

TRENCH RESCUE

Awareness



Session 2



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Course Overview

- **Session 2 – Operations at trench Rescue Incidents**
 - **Trench Incident Safety**
 - **Trench Rescue Equipment**
 - **Trench Rescue Operations**
 - **Incident Command**
 - **First to Arrive**
 - **Gaining Access**
 - **Digging Out**
 - **Package and Removal**
 - **Incident Termination**
- **Student Exercises.**



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Session Objectives

Upon completion of this session the student shall demonstrate an understanding of:

- **General hazards encountered at trench incidents and how to control them**
- **Equipment used during trench incidents**
- **Trench rescue operations and involvement of an awareness level trained member.**



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Trench Incident Safety



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Trench Rules

- **> 4' – A Ladder Must Be Used**
- **> 5' – The Trench Must Be Shored**
- **≥ 4' – Must Have A Stairway, Ladder, or Ramp Every 25' of Lateral Travel**
- **Ladder Must Be Secured and 3' Above The Lip of the Trench.**



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Surface Encumbrance

- **Trees, Boulders, Etc. Must Be Removed or Supported**
- **Underground Feature Protection Organization (UFPO) – 1-800-962-7962**
 - **A.K.A. Dig Safe in New York**
 - **Mark out utilities**
 - **Done prior to beginning work.**



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UFPO Markings



Colored Flags Are Used To Mark Location

- Electric** **Red**
- Gas** **Yellow**
- Comms.** **Orange**
- Water** **Blue**
- Sewer** **Green**



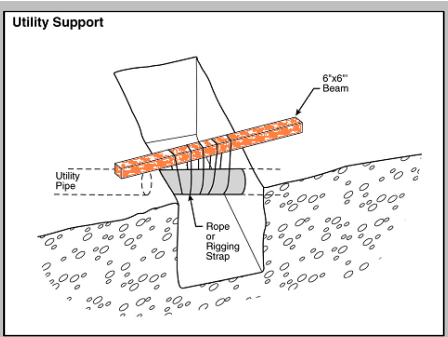
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Hazard Control

- **Two Types of Hazards:**
 - **Those you can control**
 - Location of vehicles
 - Trip hazards
 - Spoil pile
 - Utility support
 - **Those you should leave**
 - Gas
 - Electric.



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Hazard Categories

- Mechanical
- Chemical
- Man-Made
- Electrical
- Water.



Utility Marker

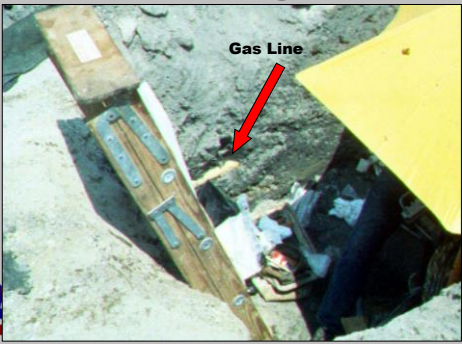


Unsupported Utility



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Hazard Categories



Gas Line



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Hazard Control Phases

- The Rescue Area
- The General Area.



Heavy Equipment



Rescue Area

General Area



Trip Hazards



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Underground Hazards (Lock-Out / Tag-Out)



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Trench Rescue Equipment



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Equipment Checklist

- Air Monitoring
- Ventilation
- Ladders
- Lighting
- Hazard Control
- Hand / Power Tools
- Ground Pads
- Shoring
- Patient Packaging
- Heavy Equipment
- De-watering
- Rehab.



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Ground Pads



2" x 12"



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Ground Pads



Marking Ground Pad Edges



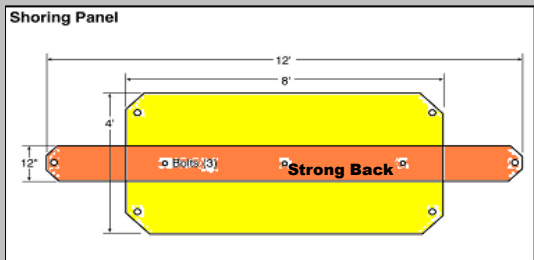
4' x 8" x 3/4"

Address Tripping Hazards



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Sheeting (Trench Panels)



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Sheeting (Trench Panels)



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Sheeting (Trench Panels)



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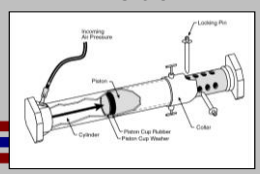
Pneumatic Shores



Paratech



Airshore



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Shores



Hydraulic

Screw Jacks



Timber



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Tools and Appliances

- Shovel Types
- Hammers
- Duplex Nails
- Ventilation
- Dewatering
- Ladders.



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Tools and Appliances



Fan For Vent



Centrifugal (High Pressure - High Volume)



Mud Hog Pump (Low Pressure - Low Volume)



Duplex Nail

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Air Bags In Trench Rescue



Stacked High Pressure



Low Pressure Lift (W/ Rigging Strap)



Filling Slough Void



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Cribbing

- 4 Point and 9 Point System
- Generally, 4x4 or 6x6 Sizes
- Weight Per Contact Point (6000 lbs per)
- Height = No More Than 3x Base Width
- Overlap The Dimension Of The Lumber.

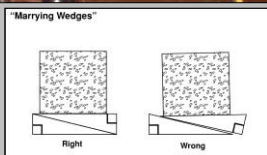


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Wedges



Filling Void Between Wale and Panel



Lift An Inch, Crib An Inch

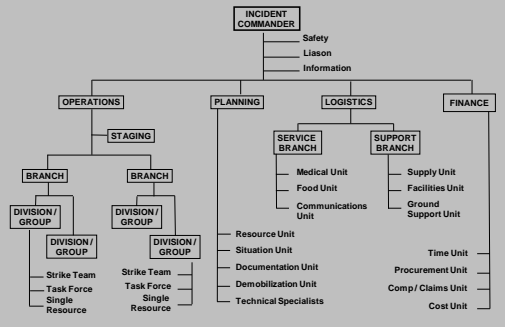
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Trench Rescue Operations



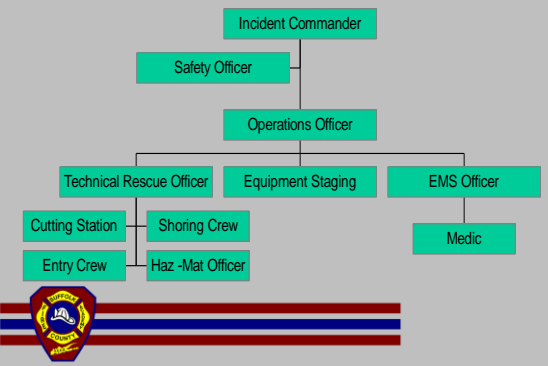
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NFA Model Incident Command System



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Sample Trench Rescue ICS System



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IAP Components

- Establish "Rescue Zones"
- Risk/Benefit Analysis
- Safety
- Strategy and Tactics
- Tasks
- RIT
- Hazard Mitigation
- Resources
- Protective Systems.



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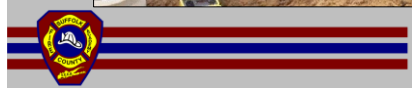
First To Arrive

- Keep apparatus at least 100' away
- Establish A command post
- Secure civilian equipment
- Gain information from witness and/or competent person
- Make victim contact
- Address utilities
- Set-up zones
- Prepare for the arrival of special equipment.



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First To Arrive



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First To Arrive

Non-entry/Self Evacuation Rescue Attempts

- Could be as simple as placing A portable ladder for victim egress
- Lower rope to victims partially buried
- Can something be placed around a partially buried victim (drum)
- Be aware of trench lip (padding).



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Initial Size-Up

- Who is in command?
- What happened?
Why were they digging?
- How many victims?
- Where are they buried?
What type of soil?



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Establish Zones

- **To Protect:**
 - **Rescuers**
 - **Victim(s)**
 - **Civilians.**

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Rescue Zones

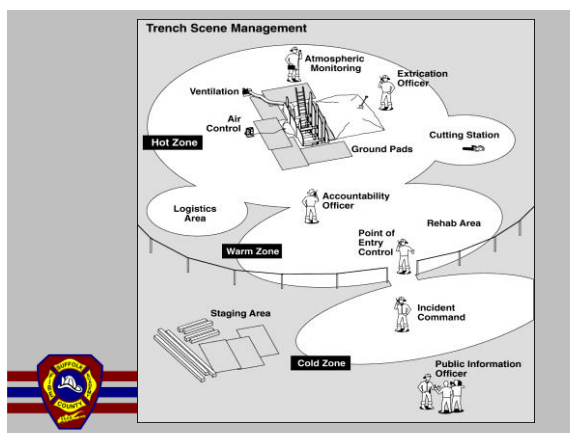
- Hot Zone** **Rescue Personnel Only**
- Warm Zone** **Equipment, Supplies**
- Cold Zone** **C.P., Media, Support, Rehab**



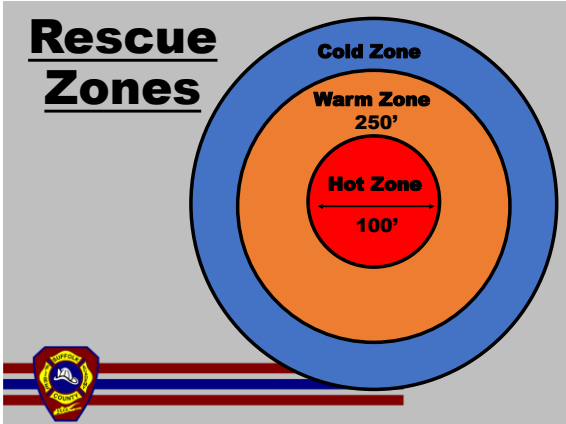
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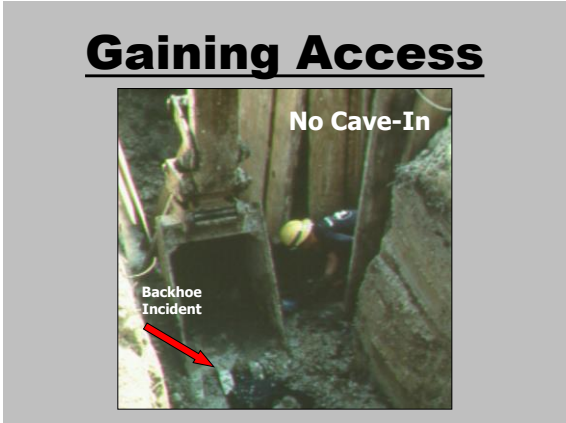
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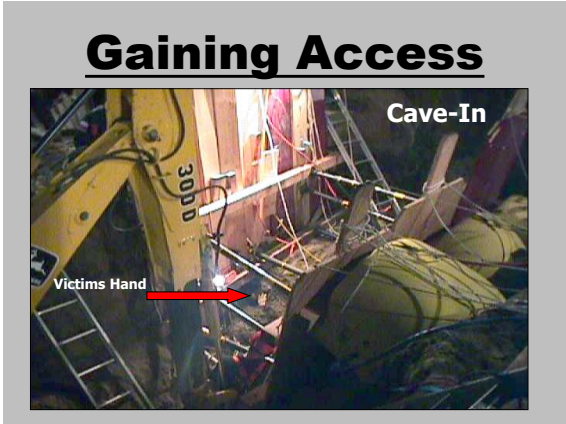
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Gaining Access

Placing Panels and Struts



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Gaining Access

Placing Panels and Struts



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Gaining Access

Placing Panels and Struts



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Gaining Access

Placing Panels and Struts



52

Gaining Access

Placing Panels and Struts



53

Gaining Access

Placing Panels and Struts



Metal Ring Placed Around Victim (Where Can We Get This And When Should It Be Placed?)

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Entrapping Mechanisms

- **Dirt**
- **Sand**
- **Boulder**
- **Pinned By Pipe**
- **Heavy Equipment**
- **Miscellaneous.**



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Digging Out



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Magnitude of Problem

- Most soil removal will be done by hand
- May be more than 20 - 30 tons!
- Never use a backhoe or excavator to gain access.

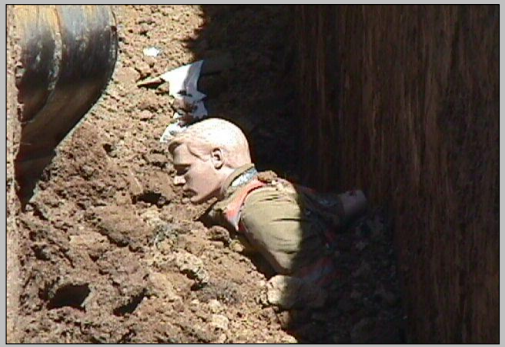


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Free The Victim Completely



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Free The Victim Completely

- Never attempt to pull a partially buried victim out (even if its just a buried limb).
- Dig by hand and use caution when getting close to victim with any type of entrenching tool.
- Do not use heavy, digging equipment.
- Consider Vac-Truck for soil removal.



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Packaging And Removal

- Plan System With Removal In Mind
- Plan Not To Dislodge Shoring
- Plan Ahead
- Plan Movement Patterns
- Plan For Packaging Device.



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Packaging And Removal



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Packaging And Removal



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Equipment Removal



Should Be As Systematic and Diligent As The Install.

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Equipment Removal



Now Is Not The Time To Get Hurt!



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Equipment Removal



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Your Team

- Success is in the members of the team
- Should be physically and mentally prepared
- Have good construction skills
- Team should include trained medical personnel.



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Your Team

Work well with others - there are many players from various agencies at these incidents.



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Student Exercise



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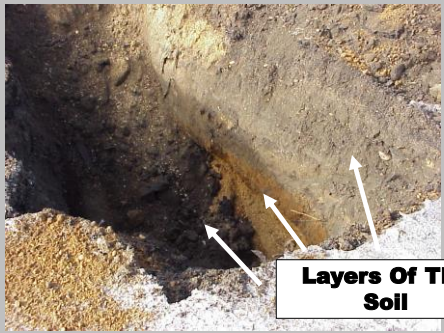
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What Do You See



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What Do You See



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What Do You See



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What Do You See



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What Do You See



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What Do You See



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What Do You See



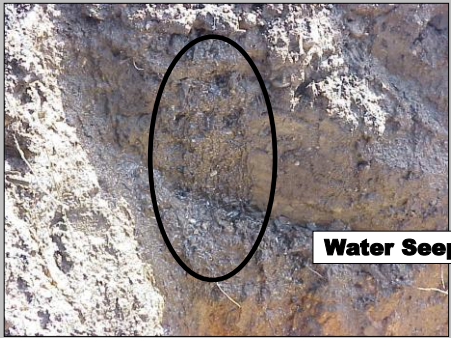
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What Do You See



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What Do You See



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What Could Go Wrong?



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What Could Go Wrong?



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Summary




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Summary



- **Safeing the trench includes padding the edge, moving the spoil pile ($\geq 2'$), and shutting down/securing equipment**
- **Control hazards in and around the trench incident that are within your scope**
- **Speak to witnesses and competent persons to gain valuable information**
- **Try to contact the victim and initiate self- or non-entry removal techniques.**

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Summary Cont'd

- **Awareness Level responders should be able to identify the technical tools used during trench/excavation incidents**
- **Trench/excavation incidents require the establishment of zones**
- **Trench must be "safed" before an attempt is made to gain access**
- **A victim must be completely un-buried before removal**
- **Have a plan before removal is attempted.**

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Questions?



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