



EXPERIENCE

COMPETENCE

INDEPENDENCE

Profile

- Head office based in Geneva, Switzerland
- Turnover of 5 to 10m CHF
- Staff of 30 to 40 persons

Competences

- Project management
- Process engineering
- Mechanical engineering
- Electrical and automation engineering
- Civil engineering
- Geology and quarry engineering management
- Construction and site management
- Commissioning
- Plant operation

Fields of Activity

- Cement plant project
- Grinding station
- Power plant
- Alternative fuels
- Waste heat recovery
- Atmospheric emissions control
- Raw material studies
- Quarries

Services

- Feasibility studies
(Market, raw material, technical, economical, financial, and environmental studies)
- Project management (EPC and multiple packages)
- Expertise and engineering
- Technical audit and due diligence
- Environmental and social impact assessment
- Geological exploration and quarry scheduling



Technological developments in the cement industry request constant innovative thinking, not only in process but also in environmental performances.

CESA was created in Geneva, Switzerland, by Jean-Paul Stoffels, who graduated from the Swiss Federal Institute of Technology. He is one of the most experienced consultant engineers within the cement world. CESA excellence is based on the decades of experience of its specialists. The company offers its engineering, industrial consultancy, and management services worldwide to the cement, mining and construction materials industries. For all projects, from feasibility studies to commissioning, CESA guarantees services with the highest level of quality and accuracy in line with the hallmark of its home country.

OUR EXPERIENCE IS THE SUCCESS OF YOUR PROJECTS



Jean Paul Stoffels

Thinking in total independence and working in full cooperation with our partners is the basis of our Consulting Engineer's philosophy .

The effective implementation of our expertise to achieve the best results for our clients, while always prioritising environment protection and energy savings, is a predominant aspect of our vision of the future.

Engineering is know-how and know-how is held by people. Therefore, our main resource is the combination of individual knowledge and skills, acquired through decades of experience by each of our engineers and experts, and team work. This interaction is the guarantee for innovative solutions integrating the latest developments in cement technology for the benefits of your projects.

Your satisfaction is our motivation. Our experience is your strength.

Jean Paul Stoffels

President

Technical achievements are not simply the sum of the best partial solutions, but are the result of the close collaboration of a flexible, motivated and competent team, where each link of the chain is foolproof to generate high customer satisfaction. Mutual trust and shared commitments are the key to success.



For all sectors of the cement and building materials industries, CESA is your worldwide partner as consulting engineer for the analysis, development, and implementation of your projects.

The projects managed by CESA come to a successful end thanks to a decentralized organization empowering each individual in his position. Therefore, rapid decision-making ensures a smooth execution of the projects implementing of optimally tailored solutions for each challenge.

Team work ensures also the client of an excellent and continuous customer relation throughout the projects. This is the basis for customer trust and for assuring the complete satisfaction of the clients.

The label of CESA's excellence is its independence toward any providers and its loyalty towards the customers and their interests.

The expertise of our engineers and experts, who all have 15 to 35 years of experience, is supported by the most modern tools, among others:

- COMFAR III Expert from UNIDO for financial and economical analysis and profitability
- Autocad, Solidworks and 3D Studio Max for design
- AXIS VM11 for the calculation of structures
- Surpac - Geovia for 3D geological modelling and Minesched for quarry scheduling

Experience
Expertise
Enthusiasm
Flexibility
Motivation
Skills
Innovations

For
Your
Satisfaction



Precision is our motto



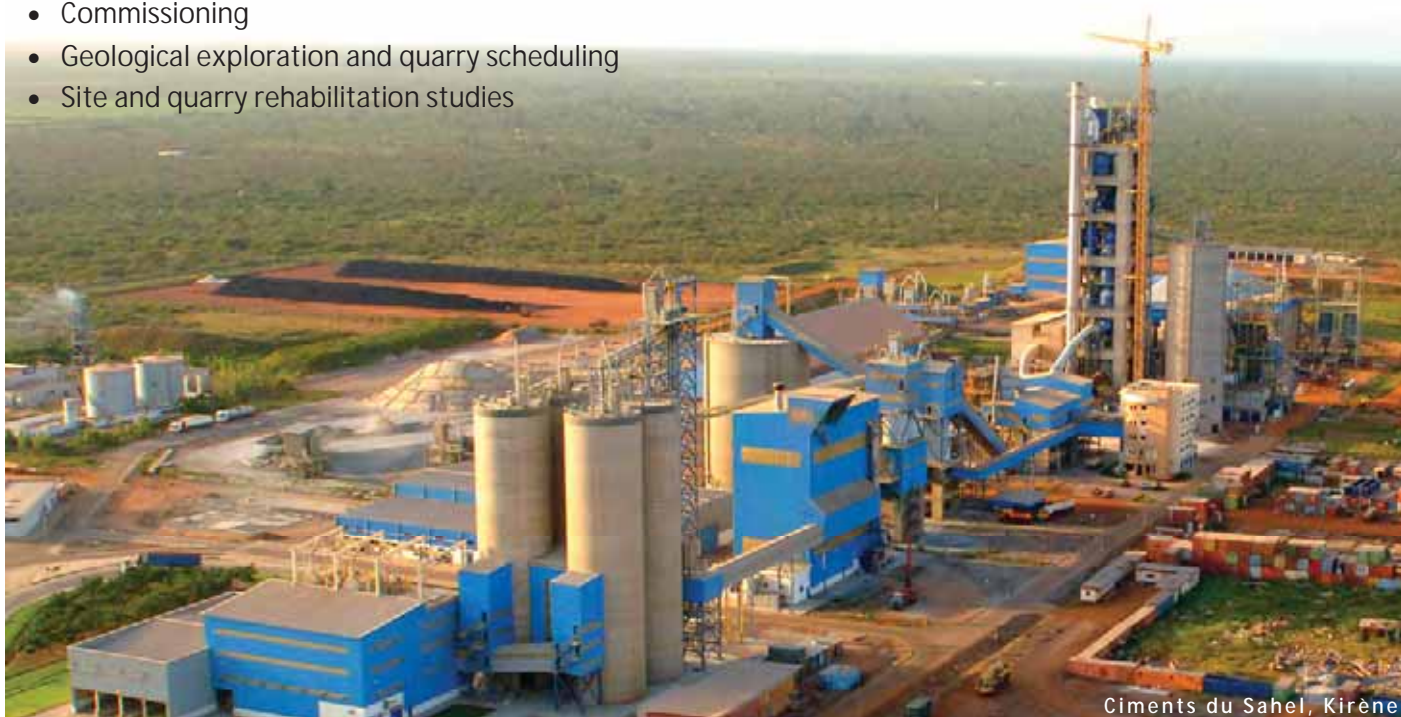
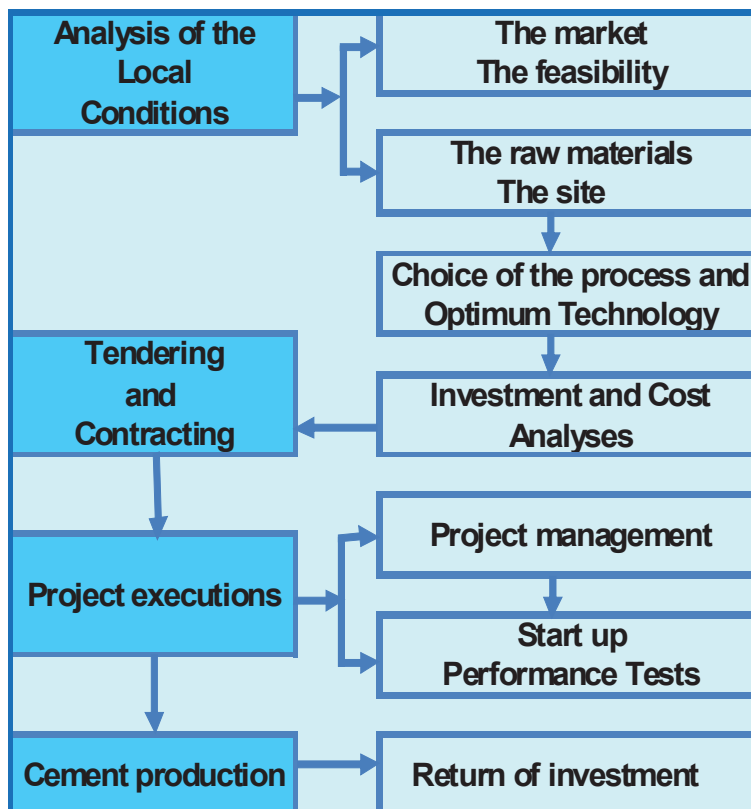
We focus on your needs

All necessary skills are available in house at CESA for the complete realisation of a cement plant. Wherever the project is located, CESA provides a full service including socio-economic and technical studies, raw materials investigations, project management and supervision of the construction, as well as staff training and monitoring of the plant operation.

Our Services :

- Feasibility study:
 - Market
 - Raw material
 - Technical concepts
 - Economical study
 - Environmental study
- Financial studies
- Due diligence
- Risk studies
- Project management (EPC and multiple packages)
- Master plans
- Plant technical audit
- Environmental and social impact assessment
- Raw materials and raw mix evaluation
- Process engineering (mechanical, electrical and automation)
- Civil engineering
- Geotechnical and soil studies
- Power plants and generators
- Waste heat recovery installation
- Construction and site management
- Commissioning
- Geological exploration and quarry scheduling
- Site and quarry rehabilitation studies

PROJECT MILESTONE



Ciments du Sahel, Kirène

Due Diligence & Technical Audit

If one is able to build a complete cement plant, he can also assess the situation of an existing cement plant, evaluate its level of maintenance, and estimate its actual value.

Due Diligence and Technical Audit

- Regional infrastructure
- Plant design evaluation
- Organisational chart
- Utilisation and reliability factor
- Maintenance program evaluation
- House keeping
- Equipment inventories
- Plant value estimation
- Productivity improvements possibilities
- Cost of refitting
- Upgrading options
- Financial evaluation of investments (CAPEX)
- Operating cost estimates

Our missions are lead by the wishes of our customers, the specifications, and site particular characteristics. For each project, we provide exclusive economical and energy saving solutions.

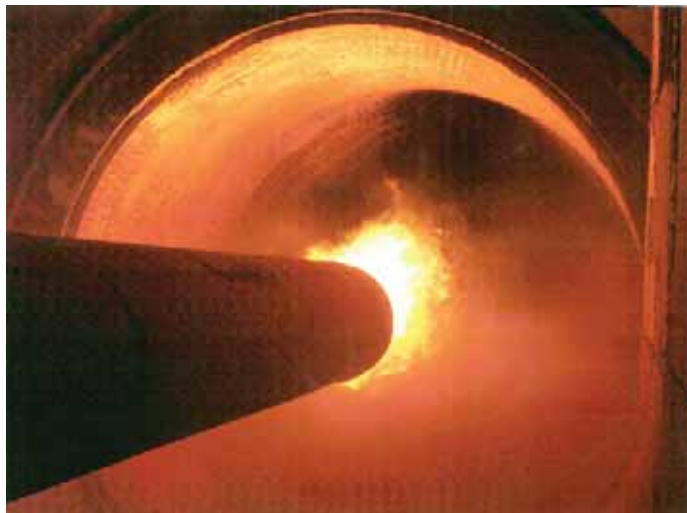
The Energy Challenge

The main challenge for mankind in the 21st century is certainly the generation and efficient utilisation of energy, in all forms.

Therefore, the experts of CESA always focus a special attention to this topic and inform our customer of the increasing need to deal cautiously with energy and materials. From feasibility study to construction, our studies are always conducted in the view of efficient energy consumption and optimal raw materials utilisation.

Nowadays, many solutions are well proven regarding waste heat recovery and alternative fuels, in particular in the use of agricultural waste as these are available almost everywhere.

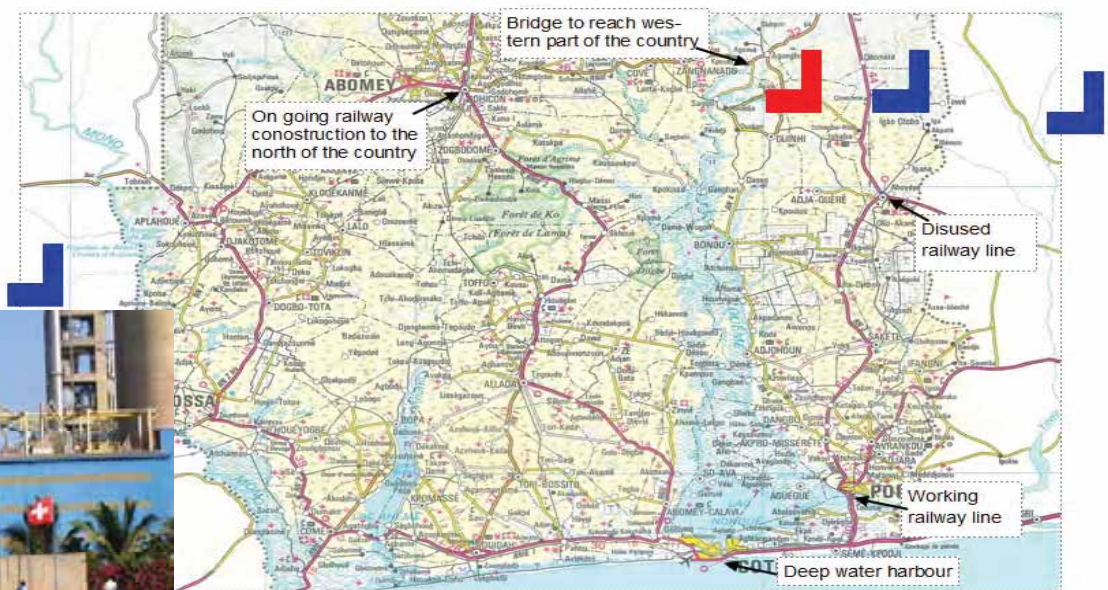
It is the pride of the team of CESA to act in this way and contribute to make the Earth a better place to live.



Providing cement engineering services without ensuring first that the planned plant is located near a stable market and where production costs are competitive would not make sense. Accordingly, CESA starts analysing the socio-economic conditions of the proposed site before recommending the construction of a cement plant.

This analysis includes in particular:

- Assessment of the potential market
 - Analyses of the competitors and customers for the domestic and foreign markets
 - Trend analyses for the medium and long term
- Raw material exploration and analysis:
 - Deposit exploration and resource evaluation
 - Selection of production process and specific equipment
 - Quarry scheduling and reserve estimation
- Technical feasibility and technical concept:
 - Following the raw material analysis the outline of the process, the mechanical, and the electrical and control concepts are defined.
- Cost estimation and economical analysis:
 - Assessment of financial investments (UNIDO program: COMFAR III Expert)
 - A compilation of investment, operating, and sales costs provides the basis for a comprehensive financial projection
- Environmental impact and management plan:
 - Review of the international and local environmental laws
 - Contact and cooperation with local authorities
 - Review of requirements for permits procedures

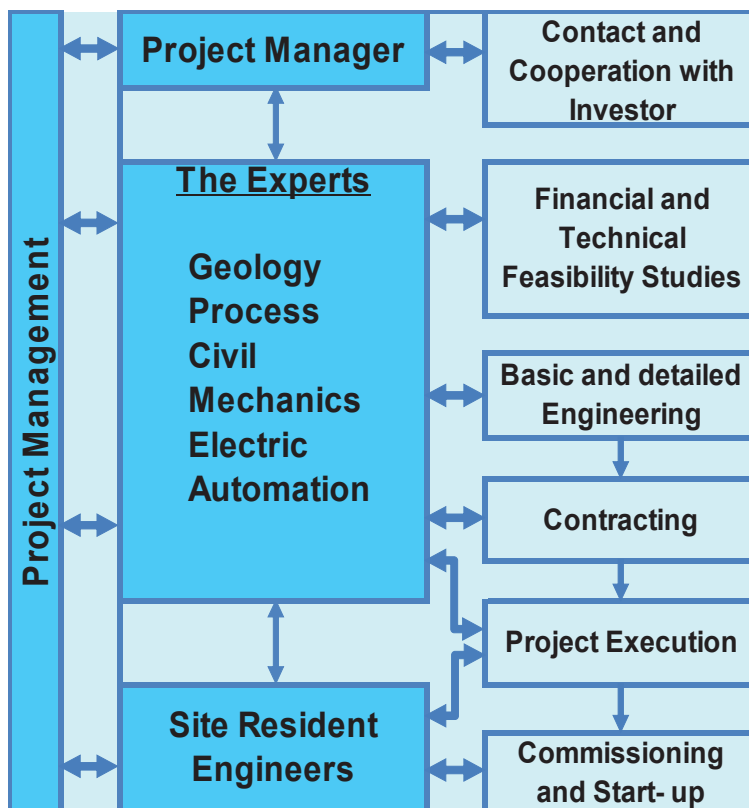


Project Management

The major challenge in a cement project are the continuation and consistence between studies, construction and commissioning. This asset of CESA is made possible thanks to the great experience of its team.

Another major advantage of our services is the effective independence of CESA with regards to the equipment suppliers or any other intervenants. Therefore, our customers can rest assured that all the efforts of CESA are devoted to protecting their interests.

- Project definition (turnkey, multiple package)
- Project management
- Basic engineering services
- Tendering
- Contracting - procurement
- Equipment supply
- Inspection of equipment fabrication
- Quality control
- Packaging and shipping
- Site construction management
- Health, safety, and environment
- Commissioning and start-up assistance
- Overall scheduling
- Cost control
- Integration of warranties and guarantees



Construction and Site Management

It is in the construction and commissioning where the success of the project shows up. This is where CESA makes the difference thanks to its comprehensive practical experience.



Ohorong cement plant—Construction phase

- Construction management
- Detailed schedule
- Planning control
- On site fabrication follow up
- Construction materials testing
- Quality-control management
- On-site construction, erection, supervision
- Cost control
- Commissioning assistance
- Staff training
- Verification of performance guarantees
- Acceptance certificates

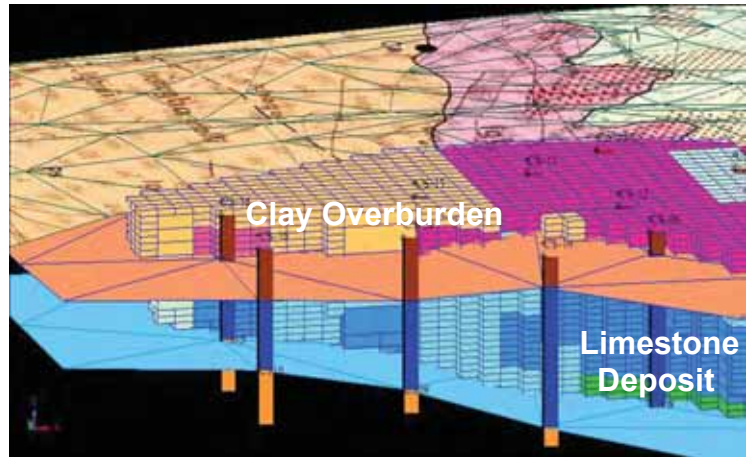
Geology and Mining

For a cement plant, the raw material is one of its important assets. Its extraction has a significant impact on the exploitation costs. Detailed knowledge of the raw material will allow increasing the life of mine of the deposit by proper blending, and assure a steady output in terms of quality and quantity.

Furthermore, improved and simplified quarry operation results in less fuel consumption per ton of raw material extracted. Steady raw mix composition allows optimising the clinker manufacturing process, and better clinker quality allows blending more additives.

In order to optimize the exploitation of the raw material, a sequence of working stages has to be implemented:

- Regional geology for site preselection
- Geological exploration
- Planning and supervision of drilling campaigns
- Evaluation of raw material qualities
- 3D geological modelling and bloc model estimation
- Resource evaluation
- Quarry scheduling and planning
- Water management
- Quarry commissioning and operation survey



3D geological and block model over regional geological map

**Know your raw materials:
it pays!**

Quarry Rehabilitation

Now a day, quarry rehabilitation should not just be an option for environmentally conscious cement producer but be an integral part of the mining plan. Indeed, the cement industry has well understood the benefit of rehabilitation. Guidelines were recently made publicly available by the Cement Sustainability Initiative (CSI) of the World Business Council for Sustainable Development (WBCSD). It shows that the long term environmental and social benefits outweigh the direct costs of rehabilitation.



Rehabilitation would with benefit be implemented progressively as the quarry exploitation is carried out. Costs are spread over the life-time of the quarry and it shows the local community that the cement producer is serious about its sustainable commitment.

Thanks to its overall understanding of the cement business, CESA will guide its customers through an effective and responsible process of quarry rehabilitation, taking into account the needs and expectations of all stakeholders.



The added value that CESA offers is:

- Proposing projects that have sustainable technical and financial objectives
- Emphasis on safety aspects
- Coordinate, implement, and monitor rehabilitation progress
- Act as a neutral (independent) adviser towards all stakeholders

**Quarry rehabilitation is a part of the license to
operate towards the local community**

The engineering department of CESA specializes in the design, the construction, and the project management for heavy industry units, particularly in the cement sector. This includes design study, planning, coordination and supervision of the construction and commissioning of equipment and production units.

Process

Our mechanical engineering department excels in project management, design, and construction of heavy industrial plants.

Additionally, it has been fully involved in many plant commissioning and plant revamping throughout the world. The tasks included planning, coordination, and supervision of plant erection and equipment installation.

- Production capacity scenarios
- Plant design
- Main production units selection:
 - Preheater Type
 - Kiln and cooler types
 - Silos capacities
- Raw mix design
- Alkalis - sulphur - chlorine balance
- By-pass
- Emissions limitation
- Process design and optimization
- Fuel diversification
- Definition of process control
- Quality control
- Central laboratory specifications



Kiln inlet

Mechanical

- Plant layout
- Mass flow diagrams
- Equipment sizing and selection
- Establishment of equipment specifications
- Analysis of the tender's proposal
- Equipment fabrication inspection
- Method statement for equipment installation
- Process control equipment
- Environmental control equipment
- General arrangement drawing
- As built documents



Complexity of the plant

Electrical & Automation

The importance of electrical & control systems increased these last years in the cement industry due to innovative development of more efficient equipment, such as sensors and analysers, power electronics and computer systems.

The electrical team is very experienced in the fundamentals of electrical control and instrumentation for the cement industry, and is also familiar with the new leading edge technologies. The special fields of knowledge include process instrumentation and control system, regulatory compliance, IT and communication networks.

- High and medium voltage network concept and design
- Selection of process control and instrumentation
- Specification and evaluation of electrical power and distribution equipment
- Specification of equipment and design of installations for hazardous locations
- Fire fighting control
- Design of industrial electrical systems including lighting, communications, grounding, and heat tracing
- Programming and automation
- Power management systems
- Control rooms and plant monitoring systems
- Field construction services, checkout, and start-up



Circular Pre-blending dome

- Soil investigation and foundation concept including soil improvement and piling
- Specifications for design and construction
 - Design guidelines
 - Material and workmanships specifications for concrete, prestress, slipform and steel structures etc.
- Structure design of all kind of industrial buildings/ structures incl. :
 - Design with European, American, Chinese, and other international codes
 - Finite element analysis and design
 - Design check and peer to peer review
- Network concept & design
- Inspection, appraisals and retrofit of existing building when upgrading and revamping



Low voltage electrical room

Civil Works & Structural Steel

The team's capabilities, composing of architects and civil engineers, cover all civil engineering expertises required for cement plant construction such as : heavy duty foundation under vibration, big prestressed silos and preheater towers, dome or space structures for storage and all kinds of industrial or non-industrial buildings encountered in the cement industry.

The department participates in all steps of a cement project form the conception stage to the supervisions in the construction phase, in particular :

- Site choice and general layout coordination
- Site levelling, roads and transport planning



Extraction Belt conveyor from storage



CEMENT ENGINEERING (CESA) S.A.

Consulting Engineers

16, rue Alexandre Gavard
1227 GENEVA, Switzerland

Web site: www.cesaeng.com

Tél. +41(0) 22 304 14 50

Fax +41(0) 22 304 14 51

E-mail: info@cesaeng.com





**RECENT
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REFERENCES**

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Cement Plant Projects

2016 - Société Saoura Ciment, *Algeria*

Cement plant 3'200 tpd : EPC project. Full engineering responsibility, contract management, erection and commissioning supervision.

2016 - Société des Ciments de Sigus, *Algeria*

Cement plant 6'000 tpd : EPC project. Full engineering responsibility, contract management, erection and commissioning supervision.

2015 - Cevital Minerals, *Algeria*

Cement plant 2 x 6'000 tpd : Multi-package project. Full engineering responsibility, contract management, erection and commissioning supervision.

2011 - 2014 La Nouvelle Cimenterie du Bénin, *Benin*

→ **Cement plant 3'600 tpd** : EPC project. Full engineering responsibility, contract management, erection and commissioning supervision.

→ **Power Supply of 30 MW** : the study of the energy supply to the plant and the camp encompasses the installation of a captive power plant as well as the possibility to connect to the power grid.

2007-2010 Les Ciments du Sahel, *Senegal*

→ **Second cement line 3'600 tpd** : Multiple packages project. Full engineering responsibility, management of all contracts, management of project execution, supervision and commissioning.

→ **Power Plant 30/40 MW** : Full engineering responsibility, i.e. feasibility study, engineering, call for tender, contract, erection and commissioning supervision.

Installation of Equipment

2012 - 2013 Holcim (Philippines) La Union plant, *Philippines*

Design engineering for clinker cooler replacement (2'800 tpd) and erection supervision.

2012 - 2013 Holcim (Philippines) Mabini plant, *Philippines*

Grinding station : Supervision of the revamping.

2011 United Cement Company of Nigeria LTD. (UniCem), *Nigeria*

Main crusher installation (1'200 tph) : Engineering review and erection supervision.

2010 Ciment Vigier (Ciments Vicat), *Switzerland*

Automatic bulk loading station : Review of civil engineering drawings and construction supervision on site.

2006 - 2007 Les Ciments du Sahel, *Senegal*

Extension packing plant (2'400 bags/hour) : Full engineering responsibility, i.e. feasibility study, engineering, call for tender, contract, erection and commissioning supervision.

2004 - 2006 Les Ciments du Sahel, *Senegal*

Coal grinding and handling installation (28 t/h) : Full engineering responsibility, i.e. feasibility study, engineering, call for tender, contract, erection and commissioning supervision.

Studies and Consulting

2014 - 2016 Monpolymet, *Mongolia*

Review of the technical and financial EPC contract, compliance with the technical requirements and the erection schedule, monthly supervision of progress, control of the performance tests documents and technical completion report.

RECENT REFERENCES

2011 - 2015 Tanga Cement Company Limited, **Tanzania**

Design review and project monitoring on behalf of the lenders (banks) for the TK2 project of 2'000 tpd.

2013 Kerkoub Group, Design engineering of a grinding terminal project of 80 tph., **Mauritania**

2012 Holcim (Philippines) Calaca plant, Design engineering for fly ash installation, **Philippines**

2011 Holcim (Guinée), Design estimation of a turnkey grinding terminal expansion project, **Guinea**

2011 Holcim (España), Market survey, feasibility study, project management and basic engineering, **Spain**

2008 - 2011 Ohorongo Cement (Schwenk Zement), **Namibia**

Design review and project implementation monitoring on behalf of the lenders for the construction of a Greenfield cement plant of 2'500 tpd.

2009 Obajana Cement, Study for the optimization of cement grinding, **Nigeria**

2007-2008 Heracles Co. (Lafarge), Transformation of kiln from grey to white clinker (250'000 tpy), **Greece**

Feasibility Studies & Call for Tenders

2014 - 2015 Giant Cement Works Ltd., **Nigeria**

Cement plant 3'000 tpd : Feasibility study and raw material exploration in Cross River state.

2013 CMS Clinker, **Malaysia**

Cement grinding plant 150 tph : Call for tender and supervision of execution at Mambong.

2012 - 2014 International Cement Company Ltd., **Nigeria**

Cement plant 3'600 tpd : Feasibility study and call for tender including own power plant in Ogun state.

2007 - 2014 La Nouvelle Cimenterie du Bénin, **Benin**

→ Cement plant 3'600 tpd : Feasibility study, basic engineering, call for tender, contract negotiation.

→ Power Plant 30 /40 MW : Feasibility study, basic engineering, call for tender, contract negotiation.

2011 Holcim (Spain), Carboneras plant, **Spain**

Precalciner and clinker cooler (3'300 tpd) : Feasibility Study for replacement.

2010 Ebonyi Cement Company, **Nigeria**

Cement plant 5'000 tpd : Feasibility Study.

2007 - 2010 Omega, **South of Europe**

Cement plant 5'000 tpd : Feasibility study and engineering for a green field plant.

2007 - 2010 SGTM, **Morocco**

Cement plant 3'600 tpd : Feasibility study, basic engineering, call for tender.

2006 - 2007 Les Ciments du Sahel, **Senegal**

Second cement line 3'600 tpd : Feasibility study, basic engineering, call for tender and contract negotiation.

Audits / Due Diligence

2013 Onigbolo Cement, **Benin**

Technical audit of the 500'000 tpy cement plant.

2012 Carthage Cement, **Tunisia**

Technical and financial audit of the 5'800 tdp Dgehal Resas Cement plant.

2009 Onigbolo Cement, **Benin**

Technical audit of the 500'000 tpy cement plant.

Exploration and Mining

- 2016 - International Cement Company Ltd, Planning and management of exploration work, **Nigeria**
- 2015 - 2016 Cevital Minerals, Exploration campaign, geological 3D modeling and extraction scheduling, **Algeria**
- 2014 - 2016 Giant Cement Works, Planning and management of exploration work, geological 3D modelling, **Nigeria**
- 2013 - 2014 Yamama Cement, Planning and management of a 285 drill hole campaign, **Saudi Arabia**
- 2013 - 2014 Quiboco Cement Industries Ltd, Exploration campaign in a marble deposit, **Uganda**
- 2011 PHME, Assessment of raw materials, **Saudi Arabia**
- 2010 SGTM, Raw material study and modelling, **Morocco**
- 2009 - 2013 La Nouvelle Cimenterie du Bénin, Complete raw material study and scheduling of extraction, **Benin**

Exhibitions / Publications

- 2013 AUCBM, Presentation about the New Cement Plant of Benin Project, **Jordan**
- 2012 Cemtech Europe, Presentation about quarry optimization, **Switzerland**
- 2011 AUCBM, Presentation about professional project management, **Jordan**
- 2011 "International Cement Revue", Publication about optimizing raw material management.
- 2010 AUCBM, Presentation about raw material management, **U.A.E.**
- 2009 "Worldcement" Magazine, Article about the extension in cement capacity in "Les Ciments du Sahel", **Senegal**

Other main projects in which our management team has been involved:

2004 Central Asia Cement	Kazakhstan	Cement plant revamping
2004 Hope Cement	United Kingdom	Indirect firing system extension
2004 Abco S.A.	Dominican Republic	Cement grinding plant
2001 Asment Ouled Zidane	Morocco	Cement plant design study
2000 Amran Cement Plant	Yemen	Clinker prod. upgrading study up to 1 mio tpy
1996 Diamou Cement Plant	Mali	45'000 tpy cement plant (expertise)
1996-1999 Oman Cement Co.	Oman (Muscat)	Cement plant extension
1995 APC 1.4 MTY	Philippines	1.4 mio tpy cement plant
1995-1998 Bosowa	Indonesia	1.5 mio tpy cement plant
1995 Maple Leaf	Pakistan	1 mio tpy, cement plant
1994 Kuwait Cement Co.	Kuwait	5'500 tpd of clinker production line
1994 Eastern Province Cement	Saudi Arabia	2 x 1 mio tpy cement plant
1994 Bizerte Cement	Tunisia	Relocation of primary crusher
1993-1995 Gaborone	Botswana	400'000 tpy cement grinding plant
1993 Hama	Syria	1 mio tpy cement plant
1989-1992 Cigu Cement	French Guinea	600'000 tpy cement grinding plant