



TRAPAC: FROM AUTOMATION TO OPTIMIZATION

Automation is transforming the container shipping industry. As the technology of cranes and stacking carriers evolves, companies like TraPac, a Los Angeles-based stevedore that operates container terminals, are increasingly embracing self-driving equipment.

For TraPac, automating its flagship operations at the Port of Los Angeles terminal enabled the company to cut costs, slash emissions, and move human operators out of harm's way. In order to fully realize the potential benefits of automation, however, TraPac needed to also harness their data. In 2017, the company implemented OSIsoft's PI System to organize and analyze the information generated by their machinery. Better data management has helped TraPac wring inefficiency out of their systems, improve maintenance, and diagnose puzzling equipment problems.

IMPROVED CYCLE TIMES

To come up with a data plan that worked with the company's systems, TraPac turned to Hatch, an engineering and management consultancy and OSIsoft partner. Hatch engineers found that there was plenty of information coming out of TraPac's machinery, but it was siloed and inaccessible. Port operators were dealing with multiple data systems from different vendors, and didn't have the tools to do in-depth data analysis.

For a port operator like TraPac, two related metrics are key for measuring success: 1) how many containers the port can move per hour and 2) how long the cycle time is for moving a single container from source to destination. By using Event Frames, TraPac was able to make an

in-depth analysis of the movements of a crane during the process of picking up and moving a shipping container. They soon found what they were looking for: When the crane was transitioning from one kind of movement to another, there was a small delay.

"We all knew that there was some delay there, just by observation, but we couldn't quantify it prior to this," says Hatch engineer Randy Vu.

Zeroing in on the small inefficiencies in the crane's movement enabled TraPac to make a 10 percent improvement in cycle time – a shift that means the port can move more containers in less time.

HIGHLIGHTS:

RMG Cycle Time
decreased
10+%

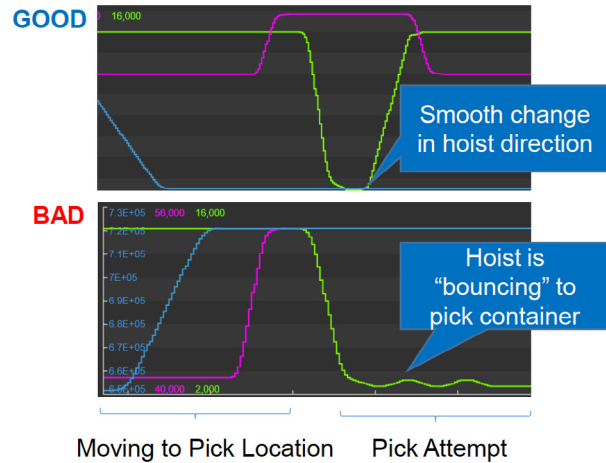
Maintenance
Compliance
100%
on target

Faster issue
resolution

EXPEDITING ISSUE RESOLUTION

Results

- Quick visual recognition of typical spreader profile versus bad
- Worked with mechanics to pinpoint issue – bent spreader flipper, distortion undetectable
- Without PI data, would be guessing at issue
- “Unless we went out there with a straight edge, we may still be searching for the cause!”



Real-time Review: Real-time dashboards have made it easy for TraPac to see issues. In this diagram, the data revealed a bent spreader that visual inspection alone could not detect.

ON-SCHEDULE MAINTENANCE

The PI System has also helped TraPac improve their preventive maintenance schedule for the self-driving straddle carriers that ferry shipping containers around the port. The carriers, called “autostrads,” operate in a fenced-off area while they are working. If they break down during a shift, workers will wait until all work in the area has stopped to fix them. To prevent expensive equipment downtime, all of the autostrads are scheduled to be serviced every 1000 hours. But in practice, the 1000-hour servicing was happening on schedule less than 20 percent of the time.

Before TraPac implemented the PI System, workers were collecting data from the autostrads manually with clipboards, a system that was slow and prone to human error. Now the data is more accurate and timely – and the autostrads are getting their recommended 1000-hour maintenance checks on time, all the time.

“With the transition towards using PI to collect that data, not only do we save manpower in manually collecting readings, but the accuracy and the repeatability of those readings is significantly improved,” says Mark Jensen, TraPac’s assistant vice president of equipment and facility maintenance. “We’ve had a fairly significant shift in the schedule compliance.”

DATA SEES WHAT PEOPLE CAN’T

Other benefits from deploying the PI System have been more serendipitous. TraPac used data analysis to solve a mystery in the port: a rail-mounted gantry crane that suddenly suffered a significant drop in productivity. There was no obvious mechanical cause, but by looking at the crane’s data in the PI System and comparing it to a normal process, engineers were able to trace the problem to a single bent flipper on the spreader that locks the crane onto a container.

“Knowing that we were having this issue with precisely landing on top of the container inspired us to start looking a little bit more closely,” Jensen says. “It was really helpful in getting us to the root cause of that issue.”

TraPac’s experiment with the PI System started out as a pilot project just last year, but already the system is proving itself – and contributing to a more data-centric culture at the port.

“We were automated, but now we’re trying to optimize,” Jensen says.

For more information about TraPac and the PI System, watch the full presentation [here](#).

PARTNER: HATCH

PI System™

Components:

- PI Server™
- Data Archive
- Asset Framework
- Event Frames
- Notifications

PI Vision™

PI ProcessBook™

PI DataLink™

PI Connector for UFL™

PI Interfaces for OPC and RDBMS™

PI OLE DB

Enterprise Agreement



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