

TOLEDO FIRE and RESCUE
STANDARD OPERATING GUIDELINES

TRENCH RESCUE

REVISION 1 1/18

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SCOPE

This procedure establishes a standard structure and guideline for all fire department personnel operating at incidents involving trench rescues. The procedure outlines responsibilities for first-responders, Technical Rescue Units, Command Officers, and other fire department personnel responding to such incidents. All other Toledo Fire and Rescue procedures shall apply to technical rescue operations where applicable.

PURPOSE

The purpose of this procedure is to establish guidelines for the response of fire department personnel and equipment to trench rescue incidents. Because trench rescue operations present a significant danger to fire department personnel, the safe and effective management of these operations require special considerations. This guideline identifies some of the critical issues which must be included in managing these incidents.

TACTICAL CONSIDERATIONS

OSHA Regulations Standard 29 CFR 1926 Subpart P regulates excavations for general industry and rescue service and shall be considered the basis for emergency trench rescue operations. For the purpose of emergency response, an excavation shall be defined by any depression, hole, trench or earth wall, man-made or natural of (4) four feet or greater in depth.

Trench collapses generally occur due to unstable soil conditions combined with improper or inadequate shoring. The potential for additional collapse is to be considered a primary hazard to victims and rescue personnel. Removing soil and debris, adding additional weight near the edge of an excavation, vibration, weather or gravity may cause unexpected and rapid collapse at any time during RECON or RESCUE operations.

Pre-incident planning is an important factor in preparing to handle these types of incidents.

Due to the inherent dangers associated with these operations, Toledo Fire and Rescue's Risk Management Profile shall be applied to all trench rescue operations and shall be continuously re-assessed throughout the incident. A phased approach to trench rescue operations which include; **Arrival**, **Pre-entry** operations, **Entry** operations, and **Termination**, can be utilized to safely and effectively mitigate these high-risk / low-frequency events.

UNDER NO CIRCUMSTANCE SHALL ANY PERSONNEL OTHER THAN THE ON-DUTY RESPONDING TECHNICAL RESCUE COMPANIES ENTER THE TRENCH.

DISPATCH - The following units shall be dispatched for all Trench Rescue incidents: USAR 1 (Station 6), USAR 2 (Station 18), (1) Battalion Chief, (1) Safety Officer, (1) Engine or Engine Co., (1) Heavy Rescue Squad

*Notify the Deputy Chief of Operations and the Deputy Chief Special Operations, Public Information Officer (PIO)

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PHASE I ARRIVAL

I. ESTABLISH COMMAND

A. First arriving TFRD member shall assume Command and begin an immediate size-up of the situation **while isolating the immediate hazard area and denying entry to all non-rescue personnel**. Establish Zones (0-50', 50'-150', 150' plus)

B. First arriving Technical Rescue Unit that is staffed with a Technical Rescue Qualified Team Leader should be assigned Rescue Sector.

Rescue Sector responsibilities include:

- Assuming technical rescue operations control.
- Identifying hazards and critical factors.
- Developing a rescue plan and back-up plan.
- Communicating with and directing resources assigned to Rescue Sector.
- Informing Command of conditions, actions, and needs during all phases of the rescue operation.

C. Designate a Safety Officer. Considerations for Safety Officer include:

- Special Operations qualified Battalion Chief or Officer
- Experienced Technical Rescue Company Officer assigned to the incident.
- Experienced Technical Rescue Member assigned to the incident.
- TFRD qualified Safety Officers.

A Safety Officer shall be established prior to the implementation of any rescue plan proposed by Rescue Sector.

D. Following the transfer of Command to a Command Officer, a Technical Rescue Advisor should be assigned as part of the Command Staff at their location, to assist in managing personnel and resources engaged in the technical rescue aspects of the incident. The Technical Rescue Advisor is responsible for ensuring that the rescue plan developed by Rescue Sector and communicated to Command is a sound plan in terms of the safety and welfare of both victim(s) and rescuers. Considerations for the Technical Advisor include:

- Special Operations qualified Battalion Chief or Officer
- Experienced Technical Rescue Company Officer assigned to the incident.
- Experienced Technical Rescue Member assigned to the incident.

The Technical Rescue Advisor position within the Command Staff should be filled prior to the implementation of any rescue plan proposed by Rescue Sector.

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II. SIZE-UP

- A. Secure a witness or responsible party to assist in gathering information to determine exactly what happened. If no witnesses are present, Command may have to look for clues on the scene to determine what happened.
- B. Assess the immediate and potential hazards to the rescuers.
- C. Isolate immediate hazard area, secure the scene, and deny entry for all non-rescue personnel.
- D. Establish communications with victim(s) and determine if non-entry retrieval can be made.
- E. Assess on-scene capabilities and determine the need for additional resources.

PHASE II PRE-ENTRY OPERATIONS

It must be determined if this will be a **RESCUE** operation or a **RECOVERY** operation based on the survivability profile of the victim(s) which include factors such as the location and condition of the victim(s), and elapsed time since the accident occurred.

Pre-entry operations shall be conducted under the direction of Rescue Sector by trained Rescue Technicians.

I. Primary Shoring Operations Guidelines for Planning

- A. Place Ground Pads for weight distribution and access to the trench lip
- B. Place Lip Bridges across the excavation for access above the trench (when applicable)
- C. Move Spoil Pile and Debris from lip area
- D. Shutdown all machinery and equipment in immediate area
- E. Place Trench Panels (non-entry)
- F. Lower, position and pressurize struts from lip area (non-entry when applicable)
- G. Place Escape Ladder(s)
- H. De-Watering pumps

Develop "best practices" shoring plan and calculate soil forces prior to conducting shoring operations.

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II. MAKE THE GENERAL AREA SAFE

- A. Establish a perimeter determined by factors such as atmospheric conditions, wind direction, structural stability, etc.
 - Minimum HOT Zone of 50 feet
- B. Consider establishing a sector to control rescue personnel entering the hazard zone.
- C. Keep all non-essential personnel out of the HOT Zone (Safety and Weight Amplification)
- D. Control Vehicle Traffic
 - Shutdown roadway traffic within 150 feet of trench collapse
 - Stage fire apparatus 150 feet of the trench collapse
 - Shutdown ALL heavy equipment operating within 300 feet of the trench collapse
 - Reroute all non-essential traffic 300 feet of the trench collapse

III. MAKE THE RESCUE AREA SAFE

- A. Approach the trench from the ends (when applicable)
- B. Scan the area adjacent of the excavation for cracks/fissures and unstable spoil pile materials
- C. Consider sloping and benching
- D. Place ground pads
- E. Secure all utilities in the immediate area
- F. De-Watering operations
- G. Atmospheric monitoring adjacent to and within multiple levels of the trench
- H. Ventilation of the trench
- I. Consider harness/tether for rescue personnel

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C. Equipment

- Personal Protective Equipment (PPE) shall include helmet, gloves, proper footwear, goggles, turnouts / Nomex or PBI or cotton jumpsuit, and a class III harness (if applicable) at a minimum. Additional PPE may be indicated by the hazard and atmospheric assessment.
- Supplied Air Breathing Apparatus (SABA) or Self-Contained Breathing Apparatus (SCBA) if applicable
- Air monitoring device that monitors oxygen levels, flammability, and toxicity for rescue/recovery operations.
- Lighting equipment
- A retrieval system with a back-up system shall be readied and in place. This may include a vertical or horizontal haul system constructed of ropes, pulleys, and other hardware, with a minimum of a 2:1 mechanical advantage.
- Fin Form or similar shoring panels
- Struts (pneumatic, hydraulic, manual or wood)
- Ropes
- Hand Tools/Power Tools

PHASE III ENTRY OPERATIONS

Entry operations shall be conducted under the direction of Rescue Sector by trained Rescue Technicians.

I. MAKE THE TRENCH SAFE

Rescue Sector shall be responsible for entry operations. The rescue plan will be discussed by Rescue Sector, Safety, Command and the Technical Rescue Advisor. Rescue Sector shall ensure that all personnel operating in the trench and the area immediately surrounding the trench are accounted for and wearing appropriate PPE.

- A. Place egress ladders into the trench. A minimum of (2) two ladders are recommended positioned no more than 50 feet intervals.
- B. Determine Strut system(s) and shoring panels
- C. Shore a safe zone in a non-collapsed area(s) of the trench (when applicable)
- D. Remove soil/debris from the collapsed area of the trench while remaining within the protection of the safe zone
- E. Secure all utilities, pipes and other obstructions within or adjacent to the trench

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II. VICTIM REMOVAL (Incidents without Collapse)

- A. Create a safe zone around the victim.
- B. Upon reaching victim, conduct a primary survey and initiate C-spine precautions. NOTE: due to the configuration of the trench, optimum C-spine precautions may not be possible and should be addressed as soon as possible.
- C. When possible, provide respiratory protection for the victim(s). Rescuers shall not administer pure oxygen to a victim(s) in a trench that has a potentially flammable atmosphere and rescuers shall not remove their breathing apparatus and give it to the victim(s).
- D. Conduct a secondary survey of the victim(s) looking for immediate life threatening injuries. If conditions permit, entry personnel should attempt to treat serious injuries prior to removal, while considering that it may be more appropriate to remove the victim(s) from danger prior to treatment.
- E. Rig and/or remove objects trapping the victim (soil, pipes, lumber, machinery, etc.)
- F. Properly package the patient for removal from the trench. This may include using a backboard, stokes basket, KED board, LSP halfback, or similar device designed for extrication. Secure any loose webbing buckles, straps, or device that may hinder the extrication process.

III. VICTIM REMOVAL (Incidents with Collapse)

- A. Create a safe zone around the victim.
- B. Extend the safe zone into the collapse zone.
- C. Remove dirt from around victim by hand.
- D. Upon reaching victim, conduct a primary survey and initiate C-spine precautions. NOTE: due to the configuration of the trench, optimum C-spine precautions may not be possible and should be addressed as soon as possible.
- E. When possible, provide respiratory protection for the victim(s). Rescuers shall not administer pure oxygen to a victim(s) in a trench that has a potentially flammable atmosphere and rescuers shall not remove their breathing apparatus and give it to the victim(s).
- F. Conduct a secondary survey of the victim(s) looking for immediate life threatening injuries. If conditions permit, entry personnel should attempt to treat serious injuries prior to removal, while considering that it may be more appropriate to remove the victim(s) from danger prior to treatment.
- G. Rig and/or remove objects trapping the victim (soil, pipes, lumber, machinery, etc.)

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III. VICTIM REMOVAL (Incidents with Collapse) continued

H. Properly package the patient for removal from the trench. This may include using a backboard, stokes basket, KED board, LSP halfback, or similar device designed for extrication. Secure any loose webbing buckles, straps, or device that may hinder the extrication process.

IV. TREATMENT

A. Immediately upon egress, the victim(s) shall be transferred to treatment personnel for ALS level examination.

B. If the victim has been contaminated from product inside the trench, a thorough decontamination of the victim should be conducted prior to transporting to the hospital. Haz Mat DECON should be coordinated with the Haz Mat Unit.

C. Provide ALS level treatment and transportation to a hospital as indicated.

PHASE IV TERMINATION

A. Ensure personnel accountability.

B. Remove all tools and equipment used in the rescue/recovery and return to proper apparatus. In cases of a fatality, consider leaving everything in place until the investigative process has been completed.

C. If entry personnel and/or equipment have been contaminated, proper decontamination procedures shall be followed prior to returning to service.

D. Conduct a Post Incident Critique.

E. Return companies to service after turning the scene over to the responsible party and ensuring the scene is secure.

F. Inspect and Log any rope equipment utilized in the Trench incident.

G. Any equipment found to be damaged shall be removed from service and Special Operations shall be electronically notified.

H. Complete a 214 and forward an electronic copy to Special Operations.

ADDITIONAL CONSIDERATIONS

- Air monitoring within Rescue Sector should be assigned to the Haz Mat Unit.
- DECON Operations, when required, should be assigned and /or coordinated with the Haz Mat Unit.
- Treatment Sector should be assigned to any ALS company assigned to the incident.
- Consider the effects of inclement weather on the hazard profile, the victim(s), and the rescuers.

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ADDITIONAL CONSIDERATIONS continued

- Maintain awareness of the time of day and ensure sufficient lighting is available on the scene if operations extend into the night.
- Trench Operations, by OSHA definition are also confined spaces and require qualified rescue personnel
- Technical Rescue incidents attract the news media; request the P.I.O.
- Request OSHA response if there has been a serious injury or death.
- **When a trench is also determined to contain Hazardous Materials, Haz Mat IQ will be utilized. The atmosphere or product shall be made neutral prior to rescue operations, or the proper level of PPE shall be utilized by a personnel certified in both CSR and HM at the Technician Level. A thorough Risk Assessment by the Rescue and Haz Mat sectors shall be conducted before determining possible operations.**

EMERGENCY CONTACT for Vacuum Truck

KEN FUTEY, FOREMAN, City of Toledo, Sewer and Drainage Maintenance Department

419-392-0529

Jeff Parker, Alternate contact, 419-392-5548

Sewer Dispatcher: 419-936-2924