



Kitsap County Technical Rescue Team

Polices and Guidelines

Title: 2.4, Trench Rescue, Version 1.1

Section/Topic: Operations

Effective Date: April 3rd, 2018

Classification: Operating Guideline

Purpose

To establish a common and standardized operational approach for Kitsap County Technical Rescue Team (KCTRT) members responding to a trench rescue incident.

Scope and Applicability

This guideline provides operational guidance for the safe and effective use of Kitsap County Technical Rescue Team (KCTRT) personnel and equipment at incidents that involve structural collapse rescue operations. This guideline is used in conjunction with WAC 296-305 and NFPA 1670, 1006 and 1983.

This guideline is intended to apply only to KCTRT personnel and while Kitsap county fire districts are welcome to adopt and use these guidelines, they are not intended to supersede individual department policy or guidelines, or to alleviate an individual agency's right and responsibility as the Authority Having Jurisdiction (AHJ).

Definitions

Trench: A narrow excavation in relation to its length made below the surface of the ground. In general, the depth is greater than the width, but the width is not greater than 15 feet.

Excavation: A man-made cut, cavity, trench or depression in an earth surface, formed by earth removal.

Rescue Group Supervisor: A competent individual trained to the appropriate level, responsible for coordinating rescue operations and the associated activities within the rescue area. Serves as the on-site "competent person" and reports to the Incident Commander.

Technical Rescue Safety Officer: A competent individual trained to the appropriate level, responsible for monitoring safety in the Technical Rescue operational area. Reports to the Rescue Group Supervisor or Incident Safety Officer.

Entry Team Leader: A competent individual trained to the appropriate level, responsible for victim disentanglement and removal operations, as well as for controlling access into the trench. Responsible for completing (or delegating its completion) the Confined Space Entry Permit and recording atmospheric readings, if applicable. Reports to the Rescue Group Supervisor.

Shore Team Leader: A competent individual trained to the appropriate level, responsible for supervising the installation of shoring systems including wood, pneumatic, hydraulic or mechanical as required by the incident. Reports to the Rescue Entry Team Leader, when present.

Equipment Officer: A competent individual trained to the appropriate level, responsible for supervising the organization and deployment of Technical Rescue equipment. Reports to Rescue Group Supervisor.

Hazard Control: A competent individual trained to the appropriate level, responsible for atmospheric monitoring, ventilation and control of utilities. Reports to the Rescue Group Supervisor.

Extrication: A competent individual trained to the appropriate level, responsible for planning and executing the extrication of the victim once accessed. Reports to the Entry Team Leader, when present.

Cut Team (Station) Leader: A competent individual trained to the appropriate level, responsible for set-up and operation of the cut station in preparing shoring materials. Reports to the Entry Team Leader.

General Guidelines and Safety

When the KCTRT is utilized as a specialty resource, the Incident Commander shall assign a competent, appropriately qualified individual to serve as the Rescue Group Supervisor. The Rescue Group Supervisor will make position assignments in accordance with the Kitsap County TRT Guidelines and Mobilization Plan as required by the needs of the incident.

First arriving KCTRT members should evaluate every trench rescue incident to determine whether it meets the legal and standard definition(s) of a confined space. If so, the guidelines established in 2.2, *Confined Space Rescue* shall be followed.

Regardless of determination of the collapse area as a confined space, the Rescue Group Supervisor will assign a competent, qualified individual to perform atmospheric monitoring and coordinate actions with the Technical Rescue Safety Officer. Atmospheric monitoring shall occur before and during all trench entries. Air monitoring shall be done at 10 foot horizontal and 4 foot vertical intervals, beginning at the lip or edge of the trench.

Should any of the following atmospheric readings be recorded, TRT members shall only enter the space with appropriate respiratory protection:

- + Oxygen levels of <19.5% or >23.0%
- + Hydrogen sulfide or other toxicity marker above PEL
- + Flammability at 10% of LEL

An appropriately trained and equipped two-person Back-up Team shall be established prior to entry. Back-up team members' level of respiratory protection shall meet or exceed the level of protection utilized by the entry team.

The Kitsap County Passport Accountability System shall be used by all TRT members on site.

KCTRT personnel are responsible for ensuring that rescue site security has been provided during all rescue operations.

KCTRT members should ensure that the following safety guidelines have been met or completed by first arriving units:

- + Provide rescue site security
- + Consider ventilating the general work area around the trench
- + Provide fire control measures as needed
- + Limit ignition sources

All rescue efforts should be first directed to any victims who can be seen or heard. Further rescue efforts should be directed to reach those victims whose location is known, but who cannot be seen or heard.

Personal protective equipment is required at all trench rescue incidents. Minimum equipment includes:

- + Helmet
- + Eye protection
- + Hearing protection
- + Gloves
- + Steel toed boots
- + Respiratory protection appropriate for the conditions

All personnel entering a trench should also be in a Class III harness with a tagline.

Personnel shall not enter an unprotected trench greater than waist deep.

A safe area shall be established prior to personnel entering a trench. Trenches that are 4' or greater in depth will have a shore placed 1.5' – 2' from the top and bottom with no more than 4' between the struts

Whenever possible, trenches should be approached from the ends rather than the sides.

Operating Guidelines

First Arriving KCTRT Personnel

1. Size up the incident and attempt to gather the following incident information:
 - a. General description of the incident and cause
 - b. Trench configuration (L, straight, T), length, width, and depth
 - c. Type of collapse
 - d. Number and location of known or potential victims
 - e. Potential incident hazards including disrupted or exposed utilities, flowing or pooling water, mechanical hazards, atmospheric hazards, or hazardous materials.
 - f. Location of potential void spaces
 - g. Identity of competent on-site representative
 - h. Determine rescue vs. recovery
2. Initiate atmospheric monitoring and ventilation of the space if possible and if not already completed by first arriving units
3. Place ground ladders at each end of the trench and within the immediate rescue operations area for emergency egress
4. Place ground pads of plywood or similar material at the lip or edge of the trench
5. Consider removing personnel, fire service or otherwise, from any unprotected trench
6. Establish a hot zone of at least 50' from the trench in all directions
7. Establish a warm zone of at least 150' from the trench in all directions
8. Establish a cold zone of at least 300' from the trench in all directions.
9. Stop or detour all traffic within 300' of the trench in all directions
10. Shut down all heavy equipment operations around the trench if not already completed by first arriving units
11. Request the following personnel and equipment as needed:
 - a. Additional TRT resources
 - b. Law enforcement for scene control
 - c. Additional fire resources for manpower
 - d. Additional EMS resources for victim and rescuer treatment

Operations Personnel

KCTRT Operations level personnel may initiate the following activities at the site of a trench rescue incident:

- + Incident size up
- + Hazardous energy management
- + Support of unbroken utilities from the exterior of the trench
- + Placement of ground ladders and ground pads
- + Movement of spoil pile
- + Debris removal from above the victim and from the exterior of the trench

Technician Level Personnel

1. First arriving Technician level KCTRT members should conduct or repeat the technical rescue size-up, including soil type.
2. Request specialty resources as required:
 - a. Vacuum trucks
 - b. Lumber cache
 - c. Utility company representatives
 - d. Public works equipment and personnel
 - e. Engineers
 - f. Contractor's home company representative
 - g. Washington State Labor & Industries
3. Evaluate the site for special hazards:
 - a. Pier holes or caissons: These bell shaped excavations are used mainly as "footers" to pour support columns for concrete buildings. They present an extreme danger due to the difficulty in sheeting and shoring their bell-shaped bottoms.
 - b. Trench and tunnel operations: In some incidents it may be necessary to dig a trench or excavation to create a parallel shaft. Any trench cut for a rescue operation should be properly protected by either benching or sloping methods.
4. Consult with Incident Commander to ensure that appropriate numbers of personnel and rehabilitation are available for sustained operations.
5. All shoring operations are to take place in an orderly, planned, and systematic fashion.
6. All shoring operations should be conducted in accordance with the recommendations made in the current edition of CMC Rescue's Trench Rescue Technician Manual.

7. Upon completion of the rescue or recovery:
 - a. All personnel and equipment potentially contaminated shall be grossly decontaminated prior to departure from the scene
 - b. Shoring systems should be left in place pending a Washington State Labor & Industries investigation
 - c. If shoring systems are to be removed, removal operations should be conducted in reverse order of placement.
 - d. If shoring systems are to be removed, carefully consider the risk of secondary collapse prior to such removal.

APPENDIX A: TRENCH RESCUE SUPERVISOR CHECKLIST

LOCATION _____
DATE _____ TIME _____

- Size up the incident
- Secure the rescue area and establish access control points
- Remove non-essential personnel and by-standers
- Provide for air monitoring and ventilation as needed
- Provide for de-watering systems as necessary
- Ensure utilities are controlled and identified
- Develop trench and site diagrams
- Establish and mark operational and safety zones
- Evaluate structural integrity
- Determine the likelihood of survivability
- Assign Technical Rescue incident management positions
- Develop a rescue or recovery plan
 - Consider assigning divisions or groups based on the size and complexity of the event
- Consider a Technical Rescue 2nd alarm
- Consider requesting additional EMS resources for victim and rescuer care
- Consider requesting specialty resources
 - Lumber cache
 - Vacuum trucks
 - Engineers
 - Public Works
 - Utilities
 - Heavy equipment
- Relay the rescue or recovery plan to the Incident Commander
- Brief all personnel on plan of action
- Ensure proper PPE, to include respiratory systems, are available and appropriate for the operation
- Consider additional personnel and rehab resources for prolonged operations to provide for crew rotation and rehabilitation

APPENDIX B: KCTR Trench Rescue Scope of Operations

TRT members qualified at the Operations level shall be trained in and may conduct the following operations:

- + Perform a size up of a trench rescue
- + Identify and manage hazardous energy
- + Properly place ground ladders and ground pads
- + Properly and safely initiate movement of the spoil pile
- + Properly and safely initiate remote de-watering operations
- + Initiate atmospheric monitoring and trench ventilation
- + Rig and operate patient removal systems in compliance with SOG 2.1, Rope Rescue
- + Other operations directed and supervised by a technician level member

APPENDIX B: KCTRT Structural Collapse Rescue Scope of Operations (Cont'd)

KCTRT members qualified at the Trench Rescue Technician level shall be trained in and may conduct the following operations:

- + All Operations level activities
- + Operate in trenches greater than 4' in depth
- + Operate in environments with known respiratory hazards using SCBA or SABA systems
- + Determine soil type
- + Complete trench stabilization using any of the following methods:
 - o Timber shoring systems
 - o Hydraulic shoring systems
 - o Pneumatic shoring systems
 - o Airbags
 - o Screw jacks