



Seattle's Tideworks Technology has deployed its latest terminal operating system to support the Manzanillo International Terminal (MIT) in Panama and its new automatic stacking cranes (ASCs). Photo courtesy of Tideworks.

Software and Hardware Advances in Cargo Handling

By Kathy A. Smith

CARGO HANDLING EQUIPMENT MANUFACTURERS continue to stretch the boundaries of technology and fuel efficiency.

When Finland-based TTS-Liftec Translifters first arrived on the ports and terminals market, they were based on the concept of how the standard ro/ro translifters were designed. Since then, the company has been evolving the design into today's purpose-built, environmentally-friendly product.

"The frames are lighter to reduce the weight of the machine and there is work ongoing to fit the translifters with a machine-to-machine interface to collect information from the operations connection to TOS (terminal operational system) to optimize operations," says Olli Mäkinen, Managing Director. "The development work to improve the machines is constantly being done in tandem with TTS' customers."

The marriage of the Translifter and TTS' Cassette (a horizontal steel pallet) system produces faster turn-around times when moving cargo and far fewer emissions. The Cassette can be picked up and dropped off anywhere while the Translifter

will go on to its next task without standing idle. This reduces emissions, since typically when compared with a tractor/trailer setup, more tractor/trailers are needed to operate in a terminal, and their engines would be constantly running while waiting to be loaded or unloaded.

Maneuvering the Cassette is done by the driver using the joystick, which is located in the driver's cab. Sensors are located on the sides of the Translifter that lock on to the tunnel of the Cassette and automatically steer the Translifter into the Cassettes. The joystick can also be utilized when driving from tight corners and narrow passageways by moving the rear end of the Translifter. Additionally, the Translifter can

TTS Liftec has combined a Translifter with a horizontal steel pallet system, called a Cassette, which can be picked up and dropped of anywhere while the Translifter will go on to its next task without standing idle. Photo courtesy of TTS Liftec Oy.



be equipped with a rear view camera to help drivers maneuver backwards when visibility is blocked by the load.

With few moving parts, little maintenance is required. "We only use high quality parts and well tested technology," says Mäkinen. "We have software features that prevent the misuse of the equipment, such as speed limitations when driving with heavy loads etc."

Mäkinen observes some container terminal operators are conservative when weighing whether to invest in capital expenditures on terminal equipment. "The total cost of ownership aspect is not always considered when investing in new equipment, which at times makes it difficult for companies with 'new' operation solutions to take a part in the market."

Automation Software

Tideworks Technology Inc., a Seattle-based provider of comprehensive terminal management and planning software solutions, recently announced the deployment of the latest versions of the company's terminal operating system (TOS) to support the Manzanillo International Terminal (MIT) in Panama and its new automatic stacking cranes (ASCs).

The ASCs have become one of the first installations of automated equipment MIT will be using in order to increase productivity. In order to leverage the abilities of MIT's ASCs, Tideworks delivered several new automation and optimization features within its Spinnaker and Traffic Control systems. Additionally, Tideworks worked with ABB, the ASC drive control system provider, to meet extensive integration requirements.

The Spinnaker Planning Management System fully-integrates vessel, berth, yard, and rail planning tools in one workspace to give terminal operators the ability to increase cargo volume and reduce vessel turn time, while maximizing efficiency. Container locations can be automated using Yard Navigator to maximize space utilization and avoid costly rehandles, an automated stowage feature allows for the calculation of the most efficient load-back sequence, and color-coded container information can be used to create electronic work orders for dispatch.

The intuitive user interfaces of the Traffic Control system removes paper instructions so that terminal operators can move crane and container handling equipment more efficiently. Real-time status updates are also provided on container movements. In addition, moves can be further planned by using filter parameters that help with priority cargoes.

Automated set-asides, automated housekeeping and "dynamic yard allocations" features are also being utilized at MIT. The set-aside feature selects the "to" location based on a process that ultimately minimizes the probability of that box needing to be set-aside again. The dynamic yard allocations feature allows yard allocation ranges to dynamically expand and contract. Additionally, there are features that minimize travel distances for the ASCs and ensure work is evenly distributed among the cranes to facilitate efficient use.

Michael Schwank, president, said in a statement that the advanced features Tideworks developed for this project open the door for Tideworks to collaborate with other automated terminals in the future.

Hybrid Technology

PACECO's long-standing PACECO - Mitsui Transtainer yard-side crane has been constantly modified to reduce maintenance costs and increase productivity.

It applies the MES hybrid system; a large size battery and engine valuable speed control system, which, according to Atsufumi Takahashi, President & CEO, improves efficiency by 60 percent compared with the conventional Transtainer. "The smaller engine needed for the lithium ion hybrid Transtainer also reduces the cost of maintenance as well," he says.

Additionally, the V-Roping anti-sway system, which allows for faster hoisting speed and higher lifting height, is characterized by the four congruent triangles consisting of eight main hoist ropes which achieve better control over sway.

"The total cost of ownership aspect is not always considered when investing in new equipment."

This TTS Liftec Cassette is awaiting a container, at which point it can be moved with a Translifter to another location and left for further operations while the Transtainer remains available. Photo courtesy of TTS Liftec Oy.



The company's Portainer ship-to-shore crane is a self-propelled trolley design system that doesn't require wire ropes for trolley traverse and reduces future maintenance costs. The Portainer crane has a centralized location of its devices at the end of a girder and a simple unit drive, which eliminates open gears, allowing for improved maintenance operations.

Automation for California

A new line of Automatic Stacking Cranes (ASC) debuted by Kalmar (a subsidiary of Cargotec), at TOC Europe will soon be coming to TraPac Inc. terminal in Los Angeles – the first terminal to deploy the enhanced cranes.

Improvements include an optimized lightweight structure that has a 10 percent weight reduction compared to the previous generation ASCs, which cuts down on operational costs by decreasing energy consumption to enable higher terminal throughputs.

A single-platform machinery trolley, segregated transformer house and a more spacious e-house allows for better usability, ergonomics and maintenance. Additionally, new AC drives control IE2 class motors to improve energy efficiency and ensure spare parts availability throughout the future lifecycle of the system. The double drum hoist mechanisms facilitate a more compact rope tower, while

maintaining optimum stiffness for fast and accurate automated operation.

More Mechanization

Optimized terminal performance will soon become a reality with an end-to-end automation solution consisting of automated truck handling on the landside, AutoShuttles as a horizontal transportation system on the quayside, and 5th generation Kalmar ASCs, all integrated by Kalmar TLS automation.

"With our latest investment finalized by 2016, we will have a complete end-to-end ASC automation system in-house, featuring the new 5th generation ASC crane," said Raimo Ukkonen, Vice President, ASCs, Kalmar. **PMM**