



## Strategic reinforcement – Perlen PM 4



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Graphic*

Perlen Paper Mills, located near Lucerne in central Switzerland, currently produce newsprint, improved newsprint and telephone directory paper on PM 5, and woody offset printing paper on PM 1.

A furnish mix mainly comprising TMP and DIP is used, with virgin pulp for the lighter grades. Most raw material needs are covered by regional supplies, since adequate quantities of timber and recovered paper are available locally. TMP furnish is produced in high speed pressurized refiners, delivered from Andritz, Austria.

The deinking line in Perlen was supplied by Voith Sulzer Paper Technology in 1991, and the TMP line in 1994 within the framework of an extensive rehabilitation project. Both lines comply with the latest state of technology.

### Project origins

During the course of strategic expansion studies, Perlen Paper investigated with external consultants various options for product types and output quantities. After detailed analysis, the decision was made for LWC offset paper production on a machine with 5,900 mm wire width.

The main goals behind this decision were as follows:

- To maintain and expand local furnish supplies. Both the TMP and DIP lines can be upgraded at relatively little outlay to enable greater output and higher quality.
- To exploit the company's excellent knowledge of local markets for launching new products.



- Adaptation of production output to achieve a good balance between furnish procurement and paper sales within a reasonable scale of activities.

#### The order

After a year of feasibility studies, a completely new paper machine line was ordered from Voith Sulzer Paper Technology. The scope of delivery includes a DuoFormer TQv in the wet section with a whitewater-regulated ModuleJet headbox. Special attention was paid to cleanliness in the design of this former for high runnability. It ensures excellent sheet quality and is also suitable for newsprint production as a startup grade.

The press section comprises two NipcoFlex presses, the first of which with double felting.

After the well-tryed TopDuoRun predrier section comes a SpeedFlow coating aggregate. This is fitted with carbon fibre reinforced plastic applicator beams which are unaffected by temperature changes. A completely new predosing system was developed.

Coating is followed by a hot-air suspension drier, as well as an infra-red drier for regulating the humidity cross-profile.

The on-line Janus calender with six rolls has a variable nip threading system. Either all the nips can be used, or only the top or bottom nips. This enables calendaring of the entire product range, from newsprint or matt offset grades to high-gloss LWC offset printing papers.

A Sirius roller ensures trouble-free winding of high-gloss paper on rolls up to

*Fig. 1: Perlen Paper Mills, central Switzerland.*

3,200 mm diameter, with lowest possible reject rates.

#### Engineering

Apart from the machinery, Voith Sulzer Paper Technology also received the order for project engineering. This covers machine design, process layout and MCR systems for the entire paper production line, including stock finishing and roll packaging. The scope of supply also includes procurement engineering by Voith Sulzer Paper Technology for all machinery as well as MCR and electrical systems. All requirements were established in teamwork with Perlen Paper, specifications compiled, tender invitations issued and subcontracts finalized.

#### Training

Right from the beginning of this project, Perlen Paper gave the highest priority to

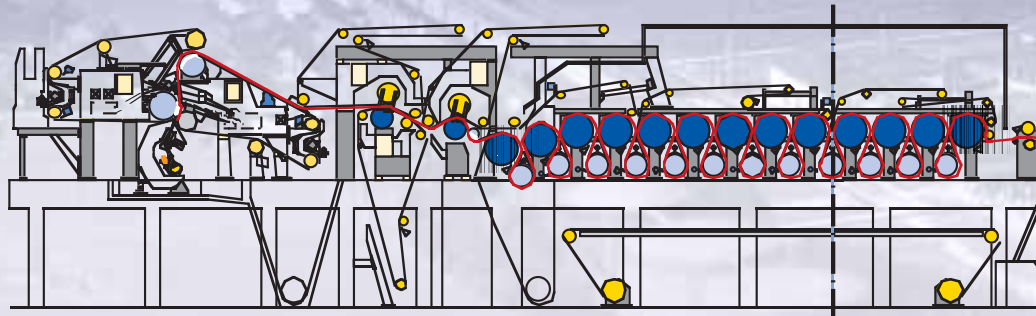
personnel training as an indispensable success factor. Together with Voith Sulzer Paper Technology and Gernsbach school of paper technology, a comprehensive training plan was compiled which is based on thorough training by our production specialists and commissioning engineers. To complement this basic training, Perlen Paper is using a process simulator as described below.

#### Process simulator

A modern production line has a programmable process control system which receives operator inputs on the one hand, and process or plant feedback data on the other hand. From this feedback data it generates user display information on the plant operating status.

For Perlen, all the PM 4 production line parameters were programmed from the outset into the process simulator, including motors, pumps, limit switches, etc. This means that the process control system with its various monitors can be connected to the simulator, enabling the operating personnel to run the plant on a virtual basis with the original control and monitoring equipment – well before the actual machine comes on line.

*Example:* The original control monitor of the programmed control system displays among other data the headbox pump pressure. This can be set to a higher value by the operator, exactly as it will be



when the plant comes into service. The control system then executes the necessary steps and issues a corresponding command not only to the process itself, but also to the simulator. Process reactions to this command are simulated, and the (virtual) headbox pump runs faster to increase the pressure and the flow rate through the headbox. Simulated pressure and flow sensor signals are then transmitted back to the process control system, and the operator sees on the display the results of his action.

By this means, the operating personnel can familiarize themselves on the original user interface with all main process functions several months before the machine actually starts operating. Another advantage for easier commissioning later on is that during simulator programming, the process control system was thoroughly checked.

#### Quality management system

The main scope of supply includes our well-proven Profilmatic cross-profile regulation system for the headbox, steam

boxes, calender and infra red dryer. As a separate order, Voith Sulzer Paper Technology was also entrusted with the comprehensive quality management system comprising:

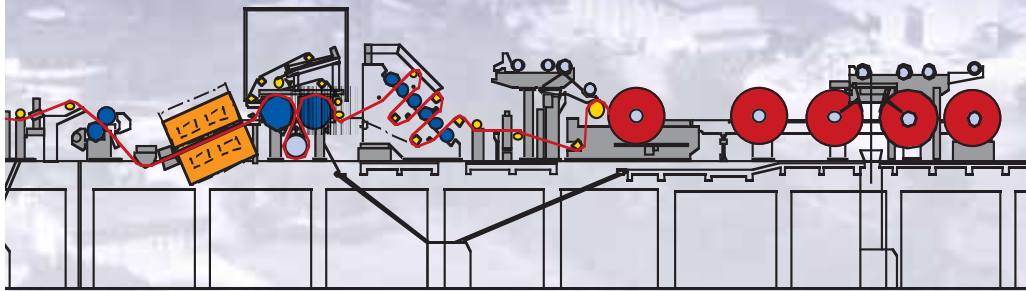
- Voith Sulzer Paper Technology “Advantage Plus” measuring frames with sensors for basis weight, moisture content, ash content, consistency, colour hue, porosity and gloss.
- Quality control system with machine-direction regulation of basis weight, moisture content and ash content, automated grade change and production data reporting.
- “Infopac” graphical quality analysis system.
- “Parsytec” web inspection system.
- “Web Eye” break analysis system.

Perlen Paper thus receives a fully comprehensive hardware and software system from a single source, without the interface problems usually encountered otherwise.

#### System partnership

Coated paper production is a new field for Perlen Paper. But by installing this

*Fig. 2: Technical data of Perlen PM 4:  
Design speed 1,500 m/min  
Wire width 5,900 mm  
Web width on roller 5,360 mm  
Design output 572 t/day  
Product grades: coated offset papers,  
glossy and matt, 45-70 g/m<sup>2</sup>,  
newsprint and improved newsprint.*



**The PM 4 project as seen by  
Rolf Maisch, Managing Director  
Perlen Paper Mills**

*“Our goals with this new production line are very ambitious. But if the concept targets, time and cost schedules are complied with as well as they have been so far, this innovative machine will be producing top quality paper as of October 2000.*

*Coated paper quality depends very much on the furnish and the basis paper, which must have fine high-strength fibres and a uniformly high consistency. Innumerable trials with TMP and deinked recovered paper, using a wide variety of treatment methods, have shown that excellent fibre mixtures and basis paper qualities are obtainable with these furnish grades, so that our goals in this respect have already been reached.*

*A more difficult task is to develop coating materials and technology to the required quality. Thanks to unprecedented teamwork between pigment manufacturers, binding agent producers, Voith Sulzer Paper Technology and Perlen Paper Mills, a good deal of pio-*



*neering work in this respect has already been done and will continue well beyond the commissioning of our new PM 4.*

*Such a large project places the highest demands on the management of both partners. In order to comply with the short realization time of only 18 months, ongoing planning is required – in other words, simultaneous engineering.*

*The civil engineering schedule allows no room for delays: foundations and bedplate phases 1 and 2 have already been completed, and some imposing concrete pillars have changed our skyline. Furthermore, the project costs and deadlines are fully on schedule.”*

modern plant and the peripheral systems described above, they have laid the best possible foundations for success – including highly competent operating personnel thanks to virtual training in advance!

To reap the full benefits of product quality from these resources, a long-term cooperation agreement was signed between Perlen Paper Mills and Voith Sulzer Paper Technology which also covers the product optimization phase after plant commissioning.

Project teams have been formed comprising experts from both sides of this partnership, together with suppliers such as the coating colours, and even including printers for final product assessment. Led by a committee made up of management members from both partner companies, key matters are dealt with ranging from stock finishing and base paper optimization to developments.

Partnership results so far have already brought excellent progress in product development. All partners involved confirm that thanks to this transparent teamwork in solving difficult tasks, both sides gain extremely valuable system know-how. There is no doubt that with such a good start, PM 4 at Perlen Paper Mills will very soon be producing LWC offset paper of the highest quality after commissioning in October 2000.