



International Technical Rescue Association

P.O. Box 213

Victor ID 83455 USA

<https://technicalrescue.org>

info@technicalrescue.org

Confined Space Rescue Syllabus

Approved April 3rd, 2025

For the most recent standards versions & supporting documentation visit

<http://technicalrescue.org/documents>

Purpose and Scope

The purpose of this document is to provide clear guidance and establish minimum standards for ITRA Confined Space Rescue levels. While techniques, procedures, styles, and components may vary between courses and instructors, the goal of the confined space rescue discipline is not to prescribe a single method. Instead, it aims to set a foundational standard for the knowledge and skills expected at each level.

Course Information

- Name: ITRA Confined Space Rescue Level 1
- Typical Length: 1-2 days
- Name: ITRA Confined Space Rescue Level 2
- Typical Length: 3-4 days
- Name: ITRA Confined Space Rescue Level 3
- Typical Length: 4-5 days

Level Descriptions

Level 1 technicians will be able to define a confined space, identify common hazards and apply appropriate control measures. Practitioners will be able to respond to a confined space incident and conduct non-entry or simple entry rescues.

Level 2 technicians will be able to further identify hazards, apply control measures and manage entry into a confined space which is not immediately dangerous to life and health. Practitioners will be able to respond to a confined space incident and conduct entry rescues including the use of rope systems and packaging to extract a patient.

Level 3 technicians will be able to apply a wide range of control measures to manage entry into confined spaces which are immediately dangerous to life and health. Practitioners will be able to respond to a confined space incident and conduct rescues using self-contained and supplied air breathing apparatus. They will be able to carry out complex and extended confined space rescues.

Requirements

- Comfortable at heights and within confined spaces
- Physical fitness and health to perform vigorous activities which may be required during the assessment such as:
 - o Carry equipment and move through various environments based on the focus of the confined space rescue industry.
 - o Carry the weight of a **standard load**, as part of a team, as required.
- Disclosure of any medical issues to your instructor(s) and/or assessor(s).

- Instructors and assessors may have their own requirements, often based on insurance requirements and liability, to be eligible for courses and assessments, such as minimum age requirements and medical conditions.
- **Level 1:** No prior knowledge or experience in confined space rescue is required
- **Level 2:** ITRA level 1 qualification or equivalent.
- **Level 3:** ITRA level 1 & 2 qualifications or equivalent.
 - Please refer to the Confined Space Rescue Sub-Charter for additional Technician Guidance.

Materials and Resources

Specific resources shall be provided by your ITRA instructor based on the region as well as the industry of confined space rescue you work in. Resources listed below are examples of references used by the ITRA confined space rescue discipline. This is not an exhaustive list.

- [Rope lab Physics for roping technicians](#)
- [International Technical Rescue Symposium](#)
- <https://roperescuetraining.com/>
- CMC Field Guide - Confined Space Rescue Technician Manual Revised 2nd Edition
 - [Apple Store](#)
 - [Google Play](#)
- [Petzl Technical Notices](#)

Learning outcomes, competencies, and expectations

Having a consistent international standard of competency helps confined space rescue technicians work safely and effectively. Confined space rescue is a constantly evolving field, with many factors affecting how a rescue is carried out. ITRA doesn't require specific techniques or equipment but instead provides guidance, sets expectations, and outlines minimum standards.

Example: Rescue teams might employ different types of atmospheric monitoring devices based on regional availability or manufacturer preferences. However, per ITRA's Syllabus, all Level 1 technicians must demonstrate proficiency in bump testing and interpreting results from their atmospheric monitor. This ensures foundational competency in detecting hazardous conditions, regardless of the specific equipment used.

Each ITRA instructor brings their own unique style, preferences, and expertise, contributing to the overall training experience.

Knowledge & Skills Overview

Instructors have the freedom to teach knowledge topics in various ways. They may use manuals, presentations, videos, lectures, hands-on practice, or demonstrations. Every topic

in this syllabus can be tested during an assessment, through a workbook, or on a written exam.

- Instructors may teach additional or higher-level topics beyond a current level or not listed in the syllabus. Such things shall not be tested during an ITRA assessment.
- Techniques for skill-based tasks may vary (e.g., using a munter hitch with a backup vs. a clutch or maestro device). Guidance for these tasks is provided in level-specific PSCs to ensure safe practices while allowing stylistic preferences.

PSC Overview

Performance: The required task that must be performed.

Standard: The expectations of how that task should be performed.

Conditions: The various criteria to perform the task.

Comments: Additional information relating to the task.

Definitions and additional information for document terms in bold text can be found in the **ITRA Rope Rescue Terms & Definitions & Rope Rescue Safety Standards** found here: <http://technicalrescue.org/documents>

Assessor Guidance

Confined Space Rescue Assessments refer to the **ITRA Assessment Charter** and ITRA **Confined Space Rescue Sub-Charter** found here: <http://technicalrescue.org/documents>

Confined Space Rescue Syllabuses

Confined Space Rescue Level 1 Syllabus

General Knowledge

100	General	Introduction to ITRA
-----	---------	----------------------

Confined Space Knowledge

400	Confined Space	Define a confined space and use common terminology for the region
401	Confined Space	Understand and explain Confined Space Law, Legislation and/or Regulation for the region
402	Confined Space	Understand and describe the required roles and responsibilities
403	Confined Space	Identify the required documents for entering and rescuing from a confined space
404	Confined Space	Understand and define common confined space hazards
405	Confined Space	Understand and implement common hazard controls for entering and working in a confined space
406	Confined Space	Understand and interpret atmosphere hazards based on monitoring
407	Confined Space	Understand the different types of rescues (Self, Non-Entry, Entry)
408	Confined Space	Recognize limitations and further resource requirements

Confined Space Skills

409	Confined Space	Demonstrate bump testing and use of a multi gas monitor
410	Confined Space	Prepare and use ventilation and exhaust systems based on atmosphere and space
411	Confined Space	Select and erect a tripod, davit or AHD
412	Confined Space	Demonstrate the use of a winch or pre-assembled rescue system
413	Confined Space	Demonstrate how to set up for a non-entry rescue system

- | | | |
|-----|----------------|--|
| 414 | Confined Space | Extract an entrant from a confined space using non-entry methods utilising their harness |
| 415 | Confined Space | Demonstrate how to set up and enter a confined space |
| 416 | Confined Space | Extract an entrant from a confined space using entry methods utilising their harness |
| 417 | Confined Space | Prepare and use personal emergency escape breathing apparatus (General Worker) |

Confined Space Rescue Level 2 Syllabus

Confined Space Knowledge

- | | | |
|-----|----------------|--|
| 430 | Confined Space | Describe and demonstrate a size up of a confined space rescue incident requiring entry |
| 431 | Confined Space | Read and understand a confined space rescue plan |
| 432 | Confined Space | Describe filter and air purifying respiratory protection options |
| 433 | Confined Space | Describe free flowing solid/engulfment rescue techniques |
| 434 | Confined Space | Describe communications options |

Confined Space Skills

- | | | |
|-----|----------------|---|
| 435 | Confined Space | Select, prepare and use appropriate PPE |
| 436 | Confined Space | Identify, construct and evaluate single point anchors |
| 437 | Confined Space | Select and implement appropriate fall protection systems |
| 438 | Confined Space | Construct and evaluate rope based systems to raise and lower a person |
| 440 | Confined Space | Demonstrate how to enter as a rescuer |
| 441 | Confined Space | Explain and demonstrate search procedures |
| 442 | Confined Space | Navigate confined space obstacles |
| 443 | Confined Space | Prepare and use patient harnesses, spreader bars and/or wristlets |
| 444 | Confined Space | Select prepare and use confined space stretchers |
| 445 | Confined Space | Demonstrate patient packaging based on patient condition and needs |
| 446 | Confined Space | Demonstrate a horizontal extraction within line of sight |
| 447 | Confined Space | Demonstrate a vertical extraction within line of sight |

Confined Space Rescue Level 3 Syllabus

Confined Space Knowledge

- | | | |
|-----|----------------|---|
| 460 | Confined Space | Implement an initial command system |
| 461 | Confined Space | Organise the rescue team |
| 462 | Confined Space | Describe considerations of working in inert or pressurised spaces |
| 463 | Confined Space | Describe personnel and equipment decontamination considerations |

Confined Space Skills

- | | | |
|-----|----------------|--|
| 464 | Confined Space | Prepare and use Self Contained Breathing Apparatus |
| 465 | Confined Space | Select prepare and use Supplied Air Breathing Apparatus |
| 466 | Confined Space | Demonstrate movement and position in restricted entries |
| 467 | Confined Space | Demonstrate horizontal and vertical extractions whilst using breathing apparatus |
| 468 | Confined Space | Demonstrate internal rigging |
| 469 | Confined Space | Identify, construct and evaluate multi point anchors |
| 470 | Confined Space | Demonstrate entry and rescue beyond line of sight for horizontal and vertical spaces |

Level 1 Knowledge PSC

#100 Introduction to ITRA

Performance:

Given a written assessment, demonstrate knowledge of the following topics.

Knowledge:

- ITRAs mission statement
- Worldwide representation and rescue disciplines
- ITRA Certification vs certificate of attendance

#400 Define a confined space and use common terminology for the region

Performance:

Given a written assessment, demonstrate knowledge of the following topics.

Knowledge:

Examples based on US / OSHA:

Definition of a Confined Space

- Characteristics of a confined space:
 - It is large enough and configured such that an individual can bodily enter and perform assigned work.
 - It has limited or restricted means of entry or exit (e.g., tanks, vessels, silos, pits, tunnels).
 - It is not designed for continuous occupancy (i.e., individuals do not normally remain in the space for extended periods).

Regulatory Definitions and Standards

- Understanding of OSHA's definition of a confined space (29 CFR 1910.146) and associated regulations.
- Awareness of the distinction between a confined space and a permit-required confined space (PRCS):
 - Permit-required confined space: A confined space that has one or more of the following characteristics:
 - Contains or has a potential to contain a hazardous atmosphere.
 - Contains a material that has the potential for engulfing an entrant.
 - Has an internal configuration that could trap or asphyxiate an entrant.
 - Contains any other recognized serious safety or health hazard.

Common Terminology Related to Confined Spaces

- **Entrant:** An individual who is authorized to enter a confined space.
- **Attendant:** A trained individual stationed outside the confined space who monitors the entrant and maintains communication.
- **Entry Supervisor:** The person responsible for overseeing the entry operations and ensuring safety procedures are followed.
- **Rescue Team:** A trained group tasked with performing rescues from confined spaces.
- **Hazard Assessment:** The process of identifying and evaluating hazards present in a confined space.
- **Atmospheric Monitoring:** The practice of testing the air within a confined space for hazardous gases, oxygen levels, and toxic materials.
- **Ventilation:** The process of introducing fresh air or removing contaminated air from a confined space.
- **PPE (Personal Protective Equipment):** Equipment worn to minimize exposure to hazards (e.g., helmets, gloves, harnesses, respiratory protection).
- **Engulfment:** A condition where an individual is surrounded by a free-flowing material (e.g., sand, grain) that can lead to suffocation or injury.
- **Lockout/Tagout (LOTO):** Safety procedures to ensure that machines are properly shut off and not able to start up again before maintenance or servicing.
- **Rescue Plan:** A pre-established plan detailing procedures for safely rescuing an individual from a confined space.

Common Types of Confined Spaces

- **Tanks:** Storage vessels for liquids or gases, often with limited access.
- **Silos:** Structures used for storing bulk materials (grain, feed, etc.), typically with vertical access.

- **Pits:** Deep structures that may house equipment or provide access to underground utilities.
- **Tunnels:** Enclosed passages for transportation or utility lines, often with specific access challenges.
- **Ducts:** Enclosed passages for air or fluid transport, which may have limited access and potential hazards.

Importance of Proper Terminology

- The significance of accurate terminology in ensuring effective communication among rescue teams, regulatory compliance, and safety planning.
- The role of common terminology in training and operational procedures to foster clear understanding and reduce misunderstandings in confined space operations.

Regional Considerations

- Awareness of any local regulations or guidelines that may define or govern confined space operations.
- Understanding regional terminology nuances that may differ from national standards (e.g., specific terminology used in local industrial sectors).

#401 Understand and explain Confined Space law, legislation and/or regulation for the region

Performance:

Given a written assessment, demonstrate knowledge of the following topics.

Knowledge:

- Regional Confined Space
 - Laws
 - Legislation
 - Regulations

#402 Understand and describe the required roles and responsibilities

Performance:

Given a written assessment, demonstrate knowledge of the following topics.

Knowledge:

- Team roles
- Team and Individual Responsibilities

#403 Identify the required documents for entering and rescuing from a confined space

Performance:

Given a written assessment, demonstrate knowledge of the following topics.

Knowledge:

- Required documents for entering and rescuing from a confined space meeting local requirements Examples include:
 - Permits
 - Air Monitoring Logs

#404 Understand and define common confined space hazards

Performance:

Given a written assessment, demonstrate knowledge of the following topics.

Knowledge:

- Common confined space hazard examples but not limited to:
 - Environmental
 - Temperature extremes
 - Atmospheric
 - Oxygen deficiency
 - Toxic gases and/or vapors
 - CO
 - H₂S
 - VOCs
 - Flammable Atmospheres
 - Dust
 - Physical
 - Engulfment
 - Grain
 - Sand
 - Mechanical
 - Machinery
 - Noise
 - Biological
 - Mold
 - Fungi
 - Bacteria
 - Insects / Rodents
 - Chemical
 - Corrosive
 - Reactive

#405 Understand and implement common hazard controls for entering and working in a confined space

Performance:

Given a written assessment, demonstrate knowledge of the following topics.

Knowledge:

- Hazard Controls
 - Lockout / Tagout
 - PPE
 - Ventilation

#406 Understand and interpret atmosphere hazards based on monitoring

Performance:

Given a written assessment, demonstrate knowledge of the following topics.

Knowledge:

- Continuous vs spot monitoring
- Effects and symptoms based on atmospheric readings
 - H₂S
 - CO
 - Oxygen
 - LEL
- Best practices when mitigating a hazard
 - Oxygen deficiency
 - Supply Ventilation
 - Toxic & Flammable Atmospheres
 - Exhaust Ventilation

#407 Understand the different types of rescues (Self, Non-Entry, Entry)

Performance:

Given a written assessment, demonstrate knowledge of the following topics.

Knowledge:

- Clarification of terms and definitions
 - Definition of the individual types of rescue:
 - self-rescue, non-entry rescue and entry rescue
 - Demarcation and comparison of the respective methods
- Rescue methods in detail
 - Self-rescue:
 - Self-initiative in an emergency, communication, and the correct behavior in confined spaces
 - Requirements for personal protective equipment and emergency equipment
 - Non-entry rescue:
 - Use of aids and remote rescue techniques (e.g. surveillance cameras, remote control systems)
 - Requirements and limitations of this method
 - Entry rescue:
 - Physical intervention by rescue workers in confined spaces
 - Necessary protective equipment, special training and process planning
- Safety requirements and risk assessment
 - Hazard analysis in confined spaces and assessment of the risks for each rescue method
 - Determination of emergency plans and operational strategies
- Technical aids and equipment
 - Overview of the required equipment and its possible uses for the various rescue methods
 - Use of monitoring and communication systems

#408 Recognize limitations and further resource requirements

Performance:

Given a written assessment, demonstrate knowledge of the following topics.

Knowledge:

Recognition of resource limitations including, but not limited to:

Personnel Limitations

- Insufficient number of qualified rescue personnel
- Lack of specific training or certification
- Fatigue and physical limitations of personnel
- Experience and knowledge gaps among rescue team members

Equipment Limitations

- Availability and suitability of rescue equipment
- Equipment malfunction or failure
- Lack of proper maintenance and inspection of equipment
- Compatibility issues between equipment types or brands

Communication Limitations

- Ineffective or unavailable communication devices
- Difficulty communicating clearly due to environmental factors (noise, distance, interference)
- Issues related to clarity, reliability, and interoperability of communication systems

Access Limitations

- Restricted or limited access for rescue equipment and personnel
- Structural integrity concerns limiting safe access
- Difficulties arising from the design, layout, or size of the confined space

Time Limitations

- Urgency of rescue based upon victim condition or hazard severity
- Limitations caused by prolonged rescue operations and resultant increased risk

Incident Complexity Limitations

- Situations involving multiple victims or complex scenarios
- Hazards requiring specialized mitigation techniques beyond available resources

Identification of Further Resource Requirements including, but not limited to:

Additional Personnel Resources

- Additional trained or specialized personnel (hazmat, medical, technical specialists, etc.)
- External rescue teams or specialized units

Additional Equipment Resources

- Specialized rescue equipment or tools
- Supplemental atmospheric monitoring devices
- Additional PPE suitable for identified hazards

Additional Technical Expertise

- Hazardous materials technical specialists
- Structural engineers or confined space specialists
- Medical or health/safety professionals

Additional Support Services

- Emergency medical services (EMS)
- Fire department or hazardous materials response teams
- Utility company or industrial contractor assistance
- Law enforcement or security personnel

Decision-Making Criteria for Requesting Additional Resources

- Proper evaluation of risk versus existing capabilities
- Timely recognition and notification of external resource needs
- Procedures and protocols for activating mutual aid or inter-agency assistance

Level 1 Skill PSCs

#409 Demonstrate bump testing and use of multi-gas monitor

Performance:

Demonstrate bump testing and use of multi-gas monitor.

Standard:

Successfully bump test a multi-gas monitor such in accordance with manufacturers standards so that it may be utilized for a confined space entry.

Conditions:

Given a clean environment with appropriate calibration gas, tubing, hoods and/or station, will perform a bump test on a multi-gas monitor.

Comments:

#410 Prepare and use ventilation and exhaust systems based on atmosphere and space

Performance:

Prepare and use ventilation and exhaust systems based on atmosphere and given space dimensions / volume.

Standard:

Identify the appropriate type of ventilation / exhaust system needed for a given simulated atmospheric condition, select the correct minimum purge time.

Conditions:

A nomograph for a ventilation system will be made available to the candidate for reference.

Comments:

This can be performed in conjunction with other skills.

#411 Select and erect a tripod, davit, or AHD

Performance:

Candidate shall select and erect a tripod, davit, or AHD.

Standard:

Proper construction of tripod, davit, or AHD in accordance with manufacturers recommendations.

Conditions:

A selection of tripods, davits, or AHD will be made available to the candidate, to include any required equipment such as hobbles, base plates, pins etc.

Comments:

This can be performed in conjunction with other skills.

#412 Demonstrate the use of a winch or pre-assembled rescue system

Performance:

Demonstrate the use of a winch or pre-assembled rescue system. A backup / belay system shall be used when appropriate.

Standard:

Candidate shall rig and operate a winch or pre-assembled rescue system:

- Perform at least 2 cycles of lowering and raising into an actual or simulated confined space.
- A backup / belay system is used when appropriate.
- Assistance maybe asked if the system cannot be operated by one person.

Conditions:

A cache of pre-assembled winches or rope rescue systems such as a 4:1 with progress capture will be made available to the candidate. This will include an appropriate backup / belay system.

At least 2 additional helpers should be available, one to operate the backup / belay system if needed and the other to be raised / lowered.

Comments:

Maybe done in combination with other skills.

#413 Demonstrate how to set up for a non-entry rescue system

Performance:

Demonstrate how to set up for a non-entry rescue system.

Standard:

Candidate shall setup and rig a non-entry rescue system for use in the vertical environment. This will include an appropriate backup / belay system.

At least 2 additional helpers should be available, one to operate the backup / belay system if needed and the other to be raised / lowered.

Conditions:

Given a rescue kit that includes equipment to perform a non-entry rescue.

Comments:

To be done in conjunction with ITRA-414.

May utilize reach poles or attach a system to the victim's tag line.

#414 Extract an entrant from a confined space using non- entry methods utilizing their harness

Performance:

Extract an entrant from a confined space using non- entry methods utilizing their harness.

Standard:

Utilizing the system they setup in ITRA-413, the candidate shall extract the entrant (victim) from the confined space using non-entry methods.

Conditions:

Entrant shall have a harness on and may also have a tag line attached to their harness. To be done in conjunction with ITRA-413. May utilize reach poles or attach a system to the victim's tag line. Tag line should not be part of system when the assessment begins.

Comments:

Using an SRL with integrated retrieval is also acceptable method if it is part of the system used in ITRA-413

#415 Demonstrate how to set up and enter a confined space

Performance:

Demonstrate how to set up and enter a confined space.

Standard:

Candidate shall show ability to choose, and use needed equipment to safely access a simple vertical and simple horizontal confined spaces. Demonstrate proper techniques and rigging for type of entry.

Conditions:

Candidate shall get harness, slings, ropes, rigging, and other associated hardware independently.

Comments:

Maybe done in combination with other skills.

#416 Extract an entrant from a confined space using entry methods utilizing their harness

Performance:

Candidate will extract an entrant from a confined space using entry methods utilizing their harness.

Standard:

For vertical operations the candidate shall safely extract the entrant ensuring two points of connection and minimizes time entrant is suspended in their harness.

Conditions:

For vertical operations, candidate will utilize a retrieval system and a back-up system to ensure two points of connection. For horizontal operations only a retrieval system is required.

Comments:

May be done in combination with other skills. This is not a rescue, but rather ensuring the candidate is able to safely extract entrants out of a confined space as part of their attendant duties.

#417 Prepare and use personal emergency escape breathing apparatus (general worker)

Performance:

Prepare and use personal emergency escape breathing apparatus (general worker)

Standard:

Given simulated readings of an IDLH (immediately dangerous to life or health) condition from an air monitor, determine that use of an emergency escape breathing apparatus is necessary to escape the area.

Conditions:

Given appropriate PPE and an emergency escape breathing apparatus properly don and operate the device they are receiving airflow to escape from an IDLH area.

Comments:

This skill is not applicable if candidate's organizations only utilize SCBA and/or SAR systems. Examples of a personal emergency escape breathing apparatus are 3M SCOTT Emergency Escape Breathing Device (EEBD), MSA Emergency Escape Breathing Apparatus, or Dräger Saver PP. This is a test for this specific skill. This does not meet the level of certification in your area.

Level 2 Knowledge PSCs

#430 Describe and demonstrate a size up of a confined space rescue incident requiring entry

Performance:

Given a written assessment, demonstrate knowledge of the following topics.

Knowledge:

Scene Assessment

- Identification of confined space type and configuration (horizontal, vertical, angled entry, etc.)
- Recognition of entry and exit points
- Evaluation of structural stability and integrity
- Potential hazards observable from outside the space (atmospheric, mechanical, chemical, electrical, physical, biological, environmental)

Incident Information Gathering

- Number, condition, and location of victims
- Victim status (conscious, unconscious, injured, trapped, entangled)
- Nature of confined space work or activity being performed prior to incident
- Witness statements and incident history (time of incident, duration of victim exposure)

Hazard Identification and Risk Assessment

- Atmospheric hazards (oxygen deficiency, toxic gases, flammable atmospheres)
- Chemical hazards (corrosive, reactive, stored materials)
- Physical hazards (engulfment potential, mechanical equipment, energy sources)
- Biological hazards (mold, bacteria, insects, rodents, contaminants)
- Environmental hazards (temperature extremes, weather conditions impacting rescue operations)

Resource Evaluation and Needs Determination

- Assessment of available and required personnel (trained rescuers, technical specialists, medical support)
- Assessment of available and required equipment (atmospheric monitoring equipment, ventilation equipment, PPE, retrieval systems, rope rescue gear, communications equipment)
- Evaluation of adequacy of on-scene resources and early identification of additional resources needed

Access and Egress Evaluation

- Determination of primary and secondary entry/exit points
- Evaluation of space dimensions and configuration impacting rescue operations (entryway size, internal obstructions, sharp edges, restricted access)
- Identification of anchor points and rigging considerations for rope rescue systems (tripods, high points, rigging options)

Atmospheric Monitoring and Ventilation Needs

- Determination of atmospheric monitoring strategies (initial and continuous monitoring)
- Interpretation of atmospheric monitoring data to identify hazards and guide entry decisions

- Assessment of ventilation requirements (natural, forced supply, and/or exhaust ventilation)

Incident Complexity and Tactical Considerations

- Identification of incident complexity (single vs multiple victims, hazardous materials involvement, entrapment/entanglement scenarios)
- Consideration of rescue versus recovery mode based on victim survivability factors
- Development of initial incident action plan and rescue strategies (rapid entry, non-entry retrieval, patient stabilization, hazard mitigation, or combination approaches)

Communication and Incident Command Considerations

- Identification of communication requirements and limitations (radio, voice, visual signals, direct communication with rescuers inside space)
- Integration of confined space rescue operations within incident command structure (ICS)
- Coordination and communication with support and external responding agencies (EMS, hazmat, utilities, specialized technical teams)

Safety and Regulatory Compliance

- Recognition and application of relevant standards and regulations (OSHA, NFPA, local jurisdictional requirements)
- Identification of roles and responsibilities for key rescue positions (entry supervisor, attendant, entrant, rescue team leader, safety officer)
- Determination of PPE requirements based on hazard assessment (respiratory protection, chemical protection, thermal protection, fall protection, rescue harnesses, helmets, gloves, etc.)

#431 Read and understand a confined space rescue plan

Performance:

Given a written assessment, demonstrate knowledge of the following topics.

Knowledge:

Plan Components and Structure

- Identification of clearly defined roles and responsibilities (Entry Supervisor, Attendant, Entrants, Rescue Team Members, Incident Commander, Safety Officer)
- Location, description, and configuration of confined space (entry/exit points, internal dimensions, structural features)
- Scope and objectives of the rescue operation (rescue vs. recovery, victim stabilization, hazard mitigation)

Hazard Identification and Risk Management

- Recognition of listed hazards present or anticipated (atmospheric, chemical, mechanical, physical, biological, environmental)
- Understanding hazard mitigation strategies specified in the plan (ventilation, isolation, lockout/tagout, PPE, respiratory protection, atmospheric monitoring)

Entry Procedures and Techniques

- Pre-entry procedures (atmospheric testing, ventilation, space isolation, lockout/tagout verification)
- Specified entry methods and techniques (vertical entry, horizontal entry, rope-assisted entry, mechanical advantage systems)
- Identification of anchor points, rigging and rope rescue systems, and retrieval methods detailed in the plan

Victim Assessment and Patient Management

- Victim condition assessment procedures (consciousness, injury severity, entrapment or entanglement status)
- Medical care and patient stabilization recommendations specified (airway management, spinal immobilization, trauma care, extraction considerations)

Equipment and Resource Requirements

- Identification and location of required equipment (atmospheric monitors, ventilation equipment, retrieval systems, rope rescue equipment, PPE, communication devices)
- Understanding of equipment deployment and operational procedures specified in the plan
- Recognition of additional resources identified or recommended (specialized teams, medical resources, technical expertise, external agencies)

Communications and Incident Command

- Established communication protocols and equipment requirements (radio channels, hand signals, direct voice communication)
- Communication pathways between entry team, attendant, entry supervisor, and incident command structure
- Roles and responsibilities within Incident Command System (ICS) identified in rescue plan

Emergency and Contingency Procedures

- Recognition of emergency procedures and rescue contingencies outlined in the plan (rapid intervention, alternate entry/exit points, backup rescue teams, emergency medical resources)
- Procedures for escalation of response and requesting additional resources

Safety Protocols and Regulatory Compliance

- Knowledge of applicable standards, guidelines, and regulatory requirements referenced (OSHA, NFPA, local jurisdictional standards)
- Identification and implementation of specified PPE requirements and safety equipment (respiratory protection, chemical-resistant suits, harnesses, helmets, gloves)

Documentation and Accountability

- Understanding documentation requirements specified in the plan (entry logs, atmospheric monitoring logs, PPE checks, personnel accountability forms)
- Recognition of accountability systems and personnel tracking methods outlined in the rescue plan

#432 Describe filter and air purifying respiratory protection options

Performance:

Given a written assessment, demonstrate knowledge of the following topics.

Knowledge:

Types of Air-Purifying Respirators (APR)

- Particulate-filtering respirators
 - Disposable filtering facepiece respirators (e.g., N95, N99, N100)
 - Reusable half or full-face respirators with particulate filters (HEPA, P100 cartridges)
- Gas and vapor cartridge respirators
 - Half-face respirators
 - Full-face respirators (eye and facial protection)
- Combination respirators
 - Respirators with cartridges providing both particulate and gas/vapor protection

APR Filter and Cartridge Types and Designations

- Particulate filter classifications and efficiency ratings (N, R, P series; 95%, 99%, 100% efficiency)
 - N-Series (Not resistant to oil aerosols)
 - R-Series (Resistant to oil aerosols, limited use)
 - P-Series (Oil-Proof, for use with oil aerosols)
- Gas and vapor cartridge types and color-coding standards (NIOSH, ANSI) for specific chemical protection
 - Organic vapors (black)
 - Acid gases (white)
 - Ammonia and methylamine (green)
 - Multi-gas/vapor cartridges (olive)

Capabilities and Limitations of Air-Purifying Respirators

- Situations appropriate for air-purifying respirators (known airborne contaminants, adequate oxygen levels $\geq 19.5\%$)
- Limitations of APRs
 - Not suitable for oxygen-deficient atmospheres ($<19.5\%$)
 - Not suitable for unknown contaminants or concentration levels exceeding cartridge/filter limitations
 - Limited protection against certain chemical hazards
 - Cartridge/filter breakthrough and service-life limitations

Selection Factors for Air-Purifying Respirators

- Identification and evaluation of specific contaminants and hazards
- Contaminant concentration and exposure limits (IDLH vs. non-IDLH environments)
- Required assigned protection factor (APF) based on respiratory hazard assessment
- Compatibility with other PPE (helmets, goggles, protective suits, harnesses)

Cartridge and Filter Maintenance and Replacement

- Inspection and storage practices for APRs, cartridges, and filters

- Recognition of cartridge service life indicators (odor, taste, irritation, breathing resistance)
- Guidelines and procedures for scheduled cartridge/filter replacement and tracking

Regulatory and Compliance Considerations

- Relevant standards and requirements (OSHA 29 CFR 1910.134, NFPA standards, NIOSH approval)
- Fit-testing requirements and ensuring proper respirator face seal
- User medical evaluation and respiratory protection training requirements
- Documentation and recordkeeping for respiratory protection programs

Emergency Escape Respirators

- Identification and use of air-purifying respirators specifically approved for emergency escape purposes
- Limitations and proper deployment of escape respirators in confined space rescue incidents

#433 Describe free flowing solid/engulfment rescue techniques

Performance:

Given a written assessment, demonstrate knowledge of the following topics.

Knowledge:

Identification and Characteristics of Free-Flowing Solid Materials

- Types of free-flowing solids commonly encountered:
 - Grain (corn, wheat, soybeans, rice)
 - Sand, gravel, aggregate
 - Fertilizer, powders, dry chemicals
 - Industrial bulk materials
- Hazards presented by free-flowing solids:
 - Rapid engulfment and entrapment potential
 - Crushing and compression injury potential
 - Suffocation and respiratory compromise
 - Environmental hazards (dust explosion potential, oxygen displacement)

Assessment and Scene Size-up Considerations

- Determining victim location, condition, and depth of entrapment
- Evaluating stability and movement of engulfing material
- Recognizing secondary hazards (mechanical equipment, atmospheric hazards, structural integrity)
- Identifying safe approach routes and victim access points

Engulfment Rescue Techniques and Strategies

- Isolation and control of material movement:
 - Lockout/tagout of mechanical equipment (augers, conveyors, gates)
 - Shutting down and securing adjacent processes and machinery
- Stabilization of engulfed victim:
 - Early victim stabilization and airway protection
 - Providing respiratory protection as needed
 - Managing victim panic and movement to prevent deeper engulfment
- Use of shielding and shoring techniques:
 - Placement of protective rescue devices (coffer dams, grain rescue tubes, panels, cylinders)
 - Techniques for insertion, stabilization, and securing of rescue tubes or panels around victim
- Material removal and excavation techniques:
 - Manual removal of material inside protective shielding
 - Use of specialized vacuum removal systems
 - Controlled excavation strategies to prevent further engulfment or collapse

Victim Removal and Extrication Techniques

- Vertical lifting and extrication methods:
 - Use of harnesses, rope rescue systems, mechanical advantage systems
 - Application of spinal immobilization or patient packaging methods when indicated

- Horizontal or angled extrication methods:
 - Excavation and tunneling techniques for horizontal retrieval
 - Use of backboards, stretchers, or rescue litters as appropriate

Equipment and Resource Requirements

- Specialized rescue equipment:
 - Grain rescue tubes, cofferdams, panels, rigid barriers
 - Air-operated or intrinsically safe vacuum extraction equipment
 - Shovels, scoops, buckets, and hand tools for manual removal
 - Rope rescue equipment (harnesses, ropes, mechanical advantage systems, anchors, rigging hardware)
- Personal protective equipment (PPE):
 - Respiratory protection (dust masks, APR, supplied-air respirators)
 - Eye protection, helmets, gloves, protective clothing, fall-protection gear

Safety and Operational Considerations

- Recognition of secondary hazards:
 - Dust explosion potential and ignition sources
 - Structural collapse potential
 - Oxygen-deficient or hazardous atmospheres
- Procedures for atmospheric monitoring during engulfment rescue operations
- Understanding operational constraints and limitations of rescue techniques and equipment
- Contingency plans and emergency response procedures

Communication and Incident Command Considerations

- Clearly defined communication protocols and methods:
 - Voice, radio, visual, and hand signals
- Integration into incident command system (ICS) and resource coordination:
 - Effective management of on-scene resources, personnel, and specialized response teams
 - Coordination with external agencies and technical specialists

Regulatory and Compliance Considerations

- Relevant standards, guidelines, and regulations applicable to engulfment rescue operations:
 - OSHA regulations (29 CFR 1910.272 – Grain handling facilities, 29 CFR 1910.146 – Confined spaces)
 - NFPA standards and recommended practices (NFPA 1670, NFPA 1006)
- Documentation, incident reporting, and accountability procedures

#434 Describe communications options

Performance:

Given a written assessment, demonstrate knowledge of the following topics.

Knowledge:

Verbal Communication (Voice-to-Voice)

- Direct conversation in close proximity
- Limitations due to noise, distance, PPE interference, atmospheric conditions

Portable Two-Way Radios

- Handheld radios (intrinsically safe, explosion-proof)
- Radio frequencies, channels, and interoperability considerations
- Advantages (mobility, ease of use) and limitations (range, penetration, battery life)

Hardline (Wired) Communication Systems

- Dedicated intercom or confined-space-specific communication devices
- Advantages (clarity, reliability, no battery reliance)
- Limitations (cable management, deployment time, potential entanglement)

Wireless Electronic Communication Systems

- Wireless headsets or intercom systems (Bluetooth, RF-based)
- Advantages (hands-free, clear audio, minimal interference)
- Limitations (battery life, signal range, interference issues)

Visual Communication Methods

- Hand signals for simplified instructions
- Light signals (flashlights, headlamps, signal beacons)
- Written messages or status boards
- Advantages (silent, useful in noisy environments)
- Limitations (line-of-sight needed, visibility concerns)

Whistle Signals

- Standardized whistle signals to convey simple commands or status:
 - One short blast: "Stop" or "Attention"
 - Two short blasts: "Advance" or "Proceed forward"
 - Three short blasts: "Retreat," "Back out," or "Evacuate the space immediately"
 - Continuous repeated short blasts: "Emergency" or "Immediate assistance required"
- Advantages (clear, audible over noise and distance, no batteries required)
- Limitations (limited to basic commands, possibility of confusion without standardized signals, obscured by respiratory protection)

Rope-Based Communication Systems

- Rope signals (tension signals, pulls) to convey basic directional or operational commands
- Application in vertical confined spaces and rope-rescue contexts
- Limitations (limited complexity of messages, requires prior agreement and practice)

Communication Equipment Selection and Considerations

- Suitability for operating environment (intrinsic safety, explosion-proof, waterproof)

- Compatibility with PPE (respirators, helmets, protective suits, hearing protection)
- Range and signal penetration requirements based on confined space complexity and depth
- Reliability, redundancy, and backup systems for communications

Communication Procedures and Protocols

- Standardized terminology (clear, concise, plain language)
- Established radio protocols and etiquette (use of repeaters, clear channel assignments, disciplined radio use)
- Pre-entry communication checks and equipment verification
- Clearly defined emergency signals and distress communication procedures

Incident Command and Coordination

- Integration of communications into Incident Command System (ICS) structure
- Defined communication pathways between entrants, attendants, entry supervisor, and command staff
- Coordination and interoperability with external agencies (EMS, HazMat, fire, utilities, law enforcement, technical specialists)

Limitations and Contingency Communications Planning

- Identification of potential limitations (distance, interference, PPE, atmospheric hazards)
- Recognition of environmental impacts (noise, explosive atmospheres, electrical hazards)
- Development of contingency plans and backup communication methods for primary system failures

Regulatory and Compliance Considerations

- Compliance with relevant regulations and standards (OSHA 29 CFR 1910.146, NFPA 1670, NFPA 1006)
- Documentation and recordkeeping of communication plans, equipment functionality tests, and incident logs

Level 2 Skill PSCs

#435 Select, prepare, and use appropriate PPE

Performance:

Candidate shall select, prepare, and use appropriate PPE.

Standard:

Uses PPE in accordance with all manufacturers recommendations and/or accepted industry safe work practices.

Conditions:

Given a confined space entry or rescue scenario, candidate will select the appropriate equipment based on the hazards given. Candidate shall verbalize and demonstrate how to conduct inspection prior to use.

Comments:

This maybe performed in conjunction with other skills.

#436 Identify, construct, and evaluate single point anchors

Performance:

Identify, construct, and evaluate single point anchors.

Standard:

Given a location for an anchor tie a single point anchor such that:

- Ensure the anchor is suitably strong for the expected load.
- Ensure the choice of hardware and anchor tying material is appropriate for the expected load.
- If the anchor is constructed from webbing or rope, knots must be appropriate.

Conditions:

An anchor location and material will be provided. Sewn anchor slings can be used if available.

Comments:

Maybe done in combination with other skills, same as ITRA-259.

#437 Select and implement appropriate fall protection systems

Performance:

Select and implement appropriate fall protection systems.

Standard:

Demonstrate the ability to setup a fall protection system such that the user will not experience forces greater than allowed by the manufacturer and/or local fall protection standards.

Conditions:

Candidate will select from available fall protection systems.

Comments:

This maybe performed in conjunction with other skills.

#438 Construct and evaluate rope-based systems to raise and lower a person

Performance:

Construct and evaluate rope-based systems to raise and lower a person.

Standard:

Demonstrates the ability to construct, evaluate and operate a rope based system to raise and lower a person in and out of a confined space so that:

- There is a main line and a backup / safety belay system.
- If the user lets go of the rope system there will be no movement of the person on the rope, and no activation of a backup / safety belay system.
- Ensure high point anchor system, i.e. a beam clamp, tripod is set up in a safe and appropriate manner.

Conditions:

A cache of rigging material suitable to support a variety of techniques will be made available.

Comments:

Maybe performed in conjunction with other skills.

#440 Demonstrate how to enter as a rescuer

Performance:

Demonstrate how to enter as a rescuer.

Standard:

Candidate shall enter a horizontal and / or vertical confined space, negotiating any restrictions, obstacles and not cause any activation of backup / safety belays, no compromise to PPE, associated ropes, and rigging.

Conditions:

Given simulated air monitor readings determine if self-contained and/or supplied air use is needed. Given a horizontal and / or vertical scenario, with all rigging completed, candidate shall safely enter a confined space with appropriate PPE for that scenario.

Comments:

Maybe done in conjunction with other skills.

#441 Explain and demonstrate search procedures

Performance:

Explain and demonstrate search procedures.

Standard:

Candidate shall be able to explain how to conduct searches in a confined space where a victim is not immediately visible from the entry point, and then demonstrate that search.

Conditions:

Given a scenario where a victim is not visible from the entry point, the assessor will answer questions from candidate based on the scenario.

Comments:

Candidate asking investigative questions related to the scenario to include interviewing “co-workers”, bystanders etc, identify the entry points and the configuration of the confined space, communications, specific tasks victim was supposed to be working on, and establishes a victim survival profile are all acceptable methods and are just examples of what can be done. Candidate will obtain any permit, drawing or other documentation available to help establish search pattern and equipment needed.

#442 Navigate confined space obstacles

Performance:

Navigate obstacles within a confined space.

Standard:

Candidate shall negotiate any restrictions, obstacles within a confined space, and not cause any activation of backup / safety belays, no compromise to PPE, associated ropes and rigging.

Conditions:

Given a confined space rescue scenario with obstacles in it, this maybe done either in a vertical or horizontal rescue scenario.

Comments:

Obstacles maybe simulated mixers, equipment, reduced profile openings, baffles or other realistic confined space conditions.

#443 Prepare and use patient harnesses, spreader bars, and/or wristlets

Performance:

Prepare and use patient harnesses, spreader bars, and/or wristlets.

Standard:

Candidate shall show the ability to prepare and use patient harnesses, spreader bars, and/or wristlets to fix a patient safe in a vertical or horizontal confined space rescue scenario.

Conditions:

Given a scenario for a vertical or horizontal confined space rescue by the assessor, the candidate shall prepare and use the selected patient packaging device in accordance with manufacturers recommendations and/or accepted industry practices.

Comments:

Given scenario dependent on the training area, maybe done in conjunction with other skills.

#444 Select, prepare, and use confined space stretchers

Performance:

Select, prepare, and use confined space stretchers.

Standard:

Candidate shall show the ability to select, prepare and use confined space stretchers to package a patient safely in a vertical or horizontal confined space rescue scenario.

Conditions:

Given a scenario for a vertical or horizontal confined space rescue by the assessor, the candidate shall prepare and use the selected confined space stretcher in accordance with manufacturers recommendations and/or accepted industry practices.

Comments:

Given scenario dependent on the training area, maybe done in conjunction with other skills. Confined space stretchers for this should be a full body device, such as a Reeves Sleeve, confined space litter, SKED, Petzl NEST or other similar devices.

#445 Demonstrate patient packaging based on patient condition and needs

Performance:

Demonstrate patient packaging based on patient condition and needs.

Standard:

Candidate shall show the ability to demonstrate patient packaging based on patient condition and needs in various ways.

Conditions:

Given a scenario for a vertical or horizontal confined space rescue by the assessor, the candidate shall prepare and use the selected patient packaging based upon the patient's condition and needs. Candidate shall be able to discuss the benefits and limitations of the device chosen and why it is the appropriate device based on the patient condition and the confined space the patient is in.

Comments:

Given scenario dependent on the training area, maybe done in conjunction with other skills.

#446 Demonstrate a horizontal extraction within line of sight

Performance:

Demonstrate a horizontal extraction within line of sight.

Standard:

Candidate shall demonstrate a horizontal extraction of a victim that is within line of sight of the opening of the confined space. Candidate can discuss if there is a need for a belay/safety line or not. Demonstrate methods for connecting a second rescuer as needed in a horizontal setting.

Conditions:

Given various equipment to choose the right technique independently including appropriate PPE and patient packaging equipment.

Comments:

Given scenario dependent on the training area, maybe done in conjunction with other skills.

#447 Demonstrate a vertical extraction within line of sight

Performance:

Demonstrate a vertical extraction within line of sight.

Standard:

Candidate shall demonstrate a vertical extraction of a victim that is within line of sight of the opening of the confined space. Demonstrate methods for connecting a second rescuer as needed in a vertical setting.

Conditions:

Given various equipment to choose the right technique independently including appropriate PPE and patient packaging equipment.

Comments:

May be done in conjunction with other skills.

Level 3 Knowledge PSCs

#460 Implement an initial command system

Performance:

Given a written assessment, demonstrate knowledge of the following topics.

Knowledge:

Initial Incident Command Establishment

- Identifying and clearly designating the Incident Commander (IC)
- Establishing an initial command post location (safe, visible, accessible)
- Communicating the establishment of command clearly to all responding personnel and agencies

Incident Size-up and Initial Assessment

- Conducting a rapid initial assessment of the confined space rescue scenario (hazards, victim status, required resources)
- Identifying immediate operational priorities (life safety, hazard control, victim rescue, stabilization)
- Determining immediate resource availability and initial resource needs

Incident Command System (ICS) Structure and Roles

- Understanding and applying basic ICS organizational structure:
 - Incident Commander (IC)
 - Operations Section (entry, rescue, hazard mitigation)
 - Safety Officer
 - Entry Supervisor
 - Attendant(s)
 - Rescue Entrants / Entry Teams
 - Support and logistics roles (equipment, medical, communications)
- Clearly defining roles, responsibilities, and reporting relationships within initial ICS structure

Incident Action Planning and Prioritization

- Developing and communicating clear initial objectives and incident priorities
- Determining appropriate rescue strategies (entry rescue, non-entry retrieval, hazard mitigation)
- Establishing tactical assignments and communicating clearly to initial responding personnel

Communication and Coordination

- Establishing clear communication protocols and channels within the ICS framework
- Ensuring timely and accurate information flow between Incident Commander, rescue teams, and supporting resources
- Coordinating effectively with external agencies and additional arriving resources (EMS, HazMat, Fire, Law Enforcement, Utilities, Technical Experts)

Safety and Accountability

- Appointing an initial Safety Officer and clearly defining safety responsibilities
- Implementing personnel accountability and tracking systems

- Ensuring ongoing hazard assessments, situational awareness, and scene monitoring throughout operations

Resource Management and Requesting Additional Resources

- Conducting early recognition of resource limitations (personnel, equipment, technical expertise)
- Initiating timely requests for additional resources (specialized rescue teams, equipment, medical support, technical advisors)
- Establishing appropriate staging areas or resource management locations

Incident Documentation and Recordkeeping

- Initiating clear, concise documentation of incident actions, times, personnel assignments, and accountability
- Ensuring consistent recordkeeping for incident evaluation, regulatory compliance, and after-action reporting

Transition and Transfer of Command

- Understanding procedures for transitioning from initial incident command to expanded ICS structure as additional resources arrive
- Clearly communicating and documenting transfer of command, including incident conditions, objectives, actions taken, and resource status

Regulatory and Compliance Considerations

- Knowledge of applicable standards, guidelines, and regulations related to incident command for confined space rescue operations (OSHA 29 CFR 1910.146, NFPA 1670, NFPA 1006, NIMS/ICS compliance standards)
- Ensuring compliance with organizational policies, local jurisdictional requirements, and best practices

#461 Organise the rescue team

Performance:

Given a written assessment, demonstrate knowledge of the following topics.

Knowledge:

Team Structure and Organization

- Clearly defining and assigning rescue team positions and roles, including but not limited to:
 - Incident Commander (IC)
 - Entry Supervisor
 - Attendant(s)
 - Rescue Entrants (Entry Personnel)
 - Backup/Standby Rescue Team
 - Safety Officer
 - Medical Support Personnel
 - Technical Specialists (Hazmat, Rope Rescue, Structural Engineers, etc.)
 - Logistics and Equipment Support Personnel

Team Selection Criteria

- Selecting personnel based on qualifications, training, and experience relevant to the incident
- Ensuring compliance with applicable standards and regulations regarding rescue personnel qualifications (OSHA, NFPA standards)
- Considering physical fitness, health status, and fatigue factors when selecting team members
- Evaluating the need for specialized skills or certifications (rope rescue, hazmat, medical training, atmospheric monitoring)

Assignment of Roles and Responsibilities

- Clearly communicating individual and team roles, responsibilities, and reporting relationships
- Establishing clear chain-of-command and communication pathways within the rescue team structure
- Designating primary and secondary responsibilities for each position to facilitate adaptability and flexibility during operations

Rescue Team Briefing

- Conducting an effective pre-entry briefing covering:
 - Incident conditions and known hazards
 - Rescue objectives and priorities
 - Assigned roles and responsibilities
 - Communication methods, signals, and emergency procedures
 - Tactical rescue plan and anticipated actions
 - Safety procedures and PPE requirements
 - Equipment and resource availability and locations
 - Contingency and emergency escape plans

Communication and Coordination within the Team

- Establishing clear and standardized communication methods among team members (radio, hardline, whistle, hand signals, rope signals)

- Ensuring effective coordination between entry teams, attendants, backup teams, and incident command personnel
- Integrating communications into the Incident Command System (ICS) structure for coordinated incident management

Safety and Accountability

- Assigning and clearly defining the role and authority of the Safety Officer
- Implementing effective personnel accountability and tracking systems
- Ensuring adherence to safety protocols, PPE selection, and proper use of respiratory protection
- Continuously monitoring and reassessing hazards and risk levels throughout operations

Operational Readiness and Equipment Checks

- Conducting thorough pre-entry equipment inspections and operational checks
- Ensuring readiness and proper deployment of rescue and support equipment (atmospheric monitors, ventilation, rope rescue gear, PPE, communication equipment)
- Confirming availability and operational status of backup and emergency equipment

Standby and Backup Rescue Teams

- Establishing clearly designated and properly equipped standby rescue team(s)
- Ensuring rapid deployment readiness of backup rescue personnel for immediate assistance or rescue contingencies
- Clearly communicating roles, responsibilities, and activation procedures for standby rescue teams

Incident Documentation and Recordkeeping

- Ensuring accurate tracking and documentation of rescue team deployment, personnel assignments, entry and exit times, and accountability checks
- Maintaining clear records of atmospheric monitoring, equipment usage, PPE inspections, and incident actions for regulatory compliance and after-action reporting

Regulatory and Compliance Considerations

- Knowledge of applicable standards, guidelines, and regulations for rescue team organization and confined space rescue operations (OSHA 29 CFR 1910.146, NFPA 1670, NFPA 1006)
- Ensuring compliance with organizational policies, jurisdictional requirements, and industry best practices

#462 Describe considerations of working in inert or pressurised spaces

Performance:

Given a written assessment, demonstrate knowledge of the following topics.

Knowledge:

Recognition and Identification of Inert or Pressurized Spaces

- Definition and characteristics of inert atmospheres:
 - Spaces containing intentionally inerted atmospheres (e.g., nitrogen, CO₂, argon, or steam-inerted tanks)
 - Purpose of inerting (fire/explosion prevention, product preservation, oxidation prevention)
- Characteristics of pressurized spaces:
 - Spaces maintained at positive or negative pressure compared to atmospheric pressure (e.g., vessels, pipelines, reactors, tanks)
 - Purpose of pressurization (process control, product integrity, contamination prevention)

Hazards and Risks Associated with Inert Atmospheres

- Oxygen-deficient atmospheres and associated risks:
 - Immediate asphyxiation hazard due to oxygen displacement
 - Rapid onset of unconsciousness or death without warning symptoms
- Difficulty detecting inert atmosphere hazards without proper monitoring equipment:
 - Lack of oxygen may not have warning properties (colorless, odorless, tasteless)
- Increased risk to rescuers due to atmosphere invisibility and rapid incapacitation potential

Hazards and Risks Associated with Pressurized Spaces

- Risk of sudden pressure release:
 - Uncontrolled depressurization or explosive rupture
 - Blast injuries, hearing damage, or physical trauma
- Potential for hazardous materials release under pressure:
 - Chemical exposure, thermal burns, toxic atmospheres
- Risks associated with confined space entry under varying pressure conditions:
 - Barotrauma (ear, sinus, lung injury)
 - Physical difficulties in movement, communication, or equipment operation

Atmospheric Monitoring and Detection

- Importance of thorough atmospheric testing before and continuously during entry operations:
 - Oxygen level testing (to detect oxygen-deficient atmospheres)
 - Detection and monitoring of inert gases or pressurized leaks
- Selection and proper use of atmospheric monitoring equipment:
 - Gas-specific monitors (oxygen, nitrogen, carbon dioxide sensors)
 - Multi-gas monitoring for comprehensive atmospheric hazard detection

Ventilation and Atmospheric Management

- Appropriate ventilation strategies and limitations:
 - Challenges and effectiveness of ventilation in inerted or pressurized spaces

- Methods for replacing inert gases with breathable air (dilution ventilation, purging, forced ventilation)
- Procedures and considerations for safely depressurizing confined spaces before entry:
 - Controlled depressurization techniques
 - Pressure monitoring and verification prior to entry

Personal Protective Equipment and Respiratory Protection

- Selection and use of appropriate respiratory protection:
 - Supplied-air respirators (SAR), self-contained breathing apparatus (SCBA) required in oxygen-deficient spaces
 - Limitations of air-purifying respirators (APRs) in inert or oxygen-deficient atmospheres
- Additional PPE considerations:
 - Protective clothing, hearing protection, eye/face protection related to pressurized hazards

Rescue and Emergency Response Considerations

- Specific challenges posed by inert or pressurized confined space rescues:
 - Rapid victim incapacitation and limited survival time
 - Hazards to rescuers due to invisible and immediately dangerous atmospheres
- Rescue methods and procedures:
 - Non-entry rescue techniques (retrieval systems, winches)
 - Specialized entry rescue procedures with appropriate respiratory protection and atmospheric controls

Operational Planning and Incident Management

- Pre-entry risk assessments, hazard identification, and mitigation strategies:
 - Clear and comprehensive rescue planning specific to inert or pressurized hazards
- Clearly defined roles and responsibilities:
 - Incident Commander, Entry Supervisor, Safety Officer, Entrants, Attendants
- Effective communication protocols and emergency signals specific to operations in inert or pressurized spaces

Training and Qualification Requirements

- Specialized training requirements for personnel working in inert or pressurized confined spaces:
 - Recognition and response to atmospheric and pressure hazards
 - Proper use and limitations of respiratory protection and PPE
 - Emergency procedures and rescue techniques specific to inert and pressurized spaces

Regulatory and Compliance Considerations

- Understanding and applying applicable standards and guidelines:
 - OSHA regulations (29 CFR 1910.146, 29 CFR 1910.134)
 - NFPA standards (NFPA 1670, NFPA 1006)
 - Industry-specific regulations and best practices
- Ensuring compliance with organizational policies, jurisdictional requirements, and safe operational practices

#463 Describe personnel and equipment decontamination considerations

Performance:

Given a written assessment, demonstrate knowledge of the following topics.

Knowledge:

Types of Decontamination

- **Physical Decontamination**
 - Definition and purpose: Methods such as brushing and scraping to remove visible contaminants
 - Applicability: Reducing gross contamination prior to further decontamination steps
- **Chemical Decontamination**
 - Characteristics and use: Use of solvents and detergents to neutralize or remove hazardous substances
 - Considerations: Effectiveness and potential hazards of chemical agents used
- **Biological Decontamination**
 - Purpose and methods: Application of disinfectants and sterilants to eliminate biological hazards
 - Importance: Preventing cross-contamination and infection

Levels of Decontamination

- **Gross Decontamination**
 - Understanding: Initial step to remove the majority of contaminants from personnel and equipment
 - Importance: Reducing the spread of hazards
- **Secondary Decontamination**
 - Procedures: Further removal of contaminants after gross decontamination
 - Techniques: Ensuring thorough cleansing and reduction of residual hazards
- **Final Decontamination**
 - Significance: Last step in the decontamination process to ensure safety and readiness for reuse
 - Importance: Meeting regulatory and safety standards

Decontamination Procedures

- **Personnel Decontamination**
 - Protocols: Implementation of entry and exit protocols to manage contamination zones
 - Use of showers or wash stations: Thoroughly cleaning personnel
 - PPE removal sequence: Safely removing personal protective equipment to minimize recontamination
- **Equipment Decontamination**
 - Methods: Procedures for cleaning tools and machinery to ensure they are safe for reuse
 - Management: Disposal or quarantine of items that cannot be decontaminated

Decontamination Zones

- **Hot Zone**
 - Definition and purpose: Area where contamination is highest and immediate decontamination is required
 - Importance: Preventing spread of hazards to other areas
- **Warm Zone**

- Characteristics and management: Intermediate area for secondary decontamination and preparation for re-entry to the Cold Zone
- Importance: Minimizing contamination spread
- **Cold Zone**
 - Purpose and procedures: Area considered free of contamination where final decontamination occurs
 - Importance: Ensuring safety of personnel and the environment

Contaminant-Specific Decontamination

- **Chemical Hazards**
 - Strategies: Use of neutralization and absorption techniques to mitigate chemical risks
 - Considerations: Safe handling and disposal of chemical decontamination byproducts
- **Biological Hazards**
 - Methods: Application of sterilization and disinfection to eliminate biological threats
 - Importance: Preventing disease transmission
- **Radiological Hazards**
 - Procedures: Implementation of time, distance, and shielding principles to reduce exposure
 - Importance: Specialized decontamination techniques for radiological contaminants

Safety Measures During Decontamination

- **Monitoring of Personnel Health**
 - Importance: Identifying and addressing any exposure or contamination
 - Procedures: Immediate medical response if necessary
- **Use of Respiratory Protection**
 - Selection and use: Safeguarding against airborne contaminants
 - Importance: Preventing inhalation hazards during decontamination
- **Emergency Response Plans**
 - Development and implementation: Managing unexpected incidents during decontamination
 - Importance: Ensuring safety and effective response

Environmental Considerations

- **Containment of Runoff**
 - Methods: Preventing the spread of contaminants to the environment
 - Importance: Environmental protection in decontamination operations
- **Proper Disposal of Waste**
 - Procedures: Managing and disposing of contaminated materials safely
 - Importance: Compliance with environmental regulations for waste disposal

Documentation and Reporting

- **Record Keeping**
 - Importance: Thorough documentation for compliance and operational review
 - Procedures: Maintaining accurate records of decontamination activities
- **Reporting to Regulatory Agencies**
 - Requirements: Reporting decontamination activities and incidents
 - Importance: Transparency and compliance with regulatory standards

Level 3 Skill PSCs

#464 Prepare and use self-contained breathing apparatus

Performance:

Prepare and use self-contained breathing apparatus.

Standard:

Candidate given a Self-Contained Breathing Apparatus (SCBA) will demonstrate the ability to conduct visual and function checks prior to donning. Don facepiece conduct checks for proper seal. Don SCBA appropriately without loss of air. All checks and donning procedure are according to manufacturer's guidelines.

Conditions:

Given appropriate PPE and SCBA properly don. Work in confined space while on air.

Comments:

This is a test for this specific skill. This does not meet the level of certification in your area. Please refer to your local regulations regarding certification o May be done in conjunction with other skills.

#465 Select, prepare, and use supplied air breathing apparatus

Performance:

Select, prepare, and use supplied air breathing apparatus.

Standard:

Given simulated readings from an air monitor, and a confined space that is not suitable for SCBA, determine that supplied air use is necessary. Candidate verbalize the need for using a supplied air system, the limitations and benefits to using this type of system. Candidate given a supplied air Breathing Apparatus (SABA) will demonstrate the ability to conduct visual and function checks. Demonstrate connecting hoses to rescuers and the system safely. Demonstrate and verbalize settings for the system. Demonstrate how to change air supply bottles if necessary. All checks and connecting procedures are according to manufacturer's guidelines. Demonstrate safe start up and use termination procedures, how to pressurize and bleed air systems. Discuss limitations of hose lengths.

Conditions:

Given an air supply system properly check and set up the system, connect hoses, and lay out hoses for ease of use.

Comments:

This is a test for this specific skill. This does not meet the level of certification in your area. Please refer to your local regulations regarding certification. May be done in conjunction with other skills.

#466 Demonstrate movement and position in restricted entries

Performance:

Demonstrate movement and position in restricted entries.

Standard:

Candidate shall demonstrate movement and position in restricted entries.
Discuss or demonstrate reduced profile entry with systems.

Conditions:

Given all needed equipment, this may be done with restricted size entry points or other areas within the confined space where they must transition through a restricted size entry point.

Comments:

May be done in conjunction with other tasks or skills.

#467 Demonstrate horizontal and vertical extractions while using breathing apparatus

Performance:

Demonstrate horizontal and vertical extractions while using breathing apparatus.

Standard:

Demonstrate line management. Does not have loss of air or mask breach during skills. Negotiates confined spaces accounting for the use of breathing apparatus.

Conditions:

Given scenario chosen by the assessor and chooses equipment independently. This may be done with SCBA or SABA.

Comments:

Scenario may include both horizontal and vertical components to make assessments more efficient. This is a test for this specific skill. This does not meet the level of certification in your area. Please refer to your local regulations regarding certification. May be done in conjunction with other skills.

#468 Demonstrate internal rigging

Performance:

Demonstrate internal rigging.

Standard:

Candidate shall show internal rigging methods. Discuss and demonstrate the use of anchors inside of the confined space. Discuss benefits and limitations of the chosen system use in confined space.

Conditions:

Given a scenario and various equipment, choose the needed equipment independently.

Comments:

This may be done in conjunction with other skills. Internal rigging examples maybe systems that assist in transitioning a rescuer and/or victim from one internal level to another, or through a horizontal opening such as a bulkhead.

#469 Identify, construct, and evaluate multi-point anchors

Performance:

Identify, construct, and evaluate multi-point anchors.

Standard:

Given a location for an anchor tie a multi point anchor such that:

- Ensure the anchor is suitably strong for the expected load
- Ensure the choice of hardware and anchor tying material is appropriate for the expected load.
- If the anchor is constructed from webbing or rope, knots must be appropriate.

Consideration should be given to:

- Failure of one leg of the system does not compromise the entire system.
- Minimal extension in case of failure of one leg.
- Focused in the expected direction of the load.
- A reasonable attempt must be made to load sharing between the legs of the anchor.
- Ensure appropriate angles between legs.

Conditions:

An anchor location and material will be provided. Sewn anchor slings can be used if available.

Comments:

Same skill as ITRA-260

#470 Demonstrate entry and rescue beyond line of sight for horizontal and vertical spaces

Performance:

Demonstrate entry and rescue beyond line of sight for horizontal and vertical spaces.

Standard:

Given a scenario where the victim is beyond the line of sight from the opening of the confined space, the candidate shall work as the primary rescuer of a team to enter the confined space and perform a rescue.

Conditions:

Candidate performs all entry and rescue skills appropriately to include assessing the needs of PPE for themselves and the victim to be rescued.

Comments:

Conjunction with other ITRA skills should be considered to keep an appropriate time frame. Scenarios with a confined space that has both horizontal and vertical components of it may be used to assess this skill set at the same time.
