Heat Exchanger Workshop

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INTERNATIONAL PAPER

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INTERNATIONAL PAPER

- We are one of the world's leading producers of fiber-based packaging, pulp, and paper
  - 55,000 employees
  - $21 Billion in revenue
  - Operations in 24 countries
  - Periodic mergers and acquisitions
- PI Systems
  - 35 sites in 7 countries
  - Distributed systems and application support
  - Limited centralized consolidated PI System
  - Process Historian standard since 1997 (some sites longer)

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The challenge

- New OSIsoft Enterprise Agreement
  - Return on investment
  - Subject matter expert involvement
    - PI Asset Framework capabilities
    - Priority re-adjustment
- PI System Administration
  - Part time assignment
  - PI Asset Framework capabilities
  - PI Asset Framework configuration training

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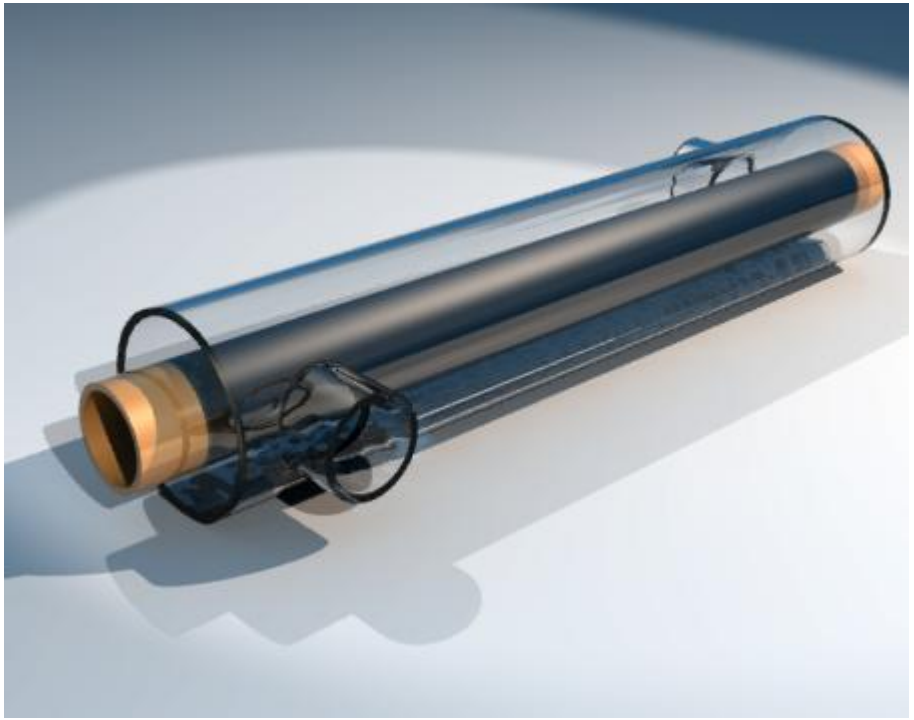
Why Heat Exchangers?

- Heat Exchangers
  - Simple machine – no moving parts
  - Known value of energy losses and maintenance costs
- Years between energy audits
- Efficiency calculations
  - Different approaches
  - Mostly done manually
- OSIsoft has a model



A simple tube in shell heat exchanger
Image: Public Domain. KoenB, creator, April 7 2007.

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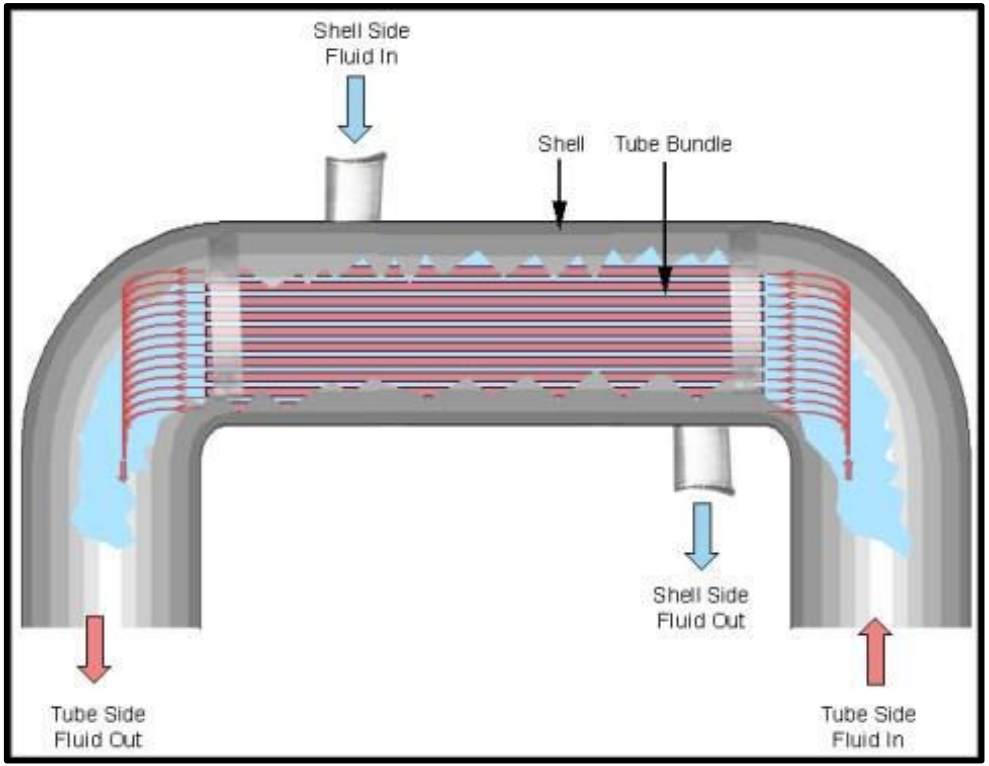
What is a Heat Exchanger?

- Device to Transfer Heat Between Fluids w/o Mixing
- Shell & Tube
  - Tube Bundle Surrounded by Large Pressure Vessel
  - Counter-Current Flow



Heat exchanger cross section
OSIsoft Heat-Exchanger-2016-Tutorial-EN.PDF

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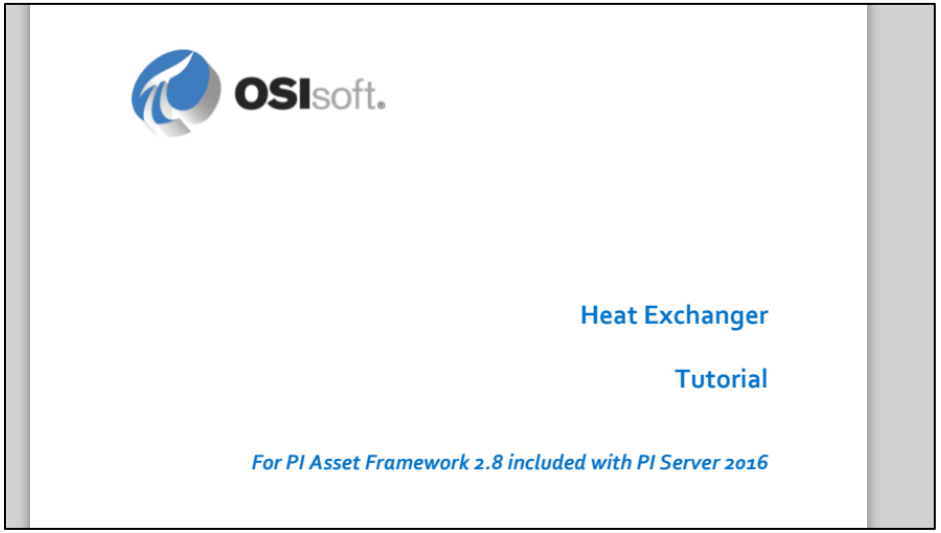
OSIsoft Heat Exchanger Model

- Built in PI Asset Framework
  - Element
  - Unit of Measure
  - Event Frames
  - Template
- Visualization Tools
  - PI Vision
  - DataLink
- Training
  - Tutorial
  - Instructors



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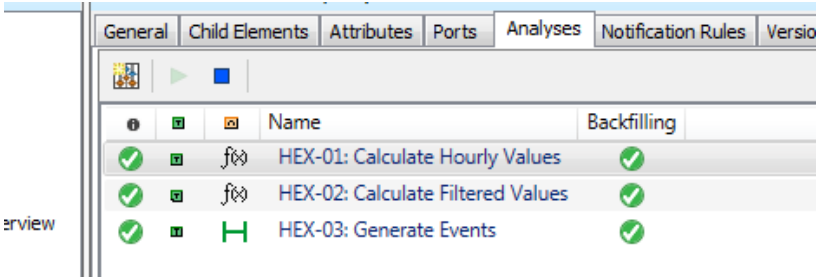
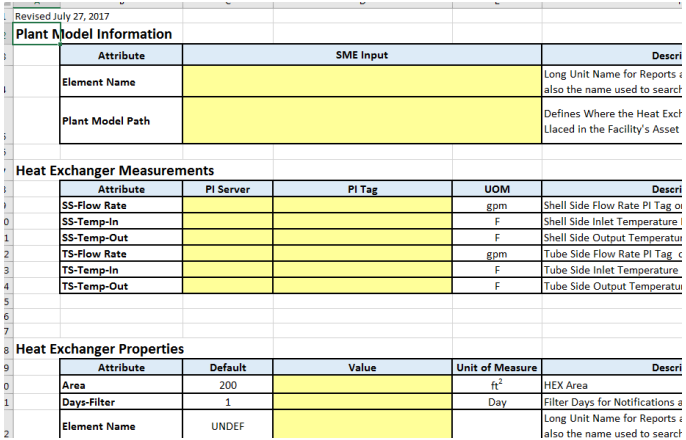
International Paper Heat Exchanger Model

- Enhanced OSIsoft model
  - Handle missing data
  - Additional error checking
- Support materials
  - Spreadsheets
    - Configuration information
    - Verify calculations
  - PI Vision Asset based displays
- Distribution package
  - PI Builder spreadsheets for templates
  - PI Vision Display Utility
  - Installation steps




Revised July 27, 2017

Plant Model Information

Attribute	SME Input	Descri
Element Name		Long Unit Name for Reports a also the name used to search
Plant Model Path		Defines Where the Heat Exch Llaced in the Facility's Asset

Heat Exchanger Measurements

Attribute	PI Server	PI Tag	UOM	Descri
SS-Flow Rate			gpm	Shell Side Flow Rate PI Tag o
SS-Temp-In			F	Shell Side Inlet Temperature
SS-Temp-Out			F	Shell Side Output Temperatu
TS-Flow Rate			gpm	Tube Side Flow Rate PI Tag
TS-Temp-In			F	Tube Side Inlet Temperature
TS-Temp-Out			F	Tube Side Output Temperatu

Heat Exchanger Properties

Attribute	Default	Value	Unit of Measure	Descri
Area	200		ft^2	HEX Area
Days-Filter	1		Day	Filter Days for Notifications a
Element Name	UNDEF			Long Unit Name for Reports a also the name used to search

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Why a Workshop?

- PI Asset Framework Task Force
  - Small team of PI System Administrators
  - Discussing and supporting PI Asset Framework configurations for months
  - Training
    - No systematic approach
    - Learn on the job/Self study
- Focusing Event
  - Bring Team together
  - Concentrate on one topic
- Customizable
  - Modified the standard Heat Exchanger Tutorial
  - Deployment Engineering

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The Workshop

- Prerequisite training – list of YouTube videos to be watched
- Face to face meeting
- International Paper discussions
  - Software development processes
  - Challenges with deploying PI System objects
  - Request driven implementation
- Heat Exchanger Tutorial training (modified)
- International Paper Heat Exchanger training
- Deployment Engineering Collaboration
  - OSIsoft COE
  - Pros and Cons of different approaches

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What we learned about Workshops

- Workshops are a hidden gem of the Enterprise Agreement
  - Customizable
  - Multiple resources can be joined together
  - Training
  - Service Voucher cover the entire engagement
- Successful workshops take significant planning (and snacks)

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What we learned about the products

- PI Asset Framework is not designed for a multi-environment or a distributed approach
  - Every object has a unique ID in every environment
  - Minimal migration tools (PI Builder or XML export/import)
  - Need to understand which errors to ignore
  - Still working on how to edit deployed objects
  - Works best with a dedicated development team which defeats some of the power of the products
  - Works best with a top down design
- PI Vision displays can be migrated
  - Element names and hierarchy matter
  - A migrated display has to have all the attributes replaced

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Where are we now?

- Centralized Configuration
- Distributed Deployment
- 4 standard Heat Exchanger models deployed in 3 sites
- 3 models in the pipeline at three additional sites
- 17 heat exchanger prospects
- Internal marketing of capability underway
- Too early to tell if energy costs have been reduced

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Summary

COMPANY and GOAL

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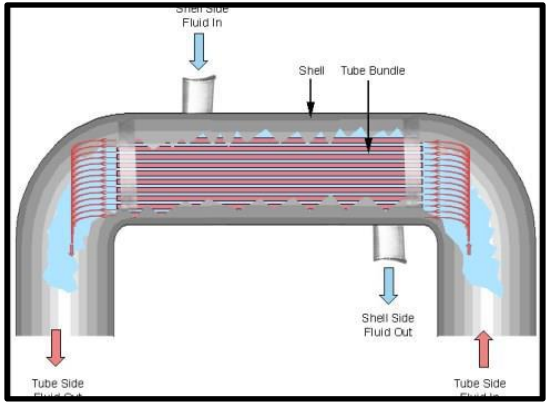
Utilize a standard model to save energy by monitoring for heat exchanger fouling



CHALLENGE

Using our investment in OSIsoft with minimal subject matter expert input

- Part Time staff
- Geography

SOLUTION

Start with a simple machine with significant operational impact

- Heat Exchanger Fouling Monitoring
- Known energy costs
- Utilize a OSIsoft Workshop to jump start the effort

RESULTS

First deployments 6 months after the development of the initial model

- Overcame startup issues
- Significant training

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Questions

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

State your **name & company**

Please don't forget to…

complete the Post Event Survey

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谢谢

Danke

Merci

Gracias

Thank You

ありがとう

Спасибо

Obrigado

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