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Incendiary Findings

By DAVID WHITE/Industrial Fire World Publisher

Occam's razor is a principle stating that an explanation requiring the fewest assumptions is most likely to be correct. By contrast, the report issued by the Bureau of Alcohol, Tobacco, Firearms and Explosives about the fire preceding the April 2013 explosion in West, TX, asks us to accept assumption in lieu of evidence.

A $2 million investigation by the ATF and other agencies ruled out all accidental or natural causes for the fire at West Fertilizer Co. The fire that detonated 30 tons of ammonium nitrate fertilizer, killing 15 people and injuring more than 200, was "incendiary, a criminal act," the ATF charges.

At least that is the assumption. It is the only hypothesis that investigators could not eliminate. Yet nobody has been charged with a crime. Can you even call it an alleged crime if there is no evidence other than the investigator's supposition?

Taking the infallibility of the ATF on faith about something as horrific as the West explosion seems unfair to the community. These people are still trying to stitch their lives back together. Along comes the feds not to alleviate their fears but foster nagging doubts and dread based on nothing more substantial than process of elimination.

If no chance of prosecution exists, why even promote the theory of potential foul play? Does West need its own private "grassy knoll" to debate ceaselessly about for the next half century?

I wonder if the ATF is sending mixed messages about the safety and reliability of ammonium nitrate. In April 2014 I spoke at a public meeting held in West by the Chemical Safety Board to release its preliminary report about the disaster.

"I want the government or industry to do some research because I want to know why at West we had one building full of ammonium nitrate explode and kill a bunch of people, yet we had another one catch fire not that far away that did not." That other fire was in Bryan, TX, in July 2009. A fertilizer facility burned to the ground without detonating nearly 550 tons of ammonium nitrate stored there.

Glen P. Corbett, an associate professor of fire sciences at John Jay College of Criminal Justice, told CSB board members that the handling of ammonium nitrate tends to be a "bi-polar issue."

"On one hand we think of it as this innocuous fertilizer and, on the other hand, we think of it as an explosive," Corbett said. "The (fire) code reflects that sort of ambiguity." Little research exists on ammonium nitrate in its working "habitat," such as storage or handling, he said.

The ATF's certainty in eliminating "accident or natural causes" seems even stranger when ammonium nitrate lies at the heart of a quite different federal investigation. Faulty auto air bags, some of which have exploded upon deployment, have caused more than 100 injuries and at least 11 deaths.

Independent studies and the National Highway Traffic Safety Administration have reported that high humidity and high temperatures puts drivers at a significantly greater risk from airbag mishaps. Both affect the stability of the ammonium nitrate used as a chemical inflator in airbags.

The NHTSA recently told the New York Times that "long-term exposure to environmental moisture and wide temperature fluctuations over time can degrade the propellant used to deploy the airbag, making it unstable and prone to unexpectedly explode."

ATF and NHTSA seem to be working at

Continued on Page 29

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David White

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Singapore firefighters battle tank fire

Photos courtesy of SCDF

Singapore firefighters take up positions during a light crude storage tank fire in April that took five hours to extinguish.

Firefighters working for the Singapore Civil Defense Force (SCDF) managed to successfully extinguish an oil tank fire at a storage facility and to contain the fire to a single tank. The blaze started on April 20th, and was extinguished after a five-hour long operation, with only 60 minutes of active firefighting.

The facility is located on Jurong Island – a large industrial complex housing several hydrocarbon and petrochemical processing, manufacturing and storage facilities. When the tank ignited, SCDF's team went into action to isolate and contain the fire, preventing it from spreading to nearby tanks. The tank, which contained light crude, measured about 131 feet (40 meters) in diameter and 65 feet (20 meters) in height, and was built with an open floating roof tank with a geodesic dome. Fires involving tanks with geodesic domes are extremely rare.

SCDF's trained personnel responded to the blaze with a new, customized rapid intervention mobile package produced by Tyco, including the Williams Fire & Hazard Control (WFHC) brand big gun Ambassador monitor which can shoot 6,000 gpm of foam onto the fire, the WFHC's Dependapump, and large diameter hose. Since 1994, the SCDF has received training from the WFHC team. In more recent years, the team has been trained to use the patented WFHC Footprint Method which is taught at the WFDC Xtreme Fire School.

"The SCDF have done a lot to ensure their team members are well prepared for events like this, as shown by their success in responding to the fire on April 20th," said Michael Sorensen, sales leader for Tyco Fire Protection Products. "We've worked with SCDF for more than 20 years to ensure they have the right products and the right training. About twelve months ago their teams were retrained to ensure the responders could respond quickly and efficiently using the fundamentals of the WFHC Footprint Method."

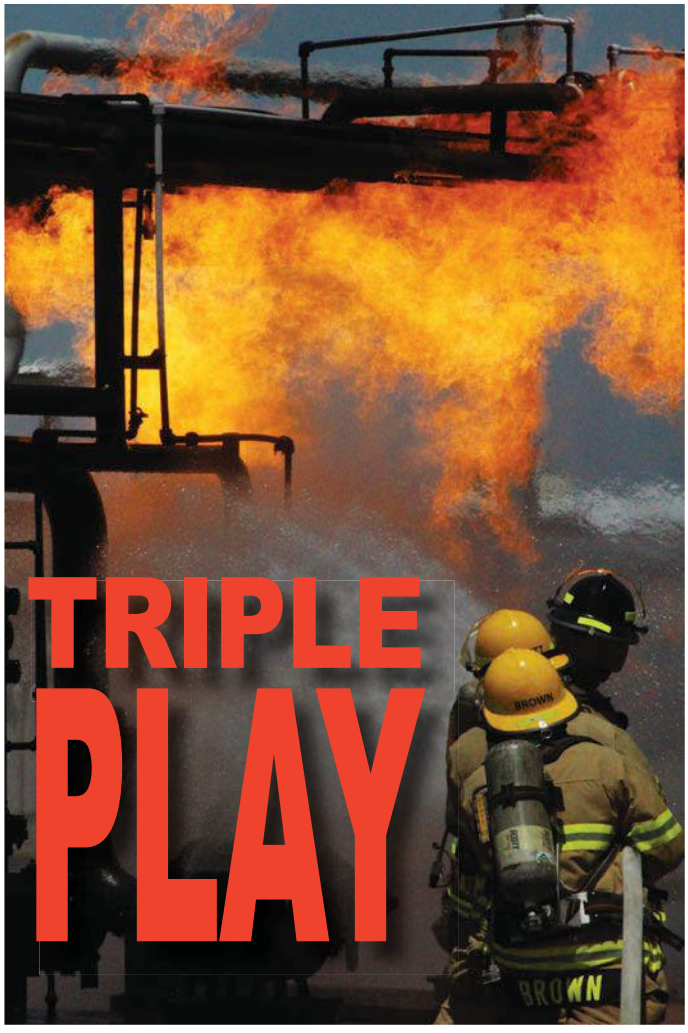
• XTREME school held in Beaumont, Pages 10-15

The region has seen several significant fire tank events since the start of April: a single tank fire in Samoa that burned for two days, a two tank fire that burned in China for 1½ days, eight storage tanks that burned in Southeastern India at a biodiesel facility, and this single tank event in Singapore. For the Singapore event, of the 150 personnel called to the scene, only a handful were needed to actively manage the big gun foam monitors. The majority of the team's time was spent preparing for the application on the tank. The fire was extinguished within five hours.

As a part of Tyco, WFHC boasts a successful history of responding to over 200 flammable liquid, gas, and pressure-fed fires throughout the world. Such success inspired a full line of specialized response equipment including specialty foam nozzles, high-flow transportable firewater pumps, foam concentrates, monitor trailers, apparatus and portable foam proportioning systems, dry chemical extinguishing packages and engineered systems. From storage tanks and pipeline emergencies to marine vessels at sea, response personnel and specialized equipment stand ready around the globe to overcome the industry's worst fire emergencies.

At top, a portable pump is brought to bear. Middle, left, the tank in full bloom. Middle, right, firefighters maintain a foam blanket. Bottom, left, firefighters use a monitor on the tank fire. Above, water streams directed at the tank fire.

Oil giants merge continuing efforts to keep firefighters ready for action



BP's semi-annual corporate fire school at Brayton Fire Training Field in Texas is steadily growing into a collaborative effort with Marathon Oil, a BP spokesman said. Half the students attending the school in April 2016 work for Marathon.

Brad Byczynski, BP's global response manager, attributes the joint operation to the "BP-Amoco-Arco heritage" of maintaining a strong fire training program.

"It makes sense to continue to collaborate," Byczynski said. "Marathon certainly believes in the training package that BP has put together."

Mark Garvin, fire chief with Marathon's Galveston Bay refinery, said other Marathon emergency response teams showed immediate curiosity about the BP fire training after the Galveston Bay facility was acquired by Marathon in 2013.

"It's a fairly well established curriculum but I still have input into it," Garvin said.

The Galveston Bay facility has participated in previous BP corporate schools, he said. Twenty members of the Galveston Bay ERT are on hand for the latest BP school at Brayton.

Photos by Anton Riecher

At left, firefighters tackle a daytime live-fire exercise. Above, firefighters reach the third of three props burning at night.

"The majority of these guys are new firefighters, so this is quite an experience for them," Garvin said.

Byczynski said the size of the April school is significantly impacted by spring turnarounds at BP facilities. Cost pressure throughout the oil industry is another factor.

"It puts people in the position of not necessarily eliminating training, but certainly deferring it," Byczynski said. "It is still an essential part of doing business."

The April class was entirely domestic with no overseas students, he said. However, participation was extended to several municipal fire departments with BP facilities in their jurisdiction.

Curriculum for the April school consisted of a benchmark of the BP fire training program – "Mass Exterior I." Byczynski described it as fundamental fire fighting based on the NFPA 1081 standards for industrial fire brigade professional qualifications.

"We make sure to stay in stride with technical innovations," he said. "But the underlying principles, the basic methodology in terms of response, haven't changed, be it hose handling, fire chemistry or using fixed or portable master streams."

The BP-Amoco-Arco relationship with Brayton stretches back to the early 1970s. In 2006, BP donated a $500,000 state-of-the-art liquefied natural gas training project to Brayton. However, BP has conducted fire training schools in Malaysia and Australia and is pursuing training opportunities in Europe, Byczynski said.

"Obviously, the challenge is delivering the BP program to international students," he said. "While we appreciate the size and scale of what can be done here, getting them all the way to Texas A&M is a pretty heavy lift."

At Brayton, the climax of the April school was a night burn involving three different projects – the pipe rack, process unit and pipe alley. At least two of the three projects burned simultaneously during the exercise. See the video at https://www.youtube.com/watch?v=j8gfQ39ywDs.

Still, Byczynski said the triple play scenario was pretty standard for a BP fire school.

"There's probably nothing really dramatic about it for us."

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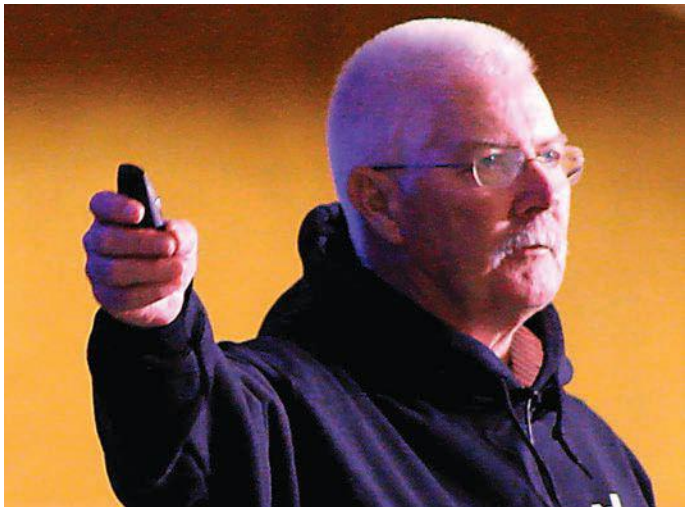


Above, Robert Moore, Emergency Services Training Institute director. Other photos show Channelview after the blast..

Channelview, TX - 1990

Texas A&M fire school director played major role in saving devastated chemical complex

Robert Moore learned the importance of planning early in his fire fighting career. In 1990, he was the assistant chief of the Channelview (TX) Volunteer Fire Department when an explosion and fire killed 17 people at an industrial chemical complex on the Houston Ship Channel.

To make matters worse for Moore, he also happened to be the safety supervisor for the chemical complex.

"I have the dubious distinction of being one of the fire chiefs at a chemical plant that had a major explosion with a massive loss of life," Moore told responders attending the Xtreme Industrial Fire and Hazard Training in April in Beaumont, TX.

The explosion and fire affecting an area of the complex comparable to a city block originated in a 900,000-gallon chemical waste tank. Unbeknownst to plant personnel, a chemical reaction in the tank's contents began to generate a pyrophoric fuel/oxygen atmosphere.

At 11:21 p.m. on July 5, 1990, the tank exploded, hurling its 24-ton roof into a parking lot 600 feet away. All the fatalities resulted from the initial blast with no other casualties reported.

"How many of you would ever think that a waste water tank is going to blow up?" Moore said. "What does waste water from a chemical plant have in it? It's got hydrocarbons. Also it had peroxide, which is an oxidizer."

Information released by the company states that the tank was taken out of service to repair a vent gas compressor. Normally, a nitrogen purge kept the vapor space inert and an off-gas

compressor drew away the hydrocarbon vapors.

Workers reduced the nitrogen purge to a minimum during the maintenance. Unfortunately, a sensor to detect any dangerous oxygen buildup was badly placed in an area where the air remained stagnant.

Flammable atmosphere filled the tank's headspace and the piping to the compressor. Attempts to restart the compressor ignited the vapor, triggering the explosion.

Not enough emergency response teams put sufficient thought and effort into pre-planning, Moore said. Since the wastewater tank was considered relatively safe, no pre-plan existed. As for training, some experiences are so overwhelming that the best firefighters find themselves staggered.

"I had the best fire brigade there could be," Moore said. "But they had never dealt with anything like fatalities, especially fatalities that were their friends."

Moore got on the scene to find his ERT in disarray. As soon as mutual aid arrived Moore ordered his brigade back to their primary jobs as process operators. Flames threatened the source of instrument air needed to operate remote valves.

"When we lost instrument air, all the valves returned to their default settings," Moore said. "All the deluge and sprinkler systems tripped."

Safely shutting down the process unit depended on reestablishing instrument air. It became doubly urgent because workers were still struggling to "crash" the neighboring facility, a propylene oxide plant, he said.

"The right place for ERT members was not out there fighting the fire," Moore said. "They had the knowledge to shut down the process unit safely."

Worse, the explosion demolished a fire protection monitor, compromising the fire water system. By the time the damage could be isolated, only two feet of water remained in the 4.5 million gallon fire water pond.

"We had to wait on the fire boats to come in and hook up to the system from the barge dock to rebuild pressure and get the fire water system back up," Moore said.

Accounting for personnel under such extreme conditions is difficult, he said.

"I had them fighting fire in ditches down by the outfall," Moore said. "I didn't know where they were."

For mutual aid, Moore depended on Channel Industries Mutual Aid (CIMA), a non-profit organization combining fire fighting, rescue, hazardous material handling and emergency medical capabilities of the refining and petrochemical industry in the greater Houston metropolitan area. Moore served eight years as a CIMA specialist.

"I always told my guards, 'If I need CIMA, I'm going to call you,'" Moore said. "'You will use the radio to request a zone one call.' When they did, I had 108 companies responding to me."

Such a large number of responders can be both comforting and demanding, he said. Resources must be managed correctly.

"We always start defensively until you figure out what you have," Moore said. "When you know what you have, you can begin to act offensively and take care of it."

In lieu of adequate pre-planning, the best move a fire chief can make is to locate an ERT member who has actual experience as an operator of the unit ablaze.

"Use that person as a resource," Moore said. "They know more about that unit than you do. Utilize the people who know."

Storage tank fires can be fairly predictable, Moore said. Process unit fires are not.

"I'm not saying that storage tank fires are easy to deal with," he said. "They're resource intensive at the best of times. But you know where the fire is. It's going to stay in that tank."

Drainage of runoff quickly becomes a critical issue, he said.

"Back in the days of surround and drown, that created a lot of problems," Moore said. "If you put that much water out there you will have to deal with it at some point. Know where the ditches go. Know where everything drains to. If you've got a burning liquid that floats on water, the fire is going to travel too."

If that burning liquid is drawn into the sewer system, flames can pop up anywhere and greatly extend the fire, he said.

Under certain conditions, it might be better to tell the operators to increase flow to the maximum rather than isolate the unit, he said. It helps take away the heat.

"Say you've got a fire burning in a pipe rack and you tell operations to isolate it remotely," Moore said. "You may have just created a bomb. When it starts heating up and pressure builds, the pipe is going to come apart, creating more problems."

Expect spill fire when dealing with any burning process unit."Where is it going to go if a pipe opens up?" he said. "To the ground and into the sewer system. You are going to have a three-dimensional fire. Making those isolations might create a BLEVE risk. You may have a pressure vessel involved."

Flame impingement might even lead to structural collapse.

"I was actually at a fire on the ship channel where a distillation column started leaning over," Moore said. "Remember the rule – the collapse zone is generally 1½ times the height of the structure. You need to be outside that zone."

Losing instrument air was only one of the major problems at Channelview. Drawing air into a system that requires a vacuum can be just as hazardous.

"If you have a fire nearby, it can start sucking flames into the system," Moore said. "Also, the noise from several thousand pounds of rushing air is enough to kill all communications. You can't hear."

Watching the operators closely when communications is impossible can be a good indicator of the severity of the situation.

"If you see those operators running around, you know there is a problem," Moore said. "I can say that because I was an operator at one time. We didn't move too quick unless there was a problem."

The process underway may represent a wide variety of temperatures, everything from cryogenic to exothermic.

"It might involve multiple feed stocks with different boiling points, different flash points and even different vapor pressures."

Decisions made during an on-site emergency can also have wide ranging impact off site, he said.

"Most plants have a community around them," Moore said. "It might not have been there when the plant was built but it's there now. Cities get bigger and start to encroach on your safe zone. You have to think about hospitals and schools that may be around."

The threat to the surrounding community might be the deciding factor in whether the fire should be extinguished at all, he said.

"Think about what's burning," Moore said. "Is it vapor? Under pressure? It might be safer to just let it keep cooking and burning off. Don't get too zealous and say, 'Look, we can put this out,' because you might have to deal with a flammable vapor cloud looking for an ignition source."

Testing responders even further, the 1990 Channelview emergency included a fire on a cooling tower. The solution involved placing a fire truck with a deck gun next to the tower and drafting from the fire water system basin.

"Don't try to fight the fire on a cooling tower," Moore said. "I mean the specific fire itself. Get some water, throw it on top and stop it that way. If you try to fight the fire where it is at, you're going to lose that cooling tower."

Channelview was only one of a series of industrial disasters during that period. Only eight months earlier an explosion and fire at another chemical complex on the Houston Ship Channel killed 23 people and injured more than 300.

Dealing with the aftermath of the explosion and fire at Channelview became a career changer for Moore.

"It's one reason why I'm at Texas A&M today," Moore said. "I dealt with that situation for the next five years. When it was over I cried 'Uncle' and went to A&M to teach about it instead."

XTREME returns to Texas A&M in June 2017

Photo by Anton Riecher

A live-fire exercise utilizing a storage tank prop at BEST in Beaumont, TX, was conducted during Xtreme in May.

Tyco Williams Fire & Hazard Control's annual Xtreme Industrial Fire & Hazard Training will celebrate its 24th anniversary in 2017 by returning to the fire school where it originated at – Brayton Field in College Station, TX.

Robert Moore, director of the Texas A&M Engineering Extension Service's Emergency Services Training Institute, said discussions to conduct the Xtreme school at Brayton have been ongoing for years.

"It just makes sense to have one of the best fire schools operating today located at Brayton," Moore said.

Drawing emergency responders specializing in industrial fire from around the world, the Xtreme school at Brayton is scheduled for June 5 through 8, 2017. Registration for the school through the WF&HC website begins in June 2016.

Chauncey Naylor, director of emergency response training and education for WF&HC, said the first Xtreme schools, then known as the Les Williams Flammable Liquid Firefighting Foam Workshop, were conducted at Brayton in 1993 and 1994.

That the school was soon transferred to the Beaumont Emergency Services Training Complex in Beaumont, TX, was largely a matter of convenience for Williams F&HC, then based in nearby Mauriceville, Naylor said.

"Now that we are part of Tyco International, we have the resources that make the move back to TEEX possible," he said.

To facilitate the move, TEEX plans to construct a 45-foot diameter storage tank to be used in live-fire exercises. Construction will begin before the end of the year, Naylor said.

"It will be eight-foot-tall with a wind girder complete with railing all the way around," Naylor said. "It will have a platform on both sides in case the wind changes during an exercise. It will be a great training instrument."

The storage tank prop can be used with a variety of foam delivery equipment mounted on the rim to an over-the-top foam application using a large-volume monitor.

Moore said that plans also call for the addition of a tank mixer to the existing storage tank project at Brayton to simulate specific emergencies such as packing gland fires.

"Other than that, we have everything that WF&HC needs," he said.

In particular, Brayton has a WF&HC large capacity pump that will be used to draft water from a large pond to support demonstrations of monitors and large-diameter hose.

"That's always been the challenge, the logistics needed to support something like the Xtreme school," Moore said.

Last year, TEEX announced a training partnership that permits WF&HC to conduct certified industrial emergency curriculum such as the Pro Board Fire Service Professional Qualifications System, an international accreditation.

"We're a certified learning center," Naylor said. "We're making sure that even our sales people are trained to a level that meets or exceeds that of the responders we sell to."

As for the Xtreme schools, versions are being cloned for overseas audiences, he said.

"Last September we conducted an Xtreme school just outside Paris," Naylor said. "We have another one in France scheduled for this September and one in Thailand in January. We are also looking at adding another school for South America, probably Brazil."

Plans are also being made to conduct an Xtreme school at facilities operated by TEEX in Abu Dhabi, UAE, he said.

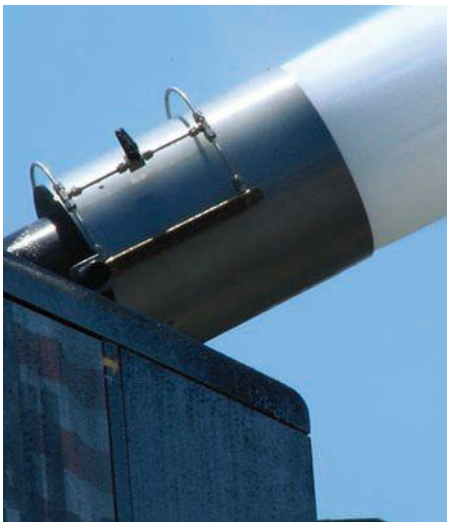
"It's actually hard to gear up to do these schools offshore," Naylor said. "Still, there is a growing demand for it."

Photos by Anton Riecher

At top, the Dependapower submersible package is demonstrated during the Xtreme training in May. Above, the pumps are placed with an articulated crane.

Pump-crane-engine package makes water more accessible

Difficult Drafting Made Easy



At left, the inner workings of the Dependapower submersible package. Above, a Big Gun Ambassador supplied by the Dependapower package.

Williams Fire & Hazard Control's latest development in submersible pump systems played a key role in an elaborate drafting exercise to support the company's Big Gun demonstrations at the annual XTREME Industrial Fire & Hazard Training in May.

The new Dependapower package includes dual submersible pumps, a Palfinger 9001-EH wireless remote control deployment crane and a Caterpillar C9 diesel engine rated at 375 horsepower, all combined in one transportable unit, said WF&HC emergency response and training director Chauncey Naylor.

"It's something we've been looking at for a long time," he said. "Nobody has built anything like this suitable for our use so we built our own."

Large volumes of water are usually the most critical resource in firefighting. However, water is not always readily accessible, particularly when the fire pump is greatly elevated above the water level. Dependapower moves water in difficult drafting situations where a conventional fire pump is limited.

The training exercises utilizing the the Dependapower involved drafting from an Olympic size swimming pool at the Tyco Williams F&HC facility in Port Arthur, TX, to supply water to a 4,000 gpm portable pump. In turn, the pump relayed water to an Ambassador 1x4 remote controlled monitor atop a Pierce fire truck loaned by Formosa Plastics.

Weighing 320 pounds, the pumps can be placed by hand or by using the Palfinger crane integrated into the Dependapower package. Though submersible, the pumps actually float on the surface of the water to avoid sucking up any mud and rocks off the bottom.

The hydraulic pumps can lift 8,000 gpm of water up to 35 feet from a body of water and provide positive discharge pressure. With a maximum vertical lift of more than 100 feet at distances up to 200 feet away, the Dependapower can still lift 6,000 gpm, Naylor said.

"Each pump has two 7¼-inch lines," Naylor said. "One is a main supply hose and the other is a return hose. There is also a small hose we call a case drain line as extra protection against hydraulic leaks."

Other than a brass impellor, the submersible units are aluminum. A hydraulic motor in each unit can operate at up to 5,000 psi. Water is sucked in through the sides of each submersible unit while an aluminum skid plate on the bottom helps keep the intake clean.

Beyond firefighting, Dependapower can be used for flood control, vapor suppression or general water movement. The Caterpillar C9 runs three hydraulic pumps – two dedicated to the submersible units and a third smaller pump that drives an oil skimmer for use in environmental cleanup.

The drum skimmer has a variable control that can be adjusted to higher or lower speeds, depending on the product being recovered, its thickness and the depth it is located.

In too many cases, the digital controls for units similar to Dependapower are designed with pump safety rather than firefighter safety in mind, a Williams F&HC spokesman said.

"If there is an oil pressure code, it will shut off," the spokesman said. "It doesn't care if there are eight guys out there on a monitor and hand line."

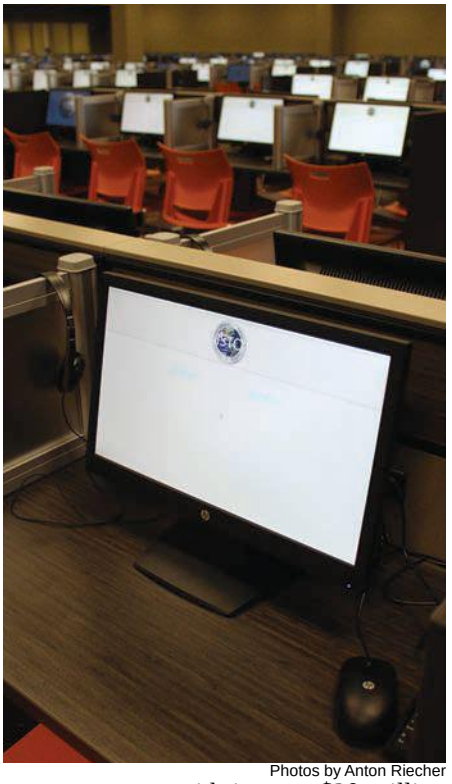
With the Dependapower unless a human operator intervenes the unit will continue to operate as long as possible, even to the point of destruction.

"We allow this because you're just as likely to have an oil pressure problem indicated because a squirrel chewed through a wire as actually having an oil pressure problem," the spokesman said. "We like to have our operators maintain control, not a control system."

Naylor describes the Dependapower as "hitting a home run."

"We've got a versatile submersible built into a real tight package," he said.

At right, Chris Lamson, president of ISTC, presents the group's new training center in Beaumont, TX. Below, one of more than 700 student testing computer available.



Photos by Anton Riecher

Non-profit training group opens new Texas facility

ROOM TO STRETCH

ISTC needed a bigger name to go with its new $20 million state-of-the-art training and conference center in Beaumont, TX. Founded as "Industrial Safety Training Council" in 1991, ISTC is now known as "International Safety Training Council."

ISTC is international primarily through its Beaumont Emergency Safety Training (BEST) complex, said Chris A. Lamson, president and CFO of ISTC.

"People do come from many other countries to train at the fire field," he said.

ISTC opened its new 67,000 square-foot facility in southeast Beaumont in April. Besides standard classrooms, the facility's computer –based training labs seat more than 550 students with an additional 168 testing computers available in auditorium-style classrooms.

The complex features a conference center with four professional meeting rooms to accommodate student groups of various sizes. All the student facilities are equipped with the latest technology in audio-visual equipment.

"Save for a couple of desks, everything is brand new," Lamson said. "That includes all the IT architecture – the computers, wiring, servers, racks, all of that. We were literally operating out of the old building in Nederland and the new headquarters here at the same time."

Then, on Saturday, Feb. 20, ISTC held its last classes at its old address. On the following Monday, all operations switched to the Beaumont facility with no interruptions.

"The changeover was handled with grace and professionalism,"

Lamson said.

ISTC is a not-for-profit 501(c)3 educational organization providing safety, health, environmental, security and emergency services training in Southeast Texas. It provides a range of site-specific and computer-based training for petrochemical plants, manufacturers, offshore marine services and energy facilities.

"We provide contractor safety compliance management for the plants," Lamson said. "ISTC provides basic level OSHA standard and industry site specific safety training to the contractors working inside the plants."

In 2015, ISTC conducted 408,600 courses to train more than 166,000 students.

Of the nearly 75 industrial facilities in the ISTC service area, each has different training requirements, he said. In some cases the requirements are preliminary matters such as drug screening, mask fit testing, custom badge printing and pulmonary function testing.

Beyond those standard entry requirements, ISTC provides computer-based training, facilitator-led training, distance learning and program development. Most work with Southeast Texas contractors requires hands-on training, Lamson said.

"They like to ensure that the students are trained and ready to work," he said.

However, ISTC recently established an on-line distance learning division. Its biggest customer to date is Sunoco Logistics pipeline services which consists of approximately 5,900 miles of crude oil trunk and gathering pipelines in the southwest and midwest United States.

"Through Sunoco, we have about 500 contractor companies registered with us," Lamson said. "Employees can take the course on-line and upload a passport photo to our website. We print out badges and mail them."

Sunoco's nearby terminal in Nederland has a total crude oil storage capacity of 24 million barrels in 130 storage tanks. ISTC recently completed site specific training for Sunoco pipeline terminals in Marcus Hook and Eagle Point, NJ, and is working to accomplish the same at the Nederland terminal.

Another project ISTC is developing for Sunoco is an on-line course to manage its pipeline inspector program.

"Sunoco inspectors are required to take a certain course every year," Lamson said. "They want to hand that off to us."

The time necessary to develop on-line distance learning varies with the complexity of the program being taught.

"Training software has evolved to keep the learner more engaged," Lamson said. "We are in the process of upgrading our learning management system to HTML 5 which is the industry standard."

With regard to ISTC's association with BEST, applying online distance learning to industrial firefighting is another topic his organization hopes to address in the future, Lamson said.

"What can we do at BEST to better suit the needs of industry?" he said. "I think part of that question needs to be turned around. What do firefighters want?"

Through its association with the Texas A&M Engineering Extension Service (TEEX,) ISTC is able to provide a broad range of nationally recognized OSHA courses to equip individuals with the knowledge and skills to maintain voluntary compliance with OSHA regulations and provide a safe workplace for their employees.

"The vast majority of industrial fire brigades are volunteer," Lamson said. "That means not only providing training to meet minimum requirements, but also introducing the brigades to scenarios like those they might encounter in their own facilities."

The source of pride for ISTC is being able to design a course that fits the customer's needs, he said.

"We don't say 'One size fits all," he said. "Things have to be done in a certain way to meet accreditation standards, but how you design your two or three day training evolution is something we will work together on."

Lamson, born in Port Arthur, is a 25-year Marine veteran. Much of his philosophy about critical thinking comes from his military experience.

"The right safety training can provide the necessary skills and knowledge that can be useful both in the workplace and at home," he said. "The ability to recognize hazards and handle unsafe situations can help avoid life-changing events for everyone."

Part of the fanfare behind the opening of the new center is a marketing campaign to make ISTC synonymous with safety.

"For too many years unless you used ISTC you didn't know what it was," Lamson said. "Everybody recognized where our facilities were but nobody knew what we did. We're starting a brand new campaign because you can't market a service if people don't know about it."

The new slogan for ISTC is short and sweet: "I am Safety."

Ferrara innovations introduced at FDIC

Inundator SkyFlow

At right, stream from WFHC Ambassador monitor compared to the Ferrara Sky-Flow's100-foot aerial. Below, the SkyFlow on display at the XTREME Industrial Fire and Hazard Training in April.

Photos by Anton Riecher

Setting record flow rates from an elevated waterway is only half of what Ferrara Fire Apparatus has achieved with its new Inundator SkyFlow Super Pumper. That the aerial can also be utilized for rescue makes it unique in modern firefighting.

"This is a whole new area for Ferrara and the industry," said Ferrara Industrial Products Specialist Bob Gliem. "No one has seen this done before."

SkyFlow was only one of several new innovations from Ferrara introduced in April at the FDIC International Conference in Indianapolis, IN.

Gliem, an industrial emergency response professional, said SkyFlow delivers an aerial discharge more than 5,000 gpm from the end of its 100-foot aerial.

"It starts out as a seven-inch waterway and ends up at 5½ inches at the tip with a six-inch flange," Gliem said. "We have a six-inch monitor nozzle out there that will give us just over 5,000 gpm at full elevation."

That flow rate is from draft. With a pressurized water source, the pumper is capable of delivering more than 10,000 gpm. It utilizes a 5,250 gpm single stage rear mount pump with a 12-inch inlet, 8-inch outlet, pressure lubricated gear box and pump shaft bearing points.

Ferrara has an exclusive relationship with US Fire Pump, maker of the largest NFPA 1901 high velocity pump for industrial firefighting on the market, Gliem said.

The vehicle comes with four eight-inch rear intakes or steamer connections, dual six- or eight-inch passenger side panel discharges, dual six-inch rear discharges and dual 2½-inch rear discharges.

The added benefit of the SkyFlow is that its aerial device is wide and sturdy enough to lift firefighters in a rescue situation. Its heavy duty aerial is a four-section, mid-mount design capable of supporting a dry tip load of 1,250 pounds.

Part of that tip load is a Tyco Williams Fire & Hazard Control Ranger 3 Plus nozzle operated wirelessly or via a panel control. Dual TFT Monsoon 2,000 gpm wireless rear mounted monitors can handle additional exposures or hazards simultaneously with the aerial waterway.

A Foam Pro AccuMax 3300 multi-point, direct injection foam system minimizes any waterway restrictions common with other foam systems.

Prior to the development of the SkyFlow, Ferrara's chief advancement in aerial technology was Super Pumper which utilizes a Schwing 85-foot, three section articulating boom as a versatile platform for the Ranger 3 Plus nozzle. Like the SkyFlow, it comes with eight-inch aerial discharge piping connected to six-inch swivels allowing for maximum flow with limited friction loss through the aerial waterway.

The Schwing offers a great deal of flexibility when pre-planning for emergencies such as tank fires, Gliem said. Besides additional options for reaction lines, the Schwing Super Pumper provides greater accuracy and personnel safety in dealing with vapor leaks and cooling during process unit fires.

"You can get mass quantities of water into a fog pattern," he said. "It gives you really good knock down to prevent vapors from finding an ignition source," Gliem said.

Right now, SkyFlow exists only as a single prototype which was on display during this year's FDIC show. However, that has been enough to build a great deal of interest, Gliem said.

"People are saying 'Man, I wish that SkyFlow had been out last year when we ordered our Schwing,'" Gliem said. "SkyFlow is really where everybody wants to go."

Also introduced at FDIC by Ferrara was the Emergency Response Aquatic Deployment System, also known as ERADS. Available in six models, ERADS represents another Ferrara-US Fire Pump joint project.

"ERADS is basically two modular pods put together in one tray the size of a standard conex intermodal container," Gliem said. "Half of the tray contains a 225 horsepower John Deere diesel engine. That pod includes a 185 CFM Vanair compressor and a 30 kilowatt generator."

With regards to "aquatic deployment," this pod includes dual 3,200 gpm submersible pumps that can be placed as much as 175 feet away to deal with difficult terrain or deployment situations involving bridges, docks, barges or wharfs.

"The pumps only weigh about 150 pounds apiece," Gliem said. "Two people can wheel them into the water like a wheelbarrow. A flotation device keeps the pumps afloat so you can get the water volume you want."

Optional dual hydraulically driven 5,000 gpm pumps are also available.

The other half of the pod can be configured to specifically meet the specialized needs of the firefighters. It might be loaded with up to 2,000 feet of 12-inch hose and a US Fire Pump hose recovery system.

"If you don't need the hose, you can drop off that pod and pick up one configured for rescue containing air bags and strut systems for confined space or structural collapse rescue," Gliem said.

ERADS adopts a concept that has been successfully in use in Europe and is sparking a great deal of interest in the U.S., he said.

"It was a very big focal point of our booth at FDIC," Gliem said.

High velocity pumps from US Fire Pump have been adapted to fire trucks as well as skid-mounted and portable units.

"We have two different configurations, based on the horsepower available to power the pump," Gliem said. "In a fire truck, the only horsepower available is an open, on-the-road diesel engine, the 600 horsepower Cummins ISX15."

However, if the pump is skid-mounted or portable, a much higher horsepower can be used.

"There is no transmission so-to-speak, in between," he said. "The gear case is direct drive right off the engine drive shaft to maximize available horsepower." Ferrara is using Volvo and Caterpillar engines with well over 700 horsepower capabilities.A US Fire Pump portable pump trailer unit produces a flow rate of 5,500 gpm at a six-foot lift using a 600 horsepower diesel driver. The portable pump enclosed skid produces 6,250 gpm at a six-foot lift using a 723 horsepower diesel driver.

"The US Fire Pump is not a process type pump," Gliem said "Other manufacturers are using a split case pump or something of that type that involves making the pump work a bit harder to achieve the higher flow and pressure. The advantage of the US Fire Pump is efficiency. The suction inlet and discharge outlet along with the internal hydraulic configuration are designed to maximize hydrant flow through." The US Fire Pump has efficiency ratings of over 80 percent, Gliem says.

Another big advantage of the US Fire Pump design is that the gear case can be mounted horizontally or vertically.

"We get that impeller closer to the water and spinning just a little bit faster than the direct drive engine pumps that are on the market," Gliem said. "That's why we're able to do more than 6,000 gpm at draft and more than 10,000gpm from a pressurized source."

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Finally, there is a solution for using the Ferrara Super Pumper class apparatus's large water flow capabilities in many municipal applications without having to rely on existing low flow hydrant systems. Built for quick and effective deployment, the ERADS system can be used anywhere there is a water supply such as a lake, river or bay. ERADS is also ideal for maritime dock facilities with large warehouses, auxiliary cooling water and fire suppression at nuclear facilities and dewatering operations in flood situations.

Contact Brad Williamson for more info: BradW@ferrarafire.com

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Incident Log

Italicized items denote fatalities

Below is a sampling of the industrial emergencies logged by IFW in 2016. To see them all, complete with links to further information, visit www.fireworld.com/IncidentLogs.aspx.

June 17

East Cleveland, UK: *A worker in a potash mine died in an accidental release of gas.*

June 16

Goleta, CA: A windswept wildfire forced the evacuation of a refinery.

June 14

Maywood, CA: Explosions at a magnesium recycling plant triggered area power outages.

Lake Country, BC: Fire broke out at a waste management company.

June 13

Elizabeth, NC: Homes downwind of a burning chemical plant were evacuated.

June 12

Mt. Vernon, WA: Firefighters spent 13 hours battling a fire in an abandoned seed plant.

June 11

Avondale, AZ: Flames gutted a vacant packaging plant.

June 9

Regina, SK: A refinery worker was scalded by hot diesel.

Eastvale, CA: A forklift pierced a container of concentrated cleaning acid, sending 15 cannery workers to the hospital.

June 8

Stanly County, NC: Fire broke out in a chemical warehouse at a feed mill.

Seremban, Malaysia: Fire consumed nearly one-sixth of a plastic products complex.

June 7

Germantown, WI: A sodium chloride tank accidently filled with acid burst, forcing the evacuation of a food processing plant.

June 6

Minsk, Belarus: *2 workers died from poisonous vapor after a fire at a nitrogen plant.*

Jalan Bagan Lalang, Malaysia: *2 co-owners of a bicycle products plant died from electrocution in a fire.*

Mauston, AK: An ammonia leak forced the evacuation of a plant making motion control equipment.

June 5

Khao Phenom, Thailand: A boiler explosion at a palm oil refinery injured 2 workers.

June 4

Mosier, OR: 11 crude oil tank cars derailed from a train, with at least 1 catching fire.

Cecil, PA: Fire consumed half of a pretzel factory.

Conyers, GA: Fire broke out in a storage building at a chemical plant.

Sweeny, TX: A small fire was reported at an oil refinery.

Sterling, CT: A machine mishap set off a detonator at an explosives plant, injuring 1.

June 3

Vadodara, India: Fire damaged a coating plant.

Laurentian Valley, ON: A fire at a fiberboard plant caused extensive damage.

Palghar, India: At least five factories were gutted in a massive blaze that broke out in an industrial area.

Columbus, OH: Dust ignited in a hopper under maintenance at a biofuels plant.

Chandigarh, India: A large inventory was destroyed in a fire at a pharmaceuticals plant.

Everett, WA: A recycling plant fire was still smoldering 3 days later.

June 2

Rotherham, UK: A fire involving thousands of gallons of oil broke out at a steel plant.

June 1

Dunmore, PA: Fire destroyed a closed manufacturing plant and damaged a nearby apartment building.

Yichangon, China: A fire at a chemical plant injured 3.

White Marsh, MD: Material and equipment caught fire at a mulch plant.

Avondale, AZ: Fire broke out at an electrical substation.

Madison, WI: An explosion rocked a metals recycling facility.

May 31

Bridgeport, CT: Fire damaged a boiler at a trash-to-energy plant.

Qidong, China: An explosion at a battery plant killed 2 and injured 18.

Maharashtra, India: *A fire at an army ammunition depot kills 17.*

New Holland, PA: Workers evacuated a poultry plant when an ammonia leak was discovered.

Ferndale, WA: A fire in a process unit at a refinery was extinguished within an hour.

May 30

Davis County, UT: An office trailer caught fire at an oil refinery.

Aichi, Japan: An explosion at a brake parts plant injured 5.

East Camden, AR: An explosion at a plant making flares injured 2.

May 29

Zanesville, OH: Oil buildup on the roof of a glass factory caught fire.

Manesar, India: An explosion of a propane cylinder triggered a 14-hour fire at a auto air conditioning plant.

May 27

Riyadh, Saudi Arabia: *An oil refinery worker died from electrocution.*

Muglizh, Bulgaria: *An explosion at a munitions plant killed 1.*

May 26

Dombivili, India: *An explosion at a chemical factory killed 3 and injured 50.*

Kolkata, India: Fire swept through a factory in a congested residential neighborhood.

May 25

Montezuma, IN: Scrap wood discarded by a factory ignited in a muddy field.

George Town, Malaysia: A 1,000-liter tank of hydrochloric acid leaked at an electronics factory.

Flin Flon, MB: An explosion at a propane facility injured 1.

May 24

Melbourne, Australia: Fire destroyed a pasta factory.

May 23

Qingpu, China: *3 workers died in a wax factory explosion.*

Hermiston, WA: A wildfire swept onto property formerly used for chemical weapons storage.

Riverview, FL: A tank of molten sulfur caught fire at a fertilizer plant.

May 22

Narsingdi, Bangladesh: *A fire in a textile factory killed 3 workers and injured 5.*

Soto de la Vega, Spain: Fire destroyed a large meat production plant employing 400.

May 21

Zhengzhou, China: A *fire that spread from one factory to another killed 6 and injured 7.*

Sydney, Australia: Fire burned 2 days at a meat processing plant.

May 20

Champaign, IL: Fire swept through a foundry specializing in heat resistant castings.

Henderson, Australia: Fire broke out at a steel fabrication factory.

Delhi, India: Fire gutted a 3-story shoe factory.

Hillsborough, NC: Fire damaged much of a textile mill listed as a historic landmark.

Spring Hill, TN: A small fire triggered suppression systems at a car plant.

May 19

Ivanpah, CA: Misaligned mirrors at a solar energy plant caused a fire in a boiler tower.

May 18

New Thippasandra, India: Fire broke out at a heavy equipment factory.

Sydney, Australia: 2 people suffered burns in a foam recycling plant fire.

May 17

Fort McMurray, AB: Nearly 12,000 people living in oil sands camps are threatened by wildfires.

May 16

New Hanover County, DE: A fire fueled by saw dust broke out at a laminated veneer lumber mill.

May 15

Baghdad, Iraq: *Suicide attackers stormed a gas plant, killing 7 and setting fire to tanks.*

May 12

Phoenix, AZ: A warehouse containing hazardous materials caught fire, injuring 1.

San Antonio, TX: An ammonia leak at a beverage plant affected 6 people.

May 10

Fogwatt, Scotland: A whiskey distillery was evacuated when hazardous chemicals spilled.

Edmonton, AB: 4 firefighters were overcome by fumes while on the roof of a burning coal silo at a cement plant.

May 9

Chateauguay, QC: 5 people injured in a fire at a plastic packaging plant.

Battle Creek, MI: A burning front end loader spread flames to a cereal-byproduct recycling plant.

Mt. Carmel, IL: A chlorine leak at a wastewater treatment plant forced nearby residents to leave.

Germantown, WI: A 3-alarm roof fire threatened a foundry.

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Philadelphia (PA) Fire Department

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FIRE CHIEF

European PPE maker claims important slice of U.S. market

Viking Legacy

Compared to the big players in the American personal protective clothing market, Denmark-based Viking Life-Saving Equipment has a small niche. However, that niche includes such prominent clients as Boston Fire Department and the Miami-Dade College Fire School.

"We're relatively new to the market even though we have been used by these departments nearly 18 years," said Ken Crouch, Viking's fire segment manager.

However, it is Viking's international ties that make it a conduit bringing European PPE innovations to American firefighters.

"We have some unique gear that other manufacturers don't have here," Crouch said.

From the UK, Hainsworth TITAN flame resistant fabric is a pillar of Vikings innovative reputation. The product is used in a breathable, comfortable outer-shell designed to minimize the effects of heat stress while being robust enough to withstand the rigors of firefighting.

"Titan is predominant as PPE fabric across Europe," Crouch said. "The difference from American fire resistant fabric is American fabrics use a Teflon coating.

After only a few fires, that coating is worn away, he said.

"Then the outer shell begins to soak up water," Crouch said. "The gear becomes heavier. That weight causes stress. The firefighters become more easily fatigued. Fighting against that weight and stress becomes a factor in heart attacks."

Under European standards, water must not penetrate the outer shell, he said. This is to keep the weight of the garment as low as possible, reducing stress and fatigue to the firefighter. The Hainsworth Titan fabric is different in that it will withstand up to 60 washings before water will penetrate the outer shell.

In the U.S., standards for fire fighting gear allows the outer shell to become wet, using a membrane underneath to stop it from penetrating to the firefighter, he said.

"So we use a different fabric from the UK that no one else has in the U.S.," he said. "It sets us apart."

Beside the European concern about physical stress for its firefighters, the EU standards address protecting firefighters from exposure to carcinogens. Viking joined a competition conducted by Gothenburg, Sweden, fire responders to come up with new designs for bunker gear to better address the problem.

"We designed the gear and gave it to them for a wear trial," Crouch said. "We won the contract. We built them 650 set of gear from that initial design." That design has since been adopted by other European fire departments.

Viking further enhanced the Gothenburg design before offering it in America, he said.

"What we sell in the U.S. is like the European gear on steroids," Crouch said. "So for once we reversed the table and introduced something to the American market of even higher quality than the EU standard."

As an alternative to the removable inner liner commonly used in the U.S., Viking gear offers a washable, removable outer shell.

Photo courtesy of Viking

"When you zip off the outer shell you are left wearing a comfortable Gore-Tex coat," Crouch said. "If you're dealing with a medical emergency or snow or rain, you are still protected."

Before getting into the fire truck, the outer shell is placed in a dissolvable washing bag. In this way, particles on the outer surface can be removed from close contact, and are less likely to transfer to the firehouse. This reduces the risk of contamination during washing, storage and other routine tasks.

The prices for Viking PPE is competitive with PPE produced by American based manufacturers, Crouch said.

Unfortunately, innovation is often stymied by tradition in the fire service, he said.

"In my lifetime we have transitioned from rubber boots and bunker coats to having a full set of turnout gear, wearing bunker coats and pants," Crouch said. "People resisted that because it was a major change."

The innovations offered by Viking are something that the fire service will slowly learn to accept, he said.

"We have to make this transition for the sake of life safety," Crouch said.

Leadership and cardiac team dynamics

By SHERRIE WILSON/American Heart Association

Some people call team dynamics unconscious and psychological forces that influence a team's behavior and performance. I believe they are intentional ways of being. Leadership has to start with someone and it's the responsibility of the team leader to set the tone for team dynamics.

Feedback, debriefing and difficult conversations are tools used by leaders to build teams.

Feedback is just data. It's data that allows us to make adjustments. Feedback should be given neutrally. It's just the other person's experience of you. Which means it's not true with a capital T. Try on taking the feedback and considering it. If it doesn't fit or work for you then ok you can disregard it, but consider this: If someone tells you once, consider it. If you hear the same feedback a second time, you better take a look at yourself and chew on it a while. If you hear the same feedback a third time, wear it and adjust. Having a friendly mentor who cares enough to have the difficult conversations is another.

The other tool used by leadership in cardiac codes is debriefing. A debriefing is an open-ended question. Open-ended questions creates loops in peoples' mind. They must work through the loops using critical thinking skills to toss the question around. The problem is if you ask and answer the question it defeats the purpose. The critical thinking skills provide for self-actualization of the answers. Maslow's Hierarchy of Needs say we peak-out with self-actualization, meaning it's a sticky lesson.

Being able to have a difficult conversation is the third key to building teams. The key to difficult conversations is neutrality. You can say almost anything if you leave your passionate ego at home and say what needs to be said in a neutral tone. Neutrality removes the emotions which tend to cloud the issues.

The American Heart Association's, Basic Life Support (BLS) and Advance Cardiac Life Support Course (ACLS) teach Team Dynamics and they include:

- Clear responsibilities
- Clear communication
- Mutual respect
- Knowledge sharing
- Constructive intervention
- Closed-looped communication
- Knowing ones limitations
- Re-evaluation of the incident

Clear Responsibilities

Clear responsibilities help everyone know what their job is in an emergency, but things don't always go in textbook fashion. Drilling with the team is the best way to ensure that all members understand their responsibilities. Not just one drill, but many. Some science says it takes as many as seven times for some to get all the details ironed out in their mind. Drills and practice codes need to be as close to a real-life incident as possible.

Learning cardiac codes can be fun especially if you have the basics down. There is a need for six members on the team. The leader, airway management, drugs/IV, CPR, monitor, recorder. But since we live in the real world and only have two EMS responders (Paramedic and EMT), we must train firefighters or other non-medical personnel to assist with the basic skills. Even security personal or a secretary can do CPR and work an AED.

Once a new member has practiced running codes with the team, they must learn to lead them too. One of the quickest ways to learn the codes is to act as the team leader. Let the rookies step up and run the mock codes until they get it into their bones. Once someone is put on the spot as a leader, they understand the importance of supporting the leader and team dynamics take on new meaning to them.

Clear Communications

Clear communications is key to maintaining calm in the team. During the mock code, clear and deliberate communications from the leader is required. Clear, precise, thoughtful and neutral statements (without emotion) are required among the team. Practice staying calm and giving orders while fighting for life and death. There is no need for an overly emotional response by anyone. It screams of rookie and lack of leadership skills.

Leaders train themselves in staying calm and doing what my Dad called "The Duck." The duck is calm on the outside and paddling like hell underneath. He smoothly crosses the pond and it looks effortless. This "Duck" persona comes with practice, practice, practice and a little experience.

Mutual Respect

If you ask most people, they think they show respect for others. Take a look at a Facebook page and you might see something entirely different. If disrespect shows up anywhere, it requires a difficult (yet neutral) conversation.

Respect for a fellow team member goes way past the differences, religions, beliefs, education and the experience one has. Respect (acceptance) is a basic and fundamental need we all have. Respecting another person says so much about you. Respect even for the rookie that makes multiple mistakes is required. It's required because we have all made some of those same mistakes and forgiveness was not only nice, it was amazing and so appreciated.

Looking past our superhero ego and into the heart of another person takes real leadership. Leaders take people and make amazing teams out of them. Building an amazing team takes time, attention and some nurturing.

Knowledge Sharing

Having a set of rules to follow is great. Knowledge sharing includes everything from reminders of the rules and regulations to expectations. Company interpretations, understanding of how procedures are applied to the job assignments and other experiences are included in knowledge sharing. Knowledge sharing means it comes from all you have and without the ego we all tend to have. When sharing with someone your knowledge notice if you begin to feel superior. If so, get off it. Someone shared it with you and you appreciated it I am sure. You are simply doing the same thing.

My mentor at the fire station shared a lot of knowledge with us. The day he dropped dead of a heart attack, the rookies went into full swing supported with the knowledge shared by him. It made saving his life an easy thing to do.

Constructive Intervention

Constructive intervention by team members is absolutely one of the most important keys to building great teams. Like knowledge sharing, it must be mostly neutral.

When working an emergency cardiac code with a physician he ordered "3 milligrams of epinephrine" be given to a patient. As a paramedic, I serve on his team and it required me to constructively intervene. I repeated the order of 3 milligrams then asked: "Doc did you mean 3 milligrams or .03 milligrams for the pediatric patient? The clarification gave the physician a moment to think. He smiled and thanked me for the polite (an neutral) correction. Privately he thanked me for being a great team member. I felt a valuable part of his team and it built our respect of one another. We are all humans and fallible. We all have memory lapses. We all need each other.

What is a head without the arms and legs? A missing toe can be the difference of balance to some. We are all in it to win it -- together. Teamwork is not a competition. Consider that real leaders don't need to fight their way to the top through forcing and controlling everything. They lift everyone around them with praise and appreciation and, in turn, end up being pushed to the top by the team.

Closed-Loop Communications

The problem with communication is the allusion that it has actually happened. Closed-looped communications are required when emergencies are going down. The team leader gives an order/directive and the receiver of the order/directive repeats back for clarification.

For example, a physician orders "300 milligrams of Amiodarone" and the receiver of the order repeats it back. This is used for critical incidents and serves a purpose of clarifying orders received. If an order is given and the expression of the person receiving it has a hint of not understanding, the leader should ask neutrally, what did you understand me say? Listening fully to the response will let you know if you need to restate or clarify the order.

Knowing Ones Limitations

Team members need to know other members' limitations. If a leader orders a drug be given by an EMT (thinking they are a paramedic). The EMT should immediately speak up and say what the limitation is for them. "I am an EMT and not trained in giving that drug." This allows a leader an opportunity to redirect the order to another member capable of fulfilling on the order. I can always assign the EMT to another skill such as CPR, basic level airway management or recording the event. We all have a place in the emergency and valuing the team member while showing respect is a sign of leadership.

Re-Evaluation

Any ongoing incident requires constant re-evaluation. So, I am working a cardiac code and I am the team leader. Once I have started running the code and into my first cycle of two-minutes of CPR, I use that time to re-evaluate. For example: The airway management person is asked, "Are you to moving air through the bag easily?" If not, I might consider hypoxia. The CPR person is asked if they are getting tired and the adjustment I make is to switch roles of the members.

Then I begin to work my way down the H's and T's of cardiac arrest. Hypoxia, Hypovolemia, Hydrogen ions (acidosis), Hyperkalemia/Hypokalemia, Hypothermia, Toxins, Tamponade, Tension Pneumothorax, Thrombosis (myocardial infraction) Thromboembolism (pulmonary embolism) and Trauma.

Sherrie Wilson is a retired firefighter-paramedic and new EMR editor for Industrial Fire World. She also runs an American Heart Association Training Center Coordinator with 500+ instructors in emergency cardiac care. She teaches team building and leadership classes in the emergency arena.

Optimizing a piggyback 4:1 haul system

By THOMAS EVANS/SAR[3]

The piggybacked 4:1 haul system is the most efficient simple haul system because the greatest mechanical advantage is created with the fewest pulleys, thus minimizing friction within the haul system. Consequently, it is a valuable addition to the riggers and rescuers toolbox. However, it has two notable drawbacks; it is often difficult to remember, and it can be hard to build to maximize the throw. This brief article walks though how to build a 4:1 haul system, optimizing it for throw as it is being built. At the end some additional tips and tricks are suggested for improved efficiency.

Rigging a Piggyback 4:1 for Maximum Throw:

Gather supplies, usually a rope, two pulleys, three carabiners, a prusik or other rope grab, and anchor material (Figure 1). Start by connecting a pulley to the end of the rope (Figure 2A). Take a bight of the rope and pass it through the pulley and clip it shut (Figure 2B). Attach a pulley to the loop of rope formed by the previous step (Figure 2C), and attach this pulley to the rope the 4:1 is piggybacked onto with a prusik (not shown). Extend the haul system toward the lip as far as it will go. At this point the rope will run out, or the haul system will reach the edge. One or

Figure 1. Equipment needed to build a piggybacked 4:1 haul system.

Figure 2. A) Sequence of steps used to build an optimized 4:1 haul system. A) Install a pulley at the rope terminus, B) Clip a bight of rope in the pulley, C) Install a second pulley in the loop created, D) Extend haul system to lip edge or until the rope nearly pulls throught the haul system, E) Tension both sides of the rope and find the bight closest to the anchor, F) Tie a knot in the bight, G) Clip knot to the anchor, H) Full 4:1 haul system extended to the lip, I) Haul system extended to the full length of the rope.

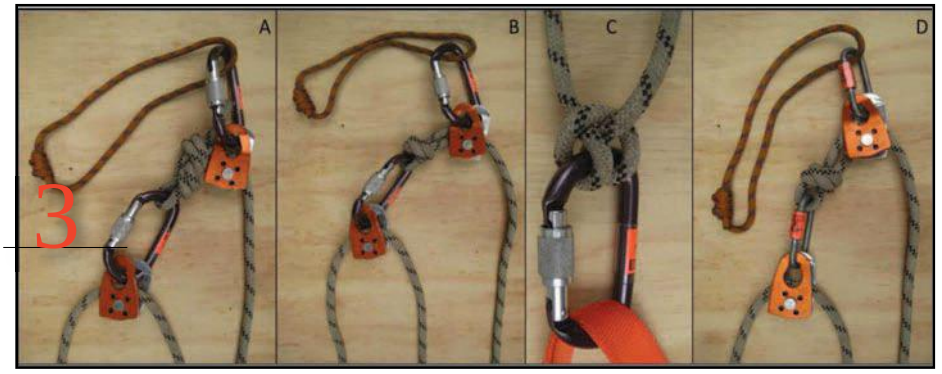

Figure 3. A) A common 4:1 haul system, B) Replace figure eight knots with slip barrel knot. C) Replace figure eight at anchor with a clove hitch. D) Replace carabiners with screw links to tighten load and bulk.

the other will limit the throw. If the rope length limits the throw (Figure 2D), leave a tail of rope out at the pulley closest to the haulers. Pull the rope between the two pulleys tight, forming a bight (Figure 2E), then tie a figure 8 knot (Figure 2F) and clip this knot to the anchor (Figure 2 G). This makes the longest possible haul system with the available rope (Figure 2I). If the haul system reaches the lip with rope to spare the final product will look like Figure 2H with extra rope on the haul side.

Further 4:1 Optimization:

At times it may be necessary to build the haul system with less rope. This can be done by using more efficient knots. The figure 8 knot by the pulleys (Figure 3A) can be replaced with a slip barrel knot (Figure 3B, Figure 4E-H). The figure 8 knot at the anchor can be replaced by a clove hitch (Figure 3C, Figure 4E-H). To further reduce mass and size, the haul system can be built with screw links (Figure 3D, Figure 4C, D, G, H) or the end of the rope can be tied directly to the pulley (not shown). If need be the 4:1 can be built without pulleys, just running the rope through carabiners (Figure 4B, F) or screw links (Figure 4D, H) however this creates considerably more friction and makes hauling difficult. Lastly, if you have a choice between where to put the most efficient pulleys, the most efficient pulley should be placed closer to the haulers (the first pulley installed). Having the most efficient pulley closest to the haulers reduces the frictional loss propagated through the system, thus improving overall efficiency.

Figure 4. Some of the variations in 4:1 haul systems. The top row is built with figures and knots, while the bottom row uses rope-efficient knots like the slip barrel and clove hitch

Dave's Notes

Continued from Page 4

cross purposes. But even more worrying is the ATF's assumption that if it cannot figure out what caused the fire and explosion then it must be skullduggery, not a flawed investigation.

When it comes to distorted logic in a federal probe, the April 1989 explosion aboard the USS Iowa is must reading. The blast tore apart a World War II-era 16-inch gun, killing 47 crew members present in the gun turret. The Navy blamed it on sabotage by a suicidal sailor who used a detonator to trigger the blast.

However, an exhaustive investigation by the Sandia National Laboratories found no evidence of such a detonator. It blamed the explosion on an accidental "overram" of explosive powder bags loaded into the gun during a firing exercise. Unauthorized experiments using "supercharged" powder bags and specially designed shells had been reported aboard ship.

The problem is that once investigators commit themselves to paper, it becomes hard to shift opinions. Naval officials disagreed with the Sandia findings. The closest the Navy came to common ground was to rule that the cause of the explosion could never be determined.

Hopefully, more research will be done on the stability of ammonium nitrate when stored, shipped or, particularly, when burning. Facts, not assumptions, are needed. After that, maybe the ATF will be open to reconsidering its verdict on the West disaster.

Protecting data from those who would misuse it

By DR. JOHN S. TOWNSEND

Not so long ago you could hop in the car, drive to the airport, go up to the counter and purchase a ticket, check your baggage and walk out the door to board the airplane all within an hour and without anyone even asking what was in your bag let alone in your shoes or your pockets. Times have changed. Time was when industrial plants were justifiably proud of their technology and their place in the community. They displayed signs welcoming visitors and offered guided tours to show off their capability and tout the superiority of their products. Indeed times have changed. Now private and corporate records have become targets for hackers and the right to telephone privacy a cause for action in the courts.

The genesis of this situation lies in part in the very entity that makes modern commercial communication possible; the desk-top computer. With the aid of the "black box" on my desk I can accomplish in minutes tasks that previously would have taken hours and often days to complete. I can transfer funds, pay my bills, make a purchase, send work to the copy center, access my medical records or submit this article, all with a click of a mouse from my desk chair.

With the addition of a few "apps" I can, from 500 miles away, see who is ringing my doorbell or, from my table in the hotel coffee shop, I can access my e-mail. From a headquarters half a continent removed a CTC Dispatcher can set a switch and change a signal to govern the movements of trains on an entire rail system or a plant operator can control the entire process of a plant from a single control board. All of this capability comes at a price and sometimes that price is a bit steep. If I can do all these things from my lap-top or cell phone, what is to stop someone else from doing the same thing? Short answer? "Nothing, really." All that is needed is a computer and an operator with sufficient "savvy" to understand how the system works and there are plenty of these around.

The damage perpetrated by "cyber hacking" is not limited to the compromising of sensitive data or the loss of valuable records it can actually become physical.

Nearly all electronic communication devices are "time sensitive." This means that they contain a timer which receives its signal from some satellite system in outer space. With a few rudimentary hand tools and a little "know how" a perpetrator can convert a cheap throw-away cell phone into a remote controlled detonator that can be actuated by the timer or by hand from hundreds (or even thousands) of miles away. All that is necessary is that the perpetrator dial up the number of the altered cell, when it rings the circuit is closed and whatever device or system the altered cell phone is connected to is activated. In the case of an explosive device the cell phone goes up in the explosion leaving nothing behind that can be used to trace the perpetrator.

The advent of the twenty-first century has seen a dramatic increase in the number of incidents of civil unrest, violence, property damage, and human casualties. Industry has had its share of deliberate acts of violence such as the ammonium nitrate explosion at West, Texas; an event which is now being identified as deliberately initiated as well as a number of airliner crashes and train wrecks, world wide. The problem is real and we must take a hard look at just what we can do to protect our industrial assets tangible, personal and intellectual.

> As our world has become increasingly "digitized" the need to defend our communications against "hackers" and, sometimes terrorists, has grown concurrently.

One of the easiest ways to protect against incursions into confidential information is not to create it. No one can steal what does not exist. Restrict information so that only that which is actually essential to the task in hand is made available. We have a tendency to try to "cover all the bases." If the file gets hacked all the information is there. Example: when I took my wife into an "urgent care" facility to get some blood drawn for laboratory tests all they asked for, in addition to the doctor's order, was my name, address, etc. and my insurance card number. They drew the blood sample. When I took my wife to the hospital for a chest X-Ray they filled out paperwork for an hour and the system brought up her entire medical history. It took much longer print out the records than it did to make the X-Ray. Now comes the question: did the hospital really need all that information at that time for that test? What difference did it make that my wife had an appendectomy in the 1980's? It wasn't that we objected to the staff having the information but did they really need it? By opening the file the record became vulnerable to compromise had anyone wanted it. Apparently someone does want the information because as soon as my wife got home from the hospital we were deluged with solicitations from insurance companies, some of which contained phrases such as 'now that you are home from the hospital …." The point here is that information in computer systems is usually not secure unless an encryption program is in place and even then security is not 100 percent. The medical world provides an example but it is by no means the only venue where information can be inadvertently compromised by accessing. When company operating records such as payroll, accounts payable or purchasing are accessed, many (if not most) systems in current use will open a whole page of data when only one entry (name) is needed. But, we input Doe, John and the whole page opens up and indeed the whole file may be available simply by scrolling up or down. It is absolutely amazing just how much information about a business can be obtained simply by looking at

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the account books. For instance: one can determine what materials are being purchased, thus an inkling of what products are being manufactured or what areas of research are under investigation. What kind and how much of these materials are on site, when they are delivered and where they are stored is also accessible. All this from one computer in the shipping and receiving department. So, one way to protect such data is to have the computer reconfigured so as to provide only the entry actually requested.

Another way to protect confidential or vital information is to compartmentalize computer systems. This means that the system serving the human resources department is completely separate from the one used by inventory control. Thus, if one system should be hacked, the others would remain secure.

Passwords are another vulnerable spot in computer systems. All too often a shrewd guess will allow a hacker access to a targeted computer or computer system. To be most effective, a password should not be associated with anything concerning the operator or the company such as birthdays, addresses or "mother's maiden name". To accomplish this there is on the market a small program that will generate strings of totally random letters and/or numbers that can be used as passwords. These should be changed frequently and on a random basis so that even if one was secured by a person with nefarious intent it would work for only a short time. The number of personnel having possession of a password should be limited to those who really "need to know." The legitimate authorized computer user needs to know the password and there should be a non-electronic copy of it somewhere, in the administrations safe deposit box for example, so that the files can be opened in case of emergency such as the regular user being unavailable or incapacitated.

Passwords are another vulnerable spot in computer systems. All too often a shrewd guess will allow a hacker access to a targeted computer or computer system.

Finally know your personnel. Know who you are dealing with for your CT work. Use the same technician each time or, in the event that another one must be used vet him/her with the company. Observe the tech at work, particularly a new or different one, in order to prevent him from adding an unauthorized device (such as a camera or microphone) to enable eavesdropping at a later date.

Employees using computers that contain sensitive data or control systems should be well vetted and checked out regularly. Avoid using a disgruntled employee. He or she may seize the opportunity to get even for wrongs, real or imagined. Keep communication lines open. Be "a good listener and have an occasional cup of coffee with employees just to gauge their general attitude. If there is a problem address it. An ounce of prevention is worth a pound of cure" especially among employees who have access to sensitive data. Instill in employees a sense of ownership in the company and thereby motivate them to be protective of it. After all, if something happens to the company their jobs and the family income goes down with it. Encourage them to be vigilant and to report anything out of the ordinary; "If you see something, say something."

Make employees aware of the various scams operating under the guise of protecting your network. It is now, unfortunately, fairly common to have a computer screen suddenly flash up a message purporting to come from Microsoft, Yahoo, Google or some other computer company saying that your computer is sending out a signal that it has been infected with some sort of virus and that it is transmitting data such as your credit card numbers etc. to a third party. and, if you will call the number on your screen, their engineers will be happy to "walk you through the process" to fix the problem. THIS IS A SCAM!!! to capture your credit card number or other information; DO NOT RESPOND to these notices but do report the incident to your CT department.

Now, at this point the reader might well wonder why this discussion of communication systems appears in a publication devoted to industrial fire protection, hazardous materials and emergency response. The answer is simple; planning. Those who would do us harm are firm believers in the principle of P^5 (Prior Planning Prevents Poor Performance). Industrial accidents occur spontaneously as a result of failure (mechanical, human or coincidental). But incursions happen as a result of planning and preparation. If we can interdict this "Prior Planning" we can prevent, or at least mitigate, the incursive incident and its consequences. Unfortunately there is far too much evidence that things that should have been seen as a "red flag" were unnoticed or ignored thus allowing the incident to occur. The policy should be "if you see something say something." A lot of false alarms can occur but the consequences of being wrong just one time can be monumental.

There are several reasons for an industrial incursion:

1.) To put a facility out of action. This is an incident deliberately planned to do as much damage to a facility as possible. It might be a case of arson, or sabotage of equipment or damage to real property; anything to put the facility out of action. It might be caused by an unscrupulous competitor, as the result of a labor dispute or a desire to make a statement by disrupting production.

2.) To obtain something required for another nefarious undertaking: These incursions are usually stealthy in nature. This might be something like the theft of a few hundred pounds of ammonium nitrate from a fertilizer plant for use in bomb making. The shortage might be made up with sugar to mask the theft. The theft of small quantities of agricultural anhydrous ammonia from field tanks for use in the manufacture of synthetic drugs is another commonly encountered incursion. In these cases the perpetrator will make every effort to cover his tracks; possibly so that he can return and obtain more materials. His goal is not to damage the facility he is penetrating but merely to obtain what he needs without arousing suspicion or notice.

3.) To engender or spread "terror". "The term "terror" by definition means fear. The object of this type of incursion is to frighten or intimidate a person or group of persons (population) so that their course of action is manipulated. This is probably the

most insidious form of terrorism because its victims are innocent bystanders. Take the incident at West, Texas, for example. The plant was damaged to be sure but that could be made good. What could not be so easily repaired was the psychological damage to those who lived in fairly close proximity to the plant and who suffered the loss of their tangible property.

One of the problems with industrial installations is that they all too often initiate unwanted growth. A company builds a plant "way out in the country" so as not to disturb the residents with noise, odors, truck traffic etc. What happens? Access is needed for the plant to operate; so, we build a paved road into it. We need electricity to operate along with water, gas and sewer service; so, we install those services.

Now comes a prospective home owner who might well be an employee of the company. He sees the nice rural setting with all the amenities and it is close to his workplace. He sees a perfect site for his dream home. Repeat this a hundred times or so and our isolated factory site becomes downtown. In the event of an accident or incursion we have what the military calls "collateral damage" along with lawsuits by the dozens. Bophal, India is, of course, the prime example of this.

Any facility can be a prime target for a terroristic incursion. We need to look at what we can do the thwart such an event.

Again at the risk of sounding redundant, "if you see something, say something." **Condition your employees to notice anything out of the ordinary and report it immediately.** "Familiarity breeds contempt." Many of the safeguards that are built into our systems are too often ignored because they work so well. For example, seals on rail cars and truck trailers are numbered but how many of us have actually checked to see if the number on the seal we break is the same as the one recorded as being put on the shipment at the point of origin? If the numbers don't match up then it is entirely possible that an unauthorized entry has been made and the shipment should be removed to a remote area and then checked carefully. Yes it takes time but how much time will it take to correct the consequences if there is something amiss?

Know the people who make deliveries to your facilities. It doesn't hurt to take a moment to exchange pleasantries. A number of years ago an alert officer at the Mexican border in south Texas initiated the break up of a large drug smuggling operation by simply noticing a departure from the usual routine of things.

In that case trucks belonging to a local LPG dealer regularly made trips across the border to deliver propane. The truck and driver normally assigned to this operation became familiar to the border officer and they would exchange a few pleasantries as they completed the formalities of the border crossing. One day a truck painted to match the rest of the fleet approached the crossing; everything seemed to be in order but the officer still had a feeling that something was not right. As the truck pulled away he realized that two things were not as they should be. The operator was not the regular driver and the truck, while bearing the same number as the one usually assigned to that route, was of a different make and model. The officer picked up the phone and called the LPG dealer and learned that there was no run on that route and that the truck was sitting in the dealer's yard. So the next call was to law enforcement who promptly intercepted the bogus truck and contacted the LPG division of the Texas Railroad Commission. It turned out that the truck was indeed a fake and the tank was fitted with a four inch blind pipe that extended from the washout plug to the top of the tank and contained a shipment of drugs worth a considerable amount of money (at the time). Additional work by law enforcement resulted in the eventual shut down of one of the largest drug smuggling operations in south Texas at that time. All because a border agent who was familiar with the traffic saw something and said (did) something.

Employees should be alert to the questions asked by visitors. How much is stored here? Is this that bad stuff that blows up? Any undue interest in alarm systems or security arrangements should also be noted and subsequently reported. Areas such as warehouses that contain material that could be made to serve a nefarious purpose can and should be monitored by remote camera systems. If the public knows (or thinks) that a camera system is operational anyone bent on mischief may give it a second thought. If something does happen, the identity of the perpetrator or the evidence needed to defend against a lawsuit is right there on the videotape.

Condition employees to note problems with equipment. If a worker notices a small leak he should report it right away and not just kick some sand over it before going on his way. It shouldn't be necessary to say this but it is surprising how many employees will walk right by a simulated leak and do nothing. They might tell you that they didn't notice it but if so, they need to be trained to look for such things.

A person intent upon obtaining something, material or data, he would be most happy to simply slip into the facility, pick up whatever it is that he is after and leave without alerting anyone. On the other hand if his objective is to do damage to the installation, then he will most likely have to bring something into the area. This may be something as large as a bundle of explosives or as small as a dynamite cap. It may seem to be an innocuous article such as a cell phone or a lap top but remember that "looks can be deceiving".

In order to carry out a nefarious act against a facility a perpetrator must get something inside the facility, either himself or some sort of" package." Employees and staff members should be observant and report any suspicious objects to the appropriate authority. There must be a training component in the facility security protocol. Just who is the "appropriate authority"? Is it plant security, the local police department, the county sheriff,or the military? This will vary with the facility but personnel need to know just who is the first responder and how that party should be contacted.

Suspicious packages (those that do not belong where they are located) may be examined visually but DO NOT touch them; call 911 or a bomb disposal agency as set forth in company procedures. Personal safety is the primary consideration at this point.

Look for unscheduled or unexpected deliveries or pickups. These have been used as a ruse to allow an operative to gain access to a targeted facility. "When in doubt, check it out".

Threats, written, via telephone or internet should always be taken seriously. Upon receipt of a threatening letter, stop handling the document immediately. Simply allow it to drop onto

a desk or table and cover it with another sheet of paper. This is to preserve any latent fingerprints or other evidence that may be on the document and, in the event that the letter has been used to carry some deleterious substance, will help to limit the amount of exposure of the material and the size of the contaminated area. In the event that a letter contains a substance such a powder or stain from a liquid, avoid breathing any dust or particulates and avoid any direct skin contact with the substance. Cautiously wash any skin area that might be contaminated with a disinfectant and report this to the responding personnel.

If a "bomb threat" is received via telephone the person answering the call should try to get the caller to repeat as much of the information as possible. Meanwhile get a second person on the line or (even better) record the call if possible. At least document the information and try to record exactly what the caller said.Try to determine where the call originated. "Caller I D" will be a great help with this. Listen for background noise; the sound of a train or a busy highway may give a clue to the point of origin. Also determine what the caller wants in return for not detonating the bomb. Keep the caller on the line and talking as long a possible. This is particularly true in the event that an attempt is being made to trace the call. While the bomber is on the line, another employee should notify the authorities and begin evacuation from the building if this is warranted. Don't take chances, it is better to evacuate when you don't need to than to fail to evacuate when you should have.

As can be noted from the foregoing, "Time Was..." when plant security was mainly concerned with keeping outsiders away from dangerous and/or sensitive installations and preventing petty theft of company property. Now it has become a major factor in plant operations and employee safety. All personnel connected with a company or a facility are impacted by the need to keep the installation free from intrusion and safe for employees. The accomplishment of this goal requires three things: 1.) Commitment by each and every employee; taking "ownership" of the welfare of the installation and realizing that "the job that you are protecting is our own". 2.) Training; it is not enough to be committed and to be vigilant. Personnel must know what to do with the information the have and how to respond to an incident. Procedural protocols must be formalized and distributed to the plant personnel and these people must be trained in the implementation of these protocols and under what circumstances this should be done. Each and every employee must be trained to adequately respond to any type of incident involving plant security according to the protocols in place and updated each time there is a change in conditions or circumstances. If something happens we need to know how to handle the situation and we need to know now. This is not the time to look it up in the manual. Who do we call? What is the phone number? how do we turn in the alarm? Where do we go in case of an evacuation? Is there a shutdown protocol that must be followed? All these are important and all are subject to change so, update and do it as soon as possible after the change is initiated. Don't wait for the next quarterly safety meeting. 3.) Vigilance; again: "if you see something, say something". We will never know just how many breaches of plant security have been thwarted by being noted by a vigilant employee.While an exact value of the damage that has been prevented and the number of injuries that might have been sustained cannot, of course, be calculated even one instance makes it worth the effort.

Security, like safety, is everybody's job and Commitment, Vigilance and Training (the "Holy Trinity" of plant security) will make sure that jobs saved today will be available tomorrow.

New Toxic Chemical Safety Act requires EPA chemical evaluation

On June 22, 2016, President Obama signed into law the Frank R. Lautenberg Chemical Safety for the 21st Century Act which amends the Toxic Substance Control Act (TSCA), the Nation's primary chemicals management law.

The new law, which received bipartisan support in both the U.S. House of Representatives and the Senate, includes much needed improvements such as:

- Mandatory requirement for EPA to evaluate existing chemicals with clear and enforceable deadlines;
- New risk-based safety standard;
- Increased public transparency for chemical information; and
- Consistent source of funding for EPA to carry out the responsibilities under the new law.

After extinguishing the fire

By JOHN FRANK/XL Catlin

Although these topics have been addressed in prior articles yet another warehouse was recently lost, due in part because of failure to adhere to three basic principles. We evaluated eight total loss warehouse fires where sprinklers were controlling the fire, or where the fire was thought to be completely extinguished, and yet ended in a total loss. Three main causes were identified. Sometimes these factors were combined. These factors were:

1. Premature closing of sprinkler valve (twice in the review of these eight incidents with many others occurring),

2. Excessive ventilation in six of the eight incidents,

3. Not providing a fire watch (with fire-fighting capabilities) to guard against rekindle while the sprinklers were being restored in three of the eight incidents.

However, first we should review the definition of sprinkler control. So called "control mode" sprinklers are not required or expected to extinguish a fire. They might, but the design basis is to stop the growth of the fire, to keep it from spreading, and to prevent structural failure. It is expected that the fire service will have to do the final extinguishment. Frequently this will be in an environment of smoke.

Another term associated with modern warehouse fire protection sprinklers is suppression, as in Early Suppression Fast Response (ESFR) sprinklers. Despite widely held beliefs, suppression does not mean extinguishment. It means that the heat release rate is quickly driven to close to zero, but not zero. Final extinguishment by the fire service and overhaul is still needed. Smoke will not be as severe as with conventional sprinklers because water application begins much sooner and with much greater volume. With in-rack sprinklers the fire is likely to be smaller still, with even less smoke.

Premature closing of sprinkler valves seems to stem from a belief that sprinklers are there to hold the fire in check until the fire service arrives, and then the fire service takes over from there. This is not true. The fire service is intended to work in conjunction with the sprinklers, not instead of them. Sprinklers should not be shut down until the interior commander is certain that the sprinklers are no longer needed.

Other common reasons given for shutting the sprinklers off too soon are to allow the smoke to lift or to allow the fire to show itself. There are many cases of the fire growing beyond control when this is done. Instead, thermal imaging cameras are recommended to find the seat of the fire.

Once the sprinklers are shut off, someone with a radio on the fire ground channel should be stationed at the closed valve to reopen it immediately if the fire redevelops. This will cause the smoke layer to decend. Interior forces should be prepared for this.

As we just discussed, smoke is to be expected. Personnel operating inside the building need to have a hose line or lifeline to find their way back out. Enough air is needed to get back out. Ventilation of course is needed but it should be controlled, coordinated with the fire attack, and reversible. If doors are open for ventilation, someone should be available to reclose them (on orders from the incident or sector commander) if the fire redevelops. Positive or negative pressure ventilation fans (building, fire service, or both) can likewise be shut down. Large truck mounted fans should be brought up to speed slowly because the large air flow can cause the fire to rapidly redevelop. Irreversible actions such as removing the side of a building allow no way to reverse course if conditions deteriorate.

In almost half of the cases we reviewed, an initial fire was thought to be extinguished and the fire service left the scene. A second or rekindled fire then destroyed the facility because the sprinklers were still out of service from the first fire. It is extra work to provide a fire watch, but far less than the multiple alarm fire that could result.

These simple and basic precautions can prevent a minor incident from turning into a dangerous and resource draining long- term event.

Feel free to contact me at john.frank@xlcatlin.com.

Initial entry training for first responders

By JAMES W. KIESLING/Gulf Coast Emergency Response Academy

In this column I will discuss a "buffet" style option of setting up an emergency response team's training program. To accomplish this I will use as an example a course given to new members of FDNY's Special Operations Command (SOC) and how it evolved to fit a large variety of ever-changing needs. This will be related to how an industrial team can utilize this buffet approach to set up a training program to address their particular needs.

The Rescue Technician course is a three week course that along with the three week Hazardous Materials Technician II course comprises the initial entry training for new members of SOC. The curriculum was initially adapted from the New York State (NYS) Fire Academy course of the same name. Even when it was initially adapted it was customized to address specific situations and equipment. The reason that this was possible is that while the NYS course was geared towards a varied audience the SOC course is geared towards one particular audience. In addition to providing for our initial training needs it also allowed FDNY SOC to begin receiving NYS certifications for these courses. This was useful when documenting our training in situations such as being certified as a FEMA Urban Search and Rescue (USAR) team. In its initial format, following the state model, it was a two week course that provided an entry (or awareness) level or training in some of our core disciplines such as: high angle, collapse, trench and confined space rescue. To fulfill our training needs this initial training is later followed up by full courses and in some cases advanced courses in each of the core disciplines. This course not only laid the foundation for further training but it also made the new members immediately useful when responding to these types of incidents.

As the course developed, curriculum was added and modified to fit the particular requirements of FDNY SOC. One example of this was the addition of a water rescue awareness day. When a member of SOC completes this course and their other core courses they are considered a collapse technician and thus eligible to put in an application for a position on New York City's USAR team, New York Task Force 1 (NY-TF1)[1]. However to be a collapse technician one of the requirements is water rescue awareness training. To fulfill this requirement it was added to the curriculum. Later as we recognized the value of the water rescue training other items were added to the water rescue curriculum such as training the new members to assist SOC's rescue divers with their equipment, deployment and operations. In this case what started as an effort to fulfill certification requirements evolved into training that enabled new members to be of immediate use towards fulfilling an important mission.

Another example of an evolution of the curriculum was the inclusion of advanced firefighter rescue techniques as well as other training that has been found to be useful in aiding firefighters in distress, such as team search techniques which are useful in finding people missing in large areas. The reasons that this advanced training is included in an entry level course are that even though the members taking the course are new to SOC they are all experienced firefighters and the rescue of missing or trapped firefighters is generally considered SOC's most important mission.

Photos courtesy of FDNY

Training exercise involving a victim impaled by rebar through his body and the car seat.

As the rescue technician course stands it consists of the following topics: Introduction/Overview, High Angle, Confined Space, Trench, Collapse, Specialized Tools, The Tactical Support Unit (TAC), Firefighter Rescue, Team Search, Thermal Imaging Camera, Auto Extrication, Water Rescue (Including Ice Rescue and SCUBA operations), Man in Machine Entrapments, Subway Operations, Elevator and Escalator Rescue, and Heavy Rigging.

All of these topics are deemed important to include in the members initial training for different reasons.

- Introduction/Overview
- High Angle
- Confined Space
- TrenchCollapse

The introduction, high angle, confined space, trench and collapse portions of this course are intended to give an overview of the general operations of SOC companies as well as an entry level of knowledge on these specific topics so the members can be an immediate asset at operations.

- Specialized Tools
- The Tactical Support Unit (TAC)

The specialized tools and TAC unit days of the course are an introduction to some of the specialized equipment carried by and delivered for the use of SOC companies. At a minimal this should enable new members to set up this equipment for the use of members with a higher level of training.

- Firefighter RescueTeam Search

Above, training exercise where responders use a torch to free a victim impaled on a fence. At right, responder is lowered down a vertical pipe inverted to retrieve a victim.

- Thermal Imaging Camera

The firefighter rescue, team search, and thermal imaging camera portion of the course bring the members to an advanced level of training on the important topic of rescuing a lost, trapped or missing firefighter.

- Auto Extrication
- Water Rescue – Including Ice Rescue and SCUBA operations.

The auto extrication and water rescue days offer an advanced level of training on topics which SOC companies may be called to assist other FDNY units. In addition the SCUBA portion of water rescue offers a base level of knowledge required to assist members that have this advanced training.

- Man in Machine Entrapments
- Subway Operations
- Elevator and Escalator Rescue
- Heavy Rigging

Man in machine entrapments; subway operations; elevator and escalator rescue and heavy rigging are all standalone components. These days of the course provide a foundation for members to operate at these specialized scenarios.

Collectively the individual components of the Rescue Technician curriculum:

Fulfill portions of the certification and training requirements of new members of SOC as well as some of the requirements of members who will apply for NY-TF1 of the SOC Task Force.

Our goal is to immediately make new members a useful part of the team during technical rescue operations (even if only at a basic level).

Lay the foundation for future training.

Provide advanced training on topics of special significance e.g. firefighter rescue.

Some of the ways that this tailored approach to training can be utilized by industrial teams in addition to those reasons it is utilized by FDNY (listed above) include:

Provide members that can support the operations of members trained to a higher level. This can be a cost effective force multiplier.

Provide a base level of training for members of an emergency team. Building upon this base, select members can specialize on given topics such as Haz Mat. Again this can be a cost effective alternative, opposed to having all members trained to a higher level on all pertinent topics.

Can be used to train for a tiered response where a large portion of personnel can be trained on the hazards and more common occurrences specific to a given facility and the immediate actions

Above, responders train to extricate a victim from a wood chipper. At right, responders use air bags and specialized cribbing to free a victim trapped between a subway car and the platform.

Training

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to take while waiting for personnel trained to a higher level.

A course designed upon this type of format can range from an all-inclusive day of training, to a course more like the FDNY SOC's consisting of three weeks or more, followed up by more advanced training. This can include the SOC mode of training where after receiving advanced training some members receive specialized training. If assigned to a Squad company this can be training offered at numerous hazardous materials schools around the Country; if assigned to a Rescue Company this can be SCUBA training; and if the member is on the SOC Task Force it can be swift water rescue and swift water boat operator schools.

This buffet or probably more appropriately termed an "a la carte" approach, allows you to order only what you want off the menu so you end up with the training program that is appropriate for whatever your training needs are.

1. NY-TF1 is comprised of members of FDNY, NYPD and NYC EMS and is a Federal asset. In addition member of FDNY SOC can apply for a spot on the SOC Task Force which is comprised of all FDNY members and can be utilized as both a City and State asset.

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