Confined Space

Awareness and Safety

Session 2

Suffolk County Fire Academy

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Course Overview

- Session 2
  - Air Monitoring
  - Personal Protective Equipment
  - Communications
  - Patient Removal Equipment
  - Hazard Control (lock-out, tag-out)
  - Assessment
  - Exam.

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Session Objectives

- Student shall demonstrate an understanding of:
  - The need and use of air monitoring equipment during a confined space incident
  - Personal protective equipment used in confined spaces
  - Communication at confined space incidents
  - Patient removal equipment
  - The importance of lock-out, tag-out
  - Confined space hazard assessment and control.

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AIR MONITORING

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Characteristics of Monitoring Instruments

- Portability
- Able To Provide Reliable, Useful Results
- Sensitive And Selective
- Intrinsically Safe.

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Types of Monitoring Equipment

- Direct Reading Instruments
  - Diffusion head assembly type
  - Electro-chemical sensor type
- Colorimetric Detector Tubes.

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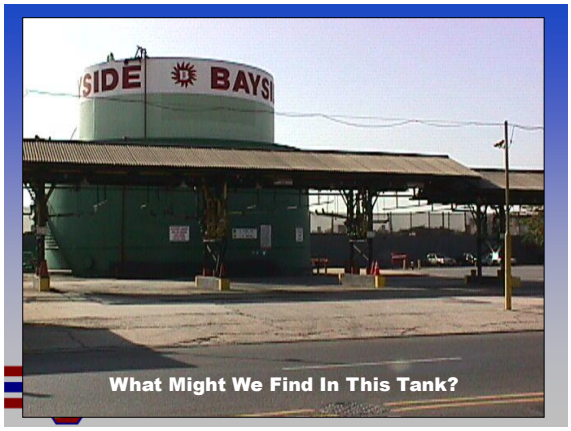

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Sequence of Testing

- FIRST – Oxygen Level
- SECOND – Flammability
- THIRD – Toxins.

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Levels of Testing

- General Area
- Top
- Middle
- Bottom
- Isolated Areas
  - Pipe or Tunnel

Long pick-up tubes or meter can be lowered into space at the different levels.

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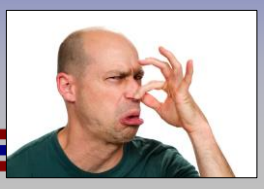
NEVER TRUST YOUR SENSES TO DETERMINE IF THE AIR IN A CONFINED SPACE IS SAFE!



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Ventilation Equipment

- Smoke Ejector
- Commercial (Blowers)
- Fixed Site Systems.

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Types of Ventilation

- General (Dilution)
  - Positive Pressure
- Exhaust Site Pick-up
- Ventilation Issues
  - Short circuiting
  - Recirculating
  - Chimney Effect.

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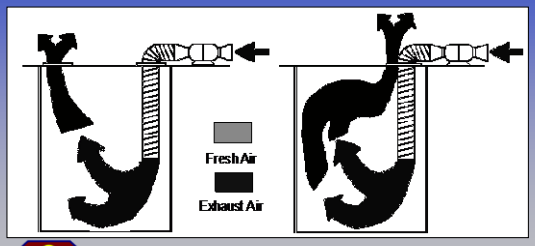
Positive Pressure (Supply) Ventilation



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Exhaust Ventilation

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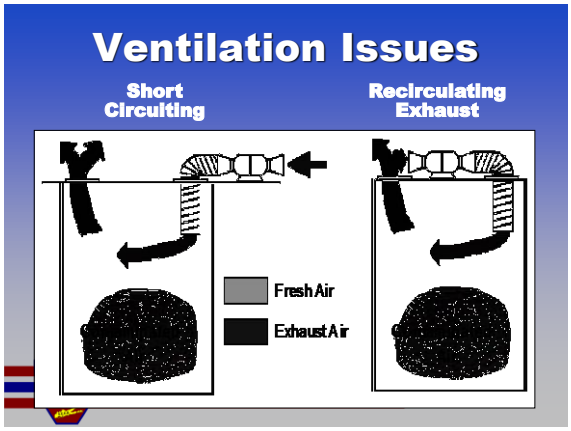
Ventilation Issues
Short Circulting
Recirculating Exhaust
Fresh Air
Exhaust Air

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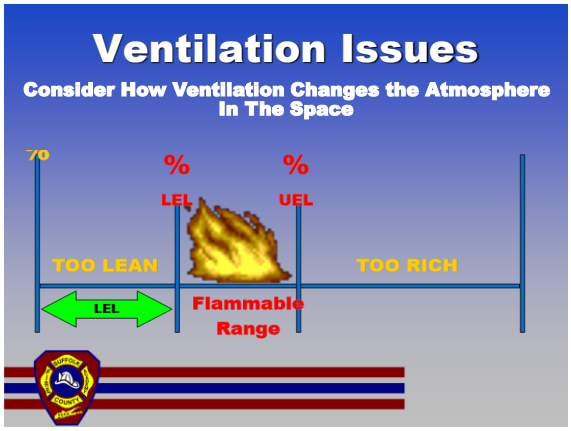
Ventilation Issues
Consider How Ventilation Changes the Atmosphere In The Space
%
%
LEL
UEL
TOO LEAN
TOO RICH
LEL
Flammable Range

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PERSONAL PROTECTIVE EQUIPMENT (PPE)

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Body Protection

- Structural Fire Fighter Clothing
- Coveralls
- Chemical Protective Clothing.


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Respiratory Protection

- Air Purifying Respirator
- Self Contained Breathing Apparatus
- Supplied Air Respirator.



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Respiratory Protection

- Supplied Air Respirator System
- Max 300' Air Hose
- 10 Minute Escape Bottle
- AKA Gunslinger
- Preferred Type of Respiratory Protection.

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Respiratory Protection

- What Caused The Victim To Become A Victim?
  - Trip and fall
  - Contact with a hazard
  - Medical emergency
  - Atmospheric issue.

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COMMUNICATIONS

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Methods of Communications

- Electronic
- Manual
- Verbal.

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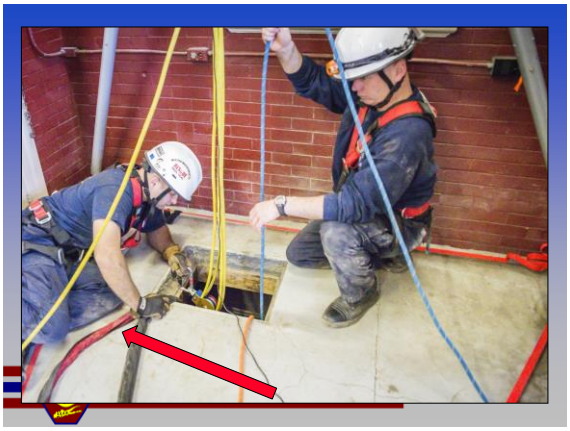

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Manual Tag Line Signals

- **O** – Ok – 1 Tug
- **A** – Advance – 2 Tugs
- **T** – Take-up – 3 Tugs
- **H** – Help – 4 Tugs.

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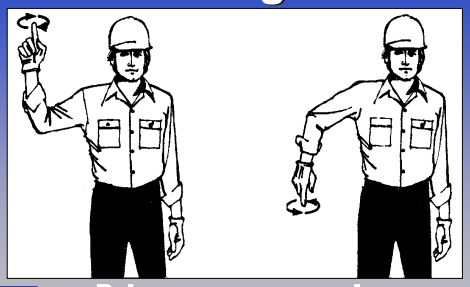
Hand Signals



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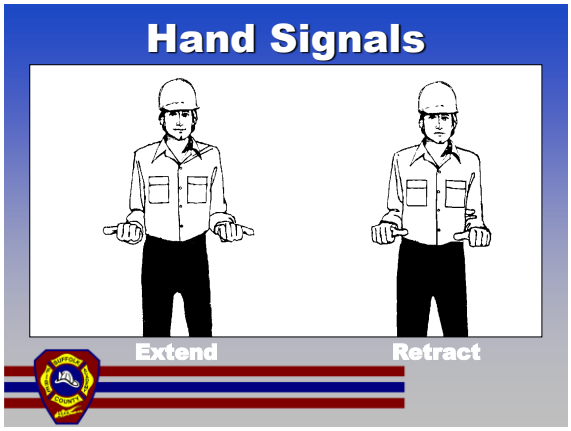
Hand Signals
Extend
Retract

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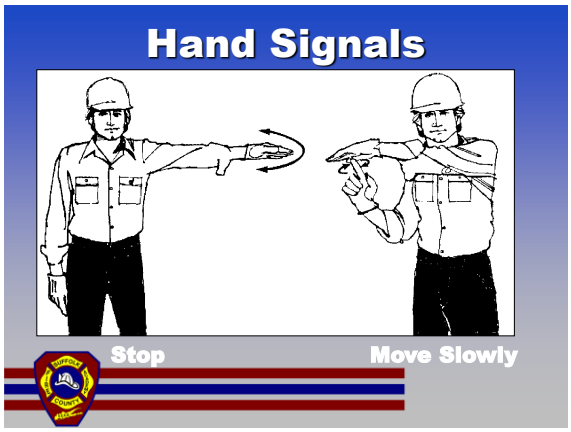
Hand Signals
Stop
Move Slowly

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unications
"Hey, Get out of there!"
Radios
Electronic

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PATIENT REMOVAL EQUIPMENT

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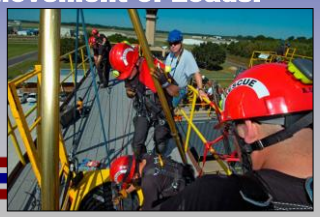
Uses of Mechanical Advantage Systems

- Raise Loads
- Lower Loads
- Horizontal Movement of Loads.



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Mechanical Advantage Equipment

- Site Constructed Equipment
  - Standard rope rescue equipment
- Manufactured Systems
  - Power winch (NEVER USE)
  - Tripod winch
  - Tube winch
  - Rope systems.

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Manufactured Tripod

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Ladder Gin – A Frame

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Ladder Rescue Systems

Ladder A Frame

Ladder Gin

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HAZARD CONTROL

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OSHA Isolation Procedure

1) Prepare For Shutdown
2) Shut Down The Equipment
3) Isolate The Equipment
4) Apply Lock-out, Tag-out and/or Bleed/Block Devices
5) Control Stored Energy
6) Verify Isolation Of The Space.

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Space Isolation

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Methods of Isolation

- Lock-Out, Tag-Out
- Bleed and Block
- Disconnect
- Blind and Blank
- FD Personnel / Guard.

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Lock-Out / Tag-Out Devices

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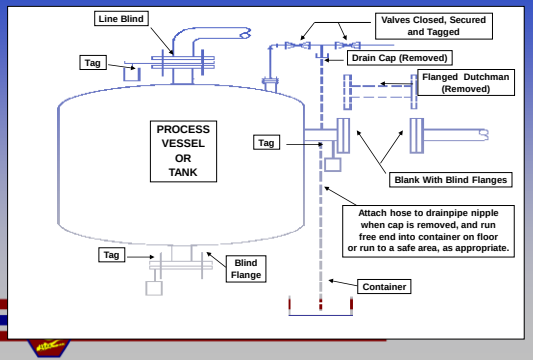
Bleed / Block



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ASSESSMENT

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Assessment of Confined Space Incidents

- Recognize Situation For What It Actually Is
  - Initial dispatch may not convey the whole story (i.e. A/M Injuries From A Fall)
- Avoid Tunnel Vision
  - Beware of hidden hazards
- CALL FOR HELP IMMEDIATELY!!!!

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Assessment of Confined Space Incidents

- **STOP** and Evaluate
- Use Head, Not Heart
- Do Not Become A Victim.

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Non-Entry Communication and Retrieval

- Call out
- Lower a radio
- Portable ladder into the space
  - To allow a victim to self-extricate
- Lower a life-saving rope
  - Similar to firefighter removal procedure
- Open another means of egress out of space
  - Horizontal vs. vertical
  - Do not add to compromised space.

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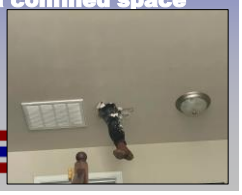
Confined Space vs. Tight Space

- "Tight Spaces" may share elements but can be distinguished from the hazards associated with confined spaces
- Do not delay mitigation of victims trapped in tight spaces (i.e. private dwelling attic)
- When in doubt, treat as a confined space emergency:
  - Meter
  - TRT request
  - Non-entry retrieval.



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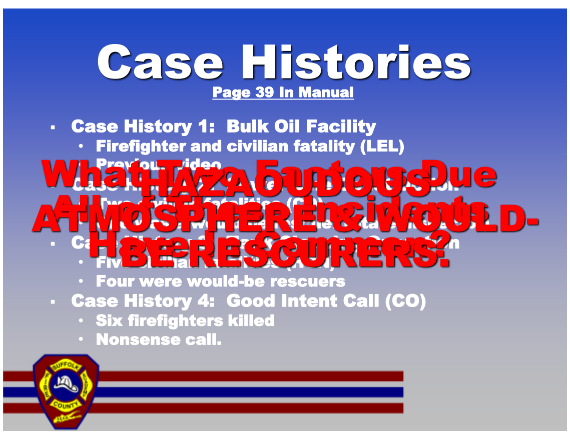

Case Histories
Page 39 In Manual
Case History 1: Bulk Oil Facility
Firefighter and civilian fatality (LEL)
What Two Factors Due All of These Incidents Have In Common?
HAZAOUDOUS ATMOSPHERE & WOULD-BE-RESCOURERS.
Four were would-be rescuers
Case History 4: Good Intent Call (CO)
Six firefighters killed
Nonsense call.

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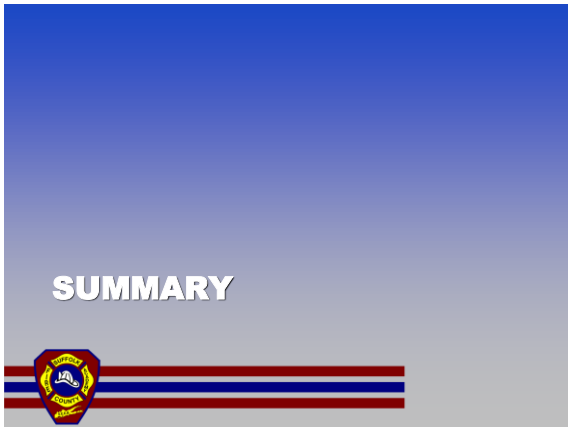

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Summary

- Air monitoring must be initiated and maintained throughout a confined space incident
- Never trust your senses to monitor the atmosphere of a confined space
- Consider the positive and negative effect of ventilation on the atmosphere in a confined space.

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Summary Cont'd

- Determine what caused a victim to become a victim when considering respiratory protection and victim viability
- Establish a means of communication
- Be familiar with rescue equipment and packaging devices
- Control hazards and ensure lock out, tag out.

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Summary Cont'd

- Assessment of confined space incidents includes slowing down and calling for help immediately
- Try to establish non-entry means of communication and rescue
- Understand the difference between confined spaces and tight spaces.

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QUESTIONS???

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