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## Safety Through Simulation

Thompson Industrial develops an innovative training tool

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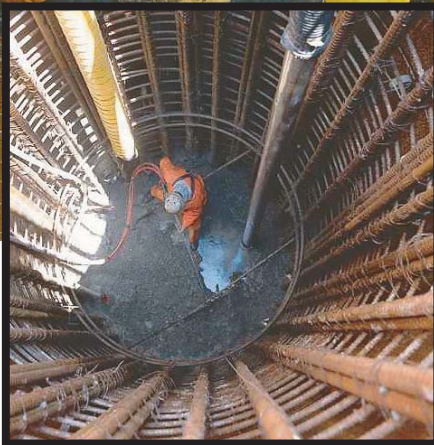
# SAFETY THROUGH SIMULATION

**A custom-built simulator helps prepare Thompson Industrial employees to perform safely and productively in the field**

By Rosalie E. Leposky



Above: Eric Miller, technical skills instructor with Thompson Industrial Services, shows a group of trainees how to use one of the required water blaster safety devices. Right photo: Technicians use water blasting to prepare a bridge caisson for the new Cooper River bridge in Charleston, S.C.



At Thompson Industrial Services, a major industrial-cleaning firm in the southeastern U.S., new employees learn job skills and safety requirements before they ever see an actual job site.

Gary Toothe, a training manager with Thompson, based in Sumter, S.C., has created a mobile training module — a frac tank mounted on a trailer chassis — in which new employees undertake simulated tasks under the watchful eyes of co-workers and trainers.

“We learn a lot about new employees when they participate in our simulator training programs,” says Gary. “Are they afraid of tight spaces or heights, or do they not like to get dirty and forgot to tell us? We learn this quickly, and they gain the full flavor of what we do in just a few days.”

Current employees also use the mobile training module to perfect their skills and to learn new ones. The simulator also allows Thompson to cross-train employees up and down the line of responsibility. “It enables supervisors and managers to gain hands-on experience in all the chores of the men they supervise, helping them become better supervisors, managers, and trainers of their subordinates,” explains Greg A. Thompson, the firm’s president and chief executive officer.

Thompson also extends its training program to the employees of subcontractors. “We want our employees to have as much training and safety instruction as possible,” says Greg. “We want to help prevent accidents for our employees and our customers’ employees alike.”

## Constructing the module

Early in 2003, Gary developed the concept for his training program. He bought a used 21,000-gallon single-step frac tank from NEC Rentals in Augusta, Ga. Because customers donated some of the parts, building the simulator cost only \$30,000.

When the frac tank arrived it was thoroughly pressure-washed and allowed to dry. Gary ordered piping, sheet steel, and other required items. He got some components from customers’ surplus-equipment yards and acquired components, plus detailed training information, from providers including Vactor Manufacturing and Guzzler Manufacturing.

Thompson has recognized the value in training, says Tony Fuller, national sales manager for North America for the Guzzler and Vactor product lines as well as for Jetstream water blasting equipment. “They allowed an employee with a good idea, lots of experience in our business, and a knack for training to develop a new teaching aid,” Fuller says. “Thompson is not so myopic that they thought they knew everything, so Gary was able to ask industry vendors the company knew and trusted for assistance.”

Gary visited Jetstream’s manufacturing plant in Houston, Tex., and the Guzzler Vactor plant in Streator, Ill., to learn about the equipment, and talk to inside trainers about their operations and maintenance information, including their use of actual products in training.

## Custom modifications

To create his training model from the frac tank, Gary added folding handrails and gripstrut walkways to the upper roof, and a 21-inch domed manway posi-

## PROFILE

### THOMPSON INDUSTRIAL SERVICES, SUMTER, S.C.

|               |   |
|---------------|---|
| OWNER:        | Greg A. Thompson  |
| SERVICE AREA: | Southeastern United States  |
| FOUNDED:      | 1986  |
| EMPLOYEES:    | 1,380 (500 year-round, 880 temporary)   |
| SERVICES:     | Chemical cleaning; hydroblasting, large-volume pumping, wet and dry vacuuming |
| ANNUAL SALES: | \$54.8 million (2002)   |
| AFFILIATIONS: | WaterJet Technology Association (WJTA)  |
| WEB SITE:     | www.thompsonind.com   |

“We learn a lot about new employees when they participate in our simulator training programs. Are they afraid of tight spaces or heights, or do they not like to get dirty and forget to tell us? We learn this quickly, and they gain the full flavor of what we do in just a few days.”

Gary Toothe

tioned on center, eight feet from the front edge of the upper roof. These modifications, which fold down to meet maximum height restrictions on the highway, allow secure access to all areas on top of the tank.

The 50-foot-long training module can go anywhere a tractor-trailer can go. “It’s a platform for teaching additional training techniques to support changing technology or customer requirements,” Gary says. “We can build the situation and put it in the tank. We can do basic training and practice the techniques to educate ourselves.”

Like a job site, the simulator is hot in the summer and cold in the winter. Lights are set up to illuminate the work area. “In the classroom, we can describe dirty working conditions,” Gary says. “In the module, the hands-on instruction is just like the real situation.”

In the nine months after the module entered service in April of 2003, nearly 200 people — instructors and general employees — had at least one training session. By the end of 2004, all employees in the firm’s Industrial Service Division will be trained in their own job classifications and those below. Employees good at one industry are trained in cleaning techniques for others, to be ready when demand occurs.

Thompson performs industrial-cleaning services for clients in a diverse array of industries, including automotive, cement, chemical, food-processing, foundries, paint and resin, pharmaceuticals, plastics, power-generating utilities, pulp and paper mills, oil refineries, rubber and tire manufacturers, shipyards and docks, steel mills, and other manufacturers.

The company’s equipment includes vacuum trucks from Guzzler (23) and Super Products (4), Keith Huber (1) and Wastequip Cusco (1); Gardner Denver, Jetstream and Aqua-Dyne water blasters, plus numerous pickup trucks and utility and support vehicles from Chrysler, Ford and GMC.

### Training the trainers

From each crew, Gary selects experienced members who become local instructors on every job site. “They take each new class first and evaluate it,” says Gary. “Then I tweak it with their suggestions and give them a new syllabus.”

Initially, Gary concentrated on training certified instructors at each work

**Right photo: A class of Thompson technician trainees on the company’s mobile training module learn the proper way to clean evaporator tubes plugged with a simulated fouling, using water blast tools operating at 8,000 psi. Below: the training module and a Jetstream water blaster.**

location to assist him. Now, when he takes the simulator to a branch office or job site, he can use a certified instructor who already works there. The instructors also teach as employees go about their tasks. “Using on-site instructors keeps our travel costs down,” says Gary. “Students get quick answers to after-class questions, and their knowledge is reinforced by what they are taught daily on their job site.”

Gary now has 20 instructors and hopes to double their number within a few months. “Our rule of thumb,” he says, “is that there should be one certified instructor for each group of 10 employees at a job site.”

Training instructors include Eric Miller, a crew chief and instructor in Sumter who is trained in all aspects of water blasting and vacuuming. “Instruction is broken down so a child might understand,” he says. “New employees even learn how and why to wear hard hats. We hire regular guys right off the street and teach them.”

“I represent Thompson at our customers’ plants. I supervise our employees, explain what has to be done, and make sure the job is done safely, on time, and on budget. My typical crew is two other men, but it can grow to a total of six depending on the size of the job and the work to be done. When a problem occurs in the field, we take it back to our classes. We train in confined space in the simulator, then do it for real. Again we bring examples to our next training class.”

### Hands-on practice

Chris Meldrim, a location manager in Thompson’s Columbia, S.C., office is assigned full-time to a plastics plant in Columbia. His crew of eight clean machines and lines with two water blasters and vacuum units. They work



## Making It Real

To make the Thompson Industrial Services mobile training module seem real, training manager Gary Toothe equipped it to simulate a variety of situations. They include vertical and horizontal confined spaces, evaporator, heat exchanger, various sizes of lines with bends, vertical and horizontal surface cleaning, floor drain cleaning, and vacuum cleaning. Equipment that can be installed in the mobile training module to support these situations includes:

- A horizontal heat exchanger in a cramped, confined space
- An evaporator simulator with 1.5-inch diameter tubes
- 1.5- to 6-inch piping with elbows
- A “P-trap” floor drain with runout piping
- Horizontal and vertical surfaces for shotgun cleaning
- Horizontal and vertical confined space entry manways
- An enclosed area for vacuuming material

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**“Customers don’t like to pay to train people, and problems might occur. Now our employees have practiced while others watch and correct them if they make a mistake.”**

**Richard Carroll**

the day shift, but come in as needed at other times.

“We practice cleaning the heat exchangers with equipment the customer donated for our classes,” says Chris. “Without their help, it would have been hard to duplicate the real-life situation. Gary Toothe and a few of us worked on a committee to design this training class.”



**Top photo: A heat exchanger tube sheet before water blast cleaning. Bottom photo: The same heat exchanger tube sheet after cleaning.**

Richard Carroll, division manager of Thompson’s office in Rock Hill, S.C., says the training module works far better than on-the-job training. “Customers don’t like to pay to train people, and problems might occur,” he notes. “Now our employees have practiced while others watch and correct them if they make a mistake.

“One of our hydroblasting customers, a chemical company with very specific regulations and rules for subcontractors, requires people working on its site to have 100 hours of hydroblasting experience before they ever step on the property. The company pays well for these experienced workers.”

### **Training and safety**

Thompson’s training and safety departments play different roles. The training department teaches employees to perform job skills safely, while the safety department is responsible for

analyzing job-site safety issues and correcting problems.

All Thompson employees — from the directors to the men in the field — take safety classes, write up safety concerns, and participate in compliance and analysis to reinforce, correct, and redirect the firm’s safety efforts.

In the simulator, safety standards and observations are taught and reinforced. If crews are not complying with all safety standards every day, Gary says, “We learn where we did well, and where we did poorly. Every employee on every crew serves as a safety inspector on each job. Their reports are turned in and read. They may make comments as simple as to report that a fellow worker failed to wear proper hand-safety protection. If not, why not?”

“That is how we discovered that a particular division was not following hand-protection guidelines. We projected the possible number of hand injuries. After we redirected our education efforts to those employees, the number of hand injuries dropped significantly.”

### **Enhancing productivity**

Fuller, of Vactor and Guzzler, observes, “Gary’s training program and mobile training module are the best I have seen. To the best of my knowledge, no one else in our industry has developed anything like his program. It has already helped increase Thompson’s productivity and safety record.

“Thompson is very progressive and understands issues such as employee turnover, safety, and the costs associated with untrained operators who break equipment. If you find and train good people and pay them well, they will stay.”

Before the simulator became available, Thompson’s training consisted of traditional classroom presentations with videotapes and PowerPoint presentations, basic hands-on training in vacuuming and waterjetting, and an apprenticeship with an experienced crew.

“Feedback and site visitations indicated that many new hires had lengthy apprenticeship times before they were considered to be a non-liability by their co-workers, primarily on production issues,” Gary says. “It was not uncommon for some trainees to be told, ‘Stay out of the way. We have work to do.’ Watch and learn was the byword. This led to dissatisfaction on the part of some trainees, and also kept the crews in the field from being as productive as possible.



**Technical skills instructor Robert Daniels shows a trainee the proper way to hold a high-pressure water blast shotgun.**

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**Gary Toothe**

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reach the job site.”

With the simulator, Gary says, new hires now are trained to a standard that allows them to join a crew with enough knowledge and hands-on training to be productive contributors. ■

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