ON FEBRUARY 4, 2001, A FIRE OCCURRED ONBOARD the Libra Star, a 291,435-dead-weight-ton very large crude carrier (VLCC), owned and operated by Vela International Marine Ltd. The fire occurred in the engine room and generated high heat and heavy smoke. The ship's staff extinguished the fire. There were no injuries or deaths. Subsequent to the inquiry, and in keeping with their commitment to high safety standards, the senior management at Vela asked that the facilities delivering firefighting training to its junior officers and crew be evaluated. Captain Paul Armitage, a serving master with seven years of command experience on Vela's VLCCs and 28 years of seagoing experience, and I headed the evaluation task force.

During May and June 2001, we visited 13 marine training establishments in the Philippines, India, Croatia, and Poland and developed criteria and an evaluation sheet that covered the following:

- cost of course,
- training facilities,
- training manuals,
- attitude toward safety,
- quality assurance accreditation,
- instructors' background and experience, and
- student-to-trainer ratio.

STANDARDS

The Standards of Training, Certification, and Watchkeeping, 1995 (STCW95) require that officers and crews sailing on Vela's crude oil and product vessels have shore-based firefighting training. All seagoing personnel must complete basic firefighting training as part of their basic training.

Officers and crew members who perform duties associated with tanker operations are also required to attend a tanker-specific, shore-based firefighting training course. The master, senior officers, junior officers, cadets, and crew members aspiring to be officers and who are involved in directing operations are required to attend an advanced firefighting course. Courses are based on the requirements of the International Maritime Organization's (IMO) resolution A437 (XI), "Training Crews in Fire Fighting"; STCW95 Convention, Model Course 1.20, "Basic Fire Fighting and Fire Prevention"; and IMO Model Course 2.03, "Advanced Firefighting." The respective governments approve the courses and routinely carry out inspections to ensure continued compliance with the regulations.

During the evaluation, we found a broad spectrum of quality and compliance with STCW95 and IMO requirements. At the facilities we visited, the courses were in accordance with the guidelines specified by the respective governments.

IMPROVEMENTS NEEDED

In some of the locations we visited, there was no evidence that the trainees were being exposed to or trained in how to deal with the physical challenges they could encounter during a fire within the vessel's internal structure, such as extreme heat and thick smoke. If not trained to operate under these conditions, crew members may be psychologically unprepared to handle the situation.

The minimum training acceptable under some statutes may not be enough. For example, we found there was a need for additional training in simulated emergency conditions, courses that familiarize crew members with the ship's firefighting equipment, and training that emphasizes making entry with various makes and models of SCBA. Only one of the facilities we visited addressed the proper use of personal protective equipment.

WEAKNESSES IN TRAINING

Training related to breathing apparatus was nonexistent or limited at best at the schools we visited—and it is the area most likely to affect the effectiveness of shipboard firefighting. The training we observed was not equal to that given to a land-based firefighter, yet the need for breathing apparatus is essential for shipboard firefighting: It can mean the difference between success and failure.

Thermal imaging cameras were not demonstrated or used at the schools we observed. This technology was developed for maritime use and is now widely used by land-based firefighters. The thermal imaging camera has made firefighting much safer and more efficient. It enables you to see through smoke, to locate victims and the seat of the fire with pinpoint accuracy, and to spot ladders and passages that are invisible to the naked eye.
Many marine training facilities use mock-ups that incorporate marine vessel features that affect firefighting tactics such as (1) elaborate interior passageways and (2) a simulated catwalk on a tanker. (Photos by author.) (3) At some training facilities, shipping containers are used to simulate a ship’s structure. (4) Baseline is being used for a firefighting simulation.

**Ship Firefighting Training for Personnel**

In all the facilities we visited, the principal training staff consisted of former ship officers or ex-naval petty officers. As we continued our evaluation, we wondered whether the trainers’ background and experience were sufficient to allow for programs that would offer training under safe, realistic fire conditions within ship mockups that would prepare emergency teams to deal with the conditions likely to be encountered onboard a ship during a fire.

**HOW DOES THIS RELATE TO LAND-BASED INDUSTRIAL FIREFIGHTERS?**

Many industrial and municipal departments have within their jurisdictions product transfer areas in which various products are loaded or offloaded. The current teachings for land-based firefighters—whether industrial, municipal, or volunteer—responding to marine fires is to use ship personnel to assist with technical issues and guidance. As an example, a ship's crew member may be asked to lead a team of firefighters to the fire location. In theory, this may be of great assistance: The crew knows the ship and the fire's location. But, what if the crew member assigned this task is not fully competent in SCBA use? Not one of the training facilities we visited offered a full SCBA course that included emergency escape maneuvers, reducing the SCBA profile, and other specialty procedures. At some facilities, the SCBA equipment was outdated or nonexistent except for the instructor’s demonstrator. In an emergency, the crew member may be more of a liability than an asset. Fire officers must have confidence in the crew who may be asked to lead the fire team.

Another factor that may influence a crew member’s ability to assist the fire department is the size of the ship's crew. Today's crews tend to be small, around 12 to 20 persons. These crews already may have been engaged in firefighting for an extended period before the fire department arrived. In such conditions, it may be unreasonable to ask these crew members to return to the fire area when they should be in rehabilitation.

In talking to ships' masters and engineers, we learned that there are no set guidelines for using the fixed extinguishing systems onboard ships. The ship's fire teams may attempt to fight the fire themselves before using the systems. Some masters told us that if the fire control team doesn't extinguish the fire in 10 minutes, the team then activates the automatic extinguishing systems. There is an additional delay while all fire control teams are accounted for and the area is secured. These delays may intensify the fire to a level at which the extinguishing system may be ineffective. When the fire department finally arrives, it may take many hours, or even days, to control the fire.

Incident commanders must gather all information, such as the time the fire started and the time the automatic extinguishing system was activated. This information will help the commander assess the condition.

**RECOMMENDED TRANSPORTATION**

During your marine training, follow these procedures:

- Develop a copy to all officers aboard assigned as fire officers. Always be as severe as possible in the training. 
- Evaluate how to use SCBA, if used, and the list of procedures. 
- Adopt a rescue drill for realistic training procedures and filling SIC emergency contact. 
- Train crew in how to protect other rescuers. 
- Purchase a SCBA Edition of a training manual.
conditions that will be encountered and the severity of the fire.

**Recommendations for Fire Departments**

The following recommendations are offered to enhance the relationship between land-based firefighters and a ship's crews and make firefighting aboard ships more efficient.

- Visit the ships that enter your jurisdictions frequently. Establish liaison with the ship's master, and develop a partnership so that ship personnel and land-based firefighters get to know each other.
- If possible, set up fire safety talks with the ship's crews. Make the talks brief; ship personnel will be busy while the ship is in port. Demonstrate emergency mask procedures during these talks.
- Conduct joint drills where possible. Involve other agencies that would respond to an incident.
- Train land-based firefighters in accordance with National Fire Protection Association (NFPA) 1405, Guide for Land-Based Firefighters Who Respond to Marine Vessel Fires. The training should range from the awareness level up to the incident command level. Invite the ship's personnel to attend whenever possible.
- Fire brigades and departments that have loading/offloading facilities within their response areas should be familiar with these techniques and their mechanics. Address questions such as how much product remains in the hose after shutdown and how emergency procedures are carried out.

I have found that a lot of ships' masters welcome visits by the fire department. The exchange of information on firefighting techniques is mutually beneficial. Techniques taught at maritime fire-training centers may differ from those taught at structural/industrial fire training centers. We can learn from each other and build on each other's strengths.

**Recommendations for Marine Transportation Companies**

During your get-acquainted visit to marine transportation companies, offer the following recommendations to them:

- Develop an SCBA manual, and give a copy to all crew members when they report board assigned ships. (Crews may not always be assigned to the same ship or to the same company.) SCBA will differ. This manual should describe the SCBA currently used and instructions on how to test, inspect, don, and doff the unit.
- Evaluate crew members' knowledge of how to use SCBA as soon as they join the ship. Identify crew members not suitable for SCBA use, and adjust emergency resources and response systems accordingly.
- Adopt a standard for firefighting and rescue drills onboard ships. Make the drills as realistic as possible, and test all firefighting procedures, including rotating personnel and filling SCBA cylinders under simulated emergency conditions.
- Train crews in current firefighting techniques for rescuing victims, firefighters, and other rescuers.
- Purchase Marine Fire Fighting, First Edition, or another comparable manual, and place it onboard the ships in locations where crews can access it for reference.
- Develop standardized SCBA entry control procedures for all ships of the same company, where possible.
- Place thermal imaging cameras aboard ships for use by the fire control teams.

Maritime fire training centers generally are dedicated to the safety of the mariners they train. The information above pertains to the training centers we visited. Some training centers have excellent training facilities and curriculum. Crews, though, may not always have the opportunity or financial ability to train at "top-notch" facilities. The quality of training may be directly related to the amount of funding available. Although the training may meet the required standards, the quality and differences in SCBAs found in training centers and on ships may affect the outcome of a fire. The firefighting techniques taught may also affect the fire's outcome. The more we standardize and remove variables, the more efficient our fire crews will become; this is as true for land-based firefighters as it is for a ship's fire control team members.

Cooperation between industrial fire brigades/fire departments and maritime transportation companies is essential for safe and efficient firefighting operations onboard a ship. Our job as firefighters is to ensure this cooperation. A ship that enters your jurisdiction is your customer in the same way that Mrs. Smith is.

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**Endnote**


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**No Substitute for Firemen, Safe Procedures and Proper Equipment.**

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