

National Safety Council
CONGRESS
& EXPO ATLANTA
2015

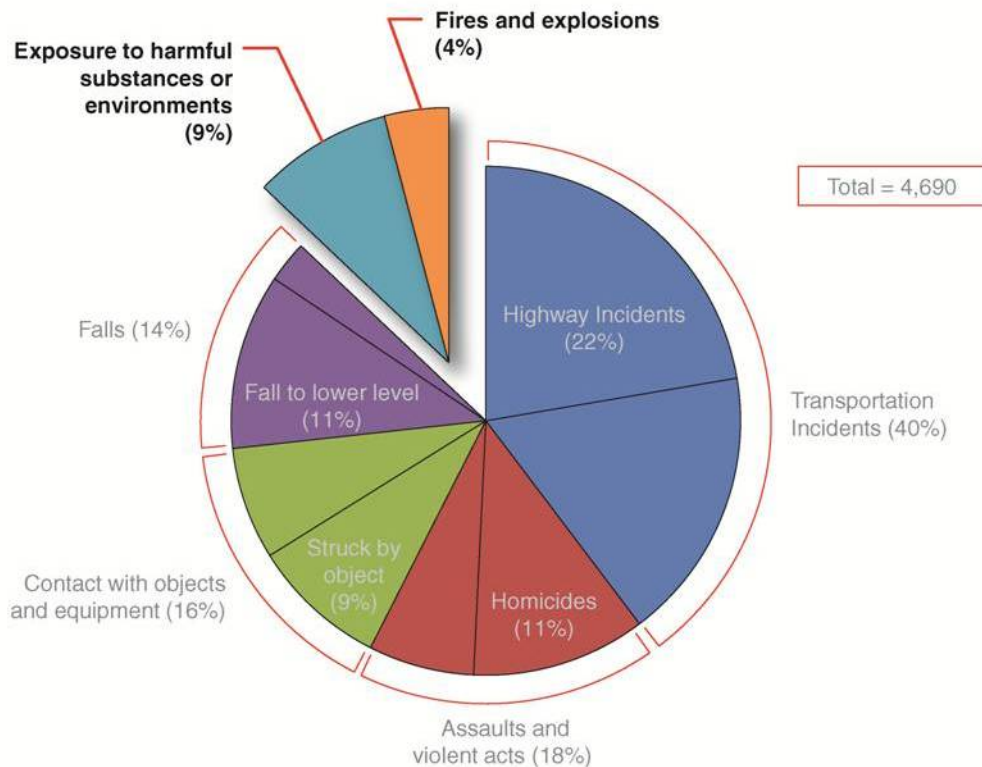
Spot the Hazards:

Review Confined Space
Hazards Missed by Most
Safety Professionals, and the
PPE Solutions that Meet
OSHA Requirements

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Why is Gas Detection Important?



More fatal work injuries resulted from transportation incidents than from any other event. Highway incidents alone accounted for more than one out of every five fatal work injuries in 2012

NOTE: Percentages may not add to totals because of rounding.
SOURCE: U.S. Bureau of Labor Statistics, U.S. Department of Labor, 2012

Spot the hazard...

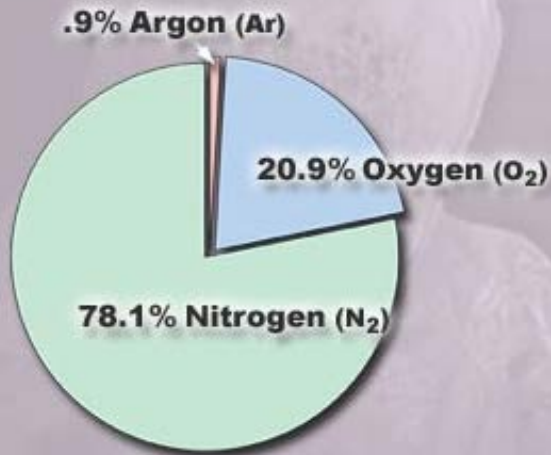
***Can you spot the
Safety Hazard?***

***... one space is perfectly
safe - the other will kill
you in 30 seconds.***



Composition of Fresh Air

Primary Constituents of Normal Air



Name	Symbol	Percent by Volume
Nitrogen	N ₂	78.08%
Oxygen	O ₂	20.95%
Argon	Ar	0.93%
Carbon Dioxide	CO ₂	0.03%
Neon	Ne	0.00%
Methane	CH ₄	0.00%
Helium	He	0.00%
Krypton	Kr	0.00%
Hydrogen	H ₂	0.00%
Xenon	Xe	0.00%

Confined Space Entry Requirements

- OSHA 29 CFR 1910.146 “Permit-Required Confined Spaces”

Periodic atmospheric
monitoring?

Best practice:
Continuous Monitoring!



OSHA 29 CFR 1926 New Construction Industry Rule

News Release

U.S. Department of Labor

May 1, 2015

**Confined spaces rule could protect nearly 800 construction workers a year
from serious injuries and reduce life-threatening hazards**

Construction protections now match those in manufacturing and general industry



WASHINGTON - The Occupational Safety and Health Administration today issued a [final rule](#)* to increase protections for construction workers in [confined spaces](#).

Manholes, crawl spaces, tanks and other confined spaces are not intended for continuous occupancy. They are also difficult to exit in an emergency. People working in confined spaces face life-threatening hazards including toxic substances, electrocutions, explosions and asphyxiation.

Last year, two workers were asphyxiated while repairing leaks in a manhole, the second when he went down to save the first - which is not uncommon in cases of asphyxiation in confined spaces.

"In the construction industry, entering confined spaces is often necessary, but fatalities like these don't have to happen," said Secretary of Labor Thomas E. Perez. "This new rule will significantly improve the safety of construction workers who enter confined spaces. In fact, we estimate that it will prevent about 780 serious injuries every year."

The rule will provide construction workers with protections similar to those manufacturing and general industry workers have had for more than two decades, with some differences tailored to the construction industry. These include requirements to ensure that multiple employers share vital safety information and to continuously monitor hazards - a safety option made possible by technological advances after the manufacturing and general industry standards were created. Â

"This rule will save lives of construction workers," said Assistant Secretary of Labor for Occupational Safety and Health Dr. David Michaels. "Unlike most general industry worksites, construction sites are continually evolving, with the number and characteristics of confined spaces changing as work progresses. This rule emphasizes training, continuous worksite evaluation and communication requirements to further protect workers' safety and health."

Compliance assistance material and additional information is available on OSHA's [Confined Spaces in Construction](#) Web page.

Under the Occupational Safety and Health Act of 1970, employers are responsible for providing safe and healthful workplaces for their employees. OSHA's role is to ensure these conditions for America's working men and women by setting and enforcing standards, and providing training, education and assistance. For more information, visit www.osha.gov

What are your customers looking for?

Ease of use

- One button operation
- Simplified training

Compliance

- Compliance at a glance
- Tamper-proof settings

Quality

- HOS
- World-class manufacturing

Durability

- Rugged design
- Designed for harsh environments

Low cost of ownership

- Automated fleet management
- Low or zero maintenance



One of these monitors will detect the hazardous atmosphere but the other may not...choose wisely!



The one with
“Visual
Compliance
Monitoring”...

**Green means in
compliance and
good to go!**

Calibration, Bump Test and Verification

- **Calibration:** The adjustment of an instrument's response to match a desired value compared to a known concentration of test gas
- **Bump test:** Briefly applying gas to check that each sensor responds to target gas and that the alarms are working
- **Calibration Verification:** A bump test utilizing a known concentration of a challenge gas to demonstrate that an instrument's alarms are activated and response to gas is within acceptable limits
- DOCUMENT ALL TESTING.....IF IT WASN'T DOCUMENTED IT DIDN'T HAPPEN
- <https://www.osha.gov/dts/shib/shib093013.html>



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**What is your Instrument
Management System?**

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- Docking stations increasing in popularity
 - Automatic bump testing, calibration, record storage and charge monitors
 - Safety professionals are often required to show evidence of up to date monitor calibration and bump test history
 - Docking stations provide objective evidence that procedures are being followed



Instrument Management Software

- Although some docking stations do not require a computer to operate
 - They can be connected to a network and regularly downloaded for management of a fleet of gas monitors
- This software in conjunction with the docking station allows users to
 - Import event and data logs from monitors
 - Save bump and calibration results
 - Generate bump test and calibration certificates
 - Detector status reports
 - Manage users and base stations
 - Configure detectors
 - Archive and save database

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Confined Space Atmospheric Monitoring

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Confined Space Entry

- Characteristics of Confined Spaces
 - Large enough for worker to enter
 - Are not designed for continuous worker occupancy
 - Limited openings for entry and exit



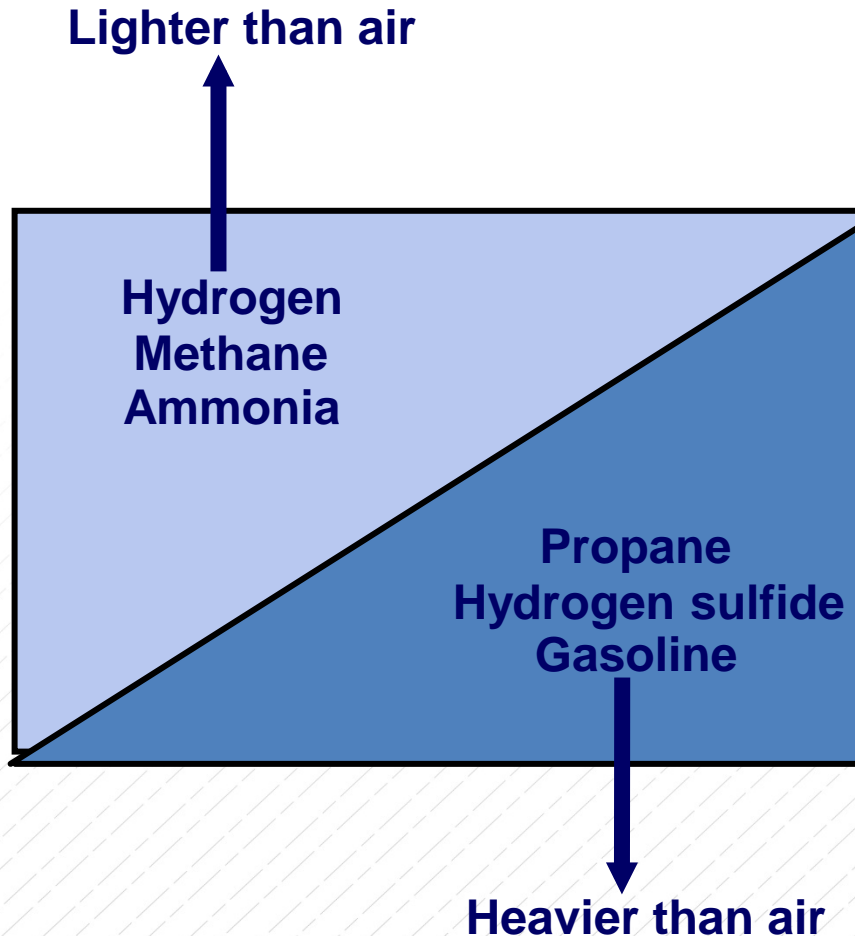
Permit Required Confined Spaces

One or more of the following:

- Hazardous atmosphere (known or potential)
 - Material with the potential for engulfment
 - Inwardly sloping walls or dangerously sloping floors
- or
- Contains any other serious safety hazard



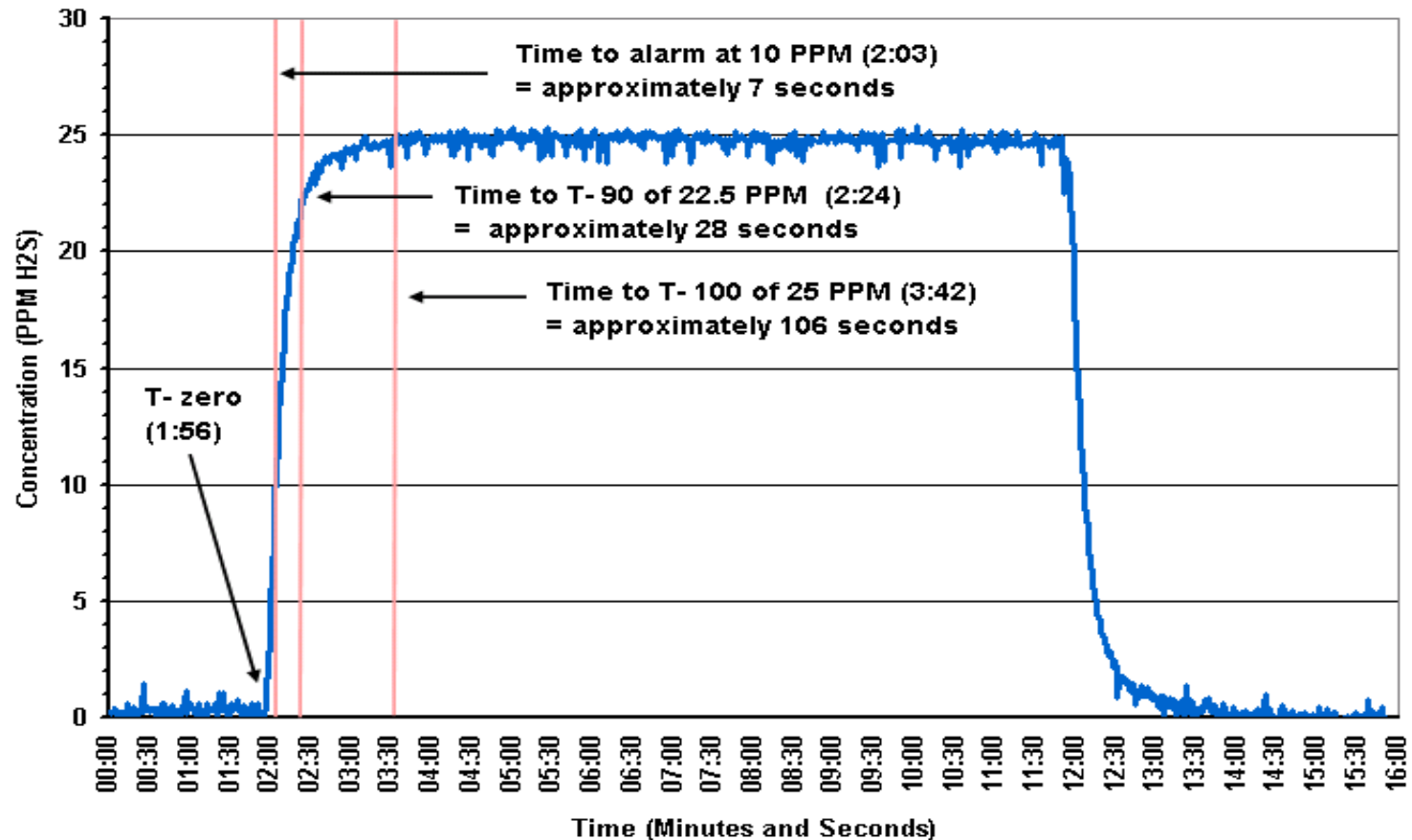
Vapor Density



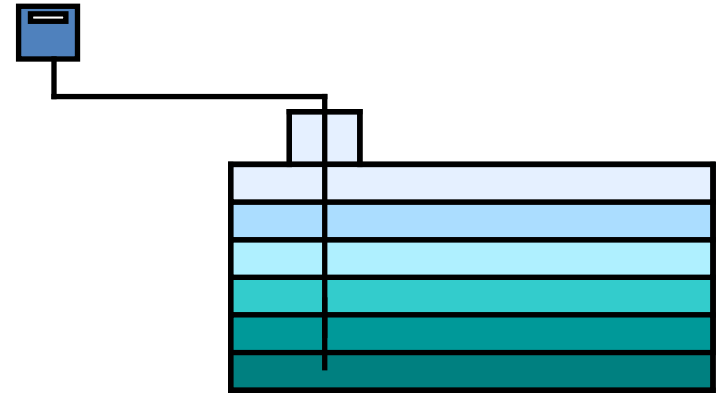
- Measure of a vapor's weight compared to air
- Gases lighter than air tend to rise; gases heavier than air tend to sink

T90 Sensor Performance

Response of H₂S Sensor When Exposed to 25 PPM Gas



Pre-testing a Confined Space



- Atmospheric hazards in confined spaces form layers
- Check all levels! Atmosphere tested (at least) a distance of approximately 4 feet (1.22 m) in the direction of travel and to each side
- Allow sufficient time for all sensors to react to each sample per level tested. Key response factors are hose length (typical 2 seconds per foot flow rate) plus T90 sensor/s response time (minimum) to 2 min. for full response if any gas is present. For Example: 10' hose x 2 seconds = 20 seconds plus most significant T90 of monitor's sensors (typically 30 seconds for standard 4-gas monitor). $(10 \times 2) + 30 = 50$
- 140 seconds per level (T 100 if any gas is present)

Important Resource Links

- <http://www.honeywellanalytics.com>
- <http://www.raesystems.com/>
- <http://www.honeywellanalytics.com/en/support/training-and-support>
- <http://hautraining.litmos.com/online-courses>
- <http://www.citytech.com>
- <http://www.cdc.gov/niosh/npg/>
- <https://www.osha.gov/dts/shib/shib093013.html>
- <https://www.osha.gov/dsg/annotated-pels/index.html>
- <https://safetyequipment.org/>

- Summary:
 - Understand your potential atmospheric hazards
 - Use an appropriate gas monitor that has been validated per OSHA SHIB 09302013
 - Perform a proper pre-test of the confined space...don't rush it!
 - Continuously monitor the atmosphere while occupied
 - Establish and maintain a documented Instrument Management system.

Questions?

Answers.