

**blacklinesafety**

# 4 Advancements Shaping Confined Space Safety

WAYS TO WORK CONFIDENTLY  
IN DANGEROUS PLACES





## A MODERN APPROACH TO CONFINED SPACE ENTRIES

Today's companies are thinking differently about how they approach their safety programs as evidence of the relationship between connectivity and safety increases\*. And this new mindset is shaking things up when it comes to managing one of the biggest workplace risks out there: Confined Space Entries (CSEs).

That's because the traditional approach to CSEs, where a worker enters a confined space supported by a disconnected attendant worker standing outside on 'hole watch' to respond to any potential incidents, is no longer considered a best practice. A shifting technological and regulatory landscape means new tools are making it possible to boost the confidence and safety of those inside confined spaces, but also their co-workers and first responders in the event of emergencies.

That's why the most progressive companies are getting ahead of CSE risks in new ways. If you're looking to better protect your people— and see some powerful transformations in organizational efficiency along the way—start by exploring these four trends.



In the US alone,  
**2.1 million workers**  
perform risky work in permit-  
required confined spaces  
([Occupational Health and Safety](#))  
with an average of 129 CSE deaths/  
year ([Bureau of Labor Statistics](#)).

\*2023, National Safety Council, [Work to Zero](#).

# FIRST THINGS FIRST: KNOW WHAT YOU'RE GETTING INTO

## What is a confined space?

According to the [Occupational Safety and Health Administration \(OSHA\)](#), a confined space is defined as an area:

- With limited or restricted means for entry or exit.
- Large enough for workers to enter and conduct specific tasks.
- Not designed for continuous occupancy.

## What are the types of confined spaces?

Confined spaces generally fall into one of these three categories:

- **TANK-LIKE COMPARTMENTS** – like storage tanks, tankers, process vessels, boilers, pressure vessels, silos and dryers.
- **OPEN-TOP SPACES** – like pits, degreasers, pipes, fat traps, sewers, shafts and ducts.
- **SMALL HATCHWAY OR ACCESS PITS** – like cargo tanks, cellular double-bottom tanks, duct keels, ballast and oil tanks, and void spaces.

## What are the main hazards?

Due to the nature of confined spaces, one or more of the following hazards can be present:

- **OXYGEN DEFICIENCY** – which is responsible for over half of confined space fatalities.
- **TOXIC GASES** – a build-up of airborne contaminants like hydrogen sulfide (H<sub>2</sub>S) that may cause impairment or loss of consciousness.
- **COMBUSTIBLE GASES** – the presence of flammable airborne contaminants, like methane (CH<sub>4</sub>) that may cause fire or explosions.
- **POOR VENTILATION** – that may lead to an oxygen (O<sub>2</sub>) deficiency.
- **POOR LIGHTING** – darkness increases the likelihood of slips, trips and falls.
- **ENGULFMENT** – from loose material in grain bins, silos and trench collapses.

**Over half (56%)**  
of confined space  
deaths are from  
atmospheric hazards.

[\(CCOHS\)](#)

## 4 CONFINED SAFETY ADVANCEMENTS

Among the thousands of companies who are a part of Blackline Safety's customer community, we've seen countless examples of innovative strategies that really raise the bar when it comes to safety. What's especially interesting in the case of confined spaces, is that they're all incorporating at least one of four advancements. These advancements shape not only how they mitigate risk, but also increase worker confidence, improve efficiency and drive down costs at the same time.

### ADVANCEMENT #1: CLOUD-CONNECTIVITY

More and more companies are integrating cloud-connected gas detectors, like wearables and area monitors, into their safety program. Cloud-connectivity enables the relay of critical real-time information from within the confined space to workers outside—both the hole watch attendant and/or remote monitoring personnel.

At the same time, you need to consider the characteristics of your confined space to find the most reliable connectivity method. **Confined spaces differ from one site to the next. It's important to remember that connectivity may be better in some situations than others, depending on the depth or location of the confined space.**

If you're able to use cellular or satellite connectivity from within the confined space, geo-stamped data from connected wearable gas detectors can be transmitted to the cloud. If the nature of the confined space prohibits connectivity, the atmospheric data from pumped connected wearables or area monitors at the entry point can provide critical information to monitoring personnel that can save lives.

When the situational information is transmitted, supervisors and/or monitoring personnel can receive real-time safety information—including alerts during incidents—from any Internet-connected device. Cloud-connectivity can be the difference between getting rescue personnel to the confined space with the required information—location, type of hazard—or someone blindly going in and falling victim themselves.

**More than 60%**  
of confined space deaths  
are would-be rescuers.

(NIOSH)

## Layers of communication

Even if there is no connectivity inside the confined space, equipping the hole-watch attendant with a cloud-connected safety device can boost safety and improve response times. That's because they integrate multiple layers of communication to ensure the safety of workers, deliver real-time situational awareness and provide incident management tools.

Available communication features include:

- **Manual SOS latch** so workers can send an emergency call for help.
- **Two-way voice communication** so first responders can connect directly with workers during an emergency.
- **Push-to-talk functionality (using the device like a walkie-talkie) or text messaging** to communicate directly with the hole-watch worker.
- **Proximity-based alerts** that share notifications—like high-gas or no-motion—with other active nearby connected devices for quicker emergency response.

This combination of capabilities allows workers to stay connected, remain protected from hazards, and communicate effectively—all while carrying less equipment throughout their working day. Confidence and peace of mind is also boosted with the knowledge they can get the job done and return home safe.



## ADVANCEMENT #2: DEEP RISK ASSESSMENTS

**While assessing risk prior to CSEs might seem obvious, the statistics tell another story.**

According to one study by the Bureau of Labor Statistics, in all of the recorded confined spaces deaths, [none of the atmospheres were tested prior to entry](#). Gas detection and proper entry procedures are key to ensuring worker protection. And risks go up during events like shutdowns and turnarounds where unfamiliar contractors are onsite or when hot work, such as welding, burning, hot tapping, brazing or grinding takes place. That's why the knowledge gained from real-time data is your superpower when it comes to CSEs.

### Pre-Entry and Continuous Gas Detection

A pre-entry check with a connected wearable multi-gas detector, like [G8 Multi-Gas](#) or connected portable area monitor like [EXO](#), can reveal the presence of toxic gases, oxygen deficiency, or a potentially explosive atmosphere. This helps identify hazardous conditions before workers enter the confined space. The data can also be transmitted in real-time to remote monitoring teams for full situational awareness.

Continuous monitoring is also possible with a pumped gas detector or area monitor. By continuously monitoring gas levels, you can detect fluctuations or emerging hazards, ensuring that confined spaces remain safe throughout the duration of the work.

These devices also give you the ability to label data to distinguish between gas readings taken during pre-entry sampling or while work is conducted within the confined space, making reporting easier for compliance or incident investigations. And with online access to gas readings from entry locations, permit writers are equipped with the crucial information they need.



**LEARN MORE ABOUT THE CRITICAL STEPS FOR CONFINED SPACE ENTRIES WITH A PUMPED GAS MONITOR.**

[WATCH SAFETY MOMENT](#)



### Did You Know?

G8 Multi-Gas can detect up to five gases simultaneously and EXO can detect up to eight.



### Did You Know?

With 100+ days battery life, EXO is the longest-lasting connected portable area gas monitor on the market.

## Personal Gas Detection

- **Automated Alerts:** Know if conditions change while work is being conducted with instant notifications and audible alarms. Gas detectors trigger alarms if dangerous gas levels are detected, even if unconnected. This allows workers to evacuate immediately, preventing exposure to hazardous conditions.
- **Access location and gas readings from anywhere:** Geo-stamped data from connected gas detectors will be transmitted to the cloud. Once transmitted, supervisors and/or monitoring personnel can receive real-time safety information—including alerts during incidents—from any Internet-connected device.
- **Eliminate silos:** Share real-time data and data history with multiple teams within your organization to improve safety today and in the future.



### Todd Connelly

Blackline Safety  
CSE Expert

## SPOTLIGHT: BLACKLINE'S RESIDENT CONFINED SAFETY EXPERT WEIGHS IN

### What are the top considerations when evaluating your CSE approach and safety?

Don't take the hazards for granted. Complacency can be a large contributor to risk. Consider the range of atmospheric hazards that may be present—including those created by the work being done—and review the rescue plan.

### What advice do you give companies when it comes to CSEs?

Understand the confined space and its hazards, properly train and refresh employees on entry procedures, partner with a gas detection technology company for the right confined space monitoring solutions.

### When introducing new technology, how can companies overcome resistance to change?

Clearly communicate the rationale for change (e.g., improved safety), get vocal and visible leadership to champion the change, pilot the new tech in field trials, and get a group of employees onboard to rally behind the new technology. Peer-to-peer messaging resonates the most.

### READ MORE:

[Change Management: Connected Safety Technology Adoption](#)

## ADVANCEMENT #3: CENTRALIZED CONFINED SPACE MONITORING

Also known as remote, digital or real-time confined space monitoring, centralized confined space monitoring ([CCSM](#)) is recognized in some jurisdictions as being equivalent to having an attendant worker physically present.

CCSM integrates real-time gas monitoring, cameras, access control, ventilation equipment, and two-way communication. All components of the CCSM system are monitored by a command center.

---

“An employer may ensure that a competent worker trained in the evacuation procedures in the emergency response plan uses a confined space remote monitoring system instead of being present outside a confined space, at or near the entrance, as required under section 56(3) Occupational Health and Safety Code.”

2023 amendment to the Government of Alberta's *Occupational Health and Safety Act*

---

### Components/Requirements of CCSM

- **Physically located at the same work site** as the confined space being monitored
- **Live visual display** that allows the attending worker to have a clear, continuous and simultaneous view of both the outside entrance and the interior of the confined space
- **Two-way continuous communication system** that allows communication with each worker inside and outside of the confined space
- **Emergency backup power** source in case of a power loss
- **System for summoning assistance** in the case of an emergency
- **Cloud-connected area gas monitoring devices**, like EXO, that can live stream gas readings from inside and outside of the confined space.

## Improving safety, reducing costs

With CCSM, operators can monitor gas detection data from a safe distance, ensuring they can take timely action to protect workers without being exposed to the confined space hazards themselves. It also offers a complete solution to remotely monitor a greater number of confined spaces simultaneously with fewer operators.



## Operational benefits of CCSM vs. conventional approaches

**~30%**  
more  
cost-effective

**80%**  
reduction in at-risk  
labor hours

Source: [InfoSignal](#)

## SPOTLIGHT: THOUSANDS OF RISK EXPOSURE HOURS REDUCED

From plant maintenance to turnaround projects, [Proveo](#), a North American leader in Remote Confined Space Monitoring (RCSM), manages all aspects of CSEs, as well as industrial safety support services. With operational efficiencies, dependable systems and streamlined logistics come cost efficiencies, which they are happy to pass on to clients.

Proveo remotely managed the confined space work conducted during a large bitumen plant turnaround. At peak, Proveo was remotely monitoring 167 confined spaces. This remote monitoring reduced costs by 35% for the client and eliminated 74,000 hours of risk exposure.

## ADVANCEMENT #4: ROBUST ANALYTICS

### Make data-informed decisions

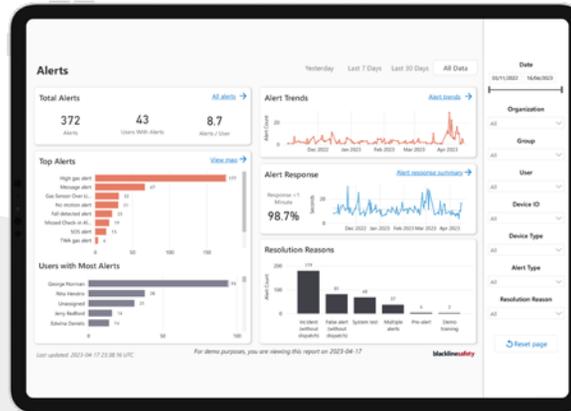
When using a cloud-connected safety hardware and software platform to support confined space entries, not only do you get real-time visibility into the safety status of the location, but you can also make safety improvements, boost workplace performance and manage compliance thanks to insights derived from analytics.

That's because the platform collects, sorts and delivers—automatically and seamlessly—data from device usage into easy-to-read reports to help you understand compliance, alerts history, gas exposure and more.



Compliance and fleet management analytics help you make sense of trends in compliance and stay on top of fleet maintenance. For example:

- Usage and compliance
- Bump tests and calibrations
- Device logs



Performance and safety analytics help you move beyond compliance and monitor performance and safety trends in your company globally, regionally, or within teams. For example:

- Alerts
- Gas exposure
- LEL-MPS readings



“Data collection and analysis is the present and future of the industrial sector. With the data we’re able to collect, track and analyze, we can respond and adapt quickly if there is a risk of gas exposure, and look back to take steps to mitigate that risk in the future. Data is a driving force in keeping our people safe and supporting our commitment to the environment.”

**Mark Silvester, CEO, Enovert**

In the case of CSEs, leveraging analytics from connected devices, either wearables or area gas monitors, can lead to proactive safety. Companies are using them to more easily search for patterns, get in front of emerging problems faster, manage compliance and support incident investigations. They also support better planning and preparation, reducing the likelihood of unexpected hazards during confined space entry and boosting the information and training needed for emergency responses.

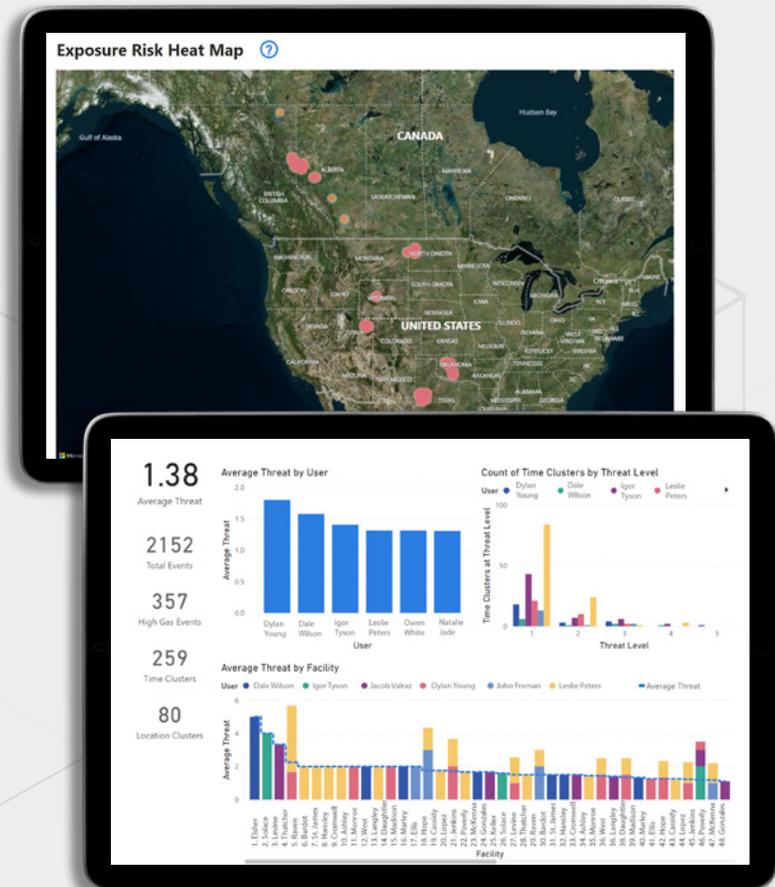
Data analytics helps answer questions like:

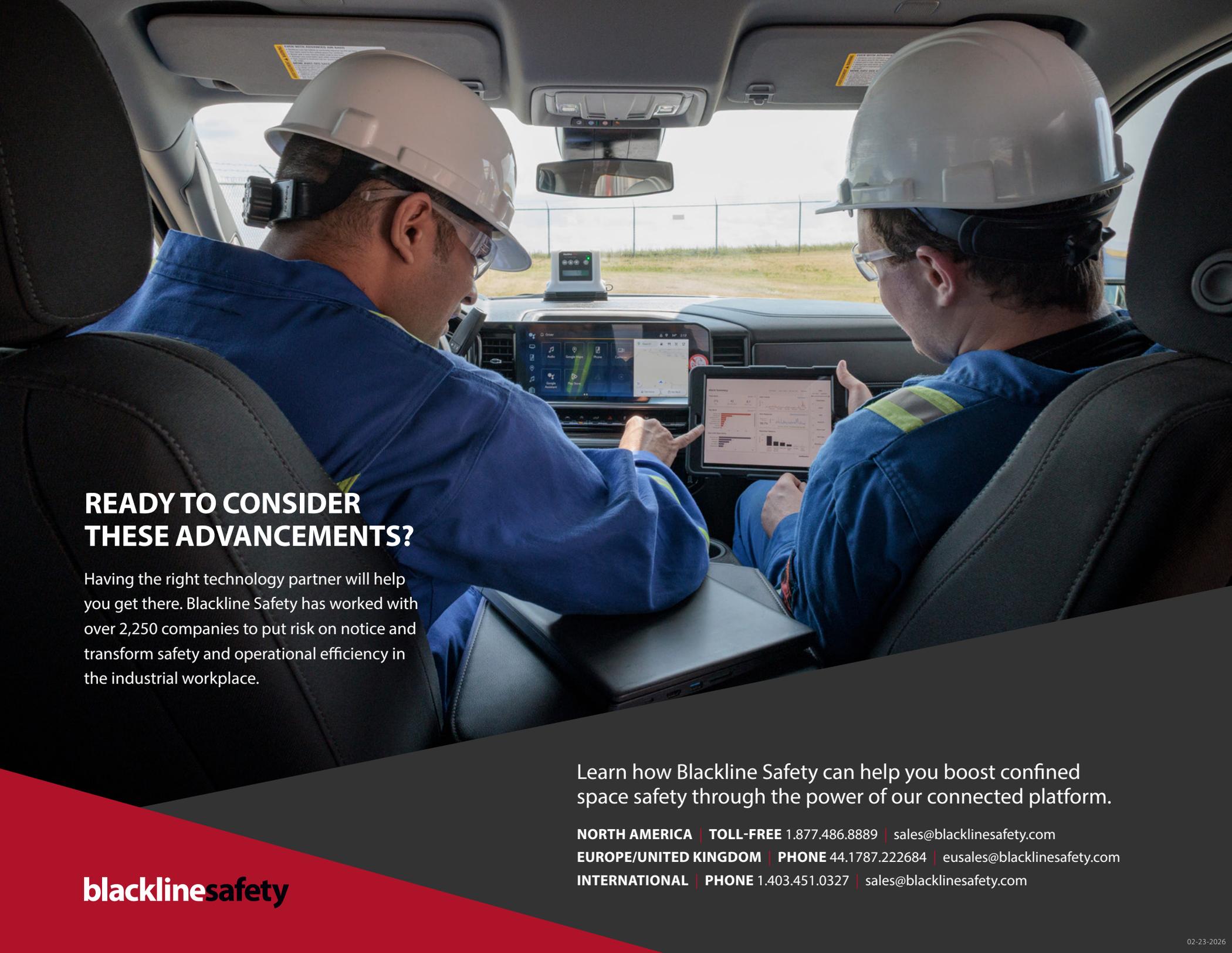
- When and where are workers entering confined spaces?
- Where are they being exposed to gas?
- What are the risk exposure hours?
- Are there recurring spikes in gas levels at specific times or locations?
- What are the differences between gas readings taken during pre-entry sampling or while work is being conducted in the confined space?

## REAL-LIFE CASE STUDIES

### Identifying high-risk sites to put proactive safety measures in place

- An upstream oil & gas company, operating in both the U.S. and Canada and employing thousands of people, oversaw several worksites and offices across both countries.
- Due to its cross-border, multi-site and multi-application operations, detecting gas levels and ensuring the safety of lone workers was a considerable challenge. The company's HSE team solely relied on workers reporting every safety incident, which in many cases failed to happen due to the fear of retribution or disinterest in filling out paperwork.
- The company deployed Blackline Safety's connected safety wearables, which provided them with significant data on worker movements, gas exposure and more, across every site and office.
- As a small HSE team with limited time and resources, the company sought out Blackline Safety's data services experts to analyze the device data and prioritize the biggest threats to its worksites and the riskiest behavior.
- The real time nature of data coming from the G7 wearables ensured they had constant visibility into risk trends across all their sites.
- Long term analysis of risk patterns allowed them to proactively measure and mitigate risky behavior with improved training, signage and information.





## READY TO CONSIDER THESE ADVANCEMENTS?

Having the right technology partner will help you get there. Blackline Safety has worked with over 2,250 companies to put risk on notice and transform safety and operational efficiency in the industrial workplace.

Learn how Blackline Safety can help you boost confined space safety through the power of our connected platform.

**NORTH AMERICA** | TOLL-FREE 1.877.486.8889 | [sales@blacklinesafety.com](mailto:sales@blacklinesafety.com)

**EUROPE/UNITED KINGDOM** | PHONE 44.1787.222684 | [eusales@blacklinesafety.com](mailto:eusales@blacklinesafety.com)

**INTERNATIONAL** | PHONE 1.403.451.0327 | [sales@blacklinesafety.com](mailto:sales@blacklinesafety.com)

**blacklinesafety**