



Manzanillo International Terminal Partners with Tideworks to Implement Automatic Stacking Cranes and Optimize Yard Space

Manzanillo International Terminal (MIT) serves as a regional transshipment hub for Caribbean and South American destinations. Operating 2.5 kilometers from the Panama Canal's Atlantic entrance and standing adjacent to the Colon Free Zone, one of the world's largest free trade zones, the facility offers efficient and reliable port services 24 hour a day, seven days a week to the many shipping lines serving the region. The facilities at MIT also boast a logistics park providing value-added cargo services to the terminal's customers.

The Challenge

Since MIT serves as a key distribution hub for the region, efficient organization and strategic use of yard space is critical to ensure rapid turn times, allowing vessels to stay on schedule while performing cargo operations at the terminal. As traffic at the terminal increased, the management team at MIT faced the challenge of moving more containers through the same yard space in a shorter amount of time. It became clear to the team that improving yard operations through automation was the best solution. By investing in automated systems the team could densify its yard space, minimize extra container handlings, and increase productivity, all while improving safety and reducing the need for human intervention.

A Successful Partnership

As its IT partner, Tideworks has helped streamline various aspects of MIT's operations in the past, and the success of those projects has led to a fruitful working relationship between the two organizations. For example, in 2010 when MIT needed to automate its work order dispatch process and improve visibility throughout its operations, it turned to Tideworks for assistance. The deployment of new versions of Tideworks' Traffic Control™ and Terminal View™ systems resulted in operational gains for the organization.

By September 2013, operations and cargo volumes at MIT had reached the point where the management team decided it was time to move forward with the next phase of automation: Implementing automatic stacking cranes (ASCs). MIT invested in

“Over the years Tideworks has proven themselves to be an invaluable IT partner. We knew that their Spinnaker and Traffic Control systems would serve as a solid foundation for more automation.”

- Thomas Rucker
Vice President of Operations
MIT

six cranes manufactured by Shanghai Zhenhua Heavy Industry Co., Ltd. (ZPMC). The cranes provide 12-wide stacking capabilities and are equipped with multiple systems employing lasers and cameras to help precisely position trucks and chassis under the crane, as well as ensure accurate landing of the spreader bar and containers. In order to leverage the cranes' capabilities, MIT needed a terminal operating system (TOS) solution that could provide specific functionality required for automated stacking operations. Furthermore, the TOS would need to be fully integrated with the ASC drive control systems. The company immediately turned to its trusted technology partner Tideworks to provide these solutions.

"Over the years Tideworks has proven themselves to be an invaluable IT partner," said Thomas Rucker, vice president of operations at MIT. "We knew that their Spinnaker and Traffic Control systems would serve as a solid foundation for more automation. Additionally, Tideworks' terminal operations experience, systems integration expertise, and history of dedicated support during all project phases made them the natural choice. We were very confident in Tideworks' ability to help us leverage the full potential of our ASC's."

MIT formed a 15-person team to manage the entire ASC project, including the required structural improvements and civil works. Tideworks' team members were onsite at various times throughout the project and were heavily involved in all technology-related aspects of the implementation process, from initial business process analysis and requirements gathering to providing support during the testing and go-live phases.

This close partnership proved to be vital for successfully delivering the technology needed for effective ASC operations, as the technical aspects of the project were incredibly complex. Tideworks offered consistent support to MIT around consulting and technical assistance, and a group of Tideworks team members provided onsite system training to the MIT team. This collaborative approach even helped overcome potential language barriers: The Tideworks team trained English-speaking Panamanians how to use the system, and they then trained their Spanish-speaking MIT colleagues. Overall, the implementation impacted about 70 percent of the organization.

"Being a part of the team on this project was a very gratifying experience," said Bill Johnson, senior business analyst with Tideworks' Professional Services group. "Working with suppliers like ABB and others to bring together an integrated solution was very satisfying, but one of the most rewarding aspects of the project was collaborating with the customer to ultimately deliver a solution that met their needs and exceeded their expectations."

Integrating the Solution

Tideworks developed several new automation and optimization features within its Spinnaker® and Traffic Control™ systems to support MIT's automatic stacking cranes. Some of the new features developed include:

- **Automated Reservations.** For the first time, Spinnaker reservation ranges – stacking areas designated for containers meeting certain criteria – are created or removed automatically based on utilization to better distribute moves and traffic.
- **Automated Planning and Move Dispatch.** The system determines the best available location for containers going to the ASC rows with no manual intervention. These moves are also automatically sent to the dispatch system, Traffic Control, for execution.
- **Dynamic Divisions, Load Balancing and Work List Optimization.** The workload assigned to each ASC is optimized to minimize travel distances and ensure an even distribution of work among the cranes. Furthermore, each crane’s work list is prioritized in accordance with operational priorities established by the terminal.
- **Intelligent, Automated Set Asides.** When an ASC is to perform a move that requires shifting other containers, the system calculates the best location for these containers and performs the “set asides” automatically. Additionally, intelligent algorithms look ahead to ensure set asides do not bury the crane’s future moves.
- **Automated Housekeeping.** The TOS automatically identifies and assigns housekeeping moves to be performed by the ASCs according to operational priorities, which helps ensure efficient and productive operations against the vessel or rail.

“When we decided to implement ASC’s we knew we’d need a technology solution that would help us capitalize on our investment,” said Rucker. “The new features Tideworks developed for its Spinnaker® and Traffic Control™ systems have helped make our jobs easier while simultaneously reducing the number of unproductive moves and the idle time of the cranes. Most importantly, the systems have helped improve the safety of our people by automating some of the high-risk aspects of terminal operations.”

Tideworks also worked with ABB Ltd, the ASC drive control system provider, to meet extensive integration requirements. Integrating with ABB was a complex process, so several of Tideworks’ team members and MIT personnel traveled to ABB’s offices in Sweden to ensure the integration was a success.

Results and Benefits

The introduction of ASC’s and the supporting TOS technology has completely changed the way MIT conducts its everyday planning and container management, turning what was often a labor-intensive process prone to human error into a manageable, automated system that strategically utilizes available yard space in the ASC areas. The project has enabled MIT to optimize resources, from yard space, to equipment, to team members, so the terminal can operate more efficiently.

“The systems have helped make our jobs easier while simultaneously reducing the number of unproductive moves and the idle times of the cranes.”

Previously, dispatch staff and equipment operators controlled nearly all container movements, which ran the risk of creating additional non-revenue generating moves. Now moves are planned automatically using Tideworks' TOS and executed by the ASC's exactly as they are instructed by the TOS. This reduces operational variability, and in turn reduces the number of container re-handles, contributing to overall lower operating costs and improved equipment utilization. When housekeeping moves need to be performed, the cranes can complete them during off-peak hours to guarantee an optimal workflow. The automated housekeeping feature has been so helpful to MIT that it has now become a standard feature available in Spinnaker across all terminals.

To further increase operational efficiency, multiple cranes can be controlled at once from a remote control center, allowing for better resource utilization. Additionally, when carrying out the instructions generated by the TOS, the crane PLC and drive controls ensure crane and container movements are executed over the optimum path, to minimize gantry, trolley and hoist movements.

The ASC's also minimize safety risk factors at the terminal by reducing human interaction with the machines and removing people from the hazardous container yard, placing them in a safer working environment. In addition, the cranes include a variety of features that have greatly improved safety for truckers and terminal personnel. An "anti-lift sensor" prevents a container from being lifted more than 0.5 meters if still engaged with its chassis or flatbed, and proximity-based sensors alert the team if there is anyone or anything in the crane's trolley path. Additionally, physical barriers separate the cranes from truck lanes to ensure there aren't any collisions.

The cranes also include a "stack profile scanning system" feature, which provides a 3-D stack alignment profile to eliminate hard landings, collision, and topple. This reduces equipment damage and improves safety.

Finally, because the cranes are electric powered, the terminal's overall environmental sustainability has increased by lowering operative noise, improving the efficiency of power consumption and reducing emissions.

Together, these features have helped MIT leverage the full abilities of its automatic stacking cranes to increase yard density and improve operational efficiencies.

"As the volume at our terminal continues to grow it is critical that we are as productive as possible so vessels stay on schedule and trucks are serviced quickly and efficiently," said Rucker. "The introduction of the ASC's has improved the operability of our entire terminal, and the unique features developed by the Tideworks team have helped us fully leverage one of our most important physical assets. We are very pleased with their service and look forward to continuing our partnership in the future."

About Tideworks Technology

Tideworks is a full-service provider of cost-effective, reliable software solutions for growing terminal operations and shipping lines worldwide. The company helps more than 300,000 users at more than 100 facilities run their operations more efficiently and profitably. From optimized equipment utilization to faster turn times, Tideworks works at every step of terminal operations to maximize productivity and

customer service. For more information about Tideworks Technology, a Carrix solution, visit www.tideworks.com/.

Communiqué PR Contact Information

Colleen Moffitt

Main: 206-282-4923 x 113

Mobile: 206-979-4698

colleen@communiquepr.com