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A Lycopodium Business



# CEMENT QUALIFICATIONS

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## PROJECTS & EXPERIENCE

## LOCATIONS

# ENGINEERING AND EPCM CAPABILITIES ALL AROUND THE WORLD



**ARGENTINA**  
TUCUMAN  
BUENOS AIRES

**BRAZIL**  
BELO HORIZONTE

**UNITED STATES**  
DALLAS, TX

**AUSTRALIA**  
PERTH

CERTIFIED

**ISO 9001**  
**ISO 14001**  
**ISO 45001**

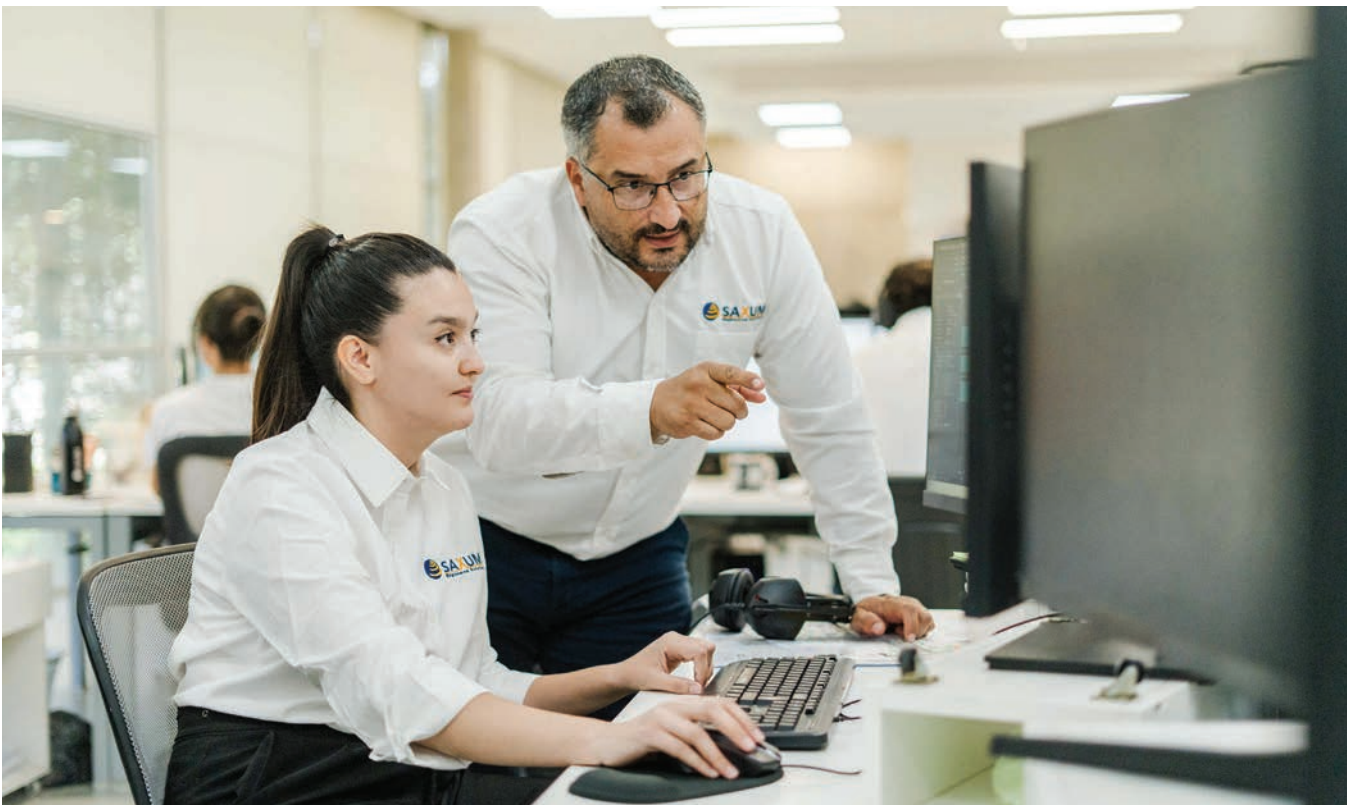


SAXUM is committed to continuous improvement, aligning all its procedures with the highest international standards. We are proud to hold the ISO 9001:2015 quality certification.

## SERVICES

We stand out through our deep expertise in EPCM services for the mineral processing, oil & gas, and infrastructure industries. Our high-level engineering and project management teams ensure reliable execution, delivering optimized technical solutions on time and within budget—whether for new developments or facility upgrades.

| Engineering & Design                 | Project Development    | Execution & Delivery       | Procurement           |
|--------------------------------------|------------------------|----------------------------|-----------------------|
| Multidisciplinary Engineering        | Feasibility Studies    | EPCM Services              | Procurement           |
| Conceptual, Basic & Detailed Designs | CAPEX/OPEX Evaluations | Site Supervision           | Logistic & Expediting |
| Trade-Off Studies                    | Consulting Services    | Commissioning              | Auditing              |
|                                      |                        | Planning & Project Control |                       |



## ENGINEERING

### INTEGRATED ENGINEERING SERVICES FOR PLANT DESIGN



PROCESS ENGINEERING FOR THE CEMENT & LIME INDUSTRIES

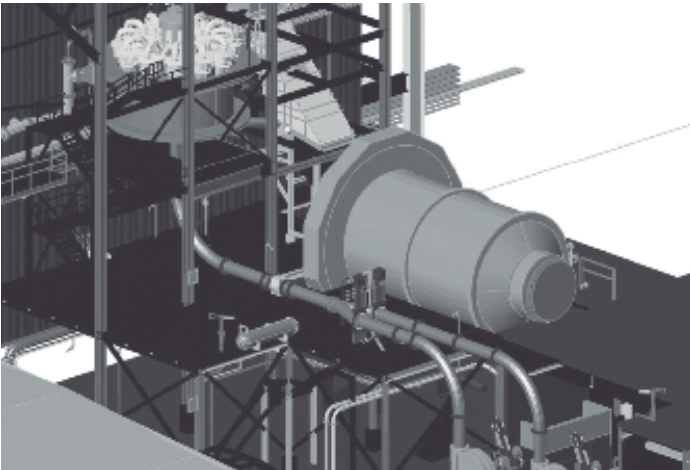
MECHANICAL ENGINEERING (PLANT DESIGN, PIPING, PROCESS GAS HANDLING, ENVIRONMENTAL CONTROLS, NUISANCE DUST COLLECTION AND MATERIALS HANDLING, CRUSHING AND GRINDING SYSTEMS)

CIVIL AND STRUCTURAL ENGINEERING

ELECTRICAL, INSTRUMENTATION & CONTROL ENGINEERING

## ENGINEERING

WE PROVIDE ENGINEERING SERVICES FROM CONCEPT TO REALITY



SCOPING STUDIES AND TRADE OFF ANALYSIS

CAPEX AND OPEX STUDIES

COMPLETE ENGINEERING: CONCEPTUAL, BASIC AND DETAILED

PROCESS, MECHANICAL/PIPING/DUCT, CIVIL/STRUCTURAL, ELECTRICAL,  
I&C ENGINEERING

SCHEDULE DEVELOPMENT

MAIN PROCESS EQUIPMENT BID DOCUMENT PREPARATION

AUXILIARY EQUIPMENT SELECTION ASSISTANCE

CONSTRUCTION BID DOCUMENT PREPARATION

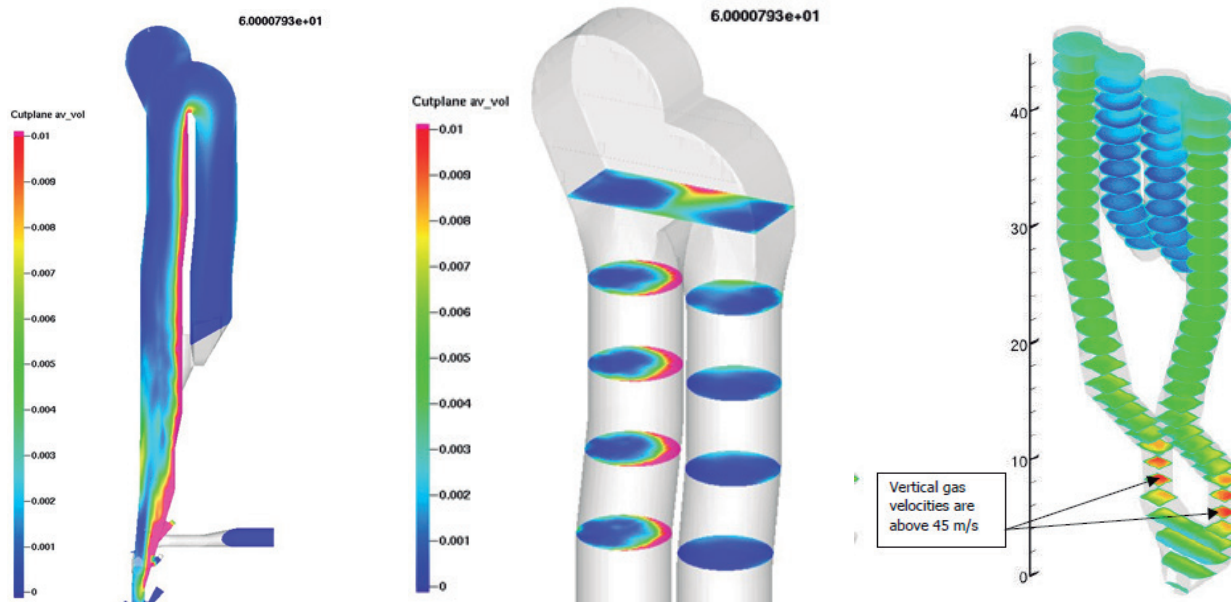
PROCUREMENT

CONSTRUCTION MANAGEMENT

SITE SUPERVISION

## ENGINEERING

### CFD FOR ALTERNATIVE FUELS ASSESSMENT



Computational Fluid Dynamics Analysis (CFD) are performed at SAXUM at the highest level of quality, in the following industrial problems:

#### CO-PROCESSING STUDIES FOR THE CEMENT INDUSTRY

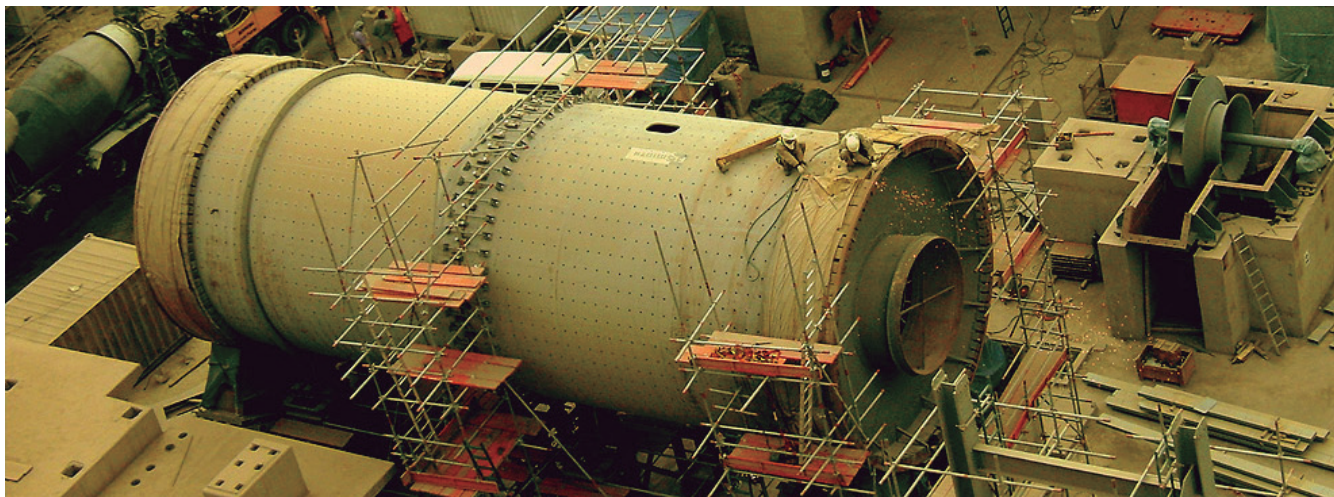
In this case, the main application is the evaluation of the efficiency of using alternative fuels in the pyro-process area of clinker production plants. The goal is to determine the optimal injection point of the alternative fuel in the pre-calciner and the ratio of the alternative fuel to be used.

#### STRESS ANALYSIS IN PIPING SYSTEMS

CFD analysis with fluid-solid interaction is also used by SAXUM to evaluate resulting stress distributions in piping systems under consideration of the real hydraulic properties of the fluid, its pressure, and the temperature conditions. These analyses give rise to the selection of the optimal designs of piping systems in industrial applications.

## ENGINEERING

### PROCESS ENGINEERING FOR THE CEMENT INDUSTRY



#### PROCESS OPTIMIZATION

- Solution of chronic problems
- Performance of mass and heat balances
- Improvement of equipment performance
- Identification of bottlenecks and opportunities for improvement.
- Comparison with “World Class” ratios
- Recommendations for changes to the process
- Chemical and mechanical process engineering. Mass and Heat balances.



#### “IN SITU” IMPROVEMENTS

- Operational troubleshooting in a practical way
- Process calculations
- Product improvements studies
- Alternative fuels and materials optimization
- Commissioning

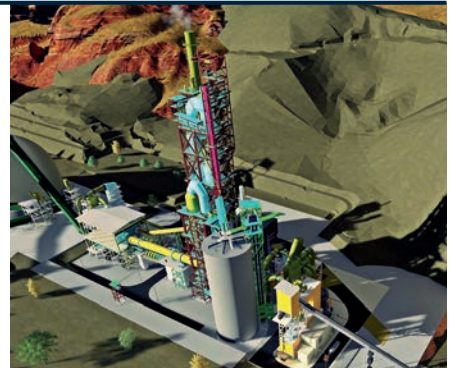


## ENGINEERING

### PROCESS ENGINEERING FOR THE CEMENT INDUSTRY

#### BENCHMARKING

- Key Performance Indicators (KPIs) tested by the world's largest cement producers.
- Databook with clear and standardized definitions
- Comparisons with “World Class” operations
- Base to implement continuous improvement systems.



#### FEASIBILITY STUDIES

- Best technology recommendation
- CapEx and OpEx estimates
- Technical-economic evaluation
- Use of existing equipment
- Facilities upgrading



#### TRAINING & PROGRAMS

- Basic program of introduction to the cement industry (modular)
- Advanced tailored made programs



## ENGINEERING

### MECHANICAL ENGINEERING & PLANT DESIGN



SYSTEMS INTEGRATION WITH MULTIPLE VENDORS

PLANT LAYOUTS

GENERAL ARRANGEMENTS

EQUIPMENT TECHNICAL EVALUATIONS

EQUIPMENT SIZING AND CAPACITY DETERMINATION

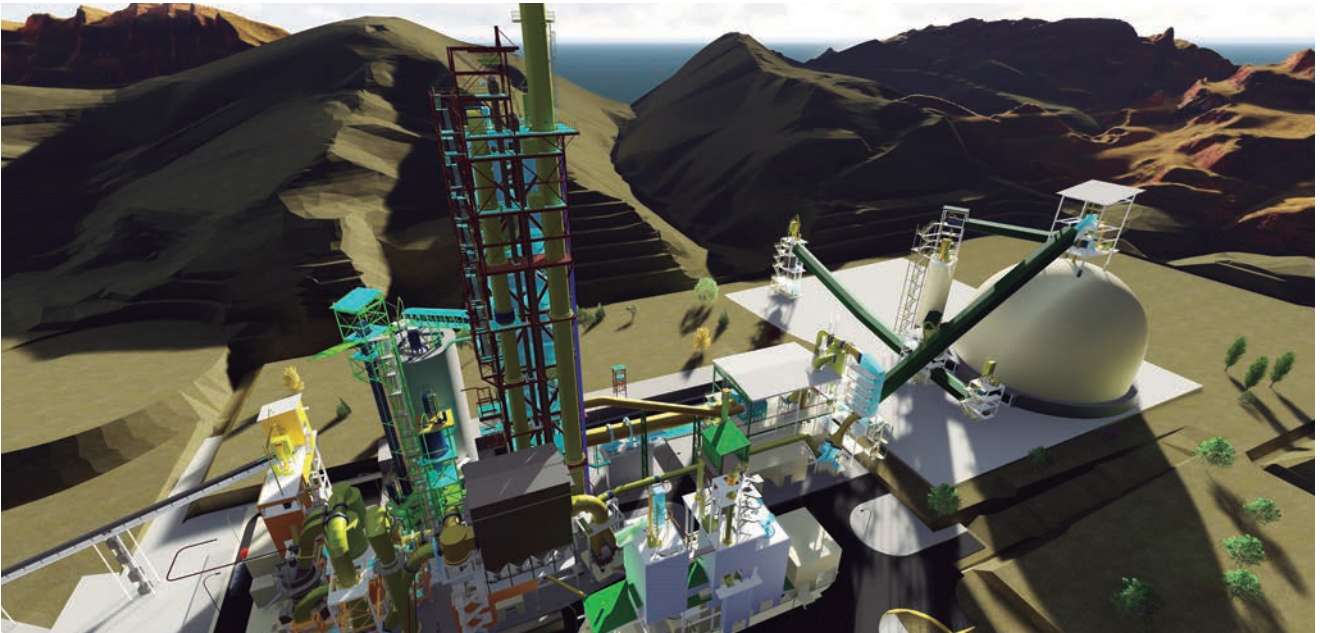
EQUIPMENT AND INSTALLATION SPECIFICATIONS

DUCTWORKS

ENGINEERING DESIGN: PIPING SYSTEMS - MATERIAL HANDLING SYSTEMS  
PROCESS EQUIPMENT LAYOUTS

## ENGINEERING

### CIVIL & STRUCTURAL ENGINEERING



- STRUCTURAL ANALYSIS & DESIGNS (INCLUDING HIGH SEISMIC & HURRICANE ZONES) FOR INDUSTRIAL PLANTS
- EVALUATION AND IMPLEMENTATION OF GEOTECHNICAL REPORTS
- STRUCTURAL DESIGN BASED ON VIBRATION MITIGATION
- DYNAMIC FOUNDATION ANALYSIS
- STRUCTURAL RELIABILITY STUDIES
- STRUCTURAL PATHOLOGY STUDIES
- DESIGN OF REINFORCED CONCRETE AND STEEL STRUCTURES
- CONCRETE AND METAL DOMES
- CONCRETE SILOS AND BUNKERS
- STEEL BINS AND HOPPERS
- TUNNELS AND UNDERGROUND STRUCTURES

## ENGINEERING

### ELECTRICAL ENGINEERING



POWER DISTRIBUTION SYSTEMS

INSTRUMENTATION AND CONTROLS

HMI INTERFACE COORDINATION

PLC PROGRAMMING

MOTORS (MEDIUM VOLTAGE AND LOW VOLTAGE)

MEDIUM VOLTAGE STARTERS AND BREAKERS

TRANSFORMERS

MOTOR CONTROL CENTERS

SHORT CIRCUIT ANALYSIS

POWER STUDIES

## ENGINEERING

### AUTOMATION & CONTROL ENGINEERING



CONTROL SYSTEM DESIGN (PCS, DCS, PLCS, RIOS)

COMMUNICATION SYSTEM DESIGN (RACKS, SWITCHES, SEVERS, PATCH PANEL)

SCADA SUPPORT (SCREENS, CAPABILITIES, SYSTEMS)

SELECTION & SPECIFICATION OF CONTROL & COMMUNICATION EQUIPMENT

CCTV DESIGN

#### DELIVERABLES

PROCESS CONTROL ARCHITECTURE

COMMUNICATION NETWORK

INPUT AND OUTPUT LIST

CONTROL AND COMMUNICATION PANEL LAYOUT

CONTROL AND COMMUNICATION WIRING DIAGRAMS

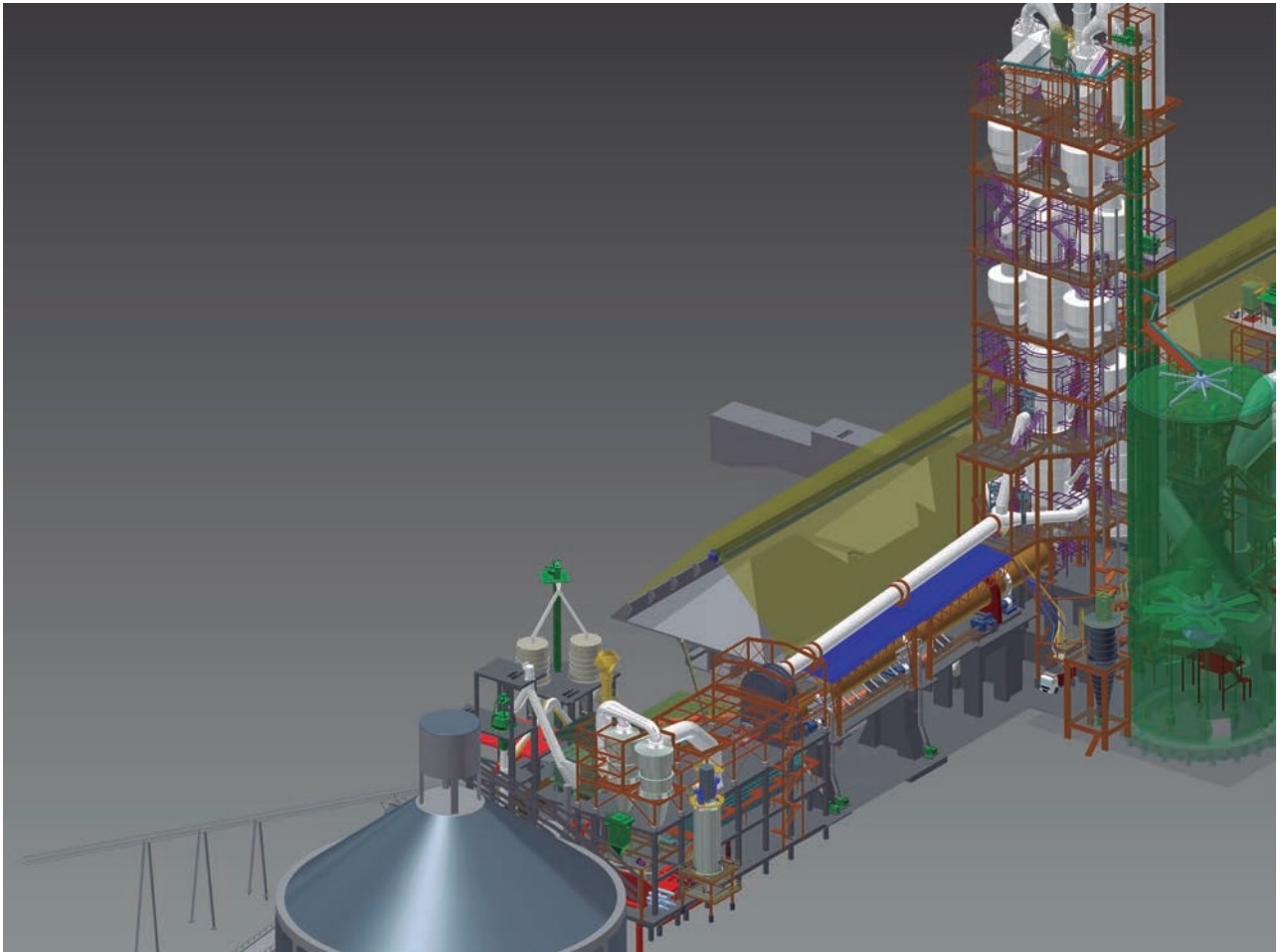
TECHNICAL SPECIFICATION AND DATA SHEETS

LOOP DIAGRAMS

CONTROL NARRATIVE/FUNCTIONAL DESCRIPTION

## ENGINEERING

### 3D MODELLING FOR FULL PROJECT INTEGRATION



INTEGRATION OF EQUIPMENT ENGINEERING WITH THE CIVIL,  
MECHANICAL FABRICATION AND ELECTRICAL ENGINEERING

SHOP DRAWING REVIEWS

FABRICATION SHOP INSPECTIONS

COORDINATION OF MATERIALS FABRICATION FOR CONSTRUCTION  
AND DELIVERIES TO THE JOB SITES

## WHY CLIENTS CHOOSE SAXUM

TOTAL RESOURCES IN HOUSE

KNOW-HOW AND EXPERIENCE IN CEMENT SOLUTIONS

LEADERSHIP IN DETAILED ENGINEERING SOLUTIONS

DEEP KNOWLEDGE OF STANDARDS AND CONSTRUCTIVE PROCEDURES

ENGINEERING MANAGEMENT ORIENTED TO SATISFY CLIENT TECHNICAL NEEDS

PROVEN PROCEDURES FOR PROCUREMENT, CONSTRUCTION  
MANAGEMENT & PROJECT CONTROL.



## PROJECTS

### GCC - Rapid City Project

**Location:** South Dakota, USA

**Commodity:** Cement

Engineering design and construction-phase project control across all disciplines, mechanical, civil, structural, electrical, and instrumentation. SAXUM also prepared data sheets and specifications for equipment procurement and construction works.



### GIANT Cement – Elementia Group Harleyville

**Location:** South Carolina, USA

**Commodity:** Cement

Full Owner's Engineer role over six months, including project management, engineering (civil, mechanical, electrical), site support, and construction assistance. SAXUM also reviewed the OEM's schedule and coordinated with contractors through commissioning on behalf of GIANT.

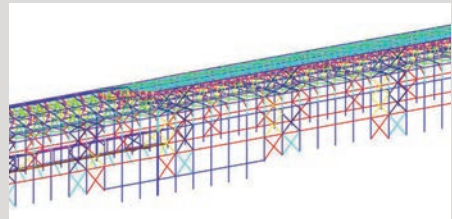


### BUZZI UNICEM - Pryor Project

**Location:** Oklahoma, USA

**Commodity:** Cement

At BUZZI's Pryor, Oklahoma plant, structural issues limited the use of a storage hall crane. SAXUM conducted a field evaluation and structural analysis, developed a detailed model, and provided repair recommendations, a budget, and revised drawings to restore full crane operation.



### Cockburn Cement Ltd. - Kwinana Project

**Location:** Kwinana, Western Australia

**Commodity:** Cement

Multidisciplinary engineering for the Kwinana Grinding Plant Upgrade in Western Australia, covering process, civil, structural, mechanical, piping, electrical, and instrumentation design for the grinding and storage system expansion.



## PROJECTS

### Capitol Aggregates Cement Plant

**Location:** San Antonio, TX, USA

**Commodity:** Cement

Project Management and Site Supervisor services for the upgrade project at Capitol Aggregates Cement Plant.



### FLSmidth CEMEX - Maceo Project

**Location:** Colombia

**Commodity:** Cement

Project integration, electrical and structural engineering and basic and detailed designs levels for the Greenfield project for the clinker and cement plant in Maceo, Colombia. Engineering document stamping and sign-off by Registered Engineers in Colombia.

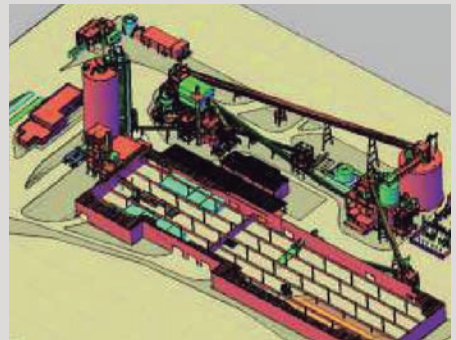


### Intercement - Cubatao Project

**Location:** Sao Paulo, Brazil

**Commodity:** Cement

Greenfield cement grinding project in Sao Paulo area. Conceptual, basic and detailed engineering, covering all project disciplines (Process, Mechanical, Structural, Electrical, Instrumentation & Control engineering) and all project areas for the 140 t/h grinding line.



### UCEM - Chimborazo Project

**Location:** Riobamba, Ecuador

**Commodity:** Cement

Development of the structural reinforcement design to repair the structural pathology presented by the radial walls and their connections of the 15,000-ton capacity multi-chamber silo. Chimborazo Plant in Riobamba Ecuador.



## PROJECTS

### Moncada - New Cement Production Line

**Location:** Cuba

**Commodity:** Cement

Project integration and Civil/Structural engineering services for several plant areas of the New Cement Production Line of 3.500 TPD – Greenfield Project.



### GCC - Odessa Project

**Location:** Texas, USA

**Commodity:** Cement

Mechanical and structural engineering for the downcomer redesign at GCC's Odessa, Texas plant, including thermo-mechanical analysis, support configuration, structural stability, and fabrication drawings.



### GCC - Rapid City Project

**Location:** South Dakota, USA

**Commodity:** Cement

SAXUM evaluated silo structural and foundation safety at Rapid City, SD, developed models, recommended reinforcements and code-compliant modifications, and designed new loading/unloading systems.

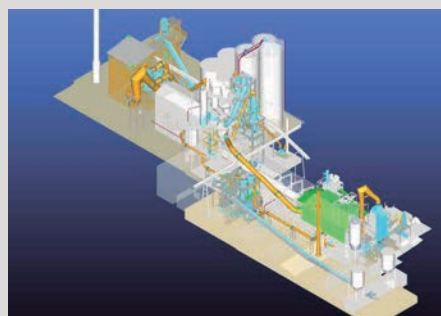


### GCC - Rapid City Project

**Location:** South Dakota, USA

**Commodity:** Cement

Conceptual and detailed complete civil/structural engineering of the GCC cement plant upgrade through FLS, the main equipment provider. SAXUM services also include the sign-off and stamping of all related detailed designs of structures and foundations.



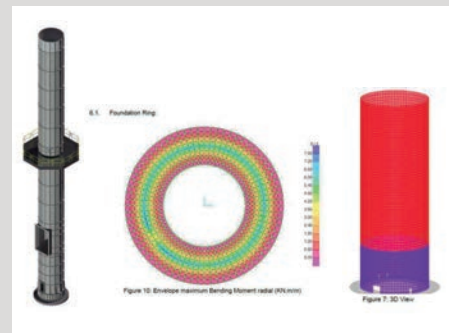
## PROJECTS

### Votorantim North America - St Mary's Cement

**Location:** Charlevoix Plant, Michigan - USA

**Commodity:** Cement

Engineering services for new raw mill blending silo and for the new clinker cooler stack including mechanical and structural design documents.



### Votorantim North America - St Mary's Cement

**Location:** Charlevoix Plant, Michigan - USA

**Commodity:** Cement

Basic and detailed engineering in mechanical and structural discipline for the new hot gas duct from the clinker cooler to the coal mill and for the related air & water utilities for the plant upgrade project of St Mary Cement at Charlevoix.



### Votorantim North America - St Mary's Cement

**Location:** Charlevoix Plant, Michigan - USA

**Commodity:** Cement

Basic and detailed mechanical and structural engineering, drawing sign off and stamping, for the new Process By-Pass Duct, to be installed in the St. Mary's Cement plant as part of the plant upgrade project



### Votorantim - Salto de Pirapora Project -

**Location:** Brazil

**Commodity:** Cement

Mechanical and Structural engineering. Project Integration. Development of project 3D Model. Review of vendors engineering attending Owner's design criteria.



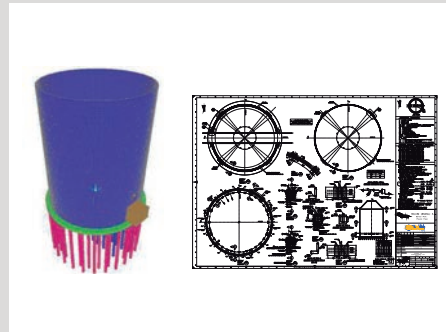
## PROJECTS

### Lafarge Holcim - Barroso Project

**Location:** Brazil

**Commodity:** Cement

Electrical and structural detailed engineering for new clinker silo with 35.000 tons capacity.



### Argos - Columbus Project

**Location:** Cartagena, Colombia

**Commodity:** Cement

Mechanical, electrical, and structural engineering for ARGOS's new cement line, including project management and site supervision. SAXUM received the 210 ASOCRETO Excellence in Concrete Award for this project.

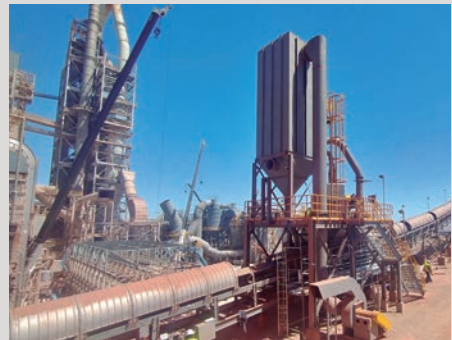


### Carlportland - Mojave Project

**Location:** California - USA

**Commodity:** Cement

SAXUM performed Civil/Structural, Piping and Electrical Basic and Detailed Engineering services in the Raw Mill Feed and Mill proper areas for the FLS CalPortland Mojave Project in California.

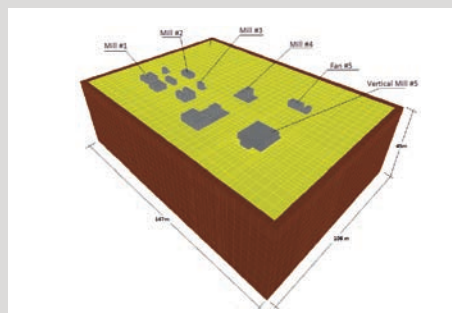


### Argos - Rio Claro Project

**Location:** Colombia

**Commodity:** Cement

New Vertical Mill. Complete structural engineering, mechanical integration and construction supervision. SAXUM was awarded with the "210 ASOCRETO - Excellence in Concrete Award".





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