
S.O.P. #: TACTICAL OPERATIONS MANUAL # 22

SUBJECT: CONFINED SPACE RESCUE

DIVISION: EMERGENCY OPERATIONS

Objective: To serve as a guide for all Fire Department personnel operating at or in a confined space environment during emergency or non-emergency situations.

Section 1: Purpose

This SOP is to be followed by all Fire Department members in assisting and developing strategic and tactical decision making while conducting operations around and in a confined space environment during rescue or recovery operations. This guide by no means circumvents the use of training, practice, experience and judgment while operating at a confined space related event. The wellbeing of emergency and civilian personnel is not to be risked for an activity that is not essential to the immediate protection of life.

Section 2: Definitions

A. A **confined space** shall be defined as

1. Large enough and so configured that a person can bodily enter it; and
2. Has limited or restricted means for entry and exit; and
3. Is not designed for continuous occupancy

Some examples of a confined space are boilers, hoppers, silos, tunnels, vessels, grain elevators, manholes, ships, sewers, tankers, attics, crawl spaces, basements before stairs are installed, and construction pits.

B. A **permit required confined space** shall be defined as

A confined space that has **one or more** of the following characteristics:

1. Contains or has potential to contain a hazardous atmosphere (Either ambient or introduced);
2. Contains a material that has the potential for engulfing an entrant;
3. Has an internal configuration such that an entrant could be trapped or asphyxiated by inwardly converging walls or by a floor which slopes downward and tapers to a smaller cross section or has piping hazards that could hinder escape;
4. Contains any other recognized serious safety or health hazard.

Note: For the purpose of rescue or recovery all confined spaces will be treated as permit required confined space.

Section 3: Response

A. A confined space rescue assignment shall consist of the following levels of response:

1. 1st Alarm - (1) Division/Battalion Chief, (1) Engine, (1) Truck, (1) ALS Medic Unit, (1) EMS Supervisor, (1) Heavy Rescue Squad (closest), Haz-Mat 114, Confined Space Rescue Team 32, Station 17 with USAR Team.
2. Working Rescue – (1) Additional ALS Medic, Rehab Unit. (NOTE: Dispatch will also notify the Maryland Occupational Safety and Health (MOSH), the On Call Safety Officer and the Public Information Officer).

B. The Confined Space Rescue Teams responding from Station 32 and Station 17 will announce their staffing levels of those members enroute that are at least trained to the operations level.

Section 4: Scene Preparation

A. Command and Control

To ensure the safety of all personnel, the Incident Command System will be used on all confined space operations regardless of whether they are emergency or non-emergency incidents. If units have arrived and the incident meets the above definitions, command will implement the following:

1. If not already dispatched, request a confined space rescue assignment.
2. Establish a Safety Officer
3. Establish a Level II accountability
4. Assessment:
 - a. Type of Confined Space: Permit or Non Permit.
 - b. Locate Responsible Party (i.e. controlling contractor or job site foreman)
 - c. If general industry, locate Entry Permit (construction sites will not have permits)
 - d. Identify the number of victims in the space
 - e. Identify the type of work being performed in space
 - f. Identify hazardous materials located in space
 - g. Rule out any other hazards located in space (i.e. machinery, electricity, etc.)
 - h. Verify any lock-out/tag-out or bleed-off/blank
 - i. Identify number of entry points and locations
5. Safety:
 - a. Establish zones
 - i. Hot Zone – 25 feet from the general area of the confined space
 - ii. Warm Zone – 100 feet from the Hot Zone (Stage Confined Space Rescue Teams)
 - iii. Cold Zone – 200 feet from the Warm Zone (Stage command, medical and all others)
 - b. Deny and restrict entry
 - c. Perform Continuous Air Monitoring
 - i. Check from outer perimeter of the hot zone to the point of entry, then top to bottom approximately every 4 feet
 - ii. Record reading for Confined Space Rescue Teams
 - d. Start Ventilation only after performing Air Monitoring
6. Perform Non-Entry Rescue if possible (i.e. retrieval line, place ladder for victim to climb out)
7. Relay critical information to Office in Charge of Confined Space Rescue Team.

B. The Incident Commander should continually monitor the condition of all personnel, as well as existing and potential environmental conditions during the events and take appropriate action with regards to staffing and resource allocation. The minimum positions to be filled within the command structure for this type of incident shall be as follows:

1. **Competent Person** - One who is capable of identifying existing and predictable hazards in the surroundings or working conditions which are unsanitary, hazardous, or dangerous to employees, and who has authorization to take prompt corrective measures to eliminate them. For the purposes of this SOP, a Competent Person will be one with Professional Qualifications as a Confined Space Technician.
2. **Assistant Safety Officer Rescue** – This position is in addition to the overall Safety Officer. This position will primarily be concerned with safety of personnel in the Warm and Hot Zones. They will be, at minimum, a Competent Person (Professional Qualifications as a Confined Space Technician).
3. **Rescue Branch Director** – This person will be responsible for developing and directing the rescue action plan in the Hot Zone.
4. **Rescue Group Officer** – Will be responsible for the four (4) Rescue Specialists assigned to his/her group.
5. **Rescue Specialists** – Will report directly to the Rescue Group Officer

Section 5: Rescue/Recovery Operations

The decision to enter into a confined space will be made by the Incident Commander in consultation with a Competent Person (Professional Qualifications as a Confined Space Technician) on scene.

A. Strategic Priorities

Strategies should focus on Hazard Identification, Victim Location, Stabilization, Access, Removal, Transportation and Demobilization. Each phase shall be approached as an individual challenge with efforts directed toward making a smooth transition between them. Resources shall be made readily available that are specific to the task.

B. Tactical Considerations

1. Ensure that the minimum positions listed above have been established.
2. Ensure Confined Space Entry Permit (Appendix A) has been completed.
3. Air monitoring shall be continuous. Several meters may be required.
4. Air monitoring shall consist of, at minimum, Oxygen, CO, LEL and H₂S.
5. If warranted, additional monitoring may be required. Haz-Mat should be consulted for this task.
6. Verify and place positive pressure air flow (electric) into space.
7. Double check all lock-out/tag-out and bleed-off/blank have been completed.
8. Confirm Rescue or Recovery.
9. Establish a separate talk group for the Hot Zone. In addition, the Incident Commander should consider the use of a Command Restricted Talk Group.
10. Develop rescue action plan and convey same to all members in the Warm and Hot Zones.
11. Establish RIT and back up equipment.
12. A safety briefing should be conducted prior to operations in the Hot Zone.
13. Monitor the progress of the operations.
14. Confer with Incident Commander to ensure proper flow of information.
15. Request additional resources as needed from the Incident Commander.

Section 6: Special Considerations

A. Statistics show that untrained members of fire departments that respond and operate at confined space incidents have a high rate of injury or death. Asphyxiation is the leading cause of death in these types of incidents. With this in mind, it is imperative that all operations focus on the safety and wellbeing of Fire Department members. Below is a potential list of considerations and items that may need to be implemented to ensure a safe and successful operation.

1. Be prepared to implement an alternative action plan.
2. Provided proper medical treatment to the victim(s) and the rescue team.
3. Properly monitor and document the air quality and other hazards assigned through the Assistant Safety Officer Rescue to the Haz-Mat Team.
4. Re-evaluate the use of full structural gear, as this can fatigue and interfere with rescue operations. Ensure that head, eye and foot protection are in use.
5. Considered these incidents as a potential crime scene that must be investigated by police and MOSH.
6. Consider the potential threat of weather, especially rain or other water run-off in below grade incidents
7. Use GFCI electrical items in and around the space.
8. Agree on back up signals or use of FD talk-a-round channels in case radio communications do not work on below grade incidents
9. Verify all rope systems have been safety checked and loaded prior to use.
10. Provide leading edge and fall protection for all members relative to the space being entered.
11. Check all members of the Fire Department who were potentially exposed to hazardous materials before leaving the Warm Zone.
12. Confer with Haz-Mat Team and support their operations as needed for decontamination

S.O.P. #: TACTICAL OPERATIONS MANUAL # 22

SUBJECT: CONFINED SPACE RESCUE

Section 7: Demobilization

Once the rescue or recovery is completed, the Rescue Branch Director and the Assistant Safety Officer Rescue shall confer with the Incident Commander as to an appropriate demobilization plan. Items to be considered are as follows:

- A. Ensure that all information gathered from the incident has been properly documented and the Confined Space Rescue Permit (Appendix A) is completed and returned to Rescue Branch Director.
- B. Document a complete inventory of all equipment lost or damaged.
- C. The Rescue Branch Director shall forward a copy of the Confined Space Rescue Permit to the Incident Commander who will then send it to the Records Division for archiving.

**BALTIMORE COUNTY FIRE DEPARTMENT
 CONFINED SPACE ENTRY PERMIT**

Appendix A

DATE		BOX AREA		TIME OF INCIDENT		TIME EXTRICATED						
LOCATION												
REASON FOR INITIAL												
DESCRIPTION OF CONFINED												
EMPLOYER &												
PERSON IN CHARGE OF WORK						PHONE NUMBER						
INCIDENT MANAGEMENT SYSTEM												
INCIDENT COMMANDER					SAFETY OFFICER							
LIASON					PUBLIC INFORMATION							
RESCUE BRANCH DIRECTOR					RESCUE GROUP							
MEDICAL BRANCH DIRECTOR					HAZMAT BRANCH DIRECTOR							
ASSISTANT SAFETY OFFICER					ENTRY CONTROL OFFICER							
COMMUNICATIONS PLAN SPECIFIC DETAILS	VISUAL	VERBAL	HAND SIGNALS	ROPE SIGNAL	PHONE	RADIO						
SPECIAL REQUIREMENTS	YES	UNIT	SPECIAL REQUIREMENTS	YES	UNIT							
Lockout/Tagout - De Energize			Class III Harness									
Lines Broken - Capped/Blanked			Tripod/ Retrieval System									
Purge - Flush & Vented			Life Lines									
Postive Pressure Ventilation			Fire Extinguisher									
Secure Area			Lighting 12V DC									
SAR - SCBA circle one			Protective Clothing									
Medic Unit			Communications									
AIR MONITORING EQUIPMENT & READINGS												
METER 1		SN#		CAL. DATE		CAL.						
METER 2		SN#		CAL. DATE		CAL.						
AIR MONITORING READINGS			TIME	TIME	TIME	TIME	TIME	TIME	TIME	TIME	TIME	TIME
TACTICAL 11 SECTION 3. PART A. NIOSH REL BY HAZARD			DEPTH	DEPTH	DEPTH	DEPTH	DEPTH	DEPTH	DEPTH	DEPTH	DEPTH	DEPTH
% OF OXYGEN	<19.5 % OR > 23.5 %											
% OF LEL	> 10 % LEL											
CARBON MONOXIDE	35 PPM											
HYDROGEN SULFIDE	10 PPM											
HYDROGEN CYANIDE	4.5 PPM											

BALTIMORE COUNTY FIRE DEPARTMENT
CONFINED SPACE ENTRY PERMIT
 ENTRY TEAM & BACKUP TEAM DATA

ENTRY		ENTRY # 1 2 3				TIME OF					TIME EXITED				
NAME		NAME				NAME					NAME				
TIM	PULS	B/P	RES	SPO	TIM	PULS	B/P	RES	SPO	TIM	PULS	B/P	RES	SPO2	
ENTRY		ENTRY # 1 2 3				TIME OF					TIME EXITED				
NAME		NAME				NAME					NAME				
TIM	PULS	B/P	RES	SPO	TIM	PULS	B/P	RES	SPO	TIM	PULS	B/P	RES	SPO2	
RIT		ENTRY # 1 2 3				TIME OF					TIME EXITED				
NAME		NAME				NAME					NAME				
TIM	PULS	B/P	RES	SPO	TIM	PULS	B/P	RES	SPO	TIM	PULS	B/P	RES	SPO2	
RIT		ENTRY # 1 2 3				TIME OF					TIME EXITED				
NAME		NAME				NAME					NAME				
TIM	PULS	B/P	RES	SPO	TIM	PULS	B/P	RES	SPO	TIM	PULS	B/P	RES	SPO2	
		ENTRY # 1 2 3				TIME OF					TIME EXITED				
NAME		NAME				NAME					NAME				
TIM	PULS	B/P	RES	SPO	TIM	PULS	B/P	RES	SPO	TIM	PULS	B/P	RES	SPO2	
Comments:															

Appendix B

**CONFINED
 SPACE RESCUE
 TACTICAL CARD**

Confined Space	Large enough and so configured that a person can bodily enter it; and 1. Has limited or restricted means for entry and exit; and 2. <u>Is not designed for continuous occupancy</u>
Permit Required Confined Space <i>(Note: For the of rescue or recovery all confined spaces be treated as permit required confined space)</i>	A confined space that has one or more of the following characteristics: 1. Contains or has a potential to contain a hazardous atmosphere (Either ambient or introduced); 2. Contains a material that has the potential for engulfing an entrant; 3. Has an internal configuration such that an entrant could be trapped or asphyxiated by inwardly converging walls or by a floor which slopes downward and tapers to a smaller cross section or has piping hazards that could hinder escape 4. Contains any other recognized serious safety or health hazard.

<input type="checkbox"/>	Arrival Sequence	UNIT NUMBER	INITIAL TACTICAL GUIDELINES
	1st arriving piece of equipment		<input type="checkbox"/> Establish COMMAND <input type="checkbox"/> POSITION EQUIPMENT AWAY FROM SPACE (Reduce Exhaust) <input type="checkbox"/> PPE: Head, Eye, Hand, Foot Protection <input type="checkbox"/> Conduct Size-up <input type="checkbox"/> Request a Confined Space Rescue Box assignment if not already dispatched <input type="checkbox"/> Meter the Atmosphere (Continuous - Entrance and every 4 feet into the space using pike pole) <input type="checkbox"/> Measure the depth using a rope or pike pole <input type="checkbox"/> Ventilate the Space with Electric Fans <input type="checkbox"/> Ensure FD Lock-out/Tag-out (in and around space) <input type="checkbox"/> If victim has retrieval/tag line in place attempt NON-ENTRY Rescue <input type="checkbox"/> Number of victim(s) and time last seen <input type="checkbox"/> Make Determination if Victim is a RESCUE or RECOVERY based on atmospheric conditions. <input type="checkbox"/> Establish Hot, Warm, and Cold zones
	1st arriving Squad/Truck		<input type="checkbox"/> Place ground pads / backboards to stabilize area around the space <input type="checkbox"/> Prepare 3:1 (Z-Rig) haul system with anchor points <input type="checkbox"/> Prepare 2 tag lines for Entry Rescue Team and 2 tag lines for 2 out rescue team <input type="checkbox"/> If warranted, setup Aerial for Stokes Basket operations <input type="checkbox"/> Conduct continuous air monitoring of space <input type="checkbox"/> Verify all electrical equip. in the hole is GECI
	USAR 17		<input type="checkbox"/> Conduct Size-up <input type="checkbox"/> Assign someone to begin a BCoFD C-Space Permit Form / Confined Space Worksheet <input type="checkbox"/> PPE: (SCBA if warranted by metering) Head, Hand, Eye, Foot, Class 3 Harness <input type="checkbox"/> Confirm back-up communication in the event of a radio failure
	HAZMAT		<input type="checkbox"/> Conduct continuous air monitoring of space <input type="checkbox"/> Assist with ventilation of the space <input type="checkbox"/> Consider decontamination needs
	EMS Units		<input type="checkbox"/> Consider hypothermia <input type="checkbox"/> Consider hyperkalemia from crush injuries <input type="checkbox"/> Transport considerations

GENERAL SAFETY ITEMS and DEFINITIONS	
Hot Zone	25 feet from the general area of the confined space. Technician / Specialist level trained rescuers only.
Warm Zone	100 feet from the Hot Zone – Operations level rescuers and Awareness providers that are properly equipped.
Cold Zone	200 feet from the Warm Zone; this is where non-trained and unequipped rescuers and civilians must be located

Additional Functions / Considerations

<p>Incident Commander <i>Decision to enter space is made by IC and a Competent Person [Confined Space Technician] on scene</i></p>	<ul style="list-style-type: none"> <input type="checkbox"/> Assume and announce a fixed command post <input type="checkbox"/> Appoint a Safety Officer <input type="checkbox"/> Assign the RIT function <input type="checkbox"/> Locate responsible party <input type="checkbox"/> Identify the type of work conducted in the space <input type="checkbox"/> Locate permit if permit required confined space <input type="checkbox"/> Are there HAZMATs in the space? <input type="checkbox"/> Are there other hazards (electrical, machinery) <input type="checkbox"/> Verify Dispatch notifies MOSH <input type="checkbox"/> Consider Command Restricted TG / Talk Around
<p>Safety Officer <i>(SO or ASO Must be a Confined Spaced Technician)</i></p>	<ul style="list-style-type: none"> <input type="checkbox"/> Conduct 360 <input type="checkbox"/> Consider ASO Rescue <input type="checkbox"/> Verify RIT is in place <input type="checkbox"/> Verify lock out / tag out or bleed / blank off <input type="checkbox"/> Verify air monitoring and ventilation of space <input type="checkbox"/> Confirm back-up signals are agreed upon if radio fails <input type="checkbox"/> HAZMAT or other hazards (machinery, electrical) <input type="checkbox"/> Leading edge and fall protection in place? <input type="checkbox"/> Verify all rope systems are SAFETY CHECKED and Loaded

Possible IMS Structure
 for a Confined Space Rescue

