ANDRITZ Metals

Success story

HYUNDAI BNG STEEL, Korea

Major revamp ensures greater reliability
and production of materials for new markets

The challenge: A leap forward in product quality, capacity, and cost efficiency

In many 20-high reversing mill modernizations the overall goal is very simple: just modernize the automation systems and technical control systems to guarantee the availability and reliability of the plant. The upgrade from the existing automation system to Siemens S7 is necessary because spare parts for the previous S5 Siemens system are no longer available. This investigation ensures that the plant is state-of-the-art.

HYUNDAI BNG STEEL, one of world's largest steel producers, approached us with a more ambitious goal in mind. The objective was the modernization of a 20-high reversing mill in order to improve production capacity and product quality, with focus on foil strips down to 50 µm strip thickness.

The requirements were

- to achieve the shortest possible downtime
- to amortize the modernization in a very short time
- to have a mill that is easy to handle and requires little maintenance
- an increase in production output
- to enhance product quality, especially strip surface, flatness, and thickness

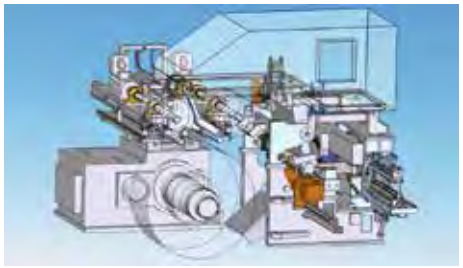
Our solution: Engineering and design review as closed loop development

The engineering professionals at ANDRITZ Sundwig considered every process step in order to find an innovative solution. Their exact knowledge of the line and process technology as well as many years of experience enabled them to develop sophisticated solutions that would give HYUNDAI BNG STEEL a competitive advantage for years to come.

The 20-high reversing mill at HYUNDAI BNG STEEL underwent extensive modernization by ANDRITZ Sundwig. The complete control electronics were exchanged and now reflect state-of-the-art equipment. Furthermore, the main drives were replaced and designated drive motors completely overhauled. A modular and digital control system, consisting of automatic thickness, strip shape, and strip tension controls, as well as new spray plates with nozzles is now being used. The automation system deals with coordination of the classic sequences and media control, as well as including a technological process computer to ensure optimum production. For this purpose, the rolling mill operator is assisted by a comprehensive HMI system. Extension of the fault indication and evaluation tools permits a prompt analysis of any deviations occurring, as well as contributing to line process optimization and improved maintenance. Based on the new design of the roll change device in combination with new drives, the roll change time was significantly reduced. The hydraulic screw down of the mill and the pass line adjustment were also renewed at the same time. In the mill stand itself, the spray plates with nozzles were optimized.

▲ New mill table

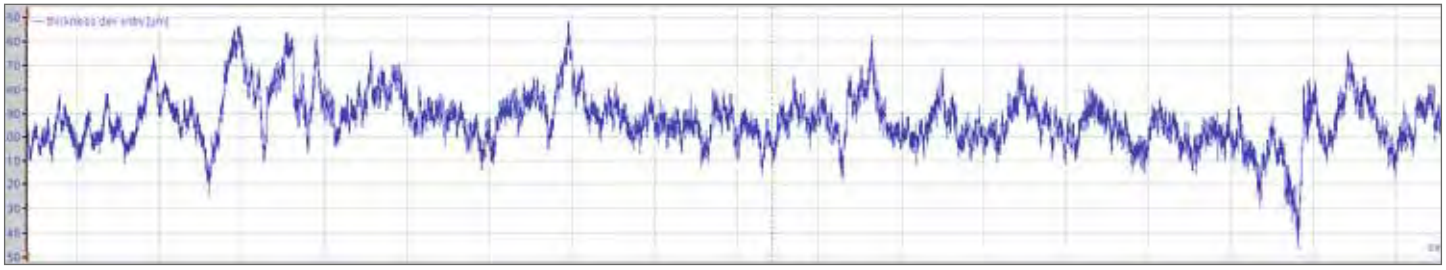
▲ Old mill table



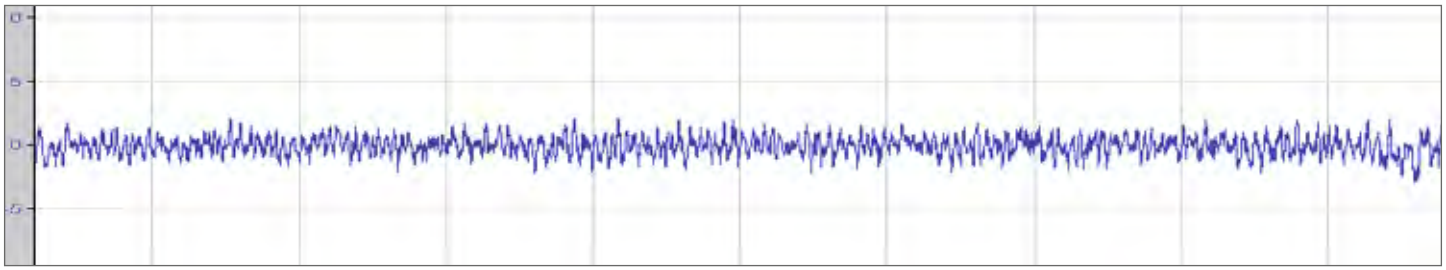
▲ 3D drawing of the new mill table

Best quality
and highest productivity

Material	Entry thickness	Exit thickness	Thickness deviation in first pass	Thickness deviation at exit from last pass
Stainless steel AISI 304	3000 µm	487 µm	22.1 µm (2-Sigma)	1.5 µm (2-Sigma)



▲ Incoming strip thickness deviation

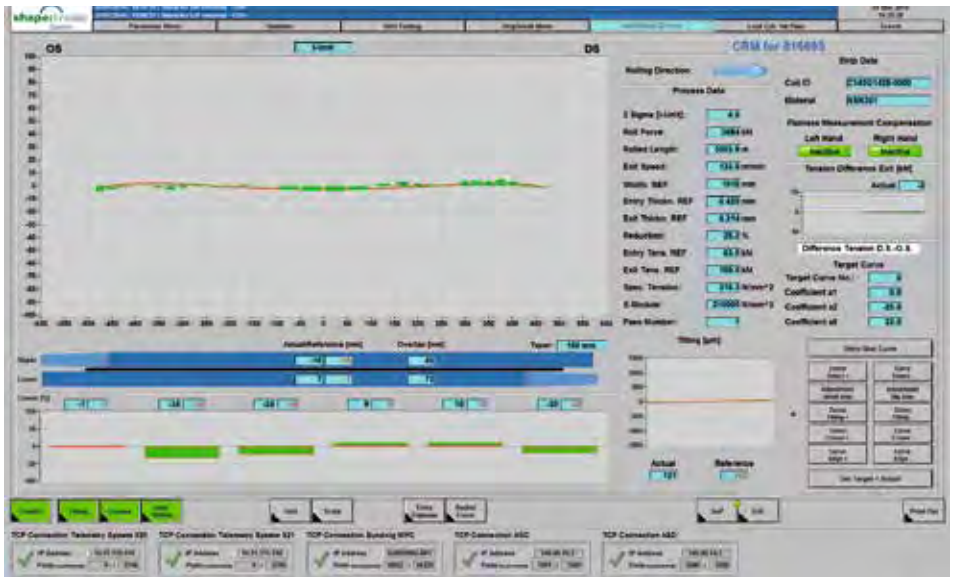


▲ Final strip thickness deviation after last pass

Result: The figures speak for themselves

After modernization, the requirements mentioned above were fulfilled. On the strength of our highly experienced technical and mechanical engineering teams, the first saleable strip was rolled 10 days after completion of installation. As a result of the modernization, the tonnage increased by approximately 10%. The various types of technological control in combination with the new hydraulic screw down made it possible to achieve a minimum strip thickness of 50 µm and flatness tolerances (3 I-units).

Parameter	before modernization	after modernization
Strip thickness	3.2-0.05 mm	4.0-0.05 mm
Strip width	450-1,020 mm	450-1,060 mm
Coil weight	18,000 kg	20,000 kg
Specific coil weight	5-17.6 kg/mm	19 kg/mm



Strip shape, measured ▶

ANDRITZ Sundwig's scope of supply

Mechanical modernization projects

- Hydraulic screw down
- Bearings for crown adjustment
- Pass line adjustment
- New mill tables
- Newly designed oil wiping system
- Lateral shifting cylinder
- Stretching roll for paper winder
- New spray plates with nozzles and modification of nozzle arrangement
- Lifting gate for mill housing

Electrical modernization of the mill stand

- Automation systems
- Technological control systems for strip thickness, roll force, strip tension, strip guiding, and strip flatness
- Drive technology
- Main control desk with process visualization and video system
- Technological process computer
- New control and servo-drive system for roll change device

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