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| ***REPLACE WITH YOUR MASTHEAD*** |
| **VFIS logo black JPG** | **SOG Title:** |
| **SOG Number:** |
| **Original Date:** | **Revision Date:** |
| **ABC Fire Department General Operating Guideline** |

**Confined Space and Trench Rescue**

***This is a sample of a standard operating guideline (SOG) on this topic. You should review the content, modify as appropriate for your organization, have it reviewed by your leadership team and if appropriate your legal counsel. Once adopted, make sure the SOG is communicated to members, implemented and performance monitored for effective implementation.***

**Purpose:**

To define the role of the \_\_\_\_\_\_\_\_\_\_\_\_ Fire Department involving confined space and trench entry and rescue.

To provide guidelines for personnel involved in confined space and trench entry and rescue in order to strengthen operations, management, and control, encourage safety and promote personnel accountability.

**Procedure:**

**Confined Space & Trench Definition**

* A confined space is defined as an area with limited or restricted means of egress that is not designed for consistent human occupancy, although the area is large enough and so configured that a person can physically enter and perform designated duties. A confined space can be further defined as having one or more of the following qualities:
	+ The area contains or potentially contains a hazardous, including oxygen deficient atmosphere.
	+ The area contains a material with the potential to engulf a person.
	+ The area is configured inside as to such that a person can become trapped by collapsing walls or a floor that slopes downward and narrows to a small section.
	+ The area contains other recognized serious hazards.
* A trench is defined as a long and narrow cut into land that is either man or naturally made. A trench can have the characteristics of a confined space.

**Entry Limitations**

* The policy of the \_\_\_\_\_\_\_\_\_\_\_\_ Fire Department shall be that members that are not certified in Confined Space and Trench Entry and Rescue, shall be PROHIBITED from entering any confined space or trench. These members shall be utilized for outside support duties, except for atmospheric monitoring.
* Members that are certified in Confined Space and Trench Entry and Rescue shall perform atmospheric monitoring and participate in an annual refresher program to maintain knowledge and skills.
* Confined Space and Trench Entry and Rescue will be known as Confined Space/Trench Rescue.

**Incident Levels**

* There shall be two levels of confined space and trench rescue incidents:
	+ Level One — A limited response to a relatively basic confined space incident in which the victim is visible; within 25 feet of the space entrance in any direction; has simple access for the rescuer(s) with SCBA utilized; victim is not entrapped or threatened by hazardous materials, engulfment (shifting sand, gravel or contents) drowning or structural/tunnel collapse.
	+ Level Two - Any confined space incident that involves more than one victim or any victim that is not readily visible; is more than 25 feet from entrance in any direction; or requires removal of SCBA to enter the space or any portion of the space where a victim is or entrapped by machinery. Or any confined space incident in which a specialty team is required by the conditions at the scene. These include known hazardous materials or atmospheres, risk of a falls greater than 10 feet, engulfment, drowning and structural collapse or instability.

**Operation Modes**

* There shall be two modes of operations:
	+ Recovery Mode — Rate and degree of risk is such to eliminate any injury or threat of loss of a rescuer during the recovery of a body. This is determined by the improbability of survival from mechanism of injury, down time and apparent hazards in the confined space.
	+ Rescue Mode — Rate and degree of risk that is reasonable and sensible to recover a viable or potentially viable victim of a confined space/trench rescue incident. This is determined by the probability of survival from mechanism of injury, level of consciousness, down time and apparent hazards in the confined space.

**Operations**

* The operational objectives are as follows:
	+ Establish incident command, sectors, division or groups and a rehabilitation area
	+ Identify hazards and locate victims
	+ Safeguard incident
	+ Gain safe access to victims
	+ Stabilize and extricate victims
	+ Terminate incident safely

The preceding objectives are detailed in the following section

**Establish incident command, sectors and a rehab area.**

* Incident command and sectors shall be established as needed according to the Incident Command SOG.
* A rehabilitation area shall be established at all confined space/trench rescue incidents and at a minimum, all entry personnel shall be examined. Other personnel shall be examined as deemed necessary by the incident commander or safety officer.

**Identify hazards and locate victims**

* Employing size up information and available resources, attempt to identify, immediate hazards and narrow down location of confined space/trench accesses and victims.
* Obtain Confined Space Entry permit, Safety Data Sheets (SDS), and any available layouts, drawings, or blueprints of the confined space or trench.
* Perform a perimeter survey for incoming electrical lines, power control switches, product pipes, valves or other utilities, uncontrolled hazardous materials and the structural instability of the confined space or trench
* Perform and maintain atmospheric monitoring. Personnel performing initial monitoring shall utilize full personal protective equipment including self-contained breathing apparatus, for protection from the possible hazardous atmosphere prior to and during opening of the egress to the confined space or trench.
* Locate additional openings to assist with ventilation, access, egress, or removal of any hazardous products. Protect openings with a barrier to prevent fills and equipment from filling into opening.
* Eliminate sources of ignition and have fire control measures available if required.
* Assure that vehicles that require to be running to be parked 500 feet downwind from any openings or incident. Limit equipment that can cause vibrations that may cause a secondary collapse.
* Request any additional resources for a Level Two incident.
* If necessary and possible, stage two points of entry to reach the victims if their location is known or suspected.
* If hazardous materials are involved, a decontamination sector should be established for the victim and the entry team.

**Safeguard incident**

* Establish incident perimeter with scene tape (Hot/Want/Cold zones), secure an access point and limit/restrict entry of non-essential personnel.
* Ventilate the space with positive pressure ventilation. Consider negative and positive pressure/ventilation for dense vapors and effects on atmosphere in changing flammability of vapors. Utilize an electric fan only.
* Continue atmospheric monitoring every five (5) minutes for oxygen concentration, Lower Explosive Limits (LEL) and carbon monoxide. If known toxic atmospheres, obtain monitoring capability for toxin from outside hazardous material resources or personnel.
* Personnel performing atmospheric monitoring must be qualified in Confined Space and Trench Entry and Rescue.
* The following atmospheric monitoring levels shall be considered as immediately dangerous to life and health environments:
	+ Oxygen deficient - <19.5%.
	+ Oxygen enriched - >23.0%.
	+ Flammability - @ 10% of the LEL.
	+ Toxicity - any limit in which the numerical value exceeds the Permissible Exposure Limit (PEL) in accordance with the hazardous material characteristics.
	+ Noise — which exceeds the PEL.
* Implement and affirm that the Lockout/Tagout procedures are complete.
	+ All mechanical devices and equipment capable of causing injury shall be placed in a Zero Mechanical State (ZMS).
	+ All electrical equipment (except for lighting) shall be kept locked out in the off or open position with a key type padlock or shall have a dedicated guard to avoid returning equipment to service prematurely.
* Assure structural stability of the confined space or trench. If structural instability exists or is questionable, request a Trench Space Box if available.
* If the space is exposed to the possibility of a flowing product that is not of hazardous nature, such as in a storm sewer or water tank, tag lines shall be utilized.
* In the event that the IC or safety officer determines that the atmospheric readings become unsafe, all entry personnel shall be evacuated from the space immediately until it is determined that the hazardous conditions are corrected and salt.
* Illumination of the area should be preferably done with 12-volt intrinsically safe lighting or chemical lights (Cyalume) as needed.

**Gain safe access to victims**

* All entry teams (primary and back up) shall be certified in confined space and trench entry and rescue.
* Entry and backup teams shall be preferably comprised of two people. Single entry and back up personnel should be avoided if possible.
* Each entry team shall perform atmospheric monitoring in the actual work area.
* For each entry team within the confined space, there shall be at least two qualified and fully equipped standby personnel.
* If the standby team needs to enter the space, another two qualified and fully equipped standby personnel must be available. In the event all standby personnel are utilized, additional resources must be summoned.
* All lids, covers, doors or hatches to the opening, must be secured to prevent accidental closure
* If entry team needs to be lowered into the opening, a retrieval system with a 2:1 mechanical advantage must be in place and operational prior to entry.
* A Class III harness or a Class II harness with a chest harness added on or wristlets shall be required when rope systems are used for entry or egress.
* A tag line shall be utilized on all entry personnel when the tag line does not pose a threat of entanglement within the confined space.
* Each entry person shall have and utilize a Personal Alert Safety System (PASS) device.
* Each entry person shall have at least two intrinsically safe light sources during entry.
* Mark as needed, with chalk or hand lights, entry and movement patterns to assure return path to egress.
* All entry personnel shall be supplied at least five (5) minutes of escape air.
* Communications between entry team and outside personnel shall be maintained and can be accomplished by the following:
	+ A minimum of two (2) communications systems shall be utilized and understood by all personnel operating at the incident.
		- Face to Face Communication.
		- Sign Boards.
		- Rope Tug (OATH) System:

O – OK (l tug)

A — Advance line (2 tugs)

T — Take up or turn around (leave) (3 tugs)

H — Help (4 tugs or 3 tugs repeated)

* + - Air Horns (apparatus or compressed air cans).
		- Intrinsically safe radio systems.
	+ Entry team contacts IC upon reaching victim and reports situation and requests necessary resources for removal.
	+ Time limit of 30 minutes maximum allowed for each entry personnel. All entry personnel are to report to Rehab are&
	+ No personnel will be allowed to re-enter space if any of the following exist:
		- Pulse rate above 100 bpm
		- Respiratory rate above 20/min or if dyspnea is present
		- Body temperature above 100 degrees F (38 degrees C)

**Stabilize and extricate victims**

* Provide air supply to victim as soon as possible. This may be accomplished by the following:
	+ Positive pressure ventilation of the confined space.
	+ SCBA
	+ Air supply from improvised methods:
	+ Tire inflation/air hose tool.
	+ Booster or garden hose.
	+ PVC pipe.
* Oxygen cylinders shall not be permitted into the confined space or trench area and pure oxygen shall not be utilized in potentially flammable atmospheres.
* Entry team shall not remove breathing apparatus and share with victim. Entry team should consider basic necessary equipment including breathing supply for victim.
* Entry team shall initiate primary survey and treat life-threatening injuries upon arrival to victim.
* A rapid secondary survey and treatment of serious injuries should be attempted if time and situation allows. Consider mechanism of injury and immobilize accordingly.

**The primary patient care priority is removal to a safe environment**

* Evaluation of satisfactory equipment and if additional assistance in confined space or trench should be performed.
* Total cervical immobilization should be accomplished although it is realized that it may not be possible due to configuration and area of confined space or trench.
* If victim is conscious, verbal contact and reassurance should be constantly maintained.
* Entry team should avoid placing victim between them and the point of entry due to possibility of crimped and tangled air and tag lines.
* Preceding removal of victims, the entry team shall consider the most advantageous route and method.
* Prior to removal, assure the following:
	+ Airway maintenance and C-spine control is as adequate as possible as circumstances allow.
	+ Removal systems are adequate to the victims’ size and weight.
	+ Mechanical advantage systems with a minimum of 2:1 advantage and a belay setup should be utilized over manual hauling of the victim.
	+ Electric, hydraulic or PTO winches should not be used fin victim removal.
	+ Determination of patient positioning (head or feet first).
	+ Victim should not be placed between entry team and point of entry.
* If victim is obviously deceased, rigor mortis, extreme dependent lividity, or injury inconsistent with life, consider delaying victim removal for investigative purposes.
* Disentanglement methods that involve cutting through, creating openings, or disassembling the confined space or trench, should be only accomplished after evaluating the impact the methods may have. This may be done by answering the following questions:
	+ Will this method cause a shill in the confined space or trench?
	+ Will this method create or increase a hazardous environment?
	+ Will the structural stability of the confined space or trench become compromised?
	+ Will this method be effective in accomplishing the goal of victim removal?
	+ Will this method cause further injury to the victim?
* Patient removal techniques may be accomplished by utilizing the following:
	+ SKED, KED, Reeves, LSP half backboards perform suitably for maneuvering through narrow horizontal and vertical areas. In certain areas, stoke stretchers or long backboards may be advantageous.
	+ KED boards require additional harnesses for lifting. Do not utilize or rely on straps that are attached to the KED for lifting. Utilize a Class Ill or Class II with additional chest harness.
	+ SKED requires a long backboard to maneuver the victim from a horizontal to vertical position for lifting to avoid additional injury to the neck and back of the victim.
	+ Protection of the victims’ head during removal is important to prevent further ii~uiy. A helmet with a lice shield should be used.
	+ Situations that are dangerous, have the potential to worsen and deteriorating patient condition warrant the use of rapid extrication techniques including utilizing the rescue knot.
	+ Long distances between the victim and the point of removal may require the use of an attendant to observe the patient’s condition.
* Following removal of the victim from the confined space or trench, the following should be accomplished:
	+ The victim should be transferred to EMS personnel for continued and advanced patient care.
	+ If the victim was exposed to a product or is potentially contaminated, the victim should be decontaminated according to the Hazardous Material S.O.G.
	+ Entry team and other personnel should report to rehab area.

**Terminate Incident Safely**

* Return the confined space or trench to a safe condition if possible.
* Once victim is removed, move unnecessary equipment and personnel from the confined space or trench area.
* Account for all personnel at least two times.
* Remove tools and equipment unless an investigation will be performed.
* Inventory and replace tools and equipment.
* If required for safety, have the confined space or trench opening secured to minimize accidental entry or injury.
* Be sure that any hazardous materials or situations do not pose a threat to investigators or other personnel while restoring confined space or trench to its usual working condition.
* If possible, leave the area in least disturbed condition as possible for investigation.
* Put any equipment or tools that are contaminated or damaged out of service until proper repair or decontamination can be completed.

***This is a sample guideline furnished to you by VFIS. Your organization should review this guideline and make the necessary modifications to meet your organization’s needs. The intent of this guideline is to assist you in reducing exposure to the risk of injury, harm or damage to personnel, property and the general public. For additional information on this topic, contact your VFIS Risk Control representative.***

**References:**

West Redding (CT) VFD – GOG 7-OR-703 Developed/Revised/Reviewed by VFIS ETC