- Improper use of a step ladder.
- No eye protection.

- **Need a taller ladder.**
- **Back support and 2nd from top step should not be used.**

- Make sure ladder or work platform is high enough to reach the work safely.
- Never stand on the top of a ladder.

Ladder is _not_ on a stable level surface.
Ladder is _not_ angled properly.

Job-Made Ladders

- Maximum Length 24′
- Ladders that extend to landing must have walk-through top section.
- Must have parallel, level, uniformly spaced rungs.

SUMMARY

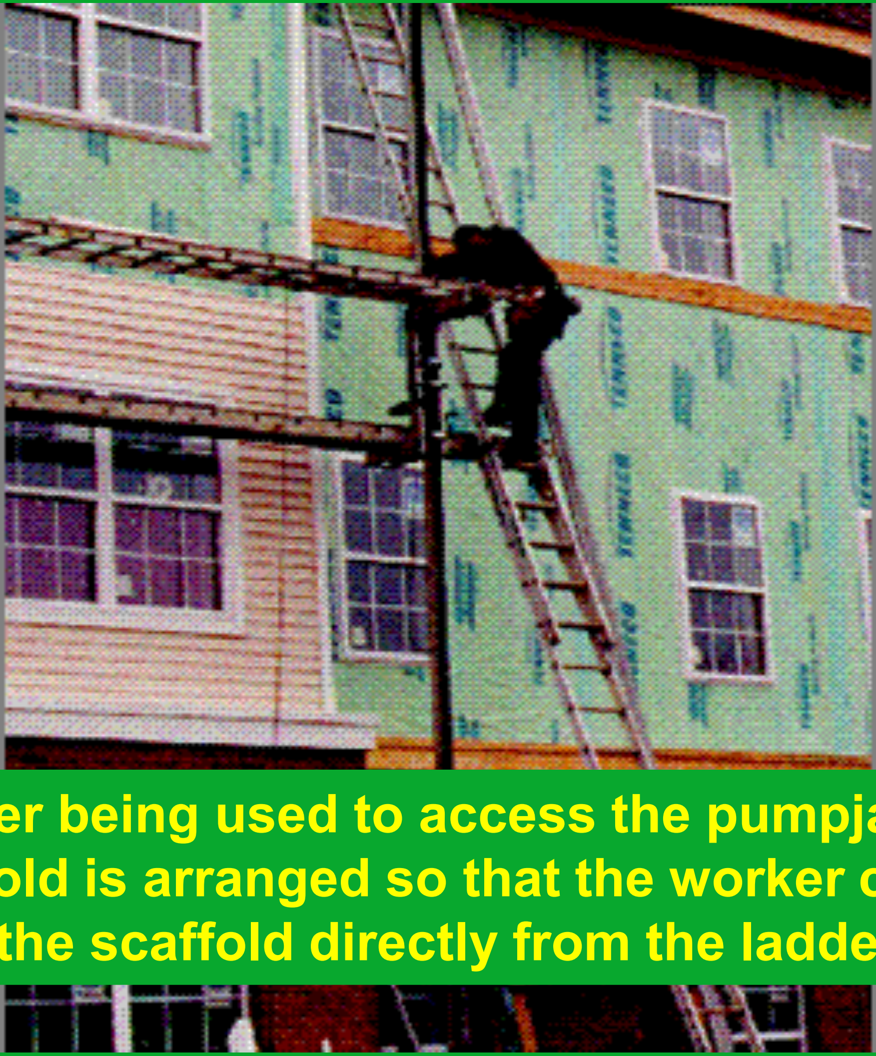
- Place ladder on stable surface
- Ladder & you should face your work
- Should not climb ladder while carrying supplies; 3 point contact
- Ladder should extend 3 ft (36 inches) above work surface
- Use the correct ladder for the job
- Use 4:1 ratio – Every 4ft up angle ladder 1ft out
- Secure ladder in place

TRAINING

- The employer shall provide training, and retaining as necessary, by a competent person to each worker using ladders and stairways on the following topics:
  - Nature of fall hazards and how to recognize hazards;
  - Correct procedures for erecting, maintaining and disassembling the fall protection systems;
  - Proper construction, use, placement and care in handling ladders and stairways;
  - Maximum intended load-carrying capacities of ladders.
  - In the standards of Subpart X

Training Requirements Standard 1926.1060

Working Safely



- Ladder being used to access the pumpjack scaffold is arranged so that the worker can step onto the scaffold directly from the ladder.

Working Safely

Ladder properly secured.

Working Safely

Ladder properly secured.

Working Safely

Working Safely

Stairway Protection

- Stairs must have railings:
  - With 4 or more treads.
  - More than 30 inches high

SECTION VII

EMPLOYER'S AND EMPLOYEE'S RIGHTS AND RESPONSIBILITIES UNDER OSHA

What does OSHA Require?

- Determine which standards apply to your workplace
- Follow the OSHA standards and requirements

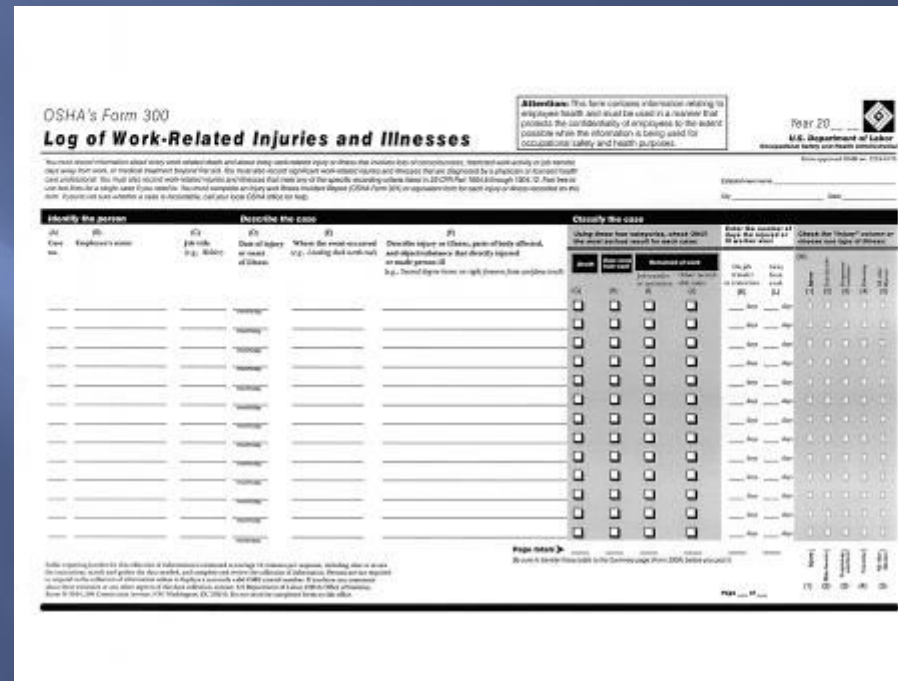
Recordkeeping and Reporting

- Employers of 11 or more employees must maintain records of occupational injuries and illnesses

- All employers must display the OSHA poster, and report to OSHA within 8 hours any accident that results in a fatality or in-patient hospitalization of 3 or more employees

Recordkeeping Forms

- Maintained on a calendar year basis
- Summary of records for the previous year must be posted from February through April



What are workers' responsibilities?

- Read the OSHA poster
- Follow the employer's safety and health rules and wear or use all required gear and equipment
- Follow safe work practices for your job, as directed by your employer
- Report hazardous conditions to a supervisor or safety committee
- Report hazardous conditions to OSHA, if employers do not fix them
- Cooperate with OSHA inspectors

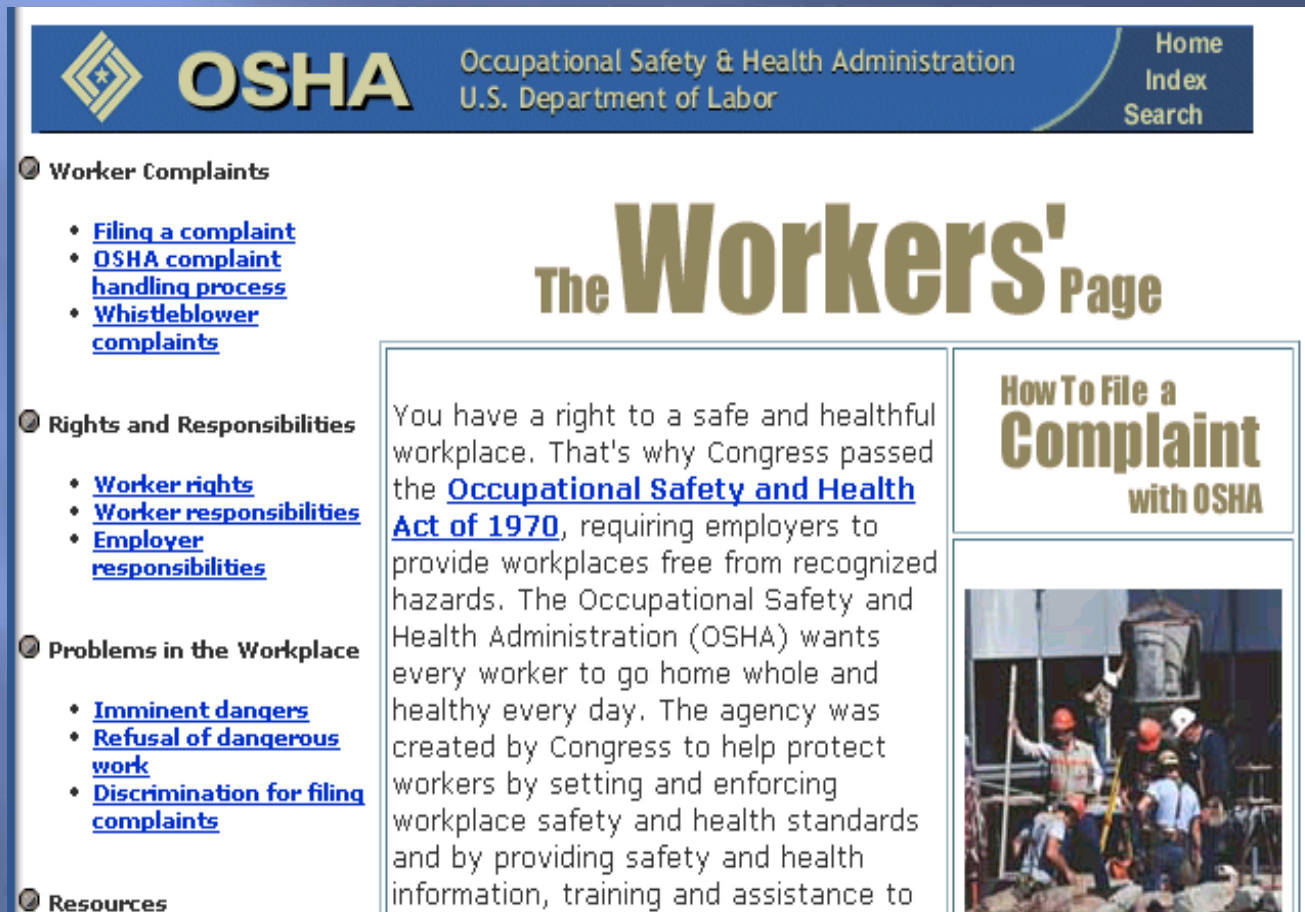
(see OSHA Workers' web page for more information)

What are workers' rights?

- Identify and correct problems in their workplaces, working with their employers whenever possible
- Complain to OSHA about workplace conditions threatening their health or safety in person, by telephone, by fax, by mail or electronically through OSHA's web site
- Section 11(c) of the OSH Act gives workers the right to seek safe and healthful conditions on the job without being disciplined or fired

(see OSHA Workers' web page for more information)

OSHA Workers' Page



www.osha.gov/as/opa/worker/index.html

What are employers' rights & responsibilities?

- Employers must provide a safe and healthful workplace free of recognized hazards and follow the OSHA standards
- The OSH Act grants employers important rights, particularly during and after an OSHA inspection
- Employers must provide training, medical examinations and recordkeeping

Competent Person in Construction

A person who;

- Knows the right standard,
- Can identify hazards in the operation, and
- Is designated by the employer, and has the authority to take appropriate actions.

- "Competent Person" is found in many standards.
- Some standards set specific requirements for the "competent person."

Workplace Inspections

- Establishments covered by the OSH Act are subject to inspection by OSHA compliance safety and health officers (CSHO's)

- Most inspections are conducted without advance notice

What Types of Hazards are Addressed in Standards?

- Electrical
- Cranes
- Falls
- Excavation
- Scaffolding
- Machines
- Stairways & Ladders
- Chemical

Employer may Qualify for "Focused Inspection"

- Has to meet certain conditions
- Inspector will "focus" on these four hazard areas:
  - Falls
  - Struck by
  - Caught in/between
  - Electrical

OSHA Emergency Hot-Line 1-800-321-OSHA

- Report workplace safety or health fatalities or the hospitalization of 3 or more employees
- Report a workplace hazard
- File a complaint about a workplace hazard
- Request information on OSHA
- Request an OSHA publication

Summary

- OSHA helps save lives and prevent injuries
- OSHA balances a cooperative approach with traditional enforcement
- OSHA standards are the enforceable requirements for worker safety and health
- Inspections are OSHA's way to ensure compliance
- OSHA offers various means of assistance

ACKNOWLEDGEMENTS

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In addition to:

- Oregon Department of Consumer & Business Services, Occupational Safety & Health Division, manual entitled "Fall Protection: Options for Specialty Contractors" produced by the OR-OSHA and Technical Resources section and developed by OR OSHA's 502 Fall Protection Committee

It does not necessarily reflect the views or policies of the U.S. Department of Labor, nor does mention of trade names, commercial products, or organizations imply endorsement by the U.S. Government.

Southwest Safety Training Alliance

Mr. Carroll Mumford CHST
Executive Director

Susan B. Harwood – Grant

2006/2007 46J6-HT13

OSHA Focus Four Train the Trainer 2006 - 2007

Training Techniques

- Introductions are important
- Introduce
  - Yourself
  - Next Speaker
    - Awards
    - Credentials
  - Films & videos

INSTRUCTOR REQUIREMENTS

- **OSHA Outreach 500** (must be current)
- **Previous Experience** (related trade/training)
- **SSTA/Focus Four Instructor Orientation**
- **Agreement to send records to SSTA** (new one signed)

PURPOSE OF GRANT

- To develop training identifying
  'Focus Four
  and other Construction Hazards'
- Have material approved by OSHA
- Translate to Spanish
- Train-the-trainer (mandatory; all instructors)
- Train workers
- Keep records of all training
- Send reports to OSHA

TRAINING TECHNIQUES

- **5 Step Training Plan**
  - Review
  - Overview
  - Presentation
  - Exercise
  - Summary

Training Techniques

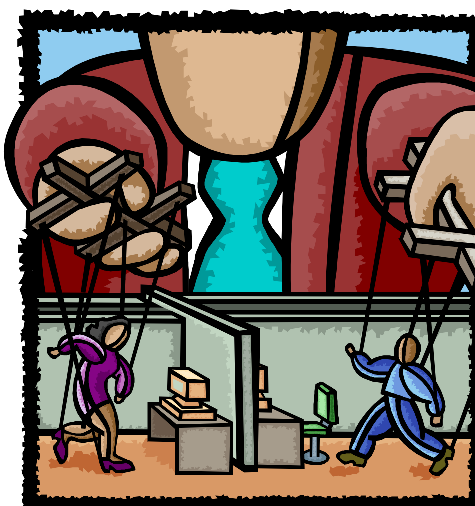
- **Overview**
  - Discuss the learning objectives
    - What will be covered in this training
  - Establish why this material is important
    - 90% of fatalities are from Focus Four Hazards
  - Explain the most frequently cited violations
    - Most citations and fines are from these hazards

Training Techniques

- Lighten up your training
- Use
  - Stories
  - Quotations
  - Court Decisions
  - Statistics
  - Life Experiences

TRAINING TECHNIQUES

- Tips for a successful presentation
  - Be prepared- rehearse your “show”
  - Be positive and show enthusiasm
  - Speak loud enough to be heard
  - Be flexible and accessible
  - Make eye contact
  - Smile



Training Techniques

- **The Training Room**
  - Arrive early to check it out
  - Table and chair arrangement
  - Electrical outlets (you may need an extension cord, power strip)
  - Light and heating controls
  - Restrooms and telephones
  - Refreshment/lunch area
  - Who to contact for emergencies

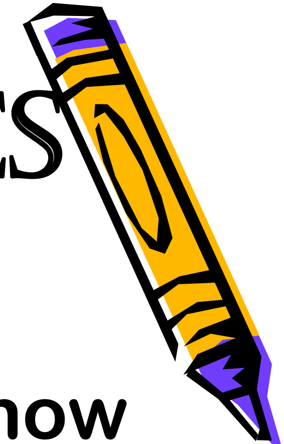
Training Techniques

- Expect to be nervous
- Have a positive attitude
- Be yourself, be flexible, be accessible
- Be prepared
- Dress appropriately
- Show enthusiasm
- Speak up

Training Techniques

- Treat students as adults
- Identify the training goals
- Emphasize how the training can be applied
- Relate the material to their experiences
- Listen and respect their opinions
- Encourage discussion -
  - What's really happing on the job?

Training Techniques



- Lead in from the overview
- Tell the students what they need to know
- Provide examples of real incidents
  - Stories or quotes
  - Newspaper clippings
  - Fatal Facts from OSHA
  - Letters of Interpretation
  - Statistics or court decisions

Training Techniques

- Training Preparation
  - Commit yourself to the class
  - Analyze the audience
  - Think “Sight and Sound”
  - Practice- Time yourself
  - Deliver the class!

TRAINING TECHNIQUES

- Training distracters (things to avoid)
  - Don’t try to “wing it”
    - Be prepared
    - Check your equipment before class starts
  - Don’t try to be someone you are not
  - Don’t lose control
  - Never embarrass students
  - Don’t be afraid to say that you don’t know- Tell the student you’ll get the answer to them!

Training Techniques

- Personality Clash
- Why
  - Two or more personalities/experiences
  - Can divide group into factions
- What to do
  - Emphasize points of agreement
  - Minimize disagreements
  - Keep focused on objectives
  - Be frank, ask that personalities be left out

Training Techniques

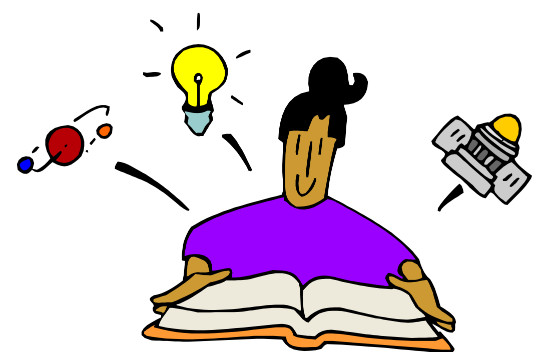
- **Obstinate**
- **Won’t budge, prejudiced, can’t see your point**
- **What to do**
  - **Use the group to straighten out the student**
  - **Ask the student to keep an open mind and see this point for the time being**

Training Techniques

- Won't talk
- Bored, indifferent, timid, insecure or feels superior
- What to do
  - Find the motivation for non speaking
  - Arouse interest by asking direct questions
  - Draw out the person next to him, then ask the shy person to comment on the response

Training Techniques

- Inarticulate
- Can't put thoughts into words
  - Get the idea, can't convey it
- What to do
  - Say "Let me repeat that for the class" and restate it more clearly



Keep records of all training

- **When training is complete the following records <u>MUST</u> be delivered to the SSTA office before cards will be issued.**
  - **Sign-in Sheet/s** (for each training session)
  - **Student Registration Form**
  - **Course Evaluations** (summary)

Acknowledgements

- The SSTA would like to thank the following people for their contributions to this program.
- **Juan Chavez – Think Safe/Work Safe**
- **Steve Healey – Performance Safety**
- **Jeff Lewis – Southwest Safety Services**
- **Ken Mushet – SHE Solutions**
- **Carl Hamilton – SCF Arizona**

MARKETING

- We have a successful program and should be proud to spread the word
- Lets work together to increase membership and make the Construction job site a <u>safer place to work</u>

EXCAVATION & TRENCHING AWARENESS FOR THE CONSTRUCTION INDUSTRY

OSHA Susan Harwood Grant

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EXCAVATION & TRENCHING AWARENESS FOR THE CONSTRUCTION INDUSTRY

Maryland Fire & Rescue Institute

- Compliance training over 35 years
- Consulting Services
- Six (6) MFRI sites throughout Maryland
- Training at Clients Sites
- Hands - on instruction

Pre - Test

- Cave – ins can happen without warning
  - True or False
- A hazardous atmosphere can be found in a trench
  - True or False

Pre - Test

- A protective system is a method of protecting employees from cave-ins
  - True or False

- A ladder shall be used for access and egress in trenches ____ ft or greater in depth
  - 10, 25, 4, 16

Pre - Test

- A competent person must be aware of:
  - Access and egress
  - Water accumulating
  - Hazardous atmosphere
  - All the above

Pre - Test

- Soil classifications are;
  - A, B, C, Stable rock
  - 1, 2, 3, 4
  - Rocky or Smooth
  - Hard or Soft

Pre - Test

- The testing of soil consists of a ____ and a ____ test.
  - Day, Night
  - Summer, winter
  - Visual, manual
  - Hot, cold

Pre - Test

- If water is added to soil it brings;

  - Lunch
  - Additional weight
  - Strength

Pre - Test

- What effects on the body can a cave-in cause;
  - Respiratory distress
  - Crush syndrome
  - Total body impact
  - All the above

Pre - Test

- Soil can weigh about ____ lbs a cubic foot;

  – 125
  – 400
  – 600
  – 50

Pre - Test

- Factors that influence cave-ins are;
  - Intersecting trenches
  - Previously disturbed soil
  - Vibration
  - All the above

Pre - Test

- The excavation standard also applies to trenches
- True or False

- Benching is a method of protecting employees from cave-ins;
  - True or False

Pre - Test

- A trench box should be used to protect employees;
  - True or False

- No employee shall be permitted underneath loads handled by lifting or digging equipment
  - True or False

Enabling Objectives

- Identify the laws, regulations, and standards as they apply to excavations
- Describe soil classification and the testing used to determine type
- Describe protective systems used in excavations
- Discuss the hazards found in trenches
- Describe the role of the competent person

Overview / Main Points

- Excavation laws, regulations, standards
- Soil classification
- Soil testing
- Competent person responsibilities
- Hazards associated with trenches
- Protective systems

Staten Island Worker Decapitated In 'Rescue'

JAMIE SCHRAM and LORENA MONGELLI
Courtesy of The New York Post
A construction worker was decapitated and another hurt yesterday in a freak accident on Staten Island.
Two employees of Formica Construction were digging a ditch in the street to install a sewer for 1 townhouses being built at Taylor Street and Degroot Place in Port Richmond, officials said.
Suddenly, dirt and cement collapsed, burying the men under the debris.
One man was buried up to his waist. The other, a 39-year-old man, whose name was withheld, was completely buried
He was decapitated when the workers tried to rescue him with a tractor.
"No doubt the fellow using it had good intentions, but there were extremely tragic results," said fire battalion Chief Daniel O'Gara.
Stefan Konowalskyj, 40, who lives nearby, was returning home from some errands when the workers realized what had happened.
"I saw these guys running around frantically screaming, 'The other guy is dead! The other guy is dead! His head is off,' " Konowalskyj said.
"There was a lot of commotion. There was also one guy down there trying to pull the other guy out . There were about a half a dozen workers standing around, not knowing what to do."
Rescuers arrived and pulled out the injured worker, 66, who was in stable condition at St. Vincent's Hospital.
The Department of Transportation issued two citations for inadequate protection procedures because the crew had not put up a retaining wall in the trench, a department spokesman said.

Updated: 02-03-2004 09:44:00 AM

Parkland, Florida Firefighters Perform a Trench Rescue

Story Tools: Send It - Print It - Most Sent - Most Popular
Insider: Get e-Alerts - Register/Subscribe

THOMAS O'CONNELL

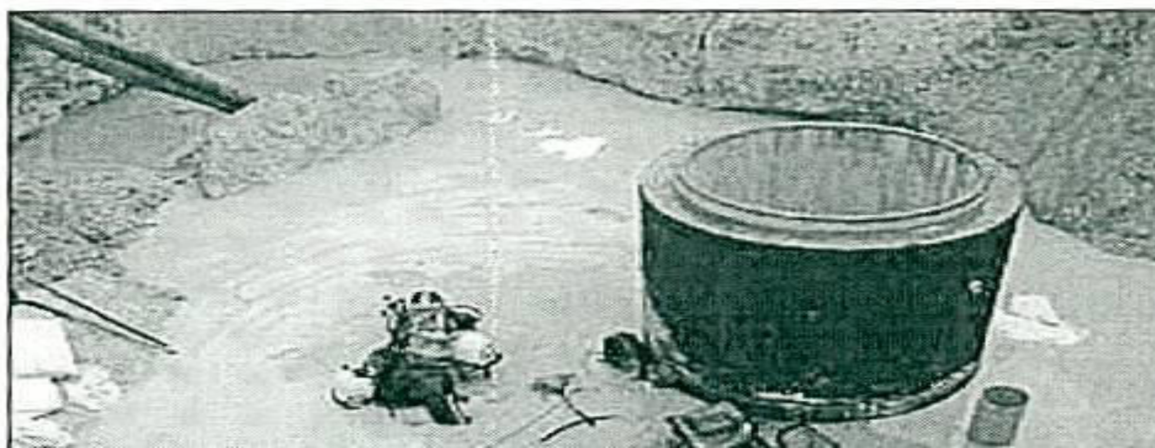
Lt. Mark Watters

Firefighters from five departments worked feverishly for over three hours to rescue a construction supervisor who had become buried in mud and water up to his neck during a trench collapse.

The incident occurred shortly after 3 p.m. on Friday January 30,2004 at a remote construction site in Parkland, Florida.

Deep sewer lines were being installed.

Parkland firefighters were first to arrive on scene and quickly summoned help from several neighboring agencies. Divers from Coral Springs, Sunrise and Margate Fire Departments worked with Technical Rescue Personnel from Sunrise Fire Rescue and the Broward Sheriff's Office.



Large quantities of spilled hydraulic fluid, rising water, and the inability to see the victim's trapped leg complicated the rescue. Divers and Technical Rescue Team personnel had to work blindly using pneumatic hoses and vacuum trucks to dislodge rocks and mud around the victim's

Tragic Facts

- Excavating is recognized as one of the most hazardous construction operations
  - 541 Workers were killed on Excavation/Trenching jobs from1992-2001
  - 411 (76%) were killed by cave-ins
  - 257 (47%) worked for companies employing less than 10 people

Tragic Facts

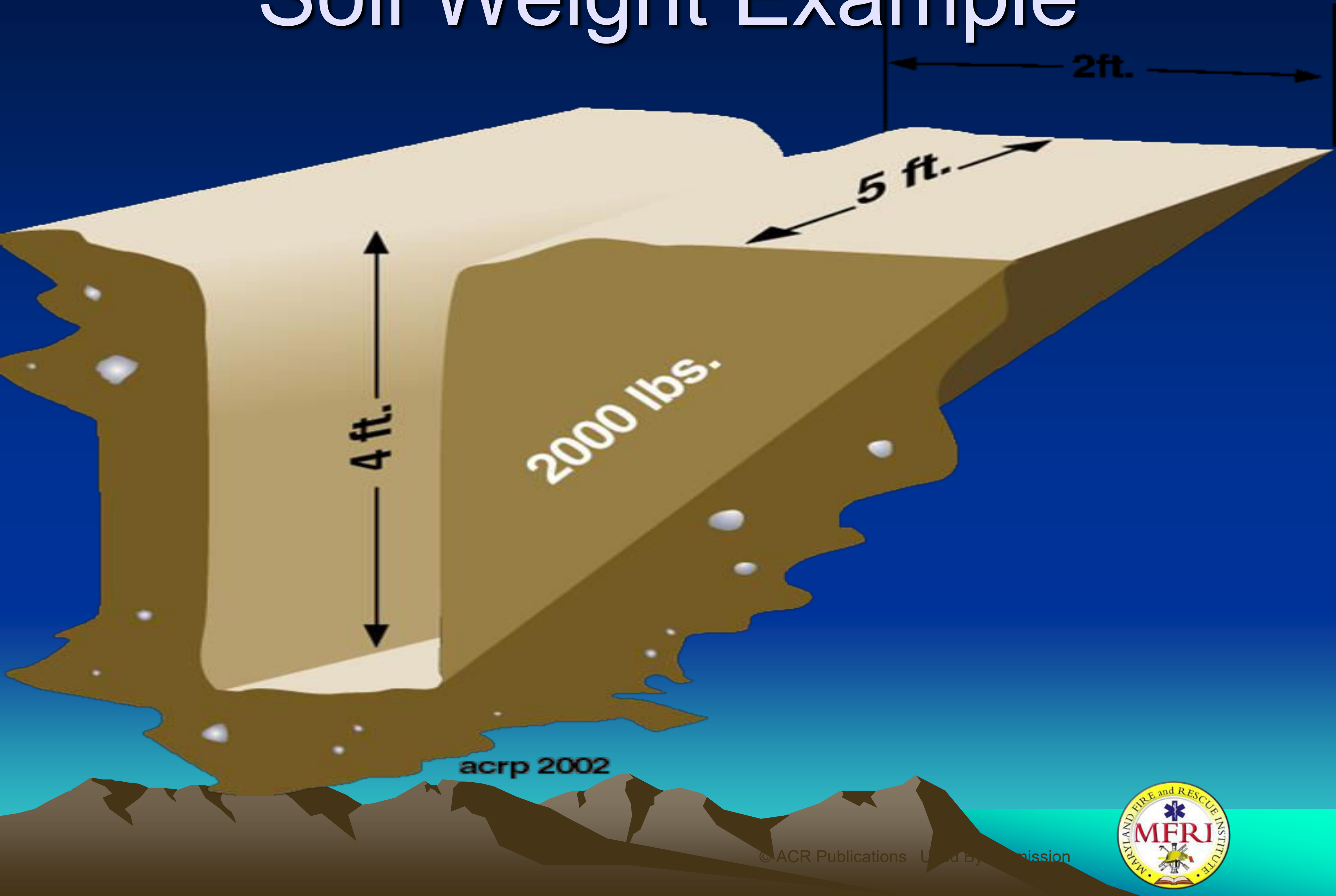
- 60% are would be rescuers
  - Civilians
  - Fire dept personnel
  - Co-workers
- Cave-ins can happen without warning
- All of the fatalities and injuries could have been prevented

Collapse Forces

- 24 inches of soil on a person's chest weighs
- 750-1000 lb.

- 18 inches of soil covering a body weighs
- 1800-3000 lb.

Soil Weight Example



Collapse Forces

- Shear wall collapse speed
- 45 mph

- 1 cubic foot of soil can weigh from
- 100 to 125 lb.

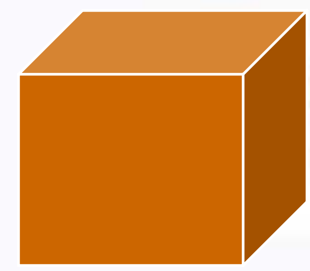
Speed of Collapsing Dirt

- Imagine this coming down on top of you….

Weight of a Volkswagen

2,785 Pounds

Weight of one cubic yard of soil



2,700 Pounds

Effects On The Body

- Respiratory distress
- Crush syndrome
- Total body impact

The Top Five Trenching Hazards

1. Cave – ins
2. Overhead Electric Line Contact
3. Falls into Excavations
4. Equipment Falling into Excavations
5. Explosion / Fire / Electrocution

UNSAFE ATTITUDES

- “I Know what I’m doing.”
- “It can’t happen to me.”
- “I’ve been doing it that way for years.
- “I’d sleep in that hole!”
- “Don’t worry, we’ll watch the walls and tell you if you need to get out.”

Most Common Causes of Cave-ins:

- Poor Planning
- Misjudgment of soil type.
- Inadequate, or incorrect installation of protective devices.
- Defective protective devices.
- Failure to adjust for changing conditions

Legal Aspects

- OSHA [29 CFR 1926.650 - 652]
  - Excavation standard applies to all open excavations made in the earth's surfaces including trenches, all surface encumbrances that would create a hazard, and protective systems

What’s In the Standard?

- scope, application and definitions
- Job Site Hazard Listing
- Requirements for Protective Systems
- Appendixes that detail:
  - Soil Classification
  - Sloping and Benching
  - Timber and Aluminum Hydraulic Shoring
  - Protective System Selection Decision Tree

Definitions 1926.650

- Accepted engineering practices
- Aluminum hydraulic shoring
- Bell-bottom pier hole
- Benching
- Cave-in
- Cross braces
- Excavation
- Faces or Sides
- Failure
- Hazardous Atmosphere
- Kickout
- Protective system
- Ramp
- Registered Professional Engineer
- Sheeting
- Shield

Definitions

- Shoring
- Sloping
- Stable rock
- Structural ramp
- Support systems
- Tabulated data
- Trench
- Uprights
- Wales

General Requirements

- 1926.651
- (a) Surface encumbrances
- (b) Underground installations
- (c) Access & egress
- (d) Exposure to vehicle traffic
- (e) Exposure to falling loads
- (f) Warning systems for mobile equipment

General Requirements

- 1926.651
- (g) Hazardous atmospheres
- (h) Protection from hazards associated with water accumulation
- (i) Stability of adjacent structures
- (j) Protection from loose rock or soil
- (k) Inspections
- (l) Fall protection

Surface Encumbrances

- All surfaces encumbrances that are located so as to create a hazard to employees shall be removed or supported as necessary to safeguard employees

Underground Installations

- Utility companies shall be contacted with in established local response times
  - Advised of proposed work
  - Asked to establish location of utility
  - When request cannot be met, employer may proceed with caution with detection equipment of an acceptable means to locate utility

Underground Installations

- While the excavation is open, underground installations shall be protected, supported or removed as necessary to safeguard employees

Access & Egress

- Structural ramps
  - Used by employees shall be designed by a competent person
  - When used for equipment shall be designed competent person qualified in structural design
  - Stairway, ladder, ramp or other safe means of egress require no more than 25 ft of lateral travel for employees in excavations that are 4 feet or more in depth
  - Ladders must be secured and extend a minimum of 36 inches above the landing

Exposure to vehicle traffic

- Employees exposed to public vehicle traffic shall be provided with and wear warning vests or other suitable garments
  - Marked or made with reflectorized or highly visible material
  - Requiring a designated, trained flag person along with signs, signals, and barricades when necessary

Exposure to falling loads

No employee shall be permitted underneath loads handled by digging or lifting equipment

Stand away from vehicle being loaded or unloaded to avoid being struck

Operators may remain in cabs when vehicles are equipped in accordance with 1926.601

Warning systems for mobile equipment

- When operator does not have clear view of edge of excavation
- Warning system shall be utilized
  - Barricades
  - Hand or mechanical signals
  - Stop logs


SAFETY OFFICER
RESCUE OIC
SAFETY OFFICER

Hazardous Atmospheres

- Testing and controls
  - To prevent harmful levels of atmospheric contaminants
  - Less than 19.5% or more than 23.5% oxygen
  - Atmosphere tested before entry
  - Adequate precautions shall be taken
    - Ventilation
    - Proper respiratory protection
    - Testing done often as necessary

Monitoring

Ventilation Blowers

Emergency Rescue Equipment

- Rescue equipment
  - Breathing equipment
  - Safety harness and line or basket stretcher
  - Must be readily available
  - Must be attended
  - Bell-bottom pier holes, deep and confined footing excavation shall wear a harness with a lifeline securely attached to it

Water Accumulation

Water Accumulation

- Employees shall not work in excavations where there is accumulated water, or where water is accumulating, unless adequate precautions have been taken, to protect employees.

Water Accumulation

- Must take adequate precautions to protect employees
  - Accumulating water
  - Varies with each situation
  - Removal monitored by competent person
  - Run off from heavy rains requires inspection by competent person

Stability of adjacent structures

- Where stability is endangered by excavation operations
- Support systems such as shoring, bracing or underpinning shall be provided
- Sidewalks, pavement and appurtenant structures shall not be undermined unless support systems are used to protect employees

Protection from loose rock and soil

- Hazard from falling or rolling from excavation face
  - Scaling to remove loose materials
  - Installation of protective barricades
  - Other means (retaining devices)
  - 2 feet from edge of excavation


What's good?
What's not so good?

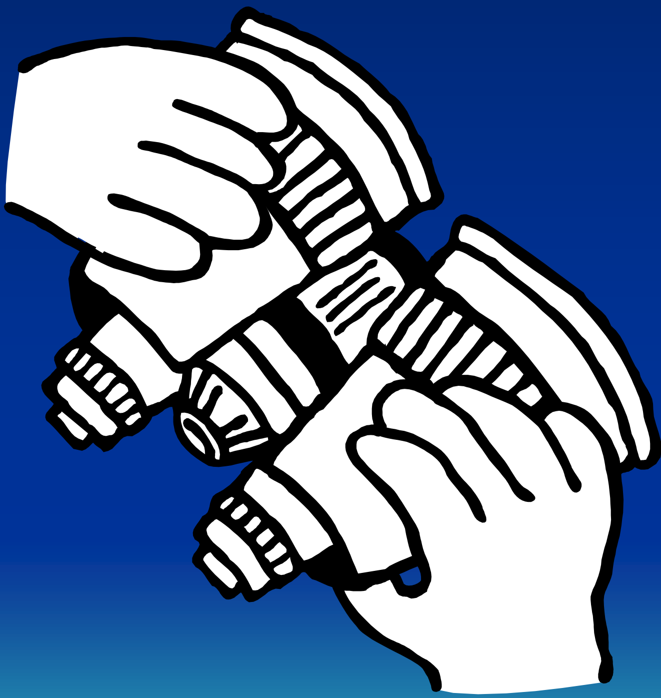
Competent Person

- One who is capable of identifying existing or predictable hazards in the surroundings which are unsanitary, hazardous or dangerous to employees & who has authorization to take prompt corrective measures

Competent Person

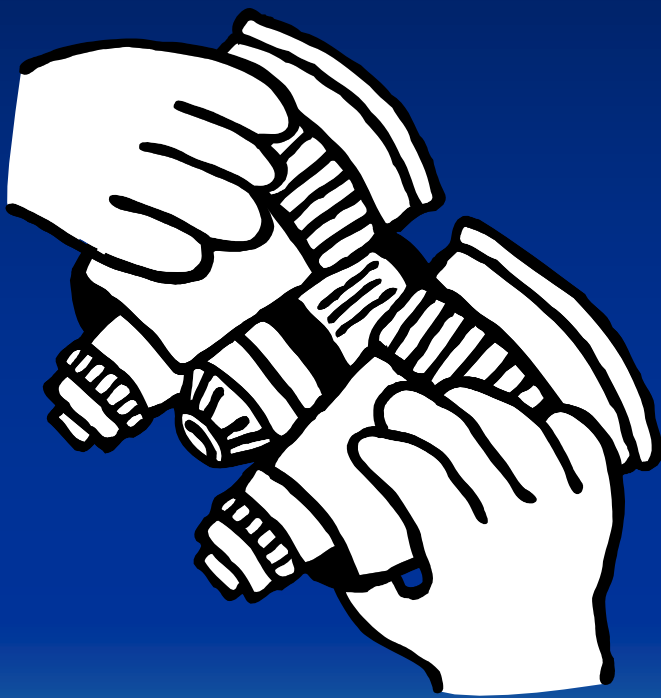
- Has specific training in and be knowledgeable about soil analysis, use of protective systems and the requirements of the standard

COMPETENT PERSON MUST BE AWARE OF:



- Falling loads or equipment
- Hazardous atmospheres
- Weather conditions and forecast
- Stability of adjacent structures.

THE COMPETENT PERSON MUST BE AWARE OF:



- Surface and overhead encumbrances
- Underground utilities
- Access and egress
- Vehicular traffic
- Continuation of trade activity

Inspections

- Daily and before start of work
- As needed throughout the shift
- After snowstorms,windstorms,thaw, earthquake
- Soil classification
- Any hazard increasing occurrence
- Employees shall be removed until precautions have been taken

Inspections

- When fissures, tension cracks, sloughing undercutting, water seepage, bulging at the bottom
- Change in size, location or placement of the spoil pile
- Indication of movement in adjacent structures

Training,knowledge and experience as demonstrated through responsible action makes a person "competent."

Fall protection

- If walkway provided
  - Where employees permitted to cross, guard rails provided where 6 feet or more above lower levels
  - Fall protection standard

Requirements of Protective Systems

1926.652

- Employees shall be protected from cave-in by an adequate protective system except;
  - Entirely in stable rock
  - Less than 5 feet in depth with no indication of cave-in

Designs using Manufacturers Data

- Deviation will only be allowed after manufacturer issues specific written approval
- Written form at the job site during construction

Materials and Equipment

- Free of damage and defects
- Maintain in manner consistent with manufactures data
- Examined by competent person & evaluated for continued use
- Removed from service until approved by registered professional engineer

Trench Boxes

Installation & Removal

- Members securely connected
  - Prevent sliding, falling, kick outs
  - Other predictable failure
- Members shall not subjected to loads exceeding those which were designed
- Members removed from bottom first
- Back fill with removal of support system

Installation & Removal

- Excavate to no greater than 2 feet below – only if system is rated at full depth and there are no indications of a loss of soil from behind or below the support system
- Employees are not permitted to work below other employees unless adequately protected from falling, rolling, sliding material
- Employees are not allowed in shields when installed, removed or moved vertically

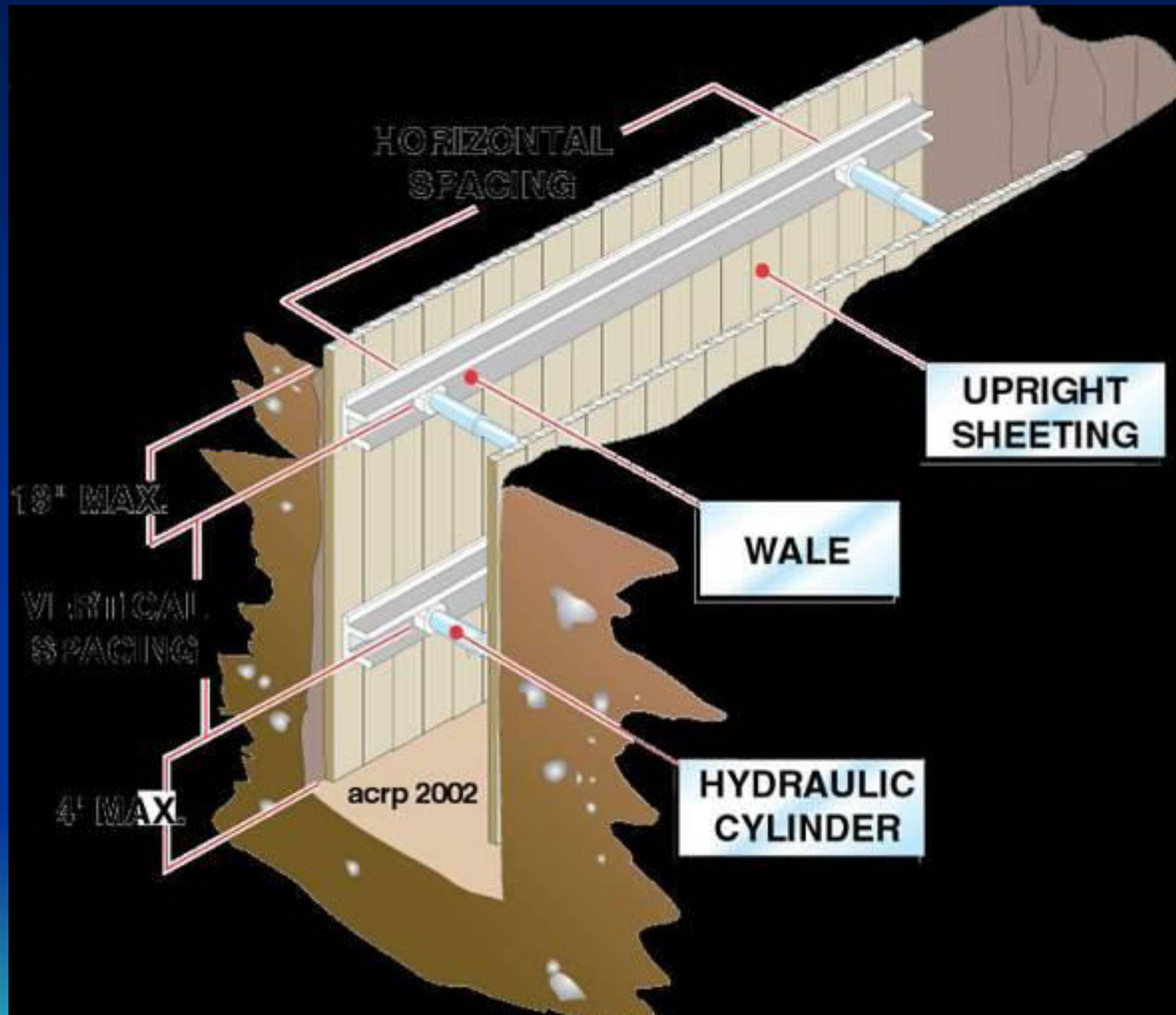

CHEVR

What's good?

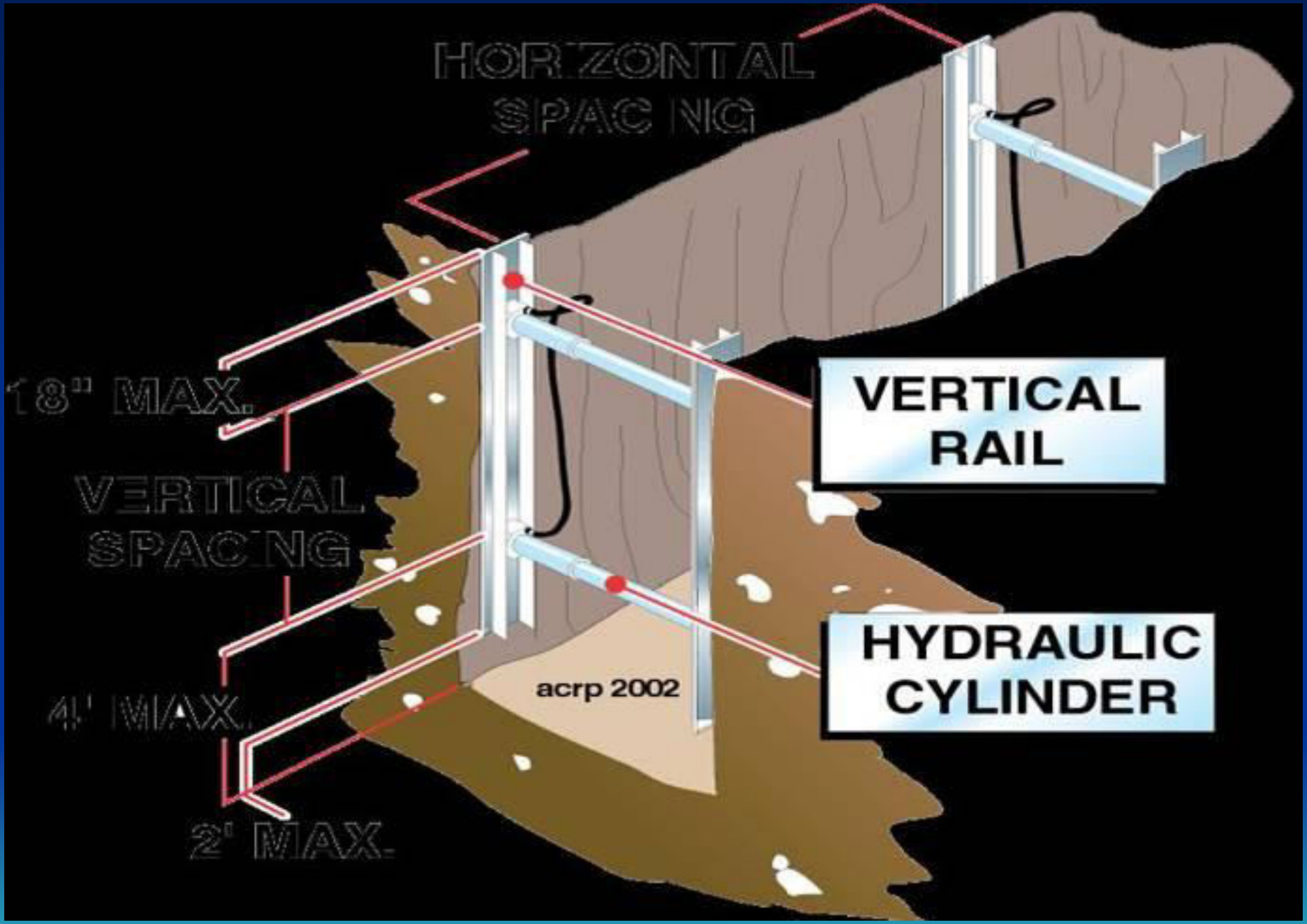
What's not so good?

Shield Used with Sloping

Horizontal Shoring Dimensions



Vertical Shoring Dimensions



Pneumatic Systems

SHIELD USAGE AND SAFETY

Shields are used to protect workers from cave-ins, not to provide support for the trench.

- Manufacturer's Data must be present at work site.
- Top of the shield must extend to the top of the trench.
- If used with sloping, top of shield must extend 18 inches above vertical trench walls.
- Shields may be stacked, provided the bottom one is rated for the total depth of the trench.
- The trench may be dug 2 feet lower than the shield bottom, but the shield must be rated for that depth.
- Backfill around the box to prevent lateral movement.

Review

Table Top Exercise

Soil Classification 1926 Subpart P App A

- Cemented soil
- Cohesive soil
- Dry soil
- Fissured
- Granular soil
- Layered system
- Moist soil
- Plastic
- Saturated soil
- Soil classification system
- Stable rock
- Submerged soil
- Unconfined compressive strength
- Wet soil

Soil Category: 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

- Stable rock

- Type A
- cohesive soils with an unconfined compressive strength of 1.5 tons per square foot [tsf]
  - Clay, silty clay, sandy clay

Soil Classifications

- 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 Fissuring

To Much Water?

Weight and Vibration

Soil Classifications

- Type B
  - cohesive soils with an unconfined compressive strength greater than 0.5 tsf but less than 1.5 tsf
  - Silt, silt loam, angular gravel
  - soils that are fissured,or subject to vibration

Soil Classification

- 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 STRENGTH MEASURE
Unconfined Compressive Strength (UCS)

- The amount of pressure in tons per square foot (tsf) required to cause the soil to fail in compression.
- OSHA Soil Classification is based on the UCS of the soil.

Basis of classification

- The classification of deposits shall be made based on the results of at least one visual and one manual analysis conducted by a competent person

Acceptable visual test

- Determine qualitative information on site in general
- Soil adjacent to excavation
- Soil forming the sides of the open excavation
- Soil taken as samples from excavated material
- Estimate range of particle sizes

Acceptable visual test

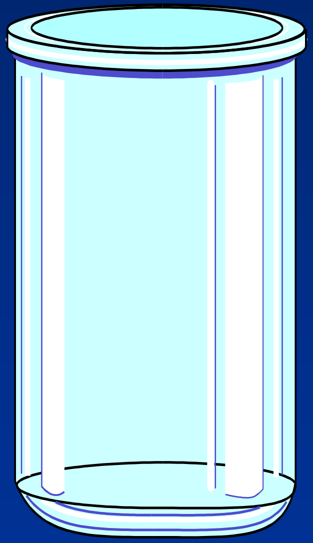
- Observe evidence of surface water
- Water seeping from the sides
- Location of the level of the water table
- Sources of vibration that may affect stability
- Evidence of previously disturbed soil

Acceptable manual test

- Plasticity
- Ribbon and thread test
- Dry strength test
- Thumb penetration test
- Other strength test
- Pocket pentrometer
- Hand-operated shearvane

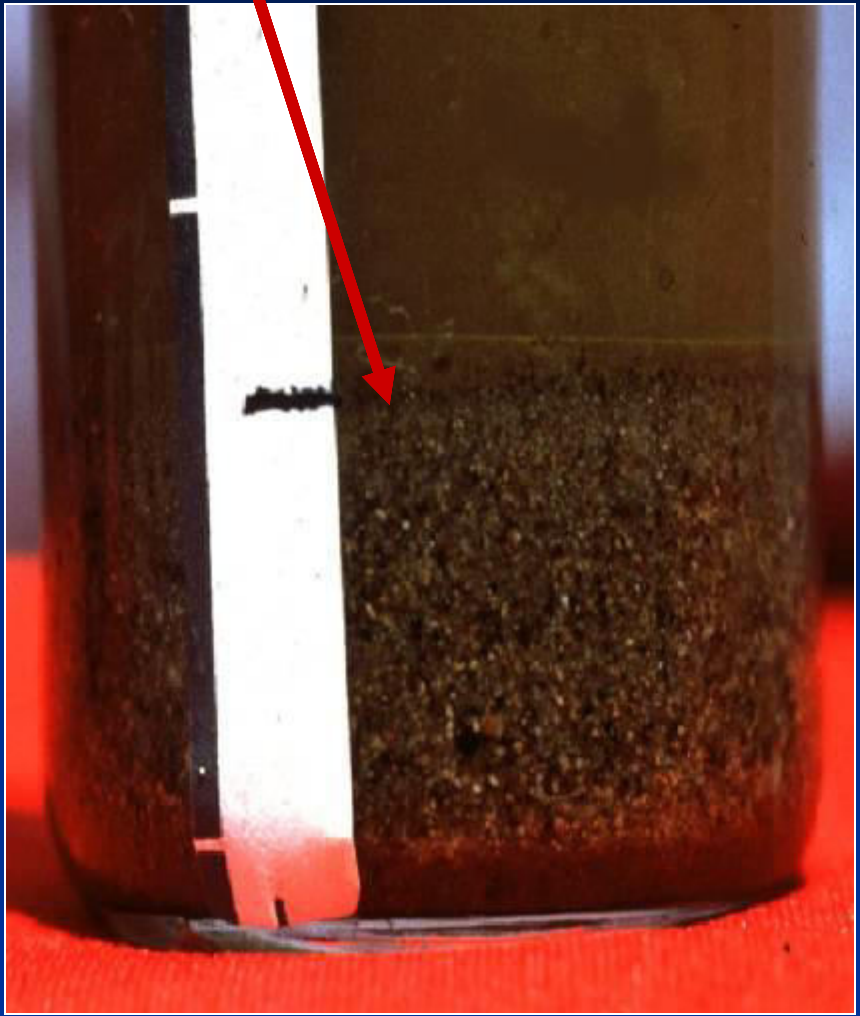
Field Sedimentation Test

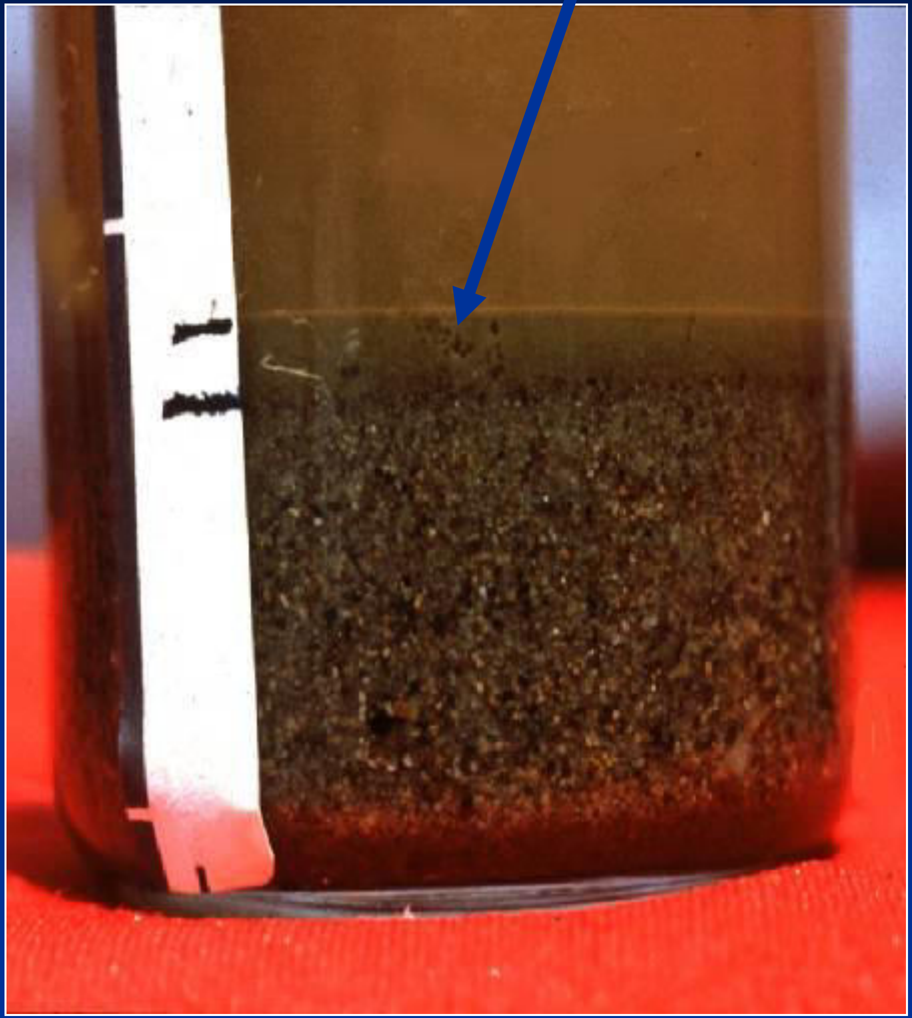
- Flat bottom container - at least 7 inches high (old olive jar)
- 1 1/2 to 2 inches of soil
- Place soil in the glass jar
- 5 inches of water on top of soil



After 30 seconds granular sand type material settles at the bottom

After 3 minutes silt type material settles on top of the sand

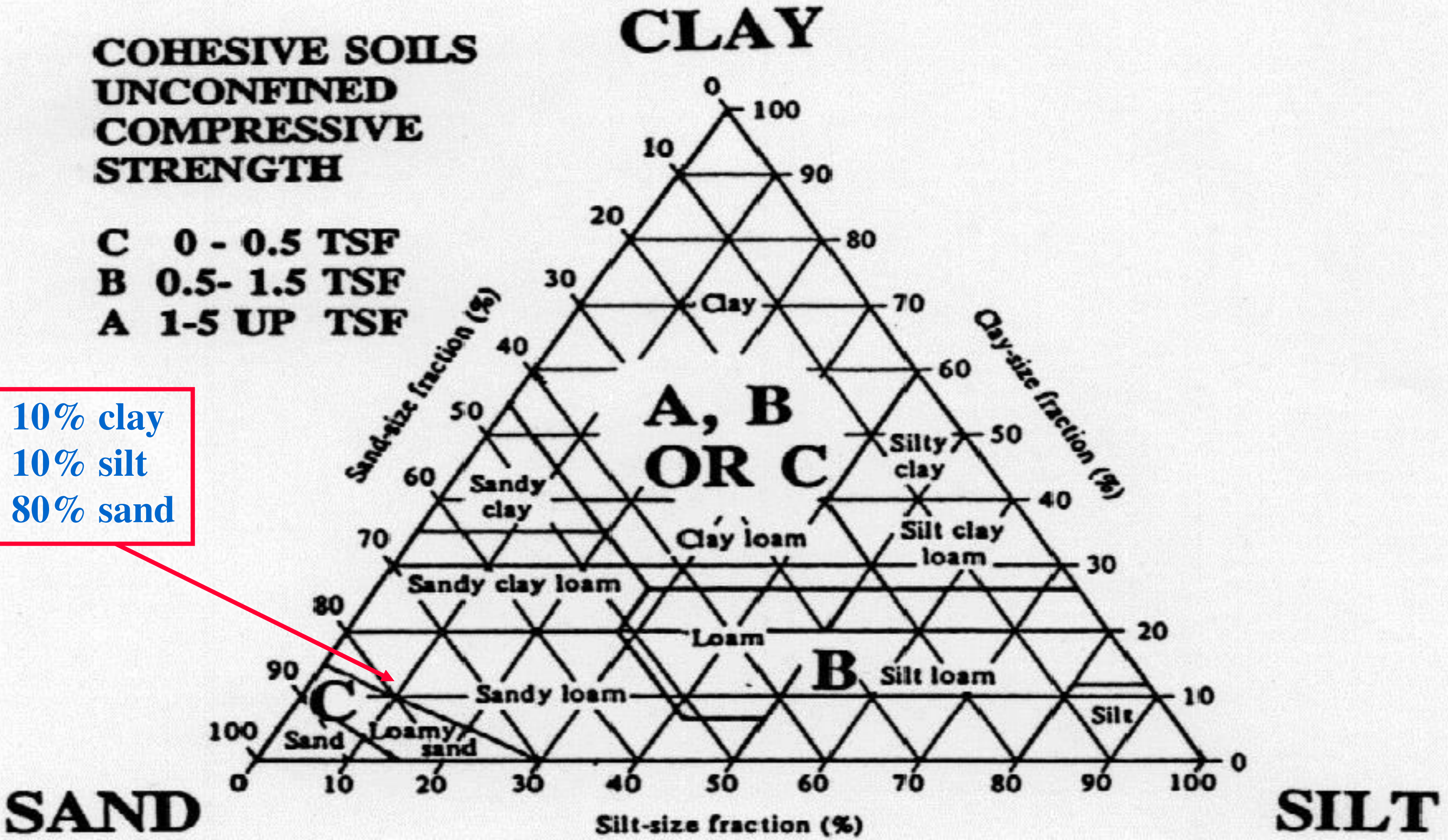




COHESIVE SOILS UNCONFINED COMPRESSIVE STRENGTH

C	0 - 0.5	TSF
B	0.5- 1.5	TSF
A	1-5 UP	TSF

10% clay
10% silt
80% sand



The Ribbon Test

- Mix soil + water to make into plastic mass
- Roll mass into cylindrical shape 1/2 to 3/4 inch diameter
- Lay across palm of hand
- Press between thumb and second joint of index finger

The Ribbon Test (continued)

- Pass through thumb
- Squeeze until it takes the shape of a 1/8 to 1/4 inch thick strip
- Allow to hang freely from hand

The Ribbon Test (continued)

- Clay loam will barely ribbon and break easily
- Clay = relatively long ribbon 6 to 8 inches or more
- More clay = longer and stronger ribbon
- Silt has tendency to produce short ribbon with broken appearance

Penciling

If a 2 inch or longer thread can be held without breaking, the soil is cohesive.

Shearvane/Torvane

Measures Soil's Shear Strength

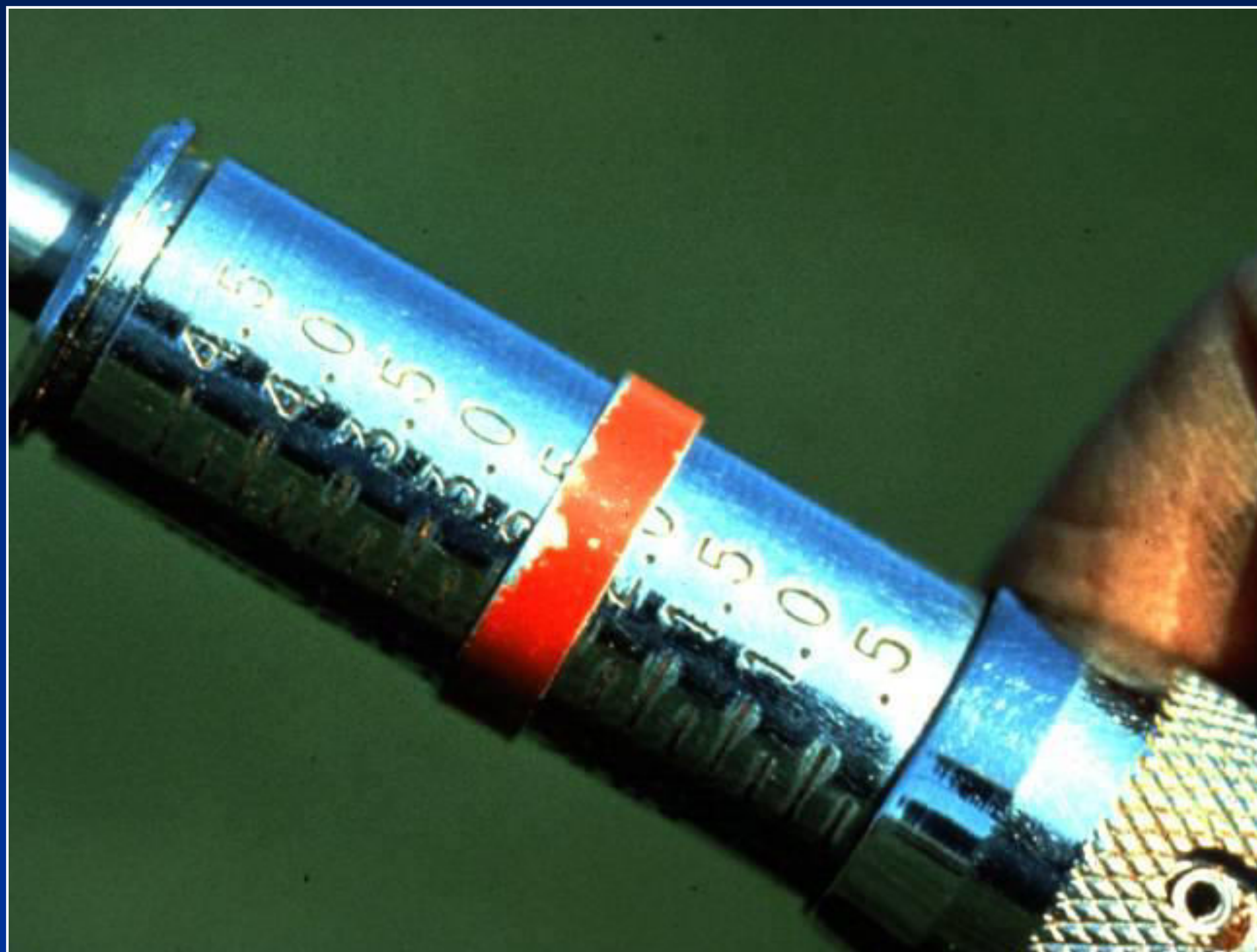
Shearvane/Torvane

- Select fresh clod or block of undisturbed soil from spoil pile
- Cut a smooth surface on the clod
- Insert vanes of device into the soil
- Retract vanes to show foot imprint
- Set indicator at zero
- Hold device firmly against soil and twist in clockwise manner until soil fails in shear

Pocket Penetrometer Test

- Device is designed to work on saturated clay soil
- Measures unconfined compressive strength of soil
- Twice the value of shear strength of same soil
- Note machine ring

Pocket Penetrometer



Pocket Penetrometer Test

- To begin test, remove red protective cap, push ring against body so that low side reads "O"
- Slowly insert piston until engraved mark is level with soil

Pocket Penetrometer Test

- Read strength in tons/sq ft using low side of ring (side closest to the piston end). Record reading and repeat step #1.
- For weak soils, use 1” adaptor foot, multiply by .0625

Thumb Penetration Test

- The thumb penetration procedure involves an attempt to press the thumb firmly into the soil in question.

Thumb Penetration Test

- If the thumb makes an indentation in the soil only with great difficulty, the soil is probably Type A.

- If the thumb penetrates no further then the length of the thumb nail, it is probably Type B soil.

Thumb Penetration Test

- If the thumb penetrates the full length of the thumb it is Type C soil.
- The thumb test is subjective and is therefore the least accurate of the tests.

Soil Classifications

- Layered Geological Strata
  - where soils are configured in layers
  - must be classified on the basis of the weakest soil
  - each layer may be classified individually if a more stable layer lies below a less stable layer
  - Type C soil rests on top of stable rock

Soil Classifications

- Look for the following conditions
  - Particle size
    - Primarily fine grained=cohesive material
    - Primarily coarse-grained sand or gravel
      - Granular material
  - Cohesion
    - Remains in clumps=cohesive

Soil Strength is Dependent Upon:

- Type of Soil.
- Amount of Moisture in the Soil.
- Whether the Soil Has Been Previously Disturbed.

If Water is Added

- **It Brings Additional Weight**
  - *Hydrostatic Pressure*
- **It Erodes the Trench Wall**
  - *Water movement typically moves soil*
- **It Can Freeze and Thaw**
  - *Resulting in cracks & false cohesion*

REMOVAL OF GROUND WATER IS CRITICAL

SOIL COMPONENTS

- Clay:
  - Composed of mineral particles less than 0.002 mm in diameter
- Silt:
  - Individual mineral fragments that range from 0.002 to 0.05 mm in diameter.
- Sand:
  - Individual rock or mineral fragments that range in diameter from 0.05 to 2.0 mm in diameter.
- Gravel:
  - Can be either angular or rounded.

COHESIVE SOIL

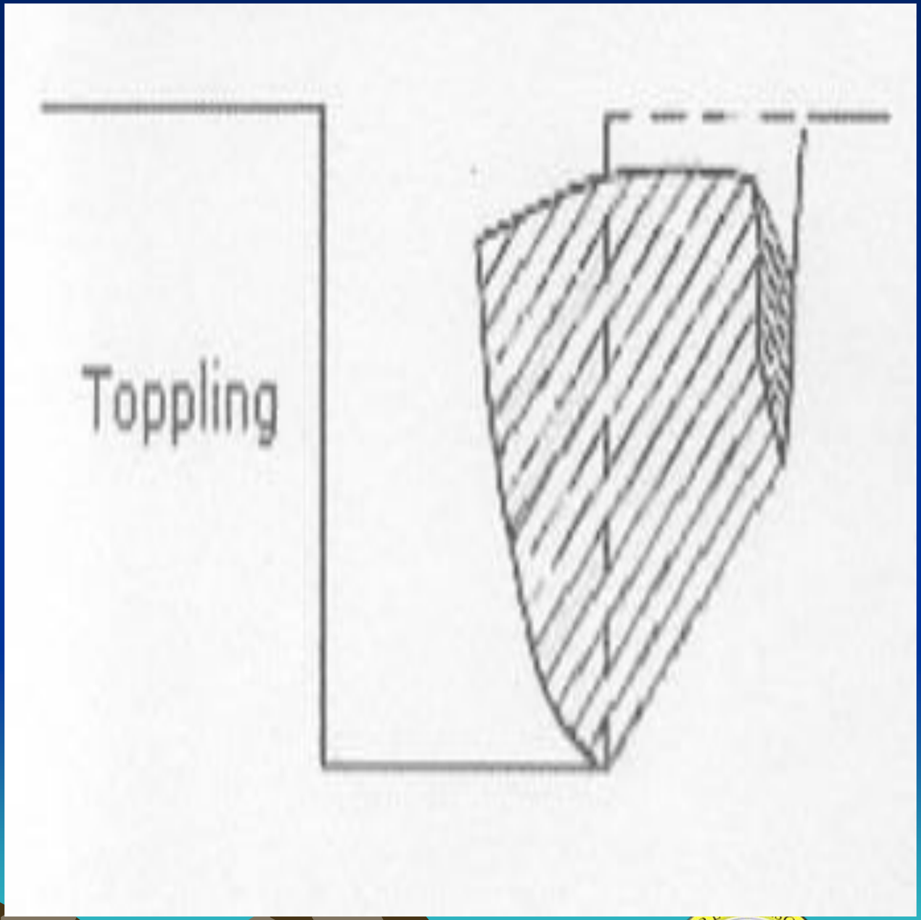
- Soil with a high clay content which has cohesive strength.
- It does not crumble.
- It can be excavated with vertical side slopes.
- It is hard to break up when dry.
- It can be molded.
- It exhibits significant cohesion even when submerged.

GRANULAR SOIL

- Soils that include gravel, sand, silt.
- Very low clay content.
- It has no cohesive strength.
- Some moist granular soils exhibit apparent cohesion.
- It cannot be molded when moist and crumbles easily when dry.

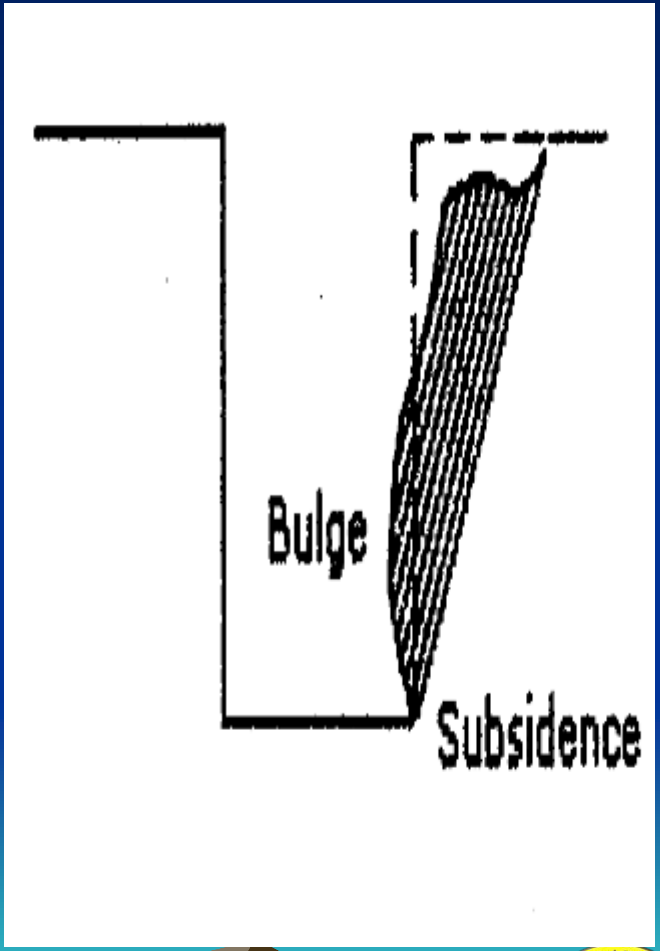
Soil Mechanics

- Toppling occurs when the trench's vertical face shears along the tension crack line and topples into the excavation



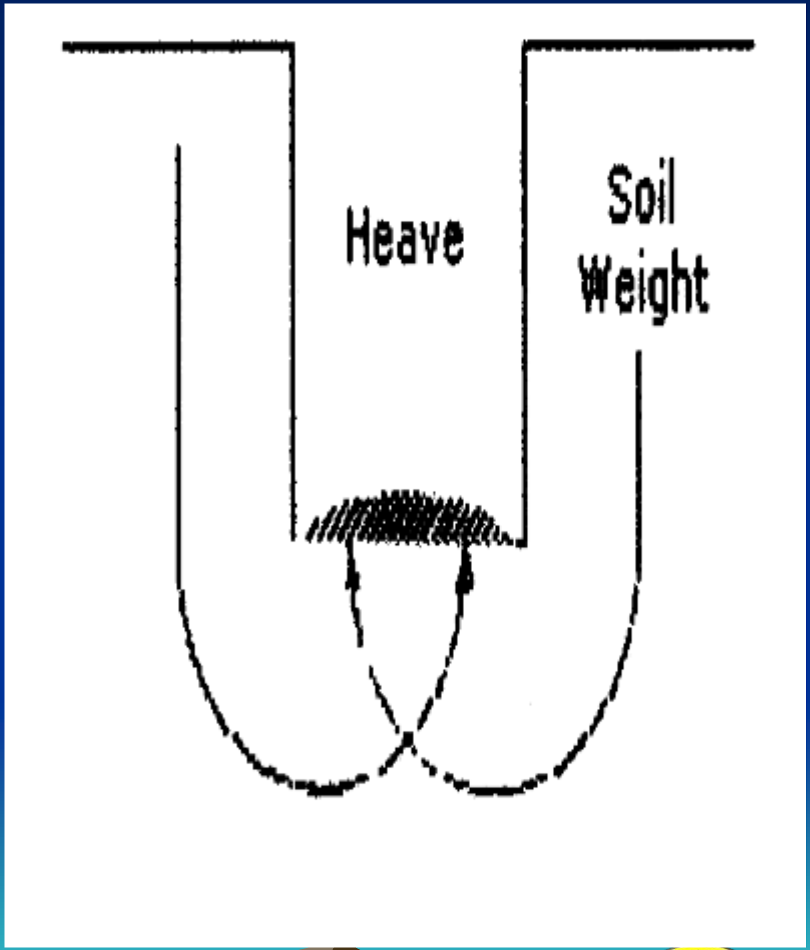
Soil Mechanics

- Subsidence and bulging occurs when an unsupported excavation can create an unbalanced stress in the soil which causes subsidence at the surface and bulging of the vertical face

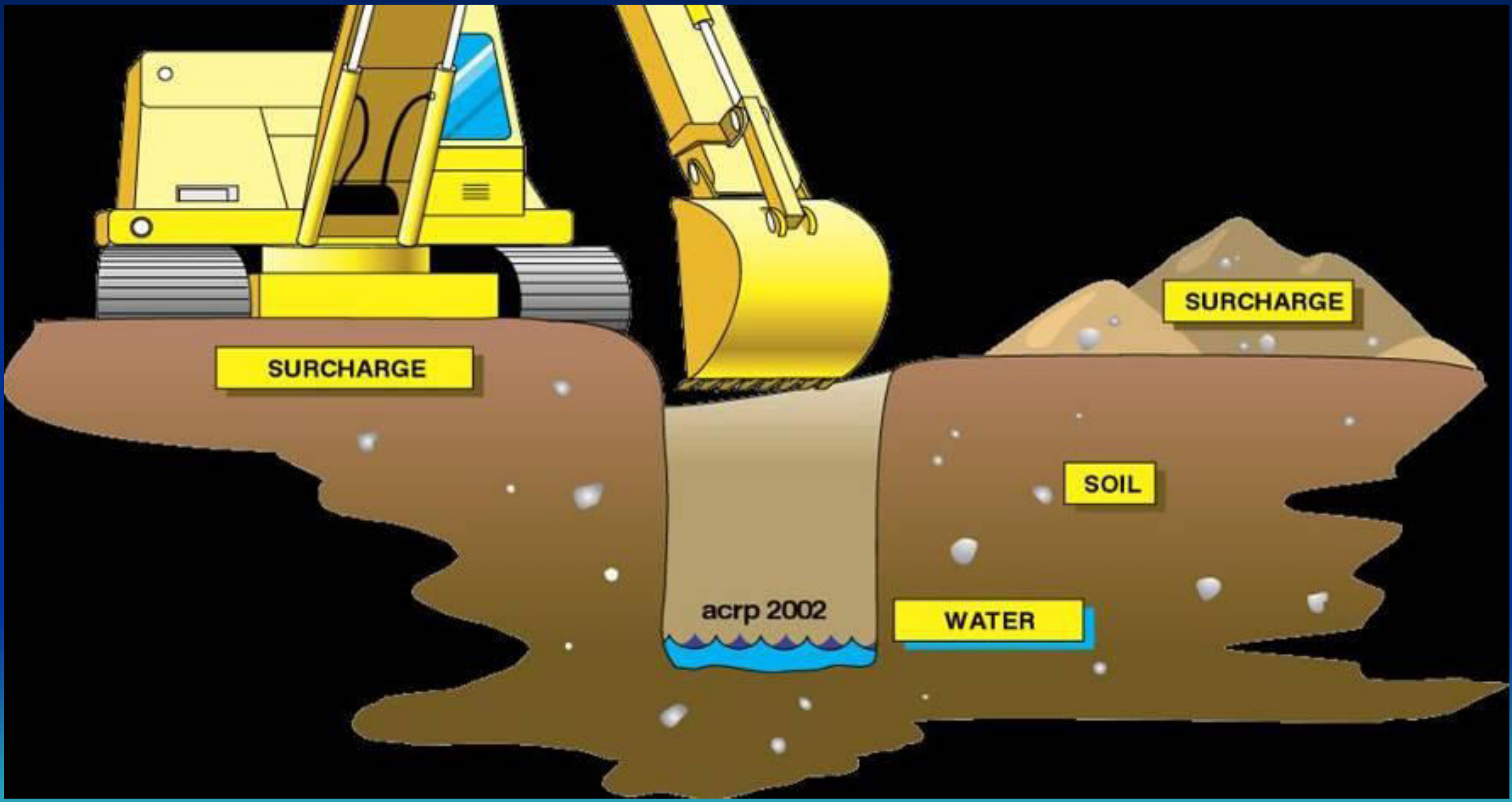


Soil Mechanics

- Heaving or squeezing is caused by the downward pressure created by the weight of adjoining soil or equipment
- Can occur even when shoring or shielding has been properly installed

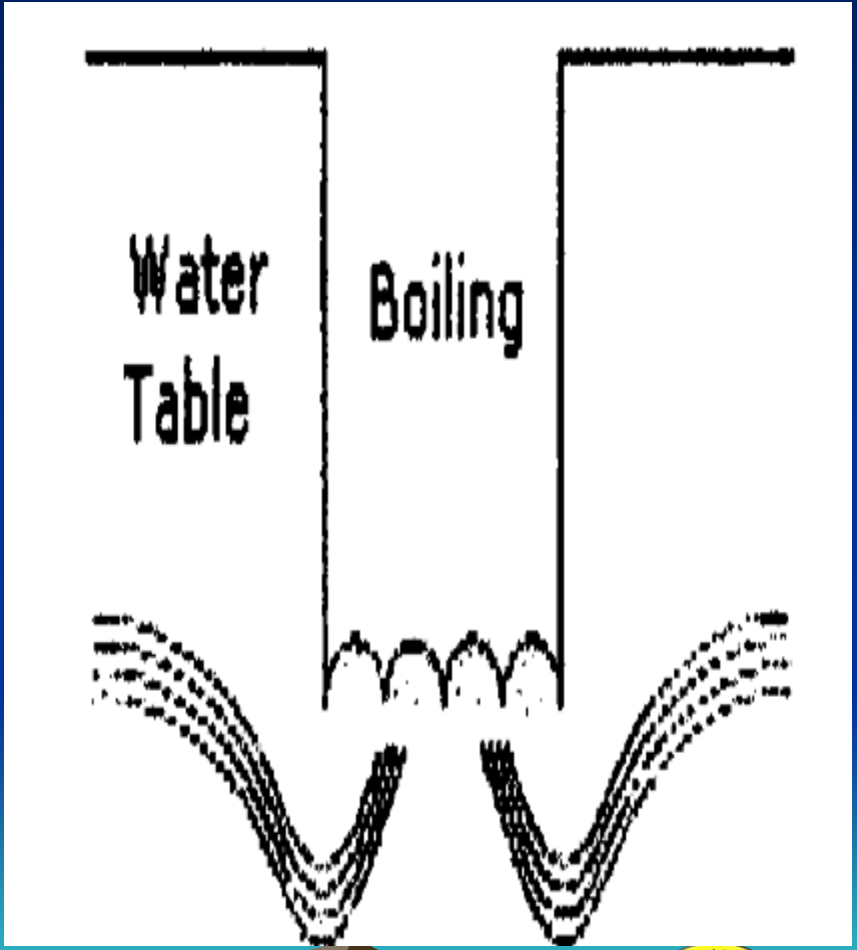


Forces Acting on a Trench



Soil Mechanics

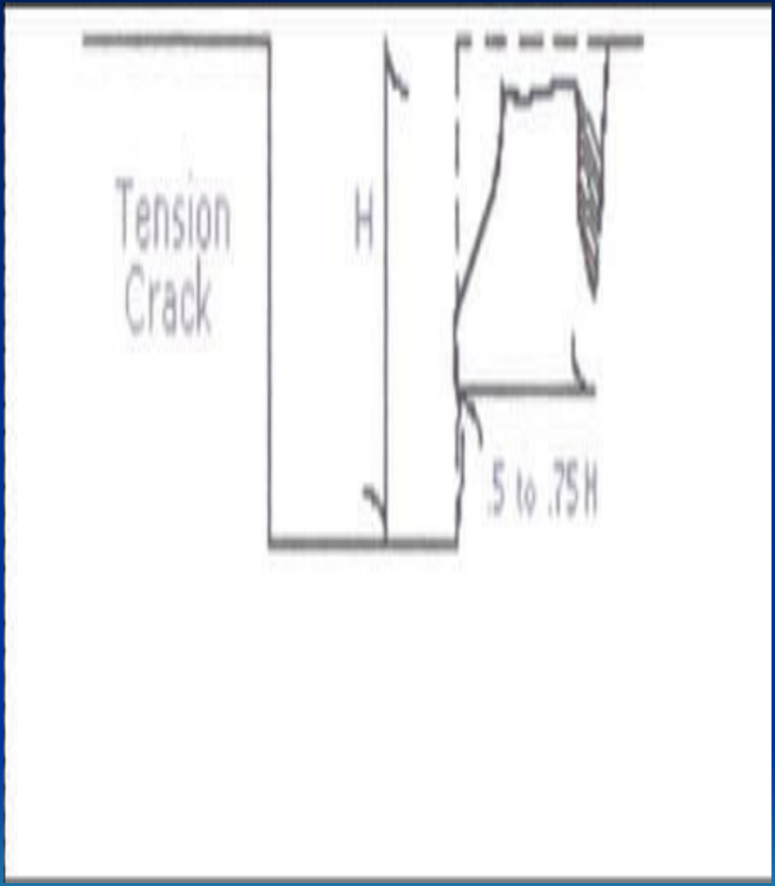
- Boiling is evidenced by an upward water flow into the bottom of the cut
- High water table is one cause
- Boiling produces a quick condition even when trench boxes are used



Trench Boiling

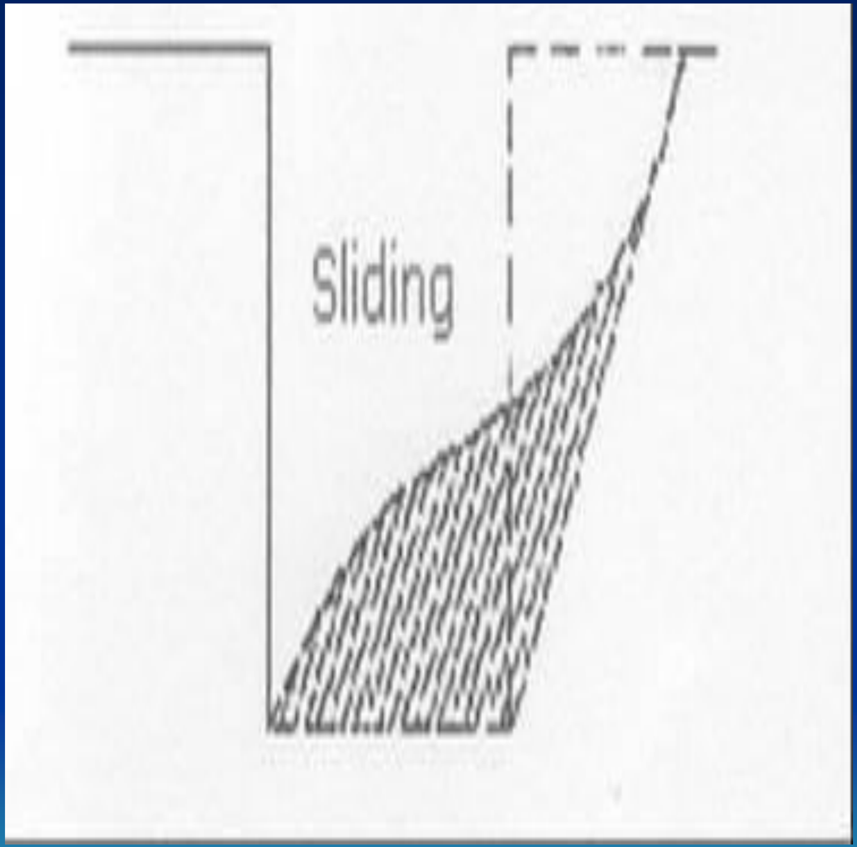
Soil Mechanics

- Tension cracks usually form at a horizontal distance of 0.5 to .75 times the depth of the trench



Soil Mechanics

- Sliding or sloughing may occur as a result of tension cracks



Sloping and Benching
1926 Subpart P App B

- Actual slope
- Distress
- Maximum allowable slope
- Short term exposure
- Stable rock
- Type A soil
- Type B soil
- Type C soil

Design of Sloping and Benching

- Allowable configurations and slopes
  - Not steeper than 11/2 horizontal to 1 vertical
  - Designs using other tabulated data
  - Shall be in written form
  - Must identify limits of use of the data
  - Identify the registered professional engineer who approved

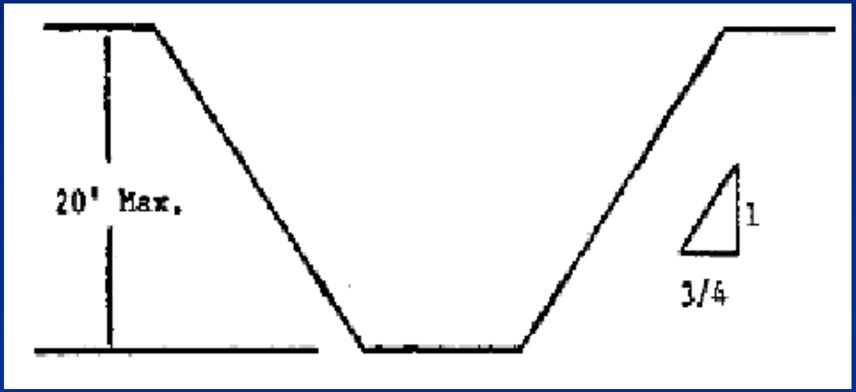
Allowable Slopes

- Soil type Height/depth Slope angle
- Stable rock Vertical 90 deg
- Type A ¾ to 1 53 deg
- Type B 1 to 1 45 deg
- Type C 11/2 to 1 34 deg

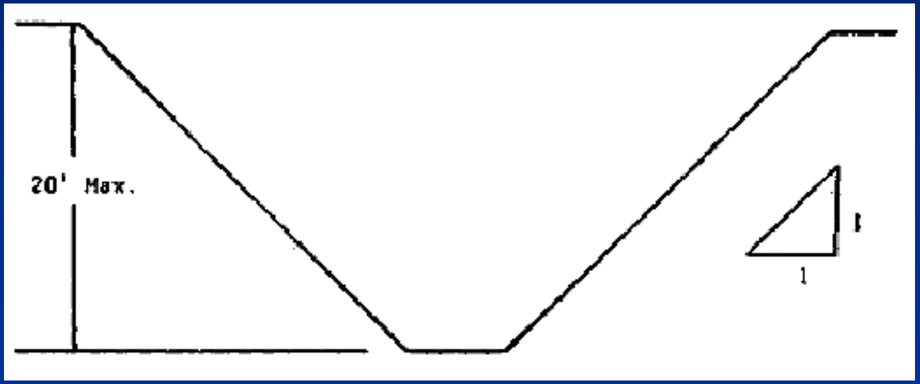
- Type A
- short term ½ to 1 63 deg
- max excavation depth 12 ft

Examples of Sloping for Different Soils

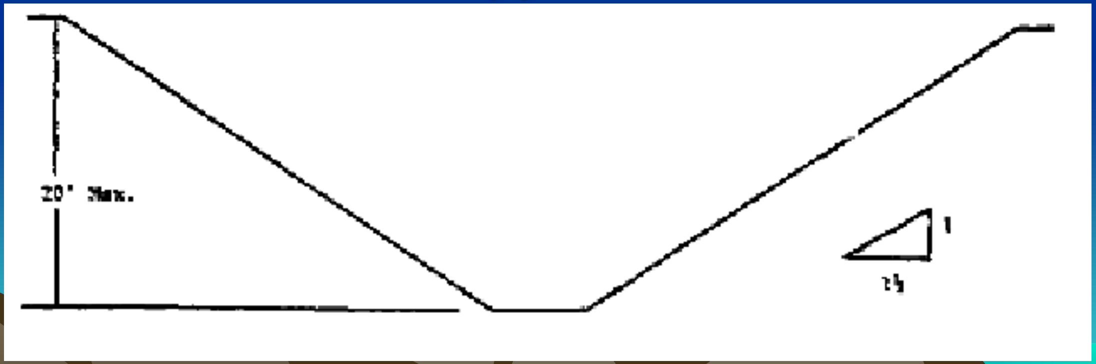
Type A



Type B



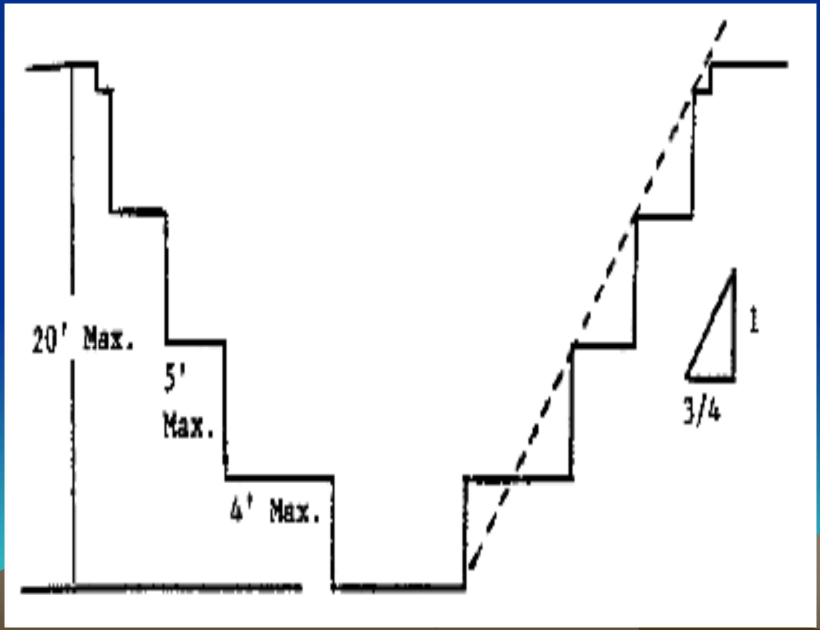
Type C



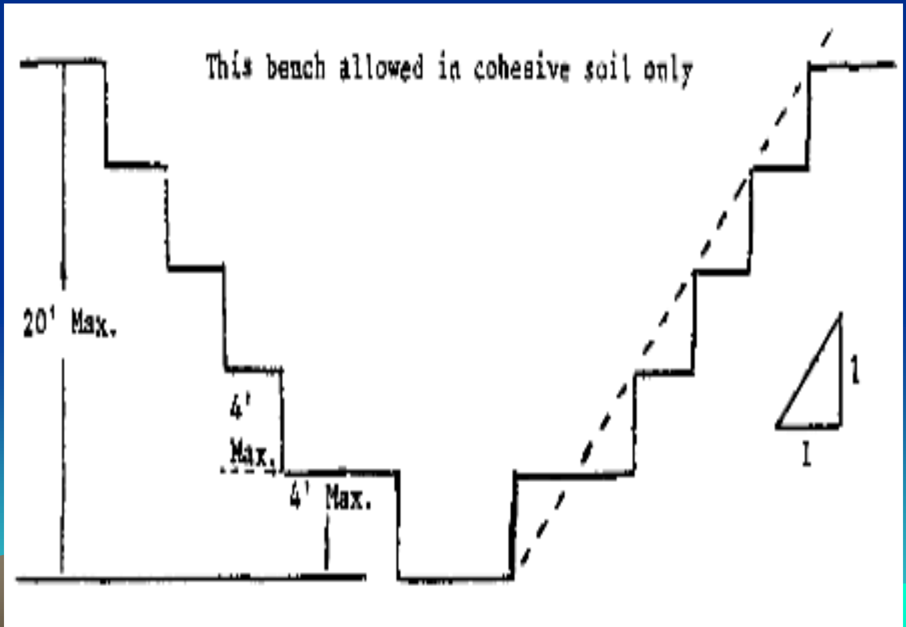
BENCHING

Only to be used on soil types A and B

Type A

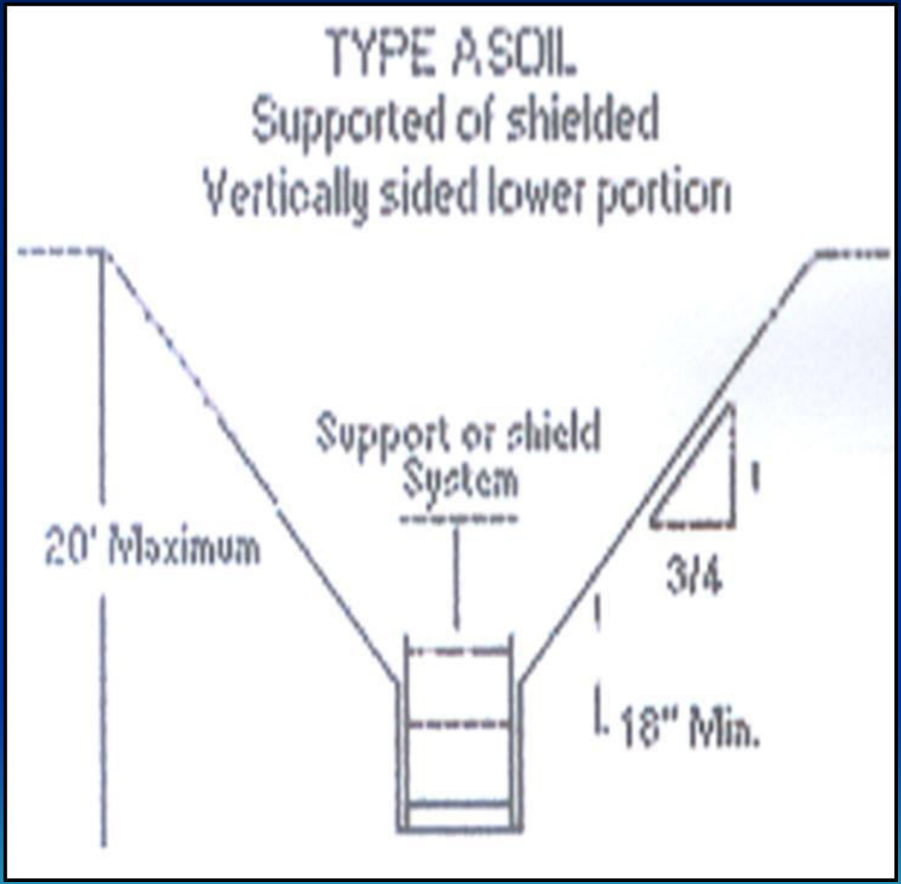


Type B



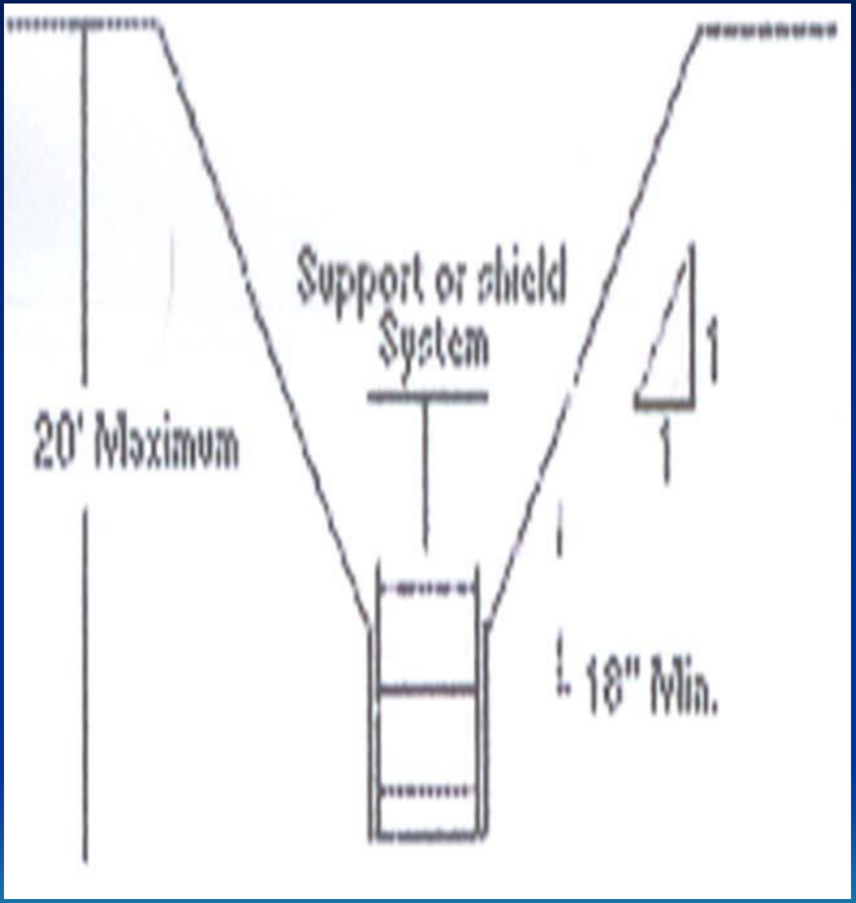
Allowable Slopes

- Type A soil
- Supported of shielded vertically sided lower portion
- ¾ to 1
- 20 feet max depth
- Shield 18 inches above to prevent rollover



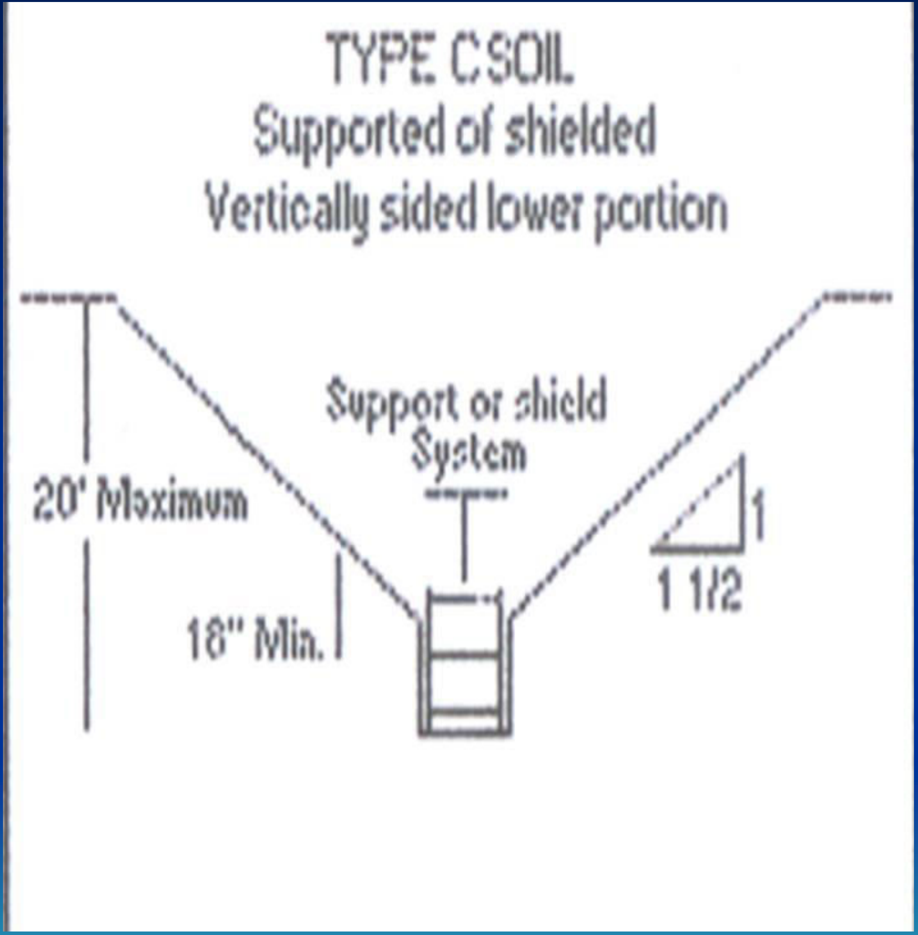
Allowable Slopes

- Type B soil
- Supported of shielded vertically sided lower portion
- 1 to 1 sloped
- 18 inches minimum at top of shield to prevent rollover

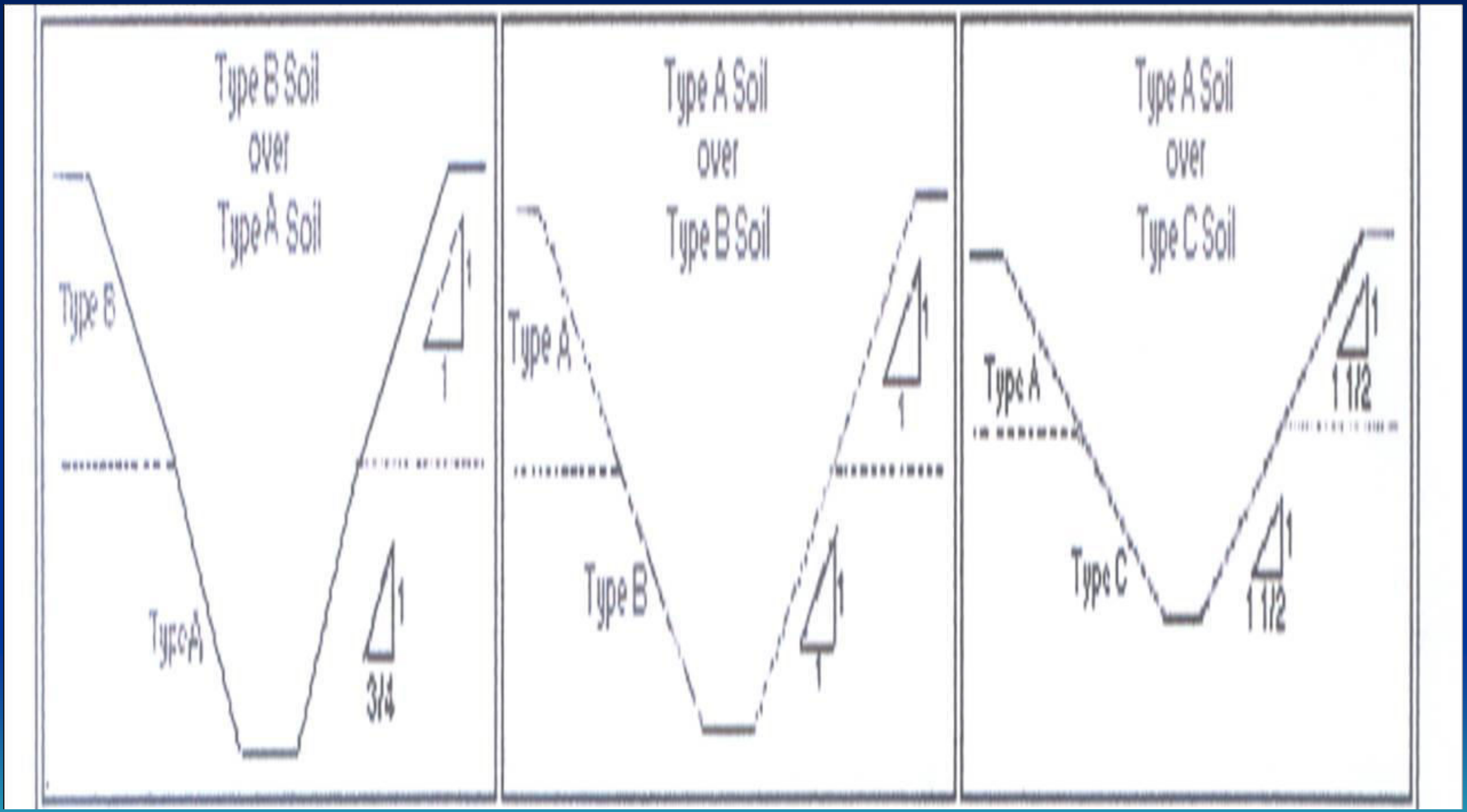


Allowable Slopes

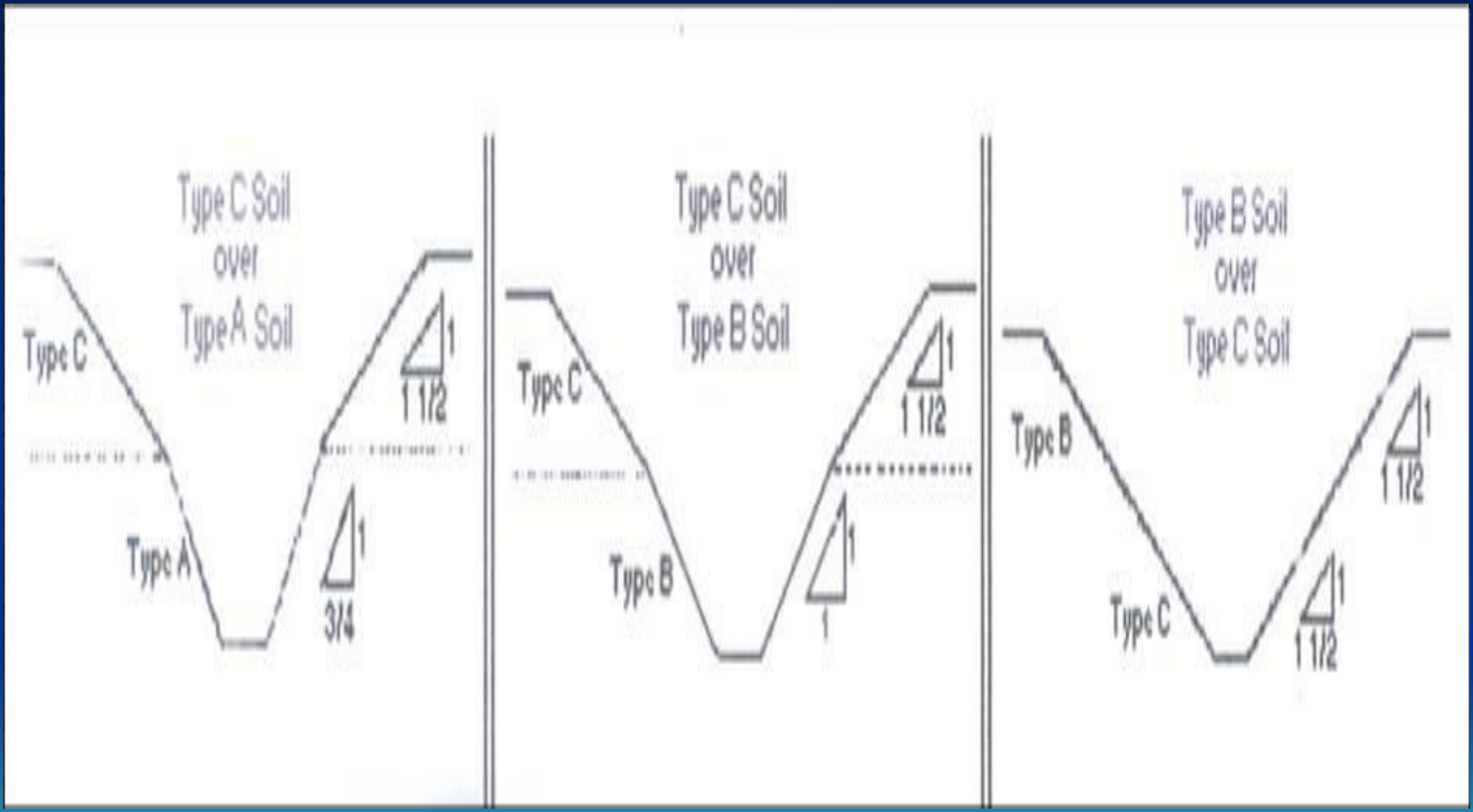
- Type C soil supported of shielded vertically sided lower portion
- 1 ½ to 1
- 20 feet max depth
- 18 inches above to prevent rollover



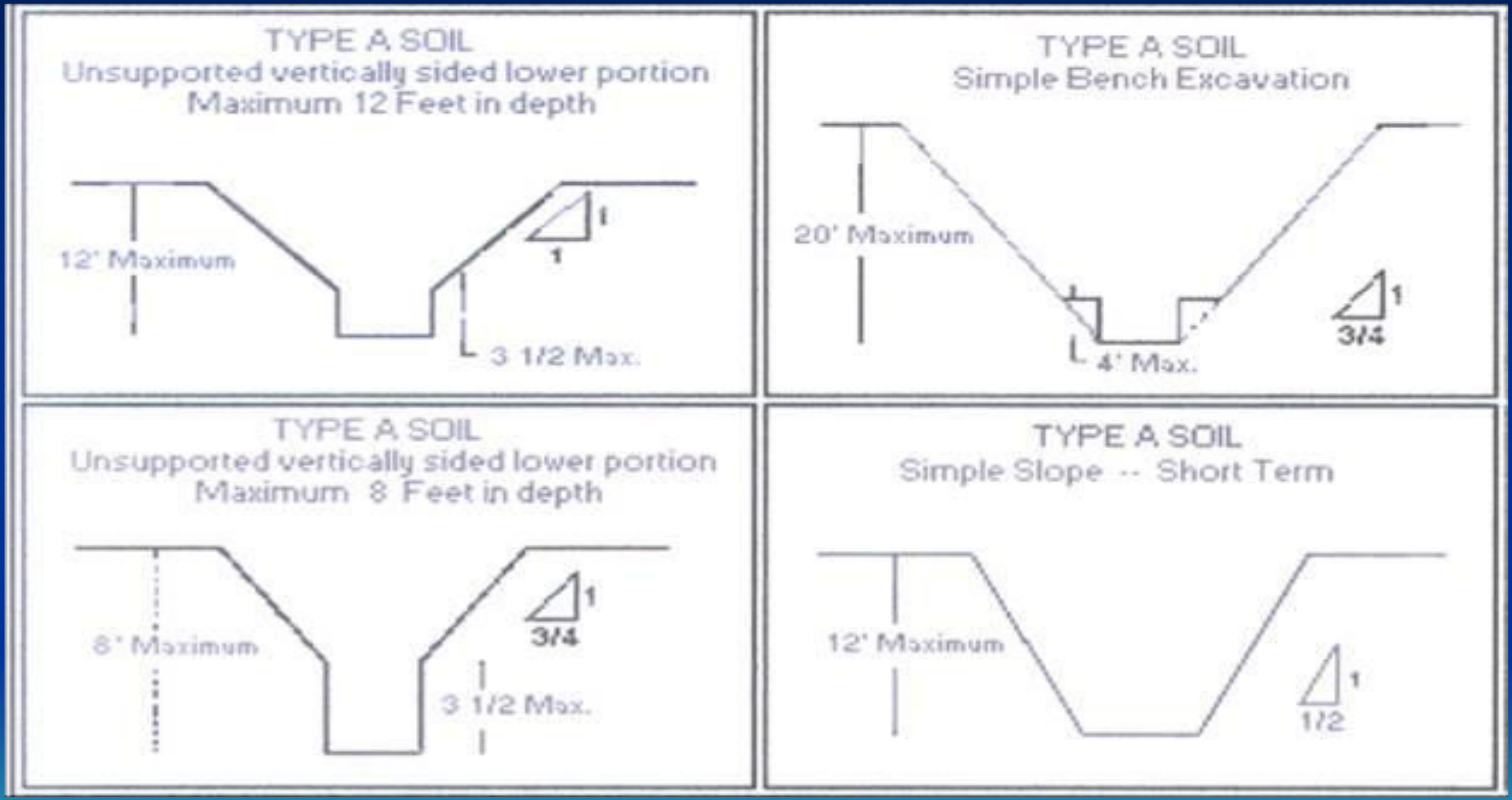
Slope Configurations Excavations in Layered Soils



Slope Configurations Excavations in Layered Soil



Excavations in Type A Soils

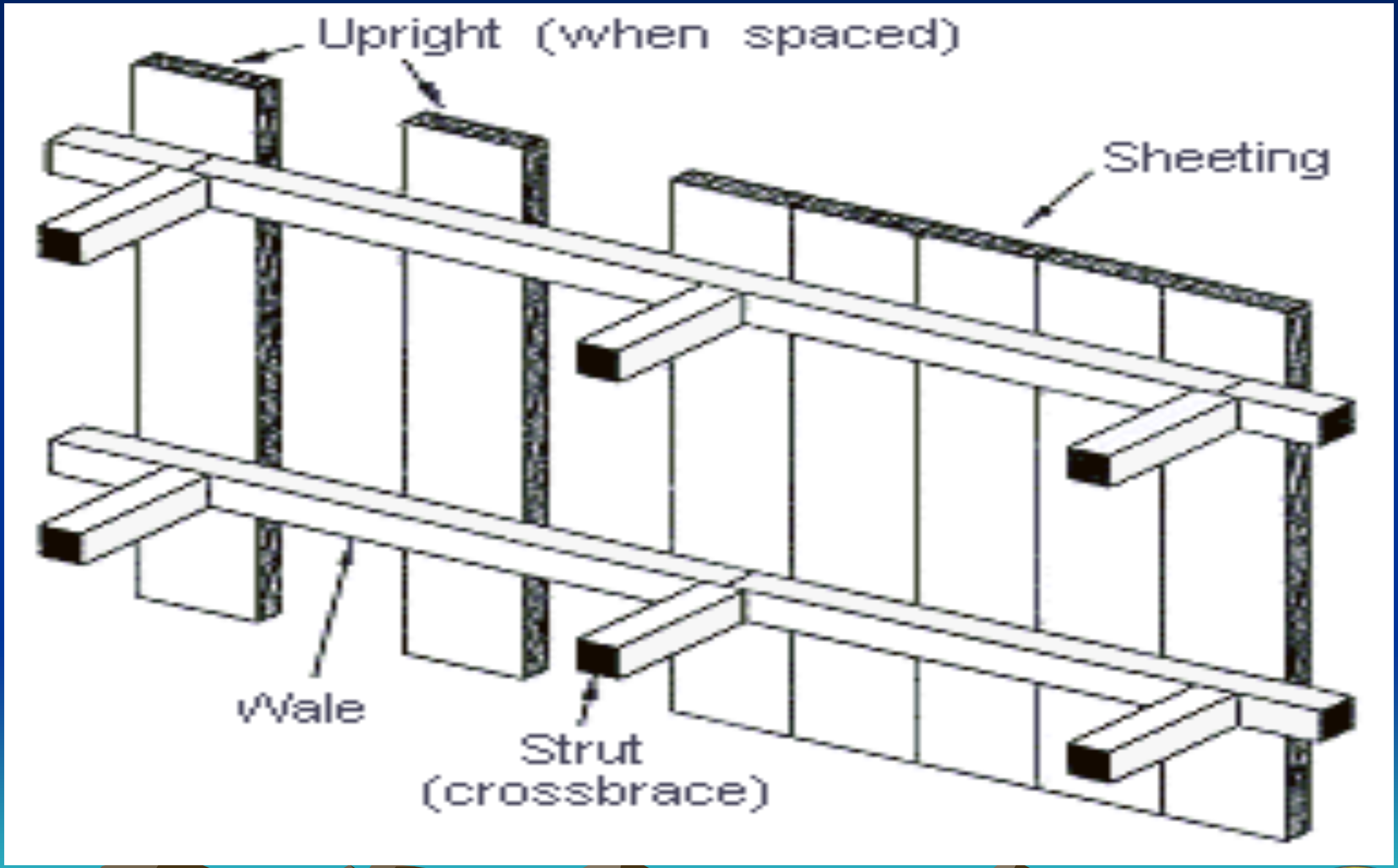


Timber Shoring for Trenches 1926 Subpart P App C

- Basis and limitations of data
  - Trenches do not exceed 20 ft in depth
  - Each table presents the minimum sizes of timber members to use in a shoring system
  - Tables are taken from National Bureau of Standards

Timber Shoring

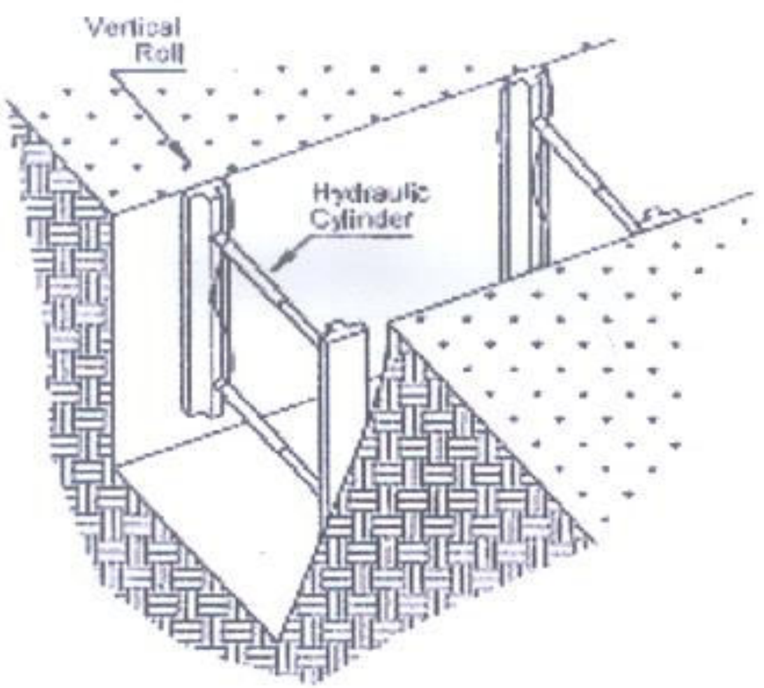
Timber Shoring



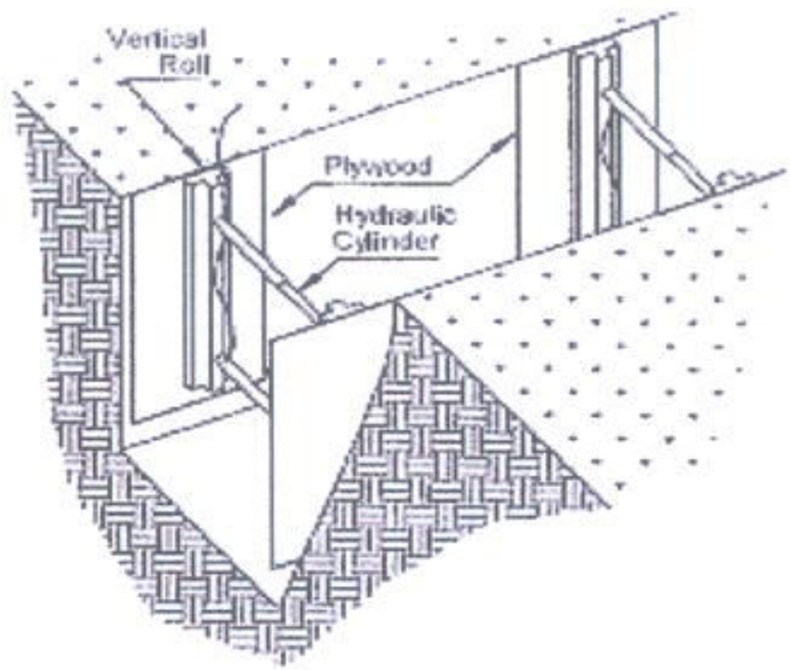
Aluminum Hydraulic Shoring 1926 Subpart P App D

- Basis and limitations of data
  - Vertical shore rails and horizontal wales
  - Meet equivalent strength properties
  - 2 inch cylinder inside diameter minimum safe working capacity of no less than 18000 lbs compressive load at maximum extension
  - 3 inch cylinder inside diameter safe working load not less than 30000 lbs axial compressive load
  - Vertical shores used must be minimum of 3 spaced equally

Aluminum Hydraulic

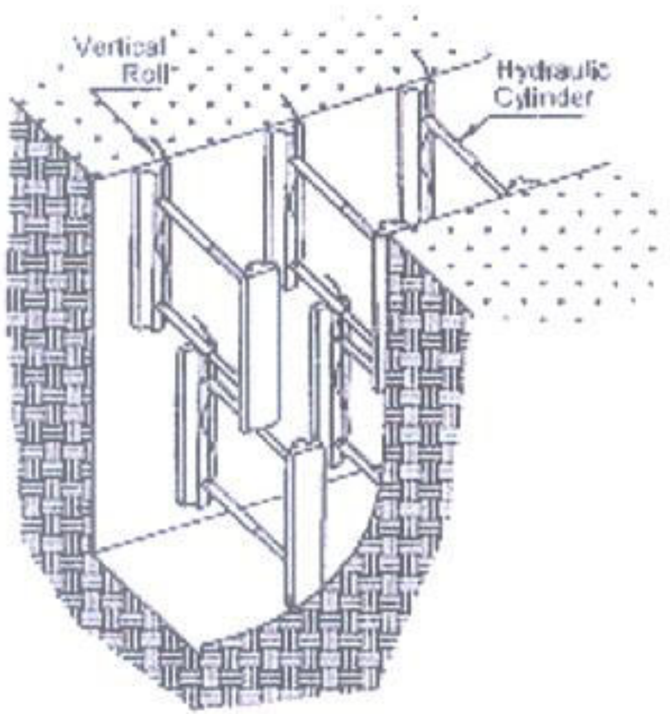


Vertical Aluminum Hydraulic Shoring
(Spot Bracing)

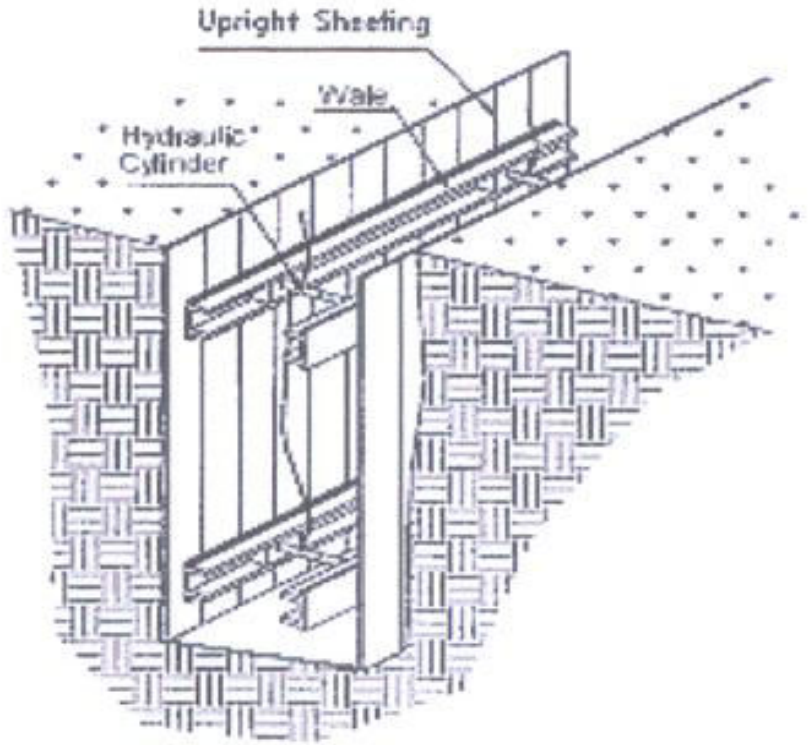


Vertical Aluminum Hydraulic Shoring
(With Plywood)

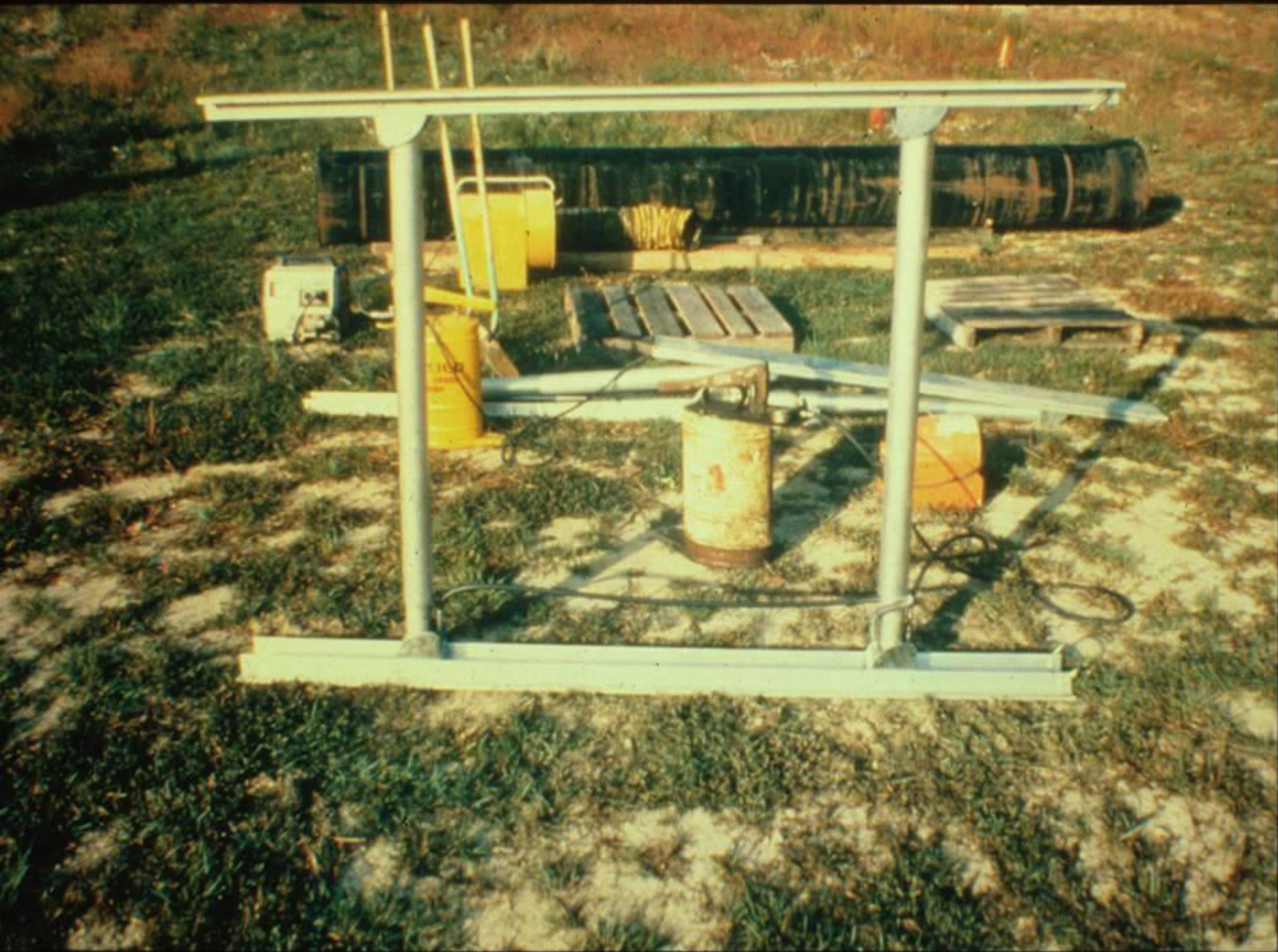
Aluminum Hydraulic



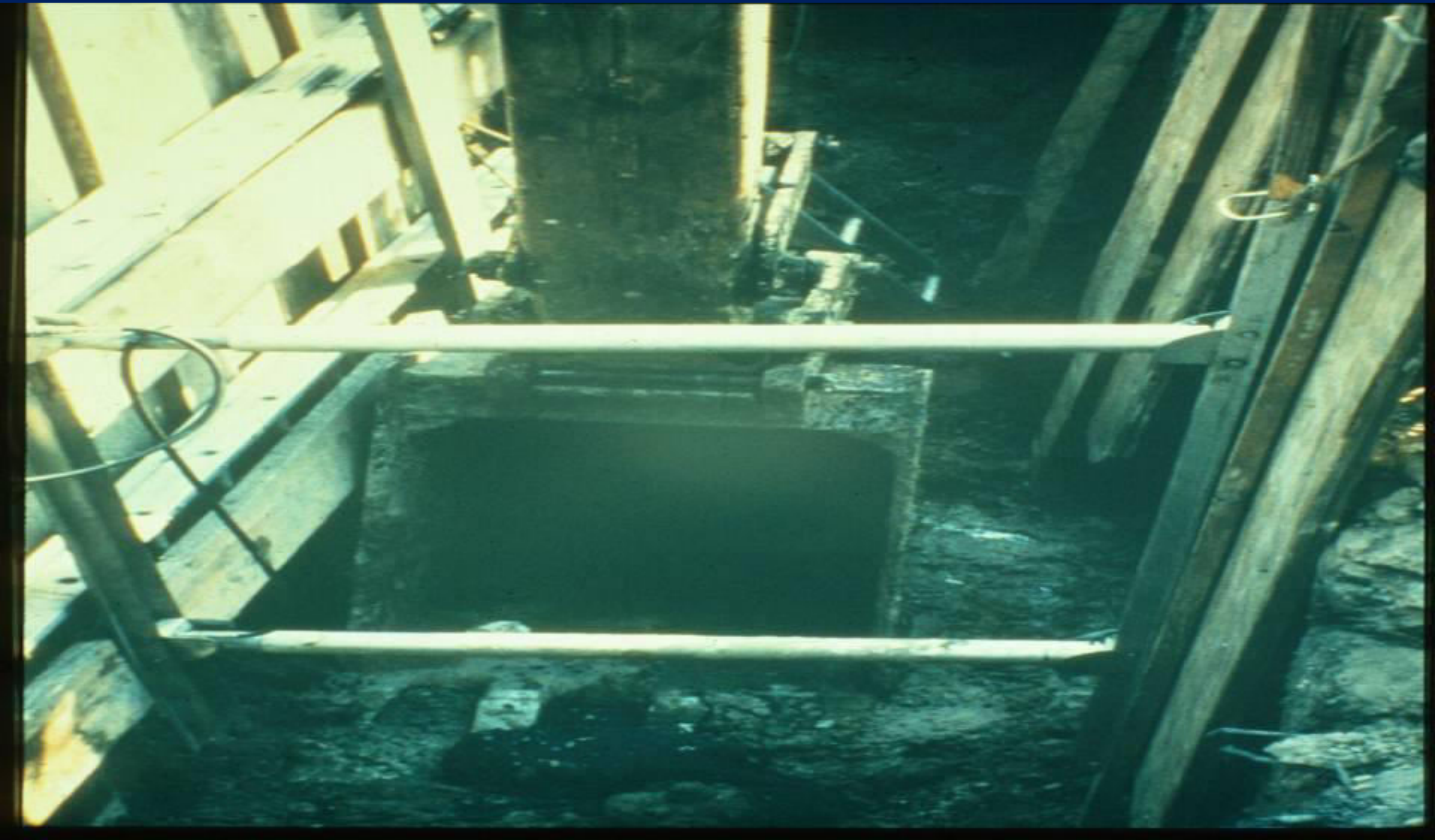
Vertical Aluminum Hydraulic Shoring
(Stacked)



Aluminum Hydraulic Shoring Waler System
(Typical)

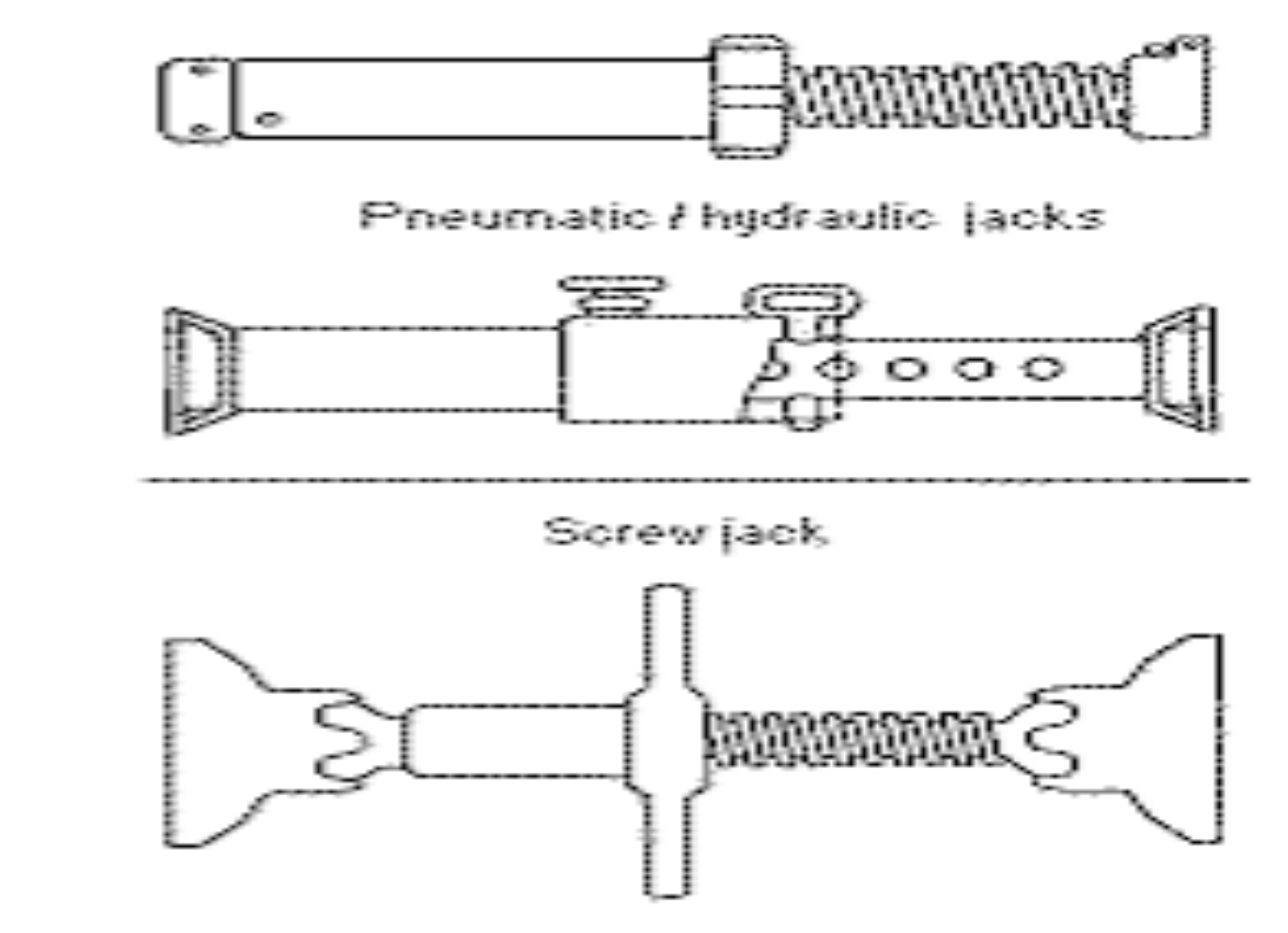


Aluminum Hydraulic

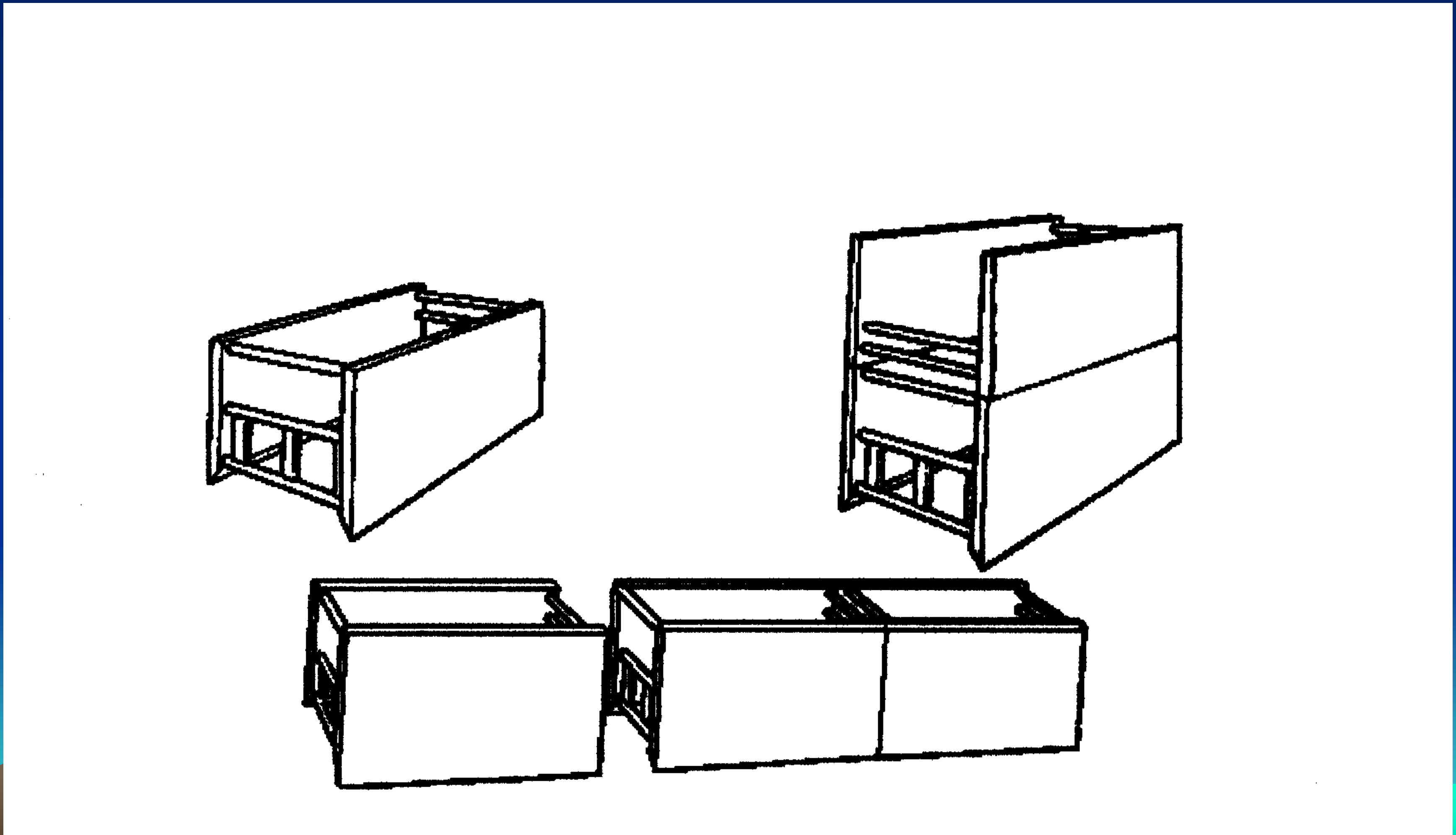


Hydraulic Shoring Usage

Alternatives to Timber Shoring 1926 Subpart P App E



Alternatives to Timber Shoring 1926 Subpart P App E



Alternatives to Timber Shoring 1926 Subpart P App E

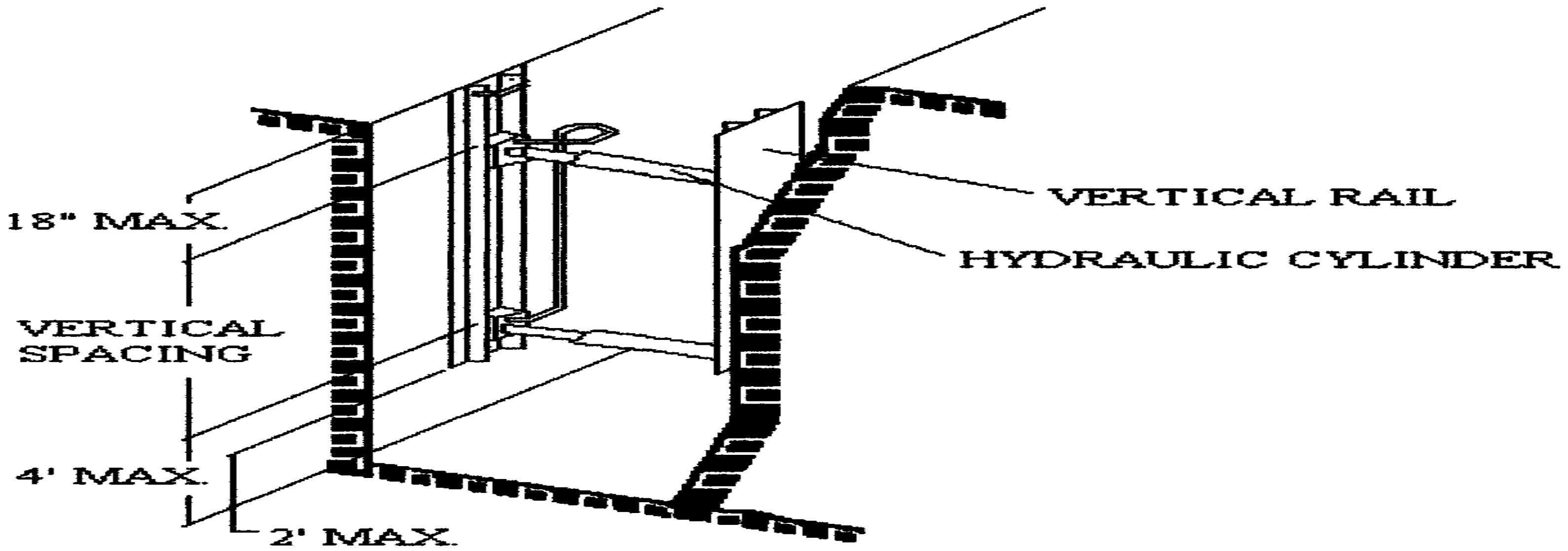


Figure 1. Aluminum Hydraulic Shoring

Selection of Protective Systems 1926 Subpart P App F

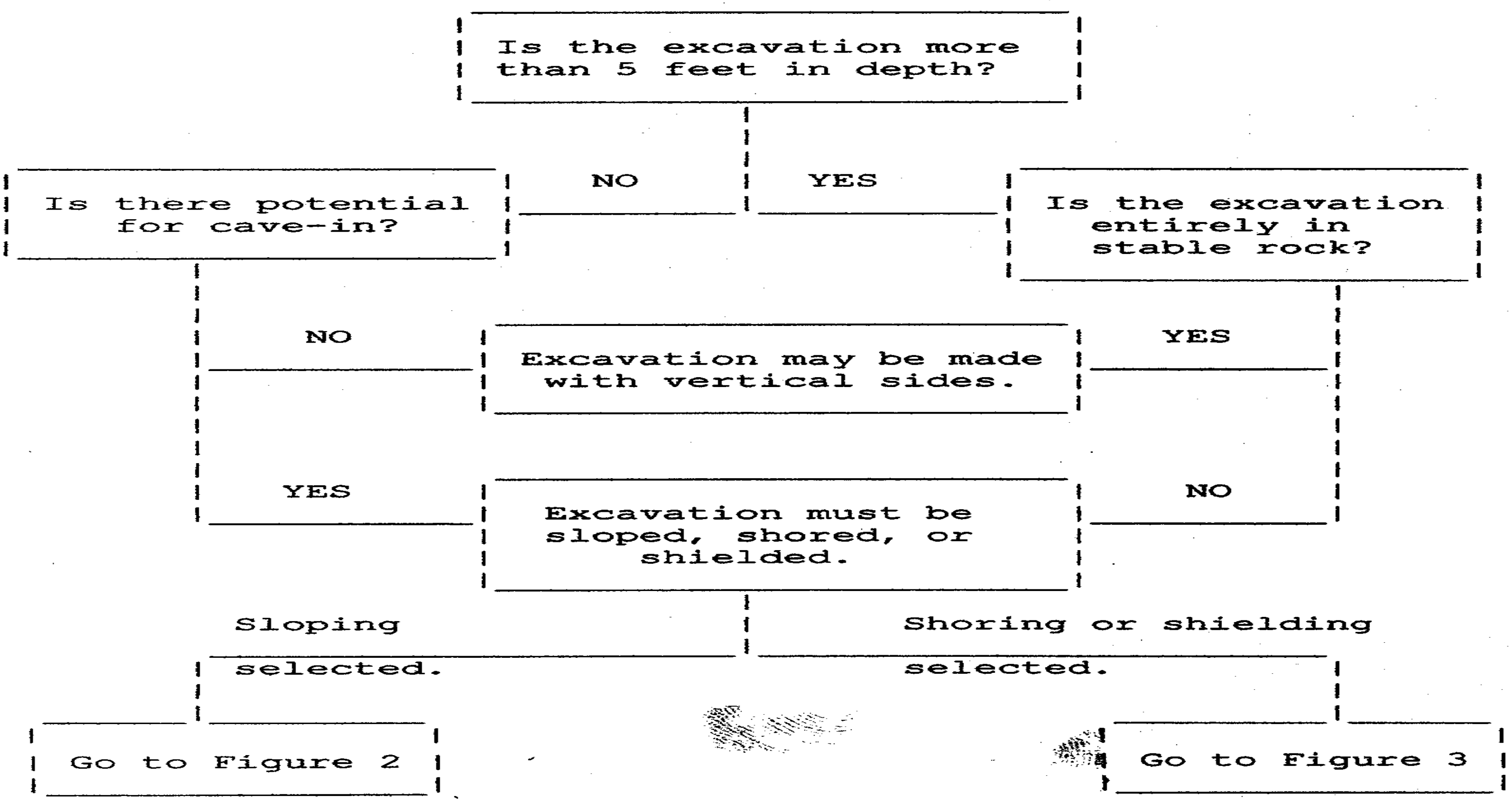


FIGURE 1 – PRELIMINARY DECISIONS

Selection of Protective Systems 1926 Subpart P App F

Sloping selected as the method of protection

Will soil classification be made in accordance with Sec. 1926.652(b)?

YES

Excavation must comply with one of the following three options:

Option 1:

Sec. 1926.652(b)(3) which requires Appendices A and B to be followed

Option 2:

Sec. 1926.652(b)(3) which requires other tabulated data (see definition to be followed.

Option 3:

Sec. 1926.652(b)(4) which requires the excavation to be designed by a registered professional engineer.

NO

Excavations must comply with Sec. 1926.652(b)(1) which requires a slope of 1 1/2 H:1V (34 deg.).

FIGURE 2 - SLOPING OPTIONS

Shoring or shielding selected as the method of protection.

Soil Classification is required when shoring or shielding is used. The excavation must comply with one of the following four options:

Option 1

Sec. 1926.652(c)(1) which requires Appendices A and C to be followed (e.g. timber shoring).

Option 2

Sec. 1926.652(c)(2) which requires manufacturers data to be followed (e.g. hydraulic shoring, trench jacks, air shores, shields).

Option 3

Sec. 1926.652(c)(3) which requires tabulated data (see definition) to be followed (e.g. any system as per the tabulated data).

Option 4

Sec. 1926.652(c)(4) which requires the excavation to be designed by a registered professional engineer (e.g. any designed system).

FIGURE 3 – SHORING AND SHIELDING OPTIONS

Other Factors Influencing Cave-Ins

- **Intersecting Trenches**
- **Previously Disturbed**
- **Vibration**
- **Surcharged Load**
- **Inclined Layers**
- **Drying / Saturation**
- **Free standing time**

Fallacies And Misconceptions

- At what depth/width do most incidents occur
  - Between 6-8 ft deep and less than 6 ft wide
    - Most utilities found in this area

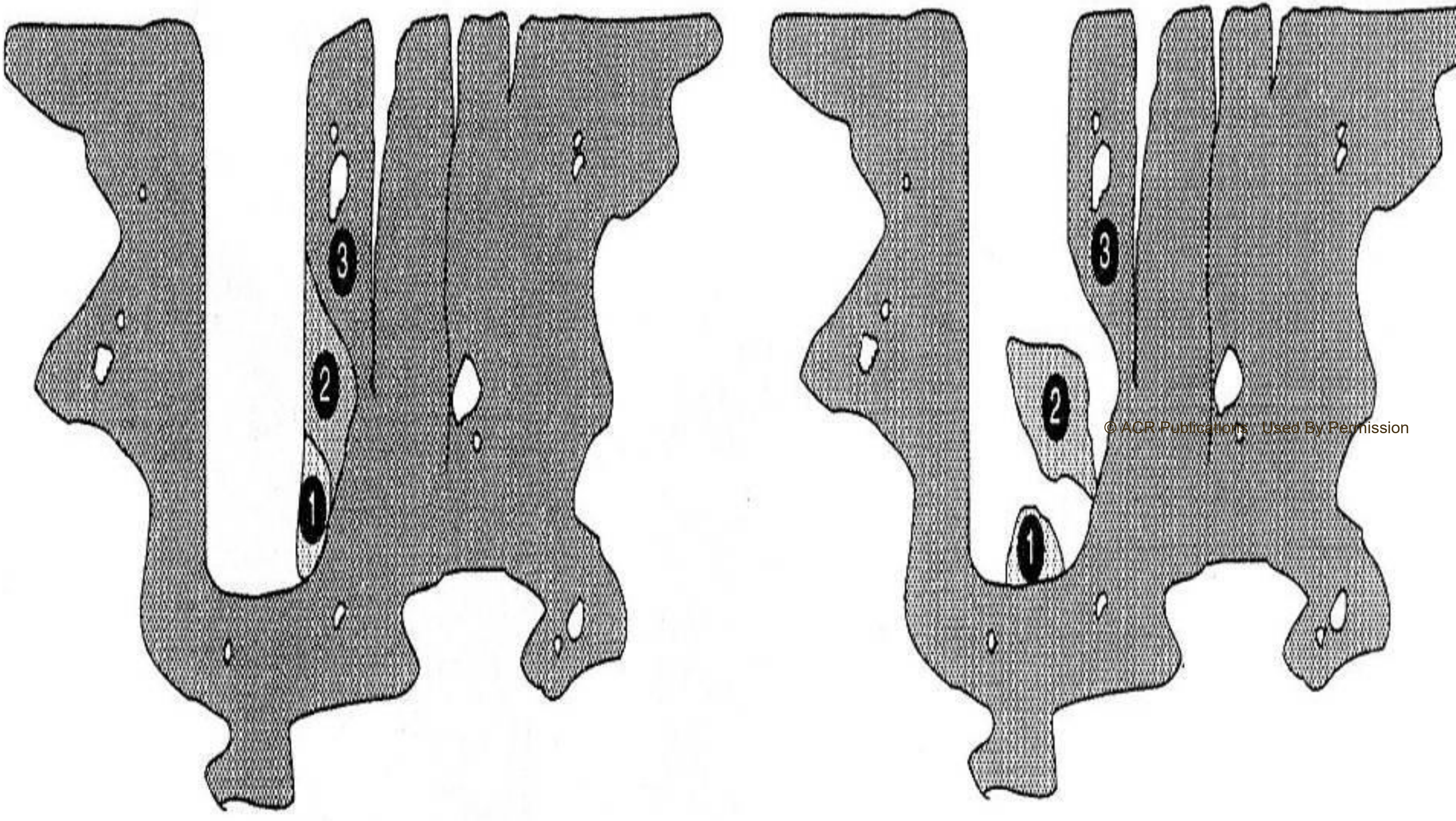
Fallacies And Misconceptions

- Most incidents occur in bad weather
  - False
  - Good weather - crews are more careful in bad weather

Fallacies And Misconceptions

- Clay is the least dangerous soil type
  - False
  - Clay looks strong but it is very deceptive - most fatal trench accidents occur in clay soil

THE TYPICAL CAVE-IN



Summary

- Excavation laws, regulations, standards
- Soil classification
- Soil testing
- Competent person responsibilities
- Hazards associated with trenches
- Protective systems

KEEP THE JOB SAFE

SO YOU CAN GO HOME SAFE!

Safety Training for the Focus Four Hazards in the Construction Industry

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- *It is not the intent of the content developers to provide compliance-based training in this presentation, the intent is more to address hazard awareness in the construction industry, and to recognize the overlapping hazards present in many construction workplaces.*
- *It should NOT be assumed that the suggestions, comments, or recommendations contained herein constitute a thorough review of the applicable standards, nor should discussion of "issues" or "concerns" be construed as a prioritization of hazards or possible controls. Where opinions ("best practices") have been expressed, it is important to remember that safety issues in general and construction jobsites specifically will require a great deal of site- or hazard-specificity – a "one size fits all" approach is not recommended, nor will it likely be very effective.*

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What Are the
Focus Four Hazards?

Electrical Hazards

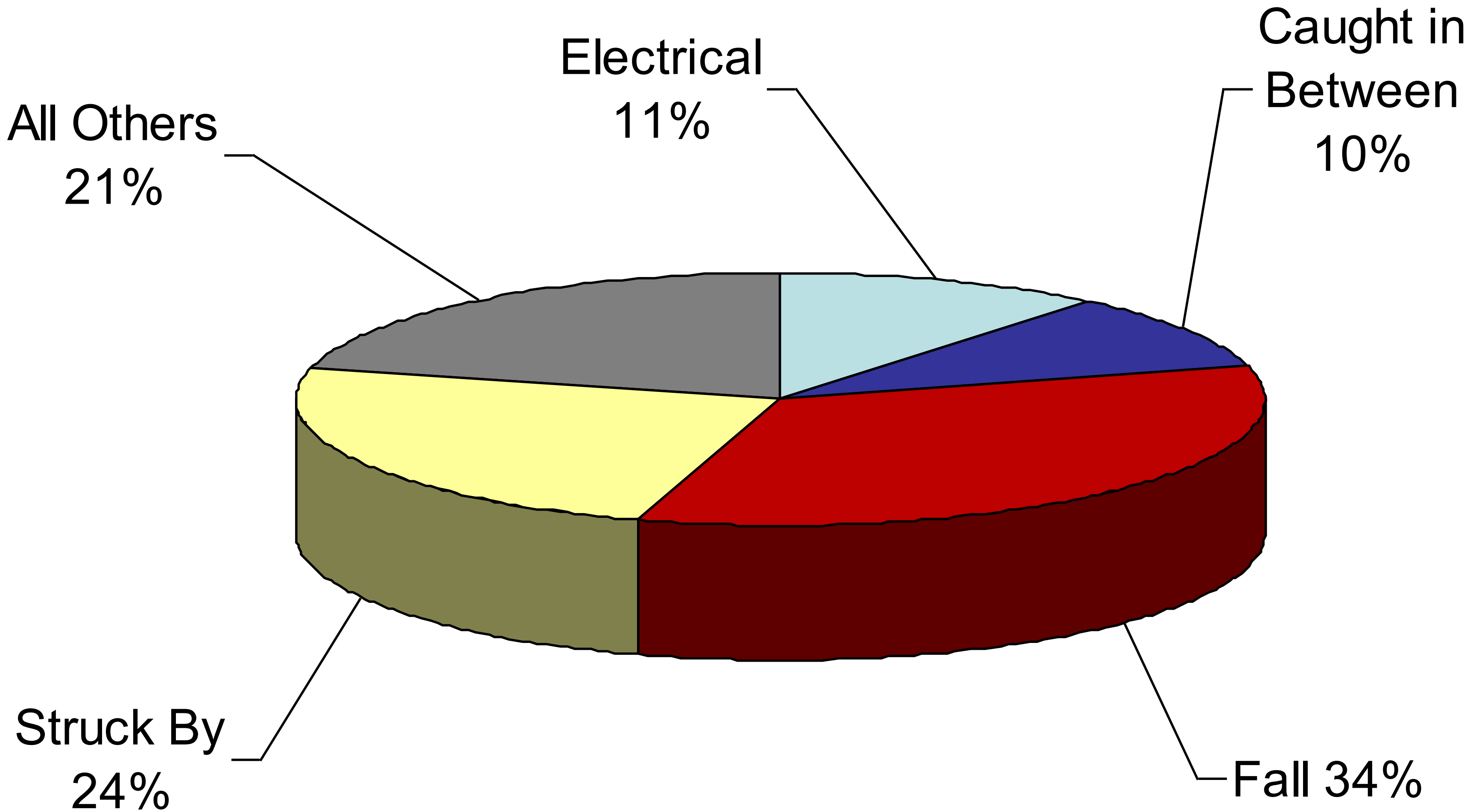
Struck-By Hazards

Caught-In-Between Hazards

Fall Hazards

Fatality/Injury Data

Fatality Data 2003 & 2004
2355 Total Fatalities



Source: Bureau of Labor Statistics

Primary Causes of Electrocution Fatalities

- Contact with Overhead Powerlines
- Contact with Live Circuits in Panels
- Poorly Maintained Cords and Tools
- Lightning Strikes

Primary Causes of Struck-by Fatalities

- Falling Objects
  - Rigging Failure
  - Loose or Shifting Materials
  - Equipment Tipover or Malfunction
  - Lack of Overhead Protection
- Vehicle and Equipment Strikes
  - Backing Incidents
  - Workers on Foot
- Flying Objects

Primary Causes of Caught-in-Between Fatalities

- Trench/Excavation Collapse
- Rotating Equipment
- Unguarded Parts
- Equipment Rollovers
- Equipment Maintenance

Primary Causes of Fall-Related Fatalities

- Unprotected sides, edges and holes
- Improperly constructed walking/working surfaces
- Improper use of access equipment
- Failure to properly use PFAS
- Slips and Trips (housekeeping)

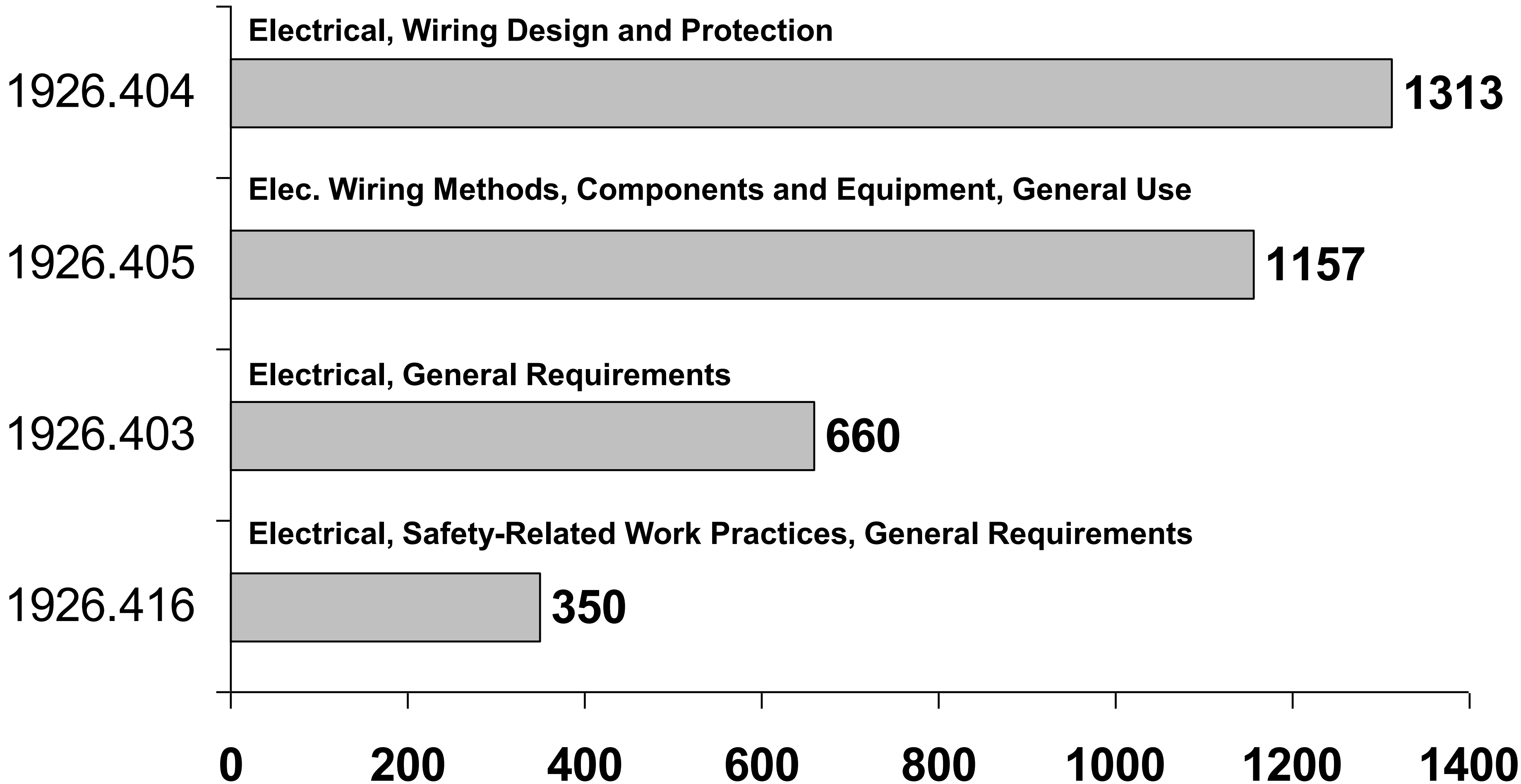
Citations

Top 10 Focus Four Citations (FY 2005)

Subpart	Citations	Total Dollar Value	Description
1926.451	8,410	$7,682,185	Scaffolding
1926.501	5,728	$7,176,729	Fall Protection Scope/Applications/Definitions
1926.1053	2,122	$964,811	Ladders
1926.651	1,794	$2,104,067	Excavations, General Requirements
1926.503	1,581	$823,501	Fall Protection Training Requirements
1926.20	1,560	$868,881	Construction, General Safety and Health Provisions
1926.100	1,519	$792,414	Head Protection
1926.453	1,379	$1,285,758	Manually Propelled Mobile Ladder Stands and Scaffolds
1926.404	1,313	$644,886	Electrical, Wiring Design and Protection
1926.652	1,264	$3,117,087	Excavations, Requirements for Protective Systems
1926.405	1,157	$344,814	Elec. Wiring Methods, Components and Equip, Gen'l Use

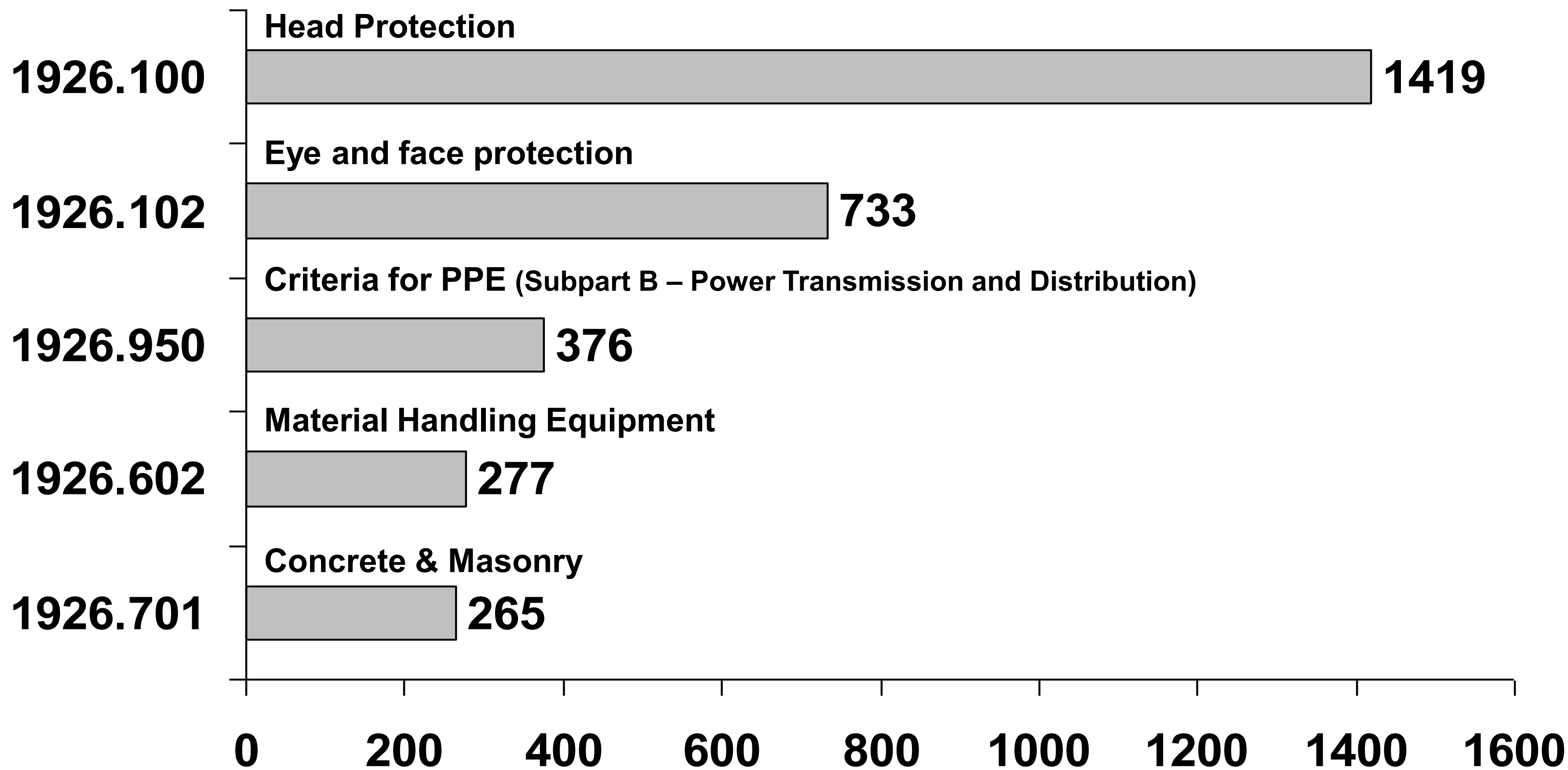
Citation statistics from Federal OSHA data for OSHA fiscal year 2005

Top Electrical Citations (FY 2005)



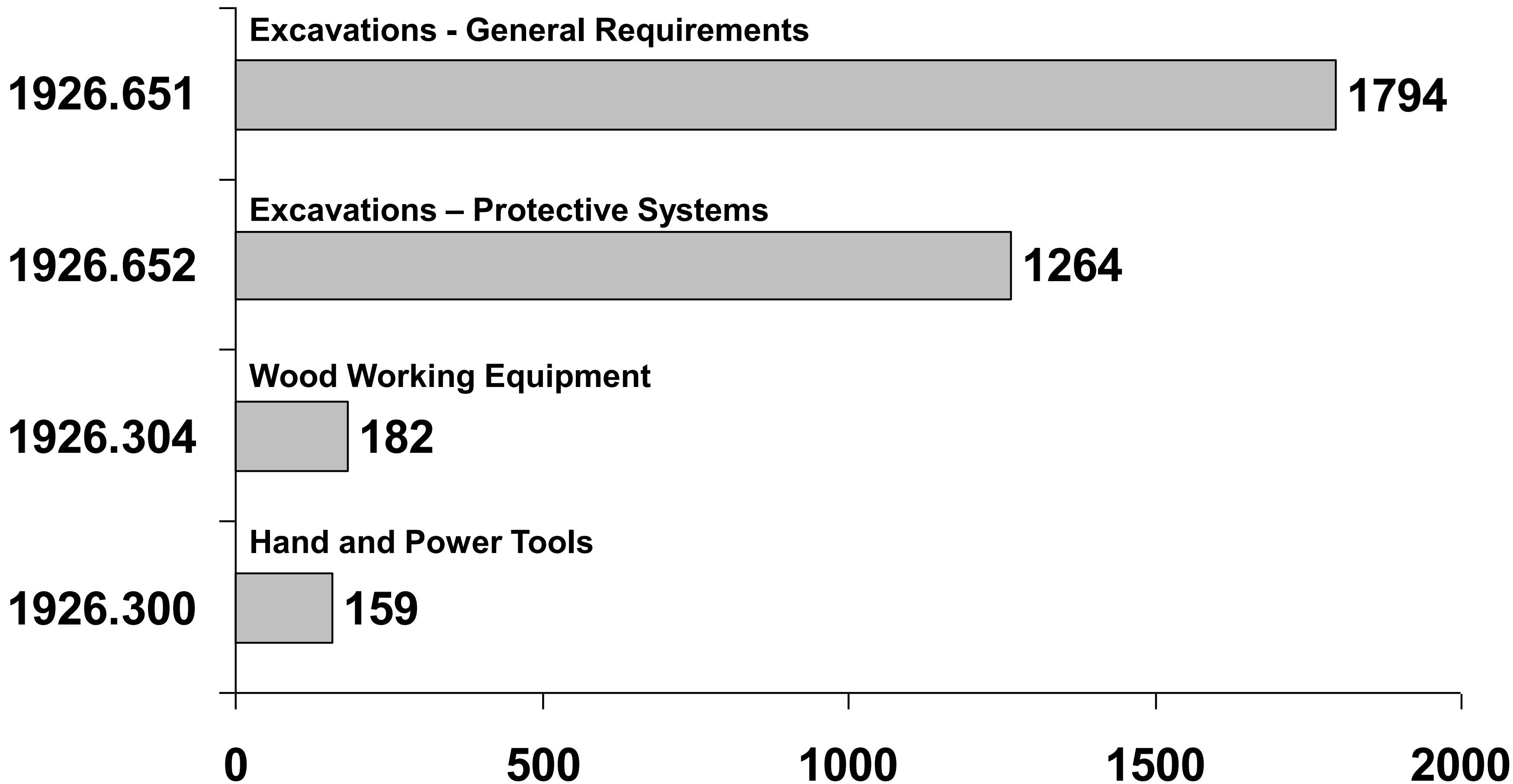
Citation statistics from Federal OSHA data for OSHA fiscal year 2005

Top Struck-By Citations (FY 2005)



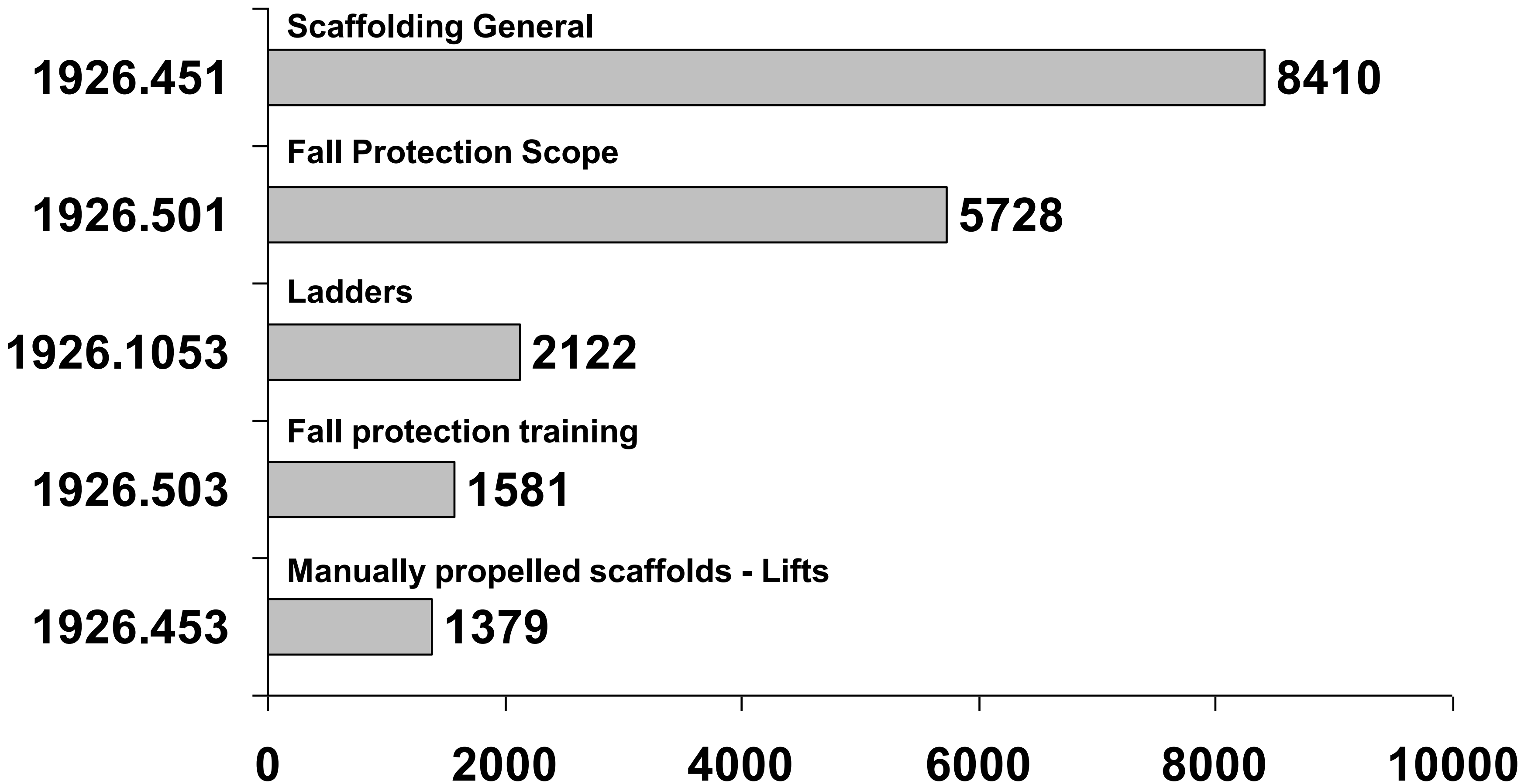
Citation statistics from Federal OSHA data for OSHA fiscal year 2005

Top Caught-in-Between Citations
(FY 2005)



Citation statistics from Federal OSHA data for OSHA fiscal year 2005

Top Fall Protection Citations (FY 2005)



Citation statistics from Federal OSHA data for OSHA fiscal year 2005

Fatality & Statistical Analysis

- 85% of all citations and 90% of dollars applied as fines are related to the Focus Four Hazards
- 79% of all fatalities are related to the Focus Four Hazards

NIOSH

FACE

Fatality Assessment and Control Evaluation Program

Division of Safety Research • 1095 Willowdale Road • Morgantown, West Virginia 26505 • Phone:(304)285-5916

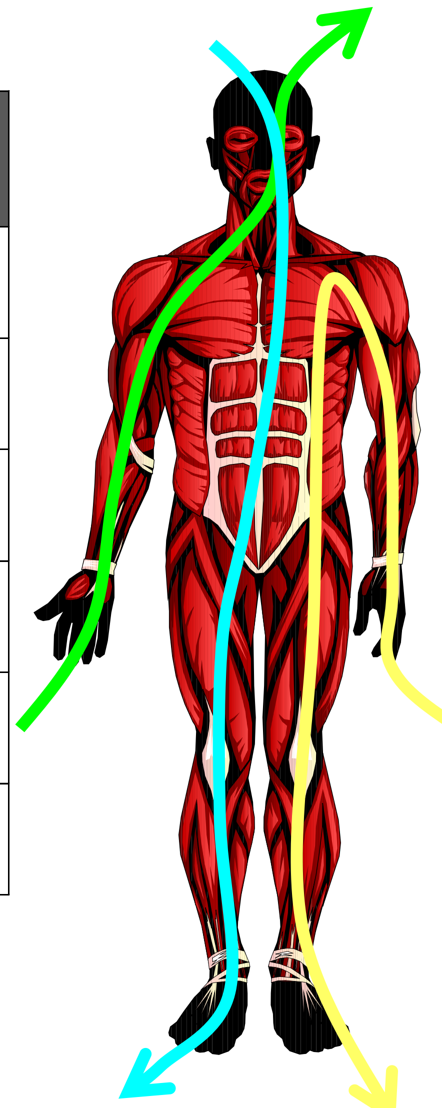
- NIOSH Fatality Assessment and Control Evaluation program (FACE) examples of fatalities caused by the Focus Four hazards
  - Electrocution
  - Struck-by
  - Caught-in
  - Fall

Electrical Hazards

Temporary Wiring and Lighting Systems

Electrical Harm

Estimated Effects of AC Currents (U.S. Standard 60 Hz)	
1 milliamp (mA)	Barely perceptible
16 mA	Maximum current an average man can grasp and "let go"
20 – 30 mA	Paralysis of respiratory muscles
100 mA	Ventricular fibrillation threshold
2 Amps	Cardiac standstill and internal organ damage
15/20/30 Amps	Common U.S. household breakers

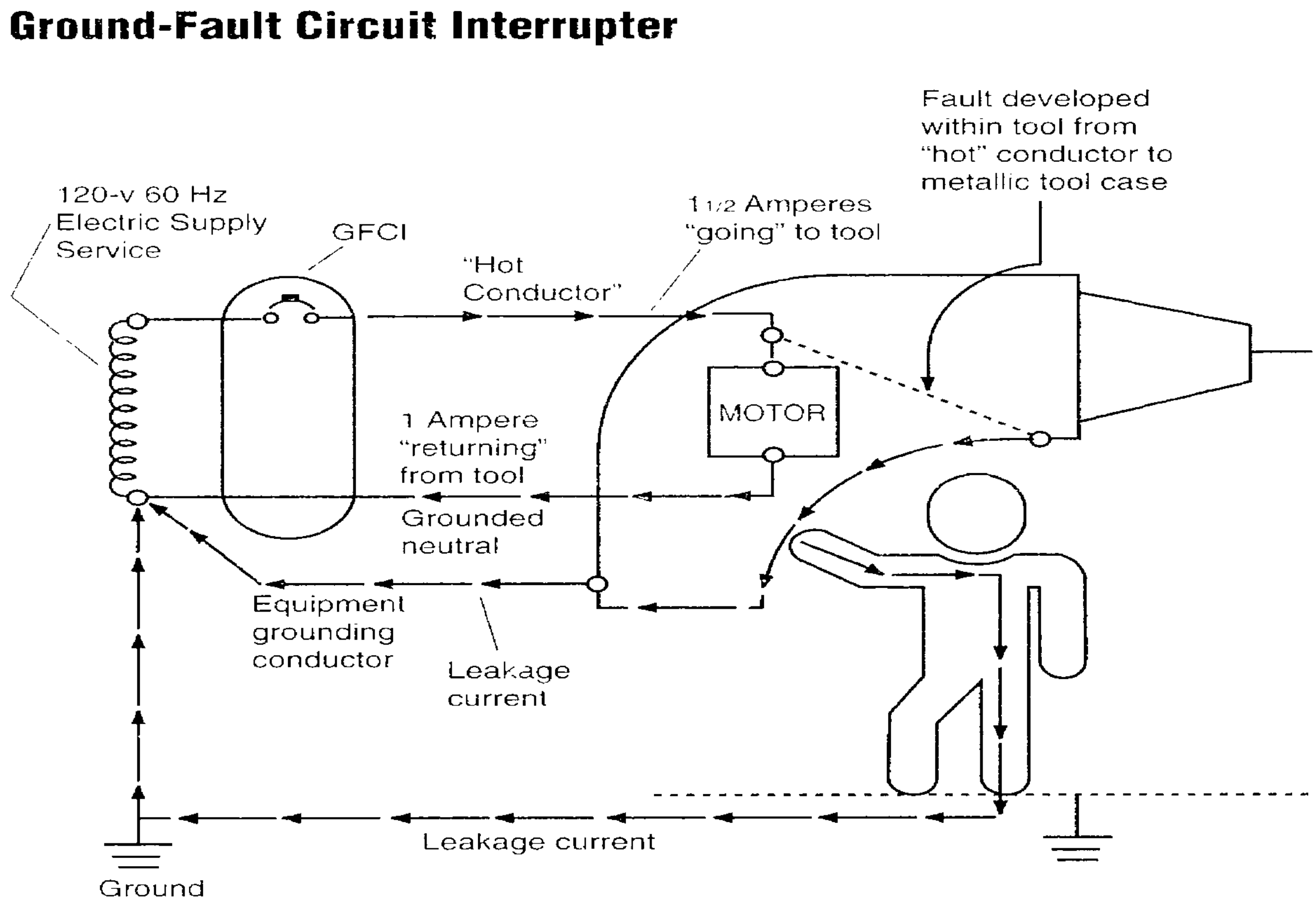


PATH: Harm is related to the path by which current passes through the body.

Ground Fault Circuit Interrupters (GFCI)

- Monitors current flow between the hot and neutral wires
- Trip between 4-6 mA in 1/40th of a second

How GFCIs Work

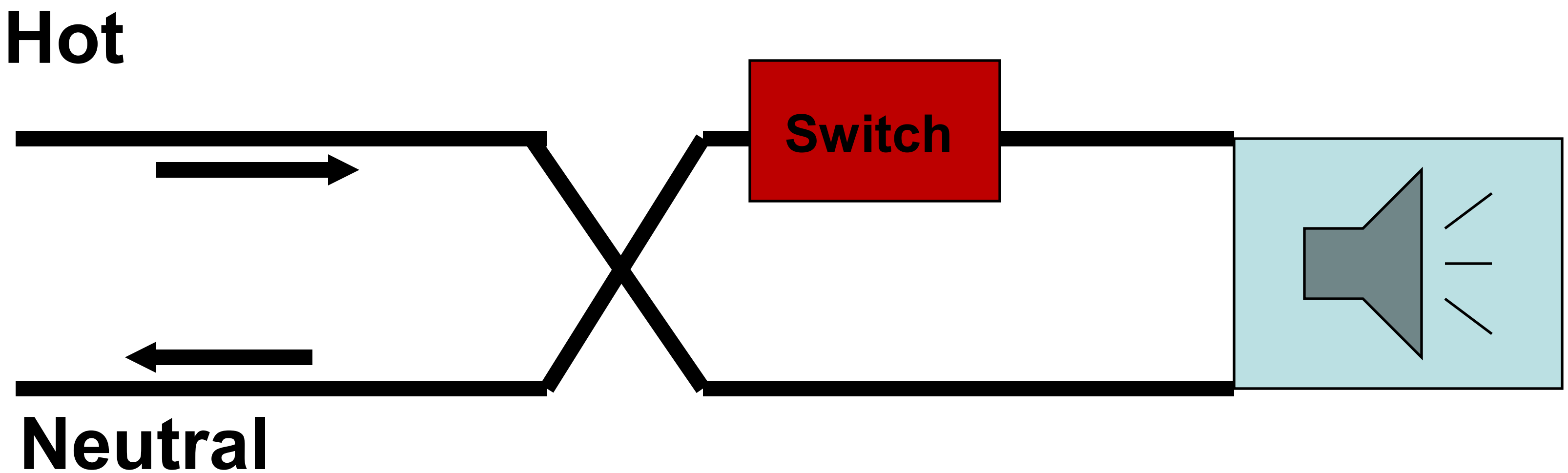


Assured Equipment Grounding Program

- Inspection is your primary protection
- Best practice recommends documented testing every 3 months
- Color coding most common:

Winter	Spring	Summer	Fall

Reverse Polarity Diagram



Tool could be hot with the switch off

Reverse Polarity

- Hot wire and neutral wire are reversed
- Even though a switch is off, the circuit could be hot

Electrical Extension Cords

- The primary insulation is cut
- If the insulation was also cut on the conductors, exposing bare wires, they could come in contact with someone
- Damage is often caused by repeated stretching or being run over

Electrical

- Wiring like this must be protected in closed boxes
- There is the potential of electric shock from loose wire nuts or exposed conductors

Electrical Panel Boxes

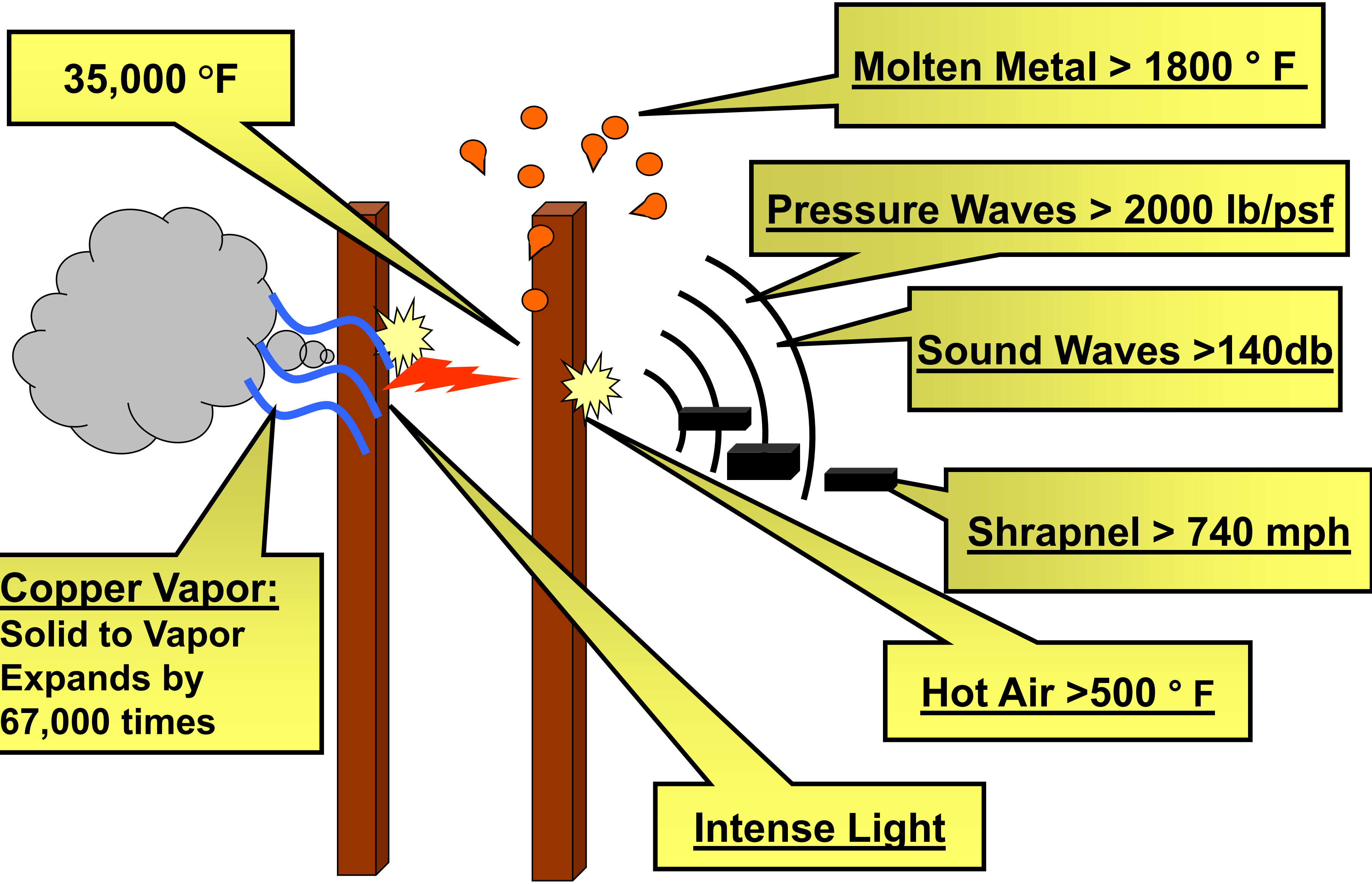
- Live electrical panels must be completely covered with a hard cover (original intended equipment)
- Employees could be exposed to live wires around the perimeter of this box
- No Cardboard!

Arc Flash Prevention

An electric arc:

- Typically lasts less than a second
- Has extremely high radiant (heat) energy
- Is explosive in nature (exerts great force)
- Can ignite or melt conventional work clothing

Electrical Arc



NFPA 70E Requirements

- Arc flash boundaries must be known
- Safe approach distances established and maintained
- Marking equipment relative to hazards
- Electrically safe (voltage rated) tools
- PPE (ATPV)
- Training

The Best Way to Work on Energized Electrical Equipment?

DON'T!

- Shut it down and lock it out
- Establish an electrically safe working condition

Overhead Powerlines


19 10:33AM

The Sad Reality

Power Line Facts

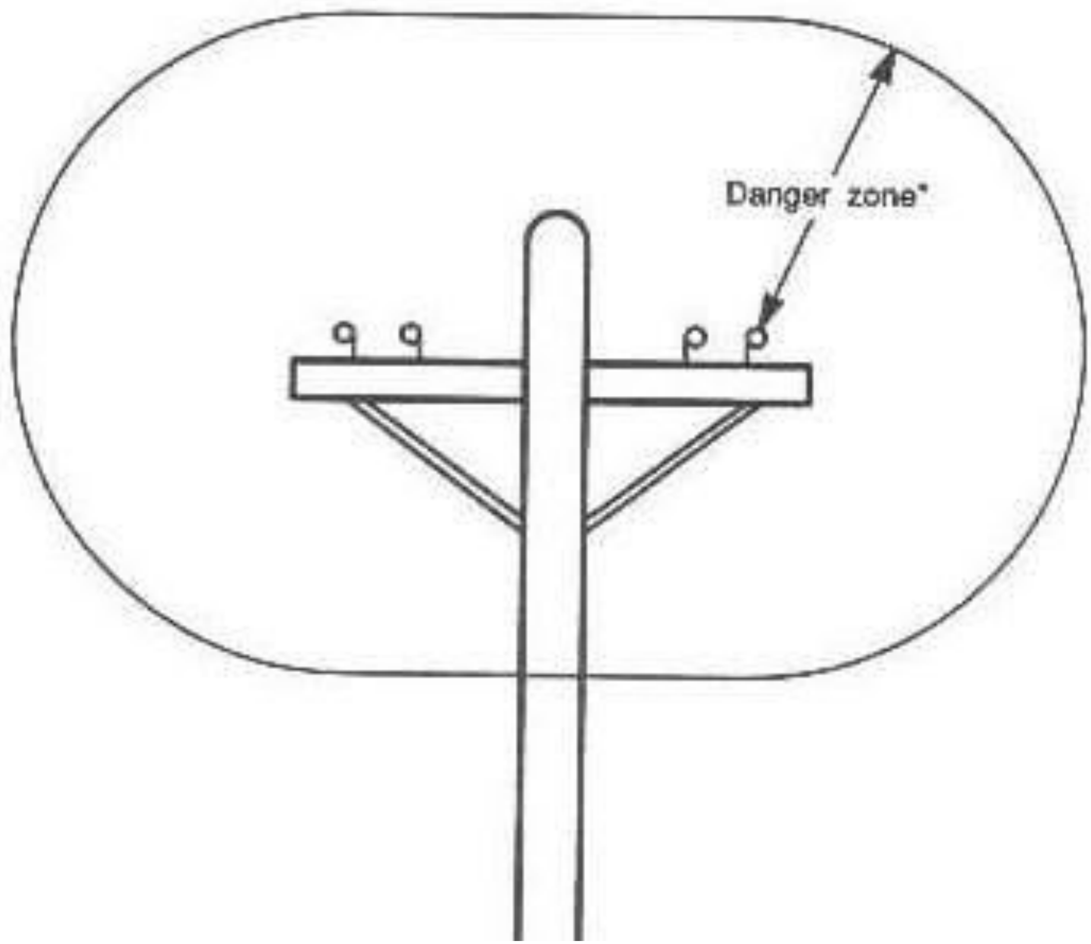
- Overhead lines are typically not insulated. Any covering is generally a weather protection, not insulation.
- Over 90 percent of the contacts occur on overhead distribution lines
- Operators are normally safe if they stay on the equipment
- Ground personnel are over 8 times more likely to be killed

Electrical Damage to the Body

- If you touch a power line, electricity will attempt to travel through your body
- When electricity travels through the body, it heats up and burns body tissue internally
- Electricity leaves the body violently, causing burns or even blowing an exit hole

Maintain Safe Working Clearance

- All equipment – ladders, scaffolds, cranes, trucks, forklifts, etc. – MUST maintain a minimum 10 foot clearance from 50 kV or less
- Add .4 inches for every kV over 50 kV



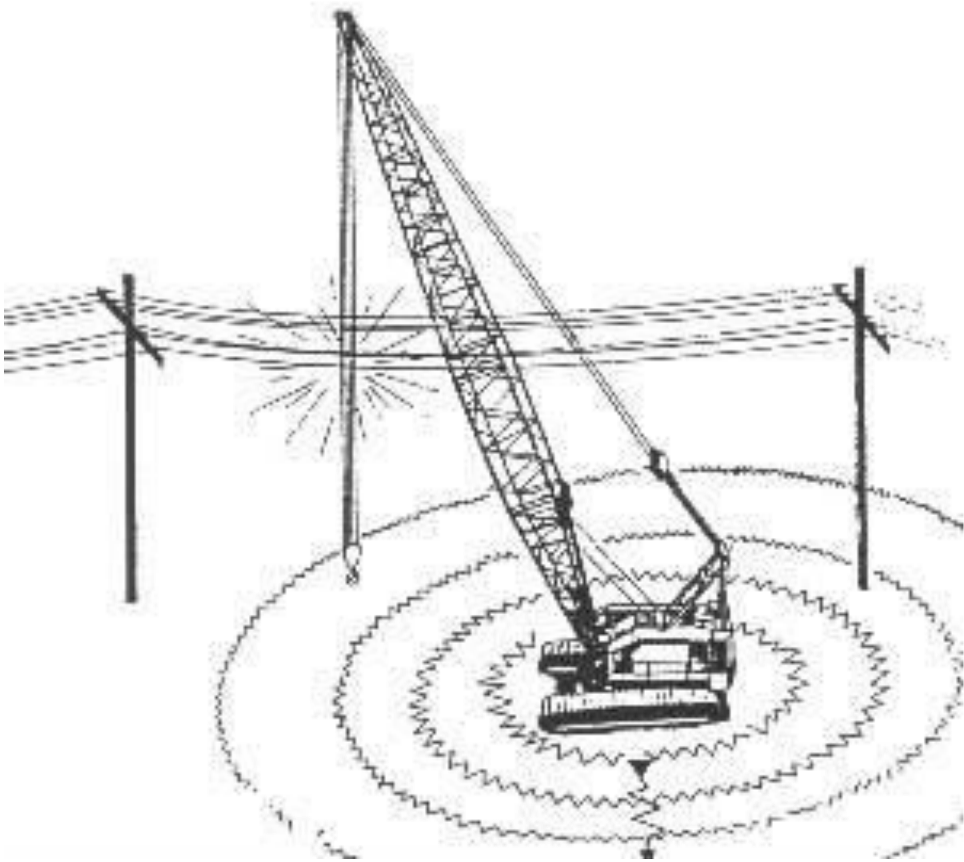
MINIMUM 10' Distance

Ensure Adequate Clearance

- Install flag warnings at proper distances
- If it is difficult for an operator to see the power lines, designate a spotter
- If you cannot maintain adequate clearances, you must have the power company insulate, move or de-energize the line

The Ground May Be Hot!

- Electricity dissipates with the resistance of the ground
- As potential drops, fields develop around the electrified machine
- If you step across a line of unequal potential, you could be electrocuted



If Contact Occurs

- Stay on the machine if possible
- Warn all others to stay away
- Notify power company immediately
- Attempt to move away but assure line is not “connected”

Bail Out Procedures

- If you must get out, jump with your feet together
- Do not touch the machine
- Hop or shuffle out of the area

Incident Free

- Planning
- Training
- Inspection
- Oversight
- Lessons learned
- Re-evaluate

Struck-By Hazards


Crane Tip Over and Failure Incidents

- Soft Ground
- Inadequate outrigger support
- Overload
- Crane out of level
- Boom strike

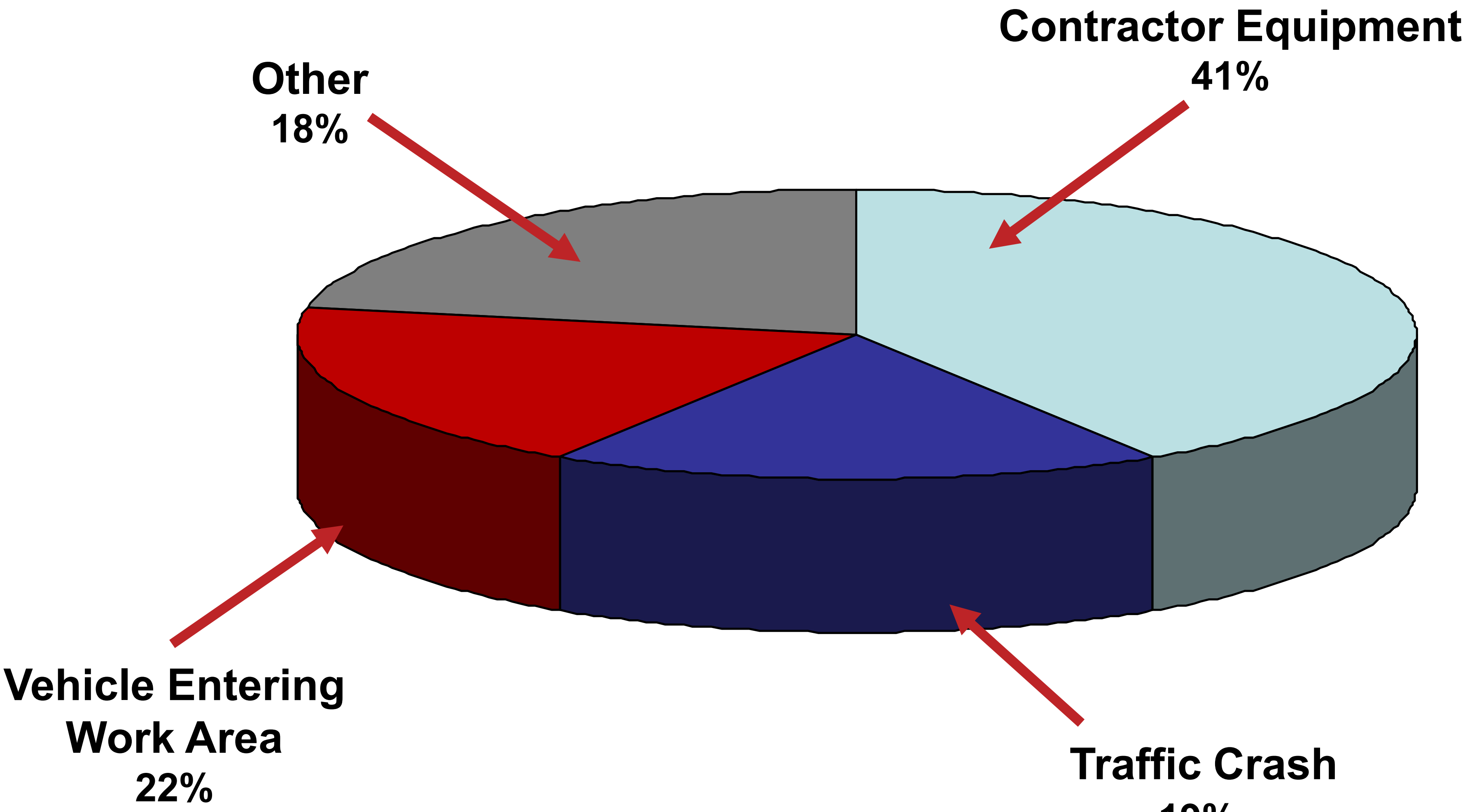
Fatalities Handling Loads

- Struck by the load
- Rigging equipment failure
- Rigging equipment overload
- Improper rigging technique

Inspect All Slings

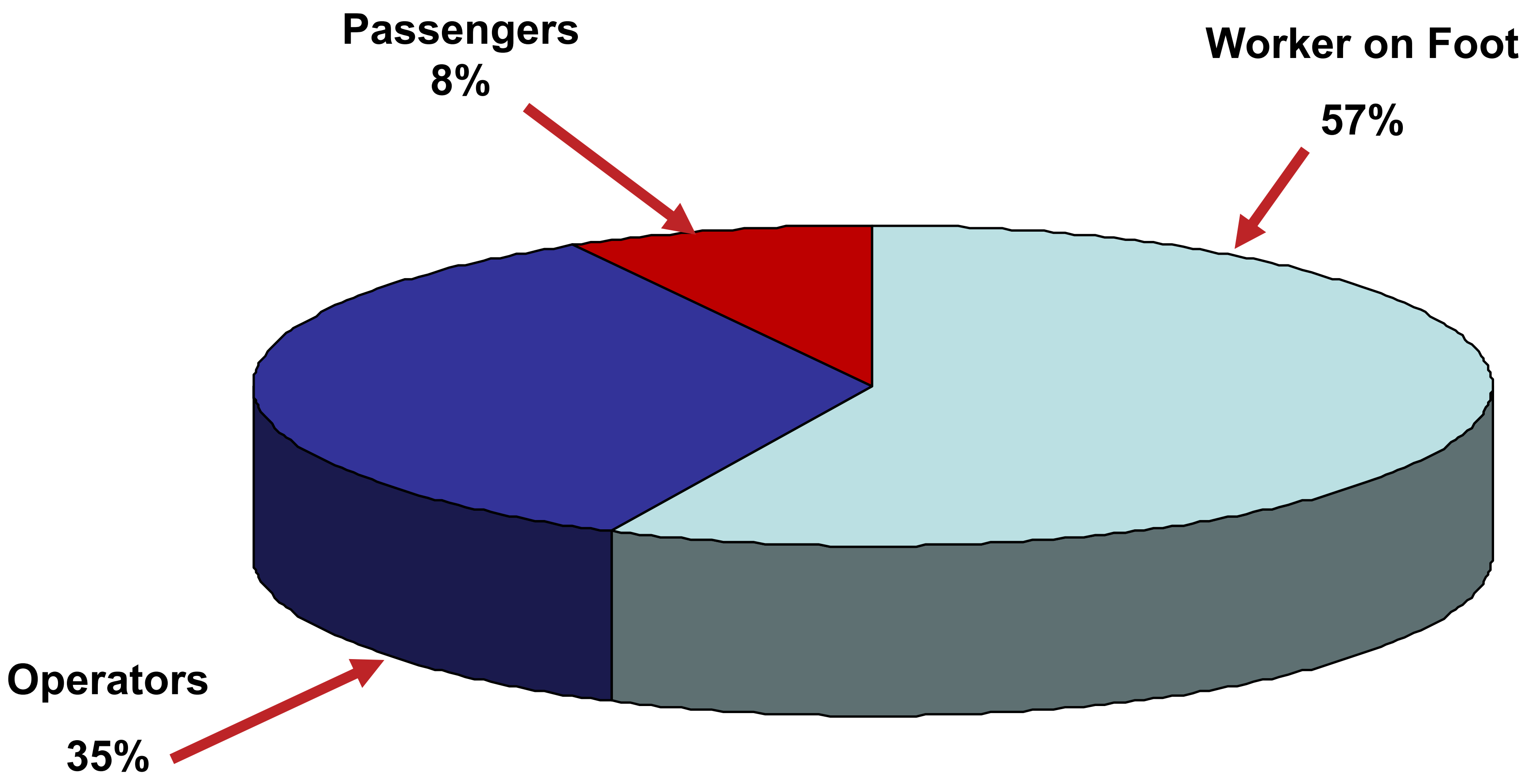
- Slings must be inspected before each use
- Slings should have tags that indicate capacities

Highway Worker Fatalities



Source: Bureau of Labor Statistics

Highway Equipment Related Fatalities



Source: Bureau of Labor Statistics

Equipment & Vehicle Hazards

Striking Workers on Foot

Poor Worker Position

- This worker is out of the driver's mirror view

Pinned In/Under Equipment

- A truck driver was working between the frame and dump box of a dump truck
- The dump box dropped suddenly, crushing his head

Equipment Does Roll Over!

Wear Your Seat Belt!

- When there is a roll-over hazard, there must be a seat belt
- Always wear the seat belt
- Only ride in the seat provided
- No riding in buckets, on fenders or on steps

Backing Equipment

- Have audible back-up alarms
- Have a spotter to direct the operator if visibility is restricted
- Keep adequate clearance behind the vehicle
- Always pay attention to backing equipment

High Visibility Clothing

- High visibility clothing refers to reflective garments that workers should wear whenever their work place contains hazards related to low visibility or when they work near vehicles or moving equipment

Loading Equipment

- Trailer secure and on a level surface
- Inspect the deck for debris, blocking or chains
- Have a spotter help properly align the equipment up the ramps
- Be sure equipment is properly secured

Maintenance Hazards

Workers under equipment that is insufficiently supported

Materials Handling and Storage

Stack and Store Materials Properly

- No more than 4:1 height to base ratio
- Secure all loads
- Stack, block, and interlock
- Keep at least 6' back from edges
- Be prepared for heavy weather

Transporting & Unloading Material

- Pipes, stacks of material, etc., can roll off a truck when bindings are removed
- Unsecured material can fall from forklifts and other equipment

Pneumatic Nailers

- Penetration checks must be made
- Safety’s must be operational
- All proper PPE must be worn

Powder Actuated Tools

- Never load the tool until you are ready to use it
- Always insert the fastener before cocking the tool
- Never cock the tool against the hand or point the tool at anyone
- Always check penetrations and use proper loads
- Wear appropriate PPE

Incident Free

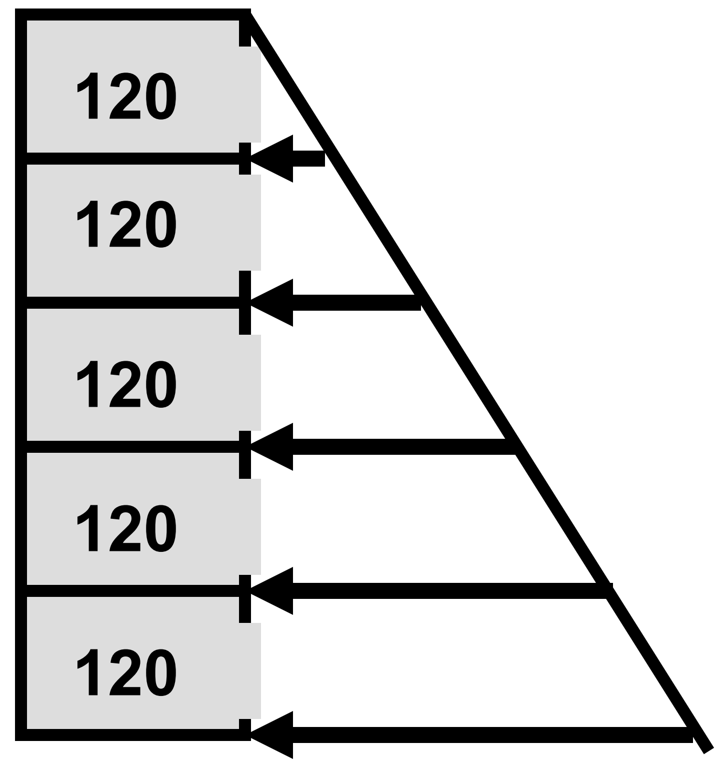
- Planning
- Training
- Inspection
- Oversight
- Lessons learned
- Re-evaluate

Caught in Between Hazards

Trench & Excavation

Soil Mechanics

- Soil weighs about 100 – 140 lb/cu.ft.
- Each foot of depth adds more pressure side pressure
- Once the pressure exceeds the ability of the soil to support itself, failure is possible

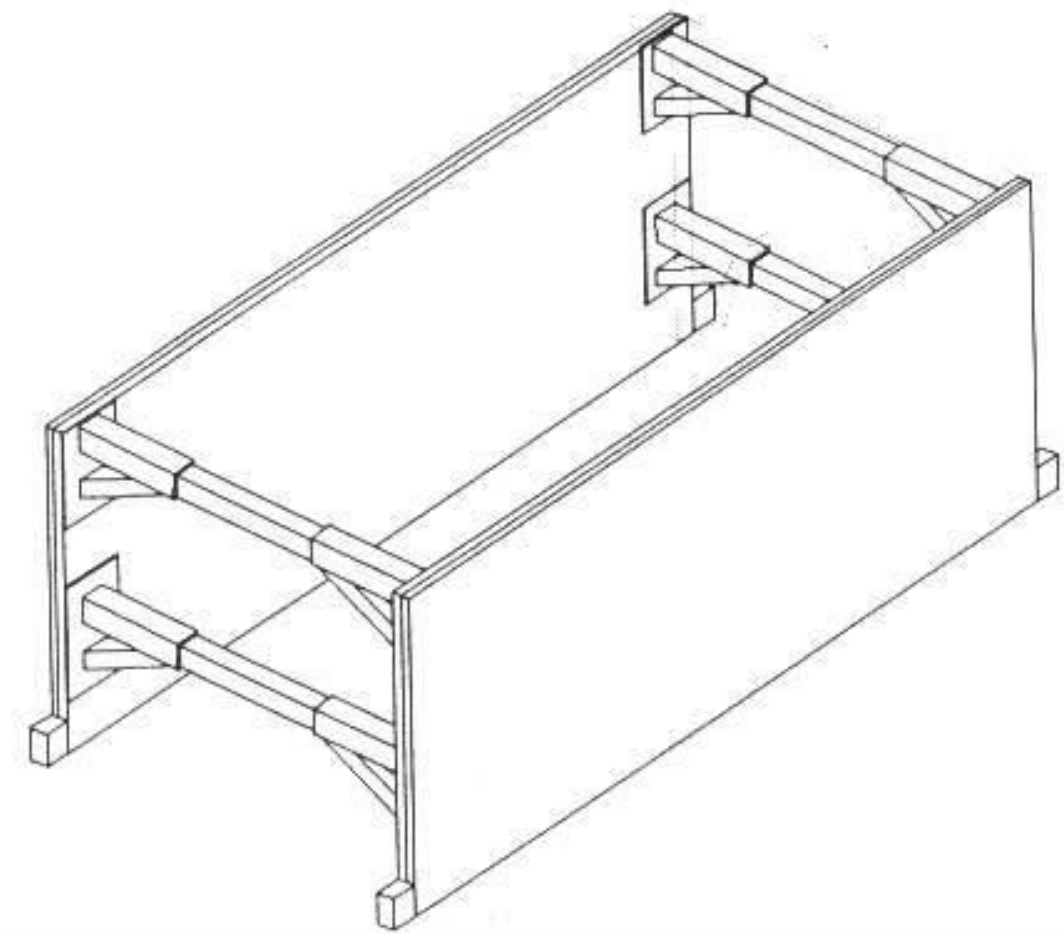


Basic Requirements
CFR 1926.650-654

- Work must be supervised by a "Competent Person"
- Protection is required over 5 feet deep or if there is a possibility of a cave-in
- Excavations must be inspected daily and/or with changes
- Access/Egress is required over 4 feet deep
- A rescue plan must be in place

Trench Shields or Boxes

- Engineered for Type C soils
- Can be used with all classes of soils
- Shields can be moved horizontally with workers inside
- Worker must stay inside shields



Barricade Excavations

- Excavations must be barricaded or marked if they are not readily visible

Utility Strikes

Rescue

- A rescue plan must be in place
- Rescue of a buried worker is a slow and tedious process

Causes of Fatalities Crushing

Caught under the truss boom during dismantling

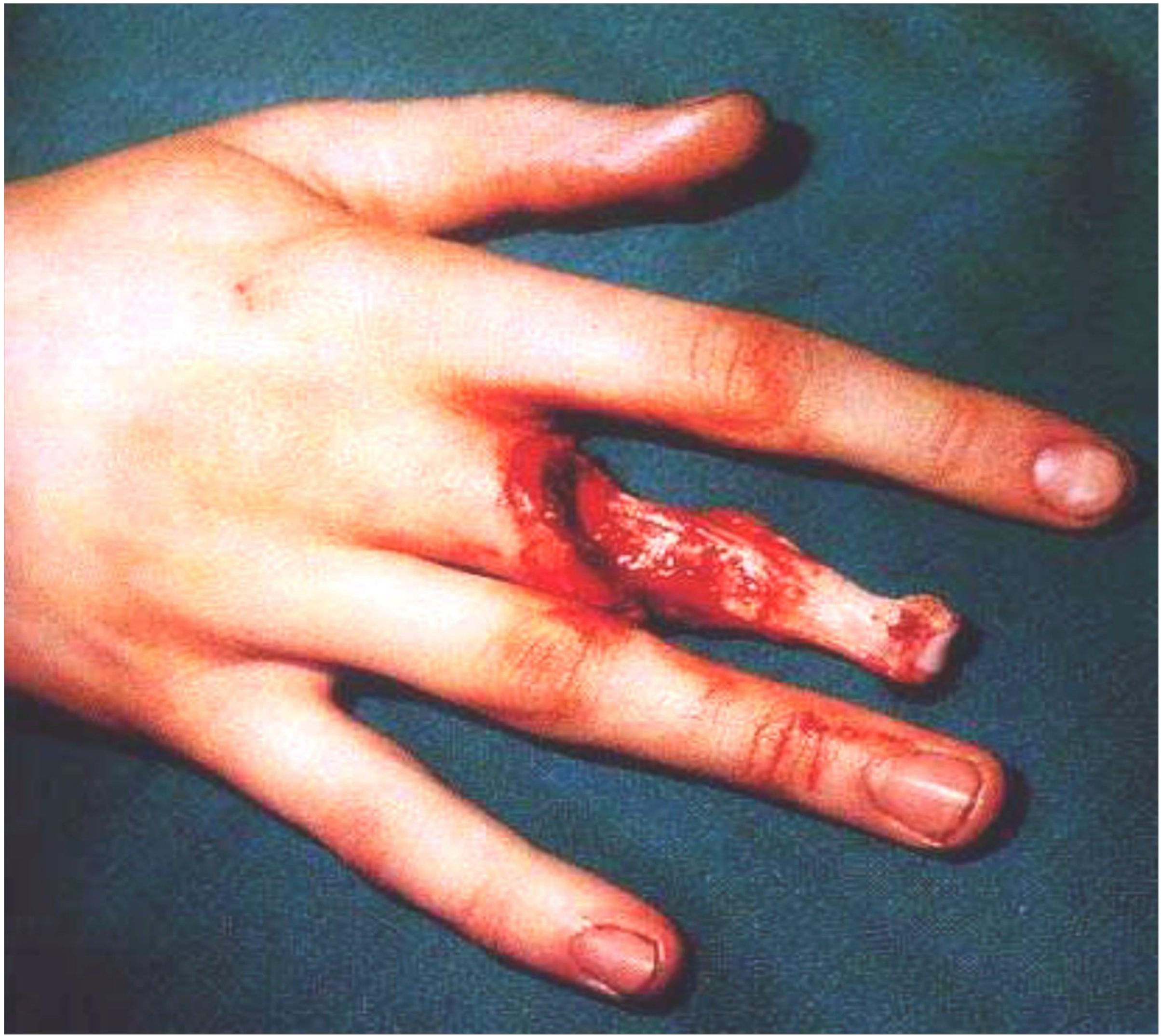
Caught between crane and carriage

Swinging/Rotating Equipment

Barricade Swing Radius

- Barricade the swing radius
- Maintain 2' distance from fixed objects

Mechanical Moving Parts



Preventing / Controlling / Abating Maintenance Hazards

- Lockout equipment
  - Place an energy-isolating device over the energy source
  - Bleed off stored energy
  - Lock it until the repair/maintenance work is completed
- Tag out the equipment (when Lockout is not possible)
  - Place a tag over the energy source and start-up mechanisms
  - Label it with a written warning that remains in place until the work is done
  - Block disabled equipment

Machine Guarding

- Install and maintain all guards on tools and heavy equipment

Miter Saws

This guard is
bolted open

Guards must cover the blade and only retract as the blade cuts through material.

Grinders & Abrasive Saws

- Guards must remain in place and eye protection must be worn
- Best practice is to use face shields and hearing protection

Dumping Trucks

- Stay clear of dump trucks while they are dumping
- Trucks can become unstable with the boxes raised
- Watch for spillage out of the end gates
- If an end gate chain breaks, you could be covered in material

Incident Free

- Planning
- Training
- Inspection
- Oversight
- Lessons learned
- Re-evaluate

Fall Hazards

Roofs

Methods of Roof Fall Protection

Guardrails and warning lines