SAN FRANCISCO FIRE DEPARTMENT

DIVISION OF TRAINING

TRAINING BULLETIN

TRAINING BULLETIN 96-3

CONFINED SPACE OPERATING GUIDELINES

FORWARD

Training Bulletins are an official publication of the San Francisco Fire Department Division of Training.

The intent of training bulletins is to enhance the knowledge of officers and members regarding SFFD operations and to help ensure operations are conducted as effectively, efficiently and safely as possible.

It is recommended the material presented in the training bulletin be used as subject matter for battalion, company drills and other training activities.

Officers are encouraged to contact the Division of Training with comments or suggestions regarding training bulletins.

SAN FRANCISCO FIRE DEPARTMENT
TRAINING BULLETIN #96-3

CONFINED SPACE OPERATING GUIDELINES

I. Purpose.

The purpose of this training bulletin is to provide standard operating guidelines to be implemented during hazardous materials/confined space rescue operations. These guidelines are intended to protect the health and safety of personnel and ensure that SFFD operations at a confined space incident are as effective as possible. They are based on requirements set forth in Title 8 California Code of Regulations (CCR) requirements and enforced by CAL/OSHA.

Hazardous materials/confined space rescues are extremely dangerous operations which must only be performed by properly trained and equipped individuals. All confined space incidents are to be considered a hazardous material incident until the preliminary survey and monitoring operations indicate that a hazardous materials incident does not exist. It has been well documented that the majority of fatalities that occur in confined spaces are would be rescuers who have not been properly trained or equipped. For rescue operations to be conducted safely, there must be a systematic approach by the fire service. OSHA mandates requirements which must be addressed for all on-site and off-site rescue personnel who will enter Permit Required Confined Spaces (PRCS) to perform rescue or retrieval operations.

Fire departments are not required to have a full PRCS program in place for performing rescue operations. However, the performance oriented elements of Title 8 California Code Regulations Section 5157 Permit Required Confined Spaces paragraphs g (training) and k (rescue and emergency service) are required for fire departments so rescuers can prepare themselves for emergency PRCS operations. Fire departments are also required to develop a rescue plan for each PRCS they must enter. The above requirements are incorporated into this training bulletin.

II. Definitions.

Attendant (Back-up Team). An individual stationed outside the confined space who is trained to perform assigned duties, and monitors authorized entrants inside the confined space. (San Francisco Fire Department personnel trained in Confined Space Rescue.)

Authorized Entrant (Entry Team). An employee authorized by the employer to enter a confined space. (San Francisco Fire Department personnel trained in Confined Space Rescue.)

Confined Space. An enclosed space which is:

1. Large enough and configured so that an employee can bodily enter and perform assigned work; and

2. Has limited or restricted entry or exit; and

3. Is not designed for continuous employee occupancy.

Permit Required Confined Space (PRCS). A space that meets all the above requirements **plus**:

1. Contains or has the potential to contain a hazardous atmosphere; **or**

2. Contains a material that has the potential for engulfing an entrant; **or**

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**

4. Contains any other recognized serious safety or health hazard.

Entry. The act by which a person passes through an opening into a confined space and includes work activities in that space. Entry takes place as soon as any part of the entrant's body breaks the plane of an opening into the space.

PRCS Entry Permit. Written document established by employer based on hazard identification and evaluation for the confined space. It authorizes entry into the confined space. It defines:

1. Conditions under which confined space entry is made;

2. Reason for entry;

3. Anticipated hazards of entry;

4. Individuals in charge of entry; and

5. Date and length of time permit is valid.

Hazardous Atmosphere. A hazardous atmosphere is an atmosphere that may expose employees to the risk of death, incapacitation, impairment of ability to self-rescue, injury, or acute illness from one or more of the following causes:

1. Flammable gas, vapor or mist in excess of 10 percent of its lower flammable limit (LFL);

2. Airborne combustible dust at a concentration that meets or exceeds its LFL; (Note: This concentration may be approximated as a condition in which the dust obscures vision at a distance of 5 feet or less.)

3. Atmospheric oxygen concentration below 19.5 percent or above 23.5 percent;

4. Atmospheric concentration of any substance for which a dose or permissible exposure limit is published by OSHA and could result in employee exposure in excess of its dose or permissible exposure limit;

5. Any other atmospheric condition that is immediately dangerous to life or health (IDLH). (Note: For air contaminants for which OSHA has not determined a dose or permissible exposure limit, other sources of information, such as MSDSs, published information, and internal documents can provide guidance in establishing acceptable atmospheric conditions.)

III. Dispatch Procedures

1. Units initially dispatched to an incident that upon arrival determine the incident to be a hazardous materials/confined space rescue shall request that the Communications Center dispatch a hazardous materials/confined space rescue incident assignment.

2. Upon report of a confined space rescue, or report of an incident that could reasonably be expected to be a confined space rescue, the Communications Center shall dispatch a hazardous materials/confined space rescue incident assignment.

3. Initial response for a hazardous materials/confined space rescue incident is:

   a. First due Battalion Chief;
   b. First due Engine Company;
   c. Hazardous Materials Team (Battalion 2, HazMat Unit, DPH Emergency Responder);
   d. Two Rescue Companies; and
   e. One (1) Truck Company (Either Truck 1 or Truck 7 depending on proximity and availability.

IV. Training

1. All members of the rescue team must receive training covering the following elements:

   a. Permit space recognition
   b. Permit space hazards
   c. Control of permit space hazards
   d. Atmospheric monitoring equipment and testing protocol
   e. Use and maintenance of personal protective equipment and rescue equipment necessary for making rescues from permit spaces
   f. Simulate permit space rescues and required rescue techniques

g. Basic first aid & cardiopulmonary resuscitation
h. Train personnel on how to use the confined space - "rescue plan checklist"
i. All members shall practice making permit space rescues at least once every 12 months, by means of simulated rescue operations in which they remove dummies, mannequins, or actual persons from the actual permit spaces or from representative permit spaces.

V. Standard Operating Guidelines

The majority of fatalities that occur in confined spaces are would be rescuers who rush in without receiving proper training and/or without instituting the appropriate precautions. It cannot be stressed enough that entry rescues must only be performed by properly trained and equipped individuals. During an emergency situation, emotions must not be allowed to dictate actions. An appropriate rescue plan is required. The incident command structure established for hazardous materials incidents in the City and County of San Francisco shall be followed during all hazardous materials/confined space incidents.

1. The SOGs for confined spaces have been developed to eliminate or control any hazards prior to and during entry rescue operations. These SOGs should be followed at all PRCS and confined space rescues:

   a. Initiate the incident command system (use hazardous materials incident command structure flowchart).
   b. If available, review entry permit.
   c. Determine number and condition of occupants in the space.
   d. If possible, attempt rescue without rescuers entering the space.
   e. If entry is necessary, institute entry procedures:
      1) Only personnel trained by the San Francisco Fire Department in Confined Space Rescue shall enter a Permit Required Confined Space.
      2) Entry personnel shall operate under hazardous materials operating guidelines.
         a) Personnel shall work in pairs, when possible;
         b) Personnel shall wear respiratory protection, the appropriate level of protective clothing, gloves and helmet;
         c) Personnel shall turn personal alerting signal system (PASS) to the "ARM" or "AUTO" position;
         d) Two means of communications shall be established between the Entry Team and the Back-up Team (attendant);
         e) A Back-up Team shall be standing-by;
         f) First aid/CPR and transport capability shall be standing-by;
         g) All spaces will be monitored for atmospheric contamination prior to entry and will continue to be monitored at the opening and by the Entry Team (rescuers) inside the space. Atmospheric testing shall be done at all levels (high and low) due to the potential stratification of vapors; and

h) A Safety Officer shall be appointed.

f. Utilize confined space "Rescue Plan Checklist", institute appropriate procedures and use required equipment.
g. Utilize confined space "Entry Control Log".
h. Retrieval systems or methods shall be used whenever a rescuer enters a permit space, unless the retrieval equipment would increase the overall risk of entry or would not contribute to the rescue. Retrieval systems shall meet the following requirements:
   1) Rescuers shall use a chest or full body harness, with a retrieval line attached at a suitable point so that the rescuer presents the smallest possible profile.
   2) The other end of the retrieval line shall be attached to a mechanical device or fixed point outside the space in such a manner that rescue can begin as soon as possible. A mechanical device shall be available to retrieve personnel from vertical type permit spaces more than 5 feet deep.
i. Obtain material safety data sheets (MSDSs), if available, for the chemical to which the victim(s) was exposed.
j. Secure area outside space and remove or control any potential hazards.
k. All spaces shall be ventilated mechanically by the use of either positive or negative pressure.
l. All equipment used inside the space must be intrinsically safe.
m. Formulate an alternate plan for emergency egress, extrication method, medical treatments, and supplemental breathing air supplies.
n. Retrieving victim(s):
   1) Victim packaging-type required is indicated by the victim's injuries and size of the opening;
   2) Determine victim's immediate needs; if possible remove victim promptly;
   3) Rescuer must never remove their respirator facepiece to administer fresh air to the victim;
   4) If victim is trapped and can not be moved promptly:
      a) Provide air to the victim with SCBA or SAR (use spare mask and buddy-breathing connection).
      b) Oxygen cylinders must not be taken into a permit space if the oxygen could react with any substances in the space and create an additional hazard.
o. MSDS information for the chemical to which the victim(s) was exposed shall be provided to ambulance/hospital personnel.
p. Decontamination:
   1) Equipment, clothing, and personnel may require decontamination, depending on the hazards encountered. All decontamination will be carried out as per recommendations from the Hazardous Materials Team.

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Incident No.: _____ Date: _____

Confined Space - "Rescue Plan Checklist"				
	Item	Yes	No	N/A
1	PERMIT REQUIRED CONFINED SPACE (PRCS)			
2	LOCATED ATTENDANT WITH ENTRY PERMIT			
3	SAFETY OFFICER APPOINTED			
4	PIPING / VALVES LOCKED, TAGGED, BLANKED OUT			
5	MACHINERY LOCKED, TAGGED OUT			
6	ELECTRICAL LOCKED, TAGGED OUT			
7	LOCATED MSDS			
8	USE OF NON-SPARKING TOOLS			
9	CONTINUOUS VENTILATION			
10	CONTINUOUS AIR MONITORING			
11	OXYGEN BETWEEN 19.5% AND 23.5%			
12	H_2S - 10 PPM OR LESS			
13	CO - 25 PPM OR LESS			
14	LEL BELOW 10%			
15	TOXICITY TEST WITHIN PEL			
16	DETERMINE PPE			
17	RADIO COMMUNICATION - CHANNEL ____			
18	OTHER COMMUNICATION (HAND, LINE TUG, ETC.)			
19	ASSIGN ENTRANTS			
20	ASSIGN ATTENDANT			
21	RETRIEVAL LINE / FALL ARREST SET			
22	LIGHTING NEEDED			
23	FIRE EXTINGUISHER / PROTECTION LINE			
24	ENTRY CONTROL LOG COMPLETED			
25	ASSIGNED BACK-UP TEAM READY			
26	INFORMED ENTRY TEAM OF KNOWN HAZARDS			
27	INFORMED BACK-UP TEAM OF KNOWN HAZARDS			
28				
29				
30				
31				
32				

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Location: _____

Incident No.: _____ Date: _____

Confined Space - "Entry Control Log"					
	Entrant Name	Air Supply	PPE	Time In	Time Out
1					
2					
3					
4					
5					
6					
7					
8					
9					
10					
11					
12					
13					
14					
15					
16					
17					
18					
19					
20					

SFFD HAZMAT/CONFINED SPACE INCIDENT COMMAND STRUCTURE