

Traffic World

Major Upgrade

By David Biederman
September 22, 2003

New technologies to make container terminals more efficient are being implemented up and down the West Coast, changing in fundamental ways the container terminal business.

The technology permitted under the new accord between the Pacific Maritime Association and the International Longshore and Warehouse Union enables terminal operators to "begin treating marine terminals more like industrial plants rather than warehouses," said Tom Ward, a principal of JWD Group, a consulting and engineering firm that advises the PMA on technology at 31 West Coast ports.

Technology and its impact on ILWU jobs was the central issue in the tough negotiations between the PMA and the union last year. Both parties were under intense pressure to make a deal after President Bush invoked the Taft-Hartley Act to end a 10-day lockout that seriously disrupted the commerce that passes through West Coast ports - commerce that adds up to \$300 billion a year. There is still much wrangling to be done over how the technology is implemented and who has jurisdiction over related jobs, but the technology juggernaut is under way.

Tom Edwards, director of contract administration and arbitration for the PMA, said that since the contract was signed, around 10 terminals have submitted "technology letters" to union officials that spell out plans to implement technology and its expected impact on terminal operations and ILWU jobs. Close to a dozen terminals are installing or upgrading gate optical character recognition systems that identify container, chassis and truck plate ID numbers as trucks pass through terminal gates. Many are exploring other technologies such as global positioning to help track containers and optimize container moves, Edwards said.

"We will start in Long Beach and work our way up the coast," said Mike Schwank, managing director of Tideworks Technology, a subsidiary of Seattle-based Stevedoring Services of America. The company, which has installed over 20 terminal management systems worldwide, is upgrading OCR systems at three SSA-operated terminals at the Port of Long Beach.

Schwank, who worked in terminal operations for 22 years prior to running Tideworks, said that the relationship between IT providers and terminal operators has evolved with the technology. What were once stand-alone terminal operating systems must now integrate not just gate and inventory management functions but also GPS, RFID, transponder and web-based systems. As a result, IT companies need to understand the

smallest details of terminal operations to design, implement, maintain and integrate systems for terminal operators.

American President Lines operates container terminals in Los Angeles, Oakland and Seattle. Dave Sanborn, vice president of APL operations in North America, said that more and more IT companies are hiring from the ranks of terminal operations. In July, APL implemented a gate OCR system from Science Applications International Corp. at its Pier 300 Container Terminal at the Port of Los Angeles, and among the SAIC technicians working on the project was a former APL employee.

With technology constantly changing, liner companies rarely develop their own systems as they did in the past. Now, said Sanborn, IT firms install systems that integrate easily with other types of systems, obviating the need for in-house development. In Los Angeles, APL is using a yard inventory management system developed by San-Francisco-based **WhereNet** and an OCR system from SAIC, and the companies collaborate on integration issues while the APL IT team pulls it all together.

Riding high on the West Coast OCR boom is San-Diego-based APS Technology, the installation contractor and systems integrator for an OCR system that it developed with Hi-Tech Solutions, an Israeli firm. APS President and CEO Russell Scheppmann said that the company's OCR system at the Port of Los Angeles covers 12 gate lanes at the Trans Pacific Container Service Corp. terminal and 56 gate lanes at A.P. Moller's Pier 400. Pier 400 has the largest gate OCR installation in the world, and when construction is completed next year, it will be the largest proprietary container terminal in the world, with a projected annual throughput of 2.4 million TEUs.

The technology that is in place at TraPac and Pier 400, and is coming soon to many other West Coast terminals, has two levels, said Ward. The first is automated data collection such as OCR. The second involves GPS, which helps terminals manage container stacks more efficiently, and yard management systems, which assist terminal managers in locating and directing yard equipment. Using radio frequency identification tags, location sensors and wireless technology, yard management systems provide real-time location data for optimal planning, space utilization and stacking.

Both levels of technology reduce dependence on marine clerks, said Ward. OCR eliminates the need for clerks to type in data collected at port and pedestal gates, while GPS and yard management systems make it redundant for clerks to verbally instruct yard crane operators and to record their moves.

TraPac, on the West Basin of the port of Los Angeles, was among the first West Coast terminals to integrate OCR with GPS and a yard management system. As an experimental ground zero on the technology front it is under the intense scrutiny of both PMA and union officials.

Scott Axelson, director of planning and development for TraPac, did confirm a 50 percent increase in the terminals' productivity reported by the San Francisco Chronicle; since June the number of containers the terminal can handle has jumped from 10,000 to over 15,000 per week.

"TraPac is getting more lifts out of each yard crane and using fewer men to do it, so the cost of storing and receiving containers is starting to go down," said Ward. "They have gone a long way towards eliminating gate queues."

Edwards said that while it is too early to gauge the full impact of technology on productivity, there have been some very practical and measurable improvements in terminals that have implemented technology, such as better land utilization and less congestion at gate lanes. "It will take a full year to get a good measurement of increases in productivity," he said.

In the meantime, APS is going gangbusters installing OCR systems along the West Coast. In late August the company signed a contract to install OCR at seven terminals operated by Marine Terminals Corp. and joint venture partners Total Terminals International LLC (Hanjin Container Terminals in Oakland, Long Beach and Seattle) and Seaside Transportation Services (Evergreen America Terminals at the Ports of Los Angeles, Oakland and Tacoma) as well as West Basin Container Terminal at the Port of Los Angeles. Also in August, APM Terminals announced that APS would install gate and crane OCR systems at APM ports in Tacoma and Oakland and crane OCR at Pier 400. All three ports will also implement yard management systems from APS.

OCR has three components, said APS Chief Engineer Lee Scheppmann. Image-capturing units record container, chassis and truck ID numbers, a software recognition system and applications program that transmits the IDs to the terminal computer, and the system infrastructure. Technical challenges abound. To record high-quality ID images under all types of conditions, OCR systems employ multiple cameras for each target. For example, three separate cameras capture container IDs and up to two are used to record the chassis and truck plate numbers. Multiple cameras allow the system to overcome sunlight, glare, fog, darkness and help clarify damaged, dirty or illegible ID markings on trucks and containers.

The applications program controls lighting levels, classifies the ID numbers and passes the results to marine clerks in the terminal control center, or "kitchen," where accurate entries are processed and exceptions - trucks that do not match up with pre-filed data - are checked. Close to 85 percent of trucks entering and exiting terminals can be processed electronically with no intervention from clerks, said Scheppmann.

APS anticipates accuracy levels of 99 percent for identifying container numbers, 94 percent for chassis ID and 98 percent for truck plates from its OCR system. Rates below the mid-90s indicate a camera problem. Such problems are rare - only two camera failures so far at Pier 400 in hundreds of thousands of equipment hours - but they are

identified by performance-monitoring software, an integral component of gate OCR systems.

The key to OCR efficiency is integration with terminal operating systems, said Scheppmann, and the full potential of OCR will not be realized until integration issues are worked out over time.

Ward said that even with the new improvements, West Coast ports do not approach the level of automation in place at some terminals in Europe and Asia that use robotics and other technologies to lessen the need for human intervention. At the Alternwerder Container Terminal at the Port of Hamburg, robotics is employed to store and stack containers, and in-port transporting is done with automated guidance vehicles that can be operated from offices. At other terminals, such as Terminal 4-6-7 at the Port of Hong Kong, the entire terminal is under centralized control and is run by a complex computer system that simultaneously processes all terminal functions. The centralized control structure has the potential to make each move an optimal one. That is what terminals worldwide aspire to, Ward said.

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