Intelligent Lifecycle Asset Management
Cradle to Grave Data Utilization in Transportation

Presented by Max Mckay, mmckay@osisoft.com
Systems Engineer
Where?

Re-use → Use → Redeploy

Why?

What?

Scrap → Remanufacture → Repair

When?

→ Takeback

How?

http://www.dllgroup.com/Industries/Transportation
Intelligent Lifecycle Asset Management
Cradle to Grave Data Utilization

Recalls
Design & Development
- Modeling & Simulation
- Engineering Tests
- Durability Testing

Quality
Manufacturing
- Production Test
- Component Genealogy
- Manufacturing Operations
- PLM

Warranty
Services
- Technical Field Support
- Parts Site Management
- Diagnostics

Services
Customer Use
- Warranty Management
- After Sales Support
- Regulatory and Compliance

Product Usage Insights
Better Service and Support
A Real-Time Data Infrastructure
Silos and Complexity

SCADA 1 → Data → Excel → ERP
SCADA 2 → Data → Excel → ERP
Field → Asset Reliability → Planning and Scheduling
On Board → Asset Reliability → Planning and Scheduling
On Board → Telemetry → EMS → LIMS
Wayside → CBM → Planning and Scheduling
Telemetry → EMS → LIMS

Traditional Strategy
Standards and Simplicity

Collect
- SCADA 1
- SCADA 2
- Field
- On Board
- On Board
- Wayside
- Telemetry

Enhance
- Ad-hoc reporting
- Learning Mgmt.
- Asset Reliability
- ERP

Deliver

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The PI System has 3 Layers

Collect
PI Interfaces

Manage
PI Server

Enhance

Deliver
PI Tools
A look at decision-ready information
A look at decision-ready information

The right assets in their context
A look at decision-ready information

Easy to understand names and units
A look at decision-ready information

Summary calculations

Average Speed

10.68 mph

Fleet Average Speed
A look at decision-ready information

Real-time visualization
A look at decision-ready information

Quality data: Context, storage and use consistent with the intended recipient
Design and Development

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Customer Use
Design and Development

Key enablers:

• Designed for **intended use**
• Define operational and manufacturing specifications
• **Data driven** decision making
• Optimal iterative approach to design and tests
• Data capture along the process to **report** and **act**
Design and Development

Solution Components

- Mobile sensors
- PI Interfaces
- PI Asset Framework
- Mobile visualization

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Manufacturing

Key enablers:

• Manufacture to specifications
• Set **targets** and **track** production
• Identify **defects** and **excursions**
• Track **energy** and **resource** consumption
• Provide **real-time** access to production data allowing timely corrective actions
"Enter A World That Is 100% Electric"
“Speed up transition to sustainable energy use in transportation while creating new opportunities.”

**BUSINESS CHALLENGES**
- Develop both the **product** and the industrial manufacturing **processes** for battery production.
  - Track product manufacturing
  - Lower production costs
  - Support R&D

**SOLUTION**
- **Real-time data** availability is critical in order to optimize the process.
  - The PI System captures data
  - PI System Tools used to detect problems and prioritize future investments

**RESULTS AND BENEFITS**
- The PI System empowers each division to **improve its performance**
  - Downtime tracking enables enhanced productivity
  - Continuous improvement becomes a reality
The PI System at BlueSolutions

Solution Components
- PI Interfaces
- PI Data Archive
- PI Asset Framework
- PI Event Frames
- Asset Analytics
- PI Visualization Suite
- PI Developer Technologies

<table>
<thead>
<tr>
<th>Solution Components</th>
<th>Technologies</th>
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</thead>
<tbody>
<tr>
<td>PI Interfaces</td>
<td>Production</td>
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<tr>
<td>PI Data Archive</td>
<td>Test</td>
</tr>
<tr>
<td>PI Asset Framework</td>
<td>Component</td>
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<tr>
<td>PI Event Frames</td>
<td>Genealogy</td>
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<tr>
<td>Asset Analytics</td>
<td>Manufacturing</td>
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<tr>
<td>PI Visualization</td>
<td>Operations</td>
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<tr>
<td>Suite</td>
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</table>
The PI System at BlueSolutions

- PI System is used **throughout the production process**
- Each product is **tested** before it leaves the plant
- **End of line** test data is captured and archived
- **Forensics** are performed when problems occur or when overperforming units are identified
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Key enablers:

- **Exchange data** with Suppliers, Vendors, Partners, and Service Providers
- Open up the capability for partners to provide **data driven services**
- Service based on measured **conditions** and **usage**
The PI System at Kongsberg Maritime

“Kongsberg Maritime has installed dynamic positioning, navigation, subsea survey, safety management and satellite positioning solutions on over 16,000 maritime vessels.”

**CHALLENGES**
- K-IMS received 300,000 e-mails and 20,000 calls/year
- Service requests were distributed 24/7 across Kongsberg US, Singapore and Norway offices
- The volume and diversity of maritime data sources was hard to integrate

**SOLUTION**
- Implement the PI System to collect vessels data and transmit to central support offices
- Securely exchange identified data streams among trusted partners with PI-Cloud Connect

**RESULTS**
- Reduced down time and service costs
- Improved predictability, optimized logistics and performance
- Improved communication
- Unlock future growth by monitoring additional systems
The PI System at Kongsberg Maritime

Solution Components

- PI Connectors
- PI Cloud Connect
- PI Developer Technologies
Multiple stakeholders...

- JV Partner
- O&M Vendor
- Performance Analytics Vendor
- Equipment Manufacturer
- Supplier
- Asset Owner/Operator

... a Service Provider perspective

- Customer
- Remote Monitoring & Diagnostics Center

Connected Services is a simple, secure, technical and commercial framework for service providers to obtain the data they need to drive service excellence.
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Customer Use

Key enablers:

- Ensure assets are **used as designed**
- Collect data **remotely** from field assets
- **Centralize** it into a single database for analysis
- Perform advance **analytics** to identify **patterns**
- Provide a **transparent** platform for users to see what data you collect and what you are doing with it
Customer Use

The PI System lets you leverage Big Data for Insights

- Statistical Analytics
- Analytical Insight
- Visual Analytics
- Time Series
- Relational
- GIS
- Unstructured

- Warranty Management
- After Sales Support
- Regulatory and Compliance
The PI System at *Syn crude*

“Mining equipment uptime is a key factor in operating efficiency. Optimized preventive maintenance programs and just-in-time intervention are key to minimizing major component failures requiring days or weeks to repair.”

<table>
<thead>
<tr>
<th>CHALLENGES</th>
<th>SOLUTION</th>
<th>RESULTS</th>
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<tbody>
<tr>
<td>Transform reactive, time intensive forensic data reviews into automated, near real-time event synthesis and creation</td>
<td>Implement an operational data-based solution using PI to improve maintenance for the fleet of heavy haulers</td>
<td>Highly scalable solution with fully validated events generated in a fraction of the time</td>
</tr>
<tr>
<td></td>
<td>OSIsoft workshop to kick-start pilot project</td>
<td>Step-change in equipment maintenance efficiency – near real-time notification</td>
</tr>
</tbody>
</table>
Fleet Monitoring

• Easy to read KPI’s provide visibility into asset health and response
• Trends are quickly identified and addressed

Trip and Utilization Reporting

• Data in context delivers insights that can be easily overlooked
• Summaries and outliers can identify ideal behaviors and practices
Reports and Dashboard from Mining Trucks

Truck, Operator & Route Report

- Average of Load - Maximum by Truck
- Average of Ground Speed - Average by Truck
- Average of Engine RPM - Average by Truck
- Duration, and Duration Expected by Truck

RoundTrip Cumulative Duration by Truck & Route

- Duration by Truck, and Route
- Duration by Route

Customer Use:
- Warranty Management
- After Sales Support
- Regulatory and Compliance

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Reports and Dashboard from Mining Trucks

Solution Components

- PI Event Frames
- PI Coresight
- Microsoft SharePoint and PI WebParts
- Microsoft PowerBI

Customer Use

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We believe People with Data can Transform their world
Questions

Please wait for the microphone before asking your questions

State your name & company
Contact Information

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Thank You

Danke
Merci
Gracias
Спасибо
Obrigado
감사합니다
谢谢
ありがとうございます