

OSIsoft®

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CONFERENCE



Turning **insight** into **action**.



Reducing TCO by Using OSIsoft Infrastructure to Integrate Quality and Laboratory Information

Presented by **Carlos Castillo Linton**

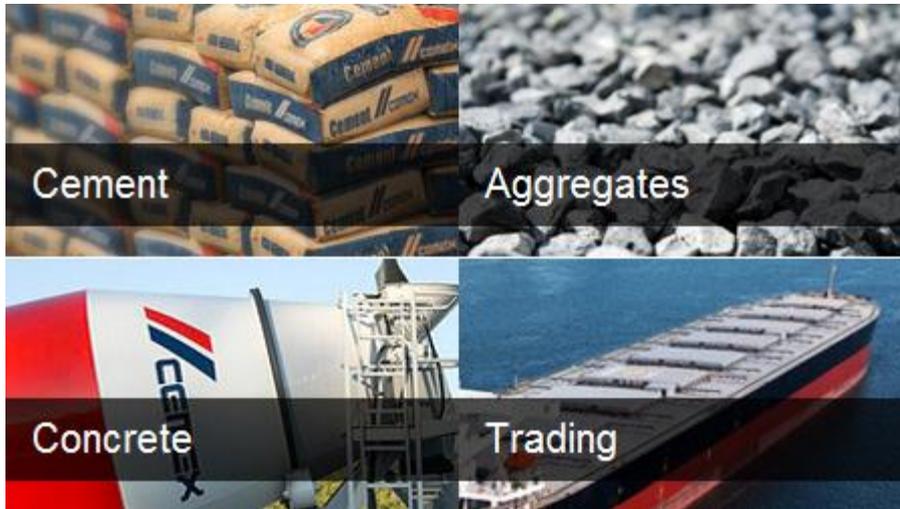
Quality Management, CEMEX Mexico

Content

- About CEMEX
- Business Challenge
- PI System at CEMEX
- Moving forward in Quality
- Business Challenges
- Solution → PIMS-QM
- PI System Architecture
- PIMS-QM Screenshots
- OSIsoft Products Employed
- Results
- Intangible Benefits
- Tangible Benefits
- Future Plans and Next Steps
- Q&A

About CEMEX

CEMEX is a growing global building-solutions company that produces, distributes, and markets **Cement, Ready-Mix Concrete, Aggregates**, and related building materials.



- Operations in **50+ countries**
- Cement: 96 million MT, 63 Plants
- Concrete: 54 million m³ , over 2,000 Facilities
- Aggregates: 168 million MT, 391 Plants
- 223 Land-Distribution Centers
- 72 Marine Terminals

PI System at CEMEX

- 1995 first PI System installed at CEMEX
- 2006 12 plants use the PI System
- In 2007 CEMEX become OSIsoft Enterprise Agreement (EA) customer
- The **PIMS** (**P**lant-wide **I**nformation **M**anagement **S**ystem) Project was an challenging deployment of a OSIsoft infrastructure in all cement facilities:
 - 58 Cement Plants
 - 12 Grinding Plants
 - 14 Countries
 - Executed in 20 months



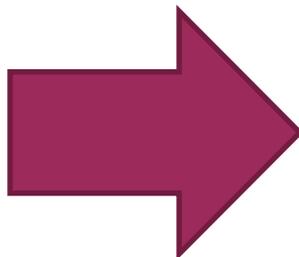
For more about how we made the EA rollout, see [CEMEX UC 2008 presentation](#)

Moving forward in Quality...

Current Situation (2010)

- In-house QM (SICA) sends data to PI System
- 2 different systems to operate
- High TCO:
 - Hardware & Licensing
 - Support & Development
- No standard code naming

Do we need 2 different systems?



Desired Situation (2011)

- Single repository for Quality and Operational data
- Less TCO for Quality tools
- Plant & Corporate visibility
- Internal benchmarking
- Standard code naming
- High Reports flexibility

Could OSIsoft's infrastructure integrate both?

Business Challenges



- Correlate quality and operations data
- Time to consolidate quality data from lab equipment
- Incorporate quality data to a real-time platform
- Standardize and simplify access to data
- Reduction of Total Cost of Ownership (TCO)

How we use the PI System?

- The PI System as keystone in our master plan:

- **Quality**
- Production
- Maintenance
- Environmental
- Energy



- OSIsoft's Center of Excellence (CoE) is a key advisor to implement this master plan

Quality has been one of our priorities because we can reduce TCO

For more about how we are using the EA infrastructure, see CEMEX UC 2009 & 2010 presentations

Solution → PIMS-QM

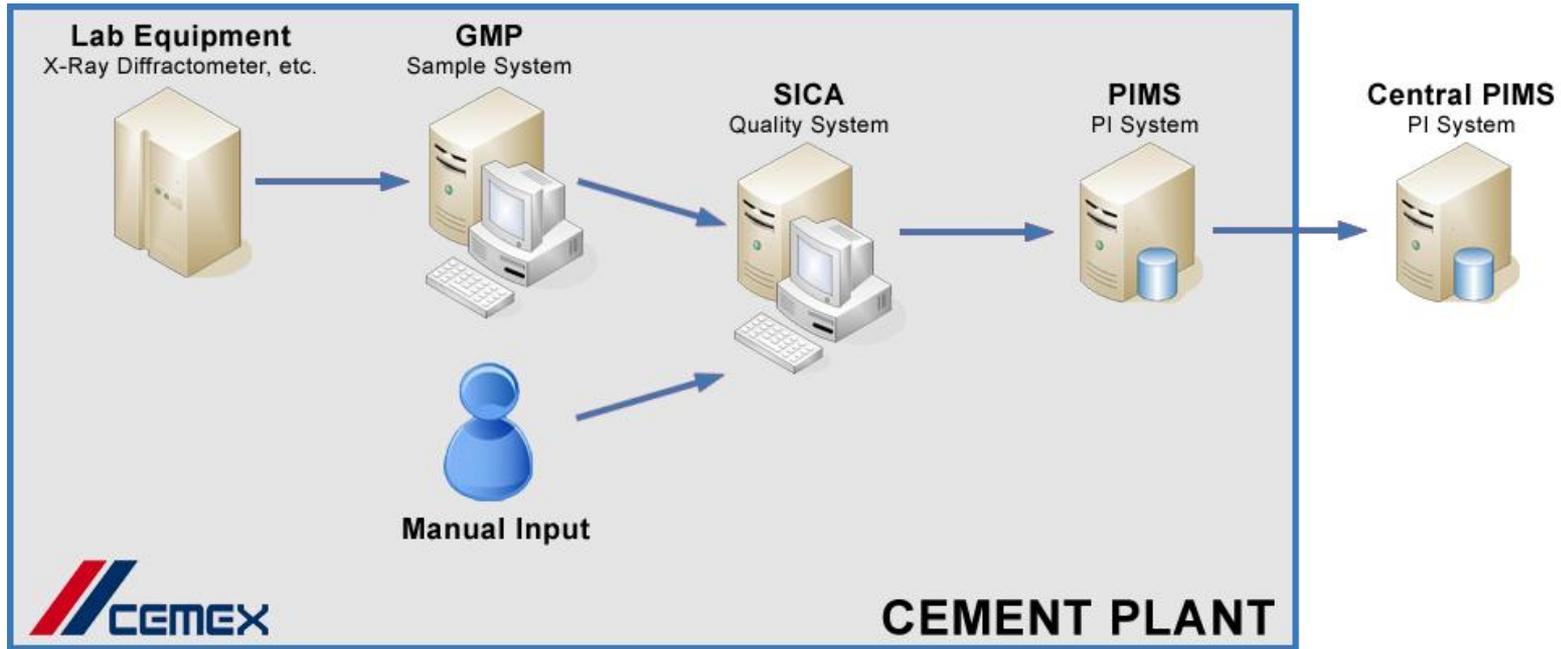
Replace existing Quality system (SICA), with **PIMS-QM** (Quality Module) using OSIsoft's real-time infrastructure.

Functionalities to cover:

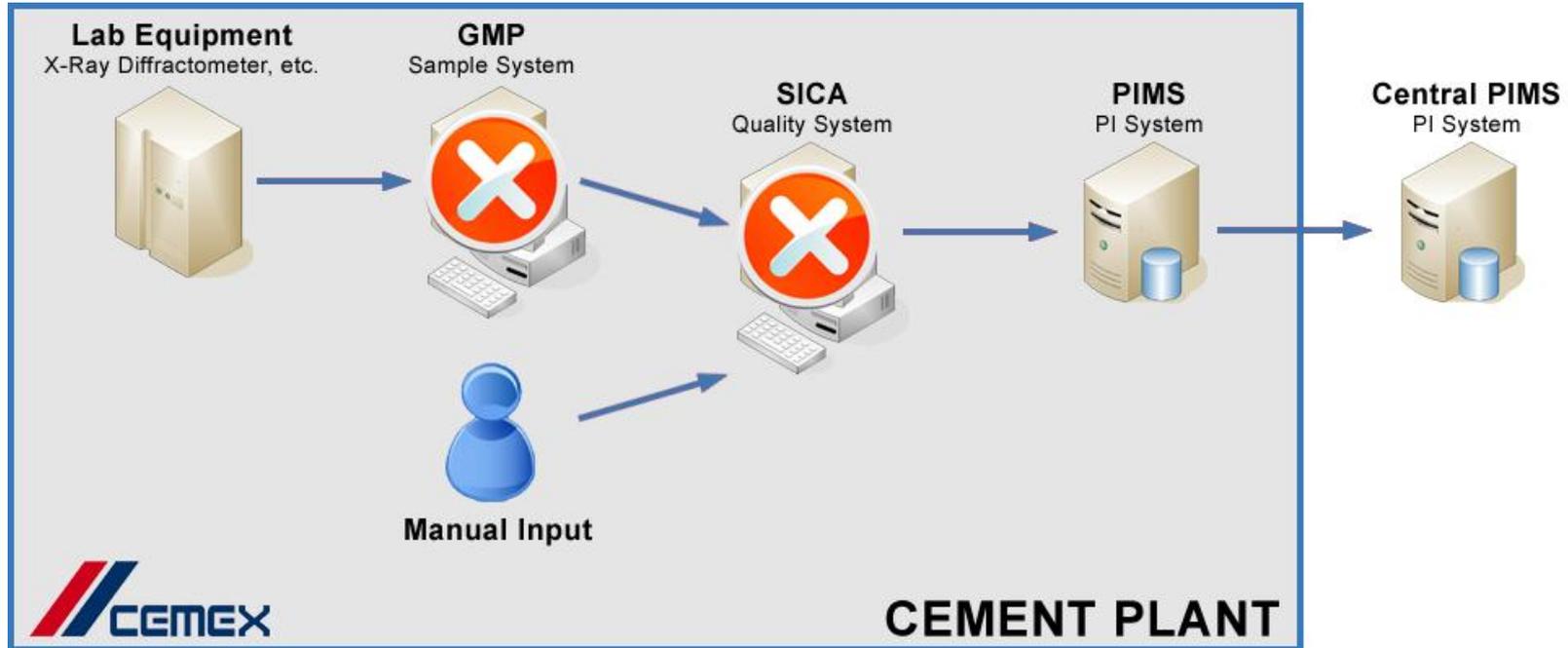
- Data extraction (interface)
- Manual Input
- Plant configuration and templates manager
- Reports
- Calculated KPIs
- Interfaces to another systems (e.g. Plant Control System)



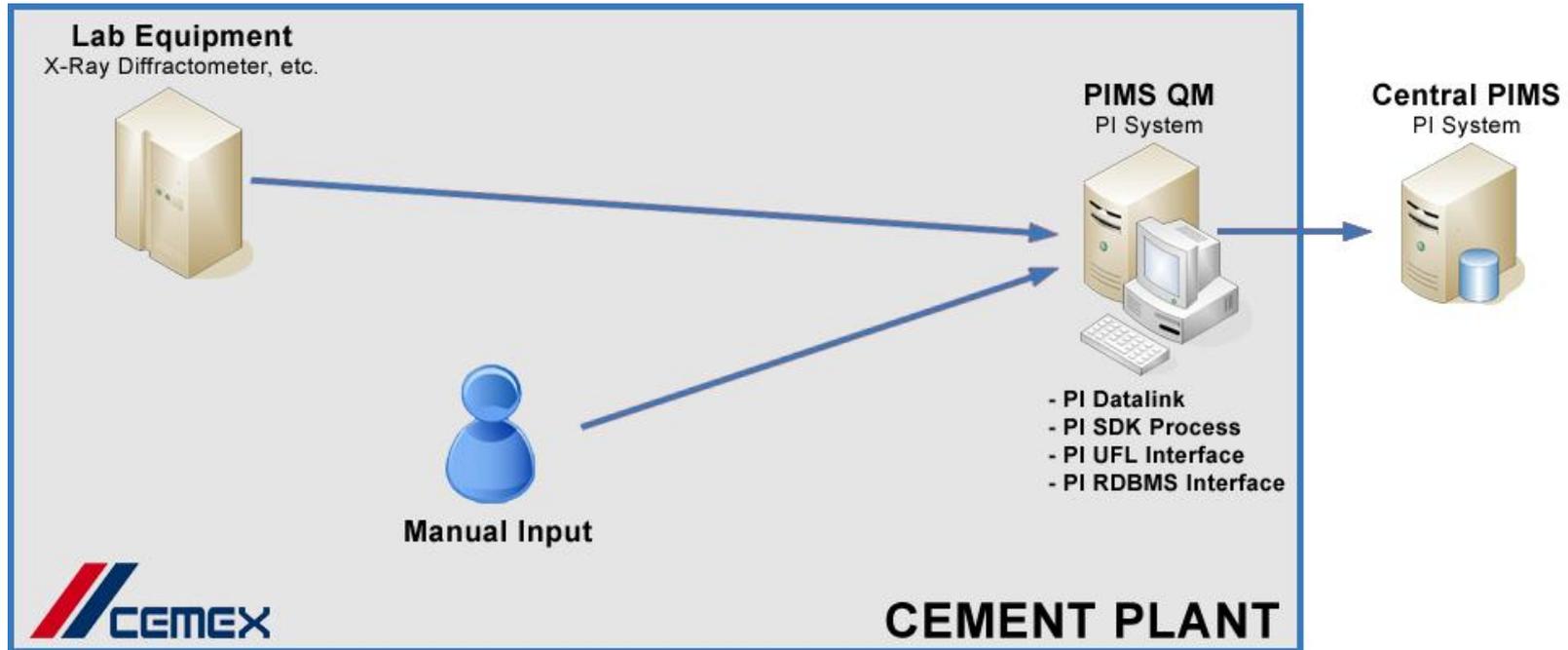
PI System Architecture



PI System Architecture



PI System Architecture



PIMS-QM Screenshots

Manual Input Templates

The screenshot displays the 'PIMS-QM: MONTERREY' interface. At the top left is the CEMEX logo and the text 'Manual Data Entry'. The main header area is dark blue with the title 'PIMS-QM: MONTERREY' in white. Below the header, there is a navigation bar with 'Capture Templates' in the center, flanked by 'Hourly' and 'Composite' options. A sidebar on the left contains buttons for 'Create new template', 'Restore / Edit templates', 'Delete templates', and 'Exit application'. The main content area lists various capture templates under two columns: 'Hourly' and 'Composite'. The background of the interface features a faint image of an industrial facility.

CEMEX
Manual Data Entry

PIMS-QM: MONTERREY

Capture Templates

Hourly Composite

Create new template

Restore / Edit templates

Delete templates

Exit application

AQ CAPTURA MANUAL MMP
AQ CAPTURA MANUAL H5 BLANCO
AQ CAPTURA MANUAL H8
AQ CAPTURA MANUAL H9
AQ CAPTURA MANUAL H10
AQ CAPTURA MANUAL MCB3
AQ CAPTURA MANUAL MCB5
AQ CAPTURA MANUAL MCG6
AQ CAPTURA MANUAL MCG7
AQ CAPTURA MANUAL MCG8

COMPOSITOS CPO 40
COMPOSITOS CPC 40
COMPOSITOS CPC 30 R
COMPOSITOS CPO 40 TEPEYAC
COMPOSITOS BCO EXPORTACION
COMPOSITOS CPO30RB
COMPOSITOS CPC30RB
CLINKER RESIDUO INSOLUBLE-PX1

PIMS-QM Screenshots

Manual Input Template Editor

PIMS-QM: Manual Data Entry

 **CREATE NEW TEMPLATE**

Step 1: Select template frequency type

Template type:

Step 2: Filter and select variables to be used in the template

Equipment: Material: Inspection Point: Variables:

Apply cascade filter

Equipment	Material	Inspection Point	Variable	Data type	Lab Equipment
Horno 8	Grey Raw Meal	Feed	Alumina Modulus	Calculated Data	Does not apply
Horno 8	Grey Raw Meal	Feed	Aluminum Oxide Content	Lab Equipment	X-Ray Spectrometer
Horno 8	Grey Raw Meal	Feed	Calcium Fluoride Content	Lab Equipment	X-Ray Spectrometer
Horno 8	Grey Raw Meal	Feed	Calcium Oxide Content	Lab Equipment	X-Ray Spectrometer
Horno 8	Grey Raw Meal	Feed	Fineness 200 Sieve/75 microns	Manual	Does not apply
Horno 8	Grey Raw Meal	Feed	Iron Oxide Content	Lab Equipment	X-Ray Spectrometer

Equipment	Material	Inspection Point	Variable	Data type	Lab Equipment

Step 3: Select group criteria, split by group and define template name to finish.

Group by: Template name:

Multisections per sheet



PIMS-QM Screenshots

Lab Equipment Interface Config.

MONTERREY
[Min] [Max] [Close]

CEMEX
New sample configuration

Sample configuration

Sample: <input type="text" value="HOURLY RAW MEAL"/>	Equipment: <input type="text" value="Molino de Materias Primas 5 E"/>
Description: <input type="text"/>	Material: <input type="text" value="Limestone"/>
Lab equipment: <input type="text" value="X-RAY CUBIX"/>	Inspection point: <input type="text" value="Feed"/>

Define sample type

Type:

Line	Element	Del. char
1	2	

Define variable type

Type:

Variable detail

Variables	Variable parameters				Value parameters	
	ID	Line	Position	Length	Position	Length
<input type="text" value="Tricalcium Alminate Content ASTM"/>			2	20	2	2

PIMS-QM variables		Variable parameters				Value parameters	
Description	Code	ID	Line	Position	Length	Position	Length
Dicalcium Silicate Content ASTM	A2S	1	1	2	20	2	2

PIMS-QM Screenshots

Data Acquisition Report

MONTERREY													
AQ CAPTURA MANUAL H10													
Fecha: Mar/04/2011													
Horno 10													
Harina Cruda													
Alimentación													
Equipo Material Punto de Inspección	Contenido de Óxido de Silíce	Contenido de Óxido de Aluminio	Contenido de Óxido de Hierro	Contenido de Óxido de Calcio	Contenido de Óxido de Magnesio	Contenido de Óxido de Azufre	Contenido de Óxido de Sodio	Contenido de Óxido de Potasio	Contenido de Fluoruro de Calcio	Modulo de Silíce	Modulo de Alúmina	Factor de Saturación de Cal	Finura Malla 200/75 micras
	Equipo Lab	Equipo Lab	Equipo Lab	Equipo Lab	Equipo Lab	Equipo Lab	Equipo Lab	Equipo Lab	Equipo Lab	Dato calculado	Dato calculado	Dato calculado	Manual
Día / Hora de Muestra													
04 Mar/2011 00:00	12.85	3.40	1.36	44.02	0.66	0.76	0.16		1.06	0.00	2.50	107.70	80.3
04 Mar/2011 01:00													
04 Mar/2011 02:00	12.81	3.38	1.32	43.48	0.68	0.73	0.14		13.33	0.00	2.60	106.80	
04 Mar/2011 03:00													
04 Mar/2011 04:00	13.01	3.40	1.33	43.78	0.67	0.76	0.14		0.55	0.00	2.50	106.00	83.8
04 Mar/2011 05:00													
04 Mar/2011 06:00	13.14	3.43	1.35	43.87	0.66	0.75	0.17		0.30	0.00	2.50	105.20	
04 Mar/2011 07:00													
04 Mar/2011 08:00	12.62	3.34	1.31	44.19	0.65	0.86	0.13		0.05	0.00	2.50	110.10	87.4
04 Mar/2011 09:00													
04 Mar/2011 10:00	12.65	3.35	1.31	44.08	0.66	0.74	0.15		0.34	0.00	2.50	109.60	
04 Mar/2011 11:00													
04 Mar/2011 12:00	12.69	3.29	1.31	43.37	0.70	0.75	0.13		0.86	0.00	2.50	107.70	85.4
04 Mar/2011 13:00													
04 Mar/2011 14:00	12.95	3.36	1.32	43.83	0.67	0.73	0.14		24.84	0.00	2.50	106.70	
04 Mar/2011 15:00													
04 Mar/2011 16:00	12.85	3.38	1.31	43.28	0.70	0.77	0.11		2.10	0.00	2.60	106.00	85.2
04 Mar/2011 17:00													
04 Mar/2011 18:00	13.32	3.34	1.31	43.61	0.68	0.74	0.24		0.74	0.00	2.60	103.60	
04 Mar/2011 19:00													
04 Mar/2011 20:00	12.84	3.36	1.31	43.65	0.69	0.72	0.10		1.39	0.00	2.60	107.10	84.8
04 Mar/2011 21:00													
04 Mar/2011 22:00	12.84	3.36	1.32	43.73	0.67	0.72	0.10		1.00	0.00	2.50	107.20	
04 Mar/2011 23:00													
CANTIDAD	12.00	12.00	12.00	12.00	12.00	12.00	12.00		12.00	12.00	12.00	12.00	6.0
MAX	13.32	3.43	1.36	44.19	0.70	0.86	0.24		24.84	0.00	2.60	110.10	87.4
MIN	12.62	3.29	1.31	43.28	0.65	0.72	0.10		0.05	0.00	2.50	103.60	80.3
PROMEDIO	12.88	3.36	1.32	43.74	0.67	0.75	0.14		3.88	0.00	2.53	106.38	84.5
DES EST	0.20	0.03	0.02	0.28	0.02	0.04	0.04		7.53	0.00	0.05	1.77	2.4
COEF VAR	1.56	1.02	1.22	0.64	2.40	4.77	25.59		194.17		1.94	1.65	2.8



OSIsoft Products applied

- Existing PI System infrastructure at each plant cover by the Enterprise Agreement
- Standard tool for all cement plants.
 - PI System
 - PI DataLink / MS Excel
 - PI ProcessBook
 - PI UFL Interface for X-Ray analyzers
- No tag license limitation
- No extra licenses required



Results

- **Single Platform** for Quality and Production data
- **Standardization**
- Real-time **Quality KPI's**
- Faster data gathering process
- Enhanced data security
- Easy corporate consolidation
- Cross business visibility



Intangible Benefits

- Keep quality practices standardized
- Business unit benchmarking
- Production and quality data correlation
- Integrate X-ray equipment from different vendors
- Eliminate risk of technology obsolescence
- Easy integration with company ERP (SAP)

Tangible Benefits

- Reduce TCO of previous in-house system by USD \$ 800 k/year approx.
- Calculated ROI is 6 months
- No extra cost for OSIsoft licenses, all are included in the Enterprise Agreement



Future Plans and Next Steps

- PIMS-QM Application Development – Completed
- PIMS-QM Implementation:
 - Mexico – 90%, Stabilization phase in progress
 - Europe – Starting in 2011
 - Asia – Scheduled for 2012
 - Americas – Scheduled for 2012

Questions



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Thank you

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