

Knowledge is the First Line of Defense

Plugging the Experience Drain in the HazMat Response Community

Maintaining Readiness is a Constant Undertaking

As a metaphor for picturing the maintenance of preparedness someone once told me to imagine a number of 5 gallon buckets where each one represents some aspect of readiness like detection, Personal Protective Equipment (PPE), communications, training, etc. Each bucket is filled with water and ideally each would stay filled representing a steady state of preparedness. But in reality each of these buckets has a hole in it and they are all constantly leaking. Each bucket leaks at a different rate. And the hole sizes can vary unpredictably with time. The challenge is to keep each bucket from drying out. I'm concerned that the training bucket may be drying out for many response organizations. Specifically, I'm seeing that detection skills are weakening across the first responder space. I'd like to examine the reasons for this loss of competency, discuss a success story and propose how we might move forward.



Passing the baton

There was a lot of competency built up in the first responder space in the post 911 era. But in the years post 911 a lot of the professionals who honed their skills in the years after 911 have or are soon to retire and with them goes competency that many times is not replaced. For a number of reasons, it seems that the baton of gas detection expertise is not being passed onto the next generation. And there is a lot of wisdom and knowledge that is being lost. A county Hazmat team did a drill with a well-outfitted, well-trained, motivated, young federal response team. Before the federal team could finish turning on all of their cutting edge detection technologies the oldest guy on the county team had already solved the gas detection challenge of the drill using "old-school" colorimetric technologies. He was having a coke and resting before the new technology had even gone down range. Many HazMat responders reject colorimetric tubes as an old, unsophisticated technique that has a short shelf life. But the name of my colorimetric tube course: "The older I get the more I like tubes" pretty much states my position on this subject. I find that when one gets "lost" during a challenging gas/vapor response the FIRST next step after common first-in 5 sensor multi-gas detectors should be tubes. I find a strong correlation between gas detection competency and routine usage of tubes. When I ask who has used tubes this year when I teach the hands raised are mostly those of grey haired individuals. The lesson here is that sometimes older techniques and wise responders can beat youth and advanced technology.

Rotational Rules

As someone who has provided both product specific and gas detection theory training to the HazMat space for over 20 years, true gas detection competency starts after 5 years of practice. One might be able to be trained to know how to turn on and run the wide array of detection technologies available to response teams in just 2 years of training. But truly understanding how a variety of detection technologies fit together in the big picture takes 5 or more years. One of the fundamentals that I teach about gas detection is that sometimes the big picture is made up of many smaller pictures. But organizations that rotate personnel at 2-3 year cycles make it difficult to maintain true competency because it's hard from them to assemble the big picture from many different technologies. They may not even know all the technologies they should be using. Wisdom is earned over time, not taught.

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The “CSI Effect”

The CSI effect is a belief held by some that forensic science television dramas, such as *CSI: Crime Scene Investigation*, influence American jurors to expect more forensic evidence in order to convict defendants of crimes. When I was at RAE Systems CSI Miami introduced a MiniRAE 2000 into their plot line for an episode. But in the episode they over represented our Photoionization Detector (PID) to have the identification capabilities one would associate with a portable gas chromatograph/mass spectroscopy (GC/MS) device rather than the simple sniffer that a PID really is in reality. As applied to the first responder/HazMat space I believe that for some people they believe that “magic” technological solutions can solve every problem. Reliance in this “magic” seems to be higher in younger generations rather than older generation. Technology may even work against us. Years ago new HazMat team members got assigned the, potentially tedious, role of calibrating detectors by hand. This ultimately gave these people “muscle memory” from pushing the buttons and turning the dials of the detectors and they gained competency and experience that ultimately benefited them during actual responses. They may have ultimately graduated to the role of the “detector person” for the team. But with the advent of automatic calibration or “docking” stations new team members don’t get to gain hands on experience during the relatively low risk process of calibration. That calibration station is never going to graduate to become the detector guy!

What are the Ingredients to a Successful Long-term Program?

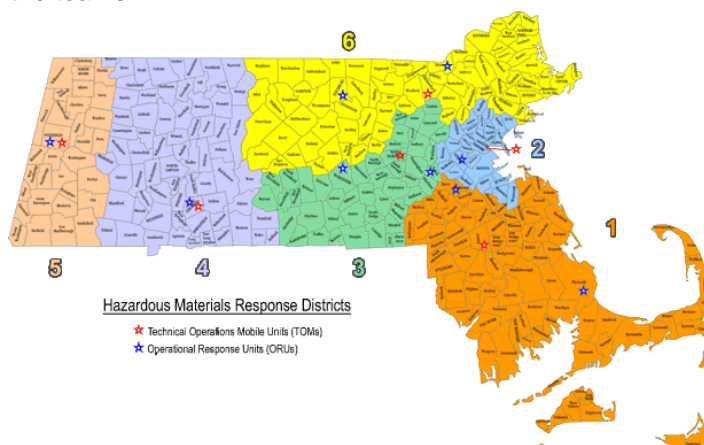
Having taught throughout North America and the world I’ve noticed that some programs are able to maintain a consistency of competency while others do not. Programs remain consistently good due to:

- **Money:** ultimately program success is based upon money to pay for personnel, equipment and training. More money makes it easier to remain successful
- **Leadership:** Often a charismatic or politically connected leader can build a program and keep it going for years only to have it atrophy after their departure.

Massachusetts, a success story

Let’s look at a state program that has consistently successfully maintained competency: the Commonwealth of Massachusetts. In 1980 there was a phosphorous trichloride spill in Somerville, MA and the response was deemed less than adequate which lead to the formation of a statewide hazmat response program. Now 14 regional state response groups are available for HazMat response. Each responder gets a yearly stipend that counts towards their retirement. This provides both immediate incentive to do HazMat respond and a heavy incentive to stay with it thru retirement. That way experience isn’t lost. Yearly training requirements maintain competency and the bar to enter is high. Yet they have a waiting list to join the teams.

- **Six Regional Response Teams** are strategically located for a maximum of 1-hour response anywhere in the Commonwealth. The Regional Teams also support local fire departments with technical information and specialized equipment.
- In 1982 the governmental officials created a task force to investigate the most uniform and cost effective way to address Hazardous Materials Emergency Response. It was determined that a regionalized approach to response would be the most effective. The Commonwealth was then divided into six regions, by fire district, and a response team was staffed for each of the six districts.



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- In 1994, through cooperative efforts of the Executive Office of Public Safety, Fire Chiefs' Association of Massachusetts, the Professional Fire Fighters of Massachusetts, and the Massachusetts Association of Hazardous Materials Technicians, a proposal was made to the Administration and Legislature for establishment of a funding mechanism to create a standardized regional response for the mitigation of all hazardous material incidents. A bond fund was issued for the creation of the program to establish a statewide, standardized, hazardous materials regional emergency response plan. The funding enabled the Commonwealth to provide state-of-the-art [equipment](#) and [training](#) .

Detectors need detectives behind them to come to make the right decisions

One thing I point out in every class that I teach is that detectors are essentially dumb devices that sense and output a number. They are highly dependent upon the person using device to interpret number and make an educated assumption on what it means. Even in the future represented by the Star Trek TV shows and movies they gave the tricorder to Spoke, the science officer. Put another way even the “magical” Tricorder needed to be interpreted by the most intelligent person on the spaceship. Training, experience and knowledge are the answer.

About the Author

Christopher Wrenn is the Vice President of Americas Sales for AEssense Corp., a Silicon Valley developer and manufacturer dedicated to providing innovative technological solutions for plant growers worldwide. Previously Chris was Sr. Director of Sales and Marketing for Environics USA, a provider of sophisticated gas & vapor detection solutions for the military, 1st responder, safety and homeland security markets. Chris was also a key member of the RAE Systems team, helping to grow RAE's revenues from \$1M/yr to nearly \$100M/yr in the above mentioned markets. Chris can be reached at chriswrenn@att.net.

Chris has extensive experience teaching gas and vapor detection and has been a featured speaker at more than 100 international conferences. He has written numerous articles, papers and book chapters on gas/vapor detection. Mr. Wrenn has received the following awards:

- 2011 “Outstanding Project Team Award,” in recognition of outstanding service and dedication to the Real Time Detection Registry Team presented by the AIHA (American Industrial Hygiene Association) President
- 2015, received the James H. Meidl “Instructor of the Year” award at The Continuing Challenge, Sacramento, CA presented by CA State Fire Marshal
- 2016, received the “Level A Award” from the International Hazardous Materials Response Team Conference “For your Leadership Service and Support to the Hazardous Response and Training Program.”