QLP® Technologies

I 4.0 AUTOMATION, robotics, power and control systems

The new Danieli control room for the Danieli Intelligent QLP adopts an IIOT platform and advanced technologies that revolutionize the control of a minimill. An entire plant can be controlled from a single pulpit, which no longer needs to be in the production area, with the assurance given by having an autopilot to check and run it.
The Danieli Automation system proactively interacts with the operator, focusing his attention just on what it is needed at that precise moment, not only for the controls on the HMI page or on the Operator Assistant replacing obsolete pushbuttons, but also on plant images displayed on LED walls.
Supported by advanced instrumentation, the QLP dimensional and qualitative parameters are always monitored.
Power electronics are widely used in the melting area (Q-One) and rolling section (Q-Heat and Q-Drive), to improve also the carbon footprint of the plant.
Robotics are designed for different applications, limiting the presence of operators on the floor and increasing overall plant safety.
Quality (Q3-Premium) and production software solutions (Q3-Met) can further push performances of the plant ahead, by monitoring quality performances along the entire production chain and identifying root causes for defects and by improving machines utilization, time to market, yards management and scheduling of production.

DEDICATED DANIELI AUTOMATION DIGITAL AND POWER TOOLS FOR MINIMILLS

The most advanced process control solutions and technological packages have been adopted for the Danieli Universal Direct Rolling minimills featuring endless casting and rolling. From liquid steel to final product, processes are optimized and under control with minimal workforce at the most competitive OpEx, using innovative process control models, new technologies and intelligent instruments, in line with the Industry 4.0 paradigm.

Following here, a presentation arranged per technology areas and related benefits of the main digital and power tools operating in Danieli competitive minimills.

SCRAP MANAGEMENT AND CHARGING

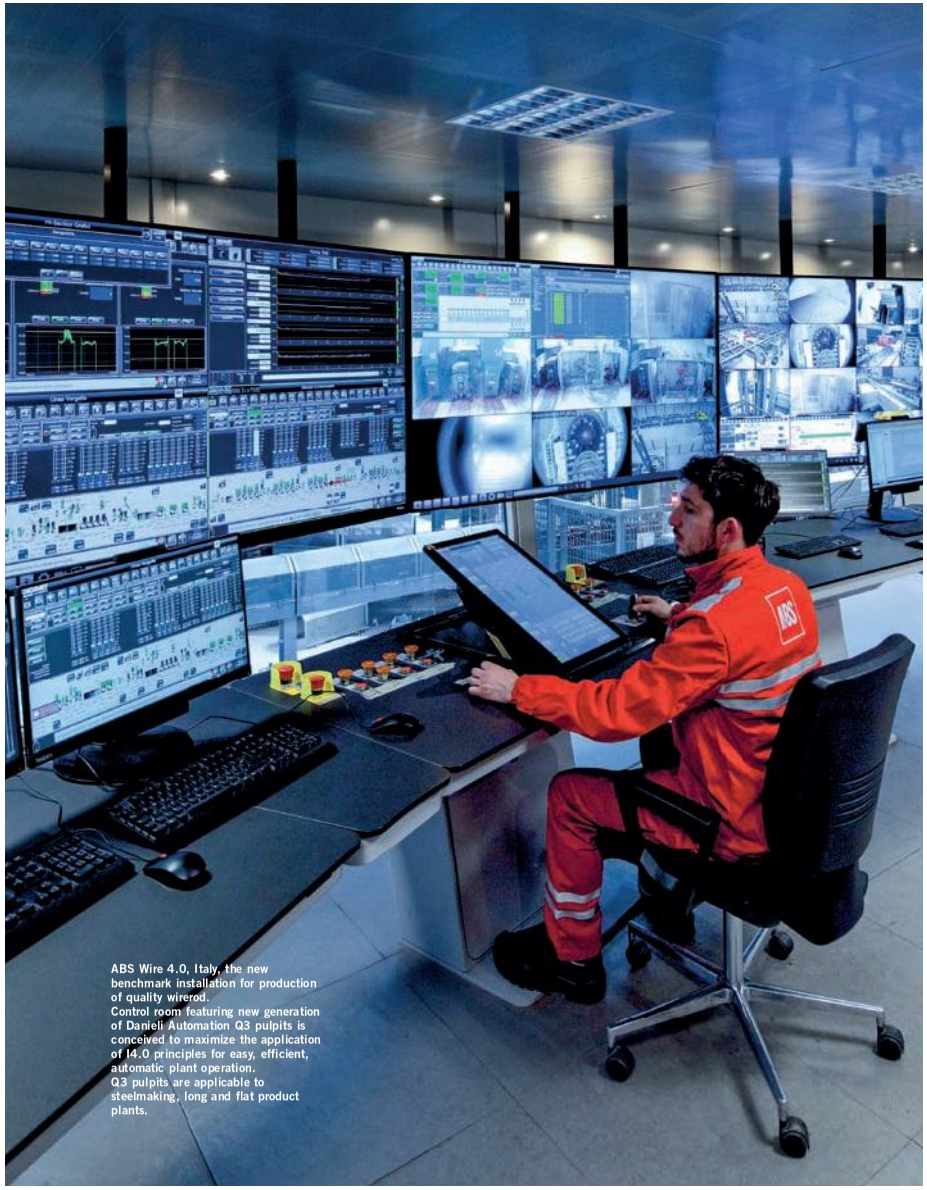
Automated scrap yards for efficient, safe scrap classification, tracking and handling.

Q-SYM2 AUTOMATIC SCRAP YARDS

Digitalization begins when scrap arrives at the scrap yard, as images are stored and the scrap automatically classified for its category and quality, independent from operator.
Then the scrap is tracked through the yard, identifying its type and relative position for automatic crane handling.
Data of scrap characteristics and layers in buckets are automatically transferred to the process control system.

Q-STS SCRAP LASER SCANNING

A 3D display of scrap status on the conveyor based on laser scanning of continuous scrap-charging systems allows for optimized scrap distribution along the belt and consequently the best furnace-feeding rate. The benefits of this are reduced OpEx for scrap handling, scrap tracking, improved control of scrap quality and resulting steel quality.

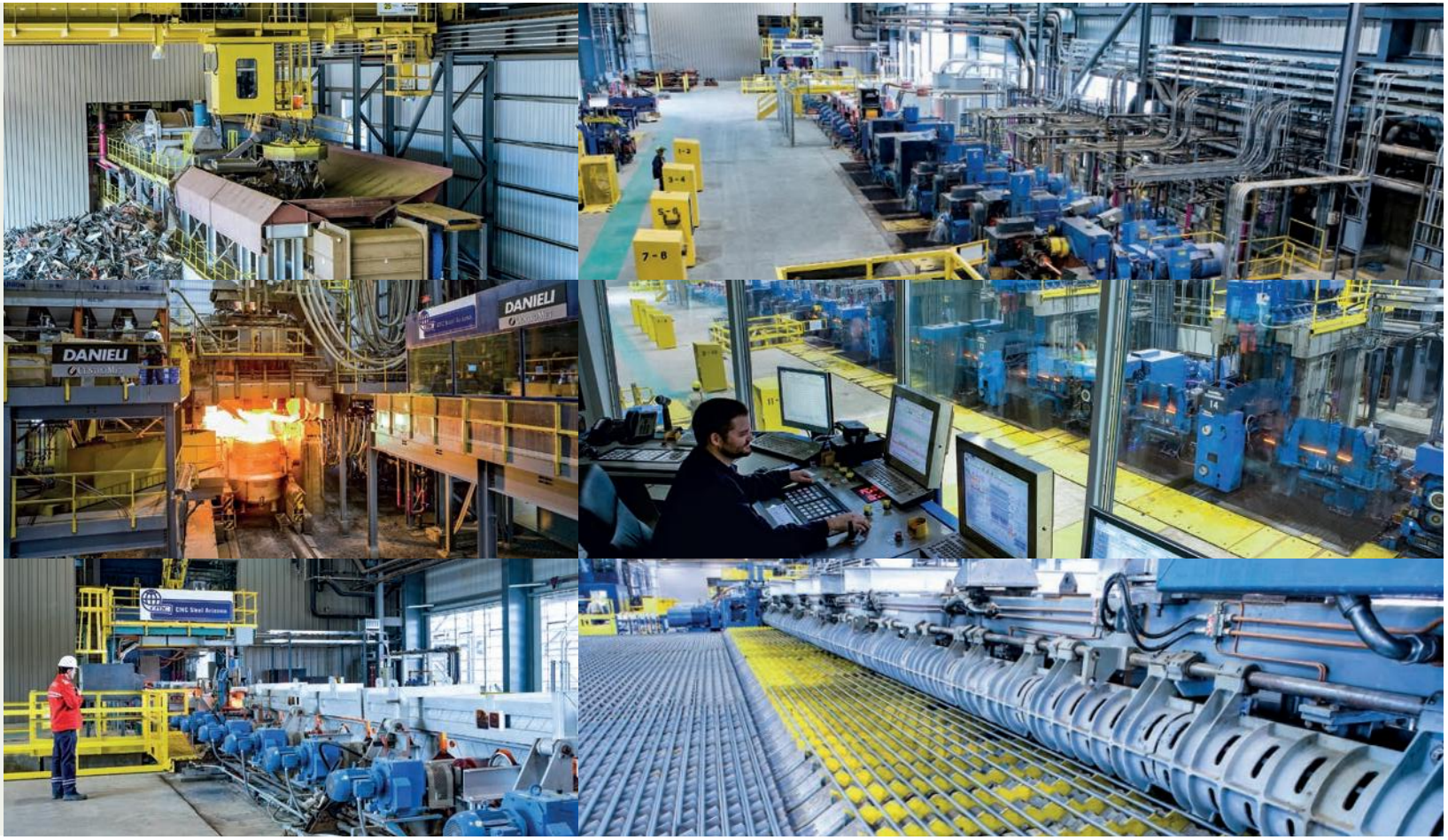


ABS Wire 4.0, Italy, the new benchmark installation for production of quality wirerod.
Control room featuring new generation of Danieli Automation Q3 pulpits is conceived to maximize the application of I4.0 principles for easy, efficient, automatic plant operation.
Q3 pulpits are applicable to steelmaking, long and flat product plants.

References and records worldwide

2009
CMC Steel Arizona

First complete MIDA endless casting and rolling minimill.
The Arizona mill is where the first 10-km billet was cast and rolled. After that CMC ordered a second MIDA minimill that was constructed and commissioned in Oklahoma.

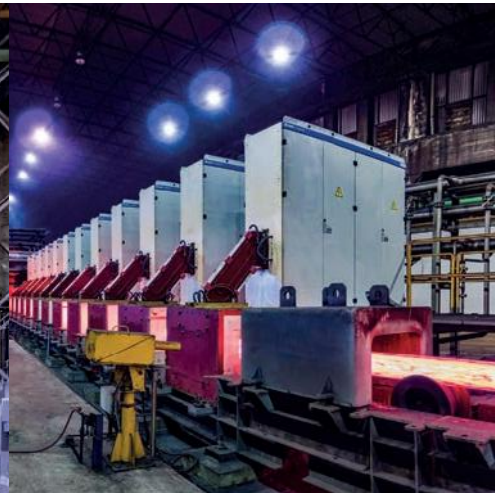


REGIONAL QLP®
Sidenor Sovel,
Greece

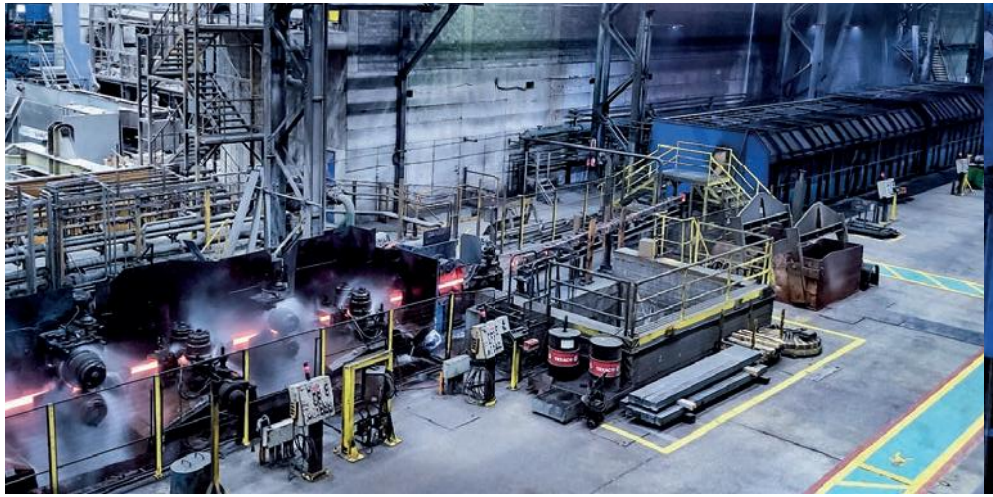
> whilst the others are used to produce billets for the direct-charge rolling mill. The endless line features FastCast technology and it is directly linked to a 22-stand rolling mill with a maximum finishing speed of 35 m/s for the rebar line and 32 m/s for the spooler line. The other five strands produce billets which are fast-delivered to another rolling mill, where they are thermally optimized by an induction heater before entering the 24-pass mill and then discharged via HTC technology at a speed exceeding 40 m/s. Again, Sovel Sidenor was first in Europe operating without billet gas reheating.

175 tph EAF+LF meltshop

Six-strand FastCast caster
equipped with FCC® and Power Mould®



Induction line made of 20 Q-Heat units



Roughing and intermediare mills with ESS energy-saving cantilever stands

DRB Direct Rolling and Bundling system

First 3-t coils spooled line operating in endless mode