

What Is Your Life-Saving Gas Monitor Trying to Tell You?

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BY JOSH FUTRELL



INDUSTRIAL SCIENTIFIC CORPORATION

Competitive pressure continues to increase how much we all try to get done in a given day. During the course of a busy shift, workers in some of the most hazardous jobs will interact with dozens of pieces of equipment whose proper use can lead to life-or-death consequences. For protection from gas hazards, this often means working with a range of gas detection equipment, from personal monitors to area monitors and fixed systems that typically are made by different manufacturers.

The Challenge with Diversity

This diversity in equipment leads to a range in how hazards are communicated in terms of lights, sounds, and displays. One manufacturer uses a certain icon to indicate an alarm condition, but another uses a completely different icon. One monitor only has red lights to indicate all kinds of statuses, from high gas alarms to a battery in need of charging, while another uses red and blue, and yet another uses red and green. A fixed system uses custom-tailored and audible and color alarm patterns for each type of gas hazard; this is almost always different from any other portable gas detectors in use at a site because those monitors typically do not have this level of flexibility.

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many different ways, none of which clearly and efficiently tells the story of what's happening.

All of these equipment differences lead to challenges for training personnel who are tasked to equip workers with the knowledge they need to decipher what their gas detectors are telling them. With worker turnover increasing as the economy rebounds, it is becoming even more difficult to ensure that people know how to respond to hazardous conditions. Even those with a lot of experience on site might struggle if you ask them, "What are you supposed to do when you have a low alarm of CO? Is that different than a low alarm of O₂?" (Hint: It probably is.)

The simplest approach has often been to just train people to respond first, assess later. During a recent project, I was told by a safety manager of a large oil and gas refinery, "We tell our guys: If it beeps, get out."

While this greatly simplifies training and avoids moments of confusion, it leads to more incidents of work stopping. Not only does this hurt productivity and cost money in very tangible ways, it creates risks in other intangible ones: workers getting hurt as they attempt to stop work and leave, workers becoming desensitized to alarms and failing to respond when there is a critical event, workers mistrusting equipment, etc. A more nuanced approach is often needed, which adds to the overhead of training.

Progress in Simplifying Hazard Communication

Portable gas detection manufacturers have been working to overcome these challenges for years. The industry has trended toward multi-color visual alerts that are used to communicate the differences between critical and non-critical events. Displays have moved toward graphical displays (which are able to display anything on them) versus segmented displays (which are restricted in terms of what icons and characters can be used). And the ability to configure equipment, tailoring it toward an individual company's policies and procedures, has increased.

However, there is still a long way to go. Detectors that use multi-color visual alarms often rely on green or yellow LEDs in conjunction with the standard red. These are hard to distinguish for parts of the population with color deficiencies or blindness. Graphical displays, while capable of presenting more complex information, are still limited in size, often no more than an inch or two across. While this might not present much difficulty for users of handheld devices (provided they have "young enough" eyes), it creates a large obstacle in area monitors and other pieces of equipment that might be at some distance away from users when they go into alarm.

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Text-Based Alarm Action Messages

One of the newest approaches to communicate gas hazards is the use of text-based alarm action messages. In addition to showing traditional gas readings, managers can create a customized message for each level of alarm for each gas type. For example, instead of just seeing an oxygen reading of "18.5% VOL" and a flashing low alarm icon, workers can also be presented with the message "WEAR SCBA" on their monitors. Instead of an explosive gas reading of "40% LEL" and a flashing high alarm icon, workers can be presented with the message "EVACUATE."

Teams do not have to think back to their training to try and recall company policy for a particular event. The policy can be presented in the moment, almost as if teams have a safety trainer with them at all times. This previously unprecedented flexibility improves safety, avoids confusion, and decreases hazard reaction time for users. It also takes experience level out of the question. Regardless of whether a worker is new to the job or site or has years of experience working in and around gas hazards, text-based alarm action messages get them to respond appropriately and quickly. This can greatly simplify the training programs that are needed, shaving hours off of the curriculum and allowing the teams to focus more on appropriate responses and less on interpreting the "beeps and blips" of equipment. This ultimately helps to ensure that work stops only when it *needs* to.

Wireless Communication

Another innovation in portable gas detection that is helping to improve the communication of hazards is the advent of wireless. Using mesh networks, Wi-Fi, or other RF approaches, portable monitors can be linked together, most often for the purpose



of communicating alarms and data back to a central control station. By investing the time and money currently necessary to add wireless infrastructure and complex systems, companies can see in real time what is happening on their sites. As of today, wireless in gas detection is used primarily to enhance the response of people *outside* of the hazardous area. People a mile away can have an increased awareness of what is happening in the field; people 20 feet away from a hazard do not typically get the same benefits.

This won't always be the case. In the near future, as wireless gas detection gets easier to deploy and more pervasive, it will become about more than slinging data far away. It will be about connecting workers together to help them watch each other's back during hazardous jobs and respond appropriately. It will become about bi-directional communication between central control and workers in the field, allowing more than just gas-related information to be shown on gas monitors (for example, central control could push a message to all workers such as "MUSTER" or "LIGHTNING STRIKES"). Wireless will become more about integrating different systems together, blurring the line between portable gas detectors and fixed systems.

Looking Ahead

A day will come in the future where con-

figurability of equipment reaches a point where it will be possible to have a completely cohesive and synchronized system: portables, area monitors, and fixed systems at a work site all working in concert and using the same means of communicating hazards in terms of lights, sounds, and messages. No more time will need to be spent on translating what each device is trying to tell you. No more trying to remember whether that audible pattern is for H₂S or explosive gases or if a flashing yellow light is good or bad. Everything will speak clearly, in plain English (or Spanish, or French, etc.) and in the same words. And, at that time, the communication might not even happen on the portable gas detector itself; there might be other wearable devices that help tie all communication together.

Until then, gas detection equipment manufacturers continue to strive to find ways to make their individual products better at grabbing and directing workers' attention. And those in the field continue to try to find ways to make their gas detection policies and programs simple enough to be understood by everybody. All these advances are in an effort to help workers know where and when the line needs to be drawn to keep safe. **OHS**

Josh Futrell is a Product Manager, Instrumentation, for Industrial Scientific Corporation (www.indsci.com).