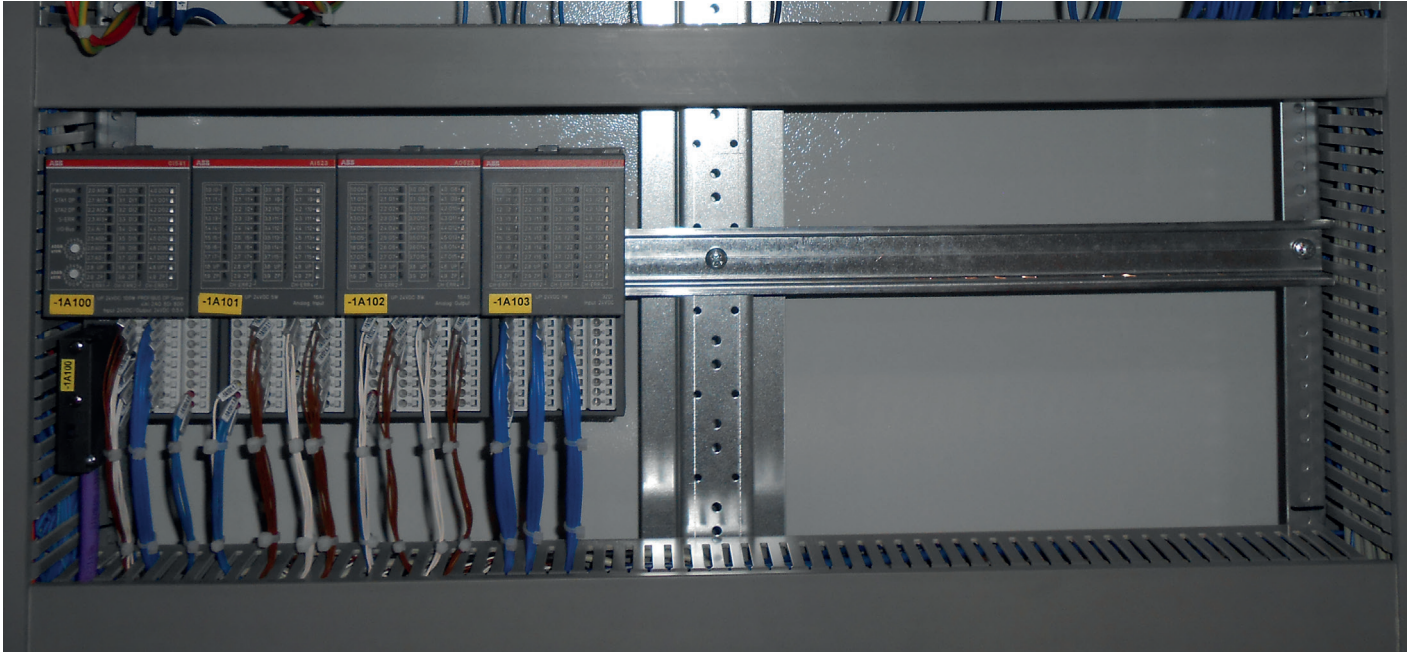


Case note

Danieli Automation & ABB

The Importance of a Strategic Partnership AC500 System: A new platform for metals



After the recent period of weakness and uncertainty, steel market continues on the path of slow recovery. Excess capacity remains the biggest threat of steelmakers, that are addressing multiple concerns including increasing market competition, raw material volatility, shifting demand, complex supply chains, cost and productivity efficiency.

Danieli Automation, daughter company of Danieli, worldwide leader in metals plant making, and technological supplier of electrics, automation and process controls for the metals industry, is highly geared with the steel market evolution, as it plays a significant role in supporting steelmakers competitiveness in the metal scenario.

The speed and degree of changes and the increasing complexity of the market, much more than in the past, requires long-term vision in both steel making and plant making.

Some years ago, Danieli Automation's mission has changed, implementing the original concept of Systems Integrator with Technological Solutions Provider, as steelmakers more and more often expect to be followed not only during the purchase of the technological supply, but also throughout its life.

As steelmakers will find increasing competition in stationary or even recessive markets, their technological demand will be more and more fragmented with limited investments targeted to a quick ROI, to the extent that tailored solution will become the state of the art. technological suppliers like

Danieli Automation shall increase their ability to acknowledge customer needs and turn them into a substantial competition element in the market.

To meet such market demand, Danieli Automation was keen on exploiting new automation and process control platforms characterized by high flexibility, top performance and competitive solutions, but even more interested in finding a reliable partner to set a new standard in metal process controls.

In any business, especially in cutting-edge technology, partnership is a cornerstone of success. Moreover, in a global and complicated market, with hardware and software vendors, products and systems, platforms and applications, it is hardly deniable that partners are a really important part of business.

A real partnership is not only based on supply relationships, it is built on the synergy between the two partners, from the very start. That's what happened in early of 2014 when Danieli Automation and ABB, after long technical analysis, online tests and performance benchmarks, decided to jointly face an exciting commitment: establish the ABB AC500 platform as the new standard for metal applications.

The first compelling challenge came immediately: design and develop a complete control system for a 300,000tpy long products minimill implementing ABB's AC500 platform as the backbone and core of process control.

The project is a greenfield plant located in Africa, supplied on a turn-key basis and featuring the following technological areas:

- 40 MVA Electric Arc Furnace with 45 ton/h melting capacity.
- 45 ton 7MVA Ladle Furnace.
- 2 Strands Caster, producing billets of 6-12m length and 130x130mm size at 3.5 m/min casting speed.
- Auxiliaries for water and fumes treatment.
- Billet Yard storage and shipping.
- Pusher type Reheat Furnace of 80 ton/h.
- Bar Mill for rounds 8-36mm and for profiles as flats, angles and channels up to 50mm width; rolling speed up to 12.5 m/sec.
- Removal Area for finish product cutting, bundling, yard storing and shipping.

The Danieli Automation and ABB teams went jointly through the process requirements, identifying the optimal system configuration in terms of processing capabilities and networking performance; the result of the effort has been outstanding in both efficiency and cost/quality ratio.

The implementation of the AC500 automation system largely exceeded conventional Plc applications; it was not just used for auxiliaries controls, process logics or sequencing; but also for the core technological packages of the plant process, including:

- EAF Electrodes Regulation Control.
- LF Electrodes Regulation Control.
- Tundish and Mould Level Control.
- Caster Oscillator Control.
- Billet Cutting Control.
- RHF Combustion Control.
- RM Speed Master Control.



- RM Loop Control.
- RM Tension Control.
- RM Shears Control.
- RM Bar Dividing Control.

Thanks to the joint partnership of Danieli Automation and ABB, the capabilities of the AC500 system have been optimized and exploited to the maximum extent. ABB AC500 is a scalable and modular PLC platform, based on a high performance processor able to execute one thousand floating-point instructions in 1 μ s with its top level CPUs. All main fieldbus standards are available and the openness of the hardware architecture is well combined with a IEC1131-compliant programming language. Highly optimized structured text, ladder and function block diagrams, continuous function chart and instruction list can be mixed in one application, choosing the best programming language to implement specific automation tasks. Additionally, C/C++ code is available as high-performance programming support. On the Ethernet cards, all most popular protocols are available to establish communication between CPUs or toward SCADA systems. For synchronous and fast operation, the power of Ethercat standard brings performance to the highest level. Safety can be managed in a fully integrated environment with two separated processors, one for safety and one for standard automation. I/O cards can be installed locally on the I/O rack of the CPU, or remotely as bus module expansion. Configurable digital I/O modules are available to enhance standardization and streamline spare parts handling. Also the technological supply for power equipment has been designed and supplied mainly using state-of-the-art ABB products, such as the ACS880 drive units. Several issues related to the poor plant grid and altitude de-rating issues have been proficiently solved by the joint technical teams.

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