

Georgia Institute of Technology
Research Communications Office
Atlanta, Georgia 30332-0800
404-894-3444

CONTACT: Ginger Pinholster/John Toon
(404) 894-3444

THERMO-MECHANICAL PULPING SUGGESTS AN ALTERNATIVE TO CHEMICALLY BASED PAPER PROCESSING

For Immediate Release
August 13, 1990
Color & B/W Available

A mechanical pulping process currently used only to make low-grade paper might someday provide a clean, efficient alternative to chemically based techniques, scientists at a new research center in Atlanta have reported.

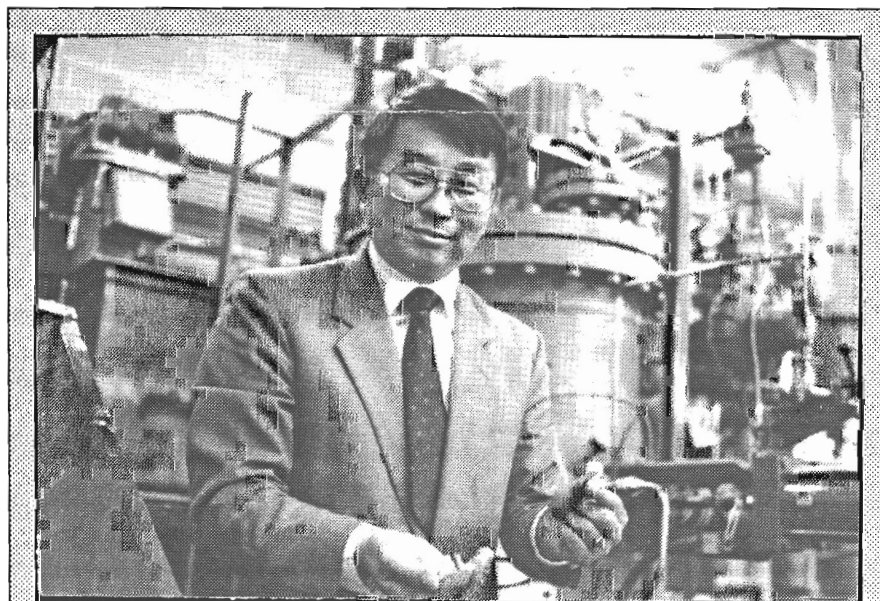
Dr. Jeffery S. Hsieh and his colleagues hope to increase efficiency, lower energy costs, and reduce the chemical emissions associated with high-yield pulp manufacturing while upgrading paper quality. Hsieh, director of the Pulp and Paper Engineering Program at the Georgia Institute of Technology, believes a carefully planned marriage of chemical pre-treatment and thermo-mechanical pulping could solve many of the industry's processing problems.

Using heat and grinding mechanisms to reduce wood chips, thermo-mechanical pulping is particularly attractive because of its high yield, Hsieh said.

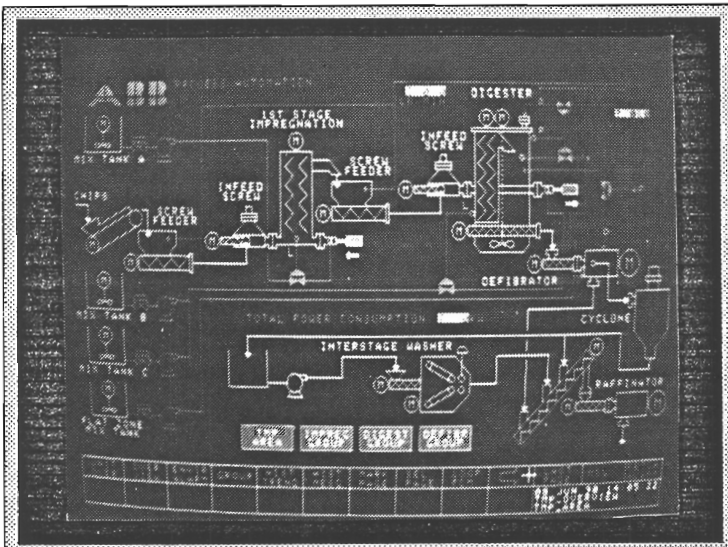
"When you put 100 pounds of wood chips into a thermo-mechanical pulping machine, you get more than 90 percent back," explained Hsieh, director of a new Chemical/Thermo-Mechanical Pulping Center (CTMPC). "The chemical processes are usually less than 50 percent efficient, and they may produce pollution. Paper companies are concerned about these problems. The center hopes to refine these technologies to offer a total solution."

Unfortunately, he added, existing thermo-mechanical pulping techniques only generate low-grade paper products such as newsprint and diaper filling. Magazine print and other high-grade products are made using a chemical technique that offers a lower yield but better quality. Such processes typically involve large amounts of sodium hydroxide and sodium sulfide, along with various bleaching agents, and these chemicals can emit potentially harmful dioxins, Hsieh explained.

-OVER-



Dr. Jeffery S. Hsieh of the Georgia Institute of Technology will supervise research at the new Chemical/Thermo-Mechanical Pulping Center. *(Please call for copies of this photograph.)*



A computer-controlled system equipped with a touch-sensitive screen (shown above) monitors pulp production in real-time and can predict product quality.

In addition to the problem of product quality, existing thermo-mechanical pulping machines aren't economical because they use too much electrical energy. But Hsieh hopes to reduce these costs -- while minimizing the pollution problems associated with chemically based techniques by adding a chemical pre-treatment step to standard thermo-mechanical pulping.

Housed by the Georgia Power Company, the research center allows commercial and educational groups to conduct research in a relatively inexpensive manner, Hsieh said. Participants include the Mead Corporation, Process Automation Business of Asea Brown Boveri (ABB),

Herty Research and Development Center, IBM Corporation, the Institute for Paper Science and Technology (IPST), the Tennessee Valley Authority, the Duke Power Company, and the Electric Power Research Institute (EPRI). Additional research partners are being sought, according to Jim Doggett, business manager for the new center.

Initial investigations will address three specific processing questions. First, Hsieh said, researchers need to know how wood chips of various sizes impact pulping efficiency. The second question involves the age of trees delivered to paper mills; Hsieh wonders whether juvenile pines and mature specimens should be processed in the same manner. Finally, the center will study methods for pulping high-density hardwoods such as oak and gum.

The chemical/thermo-mechanical pilot plant at Georgia Power's Technology Applications Center includes a two-stage system capable of processing 60 to 300 pounds of wood per hour. During a pre-treatment stage, washed wood chips are squeezed through a compression device, then impregnated with chemicals such as sulfide, which soften the fibers. Next, the wood chips are subjected to pre-heating and refining before they undergo inter-stage washing. Finally, the wood is further refined. Meanwhile, Hsieh said, excess steam is recovered for use elsewhere to help recoup energy costs.

The entire process is controlled by an ABB Taylor MOD 300 Distributor Control System (DCS). The DCS interfaces with a Real-Time Plant Management System (RPMS) on loan from IBM. A Modular Analysis of Pulp and Paper Systems (MAPPS) program is integrated into the control system, allowing researchers to simulate production runs. Since the system relays information back to a mainframe every quarter-second, it can actually predict product quality, Hsieh said, and this allows an operator to adjust experimental conditions as necessary.

"High-yield pulping is a technology for the future," Doggett said. "Thermo-mechanical pulping will never completely replace chemical processes, but it will be an important technology to the paper industry, particularly in areas where paper mills need to increase output."

###