

ADDING VALUE: INDUSTRY TREND REFLECTS SHIFT IN CUSTOMER/SUPPLIER RELATIONSHIPS

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CASE STUDY: COATING SUPPLIER RETRACES STEPS IN MAKING THE DECISION TO DESIGN AND CONSTRUCT A WHOLLY OWNED IN-HOUSE PILOT COATER.

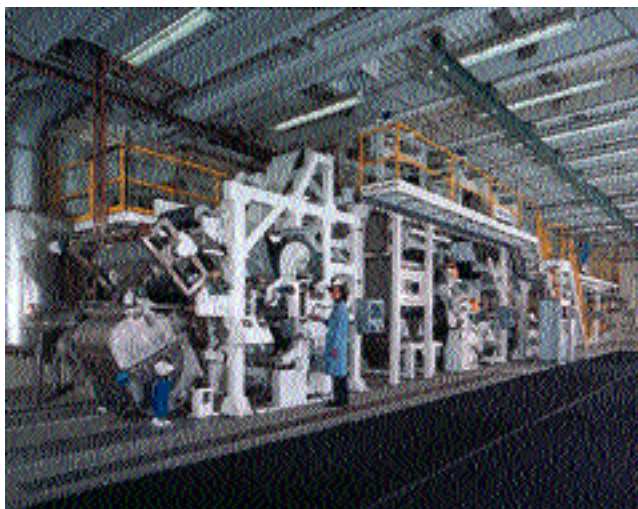
THE PILOT COATER IS A KEY ENABLER FOR ACCELERATING the new-product development process and for successfully commercializing new coating technologies. By running trials on a pilot system, it is possible to assess coating runnability in a more precise manner, which reduces the inherent risk of mill trials. Historically, these trials have been carried out at pilot coaters located at paper company research and development facilities using products developed by their existing or potential suppliers. In April, GenCorp Specialty Polymers' multiple capability pilot coater became fully operational, making it only the second latex supplier in North America to provide this service to the industry.

The decision to make such a large investment—pilot coaters typically cost between US\$ 20 and US\$35 million—is a reflection on current customer priorities as well as the desire of a supplier to expand and accelerate its product offerings and add greater value.

Not long ago, North American paper and paperboard mills relied heavily on their own R&D capabilities, with some assistance from their suppliers to address coating product and process needs, qualify improved products and/or develop new grades. Most of the larger paper companies involved with coating invested heavily in pilot coater facilities to more accurately predict the performance of new products and grades in their mill environments.

Supplier R&D efforts traditionally comprised simpler methods, ranging from wire wound drawdown bars to increasingly more sophisticated application tools such as bench top coaters, Dixon laboratory coaters, Helicoaters® and Cylindrical Laboratory Coaters®. While useful, all of these techniques encounter difficulties, in varying degrees, in simulating mill conditions with respect to similarities in

coating head geometry, coating placement, rheological behavior, coating dewatering characteristics, application speed, calendering and drying dynamics. One of the



GenCorp's new high speed pilot paper and paperboard coater features a wide variety of coating application options, including airknife, rod, inverted blade and metered size press.

COATING



A close-up of the airknife and inverted blade coating stations.



The metered size press is gaining in popularity in North America for efficiently coating lightweight, newsprint, web offset, specialty papers and paperboards.

largest drawbacks is their inability to coat large enough quantities of paper or paperboard to conduct web printing trials—the ultimate test of new products and grades. In the end, products had to make their way to the customer's pilot coater to demonstrate runnability and performance.

In recent years, long periods of weak pricing and demand for coated paper products have resulted in depressed profitability for most paper and paperboard companies, leading to significant cutbacks at both mill and R&D levels. Customer R&D efforts have necessarily narrowed to focus on new grade development. This, in turn, has resulted in an increased demand for mill technical support from the industry equipment and raw material suppliers. It's a familiar arrangement to Europeans but an important shift in priorities and expectations for those doing business in North America. Pilot coater facilities exist at nearly 20 universities and industry suppliers in Europe, but there are fewer than five facilities available in the United States and Canada.

Suppliers began to feel the pinch as they waited to pilot test, demonstrate and qualify new products. Customer interest in advanced coatings and improved coating runnability at higher speeds remained strong, but time spent to conduct trials of next generation products presented risks that customers were reluctant to undertake given their shrinking resources. They began to look to suppliers to take an enhanced role in the development and product trial process.

CONSORTIUM CONSIDERED

In 1996, two pilot coater consortia were contemplated in North America, one at the Herty Foundation in Georgia and another in Trois-Rivières, QC, Canada. Both pilot

coater consortia envisioned establishing a corporation, which would own the project, with assistance from local governments. By buying part ownership in this corporation, paper mills and/or suppliers would be entitled to voting rights as well as time allocation for use of the pilot coater. Capital allocation to a purchasing company would be determined according to percentage of ownership. An additional daily use charge, as high as US\$15,000 to \$20,000, would be levied to cover operational costs. Even assuming a large percentage share of as much as 20%, only 10 weeks of pilot coater time per year would be available for servicing an existing customer base, developing latices for new customers and working on new product developments. The consortium approach appeared to have the potential for conflicts in time allocation and may have raised concerns about a supplier's ability to deliver on intangibles such as customer responsiveness, schedule flexibility, customer confidentiality as well as proximity to existing laboratory capabilities. Eventually, the Herty Foundation project was abandoned, but the Trois-Rivières project is slowly moving ahead, according to Rene L'Heureux, spokesman for the project. Pre-engineering has begun and the pilot coater is planned to be operational sometime in 1999.

So GenCorp, second largest producer of latex in North America, made the decision to pursue the design and construction of a wholly owned in-house pilot coater at its Specialty Polymers technical center in



The hot soft nip calender is located on-line for metered size press and other specialized finishing applications.

Akron, OH. Construction began in the fall of 1996. The company spent the first three months of this year testing the completed unit, leading to full operational status last month.

IDEAL PILOT COATER DEFINED

A multi-capable pilot coater can provide a comprehensive evaluation of coating products and coater runnability. Critical end-use features and benefits to customers from new products are realized quickly when coated paper from the pilot coater is tested and printed. Working in partnership with customers, it is also viable to run trials on a mini-mill scale of "what if" scenarios for developing a new type of grade or before purchasing new equipment for coating paper or paperboard. Besides characterizing runnability, it is possible to do other process studies, including coating application with different types of metering equipment, drying studies and finishing studies. All of these capabilities provide the opportunity to not only accelerate the development of new, technologically advanced latices but also to help customers achieve timely product development of new value-added grades.

For example, the pilot coater with a metered size press unit can coat both sides of the sheet simultaneously while applying minimum stress onto the web, thus providing improved high speed runnability with minimum web breaks. This process, in combination with hot soft nip calendering, allows the coating to stay on top of the sheet for good coverage and superior optical properties. It is therefore possible to upgrade uncoated sheets (newsprint, roto news, cut size papers, etc.) and paperboard (linerboard, board with barrier properties, etc.) to



The pilot coater supercalender finishes and prepares rolls for customer print trials.

higher quality, value-added grades which demand a higher price in the marketplace.

The pilot metered size press, then, is an essential tool for developing coating formulations with the desirable end-use qualities that have excellent runnability with a customer's base sheet. The coating can be personalized to fit the targeted end-use properties while it is optimized for achieving the desirable coat weight without misting and orange peel patterns. GenCorp viewed this capability as an opportunity to further customize its pigmented metered size press latex to meet specific customer application needs.

Unlike a pilot coater located at a paper company which is designed to duplicate conditions at a few mills, a pilot coater located at a supplier needs to be able to simulate a very broad range of coating, drying and finishing conditions. Coating speeds must not only duplicate present day industry practices but also address future industry needs. It must be capable of handling a wide range of base stocks and weights, from ultra-lightweight paper to heavyweight paperboard. Coatings should be able to be applied from different coater head configurations to approximate the rheologies seen in the industry. Newer application techniques like metered size press



The coating kitchen, located just a few feet from GenCorp Specialty Polymers' new high speed pilot paper and paper-board coater, is capable of preparing a wide range of pigmented and starch formulations.

need to be considered. Flexibility in drying configurations is also very important in terms of providing adequate drying quantity as well as offering a combination of infrared and air drying methods. Finishing capability is critical along with the ability to cut rolls to order in preparation for subsequent printing trials.

SELECTED FEATURES AND VENDORS

GenCorp selected a modular design to provide the flexibility for future upgrades of the application and finishing devices as the technology evolves to higher speeds and more versatile coating stations. The Kohler Coating Machinery Company provided design engineering and overall project responsibility and T.W. Murphy, a general contractor with experience in the Wisconsin paper industry, performed the installation.

T.H. Dixon and Co. Ltd. (Kohler's English cross-licensee) was chosen to provide paper web handling equipment because it has technology for handling narrow webs at high speeds. The pilot coater can handle 5-ft diameter paper rolls with a 28-in. width and operate at speeds of 300 to 6,000 fpm.

Coating is applied from any of three major coating stations provided by Kohler: blade coater with both rigid and bent blade (roll and nozzle applicators), airknife or metered size press. A rod configuration may also be used.

The pilot coater is equipped with 12 ft of infrared drying from Marsden Inc. along with approximately 37 ft of air floatation drying supplied by Spooner Industries Inc.

Oy Gradek Ab, a veteran of European pilot installations, provided the stand-alone 10-roll supercalender. A hot soft nip calender, supplied by Fairview Machine, is available on-line for metered size press and other specialized finishing requirements. A slitter/rewinder allows the pilot coater crew to prepare rolls of coated paper and paperboard for printing trials.

The overall structural design and steel are products of Spooner Industries, who also supplied the sheet stabilizers and air turns. NDC Systems provided measurement equipment (basis coat weight gauge, moisture gauge) and Intek Systems Inc. designed the equipment drives and motors.

A very flexible coating kitchen provides the capability to prepare diverse coatings for application on the coater. The kitchen includes a Kady mill from Kady International Inc. and a starch cooker from GPC Equipment Co.

GenCorp's pilot coater facility is located in the same building as its existing paper evaluation laboratories to provide integrated technical support. Pilot Coater Manager Mark Parmentier, a graduate of the Institute of Paper Chemistry, has extensive experience in several Wisconsin paper mills and participated in the 1993 construction and startup of Specialty Polymers' Green Bay styrene butadiene/acrylonitrile latex plant.

SIGN OF THE TIMES

Although supplier pilot coaters have been a rarity in North America, the advantages are increasingly clear. Paper companies are shifting their own scarce resources and finding it difficult to make time available on their R&D pilot coaters to conduct product development and runnability trials. Yet the push for new, differentiated coating products is stronger than ever. The installation of a pilot coater in a supplier facility demonstrates a commitment to support the paper companies in their pursuit of competitive advantage in a global marketplace. The customer/supplier relationship is positively redefined to accommodate changing needs for the benefit of all.

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