# Virtual training

## Simulation technology could reduce crane accidents. But it's been slow to catch on.

BY DARCY DEVICTOR

When A. L. Ueltschi founded FlightSafety International in 1951 to train aviators with simulation technology, he most likely did not entertain the notion that someday the heavy construction industry would find that same technology valuable for safety prevention.

Yet he's probably not the only one who has been surprised. It has surprised a few people in the crane industry as well.

But take it from Ken Kelly, the corporate products sales manager for the North American Crane Bureau (NACB), Altamonte Springs, Fla., which began using simulation technology for crane training four years ago. You just can't underestimate its value for crane operators.

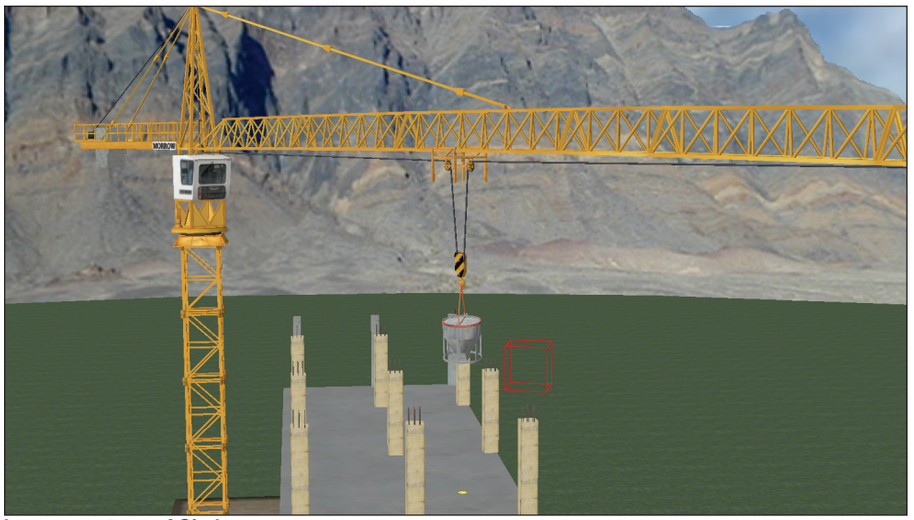

Image courtesy of Simlog

"You [can] take a situation that's dangerous—such as with a jet or a crane—and you can replicate a catastrophic failure in a virtual environment," said Kelly, who worked for 13 years at FlightSafety, where the very same technology is used to train 65,000 pilots each year.

With simulation technology, he explains, operators can be trained in a safe manner with no need for undue concern and without the potential hazard of mobile hydraulic crane accidents. "We can teach the correct [operator] response without causing damages or exposing personnel to injury," says Kelly.

In addition, if you make a mistake in simulation and the crane overturns, you just reset the system, he says. "No one is hurt, no equipment or commodities are damaged. But if you make a mistake in real life and overturn a crane — you may lose a life."

Image courtesy of Simlog


That's why to him it's not a great stretch that some companies are beginning to use the simulation technology first developed for aviators to train crane operators. The connection between the two industries is clear. Dangerous situations may apply and lives can be at stake.

Bruce Larson, training provider for Crane Safety Ltd., Sherwood Park, Alberta, Canada, agrees. "Because [simulators] can train operators in virtual disasters without causing any real danger, they are [as valuable to] crane operators as airplane pilots. They are the glitter and gold of the crane industry."

Still, even though simulator technology for crane operator training is currently available from companies such as Simlog, based in Montreal, Quebec; GlobalSim, based in Salt Lake City, and NACB, it is still vastly underutilized as a training and safety tool.

"Less than one percent of all crane operators have been exposed to simulation," said Kelly. But the main obstacle to both short-term and future growth isn't the technology itself, he says, but a lack of knowledge of what benefits customers can reap from the technology.

### Obstacles to growth

"There are people who are fighting [simulation training]," said Bill Schofield of the Crane Institute, Sanford, Fla. "But you

can't [have] progress if you don't have the right technology."

What's the main hesitancy on the part of companies to the use of simulators? Often, it's a lack of understanding as to "how the system can support their training needs effectively and cost efficiently," says Kelly. "[But] once someone has sat in the seat and operated a simulator, they change their minds [because] they [can] visualize the benefits of using simulation in the training of crane operators."

That's why companies such as Simlog are convinced that the long-term success of the technology rests with the ability to win over the operators.

"There are a lot of people who learned to operate a crane by climbing into the cab — and they still think that's the only way to do it," says Simlog President Paul Freedman. And while Freedman doesn't disagree that many in the crane industry are reluctant to accept the newer technology, he believes that "those people are slowly being won over."

How? By examples and case studies that show the cost efficiency and positive financial impact of the technology on both safety and a company's bottom line.

"One particular facility purchased a system and [projected] its initial 12 month savings [to be] $648,000," says NACB's Kelly. Part of the reason: the simulators enabled the company to combine two phases of operator training courses and to consolidate two days' worth of training into one day. That alone, he says, was a projected saving of 16 hours per employee at an average rate of $30 per hour for training in Phases I and II.

## Towering Ahead

### More than mobile

Simulation training for cranes is not limited to mobile hydraulic cranes. About a year ago, Montreal-based Simlog teamed with Morrow Equipment, Salem, Ore., to develop and offer the first PC-based tower crane training simulator—which went on the market in June.

Simlog teamed with Morrow, because, as a distributor of Liebherr tower cranes, says Simlog president Paul Freedman, they were "able to help our software design process by asking [Liebherr] questions."

The natural differences between mobile hydraulic crane and tower crane operations required a few modifications. "The point of view is very different," says Freedman. "We needed to develop a special element to simulate the deflection under load of the jib and mast."

While the Liebherr tower crane is the base for Simlog's new tower crane simulation training, the software is adaptable for use with tower cranes built by other manufacturers.

The Simlog-Morrow tower crane training simulator has also been designed to incorporate what's needed under the new certification program for tower crane operators from the National Commission for the Certification of Crane Operators (NCCCO).

The new program, which began in July, is modeled after the existing NCCCO mobile crane operator certification program. It includes a written examination, a practical examination, physical (medical) requirements, and a recertification requirement.

Information on the new certification program, a candidate handbook, and application forms are available at www.nccco.org. **CW**

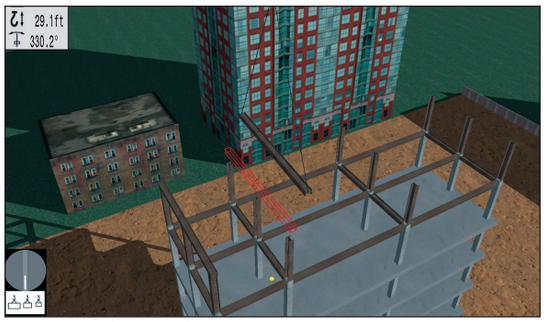

Image courtesy of Simlog

Cost-efficiency can be another selling point. "It gets very expensive to train hands-on," Freedman said. "If you're training 10 people, you can't have 10 tower cranes out on the lot."

In addition, as Simlog touts to its prospective customers and on its web site, www.simlog.com, the use of simulators can reduce the number of accidents and incidents that occur during crane operator training, and save hours worked, time, and space when compared to more traditional training in a real world environment.

At the same time, though, even developers of simulation technology admit that the technology isn't the best solution for everyone's needs. It all depends on the size of your company, the size of your facility, and the number of employees that need to be trained.

"Smaller organizations … cannot justify the purchase of a simulator in order to train one or two operators annually," says Kelly, who says that while NACB simulator systems, for example, start at $9,500, the cost of an average system will range anywhere from $25,000 to $35,000.

A case in point: The base price for NACB's mobile hydraulic crane simulation system–which comes equipped with an operator's station that has an adjustable seat, both joystick and lever controls, CPU, LMI, instructors' station (with monitor) and all applicable software—is $24,500.


Paul Freedman

## An alternative

But for those companies unable to justify that type of investment, there is still another option. Some companies, like Simlog, will set up an on-site training session on a typical PC — for roughly $3,000. "If you have two joysticks and $3,000," says Freedman, "you can help your trainers better train operators without exposure to potential hazards."

And, if that cost of software is out of a company's financial range, Kelly suggests visiting facilities that offer

## How Simulators Work

Designed to replicate real-life crane situations and hazards that crane operators might encounter on the job, simulation systems can emulate generic hoists, bridge cranes, mobile hydraulic cranes, and tower cranes.

Full-motion systems, such as the ones offered by the North American Crane Bureau (NACB) Group, include an instructor station and a student station.

The instructor's station includes a flat-panel monitor, keyboard, and mouse.

The monitor display is Microsoft Windows-friendly, and lets the instructor manipulate the following simulation controls through pull-down menus and popup windows:

- Loading student, initial condition, exercise, and playback files.
- Starting, stopping, and restarting the simulation.
- Setting and clearing malfunctions.

The student's station consists of the crane controls (wired pendant, radio pendant, mobile crane controls, etc.) view of the simulated training area.

The 3-D view is updated 30 times per second and is displayed on a user-supplied large screen television, LCD projector, or monitor.

For more information about the NACB's simulator systems, visit www.cranesafe.com.

simulator training for crane operators, such as the Crane Institute. "If the number of operators is insufficient to offset initial costs, then we would recommend that the customer not purchase a simulator, but send its personnel to established schools or apprenticeships and have them train under qualified competent trainers/operators."

Those companies may offer either type of simulator training systems, using PC-based software or the full-motion simulators.

The Crane Institute offers both options through their continuous schedule of 25 basic courses.

But attending one of the 25 basic courses at the Institute's facility in Florida is not the only way to reap the rewards of its services.

The Crane Institute preselects cities where it will present its training courses, and also makes on-site visits to facilities to custom-design the course material.

"That way we can tailor our material to their needs," said Schofield. "With the on-site training, we go to their facility to set up, they pay a flat rate each day, and we can custom-design the courses to their liking."

And, regardless of whether companies install full-motion simulators, purchase simulator software, create a simulator training system on a desktop computer, or visit training sites where potential crane operators have the chance to practice on the simulators, the benefits of the technology are definitely worth the cost, says Schofield.

"There is no question that it can improve skill and productivity, and [it] will reduce the number of crane accidents out there." **CW**