

PILOT PLANTS bring new opportunities for coating research



With two pilot plants, the state of Michigan is a focal point for coating R&D

WHAT YOU WILL LEARN:

- How Western Michigan University's pilot coater was reassembled and renovated
- What the university hopes to accomplish with the coater
- How the Dow pilot coater is being used to develop multi-layer curtain coating.

ADDITIONAL RESOURCES

- WMU's pilot coating plant: www.wmich.edu/coatingplant/newpilot.html
- Staff directory for WMU's Department of Paper Printing Science and Engineering: www.wmich.edu/ppse/Staff.htm
- Dow's pilot coaters and data: www.dow.emulpoly/na/paper/resource/coater.htm
- OMNNI Associates: www.omnni.com
- Coating short courses, workshops and conferences: www.tappi.org

Photo above: University and local officials inaugurate WMU's pilot coating facility with a paper "rib-bon" tearing. Photo: Don Meadows.

Michigan is fast becoming a key center for coating research in North America. In Kalamazoo, Western Michigan University (WMU) held dedication ceremonies for its new paper coating pilot plant in October 2002. On the other side of the state, the Emulsion Polymers business of the Dow Chemical Company already operated a pilot coater complex in Midland and in October announced a cooperative agreement with Metso to develop and market a new paper and board coating process.

PILOT COATER AT WMU

The new paper coating pilot plant at WMU is part of an engineering complex the university is completing adjacent to its Business Technology and Research Park. The university will eventually relocate its other paper and printing pilot plants to the new complex also.

OMNNI Associates of Appleton, Wisconsin, USA, handled most engineering, control system retrofit, and drive design of the modern, high-speed pilot coater acquired primarily from the Boise Cascade research facility in Portland, Oregon. The line features a Beloit size press/coater, Voith automation scanner, Black-Clawson unwind and reel, Küsters

4-nip hot soft-nip calender, Black-Clawson flotation and Marsden infra-red dryers, and Allen Bradley controls and AC drives. The line can handle rolls up to 40 in. wide and has an operating speed of 400–4000 ft/min.

The coater itself arrived in 700 boxes. The pieces required unpacking and measuring. Lacking full documentation, OMNNI relied on the expertise of its in-house staff to assemble all the parts, according to Gary R. Gardner, instrument and controls engineer. Reusing some original wiring in the drive panels simplified the conversion. New replacement processors require less space and generate less heat, eliminating the need for cooling fans.

To ensure a record of changes made to the pilot plant machinery, vendors who come in to maintain equipment will backup the work to a computer on the main floor of the 50,000-sq. ft. building.

"Installation of this new coater demonstrates the University's commitment to continue its role as an institution that does pioneering work in coating," said Said AbuBakr, chair of the Department of Paper and Printing Science and Engineering at WMU. He noted that the new facility also positions WMU to take advantage of the growth in the specialty

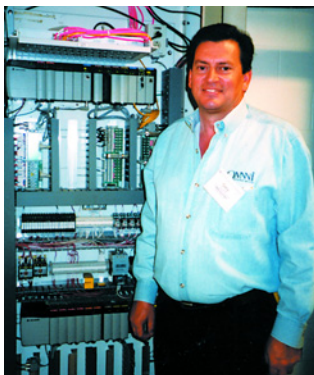
coated paper market.

"In the midst of downsizing and cut-backs, the need for product and process development has not gone away. It is actually more intense," noted Charles (Chuck) Klass, an alumnus and adjunct professor of the school and honored TAPPI leader. The new pilot coater and research facility will make Western Michigan "the leading outsource for the development of new paper products in the coated paper area" he said. It will make WMU a global center of excellence.

Jan Walter serves as general manager for the pilot plants with Rick Reames serving as paper pilot plant director and Douglas E. Cox newly appointed as director of the printing pilot plant. "This coater will provide access to those in industry who need to do coating research but can't invest in this type of equipment," Walter noted. The university emphasizes that the new facility is the only pilot coating line in North America not affiliated with a supplier company. The plant will offer industry clients a place to conduct research, provide hands-on learning experiences for WMU students, and offer research opportunities for faculty and students.

AbuBakr notes that WMU is already the only university in the world with both paper and printing pilot plants available for research. He said, "Coating is the common denominator between the two fields." Industry clients should begin running trials on the new coater in January 2003. In addition, AbuBakr says that the University hopes to launch collaborative efforts with other universities and research organizations including the Institute of Paper Science and Technology at Georgia Tech and North Carolina State University.

WMU has offered paper and printing programs for more than 50



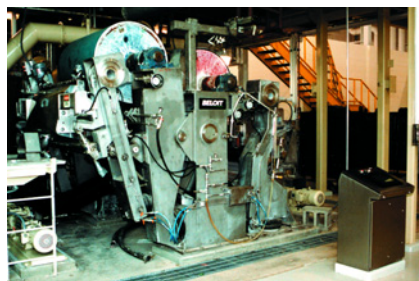
Gary R. Gardner,
*instrument and
controls engineer,
OMNNI Associates,
with one of the drive
panels at WMU.*

years. With the startup of the new pilot coater, its pilot plants will do more than US\$ 1 million in industry research each year.

PILOT COATER AT DOW

Dow's Emulsion Polymers Global Business Unit operates pilot coating facilities in Midland, Michigan, USA, and in Horgen, Switzerland.

In October, Dow named Greg Welsch leader of its paper pilot coater in Midland. "Pilot coating



The coating section of the pilot machine at WMU.

facilities like ours actually play a dual role," Welsch said. "One, they enable our customers to test new latex formulations without having to shut down their line. Two, they enable us to test our new innovations internally prior to bringing them to market."



Dow Emulsion Polymer's pilot coater and dryers at Midland, Michigan, USA.

As coating technology has evolved, Dow has modified its Midland facility to keep pace. It installed a metered size press in 1998 and a quad coater (jet, applicator roll, short-dwell, and bent blade application techniques) in 1999. At the end of 2000, Dow also installed an online, two-nip, hot soft-nip calender in its pilot coater facility.

Dow's pilot coater in Midland has a design speed up to 6000 ft/min and a web width of 28 in. It has Marsden infrared and TEC air-flotation dryers. Finishing equipment includes a Voith Sulzer on-line hot soft nip calender, a Valmet supercalender, and Black Clawson/GL&V slitter/rewinder.

Online ABB quality control equipment at the Midland pilot plant can measure unwind and reel moisture, total coatweight, and dual-sided coatweight. Top and bottom gloss and an additional moisture sensor also are available.

The new curtain coating technology being developed by Dow and Metso includes coating solutions, coating supply systems, drying systems, and process automation. Prototypes are currently installed at Dow's pilot facility in Horgen and at Metso's technology center in Järvenpää, Finland.

The new application process under development uses multi-layer curtain coating. This is significant "because several coating color layers can be applied at the same time to the paper web without any direct mechanical contact," said Ted Cosse, vice president, Dow Emulsion Polymers.

Recent trends in the use of the Midland pilot coater show an increased use of fountain (jet) and pre-metered size press applications and a gradual decline in flooded nip studies. **SI**



About the author: Meadows is senior editor of Solutions! and editor of TAPPI JOURNAL; email dmeadows@tappi.org.