AVEVAWORLD



Leverage Element Templates for Fleet Wide Monitoring

Alex Nehib and Hall Hastings Division Process Engineering



Smurfit Westrock

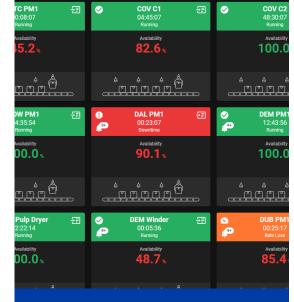
A global leader in sustainable packaging

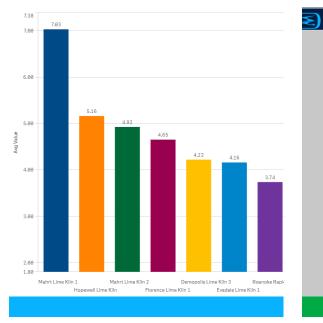


Division Process Engineering

Innovation, Engineering, and Continuous Improvement







Hopewell Cook Report - 6A							
	Cooks		Load (min)	Ready (min)	Total Cook (min)	Blow (min)	Hold (min)
01 Digester	11.0	Avg StDev	9.4 1.2	10.6 1.3	79.6 0.2	9.7 0.2	1.2 0.9
02 Digester	11.0	Avg StDev	9.1 0.7	11.1 0.2	79.5 0.1	9.5 0.1	1.0 0.5
03 Digester	11.0	Avg StDev	9.8 1.6	10.3 1.7	79.9 0.2	9.9 0.2	1.2 0.7
04 Digester	11.0	Avg StDev	9.0 0.3	11.1 0.6	79.8 0.1	9.9 0.1	1.0 0.6
05 Digester	10.0	Avg StDev	9.2 0.5	11.0 0.6	79.0 0.1	9.8 0.1	0.4 0.1
06 Digester	10.0	Avg StDev	10.0 2.1	10.0 2.4	79.1 0.1	9.7 0.1	0.6 0.4
07 Digester	13.0	Avg StDev	8.3 2.1	9.5 2.5	72.0 2.6	8.4 2.6	1.0 0.4
09 Digester	11.0	Avg StDev	9.0 0.4	10.9 0.4	79.5 0.1	9.5 0.1	0.8 0.0
10 Digester	11.0	Avg StDev	9.3 0.6	10.7 0.6	79.4 0.2	9.8 0.2	0.9 0.6
12 Digester	11.0	Avg StDev	12.0 6.3	9.6 1.9	79.2 0.2	9.3 0.2	1.0 0.5
13 Digester	11.0	Avg StDev	9.1 0.2	10.9 0.4	79.3 0.1	9.8 0.1	0.9 0.1
14 Digester	10.0	Avg StDev	9.3 0.6	10.6 0.6	79.0 0.3	10.0 0.3	1.1 0.3

Process Software and Reporting Support (AVEVA™ PI System™, Qlik, PowerBI, Ekho, PARCView, MES, ERP, Maintelligence, etc.)

Data Standardization Efforts (Downtime tracking, production data, KPIs, reliability data) Enterprise-wide Benchmarking (Resource prioritization and knowledge share)

Ad-hoc Mill Process Engineering Support



Need - Fleet Wide Monitoring and Benchmarking

Limited Resources

- Mill Process Engineering
- Corporate Functions
 - SMEs, Capital Project Engineering
- Regular future benchmarking

Consistency in Calculations

- Mill Standard Calculations (MSCs)
- Accuracy and standardization

Visibility

- Data in silos
- Mill visibility into sister mills
- Corporate visibility into fleet
- OpEx project generation
 and prioritization

- Challenge Leverage wide scale use of AVEVA PI System data historians to understand gaps, improve mill performance, and lower operating costs
 - Create tools for the mills to benchmark their operational performance against the rest of the fleet on demand



Solution – Element Templates in AVEVA[™] PI Server's 'Asset Framework' (AF)

Central Mill AF Database Build Process

	🗃 Batch Digesters - HW Only
	🗃 Batch Digesters - HW, SW, Sawdust
	🗃 Batch Digesters - SW Only
	🗃 BFW - Ion Exchange
	🗃 BFW - Reverse Osmosis
	🗃 Bleach Plant
	🗃 Boiler Feedwater
	Causticizing
	🔂 ClO2 Generator
	👍 Coated Paper Machine
	🔂 Continuous Digester
	🔂 CTO Plant
	🔂 Debottlenecking Assets
	Evaporator
	🔂 Gas Turbine
	🐻 Heat Exchanger Template

E	Category: Process Value	Categ	ory: Process Value	Name	Expression	
	Dust Loss	Ξ	Dust Loss	0	Uptime	TimeEq('Status','*-24h','*',1)
	E Feed End Temperature	T	67 Feed End Temperature	467.28	LimeMudFlowtoKilnGPM	TagTot('Mud Flow to Precoat Fi
	🔄 Firing End Temperature		67 Firing End Temperature	1939.9	LKFeedSolidsPercent	TagAvg('Lime Mud Solids Filter
	📑 Flue Gas O2	T	67 Flue Gas O2	5.5734	LimeMudDensity	TagAvg('Lime Mud Density Filte
 	🔄 Kiln Drive Status		🎺 Kiln Drive Status	63 A	DailyProduction	LimeMudFlowToKilnGPM * (LKFeed
	🔙 Lime Mud Baume		💷 Lime Mud Baume	Exclude		If Uptime <0.05 then
	Lime Mud Density		Lime Mud Density	10.3 lb/ <u>(</u>	UptimeCheck	0 else if BadVal(DailyProduction) 0
	Lime Mud Solids		nter Mud Solids	32 %		
	En Lime Production	T		267.871		else DailyProduction
		T	6 Mud Feed Status	1		<pre>if 'Asset Start'=0 then UptimeCheck else if BOD('*')<bod('asset data")="" digstate("no="" else="" pre="" st;="" uptimecheck<=""></bod('asset></pre>
	Hud Feed Status		Mud Flow to Precoat 199 gpm	199 gpm	AssetStartCheck	
	Hud Flow to Precoat	T	🍼 Natural Gas Flow	47.021		
	El Netwol Can Flam		1			eise optimecheck

Created templates for every major asset type in the mill

Identified all key process values needed for each asset type

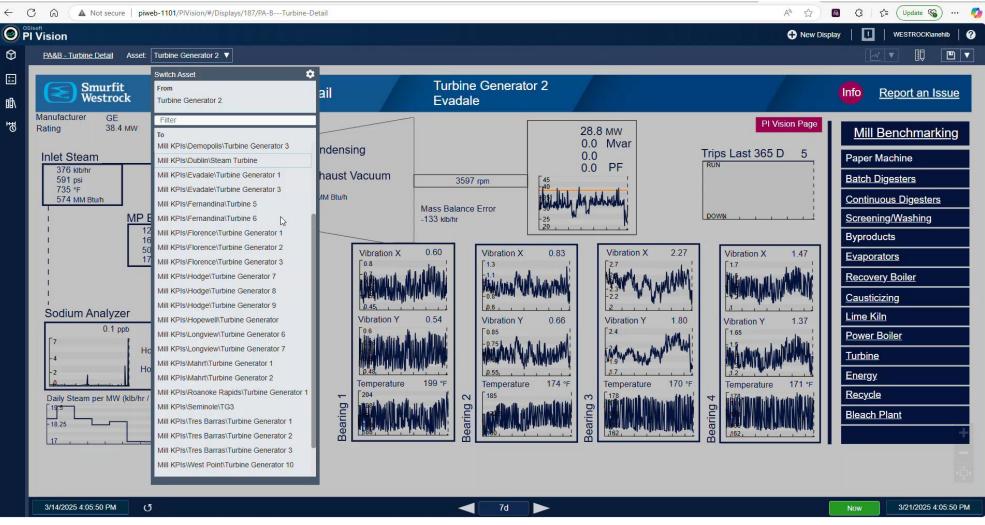
Collected PI tags for every mill, every asset

Built standard analyses to calculate KPIs for each asset type



Solution – AVEVA[™] PI Vision[™] Asset Displays

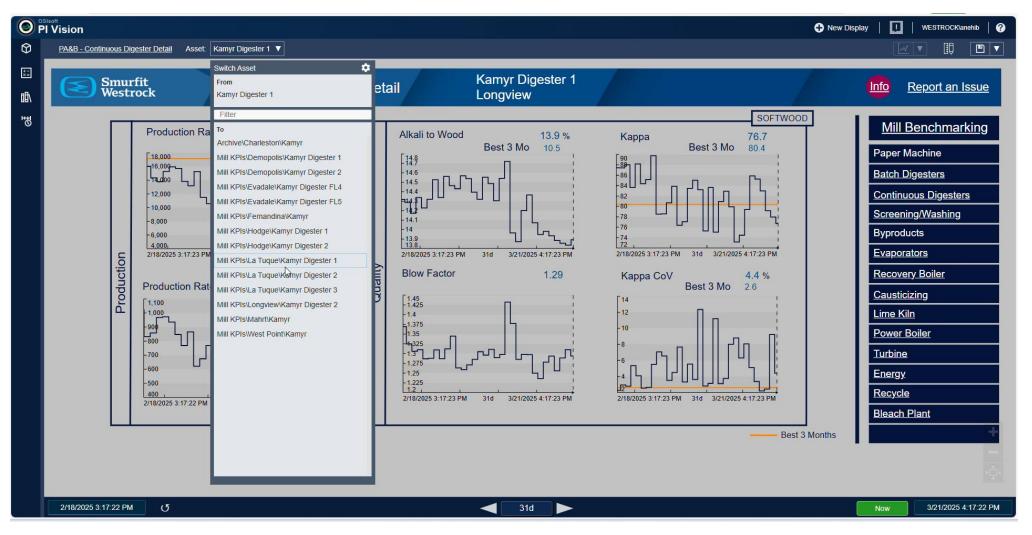
Using template attributes, a single display can be used to view PI data for all assets of same type





Solution – AVEVA PI Vision Asset Displays

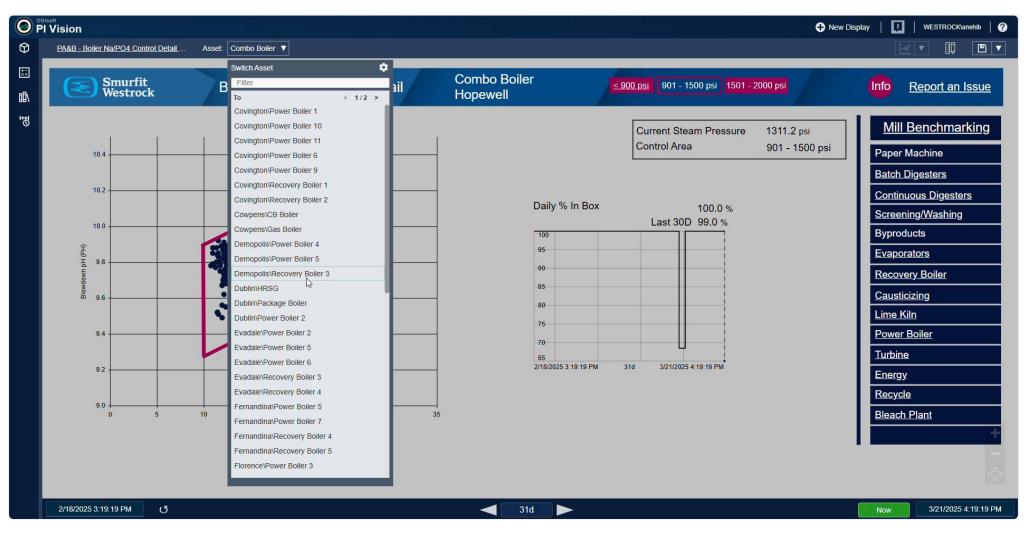
Using template attributes, a single display can be used to view PI data for all assets of same type





Solution – AVEVA PI Vision Asset Displays

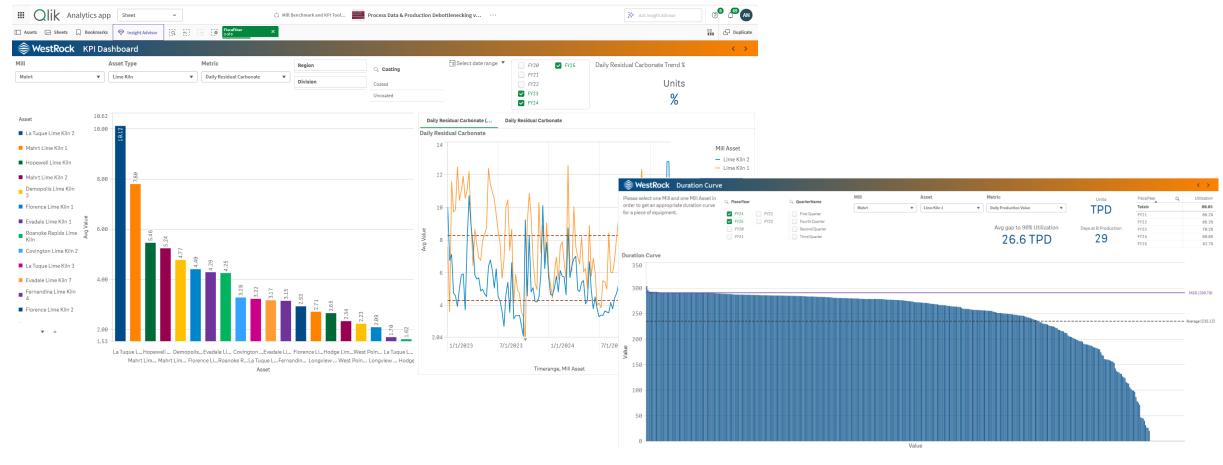
Using template attributes, a single display can be used to view PI data for all assets of same type





Solution – Using AVEVA PI Web API to View Data in BI Tools

Calculated benchmarking metrics are pulled into BI Tools using PI Web API and data is joined with other sources (Finance, Production/MES, Downtime, etc.)







Benefits – Fleet Wide Benchmarking Tools

Alignment on KPIs and Standard Calculations

- Everyone speaking the same data language
- Visibility to critical instrumentation

Easily Scalable and Expandable

- Can quickly add new metrics and analyses
- Add PI Vision displays or BI visualizations to suit any customer (mill, corporate, vendor)

Dynamic, Live Benchmarking Tools

- Used in on site benchmarking sessions to generate project ideas
- Relieve countless process engineer manhours data collecting and standardizing
- On-Demand data



Benchmarking Project

Benchmarking tools were key to identifying mill gaps and project prioritization



18

North / South American Mills evaluated and have live data in benchmarking tools



500+

Project ideas generated (Chemicals, Energy, Additional Production, Raw Materials)



\$100MM

Project ideas estimated savings





Smurfit Westrock identifies \$100MM in cost reduction opportunities by benchmarking fleet

Challenge

- Mill process data visibility and access
- Desire for regular on-demand fleet benchmarking
- Limited resources at both mill and corporate level for data collection and analysis

Solution

 Utilize PI AF element templates to build a central AF database with all major assets in the fleet

Results

- Alignment on KPIs and Standard Metrics
- Easily scalable and expandable
- Dynamic, live Benchmarking Tools on demand





Questions



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