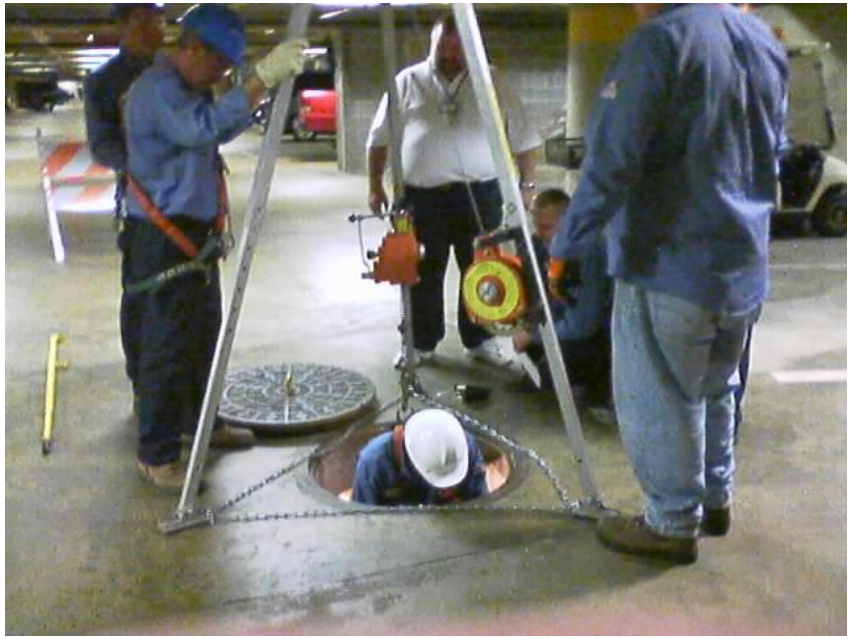
SC Budget and Control Board

Division of General Services

Confined Space Entry



DGS Safety
March 2015

Ref: **29 CFR 1910.146** & **1926.21**

BCB Confined Space Entry Policy

BCB Confined Space Entry Program

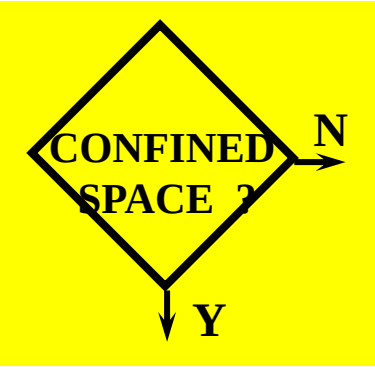
Confined Space

Self-Study Course & Exam

To Receive Credit For This Course
Contact The Safety Office For A Test
Or Print A Copy From On-Line

Passing Grade is **70%** Or Better

Note: Many Exam Questions Can Be Found In This Presentation But Not All. You Will Also Need To Refer To The **Confined Space Entry Policy** And **Program** And Other Confined Space Information Found On Safety's Webpage.



Confined Space

In Accordance With OSHA **29 CFR 1910.146**

The Division of General Services Has

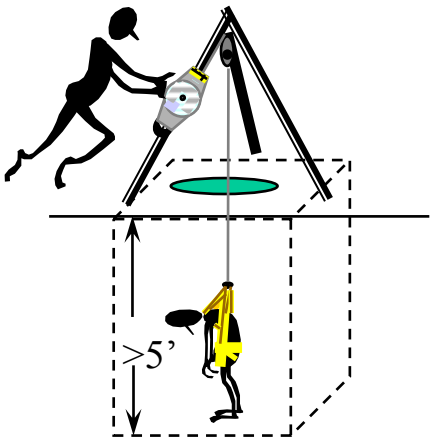
- Evaluated The Workplace And Has Identified And Posted Confined Space Locations To Include Permit Required Confined Spaces
  (see http://www.gs.sc.gov/webfiles/gs_0/policy/Confined_Spaces_A-E_4-18-2013.pdf and http://www.gs.sc.gov/webfiles/gs_0/policy/Confined_Spaces_F-Z_14-18-2013.pdf)
- A Written Confined Space Entry Program
  (see http://www.gs.sc.gov/webfiles/gs_0/policy/CSE_Pgm-Rev-Oct10.pdf)
- Training (Annually)
  - This Self-Study & Test
  - Hands-On Class

Confined Space

Examples

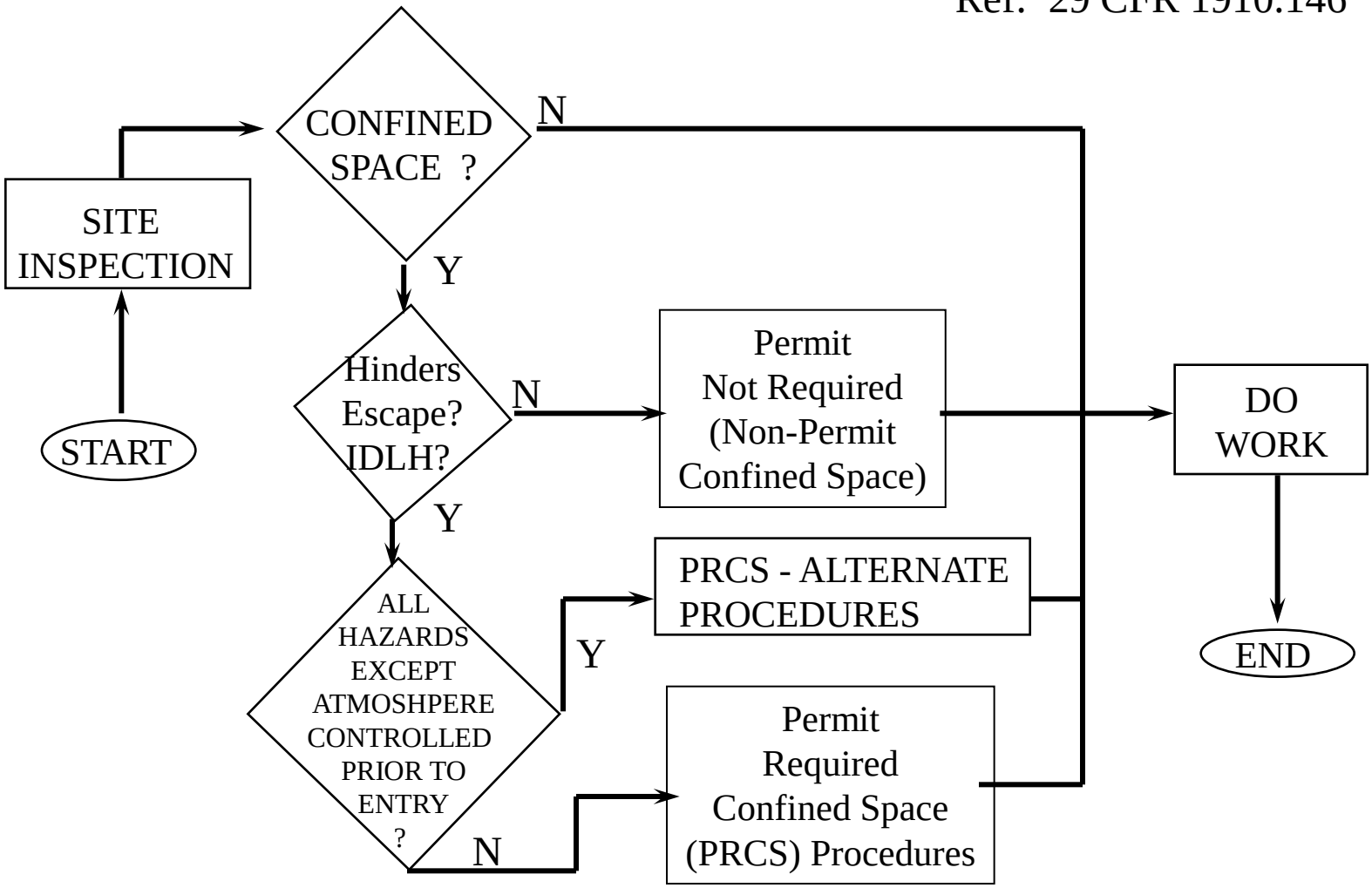
- Boilers
- Chases
- Cooling Towers
- Elevator Pits
- Manholes
- Pipelines
- Sewers
- Sump Pump Pits
- Tanks
- Utility Tunnels

How to Determine What Is A ***CONFINED SPACE*** & Which Procedures to Use



Confined Space
Decision Flowchart

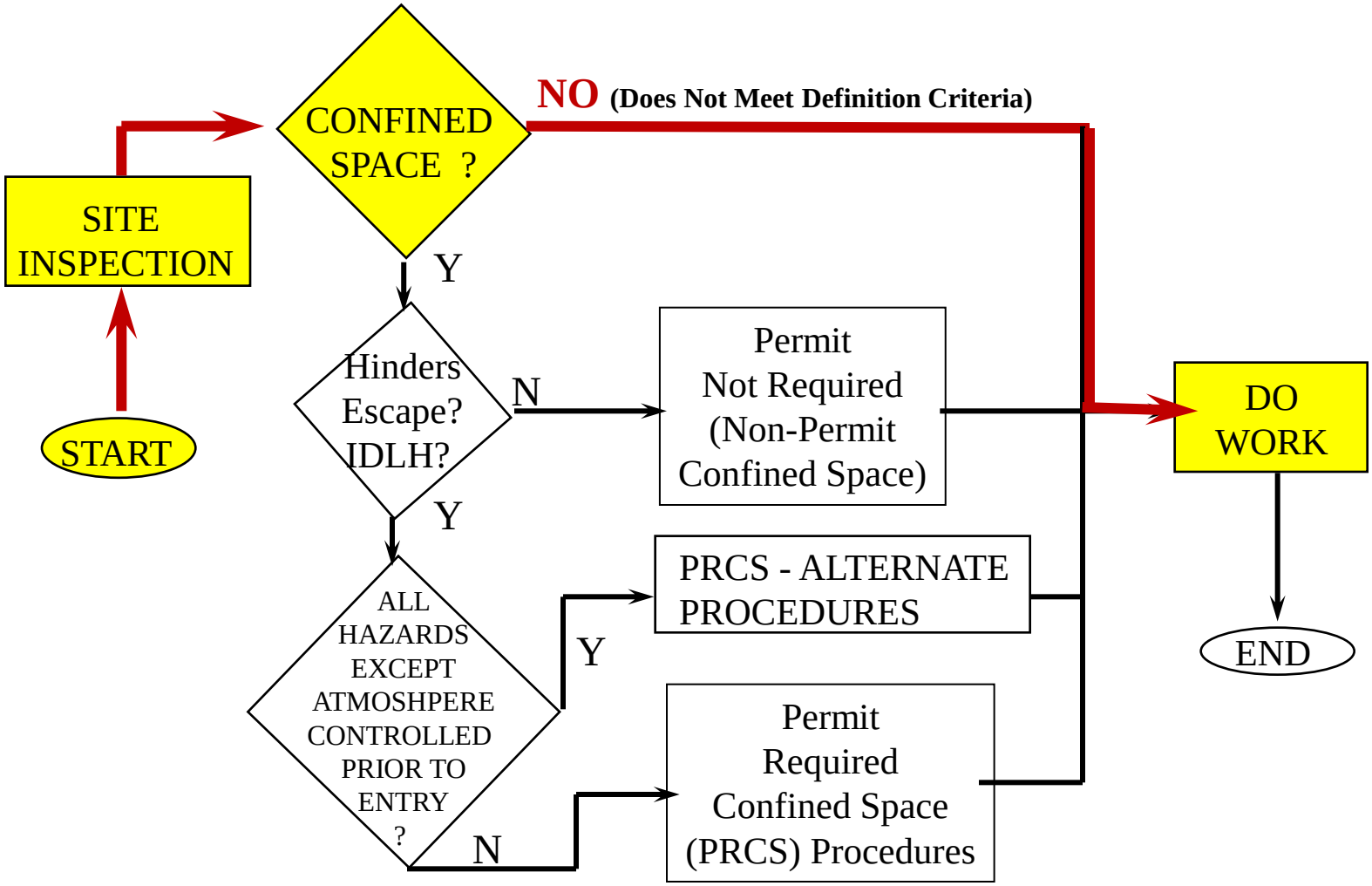
Ref: 29 CFR 1910.146

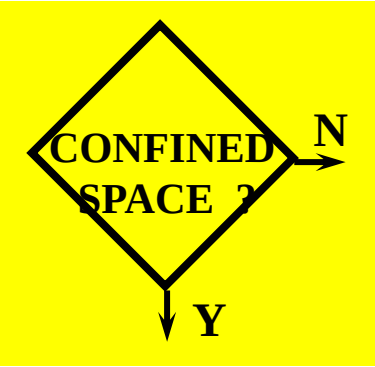


Confined Space

Decision Flowchart

Space Is **Not** A Confined Space





Confined Space

Definition

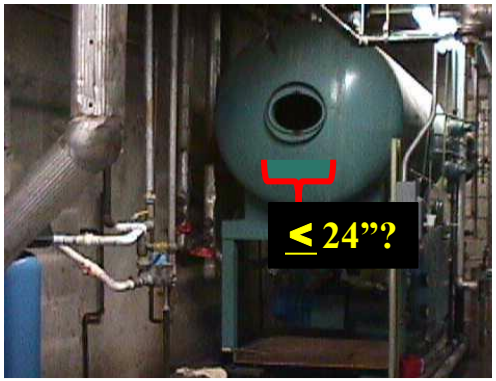
Any Space Large Enough to Enter and Work That:

- Has Restricted Entry and Exit
- Not Intended for Continuous Occupancy

Confined Space
Restricted Access

Any Permanent / Temporary Structure Or Barrier That Obstructs, Impedes Or Hinders Access To, Or Egress Or Rescue From The Confined Space.

Examples - The Entry Portal:



Size –Dimension Is 24” Or Less

- Prevents EMS Rescuers From Entering With SCBA

Confined Space

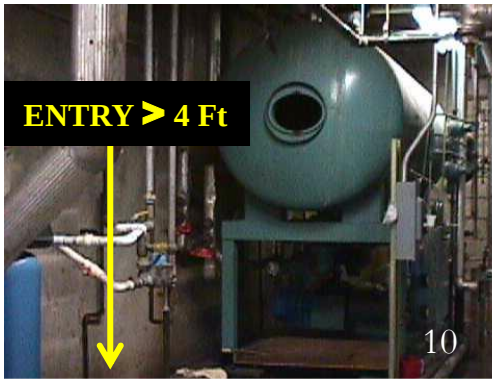
Restricted Access (cont.)

Any Permanent / Temporary Structure Or Barrier That Obstructs, Impedes Or Hinders Access To, Or Egress Or Rescue From The Confined Space.

Examples - The Entry Portal:

Location:

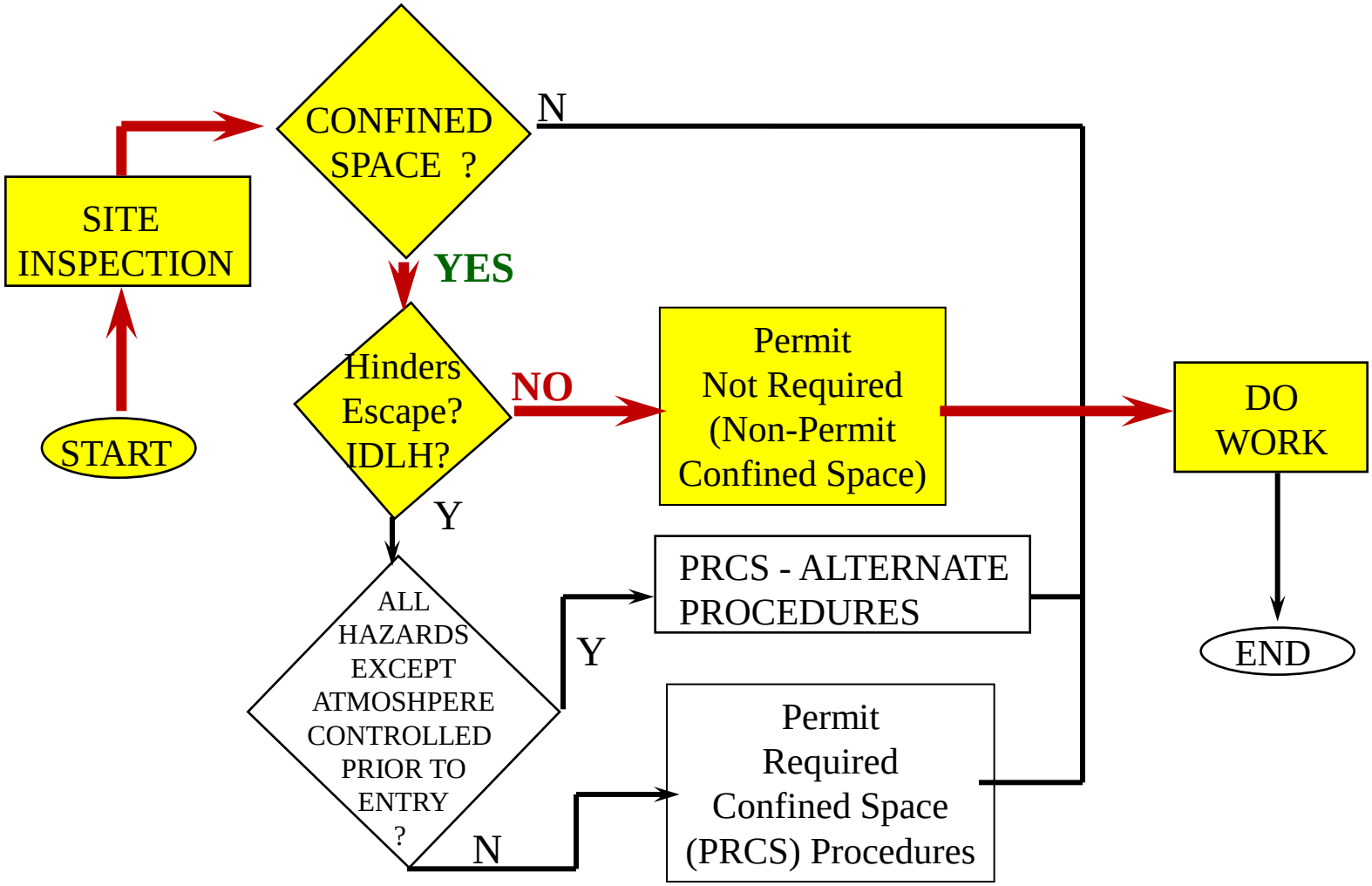
- Elevation – Opening To The Space Is 4' Or More Above Grade
- On Side – Horizontal Access Makes Use Of Retrieval Lines Difficult
- On Top / Bottom – Rescuers Have To Climb Up / Down; May Require
  - Rope Rescue & Special Patient Packaging
- Excessive Distance / Time To Evacuate



Confined Space

Decision Flowchart

Space **Is A Confined Space** (Permit Not Required)

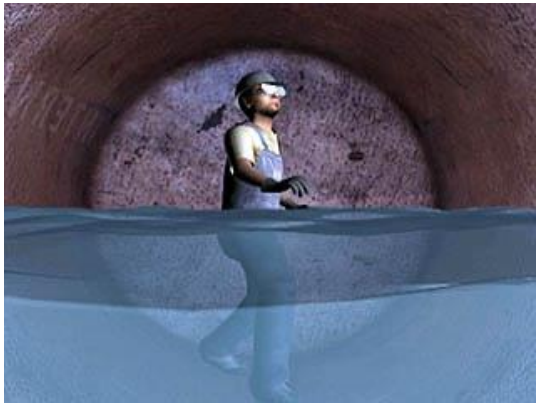


Confined Space
Definition

Immediately Dangerous To Life Or Health (IDLH)

Entrant Could Be Incapacitated or Disabled by an Actual *or Potential* IDLH Condition:

- Hazardous Atmosphere
- Entrapment
- Engulfment
- Serious Safety or Health Hazard



Confined Space
Definition

"**Entry**" Occurs As Soon As ***Any Part*** Of The Entrant's Body Breaks The Plane Of The Opening Into The Space, Including Any Extremities (Hands Or Feet).

Confined Space
Before Entering

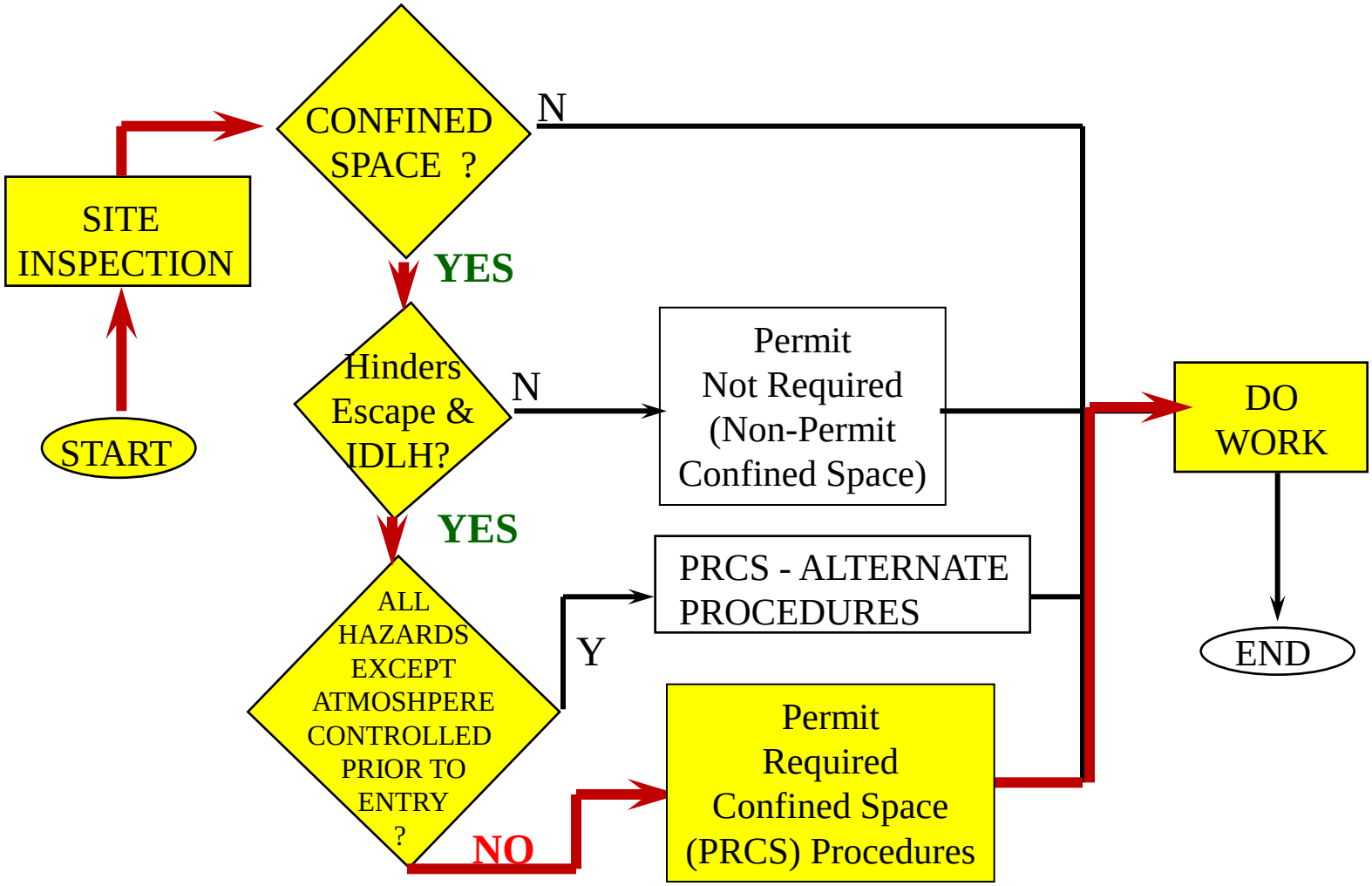
- **Required To Test Internal Atmosphere** (In This Order):
  - Oxygen Content
  - Flammable Gases And Vapors
  - Potential Toxic Air Contaminants

- Use A Calibrated Direct-Reading Instrument
- Entrant Should Observe / Perform Pre-Entry Testing

Confined Space

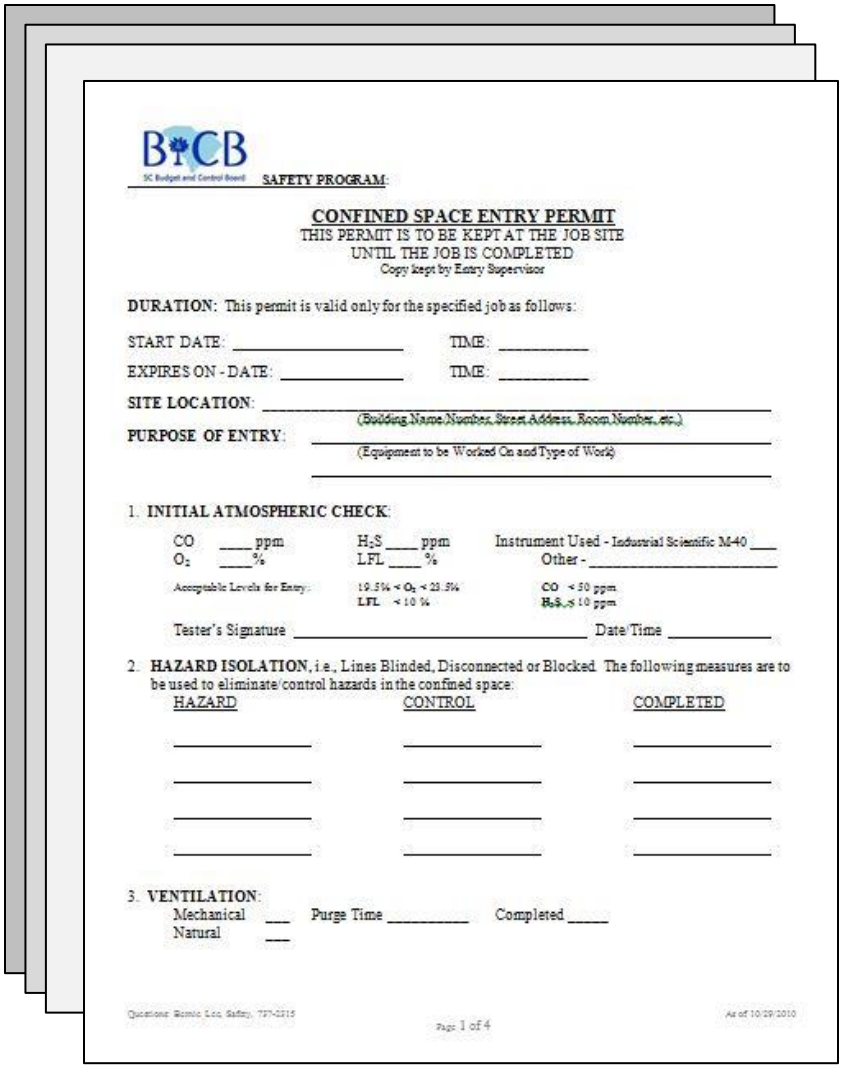
Decision Flowchart

Space **Is A Confined Space (Permit Required)**



Confined Space

Entry Permit



BCB SC Budget and Control Board SAFETY PROGRAM:

CONFINED SPACE ENTRY PERMIT
THIS PERMIT IS TO BE KEPT AT THE JOB SITE
UNTIL THE JOB IS COMPLETED
Copy kept by Entry Supervisor

DURATION: This permit is valid only for the specified job as follows:

START DATE: _____ TIME: _____
EXPIRES ON - DATE: _____ TIME: _____

SITE LOCATION: _____
(Building Name/Number, Street Address, Room Number, etc.)

PURPOSE OF ENTRY: _____
(Equipment to be Worked On and Type of Work)
_____

1. **INITIAL ATMOSPHERIC CHECK:**

CO ____ ppm H_2S ____ ppm Instrument Used - Industrial Scientific M-40 ___
O_2 ____% LFL ____ % Other - _____

Acceptable Levels for Entry: 19.5% < O_2 < 23.5% CO < 50 ppm
LFL < 10 % H_2S < 10 ppm

Tester's Signature _____ Date/Time _____

2. **HAZARD ISOLATION**, i.e., Lines Blinded, Disconnected or Blocked. The following measures are to be used to eliminate/control hazards in the confined space:

HAZARD	CONTROL	COMPLETED
_____	_____	_____
_____	_____	_____
_____	_____	_____
_____	_____	_____

3. **VENTILATION:**
Mechanical ___ Purge Time _____ Completed _____
Natural ___

Questions: Bernie Lee, Safety, 737-1315 Page 1 of 4 As of 10/29/2010

Plan & Authorization For Entry

- Supervisor Designates Entry Team
  - Entrants
  - Attendants
  - Supervisor
- Training Certifications Current
- Job Specific
  - Purpose / Scope Of Work
  - Location
  - Date, Time & Duration (Job Specific)
  - Hazards & Controls Identified
  - Equipment & PPE Needed
- Emergency Procedures
  - Communications / 9-1-1
  - Rescue Equipment On & Off Site
- Supervisor Signs & Executes

Confined Space
Definition

Permit-Required Confined Space

A Confined Space That Has One Or More Of The Following Hazardous Characteristics:

- Hazardous Atmosphere
- Contains A Material That Could Engulf Someone
- Entrapment Due To Sloping Walls Or Floors
- Other Recognized Serious Safety Or Health Hazard
  - **IDLH**: Conditions That Are Immediately Dangerous To Life And Health

Confined Space
Hazard Abatement

Each Confined Space Was Surveyed And Documented With:

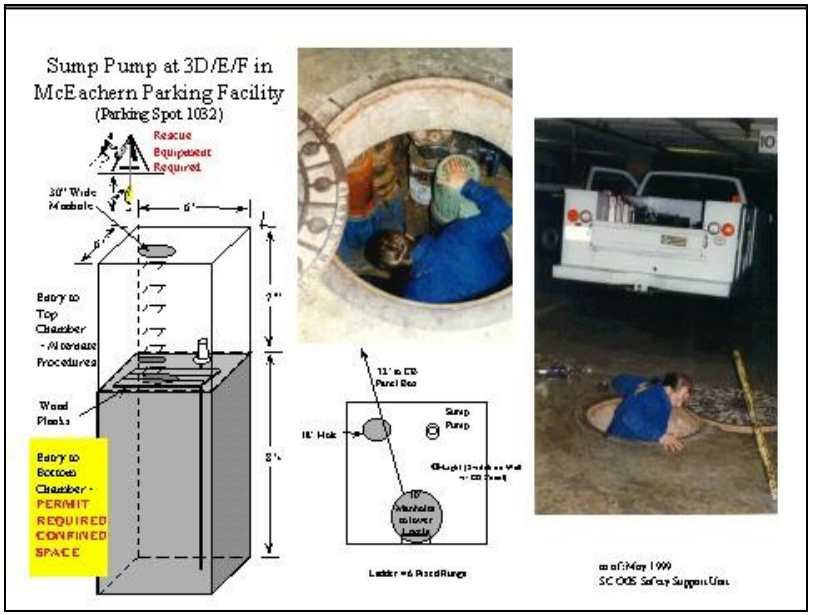
- A Diagram
- Photos

Available On The Safety Webpage (See **"Confined Spaces"** Under **"Policies & Programs"**)

http://www.gs.sc.gov/webfiles/gs_0/policy/Confined_Spaces_A-E_4-18-2013.pdf

http://www.gs.sc.gov/webfiles/gs_0/policy/Confined_Spaces_F-Z_14-18-2013.pdf

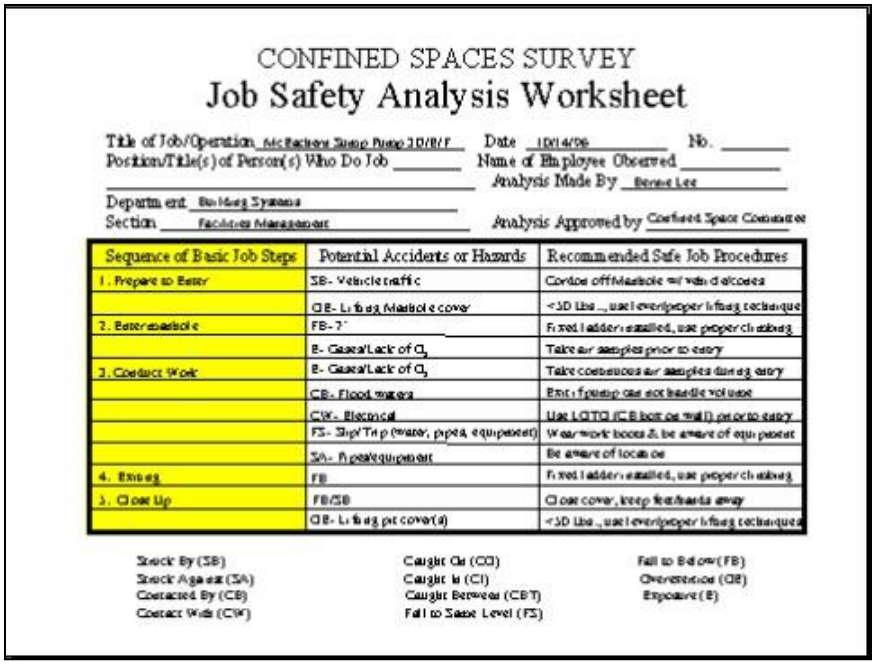
Note: The Supervisor Should Use This Visual Information To Brief The Entry Team



Confined Space
Hazard Abatement

Each Confined Space Was Surveyed Using *Job Safety Analysis*

- **Basic Work Steps Were Identified**



CONFINED SPACES SURVEY

Job Safety Analysis Worksheet

Title of Job/Operation McMahon Sump Pump 3D/B/F Date 10/14/96 No. _____

Position/Title(s) of Person(s) Who Do Job _____ Name of Employee Observed _____

Analysis Made By Bernie Lee

Department Building Systems

Section Facilities Management Analysis Approved by Confined Space Committee

Sequence of Basic Job Steps	Potential Accidents or Hazards	Recommended Safe Job Procedures
1. Prepare to Enter	SB- Vehicle traffic	Cordon off Manhole w/ vehicle cones
	CB- Lifting Manhole cover	<50 lbs., use leverlpeper lifting technique
2. Enter manhole	FB- 7'	Fixed ladder installed, use proper climbing
	E- Gases/Lack of O_2	Take air samples prior to entry
3. Conduct Work	E- Gases/Lack of O_2	Take continuous air samples during entry
	CB- Flood waters	Enter if pump can not handle volume
	CW- Electrical	Use LOTO (CB box or wall) prior to entry
	FS- Slip/Trip (water, pipes, equipment)	Wear work boots & be aware of equipment
	SA- Pipes/equipment	Be aware of location
4. Exiting	FB	Fixed ladder installed, use proper climbing
5. Close Up	FB/SB	Close cover, keep feet/hands away
	CB- Lifting pit cover(s)	<50 lbs., use leverlpeper lifting technique

Struck By (SB)
Struck Against (SA)
Contacted By (CB)
Contact With (CW)

Caught On (CO)
Caught In (CI)
Caught Between (CBT)
Fall to Same Level (FS)

Fall to Below (FB)
Overexertion (OE)
Exposure (E)

Confined Space
Hazard Abatement

Each Confined Space Was Surveyed Using *Job Safety Analysis*

- Basic Work Steps Were Identified
- **The Hazards For Each Work Step Were Identified**

CONFINED SPACES SURVEY
Job Safety Analysis Worksheet

Title of Job/Operation McBaiken Sump Pump 10/8/F Date 10/14/96 No. _____
Position/Title(s) of Person(s) Who Do Job _____ Name of Employee Observed _____
Analysis Made By Renee Lee
Department Building Systems
Section Facilities Management Analysis Approved by Confined Space Committee

Sequence of Basic Job Steps	Potential Accidents or Hazards	Recommended Safe Job Procedures
1. Prepare to Enter	SB- Vehicle traffic	Cordon off Manhole w/ traffic cones
	CB- Lifting Manhole cover	<50 lbs., use lever/proper lifting technique
2. Enter manhole	FB- 2'	Fixed ladder installed, use proper climbing
	E- Gases/Lack of O_2	Take air samples prior to entry
3. Conduct Work	E- Gases/Lack of O_2	Take continuous air samples during entry
	CB- Flood waters	Ensure pump are not handle volume
	CW- Electrical	Use LOTO (CB box or wall) prior to entry
	FS- Slip/Trip (water, pipes, equipment)	Wear work boots & be aware of equipment
	SA- Pipes/equipment	Be aware of location
4. Exiting	FB	Fixed ladder installed, use proper climbing
5. Close Up	FB/SB	Close cover, keep feet/hands away
	CB- Lifting pit cover(s)	<50 lbs., use lever/proper lifting technique

Struck By (SB)
Struck Against (SA)
Contacted By (CB)
Contact With (CW)
Caught On (CO)
Caught In (CI)
Caught Between (CBT)
Fall to Same Level (FS)
Fall to Below (FB)
Overexertion (OE)
Exposure (E)

Confined Space
Hazard Abatement

Each Confined Space Was Surveyed Using *Job Safety Analysis*

- Basic Work Steps Were Identified
- The Hazards For Each Work Step Were Identified
- **Then Measures Were Identified To Eliminate or Control Hazards**

CONFINED SPACES SURVEY

Job Safety Analysis Worksheet

Title of Job/Operation McBachers Sump Pump 3D/B/F Date 10/14/96 No. _____

Position/Title(s) of Person(s) Who Do Job _____ Name of Employee Observed _____

Analysis Made By Renee Lee

Department Building Systems

Section Facilities Management Analysis Approved by Confined Space Committee

Sequence of Basic Job Steps	Potential Accidents or Hazards	Recommended Safe Job Procedures
1. Prepare to Enter	SB- Vehicle traffic	Cordon off Manhole w/ vehicle cones
	CB- Lifting Manhole cover	<50 lbs., use ergo/proper lifting technique
2. Enter manhole	FB- 7'	Fixed ladder installed, use proper climbing
	E- Gases/Lack of O_2	Take air samples prior to entry
3. Conduct Work	E- Gases/Lack of O_2	Take continuous air samples during entry
	CB- Flood waters	Emt/pump can not handle volume
	CW- Electrical	Use LOTO (CB box or wall) prior to entry
	FS- Slip/Trip (water, pipes, equipment)	Wear work boots & be aware of equipment
	SA- Pipes/equipment	Be aware of location
4. Exiting	FB	Fixed ladder installed, use proper climbing
5. Close Up	FB/SB	Close cover, keep feet/hands away
	CB- Lifting pit cover(s)	<50 lbs., use ergo/proper lifting technique

Struck By (SB)
Struck Against (SA)
Contacted By (CB)
Contact With (CW)

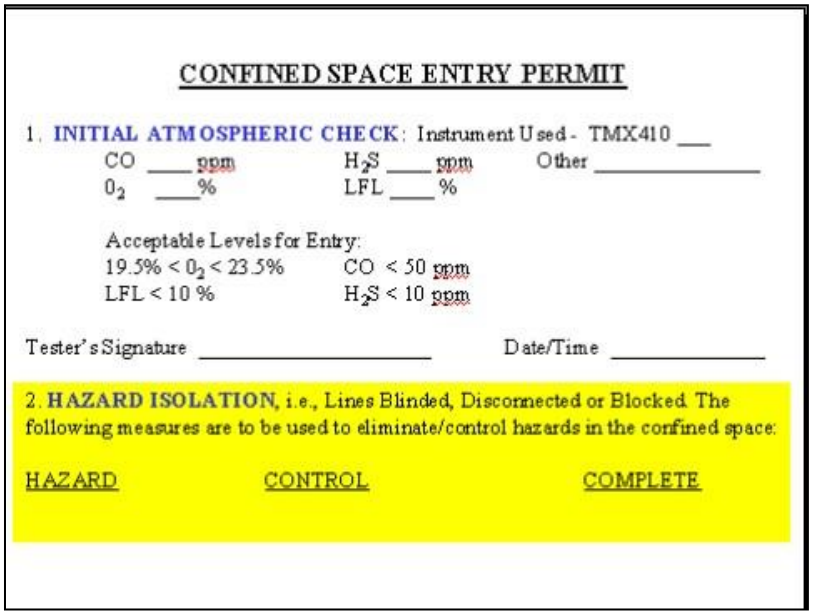
Caught On (CO)
Caught In (CI)
Caught Between (CBT)
Fall to Same Level (FS)

Fall to Below (FB)
Overexertion (OE)
Exposure (E)

Confined Space
Hazard Abatement

The Confined Space Entry Permit Has A Location For:

- The Supervisor To Inform Employees Of Any Known Hazard And How to Eliminate Or Control Those Hazards Before & During Entry
- The Entry Team To Document That Those Controls Have Been Accomplished Prior To And Maintained During Entry



CONFINED SPACE ENTRY PERMIT

1. **INITIAL ATMOSPHERIC CHECK**: Instrument Used - TMX410 ___

CO ____ ppm H_2S ____ ppm Other _____

O_2 ____% LFL ____ %

Acceptable Levels for Entry:

19.5% < O_2 < 23.5% CO < 50 ppm

LFL < 10 % H_2S < 10 ppm

Tester's Signature _____ Date/Time _____

2. **HAZARD ISOLATION**, i.e., Lines Blinded, Disconnected or Blocked. The following measures are to be used to eliminate/control hazards in the confined space:

HAZARD CONTROL COMPLETE

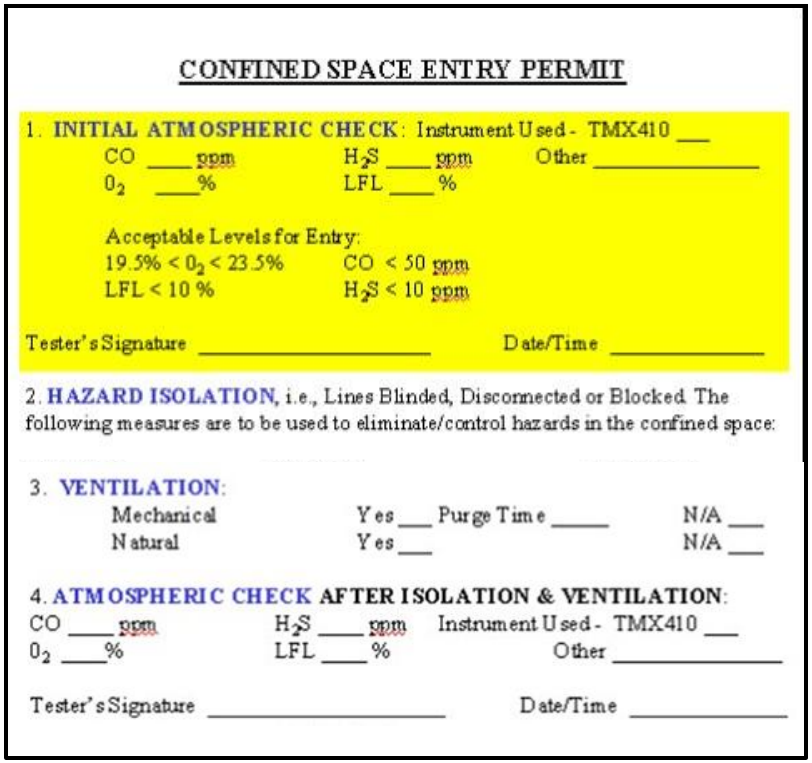
Confined Space
Definition

Hazardous Atmosphere

- **Flammable** Gas, Vapor, Or Mist In Excess Of 10% Of Its Lower Flammability Limit (LFL)
- Airborne **Combustible Dust** Concentration At LFL Or Above
- **Oxygen Level** – Concentration Too High or Low
- **PEL**: Atmospheric Concentration Above Permissible Exposure Limit
- Other IDLH Atmospheric Condition

Confined Space
Atmospheric Check

The Confined Space Entry Permit Has Locations For The Attendant To Document The Taking Of Air Samples Before & Periodically During Entry



CONFINED SPACE ENTRY PERMIT

1. **INITIAL ATMOSPHERIC CHECK**: Instrument Used - TMX410 ___
   CO ____ ppm H_2S ____ ppm Other _____
   O_2 ____% LFL ____ %

   Acceptable Levels for Entry:
   $19.5\% < O_2 < 23.5\%$ CO < 50 ppm
   LFL < 10 % H_2S < 10 ppm

   Tester's Signature _____ Date/Time _____

2. **HAZARD ISOLATION**, i.e., Lines Blinded, Disconnected or Blocked. The following measures are to be used to eliminate/control hazards in the confined space:

3. **VENTILATION**:
   Mechanical Yes ___ Purge Time ____ N/A ___
   Natural Yes ___ N/A ___

4. **ATMOSPHERIC CHECK AFTER ISOLATION & VENTILATION**:
   CO ____ ppm H_2S ____ ppm Instrument Used - TMX410 ___
   O_2 ____% LFL ____ % Other _____

   Tester's Signature _____ Date/Time _____

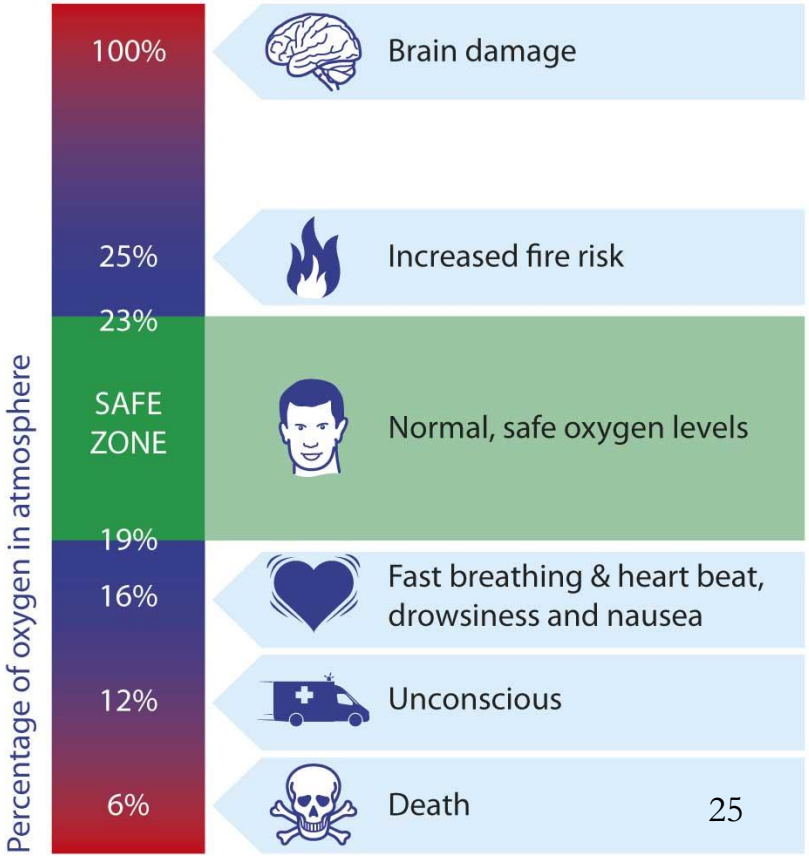
Confined Space

Monitor Atmosphere

Gas Monitor Used Prior To And During Confined Space Entry To Monitor:

Oxygen Level

- Safe: Between 19.5 - 23.5%
- Outside This Range:
  - Do Not Enter / Get Out Of The Confined Space
  - Introduce Fresh Air Using Forced Air Ventilation



Confined Space

Monitor Atmosphere

Gas Monitor Used Prior To And During Confined Space Entry To Monitor:

Carbon Monoxide (CO)

By-Product Of Combustion

- Colorless & Odorless Gas
- Symptoms:

Confined Space

Monitor Atmosphere

Gas Monitor Used Prior To And During Confined Space Entry To Monitor:

Toxic Atmosphere – Sources:

- Fumes From:
  - Cleaning
  - Welding, Cutting, Brazing, Soldering
  - Painting, Degreasing, Sealing, Bonding

Confined Space

Monitor Atmosphere

Gas Monitor Used Prior To And During Confined Space Entry To Monitor:

Hydrogen Sulfide (H_2S)
From Decomposition Of Organic Matter

- Colorless & Flammable Gas With Rotten Egg Odor
- Symptoms:
  - Low Exposure: Irritation of Eyes, Nose, Throat
  - Moderate Exposure: Headache, Dizziness, Nausea, Breathing Difficulty
  - Severe Exposure: Unconscious, Coma, Death

VISA (Multi-Gas Monitor) - Operating Instructions

Alarm Lights

Display Screen

Green / Right Hand Button

Sensor Ports

Yellow / Left Hand Button

Remote Pump Port

VISA (Multi-Gas Monitor) - Operating Instructions

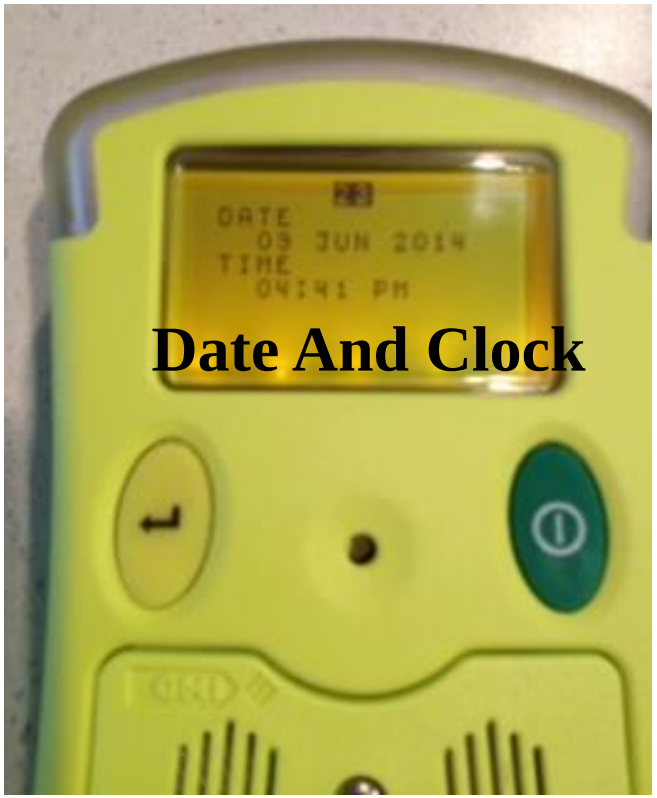
TURNING ON The Instrument

- Turn On In Fresh Air
- Press And Hold Right/Green Button Until the Display Screen Lights Up
  - The Instrument Will Go Through A 30 Second Warm Up and Test Cycle
  - Pump, Display Screen Backlighting And Blinking Green Alarm Lights Turn On

VISA (Multi-Gas Monitor) - Operating Instructions

30 Second Test Cycle

- **Instrument Identification**
- **Check The Battery Level**
  - **Full, 75%, 50%, 25% Or Low**



VISA (Multi-Gas Monitor) - Operating Instructions

30 Second Test Cycle (cont.)

Calibration Due
Date Reminder

If The Calibration Due Date Has EXPIRED

Audible & Visual Alarms Activate "CALIBRATION DUE" Flashes On Screen

Press And Hold Green/Right Button To Acknowledge And Turn Off Alarms

After Job, Turn Into FM Maintenance Supply Shop

If "CALIBRATION REQUIRED" Audible & Visual Alarms Activate The Instrument Is Not Useable

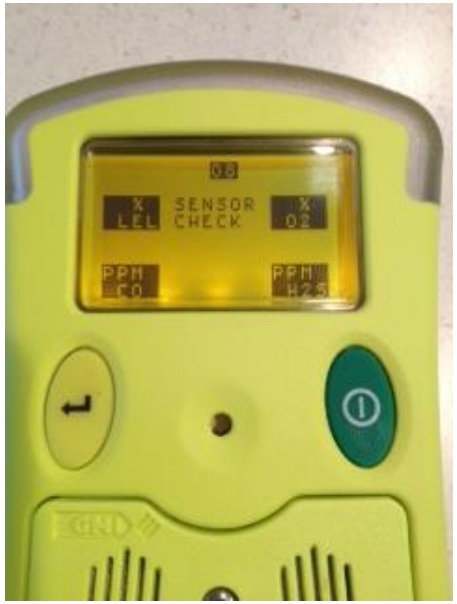
Turn OFF

Turn Into FM Maintenance Supply Shop For Re-Calibration

VISA (Multi-Gas Monitor) - Operating Instructions

30 Second Test Cycle (cont.)

Sensor Check:



Checks Appear For Sensors That Work And "Zeroed" Correctly

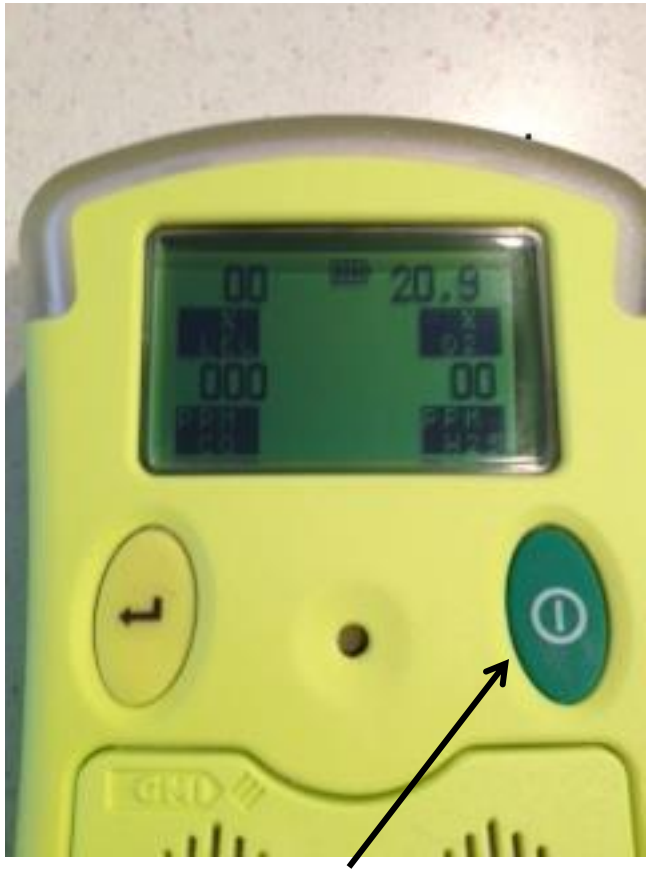
If A Spanner Symbol

Appears Over Any Sensor Or "ZERO FAULT"

Turn Off And Return Instrument To FM Maintenance Supply Room For Repair

VISA (Multi-Gas Monitor) - Operating Instructions

30 Second Test Cycle - COMPLETED



Pressing Green Button Once Turns On Display Screen Backlighting for 20 Seconds

- **Pump And Lights Turn Off**
- **Sensors Show Current Readings**
- **Instrument Is Ready For Use**
  (Audible Beep & Light Every 15 Seconds)

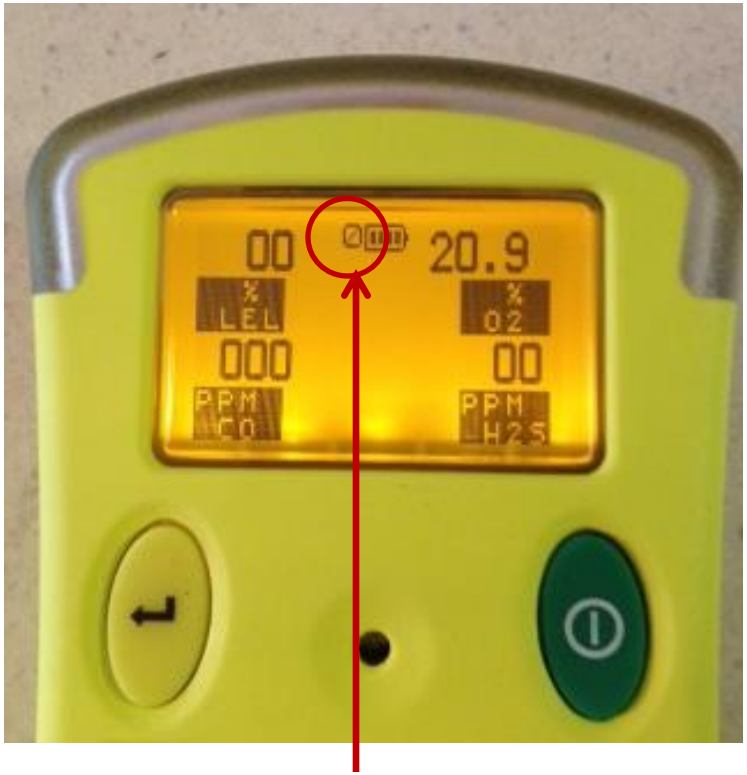
VISA (Multi-Gas Monitor) - Operating Instructions

REMOTE SAMPLING

The Sensors Work With The Pump Off

Or To Remotely Sample (With A Tube):

- **Attach The Tube**



Rotating Symbol
Pump = On

- **Turn ON The Pump**
  - **Press And Hold The Green (Right) Button**
    - **ON: Pump Symbol Rotates**

VISA (Multi-Gas Monitor) - Operating Instructions

REMOTE SAMPLING

Crack Open the Cover &

(Due to Different Gas Densities)

Take Air Samples At The**:**

Methane
(Lighter Than Air) → **Top**

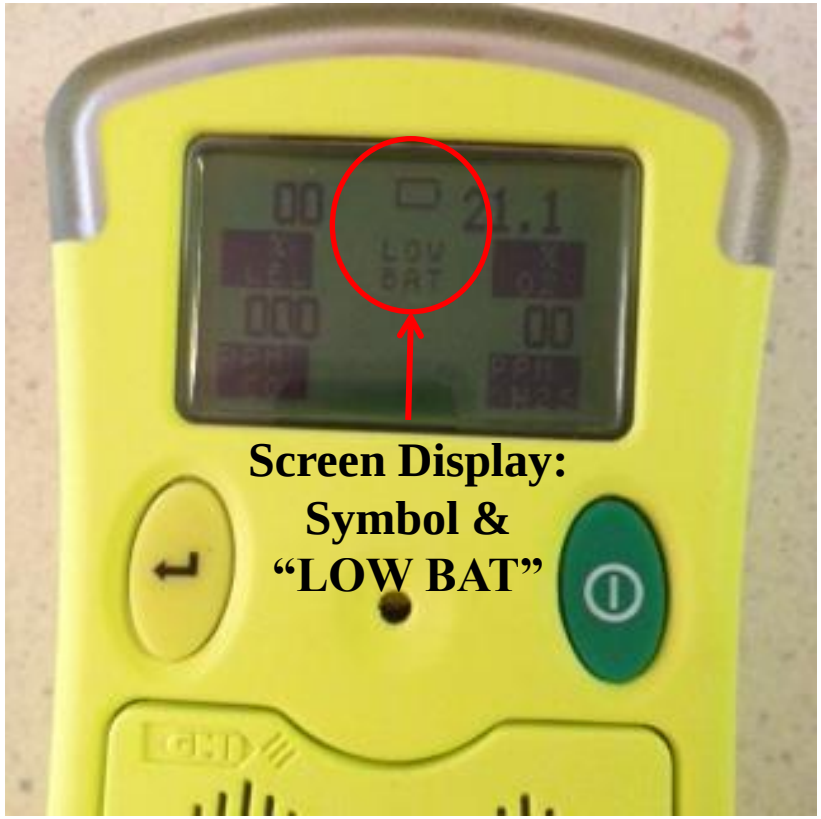
Carbon Monoxide
(Same Weight As Air) → **Middle**

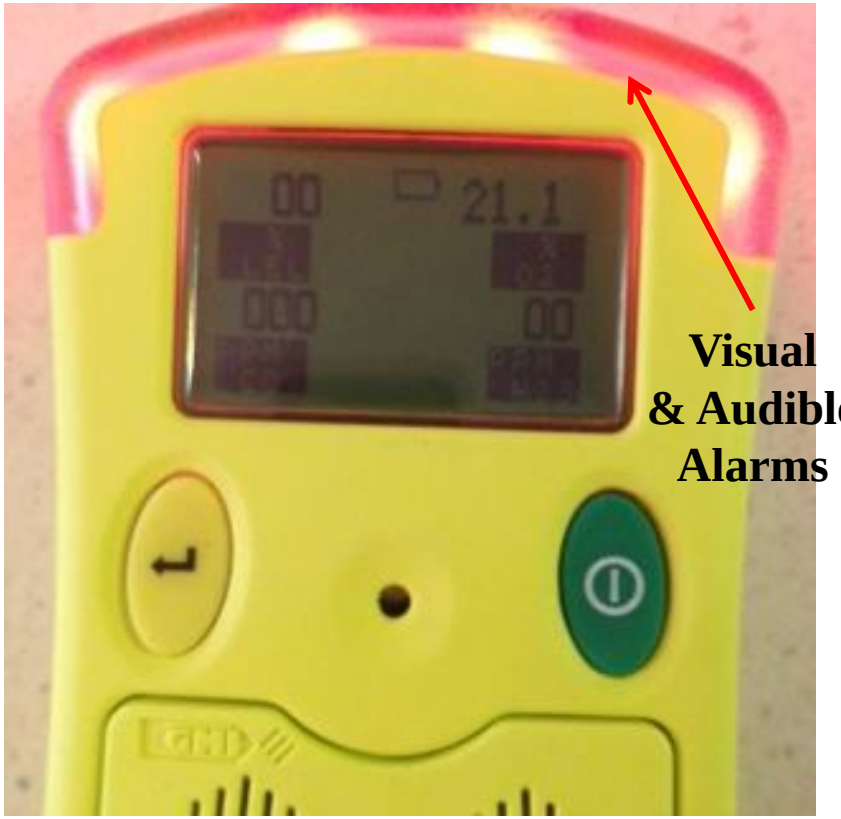
Hydrogen Sulfide
(Heavier Than Air) → **Bottom**

Then Remove the Cover & Turn On Ventilation, As Required

VISA (Multi-Gas Monitor) - Operating Instructions

ALARMS: LOW BATTERY - Approximately 30 Minutes Of Operation Remain





"Battery Fault" - Shutdown Imminent (3 Minutes)!

GET OUT!!!

VISA (Multi-Gas Monitor) - Operating Instructions

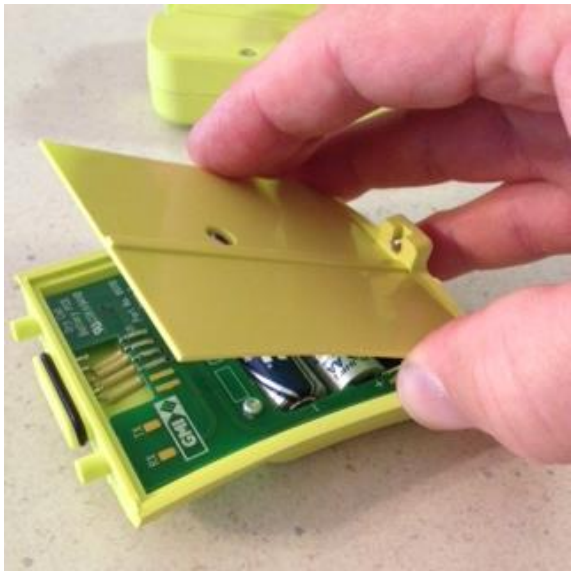
ALARMS: LOW BATTERY - REPLACING BATTERIES

Use Hex Wrench to Unfasten Set Screw

Use Pressure To Push And Remove Battery Pack

VISA (Multi-Gas Monitor) - Operating Instructions

ALARMS: LOW BATTERY - REPLACING BATTERIES



ONLY **Use ALKALINE AA Batteries**

Use Hex Wrench to Unfasten Set Screw

Lift And Remove Battery Pack Cover

Remove And Replace Batteries

VISA(Multi-Gas Monitor) - Operating Instructions

ALARMS: LOW BATTERY - REPLACING BATTERIES

Replace Lid On Battery Pack And Tighten Set Screw

Re-Insert Battery Pack Ensuring To Fit Tongue-And-Groove

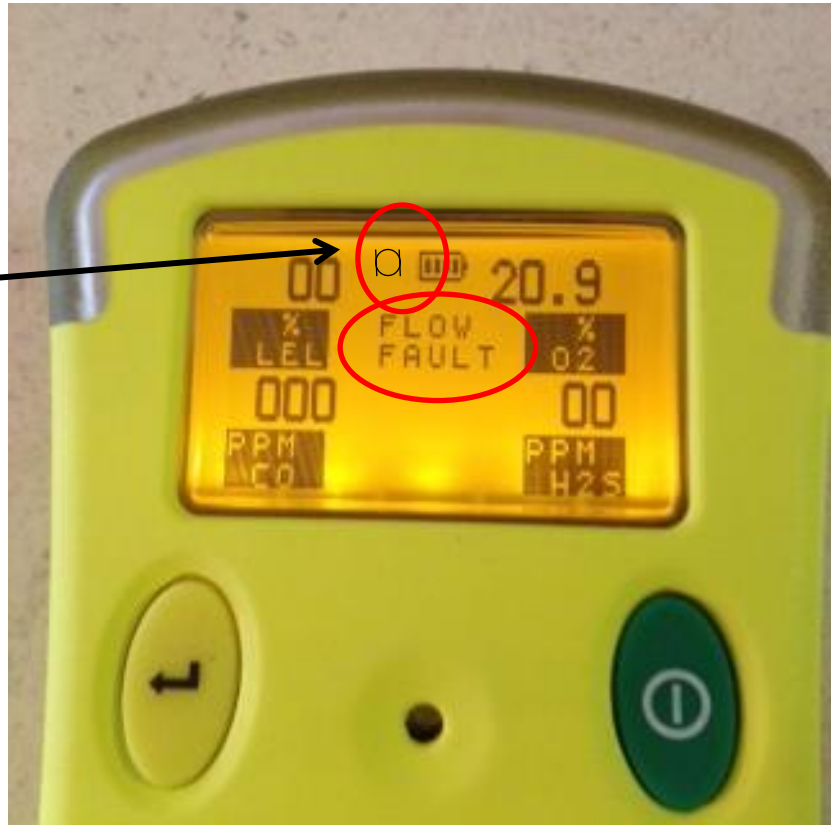
Tighten Set Screw

VISA (Multi-Gas Monitor) - Operating Instructions

ALARMS: Flow Fault

If The Rotating Pump Symbol

Changes To A "Flow Fault" Symbol



- **Audible Alarm And Red Lights Activate**
- **Pump Will Stop**
- **Check For Blocked Remote Sampling Tube And Clean**
- **Restart Pump**

VISA (Multi-Gas Monitor) - Operating Instructions

To Turn OFF:

Press Both The Yellow (Left Hand)

AND

Green (Right Hand) Buttons

QUESTIONS?

NEED MAINTENANCE?

See Kurt Patrick

In The FM Maintenance Supply Shop

Note: Regular Calibration & Maintenance Is Done By Our Vendor

Confined Space

Ventilation

No Employee Shall Enter A Confined Space With A Hazardous Atmosphere

Forced Air Ventilation Shall Be Used

- Air Supply Shall Be From A Clean Source
- Entry Is Permitted ONLY After Any Hazardous Atmosphere Is Eliminated
- Periodic / Continuous Atmospheric Testing Required
- Shall Continue Until All Employees Have Left The Space

Confined Space

Ventilation

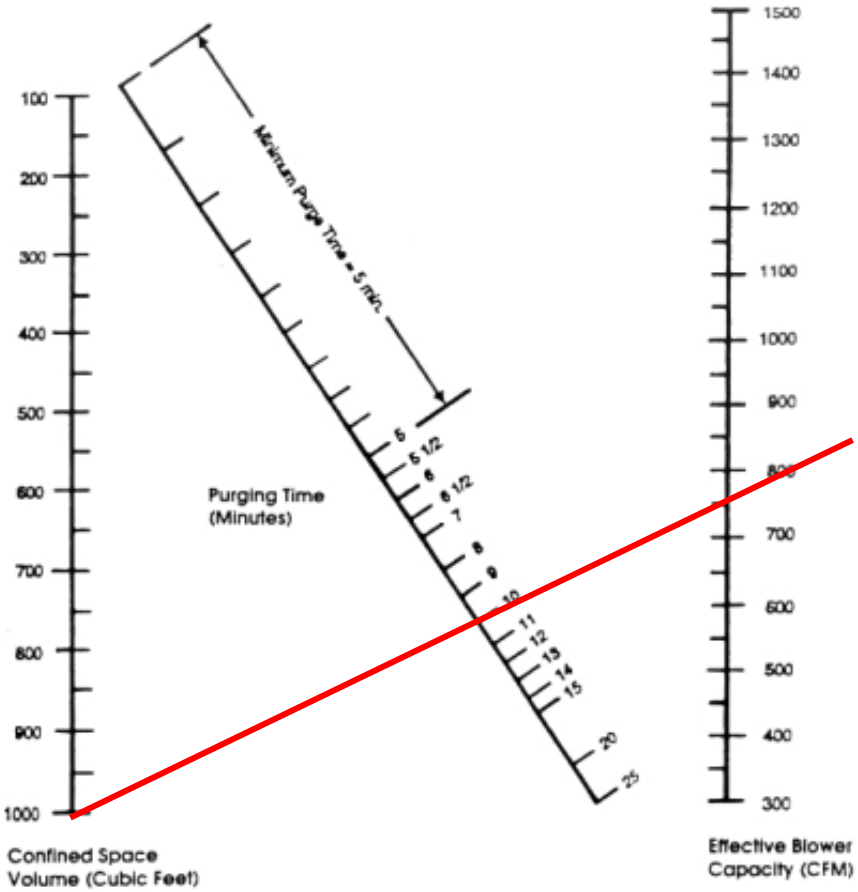


Chart Used To Estimate
Ventilation Purge Time
Based On**:**

- **Volume** of Confined Space
- **Capacity** of Blower

<u>Example</u>: 10’ Cube with 750 CFM Blower Needs 10 Minute Purge Time

Then Check With Gas Monitor

Confined Space

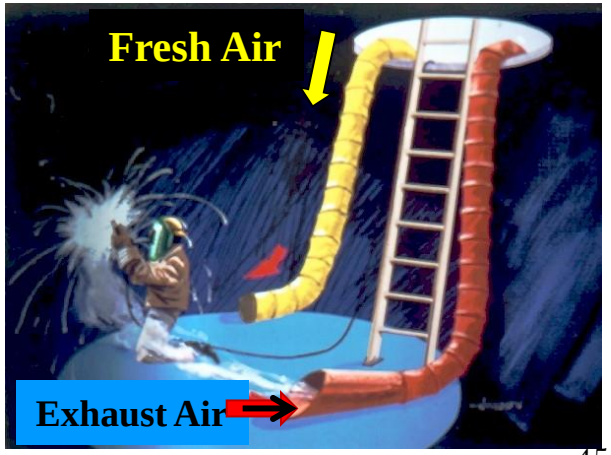
Ventilation

Place Intake In Clean Air

i.e., Upwind Of Engine Exhaust

Use Exhaust Ventilation When Welding Or Using Chemicals

In Addition To Fresh Air Supply



Confined Space

Definition

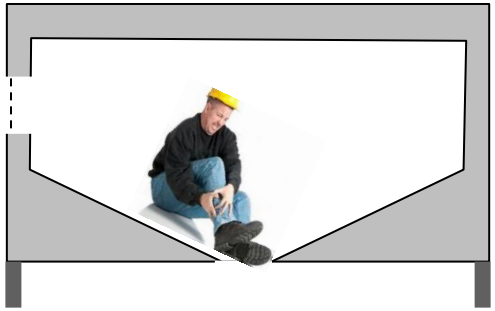
Engulfment

The surrounding & effective capture of a person by a liquid or finely divided (flowable) solid substance that can:

- Be aspirated to cause death by filling or plugging the respiratory system
- Exert enough force on the body to cause death by strangulation, constriction, or crushing

Confined Space

Definition



Configuration Hazard

Has an internal configuration such that an entrant could be trapped or asphyxiated

- By inwardly converging walls, or
- By a floor which slopes downward & tapers to a smaller cross-section

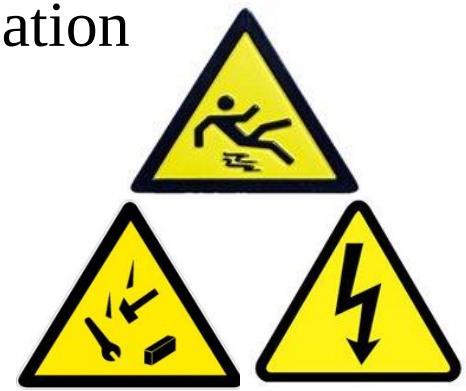
Example: Interior of Cooling Tower

Confined Space

Definition

Other Recognized Hazards

- Noise
  - Amplified Due To Acoustics Within The Space
  - Damages Hearing; Affects Communication
- Slick / Wet Surfaces
  - Slips And Falls
  - Increased Chance Of Electric Shock
- Falling Objects From Above
- Spiders, Snakes, Rodents…



Confined Space
Definition

Other Recognized Hazards

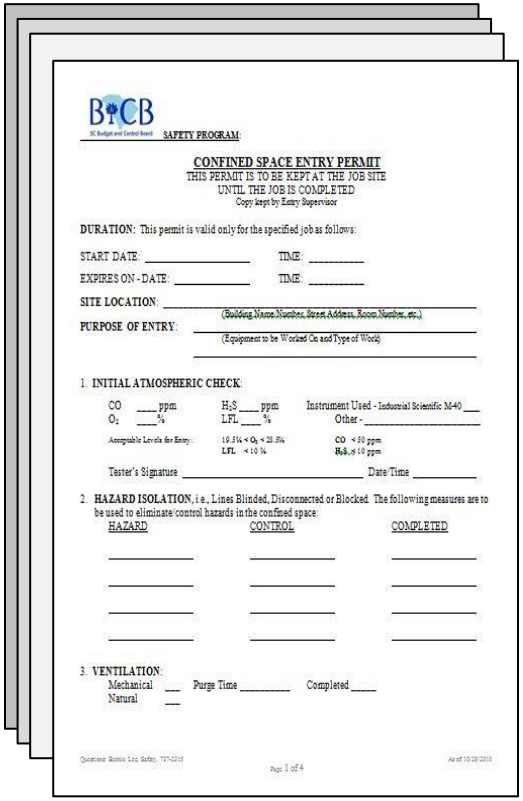
- High Temperatures & High Humidity
  - Example: Steam Pits
- Psychological Issues
  - Example: Claustrophobia
- Worker's Poor Physical Condition
  - May Easily Cause Fatigue

Confined Space

Definition

Other Recognized Hazards

- Permits From Earlier Entries May List Previous Problems That Need To Be Reviewed During The Permit Briefing
  - Old Permits Are Available From The Records Coordinator (Jean Paul Gouffray)



BCB
SC Budget and Control Board SAFETY PROGRAM:

CONFINED SPACE ENTRY PERMIT
THIS PERMIT IS TO BE KEPT AT THE JOB SITE
UNTIL THE JOB IS COMPLETED
Copy kept by Entry Supervisor

DURATION: This permit is valid only for the specified job as follows:

START DATE: _____ TIME: _____

EXPIRES ON - DATE: _____ TIME: _____

SITE LOCATION: _____
(Building Name/Number, Street Address, Room Number, etc.)

PURPOSE OF ENTRY: _____
(Equipment to be Worked On and Type of Work)

1. INITIAL ATMOSPHERIC CHECK:

CO ____ ppm H_2S ____ ppm Instrument Used - Industrial Scientific M40 ___
O_2 ____ % LFL ____ % Other - _____

Acceptable Levels for Entry: 19.5% < O_2 < 23.5% CO < 50 ppm
LFL < 10 % H_2S ≤ 10 ppm

Tester's Signature _____ Date/Time _____

2. HAZARD ISOLATION, i.e., Lines Blinded, Disconnected or Blocked. The following measures are to be used to eliminate/control hazards in the confined space:

HAZARD	CONTROL	COMPLETED
_____	_____	_____
_____	_____	_____
_____	_____	_____
_____	_____	_____

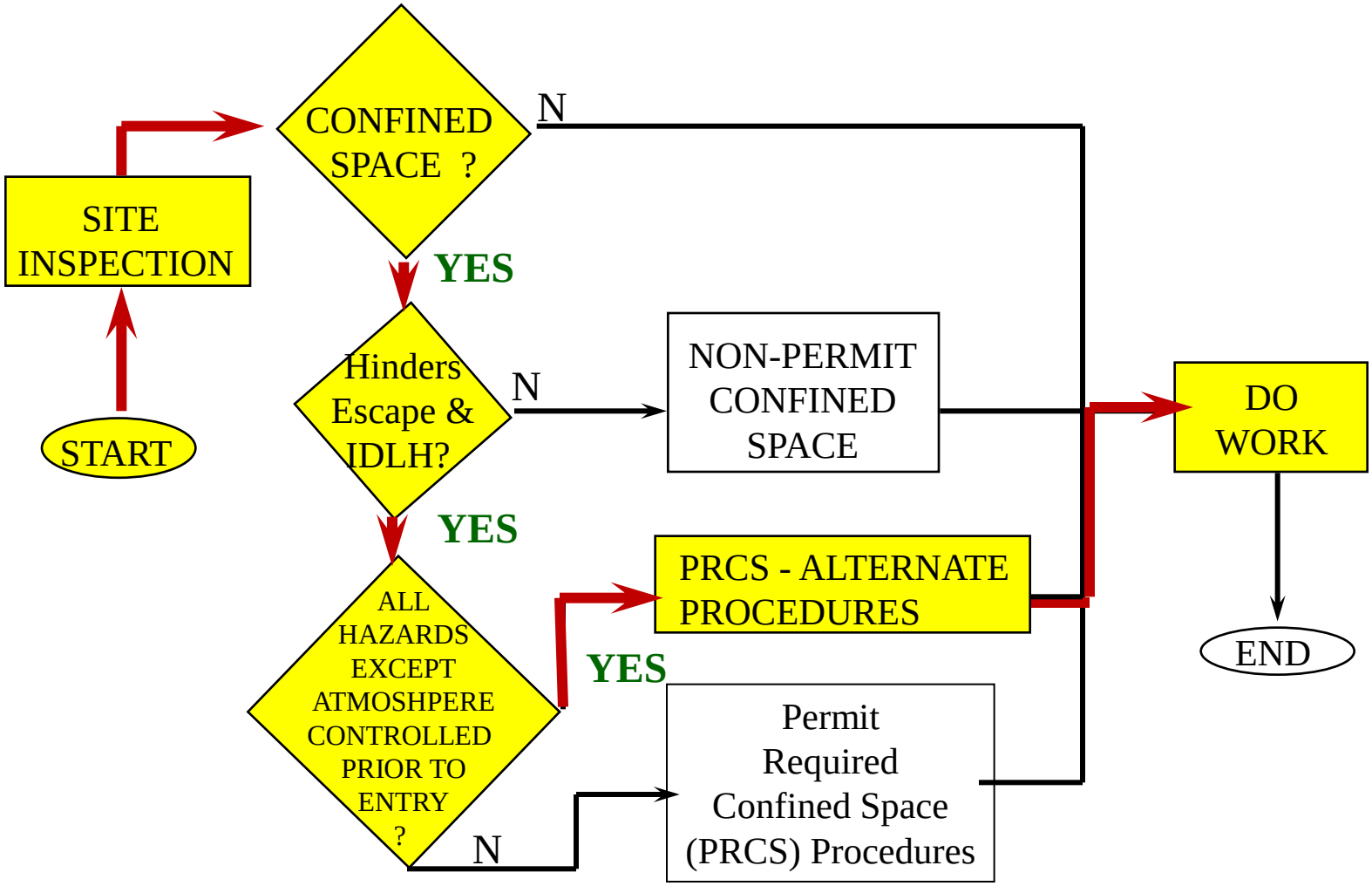
3. VENTILATION:
Mechanical ___ Purge Time _____ Completed ____
Natural ___

Questions: Bernie Lee, Safety, 737-1215 Page 1 of 4 As of 10/20/2010

Confined Space

Decision Flowchart

Space **Is A Confined Space (Alternate Procedure)**



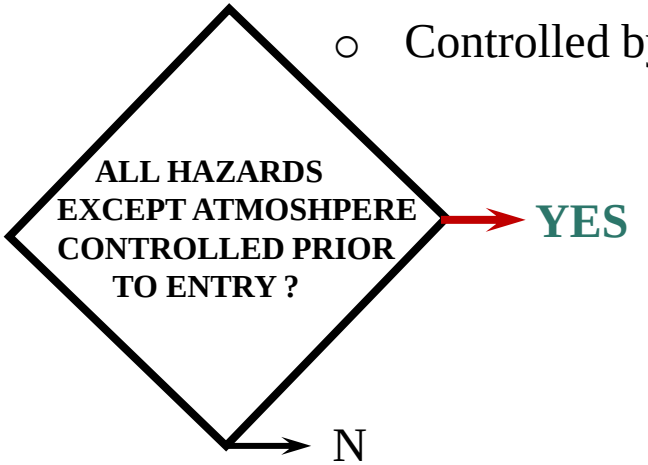
Confined Space

Decision Flowchart

Space **Is A Confined Space (Alternate Procedure)**

A Written Permit is Not Required when:

- All Hazards inside the Permit Required Confined Space can be controlled from the outside
  - i.e., by means of Lockout-Tagout
- Except For A Hazardous Atmosphere Which Is
  - Purged or
  - Controlled by Mechanically Supplied Local Air prior to and during Entry



Confined Space

Contrast Permit Required vs. Alternate Procedures

REQUIREMENT	PRCS	ALT
- HAZARD RECOGNITION	X	X
- EQUIPMENT	X	X
- GAS MONITORING	X	X
- EVACUATION	X	X
- ENTRANT	X	X
- ATTENDANT	X	*
- SUPERVISOR	X	
- PERMIT	X	**
- RESCUE EQUIPMENT	X	

PRCS - Permit Required Confined Space procedures
ALT - Alternate PRCS procedures

* - Two Man Policy Always
** - Information Should Be Available

Confined Space
Training Required

All Facilities Management Trades Specialists Require:

- Confined Space Entry (Annually)
  - Instruction
  - Hands-on
- 1st Aid-CPR (Every 2 Years Per American Heart Association)
- Other Safety Training Such As:
  - Electrical Safety And Lockout-Tagout
  - Fall Protection
  - Other As Required

Confined Space

SUPERVISOR

- Assembles Entry Team
- Verifies Permit-Required Conditions
- Knows & Briefs Team Using Permit Form
- Calls Rescue To Place On Standby
- Authorizes Entry By Signing & Issuing Permit
- On Scene To:
  - Ensure Compliance With Terms Of Entry Permits
  - Remove Unauthorized Persons
- Terminates Permit
  - Unsafe Condition
  - Job Finished

Confined Space

ENTRANT

- Trained & Authorized Employee who Enters the Confined Space
- Must Know How To:
  - Recognize and Control Hazards Or Prohibited Condition
  - Use Equipment Properly For Entry
  - Communicate With Attendant
  - Alert Attendants Of Symptoms
  - **Self-Evacuate** Upon:
    - Attendant Or Supervisor Order
    - Recognizing Sign Or Symptom Of Exposure
    - Detecting Prohibited Condition
    - Gas Monitor Alarm Is Activated

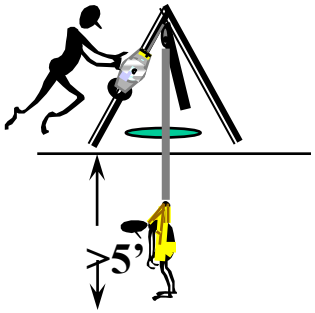
Confined Space

ATTENDANT

- 1 Per Entrant For Entire Duration of Entry
- Monitors & Protects Entrants:
  - Condition of Entrants
  - Internal Confined Space Conditions
  - Conditions External to Confined Space
- Maintains Communication With Entrant
  - Warns of Hazardous Condition Inside or External to Confined Space Which Could Or Does Endanger The Entrants
- Orders Evacuation, As Required
- Only Performs Attendant (No Other) Duties

Confined Space

ATTENDANT (cont.)

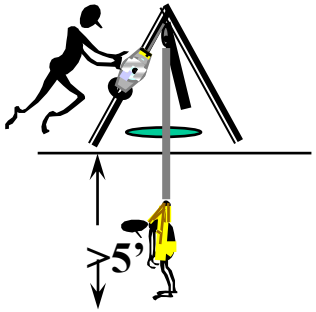


When Entering A Permit Confined Space Over 5 Feet Deep

- Know How To Use Rescue Retrieval System
  - Tripod
  - Personnel Winch
    - Automatically Provides / Takes Up Slack
    - Fall Arrest (Within 2')
    - Retrieval (Manual Winch)
  - Entrants Don Body Harness

Confined Space

Rescue System

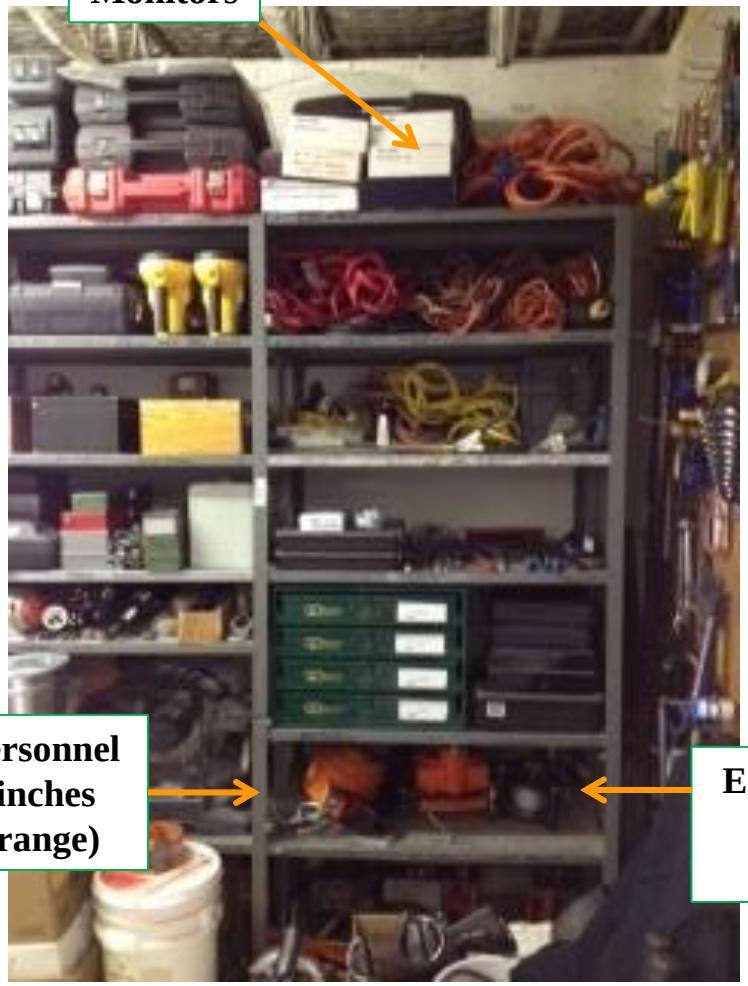


The Rescue System Consists Of:

- Tripod
- Carabiners
- Personnel Winches
- Full Body Harness

Confined Space

Rescue System

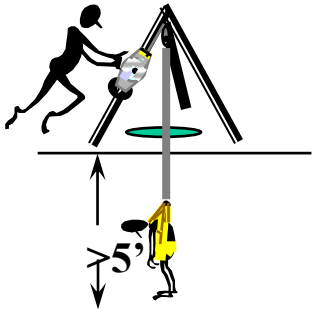


Confined Space Equipment Is Stored In The FM Tool and Equipment Room

Winches & Gas Monitors Are On Shelves Just Inside The Equipment Room Door

Confined Space

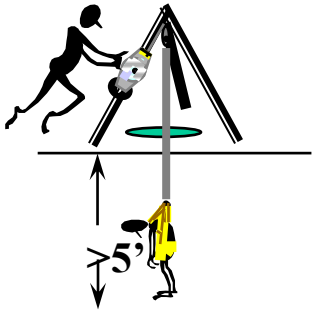
Rescue System



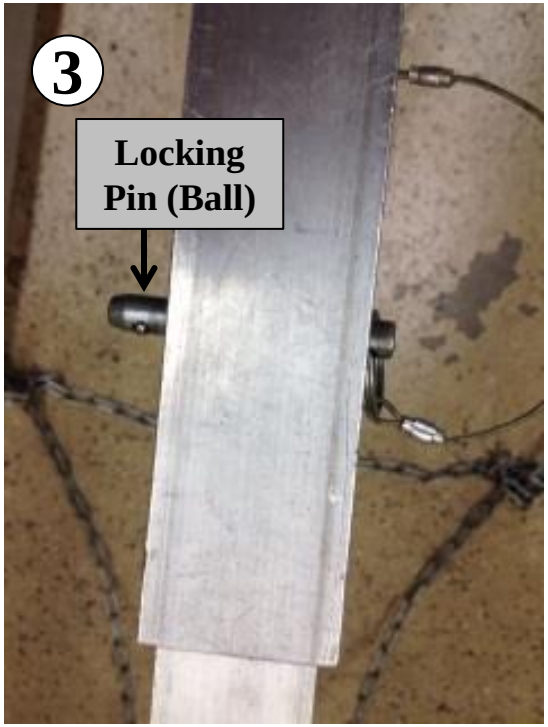
The Tripod & Body Harnesses Are All The Way In The Back Of The Equipment Room

Confined Space

Rescue System - Tripod

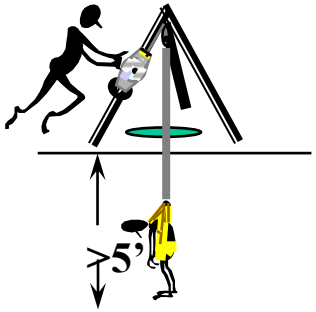


1. From The Stowed Position, Unsecure The Legs & Pull Out The Leg Locking Pins
2. Extend The Adjustable Legs To The Desired Length
   - Tripod Should Be Plumb
   - At Least 4 Holes Must Show to Attach The Winches
3. Fully Insert the Leg Locking Pin (Locking Ball Must Show)



Confined Space

Rescue System - Tripod



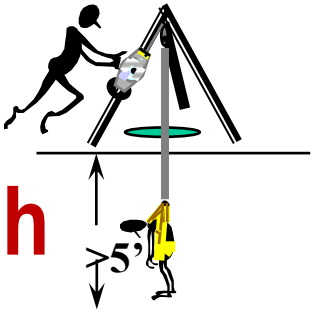
Stand Up The Tripod

Ensure the Non-Slip Feet are **Down**

The Spreader Chain Is Designed To Keep The Tripod Legs From Splaying Should An Entrant Fall
(Without It The Entrant Could Fall An Additional 5' to 6')

Confined Space

Rescue System – Personnel Winch



VS.

Personnel Winch:

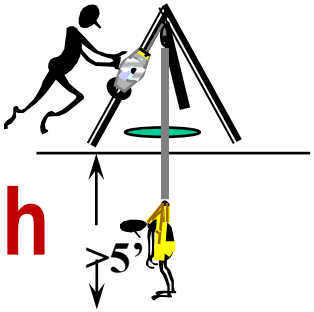
- For Retrieving Personnel Only (Manual Mode)
- Automatically Gives / Takes Up Slack
- Has Fall Protection

Mechanical Winch:

- For Lifting Equipment Only
- Manual (Up / Down) Operation Only

Confined Space

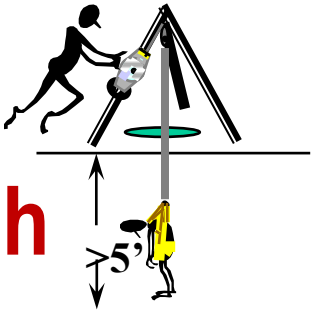
Rescue System – Personnel Winch



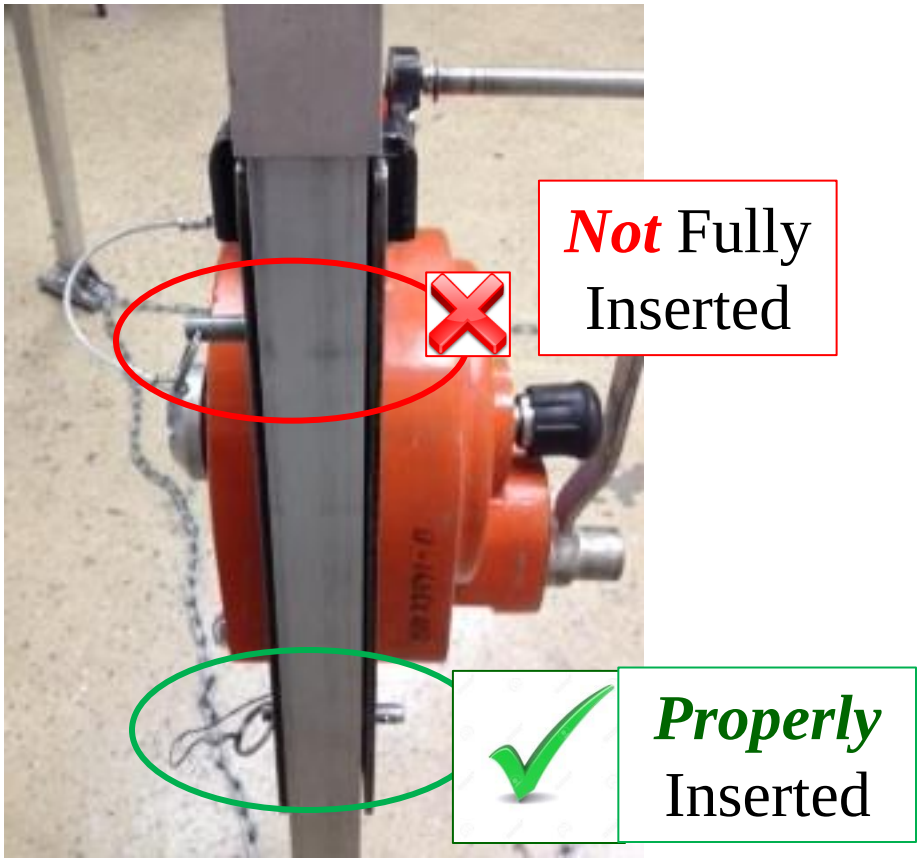
Slide Frame Of Winch Onto A Tripod Leg
And Insert the 2 Attachment Pins Fully
(Need 4 Holes Showing In Tripod Leg To Attach Winch)

Confined Space

Rescue System – Personnel Winch

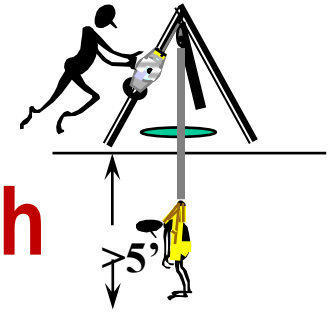


Winch Attachment Pins

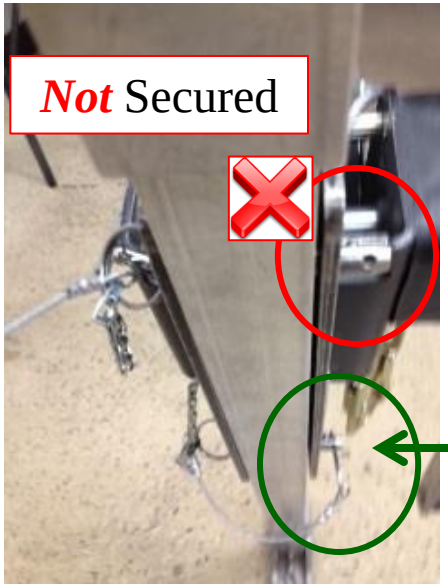


Confined Space

Rescue System – Materials Winch



Attachment Pins



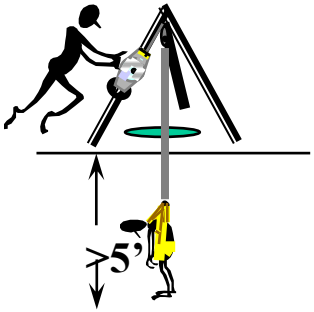
Properly Secured

Install The Materials Winch The Same As The Personnel Winch

ALL Winches should be Installed On The ***Inside*** Of The Tripod Legs

Confined Space

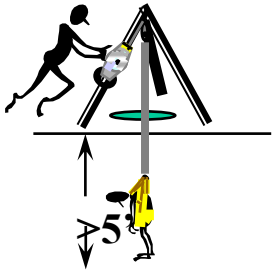
Rescue System – Pulleys



Winch Cables Are Placed Through Split Pulleys And Attached To Eyebolts In The Head Of The Tripod Using Carabiners

Confined Space

Rescue System – Carabiners



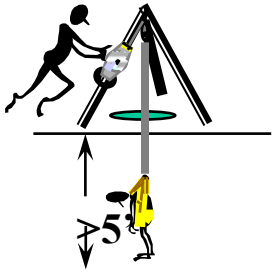
The Center Eyebolt On The Tripod Is Used To Attach Both Personnel Winches

Use The Offset Eyebolt For The Materials Winch

Do ***NOT*** Hang Carabiner On Other Carabiner

Confined Space

Rescue System – Carabiners



1. If Not Spring Loaded To Locked Position, Turn To Lock

2. Check Locked By Pushing On Latch

Confined Space

Rescue System – Inspection

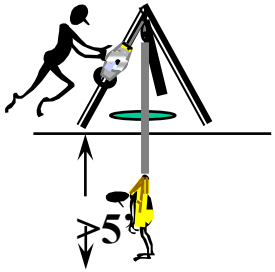
Pull Out Winch Cables And Visually Inspect For Kinks, Breakage, Cleanliness And Other Damage

Do ***NOT*** Run Hand Along Cables; Rather Use a Rag

(To Prevent Injuring Hand)

Confined Space

Rescue System – Inspection

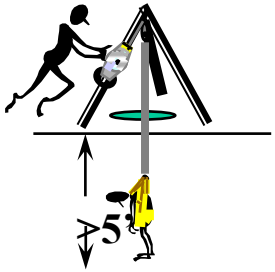


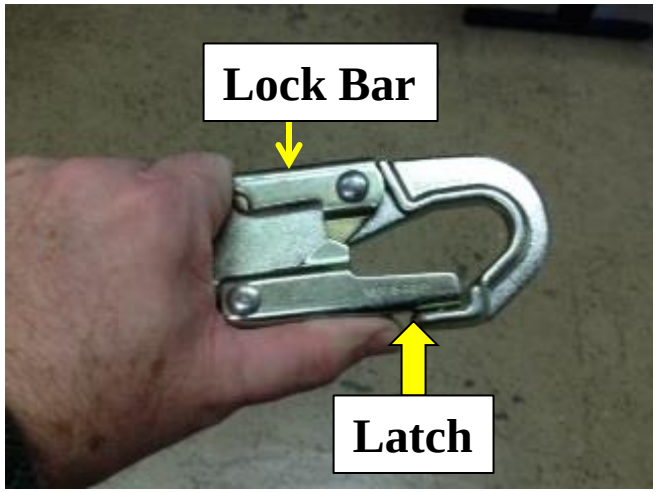
Check Fall Protection On Personnel Winches By Snatching Cable

Do ***NOT*** Use If Brake Does Not Catch Within 2 Feet

Confined Space

Rescue System – Inspection



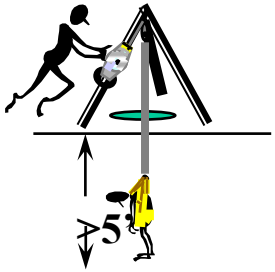


Without Pressing To Unlock
Check To Ensure The Latch
On The Locking Snap Hooks
Do Not Open By
Pushing On The Latch

Do ***NOT*** Use
If The Latch Opens
(Without Also
Pressing To Unlock)

Confined Space

Rescue System – Preparation



Crank Handle - Stowed

Ready For Rescue

Before Entry, Prepare The Personnel Winches For Potential Rescue By Removing The Crank Handle From The Stowed Position

Confined Space

ATTENDANT (cont.)

Rescue Of Entrant (Who is Unable To Self-Evacuate)

- **Do NOT Enter Confined Space To Effect Rescue**
  - 60% Of Confined Space Fatalities Are Would-be Rescuers
  - Instead **Use Non-Entry Rescue Retrieval System**

Confined Space

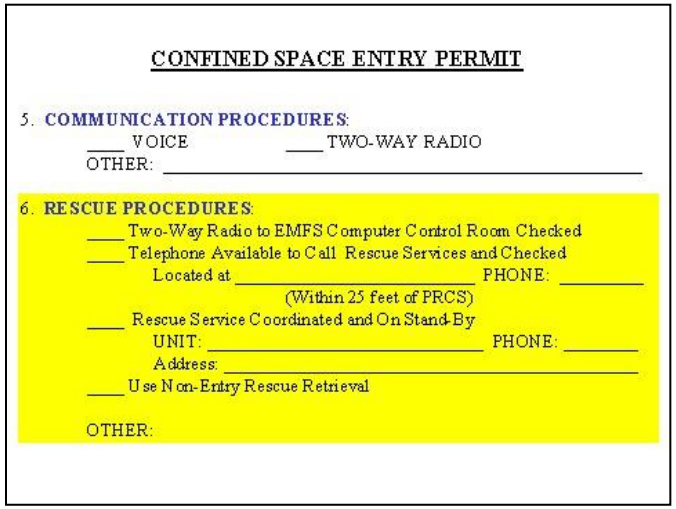
ATTENDANT (cont.)

Rescue Of Entrant (Who is Unable To Self-Evacuate)

- Call **9-1-1** For Rescue/Emergency Services

  NOTE: The Permit Has A Location For The Supervisor To Brief The Entry Team On Normal And Emergency Communications To Include An On Site Communications Check Prior to Starting Work

- Provide 1st Aid / CPR, As Required



CONFINED SPACE ENTRY PERMIT

5. COMMUNICATION PROCEDURES:
   ____ VOICE ____ TWO-WAY RADIO
   OTHER: _____

6. RESCUE PROCEDURES:
   ____ Two-Way Radio to EMFS Computer Control Room Checked
   ____ Telephone Available to Call Rescue Services and Checked
   Located at _____ PHONE: _____
   (Within 25 feet of PRCS)
   ____ Rescue Service Coordinated and On Stand-By
   UNIT: _____ PHONE: _____
   Address: _____
   ____ Use Non-Entry Rescue Retrieval

   OTHER:

Confined Space

Rescue Services

DGS Facilities Management

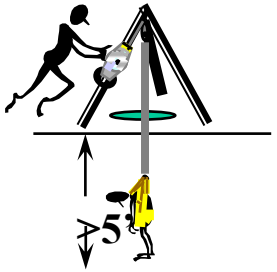
- Does Not Have 1st Response / Rescue Unit
  - We Perform Non-Entry Rescue Only
- Supervisor Notifies Columbia Fire Dept. During Permit Briefing

Columbia Fire Department

- Will Only Be On Standby Until Called For Actual Emergency
- Has Been Provided Information on DGS Confined Spaces

Confined Space

ATTENDANT - External Rescue



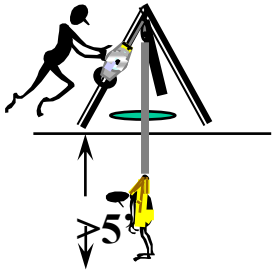
The Attendant Will Need To Retrieve The Entrant Using The Personnel Winch In Manual Mode. To Engage The Crank:

1. Push In The Knob

2. Rotate The Knob Clockwise ¼ Turn And Release

Confined Space

ATTENDANT - External Rescue



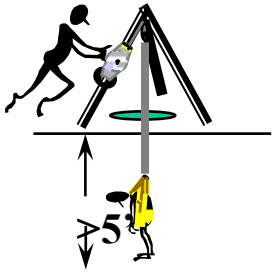
Turn The Crank Clockwise To Raise The Entrant

(It May Take Several Turns Before The Crank Engages)

If The Entrant Gets Caught
Reverse Crank To Lower

Confined Space

ATTENDANT - External Rescue



Raise The Entrant Until The Knees Are At Ground Level Then Reverse Crank To Lower The Entrant To The Ground

Ensure Positive Control Of The Entrant By Holding Onto The Back D-Ring

Disconnect And Drag To Safety To Give 1st Aid-CPR As Required

Confined Space

After Emergency

The Supervisor:

- Terminates The Permit / Further Entry Into The Confined Space
- Determines The Cause Of the Emergency
- Remedies The Cause Of the Emergency
  - *ONLY THEN* Can The Permit Be Re-Opened Or A New Permit Can Be Issued Later

If The Confined Space Cannot Be Made Safe For Entry Then The Supervisor Will Have To Hire A Qualified Contractor For Correction

Confined Space

Entry Terminated

Upon Job Completion:

- **Supervisor**
  - Closes Confined Space Entry Permit
  - Notifies Columbia Fire Dept.
  - Forwards Closed Permit to Records Coordinator
- **Records Coordinator**
  - Retains Closed Confined Space Entry Permits For At Least One (1) Year
  - Currently Is Jean Paul Gouffray, FM C&P, 737-8038; 2nd Floor of Forsythe Bldg. (915 Main St.)

Confined Space

End Of Course

Contact Your Supervisor Or The Safety Office

Confined Space

Course Exam

Remember

To Receive Credit For This Course Turn In Your Completed Test To The Safety Office

Passing Grade is **70%** Or Better