

M.V. CAPE LAMBERT-- A MOST UNUSUAL CFR-D RUN

by Captain John Norman, Rescue 1

A shipyard worker's tragic mistake turned a pleasant Sunday morning routine into a major rescue effort in the Brooklyn Navy Yard on March 8, 1998. What started out as a certified first responder defibrillator (CFR-D) run for a single engine company resulted in an "all hands," with numerous special units operating. Before it was over, one worker was dead, another hospitalized and the members of the FDNY once again had exhibited their skills and proved their dedication.

M.V. Cape Lambert

The *Motor Vessel Cape Lambert* is a U.S. Government-owned cargo ship that was built in 1972. Originally christened the *M.V. Avon Forest*, it served as a private vessel ferrying paper to Europe and bringing European automobiles to the U.S. and Canada until it was purchased by the Department of Transportation. The ship features roll on/roll off design, with a large cargo ramp that can be lowered to allow vehicles to drive on and off from its main hold level. It is 682 feet long and 75 feet in beam (width) and extends 50 feet from its keel (where the incident occurred), up to its main deck level, which provided the only access to the ship's interior.

At the time of the incident, the *Cape Lambert* and its sister ship, the *M.V. Cape Lobos*, were in dry dock in adjoining slips in the Navy Yard, undergoing a "routine" overhaul. These veterans of Desert Shield/Storm were having rusted

steel structural elements cut out and replaced. This process is done approximately every five years. Several workers with oxy-propane cutting

torches were sent into the double bottom area--which is approximately four feet high and extends the length and width of the ship between the keel and the inner deck--to cut out sections of steel plating to make way for the new steel to take its place. Work had been going on without mishap for several weeks and the *Cape Lobos* was nearly complete. At approximately 10:30 A.M., on March 8th, a fatal mistake occurred.

A worker, Carlos Videl, took his torch and began to cut a piece of plate loose. The worker had gotten into the wrong location and his 5500-degree Fahrenheit flame blew a hole through the steel plate, directly into the bottom of a nearly full 90,000-gallon tank of premium diesel fuel that supplied the ship's main engines. A flash fire ensued, burning the worker's face and consuming the available oxygen within the double bottom.

Additionally, the blaze created elevated levels of carbon monoxide before it finally self-extinguished, apparently due to this lack of oxygen. This was a major blessing for fire units because the hole in the fuel tank continued to spew a downward geyser of diesel fuel at about a 20-gallon-per-minute rate, flooding the double bottom and eventually spilling out into the dry dock itself before it could be contained. Without stretching the imagination too much, it is easy to envision the *Cape Lambert* looking just like the *U.S.S. Constellation* after a similar mishap in the same Brooklyn Navy Yard in 1960.

The alarm

Initially, workers in the vicinity of the accident attempted to rescue the unresponsive Videl, but the smoky, oxygen-deficient atmosphere, diesel fuel and the extremely difficult operating area made that impossible. Valuable time was lost since there was no ready means of calling the Fire Department from the affected hold.

The contractor's foreman had to climb the ship's vertical ladder from the keel, up three decks to contact the ship's engineer, who was on the main deck. The engineer reportedly obtained an SCBA and returned with the foreman to the scene to attempt a rescue. When the engineer recognized the extreme danger and difficulty of this rescue (the 16-inch-wide hatch in the deck did not permit entry with the SCBA on his back), he then radioed the *Cape Lobos* engineer, who dialed 911 to report the incident.



(left) The *M.V. Cape Lambert* sits on the blocks in dry dock at the Brooklyn Navy Yard.

photo left courtesy Captain John Norman
photo above courtesy Captain Terry Hatton



Narrow vertical ladders, accessible only through water-tight hatches, provided the only entrance to the incident site initially. Note: All photos were taken during critique operations, after the incident and after the ship was made safe.

FDNY response

The initial 911 report generated a CFR-D run for E-210, as well as units of the Bureau of Emergency Medical Service (EMS). At 10:52 A.M., the Brooklyn Communications Office dispatched a full Confined Space Response: three Engines (210, 207, 211), two Ladders (110 and 131, the

latter a rescue support truck), two Rescues (1 and 2), SQ-1, Haz-Mat 1 and the Field Communications Unit (due to the location aboard ship), under the command of Battalion 31 Chief Edward Collins.

First-arriving E-210 members were apprised of the situation by shipyard workers and relayed a report to incoming units. They then made their way up the gangway--at the ship's stern--down a series of narrow vertical ladders, to the hatch opening into the double bottom. From this location, they were unable to see the victims. They began making the scene safe. The oxy-propane hose still led down into the space, fed by banks of cylinders that would have to be shut down to avoid another fire and/or explosion.

They soon were joined by SQ-1 under the command of Captain Terence Hatton. SQ-1 members immediately deployed atmosphere-monitoring equipment that indicated a life-threatening condition existed in the space. Oxygen levels were depleted to below 18%; carbon monoxide (CO) levels were more than 300 ppm; and there were elevated sulfur dioxide readings (from the burning diesel fuel).

Members of SQ-1 simultaneously began deploying their high-angle rope gear, since it was impossible to determine the interior arrangement past a three- x three-foot area inside the narrow man-way. The missing workers were not visible from this opening, meaning that an FDNY member would have to enter the space in total darkness and search. They had no way of knowing whether there were other vertical openings ahead. The ropes would protect the entrants against a fall, serve as a guideline to bring reinforcements to the entrant's position and could be used as a retrieval line in case the rescuer had to be hauled out of the space should unforeseen developments occur.

Lieutenant Anthony Errico and the members of R-2 arrived. R-2's members were equipped with Scott Supplied Air Respirators (SAR), known as Scott Extension Masks. These devices--carried by all FDNY Rescue Companies--allow the wearer to enter a confined space while breathing from an air supply outside the space, fed by an air line up to 300 feet long. This allows the member to remain in the

R-1 member tends to Air Source Cart™ as another member prepares for a shipboard confined space entry. The entrant's SCBA is being supplied with air from the Cart via hose-line. The cylinder in the mask bracket provides "escape air" in the event the air hose is cut or becomes kinked.

*photos courtesy
Captain John Norman*



space for extended periods--unaffected by air supply restrictions--and limited only by the exertion and temperature effects within the space.

Lieutenant Errico directed FF Sal Civitillo to enter the space through the 14-inch-wide man-way. FF Civitillo entered with a one-hour cylinder in his SAR, since the distance to the victim was unknown. Entry through the man-way was accomplished similarly to the FDNY emergency escape maneuver in the Mask Confidence Course. The SCBA is removed from the back while the facepiece remains in place supplying air. To avoid the possibility of dropping the SCBA and pulling the mask from the rescuer's face (an occurrence that resulted in the death of a fire captain in a similar shipboard confined space incident in Virginia in 1988), the members of the Rescue Companies have been trained to secure the mask harness to themselves.

Pressing deeper into the space, following the oxy-propane hose, FF Civitillo discovered the unconscious form of Videl, approximately 30 feet from the entry point. FF Civitillo quickly placed a second SCBA on the victim and assessed his vital signs. Detecting a faint pulse, FF Civitillo then evaluated the difficulties entailed in the removal.

By this time, R-1 had arrived to back up R-2 and the other units. The Air Source Cart and air hoses were in place. Lieutenant Errico recognized the need to prevent over-extension inside the space and ordered FF Civitillo to exit the space and FFs Steve Brown (R-2) and Kevin Kroth (R-1) to enter.

Based upon FF Civitillo's size-up and the description of the space, it was decided that the two new entrants would be able to wear 10-minute "escape bottles" slung along their legs, rather than the heavy, 60-minute bottle FF Civitillo had used before the situation became clearer.

Meanwhile, Chief Collins directed Captain Norman to take two of R-1's members back out of the ship and down into the dry dock area. Here they would attempt an entry into the space through an opening that E-207 had discovered while investigating the extent of the spreading fuel oil spill. They found an 18- x 18-inch hole cut right into the bottom of the ship.

Under the direction of Battalion 32 Chief Jackson, R-1

prepared for entry through the opening. From this vantage point, the trapped worker was just visible. After consulting with the interior forces, however, it was decided that these members would stand by while the initial entrants worked to complete the removal.

FFs Brown and Kroth had their work cut out for them. The victim was located approximately 30 feet from the deck man-way and 50 feet from the access hole cut in the bottom of the ship. In the way, however, were the steel baffle plates the worker was planning to remove.

The plates--extending from hull to the deck above--were located every three feet apart down the length of the ship, and two feet, nine inches apart across the breadth. An 18-inch-wide x 24-inch-high oval was cut into each plate. The cutouts began approximately 12 inches above the bottom plate of the keel. The unconscious victim would have to be lifted over each of these barriers by the two members who could not even fit in the same space with him. Even the SKED® stretcher--specially designed for confined space rescues--would be of no help here. The members had to rely on their own skills, strength and determination to complete this removal.

Finally, after what seemed like an eternity, but which was actually only 41 minutes after FDNY arrival, the victim was passed up through the narrow man-way onto the lowest deck of the ship where CPR was begun immediately by firefighters and Bureau of EMS personnel.

There was a long way to go, however, as the victim was several decks below the access level. With the cooperation of the ship's engineering personnel and shipyard workers, several elevators were activated to allow removal without hauling the victim up the narrow vertical chases, permitting life support efforts to continue uninterrupted. This last victim was transported to Brooklyn Hospital, where he succumbed to his injuries. It was his first day working in the shipyard.

Lessons learned and reinforced

Expect the unexpected. When responding to any industrial site, report of an unconscious person should be viewed as a "red flag" of danger. Anticipate the possibility of a life-threatening atmospheric or chemical emergency and be prepared to deal with it. Wear appropriate protective cloth-

ing and SCBA, bring the Lifesaving Rope, if necessary, and summon additional resources as needed. At this incident, units encountered a deadly atmosphere, an encompassing fuel spill and leak, leaks from cutting torches fed by large banks of liquefied petroleum gas and cryogenic liquid oxygen cylinders.

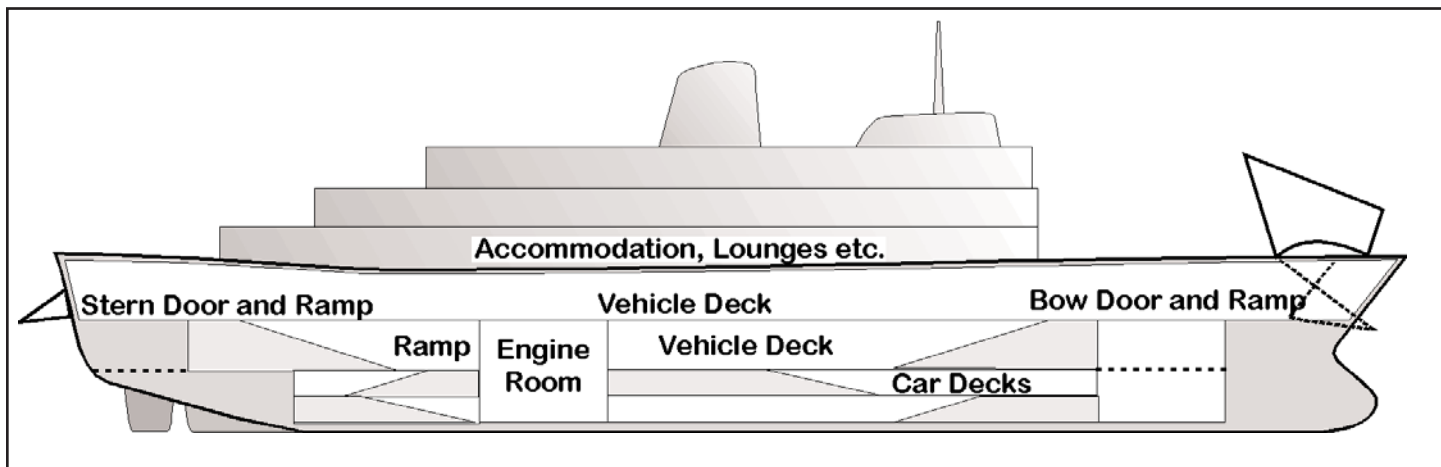
Anticipate the need for many units/additional personnel. Shipboard incidents of any kind require extensive resources due to their size and the steel construction, which prevent direct handie-talkie communications between the inside and outside of the ship. A handie-talkie relay--similar to that used at subway incidents--should be established.

For a technical rescue incident such as this, requests for additional specialized equipment may have to be relayed to other incoming units after the first-arriving units have performed their size-up of the incident. Other personnel--either FDNY or the ship's complement, if available--should be posted along the route to guide later-arriving units to the incident site through the often-complex arrangement of corridors, ladders, etc. Similarly, additional units may be required to assist in the transport of additional equipment. At this incident, the first-alarm engine companies were extremely valuable for this purpose. They transported additional air hoses and air bottles, established a water supply and stretched hand-lines to protect against fire if the fuel spill re-ignited.

This incident, as well as several others citywide, have confirmed the appropriateness of the Department's confined space response policy. Two engines, two ladders, two Rescues, one Squad, Haz-Mat and a battalion are assigned to initial reports of a confined space rescue. This response provides a readily available pool of resources, personnel, masks, air cylinders, ropes, ladders, fans, etc., which have proved essential at these incidents.

Transmit special calls as needed for additional units. The Department has many special units available for dealing with specific problems. In this incident, the location within the Navy Yard created additional difficulties. Water supply within the complex is poor. Satellite and Marine units were available to supplement the water supply in case the fuel spill re-ignited.

When the scope of the fuel leak and spill was recog-



graphic by FF Bill Kristoff

nized, Acting Deputy Chief Lawrence Lutz in Division 11 transmitted special calls for additional foam supplies. The Decon personnel of the Special Operations Command (SOC) also were special-called to deal with the protective clothing, hose, rope and other items that were contaminated with diesel fuel. Much of the equipment was so saturated that it had to be condemned. Early notification to SOC will ensure timely replacement of protective clothing.

When possible, use multiple avenues of approach to trapped victims. In this incident, a separate, remote access to the victims' location was discovered as the incident progressed. A separate rescue team was dispatched to this location and preparations made for entry from this location. This is a prudent move, given the many variables that can affect a complex removal. While it was not needed for final

removal in this case, it often can save time, effort and lives.

This incident highlighted a number of unusual hazards FDNY units can encounter on what may seem a "routine" response. A confined space, haz-mat and shipboard incident were resolved safely through teamwork and coordination. All units should recognize that a similar response could be in their future. Training and awareness can save our lives, as well as the lives of our citizens.

About the Author...

Captain John Norman is a 19-year veteran with the FDNY and is assigned to Rescue 1. He majored in Fire Protection Engineering at Oklahoma State University. He is a Contributing Editor to Firehouse Magazine and a frequent contributor to WNYF.



Operations at Brooklyn Box 386

by Captain Terence S. Hatton, Special Operations Command

On Sunday, March 8, 1998, at 1052 hours, SQ-1 was dispatched via MDT while on the air to Brooklyn Box 386. Arriving within five minutes, SQ-1 was the first Special Operations Unit (SOC) to arrive at the box. Brooklyn Navy Yard security waved SQ-1 into the dry dock location. The SQ-1 officer was familiar with the ship because the company had conducted a drill three weeks prior to this incident.

SQ-1 members gathered all their confined space and high-angle rope equipment for transport onto the ship. FFs Hindle and Zazulka quickly donned special rope harnesses. SQ-1 requested that E-210 set up a relay system for handie-talkies before descending below deck. Anticipating the tools and equipment that would be needed, SQ-1's officer ordered via the handie-talkie relay that R-2 bring specific tools aboard.

The ship had a medium smoke condition because of the numerous oxy-propane torches in use. Initially, no responsible person met the arriving FDNY units. Upon reaching the elevator dock, SQ-1 encountered an open elevator shaft, but no elevator car was present. The ship's first engineer met SQ-1 on this deck and used his onboard radio to order the elevator recalled for FDNY use. The elevator returned to its top level as Battalion 31 arrived. The ship's first engineer

informed Battalion 31 and SQ-1 of the particulars concerning the trapped workers in the salt-water ballast tank.

R-2 announced their arrival over the handie-talkie. SQ-1 awaited R-2 with their equipment and both companies descended on the elevator together. Conditions mandated that all personnel be mask-equipped.

Once on the bottom deck, a shift supervisor confirmed to the SQ-1 officer that two workers were trapped inside a manhole. The SQ-1 officer immediately ordered non-essential civilians to evacuate the manhole and immediate area. Diesel fuel was visible, running inside the manhole. (See "Emergency!...at Queens Box 7175," by Captain George Schofield, 4th issue 1977, *WNYF*, pages 20-21.)

One of the workers in the manhole was signaled verbally to exit immediately. This worker complied with the best of his ability; he was disoriented and barely able to reach the vertical opening. As this worker approached the exit, he became incapacitated. With mask facepieces donned, SQ-1 members reached into the hole and physically pulled him free. The worker was removed, unconscious, to the care of FDNY EMS. Simultaneously, other members of SQ-1 and R-2 set up rope retrieval systems and supplied air confined space masks.



Baffle plate (measuring 12 inches high) inside confined space. *Note: All photos were taken during critique operations, after the incident and after the ship was made safe.*



SQ-1 firefighter standing inside opening to the confined space. **Opening measures 22- x 14- x 44-inches deep.**

all photos by Captain Terence S. Hatton



Man-way ladder, adjacent to car/truck elevator.

SQ-1 tested the atmosphere with monitoring meters before any FDNY entry was attempted. The atmosphere was contaminated highly with carbon monoxide--300 ppm and rising (F.F.P. Haz-Mat 4 sec. 4.5 3/15/97). Oxygen was at 18% and decreasing. Other confined space gases also were above the safe limits (Training Bulletin, Confined Space Operations, Data Sheet #1, page 2).

The officers of SQ-1 and R-2 quickly formulated a rescue plan. Handie-talkie transmissions were very heavy due to multiple radios in use.

The entry team was given permission by the Safety Chief to switch to a secondary tactical channel, which enabled the Safety Chief and

entry/safety members to be in direct contact. The plan was for R-2 members to make entry and SQ-1 members to be the safety retrieval team.

The Scott masks carried by Rescue Companies have an umbilical air line capability, which allows firefighters an unlimited breathing air supply with a safety back-up provided by the cylinder normally worn at fire operations.

While the entry teams were inside the baffles, diesel fuel continued to flood the confined space. Haz-Mat Co. 1 continuously monitored the environment with their meters. Rescue support ladder companies set up smoke ejector fans for additional ventilation. Engine companies stretched hand-lines with foam nozzles for the diesel leak.

SQ-1's officer relayed progress reports to the Operations Chief on the elevator deck. He, in turn, relayed information to the Incident Commander on the dry dock. (See Captain John Norman's article for a full description of entry team actions.)

Once the victim was out of the confined space, FDNY paramedics and EMTs commenced patient assessment. The primary survey found the victim to be unresponsive, in respiratory arrest and pulseless. C.U.P.S. status indicated "C" and CPR was started. SQ-1 and R-2 packaged the patient into a metal stokes for transport. FDNY EMS personnel continued patient care while rapid transport to the elevator deck was proceeding. From this location, the victim was placed into a mechanical scaffold and raised one additional level to the top deck. He then was carried down the gangway and to the FDNY EMS ALS ambulance.

The diesel fuel contaminated the entry and safety teams. Member de-con was initiated onboard the ship. Haz-Mat Co. 1 provided contaminated personnel with coveralls. All PPE and technical rescue equipment was bagged and brought out to the dry dock and de-con pool. The members who entered the manhole were showered. Haz-Mat decon support completed the decontamination process alongside the ship. This fire/emergency incident concluded without any injury to FDNY personnel.



Hoist was used to remove victim from the vehicle deck to the ship's "top" deck.

Confined Space Rescue Plan Checklist

Determine Nature of Response

- Contact responsible on-site personnel. (Name/Title)
- What has happened?
- How many victims?
- How long has victim been trapped? (Time of Incident)

Establish a Control Perimeter

- Exclude non-essential personnel.
- Do not permit entry by unprotected, untrained rescuers.

Ensure Response of Necessary Resources

- Two nearest available Rescue Companies and nearest available Squad
- Hazardous Materials Co. #1
- Battalion Chief
- Rescue Support Ladder Co. and CFR-D Engine Co.
- Emergency Medical Service--Advanced Life Support Unit

Begin Hazard Analysis

- Interview witnesses/responsible person.
- Examine confined space entry permit, if present.
- Monitor atmosphere for oxygen content, flammable, toxic materials.
- Review hazard information from MSDS, Chemtrec, manufacturer or on-site expert.

Control Site Hazards

- Post two radio-equipped members with necessary tools at each location that controls flow/energy at inside space.
- Shut off electric power to space.
- Secure any movable parts/objects.
- Close valves on fuel/product/hydraulic/water/gas lines leading to space.
- Remove all sources of ignition, if flammables present.
- Ventilate space to remove any hazardous atmospheres. Use positive pressure venting, if possible.

Formulate Rescue Plan

- Review ongoing operations.
- Can victim be removed without rescuers entering space?
- Review responding resources.
- Contact needed expert assistance; i.e., SCUBA Rescue.

Commence Rescue Operation if within Capabilities of Units on the Scene

- All members entering confined spaces must be breathing air from SCBA unless atmosphere is proved non-hazardous (continuous meter readings).
- All members entering the space must be attached to a retrieval line and full body harness (lifesaving rope secured to member with bowline on bight and slippery hitch) at all times to permit their removal, if unconscious.
- Means of hauling members out of space (retrieval system) must be set up before member enters space.

Do not use any power equipment (crane, tower or aerial ladder) to haul a human being from a confined space! A person hung up on an obstruction while being hauled could be killed or seriously injured. If necessary, such devices may be used as anchors for manual hauling systems. If a ladder apparatus is to be used as a high point anchor, the motor should be shut off and all personnel removed from the vicinity of the controls.

About the Author...

Captain Terence S. Hatton is a 17-year veteran of the FDNY. He has been assigned to E-219, L-105, Rescue 2, L-4 and Rescue 4. While in the Captain's Management Program, he worked on the development of Rescue Co. SOPs and the Technical Rescue School at the Bureau of Training.

