

2009 Regional Seminar Series Presents:

Using PI to Capture and Report OEE



Jonathan Procopio, Project Engineer,
Smith & Nephew Advanced Wound
Management

November 4, 2009

Smith & Nephew Wound Management

- Smith and Nephew was founded in 1856 and today is a market leader in all of its business units; Wound Management, Endoscopy and Orthopedics.
- Wound Management has manufacturing in:
 - Largo, FL USA
 - Kingston upon Hull, UK
 - Suzhou, PRC
 - Third-party outsourced operations
- We are focused on delivering the highest quality products that help people regain their life.

Why PI?

- In 2006 Smith & Nephew Advanced Wound Care in Largo, FL recognized the need for a system that could satisfy the following:
 - Reliably collect and store real-time data from our production equipment.
 - Have the flexibility to contextualize data for OEE by time or conditions without having to change how and what we collect.
 - Report OEE: utilization, performance, and quality to decision makers and other business systems (BPCS and SAP).
 - To provide a interface on the shop floor for entering work requests, scrap information, and have the ability to expand this in the future.
- In our research PI was the best solution to deliver all of the above in one package.

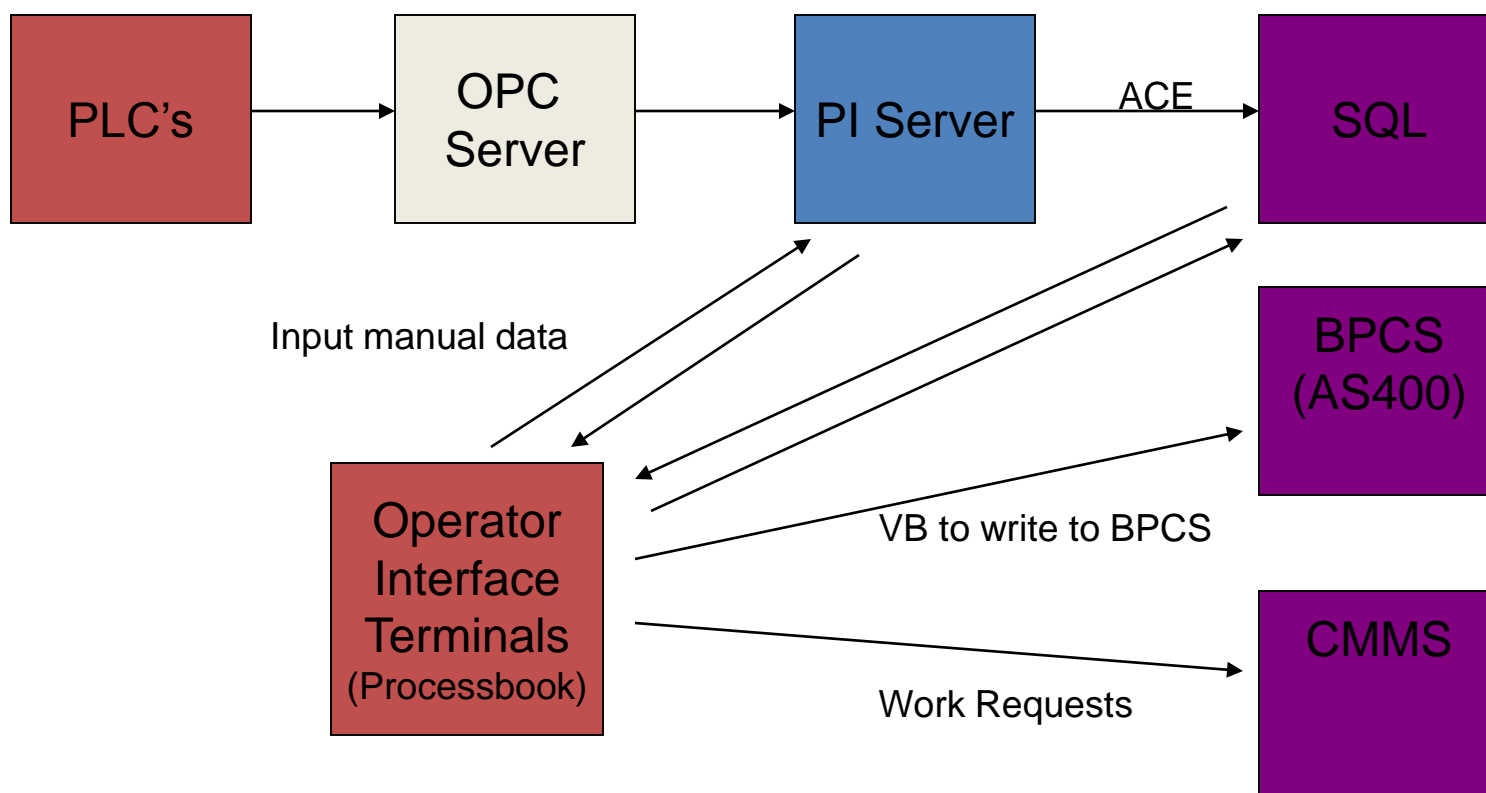
Using PI for OEE

- Overall Equipment Effectiveness:
 - **OEE= (utilization) x (performance) x (quality)**
- Utilization: Using PI we decide on a status tag or a set of conditions to tell us if the machine is producing product or not.
- Performance: Each machine has some form of throughput we can count and analyze that against the standard. Standards were kept and maintained in a SQL server.
- Quality: Using custom Processbook displays we were able to deploy Operator Interface Terminals (OIT's) on each machine that allowed users among other functions to enter scrap information to PI. This entered scrap data directly to our ERP, BPCS.

Where to Perform OEE Calculations

- Calculations for other business systems are automated in ACE on a fixed timescale.
- Currently we do all our other calculations within our reports this gives us the flexibility to refine our calculations by releasing a new version of a report. Our internal customers like this as we can quickly make changes in our calculation method and it appears to them that all the historical data is updated as well.
- PI Client tools are the most flexible for performing OEE calculations. For OEE calculations only a few tags are required allowing large time frame reports generated without problems.

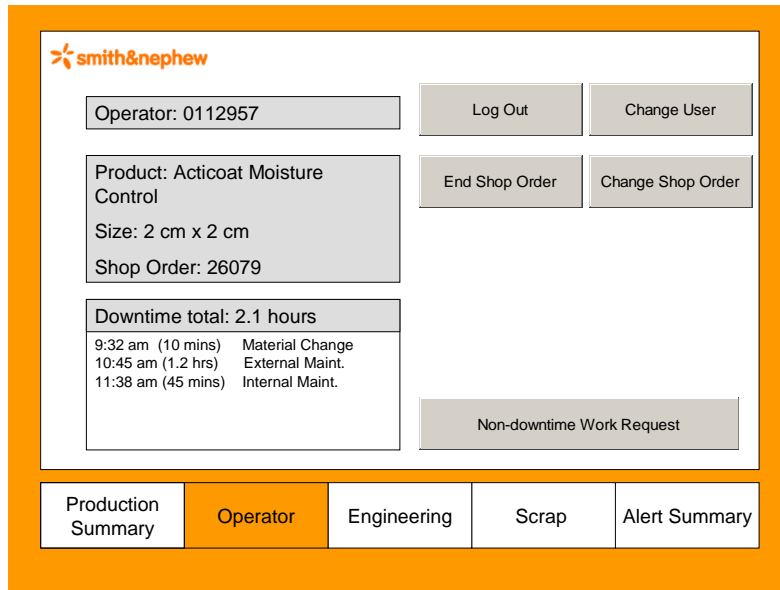
Largo's Site Network



Operator Interface Terminals

- Using VB custom Processbook displays were created and developed at each machine. These were used for:
 - Scrap information input to PI and to our ERP (AS400 and later SAP). This also trigger the material allocation in the ERP.
 - Shop orders were bar code scanned and information was retrieved from ERP then written to PI. This allows traceability of raw materials as well as lot control.
 - Users logged in using a barcode badge.
 - To display real-time information and manufacturing targets to our direct labor.
- Processbook proved to be a reliable platform as an interface for our direct labor to perform ERP functions and data entry.

Operator Interface Terminals: Examples



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Operator: 0112957

Log Out

Change User

Product: Acticoat Moisture Control

Size: 2 cm x 2 cm

Shop Order: 26079

End Shop Order

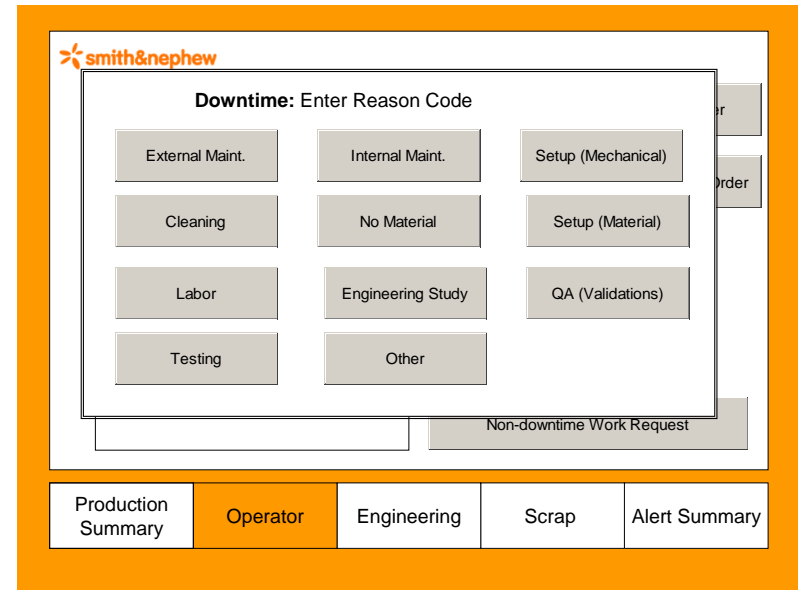
Change Shop Order

Downtime total: 2.1 hours

| | |
|--------------------|-----------------|
| 9:32 am (10 mins) | Material Change |
| 10:45 am (1.2 hrs) | External Maint. |
| 11:38 am (45 mins) | Internal Maint. |

Non-downtime Work Request

| | | | | |
|--------------------|----------|-------------|-------|---------------|
| Production Summary | Operator | Engineering | Scrap | Alert Summary |
|--------------------|----------|-------------|-------|---------------|



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Downtime: Enter Reason Code
















| | | |
|-----------------|-------------------|--------------------|
| External Maint. | Internal Maint. | Setup (Mechanical) |
| Cleaning | No Material | Setup (Material) |
| Labor | Engineering Study | QA (Validations) |
| Testing | Other | |



















Non-downtime Work Request

| | | | | |
|--------------------|----------|-------------|-------|---------------|
| Production Summary | Operator | Engineering | Scrap | Alert Summary |
|--------------------|----------|-------------|-------|---------------|

- Processbook with VB allowed customization to create applications that fit our business needs.

Operator Interface Terminals: Examples

| Skin Care | OIT Online | Work Request | Machine Running | |
|------------------|---|--|---|-------------------------------------|
| | Color Key | Color Key | Color Key | |
| | OIT Online | No Tech Required | Running | |
| | OIT Disconnected | Down and Waiting | Not Running | |
| | OIT not installed | Tech Repairing | Bad Data | |
| Wipes #1 (2113) |  |  |  | Detailed Parameters |
| Wipes #2 (2114) |  |  |  | Detailed Parameters |
| Elf (2211) |  |  |  | Detailed Parameters |
| Kalish (2261) |  |  |  | |
| Unipac #1 (2271) |  |  |  | Detailed Parameters |

| Allevyn | OIT Online | Tech. Status | Machine Running | |
|------------------|---|--|---|-------------------------------------|
| | Color Key | Color Key | Color Key | |
| Radyne #1 (6008) |  |  |  | Detailed Parameters |
| Radyne #2 (6083) |  |  |  | Detailed Parameters |
| Twin #1 (6009) |  |  |  | Detailed Parameters |
| Twin #2 (6084) |  |  |  | Detailed Parameters |
| Doyen #1 (6010) |  |  |  | Detailed Parameters |
| Doyen #2 (6011) |  |  |  | Detailed Parameters |

OEE Reporting

- Traditional OEE collection and reporting platforms allow minimal flexibility. With PI we can report OEE by time (shifts, weeks, months...) or by other variables such as operator, machine settings, raw materials... This flexibility sets PI apart from the rest.

Area: ▼



Date: 7/23/2008

Daily Production:

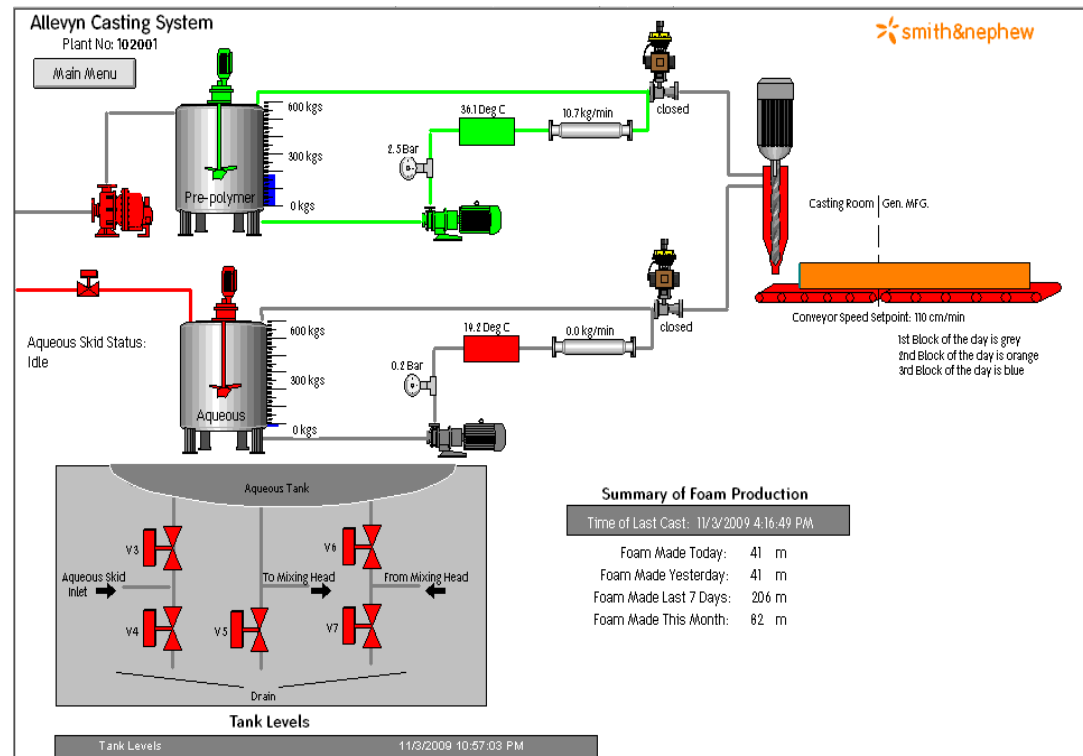
| Equipment | Shift | Operator | Utilization | Part No. | Product | Good Units Made | Rejects | Yield (%) | Downtime (mins) |
|--------------------------------|-------|-------------------|-------------|----------|--------------------------------|-----------------|---------|-----------|-----------------|
| Radyne #1 7/23/2008 Weds | 1 | Hans Illius | 64.5% | 02384 | ALVN ADH NS SUB ASSY 15CMX15CM | 23216 | 1179 | 95.2 | 171 |
| | 2 | marycummings | 41.7% | 02384 | ALVN ADH NS SUB ASSY 15CMX15CM | 14182 | 720 | 95.2 | 280 |
| | 3 | Yaina Romero | 55.0% | 02381 | ALLEVYN ADH NS SUB ASSY 9x9 | 9883 | 502 | 95.2 | 216 |
| | All | | 53.7% | | | 47281 | 2400 | | 667 |
| Radyne #2 7/23/2008 Weds | 1 | S Stojanovic | 39.7% | 02378 | ALLEVYN ADH NS SUB ASSY 3x3 | 39825 | 1175 | 97.1 | 289 |
| | 2 | Denise Cookinson | 63.3% | 02379 | ALLEVYN ADH NS SUB ASSY 5x5 | 28527 | 841 | 97.1 | 176 |
| | 3 | Tony Chesko | 52.5% | 02379 | ALLEVYN ADH NS SUB ASSY 5x5 | 23779 | 701 | 97.1 | 228 |
| | All | | 51.8% | | | 92131 | 2718 | | 694 |
| Twin #1 7/23/2008 Weds | 1 | achanh Vongphrach | 62.3% | 02388 | ALVN ADH NS SUB ASSY 10CMX10CM | 30822 | 263 | 99.1 | 181 |
| | 2 | Dusanka Radic | 50.9% | 02388 | ALVN ADH NS SUB ASSY 10CMX10CM | 13473 | 116 | 99.1 | 236 |
| | 3 | debbie fitzgerald | 50.8% | 02384 | ALVN ADH NS SUB ASSY 15CMX15CM | #VALUE! | #VALUE! | 99.1 | 236 |
| | All | | 54.7% | | | #VALUE! | #VALUE! | | 653 |
| Twin #2 7/23/2008 Weds | 1 | Leonora Keber | 60.6% | 02378 | ALLEVYN ADH NS SUB ASSY 3x3 | 38116 | 429 | 98.9 | 189 |
| | 2 | Phuong Vo | 61.4% | 02378 | ALLEVYN ADH NS SUB ASSY 3x3 | 40598 | 457 | 98.9 | 185 |
| | 3 | Alice Evans | 63.9% | 02378 | ALLEVYN ADH NS SUB ASSY 3x3 | 36090 | 406 | 98.9 | 173 |
| | All | | 61.9% | | | 114804 | 1291 | | 548 |
| Doyen #1 7/23/2008 Weds | 1 | Vasilika Dalip | 62.9% | 66000043 | ALLEVYN ADHESIVE 7.5x7.5CM 10 | 40238 | 508 | 98.8 | 178 |
| | 2 | #N/A | 1.5% | 66150043 | ALLEVYN ADHESIVE 7.5x7.5CM B10 | 1024 | 13 | 98.8 | 473 |
| | 3 | Annie Matakayaro | 64.2% | 66150043 | ALLEVYN ADHESIVE 7.5x7.5CM B10 | 42315 | 534 | 98.8 | 172 |
| | All | | 42.9% | | | 83576 | 1055 | | 823 |
| Doyen #2 7/23/2008 Weds | 1 | Amy Lubianetzky | 1.9% | 66000599 | ALLEVYN ADH 10CMX10CM BOX 10 | 1413 | 0 | 100.0 | 471 |
| | 2 | Sabina Gardner | 57.7% | 66000599 | ALLEVYN ADH 10CMX10CM BOX 10 | 33353 | 0 | 100.0 | 203 |
| | 3 | mary martiez | 66.5% | 66000599 | ALLEVYN ADH 10CMX10CM BOX 10 | 47093 | 0 | 100.0 | 161 |
| | All | | 42.0% | | | 81859 | 0 | | 835 |

Our Achievements enabled by PI

- On the install of PI we estimated a OEE change of about 10% (based on capacity we have no way of measuring).
- Disposable Wipes: Baseline OEE: 53% Current OEE: 68%
 - Data pointed to reoccurring machine failures and changeover downtime.
- Skin Care: Baseline OEE: 48% Current OEE: 76%
 - Using PI OEE data we were able to reschedule, adjust batch sizes, and go after problems causing downtime.
 - We were able to go from a 3 shift working overtime to 2 shifts in our first year.
- Bandages: Baseline OEE: >40% Current OEE: 65%
 - PI highlighted that our product changeovers and shift changeovers were regularly causing Utilization below 40%.

Engineering Applications

- PI is changing our engineering/technical teams approach to problem solving by providing real-time and historical data at everyone's finger tips.

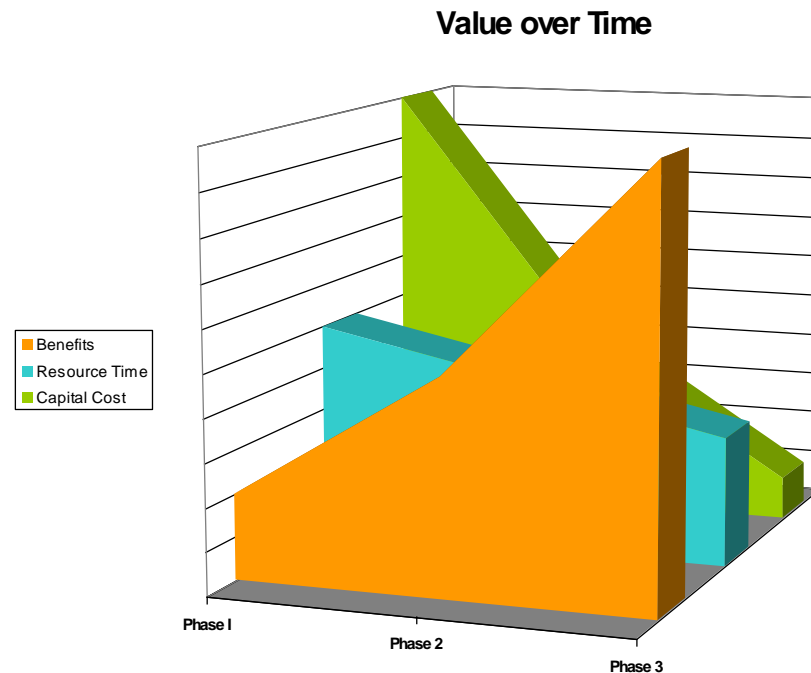


Smith & Nephew Driven by Data

- Currently Smith & Nephew has two PI systems: In Largo, FL and Suzhou, PRC. We have made PI part of our business by:
 - Tracking manufacturing metrics (OEE)
 - Defining and measuring improvement projects (Kaizen events, lean, Six Sigma)
 - Material usage and as signal for replenish (lean)
 - Engineering trouble shooting
 - FDA Validations/optimization support

Looking forward

- This year Smith & Nephew plans to implement PI at the Wound Management HQ site in Hull, UK.
- Currently finalizing our three-phase plan to take PI from a engineering tool to a enterprise system for SNWM.



Questions?