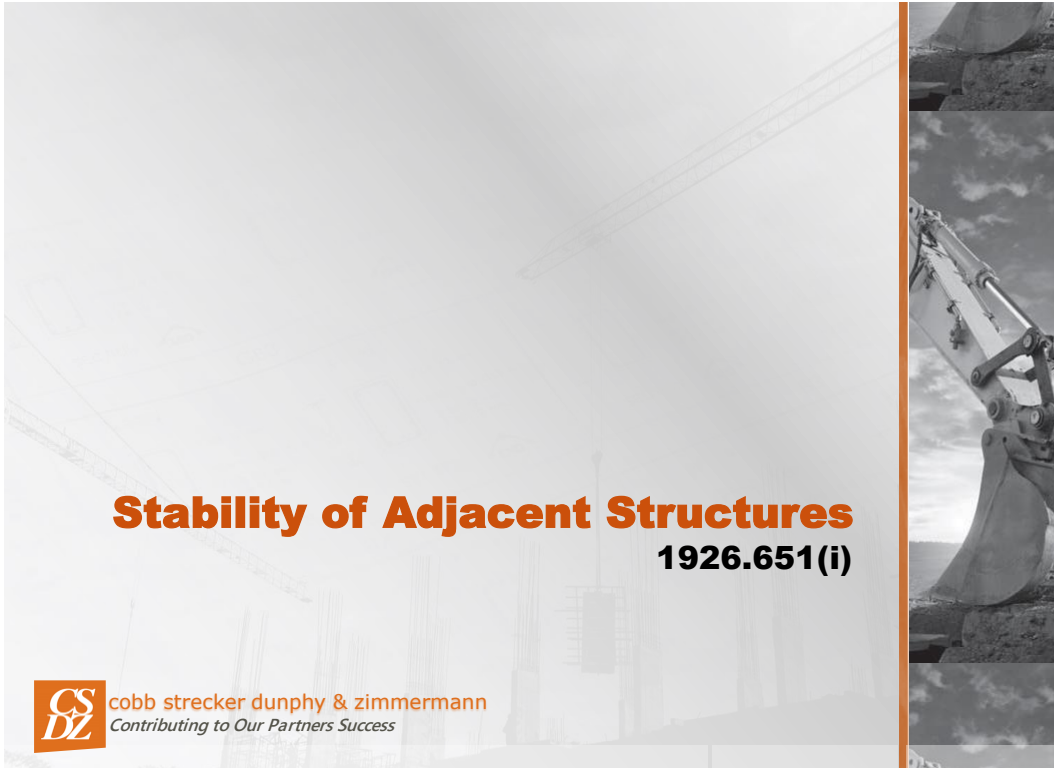


Only Necessary Equipment, Personnel and Materials Allowed in the Affected Zone.



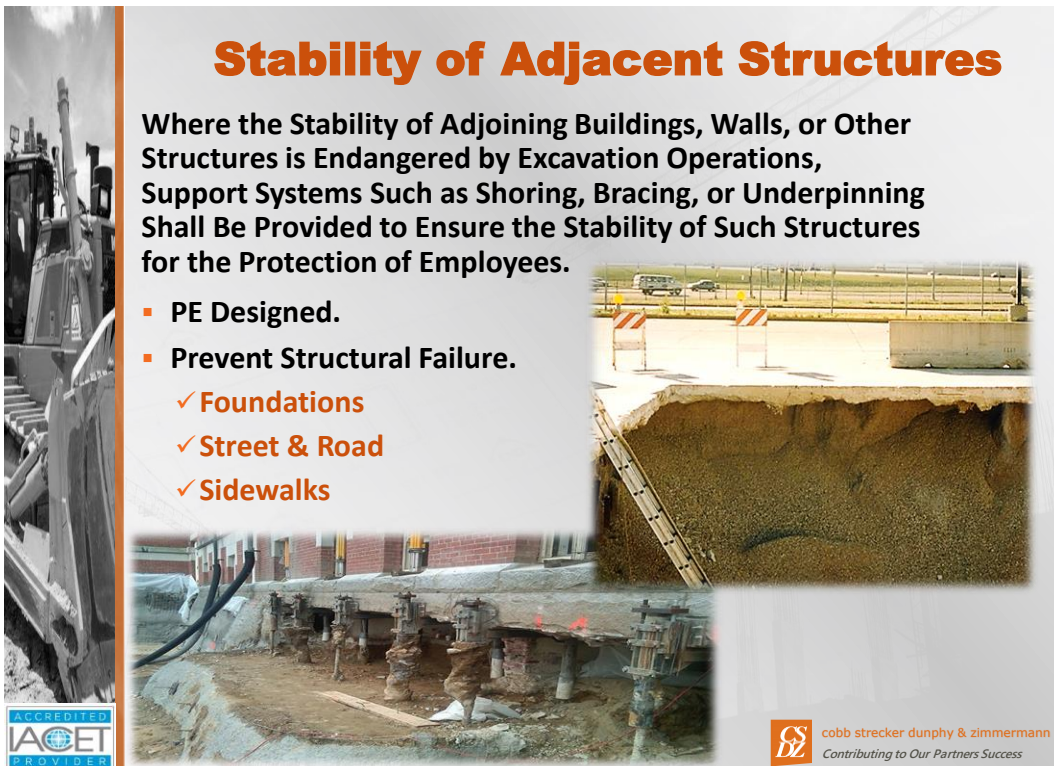
Any Potential Sidewall Stability Concerns?





Stability of Adjacent Structures 1926.651(i)

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Stability of Adjacent Structures

Where the Stability of Adjoining Buildings, Walls, or Other Structures is Endangered by Excavation Operations, Support Systems Such as Shoring, Bracing, or Underpinning Shall Be Provided to Ensure the Stability of Such Structures for the Protection of Employees.

- PE Designed.
- Prevent Structural Failure.
 - ✓ Foundations
 - ✓ Street & Road
 - ✓ Sidewalks

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Vibration Risk

Considerations to Reduce Liability:

- ✓ Prior to construction activity, establish a benchmark thru well-planned due-diligence investigation and project coordination of neighboring properties.
 - **Any pre-existing damage such as settlement or structural deficiencies to neighboring structures.**
- ✓ Any neighboring facility has sensitive electronic, instrumentation or imaging equipment such as an MRI that may be disrupted by construction related vibration activities.
- ✓ Geotechnical report that clearly identifies the underlying soil strata and geologic conditions.
- ✓ Pre-planning alternate construction equipment.
 - **EXAMPLE: auguring or pre-drilling piles as opposed to pile driving.**
- ✓ Construction logs of equipment and approximate time frames of construction.
- ✓ Vibration monitoring by a licensed testing agency
- ✓ Building movement monitoring of neighboring structures by a licensed testing agency.



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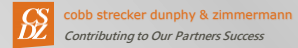
**Unique and Specialized
Precautions require Design
and Installation to be
Observed by a Registered
Professional Engineer (PE).**



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All Necessary Precautions?



Exposure to Vehicle Traffic 1926.651(d)

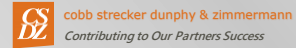


Vehicle Exposure

How are We going to Protect **Ourselves** from **Ourselves**?
 How are We going to Protect **Ourselves** from the **Public**?
 How are We going to Protect **Public** from **Themselves**?



NOTE: Vehicle Crossings must be Designed/Approved by a Registered Professional Engineer (PE).



ABC Company
 123456789012345
 987654321098765
 432109876543210
 100% Polyester
 Model # V8789
 Size Large

← Arc Rating (APV=14)

← Fiber Content

← Designation of product type, commercial name or code

← Meets requirements of ASTM 1506

← Representative or Universal Pictogram, >10mm, showing HNSA Type, Class, and FR Status

← Care Labeling for finished items

← Manufacturer Name

← Number of this specific ANSI standard

← Fabric Identifier

← Size (not required for headwear)

← Garment Type (for workwear)

← Performance Class

← Statement regarding Flame resistance

← Also Acceptable

← Wash warm, Maximum 25%, Do not bleach, Tumble dry low, Do not iron, Do not dry clean, Made in USA

← FR/ASTM F1506-15 Type R Class 3

TYPE O – OFF-ROAD – CLASS 1

- Non-Roadway speeds
- Undivided attention towards approaching traffic
- Working environments are not visually complex
- Low volume of vehicle equipment

CLASS 1

Background Material: 250cm²

Retroreflective Tape: 150cm²

Minimum Width of Tape: 38mm

TYPE R – ROADWAY – CLASS 2 & 3

Type R should be worn on or near public access roadways and highways where work takes place in close proximity to vehicle traffic, construction, utilities, fire-fighting, etc., and rail.

CLASS 2

Background Material: 775cm²

Retroreflective Tape: 200cm²

Minimum Width of Tape: 1.38in

* Smallest Size: 540cm²

CLASS 3

Background Material: 1240cm²

Retroreflective Tape: 310cm²

Minimum Width of Tape: 1.87in

* Smallest Size: 1000cm²

TYPE P – PUBLIC SAFETY – CLASS 2 & 3

- Worn by Fire, Police, EMS, and other public safety personnel
- Identifying colors may be used to differentiate tasks
- Additional options available for competing hazards and access to equipment

Use a Hazard Assessment to determine if Class 3 is needed for types R and P:

- Night Work
- High volume high-speed backgrounds
- Worker attention is diverted

SUPPLEMENTAL ITEMS – CLASS E

- Adding Class E leg wear to a Class 2 vest or shirt creates a class 3 ensemble
- Leg wear can include leg gaiters, pants, coversalls and bib overalls

CLASS E

Background Material: 485cm²

Retroreflective Tape: 520cm²

Minimum Width of Tape: 1.87in

Retroreflective & High Visibility Garments

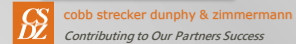
ANSI/ISEA 107

- ✓ Classes are Defined by the Min. Amount of Background and Retro-reflective Material, the Configuration, Technical Design Req'ts.
- ✓ Garment Selection based on Expected Use Settings and Work Activities Performed.



Unclassified Garments

Damaged/Defective





Do I need Work Zone Protection or Temporary Traffic Control?

Work Zone

- ✓ Any Section of a Traffic-way where Maintenance, Utility Work, Moving/Mobile Work or Any Construction Activity is Performed.
 - Highway/Street/Road
 - Shoulder – 10 feet off the road edge, varies by state
 - Beyond the Shoulder

Temporary Traffic Control is Necessary whenever:

- ✓ Any Operation or other Event Temporarily Disrupts the Normal Traffic Flow of any Highway User:
 - Motorists
 - Pedestrians
 - Motorcyclists
 - Bicyclists



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Do You Have a Defensible Work Zone Protection Strategy?

1. Do You Need/Have Permission from the Road Authority?
 - ✓ *State – County – Municipality*
2. “Approved” Temp. Traffic Control Plan or Template?
 - ✓ *State – County – Municipality*
3. Compliant Setup?
 - ✓ *Any Modifications or Adjustments?*
 - ✓ *Correct Devices?*
 - ✓ *Spacing Requirements?*
 - ✓ *Contractor Changes to Work Zone – use, work area, etc.?*
4. Trained or Certified Personnel according to State Rules?

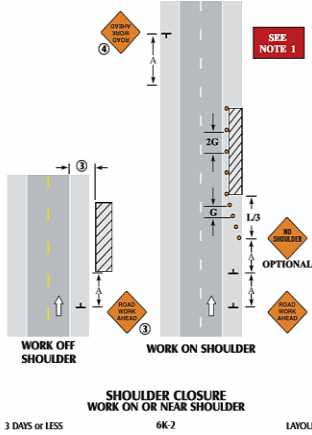


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“Approved” Templates

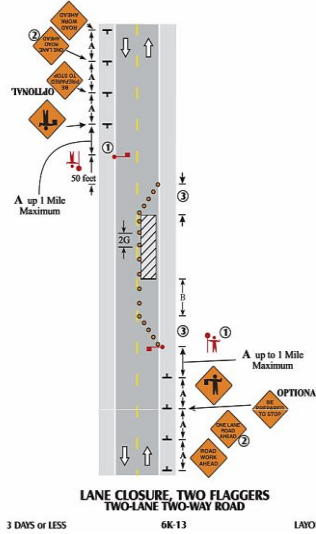
NOTES:

- All signs, barricades and channelizing devices may be omitted when the work occupies an isolated shoulder location for less than one hour and it has little or no interference with traffic.
- An operation which moves between work spaces that are less than the decision sight distance along the shoulder should use a stationary or mobile shoulder closure.
- The ROAD WORK AHEAD sign may be omitted for short term daylight operations if:
 - the distance from curb face to the work space is at least 2 feet, or
 - the distance from the edge of the roadway to the work space is at least 15 feet
 and a vehicle displaying a 360-degree flashing beacon is operating.
- This ROAD WORK AHEAD sign shall be installed on 2-lane, 2-way roads if traffic control devices are installed for a work space in the opposite shoulder.



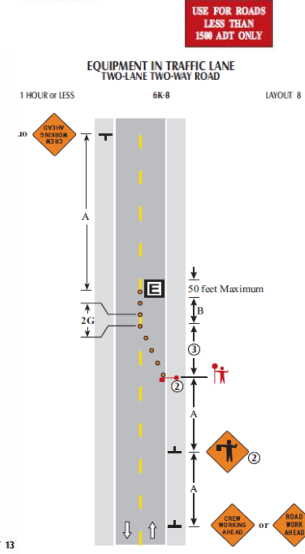
NOTES:

- The approach sight distance to the flagger shall be at least the Decision Sight Distance (D).
- The ONE LANE ROAD AHEAD sign may be omitted when the posted speed limit is 40 mph or less.
- The two-way taper should be 50 feet and using five equally spaced channelizing devices.



NOTES:

- The work vehicle shall not be parked on the shoulder opposite of the closed area.
- The flagger and the Flagger Ahead symbol sign may be omitted when traffic volumes do not restrict traffic's ability to regulate itself through the length of the work space.
- The two-way taper should be 50 feet in length using 5 equally spaced channelizing devices.



USE FOR ROADS LESS THAN 1500 AADT ONLY

How are You Managing the Herd?



Think of Lemmings...



QUOTATION

DATE _____
 START _____
 PROJECT _____


ITEM #	DESCRIPTION	QTY	PRICE	EXT
2102.502	Pvmt Marking Removal	7804 LF	\$0.60 LF	\$4,682.40
2104.523	Salvage Sign Type C	15 EA	\$35.00 EA	\$525.00
2533.507	Port Concrete Barrier 8337	768 LF	\$14.50 LF	\$11,136.00
2533.508	Relocate Port Concrete Barrier 8337	522 LF	\$3.50 LF	\$1,827.00
2564.509	Guide Post Type B	4 EA	\$50.00 EA	\$200.00
2564.615	Impact Attenuator	5 ASMM	\$1,500.00 ASMM	\$7,500.00
2564.615	Relocate Impact Attenuator	4 ASMM	\$500.00 ASMM	\$2,000.00
2563.601	Traffic Control Supervisor	Lump Sum		\$5,000.00
2563.601	Traffic Control ** Per Plan	Lump Sum		\$26,500.00
2563.619	Construction Sign Special	84 SF	\$25.00 SF	\$2,100.00
2564.531	Sign Panels Type Special	5 SF	\$200.00 SF	\$1,000.00
2564.531	Sign Panels Type C	163 SF	\$38.50 SF	\$6,275.50
2564.531	Sign Panels Type D	52 SF	\$38.50 SF	\$2,002.00
2581.501	Removable Prefromed Mask	7804 LF	\$1.25 LF	\$9,755.00
2581.603	Removable Prefromed Mask Blk	7804 LF	\$0.23 LF	\$1,755.90
Total				\$82,258.80


Above price does not include daily inspections, flaggers, mail boxes, concrete barrier, pavement marking, pavement marking removals, light plants, any special construction signs not on the plans, Retainage or Bond. All Items are Tied Unless Arrangements Are Made To Split Off.


Understand Exactly:

1. What You're actually Paying for.
2. Services You will Receive.
3. Who is Responsible for Inspections and Maintenance?
4. Template or Traffic Control Plan Used?

✓ Always have a Current Copy of Your Work Zone's Temporary Traffic Control Plan Readily Available on Site for Review.







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Example: Work Zone Inspection

CHECKLIST FOR ESTABLISHING A TEMPORARY TRAFFIC CONTROL ZONE

COMPLETED	ITEM
<input type="checkbox"/>	Obtain permit from governing road authority.
<input type="checkbox"/>	Determine the type of roadway
<input type="checkbox"/>	Determine the type of work space
<input type="checkbox"/>	Determine the duration of work.
<input type="checkbox"/>	Select hours of work to avoid peak periods.
<input type="checkbox"/>	Select the appropriate layout(s) using type of roadway, type of work, duration, traffic volume, speed and impact on pedestrian and bicycle travel. <small>(See the appropriate Index Chart at the start of each section)</small>
<input type="checkbox"/>	Determine any modifications to typical layout(s). <small>(See the Enhancement of the TTC Layouts on page 6K-x)</small>
<input type="checkbox"/>	Check decision sight distance.
<input type="checkbox"/>	Advance signing distance.
<input type="checkbox"/>	If possible, maintain access to intersections, parking areas, and driveways (public and private).
<input type="checkbox"/>	Allow for buffer space free of obstructions.
<input type="checkbox"/>	Contact the proper road authority if the work zone interferes with normal signal operation in the area.
<input type="checkbox"/>	Check the condition of devices. <small>(See the Quality Standards on pages 6K-91 thru 6K-106)</small>
<input type="checkbox"/>	Install devices beginning with the first device the driver will see.
<input type="checkbox"/>	Conduct a drive thru to check for problems. <small>(See the Enhancement of the TTC Layouts on page 6K-x)</small>
<input type="checkbox"/>	Document temporary traffic control zone, problems and major modifications to the layouts.
<input type="checkbox"/>	Traffic should be observed to see if the taper is working correctly.
<input type="checkbox"/>	Remove the devices as soon as work is completed, beginning with the last device seen by the motorist.

SAMPLE PROJECT INSPECTION CHECKLIST

PROJECT - _____

ITEM	YES	NO	HOW MANY?
1. Are any devices missing?	<input type="checkbox"/>	<input type="checkbox"/>	_____
Do any devices need repair?	<input type="checkbox"/>	<input type="checkbox"/>	_____
Were all replaced or repaired?	<input type="checkbox"/>	<input type="checkbox"/>	_____
2. Are any lights (flashers, etc.) not functioning?	<input type="checkbox"/>	<input type="checkbox"/>	_____
Were they all replaced or repaired?	<input type="checkbox"/>	<input type="checkbox"/>	_____
3. Are any devices improperly placed?	<input type="checkbox"/>	<input type="checkbox"/>	_____
Were all positions corrected?	<input type="checkbox"/>	<input type="checkbox"/>	_____
4. Do any devices need cleaning?	<input type="checkbox"/>	<input type="checkbox"/>	_____
Were all devices cleaned?	<input type="checkbox"/>	<input type="checkbox"/>	_____
ADDITIONAL COMMENTS ON THE BACK OF THIS FORM	<input type="checkbox"/>	<input type="checkbox"/>	_____

The above check was completed by _____
(name / title)

on _____ at _____ o a.m. o p.m.
(date) (time)

Figure 6K-10
6Kxxxviii

Internal Traffic Control Plan

Strategy to Control the Flow of Construction Workers, Vehicles and Equipment **INSIDE** the Work Zone.

Does Everyone Know the Plan?

BLS Statistics: 305 Construction Fatalities by Runover or Backover. 2003-2007

Vehicle Type	Fatalities
Dump Truck	177
Pickup Truck	73
Semi Truck	23
Car	70
Roller/Paver	15
Grader/Planer/Scraper	9
Van	8
Backhoe	5

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Hazardous Atmospheres

1926.651(g)

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Hazardous Atmospheres

If a Hazardous Atmosphere Exists or could Reasonably be Expected to Exist, the Atmospheres shall be Tested...



November 19, 1991 [Reviewed November 22, 2017]

Mr. George Kennedy, C.S.P.
Director of Safety
National Utility Contractors Association
1235 Jefferson Davis Highway, Suite 606
Arlington, Virginia 22202-3283

...**BEFORE** any Employee is Allowed to Enter Excavations Greater than **4-feet** in Depth.

Dear Mr. Kennedy:

This is in response to your September 25 request for an interpretation of the Occupational Safety and Health Administration's excavation standards addressing air sampling in trenches.

Air sampling required by 29 CFR 1926.651(g) does not have to be performed in all trenches over four feet in depth. This paragraph addresses excavations over four feet deep where oxygen deficiency or other "hazardous atmosphere exists or could reasonably be expected to exist", such as in excavations in landfill areas or in areas where hazardous substances are stored nearby. It is the responsibility of a competent person to determine if air monitoring needs to be performed before employees enter each excavation. ←




Ventilation Methods

- ✓ **Forced air ventilation systems.**
 - Gasoline and diesel-powered ventilators.
 - Considerations: Noise and CO exposure.
- ✓ **Electric ventilators.**
 - Deliver less CFM than gas/diesel.
- ✓ **Hazardous location ventilators.**
 - Classes based on National Electric Code (NEC)




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Conditions may Require Monitoring


- ✓ **Oxygen Deficient Environments < 19.5%**
 - *Use of Internal Combustion Engines*
- ✓ **Near Landfills**
- ✓ **Potential Contaminated Soils**
- ✓ **Wastewater / Sewage**
 - *Hydrogen Sulfide (H₂S)*
- ✓ **Flammable Gas Exposure**
 - *Natural Gas Facilities*
- ✓ **Welding or Torch Cutting**
- ✓ **Other Potential Contaminates**
 - *Nitrogen for Purging Lines*
 - *Spraying/coating Activities*




Emergency Rescue Equipment may be Required when Hazardous Atmospheres Exist or Can Reasonably be Expected to Exist, such as:

- *Respiratory Protection.*
- *Attended Lifelines or other Rescue/Retrieval Equipment.*
- *Communication Methods.*
- *Specific Training based on Exposures.*
 - ✓ *Confined Space Entry, 1st Aid & CPR, etc.*

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Multi-gas Monitors

4 Standard Gases

✓ Hydrogen Sulfide	H₂S
✓ Carbon Monoxide	CO
✓ Oxygen	O₂
✓ Combustible Gases	LEL

All Potential Contaminates Monitored in the Excavation?

- ✓ Ammonia
- ✓ Chlorine
- ✓ Ozone
- ✓ Sulfur Dioxide
- ✓ Nitrogen
- ✓ Particulates
- ✓ VOC's (Volatile Organic Compounds)
 - *Require a PID (Photoionization Detector)*

How and When Did You Verify Your Multi-gas Monitor works Correctly?


Scheduled Calibration

- **Exposing the Monitor to a Certified Concentration of Gas for a Particular Time to Verify the Accuracy of the Monitor and Internal Systems.**
- **Establishes Accuracy of the Sensors by Verifying the Monitor's Internal Systems and Electronics are Performing within Stated Specifications.**

Daily "Bump" Test

- **Brief Exposure of the Monitor Sensors to a Gas Verifying the Sensors and Instrument Alarm Functions Correctly.**
- **Does Not Check Instrument Accuracy.**

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Access & Egress 1926.651(c)



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Right Tool for the Job?

Why Create the Opportunity to Fail?

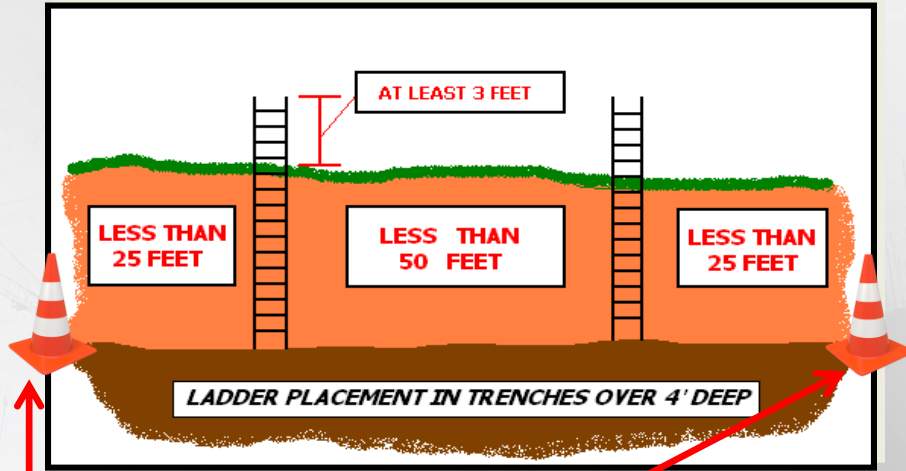


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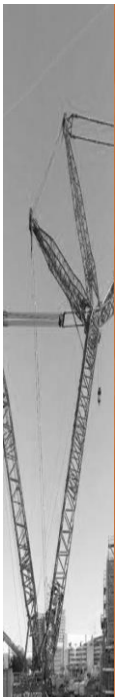
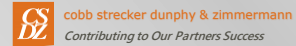


Stairway, Ladder, Ramp or other Means of Egress

No more than 25 feet of Unobstructed Lateral Travel.

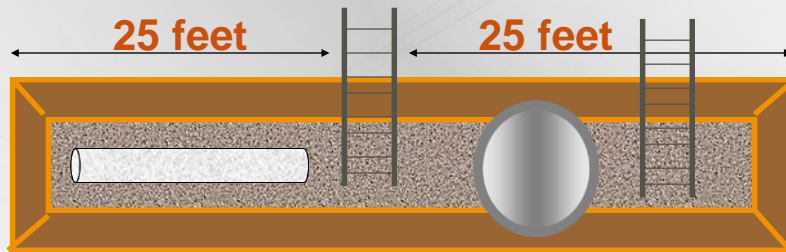


Define the End of Your Work Area when Excavations Extend Greater than 25 feet of Lateral Travel.



Ladder Placement

What if there are Obstructions?



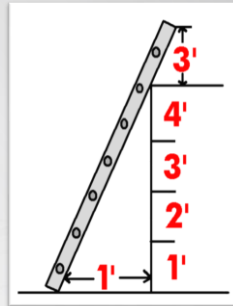
Ramp / Ladder / Stairs Required at 4 Feet or Deeper

More Ladders may be Necessary to Provide Proper Access around Obstructions in the Excavation.



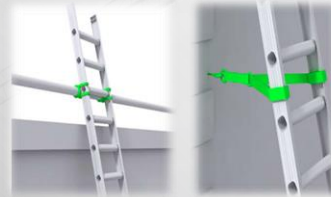
Ladder Set-up

Secure the Ladder



Practical Method:

- Stand at the base of the ladder with your toes touching the rails.
- Extend arms straight out in front of you.
- If the tips of your fingers just touch the rung nearest your shoulder level, the angle of your ladder has a 4:1 ratio.



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Ramp

an inclined walking or working surface that is used to gain access to one point from another.

Earthen Ramp – slope allows walking without using their hands to crawl, balance, pull, push.

Wood or Metal – some considerations include:

- In general, ramps and walkways that are more than 5 feet above lower levels shall have compliant guardrail systems.
- Made of slip-resistant material
- Extend from the surface to the bottom.
- Ramp consisting of more than one piece must be connected to each other to prevent displacement and be identical in thickness.
- No ramp shall incline more than a slope of 1 vertical to 3 horizontal (20° above horizontal).
- If the slope of a ramp is steeper than 1 vertical in 8 horizontal, the ramp must have cleats not more than 14 inches apart securely fastened to the planks.



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Job Made Ladders

Side Rails:

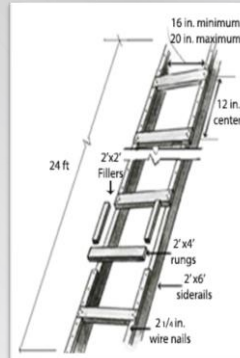
- Side rails of single-cleat ladders up to 24 ft. long should be made with **at least 2x6 in. lumber**.
- Single-rung ladder width should be at least 16 in., but not more than 20 in. btw. rails measured inside to inside.
- Rails should extend above the top landing between 36 in. (91.5 cm) and 42 in. to provide a handhold for mounting and dismounting, and cleats **must be eliminated above the landing level**.

Cleats:

- Must be** equally spaced 12 inches on center from the top of one cleat to the top of the next cleat.
- Cleats should be fastened to each rail with three 12d common nails, nailed directly to the side rails.
- Cleats should be at least 1x4 in. for ladders 16 to 24 ft. long.

Filler Blocks:

- Minimum 2x2 in. wood strips inserted btw. cleats
- The ladder is complete when filler is nailed at the top of each rail.



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Double-cleated Ladders

Use a double-cleated ladder (with center rail) or 2 or more ladders:

- When ladders are the only way to enter or exit a working area with 25 or more employees.**
- When a ladder will serve simultaneous 2-way traffic.**



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Walkways

1926.651(l)

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When is a Walkway Required?

Walkways or bridges with standard guardrails must be provided when employees are required or permitted to cross over excavations only when the excavation has:

- **Top Width Greater than 30-inches, and**
- **6-ft or more in Depth.**

August 10, 1995

George S. Kennedy, CSP
Director of Safety
National Utility Contractors Association
4301 N. Fairfax Drive, Suite 360
Arlington, Virginia 22203-1627

Dear Mr. Kennedy:



This is in response to your letter of April 18 requesting an interpretation of the Occupational Safety and Health Administration (OSHA) standards addressing fall protection where employees are required or permitted to cross over excavations.

With regard to the minimum width an excavation must be before §1926.651(l)(1) applies, please be advised that OSHA concurs with California's regulation (§1541(l)(1)) addressing this issue. **The Agency considers crossing narrow trenches (30 inches or less in width) without a walkway with guardrails to be a de minimis condition. Therefore, walkways or bridges with standard guardrails must be provided when employees or equipment are required or permitted to cross over excavations only when the excavation is 6 feet or more in depth and wider than 30 inches at the top.**

If we can be of any further assistance, please contact me or Mr. Dale R. Cavanaugh of my staff at (202) 219-8136.

Sincerely,
Roy F. Gurnham, P.E., J.D.
Director
[Directorate of Construction]

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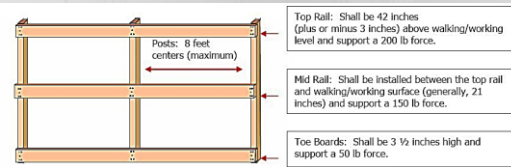



Walkways

OSHA Technical Manual (OTM)
Section V: Chapter 2

Walkways or Surface Crossings are Permitted Only under the following Conditions:

- Safety Factor of 4 in the Design.
- Min. Clear Width of 20 inches.
- Fitted with Standard Guard Rails.
- Extend a min. of 24 inches Past the Surface Edge of the Trench.



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Fall Protection 1926.501(b)(7)(i) & (ii)

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Is Fall Protection Required?

- ✓ What is your reason not to provide fall protection?
 - **Fall Restraint, Fall Arrest, Guardrail, Warning Devices, Fence, Barricades, Signs, Signals.**
- ✓ Excavation classified as a well, pit, shaft or similar?
- ✓ Is the excavation is not readily seen because of plant growth or other visual barrier?
- ✓ Routine foot traffic near excavation?
- ✓ Subcontractor/tier sub risk?
- ✓ Pedestrian/General public risk?



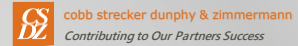
According to OSHA

Each Employee at the Edge of an Excavation 6 feet or More in Depth Shall be Protected from Falling by Guardrail Systems, Fences, or Barricades when Excavation is not readily seen because of plant growth or other visual barrier. 1926.501(b)(7)(i)



Well, Pit, Shaft or Similar

- Each employee at the edge of a **well, pit or shaft** and **similar excavation 6 feet or more in depth** shall be protected from falling by a guardrail system, fences, barricades or covers. 1926.501(b)(7)(ii)



Well, Pit, Shaft or Similar





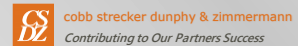
Exposure to Falling Loads 1926.651(e)



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All Employees Stand Clear of Vehicles being Loaded or Unloaded to avoid being Struck-by any Spillage or Falling Materials.

Operators may Remain in the Cabs during Loading and Unloading.



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Exposure to Falling Loads

More than Just “Digging a Hole”:

- Material Storage Prevents Rolling Into Excavation.
- Equipment Loading & Limitations.
- Qualified Rigger.
- Signal Person Training.
- Rigging Equipment.

- ✓ **Selection**
- ✓ **Inspection**
- ✓ **Set-up**
- ✓ **Use**



Is a Tooth a
Rated
Anchorage
Point?



Welding Rod?



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Working Around Suspended Loads

1926.1425(b)

While the operator is not moving a suspended load, no employee must be within the fall zone, except for employees:

- **Hooking, unhooking or guiding a load.**
- **Initial attachment of the load.**
- **Operating a concrete hopper or bucket.**

1926.1425(c)

When employees are engaged in hooking, unhooking, or guiding the load, or in the initial connection of a load to a component or structure and are within the fall zone, all of the following criteria must be met:

- **Rigging must prevent unintentional displacement.**
- **Hooks with self-closing latches or equivalent.**
 - ✓ Exception: "J" hooks are permitted for setting wooden trusses.
- **All material is rigged by a qualified rigger.**

1926.753(d)(2)

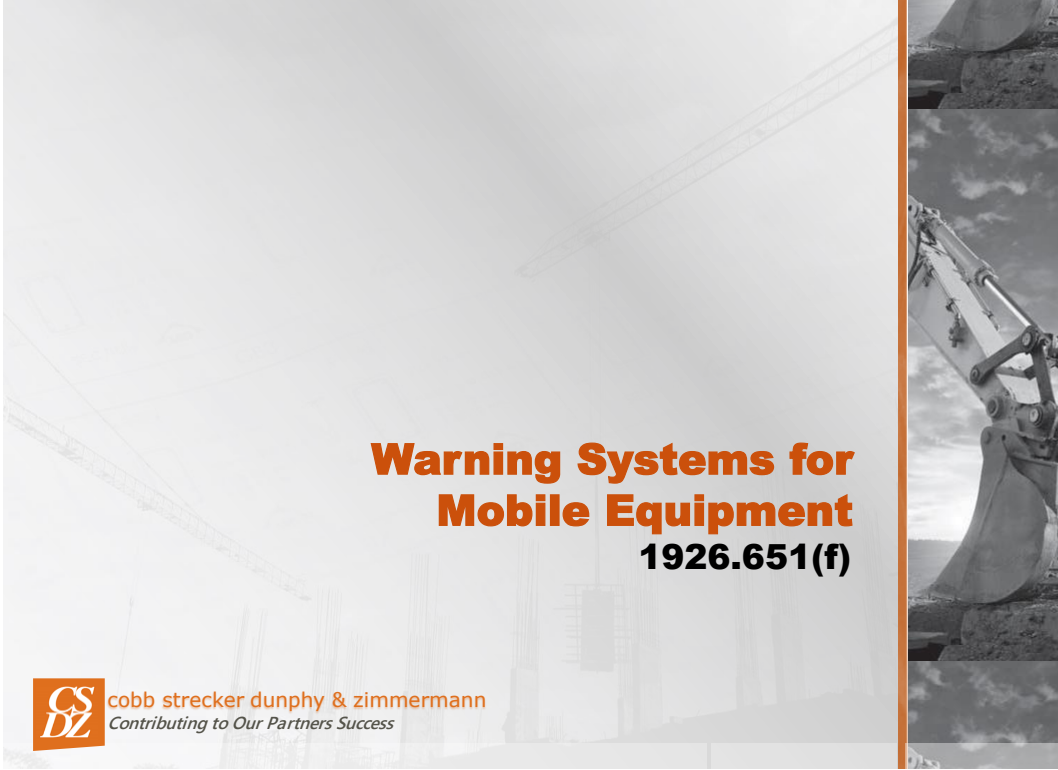
When working under suspended loads, the following criteria shall be met:

- **Rigging must prevent unintentional displacement.**
- **Hooks with self-closing latches or equivalent.**
- **All material is rigged by a qualified rigger.**



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Warning Systems for Mobile Equipment 1926.651(f)

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Vehicle & Equipment Precautions

When mobile equipment is operated adjacent to an excavation, or when such equipment is required to approach the edge of an excavation, and the operator does not have a clear and direct view of the edge of the excavation, a warning system shall be utilized such as barricades, hand or mechanical signals, or stop logs. [1926.651(f)]



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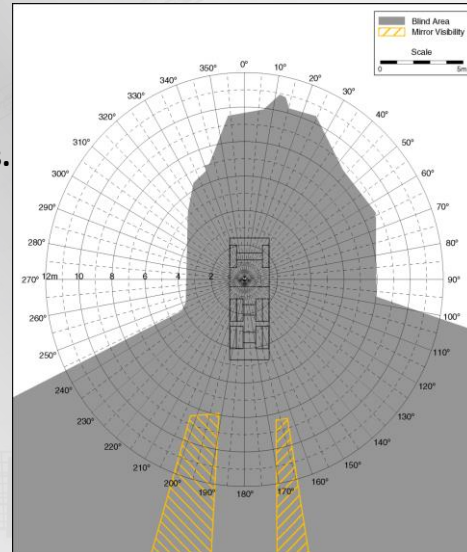


Blind Spots – hazards around vehicles & equipment

- ✓ Running over people.
- ✓ Running over materials.
- ✓ Striking equipment & vehicles.
- ✓ Rollovers.
- ✓ Contact with utilities.

Problem!!

- Workers must perform tasks near moving equipment.
- Extensive blind areas around equipment and vehicles.

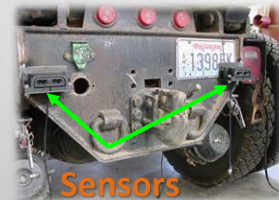


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Warning System Options

- Pre-Task Planning / Daily Pre-job Meeting
- Subcontractor Management
- Internal Traffic Control Plan
- Ground Guide or Spotter
- Barriers, Barricades, Berms, Stop Logs
- Warning Lights
- Alarms: *backup, travel*
- “Badge” Sensor Systems
- Radar Systems
- Ultrasonic Sensors
- Hybrid Devices



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Methods to Communicate

- Voice.
- Hand Signals.
- 2-way Radios.
- Air Horn.
- Hands-free Device.

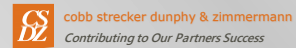


1926.1420 Signals

radio, telephone or other electronic transmission of signals.

(c) The operator's reception of signals must be by a hands-free system.

BEWARE: Ear Buds are Everywhere!!



Use a Spotter





Protecting Against Water Accumulation Hazards



1926.651(h)

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Water Accumulation Hazards

Employees **shall not** work in excavations in which there is accumulated water, or in excavations in which water is accumulating , **unless adequate precautions** have been taken to protect employees against the hazard posed by water accumulation. [1926.651(h)(1)]

Do Not Enter
Unprotected Excavations
to Place or Operate
a Pump.

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Options for Dealing with Water

- ✓ **Competent Person shall:**
 - Remove All Employee from Trenches during a Rainstorm.
 - Monitor water removal equipment and operations.
- ✓ **Diversion Methods.**
 - Drainage Ditches, Berms, Swale, Banks, Collection Pond.
 - ✓ SWPPP Requirements, Sediment Control, Inlets?
- ✓ **Pumping/Water Removal Equipment.**
 - *SWPPP Requirements?*
- ✓ **Excavate Additional Depth and Fill with Gravel or Other Granular Material.**
 - *Existing Underground Utilities?*
 - *Padding Requirements for Installation?*
- ✓ **Special Support/Shield Systems to Prevent Cave-ins.**
 - *PE Design is Necessary*



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Protection from Loose Rock or Soil

1926.651(j)



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Precautions for Loose Rock or Soil

...installation of protective barricades at intervals as necessary on the face to stop and contain falling material; or other means that provide equivalent protection. [1926.651(j)(1)]



Rockfall Netting or Fencing



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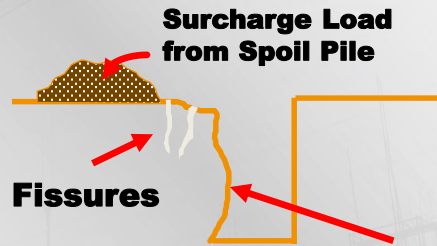
Keep Equipment, Materials, Spoil and Excavated Materials at least 2 feet from the Cut Edge of each Excavation.



Slope Spoil Pile to Prevent Cave-in of Materials.



2 Feet



Surcharge Load from Spoil Pile

Fissures

Belly Bulge



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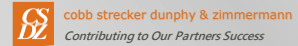
Keep Equipment, Materials, Spoil and Excavated Materials at least 2 feet from the Cut Edge of each Excavation.



2 Feet



What is the Soil Type & Ground Condition?



This is How it Starts...



...Is this OK?





What's the Big Deal?

This wasn't a problem last time...



...been doing it like this for years!



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In Closing...

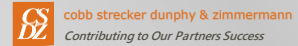


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Please Remember

Nothing is More **DECEPTIVE** to an Untrained and Inexperienced Eye than the **HARMLESS APPEARANCE** of a Trench.



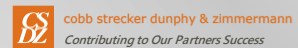
There are only 2 Possibilities when things Go Bad...

Rescue

Recovery



"All Trenches will Collapse... It's Just a Matter of Time."





Thank you!



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