



Procedures Date: 3/2010

TRENCH AND EXCAVATION COLLAPSE PROCEDURES

PURPOSE

- To provide procedures for safe and effective removal of victims from underground collapses in trenches and excavations

SCOPE

This policy applies to all uniformed personnel.

GENERAL GUIDELINES

1. Any incident in which a patient is trapped, buried or experiencing a medical emergency in a trench or excavation shall require the response of the Technical Rescue Team.
2. No firefighter or EMS person shall enter an unprotected trench to render patient care or perform disentanglement operations. All trenches shall be "shored and protected" using approved methods prior to entry by any emergency personnel.
3. All emergency vehicles shall park at least 100 feet from the collapse site. The only exception to this shall be the Technical Rescue Team vehicle that may park no closer than 50 feet.
4. All traffic shall be stopped or detoured within 300 feet of the collapse zone.
5. A hazard zone shall be established to control at least 75 feet around the perimeter of the collapse zone. This should be done with fire line tape.
6. Access early the need for the response of additional mutual aid Technical Rescue Teams. (Contact dispatcher requesting the response of other Tidewater based teams).

MAKING THE SITE SAFE

RESCUE AREA SAFETY

1. This entails the initial steps needed to make the actual collapse zone around and in the trench as safe as possible using basic techniques. **SHEETING AND SHORING OPERATIONS, ENTRY AND DISENTANGLEMENT OPERATIONS SHALL BE CARRIED OUT UNDER THE DIRECTION OF THE TECHNICAL RESCUE TEAM.**
 - A. Ground pad the trench or collapse site lip
 - B. Place ground ladder into the trench for self-rescue
 - C. Support any unbroken utilities



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- D. Provide a helmet and goggles for the victim, if possible (preferably not a fire service helmet)
- E. **DO NOT ALLOW ANY PERSONNEL INTO AN UNPROTECTED TRENCH**
- F. **DO NOT TOUCH OR LEAN ON ANY HEAVY EQUIPMENT UNTIL YOU HAVE ASSURED IT IS NOT IN CONTACT WITH ELECTRICAL UTILITIES**
- G. **USE OF GROUND LADDERS FROM THE ENDS OF A TRENCH CAN BE UTILIZED IF THE VICTIM CAN REMOVE THEMSELVES FROM THE TRENCH**

TECHNICAL RESCUE OPERATIONS PHASE

COLLAPSE ZONE OPERATIONS

1. Different collapse scenarios require different sheeting and shoring techniques as the situation demands. Each scenario is approached with the same evaluation mechanism and adaptations made to the operation as required by the configuration of the trench or excavation.
2. The following are potential forms of collapses that will be encountered. They should be handled in accordance with accepted techniques.
 - A. Single wall shear
 - B. Double wall shear
 - C. Spoil pile slide
 - D. Intersecting trench collapse
 - E. Collapses in "protected trenches"
 - 1) Rabbit box slide or above level collapse
 - 2) Industrial shoring collapse
 - 3) Inadequate protection systems in place
 - F. Class C Protective System
3. The following are potential forms of victim entrapment scenarios that may be encountered. They should be approached using accepted techniques.
 - A. Victim(s) buried to waist
 - B. Victim(s) buried to chest
 - C. Victim(s) not buried, but injured or experiencing a medical problem in the trench environment
 - D. Victim(s) trapped or pinned by heavy equipment or pipe
 - E. Victim(s) trapped in running sand or material



- F. Victim(s) completely buried
- G. Victim(s) buried in the end of a large diameter pipe

OPERATIONAL GUIDELINES

RESCUE AREA CONSIDERATIONS

1. Assure ventilation continues, monitor atmospheric conditions, as necessary
2. Assure de-watering systems are operational
3. Assure utilities are controlled and identified
4. Limit personnel at lip and collapse zone
5. Assure communications with equipment group
6. Assure safety officer in control of access and personnel
7. Assure media staging area away from collapse zone

GENERAL CONSIDERATIONS

1. Brief all personnel on plan of action and confer with appropriate groups
2. Provide constant updates to Incident Commander
3. Have a secondary plan ready in the event that the initial tactical plan proves unworkable
4. Rotate personnel regularly
5. Assure personnel involved in disentanglement and digging operations are rotated at least every 30 minutes

PATIENT CONSIDERATIONS

1. **ABOVE ALL, TREAT PATIENT FOR CRUSH SYNDROME IN ACCORDANCE WITH PROTOCOLS**
2. Consider and treat for hypothermia
3. Never dig a patient out with heavy equipment
4. Once around the patient, dig by hand
5. Consider the use of helicopter transport to a trauma center
6. Assure Technical Rescue Team paramedics coordinate and direct patient care/operations at all times
7. Plan movement mechanism well ahead of time for the removal of the patient once disentangled.



COMMUNITY RESOURCES

1. In the event that Public Utilities is needed, advise the following:

Exactly what is needed?

- A. Manpower
 - B. Heavy equipment (what kind)
 - C. Pumps (what type)
 - D. Vac truck
2. Assure that all utilities that are identified have a representative present. **DO NOT ATTEMPT TO CONTROL ELECTRICAL UTILITIES.**
 3. Assure a staging area for all incoming community resources requested.

SPECIAL SITUATIONS

1. Running Sand or Material

- A. In these cases it may be necessary to encase the victim(s) in an isolation tunnel.
- B. Items which may be used for isolation tunnels:
 - 1) Concrete or steel pipe
 - 2) Corrugated pipe

2. Pier Holes or Caissons

These are bell shaped excavations, which are used mainly as "footers" to pour support columns for concrete buildings. They represent an extreme danger due to the difficulty in sheeting and shoring and their bell shaped bottoms. Extreme caution should be exercised when involved in these types of operations.

3. Trench and Tunnel Operations

In certain cases it may be necessary to dig a parallel trench or excavation in order to create a parallel shaft. If this becomes necessary, consider the following:



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- A. Any trench cut for a rescue operation should be properly protected by either conventional or industrial means.
- B. Assure all utilities are identified prior to cutting the trench. Dialing Dig Test or requesting the utility company on an emergency basis can do this.
- C. Assure adequate shaft material for construction of your parallel shaft.
- D. If possible, request and retain a certified engineer to assist in the planning and implementation.
- E. This should only be used as a last option.

TERMINATION

- 1. Rehab all personnel prior to termination and removal operations/conduct PAR
- 2. Brief all personnel on the operation and its intended outcome

- 3. Perform removal operations in the REVERSE ORDER
- 4. Beware of secondary collapse zones; no equipment is worth an injury
- 5. Stage, clean and inventory all equipment; report any lost or damaged equipment
- 6. Any parallel shaft construction, tunnels or isolation tunnels should be left in place; removing them may cause a collapse



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COMMAND TACTICAL WORKSHEET TRENCH RESCUE

Primary Assessment

- Secure witness or RP
- Determine location, number and condition of victim(s)
- Rescue/recovery mode

Secondary Assessment

- Type of soil and collapse
- Hazard(s) to rescuers (secondary failure, electric, traffic, water)
- Assess need for additional personnel
- Assess need for additional equipment

Sectors

- Safety
- Operations (technical)
- Extrication (technical)
- EMS (treatment, transport)
- Access
- EMS (technical medical/MDs treatment)
- Staging
- PIO
- Police Liaison



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Rescue Operations

- Make general area safe (traffic control)
- Make rescue area safe
 - Atmospheric monitoring
 - De-water
 - Secure utilities
 - Make trench lip safe
- Ladder placement (not > 25' travel distance)
- Create safe zone
- Shoring/panels
- Personal protective equipment
- Victim removal equipment
- Transfer to ALS

Termination

- PAR (personnel accountability)
- Removal of equipment (or not)
- Remove equipment
- CISD
- OSHA