



MORGAN HIGH SPEED PINCH ROLL AND LAYING HEAD

FOR INCREASED PRODUCTION,
IMPROVED YIELD AND CONSISTENT
PRODUCT QUALITY

HIGHEST OPERATING SPEEDS GREATER CONSISTENCY. GREATER RELIABILITY.

RELIABLE SPEED AND PRECISION...

The high-speed pinch roll and laying head system plays a crucial role in the production of high-quality rod. That's because speed is an essential factor for your productivity. At the same time, however, the coil must be well-formed and correctly positioned on the conveyor. This calls for precise control and accurate coordination of the pinch roll and laying head speeds.

Designed for sustained high-speed operation, the Morgan High Speed Pinch Roll and Laying Head system has set new standards - and works with extreme precision and reliability. The new laying head arrangement incorporates an integral segmented deflector plate for front and tail end control, and a rugged gear box with oil film or roller bearings for reduced vibrations, all to allow for long-lasting, less wearing pipe paths.

...FLEXIBILITY...

The pinch roll and laying head must also be variable enough to adapt to your requirements for product size range and production rates.

The optional use of multiple pipe supports in the laying head provides a means to efficiently cover all products, in either clockwise or counterclockwise rotations, complete with front and tail end control.

Together with the latest design turndown, the laying head can process even scratch-sensitive grades with optional interchangeable vertebrae and rollerized pipe supports. The laying head pipe support can be changed in less than 15 minutes, minimizing the impact on mill operations.

Our system offers greatly improved flexibility and minimized change times, thanks to the new laying head pipe support design and pinch roll units that can be traversing. In addition, the Morgan High Speed Pinch Roll and Laying Head are designed for rolling a wide range of finished rounds from 4.0 mm to 26.0 mm.

...AND DURABILITY

Our wear components demonstrate sufficient life to minimize production interruptions.

For high-speed rolling of small sizes, a revolutionary laying head upgrade with extremely long life has been recently developed. This new durable pipe technology results in significant reduction in downtime and achieves predictable, reliable production.

Our innovative designs and pioneering technology enable Primetals Technologies mills to perform consistently and reliably at the highest possible day-to-day operating speeds.

ADVANTAGES OF MORGAN HIGH SPEED PINCH ROLL AND LAYING HEAD

- Repeatable, error-free operation over the entire range of sizes with the patented Morgan Intelligent Pinch Roll and customized mechatronics package.
- Highest operating speeds on the market with a self-regulating system that minimizes operator input.
- Fewer oversized and distorted tail end rings on small sizes with tail end control.
- Uniform metallurgical properties from well-defined and consistent ring pattern on the conveyor.
- Laying head pipe life beyond 130,000 tons demonstrated on small diameter products rolled at high speeds with SR Series® pipe upgrades.
- Improved coil quality for all larger sizes with the Morgan High Speed Laying Head.
- Reduced coil height - facilitating coil stacking and shipping - thanks to wobble control.
- Produce surface-sensitive grades with interchangeable vertebrae and rollerized pipe features.
- Achieve different coil dimensions for different product sizes with the twin pipe design.
- All options easily controlled with mechatronic packages.
- Ready-to-use pipes available for your mill with our bending services.





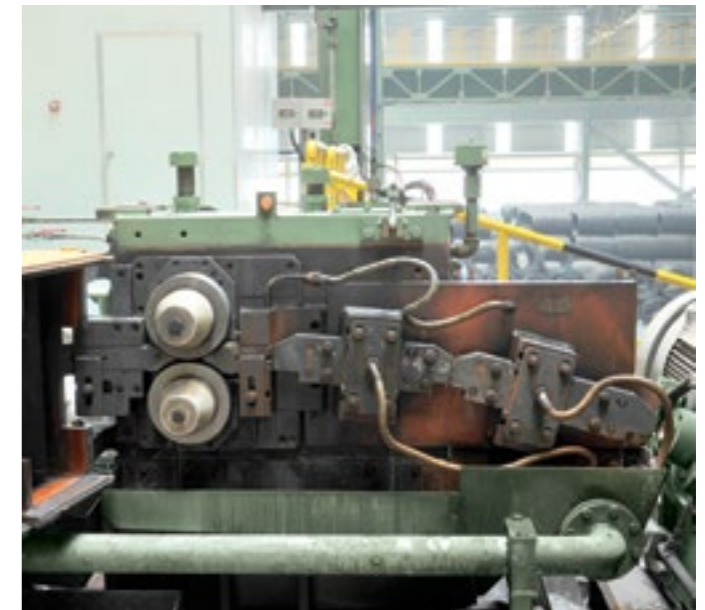
Morgan High Speed Laying Head for consistent high speed operation



Morgan High Speed Pinch Rolls are durable and reliable



Morgan High Speed Pinch Roll and Laying Head arrangement



Innovative turndown design dramatically extends time between changes

PRODUCING THE BEST RINGS AT HIGH SPEEDS

The Morgan High Speed Pinch Roll and Laying Head system enables mills to produce consistently and reliably both small products at high speeds and large products at lower speeds. The new generation laying head design includes a new pipe support with integral segmented deflector plate, a new guide path and the latest pipe technology. Primetals Technologies' patented self-regenerating SR Series® pipes produce consistently excellent coil patterns, well-formed head and tail rings, and dramatically increased pipe life - all at higher speeds and with better ring patterns than previously possible. The system allows operators to run at maximum production rates with consistent rings, while reducing delays at the reform station due to poor coil package.

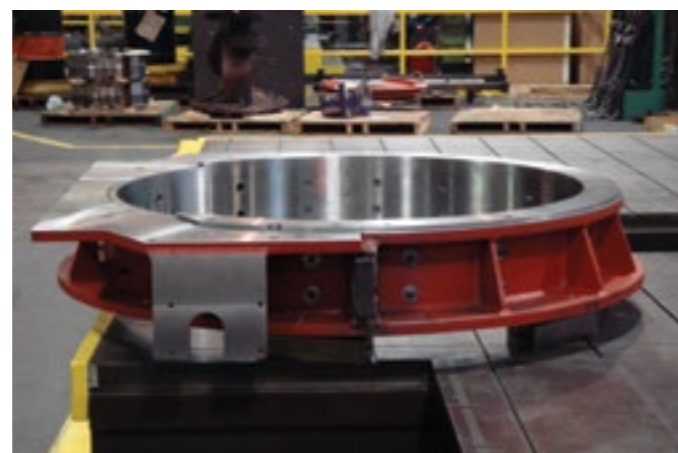
The SR Series laying head upgrade has proven consistent performance, improving ring pattern on small sizes at high speeds, which results in smooth operation on the Morgan Stelmor® conveyor, more uniform cooling, improved rod coil quality and increased production through reduced downtime.

UPGRADES AVAILABLE FOR EXISTING LAYING HEADS

For mills looking to improve productivity and coil package, the ideal choice is to apply improvements available in the latest generation of Morgan High Speed Laying Heads. The new guide path with SR Series technology pipes results in improved coil pattern, well-formed head and tail rings, and dramatically increased pipe life, all at increased production rates.

The newly-redesigned gearbox and base, coupled with the lightweight integral pipe support, significantly reduces system vibrations and therefore enables higher-speed operation. Additional improvements include an electric linear actuator that eliminates hydraulic lines and reduces maintenance time by improving interior access.

Laying head cobbles and poor performance can result from worn and poorly-repaired split rings. To further improve the laying head operations and provide a cost-effective maintenance solution, we have developed a new split ring design with replaceable wear bushing.



New patented split ring design with wear bushing

FEATURES OF THIS NEW TECHNOLOGY

- Unmatched production levels - Virtually eliminate pipe changes during normal small product rolling campaigns
- Improved head and tail ends - Greatly improve consistent formation of head and tail ends
- Excellent ring pattern - Predictable results with consistent ring spacing
- Easy retrofit - Seamless transition to replace older laying head arrangement
- Reduced maintenance costs - Longer life on turndowns, laying head bearings and pipes

KEY UPGRADE BENEFITS

- Record results in performance
- Reduced vibrations
- Improved laying pattern and tail end ring formation
- Unmatched pipe life
- Easy retrofit for existing systems

HIGH SPEED - DAY AFTER DAY

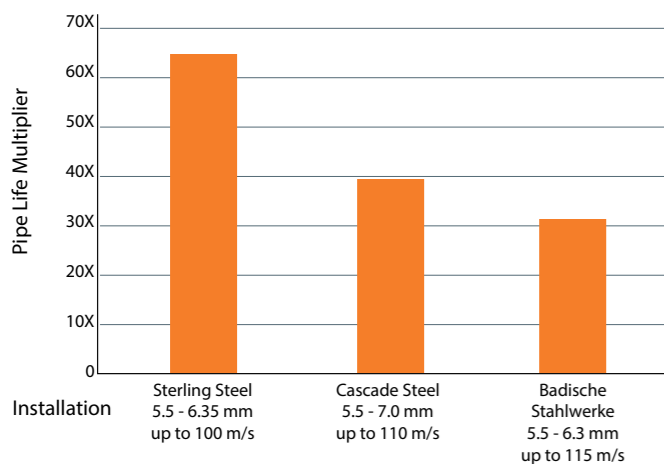
Our customers know that the high-speed pinch rolls and laying head are a critical area of rod mill equipment. Our innovative design and pioneering technology has enabled Primetals Technologies mills to perform consistently and reliably at the highest day-to-day operating speeds possible.

Other pinch roll units in our mills, notably intermediate pinch rolls, provide a flexible system with mechatronics for upstream mill processes.

A new turndown design with extremely long life is now available to further extend time between changes of those parts to more than 200,000 tons on small sizes at high speeds.



Example of coil height reduction possible with new SR Series pipes, producing the coil on the right, compared to standard pipe on the left



Experience of SR Series pipe life improvements on small diameters



Mechatronics control for consistent rings throughout the coil



Traversing pinch roll between water boxes

MECHATRONIC PACKAGE

The success of the Morgan High Speed Pinch Roll and Laying Head system is ensured with a mechatronics package, which provides closed loop control of pinch force using servo control technology and pinch roll drive speeds. The laying head control reliably shapes coils of a specified diameter with repeatable front-end positioning, and coordinates speeds with pinch rolls for precise positioning and smooth operation. This self-regulating system minimizes user input and set up with monitoring and controls managed through an easy-to-navigate human machine interface (HMI). The HMI allows both fine and wobble adjustments to the laying head's rotational speed.

The mechatronics package can be fully integrated into the standard automation solution for the rolling mill.



Pinch roll control setup screen

FEATURES OF THE INTELLIGENT PINCH ROLL CONTROL

- Self-adapting control, regulating in force control and monitoring position of the gap
- Faster reaction time than conventional pinch rolls
- Servo control of pinch force and position
- Closed loop control of pinch force and pinch roll drive motor
- Self-regulated system avoids roll slip, removes user input from pulpit
- Rapid roll closing times, 0.1 to 0.15 seconds, repeatable to within +/-5 milliseconds
- Precise timing during high speed rolling up to 120 m/s
- Automatic pinch position detection, with no operator action required
- Automatic pinch torque control

FEATURES OF HIGH SPEED LAYING HEAD CONTROL

- Accurate and repeatable front-end positioning to insure proper orientation of the coil on the Morgan Stelmor conveyor
- Integration with pinch roll controls for tail end speed up and other special functions
- Complete and accurate speed control through the billet to produce the best coil package

EXCELLENCE FROM EXPERIENCE

SELECTED SUCCESS STORIES WITH MORGAN HIGH SPEED PINCH ROLL AND LAYING HEAD SYSTEMS



MORE QUALITY PRODUCTS AT HIGH SPEEDS

Customer

Zenith Steel, Changzhou, China

Plant type

High speed rod mills

Our solution

Provide two rod outlets, each with Morgan Vee Mini-Block pre-finishing mills, Morgan Vee No-Twist® Mill, Morgan Water Boxes, Morgan High Speed Pinch Roll and Laying Head system, Morgan Stelmor® conveyor, reform and compactors for high production capability.

Technical data

105 m/s maximum finishing speeds, 150 tph maximum production rate, rod sizes 5.5 mm - 20.0 mm, rebar sizes 6.0 mm - 16.0 mm

The result

The new rod mills are equipped to produce carbon steels, welding wire, cold heading, spring, bearing, tire cord and PC strand.



FASTER MILL, BETTER QUALITY MIX

Customer

Třinecké Železárny, Třinec, Czech Republic

Plant type

Two-strand wire rod mill

Our solution

To meet anticipated future market demands, a major modernization incorporated new pre-finishing stands, Morgan Water Boxes, Morgan Rod Reducing/Sizing Mills and Morgan High Speed Laying Heads.

Technical data

110 m/s maximum finishing speeds, 162.5 tph, plain rod from 5.0 mm - 20.0 mm, plain carbon, welding rod, spring steel, high carbon, bearing and cold heading qualities.

The result

The modernized mill provides an improved and expanded product mix, at faster speeds and with greater mill utilization.



HIGH SPEEDS AND INCREASED PRODUCTION

Customer

Badische Stahlwerke GmbH, Kehl, Germany

Plant type

Two-strand wire rod mill

Our solution

Modernization of a two-strand mill for more production, expanded product range and high quality coils with new finishing blocks, Morgan High Speed Shears, Morgan Intelligent Pinch Rolls and Morgan High Speed Laying Head with new pipe support and SR Series pipe.

Technical data

Plain rod sizes 5.5 mm - 21.5 mm, ribbed sizes 6.0 mm - 20.0 mm, including fine grain rebar, low to medium carbon steel grades, maximum finishing speeds of 115 m/s.

The result

High speeds, increased production and new products in high quality coils.

Primetals Technologies USA LLC

A joint venture of Mitsubishi Heavy Industries and partners

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