Efficiency in folio-size sheeting requires more than an efficient sheeter

Advanced MES software and machine design enable **E.C.H. Will's** latest folio sheeter generation to increase overall production efficiency

Good times or bad, one thing in the sheeting business is certain: Having a fast machine is no longer fast enough.

With Just-In-Time (JIT) inventory policies becoming the standard as printers, paper merchants and other customers want smaller orders filled more often, in turn, producers themselves need greater overall efficiency. It's the only way to satisfy customers' evolving demands for super-fast delivery with perfect product quality.

Sheeting machinery cannot deliver that capability merely by running faster. In fact, a high speed system is inefficient if its full capability goes unused. Even in better times, many converting lines have been running at 60% capacity. Given recent declines in demand, the need for efficiency throughout the facility becomes most important.

"What good is a sheeter that finishes a job in a few minutes, if it takes four times that much time to set up the next job?" asked Olaf Dreger, Product Director at E.C.H. Will, a Körber PaperLink (KPL) company. "An aging sheeter, even a very fast one, cannot handle tomorrow's efficiency needs . . . which, in fact, already confront us today."

Yet, when machine manufacturers and their customers discuss efficiency, they often retain the habit of talking only about machine speed. Dreger says that E.C.H. Will prefers the term "Overall Equipment Efficiency" (OEE). This broadens the conversation to include all important ellements of the folio-size converting process.

Those elements extend to job planning, material and pallet logistics, machine setup, output handling and maintenance. Overall profitability now requires that all these be speeded up, in support of the higher machine speed.

THE FUTURE IS ALREADY IN PLACE

E.C.H. Will's newest folio sheeter generation already answers all these

GFS PRO Highlights

Principal features of the GFS PRO folio sheeter include:

High output due to a 2.8 m working width, a >1000 g/m² knife load capacity and production speeds of up to 410 m/min

Highly automated reel handling and sheeter operation, with optional inclusion of fully-automated pallet magazines

Outstanding output quality. Patented mark-free sheeting technology eliminates all components that might cause surface marks and scratches, such as top tapes, nips and brake carriage

Intelligent operating and design concepts, including easy access to all relevant areas of the sheeter, such as the overlapping section

Faster size changes

Shorter reel change times. The economic single unwind solution typically takes just 4¼ minutes for a full set of eight reels – versus 20 minutes with comparable systems

Low production noise emission meets the most rigid workplace regulations

GFS PRO Efficiency Highlights

Machine width	2900 mm 6 pockets
Average reel change time (single unwind solution)	4.25 min
Average size change time	4.25 min
Maximum machine speed	410 m/min
Maximum knife load	>1000 g/m²

PRO technology boosts productivity throughout the machine.

needs, employing the company's "PRO technology" at installations in Germany, Finland, Poland, Japan, Korea and Indonesia.

Their GFS PRO high-speed sheeter keeps production running smoothly by incorporating Manufacturing Execution System (MES) software to bridge the gap between the owner's Enterprise Resource Planning (ERP) system and local machine controls. In addition, a large number of mechanical improvements speed up and improve the actual sheeting process.

Altogether, the system virtually eliminates downtime between jobs, smoothes production workflow, reduces waste, frees up personnel and enables a faciilty to work around unexpected situatons more swiftly. As a result of this new approach to production, producers can offer job sizes that were previously impractical, even as small as a single pallet.

While this versatility opens new sales opportunities to sheeting enterprises, it brings with it the need for automation to be comprehensive and interrelated. For example, producing in 500 different formats is little use unless facilities are orchestrated such that each job will fit on its pallet exactly.

THE ADVANTAGES OF PRO TECHNOLOGY

At the heart of this revolution is the machine itself. The GFS PRO folio sheeter was designed from the ground up to begin a new productivity era. The PRO technology concept centres on a new system for sheet transport and overlapping, among its many innovations. By the combined use of vacuum belts and electrostatic charge, sheets are controlled without top tapes. It is typical for the sheeter to run up to 500 tons per day, of even sensitive materials, at up to 410 m/min without making a single mark on the surface.

"With the PRO technology, we make it possible to replace multiple old machines with a new one that achieves higher output and higher quality, using fewer personnel"

A GFS PRO system installed at one of Europe's largest fine-paper production facilities has significantly exceeded that facility's previous daily output, achieving a world record production of 709 tons per day. "With the PRO technology, we make it possible to replace multiple old machines with a new one that achieves higher output and higher quality, using fewer personnel," says Harald Rann, Product Manager Folio Systems at E.C.H. Will.

The PRO generation achieves 50% more output per operator, compared to a similar machine using older technology. Material waste is also reduced.

The high level of automation has an additional benefit that is integral to the PRO concept – it allows comprehensive production data to be incorporated into the MES system, furthering coordination.

MES Benefits

	Reduced by
Manufacturing cycle time	45%
Data entry time	75% or more
Work in Progress (WIP)	24%
Paperwork between shifts	61%
Lead time	27%
Paperwork and blueprint losses	56%
Product defects	18%

Multiple studies have demonstrated how MES technology significantly increases profitability, productivity and process performance. Source: Siemens AG: SIMATIC IT Partner Kit, Munich 2003

MES TECHNOLOGY

E.C.H. Will originally developed MES software for its cut-size lines, employing it from reel handling to palletizer. "The cut-size results demonstrated an enormous increase in efficiency," says Dreger. "It was clear that we should optimise the OEE concept by integrating MES into our PRO technology."

In filling the critical gap between machine-level automation and a company's ERP system, the GFS PRO's MES software is able to reproduce machine settings, execute fully-automated orders and provide full production reports.

Although the MES concept is not new – some sheeting plants have tried developing MES systems to their own standards – the E.C.H. Will system is clearly set on a course for the future. It is designed to the ISA-95 standard, on an object-oriented database software platform. Its interface is intuitive, a virtual model of the resources, end products and production process.

SPECIFIC MES CAPABILITIES

The capabilities and scope of E.C.H.

Above: The GFS PRO folio-size sheeter achieves 50% more output per operator compared to a similar machine.

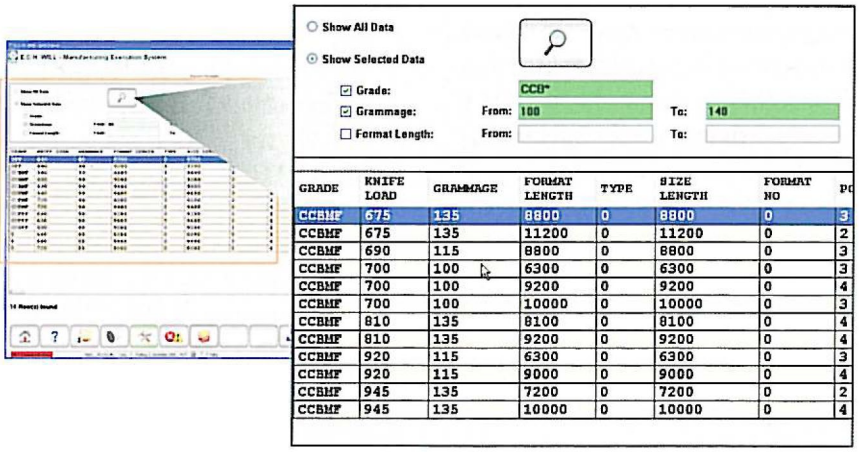
Will's PRO technology and this MES system are continually expanding. Modules currently include the following:

Machine Parameters Some paper mills produce up to 1,000 different products. To achieve highest product quality, the machine operator can adjust and optimise up to 200 different settings for each product. These machine parameters are then stored in the MES database for future reference. They can be reproduced within seconds, thus speeding the same or similar orders in the future. This assures consistent product quality – independent of operator – from order to order.

Efficiency Monitoring During production, the MES system knows in which area a disturbance occurs. Pinpointing the bottleneck enables detailed error analysis, discovery of the cause and recommendation of a specific strategy to facilitate continued workflow. The overall monitoring provides reliable figures to benchmark those strategies.

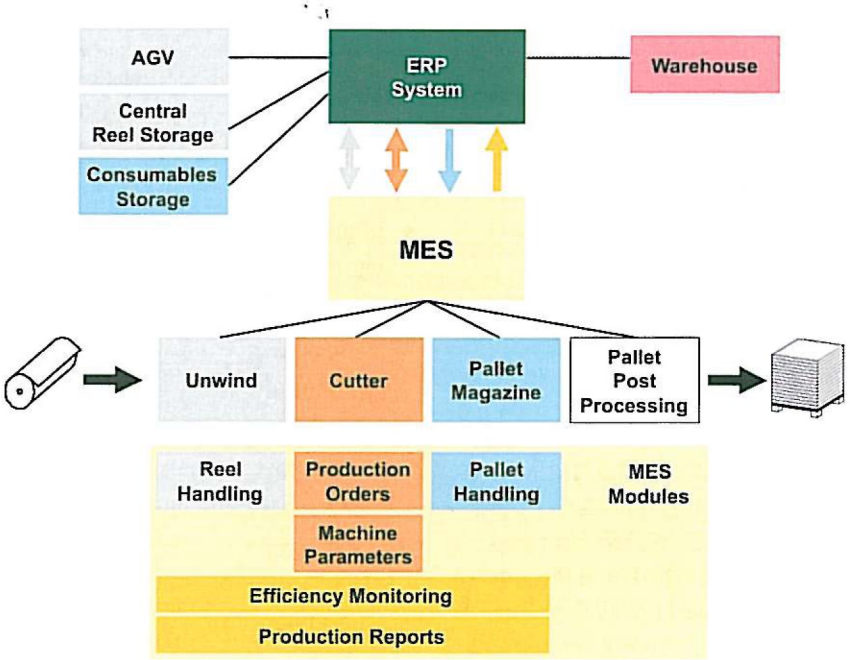
Production Reports Timely reports list in detail both production data and waste information. The data can be sent to the ERP system or retained in the MES database for later analysis. Reports show predefined or individual time ranges (such as shift reports or day reports) and provide a basis for a Continuous Optimization Process.

Production Orders The ERP system provides production data to the MES system, enabling control of all the machines in the converting line, from backstand to sheeter to pallet post-processing. This reduces opportunities for input errors, cuts waste and optimises order-change with segmented starting of the next order.



GRADE	KNIFE LOAD	GRAMMAGE	FORMAT LENGTH	TYPE	SIZE LENGTH	FORMAT NO	PC
CCBMF	675	135	8800	0	8800	0	3
CCBMF	675	135	11200	0	11200	0	2
CCBMF	690	115	8800	0	8800	0	3
CCBMF	700	100	6300	0	6300	0	3
CCBMF	700	100	9200	0	9200	0	4
CCBMF	700	100	10000	0	10000	0	3
CCBMF	810	135	8100	0	8100	0	4
CCBMF	810	135	9200	0	9200	0	4
CCBMF	920	115	6300	0	6300	0	3
CCBMF	920	115	9000	0	9000	0	4
CCBMF	945	135	7200	0	7200	0	2
CCBMF	945	135	10000	0	10000	0	4

Product-related machine parameters are stored in the MES database and can be reproduced within seconds.



The MES software bridges the gap between the owner's ERP system and local machine controls. It is able to reproduce machine settings, execute fully-automated orders and provide full production reports.

Left: Efficiency requires more than a fast sheeter. E.C.H. Will focuses on Overall Equipment Efficiency, which considers all important elements in the converting process (here, pallet post processing).

Below: The PRO technology concept centres on a new system for sheet transport and overlapping, which eliminates those areas in the sheeter (e.g. top tapes, brake rollers) that might cause marks and scratches on sensitive papers.

Reel Handling To optimise reel storage processes, the reels needed for production are tracked from the point of arrival to the point and time of use. The system approves the reel number/material ID (various input options include RFID), and it reports consumption data to the ERP when reels are unloaded.

ADDITIONAL MES CAPABILITIES

With the growing demand for varied output types and quantities, additional MES capabilities are being planned.

For example, delivery of more than 1,000 different products requires not only corresponding pallets, but also their organised handling. E.C.H. Will has already developed MES solutions for its cut-size lines that track and direct this aspect of production.

Eventually it will become possible to follow the loaded pallet from the folio sheeter, to wrapping in folio reams, on to the truck bed. "This becomes essential if no other system controls the end process," notes Matthias Kühn, E.C.H. Will Product Manager MES Software. "Any backlog or missing delivery of sheeted product impairs overall efficiency. And with fewer humans involved in the pallet transportation process, systemised tracking is a must."

NOT JUST A MACHINE - A PRODUCTION SYSTEM

"Our ability to deliver OEE advantages grows from having developed thse concepts in a full-system context," says Dreger. "Being a member of the KPL Group, we make sure that E.C.H. Will machines interface efficiently with our sister companies' machinery to form integrated systems." For example, output can be sent to a WRAPMATIC GRM ream wrapper made by Pemco, another KPL company.

THE FUTURE OF MES AND FOLIO SHEETING

Someday, maybe not too far off, the customer of a mill or converter should be able to access their provider's system, place an order, initiate the production process themselves, and track production and delivery right through to their dock. Meanwhile, the same capabilities that will make that scenario possible will enable the efficiencies that our industry now requires. Regardless of temporary changes in the demand for folio-size products, the long-term trend remains one of growth, to be enjoyed by those companies that run efficiently enough to compete and profit in the new environment.