SIROLL Power Coiler for hot-strip mills
Precise coiling of a wide range of steel products, including X100 pipe grades at 25.4 mm strip thicknesses

In the field of SIROLL HM technology Siemens VAI has introduced a number of modernization packages for hot-strip mills which reduce production costs and improve product quality. The SIROLL Power Coiler was developed to enable efficient and improved coiling of high-strength and other advanced steel grades, especially for thick gauges. This solution is ideal for installation in both new and existing hot-strip mills.

Your challenge:
Steel continues to maintain its predominant role in the industry. Steel is modern and the development of new steel grades is driven by the market to assure its competitiveness against other materials such as aluminum. The wide product mix rolled in hot-strip mills includes various advanced steel grades such as thin-gauge dual-phase steels and thick-gauge high-strength steels.

This trend demands the introduction of more powerful coiling equipment because existing down-coilers are not capable of coiling these types of advanced steel grades.

The coiler must allow the product mix of the hot-strip mill to be extended and must also assure the reliable coiling of heavy-gauge, high-strength steels up to a thickness of 25.4 mm. A coiler must also be capable of coiling pipe grades with yield strengths of 355 to 1,100 N/mm² and tubular steels such as X100/X120.

Our solution:
Siemens VAI developed a new coiler type known as the SIROLL Power Coiler. It was implemented for the first time in the hot-strip mill of ArcelorMittal at Fos-sur-Mer, France. The objective of this installation was to enable the coiling of thicker-gauge, high-strength strip grades, which was beyond the capacity limits of the previous coiling equipment.

The SIROLL Power Coiler is equipped with four wrapper rolls, whereby the first wrapper roll is characterized by a special design and control system. This coiler solution features a heavy-duty pinch roll with pre-bending capabilities.

Coiling can be performed in two modes; the classic mode with step control and the heavy-gauge mode. The coiling mode to be applied depends on the coilability index, which is based on strip thickness, strip width and hardn ess at coiling temperature.

The SIROLL Power Coiler assures that the complete range of strip thicknesses from 1.2 mm up to 25.4 mm can be coiled at strip widths up to 2,100 mm.
Technical description
A key focus of the SIROLL Power Coiler development was to employ the pinch rolls and the first wrapper-roll unit to prebend the incoming strip. This significantly reduces overall power demands for the initial coil windings and simultaneously decreases the friction between the strip and coiler aprons. Advanced control systems are installed to enable dynamic step control and force control of the wrapper rolls, non-linear hydraulic gap adjustments, hydraulic pinch-roll control, hydraulic side-guide control and strip-tension control. Other features, such as variable pinch-roll forces depending on the diameter of the coiled strip, side-guide force control, oscillation function and tracked tension relief during strip thread-out from the finishing mill contribute to the strip-coiling quality with respect to telescopicity.

The pinch roll of the SIROLL Power Coiler is also equipped with Siemens VAI pinch-roll polisher to minimize strip surface defects.

Main features
- Incorporation of a fully hydraulic and improved pinch roll with high-speed position and pressure control
- Design of initial wrapper roll as a twin-type unit (patent pending)
- Application of precise force control on the first wrapper-roll unit
- Installation of 4th wrapper roll allowing shorter apron lengths for reduced friction with incoming strip
- Use of automatic step control for thinner steel strips

Advantages of SIROLL Power Coiler
- Pre-bending of thicker strip gauges by pinch-roll resulting in reduced power requirements for initial strip windings
- Reliable and improved strip threading and winding
- Improved coiling quality right from the start of coiling
- Compact coiling of heavy-gauge and high-strength steels, even at low coiling speeds
- Reliable coiling of sheets produced under suboptimal conditions
- Efficient coiling of strip already cooled to achieve required mechanical properties

References
ArcelorMittal at Fos-sur-Mer, France - First installation of a SIROLL Power Coiler (hot-strip mill modernization)
ArcelorMittal Poland - Two SIROLL Power Coilers (new hot-strip mill)
OAO Severstal, Russia - Two SIROLL Power Coilers (hot-strip mill modernization)
ArcelorMittal Indiana Harbor West, U.S.A. - One SIROLL Power Coiler (hot-strip mill modernization)
ATI Allegheny Ludlum, U.S.A. - Two SIROLL Power Coilers (new hot-strip mill)