

Condensate Recovery Maximization PROJECT C311534
SAIH RAWL CENTRAL PROCESSING PLANT (SRCPP) & SAIH NAHIDA GAS PLANT (SNGP), OMAN



PLEASE Remember...



Turn off your cell phone

And be quiet



Confined Spaces

Mobile phones..... Silent mode please

Thank you

Confined Spaces

Introduction

Many workplaces contain spaces that are considered to be “confined” because their configurations hinder the activities of any employees who must enter into, work in and exit from them. In many instances, employees who work in confined spaces also face increased risk of exposure to serious physical injury from hazards such as entrapment, engulfment and hazardous atmospheric conditions

Confined Spaces

Overall Aims

- The hazards and risks associated with confined space entry
- Need for risk assessment
- Control measures required before entry into a confined space

Learning Outcomes

- Assess the risks of confined space entry
- Provide guidance to project personnel of the dangers in confined spaces
- Assess the requirements for emergency response

Objective

Confined Spaces

- To familiarize personnel with the and safe practices with a



Confined Spaces

How can you identify a Confined Space

We can define a confined space as one that, by design, has limited openings for entry and exit, unfavourable natural ventilation that could contain or produce dangerous air contaminants, and is not intended for continuous employee occupancy

The hazards associated with confined spaces can cause serious injury and death to workers. Two major factors lead to fatal injuries in confined spaces:

- Failure to recognize and control the hazards associated with confined spaces and
- Inadequate or incorrect emergency response. The emergency response is usually a spontaneous reaction to an emergency situation and can lead to multiple fatalities

Confined Spaces



Confined Space Entry

Confined Spaces

Video – Confined Spaces



Confined space.avi



Welder_Incident_in_Confine_Space.wmv

Confined Spaces

Definitions

Confined Space

Any space of an enclosed nature where there is the risk of death or serious injury from hazardous substances or dangerous conditions

Responsible Person

The person directly responsible for the work being performed in a confined space

Entry Supervisor

The employee responsible for co-ordinating the entry into the confined space

Confined Spaces

Definitions

Attendant

The employee who remains outside the confined space and:

- Monitors the entrants
- Guards the space against unauthorised entry
- Warns the entrants of an unusual conditions
- Summons the rescue personnel if needed

Entrant

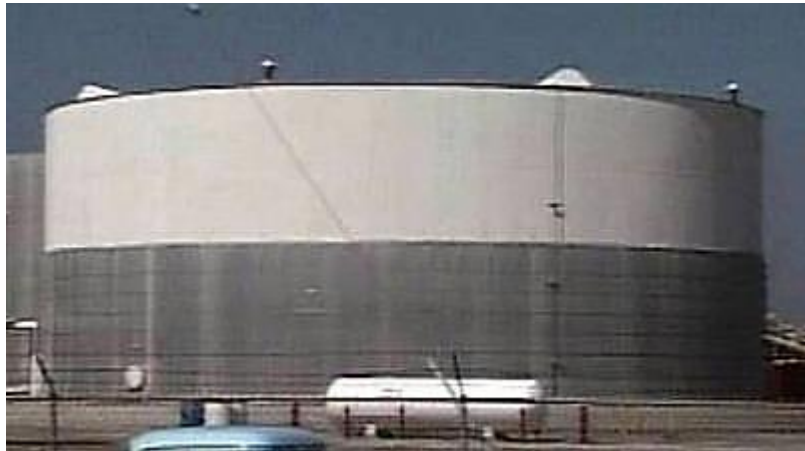
The employee who will physically enter the confined space and perform the work

Confined Spaces

A Confined Space is any area not normally occupied by personnel, having limited means of access and egress, and which could be subject to the hazards of Oxygen deficiency/enrichment or the accumulation of toxic and or flammable gas mixtures or dust

Confined Space examples

Confined Spaces



Tanks



Pipes

Confined Space examples

Confined Spaces



Vessels



Duct Work

Confined Space examples

Confined Spaces



Silo



Inlet Basins

Confined Space examples

Confined Spaces



Man-hole



Trench

Confined Space examples

**Enclosed Water
Tanks**



Confined Space examples

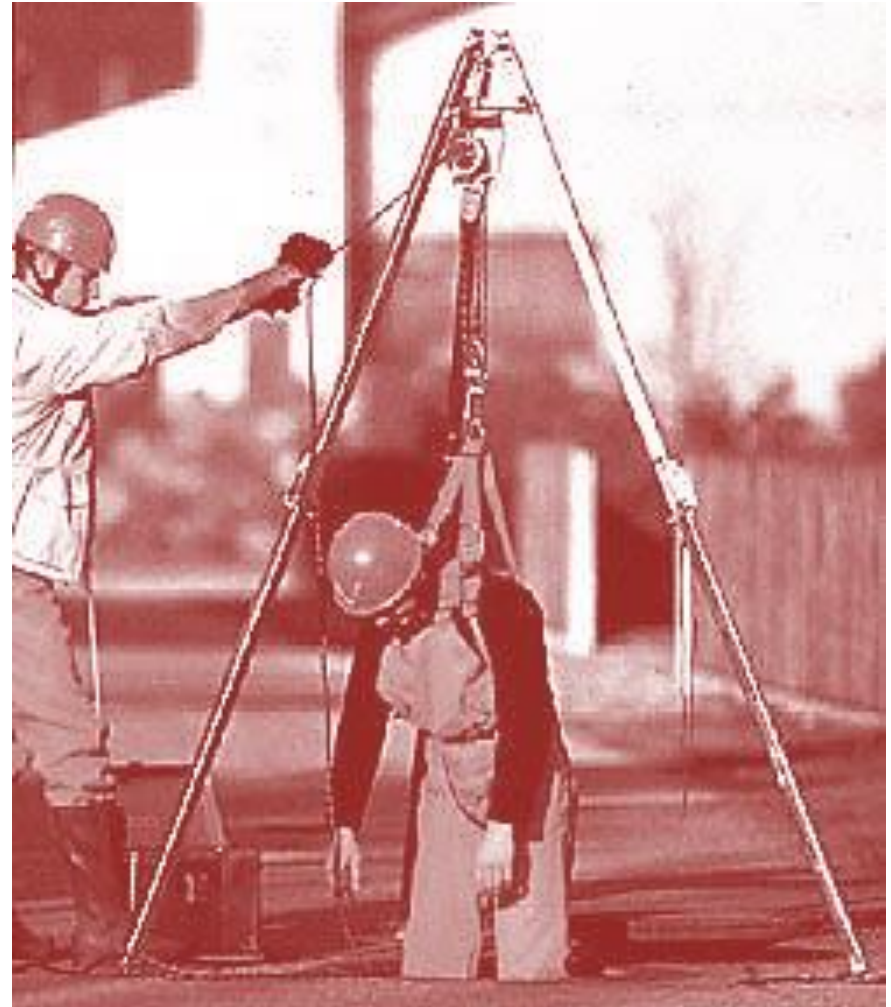


Hoppers

Hazards

Confined Spaces

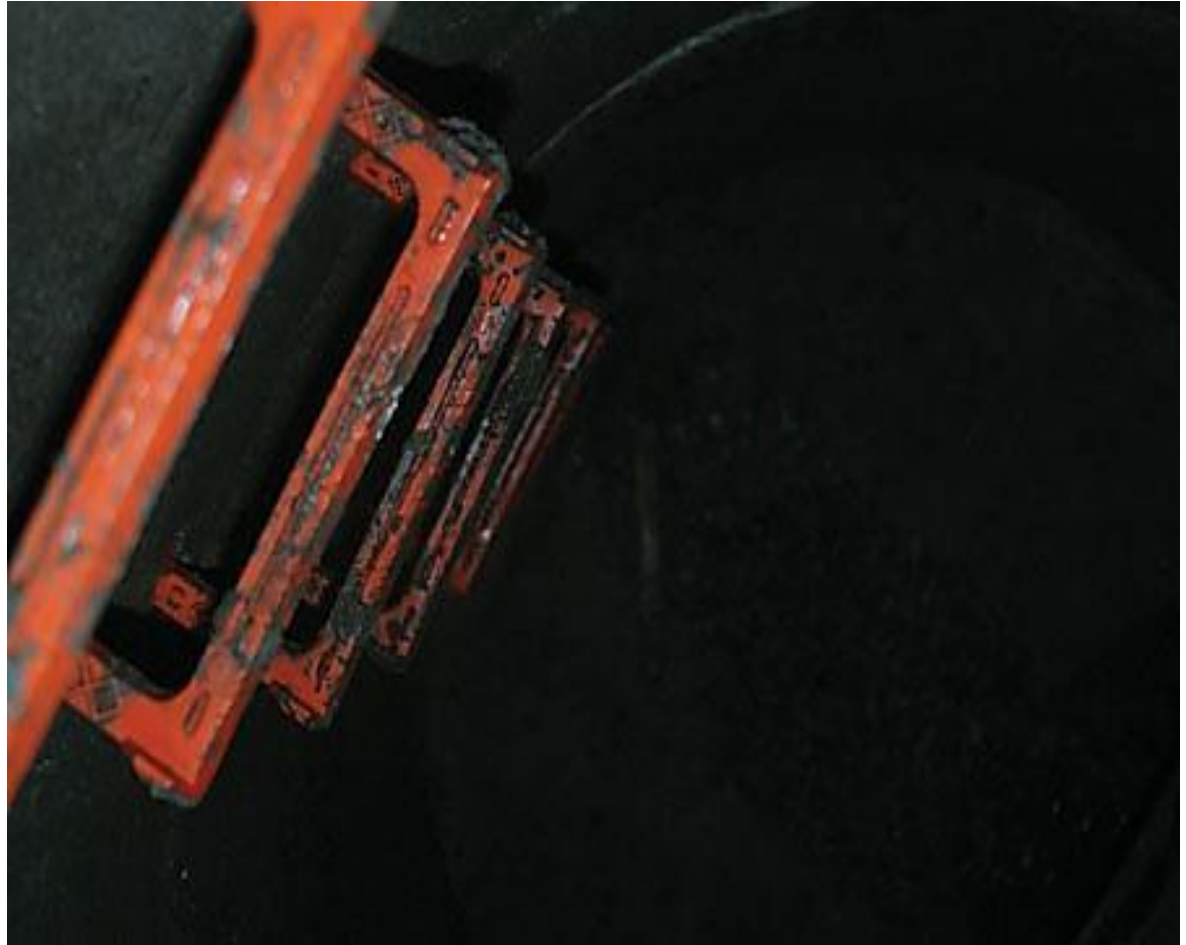
- Confined spaces can be deadly
- Some confined spaces are more hazardous than others
- Confined space conditions can change rapidly from no hazards to life-threatening hazards
- The hazards of confined spaces can often be controlled or eliminated before entering



Hazard: Oxygen

Confined Spaces

When oxygen (O_2) is present in concentrations less than 19.5% the atmosphere is said to be oxygen deficient



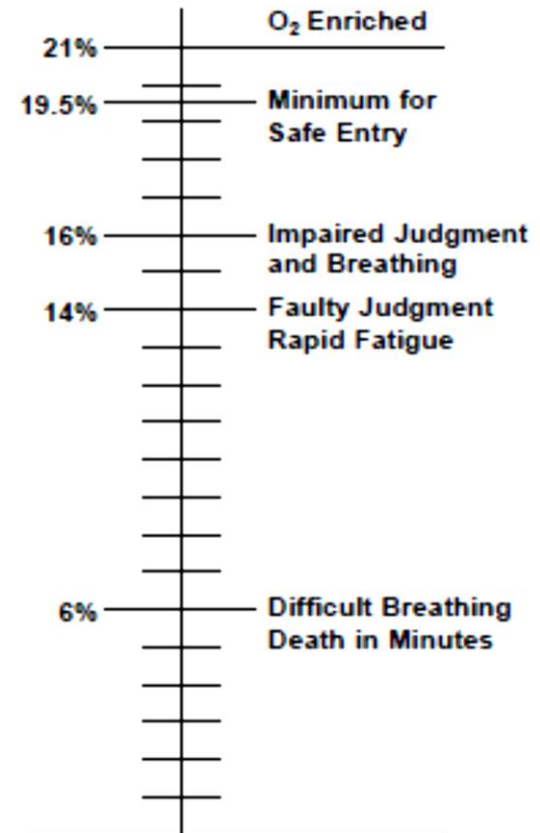
Confined Spaces

Hazard: Oxygen-Deficient

When oxygen levels drop below 17%, there is increased breathing volume, accelerated heartbeat and a deterioration of night vision, which is usually not noticeable

Oxygen atmospheres with 14 to 16% oxygen contribute to poor muscular coordination, rapid fatigue and intermittent respiration

At 6% oxygen, there is a rapid loss of consciousness and death in minutes



Confined Spaces

Hazard: Oxygen-Deficient

Oxygen deficiency can be caused by several processes:

Consumption: Oxygen is used up by the person who is in the confined space and turned into carbon-dioxide

Displacement: Denser material push the oxygen out of the occupied space

Reaction: Oxygen is reacted with other materials to make other compounds



Confined Spaces

Hazard: Oxygen-Deficient

Combustion: Processes which operate by the principle of combustion use up oxygen much faster than the human respiration

Welding, burning natural gas, propane, gasoline, and diesel engines are examples of combustion processes



Confined Spaces

Hazard: Oxygen-Deficient

Effects of Low Oxygen

- 15-19% -- Physical work difficult
- 12-14% -- Poor Co-ordination
- 9-11% ---- Fainting & Nausea
- 6-8% ----- Death in 8 minutes

If you feel any Symptoms

Leave Area Immediately!

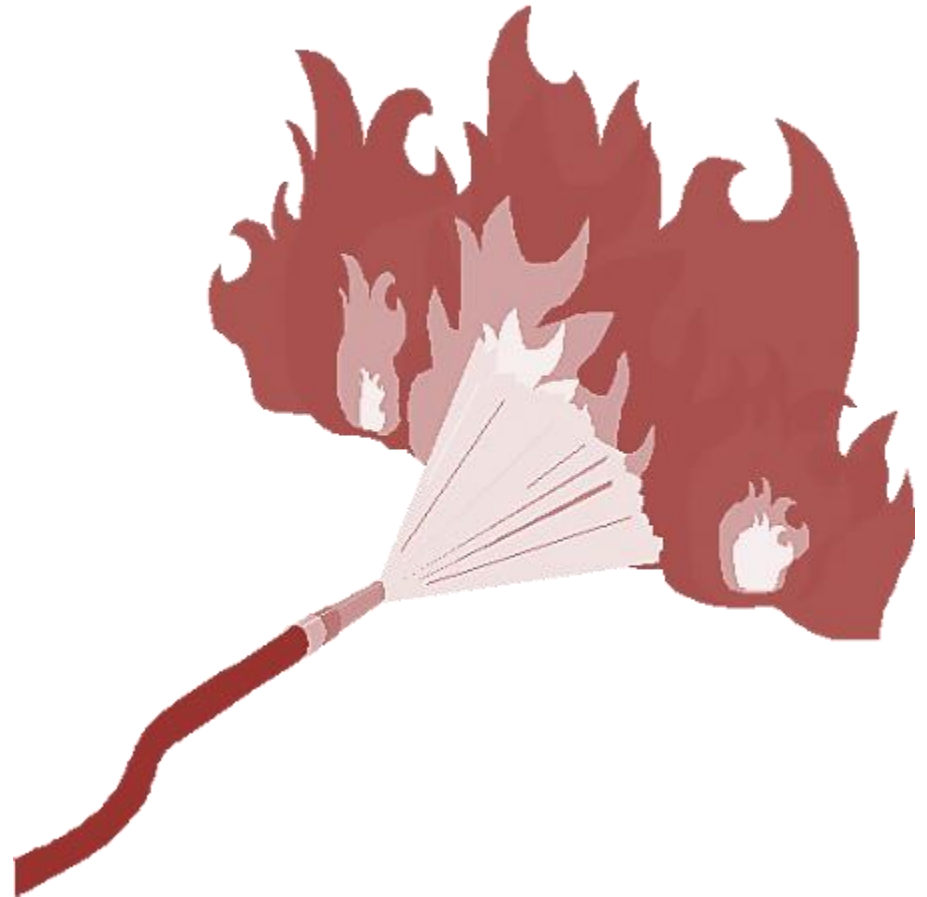


Confined Spaces

Hazard: Oxygen-Deficient

Oxygen in concentrations greater than 23.5% is too **oxygen rich** and can cause combustible materials to ignite very quickly

Safe Range of Oxygen is 19.5% to 23.5%



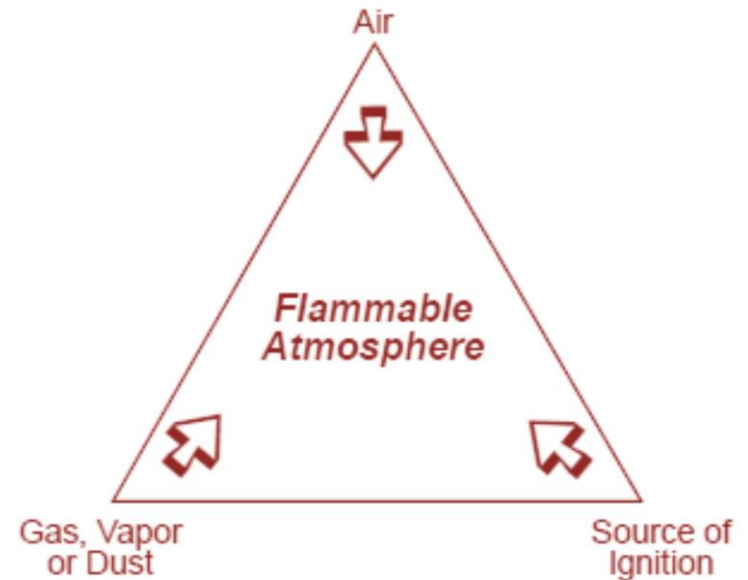
Confined Spaces

Hazard: Toxic Gas Mixtures

Flammable atmospheres generally result from evaporation of flammable liquids, by-products of chemical reactions, enriched atmospheres or concentrations of combustible dusts. Two things make an atmosphere flammable:

- The amount of oxygen in air and
- A flammable gas, vapour or dust in the proper mixture.

Different gases and combustible dusts have different flammable and explosive ranges



Confined Spaces

Hazard: Toxic Gas Mixtures

Man-holes often remain covered for long periods of time

Naturally occurring toxins, such as Hydrogen Sulfide can accumulate inside manholes

H₂S

CO



Confined Spaces

Hazard: Toxic Gas Mixtures

Because air cannot freely move in and out of confined spaces due to the design and configuration, the atmosphere inside a confined space can be very different from the atmosphere outside.

Deadly gases may be trapped inside, particularly if the space is used to store or process chemicals or organic substances that may decompose. There may not be enough oxygen inside the confined space to support life, or the air could be so oxygen-rich that it is likely to increase the chance of fire or explosion if a source of ignition is present

Confined Spaces

Hazard: Toxic Gas Mixtures

Maximum Concentrations of Toxic Gas (PPM) for Entry

Gas	Entry without Breathing Apparatus	Entry With Suitable Breathing Apparatus	No Entry Purge and Reset
Hydrogen Sulphide (H ₂ S)	< 1 PPM	1 to 20 PPM	> 20 PPM
Carbon Monoxide (CO)	< 1 PPM	1 to 250 PPM	> 250 PPM

Confined Spaces

Hazard: Flammable Gas Mixtures



CH₄

Man-holes may also accumulate highly flammable gasses such as methane and ethane. Unlike the gas we receive at home, we cannot detect some of these gases with our sense of smell.

Confined Spaces

Hazard: Flammable Gas Mixtures

**Less than 10%
LEL required
for Entry**



Hazard: Live Electrical Lines

Confined Spaces

All live electric lines to be disconnected and LOTO System applied to avoid any shock or burn



Hazard: Falls, Poor Visibility, Dust

Confined Spaces

Lack of proper access can lead to falls

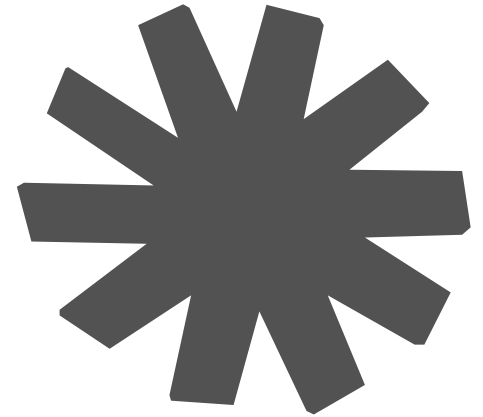
Poor visibility creates confusion and increases potential hazards

Presence of dust leads to health problems



Hazard: Moving Parts and Piping Confined Spaces

Moving parts such as agitators, rollers, conveyors, etc. and Piping and Duct systems can create serious accidents



Confined Spaces

Tool Box Talk

In general, these are the things you should be aware of before you enter a confined space

- How to enter it safely
- Do we know how to exit quickly
- Know that the atmosphere in the space is tested and found to be free of dangerous levels of toxic or flammable vapours, and that there is sufficient oxygen
- We will know that the atmosphere within the space is going to remain safe while you are working
- Know the rescue plan in the event of an emergency, and make sure the proper rescue equipment is available and in good condition
- Know that another person outside the confined space is keeping an eye on you as you work, and that they know the rescue plan, too

Confined Spaces

Tool Box Talk

It is possible to work safely in a confined space, but it's a task that requires careful planning and preparation. Don't be tempted to take shortcuts when it comes to confined spaces

Follow all safety precautions and don't hesitate to speak up if you are unsure of the correct procedures

YOU play the most important role of all when it comes to working safely. By consistently following safe work procedures and not taking chances, you will be working safely for a long time to come

Confined Space: Safe Entry Procedure

Confined Spaces

The entry of a confined space begins with a **Confined Space Entry Permit**

The permit system requires that work supervisor & safety representative visit the work location and evaluate the conditions under which entry will be made



Confined Spaces

Permit to Work

Entry into a confined space should only be allowed when a separate permit-to-enter has been issued. This permit should only be issued after tests have taken place to ensure that the atmosphere is safe to breathe

THIS IS NOT A PERMIT TO WORK

Petroleum Development Oman LLC		CONFINED SPACE ENTRY CERTIFICATE	Certificate No: 14110						
Yellow - Worksite - Gases - Permit Issue Point									
1. APPLICATION by Permit Applicant									
Name _____	Exact Location: _____	Associated Work Permit No. _____							
Post/Ind _____	Equipment/Space to be entered: _____								
Contractor _____									
Signed _____									
2. SAFETY PRECAUTIONS REQUIRED Items to be Checked by Responsible Supervisor/Area Authority before Confined Space Entry can proceed, and confirmed by signature in Box 4:									
		REQUIRED	CHECK						
		YES	NO						
1.	a. The above equipment has been isolated from all source of dangerous liquids, gases and flames by insertion of spades or by removing a section of pipework and blanking open ends of the circuit.....	<input type="checkbox"/>	<input type="checkbox"/>						
	b. Equipment has been isolated from all sources of electrical and mechanical power.....	<input type="checkbox"/>	<input type="checkbox"/>						
	c. Isolation Certificates are attached. (Enter Numbers)	<input type="checkbox"/>	<input type="checkbox"/>						
	<table style="width: 100%; border-collapse: collapse;"> <tr> <td style="width: 50%; border: none;">Mechanical</td> <td style="width: 25%; border: none;"> </td> <td style="width: 25%; border: none;"> </td> </tr> <tr> <td style="border: none;">Electrical</td> <td style="border: none;"> </td> <td style="border: none;"> </td> </tr> </table>	Mechanical			Electrical			<input type="checkbox"/>	<input type="checkbox"/>
Mechanical									
Electrical									
2.	Equipment freed of all dangerous materials. All flushing/ inert gas purging complete, all liquids drained and ventilated atmosphere restored in Confined Space	<input type="checkbox"/>	<input type="checkbox"/>						
3.	Equipment surrounding area checked and safe from hazards arising from other work/operations	<input type="checkbox"/>	<input type="checkbox"/>						
4.	Life lines, breathing apparatus and resuscitation equipment available	<input type="checkbox"/>	<input type="checkbox"/>						
5.	Adequate access and escape routes are provided.	<input type="checkbox"/>	<input type="checkbox"/>						
6.	The requirements of Operating Standard SI No 19 are to be observed	<input type="checkbox"/>	<input type="checkbox"/>						
7.	Air moving equipment installed and operational. Vessel is sufficiently cool for access	<input type="checkbox"/>	<input type="checkbox"/>						
8.	Procedures and rescue plans formulated and discussed with the Permit Holder, personnel entering vessel and standby personnel. Evacuation Exercise conducted where stated as required on Permit	<input type="checkbox"/>	<input type="checkbox"/>						
9.	Standby personnel appointed. (names)	<input type="checkbox"/>	<input type="checkbox"/>						
3. GAS TESTING									
RESULTS OF TESTS	GAS	LIMIT	RESULTS						
	OXYGEN	20-21% VOL	%						
	HYDROCARBONS	0% LEL for HOT WORK 4% LEL for COLD WORK WITHOUT BA 10% LEL for COLD WORK WEARING BA	%						
	H ₂ S	10 ppm	ppm						
	OTHER	_____	_____						
Confined Space Tested: _____									
I have tested this space for the above gases, with the results shown:									
Name _____	Signature _____	Auth No. _____	Date _____ Time _____						
Class A Authorized Gas Tester									
FOR ADDITIONAL GAS TEST RESULTS SEE OVERLEAF									
4. AUTHORISATION TO ENTER CONFINED SPACE by Responsible Supervisor/Area Authority									
I certify that the above results indicate that the Confined Space covered by this Certificate is safe to enter. Gas test to be repeated at the intervals specified on the Permit to Work associated with this Certificate.			Breathing Apparatus to be worn Yes <input type="checkbox"/> No <input type="checkbox"/>						
This Certificate is valid until: Time _____ Date _____			Light Furne Respirator to be worn Yes <input type="checkbox"/> No <input type="checkbox"/>						
Name _____	Signature _____	Date _____	Time _____						

Confined Spaces

Permit to Work

A Permit To Work will:

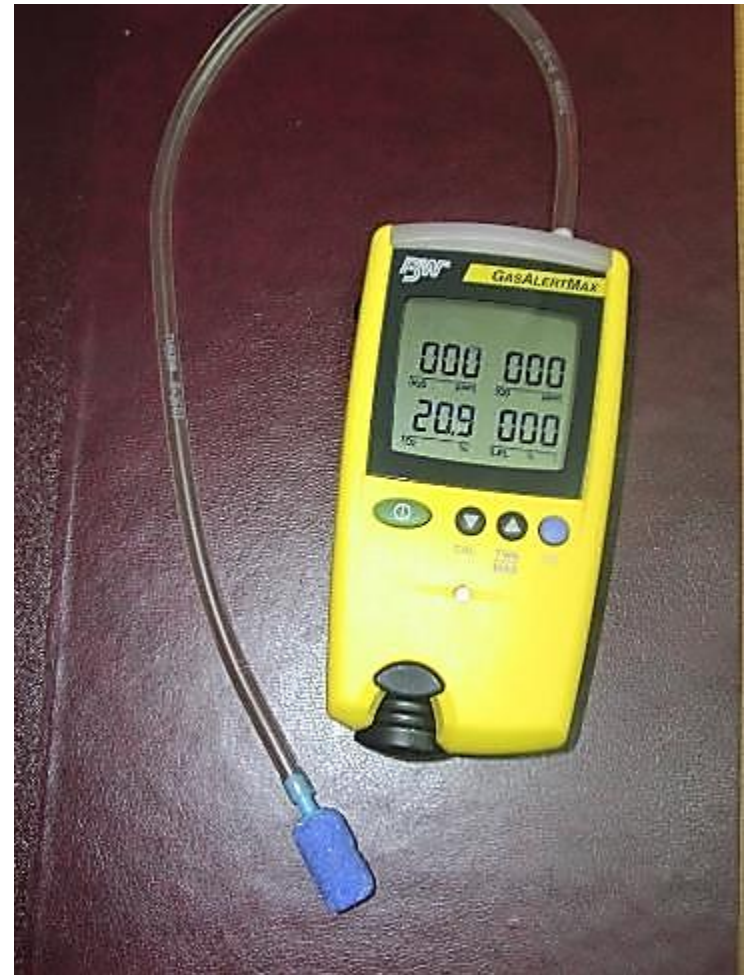
- Set out the work to be done, the location and the precautions to be taken
- Predetermine safe methods of work
- Provide a clear record that all foreseeable risks have been considered
- Define the precautions to be taken and their sequence
- Provide written authority for the confined space to be entered and the work to start and the time when the work must cease

Gas Test

Confined Spaces

The Authorized Gas Tester will tests the space for hazardous concentrations of known harmful substances, such as **Hydrogen Sulfide**, **Carbon Monoxide**, and **Flammable Mixtures**

The concentration of **oxygen** is measured at the same time



Confined Spaces

Testing the of the atmosphere

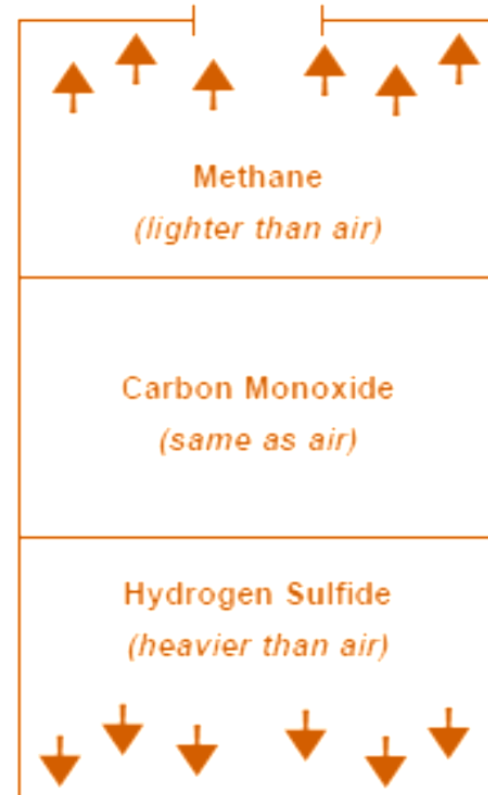
The atmosphere in a confined space may be hazardous due to:

- Low oxygen levels
- Flammable or explosive concentrations of gases, vapours or dusts Toxic levels of gases and vapours

Therefore, the air in a confined space must be tested first for oxygen, then for flammable or combustible gases and vapours, and then for toxic gases and vapours

Confined Spaces

Testing the of the atmosphere



Ventilation Confined Spaces

If concentrations of materials are found to be at harmful levels, the confined space must be ventilated to remove them before entry



Ventilation

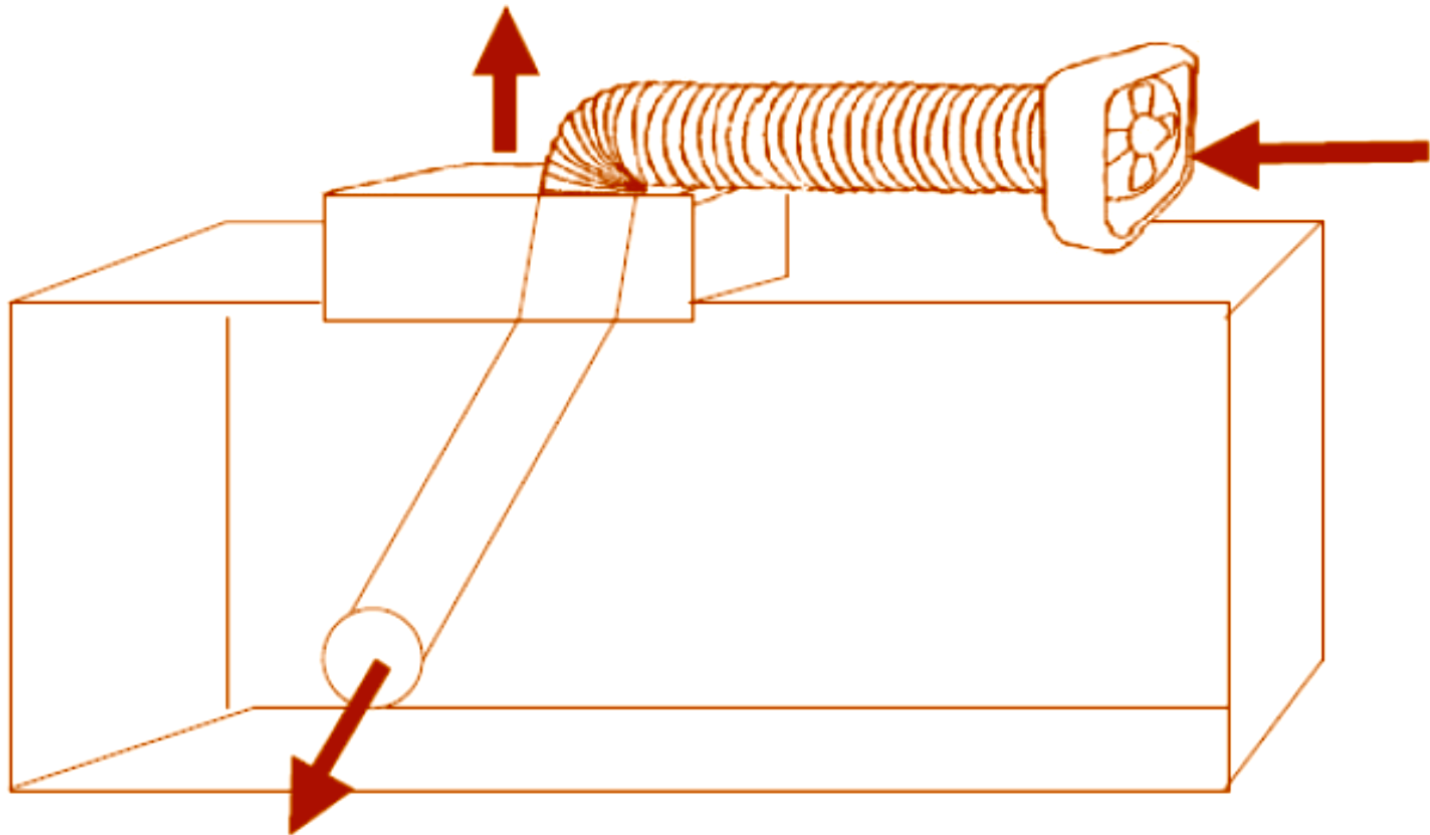
Confined Spaces

A common method of ventilation requires a large hose, one end attached to a fan and the other lowered into a manhole or opening

The air intake should be placed in an area that will draw in fresh air only. Ventilation should be continuous where possible, because in many confined spaces the hazardous atmosphere will accumulate again when the flow of air is stopped

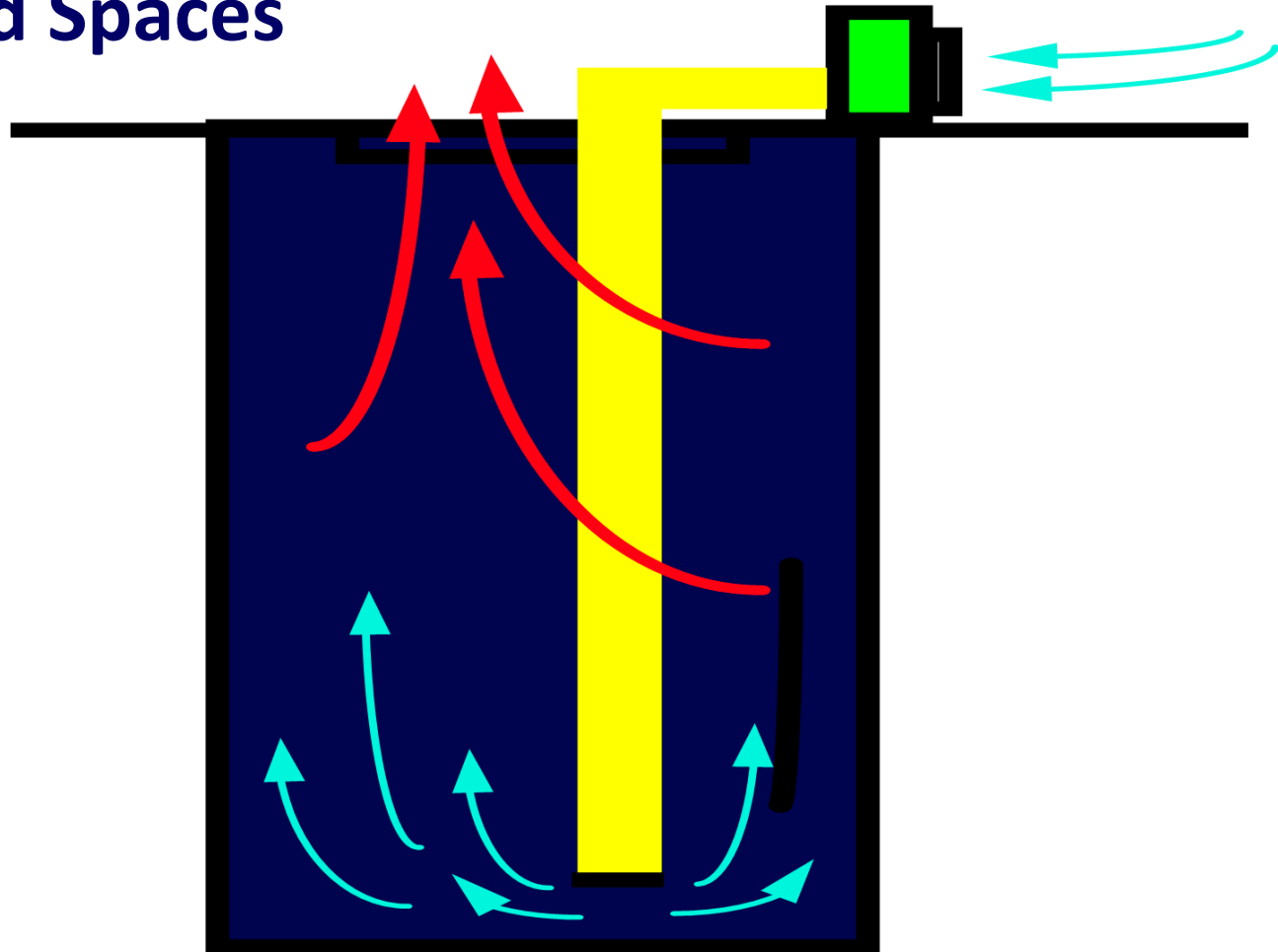
Periodic testing must be conducted to ensure that the atmosphere inside the confined space is safe

Ventilation Confined Spaces



Ventilation

Confined Spaces



Confined Spaces

Risk Assessment

The Confined Space Entry procedure should detail how hazards relating to the entry shall be identified and the associated risks assessed and what precautions are required. The assessment should consider:

- The task
- The working environment
- Working materials and tools
- The suitability of those carrying out the task
- Arrangements for emergency rescue

Job Safety Analysis - JSA

Confined Spaces

A Job Safety Analysis (JSA) must be completed before any entry into a confined space

The JSA should identify the:

- Sequence of work to be performed in the confined space
- Specific hazards known or anticipated
- Control measures to be implemented to eliminate or reduce each of the hazards to an acceptable level



Job Safety Analysis - JSA

Confined Spaces

NO ENTRY shall be permitted until the Job Safety Analysis has been reviewed and discussed by all persons engaged in the activity.

Personnel who enter a confined space **must be informed** of all known or potential hazards associated with the confined space to be entered.



Permit To Work

Confined Spaces

Each hazard to which the entrant may be exposed, adjacent operations or processes, and scheduled activity are reviewed

For each hazard identified, countermeasures are detailed on the Confined Space Entry Permit

THIS IS NOT A PERMIT TO WORK

OHL Industrial Professional Development Centre Ltd.		CONFINED SPACE ENTRY CERTIFICATE	Certificate No: 14110														
		<small>Yellow - Workable Green - Permit Free Role</small>															
1. APPLICATION by Permit Applicant																	
Name _____	Enter Location: _____	Associated Work Permit No. _____															
Position: _____	Equipment/Space to be entered: _____																
Contractor: _____																	
Signed: _____																	
2. SAFETY PRECAUTIONS REQUIRED Items to be Checked by Responsible Supervisor/Area Authority before Confined Space Entry can proceed, and certified by signature in Box 4.																	
		REQUIRED	CHECK														
		YES	NO														
a. The above equipment has been isolated from all sources of dangerous liquids, gases and fumes by insertion of spades or by removing a section of pipework and blanking open ends of the circuit. _____		<input type="checkbox"/>	<input type="checkbox"/>														
b. Equipment has been isolated from all sources of electrical and mechanical power. _____		<input type="checkbox"/>	<input type="checkbox"/>														
c. Isolation Certificates are attached. (Enter Numbers) _____	<table style="width: 100%; border-collapse: collapse;"> <tr> <td style="border: 1px solid black;">Mechanical</td> <td style="border: 1px solid black; width: 50px;"></td> <td style="border: 1px solid black; width: 50px;"></td> </tr> <tr> <td style="border: 1px solid black;">Electrical</td> <td style="border: 1px solid black;"></td> <td style="border: 1px solid black;"></td> </tr> </table>	Mechanical			Electrical			<input type="checkbox"/>	<input type="checkbox"/>								
Mechanical																	
Electrical																	
1. Equipment freed of all dangerous materials. All flammable gas purging complete, all liquids drained and vented atmosphere restored in Confined Space. _____		<input type="checkbox"/>	<input type="checkbox"/>														
2. Equipment surrounding area checked and safe from hazards arising from other work operations. _____		<input type="checkbox"/>	<input type="checkbox"/>														
3. Life lines, breathing apparatus and resuscitation equipment available. _____		<input type="checkbox"/>	<input type="checkbox"/>														
4. Adequate access and escape route are provided. _____		<input type="checkbox"/>	<input type="checkbox"/>														
5. The requirements of Operating Standard 51 No 19 are to be obtained. _____		<input type="checkbox"/>	<input type="checkbox"/>														
6. Air moving equipment installed and operational. Vent is sufficiently cool for access. _____		<input type="checkbox"/>	<input type="checkbox"/>														
7. Procedures and rescue plans formulated and discussed with the Permit Holder, personnel entering vessel and standby personnel. Discussion/Debrief conducted where stated as required on Permit. _____		<input type="checkbox"/>	<input type="checkbox"/>														
8. Standby personnel appointed. (names) _____		<input type="checkbox"/>	<input type="checkbox"/>														
3. GAS TESTING																	
RESULTS OF TESTS:	<table style="width: 100%; border-collapse: collapse;"> <thead> <tr> <th style="border: 1px solid black;">GAS</th> <th style="border: 1px solid black;">LIMIT</th> <th style="border: 1px solid black;">RESULTS</th> </tr> </thead> <tbody> <tr> <td style="border: 1px solid black;">OXYGEN</td> <td style="border: 1px solid black;">20-21% VOL</td> <td style="border: 1px solid black;">%</td> </tr> <tr> <td style="border: 1px solid black;">HYDROCARBONS</td> <td style="border: 1px solid black;">5% LEL for HOT WORK 4% LEL for COLD WORK, WITHOUT BA 10% LEL for COLD WORK WEARING BA</td> <td style="border: 1px solid black;">%</td> </tr> <tr> <td style="border: 1px solid black;">H₂S</td> <td style="border: 1px solid black;">10 ppm</td> <td style="border: 1px solid black;">ppm</td> </tr> <tr> <td style="border: 1px solid black;">OTHER</td> <td style="border: 1px solid black;"></td> <td style="border: 1px solid black;"></td> </tr> </tbody> </table>	GAS	LIMIT	RESULTS	OXYGEN	20-21% VOL	%	HYDROCARBONS	5% LEL for HOT WORK 4% LEL for COLD WORK, WITHOUT BA 10% LEL for COLD WORK WEARING BA	%	H ₂ S	10 ppm	ppm	OTHER			
GAS	LIMIT	RESULTS															
OXYGEN	20-21% VOL	%															
HYDROCARBONS	5% LEL for HOT WORK 4% LEL for COLD WORK, WITHOUT BA 10% LEL for COLD WORK WEARING BA	%															
H ₂ S	10 ppm	ppm															
OTHER																	
Confined Space Tested: _____																	
I have tested this space for the above gases, with the results shown:																	
Name _____	Signature _____	Auth No. _____	Date _____ Time _____														
<small>Class A Authorised Gas Tester</small>																	
<small>FOR ADDITIONAL GAS TEST RESULTS SEE OVERLEAF</small>																	
4. AUTHORISATION TO ENTER CONFINED SPACE by Responsible Supervisor/Area Authority																	
I certify that the above results indicate that the Confined Space covered by this Certificate is safe to enter. Gas test to be repeated at the intervals specified on the Permit to Work associated with this Certificate.		Breathing Apparatus to be worn: Yes <input type="checkbox"/> No <input type="checkbox"/>															
This Certificate is valid until: Time _____ Date _____		Light Fume Respirator to be worn: Yes <input type="checkbox"/> No <input type="checkbox"/>															
Name _____	Signature _____	Date _____	Time _____														

Confined Spaces

Isolation of Energy Sources – Permit will be required

In a confined space, it may be very hard to separate the employee from the sources of hazardous energy

The close quarters in which the employee works increases the likelihood of the injury

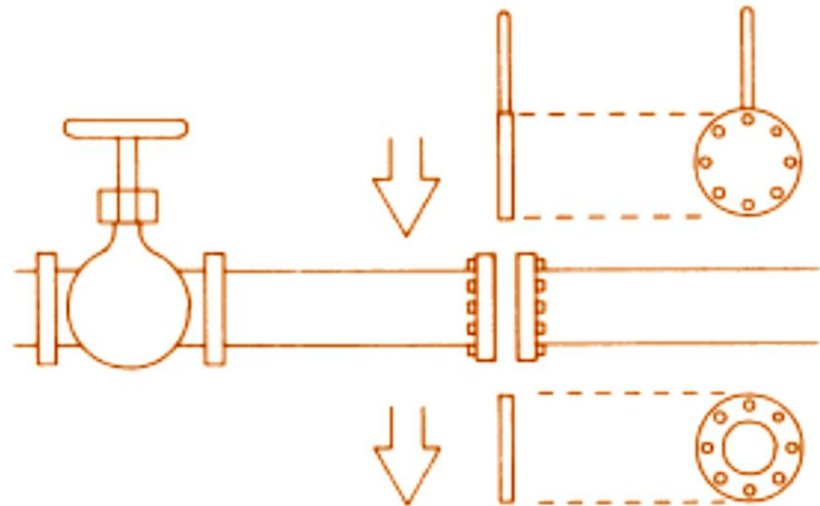
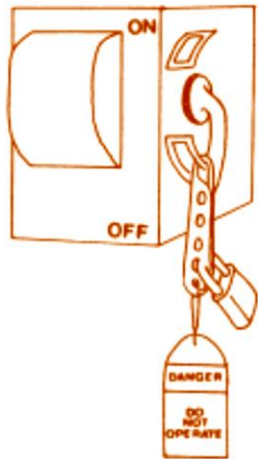
The activation of electrical or mechanical equipment and the release of material through lines connected to the confined space are major causes of injury

A Lockout/Tagout System is required

Confined Spaces

Isolation of Energy Sources – Permit will be required

Isolation of Energy Sources



Confined Spaces

Confined Space Attendant

The duty of the hole watch is to remain stationed at the entrance of the confined space and monitor the entrants and the physical conditions of the surrounding area



The hole watch should position himself at the entrance of confined space and wear orange colored Hi visibility vest

Confined Spaces

Confined Space Attendant

Qualified person assigned by the company



Confined Space Attendant must

- Enforce compliance of all permit requirements
- Wear a visible vest
- Put necessary sign-boards
- Ensure personnel sign-in and sign-out
- Know the signs and symptoms of hazards
- Attends Pre-Entry Safety Meeting

Confined Spaces

Confined Space Attendant



Keep contact with entrants

- In an emergency situation, instruct to stop the job and evacuate
- In an emergency situation, sound the alarm, ask for emergency rescue and first-aid
- In an emergency situation, never enter the confined space before assigning another trained entry-watch and taking necessary precautions
- After work finishes, barricade the access and put sign-boards



Confined Spaces

Confined Space Attendant

Means of effective communication system must be readily available for the confined space entry attendant to reach the Emergency Rescue Team in an emergency



Confined Spaces

Confined Space Attendant

A standby person should be assigned to remain on the outside of the confined space and be in constant contact (visual or speech) with the workers inside

Standby personnel should not enter a confined space until help arrives, and then only with proper protective equipment, lifelines, and respirators



Confined Spaces

Confined Space – Duties

Attendant

- Remain outside permit space during entry operations unless relieved by another authorised attendant
- Perform non-entry rescues when specified by employer's rescue procedure
- Maintain communication with and keep an accurate account of those workers entering the permit required space
- Summon rescue and other services during an emergency
- Perform no other duties that interfere with the attendant's primary duties

Confined Spaces

Confined Space – Duties

Entry Supervisor

- Know the hazards including information on the mode of exposure, signs or symptoms, and consequences of exposure
- Verify emergency plans and specified entry conditions such as permits, tests, procedures and equipment before allowing entry
- Ensure that data from required tests are documented and are made available to each employee who enters the permit space
- Ensure that entry operations remain consistent with the entry permit and that acceptable entry conditions are maintained

Emergency Rescue

Confined Spaces

For critical jobs, rescue facilities must be stand-by, ready for any Emergency



Confined Spaces

Emergency Rescue

Over 50% of the workers who die in confined spaces are attempting to rescue other workers

Rescuers must be trained in and follow established emergency procedures and use appropriate equipment and techniques (including lifelines, respiratory protection and standby persons)



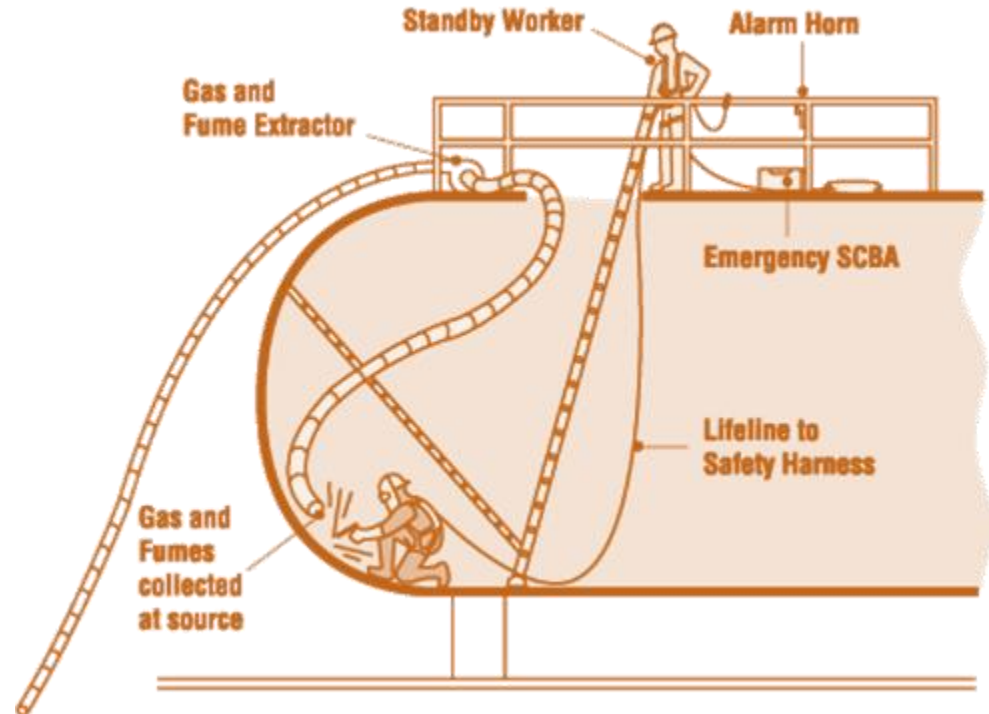
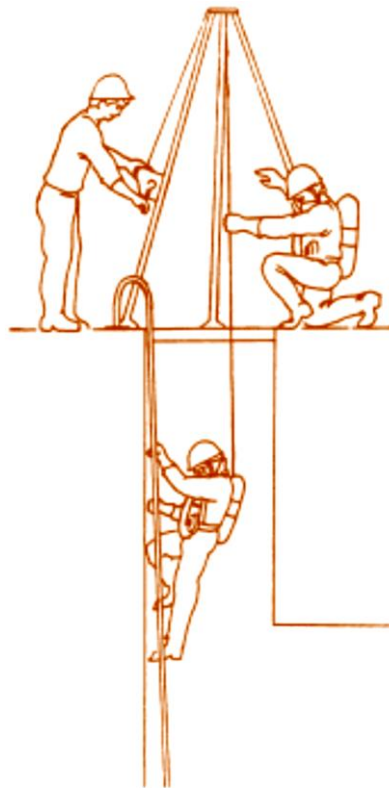
Confined Spaces

Emergency Actions

- Should a person within the enclosed space give an alarm, the work party **MUST** advise the stand-by-man and vacate the space immediately
- Should any of the General alarms be sounded, the stand-by-man **MUST** immediately notify the work party and initiate an evacuation of the enclosed space
- Prior to any evacuation of the enclosed space any equipment being used **MUST** be shut down and the worksite made safe
- Prior to any re-entry of the enclosed space all the conditions of the Permit To Work and entry certificate must be reassessed and the enclosed space must be gas tested by an Authorized Gas Tester

Confined Spaces

Confined Space – Safe Entry Procedure



Confined Spaces

Personal Protective Equipment

PPE is traditionally regarded as the last line of protection with the emphasis being placed on avoidance and appropriate managerial control methods. However, the potentially hazardous nature and isolated position of those entering a confined space means that, for the Worker, PPE will be required to be worn

Each confined space will present different hazards and degrees of risk to health and safety, the final provision of PPE should therefore be based on an assessment of risk. As a general rule should include:

- Body protection (hard wearing overalls)
- Foot protection (toecaps (200 joules))
- Head protection

Confined Spaces

Personal Protective Equipment

Select required PPE and
get training to use them



Confined Spaces

Personal Protective Equipment

- Provide proper access as best as possible
- Full-body Harness and 100% tie-off
- Provide tag-line attached to body harness
- Provide lighting using below 24 v



Ground

24 V

Light Ball Protection



Confined Spaces

Confined Space – Safe Entry Procedure

Personal Protective Equipment

There are three types of respiratory hazards:

- Oxygen deficient atmospheres
- Gases and vapours
- Particulate contaminants

Confined Spaces

Confined Space – Safe Entry Procedure

Personal Protective Equipment (Types of Respirators)

Air Purifying Respirators



Confined Spaces

Confined Space – Safe Entry Procedure

Personal Protective Equipment (Types of Respirators)

Air Supplying Respirators



Confined Spaces

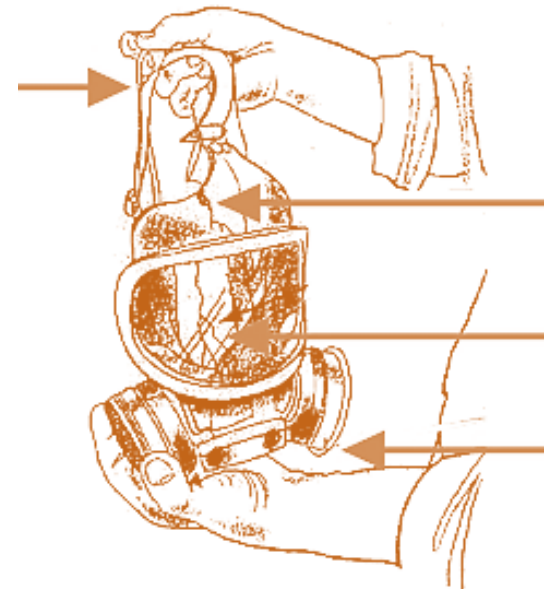
Confined Space – Safe Entry Procedure

Personal Protective Equipment (Checks)

Respirators Inspection

You must carefully inspect your respirator before and after each use to make sure it is not damaged or worn

- Check the head-straps for loss of elasticity and signs of wear such as cracking, tears, and loose or broken buckles
- Look for missing or worn gaskets
- Inspect the face piece or mask for cracks, holes, tears, dirt, and distortion
- Check the input and output valves for missing or worn valve covers, cracks, and dirt
- Check air supplying respirators for damaged air hoses, and loose or damaged air hose connections. Also, make sure your air tanks are full and your regulator is working properly



Confined Spaces

Confined Space – Safe Entry Procedure

Personal Protective Equipment (Gas Detectors)

For detection of any local pockets of gas or lack of oxygen the worker should use his portable oxygen or multi-gas meter with audible alarm features

This is especially important when entering tanks and/or voids of complicated geometry with high possibility of "pockets of atmosphere" with low O₂-content, and where rescue operations may be difficult

Preferably a multi-gas meter should be used, capable of simultaneous monitoring of oxygen, combustible gases and hydrogen sulphide and carbon monoxide

Confined Spaces

Respiratory Protection

There are three types of breathing apparatus normally used in the industry:

- Emergency Escape Breathing Apparatus (EEBA)
- Self Contained Breathing Apparatus (SCBA)
- Supplied Air Breathing Apparatus (SABA)



Confined Spaces

Emergency Escape Breathing Apparatus (EEBA)

One of the types used here is the Sabre ELSA (Type EN 1146) which is a self-contained open circuit, compressed air, constant flow escape breathing apparatus

ELSA comprises a compressed air cylinder with a combined reducer / cylinder valve, an escape hood with a breathing hose and stowage bag

ELSA is fitted with a 2 litre (10mins duration) aluminium cylinder or a 3 litre (15mins duration) steel cylinder, the constant flow rate is 38 litres per minute



Self Contained Breathing Apparatus (SCBA)

There are a number of different SCBA's available, however the apparatus approved for use in an gas exposure in the oil and gas industry is called Pressure Demand Self Contained Breathing Apparatus

It is also known as positive pressure apparatus, because a slight positive pressure is maintained in the facemask during use



Supplied Air Breathing Apparatus (SABA)

Supplied Air system function like a network, there is usually one source of air (cascade system or a compressor, tank and filter system) which supplies a regulated air pressure through hoses to a number of breathing apparatus

There are a number of different Supplied Air Breathing Apparatus available. The SABA approved for use in gas environments in the oil and gas industry is called Pressure Demand Supplied Air Breathing Apparatus



Breathing Apparatus

In order to operate a BA system you not only need to be familiar with the components and their function, you also need to understand that there are certain procedures to follow to ensure that the unit is in good working order.

Pre-use Check

The major components of all BA units require to be checked pre-use, and these include the following:

- Cylinder for type, condition, charge capacity and test date
- The back plates, harnesses and all associated webbing
- The pneumatics for condition and signs of leaks
- Facemask for condition (Remember the five point check)

Breathing Apparatus

Cylinder

Back-plate and Harness

Pressure Gauge and Whistle



Demand Valve



Facemask and Straps



Exhalation Valve



Facemasks

There is a five point check for masks – per-use:

1. Straps - Pull the straps through the buckles and stretch the straps, check for signs of wear
2. Face Seal – Check the overall condition for signs of splitting and cracking, check the chin cup which can be affected by aftershave
3. Inner Mask – Check the inner mask on the bridge of the nose area for oily contamination from skin transfer
4. Valve Flaps – Check the valves flaps in the inner mask for distortion and replace if required
5. Visor – Check the visor clarity



Practical Demonstration and Use (Sabre ELSA)

- Place the neck-strap around your neck with instructions clearly at the front.
- Hold the bag firmly with one hand and pull the flap to withdraw the firing pin
- Pull the hood from the bag
- Place the palms of the hands together and insert through the rubber neck seal and open the hood with your hands.
- Hold the hood with the neck seal over the top of the head and pull the hood down over the head until the neck seal is around the neck
- Check that clothing or hair is not trapped in the neck seal.
- Check that there is a steady flow of air into the hood
- Breathe normally



LEAVE THE AREA IMMEDIATELY!

Practical Demonstration and Use (Contour SCBA)

- With the harness straps fully slackened, don the apparatus and adjust the straps for a comfortable fit
- Hang the facemask from the strap around the neck
- Fasten waist belt buckle and adjust for comfortable fit by pulling the straps down and away
- Check that red bypass knob is in the OFF position and depress black reset button
- Open the cylinder valve fully. Check pressure gauge to ensure cylinder is at least 80% FULL



Practical Demonstration and Use (Contour SCBA)

Positive Pressure Test

- Insert fingers under face seal and check for a steady outward flow of air
- Remove fingers and allow mask to re-seal



Practical Demonstration and Use (Contour SCBA)

Face seal / Whistle Test

- Hold breath and listen carefully for any leaks. Check pressure indicator – movement of the needle indicates a leak
- Check the pressure indicator, breathe down the air in the system and check that the whistle sounds at 55 +/- 5 bar
- Open cylinder valve fully upon completion



Confined Spaces

Should conditions develop where an entrant cannot get out of the space on their own:

- The Standby man **MUST** raise the alarm at once!
- He **MUST** standby the entrance until help arrives
- Only trained & equipped personnel **MUST** perform a rescue

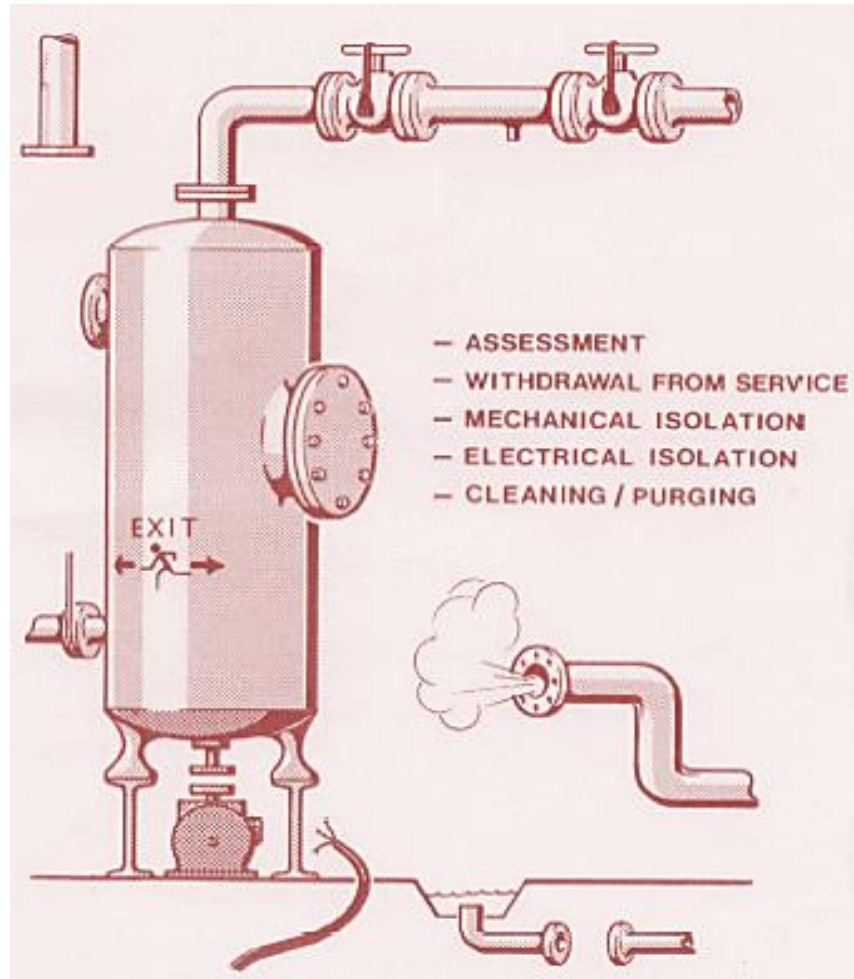
**Look out for yourself and your colleagues and
always follow procedures!!!**

Confined Spaces

Required Measures

- All persons to enter a confined space **MUST** receive training
- There **MUST** be adequate ventilation and extraction
- There **MUST** be sufficient lighting
- There **MUST** be a trained standby man with radio contact with the entrants
- There **MUST** be at least one radio & gas monitor in the confined space with the entrants
- Tags of entrants **MUST** be on display at the entrance, along with the permit and gas test record

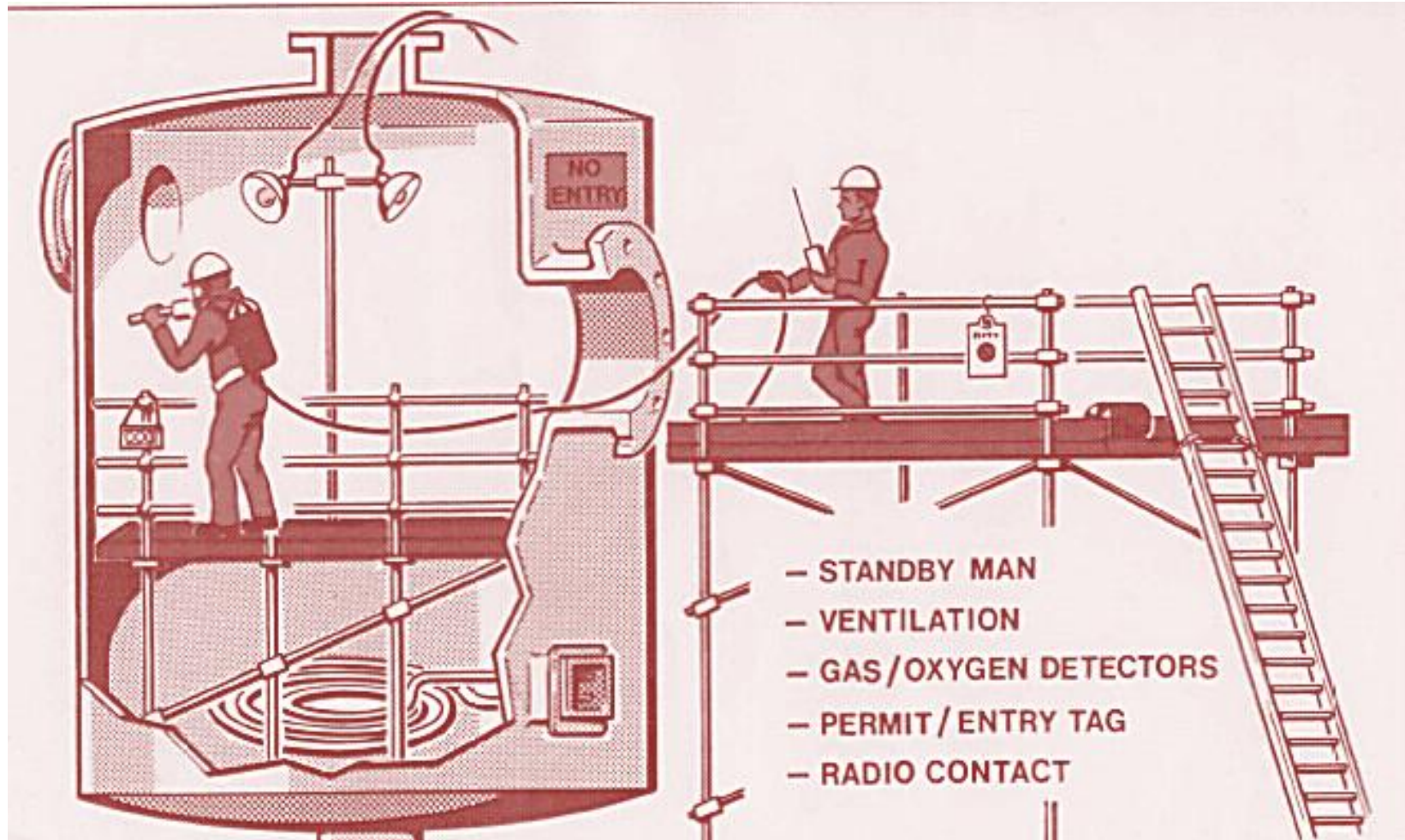
Confined Spaces



Confined Spaces



Confined Spaces



Confined Spaces

Summary

This short course is simply some basic guidelines for you to follow, which is supplemented by JV (OHLI SENER) specific policies and procedures when working in or around confined spaces. We cannot possibly list all potential hazards or effective safety methods to follow. It's each individual's responsibility to follow our company's policies and procedures when working around or in confined spaces

Confined space entry has been around for a long, long time and it will continue into the future. It's a safe job, if all the procedures are followed. It's up to each individual to use common sense, good judgment and follow the rules. It just makes good sense, and it's the only way to enter confined spaces safely

Remember...

What do you see in the picture below?





One last thing

One last thing, my buddy



We are all responsible for our own safety, that is why my buddy is watching my back – and I his...



QUESTIONS???

Thanks for your attention