TraPac drives operational results through automation and digitalization at Port of Los Angeles

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About TraPac

- Container terminal operator and vessel stevedore that provides port terminal services to the West Coast of USA
- Leading edge in container-terminal automation in North America
- Among the first to implement and combine:
  - Automated straddle carriers with automated stacking cranes and automated on-dock rail system
  - Terminal-wide PI System

About Hatch

- Multidisciplinary engineering and management consultancy company
- +9000 employees, 65 offices, six continents
- Principal sectors: Infrastructure, Mining & Metals, and Energy
- Extensive systems, process control and PI experience

Business Challenges – Making the Case for the PI System

- Complex automation solution that involves multiple systems from different vendors
- Inadequate data-acquisition tools for in-depth analysis of existing KPIs

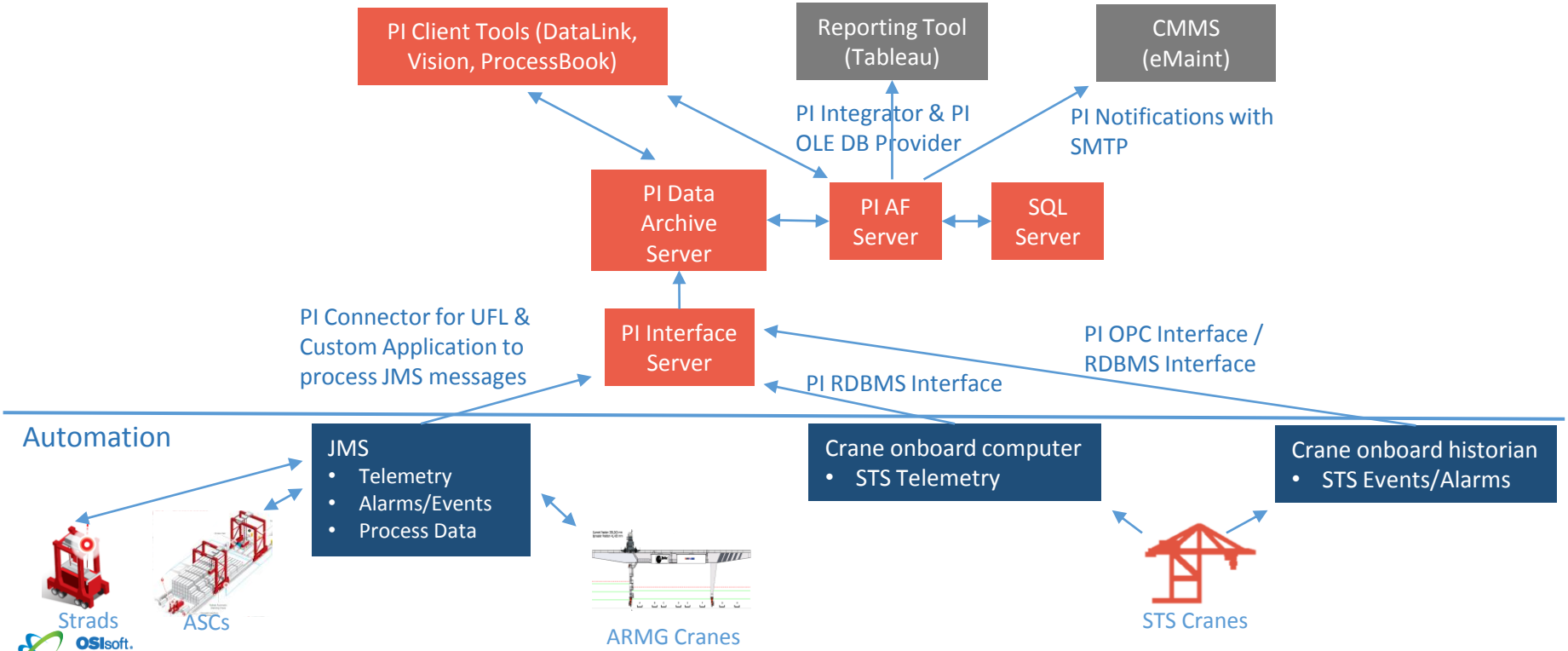
Business Solution – Deploying the PI System

- PI System selected because of:
  - Ability to look at data from an operational improvement/process perspective
- Implemented Proof of Concept with OSIsoft's support
  - Up and running within a few days
  - Organized AF hierarchy and basic calculations and templates quickly

Implementation Considerations and Challenges

- Key productivity metrics include:
  - **Gross Moves per Hour** – total number of containers moved per hour
  - **Cycle Time –** overall time to move container
- Data sent as “messages" but needs to be transformed into Process and Equipment data
- No JMS interface available from OSIsoft

Implementation Details



Demonstrating Value of PI – 3 Use Cases

1. Improved operational efficiency
2. Accelerated issue resolution
3. Improved preventative maintenance program

Use Case: Improved Operational Efficiency – Optimizing RMG Travel Times

Objective: Improve operational efficiency of RMG by improving travel times for its movements

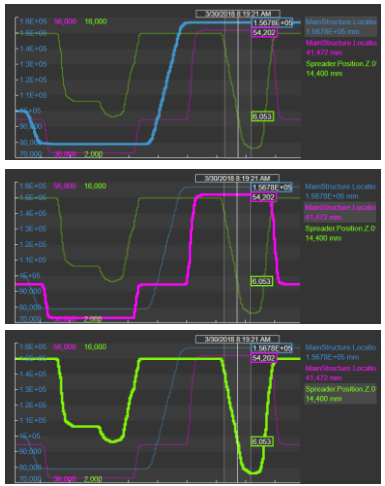
Use Case: Improved Operational Efficiency – Optimizing RMG Travel Times

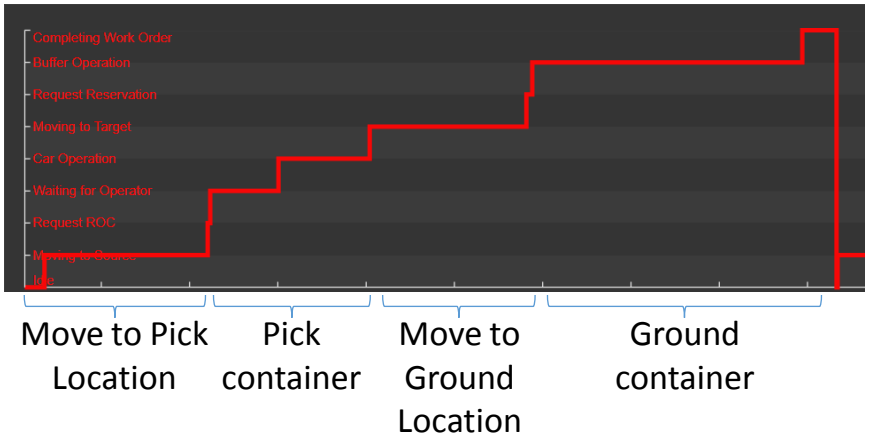
Divide the RMG cycle into phases based on crane movement, job status, remote operator status, transfer area reservation status

Horizontal

Lateral

Vertical



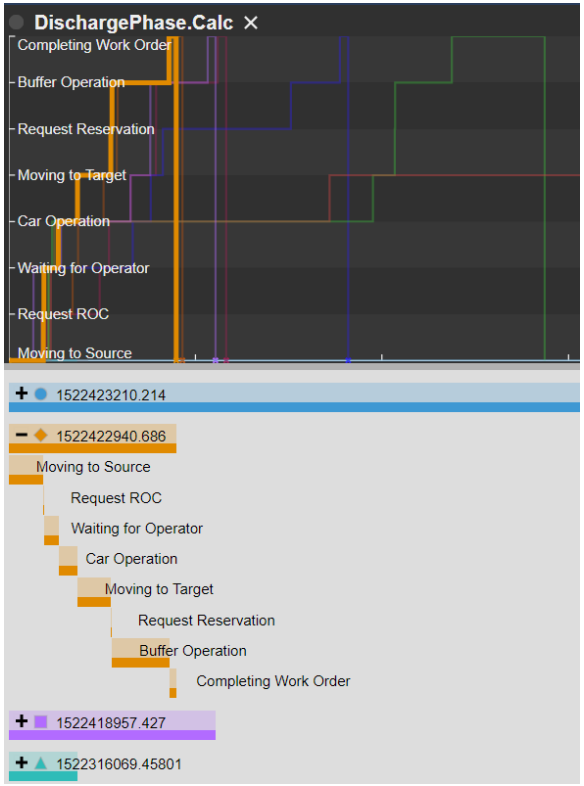


Use Case: Improved Operational Efficiency – Optimizing RMG Travel Times

Used Event Frames to quantify duration of each phase and create a baseline to help identify outliers

Results

- Quantified idle time crane movements which provided necessary data to support programming changes to RMG PLC
- 10% improvement in cycle times



Use Case: Expediting Issue Resolution

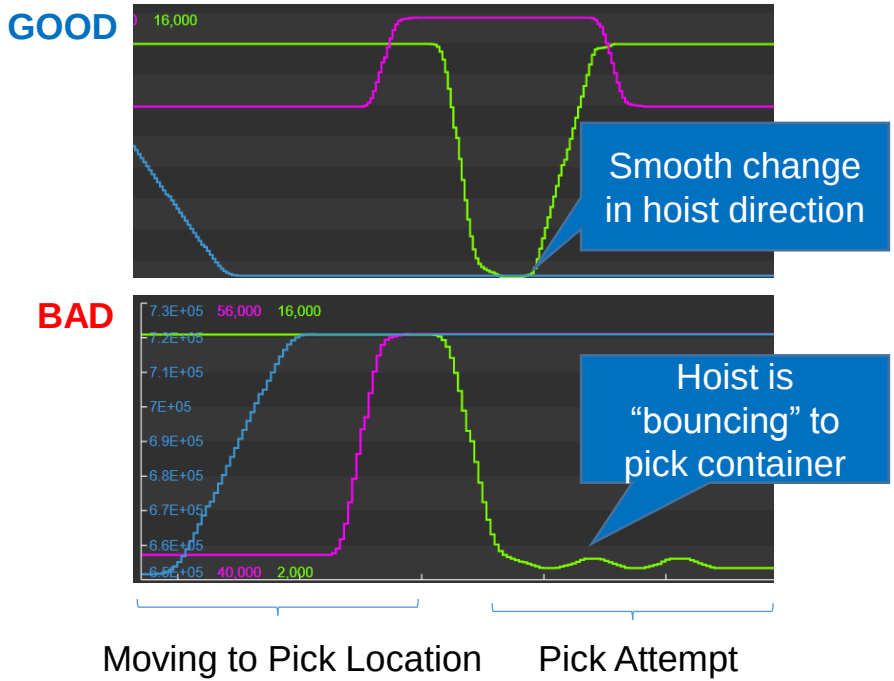
Objective: Leverage PI System to expedite troubleshooting

- Problem reported as significant reduction in RMG throughput
- Initial suspicions pointed to recent control-system update
- Problem was intermittent and visual inspection was inconclusive

Use Case: Expediting Issue Resolution

Results

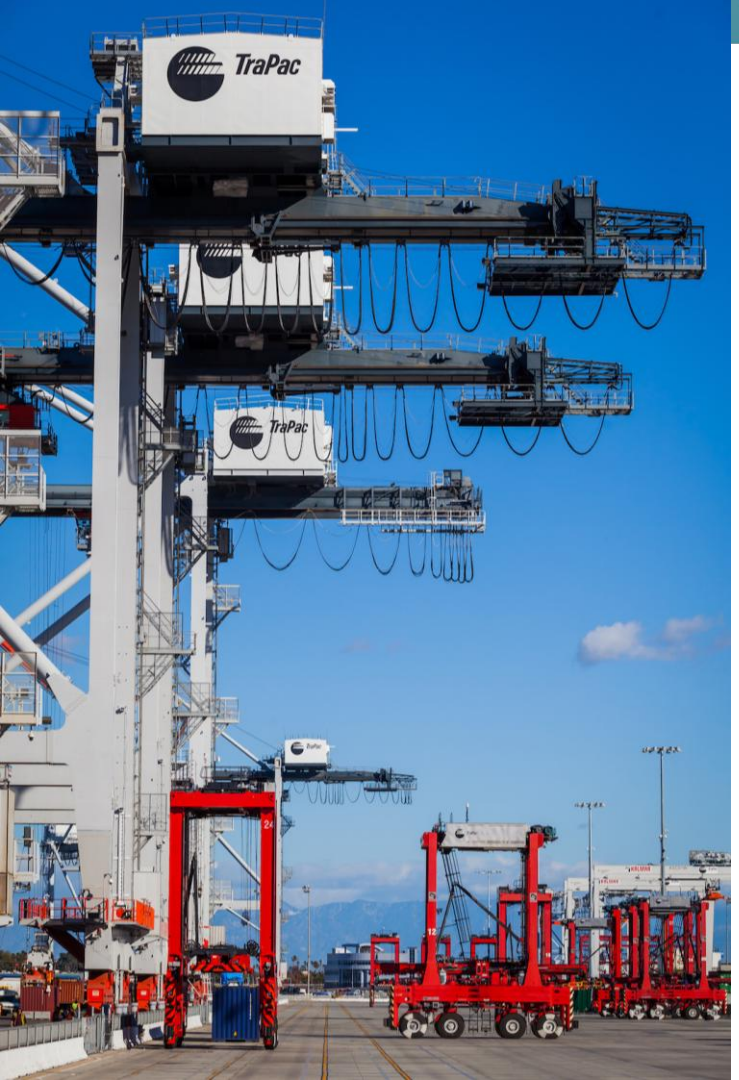
- Quick visual recognition of typical spreader profile versus bad
- Worked with mechanics to pinpoint issue – bent spreader flipper, distortion undetectable
- Without PI data, would be guessing at issue
- “Unless we went out there with a straight edge, we may still be searching for the cause!”



Use Case: Improving Maintenance

Objective: Leverage PI System to digitalize maintenance workflow and improve maintenance interval compliance

- PI AF configured to send email to third-party CMMS daily using PI Analysis, PI Event Frames and PI Notifications



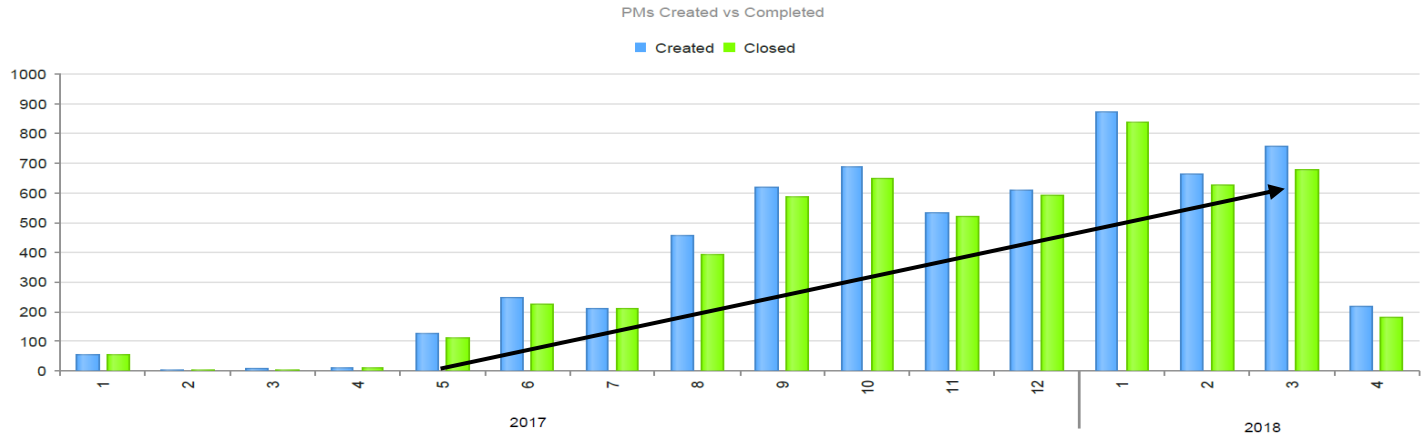
Use Case: Improving Maintenance

Straddle Carrier

- Automated container transport vehicle
- Travels freely between equipment
- Operates in fenced-off automated area
- Breakdowns may not be addressed until work stoppage

Use Case: Improving Maintenance

Results: Data provided by PI System helps drive the PM maintenance regime within our CMMS, particularly for meter driven PM, resulting in a significant upward trend in PM creation



Use Case: Improving Maintenance

Results: Timely and accurate data has resulted in a significant shift in compliance to PM schedules

- Autostrad PM is typically based on a 200 hrs inspection and a hierarchical 1,000 hrs service interval.
- Actual intervals against this target have been tracked for gauging PM Schedule Compliance.
- PM Scheduling compliance: -0/+10%: on target. -0/+5%: considered hitting the bullseye.

Use Case: Improving Maintenance

More data is desirable before declaring an outstanding success but the indicative trend so far is very favorable.

PM Schedule Compliance – 1,000hrs servicing
Previous method – prior to Jun 2017

Interval	Count of Interval	%
<950	76	48%
950-999	11	7%
1000-1049	17	11%
1050-1100	12	8%
>1100	42	27%
Total Count	**158**	

11% bullseye
19% on target

PM Schedule Compliance 1,000hrs servicing
New method –Since Jan 2018

Interval	Count of Interval	%
1000-1049	28	80%
1050-1099	7	20%
Total Count	**35**	

80% bullseye
100% on target

The new method supported by PI sees good accuracy and repeatability for the 200hrs inspections interval. The previous method never captured 200hrs inspection data for comparison.

Leveraging the PI System to improve operations

TraPac

Company and Goal

Automated container-terminal operator with a goal to improve operational efficiency and asset utilization.

CHALLENGE

Inadequate tools and data for detailed process analysis

- Information was siloed
- Data was not appropriately structured for quick insight

SOLUTION

Deployed a PI System and integrated it with container-terminal systems to improve operational awareness.

- Full PI system deployment
- Developed custom application along with PI Connector for UFL to historicize JMS messages

RESULTS

Improved Operational Efficiency: RMG Cycle Time decreased by more than 10 %

Expedited Issue Resolution: Significantly faster. Flipper issue resolved within a shift.

Increased Maintenance Compliance: 100% on target

- Major shift in culture at TraPac – **Data-centric!**

Next steps

- Increase data collection
- Deploy downtime tracking tool
- Identify further optimization opportunities

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Questions

Please wait for the **microphone** before asking your questions

State your **name & company**

Please remember to…

Complete the Online Survey for this session

Merci

谢谢

Danke

Спасибо

Gracias

Thank You

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ありがとう

Grazie

Obrigado