

Productivity and quality soar yielding US\$3 million annual savings!

A Rockwell Automation control solution for China's Anshan Iron and Steel Company improves continuous casting productivity and product quality, while redeeming at least 250 kilotonnes / year of scrap steel – financial savings in excess of US\$3 million per year. Anshan's hot end becomes an Information Enabled Enterprise.

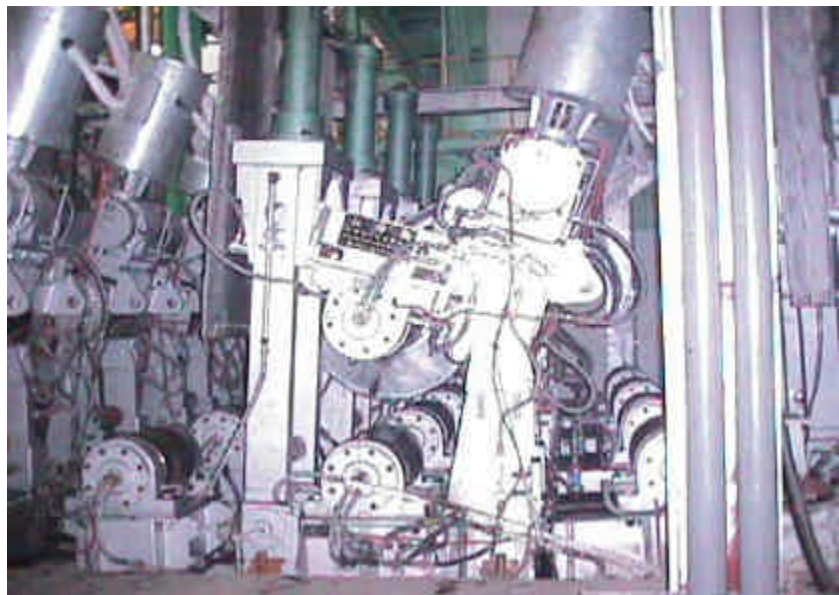
Background

China's largest steel plant, Anshan Iron and Steel Company in Liaoning province, embarked on a series of upgrades aimed at optimising the 'Overall Equipment Effectiveness' (OEE) of the plant. Manufacturing flat and long steel products, Anshan is a fully integrated plant; part of the upgrades involved building a one-strand slab continuous caster, a four-strand bloom continuous caster, as well as a ladle refining furnace and a vacuum degassing system to complement the three existing 90 tonne capacity, basic oxygen furnaces (BOF) in Anshan's Number one steelmaking plant.

The new slab caster was designed for a capacity of 1.1 million tonnes/year, with the bloom caster producing 0.7 million tonnes/year of steel product.

Challenge

Anshan Iron and Steel Co. required an automation control solution for the continuous casters that would achieve the required levels of production flexibility, improve product quality and reduce production costs.



Solution

After careful investigation, Anshan Iron and Steel finally chose Rockwell Automation as its automation partner for the design, supply, engineering and start-up support for plant automation, drives systems, networking, Human-Machine Interface (HMI) and the level 2 process control computer system. The total system was successfully commissioned in September 1999, less than a year after commencement of the project. The excellent teaming between Anshan Iron and Steel Co. and Rockwell Automation's Engineered Services Group ensured

smooth operations during the design and implementation of the project.

Advanced system controllers now provide precise drives coordination, real-time process control and smart logic processing. Rockwell Automation 1336 series AC drives were used for the segment and withdrawal control, while Centerline Motor Control Centres (MCCs) were used for the auxiliary motor control and power distribution. Rockwell Automation also included various field devices—such as encoders, proximity and limit switches—in their solution.

Critical functions such as automatic mould level and tundish level control are incorporated within the new system controller. Integrated position controllers are used to regulate the mould width, while automatic on-line width changes are performed in the system controller based upon the slab tracking system.

Rockwell Automation's NetLinx fully integrated data communication architecture ensures seamless communication between different sections of the plant, as well as between field devices and the level-two computer system.

ControlNet connects each control station, HMI and Remote I/O rack—as well as interfaces to hydraulic valves, measurement equipment and other speciality I/Os. Ethernet links the control stations to the level #2 Process Control system and ensures communications between the slab caster and the bloom caster.

Windows to the process are integrated on Rockwell Automation's ViewAnyWare technology which provides a common editing environment from embedded and Windows CE Systems architecture. The operator HMI runs Rockwell Software's Award winning RSView32 SCADA software which exposes an object model and supports VBA and Active X technology. In addition to acting as a plant to distributed client / server management system—where it tracks material production runs, and manages multiple

casting schedules and on-the-fly product change-overs, the RSView system is fully expandable to provide a seamless integration to a future ERP system at Anshan Steel. Windows NT-based level 2 Process Control servers optimise the process functions and RSQL, a key component of the RSBizWare solution, transfers data from the PLC database to the level 2 database in a flexible, reliable, fast and easy-to-use manner. RSBizWare is a suite of products that solves the connectivity need from the plant floor to the enterprise along with simulation, data mining, real time OEE calculations, finite capacity scheduling, unit tracking, etc.

Results

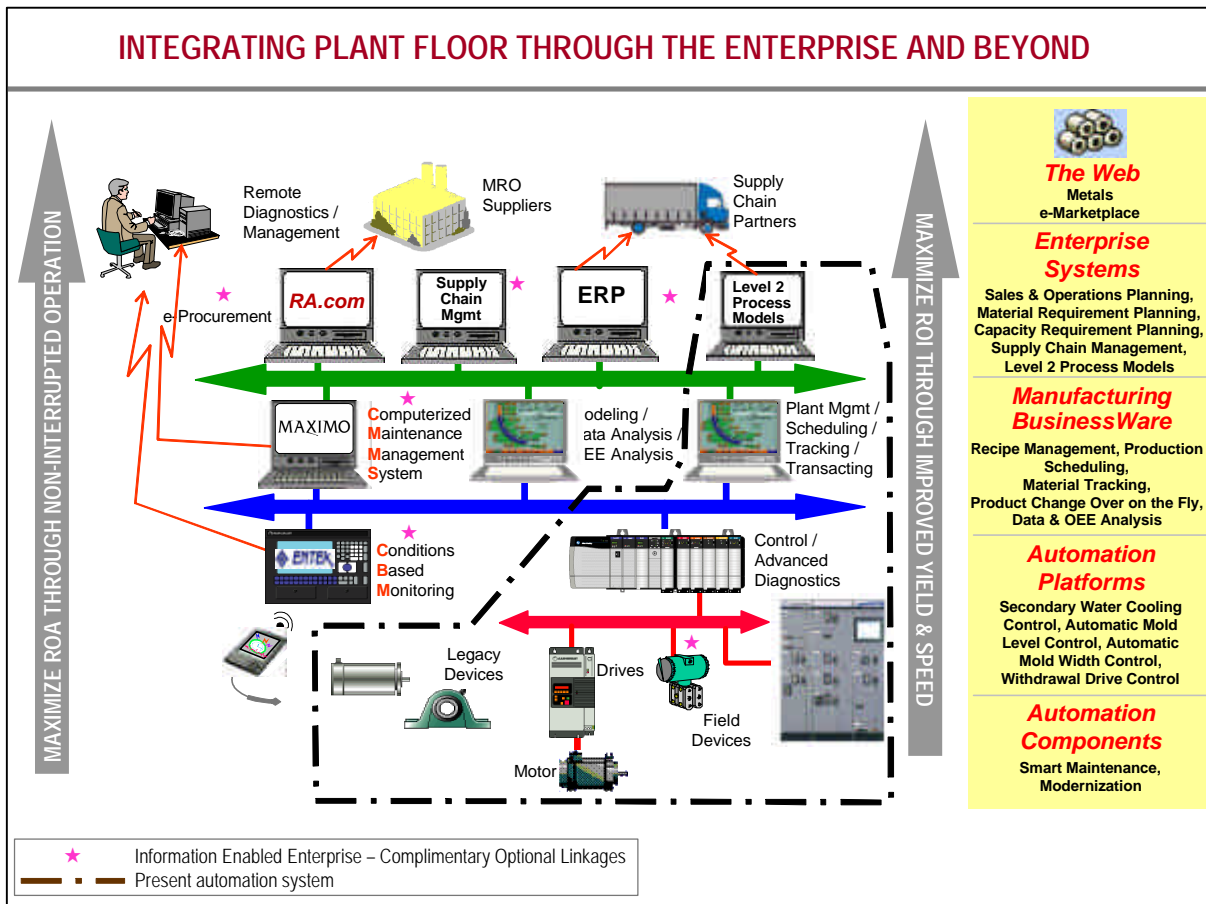
Rockwell Automation's Complete Automation solution provided the state of the art automation system required in the continuous casting lines at the Anshan Iron and Steel Company. The

new control system has minimised uncontrolled product variation over time, increased machine uptime, improved product quality, leveraged full mill capacity and reduced maintenance costs. At least 250 kilotonnes/year of scrap steel has been saved, which corresponds to a financial saving of 25mRMB (around US\$3.25 million) per year.

The architecture below depicts Rockwell Automation's concept of an Information Enabled Enterprise. The area outlined with a brown dash line represents the present automation level under discussion in this document. The remaining portion illustrates a host of solutions that Rockwell Automation can provide today to integrate the plant floor to the enterprise and beyond.



INTEGRATING PLANT FLOOR THROUGH THE ENTERPRISE AND BEYOND



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