



**ARCADIA FIRE DEPARTMENT
STANDARD OPERATING GUIDELINE**

TRENCH RESCUE

Number: 114
Revision Date: 11/08/2012
File Name: Trench Rescue

Review Date: 03/25/2017

Approved: _____
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PURPOSE

To provide guidance for rescue teams to safely approach, shore, enter and retrieve victims following a trench rescue. Rescuers shall not enter unsafe trenches or excavations. An unsafe trench is one that has indications such as fissures, overhangs, etc. such that it may be prone to collapse and is not adequately shored.

PROCEDURE

I. Definition

Any excavation that is over five feet in depth, and is deeper than it is wide.

II. Approach

Due to the potential for secondary collapse being caused by the weight of additional vehicles and personnel, responding units shall establish staging no closer than 150 feet to the excavation. Reconnaissance shall be done by the persons most knowledgeable and trained in trench rescue incidents and/or Company Officers of the first arriving units in order to minimize the number of personnel that may be exposed to the hazardous condition.

- A. Order any personnel in the trench out immediately
- B. Order all heavy equipment to be shut down
- C. Do not allow any hand tools to be removed. These may serve as clues to the location of trapped victims.
- D. Locate and secure the job foreman.

III. Manpower and Equipment

- A. Entrapped person response – 1 engine, 1 truck, 2 US&R, 1 Haz-Mat, 1 BC, 1 RA
- B. Request Air Unit and possible additional RA
- C. Establish rehab, medical and staging areas
- D. Establish the Incident Command System

IV. Site Preparation: Create Three Zones

- A. Hot Zone – 0 to 50 feet
No apparatus except those directly involved in the rescue operation are to be permitted within this area. The number of personnel in this area is to be controlled in order to minimize the potential for a secondary collapse.

B. Warm Zone – 50’ to 150’

Establish a “control zone” in this area in order to control access into the Hot Zone. The Command Post will be established in this area.

C. Cold Zone – 150’ to 300’

This will be the Staging Area, PIO Operations, Rehab and all other staff support shall function in this area.

V. Assign a Safety Officer

This position is vital and can be assumed by a Company Officer upon arrival. If a more experienced or knowledgeable person in the field of trench rescue is available, he/she should be assigned to this position. The Safety Officer is responsible for personnel safety during the entire operation and ensuring that proper procedures are being followed for the safe extrication of the victim(s) and can stop the operation at any point if the safety of the rescuers is being unduly compromised. More than one Safety Officer may be needed under certain conditions.

VI. Size Up and Assessment

This is done in order to develop an action plan based on the level of safe working conditions. Since the excavation has already proven itself to be weak, use extreme caution in approaching the area. A trench is weakest along its edge. Always approach from the ends. Since it is impossible to predict the type of conditions that will be encountered, the following are some factors that will influence the first arriving officer’s decisions and subsequent actions.

- A. Depth of excavation
- B. Amount of soil that has collapsed
- C. Depth of soil covering the victims
- D. Number of victims that are trapped
- E. Last known or possible location of victims
- F. Potential hazardous or toxic atmosphere
- G. Potential for secondary collapse
 - 1. Cracks in the soil
 - 2. Chunks of soil falling off
 - 3. Water causing erosion

VII. Risk Assessment

Risk management is a method used to reduce exposure to hazards; however, many hazards cannot be avoided completely. Properly placed and installed shoring will be used to reduce the risk of cave-in and reduce the hazards associated with trench rescue incidents.

A risk assessment plan is a tool for determining which risks are acceptable. NFPA 1500, 6-2.1.1. The concept of risk management shall be utilized on the basis of the following:

- (a) Activities that present a significant risk to the safety of members shall be limited to situations where there is a potential to save lives
- (b) Activities that are routinely employed to protect property shall be recognized as inherent risks to the safety of members and actions shall be taken to reduce or avoid the risks
- (c) No risk to the safety of members shall be acceptable when there is no possibility to save lives or property

VIII. Prepare Shoring Equipment

The shoring equipment to be used shall be determined by the resources immediately available and the first in officer (IC).

- A. Ladders as uprights or struts
- B. Plywood sheeting
- C. 2" x 8" uprights
- D. Hydraulic shores
- E. Screw jacks
- F. Air bags
- G. Timbers

Note: Place all equipment no closer than two times the depth of the trench to avoid extra weight on the lip of the trench.

IX. Personal Safety Equipment

All personnel must wear the following safety equipment:

- A. Helmet
- B. Gloves
- C. Eye protection should be worn while working in the trench.
- D. Safety shoes
- E. Long pants
- F. Personnel operating power equipment must have eye and hearing protection.
- G. Monitor atmospheric conditions prior to entry. This is a confined space and SCBA's may be required.

X. Install Escape Ladder

Place a ladder in the trench, to be used if a rescuer falls.

XI. Edge Protection

If the edge is not clean, the lip along the long edge of the trench is to be cleaned back approximately two feet in order to provide a safe working surface. This is done by approaching the trench from the ends and having one person standing on the end of a plank and removing soil from the area in front of him/her. The person then moves back off the plank and the plank is then moved forward into the area just cleaned. The process is repeated until an adequate area has been cleaned to allow for rescuers to operate safely. The plank serves to distribute the weight of the rescuer and reduce the pressure on any one spot along the trench.

XII. Shoring Systems, Struts and Uprights

All shoring shall be in compliance with the State Fire Marshall's Emergency Shoring and Trench Rescue curriculum.

A. Vertical Uprights

1. Vertical uprights shall be minimum 2" x 8" material, 2" x 10" or 2" x 12" preferred
2. Vertical uprights shall be placed no further than 4 feet apart in type C soil (previously disturbed, / collapsed)
3. Vertical uprights may be spaced up to 8 feet apart in compact, standing solid soil

B. Horizontal Struts

1. Wood - Minimum 4" x 4" material
2. Screw jacks – Minimum 1 ½" diameter
3. Air bags
4. Top strut no more than 24" below soil level
5. Spaced no further than 4 feet apart -Bottom strut 18" from the bottom of the trench

TRENCH RESCUE WORKSHEET

SAFETY OFFICER

Acceptable risk for SAFE OPERATION

Exercise authority to STOP and PREVENT UNSAFE ACTS

Obtain briefing form incident Commander

Participate in Planning Process

Maintain Safety Zones and Perimeter control

Maintain edge protection

Eliminate trip hazards

Emergency escape ladder every 25 feet

Control vibration hazards

Observe water accumulation/ prepare for removal

Observe/monitor stress cracks

Establish rehab area

Evaluate rescues crews - rotate every 20 min. maximum

Atmospheric monitoring - evaluate readings

Appoint scribe

Document ALL actions - Incident Action Plan