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Safety Hazard Webinar Confined Spaces

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Opening Points

- This presentation is based on current United States federal requirements. US state or other country requirements may be different. Always consult User Instructions and follow local laws and regulations.
- This presentation contains an overview of general information and should not be relied upon to make specific decisions. Completing this program does not certify proficiency in safety and health.
- Information is current as of the date listed for this presentation, and requirements can change in the future.
- This presentation should not be relied upon in isolation, as the content is often accompanied by additional and/or clarifying information or discussion.
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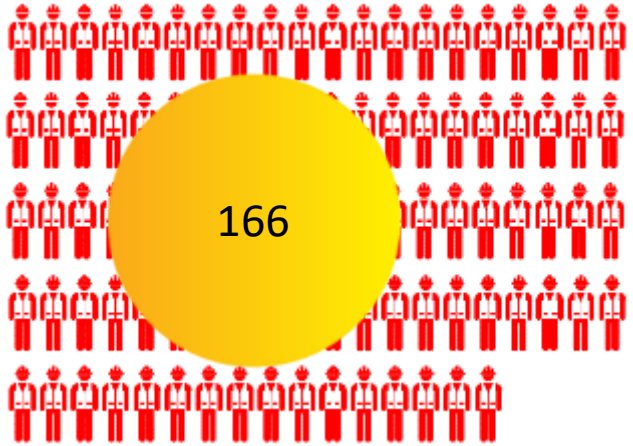
Today’s Objectives

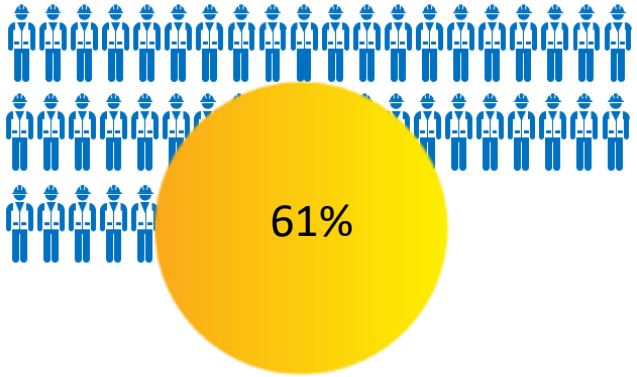
- Confined Space – Why and What
- Confined Space Regulations
- Confined Space Roles & Responsibilities
- ABC’s of Confined Space
- Confined Space Entry & Rescue Plans

What are the risks?

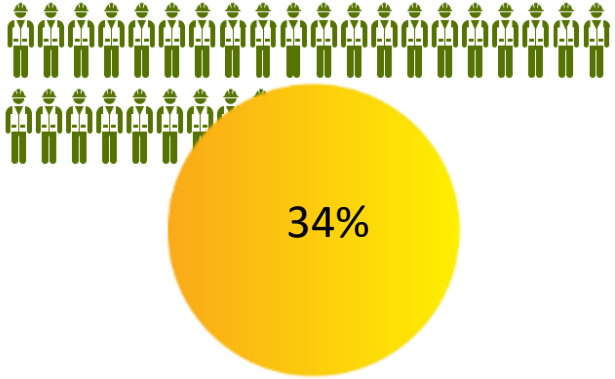
Deaths occur each year
In the USA alone
(OSHA, 2017)[1]



Deaths from physical hazards
engulfment, falls, “struck by”, electrocution, heat, etc.



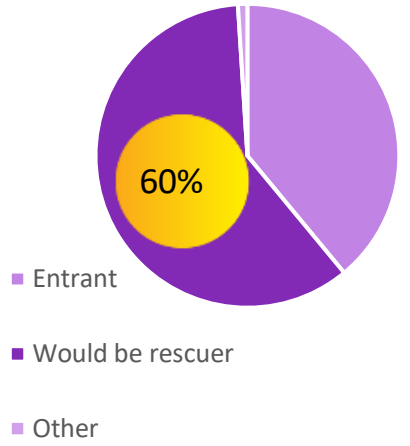
Deaths from atmospheric hazards
engulfment, falls, “struck by”, electrocution, heat, etc.



In multi-fatality incidents reviewed,

60% of deaths are would-be rescuers:

More people die attempting to rescue others than the initial afflicted entrants



Sources:
OSHA, https://www.osha.gov/harwoodgrants/grantmaterials/bytopic/
Rocorecue, https://www.cdc.gov/niosh/docs/86-110/defaukt.html

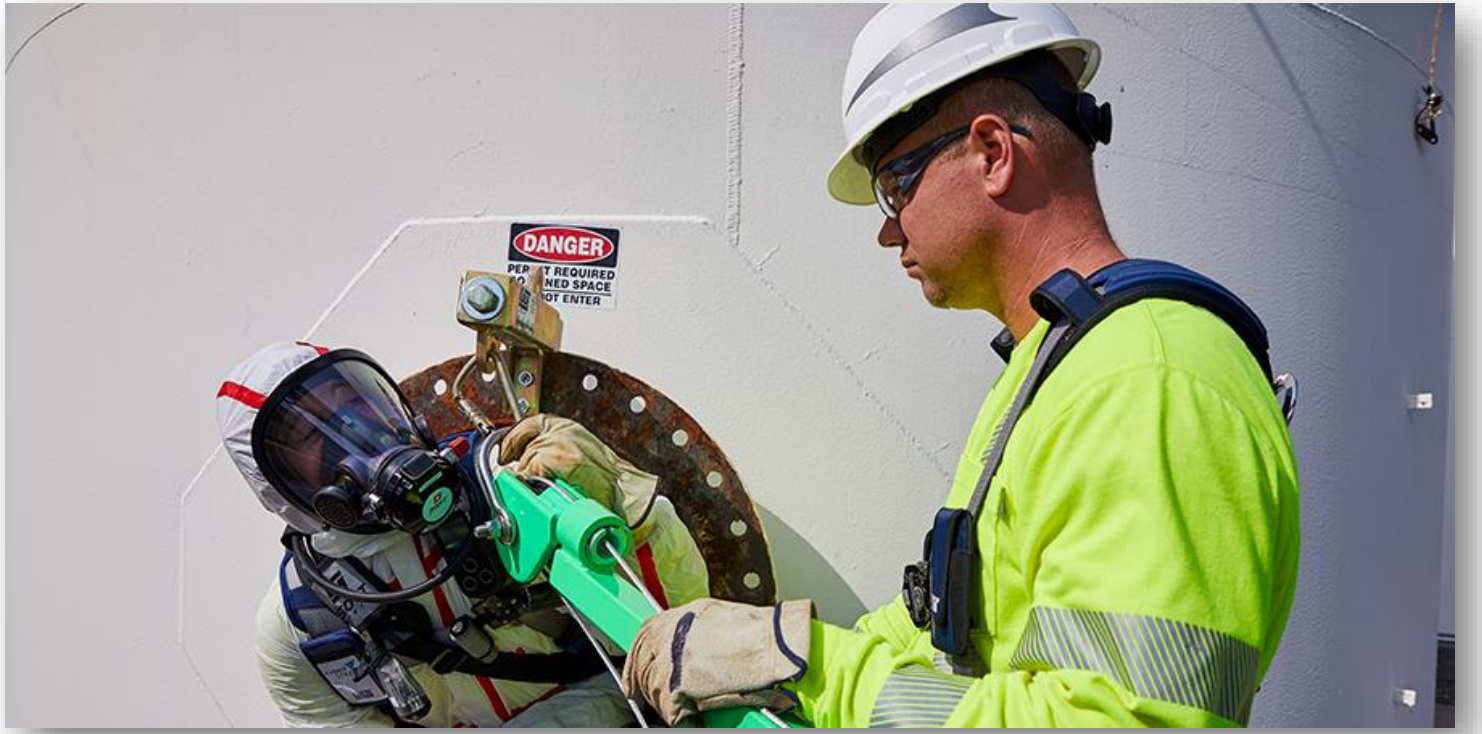
Who goes into a Confined Space?

In every industry, based on the work that needs to be done inside a confined space, employees from several entities may need to enter the confined space.

- Host Employer's Employees
- Contract Workers
- Rescue Teams

1.6M workers enter 4.8M confined spaces each year*

Office of Federal Register, 1993

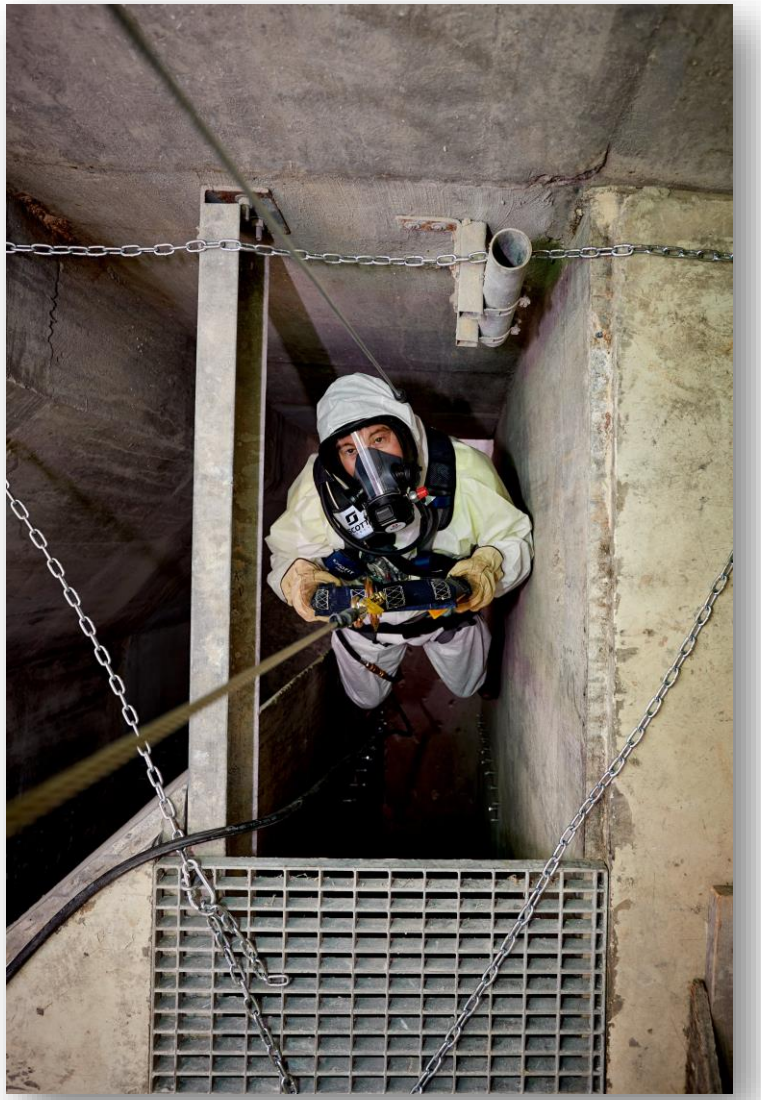


Why go into a Confined Space?

There are many tasks that need to be completed inside of confined spaces, but the most common of these are:

- Inspection
- Cleaning
- Environmental Monitoring
- Repair
- Welding
- Maintenance
- Construction

What is a “Confined Space” ?



Step 1: Three questions to consider about the space

1. Is it large enough and so configured that an employee **can bodily enter** and perform assigned work?
2. Does it have limited or **restricted means for entry or exit?**
3. Is it **not designed for continuous** employee occupancy?

No to any → **US Non-Confined Space**

Yes to all → **Step 2: Consider additional risks**

Does the space have any other serious health or safety hazard, such as engulfment, entrapment, asphyxiation, atmospheric hazards, configuration hazards, etc.

No → **US Non-Permit CS**

Yes → **US Permit CS**

What hazards can exist within a confined space?

The hazards found inside confined spaces can be divided into three categories. These need to be understood and controlled prior to rescue.

Atmospheric Hazards

Physical Hazards

Configuration Hazards

Confined Space?

residentialwastesystems.com

Examples of Confined Spaces

Confined Space Regulations

Regulations - Federal

OSHA 1910.146 Permit Required Confined Spaces (1993)

- Contains requirements for practices and procedures to protect employees in general industry from the hazards of entry into “permit-required” confined spaces. This section does not apply to agriculture, to construction, or to shipyard employment.

OSHA 1926 Subpart AA (2015)

- Contains requirements for practices and procedures to protect employees in construction from the hazards of entry into “permit-required” confined spaces. This standard sets forth requirements for practices and procedures to protect employees engaged in construction activities at a worksite with one or more confined spaces, subject to the exception of Excavations, Underground Construction, Caissons, Cofferdams, Compressed Air or Diving

Regulations – State Plans

There are 28 States/US Territories with "State Plans"

- 22 of the States/US Territories follow both 1910.146 and 1926 Subpart AA completely

  CT, NJ, MD, KY, TN, NC, SC, NY, MA, VT, IN, IL, IA, MN, NM, WY, AZ, NV, HI, PR, VI, MI

- 3 of the States/US Territories follow both 1910.146 and Subpart AA with minor additions

  VA – Specifically addresses Telecom with 16VAC-70 replacing 1910.268

  UT – Includes Agriculture

  AK – Requires attendant to only be allowed to watch once PRC at a time

- 3 of the States/US Territories have created their own requirements which are quite similar to the Federal rule

  CA, OR, WA

What standard are host employers required to follow?

If a “host employer” allows their employees to enter a permit required confined space for non-construction activities they are required to meet the obligations of 29 CFR 1910.146

If the “host employer” hires contractors to perform work in confined spaces they are obligated to meet all requirements of the “host employer” as identified in 29 CFR 1926 – Subpart AA

https://www.osha.gov/confinedspaces/faq.html

What standard are contractors required to follow?

“An employer whose workers are engaged in both construction and general industry work in confided spaces will meet OSHA requirements if the employer meets the requirements of 29 CFR 1926 Subpart AA – Confined Spaces in Construction.”

https://www.osha.gov/confinedspaces/faq.html

Key Differences & Clarifications

- Requires a competent person to evaluate the work site and identify confined spaces, including permit spaces 1926.1203(a)
- Requires continuous monitoring unless employer can demonstrate that equipment for continuous monitoring is not commercially available or periodic monitoring is sufficient 1926.1203(e)(2)(vi)
- Requires continuous monitoring of engulfment hazards 1926.1204(e)(1)(iii)
- Non-Entry rescue is require unless retrieval equipment would increase the overall risk or would not contribute to the rescue of the entrant 1926.1211(c)
- The employer must designate an entry rescue service whenever non entry rescue is selected and they are available if the nonentry rescue system fails 1926.1211(c)
- Employer must establish a communication with the emergency response team and be notified when they are not available 1926.1210(d)

Key Differences & Clarifications

- More detailed provision requiring coordinated activities when multiple employers at the worksite 1926.1204(k)
- Requires informational exchange between entry employer, controlling contractor and host employer which includes1926.1203(h):
    - location of permit spaces to be entered
    - Hazards that exist or may exist in the spaces
    - Past experiences with entry into the spaces
    - Precautions taken during past entries
    - Precautions to be used during current entry
    - Post entry debrief
- Requires training in a language and vocabulary that the employee can understand 1926.1207(b)(1)

Roles & Responsibilities

Duties of Entry Supervisor

- Familiar with and understands the hazards that may be faced during entry
- Determines at intervals dictated by the hazards and operations that entry operations and conditions remain consistent with terms of the entry permit
- Verifies appropriate entries have been made on the permit; specified tests conducted, procedures and equipment are in place before signing permit and allowing entry to begin
- Verifies that rescue services are available, means for summoning them are operable, that employer will be notified if services become unavailable
- Removes unauthorized individuals who enter or who attempt to enter the permit space during entry operations
- Terminates the entry, cancels or suspends the permit as required

Duties of Attendant

- Understands the hazards that may be faced during entry
- Is aware of possible behavioral effects of hazard exposure in authorized entrants
- Maintains an accurate count of authorized entrants in the permit space and who is in the space
- Remains outside the permit space during entry operations until relieved by another attendant
- Communicates with authorized entrants as necessary to assess entrant status and to alert entrants of the need to evacuate the space
- Assesses activities and conditions inside and outside the space to determine if it is safe for entrants to remain in the space
- Orders the authorized entrants to evacuate the permit space immediately if prohibited conditions occur
- Summons rescue and other emergency services when entrants may need assistance to escape from permit space hazards
- Can not have other duties that interfere with attendant duties
- Performs non-entry rescues as specified by the employer’s rescue procedure

Duties of Entrant

- Are familiar with and understand the hazards that may be faced during entry
- Properly use equipment as required
- Communicate with the attendant as needed
- Alert the attendant whenever:
  - There is any warning sign or symptom of exposure to a dangerous situation; or
  - Entrant detects a prohibited condition
- Exit from the permit space as quickly as possible whenever:
  - An order to evacuate is given by the attendant or the entry supervisor
  - There is any warning sign or symptom of exposure to a dangerous situation
  - The entrant detects a prohibited condition
  - An evacuation alarm is activated

Confined Space ABC’s

Do regulations require use of Confined Space products?

Non-Confined Space

Non-Permit CS

Permit Required CS

Confined Space Equipment Requirements

No Confined Space equipment required

Confined Space equipment ***can still help*** when accessing these areas

A **Anchorage:** Mechanical device or fixed point; mechanical device needed if space is > 5ft deep

B **Body Support:** Chest or full-body harness

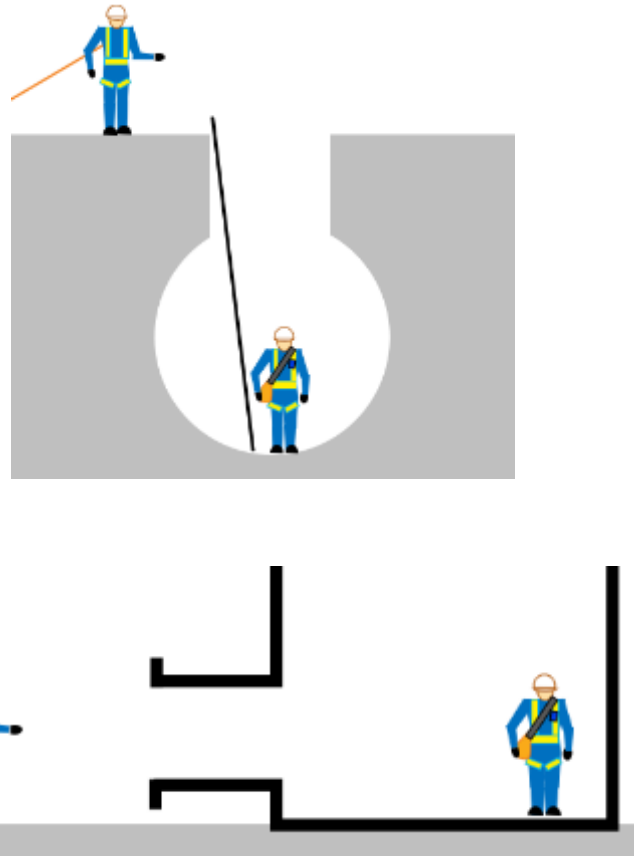
C **Connector:** Retrieval line connected at center of back, near, or above shoulders

D **Detection**: Air within the confined space must be evaluated with gas detection. In some Instances an "escape" air supply is required

E **Education**: Employees must be trained

Confined Space equipment is ***required*** when accessing these areas

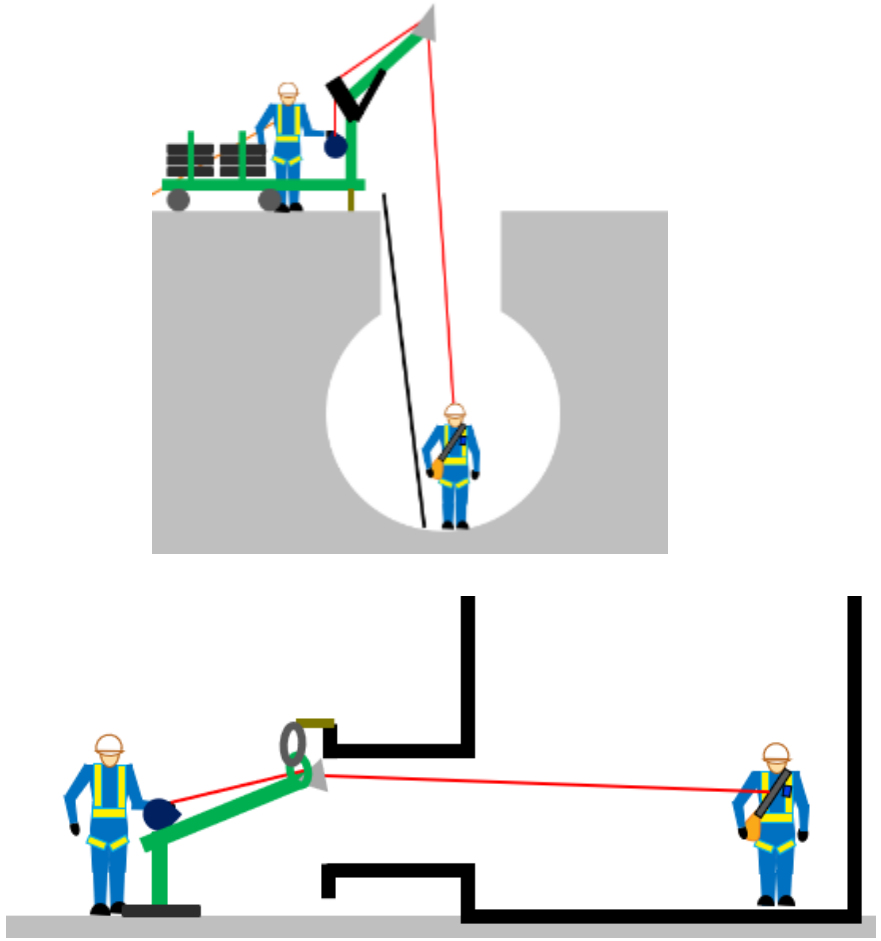
How does the correct equipment help access / rescue?



Concerns	Access (Entrant)	Rescue (Rescuer)
Safety	**Fall risk** (vertical entry)	**Exposure, people**: Rescuer must also enter the confined space **Exposure, time**: More time spent within the confined space
Efficiency	**Inefficient** (vertical entry/exit)	**Time**: Extraction cannot begin immediately **Labor**: Lifting/dragging is entirely manual

Without confined space access equipment, multiple safety and rescue issues arise

How does the correct equipment help access / rescue?



Concerns	Access (Entrant)	Rescue (Rescuer)
Safety	Fall risk (vertical entry) **Protection provided**	Exposure, people: Rescuer **need not** enter the confined space Exposure, time: **less not** spent within the confined space
Efficiency	Inefficient (vertical entry/exit) **Efficient method**	Time: Extraction **can begin immediately** Labor: Lifting/dragging has **mechanical advantage**

With confined space access equipment, multiple safety and rescue issues are reduced

Choosing the right equipment – “A” Anchors

1 Entry Direction

Horizontal

- Pole Hoist

- Side Entry Systems

Vertical

- Davit Systems

- Tri-Pods

- Tank Pod

- Pole Hoist

- Rescue Davit

2 Supporting Structure (Concrete, Soil, Steel)

↓

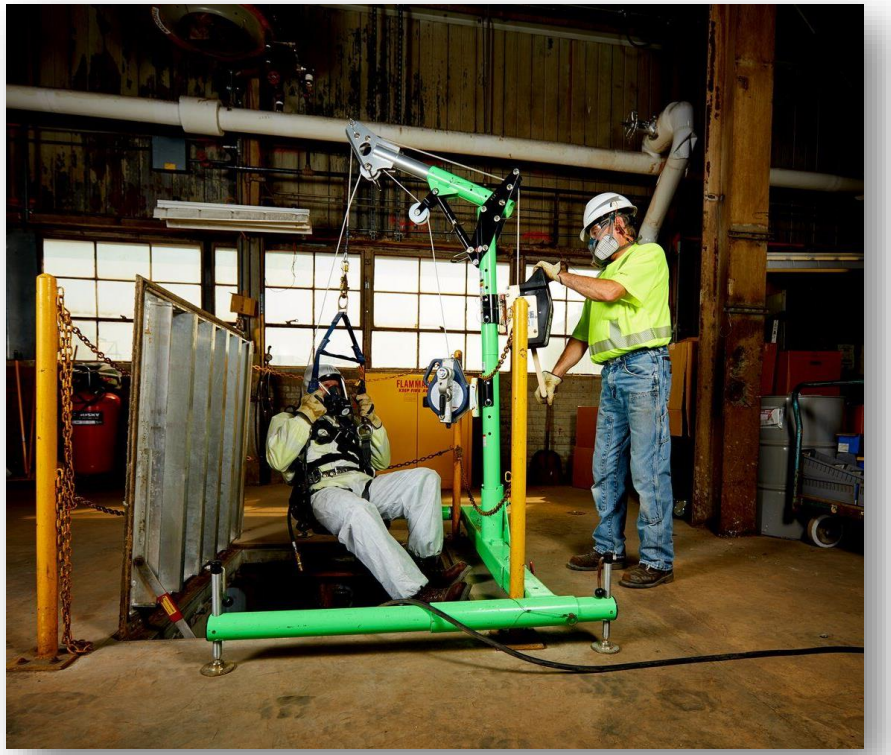
3 Entry Configuration (Round, Square, Overhead Clearance)

↓

4 Depth of Entry (Leads to “Connector” Type and Length)

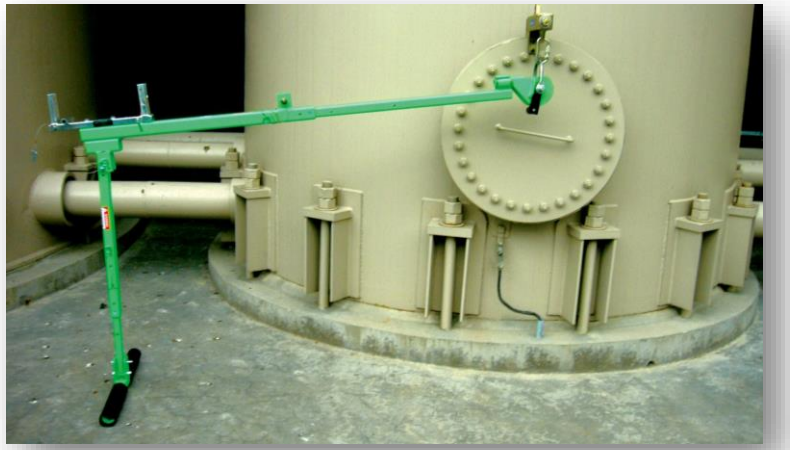
Choosing the right equipment – “A” Anchors

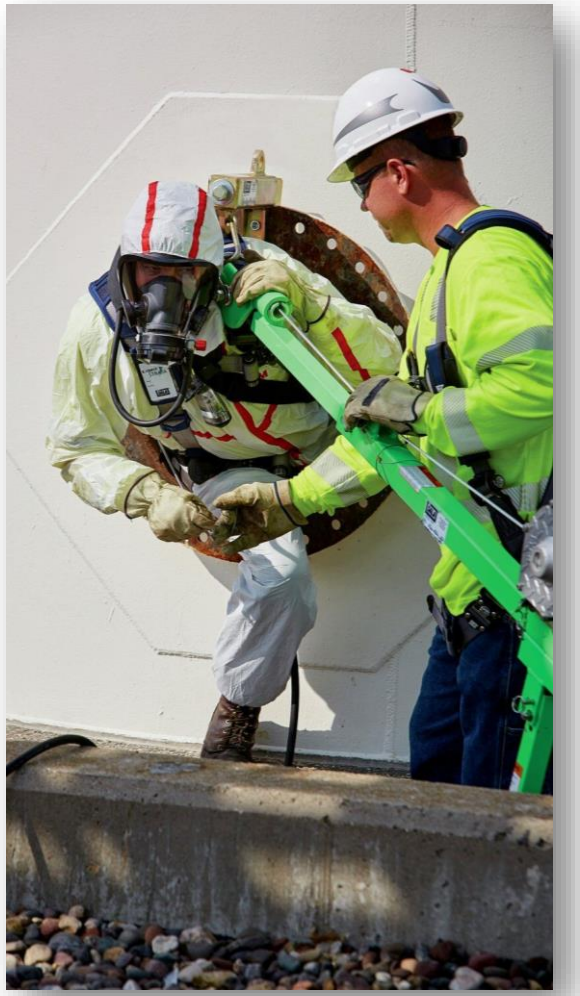
Vertical Entry Examples



Choosing the right equipment – “A” Anchors

Horizontal Entry Examples





Pole Hoists

Side Entry Systems

Choosing the right equipment – “B” Body Support

Primary Confined Entry / Retrieval Harnesses

ExoFit Nex | Delta | Protecta

Attachment points **on each shoulder** facilitate upright retrieval.

Intended to be used with Y-Lanyard

However…
Specific harness choice **depends on work** being done (e.g., coated, hot work)
Due to spatial constraints, best harness choice may be the **simplest** (least webbing and hardware)

Additional Options for Descent

Harnesses

Harnesses with seat sling attachments can add comfort for vertical descent

ExoFit NEX Tower Climbing Harness

ExoFit NEX Oil & Gas Harness

Accessories

Suspended Workman’s Chair

Bosun Chair

Retrieval Wristlets (if entrant did not have harness and is in need of rescue)

Choosing the right equipment – “C” Connectors

- All entries for permit required CS, vertical and horizontal, must be provided with a pre-rigged retrieval system
- All entries for permit required CS, greater than five feet vertically, must incorporate a mechanical advantage also
- Non-permit CS, as best practice, should have the same
- Mechanical advantage is important for both vertical and horizontal

Winches

Retrieval SRL’s

“D” Detecting Atmospheric Hazards

The definition of ‘atmospheric hazards’ is quite consistent

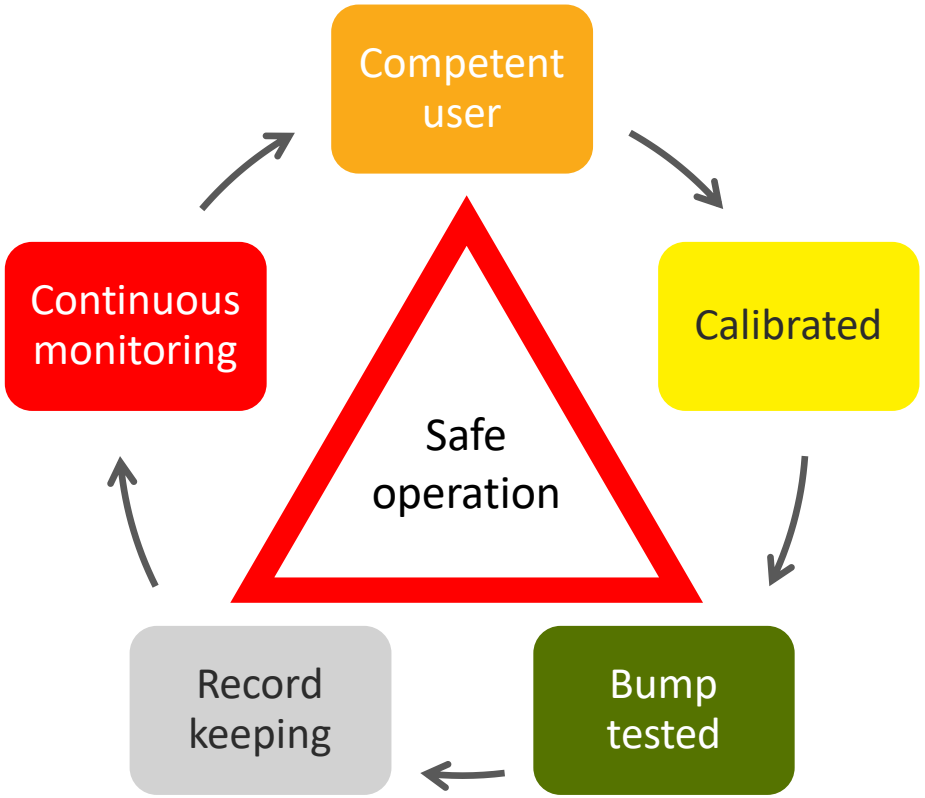
“Atmospheric hazard” means:

a) Flammable or combustible or explosive agents

b) Oxygen content less than 19.5% or more than 23% by volume

a) Toxic contaminants (gases, vapors, fumes, dusts or mists) that could
(i) result in acute health effects that pose an immediate threat to life
(ii) interfere with a person’s ability to escape unaided from a confined space.

Using – “D” Portable Gas Detection



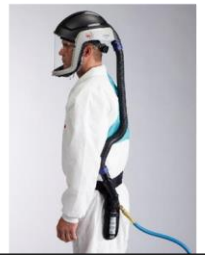
“E” Education

- Everyone involved in the process must be trained
- Employees must understand their role
  - Supervisor
  - Attendant
  - Entrant
  - Rescue Team
- Employees must be trained on how to use equipment
- Rescue training should be conducted annually
- All employees, as best practice, should also receive refresher training annually

Choosing the right equipment - “F” Full Body Protection (PPE)

Respiratory Protection





Escape, Supplied Air, and Self-Contained Breathing Apparatus



Hearing Protection


Head, Eye, and Face Protection


Body Protection

Communications

- Everyone inside the space
- Those inside and outside the space
- Rescuers and the Emergency Services

- Internal communications can be audible, via radios or cable-intercoms, or even tugs on a rope, but:
  - They must be effective and understood by everyone
  - They must be safe (such as in explosive atmospheres)

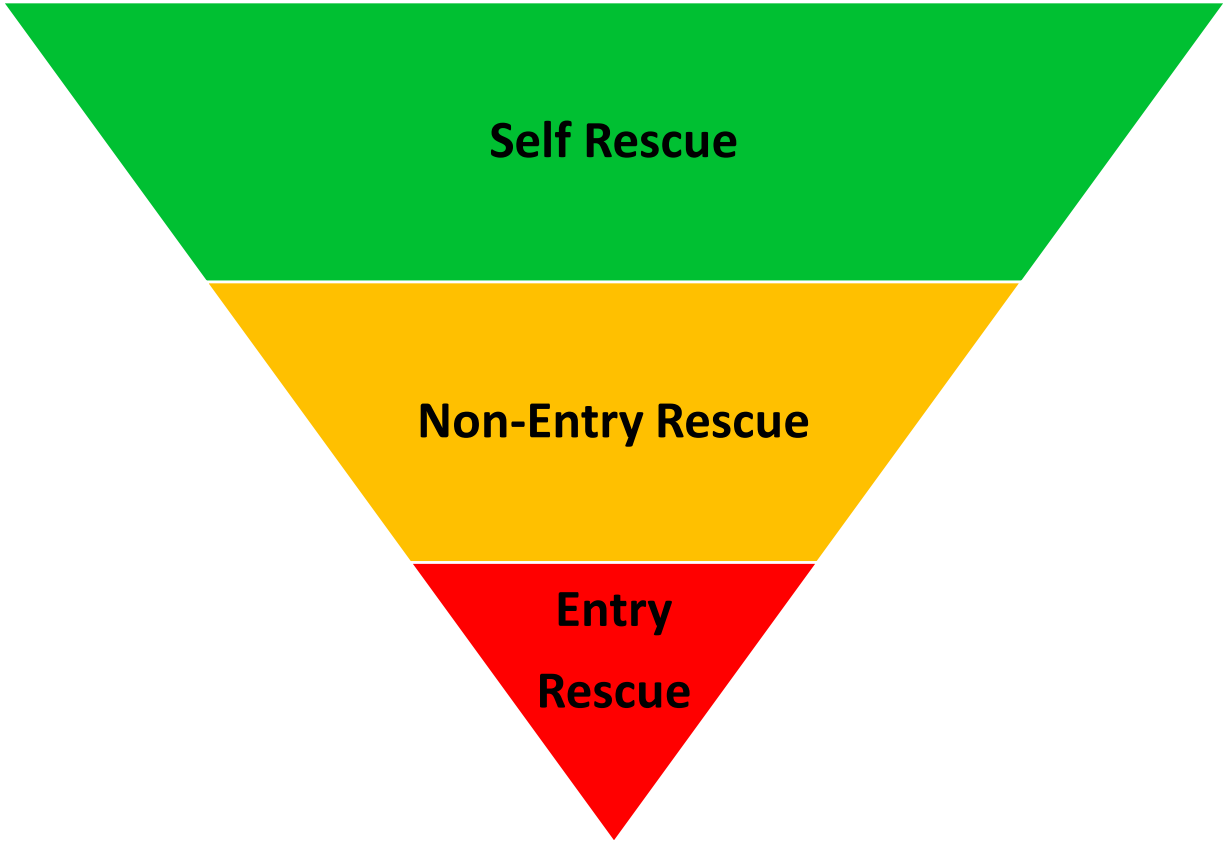

Entry & Rescue Plans

Confined Space Planning

Confined Space Planning

- Identify Confined Spaces
- Identify hazards within the confined spaces
- Be able to test atmosphere of spaces with appropriate equipment
- Communicate employee's roles and responsibilities to prevent unauthorized entry
- Identify employee duties and provide training
- Provide PPE and other equipment necessary to work within and around confined space
- Have a rescue plan in place
- Implement appropriate procedures for summoning rescue and emergency services

Rescue Hierarchy



Rescue and Emergency Response

- Evaluate a prospective rescuer's ability to respond to a rescue summons in a timely manner, considering the hazard(s) identified
- Evaluate a prospective rescue service's ability, in terms of proficiency with rescue-related tasks and equipment, to function appropriately while rescuing entrants from the particular permit space or types of permit spaces identified
- Select a rescue team or service from those evaluated that has the capability to reach the victim(s) within a time frame that is appropriate for the permit space hazard(s) identified and is equipped for, and proficient in, performing the needed rescue services

Summary

- Confined Space – Why and What
- Confined Space Regulations
- Confined Space Roles & Responsibilities
- ABC’s of Confined Space
- Confined Space Entry & Rescue Plans

Resources

Compliance Resources

OSHA

- Permit-Required Confined Spaces OSHA 3138-01R 2004

NIOSH

- A Guide to Safety in Confined Spaces, (NIOSH Publication Number 87-113), July 1987
- Working in Confined Spaces, (NIOSH Publication Number 80-106), December 1979
- Assistance in Preventing Occupational Fatalities in Confined Spaces: NIOSH Alert, (NIOSH Publication Number 86-110), January 1986

Industry Standards and Best Practices

ANSI – Z117.1 Safety Requirements for Confined Spaces

- This standard provides minimum safety requirements to be followed while entering, exiting and working in confined spaces at normal atmospheric pressure.

NFPA – 350 Best Practices Guide for Confined Space Entry

- This guide provides recommendations to be followed while entering, exiting and working in confined spaces.

NIOSH - A Guide to Safety in Confined Spaces

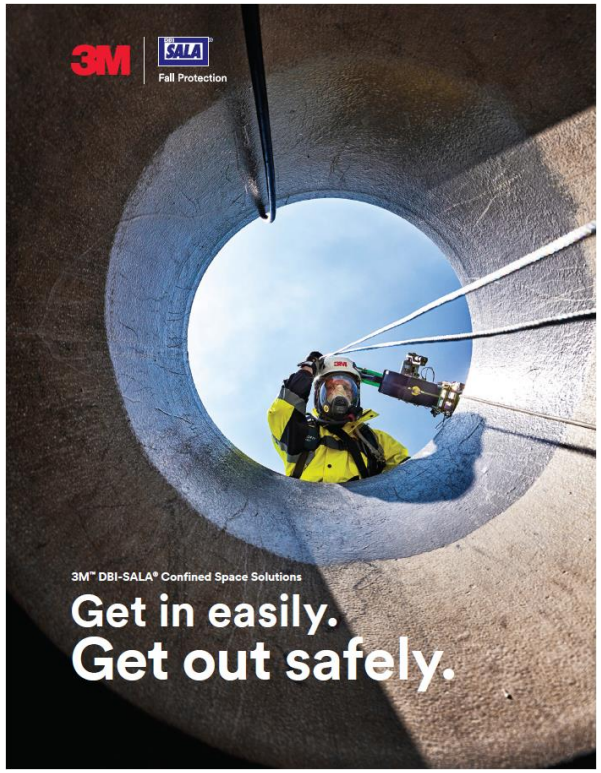
- This guide provides recommendations to be followed while entering, exiting and working in confined spaces.

Additional Resources

Fisher Scientific Safety Specialists

3M Fall Protection Specialists

3M Solutions



Training Courses

We offer a variety of training and education courses to prepare employers and workers on proper use of safety equipment in confined spaces.

- On-site
- Classroom
- Online (digital/eLearning)

Part #	Course	Duration	Description
6480	Confined Space Level 1	1 Day	This course addresses basic principles and concepts of confined space safety and the role of the attendant and entrant in the process. This course is ideally suited for those who will either enter or serve as an attendant for those entering basic confined spaces at the worksite.
6482	Confined Space Level 2	2 Days	Participants will learn principles required to safely identify, assess, monitor, and/or enter the confined spaces they may encounter on their job site. Participants for this course are all those who may be involved with a confined space program at the worksite.
6491	Confined Space Industrial Rescuer Level 1	1 Day	The Confined Space Industrial Rescuer Level 1 program will teach participants basic principles of confined space entry rescue using pre-engineered systems for both horizontal and vertical extrications for standard confined space applications within normalized atmospheres. The course will include a focus on the development and implementation of on-site rescue planning. The course prerequisite is attendance in our Confined Space Level 1 course and cannot be taken as a standalone course.
6493	Confined Space Industrial Rescuer Level 2	2 Days	The Confined Space Industrial Rescuer level 2 program will teach participants principles of confined space entry rescue using pre-engineered systems for both horizontal and vertical extrications into normalized or potentially hazardous atmospheres. The course will include rescue planning and development, as well as problem solving strategies and techniques for more complex spaces. The course prerequisite is attendance in our Confined Space Level 2 course or equivalent type training.
7480	Confined Space Instructor	2 Days	The Confined Space Instructor will prepare participants for the delivery of our prescribed confined space safety curriculum designed for individuals serving as either attendants or entrants in basic confined space work environments. Participants successfully completing the course will be capable of delivering our established Confined Space Level I program. The course prerequisite is attendance in our Confined Space Level II course.

For additional information on any of these programs, please contact our program coordinators at 800.328.6146 option 4 for training, or visit us at 3M.com/SafetyTraining. In Canada, call 800.325.5776.

Thank You