



SIEMENS

Ingenuity for life



SIMOTION

SCA Hygiene Products GmbH operates dynamically and flexibly no matter what the situation

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SIMOTION integrated motion control system makes Tempo

In addition to the acceptance level of the end user, when it comes to the business opportunities for toilet paper in the market, the production technology is always decisive. This is the reason that SCA Hygiene Products GmbH, the German daughter company of the global Swedish manufacturer of paper, tissue and hygiene products, demands one thing for the converting and packaging solutions used in its production process:

To produce and package the wide range of different toilet paper types and grades quickly and flexibly around the clock. In intensive teamwork involving all of the suppliers, one of the most innovative high-performance and most flexible production plants worldwide was created. It took less than one year from the planning to start-up: The production of the toilet paper with the brand label Tempo. Seamless and integrated open-loop control and drive technology from Siemens are the driving force and have an integrating function over the complete production system.

Innovative production line created in a team

What was essential for SCA was that the automation technology of the plant and system components fully complies with the SCA factory standard across the board and represents the latest state-of-the-art technology. This was to simplify operator control and maintenance and reduce

the spare parts inventory. Together with Futura S.p.A. in the converting area, Körber PaperLink Group for the packaging, and W+D Langhammer GmbH for transport and palletizing, Siemens took on the challenge and created one of the most innovative production plants worldwide.

With up to four mother rolls being unwound with a flying splice and integrated production of the core – the system is currently producing up to 30 logs (rolls with the full web width) or 880 toilet paper rolls a minute. A wrapper and a bundler are directly connected. They are followed by a palletizer and a foil stretcher. In order to utilize the high performance of the new line, SCA invested in their own paper production that has made it now one of the fastest worldwide and supplies rolls with diameters of up to 2.5 m and up to 2.6 m wide.

The latest state-of-the-art converting performance and motion control

As a result of the large diameter of the mother rolls, even at high processing speeds of up to 650 m/min, the number of roll changes is kept within limits – approximately every 45 minutes. The paper layers are fed through the plant in different ways, glued, pre-embossed, embossed across all layers, laminated and perforated. Such complex motion sequences that interact and depend on one another at the highest and variable velocities demand a high performance, integrated and seamless control and drive system from start

to finish. In order to achieve a maximum degree of flexibility, the rewinder alone has about 50 axes that are directly driven from 1FK7 and 1FT6 servomotors from Siemens. These are coordinated by a group of several SIMOTION D445 motion controllers adapted to the modular line architecture. These motion controllers are integrated in the modular SINAMICS S120 drive system. A fail-safe SIMATIC S7 handles the logic and safety tasks. A "virtual leading axis" is the master and "pacemaker" in the converting area. This is generated in a SIMOTION D445 control unit of the rewinder. All of the other drive axes are electronically coupled to this. The motion controllers of the various plant sections and the higher-level safety control communicate with one another via PROFINET (in some cases, using the fail-safe PROFIsafe profile).

Simple, more efficient engineering

The SIMOTION Scout engineering system reduced the engineering time and, in turn, the costs. The Motion Control Chart (MCC) integrated in SIMOTION Scout especially simplifies programming complex motion sequences that can be transparently represented in the form of a flow diagram. In addition to special motion control commands (e.g. "reference axis"), there are also commands to access I/O, logic and arithmetic operations, subprogram calls and control of the program flow. Among other things, Futura implemented the flying mother roll change ("Flying Splice") and various unwinders and winders of the plant. Synchronizing and cutting head travel in the longitudinal direction when producing the cores ("Flying Saw") were also implemented significantly faster using Scout and MCC than would have been the case if conventional (programming) techniques had been used. An additional advantage is the significantly extended diagnostics capability of the new drive system, which noticeably simplifies troubleshooting

Packing in fractions of a second

KPL Packaging designed and constructed a foil packer with about 25 individually controlled servo axes to directly pack the high number of rolls coming from the saw in various packaging types. These also follow the virtual leading axis of a SIMOTION D445 that specifies the velocity of the complete production line. The downstream bundler brings the various packages into wrapped bundles – for instance for the wholesale trade. Both the PLC and the motion control tasks of this plant section are implemented on a SIMOTION D445. The next to last station is an automated palletizer with SIMOTION,



SINAMICS S120 and about 15 servo axes. This palletizer can be supplied with products in two ways and brings the individual packages into an optimized position on the pallets. A foil stretcher completes the line.

Everything from a single source

The seamless and integrated automation technology across the complete production system is also reflected by the SIMATIC Operator Panels. A Multi Panel MP377 Touch is the central operator location for the converting part and is located directly at the main processing section. An additional seven distributed Multi Panels MP277 or Touch Panels TP177 devices supplement the system and are used at the individual stations. A SIMATIC WinCC flexible 2008 provides a common user interface across all of these. A powerful SINAMICS G120 inverter (150 kW) ensures that the production hall is kept free of dust. Inverters from Siemens also ensure that the finished packages are smoothly transported along conveyor belts. And anyone who takes a close look will also see Siemens components under the ceiling of the production hall: The hall crane to transport the mother rolls is controlled from an operator device that has a wireless communications link to the crane control. A SCALANCE WLAN Access Point, which transfers the operator commands to the drives via the control, has been installed in the center of the hall for this purpose.

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