3.5.3.6 Trench and Excavation Collapse

	YOUR ORGANIZATION STANDARD OPERATING PROCEDURES/GUIDELINES
TITLE: Trench and Excavation Collapse	**SECTION/TOPIC:** Special Rescue Operations
NUMBER: 3.5.3.6	**ISSUE DATE:**
	REVISED DATE:
PREPARED BY: X Preparer	**APPROVED BY:** X Approver
These SOPs/SOGs are based on FEMA guidelines FA-197	

1.0 POLICY REFERENCE

CFR	
NFPA	
NIMS	

2.0 PURPOSE

This standard operating procedure/guideline addresses response to and operations during a trench or excavation collapse incident; may include information on equipment use and maintenance.

Trench Rescue Operations present a significant danger to Fire Department personnel and may involve complex requirements for shoring, hand tools, earth- moving equipment and other specialized resources. The safe and effective management of these operations requires special considerations. **Therefore, it shall be the policy of the Phoenix Fire Department to NOT allow the entry of any personnel into an unsafe trench or excavation.** This procedure identifies some of the critical issues which must be included in managing these incidents.

3.0 SCOPE

This SOP/SOG pertains to all personnel in this organization.

4.0 DEFINITIONS

These definitions are pertinent to this SOP/SOG.

Excavation: For the purpose of emergency response, an excavation shall be defined by any depression, hole, trench or earth wall, man-made or natural, of four feet or greater.

5.0 PROCEDURES/GUIDELINES & INFORMATION

5.1 Response to and Operations during a Trench or Excavation Collapse Incident:

Cave-ins and collapses generally occur because of unstable soil conditions combined with improper or inadequate shoring. The potential for additional collapse must always be considered as a primary hazard and personnel must be aware that any action may disrupt the temporary stability and cause an additional collapse. The temporary stability, at any point in an operation, may be disturbed by removing soil or debris, by adding weight near the edge of an open cut, by vibration (such as vehicle movement), rain, or simply by the passage of time.

TACTICAL CONSIDERATIONS
Phase I Arrive on Scene. Take Command. Size-Up.

I. ARRIVAL ON SCENE
- A. First arriving company officer should take Command and begin an immediate size-up of the situation.
- B. Spotting Apparatus. The first-in company should spot the apparatus at least 50 feet from the location of the trench failure. Command should dictate Level 1 staging at least 150 feet from the scene.

II. THE PRIMARY ASSESSMENT
- A. Command should determine exactly what has happened.
- B. Assess the potential hazards to the rescuers.
- C. Secure an RP (responsible party), job foreman, or witness to the accident.
- D. Identify any language barriers that may be present between witness(es) and rescuers.
- If there are barriers, Command should call for bilingual individual to assist with communication with the witness(es).
- E. An immediate assessment of the victim's injuries should be determined.
- F. Determine how many victims are affected by the accident.
- G. If not witness is present, Command may have to look for clues on the scene as to what has happened.
- H. If there are victims, Command should determine how long the victim has been buried.
- I. An early decision must be made as to whether this operation will be run in the rescue or recovery mode.

III. THE SECONDARY ASSESSMENT
- A. Assess on-scene capabilities.

B. Assess the need for additional resources.
C. Assign a safety officer (**Safety Sector).**
D. Assign personnel.
Lobby Sector, Extrication Sector, Treatment Sector

Phase II Pre-Entry Operations

I. MAKE THE GENERAL AREA SAFE

A. Create a hot, warm, and cold zone
1. Hot zone extends 0-50 feet
2. Warm zone extends from 50-150 feet
3. Cold zone extends from 150-300 feet

B. Control traffic movement
1. Shut down roadway
2. Re-route all non-essential traffic at least 300 feet around the scene

C. Control the crowd
1. Remove all non-essential civilian personnel to at least 150 feet from the incident2.Remove all non-essential rescue personnel at least 50 feet from the incident

D. Shut down all heavy equipment operating within 300 feet of the collapse

II. MAKE THE RESCUE AREA SAFE
A. Control all hazards in the area, i.e., utilities, electric, gas, water.
B. De-water the trench if necessary.
C. Monitor the atmosphere in the trench.
D. Ventilate the trench if necessary.
E. Identify soil type and condition.

Phase III Entry Operations

I. MAKE THE TRENCH LIP SAFE

A. Approach the trench from the ends if possible.
B. Look for unidentified hazards (i.e., fissures, unstable spoil pile).
C. Assess spoil pile for improper angle of repose and general ravelling.
D. Remove any tripping hazards (i.e., shovels, shores, tree roots).
E. Provide level area for ground pads.
F. Place ground pads around lip of trench.

II. MAKE TRENCH SAFE

Extrication Sector will be responsible for entry operations. **Extrication Sector** shall ensure that all personnel operating in the hot zone are wearing steel-toed boots, helmet, eye protection, and gloves.

A. Place ingress and egress ladders in trench. There should be at least 2 ladders placed in the trench no more than 50 feet apart.
B. Decide on shoring system to be used (i.e., hydraulic shore, pneumatic shore, timber shore).
C. Create a safe zone in the uncollapsed portion of the trench (possibly from both ends).
This shall be accomplished using an approved shoring system, i.e., pneumatic, hydraulic, timber.
D. Remove the dirt from the collapsed zone. Rescuer shall remain in the safe zone while removing the dirt from the collapsed zone.
E. Secure all unsecured utilities, pipe, or any other obstruction in the trench.

III. VICTIM REMOVAL/ACCIDENTS WITHOUT CAVE-IN
A. Create a safe zone around the victim.
B. Remove objects trapping the victim (i.e., pipes, lumber, machinery).
C. Assess victim's condition.
D. Proper patient packaging.
E. Remove victim from the trench (vertical haul, horizontal haul).

IV. VICTIM REMOVAL/ACCIDENTS WITH CAVE-IN
A. Create a safe zone.
B. Begin dirt removal, operating from a safe zone (buckets, small shovels, by hand).
C. Continue extending safe zone into collapse zone.
D. Continue dirt removal.
E. Uncover victim to below the diaphragm.
F. Begin patient assessment if possible (ABC's).
G. Begin ventilation if possible.
H. Completely uncover the victim.
I. Proper patient packaging.
J. Remove the victim from the trench (vertical haul, horizontal haul).

V. TREATMENT
A. ABC's primary survey.
B. C-Spine precautions.
C. Secondary survey.
D. Consider removing the victim from danger prior to providing definitive care.
E. Follow local protocol.

Phase IV Termination

I. PREPARE FOR TERMINATION
- A. Personnel accountability.
- B. Remove tools and equipment from trench. If there has been a fatality, **Extrication Sector** may consider leaving tools and equipment in place for investigative purposes.
- C. Remove trench shoring system (last-in/first-out).
- D. Re-stock vehicles.
- E. Consider debriefing.
- F. Secure the scene. This may include leaving the shoring system in place or covering the trench.
- G. Return to service.

Additional Considerations

I. SECTORS ESTABLISHED
- A. Safety Sector
- B. Lobby Sector
- C. Extrication Sector
- D. Treatment Sector
- E. Staging Sector
- F. Resource Sector

II. CONSIDER AMBIENT CONDITIONS
- A. Heat. Consider rotation of crews.
- B. Cold. Consider affects of hypothermia on victim and rescuers.
- C. Rain/Snow. Consider the affects of rain or snow on the hazard profile.
- D. Time of day. Is there sufficient lighting for operations extending into the night.
- E. Consider the affect on family and friends; keep family informed.
- F. Consider news media; assign a P.I.O.
- G. Call for OSHA. Command should consider calling on OSHA representative to the scene if there has been a serious injury or death.

5.2 <u>Use of Equipment during a Trench or Excavation Collapse Incident</u>:

5.3 <u>Maintenance of Equipment used during a Trench or Excavation Collapse Incident</u>: