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DFDS: paper is key to logistics service

HEIMBACH: forming fabrics that raise productivity

ABB: upgrades for Styron's pilot coater

Forest Bioenergy Review supplement with this issue

More curtain calls for Styron's pilot coater

The number of curtain calls is a good measure of the popularity and quality of any stage production.

Star performers help of course, but it's the measure of the back-stage team that keeps the production flowing smoothly.

And so it is with leading latex manufacturer Styron, which has for more than half a century provided pilot coating facilities that offer customers in the paper industry the means to experiment with a range of variables to find optimum conditions on their own

The new pilot paper coater built in Switzerland by Styron is expected to meet its targets with sophisticated control systems provided by ABB. Vince Maynard visited the facility to find out more

coating lines without the need to hold up production with the costs it incurs.

Styron's two pilot coaters, in the US and in Europe, enable customers to develop and improve their products by using a wider range of parameters than would be possible with their

own facilities.

Both of Styron's original facilities – at Midland in Michigan and at Horgen in Switzerland – have provided sterling service to customers for almost half a century, but it recently became increasingly clear that the Swiss site would be unable to meet

future needs in the mid-term. Space limited its expansion, access was difficult for vehicles and its warehousing was almost a kilometre away.

So in 2007 work started on a larger Global R&D Centre facility at a new location at Samstagen. This was constructed to meet Styron's long-term needs, and the relocation to the new site was completed in August 2008.

We recently visited the Samstagen pilot coater facility to find out more about the services it offers paper coating line development teams.



“Styron is the world’s leading supplier of latex for paper and board coating with a 35 percent global market share,” said Marco Ahtinen, project manager and head of the Center of Excellence, including the pilot coater and the application testing laboratories in Samstagern.

“Styron supplies half of Europe and North America’s latex needs with additional growth in developing markets. Whereas many competitors supply only commodity latex products, Styron maintains its leadership position through continuous technology

development and applications expertise.”

As is to be expected in projects of this size and complexity, Styron initially had to overcome some technical challenges at Samstagern, said Ahtinen, 40, who joined Styron Europe GmbH towards the end of 2002, initially within Paper & Board Technical Service and Development, including various project assignments on Multi-Layer Curtain Coating technology development.

One such challenge was related to energy consumption,

and especially to its fluctuations related to the non-continuous nature of coating trials. Styron found a solution in the installation of power compensation and active filters in the supply, both provided by ABB.

In addition the local natural gas supply grid capacity had to be enhanced and Styron had to install on site pre-treatment facilities for waste water and state-of-the-art environmental controls.

An hour’s drive from Zurich Airport, I had arrived to the sound of typically-Swiss cow bells and find that it’s an unimpressive

industrial unit. Inside, however, it’s a centre that spells quality and yet more quality.

I’d already talked to a number of people in the industry prior to the visit, so I knew what to ask Ahtinen and his team at Samstagern: For example:

- * What do you do if you want to move your production of coated products forward without the inevitable down time to mill production?
- * How can you take a coating concept to the next stage without massive investment?
- * Will an idea for a specific coating ▶

◀ work on my mill?

* Can I trial curtain coating?

These are just a few of the questions that the Samstagern team at Styron take in their stride.

The move gave the team the opportunity to ensure they were well equipped for the future and took the opportunity to install new process controls, a new machine frame that would enable future increases in speed to 3,500m/min, a new coating kitchen to enable the huge variation and permutations needed to offer a truly first class service and flexibility of service.

Another aspect of the new site is that it has easy access to rail, road and air and to ensure that customers have the best possible opportunity to view trials a specific viewing area has been constructed. Customer development projects are addressed by a diverse team of technicians in the lab and



pilot coater as well as technical service and development engineers. With an average of at least 15 years of industry and coating technology experience per employee, the customers can count on superior technical know-how.

Following the commissioning of the new pilot coater it was key that Styron maximised its investment by offering the maximum range of coating possibilities. To ensure continued

flexibility coupled with speed and reliability, Styron recently gave ABB the green light to build on the existing control setup and ensure they have everything in place for continued growth.

ABB, which had supplied the control systems for the pilot coater at Horgen, was also commissioned for the Samstagern facility in 2008, which was upgraded with drives and a DCS setup based on its 800xA system. New functionality was provided with the number

of stand-alone coating stations increased to four, along with five coating technologies and a design speed of 2,500 m/min, but with key infrastructure ready for an increase to 3,500m/min.

More recent improvement has been provided with a Quality Control System (QCS) from ABB replacing another manufacturer's system, and forming an integral part of the controls.

Scope of the ABB QCS800xA system is:

- Unwinder Frame: NP1200 scanning frame with basis weight sensor, HPIR moisture sensor, three component ash sensor and sheet width measurement, prepared for future Direct-IR Coat weight (top & bottom)
- Winder Frame: NP1200 scanning frame with basis weight sensor, HPIR moisture sensor, three component

Control system challenge for ABB

Marco Ahtinen, project leader at Styron's pilot coating line at Samstagern, explains the complexities of the control systems being installed

Q: What are the permutations of different test possibilities that can be performed on the Samstagern pilot coater?

A: The complexity of the pilot coating environment leads to the requirements for the new Quality Control System (QCS) that will be delivered soon by ABB to the Samstagern pilot coater. This is not a list of coating application possibilities available in Samstagern, however.

Normally, QCS scanners installed in the industry are dedicated to a more or less constant paper quality (such as base paper scanner, scanner after top-side coating, after bottom-side coating). In the pilot coating environment, where multiple coating (except for multi-layer curtain coating) is carried out by running the paper through the machine several subsequent times, the two scanners (before and after coating) are exposed to an increased degree of paper variations to be analysed, in order to identify coat weight and moisture: Base paper, coat 1 top side, coat 1 bottom side, coat 2 top side, coat 2 bottom side, etc. This means there about eight different coating levels of paper to

be processed and analyzed.

Further, the types of base papers to be coated vary a lot, from basis weight (28-300 g/m²) to fibre furnish variability (virgin fibres; wood-free or wood-containing, recycled fibres, geographical mixes, etc) to 'ash' levels variability (which equals filler pigment content). It is impossible to quantify this as a specific number of permutations, but there could be up to ten.

A large range of mineral pigments could be coated, each having specific 'ash factors' to be considered in the QCS software for coat weight determination. These include calcium carbonates (ground or precipitated), clays (primary or secondary), titanium dioxide, calcined clays, silica-gels etc. This leads to at least ten different ash factors.



Marco Ahtinen, who is project leader at Styron's pilot coating lines in Switzerland, with Paul Goss of ABB

ash sensor, Direct-IR Coat weight dual sided sensor (top & bottom) and sheet width measurement

- The ABB QCS SW will support five kinds of coat weight measurements: differential basis weight, differential ash content, Direct-IR coat weight top, Direct-IR coat weight bottom and Direct IR coat weight total. The Direct IR coat weight measurements will use ABB's Autocal SW for optimum precision and repeatability.

In total, the system will consist of nine hardware sensors with five calculated coat weight methods to provide maximum flexibility to support the process requirements.

The decision to give ABB the green light was critical in that it must ensure that any investment can deliver reliability, flexibility for future upgrades, very low

maintenance needs coupled with quick intervention should it be needed.

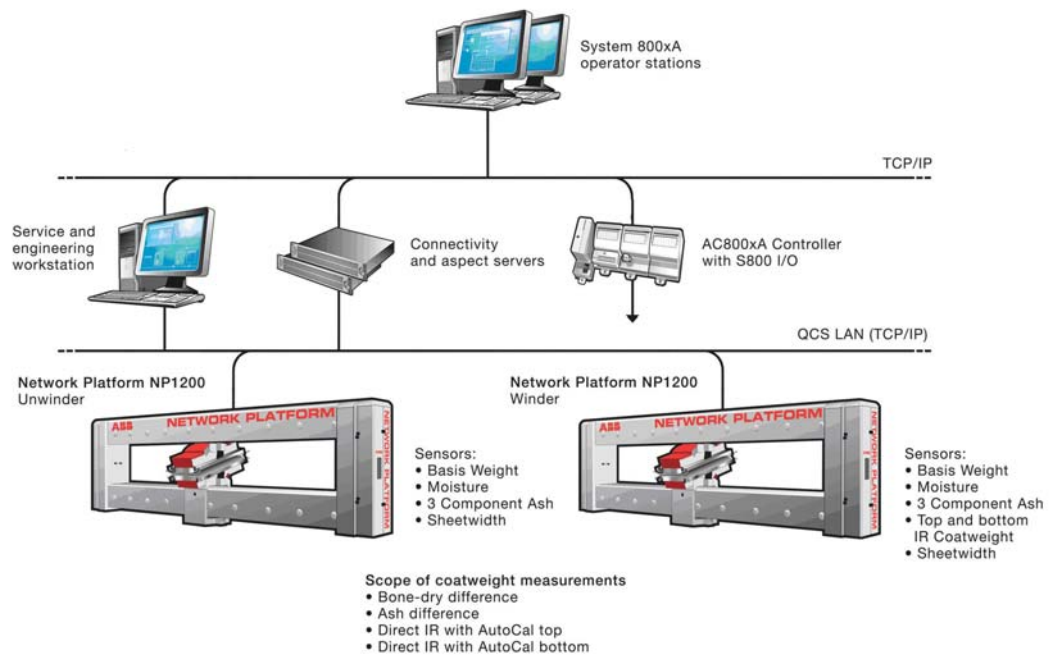
But with a similar ABB control system already installed at Styron's

Midland pilot coater in the US, the justification was made easier, particularly because it enables discussions to take place between the two teams for sharing

operational experience with the leveraged control systems.

Completion of the project is expected in the fourth quarter of 2011.

QCS800xA for pilot coater Styron Europe GmbH



These variables in the pilot coating requirements lead to a total number of at least 800 different combinations which needed to be considered for ABB's design of the Quality Control System. This affects: number of sensors, software calculation complexity and speed requirements for measurement feedback (due to short pilot coater trial times).

Q: What are the differences in capabilities between the pilot coaters at Samstager and at Midland?

A: The main differences between the two pilot coaters include:

Midland pilot coater: Design and capabilities provide highest simulation possibilities for paperboard; coating applications; online hot-soft calender capabilities; air-knife coating station

Other features include

- Pilot coater including three stand-alone coating stations that cover roll application, jet coating, short dwell time application, film coating and air knife coating technologies
- State-of-the-art quality and process controls for better data analysis and trouble-shooting
- Pilot coater design speed of 6,000 feet/min (1,800 m/min) with infrared and air flotation drying equipment
- State-of-the-art online hot soft calender along with off-line production sized multi-purpose super calender.

Samstager pilot coater: Design and capabilities provide highest simulation possibilities for high speed coating applications; Multi-layer curtain coating station.

Other features include:

- Pilot coater that includes four stand-alone coating stations offering roll application, jet coating, short dwell time application, film coating and multi-layer curtain coating technologies
- Pilot coater with design speed of 2,500 m/min, with specific infrastructure and features ready for future speed increase to 3,500 m/min (machine frame, reserve drying capacity, web tensioning and guiding elements)
- Multi-Layer Curtain Coating (MLCC) expertise center since 1999; 3rd generation custom-made MLCC station applying up to five simultaneous coating layers, designed specifically for high-speed applications
- State-of-the-art coating colour make-down technology that combines efficiency, reliability, repeatability and flexibility
- Minimum raw material needs thanks to flexible and movable coating color feeding systems
- New process controls including better data analysis and trouble-shooting
- State-of-the-art offline super- and soft-calenders.