Smarter ports = cleaner & safer future

by Devon Van de Kletersteeg, *Industrial and Ports Marketing Manager, CM Labs Simulations*

In an increasingly competitive space, ports that are more sustainable gain a clear advantage. After all, embracing sustainability leads to more efficient port operations, higher ESG scores, and a better public image – all of which can help the port edge out over its competitors. To this end, ports need strategies centered on digitalization and decarbonization. This demands both technical innovation and highly trained personnel – a combination that simulation training excels at providing. By enabling operators to practice scenarios and hone skills in a virtual environment, simulation training offers a way to make ports faster, safer, and greener. Here's how!

The way a port approaches training has knock-on effects that ripple throughout the entire operation. This is because simulation training has the capacity to reduce emissions in several ways, among others, during training and operations, as well as by reducing vessel idle times with more streamlined and efficient operations. Substantial gains in safety also cannot be overlooked.

"If you can have operators […] understand better"

To begin with, using simulation during operator training reduces the use of real equipment for learning purposes, **often by as much as 40%**. "When it comes to training and simulation, reducing emissions can mean being able to have less reliance on actual equipment when you're training your operators," said my colleague Yannick Lefebvre, Technical Sales Manager and Port Industry Subject Matter Expert at CM Labs Simulations, in our recent webinar, **Green Ports and Practices: Simulation Training and Sustainability in Action**. Simulation training provides immediate reductions in emissions, simultaneously speeding up training times – as operators are no longer dependent on equipment availability.

Simulation can also lead to measurable changes in productivity, which, in turn, allows operators to do more while burning less fuel. "If you can have operators that are more efficient, that get more moves per hour in, that understand their yard layouts, understand better how to drive around and move boxes around, you're also taking less time to do things, thus having fewer emissions," Lefebvre noted.

ZHD Stevedores, an independent company operating port terminals in the Netherlands, saw a substantial improvement in operator productivity after adding simulation into its training program. "I notice that people come in, and their increase in production on a simulator is quite rapid," **said Alain Bornet, Managing Director of ZHD**. "They come in at 40 minutes to an hour for 550 tonnes of bulk material moved, and after a couple of sessions, they're already in the 20-to-30-minute range."

Such changes in productivity, multiplied over several operators and over many months or years, can be substantial. According to one analysis, improving a ship-to-shore operator's moves per hour from 15 to 19 reduces the amount of machine time needed to move 184 containers by 2.5 hours while simultaneously saving approximately $58,050 per operator in the first 15 shifts after training.

Even when utilizing electric equipment, these changes in productivity still affect vessel idle times and environmental impact. "There's a bit of a falsehood that going electric just means we're not emitting anymore," underlined Lefebvre. "Something has to generate that power upstream. And if you're inefficient in your operations – even if you're using cleaner energy – you're still wasting energy in getting the work done, so there's really a number of aspects to consider."

"It's not long before you start getting questions"

Another benefit of simulation training is its ability to allow operators to learn from mistakes without damaging equipment or placing personnel in harm's way. This helps prevent safety incidents as well as reduce equipment wear and tear. "Simulations help operators optimize their movements and reduce wear and tear, further minimizing their environmental footprint. In a simulator, you can look at details like, 'is the person shock-loading cables?' Because if they're being rough with the equipment, that's going to translate into having to replace parts like cables more often – after all, those cables are metal and need to be manufactured. That will have a direct effect on your overall environmental impact as you're going about your day-to-day operations," Lefebvre explained.

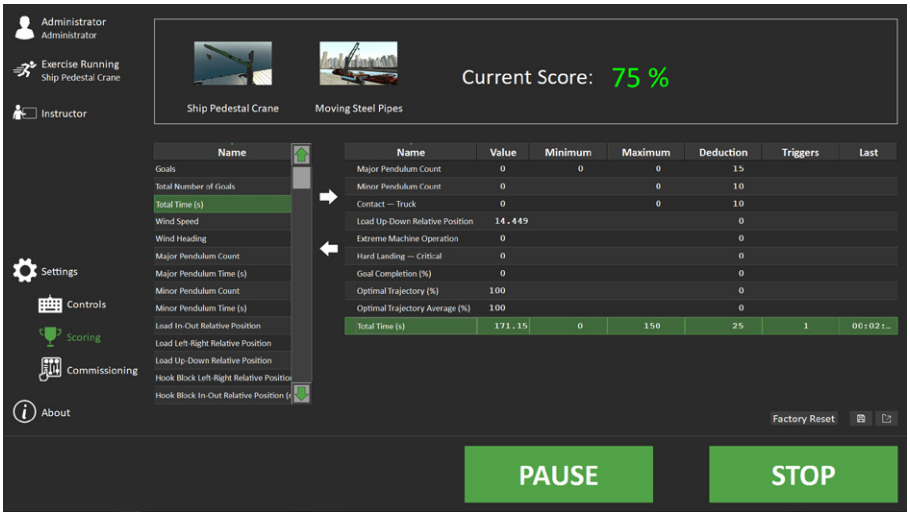
At the Texas-based Port of Corpus Christi Authority (PCCA), simulation has helped make the training of new operators safer while also addressing concerns about productivity. "Field training definitely has its risks both from a safety and productivity perspective," observed Eric Battersby, PCCA's Bulk Terminal Manager. "Productivity is a big driver behind bulk operations, and when you put somebody who's unfamiliar with the machinery up there, it's not long before you start getting questions as to why productivity is falling or why it's taking longer than it had before. Plus, you've got 50 tons hanging from the end of the crane hook. That's a lot of weight,

Simulation training for productivity

STS training with simulation analysis

	After training on live equipment	After simulation-based training	Operational standard
Moves per hour	15	19	23 moves/hr = 184/shift
% productivity rate compared to standard	65.22%	82.61%	100%
Extra hours required for op. standard 184 moves	4.26 hours	1.68 hours	-
Hourly cost of gang	$1,500	$1,500	$1,500
Extra cost per gang for op. standard 184 moves	$6,390	$2,520	
Total cost over 15 shifts	$95,850	$37,800	

Increase in productivity translates into incremental value of **$58,050 per STS operator** in the first 15 shifts after training



and you can do serious damage if you put somebody in there who isn't familiar with the controls and movements of that crane."

"Simulations help […] master […] changes"

Simulation training also helps pave the way for a smoother and safer transition to new equipment. As Lefebvre observed, "Whether they're remotely operating a machine or transitioning from gas-powered to electric equipment, operators face new complexities. Simulations help them master these changes without the risks of real-world trial and error."

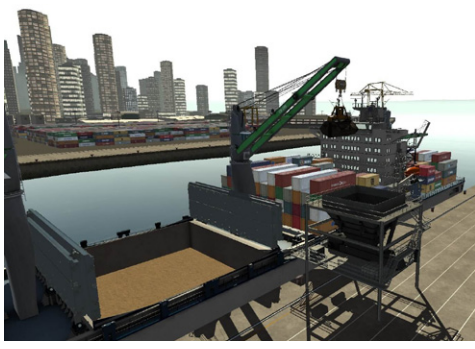
With simulation, operators can even train for new equipment ahead of deployment. "When purchasing new equipment, you're often talking about a 12-to-18-month lead time. So, by the time you make a decision to purchase new equipment, it's still a long time away. And we've seen some of our customers begin their training on the new equipment before they take delivery of it," Lefebvre observed. As a result, productivity dips when integrating new equipment is kept to a minimum.

Still, while the benefits of simulation training are clear, many ports face challenges in adopting the technology. High-quality simulation systems require an upfront investment in hardware, equipment training packs, and instructor tools. Resistance to change is another obstacle. Operators accustomed to traditional methods may be hesitant to embrace new technologies. Lefebvre recalled one instance when an operator was at first sceptical about the potential that simulation had, "A couple of years back, we were demonstrating our technology, and the night before our demonstrations, we actually had one of the instructors over, and I could see that he was uncomfortable with the idea of using a simulator. By two o'clock on the day of demonstrations, he was the one clicking around and getting people to get on the simulator because he very quickly realized that a simulator is really just a virtual machine."

Rethinking operations

The use of simulation training in ports is still in its early stages, but its potential is enormous. Simulation isn't just about training – it's about rethinking operations for a cleaner, more efficient, and less hazardous future.

By combining efficiency with sustainability, simulation training offers a vision of how global trade can evolve in a way that benefits both the economy and the environment. As adoption grows, the shipping industry moves closer to a cleaner, faster, and safer future – one simulation at a time. That's how! □



Photos: CM Labs

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