

Outlook for regional development, forest and papermaking technology, covered at China conference

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The 1990s will be a slow period for forest technology development. By the end of the decade, fine paper grades will be produced at 1300 m/min. And R&D is being pursued vigorously in the paper industry to develop new products for the marketplace and to enhance the competitiveness of paper-related products against such competing enterprises as polymeric packaging and electronic data handling. In Asia, growing reciprocity between Taiwan and Mainland China will be a key ingredient in meeting the region's future paper consumption demands.

These "forecasts" of what will be happening in the pulp and paper industry and related enterprises were among topics presented at the 1991 China Paper Conference, held Nov. 6-7, 1991, at the Great Wall Sheraton Hotel in Beijing, PRC. From Nov. 5-9, 1991, China Forest '91 and China Paper '91 featured equipment, machinery, and products from 16 countries and regions throughout the world.

The technical conference program, organized by TAPPI, gave attendees an overview of advances and—in at least one instance—retreats in forestry, pulp, and papermaking industries.

Slower pace for forest technology research

Robert C. Kellison, professor of forestry at North Carolina State University in Raleigh, NC, said that high debt load incurred due to consolidation, pollution abatement equipment, and paper/paperboard recycling facilities is the reason for the slowed pace in forest technology research. And, environmental concerns are taking precedence over technological concerns in the management of forest resources. The growing importance of plantation forests will accelerate the major shift in the wood-producing and wood-manufacturing regions of the world. This shifting began in the 1960s with the concentration of wood manufacturing plants in South America and South Africa, which have extensive open areas, optimum growing conditions for selected tree crops, a plentiful labor supply, and the need, as developing countries, to produce exports for the balance of payments.

The United States (except for the South), Canada, and Scandinavia will be most affected by this shift. But particularly hard hit will be the former Soviet Union, which has more than 50% of the world's long-fibered resources, Kellison noted. Today, the region's drawbacks are many: a harsh environment, out-of-date manufacturing facilities, a poor infrastructure, and the need to undergo political reorganization or realignment before it can

become a formidable international force in the manufacture and trade of wood products. The biggest beneficiaries will be countries in South America, Africa, and Asia.

With the exception of tree improvement programs, Kellison noted, forest technology development will be at a low level during the decade. "The prognosis is that the forest industry throughout the world will have to pay down the huge capital investments in consolidation, pollution abatement equipment, and in paper/paperboard recycling facilities before they again become very interested in investing in funding and implementing biologic research. That will not happen in a significant way until after the turn of the century," Kellison said.

Nonwood fiber pulping booming

In another arena, progress in nonwood plant fiber pulping and papermaking, especially in the developing countries, has been great in the past 15 years, according to Joseph E. Atchison, Joseph E. Atchison Consultants, Inc., Larchmont, NY. In 1975, nonwood represented only 6.9% of the world's pulping capacity; by 1990, it represented 8.5%. Nonwood fibers are expected to represent as much as 10% of total papermaking pulp capacity by 1995. This increase is due to expanded nonwood pulping capacity in countries such as China and India that lack adequate wood supplies.

Much of the work on bagasse, the leading nonwood plant fiber for pulp, has been carried out in the United States by American companies and research institutions, Atchison said. Bagasse has been used successfully to produce all grades of paper and paperboard, and it has been a highly successful raw material for manufacture of a complete range of reconstituted panelboard. Practically all the advanced technology developed for bagasse pulping can be applied to straw and other nonwood plant fibers, he said.

The fact that "more than two billion tons of such materials could be made available, and even greater quantities grown if necessary, bodes for tremendous expansion possibilities in their use," Atchison said.

R&D still active after all these years

Recent developments in pulp and paper industry research were highlighted by Ronald A. Yeske, vice president for research and academic affairs, and Barry W. Crouse, director of the research service division, Institute of Paper Science and Technology in

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Atlanta, GA. Although R&D expenditures of a mature industry like pulp and paper will not match those of emerging, high-technology areas such as semiconductor electronics and biotechnology, there is still vigorous R&D activity taking place, much of it carried out through international research efforts at institutions such as PAPRICAN, STFI, and ISPT, the authors noted.

In pressing and drying, for example, the past two decades have been marked by considerable advances in water removal technology. Much of the R&D research has focused on increasing the amount of water removed by mechanical means, thereby reducing the amount of energy use associated with evaporative drying. More recently, the emphasis has shifted toward enhanced paper properties. The widespread adoption of the extended nip press, using shoe presses or other configurations to increase the period of residence of paper in the press nip, has been the major new achievement of the past decade, Yeske and Crouse said.

The ability to recover both chemicals and energy has encouraged widespread adoption of the kraft pulping process throughout the world. But the disadvantages of the chemical recovery processes in kraft pulping, among them the potential for catastrophic steam explosions, is encouraging the development of alternative, combined cycle gasification processes. The R&D challenge, the authors noted, is to develop an alternative that is economically comparable to the modern recovery boiler, is suitable to incremental capacity additions, and operates without severe corrosion or environmental concerns.

Another active research area is the development of a commercially viable approach for on-line ultrasonic measurement of mechanical properties of paper, they said.

"Monster machine" by year 2000?

Andre Allard, Beloit Corp., Beloit Fampa Division, Jelina Gora, Poland, described emerging technologies in papermaking.

"By the year 2000, the paramount paper machine will be an 1800-m/min monster producing over 1100 metric tons of newsprint daily," Allard predicted. The sheet itself will be stratified for optimum appearance and properties, and there will be a substantial increase in water removal at the press section with exiting solids of 55% or higher. The dryer section will be shorter in length but longer in performance, he said. Drying restraint and a fully supported sheet throughout the drying process will boost runnability and quality standards. "High-temperature, soft-nip calenders for improved printability, high gloss, and reduced linting will be the norm on our turn of the century machine," Allard said.

Joseph Marton, a consultant from Silver Spring, MD, said that while machine width over 10 m is uneconomical, speed increase has no technological or economic limitation and will likely continue. Contributing to machine speed increases are mechanical developments, improved headbox design, improvement in processing technology and control, and more efficient draining devices and innovations like two-sided draining, he noted.

Mainland China and Taiwan: room to share

Concern about the development of pulp and paper industry in Asia, particularly Mainland China and Taiwan, was discussed by Tong

Ho Tsai, president and managing director of Cheng Loong Co., Ltd., and vice chairman of Taiwan Paper Industry Association.

"There are challenges facing Mainland China and Taiwan and mutual reciprocity," he said. Because of Taiwan's small domestic market, it should seek international markets and promote economic growth based on export-oriented policy. Another problem is Taiwan's extreme shortage of petroleum, forest, and other natural resources. "At present, the pulp made from local sources makes up approximately 3–5% of papermaking materials. Except for a great amount of recycling of wastepaper, the rest depends almost entirely on imports," he said.

As a consequence of the continuous fast development of the Taiwanese economy and swift increase in income, blue-collar workers are choosing service-oriented careers. This results in a shortage of manufacturing industry labor and rising wages. Feasible measures to solve the problems are intensive automation, development of large-scale facilities, and promotion of R&D to reduce costs; production of added-value products; improvements in the industrial structure thorough integration; and expansion of overseas markets, especially Mainland China and Southeast Asia, he said.

The situation he described in Mainland China is vastly different. Among the challenges are:

- The pulp and paper manufacturing industry consists mostly of small mills scattered across the region, which results in loss of utilization efficiency. Merging and integration could effectively improve the industrial structure.
- Timely introduction of administrative, technical, and investment resources is needed to overcome shortfalls in these areas.
- The forestry resource is insufficient. A long-term plan to cultivate forests and guarantee the resource of the industry is urgently needed.
- Environmental pollution is a serious problem that remains to be improved with more capital.

Reciprocity will promote an intensive development of the region's pulp and paper industry so it can meet the consumption requirements of the 21st century Pan-Pacific development, Tong Ho Tsai told the conference attendees. Taiwan offers capital, entrepreneurs, management systems, management information systems, and R&D; Mainland China offers labor manpower, natural resources, market, land, nonwood pulp, and R&D.

From bleaching to the environment

Other topics covered in the technical program were new developments in pulp bleaching, presented by Norman Liebergott and Barbara van Lierop of PAPRICAN; newsprint from 100% ONP, presented by Frank W. Lorey of Garden State Paper Co., Elmwood Park, NJ; a review of environmental control policies and pulp and paper industry responses in the United States, presented by David E. Peakes of ABB Environmental Services, Inc., Portland, ME; and modern sizing technology, presented by David H. Dumas of Herchem (HK) Ltd., Kowloon, Hong Kong. **17**