



Thin metal sheets with highly sensitive surfaces must be handled gently

■ Kohler Maschinenbau GmbH, Germany

Gentle, Fast, and Safe

Modular Sinamics converters with integrated safety functions form the centerpiece of a new cut-to-length line for surface-sensitive thin sheet metals produced by Kohler.

Thin sheet metals with coated and sensitive surfaces are considered to be particularly demanding during the coil-to-plate process, as they are very susceptible to damage and therefore must be handled gently. Kohler Maschinenbau GmbH in Friesenheim, Germany, specializes in the production of machines that can guarantee this protection. The company, which is based in the Black Forest, recently completed a custom-designed cut-to-length line for a leading German manufacturer of surface-treated aluminum and copper strip metals.

Keeping the line structure

Using this line, it is possible to process sheet metals at throughput speeds of up to 80 m/min. The existing intermediate layer is initially leveled and coiled in the process, so that a film with good adhesion can be reapplied as required to protect the sensitive surfaces. This can either be left on the sheet metal or removed again prior to the cutting process. Tobias Frank, project manager at Kohler, explains, "The new machine also offers a highly dynamic stacking station. Palletted stacks of plates come out ready for transport at the end of the process – virtually at the

touch of a button." The entire plant is controlled using a fail-safe Simatic S7-CPU 416F. The modular drive assemblies of the various plant sections and the other units are linked to the controller via Profinet. For this Kohler relies throughout on the Sinamics S120 drive system, thus following the line structure. As a result, the plant sections can be constructed independently of each other, commissioned, and then quickly linked together. The Simatic S7 F-CPU also coordinates the combination of 46 frequency-controlled axes and more than 40 auxiliary axes. In addition, it reliably monitors the whole plant's functional safety.

Safety functions ease pressure on the controller

Safety functions within the drive itself ease pressure on the controller. Frank explains, "At Kohler we use the Safe Torque Off, Safely Limited Speed, and Safe Operating Stop safety functions. With this project, however, we also used the Safe Direction safety function for the first time." It is hereby possible to safely monitor the direction of motion in combination with Safely Limited Speed. According to Frank, "Using this new function means that we can ensure that the drive rolls inside the system always rotate toward the operator." This prevents accidents because no one can be accidentally drawn in between the rolls. "Reliable monitoring of the direction of rotation also enables the drive rolls to be cleaned safely. And thanks to these safety functions within the drive, we eliminate not only the need for additional safety hardware but also any wiring requirements," says Frank, summing up the advantages.

Precise and inexpensive processes

Those in charge also save themselves a great deal of effort when assigning parameters by using the Drive-Cliq digital system bus, which links a drive assembly to the relevant control units. It also links virtually all the motors of the Simotics models M-1PH7 and S-1FK7/1FT7 used throughout. The electronic nameplate is read out automatically, rendering time-consuming and often error-prone manual parameterization unnecessary. The highly dynamic Simotics servomotors ensure high stacking speeds in the stacking system at the end of the 45 m long line. Frank says, "The lifting tables here, which are often operated hydraulically in other companies, are moved via servomotors and rigid chains." He adds, "This process is fast, precise, and leak-free, so it meets our requirements perfectly. Overall, I have to say that we are absolutely delighted with the col-



Photos: Wilhelm Media

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Tobias Frank, Project Manager, Kohler Maschinenbau GmbH

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Energy efficiency gaining importance

Last but not least, energy efficiency in cut-to-length lines is gaining increasing importance. Frank explains, "So that we can work as energy efficiently as possible, we operate the frequency converters of our systems via a common DC link and feed the energy generated during deceleration back into the supply network afterward." This means that the energy can be reused, whereas with units supplied individually the energy would need to be reduced via braking resistors and would inevitably be lost as a result. ■

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