

Mechatronics packages for processing lines

Expand Capacity, Enhance Quality

Maintaining a competitive edge is a continuous process that wins particular importance in a demanding market. This article provides an overview of available options in the area of mechatronics.

Staying on top in industry requires quality and throughput improvements at tightly controlled operational costs. What options are available to meet these growing demands?

Companies today ask for higher-quality products at competitive prices. At the same time, the present situation holds opportunities for those who prepare for the next upward cycle. Trends in the industry call for production with less impact on the environment and higher efficiency, creating demand for new advanced high-strength steel grades with perfect strip surfaces, tight tolerances, uniform mechanical properties and excellent flatness.

Requirements for a typical line

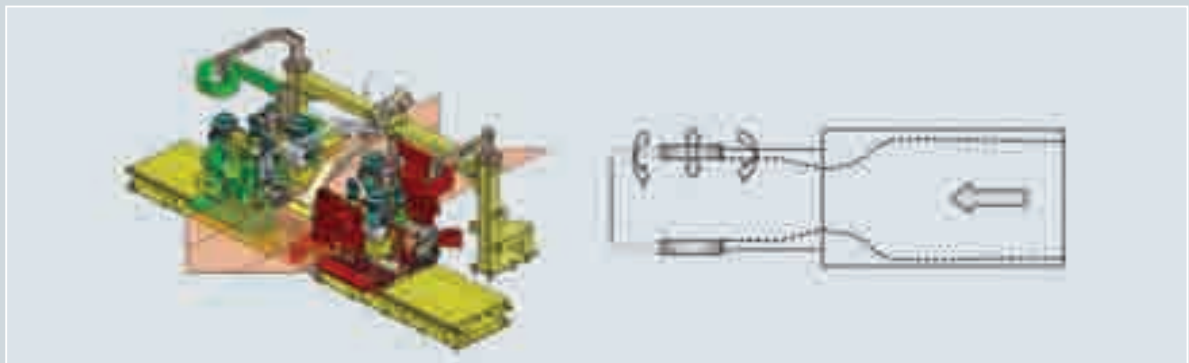
Highest processing-line availability is the key to economical viability. Also, the line has to adapt flexibly to any condition, ensuring consistent production even if challenging materials are used or a wide variety of

end products is made. Plus, technical-processing equipment and automation must be highly reliable, day after day. The next requirement is high production throughput and yield, with reduced strip-to-strip transition times and minimal scrap losses. Also essential are safe operation and maintenance procedures. Low operating costs ensure highly competitive and profitable operation. This means minimizing the use of coating materials and other consumables, reducing the need for maintenance, and lowering energy consumption and automating processes.

A host of solutions

A number of mechatronics packages for various stages of processing lines and a rolling mill can help meet new requirements:

- **Welders** are a prerequisite for continuous processes in any line. Siemens VAI delivers welders of all types, whereas laser welding offers particular per-



Side trimmer with a new dynamic width adjustment



The DAK® dynamik air knife controls both longitudinal and transversal coating thickness in Galvanisation Line.



A laser welder joins steel strips for continuous processing.

formance, productivity and cost-efficiency benefits. Better control of over thickness also improves the performance and service life of downstream equipment such as scale breakers, skin-pass mills, etc. The laser's flexibility to cut and weld high-strength and carbon-quality steel in homogeneous as well as heterogeneous combinations imposes fewer constraints on production management. And since there is no contact between the welding head and strip, coated and uncoated strip surfaces can be joined without any cutting and welding-tool wear.

- **Coating machines** contribute to important raw-material savings in painting, chemical treatment or zinc-coating processes. The DAK® (dynamic air knife) system not only controls longitudinal but also transversal coating thickness. In zinc coating processes, a DAK system can reduce zinc consumption by approximately 5 percent for a target coating quality of 60g/m² per face.
- **Controlled elongation systems** improve line flexibility and productivity and permit a top-level quality product. A skin-pass mill with high response time of temper-mill roll force minimizes the non-skin-pass strip length during weld passage. Also high-pressure work-roll cleaning system increases the work roll life time-reducing maintenance costs. Elongation remains constant for a given operation and is insensitive to variations of strip gauge and width, metallurgical strip properties and strip velocity. In pickling lines, the Siemens VAI scale breakers reduce acid consumption and increase line speed, enabling faster roll changes as well as increased service life of wringer and looper rolls.

- **Side trimmers** are available for all kinds of lines and strip thicknesses. The Siemens VAI side-trimmer design uses servo-motor-powered turrets that enable fast knife replacement without line stoppage. Unlike conventional systems that stop the line for width changes, the new dynamic width-change mechatronics (DWA) design only lowers the speed as the weld arrives in the side-trimmer area. Then, the side-trimmer mechatronics move the knife in a double curve to perform the width change, effectively increasing line productivity.
- **Automatic surface inspection** using the SIAS system ensures perfect, defect-free steel-strip surfaces. The system quickly detects surface defects such as roll marks and acts as production watchdog, drastically reducing the need for manual inspection. Since the system can, for example, detect edge cracks on a pickling line, it can help to avoid damages and loss of productivity in downstream processes.

Holistic approach to plant modernization

Building on engineering and process competence, Siemens VAI delivers proven mechanical solutions to optimize actuator systems, control systems, sensors and measurement with a focus on improving overall line performance, reducing maintenance costs and offering top-level service and support. ■

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