Taking Advantage of the PI System as an Infrastructure for Integration and MES Applications in Global Production Process

Presented by **Ronaldo Manzano**
MES coordinator for Latin and North America

RHODIA
SOLVAY GROUP

"If you don't think information is important, maybe your competitors do and can get some advantages, changing the game's rules. Think twice"

Unknown

Agenda

1. Self introduction
2. Rhodia in brief
3. How to work Globally and Act Locally
4. PI System as an Integration Infrastructure
5. Customer Based PI System Applications
6. Lessons learned

My most relevant experiences using PI

- ✓ Master: Real time Monitoring and fault Diagnosis in a Distillation Column using PI

✓12 years working for Rhodia and other previous 13 years worked for Solvay:

- ✓ 2009 – actual: MES Coordinator for Latin and North America **(IT)**
- ✓ 1991 – 2009 Automation Engineering and Maintenance **(AT)**

- ✓ Project manager:
  - ✓ 2006 - PI (OSISoft) – Paulinia plant – Brazil;
  - ✓ 2010 – PI Skills development – France;
  - ✓ 2011 - PI (OSISoft) and SAP (MES) – Chicago Plant – USA;
  - ✓ 2012 - PI (OSISoft) – University Park plant – USA;
  - ✓ 2012 - PI (OSISoft) – Santo André plant –Brazil;
  - ✓ 2013 - PI (OSISoft) – Vernon plant – Texas USA;
  - ✓ 2013 - PI (OSISoft) – Coatis plant – Brazil.

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Globally Diverse Company

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PI System Supports Globalization of MES/PIMS and Production Processes

"The PI System has been used to support the integration and normalization of Rhodia / Solvay's production processes globally and has enabled a "Think global, act local" evolutionary integration and MES/automation strategy. The PI System is fundamental to our sustainable and profitable growth strategy."

Ronaldo Manzano
MES Coordinator for Latin and North America

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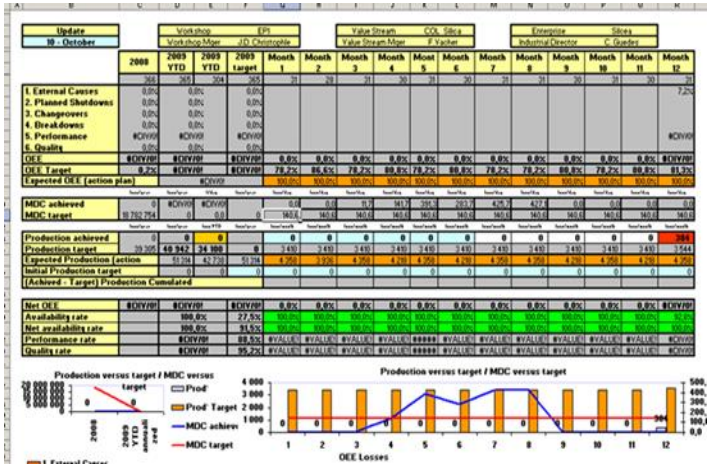


Business Challenge

- Global Company with Multicultural Needs and Expectations
- Legacy AT/IT and MES
- No common KPIs or Procedures
- Local needs and expectations for automation and integration vs desire for global standardization
- No common Global support organization

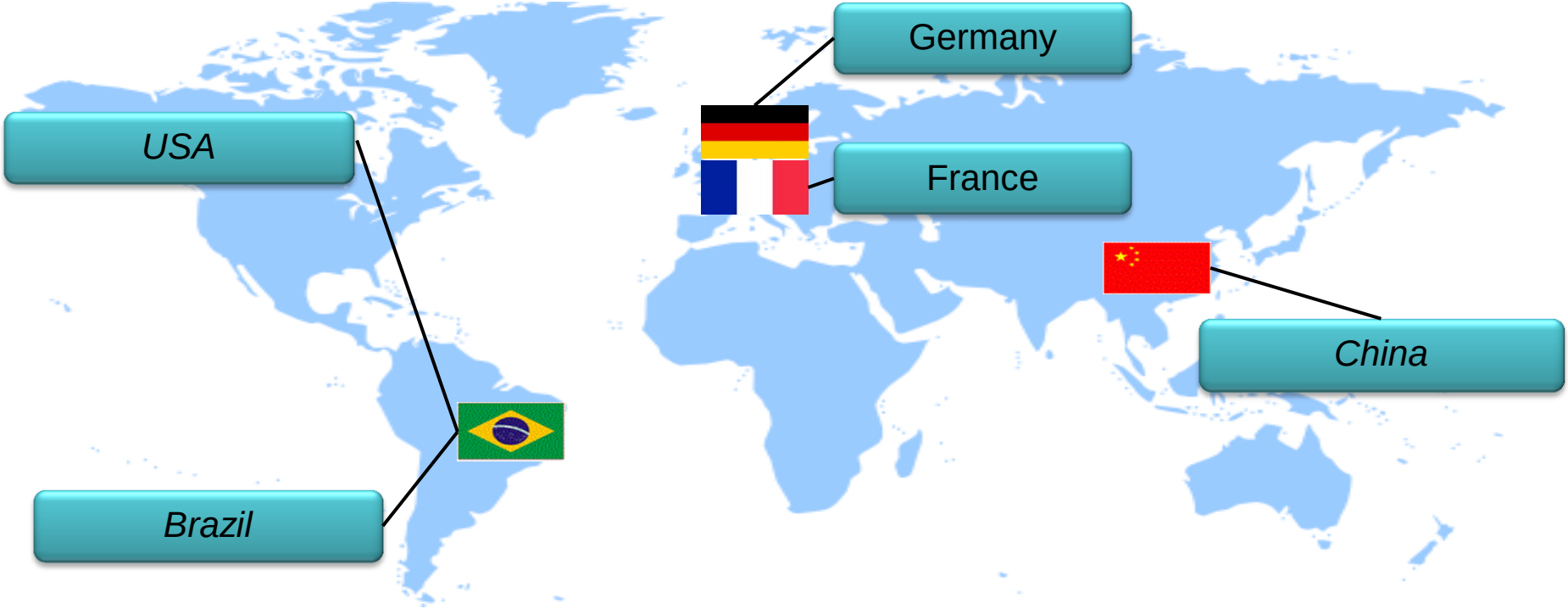
Solution

- Global Standardization on the PI System as an Infrastructure for integration and MES applications
- Creation of a customer focused WW team and approach to MES/PIMS development, rollout, and support
- Development of standardized templates, calculations, applications and KPIs using the PI System

Results and Benefits

- Global, customer focused, collaborative WW support team
- Cultural alignment and leverage
- Balanced and evolutionary procedures and application development, rollout, and support
- Key element of corporate strategy for sustainable growth and profitability

The Need for Global Support



Challenges

- Work in **Global mode**;
- **Multicultural** People and Environment;
- Legacies and **Automation** levels;
- Define **Global** key indicators and procedures;
- **Specificities** of each plant (customizations)
- **Planning**

Standardization

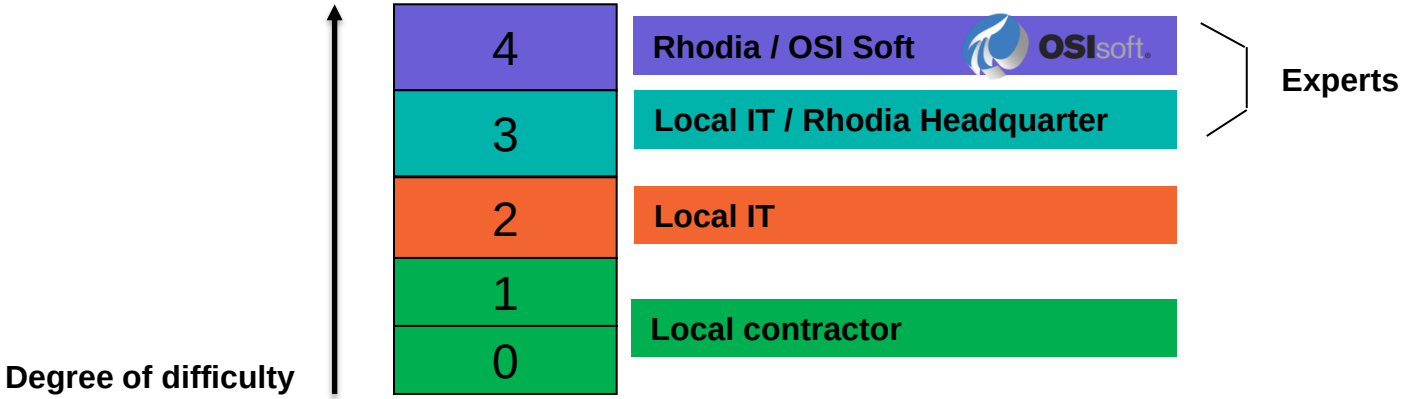
- Create a **Global organization**;
- Define and write down **Procedures** (English);
- Metrics for **key indicators**, templates and calculations for all GBU;
- Make **Global support** for PI System and users;
- Develop **professional applications** (.Net, Java,…);
- **Trainings;**
- PI System **Architecture** – Hard & Soft & Services;
- Work **side-by-side** with Engineering and Maintenance;
- Be **Customer Oriented**.

Organization focused on the Customer

MES POC
Plant
Product line
MES POC(*)
MES coordinator
OSIsoft.
Support
MES/PIMS
Development
(*) Point Of Contact

Support Calls

Calls escalation are inspired by ITIL* philosophy:



* **ITIL**= Information Technology Infrastructure Library is a set of practices for IT service management (ITSM) that focuses on aligning IT services with the needs of business.

Organization of IT support team for MES

- Support is done **remotely** (remote connection to computers);
- For physical actions, (hardware failure, last chance reboot…), we **rely on local agreements:**
  - Hardware vendors
  - Local IT
- Requests for servers must be sent to a **unique email** address;
- Requests for customers must be sent to the local IT **helpdesk;**
- Only requests written in **English** will benefit of 24 hours/ 5 days support.

MES/PIMS Network Animation

- **Periodically** meet each POC on his site;

- Meeting will be the **opportunity** ...
  - For POC give **feedback** on usage of PIMS in the plant, **request** trainings, developments, ask questions,...
  - For MES coordinator **broadcast** information on MES/PIMS system, **new** MES/PIMS applications, inform KPI measurements, ...

SLA: Service Level Agreement – IT side

Service	Requested by
Automatic monitoring	Automatic
Administration	Automatic
Automatic-backup management	Automatic
Backup-to-tape management	Automatic
Repair of MES system	Automatic
Management of Front-End server	Automatic
Support on MES Server	POC
Support on client applications	End user
Authorizations	End user
Installation of client applications	End user
Training	POC
Animation of MES POC Network	MES coordinator
Development of MES applications, purchase new tags and users licenses.	POC

SLA: Customer side

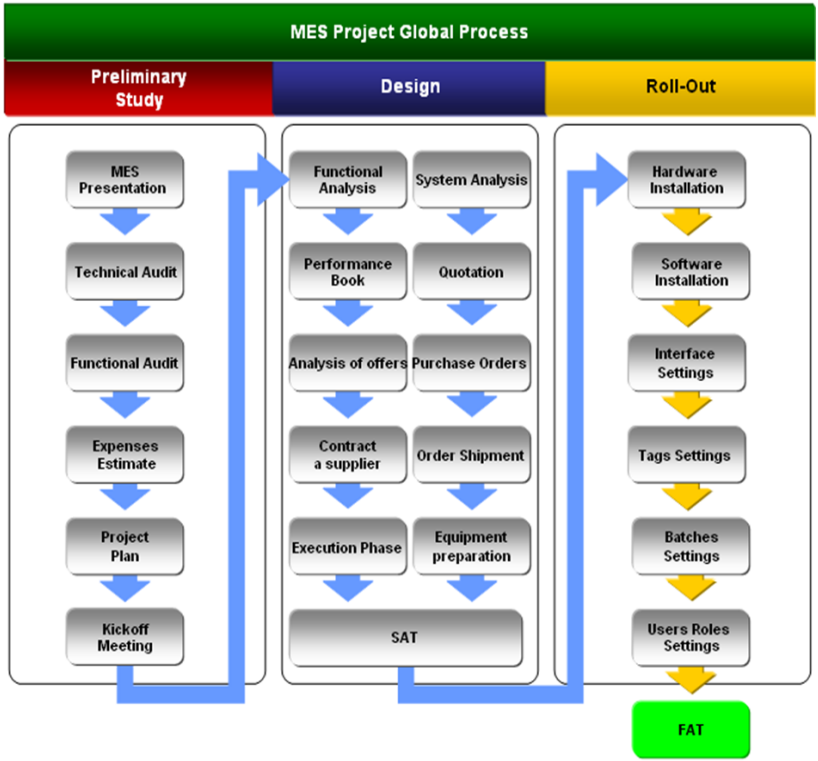
- Nomination of POC
- Unique to communicate with IT
- Broadcast all communication to the end-users
- Support for local actions
- Provide facilities for on-site training.

Planning is everything:

Comprehensive, systematic and it needs involvement of your team and the customers to be succeed.

Main Deliverables

- **Infrastructure** (secure, robustly, reliable, ready to remote access and cost effective);
- **PIMS** installed & configured;
- **Applications** installed and configured;
- **People trained** (PI Basic and Advanced, VBA and Administrator scope).



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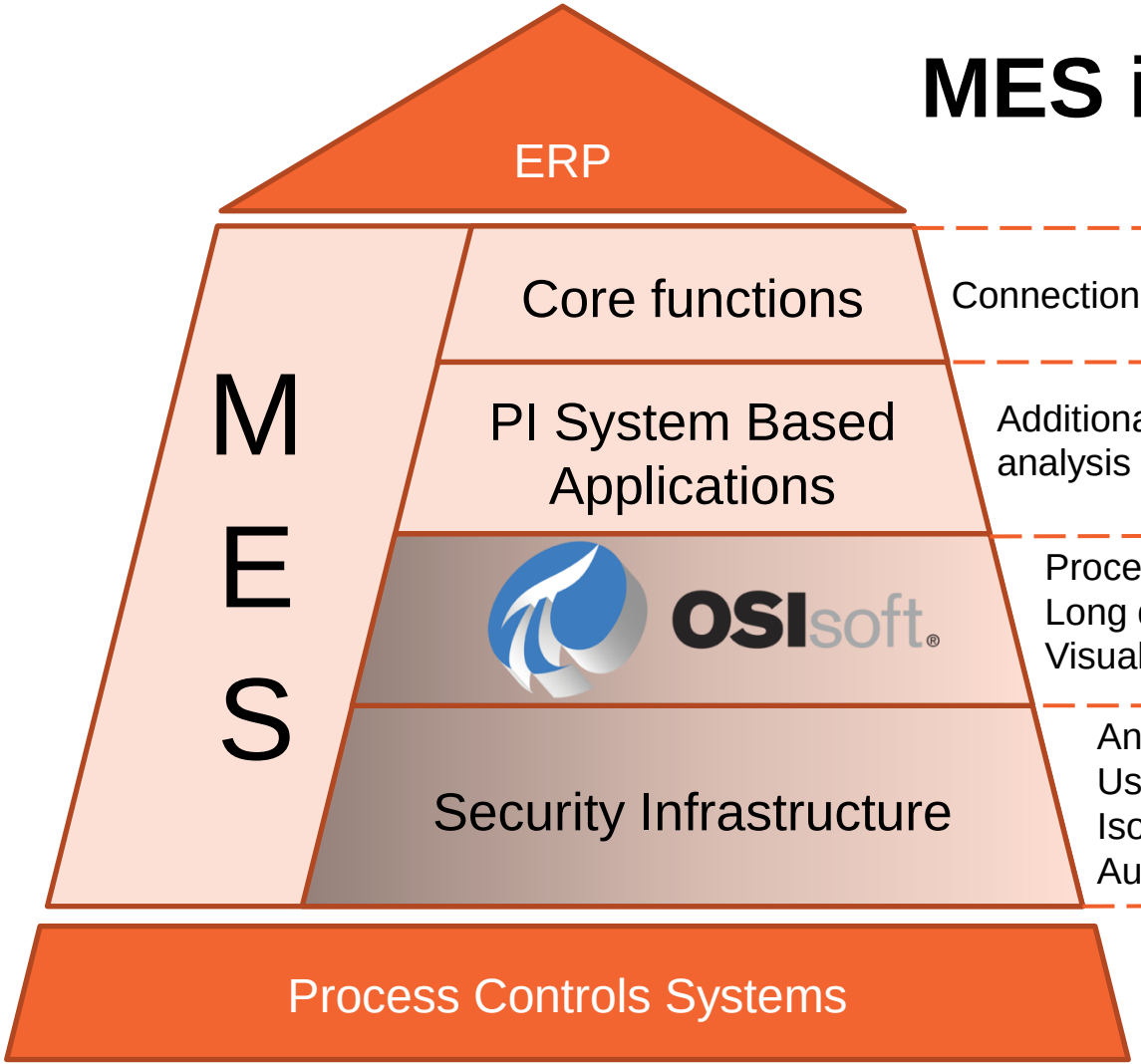
MES in Rhodia using PI



Connection to ERP (SAP)

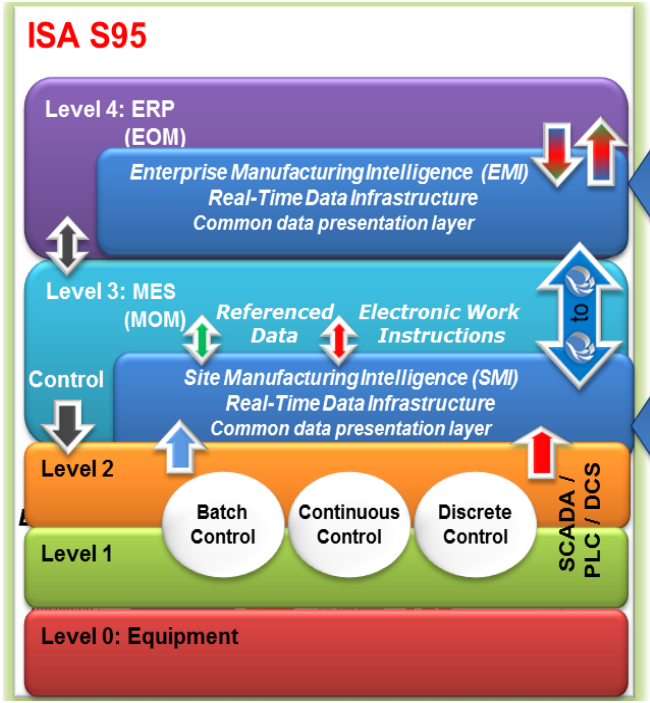
Additional application for Visualization and analysis of data

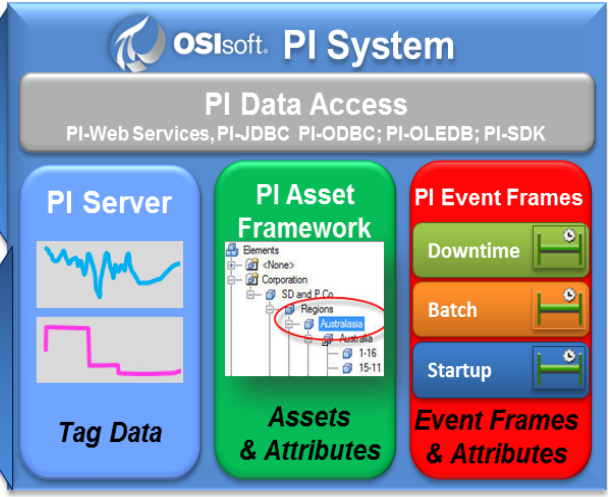
Process data collection (sensors and batches)
Long duration storage
Visualization and analysis of data

Antivirus
Users Authentification with AD
Isolation with firewall
Automatic monitoring

The PI System as an Infrastructure for MES

- Aggregation
- Normalization
- Contextualization
- Analysis
- Visualization
- Propagation



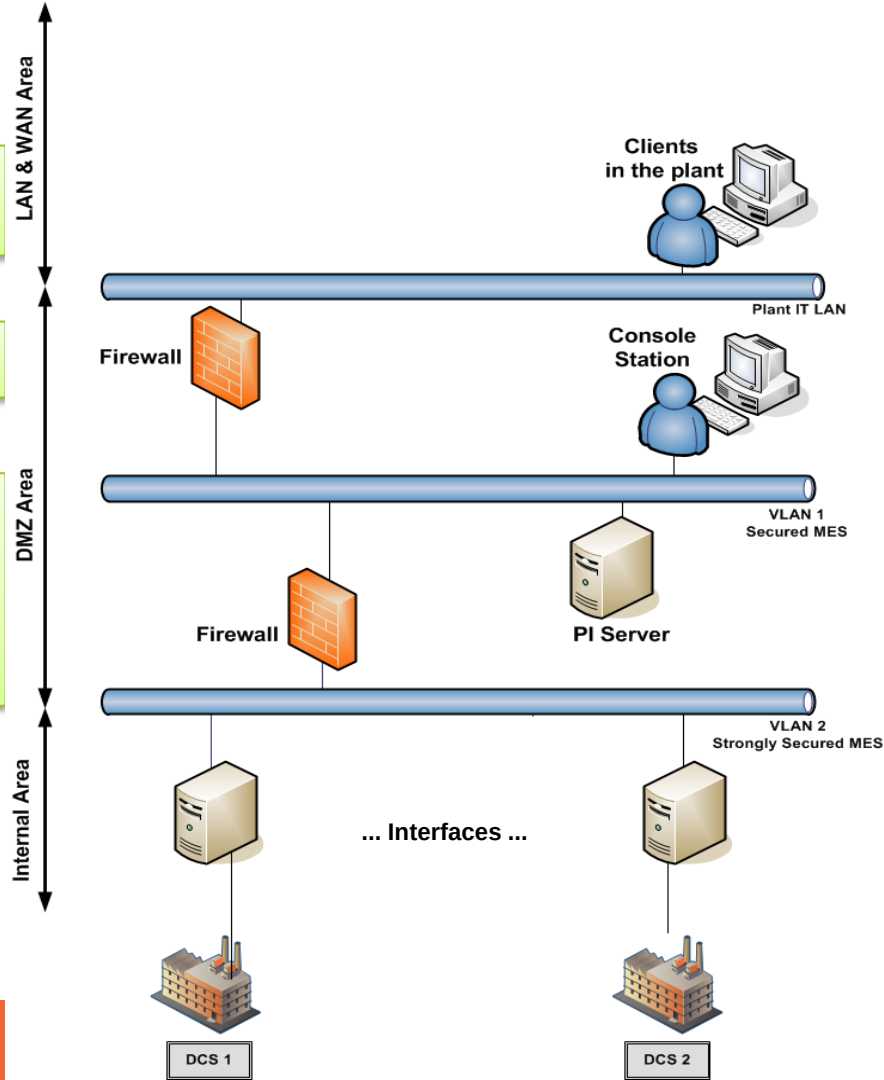


Reference: Article by OSIsoft: "*Evolutionary Enterprise Manufacturing Operations Management*" - Russia MES Magazine Sept, 2012
*Manufacturing Intelligence (MI) Definition by ARC

PI Manage (PI-PB, PI-BatchView, PI-SQC, PI-Datalink)
Process Template Monitor Client

PI Manage

PI Enterprise server
PI-PE, PI-Totalizer, Alarm, PI
AF/MDB, PI-DAP, PI-SQC, PI-Batch
Process Template Monitor



Reference Architecture

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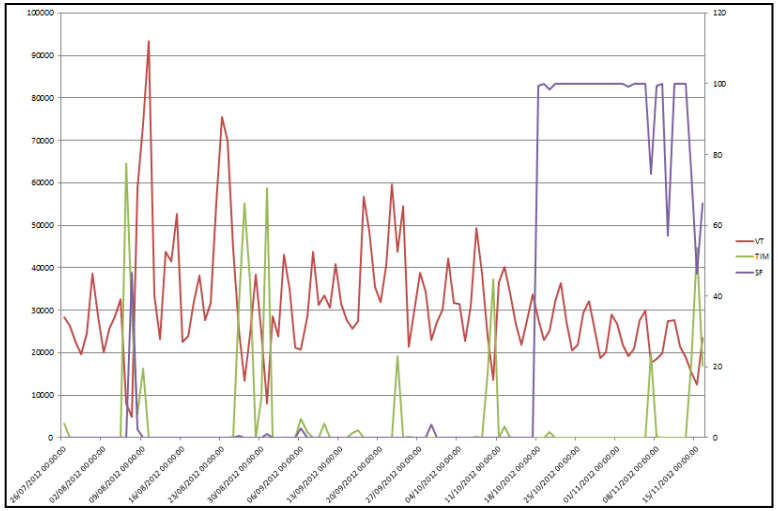
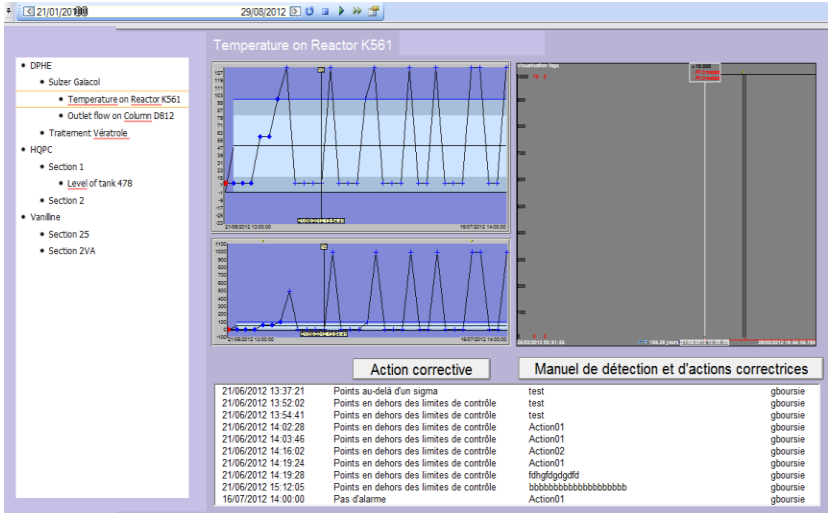
PI System Applications



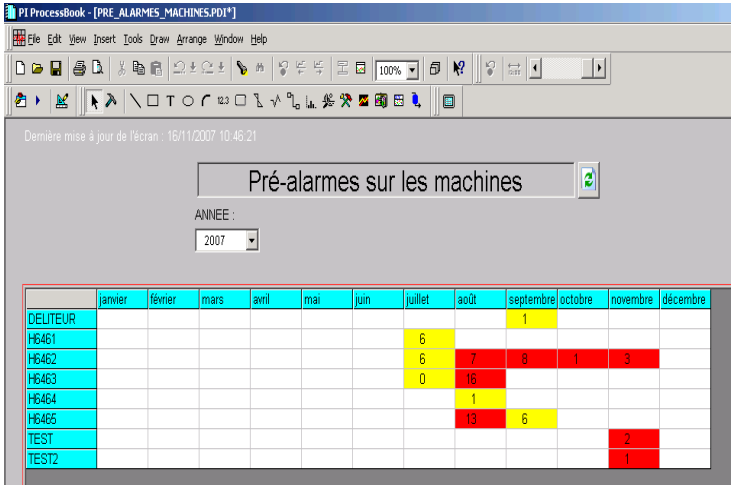
1- PID Assessment:
Automatically compute few daily-performance-indicators for each PID loop

2 - SPC charts: Improve the standard PI SPC
function with additional features



PI System Applications

3 - Assets monitoring: Monitor the operations on production assets , log bad conditions and provides maintenance people with a dashboard

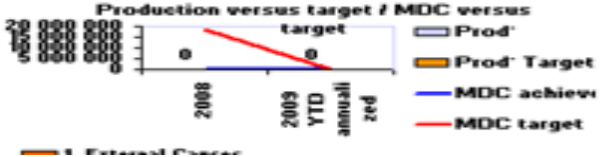


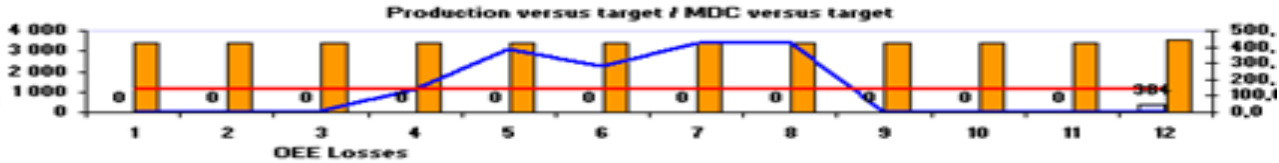
4 - WCM's Key Performance Indicators for Production

On each end of shift, the PI System and MES system will automatically compute and store industrial KPI such as: Qty produced, Duration of production, Production losses (qty & duration), OEE and sub-OEEs, and others.

Update	Workshop	EPI	Value Stream	COIL Silica	Enterprise	Silicea
10 - October	Workshop Mger	J.D. Christophle	Value Stream Mger	F.Vacher	Industrial Director	C. Guedes

	2008	2009 YTD	2009 YTD	2009 target	Month 1	Month 2	Month 3	Month 4	Mont 5	Month 6	Month 7	Month 8	Month 9	Month 10	Month 11	Month 12
	366	365	304	365	31	28	31	30	31	30	31	31	30	31	30	31
1. External Causes	0,0%	0,0%		0,0%												7,2%
2. Planned Shutdowns	0,0%	0,0%		0,0%												
3. Changeovers	0,0%	0,0%		0,0%												
4. Breakdowns	0,0%	0,0%		0,0%												
5. Performance	#DIV/0!	#DIV/0!		#DIV/0!												#DIV/0!
6. Quality	0,0%	0,0%		0,0%												
OEE	#DIV/0!	#DIV/0!		#DIV/0!	0,0%	0,0%	0,0%	0,0%	0,0%	0,0%	0,0%	0,0%	0,0%	0,0%	0,0%	#DIV/0!
OEE Target	0,2%	#DIV/0!		#DIV/0!	78,2%	86,6%	78,2%	80,8%	78,2%	80,8%	78,2%	78,2%	80,8%	78,2%	80,8%	81,3%
Expected OEE (action plan)		#DIV/0!			100,0%	100,0%	100,0%	100,0%	100,0%	100,0%	100,0%	100,0%	100,0%	100,0%	100,0%	100,0%
MDC achieved	0	#DIV/0!	#DIV/0!		0,0	0,0	11,7	141,7	391,3	283,7	425,7	427,1	0,0	0,0	0,0	0,0
MDC target	18 782 754	0	0,0	0	140,6	140,6	140,6	140,6	140,6	140,6	140,6	140,6	140,6	140,6	140,6	140,6
Production achieved	0	0	0		0	0	0	0	0	0	0	0	0	0	0	384
Production target	39 305	40 942	34 100	0	3 410	3 410	3 410	3 410	3 410	3 410	3 410	3 410	3 410	3 410	3 410	3 544
Expected Production (action		51 314	42 738	51 314	4 358	3 936	4 358	4 218	4 358	4 218	4 358	4 358	4 218	4 358	4 218	4 358
Initial Production target		0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
(Achived - Target) Production Cumulated																
Net OEE	#DIV/0!	#DIV/0!		#DIV/0!	0,0%	0,0%	0,0%	0,0%	0,0%	0,0%	0,0%	0,0%	0,0%	0,0%	0,0%	#DIV/0!
Availability rate		100,0%		27,5%	100,0%	100,0%	100,0%	100,0%	100,0%	100,0%	100,0%	100,0%	100,0%	100,0%	100,0%	92,8%
Net availability rate		100,0%		91,5%	100,0%	100,0%	100,0%	100,0%	100,0%	100,0%	100,0%	100,0%	100,0%	100,0%	100,0%	100,0%
Performance rate		#DIV/0!		88,5%	#VALUE!	#VALUE!	#VALUE!	#VALUE!	#####	#VALUE!	#VALUE!	#VALUE!	#VALUE!	#VALUE!	#VALUE!	#DIV/0!
Quality rate		#DIV/0!		95,2%	#VALUE!	#VALUE!	#VALUE!	#VALUE!	#####	#VALUE!	#VALUE!	#VALUE!	#VALUE!	#VALUE!	#VALUE!	#DIV/0!



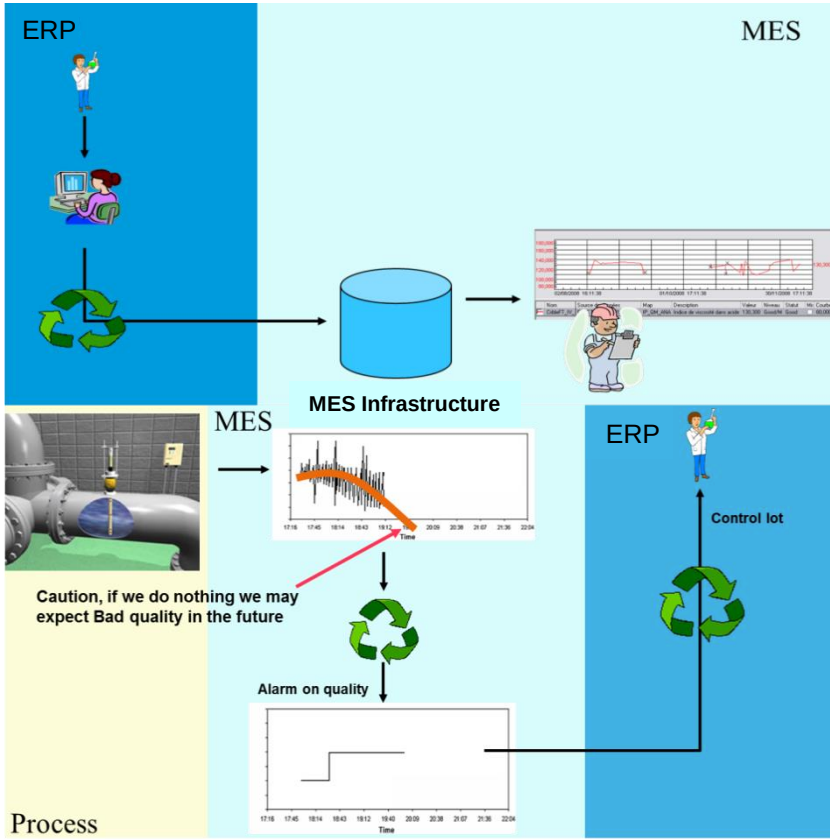


PI System Applications

5 - Quality*
- Quality Control results
- Quality alarms

6 - Maintenance*
- Actual utilization of assets
- Maintenance alarms

7 - Production*
- Quantities produced/consumed
- WCM's Key Performance Indicators for Production



*Part of MES scope. Needs ERP connection.

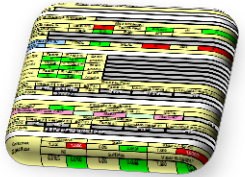
Interactive Integrated Management Platform

Rhodia presentation

Full interactive menus

Trainings

Daily Production meetings



Plant Performance

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Lessons Learned

Use Sound Project Management

1. Define clear scope and Responsibilities
2. Define goals and needs at beginning
3. Plan, plan, and plan some more
4. Teamwork and collaboration
5. Be customer focused
6. Respect multicultural aspects
7. Standardize what is possible

Strategically Leverage the PI System

1. Integration Infrastructure - simplification of IT and application architecture and cyber security
2. Augmentation of MES – ability to standardize, “localize”, and share applications and best practices
3. Standardization and Governance of performance calculations and KPIs
4. Normalization of Units of Measure and Time Zones
5. Knowledge Management and Collaboration

“Most of my customers don't realize that the way they look and the way they think about their looks are two separate issues.”

Martha Beck

“Keeping moving forward”

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Rhodia/Solvay - Paulinia Plant - Brazil

THANK YOU

Obrigado

Merci

謝謝

Gracias

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