

Automazioni Industriali Capitanio s.r.l. conquers complexity and time constraints thanks to Integrated Architecture

Indian greenfield steel rolling mill deploys state-of-the-art integrated control solution and achieves optimal production rate within days of hot testing

Background

Automazioni Industriali Capitanio s.r.l. (AIC) is an independent global system integrator, which designs, manufactures and markets automation systems, primarily for the metals industry. For almost forty years it has successfully designed, produced and commissioned industrial automation systems for the management of process automation in the iron and steel industry. This success is thanks to its deep expertise in various system typologies, including melt shops, continuous casters, long products rolling mills for bars, wire rods and sections, water treatment plants and dedusting systems.

It offers a broad range of capabilities based on numerous electrical technologies. Products and services are always tailored to match the precise requirements of customers all over the world.

Today AIC is one of the leading suppliers of electrical & automation solutions for the world's metals industry – long products steel rolling mills in particular – with more than 700 installations worldwide. The company's headquarters is in Brescia, Italy and can offer support to its customers all over the world. In addition to its Italian operations, AIC North America Corp, New York, USA and AIC India Ltd., Kolkata, India support the local markets.

In a recent greenfield rolling mill project in India, it combined its own expertise with the product and domain experience of Rockwell Automation to develop a completely integrated control solution within incredibly tight time constraints.



Fig. 1: Rolling mill and AIC local control station

Challenge

The project was undertaken on behalf of an independent Indian steel producer and comprised the design, build, testing and commissioning of the electrical systems for a long stainless-steel product (bar and wire rod) hot-rolling-mill, which would sit alongside existing facilities, including another mill.

According to Marco Capitanio, managing director at AIC: “The Indian customer awarded the order for mechanical element of the project to a Swedish company; while we handled the electrical side – working to the Swedish company’s specification and with the input of an Indian consultant.”

Interaction between all parties continued at all phases of the project, which was broken down into multiple discrete segments – commercial, kick off, engineering (design), engineering (software), manufacturing of the electrical equipment in our Italian workshop, internal testing (including s/w), shipment to India, erection, cold and hot commissioning and finally support and training.

The mill, developed for stainless and special steel bars, rods and sections, comprised multiple stations, including stands, shears, blocks, finishing lines and cooling beds, all of which required different types of electrical infrastructure, and all ultimately controlled from a number of local command desks and a main command desk.

“To compound the scale and complexity of the installation,” Capitanio elaborates, “was the short timescales in which we had to complete the project. This was further complicated by the different working methodologies used by ourselves, the Swedish OEM, the project consultant and the Indian customer. However, as a global company, we are used to dealing with different practices and procedures and took this all in our stride.”



Fig. 2-3: Main DC Drives panel supplied by AIC and equipped with PowerFlex DC Drives

Solution

AIC specified, sourced/built and installed all the main and auxiliary motors, all the main and auxiliary AC and DC drives, all PLCs, all main and local control desks, all software for the PLCs and HMIs, the HMI & database system and the networks; while also providing the necessary services towards successful project completion (engineering, commissioning and remote support).

The equipment supplied by Rockwell Automation was at the heart of this very impressive installation. Four Allen-Bradley ControlLogix 5000 programmable automation controllers provided the primary control for the line, communicating via 3,500 I/O with no less than 42 racks along its entire length. The racks housed a variety of modules depending on their position and function, but in total 19 DC Allen-Bradley PowerFlex drives were used including PowerFlex 2000A standalone regulators (SAR) and control cards. 69 AC Allen-Bradley PowerFlex755 drives were also used to control the roller tables, shears pinch rolls, laying forming head and the bar and coil handling, along with four FLEX™ soft starters for the pumps.

THE HMI system is based on Allen-Bradley FactoryTalk SCADA running on PCs and PanelView Plus operator panels used for some various control stations. Two networks were deployed: EtherNet/IP for SCADA, HMI and the drives (the drives are in a redundant configuration) and ControlNet for the I/O.

“We use axis control supplied by the ControlLogix PAC to control the start/stop shear and the laying head,” Capitanio explains, “and the system is very efficient. The performance in terms of tolerance

(cutting/positioning) is very good. The AIC automation & HMI software also gives the customer integrated management of each area of the plant using just one platform, from the reheating furnace all the way up to the handling of the finished products.”



Fig. 4-5: Main control desk and local roughing mill pulpit

Outcomes

“Our Indian customer has now got a fully integrated control architecture, which as well as helping during commissioning also allowed them to reach nominal capacity within just a few days of the hot testing,” exclaims Capitanio. “Even though the start up and project time was shorter than market average for India, we achieved all the primary objectives with the projects timeframe.”

AIC’s customer also benefits from remote access. In the first instance an employee was left on site to deal with any issues. “We left one guy on site,” Capitanio explains. “Now there is no need, we can do it all remotely. Maintenance is also much easier with this integrated architecture.

“We have been working with Rockwell Automation since before 2000,” Capitanio concludes. “We have chosen Rockwell for this job because it ensures very flexible products, offering the high performance we demand. Problem solving is always quick and easy. In this project we also involved Rockwell Automation in India, so there was a good interaction at a local level.”

Solutions

A Rockwell Automation solution was installed, which included:

- Four Allen-Bradley ControlLogix 5000 programmable automation controllers, communicating with no less than 42 racks
- 3,500 I/O
- 19 DC Allen-Bradley PowerFlex drives
- Allen-Bradley PowerFlex 2,000A standalone regulators (SAR) and control cards
- 69 AC Allen-Bradley PowerFlex 755 drives
- Four Flex soft starters
- Allen-Bradley PanelView Plus HMIs
- FactoryTalk SCADA running on PCs at the various control stations
- EtherNet/IP for SCADA HMI and the drives and ControlNET for the I/O

Results

- Optimal production rate achieved from the first production phases
- Project completed successfully within short timeframe, due in part to Integrated Architecture
- State-of-the-art automation technologies
- This is the first rolling mill in the world with the new PowerFlex DC Drives for main stands
- Each control desk is designed with a user-friendly approach and the customer's operators can manage their plant without any difficulty or trouble



Fig. 6-7: Overview of products and plant