VORTEX PORT CRANE TRAINING SOLUTIONS

SAFE, EFFICIENT, PROVEN.

When your operators train on a Vortex Crane Simulator, they gain the realworld skills they need to operate port equipment safely and efficiently, and with proven results.

That's because Vortex delivers the most authentic simulation-based training experience available—we work with you to ensure that your Vortex Simulator reproduces your equipment and procedures. The result is real learning and evaluation that translates into on-the-job skills.

Vortex Simulators are designed from the ground up to prepare operators for the routine and the unexpected. The built-in learning methodology trains your operators to properly handle machines and loads, and master terminal processing and traffic flow. Simulation for night operations, poor weather conditions, and emergency situations are part of the training.

Increased efficiency, safety, and lifts-per-hour: With a Vortex Simulator, your operators are trained to deliver.



IMPROVED PORT EFFICIENCY WITH VORTEX

ENSURE SAFE OPERATOR BEHAVIOR

Vortex Simulators provide apprentices with the ability to learn safe lifting practices with many load types, and varied weather and worksite conditions—with no risk to equipment or operations. Experienced operators can also continually refresh their skills to maintain the highest degree of productivity.

To help you monitor a trainee's ability to safely operate port equipment, each training session collects objective metrics related to the number of collisions and spills, loading violations, time spent in rough handling of crane, objects moved, and more.

We'll help you incorporate your safety parameters directly into the simulation. And when incidents do occur in real life, Vortex allows you to recreate them so you can assess safety protocols, and apply lessons learned.

IMPROVE CREW EFFICIENCY

Over a thousand simulators have been built using Vortex. They have been proven to increase lifts per hour, and promote operator efficiency and safety.

- Practice specialized or difficult maneuvers in a safe, controlled environment.
- Build operator efficiency with self-guided exercises that motivate trainees to improve their skills progressively.
- Practice full-mission, team-based, multi-machine scenarios.
- Train for new environments and equipment before they come online.

TRAIN MORE OPERATORS FASTER

Because you can objectively screen new operators on a Vortex Simulator instead of using real equipment, you can consider more applicants more quickly, and ultimately hire the best possible drivers. Vortex will then help you accelerate training, with advanced learning methodologies only available with simulators:

- Screen applicants for basic skills and hand-eye coordination, and improve both apprentice and experienced operator performance through repetition.
- Significantly reduce on-the-job training time and reach production targets more quickly.
- Reinforce and measure operator performance through after-action review and quantitative measurement of student performance, including unsafe actions—and their responses to incidents.

REDUCE YOUR TRAINING COSTS

Using simulators for training lowers equipment fuel costs, and reduces wear and tear on expensive operational machines. Plus, you'll be able to keep live equipment in full production while operators train on the simulator.

Instructors have full control of a training environment that allows them to adjust the port environment as well as create fault conditions and challenges for the student. And with hot-swappable controls, a single simulator can be used to simulate all of your equipment.

Designed to fit into existing training installations, Vortex Simulators are compact and portable, and do not require you to allocate special environments or dedicated maintenance personnel. Your Vortex simulator comes bundled with a complete customer care package to protect your investment, including on-site installation, hardware maintenance, and software upgrades.

YOUR TRAINING. YOUR OPERATIONS.

Vortex Simulators are designed to replicate your equipment and your terminal operations, down to the most critical details. Their built-in learning methodology trains your operators to properly handle machines and loads, and master terminal processing and traffic flow.

THE WIDEST RANGE OF PORT TRAINING EXERCISES IN THE INDUSTRY

Port crane training exercises cover ship-to-shore and shore-to-ship lift operations, hatch cover management, wire rope sling operations, and supported lifts.

Full pre-operation and start-up procedures are simulated for all cranes. Vortex displays a complete visualization of the cranes, including both inside and outside views, the frame and the crane structure, cables, and trolley movement.

Vortex simulates the handling of containers throughout your port using RTGs, straddle carriers, or reach stackers.

We'll work with you to tailor training exercises to your specific training needs, safety protocols, and operational criteria.

THE MOST REALISTIC SIMULATIONS AVAILABLE ANYWHERE

Simulated loads include containers, bulk material, and break-bulk cargo such as wind turbine components, concrete pipes, excavators, crated large objects, and irregularly shaped objects covered with tarps.

The simulator also includes interfaces to correspond with load indicators, trolley position, and container management systems.

The Vortex Simulator responds to operator controls in order to reflect equipment movement, vibration, impact, acceleration, and emergency stop positions and reactions.

It replicates full control of the spreader bar, including selection of spreader bar operating mode from single pick, twin-20, or separating twin-20s; raising & lowering of flippers; and operation of twist-locks (lock/unlock).

To enhance the realism of the training exercises, Vortex Simulators include audio-visual effects such as port traffic, port and platform lighting (both ambient and natural lighting), crane and ship sounds, and radio communication.









A FULLY IMMERSIVE ENVIRONMENT

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1

Flat-panel high-resolution displays. Display configurations range from a single-screen option to full dome projection.



2

Authentic controls from heavy equipment industry suppliers. Simulators can also feature OEM control sets if required.



Hot-swappable controls make it fast and easy to switch between control sets for training on many machines.

3

4

3



Durable high-quality steel construction provides maximum protection for your investment.



The LMI, auxiliary controls, and operator's dashboard are implemented on a touch screen in front of the operator.



6

Rugged industrial PCs are mounted in portable shock racks. We never use less reliable IT datacenter computers.





A 3-degree-of-freedom motion platform replicates the motion and vibration experienced while traveling and lifting.



NOT ALL SIMULATORS ARE CREATED EQUAL.

You can't afford downtime when you're training your operators.

That's why Vortex display and computer systems are designed for maximum reliability. We build all Vortex simulators using ISO 9001:2008 certified and audited processes.

Only the highest-quality display systems: Vortex displays are rugged commercial-grade digital-signage HD displays. We never use consumer TV displays—our flat-panel LCD displays have a much longer operating life, are designed to operate in portrait or inclined positions, and have sturdy enclosures with active cooling systems.

Displays are mounted on a moveable strong-back display rack. All cables are tucked away and bundled in a single umbilical to the computer rack—you'll never see a confusing mess of cables in a Vortex installation.

Computers that are built to last: Our shock-mounted industrial computers are designed to withstand shock and vibration. They have been burn-in tested, have redundant RAID configured hard disks, and are mounted in a transportable shock rack.

Real training, real controls: Vortex Simulators feature real equipment seats and controls. Vortex Simulator cab control layouts mimic the real cab, with dual- or single-axis joysticks, levers, pedals, steering wheels, button/toggles, and dash controls.

Vortex Simulators are designed with interchangeable controls that are easily swapped in less than a minute. They directly plug in/out of the equipment cab, and there's no need to mess around with wires or connectors. The design is hotswappable so you don't even need to shut down the simulator to make the swap.

This simple design makes it easy to reconfigure your simulator to maximize training potential.

INSTRUCTOR STATION

From the instructor's station, monitor the entire operation, record student performance, and perform after-action review with the crew.



A COMPLETELY SCALABLE TRAINING SIMULATOR

FROM DESKTOP SIMULATORS TO FULLY IMMERSIVE SOLUTIONS

Add screens, machines, or training scenarios whenever you want: Vortex adapts to your budgets and requirements as needed.







BRING THE TRAINING TO YOUR OPERATORS

From cabin-integrated simulators and trailer-based solutions to fully finished HVAC-equipped containerized solutions, Vortex Simulator training adapts to your environment.



"The Vortex Simulators are an integral part of our training program. We use them regularly to assess new students and for continuous training. The Vortex Simulators were the most complete simulators out there." "With the use of the Vortex Simulator, we hope to reduce the time to complete our current 18-month training program by 6 months. We have been very impressed with its accuracy and realism." "Our customers are always impressed with the realistic graphics and feel of the crane's behavior in the simulated environment."

Brian Burgess,

Training Coordinator, International Union of Operating Engineers, Local 721

Ryan Eagen,

Fuel Handling Simulator Project Manager, Bruce Power Joachim Dobler,

Head of Marketing – Mobile Harbour Cranes/Reach stackers, Liebherr

IT'S NOT A GAME TO US

There has been a troubling trend recently toward the use of game engines to build simulators for equipment operations training. Game engines provide the physics found in console games such as race car and action games for Xbox, PlayStation, etc. They are designed for entertainment as well as fast—but not physically accurate—game play. These engines are cheap (often free) and openly distributed, and hence carelessly adopted by many software developers for more serious purposes such as operator training for complex equipment.

The accuracy of these engines is so poor that there is a real risk of negative training. Game physics have not been validated, are not reliable, and should not be applied to engineering applications—after all, if the simulation isn't right, the training won't be right either. You can't reliably train, let alone qualify an operator of advanced equipment, if the simulated environment is wrong. And you can't do it without introducing unforeseen risk. It is important to understand what's inside your simulator. Inside Vortex simulators is the Vortex Dynamics engine. This engine simulates multi-body dynamics and has been validated against empirical and engineering data. It captures the real behaviour of cranes, rigging, cables, loads, and vessels, and gives you the precise, objective criteria you need to evaluate and train your operators.

Vortex results are proven. Hundreds of peer-reviewed academic research papers have been published using Vortex. It's been validated again and again in tough environments such as defense ground vehicles and robotics. It is used by Honda, John Deere, L-3, Liebherr, Lockheed Martin, NASA, and over 100 other leading companies, defense organizations and academic institutions.

"Ensuring the best qualified crane operators demonstrates due diligence for reducing costs associated with accidents and liability, and for reducing costs from damages and repairs, while boosting productivity and related profits. Vortex simulators contribute to all of the above." "Our trainers and students love the Vortex simulator. It's just like the real crane – you really see, hear and feel all the right behaviour as you lift and move various heavy materials. And it took almost no time for our instructors to set it up and begin rolling out this type of next-generation training to our customers." "Our students always look forward to training on the simulators and effectively learning the fundamental skills of crane operation. Based on our experience, any training organization should be very pleased to have CM Labs supply and support crane operator training simulators."

Gerry Hughes, Director,

Austin Emezaro,

Geir Gislason,

Training Manager, PNI Training

Operating Engineers Training Institute of Ontario

Operations Manager, JC International Ltd (JCI)

ABOUT CM LABS SIMULATIONS INC.

For over 15 years, CM Labs' Vortex Simulators and services have helped train equipment operators in port, maritime, and offshore environments all over the world.

CM Labs' feature-rich Vortex Simulators provide immersive. ultra-realistic learning environments that promote increased safety and operational efficiency, essential skills development, and reduced training costs.

Developed by operators, trainers, and simulation experts, our standards-based solutions prepare heavy-equipment operators for the real world.

Our expertise spans diverse areas, including construction, mining, and forestry equipment, sub-sea vehicles, marine equipment, industrial robotics, defense vehicles, and planetary robotics. We are the industry's go-to problemsolver for the most challenging mechanical dynamics simulations.

All CM Labs technologies and services are backed by our multidisciplinary staff of experts, with PhDs and master's degrees in the fields of virtual reality, engineering, computing, physics, and mathematics.

Our clients include Lockheed Martin, Liebherr, John Deere, Honda, NASA, Boeing, and over 100 other world-class companies, defense organizations, and academic institutions.

CM Labs has worked with leading North American training institutes such as the Operating Engineer's Training Institute of Ontario (OETIO) to develop proven, highly effective training curricula for operator training.

All CM Labs business processes are ISO 9001:2008 certified.

CONTACT US NOW

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