

# MEETING KAZAKHSTAN'S CEMENT NEEDS

**Albert Braun, ABB, Switzerland, presents a case study involving the revamping of an old plant to meet domestic demand.**

## ■ INTRODUCTION

On 16 December 1991, Kazakhstan declared its independence. In the short time since, a transfer from a one-party dictatorship to a multi-party system has been achieved. The results of this 15-year, independent state development in the economic field are remarkable.

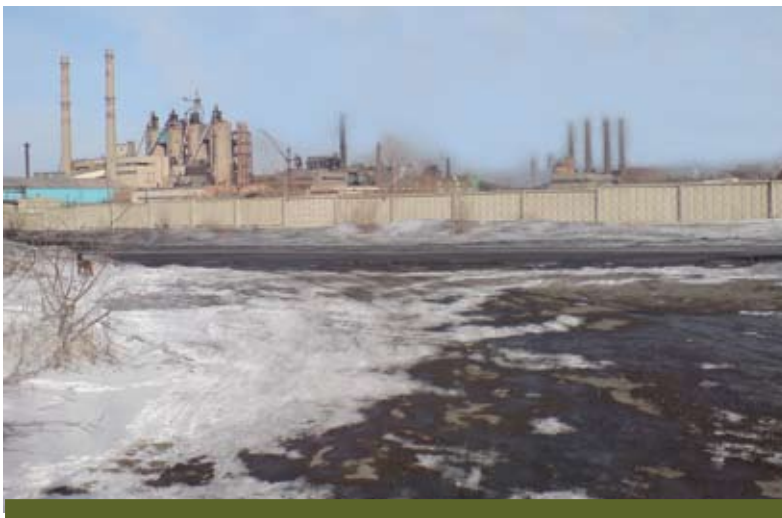
The country is presently experiencing an economic boom, with very high growth rates and a very active construction sector. In this rapidly growing economy, generated by the enormous energy resources to be exploited,

consumption, especially of cement, in Kazakhstan has noticeably increased over the last few years.

As a result of the residential building boom, Kazakhstan's cement producers continue to struggle with increasing demand. Consequently, imports have nearly doubled to the point that they currently represent approximately 35% of the market. Furthermore, in both Kazakhstan and in neighbouring Russia, the market price of cement has increased by approximately 20% in US\$ terms over the past year.



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*Figure 1. Central Asia Cement plant in Aktau. Production lines 5 and 6 (dry process) to the left and production lines 1 - 4 (wet process) to the right.*

“The landscape of Kazakhstan is rich in commercial minerals and is therefore one of the fastest growing economies in the world, besides China, India and Vietnam, with an average gross domestic product (GDP) growth of 9.4% pa for the past five years.”



Figure 2. Map of Kazakhstan.

At the end of 2004, as the demand and supply gap continued to widen simultaneously with the rapid economic growth, Karcement JSC, a sister company of Central Asia Cement JSC, decided to refurbish its dry process clinker production line 6.

Reflecting on experiences gathered throughout the Karcement revamping project, this article outlines ABB Business Unit Minerals' efforts to approach Kazakhstan's emerging cement industry.

### ■ COUNTRY PROFILE

Kazakhstan is located in Central Asia, covering a territory of almost 2.8 million km<sup>2</sup> and bordering on China, Kyrgyzstan, Turkmenistan, Uzbekistan and the Russian Federation. In terms of size, the country ranks 9<sup>th</sup> in the world, which is comparable to the territory of Western Europe.

It is a multinational country, with representatives of more than 120 nationalities. The overall population is slightly above 15 million with a density of just 5.5 people per km<sup>2</sup>. Since 10 December 1997, Astana has been the capital, with a population of 528 000 people.

Due to the remoteness of the country from oceans and the vastness of its territory, Kazakhstan has a dry but harsh continental climate.

Temperature in the summer can rise to 35 °C, whereas winters are cold, with temperatures falling below -25 °C in the north and -5 °C elsewhere.

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### ■ KAZAKHSTAN'S CEMENT INDUSTRY

In 1998, when the Russian economic meltdown sent a chill across the region, cement demand in Kazakhstan plummeted to less than 1 million t and was hardly any better in the following years.

As the country's economy rapidly recovered at the turn of the millennium, with consistent GDP growths close to double digits thereafter, cement demand started to pick up again during 2001 - 2004, with an average increase of 20% - 30% pa.

Kazakhstan's cement consumption rose 21% in 2005, registered a further 20% in 2006 and, according to forecasts, the country's demand will reach 9 - 10 million tpa in 2010. Until then, 40% of cement will be imported, mainly from Russia, China and Kyrgyzstan.

The main markets remain in Almaty and Astana, where many construction projects, such as roads and bridges, need to be built to improve the transport system leading to the cities. Moreover, Kazakhstan will host the 7<sup>th</sup> Asian Winter Games in Almaty in 2011. As such, infrastructure and housing have to be developed for the event. However, without cement, no construction of public, private or industry facilities can be implemented.

Counteracting this, the government of Kazakhstan adopted a series of important measures and made a comprehensive plan to create sustainable growth in major sectors for manufacturing, agriculture, transport, tourism and construction until 2015, with priority in the construction industry to push the increase of cement production.

Today, there are five major cement manufacturers in Kazakhstan: Central Asia Cement JSC, Shymkent Cement JSC, Semeycement JSC, Vostok-Cement JSC and Sas-Tubinsk Cement, with a total output that is still less than 5 million tpa.

### ■ CENTRAL ASIA CEMENT

Central Asia Cement JSC ("CAC") is the owner of Aktau cement plant, located in central Kazakhstan near Karaganda, 180 km south of Astana. With a total area of about 130 hectares, the most important raw materials, limestone and clay, are extracted from two quarries nearby. The deposits are sufficient to meet the company's current production needs for over 100 years.

The idea of constructing a cement plant in the Karaganda region was first conceived in 1933. After four wet process lines had been put into operation, the construction of line 5, the first dry process line, with a rated production capacity of 1 million tpa, started commercial production in March 1975. It was soon followed by the construction of a more technologically advanced second dry process line 6 in 1976.

Due to the economic crisis in the early to mid-1990s, which followed the disappearance of the

USSR, lines 3 and 4 have been shut down since 1993, whereas the two dry kilns finally stopped operation in 1995. Lines 1 and 2 were in operation on-and-off but were finally shut down at the end of 1997, as demand for cement subsided dramatically.

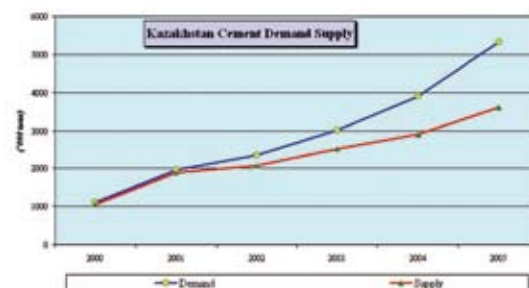


Figure 3. Kazakhstan: cement supply and demand.



Figure 4. Kazakhstan: growth in major economic sectors.



Figure 5. The Karcement plant near Aktau is strategically located to meet domestic demand.

Table 1. Economic key indicators: actual and forecast

Economic key indicators	2005	2006	2007	2008	2009	2010	2011
Real GDP growth (%)	9.4	10.6	9.0	8.3	9.8	10.1	9.5
Industrial production growth (%)	4.6	7.0	-	-	-	-	-
GDP per capita (US\$)	3550	5083	-	-	-	-	-
Nominal GDP (billion US\$)	48.0	77.9	-	-	-	-	-
Consumer price inflation (average %)	-	8.6	8.1	8.0	7.3	6.9	6.8
Budget balance (% of GDP)	-	0.8	0.2	0.1	0.1	1.5	0.6



Production Society Karaganda Cement was privatised in 1996 and renamed Karaganda Cement Open Joint Stock Company. Central Asia Cement JSC, was incorporated in Kazakhstan on 15 May 1998, to acquire the Karaganda cement plant complex.

The owner of the Karcement cement investments is Steppe Cement Limited, a company listed on London's AIM, a recently incorporated holding company resident in the territory of Labuan, Malaysia.



Figure 6. Karcement plant: kiln and preheater.



Figure 7. Site survey: plant specific data appears in Russian.

### ■ OUTLINE OF KARCEMENT RESTORATION PROJECT

The Karcement revamping project represents the first major investment in the cement sector in Kazakhstan for over 15 years and involves the refurbishment and re-commissioning of a production line, which is presently mothballed, to manufacture cement using the dry process.

After completion, the line is expected to produce about 1 million tpa of cement, which will help to satisfy the rapidly increasing demand for cement in Kazakhstan. Furthermore, the project should also offer new opportunities for the village of Aktau nearby and the immediate region, especially taking into account the strategic location of the plant in the middle of the country with direct access to the railway.

To finance the refurbishment of the clinker plant, Karcement JSC, a sister company of Central Asia Cement JSC, has entered into a multi-million long-term loan with EBRD (European Bank for Reconstruction and Development).

In October 2004, PEG, a Swiss based consulting company, was appointed to assist in the feasibility study for the line 5 project concept, in order to take advantage of the existing equipment and buildings, while replacing the outdated or broken equipment with reliable and recent technology. In June 2005, PEG published the "Final Feasibility Report on Plant Revamping" for process line 5.

Halfway through 2005, Central Asia Cement invited OJSC Yzhgiprocement, an open stock company situated in Kharkov, Ukraine, to carry out an inspection of the actual condition of production line 6, resulting in the technical report, "Evaluation of the Technical Condition and Determination of Expenses for Reconstruction of 6<sup>th</sup> Production Line".

Just a few months after this much-detailed study, the customer decided to modernise line 6. Upon this, tendering for the mechanical and electrical portion had started, whereas the awarding of related contracts had been expected at the beginning of 2006.

### ■ ABB'S APPROACH IN KAZAKHSTAN

In the early 2000s, as the country's economy rapidly recovered with consistent GDP growths close to double digits and the economic key indicators predicted, cement consumption in Kazakhstan increased tremendously. The ABB unit, based in Baden, Switzerland, started to focus on Kazakhstan.

During 2001 - 2004, ABB Business Unit Minerals tried to establish itself in the market by following up preselected opportunities from the headquarters in

Switzerland and trying to emphasise ABB's keen interest in working in Kazakhstan to the relevant parties. Due to several problems, mostly arising from their inability to communicate in Russian, this strategy did not bring any countable result.

However, being present in neighbouring countries, Russia and Ukraine, as well as with the support of the local ABB office in Almaty, ABB Business Unit Minerals was able to build local contacts in both the mining and the cement industries.

Finally, in June 2005, ABB's contact at PEG S.A., who was working on the feasibility study for the Karcement line 5 project, provided initial information about the company's activities at the Central Asia Cement plant to ABB.

Based on this information, the ABB sales area manager tried to establish contact with the management of Karcement and in August 2005, ABB visited Central Asia Cement to discuss the modernisation of its production line 5.

From 21 - 24 October 2005, the first visit to the cement plant in Aktau took place. At this time, a detailed site survey of production line 5 was executed by a group of engineers from ABB. During the intensive analysis of the existing installation, the first discussion about the modernisation of production line 6 started in parallel, which, in the end, led to an extension of the survey so as to spend adequate time examining production line 6.

After the collection of the most critical plant specific data, which appeared mainly Russian, ABB agreed to compose a budgetary offer for the supply of electrical equipment for line 6.

Since both lines 5 and 6 have not been in operation for more than five years, modernisation to the latest standards, production and efficiency levels, demands a whole different set of skills and competencies from the

suppliers and partners, compared to the construction of a greenfield cement plant.

In this respect, the greatest consideration has been given to the locations of electrical rooms and substations, as these contribute directly to the operational costs and losses, due to cable lengths and distances between electrical rooms and electrical consumers.

The major challenge in composing a tailored offer was the evaluation and design of electrical equipment (cables, motors, etc.) that can withstand the extreme cold conditions, with temperatures dropping below -35°C in the winter, while matching the complex Kazakhstan regulations (GOST – Certificate of Conformity).

In order to be able to present its capabilities and to discuss the technical specifications the company would offer for the modernisation project, ABB's engineers paid a second visit to Aktau on 13 – 15 December 2005. The outcome of the meeting with Karcement plant personnel was an agreement about the detailed scope of electrical equipment to be supplied and a preliminary time schedule for the project execution.

After the huge amount of information and documents collected during the different site visits had been screened, the ABB sales department, with the help of the equipment related engineering departments, compiled and finally submitted the requested budgetary offer to CAC on 5 January 2006.

On 3 February 2006, ABB submitted a firm quotation to CAC, which on 20 April 2006 resulted in a notice of award, followed by the contract signing on 30 May 2006.

ABB's scope of supply comprises complete electrification and power distribution, process control and process instrumentation. Furthermore, ABB delivers the complete

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infrastructure package, including telephone, intercom, lighting, cables and installation material. Additionally, supervision of installation and commissioning is part of the supply.

Currently, line 6 is under execution and despite some intricate formalities for the supply over long transport routes, most of the equipment has already been delivered and installed on site. This has been achieved with the support and assistance of the local ABB office in Almaty. Furthermore ABB's supervisors are permanently on site to make sure that the installation is carried out in the most appropriate way.

In the meantime, ABB is already participating in the tendering for the electrical package of Karcement line 5, whereas FLS-Ceceleg (JV) has been competing with Sinoma regarding the mechanical portion.

In the future, a further opportunity may arise, if Karcement decides to convert the wet process lines 1 to 4, which are still in operation.

In retrospect, the success of line 6 could be seen as a door opener for ABB to both the KZ & CIS market using "our approach" i.e. complete EC&I supply.

### CONCLUSION

Approaching an emerging market is the objective of many companies working in various fields in different industries; however this task is difficult to realise due to lack of local resources, as well as limited flexibility during acquisition and evaluation.

In this respect, ABB has shown its dedication to the Kazakhstan market during acquisition, evaluation and contract negotiation, and with its successful participation in the Karcement revamping project, it has proved that it can fulfil the expectations of the client.

Furthermore, it must be kept in mind that the efficiency of an industrial plant is not only influenced



Figure 8a. "Outdated" electrical equipment: switchgear.



Figure 8b. "Outdated" electrical equipment: motor.



Figure 9. Modernisation of kiln line 6.

by its major mechanical and electrical installations, but also by the appropriate planning, selection and engineering of the required overall infrastructure.

ABB's ability to adapt to an extraordinary market situation and challenging project conditions, has not only been successful in Kazakhstan, but has also been proven in Vietnam, Indonesia, Thailand, Pakistan, Egypt and Morocco, always taking into consideration that tremendous obstacles had to be overcome from the offer stage until successful installation and commissioning.

The efforts ABB has been spent in this emerging market are seen as a long-term strategy, based mainly on close cooperation with customers, as well as on the strong trust in ABB's capabilities, which have been successful in the global cement industry over a period of more than 40 years and have a proven track record of serving customers' needs worldwide since the 1960s. 

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