

ABB Industrial IT Solutions installed at YunNan HongTa DianXi Cement

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PROFIBUS enabled control systems from ABB

ABB has installed an Industrial IT control solution for the HongTa DianXi cement company in YunNan, southern China.



About the Customer

The YunNan HongTa group is a large and well-known enterprise in the People's Republic of China. The group's businesses include tobacco, building material, cement, chemicals, hydro-electric power, highway construction, and financial services.

The DianXi cement company, a subsidiary of the HongTa group, is the largest cement manufacturer in YunNan province.

The plant has three production lines which have a daily cement production capacity of 1000 tons, or 9 million tons a year. Maximum production capacity is 11 million tons per year, which is the largest capacity of its kind in the YunNan province. The company has adopted the latest technologies available for cement production.

Project objectives

The customer had the following goals and requirements for the automation and control of its kiln and cement grinder:

- Adopt a new control system based on latest control and communication technology (ABB's Industrial IT was chosen)
- Use standard Ethernet and TCP/IP model for the plant network
- Base the control strategy on an industry standard fieldbus (PROFIBUS was chosen)
- Integrate a large variety of transmitters, sensors, meters, analysers, actuators and positioners from different vendors. (All required PROFIBUS communication)
- Use field devices both locally wired and connected to remote I/O modules
- Use Chinese language for operator & engineering software interfaces

Project Details: Layout/Architecture:

The automation system has the following components:

There are 4 operator stations and one engineering station

The control network is based on Ethernet with TCP/IP protocol. The system supports the industry OPC protocol for data exchange between controllers, Operator stations, or other third party systems or applications. Redundant networking is also supported.

There are six field Control IT AC800F Field-controllers; three are dedicated to the kiln process and three to the cement grinder process. Each controller is connected to three or four PROFIBUS segments, with three or four Master Cards(FI830.)

There are nine remote I/O S800 stations operating at a communication speed of 12MB/s.

There are 225 field devices distributed over nineteen Profibus segments (64 on Profibus DP, 161 on Profibus PA.)

System Features & Technology

Industrial IT

ABB's suite of integrated Industrial IT solutions uses the latest technology available in control systems. ABB's comprehensive Industrial IT portfolio of compatible products is coupled with more than 20,000 software, application, and service professionals worldwide. ABB's product strategy is for evolution through enhancement to protect customer investment.

Since initial release of its Industrial IT Architecture, ABB has introduced many advances in control systems. This architecture supports standard fieldbus technology using open standards.

The Multibarrier MB204

Three MB204 Multibarriers are utilized in this project. The Multibarrier MB204-Ex is a 4-fold fieldbus distributor for hazardous and non-hazardous areas. In an Intrinsically Safe (IS) segment (hazardous Zone 1 area), it increases the number of devices per bus, offers flexibility and reduces cost of power supply and wiring by approximately 30%.



The Multibarrier MB204

When connected to the low speed fieldbus segment, behind the segment coupler/link, the multibarrier ensures IS supply of up to 4 instruments. Since the barriers can be "cascaded," up to 32 field instruments can be operated on a single segment coupler in the hazardous area. The multibarrier does this without requiring a separate power supply.

In a conventional **Ex i** installation, a short circuit will lead to the failure of a complete segment with up to 10 nodes. ABB's multibarrier provides increased field instrument communication availability through a short-circuit-proof bus network: if a short-circuit occurs in an instrument, only that individual link is affected, while the bus link of the segment remains fully operational.

Field IT

ABB has developed a broad range of world-leading fieldbus-enabled devices - from process measurement to final control element - in both safe and hazardous environments. All are integrated in Industrial IT under the Field IT suite. Field IT makes

available to the automation architecture the wealth of data resident in these intelligent (i.e. microprocessor based) field instruments. All are certified with the Profibus International Organisation. The FieldIT portfolio of fieldbus products is constantly enhanced

Control IT

The ABB AC 800F controllers run on RISC based processors. They can be set to run tasks at different operating cycles. Therefore, each task can be

individually programmed and set at a different operating speed, priority or cycle time. In this way, the controller can run both complex control tasks as well as fast switching tasks down to 5ms. The system programming language is standard IEC61131-3. Even though there are nine controllers in this system, the system variables and tag values from the different process segments can be shared across the system by the controllers and the operator stations.



The Control IT AC 800F Controller

Open fieldbus technology

The ABB Control IT AC800F controllers support PROFIBUS DP and DP V1 standards. This means that the engineering software can program field devices online. For this project, ABB utilized 161 PA devices, including

ABB temperature transmitters, standard and differential pressure transmitters, VEGA radio level instruments, and Siemens positioners.

The various field device vendors have adhered to the PROFIBUS standards for communication, which makes it possible to have a unified way of configuring as well as communicating with these devices. The engineering software provides a uniform approach to configuring all these devices online which improves engineering efficiency and reduces cost.

Efficient FieldBus device templates:

DP V1 standards have resolved the versatility problem of fieldbus equipment configuration. However, due to smaller differences in each vendor's field devices, engineers need to spend much time in reading parameter references for each device to do DP V1 configuration. Because of the ABB engineering software's template technology, devices configuration templates are readily available for different manufacturers' field devices based on the ProfiBus PA standards. These templates can be used directly from the device or downloaded from ABBs internet website.

Scalability

The system is completely scalable, and if the customer wishes to expand the plant, more controllers or operator stations can be added, and engineering is done in the same efficient manner.

Chinese version software

The system software is available in Chinese version including engineering tools, operator interface, help function and all menus.

Startup and Commissioning

The DianXi cement plant has been in operation since September 2001. Commissioning took approximately one month.