



What if Expedia Showed your Mill's Operations Data

Presented by

Gopal GopalKrishnan, P.E.
Solution Architect
OSIsoft, LLC.

What if Expedia Showed your Mill's Operations Data

Abstract

It is no surprise that the big-data hype is falling into the trough of disillusionment (Lisa Kart, Gartner, January 2015, "[Big Data Industry Insights](#)") and organizations are struggling to get value from their big data investments. As if to save the day, a McKinsey January 2015 article "[Getting Big Impact from Big Data](#)" makes a number of recommendations.

"Visualization tools... are putting business users in control of the analytics tools by making it easy to slice and dice data, define the data exploration needed to address the business issues, and support decision making.", writes David Court. Earlier in the article he says **"...analytics specialists builds models targeted to specific use cases. These models have a clear business focus and can be implemented swiftly."**

In my own work and those with our paper & pulp customers, we find self-service data analytics that use models targeted to specific use cases such as sheet breaks, resin usage, and real-time costing is key to rapid insights and high impact returns to the business.

Whether it is small data or large data, or even big data, what is needed is an enterprise wide MOM (manufacturing operations management) infrastructure that collects data and events and places them into the appropriate semantics for every user. This is a critical foundation for achieving the goals of operational intelligence. Attend this session to see several paper & pulp examples of rapid insights and an Expedia like self-service user experience with PI System data.

Expedia user experience

Expedia

Account ▾

Sign in to see exclusive

Select your departure to San Francisco Mon, Jun 15

Prices are roundtrip per person, includes all taxes and fees.

Nonstop ✕ United ✕ Afternoon (12:00p - 5:59p) ✕

Filter your results by

Sort by: Price (Lowest) ▾

Save up to \$689 when you book your Flight and Hotel together. ✕
[Shop Flight + Hotel](#)

Stops	From:
<input checked="" type="checkbox"/> Nonstop (19)	\$420
<input type="checkbox"/> 1 Stop (49)	\$428

Airlines	From:
<input type="checkbox"/> US Airways (20)	\$500
<input checked="" type="checkbox"/> United (16)	\$430
<input type="checkbox"/> Delta (11)	\$526




[Show all](#)

Departure time

☐ Morning (5:00a - 11:59a)

☒ Afternoon (12:00p - 5:59p)

☐ Evening (6:00p - 11:59p)

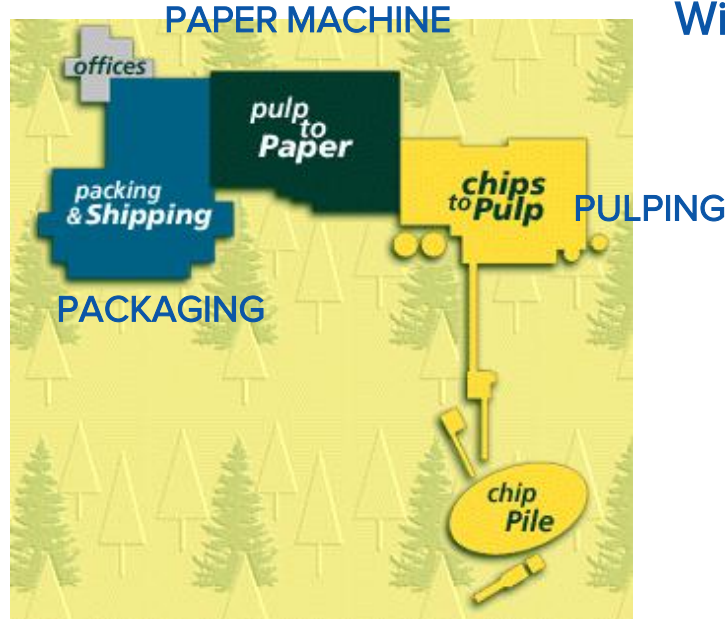
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	1:00p - 4:11p United Show Flight Details ▾	6h 11m EWR - SFO Nonstop Very Good Flight (8.3 out of 10)	4 left at \$517.19 roundtrip Select
	3:12p - 6:28p United Show Flight Details ▾	6h 16m EWR - SFO Nonstop Very Good Flight (8.3 out of 10)	4 left at \$517.19 roundtrip Select



This talk is about...

- Rapid insights into your data – for specific questions; start with simple AF/EF models and calculations...
- Expedia like user experience for those questions and other Operations data...

Paper Operations

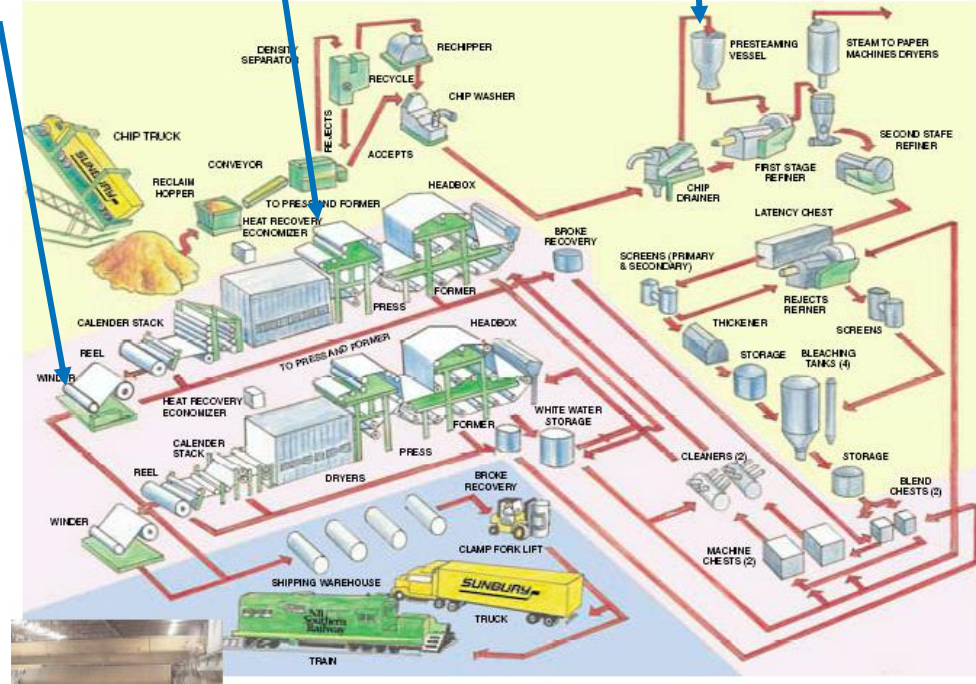


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http://www.tappi.org/paperu/all_about_paper/paperClips.htm

PAPER MACHINE

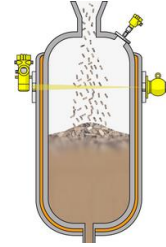
PACKAGING Winder

PULPING - Digester



Examples

- Pulping
 - Digester operations
- Paper Machine
 - Production costing, energy costing
 - Sheet breaks
- Finishing
 - Winder production data
- Other
 - Box plant production data
 - Saw mill production data

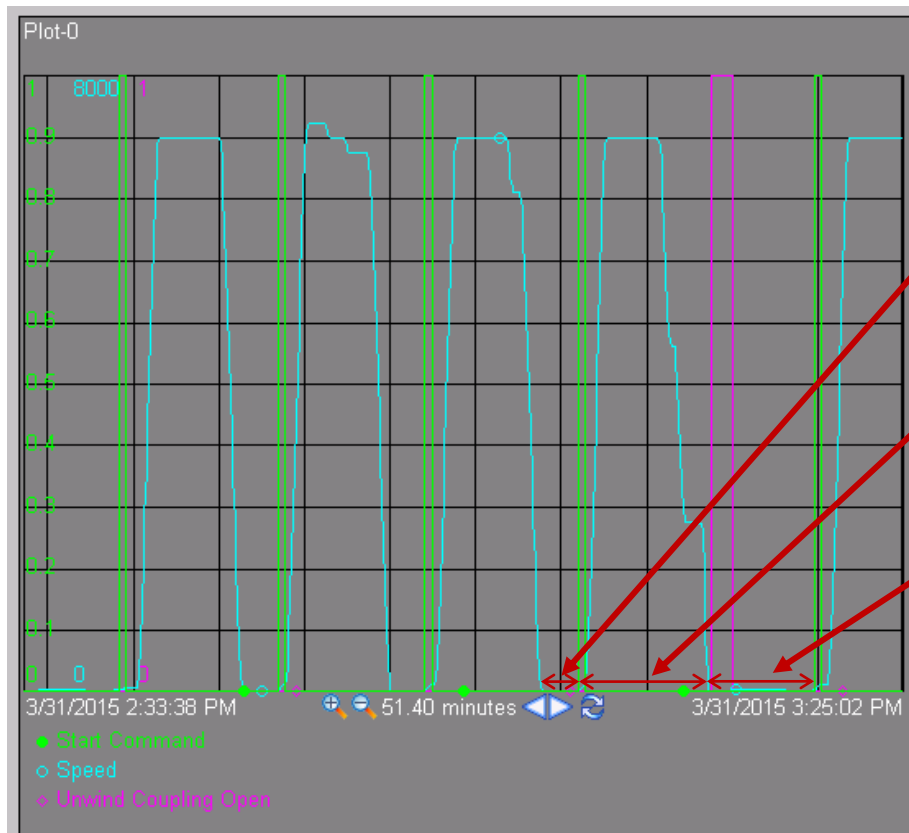


Examples

- Pulping
 - Digester operations
- Paper Machine
 - Production costing, energy costing
 - Sheet breaks
- Finishing
 - **Winder production data**
- Other
 - Saw mill production data
 - Box plant production data



Winder Operations



~ 45 minutes per Reel

Between Sets

~ 2 minutes

Build a Set (winder spinning)

~ 6 minutes

Between Reels

~ 10 minutes

~ 3 Rolls in a Set

~ 30-40 reels per day

~ 3 to 5 sets per reel

~ 100 sets per day



Winder production data

- How can I get better visibility into my Winder operations?
- What's the average time for a set?
- How much time do I lose between sets? (slitter moves...)
- How much time do I lose between reels? (unload, coupling open...)
- How often is the slitter moving, for how long?
- Show me by shift, by day, by month ...



Winder – Template and Calculations

General | Attribute Templates | Ports | Analysis Templates

Filter

Name
Speed
Speed Reference
Speed Setpoint
Start Command
Tension
Tension Reference
Tension Setpoint
Thread Mode
TimeBetweenReels
TimeBetweenSets
Unwind Coupling Closed
Unwind Coupling Open
Unwind Coupling OpenDuration_24hr
Unwind Coupling OpenDuration_Last
Category: Status
Category: Winder-Rider Roll
Category: Winder-Unwind

General | Child Elements | Attributes | Ports | Analys

Filter

Category: <None>

Acceleration
Acceleration Rate
Deceleration Rate
SetDuration
Speed
Speed Reference
Speed Setpoint
Start Command
Tension
Tension Reference
Tension Setpoint
Thread Mode
TimeBetweenReels
TimeBetweenSets
Unwind Coupling Closed
Unwind Coupling Open
Unwind Coupling OpenDuration_2

General | Child Elements | Attributes | Ports | Analyses | Version

Name	Schedule	Output(s)
f SetDuration	"Speed";"Speed"	SetDuration
f SlitterMovingCount_Daily	Natural	SlittersMovingCount_Daily
f SlitterMovingDuration	Natural	SlittersMovingDuration_...
f TimeBetweenReelAndBetweenSets	"Start Comman...	TimeBetweenSets; TimeB...
f UnwindCplOpen	Offset=86340;...	Unwind Coupling OpenD...

Name	Expression
PrevT	PrevEvent('SetDuration','')
Duration	Float('*' - PrevT)/60
PrevStart	FindEq('Start Command','*-1s','*-24h','True')
DeltaFromPrevStart	*' - PrevStart
CplOpenTrue	If FindEq('Unwind Coupling Open','*',PrevStart,"True")="No Result"
BtwSet	If 'Start Command'="True" and PrevVal('Start Command','*')="False"
BtwReel	If 'Start Command'="True" and PrevVal('Start Command','*')="False"

[Add a new expression](#)

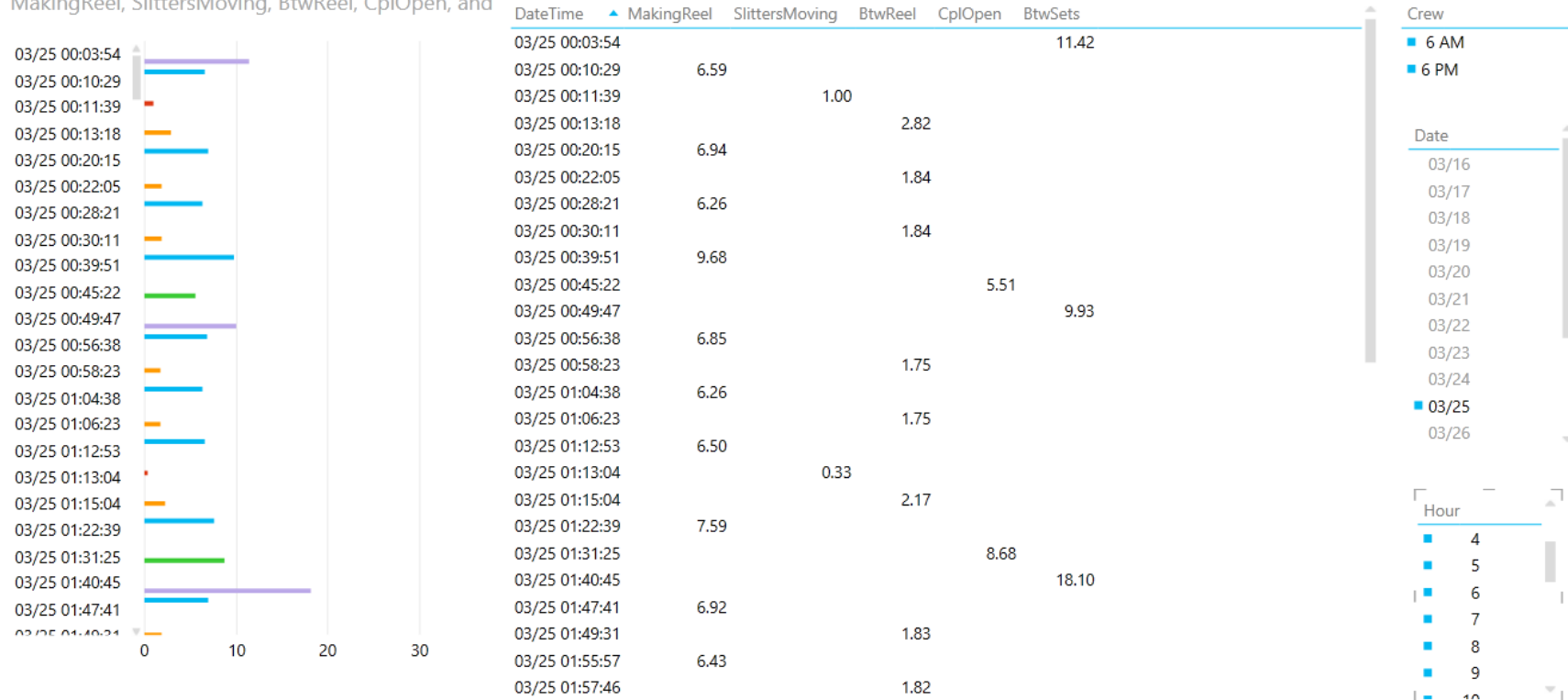
Scheduling: ☒ Event-Triggered ☐ Periodic

Trigger on: Start Command, Start Command

MakingReel, SlittersMoving, BtwReels, CplOpen, BtwSets

Making Reel, SlittersMoving, BtwReels, CplOpen, BtwSets

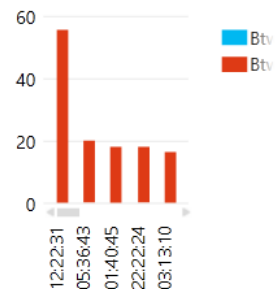
MakingReel, SlittersMoving, BtwReel, CplOpen, and



Between Sets and Reels (minutes)

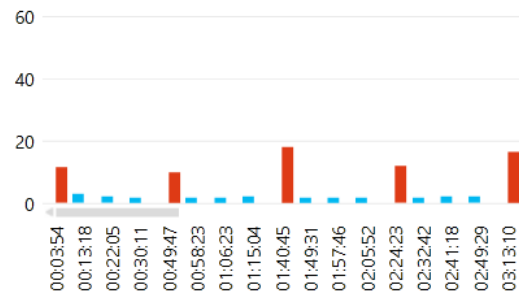
Winder by day - MakingReel, BtwReels, BtwSets

BtwReel, and BtwSets by TimeOnly

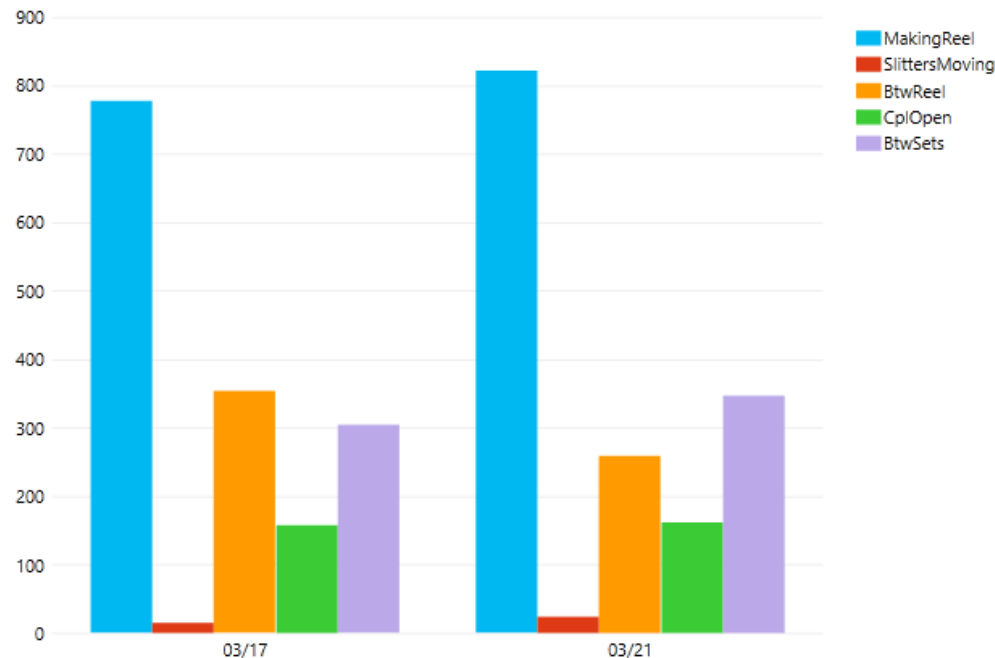


TimeOnly	Date	BtwSets
12:22:31	03/25	55.1
05:36:43	03/25	19.1
01:40:45	03/25	18.1
22:22:24	03/25	17.1
03:13:10	03/25	16.1

BtwReel, and BtwSets by TimeOnly



MakingReel, SlittersMoving, BtwReel, CplOpen, and BtwSets by Date



Date

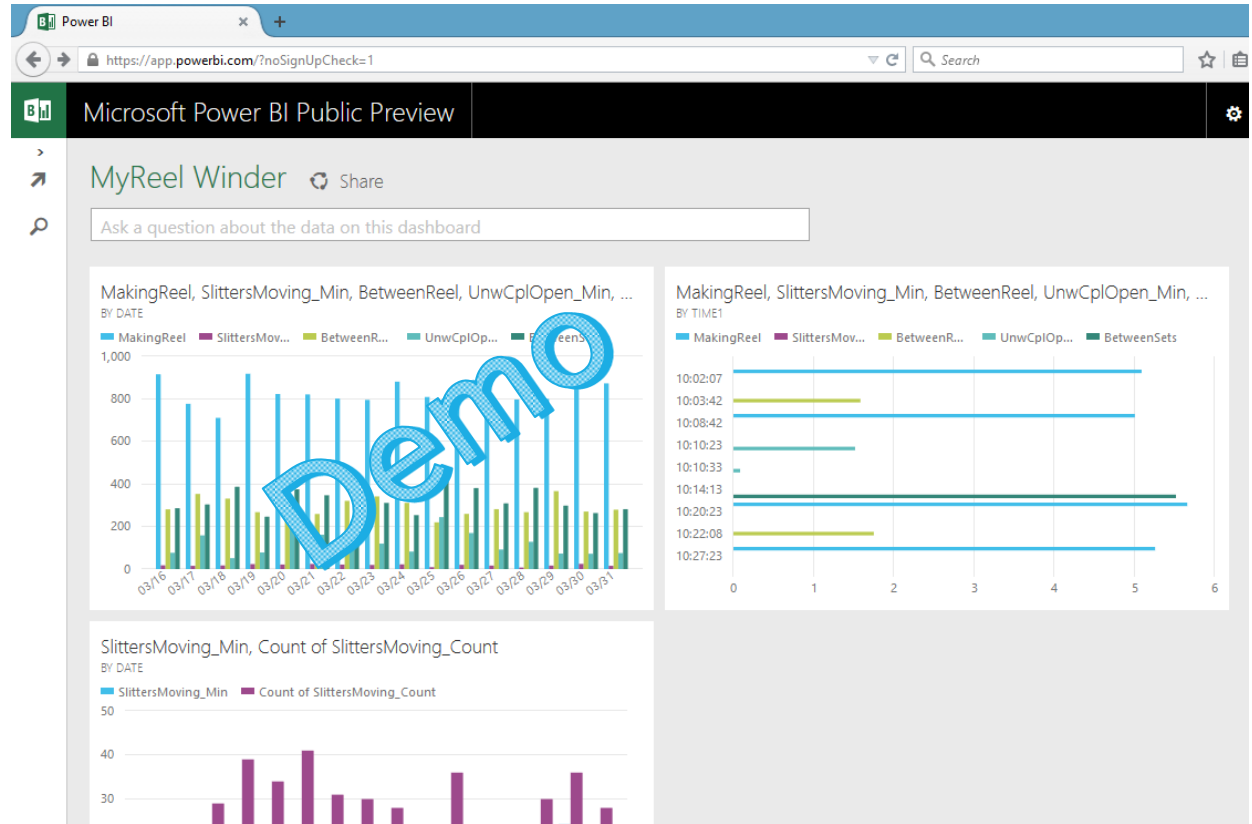
03/16
03/17
03/18
03/19
03/20
03/21
03/22
03/23
03/24
03/25
03/26
03/27
03/28
03/29
03/30
03/31

DayType

WkDay
WkEnd



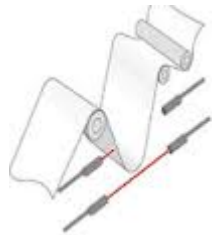
Winder – PowerBI dashboards



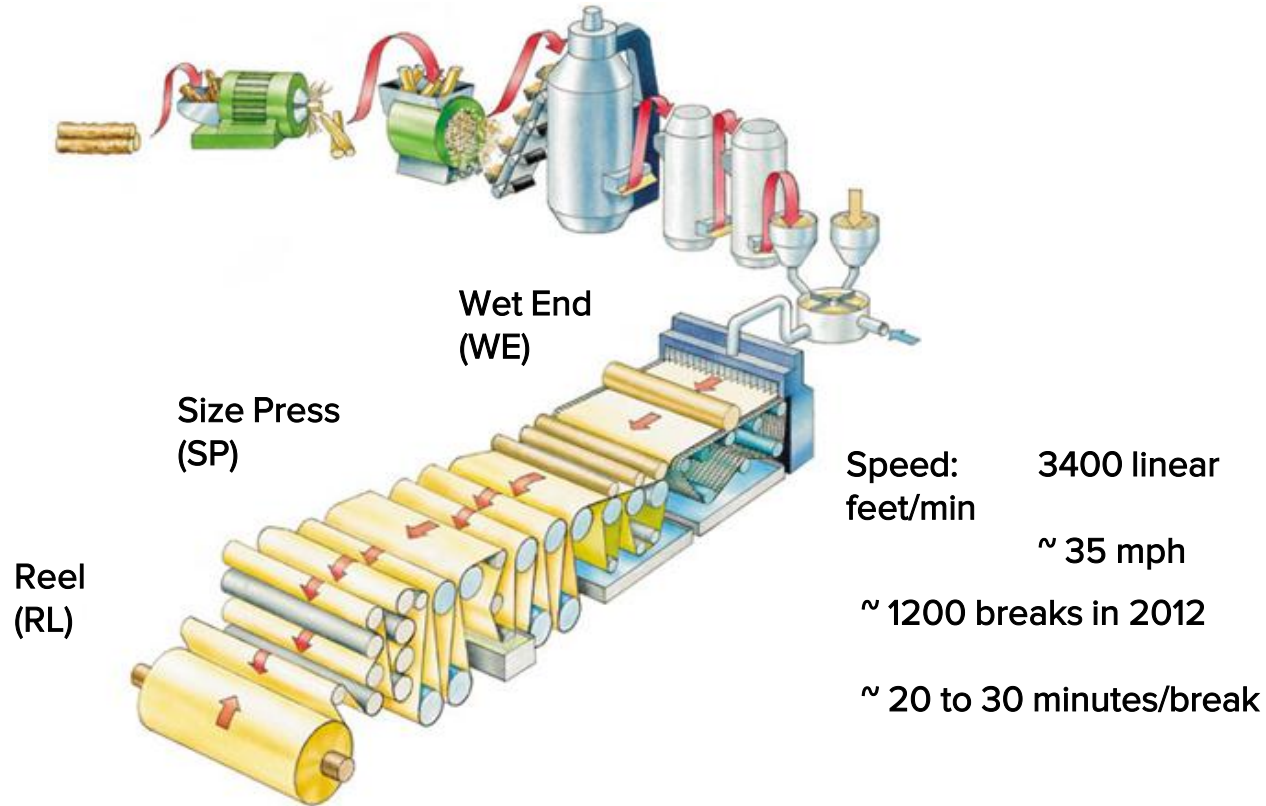
<https://app.powerbi.com/>

Examples

- Pulping
 - Digester operations
- Paper Machine
 - Production costing, energy costing
 - Sheet breaks 
- Finishing
 - Winder production data
- Other
 - Saw mill production data
 - Box plant production data



Sheet Breaks



Sheet Break Analysis

- What is the distribution of the sheet breaks?
- Where do the most sheet breaks occur?
- Show me by month, by day of week, by hour etc.
- AM shift vs. PM shift?

- Good Periods

72 hour period where I've 2 or less sheet breaks/day in SizePress+WetEnd

How many Good Periods did we have? When?

What's the Good vs. not-so-Good fingerprint (operating variables)?

Can I use the findings from Good Periods to guide my operations?



Sheet Break - Templates and Calculations

Library

- MyAFDB
 - Categories
 - Analysis Categories
 - Attribute Categories
 - Element Categories
 - Reference Type Categories
 - Table Categories
 - Templates
 - Element Templates
 - KPITags
 - KPITags2012
 - MachineSpeed
 - SheetBreaks
 - TagStats

SheetBreaks

General Attribute Templates Ports

Filter

Name Description Default Value

Library

- MyAFDB
 - Categories
 - Analysis Categories
 - Attribute Categories
 - Element Categories
 - Reference Type Categories
 - Table Categories
 - Templates
 - Element Templates
 - KPITags
 - KPITags2012
 - MachineSpeed
 - SheetBreaks
 - TagStats

TagStats

General Attribute Templates Ports

Filter

Name: PctDelta

Description:

Group by: ☐ C

Elements

Elements

- BI Model
 - Ash_21
 - BreakEyes
 - HWd_Ref_Pwr_2.2
 - MachineSpeed
 - Pct_SWd_28
 - SheetBreaks
 - Speed_3600
 - SWd_Ref_Pwr_6
- Stat Model
 - KPITags
 - KPITags2012

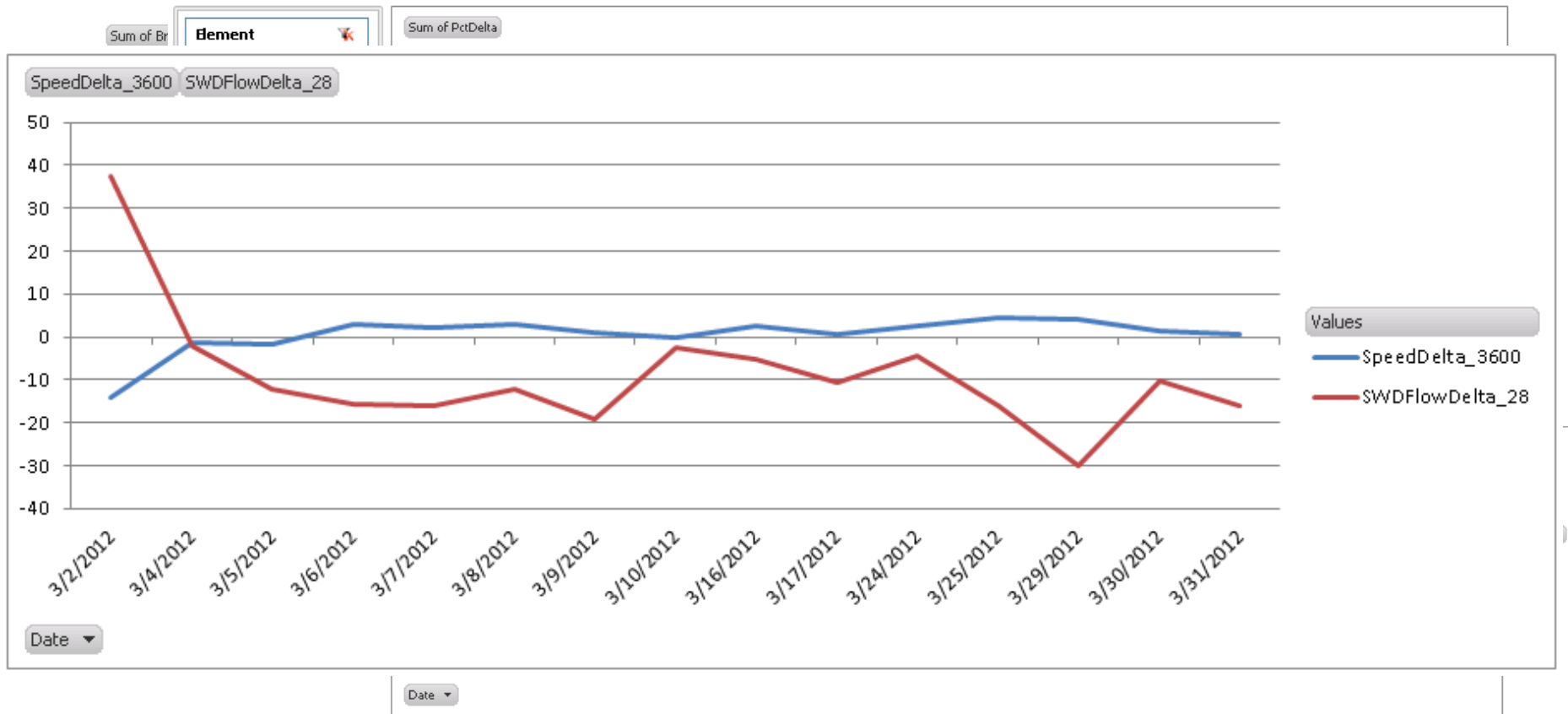
Pct_SWd_28

General Child Elements Attributes Ports Version

Filter

Name	Value
Avg_24Hr	30.4253368
Base	28
PctCV_24Hr	7.51654673
PctDelta	8.661918
SD_24Hr	2.28693461

Sheet Break Analysis



Examples

- Pulping
 - Digester operations
- Paper Machine
 - Production costing, energy costing (component tracking)
 - Sheet breaks
- Finishing
 - Winder production data
- Other
 - Saw mill production data
 - Box plant production data



Costing – component tracking – template

PM1

- Broke
- Clay
- Coagulation
- Dryer
- Kraft
- Mix
- PGW
- Refiner
- Sizing
- Starch
- SteamB
- TiO2

PnP_ProductCost_Template

General Attribute Templates

Filter

Name

Category: <None>

- CostGroup
- CostPerTon
- Name
- SetPoint
- SortOrder
- Target
- ToHourConversionFactor
- UnitCost
- UnitCostUOM
- Value
- ValueUOM

Category: PnPCostPerHour

CostperHour

PnP_ProductCost_Template

General Attribute Templates Ports Analysis Templates

Name: Calc_CostperHour

Description:

Categories:

Analysis Type: ☒ Expression ☐ Rollup ☐ Event Frame Generation

Example Element: [myPaper1\PM1\Clay](#)

Evaluate

Name	Expression	Value	Output Attribute
Variable1	'Value' * 'UnitCost' * 'ToHourConversionFactor'	3559.16725	CostperHour

[Add a new expression](#)

Evaluated at 3/23/2014 6:01:57 AM

Scheduling: ☒ Event-Triggered ☐ Periodic

Trigger on: Any Input

Costing - component tracking

PM1

Broke
Clay
Coagu
Dryer
Kraft
Mix
PGW
Refine
Sizing
Starch
Steam
TiO2

SteamBox

General | Child Elements | Attributes | Clay

Filter

Name
Category: <None>
CostGroup
CostPerTon
Name
SetPoint
SortOrder
Target
ToHourConversionFactor
UnitCost
UnitCostUOM
Value
ValueUOM
Category: PnPCostPerHour
CostperHour

Clay

General | Child Elements | Attributes

Filter

Name
Category: <None>
CostGr
CostPe
Name
SetPoi
SortOr
Target
ToHour
UnitCo
UnitCo
Value
ValueU
Category: PnPCo
Costpe

RefinerPower

General | Child Elements | Attributes | Ports | Analyses | Version

Filter

Name	Value
Category: <None>	
CostGroup	Electricity
CostPerTon	0.326471
Name	RefinerPower
SetPoint	0
SortOrder	801
Target	0
ToHourConversionFactor	1
UnitCost	0.07
UnitCostUOM	\$/kwh
Value	67.6367645
ValueUOM	kwh
Category: PnPCostPerHour	
CostperHour	4.244123

Group by: ☒ Category ☐ T

Name: Value

Description: Current value

Configuration Item: ☐

Categories:

Default UOM: <None>

Value Type: Single

Value: 67.6367645

Data Reference: PI Point

Settings...

\\PISB\SINUSOID;RelativeTime=-20m

Tracking Costs

PM1

General | Child Elements | Attributes | Ports | Analyses | Version

PM1

General | Child Elements | Attributes | Ports | Analyses | Version

Name: PM1_Reel

Description:

Categories:

Analysis Type: ☐ Expression ☐ Rollup ☒ Event Frame Generation

Event Frame Template: PnP_ProductCost_EFTemplate

Name	Expression	Value
StartTrigger	'ReelID' Mod 10 =0	True
EndTrigger	'ReelID' Mod 10 <>0	False

[Add a new expression](#)

Evaluated at 3/22/2014 3:13:33 PM

StartTrigger true for: 0 Seconds

Schedule: ☐ Periodic ☒ Natural

Trigger on: Any Input

Functions

- Abs
- Acos
- And
- Ascii
- Asin
- Atn
- Atn2
- Avg
- Max/Min
- Abs(number x)
Return the absolute value of an integer real number.
Example: Abs(1)

Attributes

Connected to the PI Analysis

Tracking Costs

PnP_ProductCost_EFTemplate

- PM1_Reel 20140321 21:10:14
- PM1_Reel 20140322 16:31:16
- PM1_Reel 20140322 16:31:16
- PM1_Reel 20140322 16:31:16
- PM1_Reel 20140322 16:31:16
- PM1_Reel 20140322 16:31:16

General | Child Event Frames | Referenced Elements | Attributes

Filter

Name	Value	Description
Category: <None>		
CostPerTon	568.3839	
Grade	xyz	from DCS tag
PM	PM1	
Reel Feet	1000	from DCS tag
Reel Weight	1	from DCS tag
ReelID	990	from DCS tag
Tons	1.6227566	
Category: PnPCost_byReel		
Clay.Cost.byReel	658.419	
RefinerPower.Cost.byReel	0.7280883	
RolledUp.Cost.byReel	922.348755	
SteamBox.Cost.byReel	263.3114	

Group by: ☒ Category ☐ Template

Name: RolledUp.Cost.byReel

Description:

Configuration Item: ☐

Categories: PnPCost_byReel

Default UOM: <None>

Value Type: Single

Value: 922.348755

Data Reference: PI Point

Settings...

```
{mypaperL\PM1}
RolledUp.CostperHour;TimeMethod=NotSupport
ed;TimeRangeMethod=Total;RateConversion=h
our
```

Tracking Costs

PI DataLink
for
Reel events

Microsoft Excel - PnP_Cost_DLT.xlsx

Formula Bar: `=PIEDat("\pib\mAFDB", "*-1d", "", 0, "", "PnP_ProductCost_EFTemplate", "active in range", "start time ascending", ...)`

A	B	C	D	E	F	G	H	I	J	K	L	M	N	O
Event name	Start time	End time	Duration	PM	Grade	ReelID	CostPerTon	Reel Fee	Reel We.	RolledUp.Cost.byReel	Refinerf.	SteamBc.	Clay.Cos.	Tons
PM1_Reel	21-Mar-14 21:10:15	21-Mar-14 21:20:35	0 0:10:20	PM1	abcd	950	774.3988037	1000	1	1150.518555	0.03442	328.7188	819.4662	1.485693
PM1_Reel	21-Mar-14 21:23:07	21-Mar-14 21:28:21	0 0:05:14	PM1	abcd	960	771.0238647	1000	1	605.0664063	0.023782	172.8753	431.3513	0.784757
PM1_Reel	22-Mar-14 14:21:08	22-Mar-14 14:28:02	0 0:06:54	PM1	abcd	970	700.2298584	1000	1	1011.311707	0.763728	288.7321	720.764	1.444257
PM1_Reel	22-Mar-14 15:13:25	22-Mar-14 15:23:07	0 0:09:42	PM1	abcd	980	689.8548584	1000	1	1422.485718	1.110131	406.1108	1015.526	2.062007
PM1_Reel	22-Mar-14 16:31:17	22-Mar-14 16:38:46	0 0:07:29	PM1	xyz	990	568.3839111	1000	1	922.3487549	0.728088	263.3114	658.419	1.622757


PI OLEDBent.
for
Reel events

PowerPivot for Excel - PPCost.xlsx

Table: [EventFrame]

EventFrame	StartTime	EndTime	RefinerPowerCostbyReel	Tons	RolledUpCostbyReel	SteamBoxCostbyReel	CostPerTon	PM	ClayCostbyReel	ReelID
PM1_Reel 201...	3/21/2014	3/21/2014	0.03441966	1.485693	1150.519	328.7188	774.3988	PM1	819.4662	950
PM1_Reel 201...	3/21/2014	3/21/2014	0.02378162	0.784757	605.0664	172.8753	771.0239	PM1	431.3513	960
PM1_Reel 201...	3/22/2014	3/22/2014	0.7637276	1.444257	1011.312	288.7321	700.2299	PM1	720.764	970
PM1_Reel 201...	3/22/2014	3/22/2014	1.110131	2.062007	1422.486	406.1108	689.8549	PM1	1015.526	980
PM1_Reel 201...	3/22/2014	3/22/2014	0.731202	1.622757	922.3488	263.3114	568.3839	PM1	658.419	990

Tracking Steam Usage Lbs/Ton

Grade 

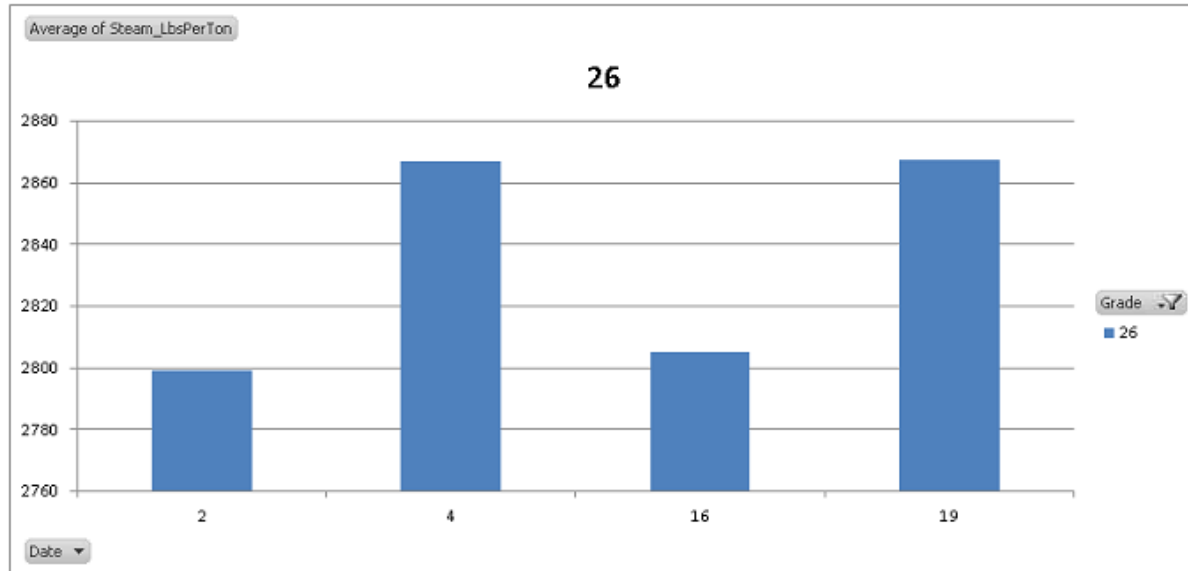
26	33.5
35	42

Month 


5	6
---	---

Date 

2	4	16
19	5	11
14	18	31




Tracking Steam Usage Lbs/Ton

Grade 

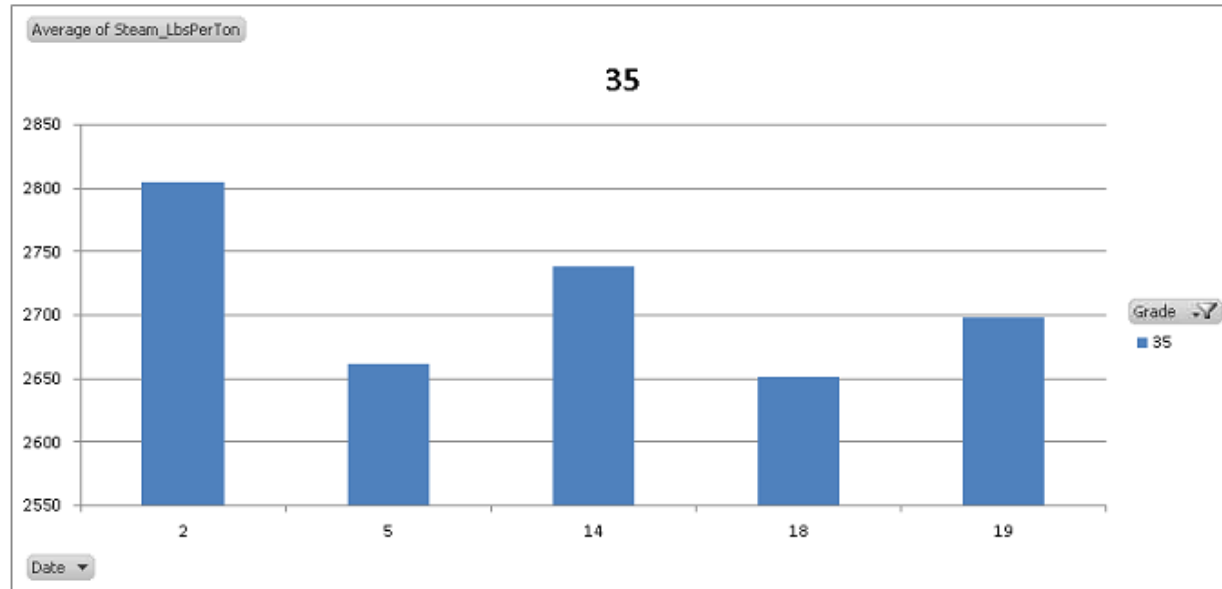
26	33.5
35	42

Month 

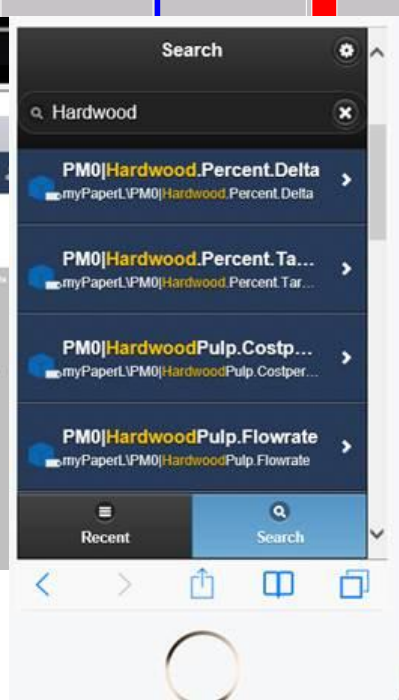
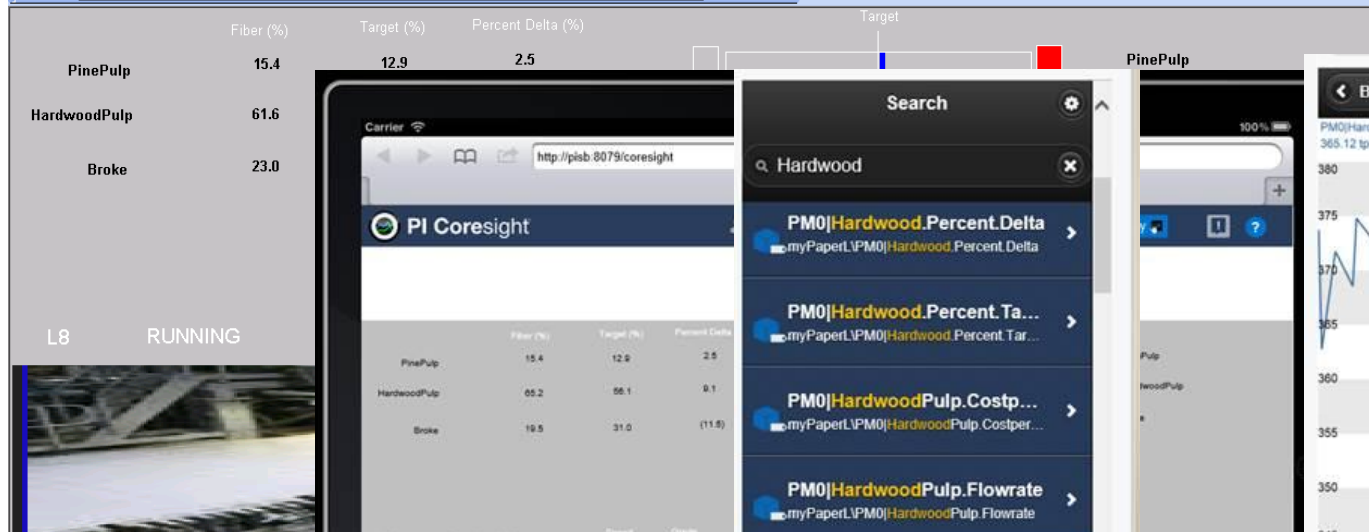
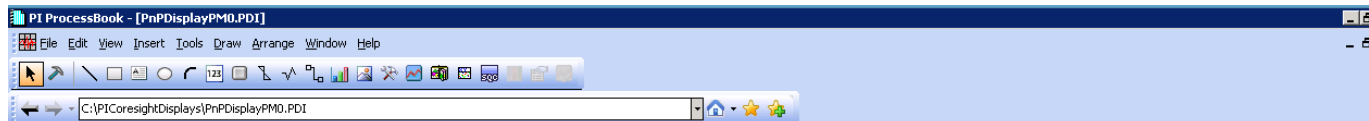
6	5
---	---

Date 

2	5	14
18	19	4
11	16	31

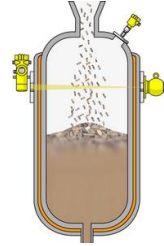


Operator display – Center-lining, recipe deviation...



Examples

- Pulping
 - **Digester operations**
- Paper Machine
 - Production costing, energy costing
 - Sheet breaks
- Finishing
 - Winder production data
- Other
 - Saw mill production data
 - Box plant production data



Digester - Templates and Calculations

EL_BatchDigester

General Attribute Templates Ports Analysis Templates

Filter

Name	Description
Category: <None>	
Black Liquor	Total Black Liquor
Blow Back Valve	Blow Back Valve
Blow Time	Blow Time
Chips	Chips Fed
H Factor-Actual	H Factor-Actual
H Factor-Target (Line)	H-Factor-Target (Line)
H Factor-Target (Unit)	H-Factor Target (Unit)
LastHoldDuration	
LastIdleDuration	
LastLoadDuration	
LastReadyDuration	
Level	Level
Overpressure	Overpressure
Pressure A	Pressure A

General Child Elements Attributes Ports Analyses Version

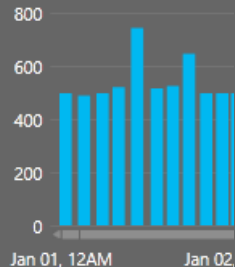
Filter

Name	Value
Category: <None>	
Black Liquor	4134.61 US gal
Blow Back Valve	1
Blow Time	2134.13281
Chips	54.28259 ton
H Factor-Actual	0
H Factor-Target (Line)	500
H Factor-Target (Unit)	I/O Timeout
LastHoldDuration	0 min
LastIdleDuration	0 min
LastLoadDuration	14 min
LastReadyDuration	0 min
Level	35.98305 in
Overpressure	0 psi

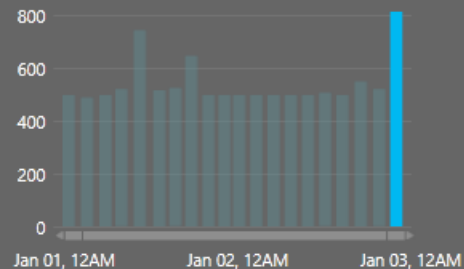


Digester – Operations Analysis

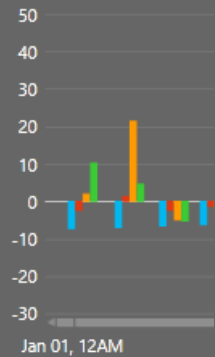
H by StartTime



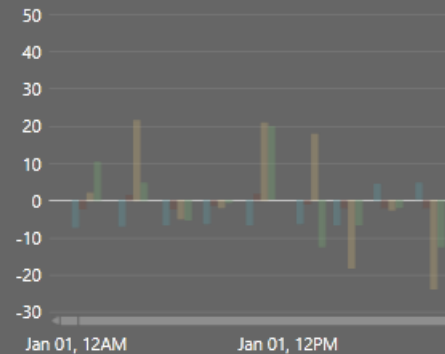
H by StartTime



BL4000, TTop340, St



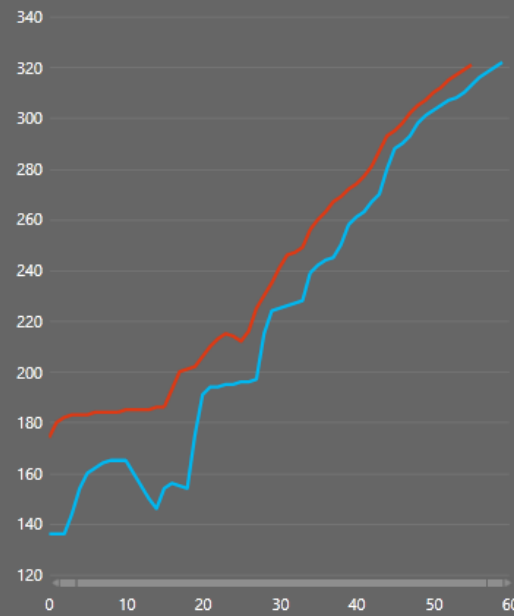
BL4000, TTop340, Steam40K, and Dur135 by



Digester

Digester - Heating Phase

Heat-Temp-Top by TimeAfter, and EventFrame



EF

- DigCyc 20150101 00:35:38
- DigCyc 20150101 03:13:38
- DigCyc 20150101 05:43:58
- DigCyc 20150101 08:01:58
- DigCyc 20150101 10:25:58
- DigCyc 20150101 13:16:38
- DigCyc 20150101 15:23:58
- DigCyc 20150101 17:39:38
- DigCyc 20150101 20:01:38
- DigCyc 20150101 22:09:38
- DigCyc 20150102 00:19:58
- DigCyc 20150102 02:36:38
- DigCyc 20150102 04:59:38
- DigCyc 20150102 07:25:38
- DigCyc 20150102 09:43:38
- DigCyc 20150102 12:00:38

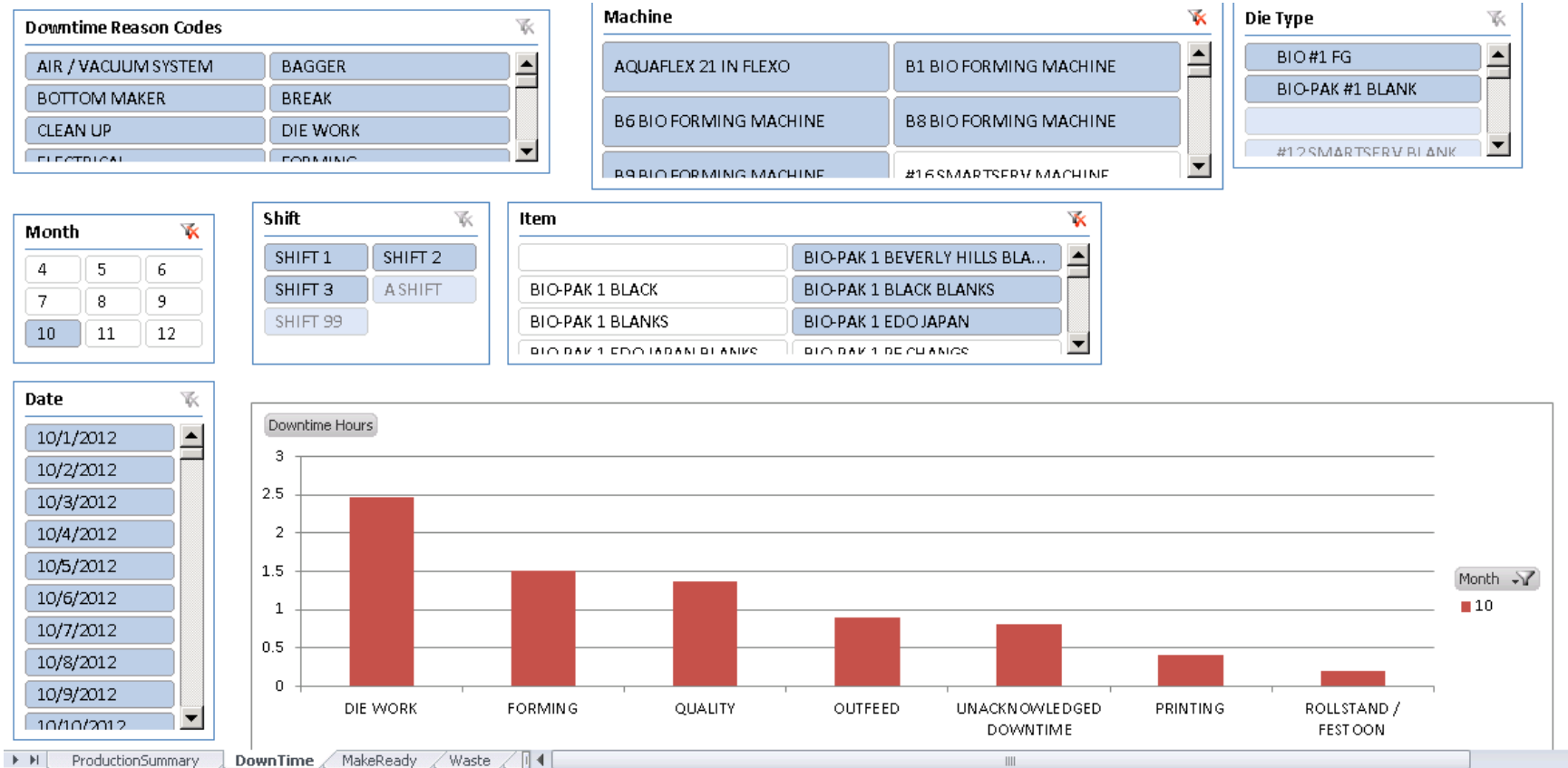


Examples

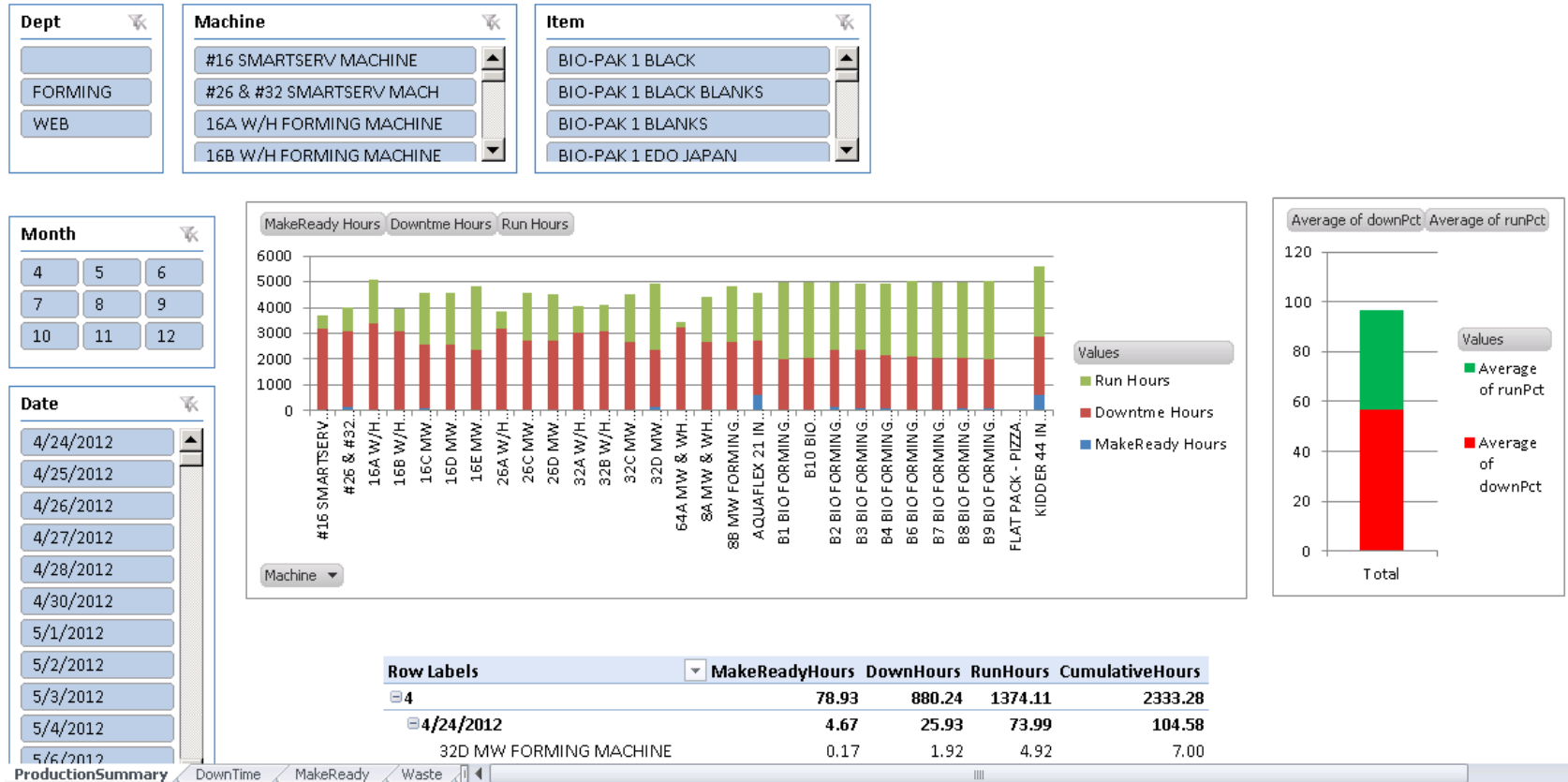
- Pulping
 - Digester operations
- Paper Machine
 - Production costing, energy costing
 - Sheet breaks
- Finishing
 - Winder production data
- Other
 - Converting (box) plant production data
 - Saw mill production data



Converting Plants - Downtime



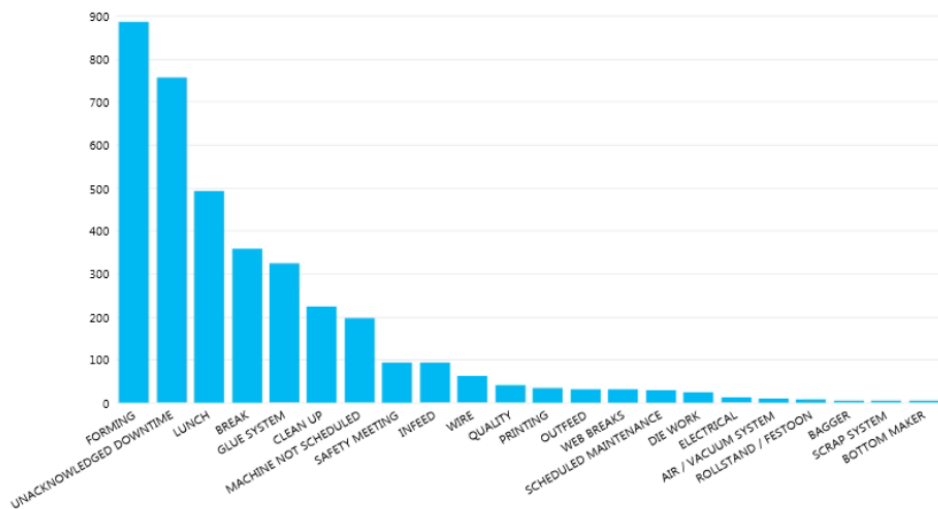
Converting Plants – Production Summary



Converting Plants - Downtime

Downtime by ReasonCode, Machine, Month, Day

durationHours by DTDesc



Filters

VIEW

machineLongDesc

(All)

Search...

<input checked="" type="checkbox"/>	(All)	
<input checked="" type="checkbox"/>	16D MW FORMING MACHINE	690
<input checked="" type="checkbox"/>	16E MW FORMING MACHINE	1294
<input checked="" type="checkbox"/>	26A W/H FORMING MACHINE	278
<input checked="" type="checkbox"/>	26C MW FORMING MACHINE	793
<input checked="" type="checkbox"/>	26D MW FORMING MACHINE	604
<input checked="" type="checkbox"/>	32A W/H FORMING MACHINE	156
<input checked="" type="checkbox"/>	32B W/H FORMING MACHINE	273
<input checked="" type="checkbox"/>	32C MW FORMING MACHINE	515
<input checked="" type="checkbox"/>	32D MW FORMING MACHINE	1259
<input checked="" type="checkbox"/>	64A MW & WH FORMING MACH	77
<input checked="" type="checkbox"/>	8A MW & WH FORMING MACH	653
<input checked="" type="checkbox"/>	88 MW FORMING MACHINE	1575
<input checked="" type="checkbox"/>	AQUAFLEX 21 IN FLEXO	532
<input checked="" type="checkbox"/>	B1 BIO FORMING MACHINE	1068
<input checked="" type="checkbox"/>	B10 BIO FORMING MACHINE	1207
<input checked="" type="checkbox"/>	B2 BIO FORMING MACHINE	1438
<input checked="" type="checkbox"/>	B3 BIO FORMING MACHINE	1302
<input checked="" type="checkbox"/>	B4 BIO FORMING MACHINE	1029
<input checked="" type="checkbox"/>	B6 BIO FORMING MACHINE	1525
<input checked="" type="checkbox"/>	B7 BIO FORMING MACHINE	1421
<input checked="" type="checkbox"/>	B8 BIO FORMING MACHINE	1172
<input checked="" type="checkbox"/>	B9 BIO FORMING MACHINE	1012
<input checked="" type="checkbox"/>	KIDDER 44 IN WEB FLEXO	1025

reportDT

(All)

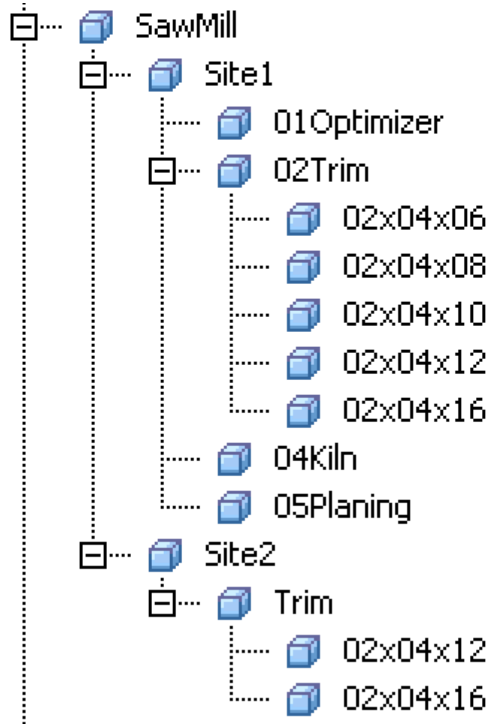
<input checked="" type="checkbox"/>	(All)	
<input checked="" type="checkbox"/>	5/3/2012 12:00 AM	994
<input checked="" type="checkbox"/>	5/2/2012 12:00 AM	1328

Examples

- Pulping
 - Digester operations
- Paper Machine
 - Production costing, energy costing
 - Sheet breaks
- Finishing
 - Winder production data
- Other
 - Box plant production data
 - Saw mill production data



Saw Mill – AF Model



02x04x16			
General Child Elements Attributes Ports Analyses Version			
Filter			
	Name	Value	Description
Category: <None>			
	CurrentHour	12	
	DailyBDF	127976	
	DailyCount	89	
	Factor	2	
	HCount	148	
	HourlyBDF	63988	
	HourlyCount	31994	
	HourlyCountUseRelativeTime	-6	
	MBDFperHour	148 MBDF/Hr	
	Midnight	122	
	MidnightToNowCount	26	
	PrevHourCounter	154	
	Today6AMCounter	140	
	TodayBDF	16	
	TodayCount	8	
	Yesterday6AMCounter	33	
Category: 02x04			
	Counter	148	

Saw Mill Reporting

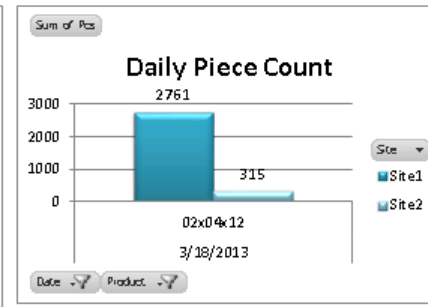
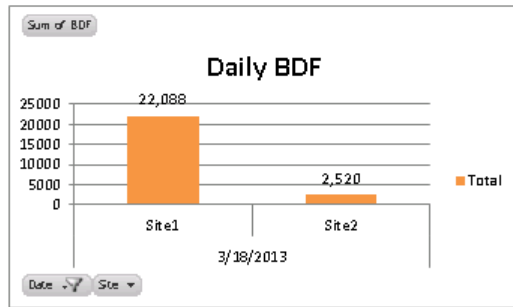
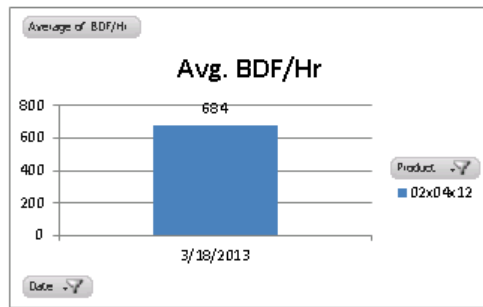
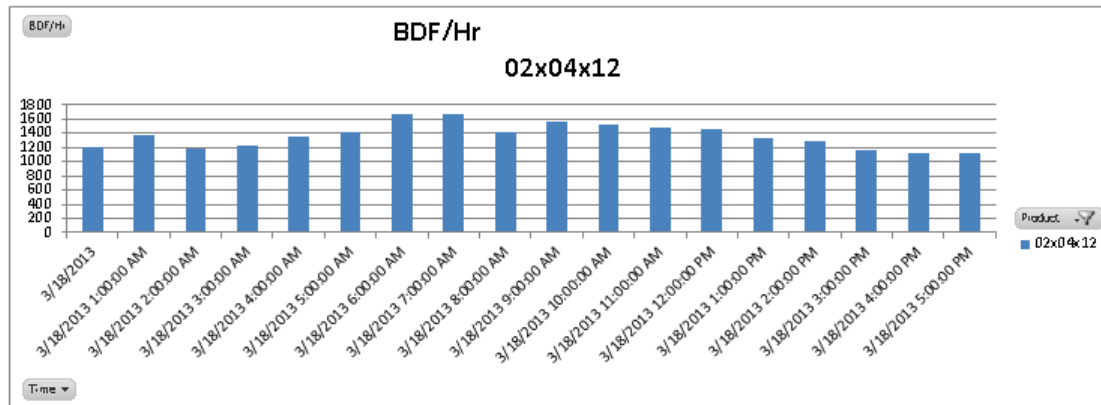
BDF= board-feet

Month
3

Date
3/16/2013
3/17/2013
3/18/2013

Site
Site1 Site2

Product
02x04x10
02x04x12
02x04x16



PI System Sandbox

<https://pisquare.osisoft.com/community/developers-club>

PI Server – Site 1



PI Server – Site 2



PI System – Sandbox

Win 2008 R2 or Win 2012
- 80GB disk and 8GB RAM

Office Excel 64 bit - 2010 or 2013
PowerPivot or PowerView

PI Server 2015 (PI DevClub license is OK)
SQL 2014 (SQL Express is OK)
AF 2015 (Server and Client)
EFGen
PI SMT
PI Builder

PI OLEDB Enterprise

PI DataLink 2014
PI ProcessBook 2015
PI Coresight 2015

Call to Action

- Get a PI Developers Club subscription

<https://pisquare.osisoft.com/community/developers-club>

- Deploy a PI System sandbox
- Start with simple AF/EF models and calculations to answer specific questions

Gopal GopalKrishnan, P.E.

gopal@osisoft.com

Solution Architect

OSIsoft, LLC

Questions

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

State your
name & company





THANK
YOU

