

GLOBAL  WEBINAR

How Data Infrastructure Improves Mill Analytics and Asset Performance

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Speaker



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Forest Products

**10 of the Top 10
Pulp & Paper companies
rely on the PI System**

- More than 400 deployments around the world
- PI Server license #2 is from a paper customer that has been working with OSIsoft for more than 30 years
- The PI System is critical for mill survival and transformation
- Millions of dollars saved
- A robust partner ecosystem

OSIsoft's Strategy: From Sensors to Community

Sensors



Millions of
Smart Devices

Assets



Multiple
Sensors

Plant



Multiple
Assets

Enterprise



Multiple
Plants

Community



Multiple
Enterprises

What is your current use case for a data infrastructure solution?

Operations
monitoring

Asset reliability
focused on
maintenance

Compliance with
regulations
(safety/environmental)

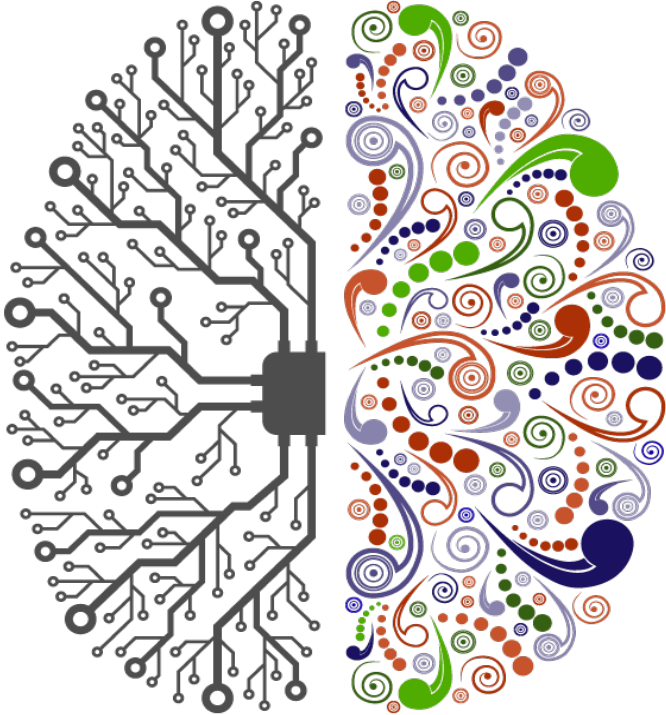
Sustainability/
green initiatives
(reduced emissions or
consumptions)

Product quality
assurance

Sharing
information
with suppliers
and clients

We do not have
data
infrastructure

Neuroscience

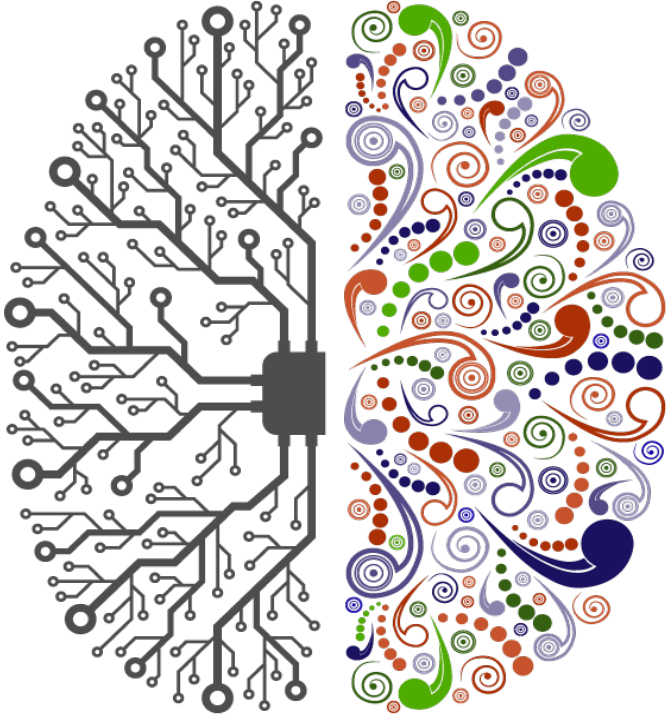


Learning

Data organization

Categories & priorities

Neuroscience

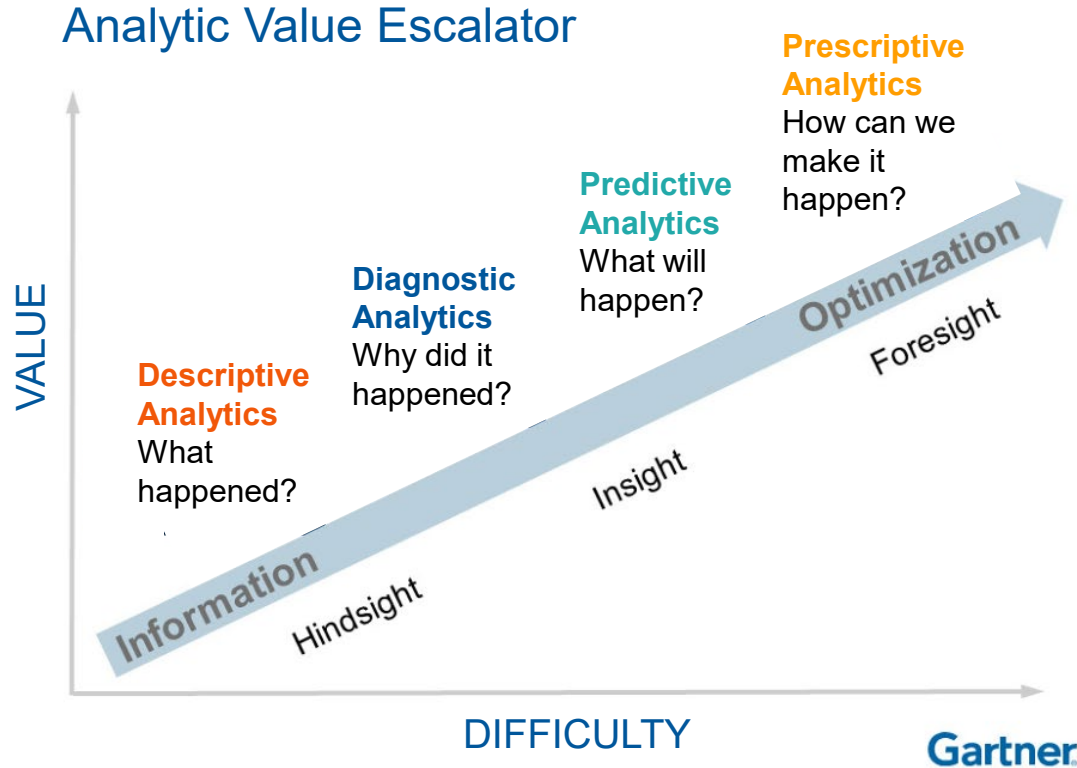


Brain limitations

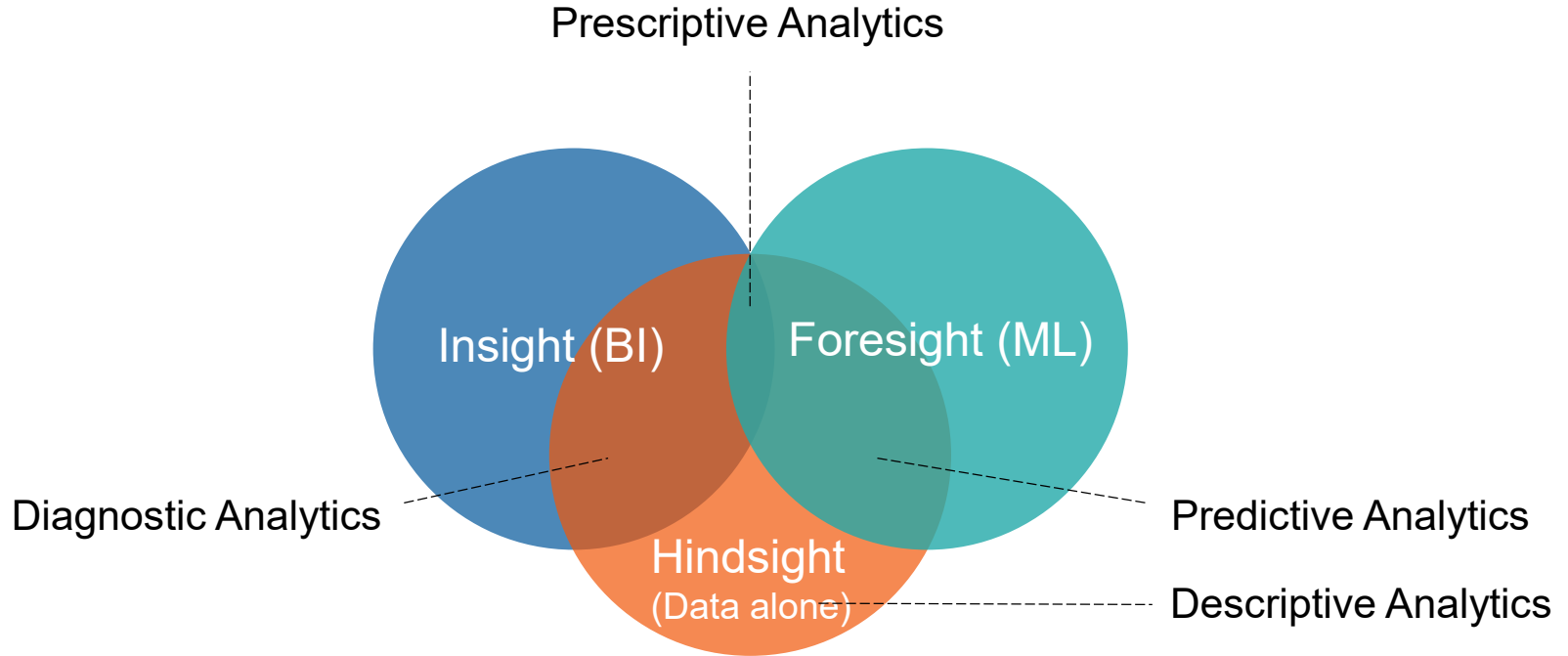
Bandwidth

Switch focus

Gartner Analytics Model



The Interaction of Different Tools Gives Insight



What we have learned from our
customers leading Pulp & Paper
companies?

“Pyramid” of Applications for Analytics

Business Critical

Scalable

Complex
Analytics

Data-
driven
decisions

Recurring Schedule

Organized

Replicable

Visuals and
Calculations

Throw-Away (Short-term life)

Trends

Tables

Ad-hoc
calculations

Merging the Analytics Model and the Pyramid

Descriptive

- Data frequency: near Real-time
- PI Vision for trends, gauges, bars
- Notifications
- Excel for ad-hoc analysis forms and other graphics

Diagnostic

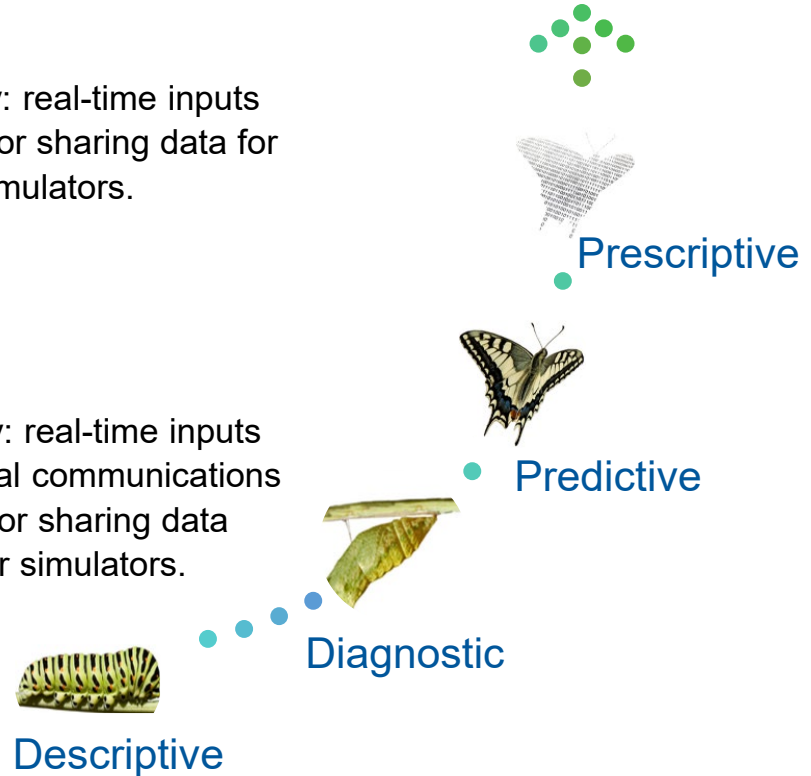
- Data frequency: accurate historical
- AF Analytics for roll-up, aggregations, events & notifications
- PI Integrators for sharing data if necessary:
- Pattern recognition for events
- Business Intelligence (BI)
- Multivariate Analysis (MVA)

Predictive

- Data frequency: real-time inputs
- PI Integrators for sharing data for ML, MVA, or simulators.

Prescriptive

- Data frequency: real-time inputs and bidirectional communications
- PI Integrators for sharing data for ML, MVA, or simulators.



Descriptive Analytics – Corporate Standards



1) Washing Dashboard

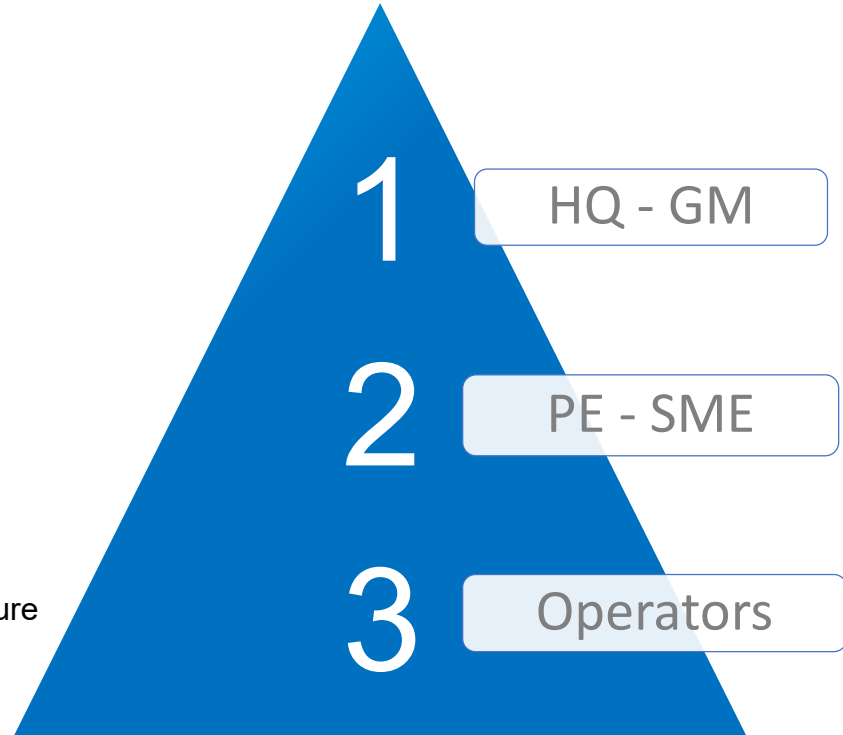
- OEE
- Production
- Yield

2) Line x 3

- % BLS
- Dilution Factor
- Production
- Kappa
- Shower flow/ production
- #BLS/ production
- OEE

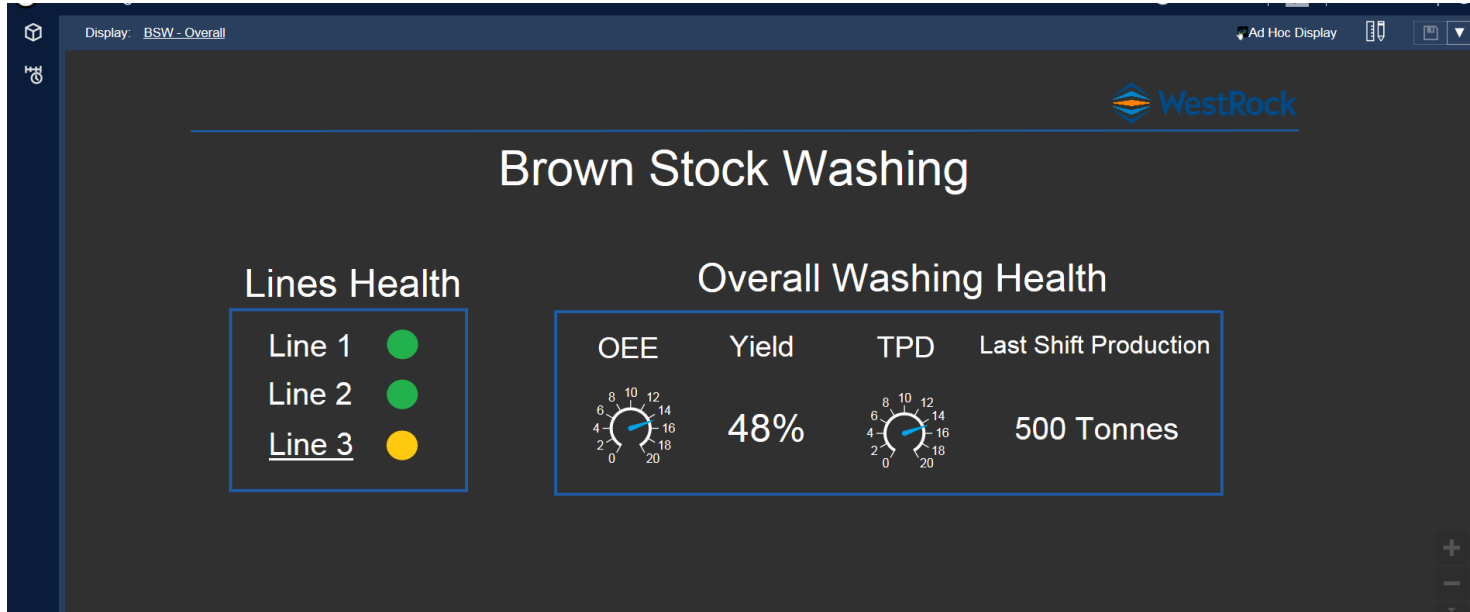
3) Stages x 9

- Repulping
- Dilution Flow
- Exit conductivity, Drop Leg, Shower
- Correlations (Drop Leg T & Vacuum, % Valve op. & production)
- % TC Water
- Shower Flow
- Shower Temperature



Level 1

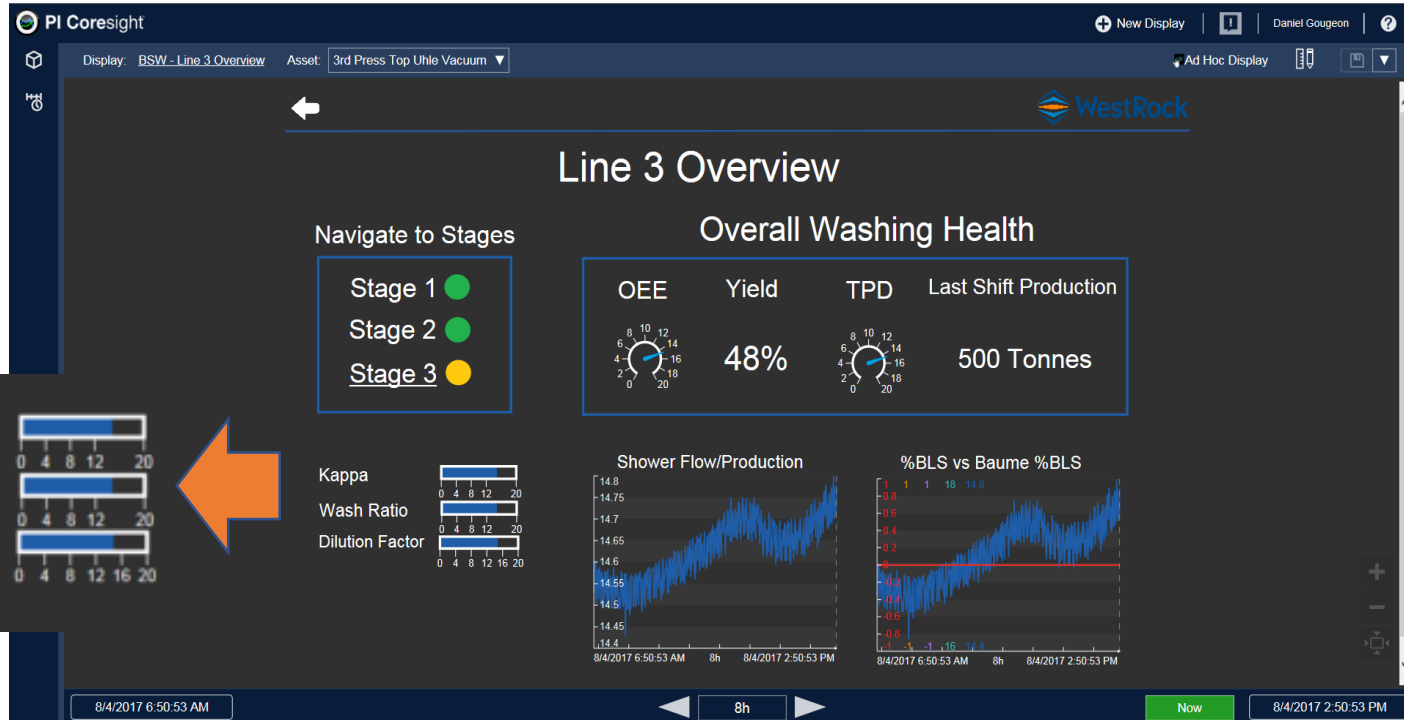
Head Quarters – GM Dashboard Prototype



GM

Level 2

PE – SME Dashboard Prototype



Pulp Mill
Supt



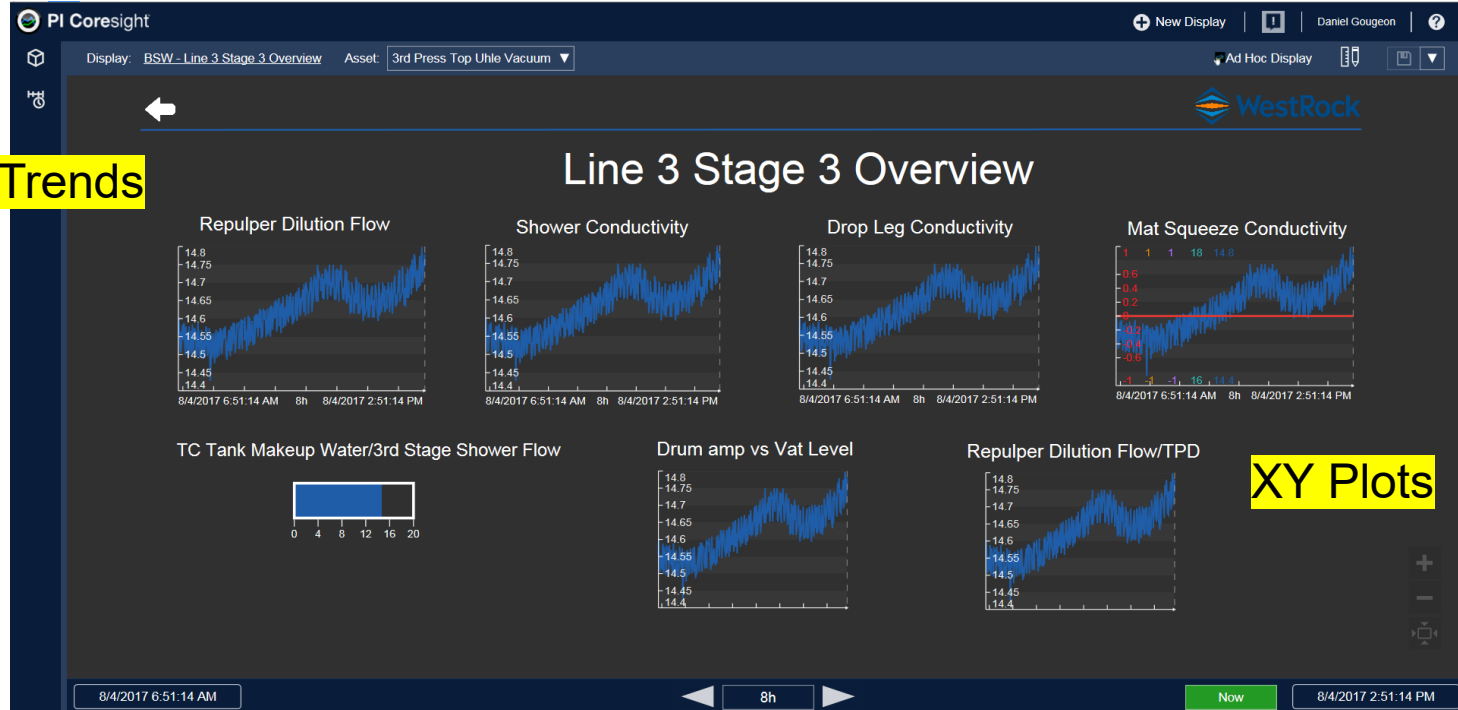
Process
Engineer

Level 3

Operators Dashboard Prototype

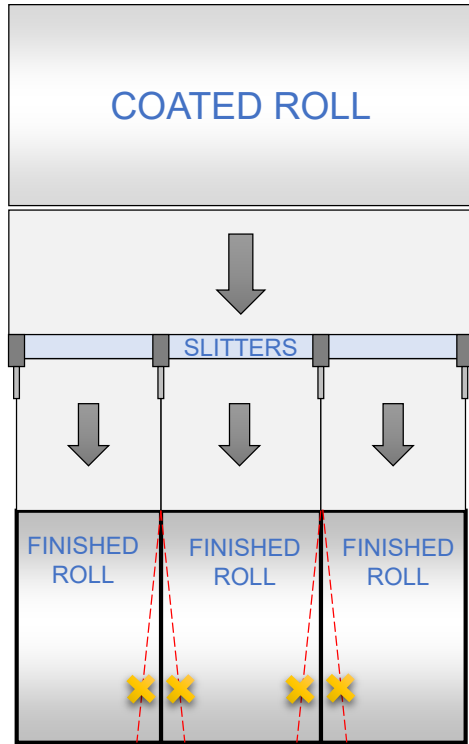


Trends



Operators

Diagnostic Analytics – In Line Quality



TOP VIEW

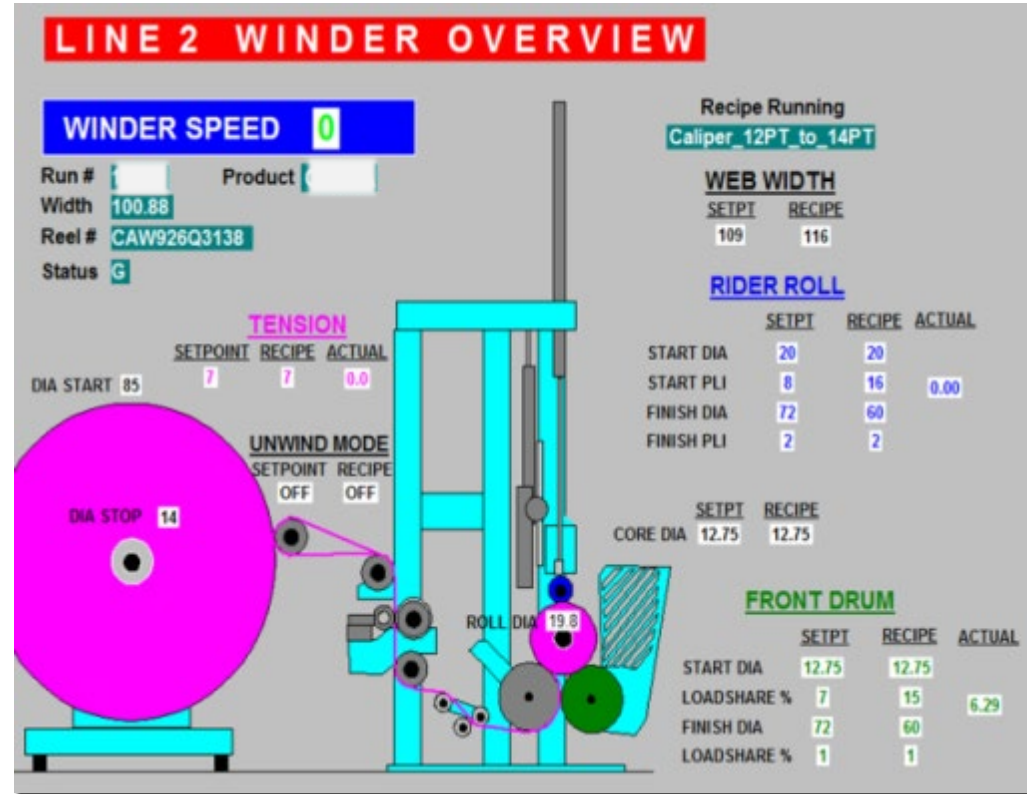


- Finished rolls become lapped or “stuck” at the slitting and winding process
- Rolls are scrapped at a significant cost
- 3 winders (24/7)

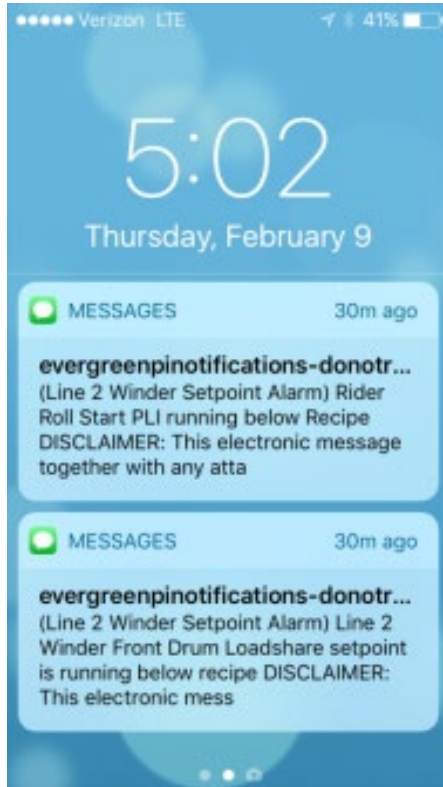
Visuals Solved Business Challenges



- Established process set points
 - Three basic groups (recipes) of products
- Created screens to monitor recipe set points vs running parameters
- Operators trained on basics of “TNT” for winding
 - Tension
 - Nip
 - Torque



Notifications to Prevent Recurrence



- Notifications created to alert when winder is running above or below set point
- Different notifications for 3 main parameters “**TNT**”
 - **T**ension
 - **N**ip
 - **T**orque

In-line Quality Improvements

CHALLENGES

- Determining machine recipe settings vs. running parameters when off quality products were produced.

SOLUTION

- Visualizations monitor recipe settings vs running parameters
- Notifications set when recipe set points doesn't match running parameters

BENEFITS

- Saved ~\$180,000 in one year by reducing off quality product on target equipment by 60%



“

Operator and Supervisor ability to monitor process with data for immediate feedback to positively impact results.

”

Brent Lindsey, Manufacturing Excellence Engineer at Evergreen Packaging

Predictive Analytics – Critical Events



Predictive Analytics – Critical Events



Name		2.. [407.16:57:00] ...	Duration	Start Time	End Time
Parada de Produção - Digestor Eucalipto 20170317 15:32:00			12:8:06:00	3/17/2017 3:32:00 PM	3/29/2017 11:38:00 PM
Parada de Produção - Digestor Pinus 20170317 01:01:00			10:23:44:00	3/17/2017 1:01:00 AM	3/28/2017 12:45:00 AM
Parada de Produção - Digestor Pinus 2018-03-15 16:32:00.000			6:20:54:29...	3/15/2018 4:32:00 PM	3/22/2018 1:26:29.373 PM
Parada de Produção - Digestor Eucalipto 2018-03-15 16:32:00.000			6:20:54:29...	3/15/2018 4:32:00 PM	3/22/2018 1:26:29.373 PM
Parada de Produção - Digestor Eucalipto 2018-03-27 14:10:00.000			5:19:03:04...	3/27/2018 2:10:00 PM	4/2/2018 9:13:04.977 AM
Parada de Produção - Digestor Pinus 2018-03-26 08:52:00.000			4:2:37:00	3/26/2018 8:52:00 AM	3/30/2018 11:29:00 AM
Parada de Produção - Digestor Eucalipto 2018-04-03 23:18:00.000			4:2:13:00	4/3/2018 11:18:00 PM	4/8/2018 1:31:00 AM
Parada de Produção - Digestor Pinus 2018-04-04 04:40:00.000			3:20:52:00	4/4/2018 4:40:00 AM	4/8/2018 1:32:00 AM
Parada de Produção - Digestor Pinus 2018-03-22 13:27:00.000			3:19:24:32...	3/22/2018 1:27:00 PM	3/26/2018 8:51:32.983 AM
Parada de Produção - Digestor Eucalipto 2018-03-22 13:27:00.000			3:19:24:32...	3/22/2018 1:27:00 PM	3/26/2018 8:51:32.983 AM
Parada de Produção - Digestor Pinus 2018-03-19 06:01:00.000			3:7:25:29....	3/19/2018 6:01:00 AM	3/22/2018 1:26:29.373 PM

Prevention of Events Via Captured Knowledge



\\ORTSRV008-VM\Klabin_ORT - PI System Explorer

File View Go Tools Help

Database Query Date Back Check In Refresh

Notifications

New [Icons]

- Notificação - Insumos Nivel Crítico (9)
- Notificação - Insumos Nivel Super Crítico (9)
- Notificação - Interface (6)
- Notificação - Interface com Redundância (20)
- Notificação - Leitura Incoerente (9)
- Notificação - Níveis para Transbordo (23)
- Notificação - Trip Espurio CDR (16)
 - Notificação - Trip Espurio CDR (35218ESPURTT2570.STA)
 - Notificação - Trip Espurio CDR 1 (35218ESPURTT2577A.STA)
 - Notificação - Trip Espurio CDR 10 (35218ESPURTT2607B.STA)
 - Notificação - Trip Espurio CDR 11 (35218ESPURTT2607C.STA)
 - Notificação - Trip Espurio CDR 12 (35218ESPURTT2608.STA)
 - Notificação - Trip Espurio CDR 13 (35218ESPURTT2623.STA)
 - Notificação - Trip Espurio CDR 14 (35218ESPURTT2625.STA)
 - Notificação - Trip Espurio CDR 15 (35218ESPURTT2627.STA)

Notificação - Trip Espurio CDR

Overview Trigger Message Subscriptions History

Trip Espurio CDR (0 Required acknowledgments)

- Cleyton Ferreira Gil - Email
- Joao Maria Batista - Email
- Diego Carlos Monteiro - Email
- Nilton Cavalheiro Lopes - Email
- Paulo Cesar dos Santos - Email
- Vilson Luiz da Costa - Email
- Ademar Ortolani da Silva - Email
- Clayton Ferreira Bof - Email
- Joao Batista Galbes - Email
- Joao Eduardo Lima - Email
- Marco Aurelio dos Santos Machado - Email
- Sergio Luiz Cipriano Horta - Email



CHALLENGES

- The goal is to transform data from the logs to the final products
- Maintenance predictions in recovery boilers

SOLUTION

- Capture spurious trips in EF from the recovery boiler by faulty temperature reading
- Automation and analytics to avoid failure before it happens

BENEFITS

Avoided two boiler shutdowns, saving \$9.6M USD



“

The most important asset in a mill is the information and knowledge we can achieve from data.

”

Raquel Goulart, IT Specialist



PRESCRIPTIVE ANALYTICS

Rule #1:
What is the business challenge?

Before You Begin



Alignment

Strategy

Resources

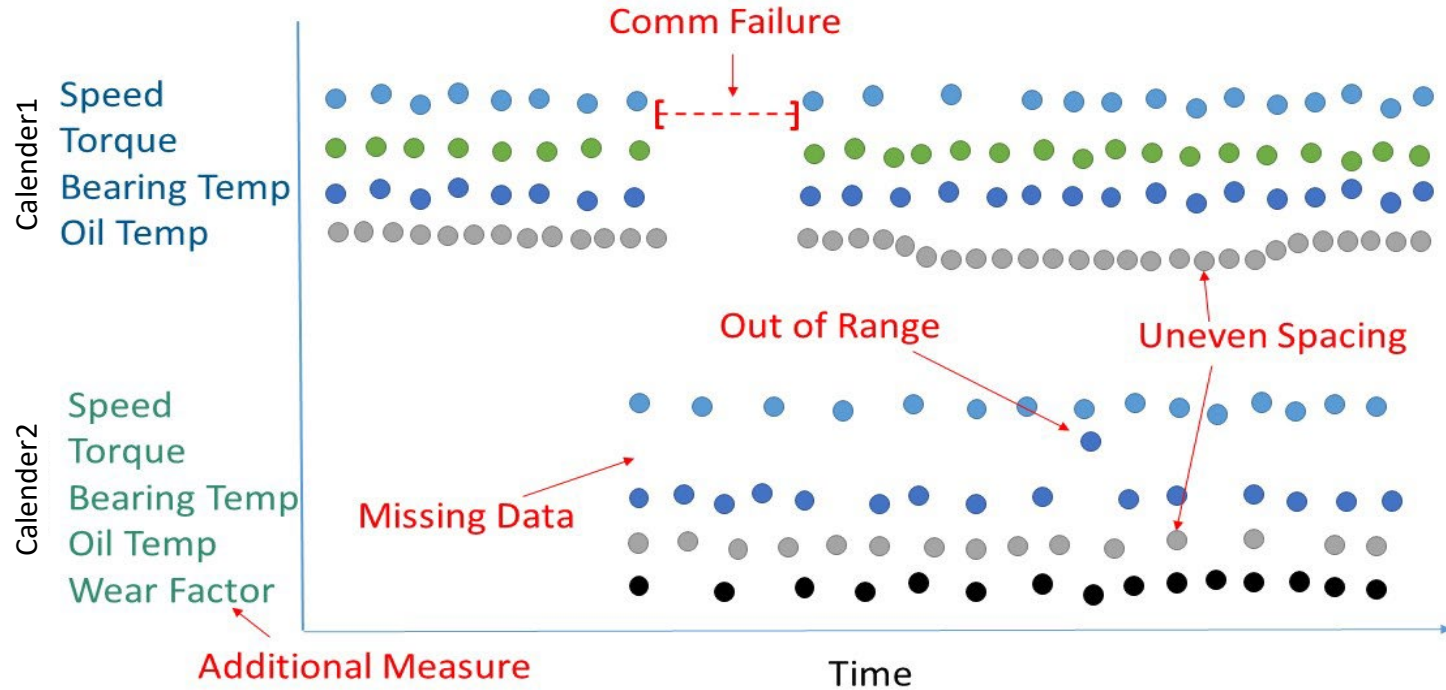
Value



Rule #2: Treat Data Properly

Cleaning, augmenting, shaping it...

Operational Data is Time Series



Time Series to Tables is Hard



	Speed	Torque	Bearing Temp	Oil Temp
03:00	0.8	25	50	X
03:10	10	24	50	60
03:20	10	25	50	60
03:30	X	X	X	60
03:40	9.9	25	50	120
03:50	9.9	25	45	60

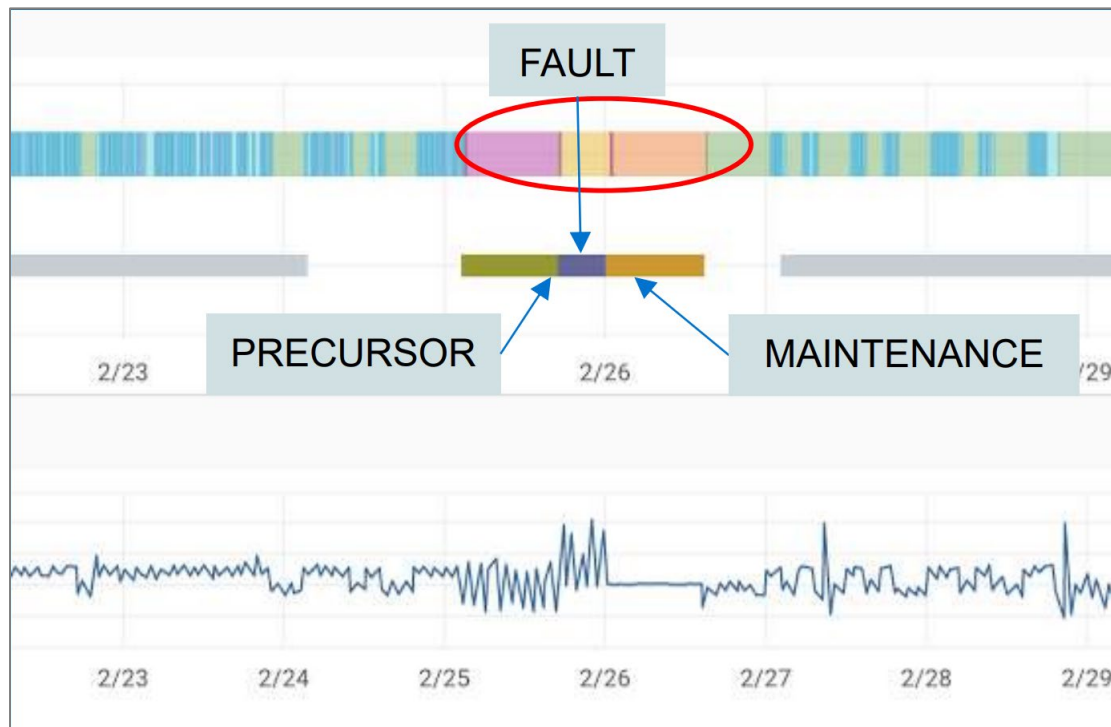


Rule #3: Involve Your Experts From the Get Go

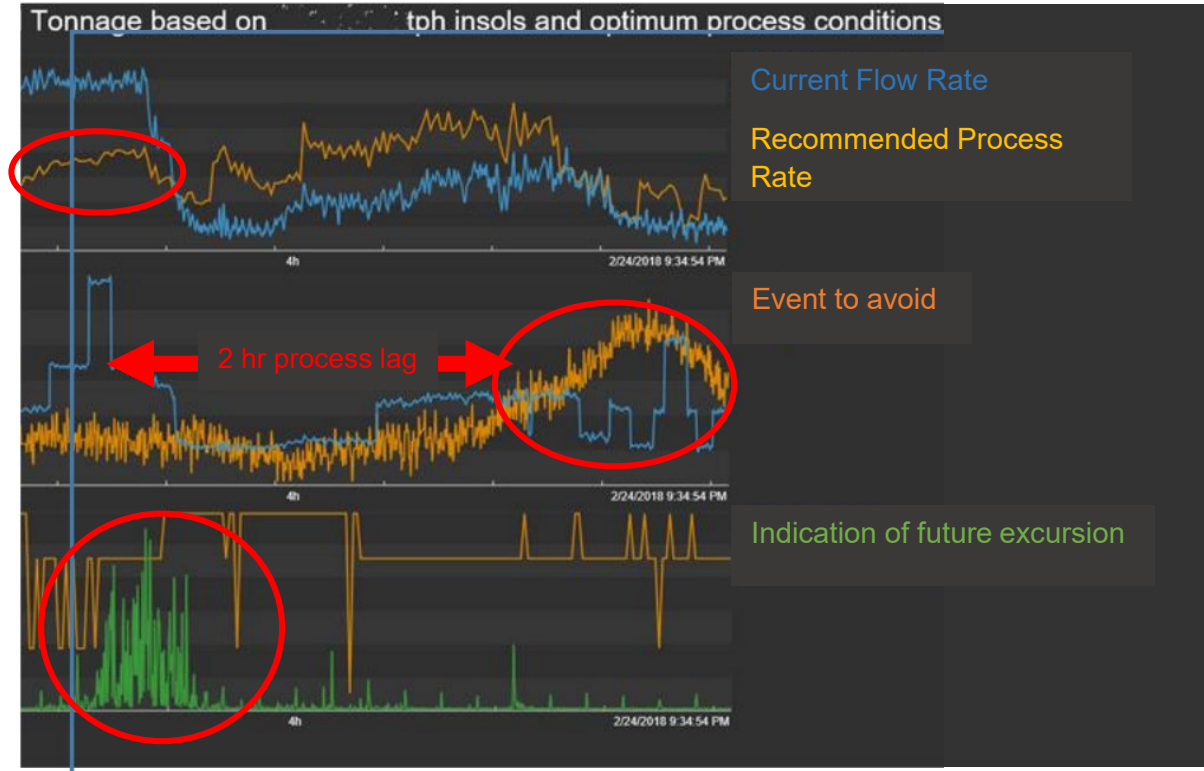
Avoid Surprise, Work With Your SMEs



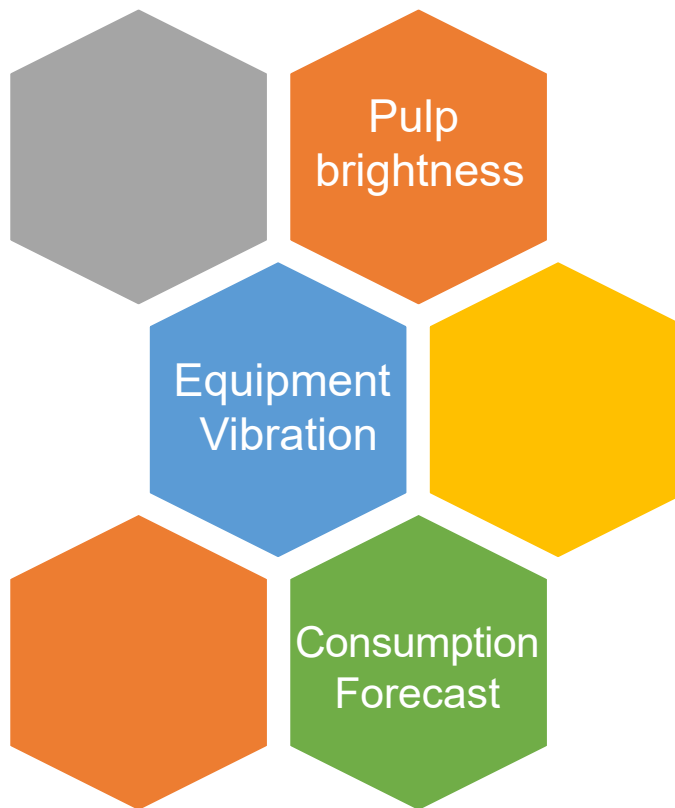
Pattern Recognition



What the Prescription Looks Like



Additional Use Cases



Questions?



THANK YOU

osisoft®

謝謝 KEA LEBONA
TAPADH LEIBH 고맙습니다
БАЯРЛАЛАА MISAOTRA ANAO
DZIĘKUJĘ CI NGIYABONGA
TEŞEKKÜR EDERIM OBRIGADO شڪرا
DANKON TANK TAPADH LEAT SALAMAT
DANKIE TERIMA KASIH GRACIES
СПАСИБО
KÖSZÖNÖM
PAKMET CIZGE
GO RAIBH MAITH AGAT
БЛАГОДАРЯ GRACIAS
ТИ БЛАГОДАРАМ
TAK DANKE MAHADSANID
РАҲМАТ
MERCİ
HATUR NUHUN
CẢM ƠN BẠN
WAZVIITA
FALEMINDERIT
DANK JE
ΕΥΧΑΡΙΣΤΩ GRATIAS TIBI
AČIŲ SALAMAT MAHALO IĀ 'OE TAKK SKAL DU HA
GRAZZI PAKKA PÉR
PAXMAT CAĞA
SIPAS JI WERE TERIMA KASIH
UA TSAUG RAU KOJ
ТИ БЛАГОДАРАМ
СИПОС
MULTUMESC
FAAFETAİ
ESKERRIK ASKO
HVALA ХВАЛА ВАМ
TEŞEKKÜR EDERIM
HVALA
ДЗЯКУЙ
GRAZIE
DI OU MÈSI
ĎAKUJEM
MATUR NUWUN