

Modernization of EPCC's control system with Industrial^{IT}

When Eastern Province Cement Company (EPCC) decided it was time to modernize their control system, they were looking for a system that could provide the highest efficiency coupled with the best possible reliability. Standardization and interchangeability of components was also a prime consideration of the company, as was the desire to have the latest technical features and a system that was easy to use. ABB with its Industrial^{IT} was chosen as the platform that would best meet these challenges.

The Saudi owned Eastern Province Cement Company (EPCC) is one of the Middle East's leading cement producers and one of the largest manufacturers of ordinary Portland and sulfate resisting Portland clinker and cement in Saudi Arabia. The plant is ideally located on the shores of the Arabian Gulf, 65 km

from Al Jubail – one of the largest commercial ports in Saudi Arabia. This site also makes it easier to export to many destinations in Europe.

ABB supplied all the electrical and DP800 and DP1500 Procontic control systems for this plant, which opened in 1984. Over the years, modifications to the plant – in part by ABB – have kept the plant operating efficiently and reliably, enabling it to meet rising cement demand in the region.

Why choose Industrial^{IT}?

Entering its 20th year of operation, these very reliable, but aging control systems were beginning to suffer from a lack of spare parts as well as increased downtime. In addition, as demand for cement continued to rise, EPCC decided it was time to fully modernize the control system.

The main targets of the modernization project were to have an open solution using the latest in cement automation technologies. All process controls had to be integrated into one platform with industry standard communications, eliminating the need to develop custom interfaces to third-party equipment. In addition, the maintenance of the equipment needed to be optimized to ensure the highest possible availability. This was to include easy updates and quick trouble-shooting. The turnkey solution had to be simple to use and had to provide the necessary information to those who needed it, when and where they needed it, at all levels in the company. Another major challenge was that plant downtime had to be minimized for all system modernization tasks.

Such demanding targets required a company that was already familiar with EPCC's control system. In consultation with WS Atkins plc in the UK, EPCC decided that ABB's 20-year relationship with the company, plus all the advantages of its Industrial^{IT} platform made it the ideal choice for the plant's control system modernization project.



The dedicated solution

ABB Switzerland's local business unit in Saudi Arabia formed the project team chosen to tackle the numerous issues of asset management. These included the elimination of all things obsolete, improving the operational performance at all levels, and improving the overall decision-making process by integrating the information flow from the plant floor to the boardroom.

ABB was contracted to supply most of the equipment needed for the project: for local and remote control, the control system for both cement production lines, the seven stacker/reclaimers, a modernized management information system capable of e-Business solutions with a client server architecture, remote and self diagnostics, hot back-up and

mirrored servers, a large video and industrial TV system (including plant supervision), and plasma screens and digital video technology.

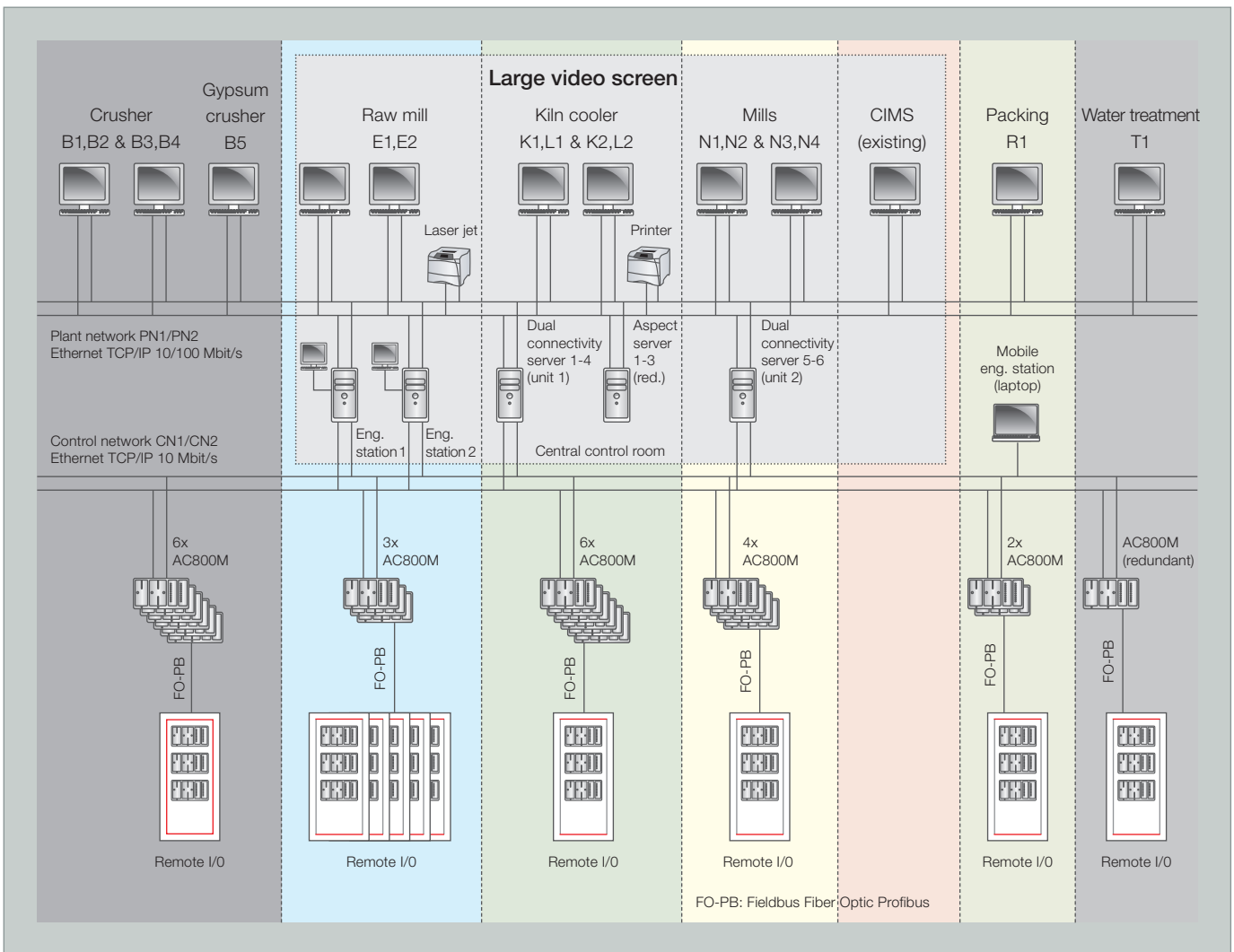
In addition to the newly assembled central control room, the original 12 control rooms were reduced to 5 smaller, subordinated ones. The new control room is now equipped to allow complete plant monitoring and control of the raw mills and raw material transport systems, kiln, clinker storage, cement milling up to the feed of the cement silos, gypsum crushing, storage and transport. A new crusher control and monitoring system was installed.

The complete network topology was designed by ABB to fit seamlessly and securely into EPCC's existing architecture. This was defined using standard networks such as Ethernet (TCP/IP, IEEE 802.3) and fieldbus technologies (Profibus) for a cost-optimized solution. It has enabled integration with third-party systems as well as previously delivered ABB systems, for example the cement information management system (CIMS) delivered in 1999.

The EPCC automation platform is based on a redundant TCP/IP control network and a redundant TCP/IP plant network (client server network) using ABB's

Control^{IT} Aspect servers, dual connectivity servers, AC800M controllers and S800 I/O system. I/O units located in the remote periphery centers are connected to the controllers via electrical or optical Profibus connections. Thanks to the scalability of ABB's Industrial^{IT}, the ABB CIMS already installed in the plant could be easily connected to the plant network.

Redundancy is provided at the network level. It is also provided for the dedicated controllers and power supplies. Fiber optics are used to ensure trouble-free operation. ABB paid particular attention to the human-machine interface



aspects. The current system now provides the best information possible, quickly and accurately at all user levels using ABB's Industrial IT Plant Explorer. The display updates on the operator stations are exceptionally good. The new digital controllers in the system provide for quick and easy tuning of the control loops. Trend logging for 17,000 items is managed using the connectivity server. In addition, this server works with the Aspect server in load sharing mode, making the dynamics of the process visible to operators and allowing them to initiate corrective action immediately when required. The engineering tools included, for example Control Builder M, enable on-line editing of the control programs in a multi-user environment. This means that the control philosophies are enhanced on-line, without interrupting production, with safety provided by interlockings and alarm messaging. Maintenance, and especially preventive maintenance, is optimized with the new system by providing the staff with real-time information, such as operating hours and the number of motor starts. Due to the more simple operation and the availability of information, the operators could switch from the old system to the new one in a short, on-the-job training session. Further in-depth training was given to operators, engineering and maintenance staff by ABB.

It was critical during project planning that downtime during the modernization process be minimized. The control systems for the first cement kiln and one raw mill were replaced by the Control^{IT} AC800M distributed control systems with S800 I/O modules. All of this was done successfully by ABB during a 10-day production stop!

Benefits for EPCC

Through this modernization process, EPCC has witnessed the value and power of ABB's Industrial^{IT}. Besides providing the platform that could best



meet these challenges, Industrial IT has merged real-time functionality with transactional business functionality.

Total integration with Industrial IT means the entire plant can be easily monitored and controlled from any PC on site or remote. This means having access to substations, power distribution, motor control centers, generators, drive systems, communication systems, monitoring systems, third-party subsystems, quality systems, collaborative production management systems, expert systems, optimization systems, and enterprise and business systems. It also supports and seamlessly integrates industry standard communication technologies such as TCP/IP, OPC and Profibus. All EPCC plant and systems data are stored in one central location, making them rapidly accessible. According to one customer, "ABB's Industrial IT has helped to significantly reduce the need for hard copy documentation. With the added advantage of having a more 'paperless' plant, downtimes have been significantly reduced because the required information can be found at the click of a button. This in turn has significantly improved overall production efficiency."

Industrial IT, as an open system based on Windows 2000, can integrate other applications from the user's environment.

For EPCC, the decision to select ABB has been a complete success. Downtime has been minimized. EPCC now has a state-of-the-art control system – one that can be extended in years to come as EPCC changes or expands.

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