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NC Office of the State Fire Marshall

Technical Rescuer; Trench Rescue Level II

VICTIM MANAGEMENT

Victim Management

Once rescuers have gained access to the victim and all medical assessments have been made, a plan must be devised for packaging and safely removing the victim from the environment that will minimize any aggravation of the victim's medical condition.

Victim Considerations:

- Rescue or a recovery?
- Advanced life support be necessary before the victim can be moved or can it be delayed?
- Will the packaging device fit in the trench?
- Will it protect the victim from potential falling debris?
- What type of evacuation is in order?
- A plan should begin as soon as the interior operations begin, don't wait until you have the victim totally uncovered, the victim's injuries may require rapid evacuation.
- Develop at least two plans for evacuation, and begin implementing early/

Strategic And Tactical Considerations

- Identify Phase Of A Trench Collapse Operation.
 - Identify Critical Issues Of Accessing, Stabilizing And Extrication.
 - Identifying Resources
 - Weigh The Risk And Benefits
 - Assess Personnel Accountability And Search And Rescue Tactics.
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Emergency Evacuation

- Evacuate
 - 3 Short Air Horn Blasts
(1 second each, continuous until everyone is out)
 - Cease Operations
 - 1 long 3 second Blast
 - Resume Operations
 - 1 Long 1 Short Blast
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Accountability System

- Ensures that only personnel who are authorized and properly equipped to enter the work area.
 - tracks all personnel's location and status during the operation.
 - degree of accountability is based on size and complexity of the incident.
 - Some operations only require one or two rescuers in the trench at a time and they are in visual and verbal contact with surface.
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Accountability System

- Accountability systems can be met by:
 - Recording the trench crew's name
 - Time in, time working, time out
 - Adding A class III harness and retrieval line
 - Personnel accountability is the responsibility of:
 - IC, the safety officer, accountability officer.
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Types Of Victim Entrapments

- Partial burial and totally burial.
 - Partially buried victims have a greater chance of survival than totally buried victim, but can die due to severe trauma if quick action is not taken to stabilize the victim.
 - Falls or a medical crisis
 - Seizures, heart attack or stroke...
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Considerations For Making Entry

- Soil may not be the only material entrapping a victim, pipes and heavy equipment may have to be lifted off the victim before access can be made.
- Only lift heavy object enough to remove the victim.
- Can lifting procedures can be accomplished from within the trench or from above using a lifting station and lifting straps.
- Consider the weight of the object to be lifted, depth of the trench, and limitations of on scene equipment.
- The cardinal rule for gaining access to the victim is to remove any entrapment mechanism and uncover the victim's head and chest first.

Considerations For Making Entry

- A means of entry and egress, a stairway, ladder, ramp, or other means of safe egress must be installed in trenches with a depth of 4 feet or greater, (OSHA CFR 1926.651 (c)(2)).
- Horizontal spacing between points of entry and egress shall be no more than 25 feet, (oshacfr 1926.651 (c) (2)).
- For rescue operations a minimum of two points of entry/egress are recommended, using fire service grade ladders installed in close proximity to the interior rescue personnel, the top of the ladders should extend at least 3 feet (about 3 rungs) above the lip of the trench.

- For a non-intersecting trench, a minimum of 6 panels will be needed (3 on each side) to provide a minimum safe horizontal work area of 12 feet for rescuers.
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Making Initial Contact With A Victim

- The AHJ determines whether it is safe for a rescuer to make entry into the trench with less than a 12 foot work zone established.
- i.e. A victim is visible and exhibiting respiratory difficulty, one set of panels has been installed directly over the victim and a ladder is in place.
- Is it safe for the rescuer, staying on the ladder, to enter the trench to perform initial medical assessment and treatment?
- Some rescue teams protocols require at least 2 sets of panels must be set before any rescuer is allowed to enter the trench.

Stabilizing Hazards

- Backhoes and pipes.
- If the backhoe is running have it shut down and give the keys to the IC or Operations Officer.
- Chock all wheels.
- Stabilize the under carriage using cribbing, struts, and air bags (if needed).
- If the bucket is suspended or hanging over the work area, secure it using rated chains, load binders, or rated a come-along.

Stabilizing Hazards

- Secure the chain around the bucket, attaching come-a-long between it and an anchor point near the cab area, this prevents the bucket from moving in the event the hydraulic cylinder controlling the bucket begins to loose pressure.
 - Once the bucket is stabilized, digging operations can begin.
 - Cribbing can be used to stabilize the under carriage of the bucket.
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Stabilizing Hazards

- Stabilizing pipes near the trench lip is to move them away from the trench manually or mechanically, then shimmed and or picketed safely.
- If it is unsafe to move the pipe then the pipes should be secured in place.

Lifting And Stabilizing A Pipe

- Pipe on a victim in the trench.
 - 3 Options:
 - lift and crib
 - crib and dig out from under the object
 - combine both methods.
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Partial Burial

- Interview the foreman, competent person and workers to determine number of victims and the point last seen (PLS) and position for each.
- If the victim is visible and conscious, insert a ladder close to their proximity.
- Oxygen use is permissible providing no potential for fire or explosive gases to enter the trench.

- An air knife is an excellent tool for cutting and loosening up soil in an effort to gain access
 - It operates off compressed air at a working pressure of 90 psi and will not harm rescuers or victims if it comes into contact with the skin.
 - Is a soil vacuum truck available; these trucks suck up large amount of soil and small debris and deposit them into a holding tank.
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Total Burial

- Look for clues:
 - End Of Pipe String(should Be First Place To Start)
 - Grading Pole
 - Backhoe Tracks
 - Exposed Pipe Or Other Object In The Trench,
 - Paint Buckets,
 - Grease Cans, Solvents,
 - Refreshment Containers,
 - Shovels
 - Helmets

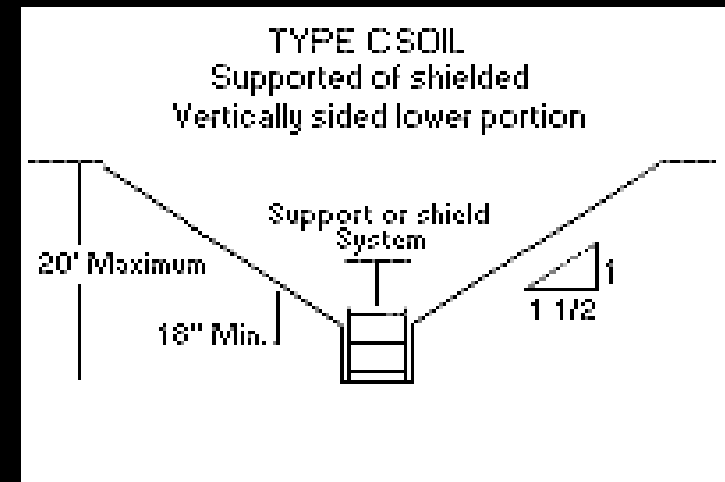
Total Burial

- Determine depth & width:
 - At commercial sites check for an engineering hub (i.e. Engineer's Flagstick) which will give information regarding the original depth of the trench and the centerline distance of the trench from the hub.
 - This can help with narrowing the initial search area.
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- Once the rescue work area has been established and a protective system is in place, interior rescuers can begin accessing victim by removing the dirt.
- Use Pike poles can be used to probe in loose dirt
- Search dogs can narrow a search area.
- If in recovery operations, consideration may be given to cutting the trench walls back to a safe angle of repose,

Angle of Repose

- According to OSHA, 1 1/2' foot horizontal for every 1' vertical for class C soil.
- A trench with a depth of 10' would require that each trench wall be cut back 15'.
- Add the original width of the trench,
- Let's say 5 feet; the overall width of the opening would have to be 35 feet.
- Allowable space and obstacles may not permit the above option.



Total Burial; Digging Soil

- Four rules for digging in a trench.
 1. Never use a mechanical device or backhoe to dig up a partially buried victim.
 2. Never attempt to pull out a partially buried victim.
 3. Dig by hand when you get near the victim
 4. Dig until you can see the tops of the feet.
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Concerns while Accessing Victim

- Do not to dislodge any shoring materials.
- Stabilize & secure all equipment near lip of trench to prevent a falling hazard.
- Safety officer should monitor the integrity of the protective system throughout the operation.
- Evaluate how the type of packaging device and lifting device will impact the victim's removal.
- Be careful not to build the shoring system so congested that you cannot extricate the victim.

- If adjustments or moving of the shores is necessary, do so before victim packaging begins.
 - Consider a vertical raise if manipulation via shoring is cumbersome.
 - An Artificial High Direction rigging system may have to be constructed to lift the victim.
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