

## Companies

## UPM Nordland Papier and E.C.H. Will cooperate in the development of paper-converting machinery

The requirements regarding the production and conversion of paper are steadily increasing, concerning both the quantities produced and the quality required. UPM Nordland Papier, a part of UPM Kymmene and one of the biggest European production facilities for fine paper, and the Hamburg-based machinery company E.C.H. Will, market leader for paper-converting machines, are connected by a long-standing development cooperation which began more than 20 years ago. The latest outcome of this close cooperation is the folio-size sheeter GFS PRO, a development project which started back in 2001.

### GFS PRO folio-size sheeter: innovation through cooperation

We visited Günter Brümmer, converting director at UPM Nordland Papier in Dörpen, Germany. He began work in engineering at this location in 1989 and is today head of UPM Nordland converting, with 550 employees, and is a

member of the mill's management board. His department handles 970,000 tonnes of folio sheets and 220,000 tonnes of cut-size products per year. This adds up to 4,000 formats per year and up to 5,000 pallets per day!

The paper has to be rolled out quickly and effectively in the requested formats. Requirements concerning time of delivery and format flexibility are continuously increasing, especially for folio-size formats. In order to meet this tightened time frame, zero-defect production is crucial. Facing steadily increasing production targets, the main challenge is to minimize damage on surface or cutting edges during the sheeting, overlapping and stacking processes or better yet, to avoid them completely. Due to the sensitive surfaces of coated papers, for instance, so far it has not been possible to achieve the maximum production speed without marking the material.

To meet these challenges successfully, UPM Nordland Papier has decided on

intensive development cooperation with E.C.H. Will, a specialist manufacturer of cut-size and folio-size sheeters. Since the early eighties, both companies have cooperated in the cut-size and packaging area. Because of the regional proximity of their facilities, it is possible to perform production tests at both the customer's as well as at the manufacturer's site at short notice. UPM Nordland Papier was a pioneer in adopting state-of-the-art technology for cut-size sheeting. In 1998, the first 15-pocket cut-size sheeter was put into operation at the Dörpen facility.

Mr. Harald Rann, product manager folio systems at E.C.H. Will, has visited UPM Nordland Papier more than 30 times and is happy that the production experiences of his customer were strongly influencing the in-house development process. The starting point for the experts at both companies was the question concerning what the maximum requirements for cross cutters would be in the future. Based on intensive discussions, important detail solutions were developed. The project goal was the development of a new sheet transport and overlapping system guaranteeing efficient mark-free sheeting of sensitive paper. At the same time, sheet transport was designed to be more operator-friendly by omitting top tapes. These two elements are essential components provided by today's "PRO" technology.

### Fully automatic high-performance cross cutter to meet the highest production requirements

The shared target of the cooperation was the development of a fully automatic high-performance sheeter, with special attention to short cut-off length below



From left: E.C.H. Will product manager Harald Rann, Günter Brümmer, converting director, and Mr. Hans Hermes, converting supervisor, of UPM Nordland.

1,000 mm and the converting of sensitive coated papers. UPM Nordland Papier made high demands on the degree of automation and required a maximum knife load of 1,000 gsm at a machine width of more than 2,800 mm.

The close cooperation between supplier and customer was reflected during the running project in many individual solutions. An example is the development of the fully automatic reel change, with short downtimes of less than five minutes for eight paper reels. Operator intervention is no longer required. The request for a higher knife load could be achieved as well. The cross cutter block has been equipped with carbon fibre shafts and two knives for each knife shaft. Due to the quality of its material and the state-of-the-art drive system, the knife block provides a significantly higher performance than conventional cross cutters, particularly for short cut-off lengths.

For all sub-projects, the early involvement of UPM Nordland Papier and the ongoing tests with different paper qualities at the Dörpen facility were decisive for the successful implementation of the project.

The result of this development cooperation is the state-of-the-art GFS PRO folio-size sheeter, with the following main features:

- Machine width: 2.83 m, cut-off length: 400 – 1,600 mm, up to 6 pockets.
- Machine speed: 410 m/min. As we were told, a speed increase would not increase the line output significantly, since the production lots at UPM Nordland Papier are rather small.
- Fully automatic reel change without the need for operator intervention. Short downtime of less than 5 minutes for the automatic splicing of 8 reels.

- The line is equipped with two types of de-curler heads for coated and uncoated papers.
- Two slitters are required since their cutting capability is limited to 600 gsm each.
- Cross-cutter: up to 1,000 gsm cutting capability. The shaft has two knives and is made of carbon fibre material, which combines excellent strength with a 3 times lower weight than steel. The manufacture of carbon fibre shafts requires special know-how, which E.C.H. Will has developed since 1993.
- The cross-cutter is driven by 4 directly-coupled water-cooled torque motors, a joint development with Siemens. The motors reach very high torque at relatively low speeds. In order to produce folio formats at various cut-off lengths, the drive has to accelerate and decelerate the cross cutter shaft up to 500 times per minute!
- Mark-free sheeting technology had previously been developed for a 1,800 mm wide folio-size sheeter FS Pro (we reported in ipw 04/2005, p. 18 f, and in ipw 07/2005, p. 17 f): vacuum and electrostatics are replacing conventional top tapes and prevent sheet marking. Some tapes are only required for the reject gate in the overlapping section.
- 4 pallet magazines ease the frequent change of formats (up to 30 per day)
- For operation and safety reasons the converting line is supervised by a camera system.
- Optimized man-machine-interface operating concept with control panels on both sides of the line. Mounted on a rail they can be moved to a position where the action takes place.
- Maintenance-friendly equipment design: easy access, standardized parts and long service intervals minimize maintenance cost.

I asked Mr. Brümmer about the expected useful life of the new converting line. The line is expected to last up to 40 years or more, but it is rather unlikely that the control and automation hard- and software will last that long.

#### Daily output record exceeded

Early in the project stage, a narrow version of the GFS PRO – the prototype of the folio-size sheeter FS PRO – was installed at UPM Nordland Papier. Because of realistic production tests, the potentials as well as the weak points of the new technology were able to be identified right from the start and helped to enhance product development.

This preparatory work allowed the partners to reach the theoretical potential of the GFS PRO very quickly. The daily output of the machine has exceeded the requirements of UPM Nordland Papier. The existing record for daily output has already been significantly exceeded. These results will have a positive impact on further ideas and projects for future cooperation. ■ )

#### Interview

After a long-standing and intensive cooperation, the folio-size sheeter GFS PRO from E.C.H. Will has been installed successfully at UPM Nordland Papier. On the occasion of a joint visit to the production facilities, Günter Brümmer, director of converting at UPM Nordland Papier, and Harald Rann, product manager of folio systems at E.C.H. Will, responded to the questions posed by ipw advisory editor-in-chief Dr. Walter Isler:

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**ipw:** *What are the main challenges for the development of paper converting machines from the paper manufacturer's point of view?*

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**Brümmer:** In our highly competitive market, the degree of automation of the machine including the periphery ranks first. Other must-haves are a maximum knife load and a straight-forward batch run. Operator concepts have to be intuitive and failure indication systems have to be intelligent. Furthermore, we expect that our hardware has a long life expectancy.

**ipw:** *What is the benefit of the close cooperation with a big paper manufacturer from the technology supplier's point of view?*

**Rann:** The very early integration of practical experience gained from the production process provides the best conditions for developing market-driven products. These experiences can especially be used for the design of the operating concept, because only in this way will a converting line be operator-optimized. Furthermore, maintenance requirements must be kept in mind in order to guarantee a high level of availability over the whole machine life cycle.

Both factors have been incorporated into the development of the GFS PRO and generate further advantages for our customers, besides increased output and enhanced product quality.

**ipw:** *What kind of learning experiences did UPM Nordland Papier gather during the testing procedure? What concrete requirements resulted from the tests and have been adopted for product design?*

**Brümmer:** The testing procedures on the FS PRO in Hamburg have been decisive for the use of the new technology at our facilities. By setting up the FS PRO prototype at UPM Nordland Papier, we were able to very quickly identify the weak points and limits of the system at that time and to respond positively to them. Thus it was possible to steer further development in the correct direction. This was the target of the FS PRO prototype – by using this prototype, the experiences of UPM Nordland Papier directly influenced the product development process. We were ready to accept a certain delay in the product implementation of the GFS PRO folio-size sheeter in order to achieve improvements.

**Rann:** The new “PRO” technology was used under production conditions for the first time at a working width of 1,800 mm. For the GFS PRO, several functions were optimized. First of all, the “PRO” technology was transferred to a working width of more than 2,800 mm. This had been the biggest challenge, and to meet it a lot of special requirements and experiences of UPM Nordland Papier had to be considered.

The result is a machine that fulfils the highest requirements of product quality by using mark-free sheeting technology. At the same time we achieved the pre-conditions for the highest tonnages by using a maximum knife load of the cross cutter of about 1,000 gsm in addition to other excellent performance characteristics. With a continuing focus on machine operators we improved the operating concept of the machine, for example by limiting maximum noise exposure to 82 dB (A).

**ipw:** *What is the concrete benefit for UPM Nordland Papier concerning the cooperation of both companies?*

**Brümmer:** The GFS PRO is the first folio-size sheeter which has been installed at UPM Nordland Papier by E.C.H. Will. An important precondition for that was that our strategic development guideline in automation and technology could be adopted by this machine. By means of intensive cooperation during the project planning and engineering phase we were able to influence the design and choice of components.

Furthermore, we used the opportunity to leave well-known paths to allow us to be convinced of the advantages of new systems. In the end, this was a win-win-situation for all parties involved.

**ipw:** *What are the effects of the successful project for the production processes of UPM Nordland Papier today?*

**Brümmer:** We were able to reach the agreed performance of the machine very quickly. Of course, we had to take into account a certain time frame for fine-tuning, since we were dealing with a prototype. The planned daily output of the machine meets the defined target values. The successful project is opening up new ideas for future production

improvements. We certainly see further potential to increase the daily output. The machine has already significantly exceeded previously existing in-house records.

**ipw:** *What are the future challenges UPM Nordland Papier expects in paper converting?*

**Brümmer:** Our industry is characterized by increased costs in raw material, energy and human resources, while requirements regarding quality and output are growing at the same time. That's why we need the right tools for our most important resource, the staff. Consequently, besides self-evident parameters such as performance, quality and reliability, machines have to fulfil the most important factor: efficient operability. Machines have to be designed by humans for humans. Therefore, it is crucial to have an open dialogue concerning requirements, expectations and potentials. That is only possible if partners trust each other, today and in the future.

**ipw:** *What are the future challenges for product design of paper converting machines? What does the successful implementation and launch of the project mean for the market position of E.C.H. Will?*

**Rann:** Particularly in Europe, the development of small batches is becoming more and more apparent. Thirty format changes and more within 24 hours will be usual. In order to economically produce these small batches it will be crucial to increase the degree of automation.

We are convinced that we have strengthened the market position of E.C.H. Will as a supplier of folio-size sheeters by the successful conclusion of this project. In the future we will continue to be an important partner for paper mills and converters interested in forward-looking solutions for new investment or replacement projects. E.C.H. Will has started up a second GFS PRO sheeter in Japan, another unit is on order for a Finnish customer with a planned delivery date in January 2008. **WI ■**