



OSIsoft PI System in the Consumer Goods Industry

Jaume Valls and Emilio Anglés

Kellogg's[®]

Agenda

- About Kellogg Company
- About Kellogg Manufacturing Valls
- Regulatory compliance using PI System
- Managing production lines Critical Control Points (CCP's) using PI AF
- Osisoft PI Digital Twin for improving OEE in packing lines
- Q&A

About Kellogg Company

100+ Year Heritage, Progressive Growth



W.K. Kellogg

1906 - Kellogg Company founded

Overseas expansion into UK, Australia



Canadian expansion

1950s – Latin America, Mexico entry

1960s – Asia, Japan entry

Expands into select Frozen Food products in U.S. and bars



Enters biscuits, cookies, crackers with Keebler acquisition



Acquired Pringles



Wilmar International joint venture



Acquired Mass Food Group, leading Egyptian cereal company



Acquired RXBAR, fastest-growing US nutrition bar brand



1906 1920 1940 1960 1980 2000 2012 2013 2014 2015 2016 2017

Numerous iconic foods launched from the 1930s to the 1980s



Acquired Kashi and MorningStar Farms soy-based vegetarian foods

\$14.6 billion in sales



Acquired Bisco Misr, Egyptian biscuits company



Acquired Parati, leading Brazilian biscuits, pasta and powder beverage company

Our Vision

To enrich and delight the world
through foods and brands that matter

Our Purpose

Nourishing families so they
can flourish and thrive



Kellogg's

Morning
Star
FARMS

Kellogg's
Special
K

Parati

Kellogg's
mini
MAX

OSIsoft
PIWorld

CORN
FLAKES

RICE
BUBBLES

TOWN
HOUSE

Keebler

FROOT
LOOPS

Kashi

Radkau

RICE
KRISPIES

Raisin
Bran

COCO
POPS

Sultana
Bran

Eggo

CHEEZ-IT

Pringles

CHOCO
KRISPIS

pop.
tarts

Gardenburger

ZUCARTAS

RXBAR

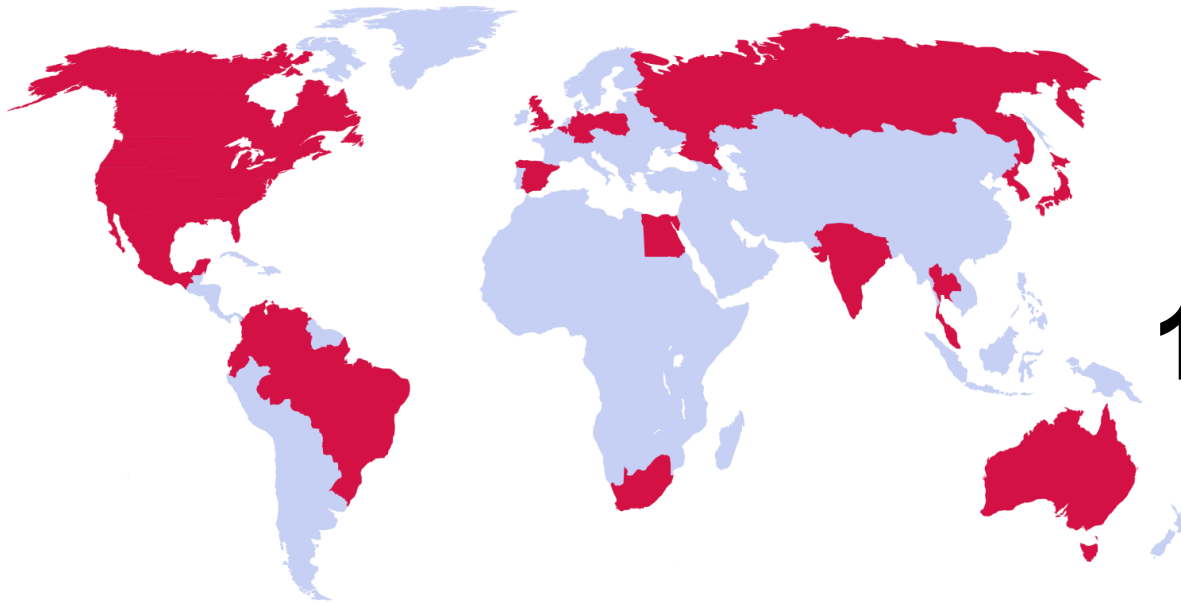
Mini-
Wheats

ALL-
BRAN

Kellogg's



Bringing Our Best to the World



33,000 employees
in **21** countries
1,600 foods marketed
in more than **180**
countries

Kellogg Company Overview

2017 net sales ~\$13 Billion

About Kellogg Manufacturing Valls (Spain)

Kellogg Manufacturing Valls

47.060m²

24H 7DAYS

**+ 300
EMPLOYEES**

CAPACITY 80M KG

What do we produce?



AREA 1 Sp K : Classic + Variants
Smacks
2 packing lines

AREA 2 Corn / Rice
2 packing lines
CK/RK/CF/FF

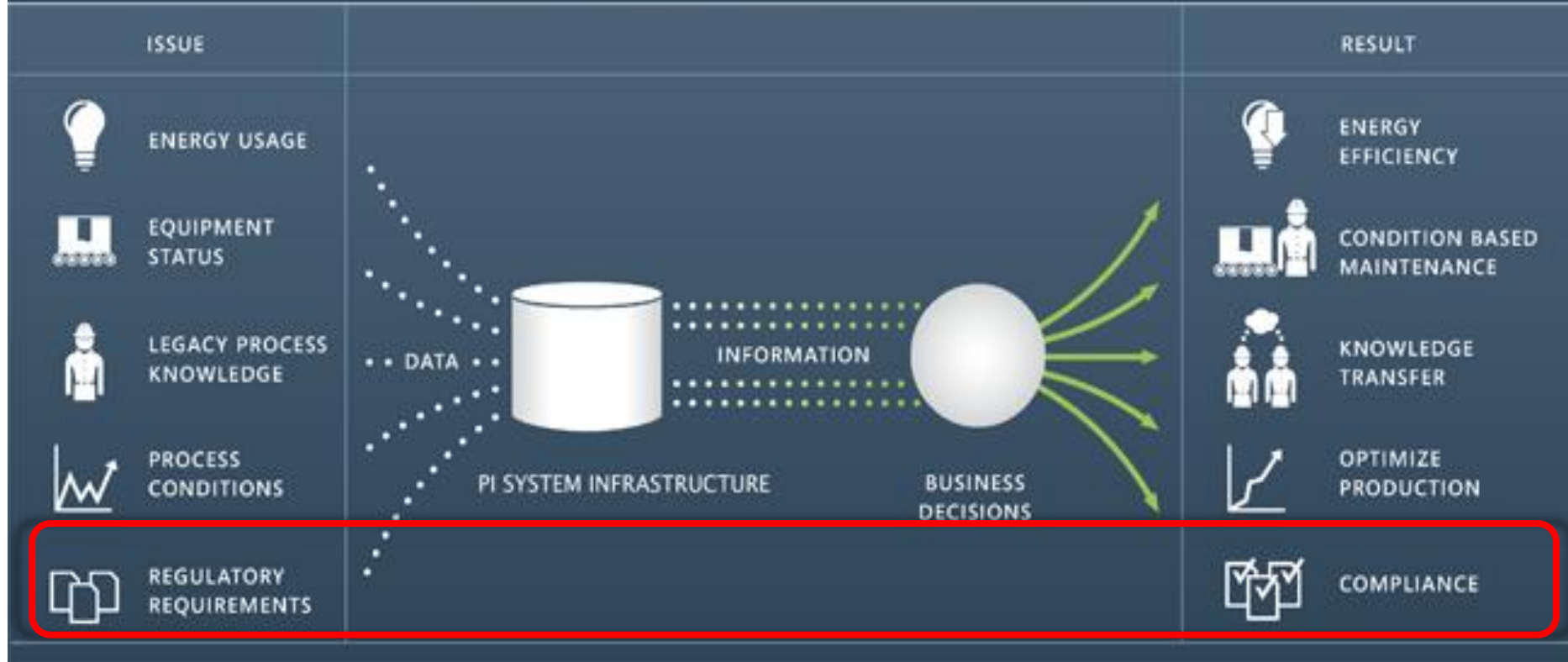
AREA 3 Coex/Dx
2 packing lines
MP/TRESOR/CH/CB/CPR/LS/HL/ROULETTE



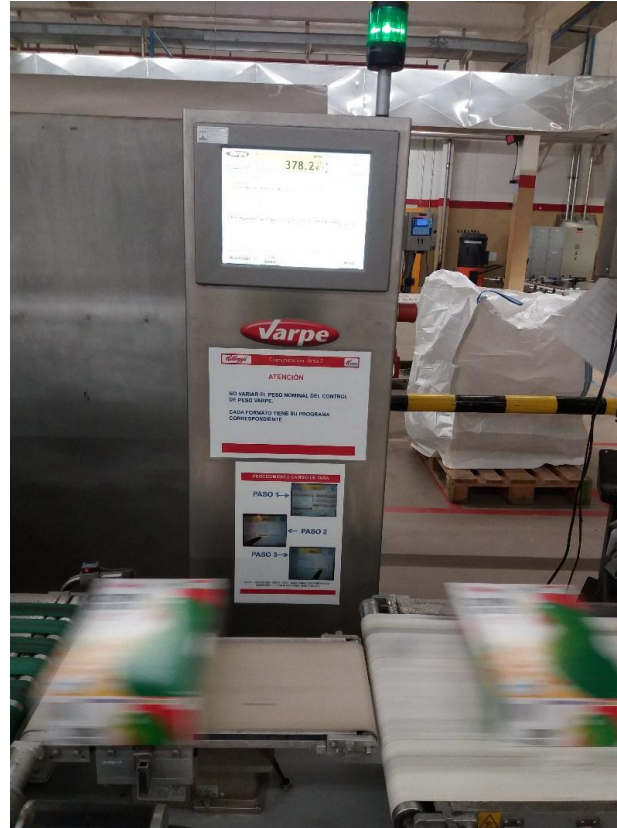
Consumer Product Goods Industry use cases

Kellogg Manufacturing Valls

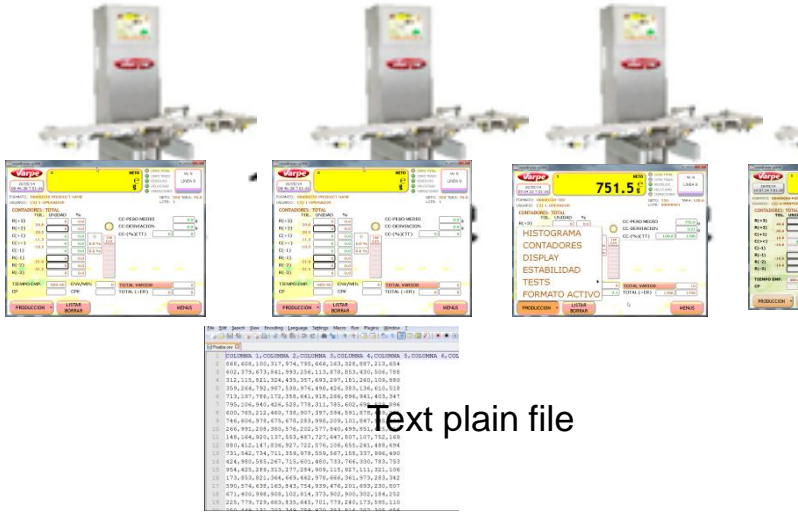
PI SYSTEM TECHNOLOGY ENABLES KEY BUSINESS SOLUTIONS



Challenge: Avoid non-conformities related with the nominal quantities that we put into our packed products during regulation and compliance audits.



Challenge: Initial situation



Text plain file

Each shift, operators took from the line 8 samples:

- The average weight.
- The standard deviation.
- Number of cartons produced.
- Number of cartons rejected.
 - Above the legal weight
 - Below the legal weight

DEPARTAMENTO DE CALIDAD

REGISTRO PESADORAS VARPE

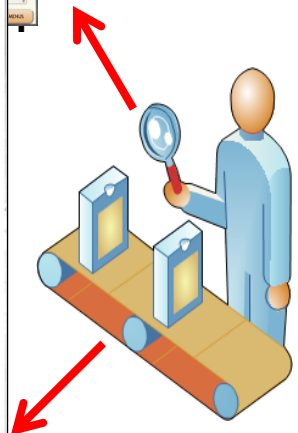
ID Documento: VA-QA-0142-RS
 Versión: 1
 Fecha de versión: 13/02/2014

FECHA: 11/03/2014
 HORA: 8:45

| | LINEA 3 | LINEA 4 | LINEA 5 | LINEA 6 | LINEA 7 | LINEA 8 | LINEA 9 | LINEA 10 |
|------------------------|---------|---------|---------|---------|---------|---------|---------|----------|
| LINEA: | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 |
| FORMATO PESO: | 54E | 56E | 57E | 58E | 59E | 59E | 59E | 59E |
| TARA: | 59E | 59E | 59E | 59E | 59E | 59E | 59E | 59E |
| TOTAL PAQUETES: | 14500 | 1440 | 2450 | 5000 | 5000 | 14500 | 14500 | 14500 |
| PESO MEDIO: | 549.26 | 550.9 | 549.8 | 549.1 | 549.1 | 549.1 | 549.1 | 549.1 |
| DESVIACION (+ o -): | 4.98 | 3.92 | 3.66 | 3.54 | 3.54 | 3.54 | 3.54 | 3.54 |
| TOTAL PAQUETES R (+2): | 000 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| TOTAL PAQUETES R (+3): | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| TOTAL PAQUETES R (-2): | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| TOTAL PAQUETES R (-3): | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |

LABORATORIO: *LABORATORIO SANCHEZ*

FIRMA:

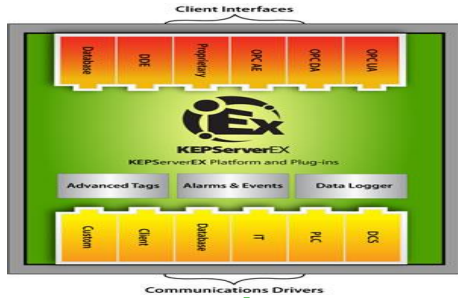


Solution



PI Server 2012

Realize the Power of Data



PI Interface for OPC DA



Varpe@varpe-cp2009

Varpe 4 **NETO** 444.4 g^e

18/03/2014 13:51

FORMATO: 00000001-450
USUARIO: (3)-0001-OPERADOR

NETO: 450.0 TARA: 62.0
LOTE: 1 TURNO: M1-18

CONTADORES: TOTAL

| | TOL. | UNIDAD | % |
|-------|------|--------|------|
| R(+3) | 20.0 | 0 | 0.0 |
| R(+2) | 13.5 | 1 | 0.1 |
| C(+1) | 13.5 | 0 | 0.0 |
| C(><) | | 1865 | 99.6 |
| C(-1) | 13.5 | 0 | 0.0 |
| R(-1) | 0.0% | 0 | 0.0 |
| (-2) | 13.5 | 6 | 0.3 |
| | | 0 | 0.0 |

PESO MEDIO (CC) 447.6 g
DESVIACION (CC) 2.9 g
TOTAL (CC) 1865

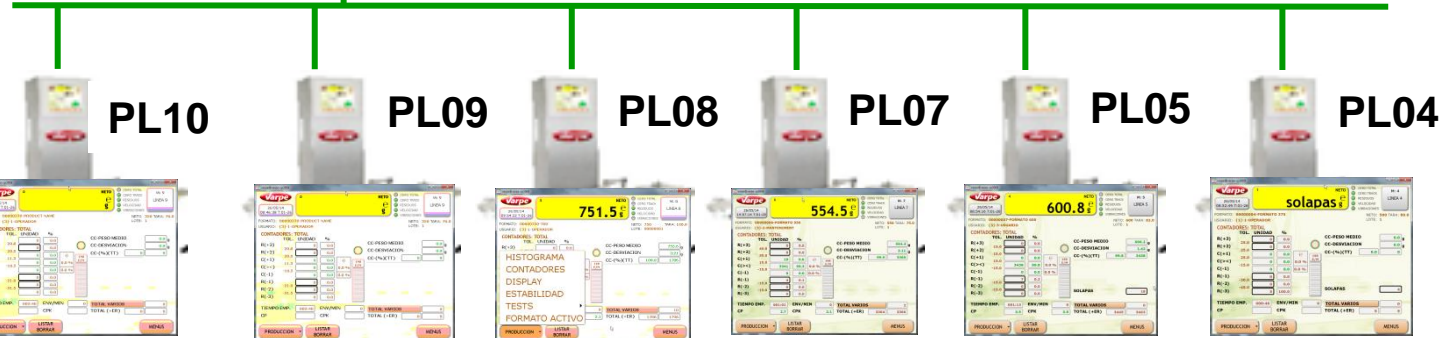
RECHACE PESO MEDIO 0
CONTADOR DM 0
ERROR CADENCIA 8
ERROR LONGITUD 0
ERROR CERO/UFL/OFL 0

TEMPO EMP. 000:53 ENV/MIN 88
CP 1.6 CPK 1.3

TOTAL (TT) 1880

PRODUCCION LISTAR BORRAR MENU

Modbus TCP/IP communication



Solution: Finally, we create the PI tags in our PI Archive server

- 1 sample every 20 secs.
- 180 samples per Hour.
- 1440 samples per Shift.

Varpe

ÚLTIMO PESO: **503,90 g**

Selecciona una LINEA: **PL07** FORMATO: **40** Cerrar

14/09/2018 14:59:06 PESO NETO: **500 g** TARA: **76 g**

00000005008311577 Special K 16x375g+125g ITA

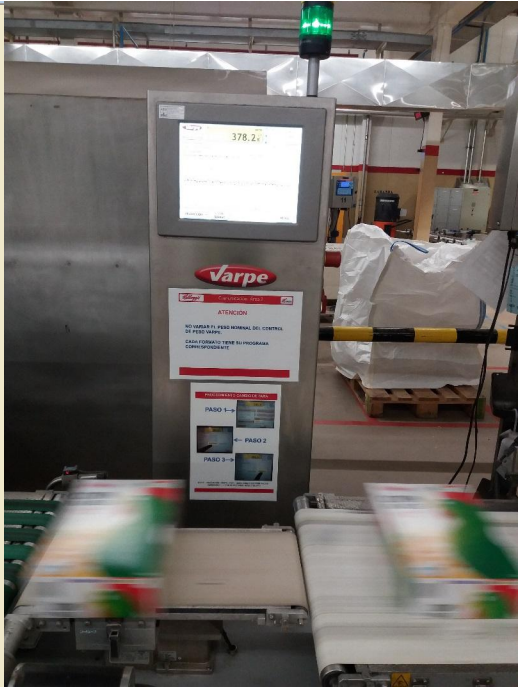
CONTADORES: TOTAL

| | TOL. | UNIDAD |
|-------|---------|-------------|
| R(+3) | 15,00 g | 0 paq |
| R(+2) | 15,00 g | 269 paq |
| C(+1) | 15,00 g | 0 paq |
| C(>-) | | 564.146 paq |
| C(-1) | | 0 paq |
| R(-1) | 15,00 g | 720 paq |
| R(-2) | 15,00 g | 0 paq |
| R(-3) | 15,00 g | 0 paq |
| CP | 2,10 g | CPK 1,99 g |

| | |
|------------------|-------------|
| PESO MEDIO (CC) | 500,77 g |
| DESVIACION (CC) | 2,39 g |
| TOTAL (CC) | 564.146 paq |
| PAQUETES TOTALES | 565.742 paq |
| SOLAPAS | 0 paq |
| CADENCIA | 36 paq |
| LONGITUD | 563 paq |

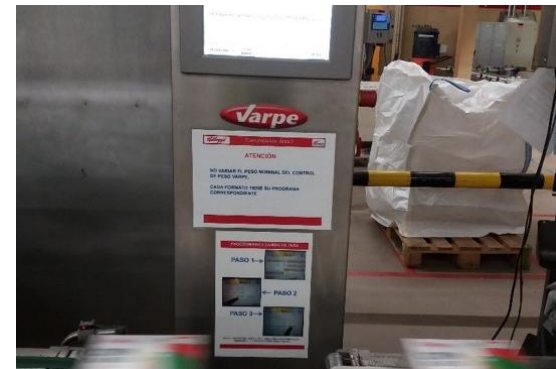
Histograma (20seg) 14/09/2018 14:59:23

The histogram displays weight data from 14:00 to 14:55. The y-axis ranges from 485 to 515 grams. A horizontal dashed line is drawn at 503.90 g. The data points fluctuate around this mean value, with a peak near 505 g and a trough near 495 g.



Kellogg Manufacturing Valls

Regulatory compliance: Avoid non-conformities related with the nominal quantities that we put into our packed products during regulation and compliance audits



CHALLENGE

Digitize our packing in line weight control in order to comply with legal requirements.

- Avoid Non-conformities during BRC audits.
- Eliminate operator manual data collection.
- Information in real time.

SOLUTION

Connect packing in line weight controls to PI System.

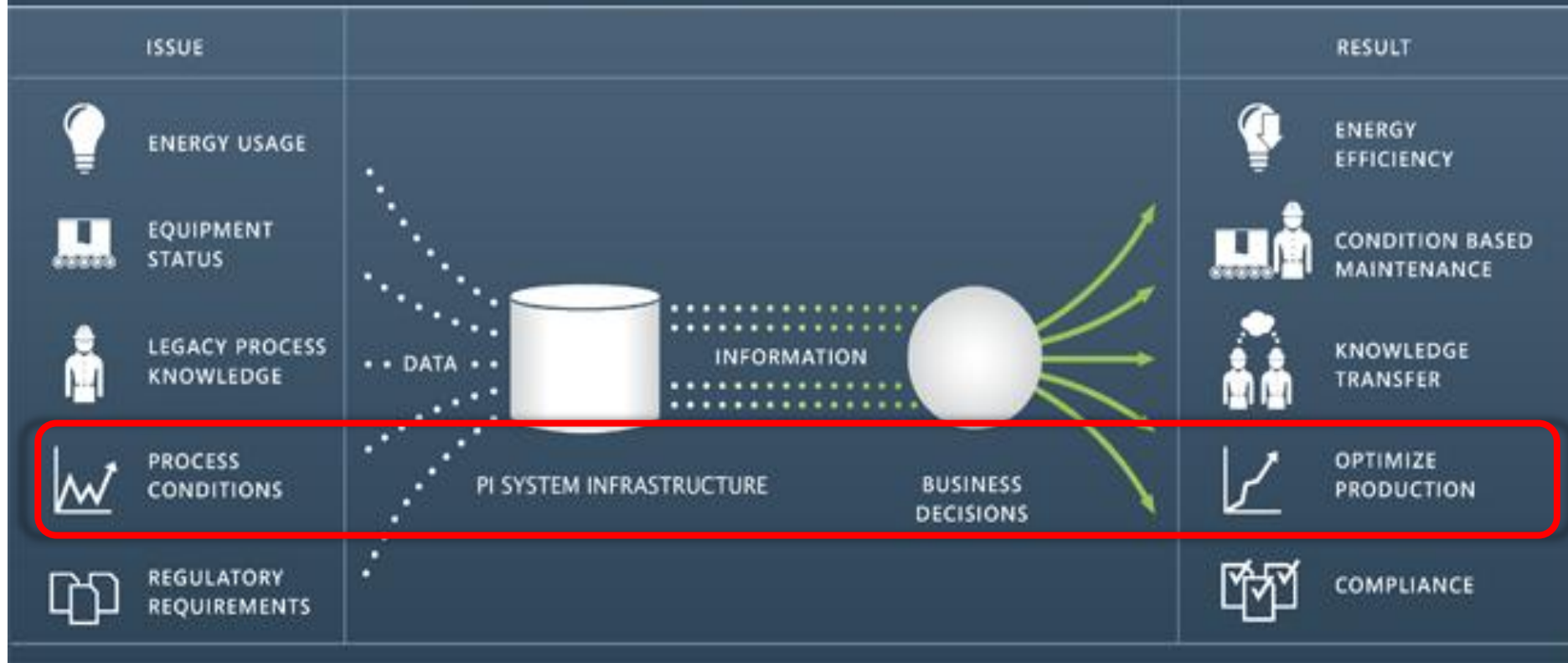
- Connect in line weight controls via protocol Modbus/TCP .
- Automatic data collection using PI OPC Interface.

RESULTS

Regulatory requirement for Quality Compliance.

- We have not had Non-conformities during the BRC audits anymore.(1440 weight samples per shift).
- We have eliminated the human error.
- The information in real time enables to take actions at shift basis.

PI SYSTEM TECHNOLOGY ENABLES KEY BUSINESS SOLUTIONS

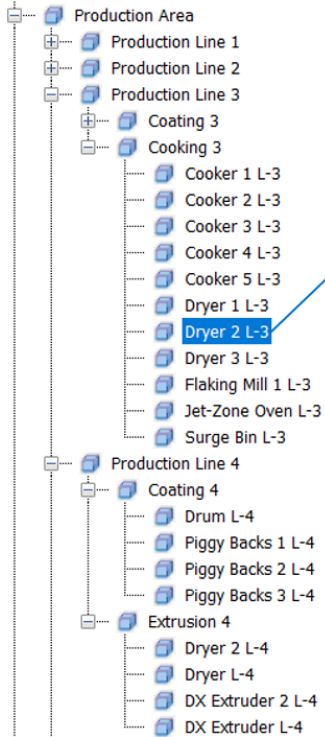


Challenge: Avoid product holds and food recalls controlling Critical Control Points (CCP's).



Production Area

2. Set up PI Asset Framework structure



1. Collect CCP's Temperatures from our dryers



Dryer 2 L-3

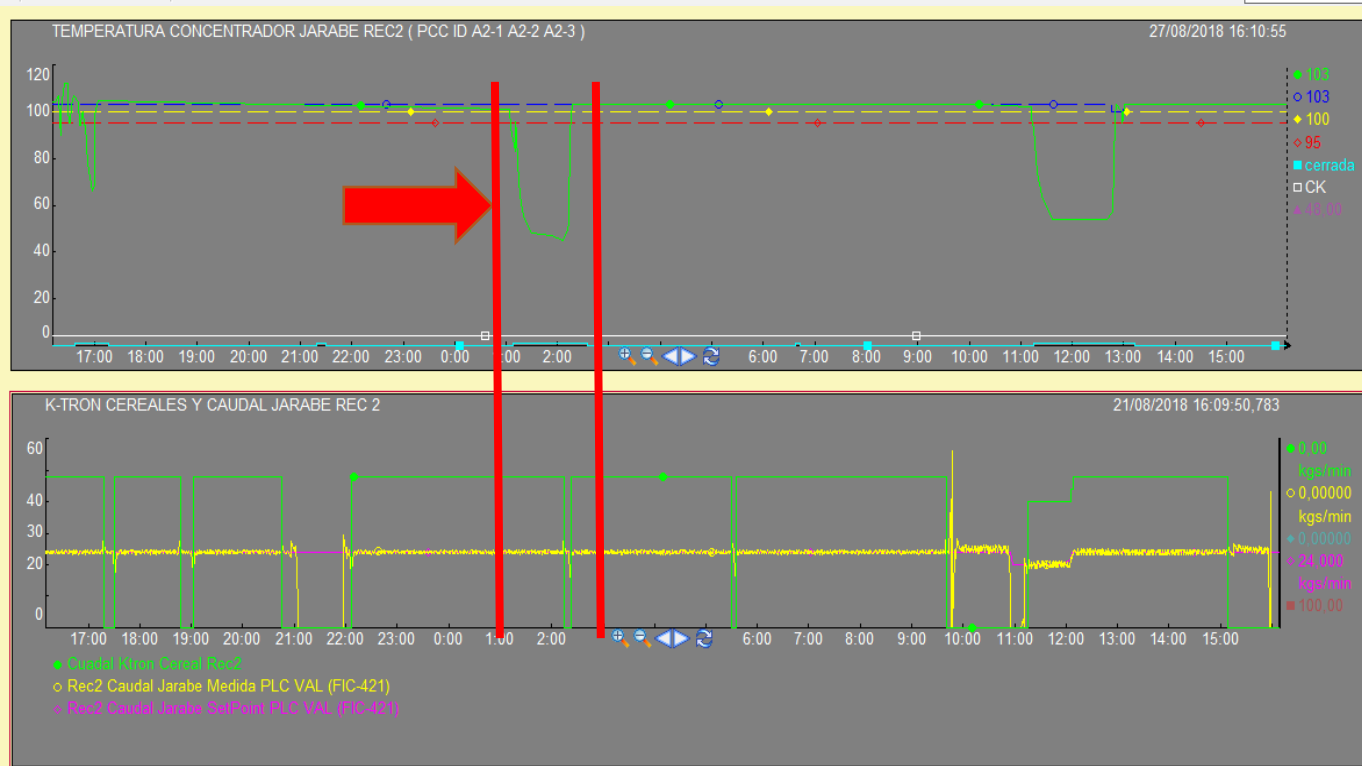
General Child Elements Attributes Ports Analyses Notification Rules Version

Excluded attributes are hidden.

Filter

| Category | Name | Value | Description | | |
|------------------------------|------|-------|---|-------------------------|--|
| Category: Downtime | | | | | |
| ☑ | ☑ | ☑ | Downtime - per Day | 0.5425 h | Downtime per Day (in seconds) (status <=> Running) |
| ☑ | ☑ | ☑ | Downtime - per Hour | 0 h | Downtime per hour (in seconds) (status <=> Running) |
| ☑ | ☑ | ☑ | Downtime - per Shift | 0 h | Downtime per shift (in seconds) (status <=> Running) |
| Category: Electricity | | | | | |
| ☑ | ☑ | ☑ | Total Electricity Consumption - per Day | 1579.431 kWh | Electricity Consumed (in kWh) per hour |
| ☑ | ☑ | ☑ | Total Electricity Consumption - per Hour | 102.3148 kWh | Electricity Consumed (in kWh) per hour |
| ☑ | ☑ | ☑ | Total Electricity Consumption - per Shift | 204.6859 kWh | Electricity Consumed (in kWh) per shift |
| Category: Metadata | | | | | |
| ☑ | ☑ | ☑ | Equipment Code | Dryer 2 L-3 | |
| ☑ | ☑ | ☑ | Line | Production Line 3 | |
| ☑ | ☑ | ☑ | Site | Windsor Site | |
| Category: OEE | | | | | |
| ☑ | ☑ | ☑ | % Availability - per Day | 96.609375 % | % of Availability per Day (Status = Running) |
| ☑ | ☑ | ☑ | % Availability - per Hour | 100 % | % of Availability per hour (Status = Running) |
| ☑ | ☑ | ☑ | % Availability - per Shift | 100 % | % of Availability per shift (Status = Running) |
| ☑ | ☑ | ☑ | % Quality - per Shift | 100 % | |
| | | | | 28.0797519683838 kg/min | |
| | | | | 33.3540840148926 kg/min | |
| | | | | 9.93363380432129 % | |
| | | | | 100.527900695801 kW | |
| | | | | Philips Parfait Puffs | |
| | | | | 0 kg/min | |
| | | | | 0 | |
| | | | | 110.374687194824 °C | |
| | | | | 18.5747299194336 t | |
| | | | | 1.19339036941528 t | |
| | | | | 2.38722681999207 t | |
| | | | | 0.139359533786774 t | |
| | | | | 0 t | |
| | | | | 0 t | |

Solution: 3. Use Analytics in order to monitor out of standard conditions for the CCP's



Solution: Send PI Notification



PI Notifications




lun 27/08/2018 16:39

Valls.PiNotifications@kellogg.com

CRITICAL: CCP Out of Control

Para  Angles, Emili

 Mensaje enviado con importancia Alta.

8/27/2018 4:38:45 PM Romance Daylight Time (GMT+02:00:00)

The CCP for " **Concentración REC2** " has been **15 minutes** below the Critical limit of 190 °C.

K-TRON Cereal Rate during out of limits was: **48 kg/min**

Please review the line and take an action immediatly



Results: It allows to reduce variability in our process and now less time is spent looking for data and more analysing it

OSIsoft PI Vision

RC_CCP-Detail Asset: Dryer L-5+ Ad Hoc D

Kellogg's

Total Produced - per Shift: 1.0471 t
 Total Rejected - per Shift: 0.46444 t

Dryer L-5
 Lizzys Loops
 Windsor Site
 Production Line 5

% Availability - per Shift: 100 %
 Downtime - per Shift: 0 h

Temperature
 115
110
105
100
95
90
85
80
23/08/2018 15:10:32 8h 23/08/2018 23:10:32
 Temperature
 111.08 °C
 100 °C
 90 °C

Product
 100 50 0
 23/08/2018 15:10:32 8h 23/08/2018 23:10:32
 Dry Mass Flowrate
 23,109 t/h
 Mass Flowrate
 22,812 t/h
 Recycled Material
 30,325 %
 Recycled Dry Mass Flowrate
 0 t/h

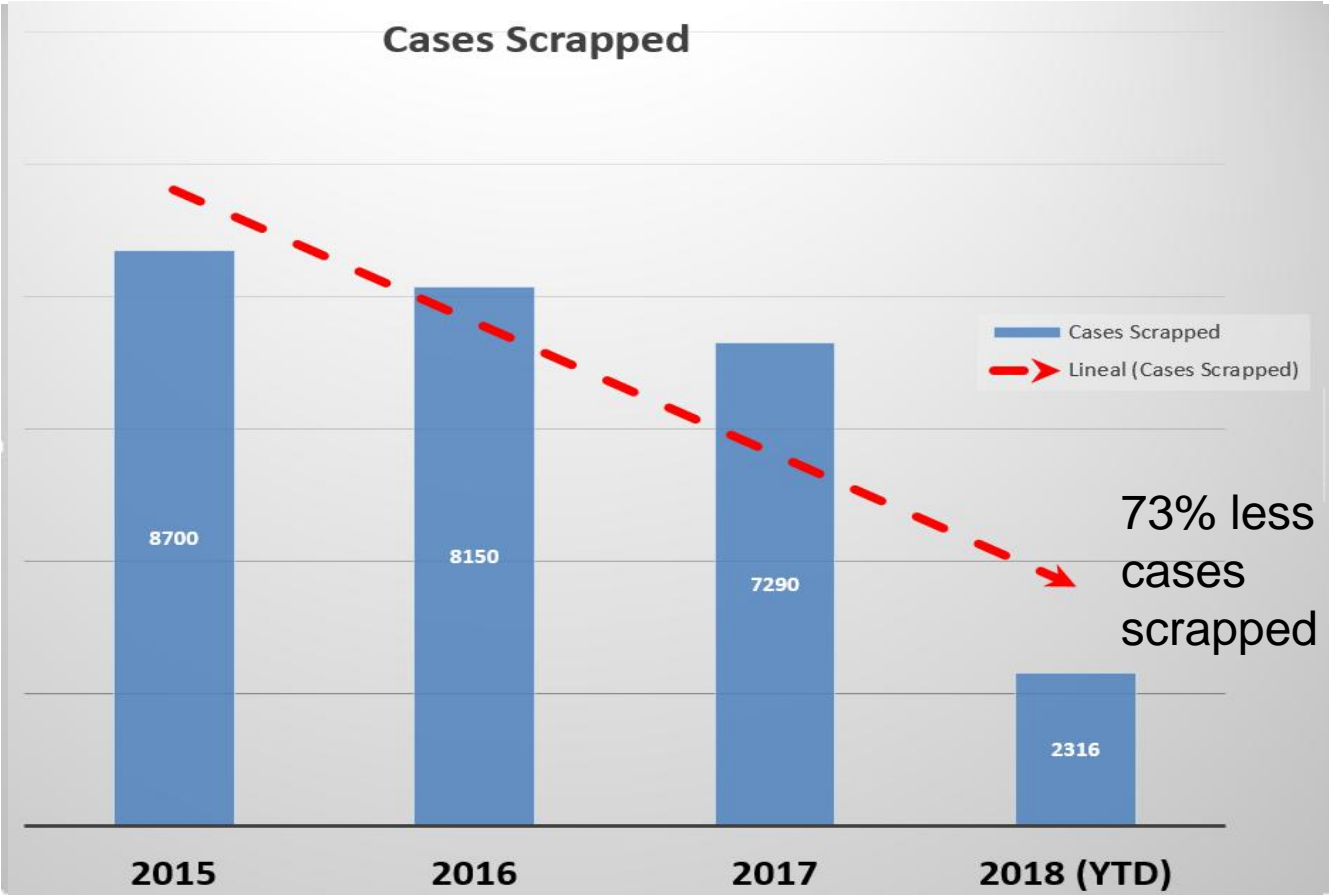
Energy
 10.4
10.2
10
9.8
9.6
23/08/2018 15:10:32 8h 23/08/2018 23:10:32
 Power draw
 10,318 kW

| Event Name | Asset | Event Type | Start Time | End Time | Duration | Reason | Acknowledgment |
|--|-----------|--------------------------------------|---------------------|---------------------|----------|--------------------------|----------------|
| Royal Cereals - OOC - Dryer L-5 - 2018-08-23 07:09:00.000 - 99.402214050293 | DRYER L-5 | Royal Cereals - Out of Control Event | 23/08/2018 15:09:00 | 23/08/2018 15:16:00 | 7m | Incorrect Burner Control | Acknowledge |
| Royal Cereals - OOC - Dryer L-5 - 2018-08-23 08:12:00.000 - 96.3386383098641 | DRYER L-5 | Royal Cereals - Out of Control Event | 23/08/2018 15:12:00 | 23/08/2018 15:17:00 | 5m | | Acknowledge |
| Royal Cereals - OOC - Dryer L-5 - 2018-08-23 08:22:00.000 - 87.1982503100586 | DRYER L-5 | Royal Cereals - Out of Control Event | 23/08/2018 15:22:00 | 23/08/2018 15:27:00 | 5m | Incorrect Burner Control | Acknowledge |
| Royal Cereals - OOC - Dryer L-5 - 2018-08-23 08:24:00.000 - 96.9678879882813 | DRYER L-5 | Royal Cereals - Out of Control Event | 23/08/2018 15:24:00 | 23/08/2018 15:27:00 | 3m | | Acknowledge |
| Royal Cereals - OOC - Dryer L-5 - 2018-08-23 09:20:00.000 - 80.12036891843 | DRYER L-5 | Royal Cereals - Out of Control Event | 23/08/2018 17:20:00 | 23/08/2018 17:21:00 | 1m | | Acknowledge |

23/08/2018 15:10:32 8h Now



Results



Kellogg Manufacturing Valls

Managing production lines Critical Control Points (CCP's) using PI AF



CHALLENGE

Avoid product holds and food recalls controlling Critical Control Points using PI System

- Reduce CCP's Incidents.
- Reduce product holds.
- Make our process more stable reducing variability.
- Eliminate operator manual data collection.

SOLUTION

Connect production CCP's Temperatures to PI System

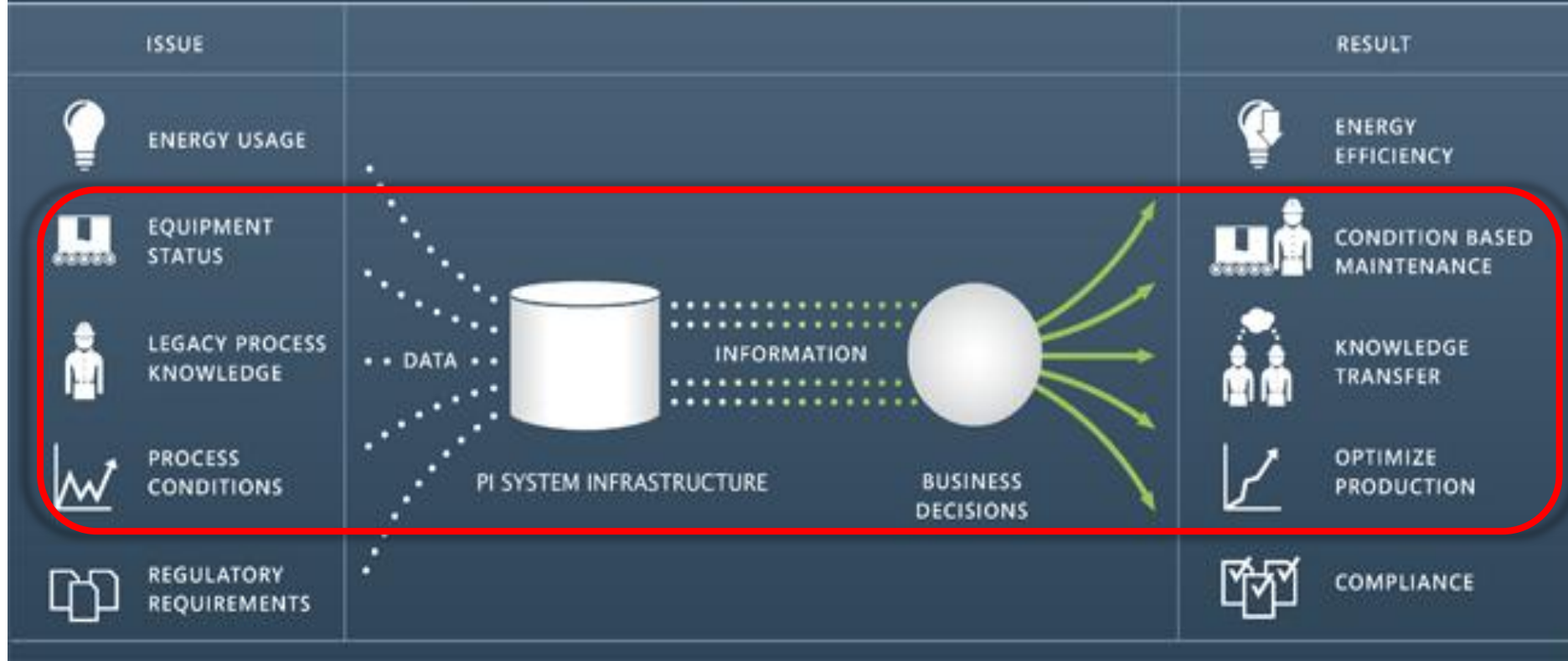
- Automatic data collection using PI OPC Interface of all process PLC's.
- Create a PI Asset Framework structure and setup Analytics and PI Notifications.

RESULTS

64% of CCP's incident reduction since 2015.

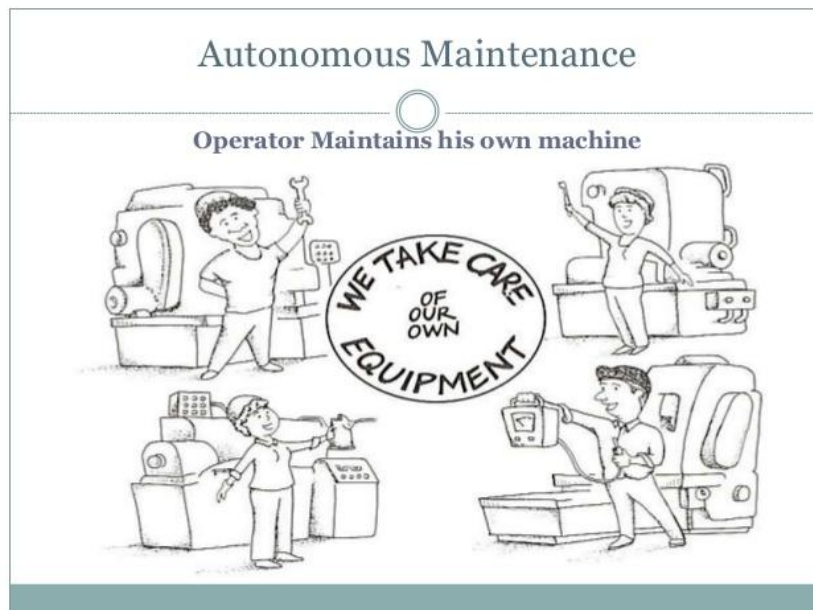
- From 14 Incidents in 2015 to 5 in 2018 YTD, 64% reduction.
- From 13 product holds in 2015 to 5 in 2018 YTD, 61% reduction.
- We have reduced variability in our process and cases scraped.
- Less time is spent looking for data and more time spent analyzing it.

PI SYSTEM TECHNOLOGY ENABLES KEY BUSINESS SOLUTIONS



Challenge: Be in the best in Class CPG Industry = 80% OEE

In 2015 the packing lines OEE was 68%



1. Improve Mean Time Between Failures (MTBF), **10 min in 2015**
2. Reduce minor stops per hour, **6 per hour in 2015**

Context

Continuous Improvement TEAM needs data in order to:

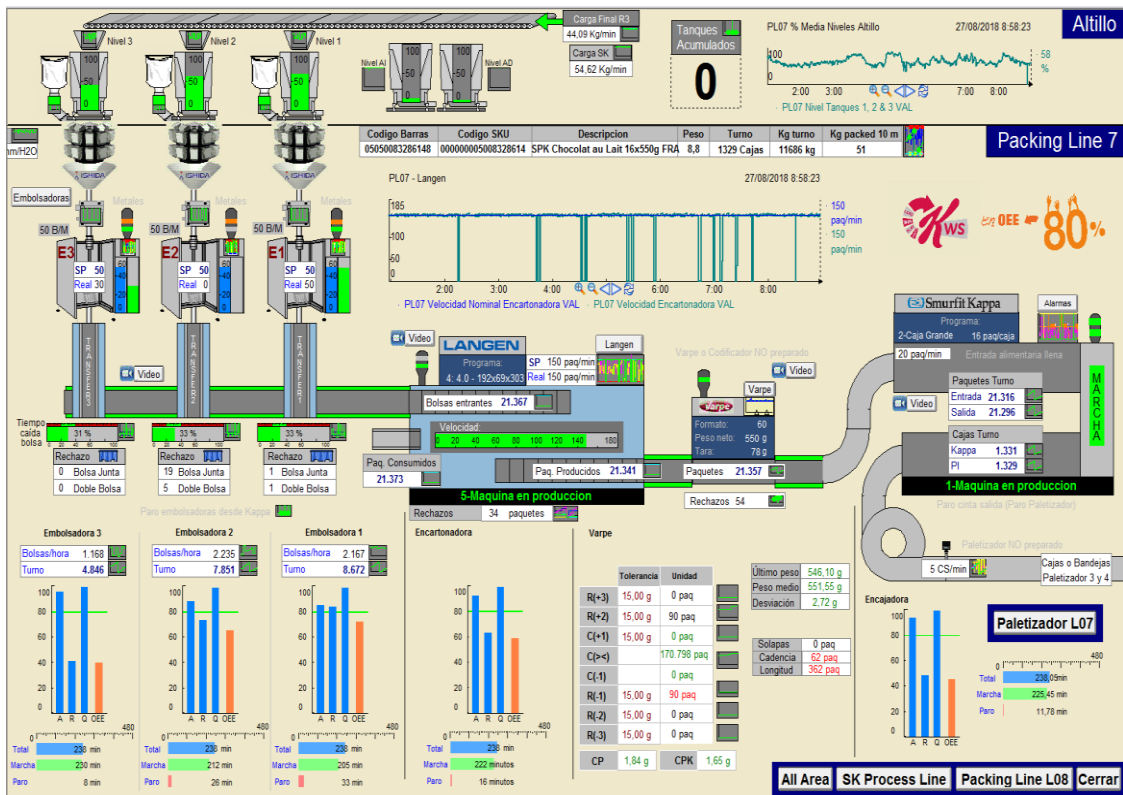


- Measure the improvement
- Eliminate the historical fights between Maintenance and Production

Solution

1. Create a Digital Twin connecting all Packing machines to PI System via PI Interface for OPC DA

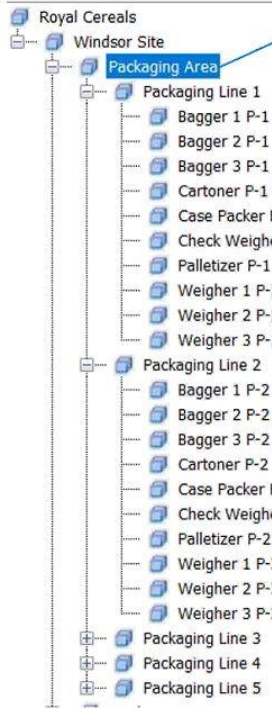
Digital Twin



Solution: 2. Set up PI AF structure and Analytics

Packaging Area

Analysis



Viewing Paula Baquer's Scre...

| Filter | Name | Value | Desc |
|--------------------|------------------------------|--------------------|------|
| Category: Downtime | Maximum Downtime - per Day | 4.30611332575439 h | |
| | Maximum Downtime - per Hour | 0.43111099725845 h | |
| | Maximum Downtime - per Shift | 0.66305529131165 h | |

| Name | Backfilling |
|------------------------------------|-------------|
| f00 Downtime per hour | |
| f00 Downtime per shift | |
| f00 EF Downtime | |
| f00 EF Out Of Control Event | |
| f00 Electricity consumed per day | |
| f00 Electricity consumed per hour | |
| f00 Electricity consumed per shift | |
| f00 Equipment Status | |
| f00 Reason Codes | |
| f00 Total Tons of Cereal | |

Generation Mode: Explicit Trigger Event Frame Template: Royal Cereals - Out of Control Event

| Name | Expression | True for | Severity | Output Attribute |
|-------------------------|--|----------|----------|------------------|
| Start triggers | | | | |
| Lo Temperature | 'Temperature'<'Temperature Lo' and 'Reject Valve Status'="Close" | Not Set | Major | |
| LoLo Temperature | 'Temperature'<'Temperature LoLo' and 'Reject Valve Status'="Close" | Not Set | Critical | |
| Outputs at close | | | | |
| Calcuration | EventFrame("Duration") | | | Duration |
| ReasonCode | if 'RandomSeed' >0.8 then "" else 'Reason Code' | | | Reason |

Multiple start triggers are configured. Child event frames will be generated when the trigger changes. See documentation for more details.

Scheduling: Event-Triggered Periodic

Trigger on: Any Input

Connected to the PI Analysis Service.

| Name | Expression | Output Attribute |
|----------------------|---|----------------------------|
| ShiftStartTime | 'Current Shift' | Map |
| TotalTonsShift | //Totalizes the total Tons per shift if ShiftStartTime = '' then 0 else TagTot('Dry Mass Flowra | Total Produced - per Shift |
| TotalRejectTonsShift | //Totalizes the total rejected Tons per shift if ShiftStartTime = '' then 0 else TagTot('Reject Dry Mass | Total Rejected - per Shift |
| TotalTonsDay | //Totalizes the total Tons per Day TagTot('Dry Mass Flowrate','t','*') | Total Produced - per Day |
| TotalRejectTonsDay | //Totalizes the total rejected Tons per Day TagTot('Reject Dry Mass Flowrate','t','*') | Total Rejected - per Day |
| TotalTonsHour | //Totalizes the total Tons per hour TagTot('Dry Mass Flowrate','*-1h','*') | Total Produced - per Hour |
| TotalRejectTonsHour | //Totalizes the total rejected Tons per hour TagTot('Reject Dry Mass Flowrate','*-1h','*') | Total Rejected - per Hour |

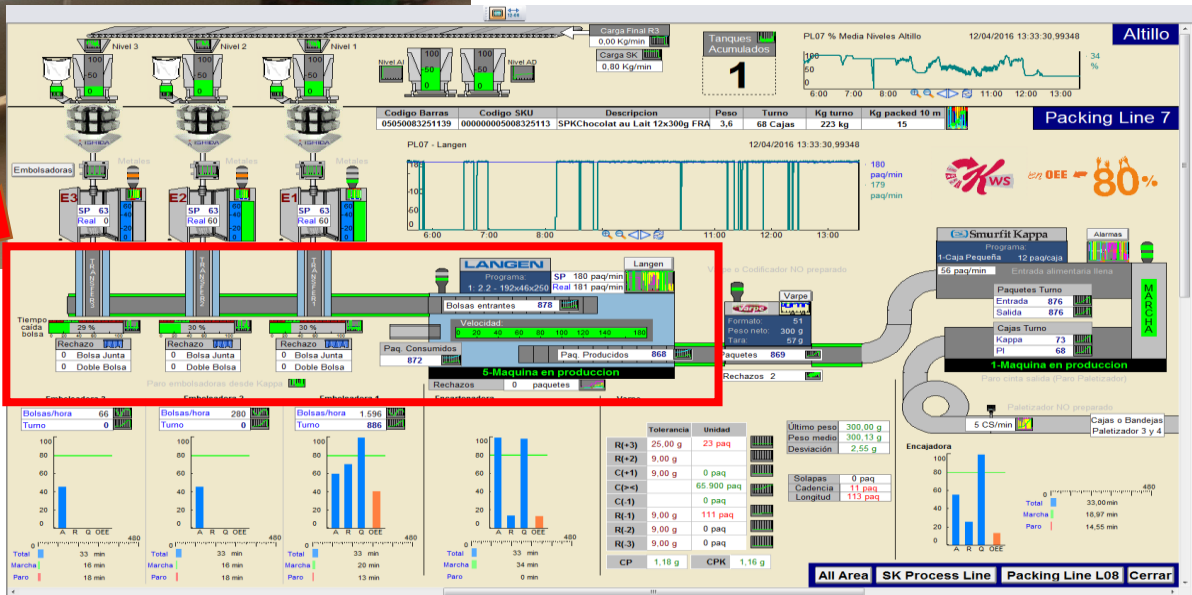
Scheduling: Event-Triggered Periodic

Period: 01h 00m 00s Configure Advanced...

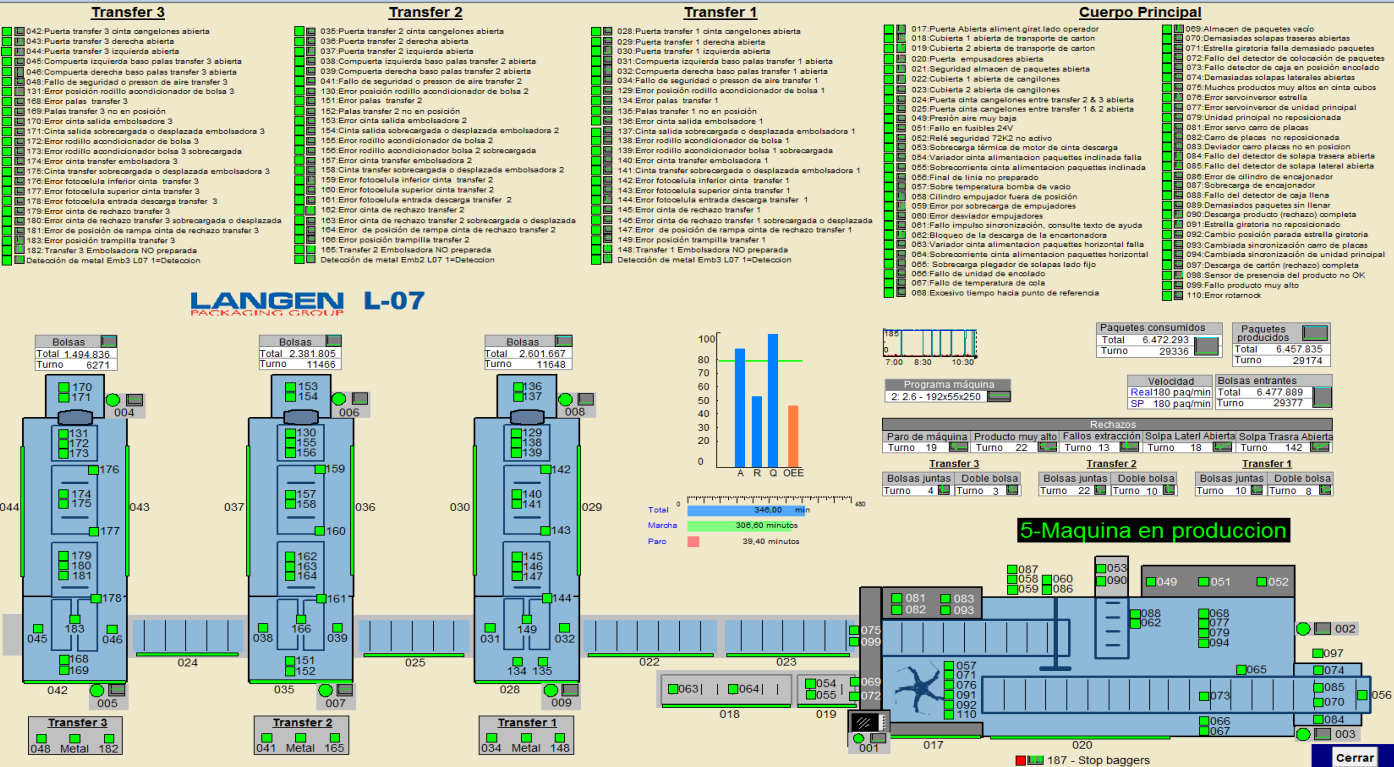
Example of equipment digitized



- It was the cartoner, **packing reference machine** which besides is our bottle neck in the production line.



Results: To Control minor stops in real time allow us to find Root cause of inefficiencies and set up AM task accordingly



Results: We dispose a dashboard where our operations team can control the efficiency of our packing lines in real time.

OSIsoft
PI Vision

+ New Display | ! | OSI/pbaquer | ?

RC_Overview-Production
Asset: Production Area+ ▼
Ad Hoc Display

Home

CCP Data

Overview

OEE

Back

| Production Line 1 ● | | Production Line 2 ● | | Production Line 3 ● | | Production Line 4 ● | | Production Line 5 ● | |
|--|--|--|---|--|--|--|---------------------------------------|--|---|
| Product: Lizzys Loops | | Product: None | | Product: Philips Parfait Puffs | | Product: Dianas Date Delight | | Product: Lizzys Loops | |
| Production | 16.339 <small>Per day</small> | Production | 0 <small>Per day</small> | Production | 0 <small>Per day</small> | Production | 5.5119 <small>Per day</small> | Production | 13.33 <small>Per day</small> |
| 1.1074 <small>Per shift</small> | 1.1074 <small>Per hour</small> | 0 <small>Per shift</small> | 0 <small>Per hour</small> | 0 <small>Per shift</small> | 0 <small>Per hour</small> | 0 <small>Per shift</small> | 0 <small>Per hour</small> | 1.0471 <small>Per shift</small> | 1.0471 <small>Per hour</small> |
| Rejected | 0.49664 <small>Per day</small> | Rejected | 7.1327 <small>Per day</small> | Rejected | 2.7605 <small>Per day</small> | Rejected | 3.8479 <small>Per day</small> | Rejected | 30.924 <small>Per day</small> |
| 0 <small>Per shift</small> | 0 <small>Per hour</small> | 0.86196 <small>Per shift</small> | 0.86196 <small>Per hour</small> | 0.17496 <small>Per shift</small> | 0.17496 <small>Per hour</small> | 0.31284 <small>Per shift</small> | 0.31284 <small>Per hour</small> | 1.9512 <small>Per shift</small> | 1.9512 <small>Per hour</small> |
| OEE | 0.00 % <small>Availability</small> | OEE | 0.00 % <small>Availability</small> | OEE | 89.50 % <small>Availability</small> | OEE | 0.00 % <small>Availability</small> | OEE | 100.00 % <small>Availability</small> |
| 0 % <small>Per shift</small> | 102.22 % <small>Performance</small> | Calc Failed <small>Per shift</small> | Calc Failed <small>Per shift</small> | 0 % <small>Per shift</small> | 0 <small>Performance</small> | 0 % <small>Per shift</small> | 0 <small>Performance</small> | 33.757 % <small>Per shift</small> | 96.658 % <small>Performance</small> |
| 100.00 % <small>Quality</small> | | 0.00 % <small>Quality</small> | | 0.00 % <small>Quality</small> | | 0.00 % <small>Quality</small> | | 0.00 % <small>Quality</small> | 34.82 % <small>Quality</small> |
| Electricity | 6.081.9 <small>Per day</small> | Electricity | 62.409 <small>Per day</small> | Electricity | 36.926 <small>Per day</small> | Electricity | 15.144 <small>Per day</small> | Electricity | 20.197 <small>Per day</small> |
| 410.04 kWh <small>Per shift</small> | 410.04 <small>Per hour</small> | 4,147.3 kWh <small>Per shift</small> | 4,147.3 <small>Per hour</small> | 2,674.1 kWh <small>Per shift</small> | 2,674.1 <small>Per hour</small> | 715.25 kWh <small>Per shift</small> | 715.25 <small>Per hour</small> | 1,346.8 kWh <small>Per shift</small> | 1,346.8 <small>Per hour</small> |
| Downtime | 15 h <small>Per day</small> | Downtime | 15 h <small>Per day</small> | Downtime | 4.6711 h <small>Per day</small> | Downtime | 9.0928 h <small>Per day</small> | Downtime | 0.5425 h <small>Per day</small> |
| 1 h <small>Per shift</small> | 1 <small>Per hour</small> | 1 h <small>Per shift</small> | 1 h <small>Per hour</small> | 0.105 h <small>Per shift</small> | 0.105 <small>Per hour</small> | 1 h <small>Per shift</small> | 1 <small>Per hour</small> | 0 <small>Per shift</small> | 0 <small>Per hour</small> |

Production per shift

35.181 t

3,138 Cases

Quality per shift

0 %

87.698 %

Electricity Consumed

9,293.6 kWh

2,415.2 kWh

Safety

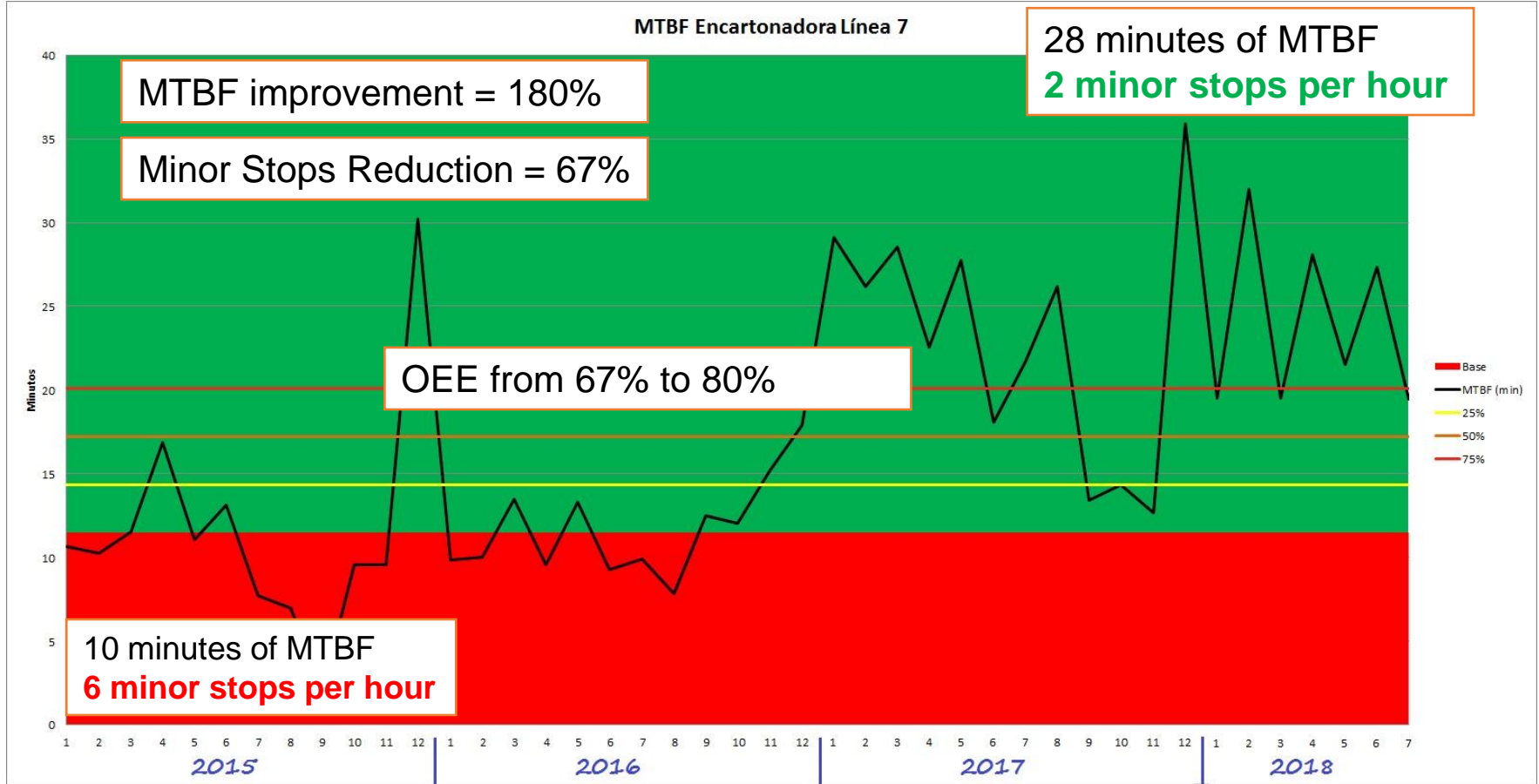
700 days
without incidents

Weekday 5

Current Shift 2



23/08/2018 17:37:44
◀ 8h ▶
Now
24/08/2018 01:37:44

Results



LANGEN

Programa:
4 3.8 - 192x69x290

| | | |
|------------------|-------------|---|
| Bolsas entrantes | 34.315 |  |
| Paq. Consumidos | 34.274 |  |
| Rechazos | 63 paquetes | |

5-Maquina en produccion

Velocidad:

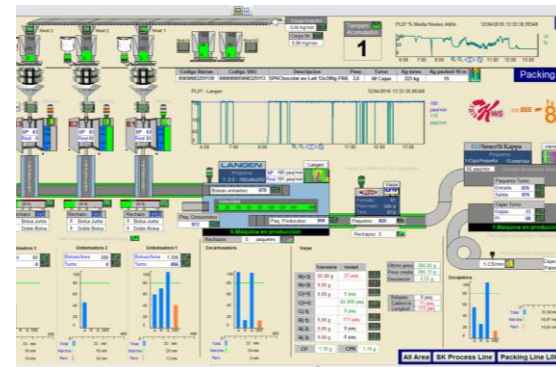


SP 150 paq/min

Real 150 paq/min

Kellogg Manufacturing Valls

Osisoft PI Digital Twin for improving OEE in packing lines



CHALLENGE

In 2015 the packing lines OEE was 68% in order to be in the Best in Class CPG industry (80% OEE), the company started an Autonomous Maintenance project.

- Reduce line minor stops, 6 per hour in 2015.
- Improve the 10 minutes MTBF that we had in 2015.
- No automatic data capture for Root Cause Analysis

SOLUTION

Create packing line Digital Twin using Osisoft PI System

- Automatic data collection using PI OPC Interface of all packing machines.
- Create a PI Asset Framework structure and setup Analytics.

RESULTS

- 80% Efficiency improvement in packing
- 67% less of minor stops per hour.
- MTBF increased from 10 minutes to 28 minutes. (180%).
- Use of the PI System to support Advanced Data Analytics and Machine Learning projects

Use cases Summary



RESULTS

Regulatory requirement for Quality Compliance.

- We have not had Non-conformities during the BRC audits anymore.(1440 weight samples per shift).
- We have eliminated the human error.
- The information in real time enables to take actions at shift basis.

RESULTS

64% of CCP's incident reduction since 2015.

- From 14 Incidents in 2015 to 5 in 2018 YTD, 64% reduction.
- From 13 product holds in 2015 to 5 in 2018 YTD, 61% reduction.
- We have reduced variability in our process.
- Less time is spent looking for data and more time spent analyzing it.

RESULTS

80% Efficiency improvement in packing

- 67% less of minor stops per hour.
- MTBF increased from 10 minutes to 28 minutes. (180%).
- Use of the PI System to support Advanced Data Analytics and Machine Learning projects

PI System in the CPG Industry



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Questions?

Please wait for
the **microphone**



State your
name & company

Please rate this session in the mobile app!

An advertisement for the OSISOFT PIWorld mobile app. The background is dark blue with a hexagonal pattern. The text reads: "Search 'OSISOFT' in your app store". Below this are two buttons: "Download on the App Store" and "GET IT ON Google Play". On the right, a smartphone displays the app's splash screen, which features the OSISOFT logo (a stylized atom) and the text "OSISOFT PIWorld" and "WELCOME TO PI WORLD 2018! SAN FRANCISCO | APRIL 23-27".

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 DZIĘKUJĘ CI NGIYABONGA TEŞEKKÜR EDERIM GRACIES OBRIGADO شكرا SALAMAT
 DANKON TANK TAPADH LEAT SALAMAT
 KÖSZÖNÖM DANKIE TERIMA KASIH GRACIES
 СПАСИБО
 ПАКМЕТ СІЗГЕ
 GO RAIBH MAITH AGAT
 БЛАГОДАРЯ GRACIAS MAHADSANID
 ТИ БЛАГОДАРАМ
 TAK DANKE MAHADSANID
 RAHMAT MERCI
 HATUR NUHUN
 GRAZZI ПАККА ПЕР PAXMAT САГА
 CẢM ƠN BẠN
 WAZVIITA
 FALEMINDERIT
 TI БЛАГОДАРАМ СИПОС
 DANK JE EΥΧΑΡΙΣΤΩ GRATIAS TIBI
 AČIŮ SALAMAT MAHALO IĀ 'ŌE TAKK SKALDU HA
 GRAZZI ПАККА ПЕР ありがとうございます
 SIPAS JI WERE TERIMA KASIH MATUR NUWUN
 UA TSAUG RAU KOJ
 TI БЛАГОДАРАМ СИПОС
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THANK YOU