



Voest-Alpine Industries

Designed for Success

Results

- Accelerated retrofit to decrease downtime by 1,800 hours
- 30% increase in production capacity
- Safer, more continuous processing
- Greater quality with automated systems
- Enterprise-wide communication
- Remote diagnostics and troubleshooting
- Faster maintenance, higher uptime

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Tom Very
Automation Project Engineer
Voest-Alpine Industries, Inc.

Forging Ahead

GE Fanuc Controls Cut Steel Mill Downtime During Caster Retrofit

Staying competitive in the steel casting industry means keeping up with the latest in automation technology. These systems provide faster, safer, and more efficient casting for improved productivity. However, acquiring automation technology often requires a retrofit, which typically takes three months per machine at a lost production cost of about \$1,000 per minute. Fortunately, technologies such as decentralized I/O and controls have simplified and accelerated the retrofit process.

By using a decentralized I/O system, Pittsburgh, Pennsylvania-based Voest-Alpine Industries, Inc. was able to completely refurbish the control scheme of one six-strand billet caster within just two months and a second within only 48 days. The project at SICARTSA (Lazaro Cardenas, Mexico), the main steel plant for Villacero, S.A., features GE Fanuc intelligent field I/O and Series 90™-70 programmable logic controllers. The distributed system allowed Voest-Alpine to simultaneously work on multiple phases of the retrofit and significantly shorten installation time, saving SICARTSA 1,800 hours in downtime.



imagination at work

“The only way to meet our tight deadline was to avoid the traditional, sequential installation phases,” explains Tom Very, automation project engineer for Voest-Alpine. “With the GE Fanuc system, we could work on many areas at once and automate two casters in less time than it normally takes for one.”

GE Fanuc field I/O uniquely permits control with a hand-held monitor. Therefore, one electrician team could wire a machine section while a second team could complete commissioning in a separate area—without waiting for access to the main control panel. Related components such as a turret drive could be added separately at a deliberate pace without affecting completion of the monitoring and control system.

The new system establishes control at a local level on each caster. More than 1,620 I/O points monitor each machine’s parts and functions such as variable frequency drives, pumps, valves, pressure transmitters, and limit and proximity switches. The I/O supply data to six GE Fanuc PLCs—one on each caster strand—and a hot backup PLC system. The common PLCs communicate over a Genius® local area network (LAN) while the strand PLCs operate over an open-architecture Ethernet LAN.

The new Ethernet LAN, which links with SICARTSA’s plant network for a direct data exchange between management and manufacturing, further simplifies maintenance. Remote programming and troubleshooting of the system is possible from any location around the world via modem or Internet connection.

“The new system is easy to use and troubleshoot—from inside SICARTSA or from a remote technical support location,” Very says. “Operators can quickly trace any problems through a built-in historical data analyzer and graphical interface. Since the system has been in place, we’ve had few complications, and SICARTSA’s staff enjoys the automated advantages.”

Casting Away

The new system automatically monitors and adjusts critical process controls such as casting speed, mold level, and cutting length. Plant operations are simplified with expert, automated fault and alarm reporting, billet tracking, system



diagnostics, and mill recipe management. With real-time process control, SICARTSA—Mexico’s largest producer of corrugated wire and wire rod—is able to improve quality while boosting productivity. For example, monitoring and controlling of mold levels results in fewer fluctuations in the level of molten steel in the caster molds. These fluctuations typically permit gas in the mold, which results in metal and surface defects. Removing the defects involves reheating the cast products up to 1,200 degrees C. “Since installation of the new system, SICARTSA has seen an increase in casting quality along with a decrease in quality-related reheating expenses,” Very says.

At the same time, proper casting speed has helped the company achieve safer and more continuous production. Operators can adjust casting times for optimum synchronicity with earlier and later processes. Molten steel flows from a basic oxygen furnace (BOF), onto the continuous casting plant, and, finally, into a hot rolling mill as a billet. By monitoring and controlling casting speed, the new system helps SICARTSA decrease costly reheating between these temperature-sensitive processes and boost overall productivity. With smoother manufacturing and higher reliability, production capacity has increased more than 30 percent. “The company can cast at a rate of 3.7 meters per minute while producing 127 millimeter-square billets,” Very says. Additionally, the new system further raises product quality with more consistent temperatures, since any loss of heat during processing may degrade the steel’s quality.

Minding the Mill

Since the main operator control panels are located on the hazardous casting floor for easy access, SICARTSA stocks completely assembled and tested replacements for quick changeovers. These electronically preconfigured replacements speed installation and reduce downtime—which is critical at a lost production cost of \$1,000 per minute.

In addition to protection from the molten metal, Voest-Alpine also designed the system for continuous production and safety. The continuous casters can maintain their speeds even in the event of a PLC failure. Operators can manually override drives and bypass the controls system as required.

“Voest-Alpine was able to easily incorporate manual overrides in the system because we were working with open-architecture PLCs and I/O,” Very says. “This openness also allowed us to quickly link together existing and new equipment for the fastest possible installation.”

With the GE Fanuc control system, Voest-Alpine met SICARTSA's short deadline for retrofitting two six-strand casters. The success of the project has encouraged the plant to retrofit a third caster with the same features. Production and quality have both improved at SICARTSA—and the new automated equipment in the continuous casting area is “steeling” the show.



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Additional Resources

For more information, please visit the GE Fanuc web site at:

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