

Burlington Fire Department

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Section: 04 - Special Operations

SOG Number: 04.17 Effective Date: Oct. 2, 2009

Subject: Trench and Excavation Rescue

By Order of Fire Chief Steven A. Locke

I. Purpose:

To provide basic operational guidelines for the rescue and/or recovery of victims at an incident involving a Trench or Excavation.

II. Scope:

This procedure is intended to give a general guideline for conducting a safe and effective operation at an incident involving a Trench or Excavation. It is not intended to put in place a specific structure or evolution to use. It is recognized that no two incidents are the same and each situation may require a different approach for a successful outcome.

Included in this procedure are some Command Checklists and Incident Management Resource Guides for use by the IC and Units operating on scene.

As with any emergency, the authority to deviate from this guideline rests with the Incident Commander (IC) or Chief Engineer.

III. Definitions:

<u>Excavation</u>: A man-made cut, cavity trench, or depression in an earth surface formed by earth removal. An excavation is typically wider than it is deep.

<u>Trench:</u> A narrow excavation in relation to its length made below the surface of the ground. In general, the depth as measured at the bottom is greater than the width, but no greater than 15 feet wide. If forms or structures are installed or constructed with the excavation so as to reduce the dimension measured from the

forms or structure to the side of the excavation to 15 feet or less, the excavation will be considered a trench.

IV. Guidelines:

A). Size Up

- 1. First arriving unit should establish Command and secure job foreman or responsible party and/or witness. This will help to identify nature of problem and location of victim.
- 2. Direct all emergency vehicles to stage at least 150 feet from the collapse site. The only exception is the technical rescue vehicle and/or trailer which may be located no closer than 50 feet.
- 3. Try to determine the location, number and possible condition of victims. Is there a collapse with entrapment from debris or equipment, or is there a medical emergency within the excavation site?
- 4. If victims are buried, command should try and determine length of time buried.
- 5. Attempt to gather the following information:
 - a. Width, depth and length of trench?
 - b. Identify any hazards to rescuers:
 - c. Flowing water
 - d. Disrupted or exposed but non-disrupted utilities
 - e. Secondary collapse potential
 - f. Mechanical hazards or heavy equipment involved
 - g. Hazardous materials or explosives
- 6. A risk assessment should be considered before proceeding, remember "We should never risk our lives for that which is already lost." Always consider Low-Risk before High-Risk options, determine Rescue Mode or Recovery Mode. If this is to be a recovery and not a rescue attempt, take the time to secure and make the scene as low-risk as possible.
- 7. The IC may wish to leave the victim and scene in place for investigation by proper authority.
- 8. Assess the need for additional personnel and/or resources. Request the Technical Rescue Trailer, the MSU, a Paramedic, and also consider requesting *Vermont Urban Search and Rescue Task Force 1** with trailer. Determine the need for any specialized equipment (DPW), or possible hazardous materials response.

B). Pre-Rescue Operations

- 1. Secure the scene, remove all non-essential personnel or civilians. Shut down roadway traffic and/or re-route at least 300 feet in all directions. Request police if needed for traffic or crowd control.
- 2. Create a Hot, Warm, and Cold Zone.
 - a. Hot zone extends 0-50 feet from the trench in all directions.
 - b. Warm zone extends 50-150 feet in all directions.
 - c. Cold zone extends 150-300 feet in all directions.
- 3. Shut down all heavy equipment operating within 300 feet of collapse area.
- 4. Designate a Safety Officer, also consider Operations Section if needed. Whenever possible, the Incident Commander should ensure that properly trained personnel staff these critical positions. Additionally, the Incident Commander should consider keeping a trained member at the Command Post in the Aid position if personnel numbers on scene allow.
- 5. Develop Incident Action Plan.
- 6. Assemble appropriate personnel and equipment on scene, including site foreman or responsible party if available.
 - a. Technical Rescue Trailer
 - b. MSU
- 7. Make trench lip safe.
 - a. Approach the trench from the ends whenever possible
 - b. Look for any unidentified hazards (i.e., fissures, unstable soil pile, etc.)
 - c. Provide level area and start placing ground pads around lip of trench
 - d. As soon as practical, place a ground ladder in each end of trench
 - e. Move spoil pile back from lip of trench a minimum of 2 feet utilizing hand tools.
 - f. Provide ventilation for trench if required.
 - g. De-water trench if required.
- 8. Perform a Pre-Rescue briefing on the Incident Action Plan with all involved personnel.

C). Rescue Operations

1. After completion of Size-Up and Pre-Rescue Operations the Incident Commander should assign a Rescue Group with a Rescue Group Supervisor, made up of appropriate personnel to carry-out the Action Plan developed. If available resources allow, a separate Operations Section Chief should be considered.

- 2. Assign personnel into crews of 4 or 5.
- 3. Limit personnel at trench lip to those required to perform the assigned task.
- 4. Span trench on each side of collapse area with planking and secure by nailing into ground padding. Place an extension ladder for ingress and egress at both ends along spanned area. This will be your work platform for setting of shores.
- 5. Determine type of shoring system needed, can pneumatic be utilized or will you need timber?
- 6. First, two trench panels should be positioned to provide a safe zone around victim. Shoring should start with top shore whenever possible; some situations may dictate placing middle shore first (i.e., uneven trench wall causing bottom kick-out). Eight-foot trench panels should have a minimum of three shores spaced equally along length, and all shores shall be toe nailed into place to secure.
- 7. After placing initial two panels, placement of additional panels should continue on each side to expand safe zone. Each situation will dictate how many are require, with six being the recommended minimum.
- 8. Begin patient assessment as soon as safe zone is large enough to allow access to victim. If victim is buried, uncover to the waist perform primary assessment and ventilate if required. Crush syndrome should be considered and treatment options taken into account with any buried victim.
- 9. Utilize appropriate patient packaging and immobilization.
- 10. Remember "all work within the trench should be conducted from the shored safe zone."

D). Termination

- 1. Conduct a Personnel Accountability Report (PAR).
- 2. Remove all tools and equipment from trench. If there has been a fatality Command may consider leaving tools and equipment in place for investigative purposes.
- 3. Remove trench shoring, *Last In / First Out*. Any pneumatic shoring that needs to be left in place should be replaced with timber.

- 4. Equipment accountability, all equipment used in the rescue should be checked, cleaned, and dried before placing back in service. Document any damaged or lost equipment for possible reimbursement.
- 5. Debrief if situation dictates. Consider an After Action Review.
- 6. Secure scene and transfer to proper agency or contact. This may include leaving timber shoring in place or filling in trench.

V. Responsibility:

It is the responsibility of all members to read, understand and follow this Standard Operating Guideline

Revision History				
Revision Date	Section	Summary	Principal Author	
			DC B. Bourgeois	
11.15.2018	IV. A. 8.	Updated to reflect availability of Paramedics in BFD and utilization of VT USAR TF-1 IPO Colch. Tech. Rescue.	DC A. Collette	



Command Checklist

Trench and Excavation Rescue

Initial	Size-Up:				
	Direct all apparatus to stage a minimum of 150 feet from site, exception being Technical Rescue vehicle/trailer. Determine number, condition and location of victims. If buried determine length of time Is there a collapse, entrapment from debris /equipment, or is this a medical emergency.				
	Attempt to gather the following. Width, depth, length of trench Flowing Water Utilities - Disrupted Mechanical / Equipment Hazards Hazardous Materials / Explosives Yes / No Yes / No				
	Determine Rescue Mode or Recovery. Assess need for additional personnel and/or resources. □ Technical Rescue Trailer □ Air Van □ Colchester Technical Rescue with Trailer/Equipment				
Pre-Rescue Operations:					
	Secure scene, remove all non-essential personnel or civilians. Shut down roadway traffic and/or re-route at least 300 feet in all directions. Shut down all heavy equipment operating within 300 feet of collapse area. Make general area and rescue area safe, if unable to secure all hazards, rescuers and IC should be made aware of. Secure hazards. Perform Lock-Out / Tag-Out if possible. Atmospheric monitoring. Designate Safety Officer and if situation dictates an Operations Officer, whenever possible utilize appropriately trained personnel for critical positions. Make Trench Lip Area Safe. Approach trench from ends whenever possible, look for any unidentified				
	 hazards (i.e. fissures, unstable spoil pile etc.) Provide level area and start placing ground pads, moving spoil pile a minimum of 2 feet back from lip utilizing hand tools. De-water trench or provide ventilation as needed. 				
	Develop Incident Action Plan Assemble appropriate personnel and equipment on scene, including Technical Rescue Trailer and Air Van. □ Proper PPE.				

TECHNICAL RESCUE

Command Checklist

Trench and Excavation Rescue

	Rescue Operation:			
		or all personnel on scene.		
	☐ Assign personnel into Groups or Teams of 4 to 5.			
		ench lip to those required to perform assigned task.		
	☐ Span trench with plan	nking and secure to by nailing to ground pads. Place ingress/egress		
		along spanned area. This will be work platform for setting of shores.		
		provide safe zone for victim(s) if possible.		
		required, all work within the trench to be conducted from the shored		
	safe zone.			
		atient packaging and immobilization.		
	Termination:			
	i ci mination.			
	☐ PAR – Personnel acco	ountability.		
	☐ Equipment accountab	pility.		
		ove all equipment from trench. Equipment should be checked,		
		ned and dried before placing back in service.		
		ove trench shoring, Last In / First Out. Any shoring that needs to be		
		n place should be replaced with timber.		
 □ Consider leaving all equipment and tools in place if there has been a fatality. □ Secure scene and transfer to proper agency or contact. 				
	□ Debrief.			
*	Training Levels			
	ightarrow Awareness Level:	This level provides information for the first responder to identify the hazards associated with trench collapse. It teaches decision making to allow for incident stabilization by first responders so that they become part of the solution not part of the problem.		
	→ Operations Level:	First level at which personnel can perform key rescue functions. Personnel trained to Operations level can place sheeting and shoring in trenches that are no greater than 15 feet in depth and do not intersect with other trench areas. Personnel at this level can function as sector officers within the ICS system.		
	→ Technician Level:	Personnel at this level have received training associated with deep wall and intersecting trenches. They should be utilized for overall operations, including development of protective systems, access, and disentanglement on victims within collapse site.		