



# Chicago Fire Department – thinking outside the box

**A single cubic foot of soil can weigh as much as 145 pounds and a typical cave-in can involve about 1.5 cubic yards of soil weighing approximately 4,000 pounds. After experiencing an increase in trench rescue operations, Chicago Fire Department came up with a world-class innovation that has considerably shortened rescue time: Ann Marie Knegt reports.**

In 2002 Chief of Special Operations Mike Fox of the Chicago Fire Department attended a trench rescue operation where a little boy was stuck up to his chest in the mud. While working in his back yard, he had fallen into a catch basin. The fire companies had been working for hours to get him out of the basin, and the operation seemed doomed to fail due to the lack of space.

Several weeks previously Mike had seen a demonstration from a firefighter from the suburbs, who had had the idea of using a vacuum truck from the City's Water Department combined with

rescue air lines to rescue people from trenches. "I requested that our Water Department send out a vacuum truck, and as I had received some training on how to use the vacuum trucks in these types of situations, I knew the dangers involved. When the truck arrived, there were some really surprised faces at the rescue scene. I proceeded to explain to my superiors what my plan of action was and what the dangers were in this situation, then we put the machine to work and removed the mud and we were able to free the boy."

Mike explained the problems they had encountered during the rescue of the boy to the firefighter who had come up with the idea to use the vacuum truck, Dave Adler (now one of the owners of Rescue Vac Systems Inc). Dave replied that he was working on a set of extensions and accessories that would increase safety during the rescue process.

After the new kit was completed, Dave travelled to Chicago where he tested the new accessories and provided training for Chicago Fire Department at one of its training sites. From then on the system became part of Chicago FD's standard protocol, and every time the department faced a trench incident the truck was called out.

In May 2009, this happened again during another incident, where a sewer situated 10ft underground had collapsed. The situation appeared dire, and even with the help of the truck no progress was being made. "We had encountered another problem. It turned out that the nozzle extensions we were using were too big to get through the hole, and we had to adapt these eight-inch tubes into a four-inch tube to gain access. We connected a five gallon bucket and a traffic cone to the hose of the vacuum truck and managed to suck the mud and debris out," Mike recalls.

Once again, the vacuum truck saved the day and the victim was brought out alive and well, and when the rescue team raised the issue of extension sizes with Dave, to their amazement, he was already developing several smaller models. After these had

*The City of Chicago Fire and Rescue vacuum unit is a Vac-Con Vacuum Truck, model V309TH, mounted on a Ford LNT8000 chassis.*

## Equipment carried onboard

(5) 8"x10ft vacuum hoses; (20) 8" hose clamps; (2) 8" safety vacuum relief valve; (3) 8" specialty vacuum tips ranging in length from 2ft to 10ft; (4) 4"x25ft vacuum hoses; (1) 8"x4" vacuum hose reducer; (2) 4"x3ft vacuum tips; (2) 4"x 3ft tip extensions; (1) rescue shield; (1) 175cfm air knife; (2) 200ftx1" air hose.



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The new Rescue Vac vehicle will be on show at the FRI 2010 (24-28 August), outside McCormick Place.



been finalised, Chicago FD acquired them and have used the new nozzles with great success in several rescue operations.

However in August 2009 Chicago FD came across another challenge in which two workers were trapped in a sewer catch basin on the north side of Chicago. Mike explains that because they did not own a vacuum truck, he had to contact the Water Department to request a vehicle. The problem was that the incident took place on a Sunday and no personnel were on duty. "We were at the incident scene and had all our extensions ready, but we were on the other side of Chicago, and the Water Department had to call people on their day off. This meant the

workers had to drive to the depot to pick up the truck and bring it out to us, and this took 2.5 hours."

Before using the vacuum truck, the only way to rescue people was to dig them out with bucket and shovel. Trench rescue operations are really a fight against time, and in this case the late arrival of the vacuum truck caused a severe disadvantage. After the incident, Mike talked to the Water Department and asked if it could keep people on shift during the weekend. Although the people from the Department understood the FD's problem, it would have been too expensive for them to do so. However, they came up with an alternative solution and donated an older truck to Chicago Fire Department, and also provided training on how to operate it. "We modified the vacuum truck they gave us, and painted it in our traditional red and black, and we installed all the lights on it. Now we have our own vacuum truck to respond to trench incidents and this will speed up the rescue immensely. It is a great example of how Government Agencies can think outside the box and come up with viable solutions!"

Mike emphasises that Chicago Fire Department has been hit by budget cuts the same as any other fire service in the current climate. However by talking to the Water Department, which understood the challenges he faced, he was able to overcome the issues.

"The new Rescue Vac vehicle will be on show at the FRI 2010 in August, outside McCormick Place, so that if we have an incident we will still be able to respond with the truck. All our rescue squads will be trained on how to use the new truck and we have the full range of RescueVac equipment on them, enabling us to tackle any type of rescue incident. My message to other fire departments is to talk to other Government Agencies and departments, think outside the box and come up with solutions to get around funding issues."

The City of Chicago Fire and Rescue vacuum unit is a Vac-Con Vacuum Truck, model V309TH, mounted on a Ford LNT8000 chassis. The vacuum system consists of a Vac-Con 3-Stage Centrifugal Compressor, capable of 200" H2O (14.75" Hg) @3600 CFM, driven hydrostatically by the chassis engine. The hydrostatic drive provides for a simple, one-man operation, and allows the truck to be safely operated in neutral, requiring no engagement of transfer cases or power take-off units. The vacuum tank is constructed of corrosion-resistant Corten steel, and has a usable capacity of nine cubic yards (1,800 gallons). This tank uses a hydraulic scissors hoist to dump material at a 50 degree angle

## Is your light compliant with the European Directive regarding explosion protection?

Peli Products, the global leader in the design and manufacture of advanced lighting systems and virtually indestructible cases, has announced that several of their safety approved torch models fully comply with updated ATEX safety standards (effective since October 2009).

ATEX Standard changes affecting torches certified in Category 1&2 (Zone 0&1), are a result of Standard for Protection of Equipment by Intrinsic Safety "i" changes (from EN50020 to the new EN60079-11:2007) and Increased Safety "e" changes (from EN60079-7:2003 to EN60079-7:2007).

Peli has launched a number of new torch models for use in hazardous areas, including two new zone 0 models:

The Stealthlite 2410 Zone 0 Recoil LED; which features;

- LED beam of 79
- Battery burn-time: eight hours
- Convenient side-mounted switch for one-hand operation
- Submersible up to 150 meters
- Can be mounted to a variety of work helmets with our versatile bracket kits.

The Little ED 3610 Zone 0 Recoil LED features;

- LED beam of 79 lumens
- Battery burn-time: eight hours
- Powerful right-angle light
- Stainless steel clip and key ring for hands-free operation
- Ergonomic switch that allows easy operation even with gloves on.



through a full diameter discharge door. The door is secured by hydraulic latches to ensure payload integrity. The vacuum boom draws material into the tank through an 8" tube, which can telescope up to 5". This front-mounted boom is also capable of rotating 180 degrees to provide a full range of access to difficult excavation locations on either side or in front of the truck.

Dave Adler, who developed this vehicle in conjunction with Chicago Fire Department has been in the fire service for over 32 years, in addition to being a third generation underground contractor. After frequently responding to trench rescue incidents, he asked himself how he could decrease the rescue time. During these incidents the patient is at risk to develop hypothermia and "crush" syndrome: blood supply and oxygen are cut off from the limbs and muscles, while toxins build up. When the victim is released the toxins enter the system and kill the patient.

This can occur after 15 minutes of being trapped, but the time frame is dependent on type of incident, depth and even temperature.

"There had to be a way to shorten the time victims were trapped," Dave asked himself. "Rescuers receive excellent trench rescue training, and state-of-the-art shoring equipment is now available, so this wasn't the problem. One of the most labour-intensive and time consuming segments of trench rescue operations is the soil removal. That's where the Rescue Vac System was developed." A vacuum only lifts debris on the surface and an air knife aerates and fractures the soil. When these two technologies are blended an incredibly efficient rescue system emerges. The Rescue Vac System utilises specially design vacuum hoses that connect to a municipal vacuum truck. The air knife connects to a typical contractor's air compressor operating at 100PSI and supplying 175 cubic feet per minute of air. The

## IAFC announces stand down in confined space and technical rescue

In June the International Association of Fire Chiefs (IAFC), through its Safety, Health and Survival Section, urged all fire chiefs and officers to immediately issue a stand down in their departments due to two separate, but similar confined space rescue incidents that nearly took the lives of several firefighters. During a stand down, personnel are directed to postpone non-emergency tasks to focus on critical safety training.

In addition to federal, state and local laws, the IAFC Safety Health and Survival Section identified a number of online resources for fire and emergency service leaders and personnel to use in this stand down and in their ongoing efforts to educate personnel on technical rescue operations.

"In recent weeks, incidents involving confined space rescues in both Ohio and Indiana left initial civilian victims dead and firefighters critically injured," stated Chief Billy Goldfeder, Chair of the IAFC Safety, Health and Survival Section. "In both cases, while heroic attempts were made to save the victims, firefighters ended up becoming victims themselves."

During the stand down, chiefs are requested to have all personnel immediately review and discuss applicable departmental policies and procedures to minimise the risk to firefighters in confined space and related technical rescue incidents.

"Confined space and similar technical rescues are high-risk, but low-frequency events," said Chief Jeff Johnson, IAFC president. "The rarer the incident type, the more likely that fire and EMS personnel may be unaware of, unprepared for, or even forget proper procedures as they race to rescue a victim. I urge fire and emergency leaders to immediately take action to review the dangers and proper procedures for confined space rescue operations."

Rescue Vac System decreases the rescue dig operations from a fatal six to ten hours down to a life saving 20-30 minutes. This technology can be utilised for trench and silo rescues, landslides, debris flows and should be considered for building collapse and parallel vertical shaft rescue operations.

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