

Safety ....is a way of thinking

Jason Humphries &  
Todd McCarley

Alabama League of  
Municipalities

Loss Control Division



# Our Mission

- To assist our member in preventing as many accidents as possible.
- Dollar figure of total incurred work comp claims above \$20,000.00
- 01-01-2001 thru 08-03-2005
  - \$6,329,086.07

# Summary of claims above \$20,000.00

- 1478 claims
- Back-242
- Head-50
- Face-16
- Lungs-34
- Eye-116
- Knee-104

# General Hazards Associated with Utility Operations

- **Vehicle operations**
- **Confined spaces**
- **Excavating, trenching, & shoring**
- **Landscaping & maintenance activities**
- **Hazardous materials, chlorine, & sulfur dioxide**
- **Electrical hazards**

# What are some of the consequences when safety is overlooked?

➤ **Injuries**



➤ **Reduced workforce**

➤ **Reduced wages for injured**



➤ **Higher insurance premiums**

➤ **Diminished morale**



# What are some of the reasons safety is overlooked?

➤ **Lack of knowledge**

➤ **Lack of training**

➤ **Acting in haste**

➤ **Complete carelessness**



# All accidents arise from one of the four elements!

✓ **People**



✓ **Equipment**

✓ **Materials**

✓ **Environment**



## ➤ **People**

- **Employees may be inadequately trained**
- **Employees may not be aware of inherent hazards**

## ➤ **Equipment**

- **May be defective/outdated, inadequate safety guards**
- **May not be used for intended purpose**

## ➤ **Materials**

- **Employees may be improperly trained in handling of materials**
- **Hazardous methods or procedures may be practiced when handling materials**

## ➤ **Environment**

- **Working on right of ways or in the middle of a busy street**
- **Physical elements of the environment, (rain, temperature, noise)**

Is anything wrong with this ?



# Summer Safety

- Safety in the Sun
- Problems with the Heat

# Safety in the Sun

- Skin Cancer.....an epidemic
- One million cases this year
  - Basal cell....75%
  - Squamous cell...20%
  - Melanoma.....32,000 diagnosed / 7,200 deaths
    - Intense sun exposure/ 2 or 3 severe sunburns before age 18 dramatically increases chance of melanoma later on
    - Know the symptoms
      - A.....Asymmetry
      - B.....Border
      - C.....Color
      - D....Diameter

# Sun exposure safety tips

- Wear a hat
- Use sunscreen....SPF 30
- Limit exposure between 10:00 AM and 3:00 PM if possible

# Heat related illnesses

- Heat Cramps
- Heat Exhaustion
  - Cool clammy skin pale in color, headaches, dizziness, l.o.c., nausea
  - Move patient to a cool area, elevate feet, loosen clothing, give small sips of water, cool water towels placed around arm pits, neck and groin areas.....call 911

# Heat

- Heat Stroke
  - Dry pale skin (no sweating), possible seizures, may collapse/pass out
  - Treat similar to heat exhaustion, if available place ice under arm pits and in groin area
  - Serious medical emergency...50% of heat stroke victims will die
- Be alert for *repeat* heat stress victims
- Solution....drink, drink, drink...limit alcohol, no big meals

# Do you have employees trained in CPR ?

- Local Fire Dept
- American Red Cross
- First responder training important...it *Could* happen to you

Let's really focus!



# Vehicle Safety

- Inspect use of vehicle before use daily
- As required by law, ALWAYS buckle seatbelt !
- Don't allow yourself to be easily distracted; try to avoid talking on cell phones, reading, etc... while driving
- Focus on driving, we must drive **DEFENSIVELY** !



# Smart Driving



- **Buckle up!**
- **Don't speed or drive too slowly**
- **When working on or near right of ways, always activate hazard lights & wear reflective PPE's**
- **Always ensure that your vehicle is properly loaded and the load is adequately secured**

**Over 41,000 people  
killed  
annually due to motor vehicle crashes.**



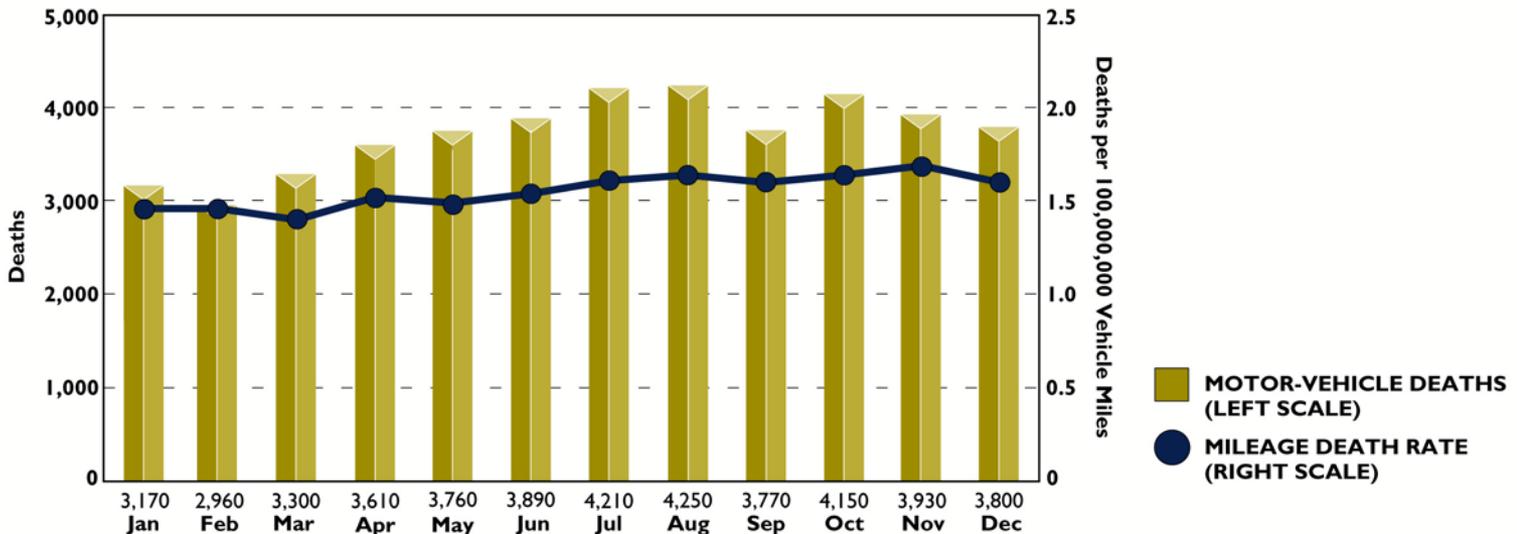
**2,000,000 more suffer disabling injuries  
from vehicle crashes.**

# Defensive Driving

- Risks
- Challenges
- Key Program Points
- We offer a proactive driver training course

# Total Motor Vehicle Deaths by Month...Be Careful Going Home!

MOTOR-VEHICLE DEATHS AND MILEAGE DEATH RATES BY MONTH, 2003



# Stay alert to your surroundings.

- In a challenging driving environment



Keep Your Eyes on the Road!





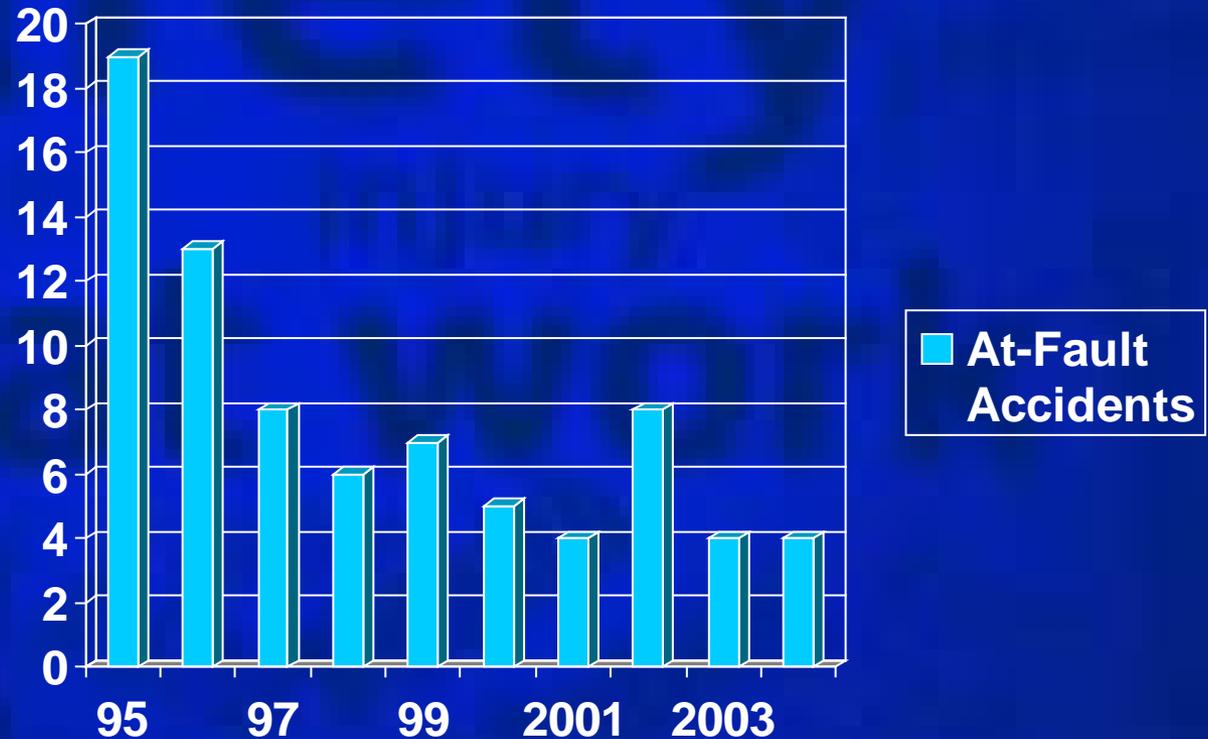
# Signs are not Always Effective



# Driving tips

- Aim High in Steering
- Get the Big Picture
- Keep Your Eyes Moving
- Leave Yourself An Out
- Make Sure They See You
  - (Smith System Driver Improvement Institute)

# Positive Results Can Occur/At-Fault Vehicle Accidents- Montgomery Water Works

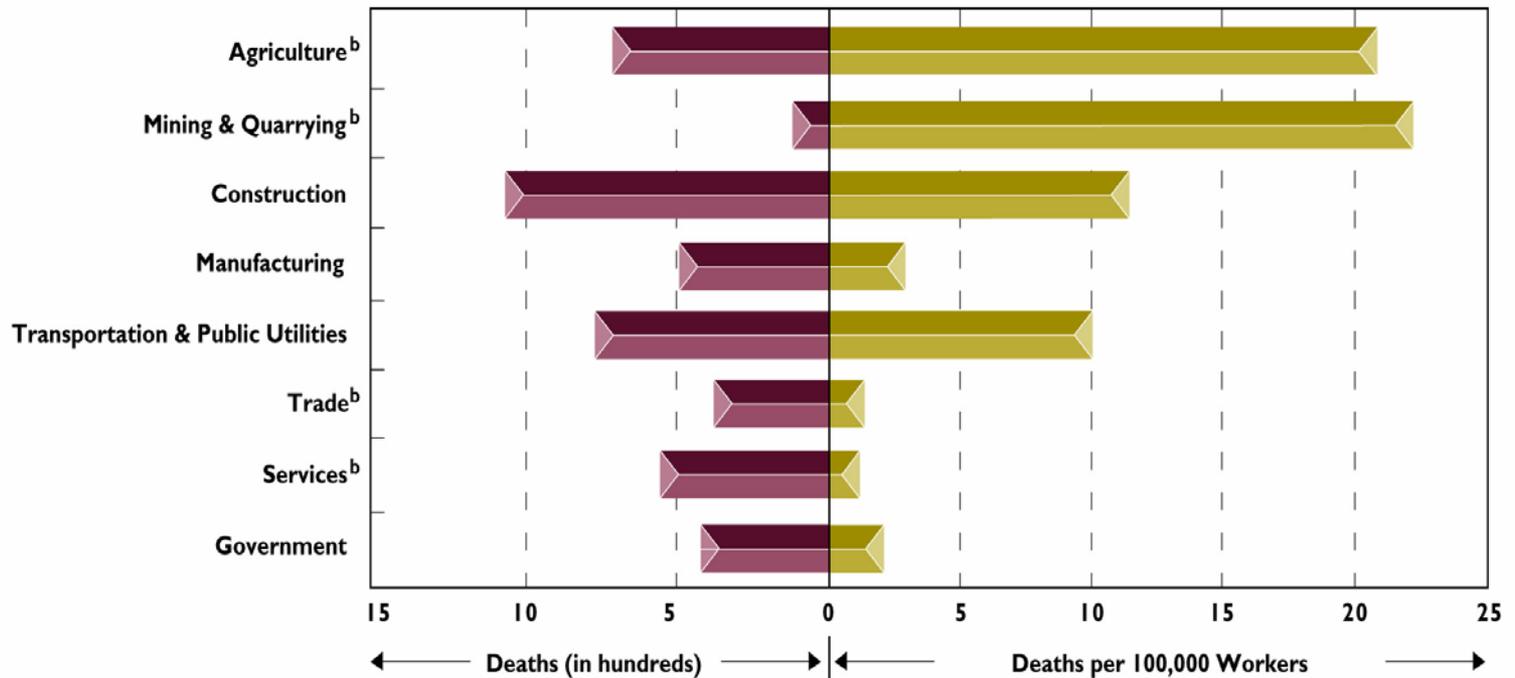




# Risks

- Water and Waste Water is a dangerous occupation

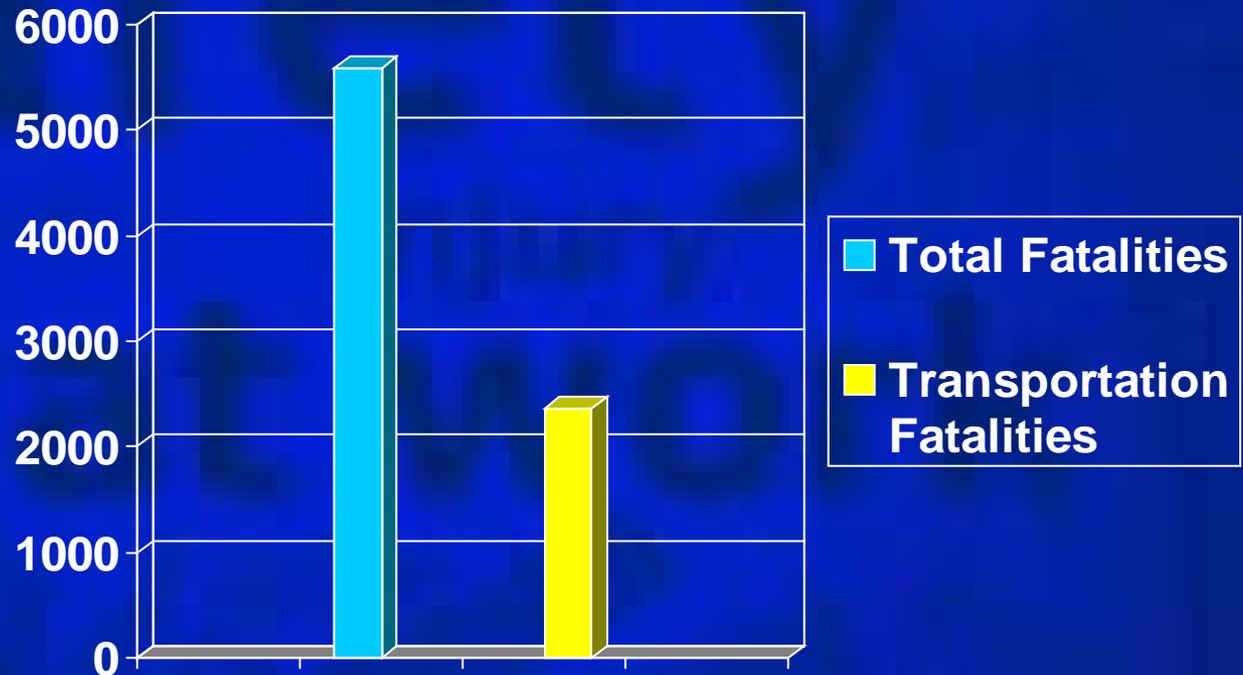
OCCUPATIONAL UNINTENTIONAL-INJURY DEATHS AND DEATH RATES BY INDUSTRY, UNITED STATES, 2003



See footnotes above.

DEATHS (IN HUNDREDS)  
DEATHS PER 100,000 WORKERS

# Fatal Occupational Injuries U.S.-2003





# Responsibilities

- Are you trained in all job duties that you are asked to perform in ?







BRANXTON LIONS CLUB

**DRIVE CAREFULLY**

60



*We have*



**TWO CEMETERIES**

**NO HOSPITAL**

# Toyota now makes elevators



# Confined Space/ 300 deaths per year...60% (180) rescuers

- Definition
- Examples
- Permit Required
- Sample Permit

# Definition of a Confined Space

- Is large enough so an employee can bodily enter and perform work
- Has limited or restricted means of entry or exit
- Is not designated for continuous employee occupancy

# Permit Required Confined Space

- Meets the definition of a confined space and has one or more of the following characteristics:
  - Contains or has the potential to contain a hazardous atmosphere (oxygen, toxic gas, flammables)
  - Contains a material that has the potential for engulfing an entrant
  - Has an internal configuration that might cause an entrant to be trapped
  - Contains any other recognized serious safety or health hazard

# Dangers associated w/confined spaces:

- ✓ **Engulfment**
- ✓ **Entrapment**
- ✓ **Poisonous gas**
- ✓ **Oxygen rich atmosphere**
- ✓ **Oxygen deficient atmosphere**



# Atmospheric Monitoring - Confined Spaces

- **Test prior to entry & continuously during occupancy**
- **What do I need for air samples to tell?**
  - **Whether there is too little or too much oxygen**
  - **Whether or not there are any combustible gases or vapors present**
  - **Whether or not there are any toxic gases or vapors present**
- **Always establish & review procedures for summoning rescue & emergency services. Never allow an unauthorized person to attempt a rescue. Practice non-verbal communication procedures!**

# Protection & Protective Equip. Conf. Spaces

## *NEVER:*

- **Enter a confined space until all hazards have been identified & correct procedures initiated**
- **Introduce hazards without notifying the area supervisor & making provisions for these hazards**
- **Re-enter a permit required confined space once the permit has been revoked until the conditions causing the revocation have been corrected and/or eliminated**
- **Attempt the rescue of confined space entrants unless you are part of a designated rescue team & have proper knowledge, skills, & equip. to effect a safe rescue**

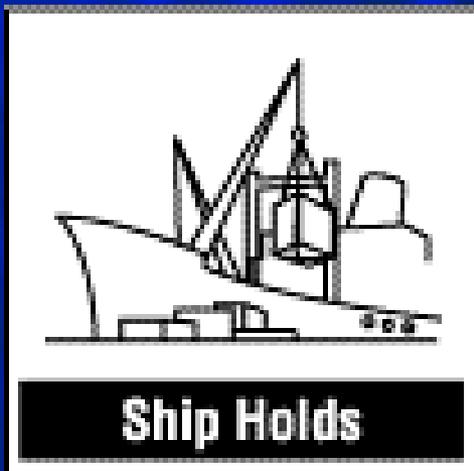
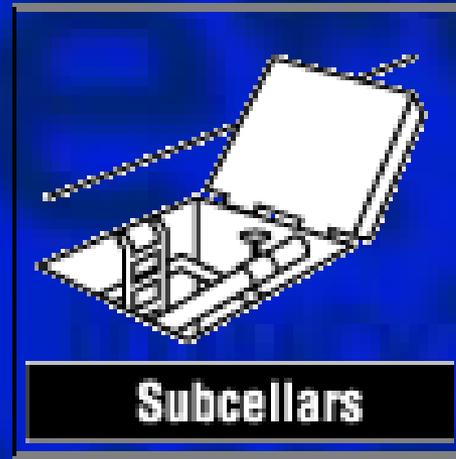
- **REMEMBER – 60% of all confined space fatalities are would be rescuers!**
- **Isolate confined space from unwanted energy sources**
- **Maintain proper mechanical ventilation**
- **Monitor for atmospheric conditions**

## Protection & Protective Equip. Confined Spaces *cont....*

### *ALWAYS:*

- **Provide barriers to protect & warn unauthorized personnel & keep entrants safe from external hazards**
- **Provide unrestricted immediate communication between entrants and external attendees**
- **Wear appropriate personal protective equip. (PPE's), be familiar with their use, operation, and limitations**
- **Think about what you have done, what you are doing, & what you anticipate doing!**

# Examples of Confined Spaces



# MONTGOMERY WATER WORKS AND SANITARY SEWER BOARD

## CONFINED SPACE ENTRY PERMIT/REPORT

DATE OF ENTRY \_\_\_\_\_ LIFT STATION NO. \_\_\_\_\_ MANHOLE NO. \_\_\_\_\_  
LOCATION \_\_\_\_\_  
DESCRIPTION OF CONFINED SPACE \_\_\_\_\_  
PURPOSE OF ENTRY \_\_\_\_\_  
AUTHORIZED ENTRANT(S): \_\_\_\_\_  
\_\_\_\_\_  
ATTENDANT(S): \_\_\_\_\_  
\_\_\_\_\_  
ENTRY SUPERVISOR: \_\_\_\_\_

### POSSIBLE HAZARDS IN THE CONFINED SPACE

(CHECK ALL ADDITIONAL ITEMS THAT APPLY)

- |   |  |                                      |
|---|--|--------------------------------------|
| <input checked="" type="checkbox"/> Lack of Oxygen    | <input type="checkbox"/> Electrical Hazards  | <input type="checkbox"/> Engulfment  |
| <input checked="" type="checkbox"/> Toxic Gases       | <input type="checkbox"/> Mechanical Exposure | <input type="checkbox"/> Entrapment  |
| <input checked="" type="checkbox"/> Combustible Gases | <input type="checkbox"/> Chemical Contact    | <input type="checkbox"/> Temperature |

### SAFETY EQUIPMENT USED

(CHECK ALL THAT APPLY)

- Tripod     Harness     Respirator     SCBA     Lighting  
 PPE (shoes, gloves, hardhat, safety glasses, etc.)

### MEASURES USED TO ISOLATE THE SPACE AND TO ELIMINATE OR CONTROL HAZARDS BEFORE ENTRY

(CHECK ALL THAT APPLY)

- Purge-Flush     Lockout/Tagout     Blanking, Blocking, Bleeding  
 External Barricades/Cones     Confined Space Identification Signs  
 Ventilation -Time Blower on: \_\_\_\_\_

Before Entry \_\_\_\_\_ min.

During Entry \_\_\_\_\_ min.

Total Blower time \_\_\_\_\_ min.

## RESCUE INFORMATION

AT LEAST 1 CPR QUALIFIED EMPLOYEE AT THE JOB SITE?  YES  NO  
 TWO WAY RADIO AND/OR CELL PHONE AT THE JOB SITE?  YES  NO

ATMOSPHERE TESTING					
GAS DETECTOR USED _____					
DATE OF LAST CALIBRATION _____					
	Approx Depth	% Oxygen	H <sub>2</sub> S (ppm)	% LEL	CO (ppm)
Test ① Before Ventilation					
Permissible Entry LIMIT		19.5 - 23.5	<10	<10	<25
Test ② After Ventilation, Prior to Entry					
*If readings not in permissible limits after Test 2 - DO NOT ENTER *Attendant to monitor detector during duration of entry					

TIME OF ENTRY: \_\_\_\_\_ TIME OF EXIT: \_\_\_\_\_ DURATION OF ENTRY: \_\_\_\_\_

**ATTENDANT TO MONITOR ENTRANT AT ALL TIMES**  
**IF ENTRANT BECOMES INCAPACITATED, REMOVE HIM FROM THE CONFINED SPACE**  
**AND CALL 911 FOR MEDICAL HELP.**  
**NEVER ENTER A CONFINED SPACE TO RESCUE A CO-WORKER**  
**WITHOUT PROPER TRAINING/SAFETY EQUIPMENT**

ENTRY PERMIT CANCELED AT \_\_\_\_\_ BY \_\_\_\_\_  
ENTRY SUPERVISOR

**AFTER CANCELLATION, PERMIT MUST BE RETAINED FOR ONE YEAR**

What's wrong with this picture?



# Trenching/Excavation

- Trenching accidents on construction sites account for an estimated 100 fatalities per year with at least 11 times as many workers injured
- 79% of trench fatalities occur in less than 15ft excavations
- A worker does not have to be completely buried in soil to be seriously injured or killed
  - Soil pressures/other factors (drowning ,electrocution)

# Trench Terminology, Dynamics of Earth, and Types of Collapse

- Defined
- An open grave waiting for an occupant
- deeper than wide
- < 20 ft. in depth – greater requires engineering resources
- Excavation

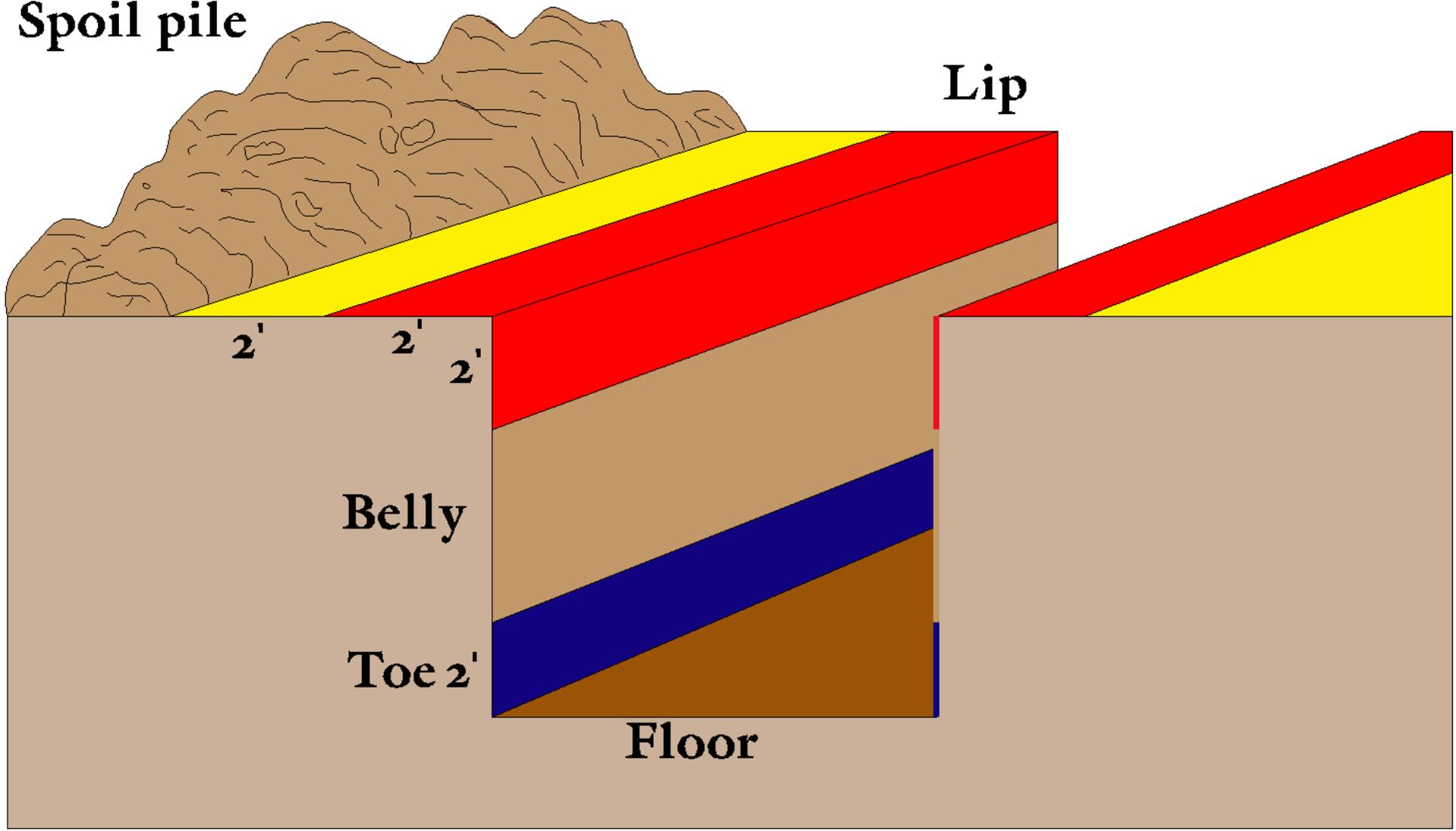
# Parts of a Trench

- Lip – 2 ft. from edge vertically and horizontally
- Belly
- Toe – 2 ft. from bottom vertically
- Floor
- Spoil Pile

# Anatomy of a Trench

Spoil pile

Lip

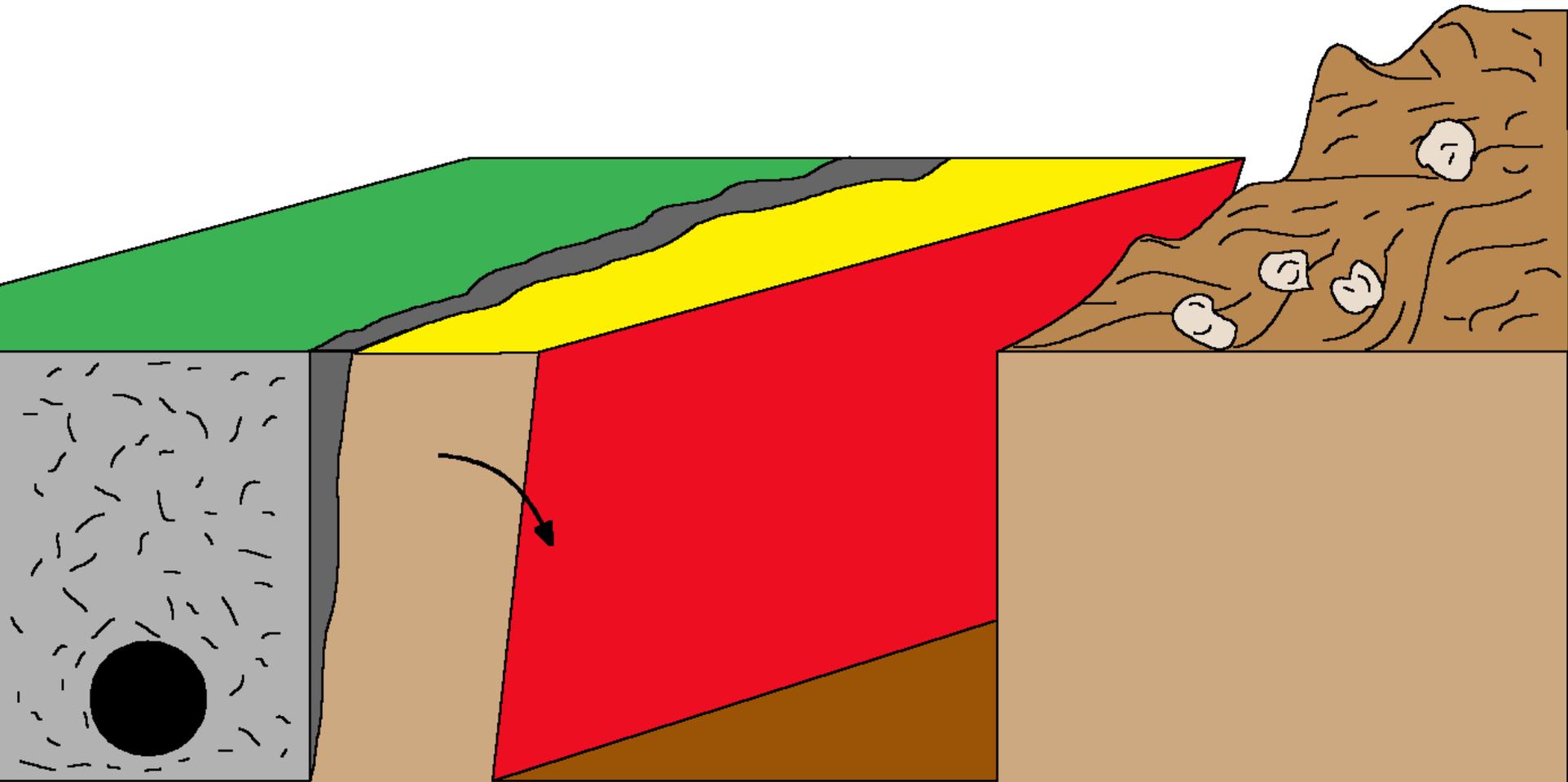


Belly

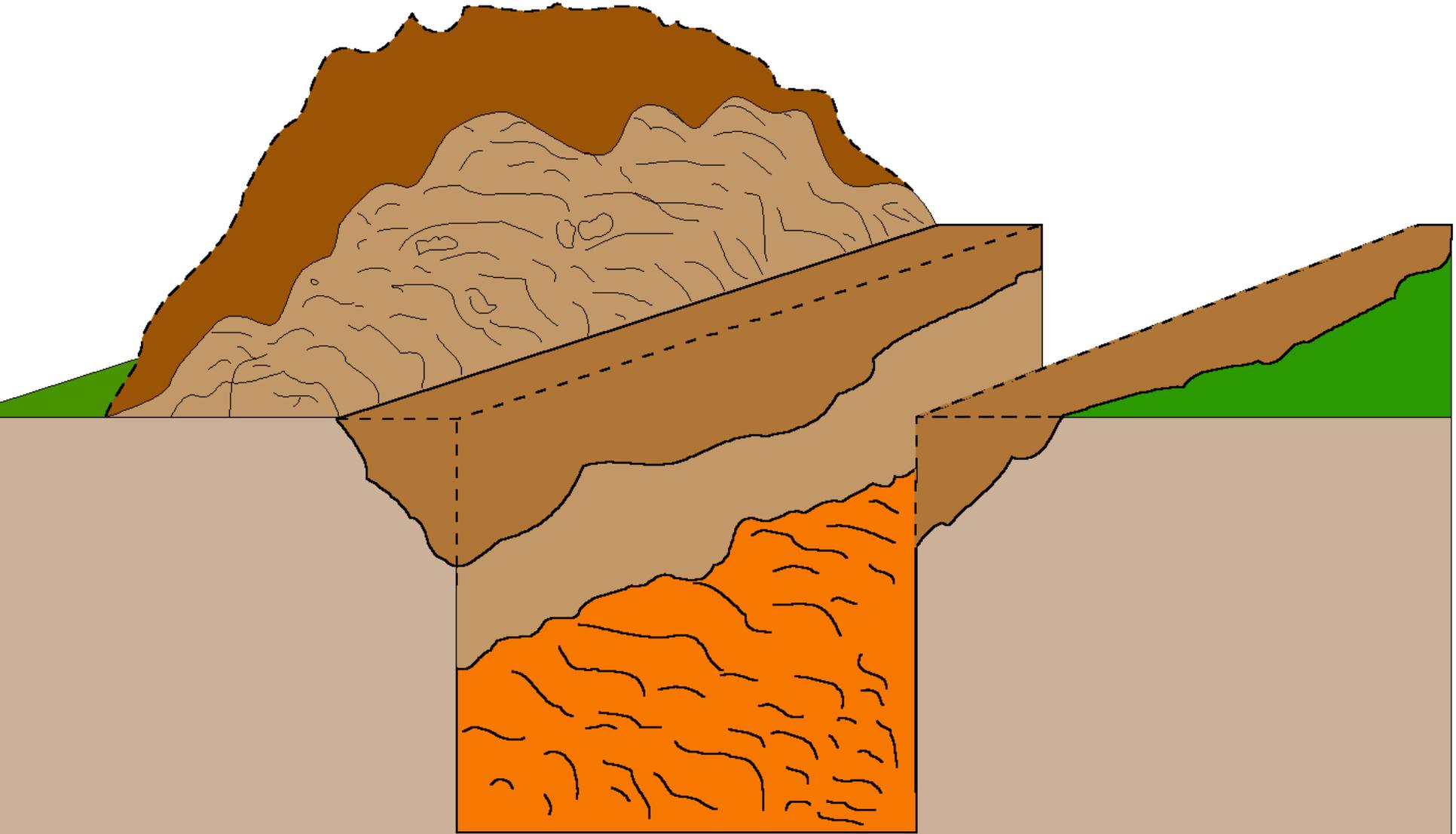
Toe 2'

Floor

# Shear wall collapse



# Lip(s)-In



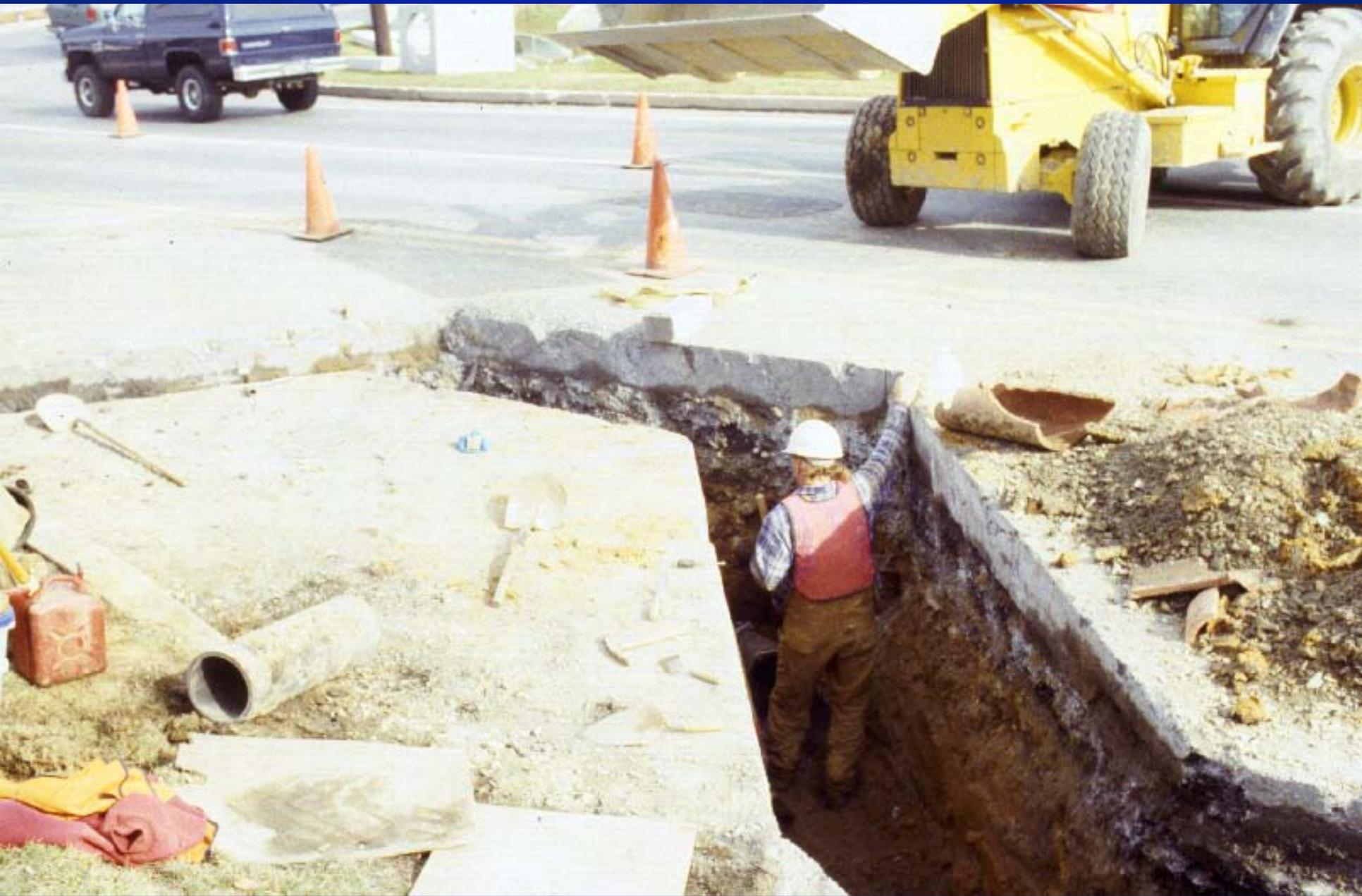
# Secondary collapse of the trench

- at least a 50% chance in undisturbed soil
- at least a 75% chance in disturbed soil





**OSHA's excavation standard requires employers to provide sloping, benching, shoring, or shielding to protect workers in excavations five feet or deeper.**







# Hazardous Environment

- Oxygen Deficiency
- Toxic Gases
- Carbon Monoxide
- Acetylene
- Methane
- Natural Gas
- Propane
- Sewer gases

# Hazardous Environment

- Utilities
- Electric
- Water
- Product, chemical
- Steam



This could be you !!!!!!!!





# Dynamics of Earth

- One cubic foot of dirt weighs \_\_\_\_\_
  - 100 POUNDS
- One cubic yard of dirt weighs \_\_\_\_\_
  - 2700 - 3500 POUNDS
- One gallon of dirt weighs \_\_\_\_\_
  - 13 POUNDS

# Dynamics of Earth

- One cubic foot of dirt fills 8 one gallon buckets
- One cubic yard of dirt fills 203 one gallon buckets
- Consideration of these weights vs. human body in collapse situations

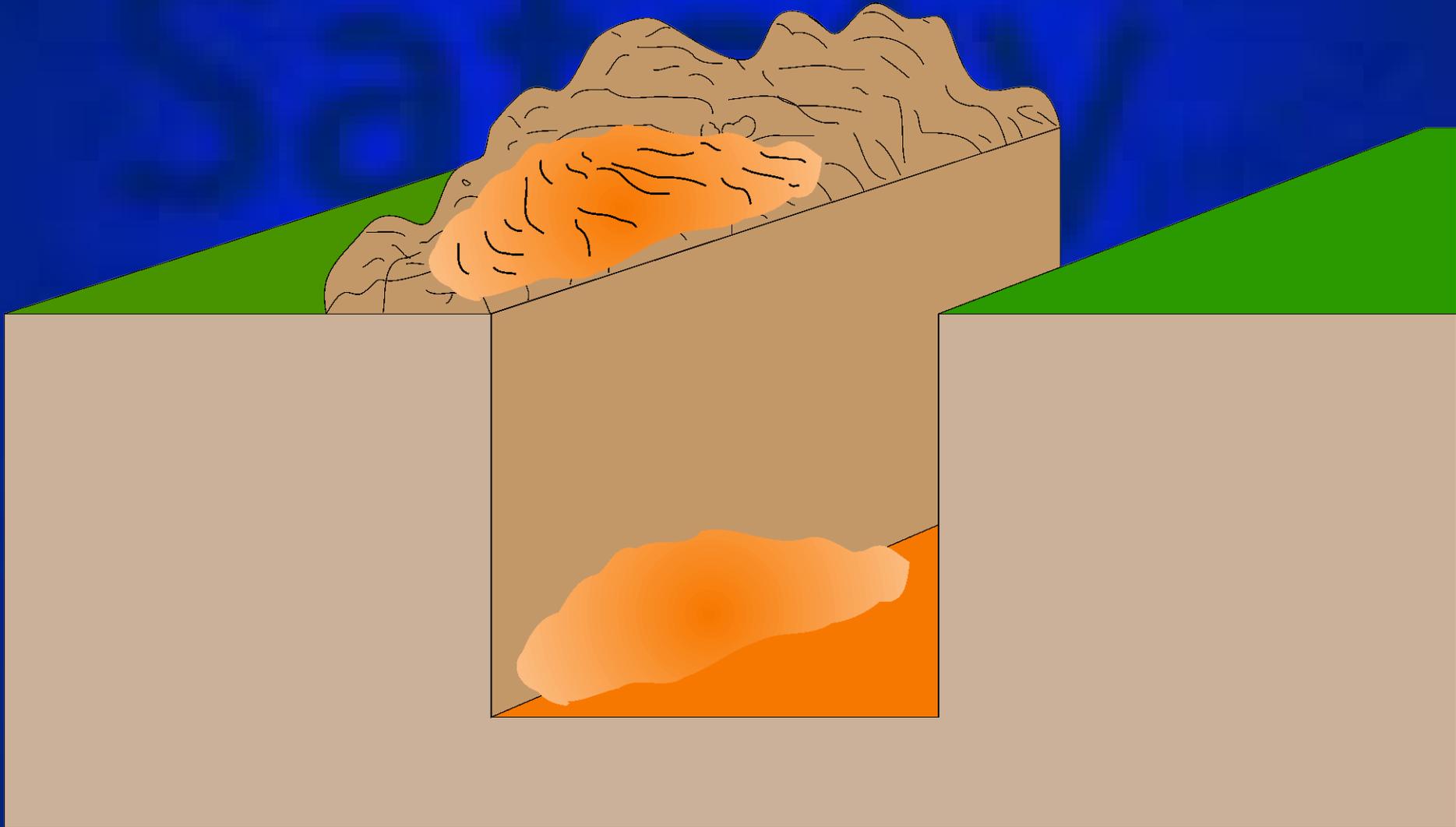
# Types Of Trench Collapse

- SPOIL PILE COLLAPSE
- SLOUGH - IN
- SHEAR WALL COLLAPSE
- LIP-IN MULTIPLE WALLS

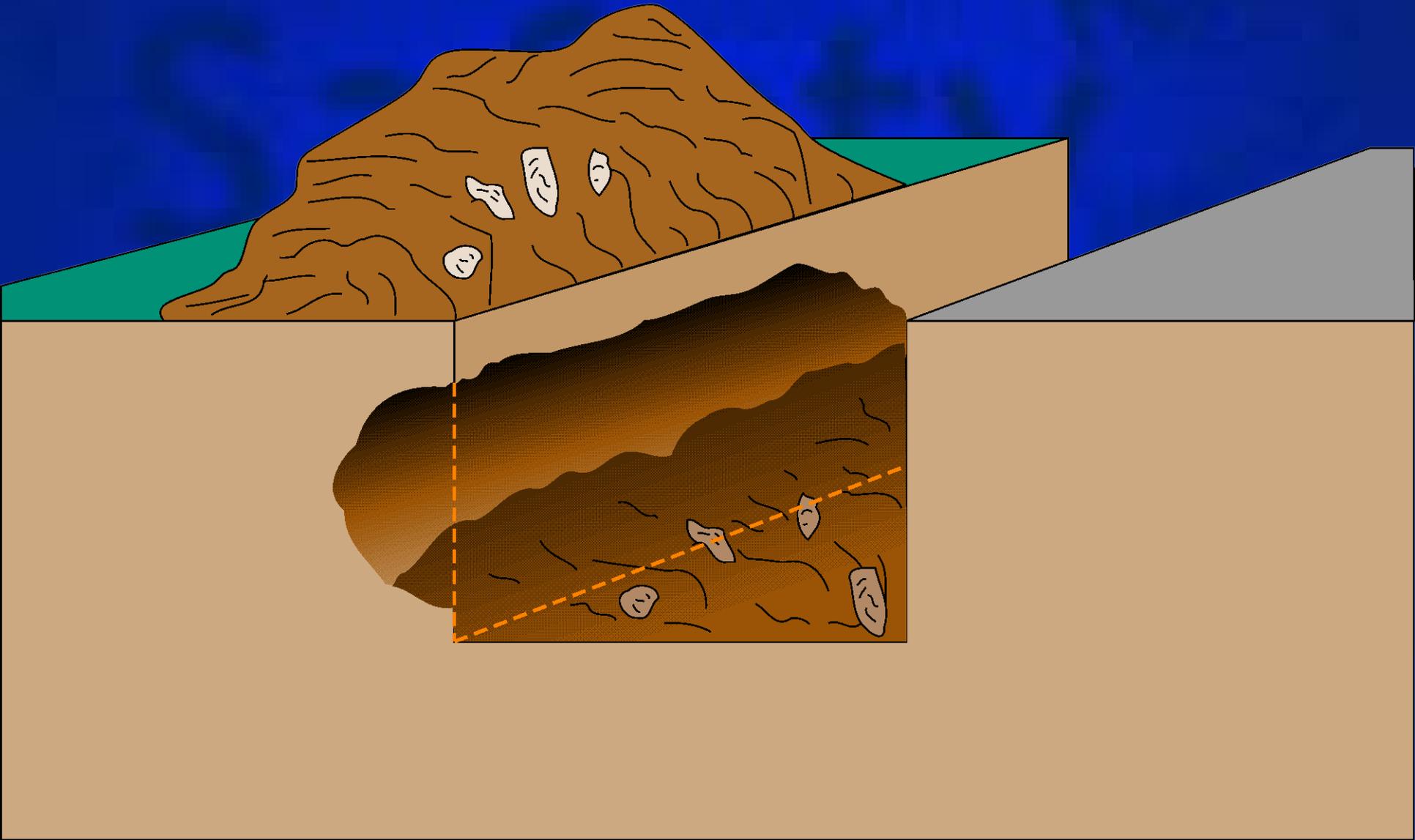
# Spoil Pile Collapse

- Most common type of collapse – why?  
Laziness .. complacency...MONEY
- additional pressure exerted downward and towards trench opening
- patient found on floor or far wall
- Law requires min. distances based on depth, usually 2 ft. from lip

# Spoil Pile



# Slough-In



# Is This Your Employee?



Are these?



# Cave-in waiting to happen?



### Man Is Killed In Pit Collapse

A construction worker was killed when a trench collapsed on him at a construction site in Laguna Beach, Calif., on Wednesday.

### Worker Rescued After 6 Hours Trapped in Ditch

Maryland Man Was Buried Up to His Waist by Cave-in

A construction worker was trapped for six hours in a trench that collapsed on him in a residential development in Laguna Beach, Calif., on Wednesday.

### Laguna Beach Man Killed in Trench Cave-In

By GREG HIRSHMAN and LESLIE KIRKMAN

LAGUNA BEACH — A well-known contractor, Robert J. ... Wednesday about the site of a ...

A construction worker was trapped for six hours in a trench that collapsed on him in a residential development in Laguna Beach, Calif., on Wednesday.

throughout the afternoon in response to reports that a man had been on records of dirt filled with ...

### Man dies in cave-in at construction site

Heavy rains may have been a factor

By Dick Winter

Just after the city and Sheriff's Office had started a ...

"Soil saturation levels have created conditions for more unstable than normal," ...

### TRENCH: Manslaughter Charge Against Contractor

The Division of Occupational Safety and Health ...

... but department officials ...

... created conditions for more ...

### Manslaughter Charge Filed Over Death in Trench Collapse

LAGUNA BEACH — A well-known contractor, Robert J. ... Wednesday about the site of a ...

### TRENCH: Manslaughter Charge Against Contractor

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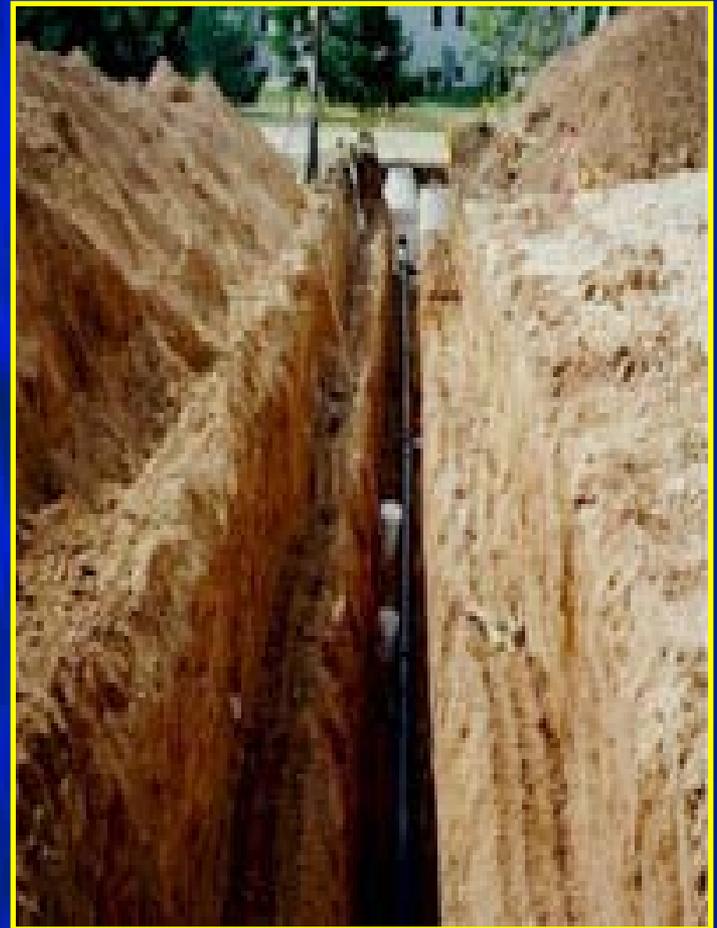
... but department officials ...

... created conditions for more ...



Rescue workers and a contractor's employee are seen at the site of a trench collapse in Laguna Beach, Calif., on Wednesday.

# No Protective System/Improper Soil Placement



# Worker Excuses

- “I know what I am doing....I’ve been in this business for 20 years !!”
- “That’s the most ridiculous thing I’ve ever heard...show it to me in writing !!”
- “I haven’t got time for all that # \$ + \* @ % ..... I have a schedule to keep !!!”

# The Solution

- Quality training
- Constant awareness

# One Training Solution

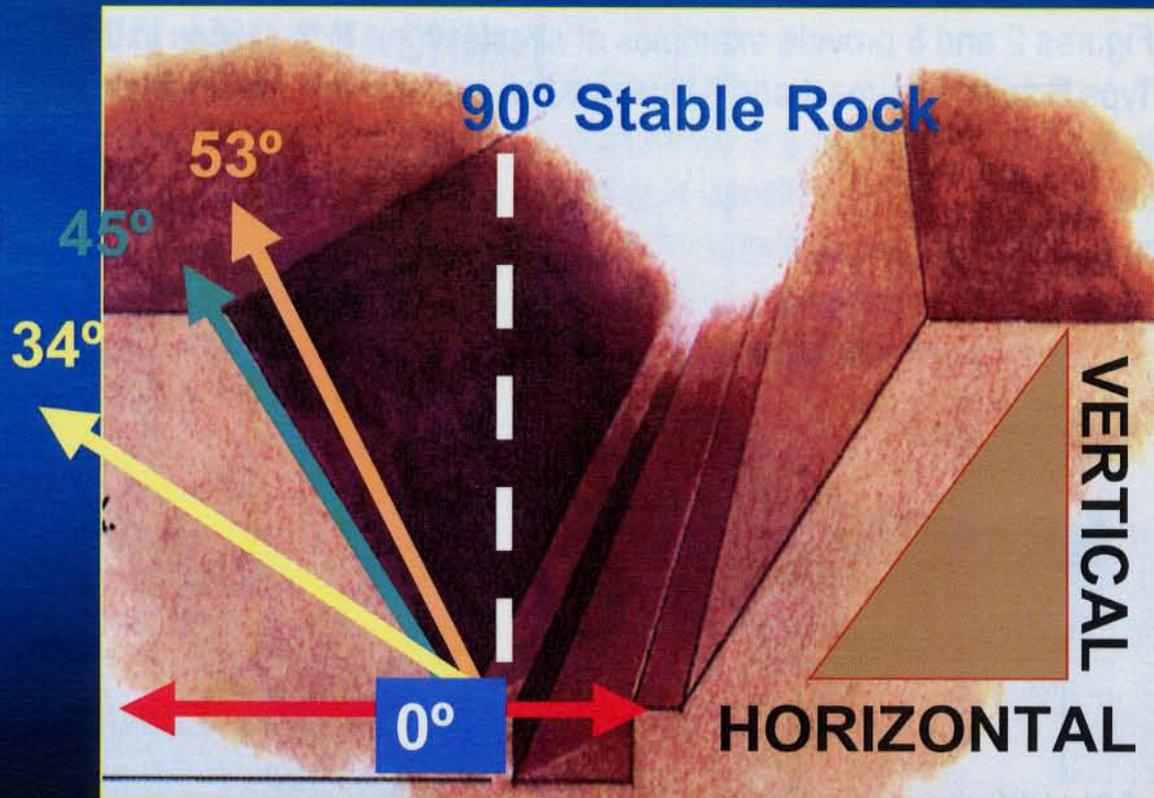
- OSHA Competent Person Training
- OSHA 29CFR1926 Subpart B
- A competent person can identify hazards that are dangerous to employees and has the authority to take prompt corrective measures



# One solution...trench shield



# SLOPING



## TYPE OF SOIL

Stable Rock  
(90°)

A - H<sup>3</sup>/<sub>4</sub>:1V  
(53°)

B - H1:1V  
(45°)

C - H1½:1V  
(34°)

# Hazardous Materials – Utility Operations

- **Utility employees are exposed daily to numerous hazardous gases & other materials**
- **What can be done to mitigate the dangers associated with these substances?**

**Educate yourself !**

# Effects of Inhaled Toxic Agents

- **Ammonia:** Mild irritation of eyes, nose, & throat; not a bad agent until exposures exceed 500 p.p.m.
- **Chlorine:** Creates an IDLH atmosphere at only 10 ppm. Exposure to 10 ppm for a brief period causes coughing, shortness of breath, chest pain, possible nausea, & vomiting. As little as 100 ppm can prove fatal
- **Sulfur Dioxide:** creates an IDLH at 100 ppm; fatal at 500 ppm

## Effects of Inhaled Toxic Agents cont...

- **Carbon Monoxide:** an odorless colorless gas that has approx. the same density as air. Exposure effects are nausea & severe headache. Carbon Monoxide may be fatal at 1000 ppm, but is considered dangerous at 200 ppm.
- **Hydrogen Sulfide:** exposure levels are recommended to be no more than 20 ppm per an eight hour day. At 50 ppm exposure time should be no longer than 10 minutes. 1000 ppm of H<sub>2</sub>S will cause immediate apnea & death shortly thereafter. H<sub>2</sub>S causes the respiratory center in the brain to cease functioning.



# Incentive Programs

- Small award annually to those employees that:
  - Did not have a lost time injury during the previous year
  - Were not involved in an *at-fault* accident while driving a Water Works vehicle

# Incentive Programs...cont'd

- Types of awards ....(cost less than \$15)
  - Gym bags
  - Clothing
  - Umbrellas
  - Thermos
  - Insulated coolers
  - Folding chairs



# Guidelines from Geller

- Behaviors required to achieve a reward should be specified
- Everyone who meets the criteria should be rewarded
- It is better for many participants to receive small awards than for one person to receive a large award
- Groups should not be punished for failure by one individual

# Incentive Programs-Summary

- Awards are a token of gratitude
- Popular with employees
- Watch for non-reporting of injuries
- Put a positive spin on safety
- Helpful....yes.....cure-all....no

# Safety Resources

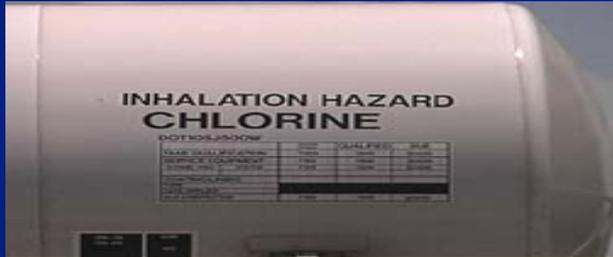
- People....especially mid-level supervisors
  - Come in 3 categories:
    - Strong supporters
    - So-So supporters
    - CAVE People

# ***NOTICE***

**IF YOU'RE NOT  
CONFRONTING  
UNSAFE BEHAVIOR  
YOU'RE *REINFORCING* IT!**

# CAVE People

Citizens  
Against  
Virtually  
Everything



# Chlorine Safety

- **Train all employees in safe handling of chlorine**
- **Ensure override shutoffs are present on all chlorine equipment**
- **Conduct constant inspections & maintenance of machinery**
- **Restrict access to facility & provide security surveillance**

# Chlorine Cylinder Inspections

- ✓ **Cylinders del. w/protective hoods over valves**
- ✓ **Check for Tare weight**
- ✓ **Check cylinders-current hydrostatic test dt**
- ✓ **Check cylinder valves for closure**

- ✓ **Check cylinder valve condition**
- ✓ **Check opening of valve**
- ✓ **Check fusible plug condition**
- ✓ **Check cylinder wall condition**
- ✓ **Check overall condition of cylinder**

## **In Summation:**

- **Train and educate yourself**
- **Do not allow yourself to be rushed**
- **Exercise good judgment**
- **Maintain situational awareness**

# Dealing With People

“ Why is it that when I just need two hands to do a task, I have to put up with the attached human being?”

Henry Ford

# Quit Complaining About Your Job



-Viktor-

Photo by Vincent Laforet / The New York Times





# Resources...cont'd

- OSHA...excellent Web site...[www.osha.gov](http://www.osha.gov)
- PESCA...need your involvement..[www.pescala.org](http://www.pescala.org)
- Promotional items...mats, pens, notes on paychecks, posters, e-mails
- Prayer
  - Whoever listens to me will live in *safety*, and be at ease, without fear of harm

Proverbs 1:33 NIV

# Resources...cont'd

- Tailgate Safety meetings
- Videos...rent, don't buy..15 min or less
- Network with other professionals
- Free training...Deep South Center, EPA Grants through ADEM
- We have a safety video library

# Final Thoughts

- Work upstream, not downstream...before, not after the accident
- The absence of injury is not the same as the presence of safety
- Safety is a process.....not an event
- Put on the belt of safety culture each day
- Remember who you are working for....the really important relationships..family

## **Sources:**

**Acute & Respiratory Effects of Exposure to Inhaled Toxic Agents, by Robert Frank**

**Safety in Confined Spaces, Alabama League of Municipalities**

**OSHA Technical Manual, Section V: Chapter 2**

**NIOSH**

**Safe Handling of Chlorine & Sulfur Dioxide, by Kenneth J. Baughes**

**Center for Safety in the Arts**

Creating a safety culture is like turning a very large ship.....it takes time!



# Questions and Answers



**Thank you** for your  
**Time and Attendance!**