



An Integrated Solution

Nguyen Tuan Anh and Enzo Filoni, ABB, discuss the company's work on the Hatien 2 cement plant's conversion from fuel oil to coal firing in Vietnam.



Figure 1. Hatien 2 cement plant, a subsidiary of Vietnam National Cement Corporation, showing port facilities at the Ba Hon Channel.

The Vietnamese Hatien 2 cement plant is located on the border between two ecological sub-areas: the mountains and the flood plain. The limestone mountains, with an altitude of approximately 150 m, form the end of the Con Voi mountain range of Cambodia. The flood plain is relatively low and flat (mainly 1 m below sea level), and in the flooding season it is affected by a shallow overflow in a very short time (usually less than three months).

Hatien 2 Cement Company, a subsidiary of VNCC (Vietnam National Cement Corporation), produces approximately 700 000 tpa cement to meet demand in southwestern Vietnam. Approximately 600 000 tpa clinker are delivered to Hatien 1 Cement Company in Ho Chi Minh City and to local grinding plants in the region.

The clinker production includes two wet-process kilns (put into operation in 1964), with a capacity of 250 000 tpa clinker, and one dry process rotary kiln, with a capacity of 900 000 tpa clinker.

Both production lines use medium fuel oil (MFO) for clinker burning.

The project

In 2000 the company began a feasibility study of a conversion from fuel oil to coal burning. Since then, the war in Iraq has seen oil prices increase dramatically, almost pushing Hatien 2 Cement Company into loss. Consequently, it now uses anthracite dust coal type 3cHG, which is available in Vietnam, and is currently implementing a conversion project from fuel oil to coal burning.



Figure 2. Access way to existing kiln burner.

The contract between ABB and Hatien 2 Cement Company was signed in September 2005 and came into force shortly after. The contract is one of three awarded for the project: Polysius supply the mill and burner equipment packages, Bedeschi supply the coal conveying equipment, while ABB Switzerland is responsible for supplying the complete electrical and automation equipment.

ABB's scope of supply comprises the following:

- Industrial^{IT} Process Control System.
- MV distribution (including integration with the existing supply).
- Intelligent MCC.
- LV distribution.
- Transformer.
- Power factor compensation.
- Cables and installation material.
- Complete engineering of the lighting system, lighting protection, fire detection system, air con, ventilation system, and civil work for the electrical substation.
- Site supervision and commissioning for all electrical and automation equipment.



The customer will buy the local portion of the equipment based on ABB engineering, while civil work was carried out by the local ABB contractor CONINCO. The transformers are manufactured by ABB Vietnam, which runs a large transformer factory in Hanoi, with more than 320 employees.

The software engineering will be realised by a group of local ABB engineers led by Swiss senior engineers. They are well skilled and experienced with cement applications. This group is also carrying out the software engineering for other cement projects in Vietnam.

Supply highlights

The overall design is based on ABB's integrated Industrial^{IT} solution. The process control system is engineered with this system, which is the industry's first comprehensive and integrated enterprise, management and control system. It is designed to scale in both size and performance from a small, low-level unit and area automation solution to extremely large, vertically integrated plant-wide and multi-plant management and control applications. It addresses the requirements of both multi-plant economic and production control, as well as the more traditional process plant regulatory control and safety-related applications.

The system is made up of a set of distributed applications, each of which have a client and a server, and it can be viewed as a cluster of client-server applications. The client can be heavy, light or thin. Heavy clients run on PCs on high speed networks. Light clients are web browser based, using HTTP on medium speed

networks. Thin clients are communicators and mobile 'phones using WAP for communication on low/medium speed networks. In fact, Process Portal goes beyond the traditional boundaries of an HIS; the system infrastructure built around the Aspect ObjectTM concept is designed primarily to be a platform for the integration of all information available in different systems used in industrial plants.

Industrial^{IT} demonstrates the ABB group's commitment to bridging the gap between industrial and business assets with the information technology (IT) required to integrate these components in real time. The commitment encompasses a portfolio of compatible product building blocks for power, automation and information; a robust, open architecture for integrated solutions; and the domain expertise acquired through more than 100 years of meeting customer needs.

Each removeable starter module, independent of DOL or REVERSE, is fitted with a coordinated, short-circuit breaker protection, contactor and a programmable microprocessor based motor control unit. The intelligent MCC is a complete self-contained unit with a non-volatile memory. No battery back-up is required. It detects the actual motor current information utilising the built-in CT (current transformer) unit. The intelligent MCC communicates with all other field units within the system via a Field Bus plug using Profibus DP as the communication protocol.

MV Distribution consists of a Unigear ZS1 type, manufactured according to the new switchgear concept of ABB Switzerland. It includes the latest technologies, for example:

- Sensor technology is used instead of traditional instrument transformers, increasing the switchgear's application flexibility and electrical safety.
- Programmable multifunction bay control and protection units are used instead of individual components.
- Communication facilities with process automation are included.

This concept provides the following advantages over previous solutions:

- Increased safety and availability of energy distribution.



Figure 3. This control room was built in 1964.



Figure 4. The Hatien 2 plant is located at Kien Luong in the Kien Giang Province.



- Uniform switchgears design.
- A smaller variety of panels is required.
- The application of the MV-feeder can be changed by adapting the software.
- Load independent design: no replacement of components is required when the load is changed.
- Fewer types of components are used; fewer spare parts are required.
- A smaller battery capacity is required for switchgear control.
- All information is readily available, for energy management, event recording, etc.
- Improved integration of energy distribution into process control IIT.

ABB is also responsible for supplying the adaptation feeder from the main substation. The programmable micro-processor based switch bay protection and control unit features the following functions:

- Protection.
- Measurement.
- Control and mimic.
- Monitoring and event recording.

All the functions mentioned above, as well as power quality functions, are integrated in a programmable environment. The flexibility and scalability of these new generation devices make it possible to integrate all the secondary functions in a unique device, leading to a smart and clean solution that can be integrated where the traditional approach of using individual apparatus for each function would be ineffective and expensive.

The switchgear information is collected per substation and sent by serial bus to the process control. All status, metering, alarm and trip signals are available for remote indication and can be selected according to requirements. Remote control and configuration of the program are also possible.

Instrumentations, MCC and MV Switchgear are connected with the process control system via PROFIBUS and MODBUS communication. This reduces the overall system wiring and engineering costs.

Most of the automation and electrical equipment comes from a single source and has the ABB brand. This will enable the seamless integration of the system and reduce operating costs later on.

Project status

So far ABB has delivered the technical document to Hatien 2 Cement Co. Based on this design, Hatien 2 is calling for tender of the supply of the local portion. ABB is also helping the client coordinate with the local supplier in order to ensure quality standards and punctual delivery.

Delivery of the imported equipment will take place by March 2007, and the project will be put into operation in about June of the same year. ◆