Recycling, environment, free trade, and education are recurring themes at TAPPI 92

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More than 12,200 people from 17 countries—Argentina, Australia, Belgium, Canada, Chile, China, Cyprus, France, Germany, Hungary, India, Italy, Mexico, South Korea, Sweden, United Kingdom, and the United States—"rode the wave of technology" into Atlanta, GA, March 2–4, 1992, to attend TAPPI 92, TAPPI's biennial Association meeting.

The technical program, according to TAPPI President F. Keith Hall, provided an opportunity to learn more about the issues and trends affecting the paper and related industries in the 1990s, while the TAPPI 92 exhibits brought the most current technology and equipment from more than 600 companies together in four halls at the Georgia World Congress Center.

CEO Panel

Kicking off the technical sessions, the CEO Panel moderated by Hall presented the viewpoints of CEOs from James River Corp., MacMillan Bloedel, Inc., and Mo Och Domsjö Ab about trends and issues in the pulp and paper industry.

Robert C. Williams, president and CEO of James River Corp., shared his observations on worldwide competitiveness and touched on the business environment, the natural environment, competition and free trade, government support, education, capital formation, technology, and opportunity.

The challenge that faces the U.S. pulp and paper industry in the current climate of global economic competition, according to Williams, is sustaining the competitive position it holds. Williams advocates free trade and believes it is on the horizon for the United States.

He acknowledged that the U.S. pulp and paper industry, able to draw from large national and private renewable timber resources, is in a fairly sound competitive position. However, he pointed out, such factors as the industry's investment of US$ billions in environmental improvement could impact that competitiveness. As these problems are corrected, the human and capital resources focused on them need to be directed to more productive areas to improve efficiency and effectiveness, he said. The industry needs to work hard to reach its goal of 40% recycled fiber content by 1995, and to that end, must have the freedom to use the right fiber in the right places rather than having fiber content legislated, he continued. The industry must pursue what he termed "paper energy" to recover the value of some 40 million tons of wastepaper that carries a value of some US$ 1 billion in fuel costs and an additional US$ 2–3 billion savings in municipal solid waste.

Noting the relationship between industry and government in Germany, Japan, Canada, Chile, and Brazil, Williams defined another factor that impacts the United States' ability to compete globally.

"In most of these countries, industry is assisted rather than resisted by government," said Williams. "Substantial subsidies are provided," while in the United States, industry faces "the massive burden of overregulation, excessive controls, administrative red tape, unsound litigation, fines and taxation." The U.S. government must become a more positive force in business, said Williams.

He shares a growing concern about U.S. education: the ability to compete is heavily dependent on student performance, and the nation's literacy and enumeracy levels are shameful. Said Williams, "In education, we usually blame the system, teachers, curriculum." However, he believes the most serious problem facing the U.S. education system is a cultural one. The priority a family places on education, its expectations for performance, and how it recognizes success impact a student's motivation, drive, and desire, asserted Williams.

Regarding the issue of capital formation, Williams said that an investment tax credit will lower the cost of capital, as it did before the tax reform of 1986. He also believes that accelerated appreciation and reduced interest rates will help to reduce the capital intensity of the industry.

"Related to this is technology," said Williams. "Over the past 40 years, our industry has lost...the technology leadership in areas such as pulping, bleaching, papermaking, alkaline systems, calendering, some aspects of coating, automating and converting, and some application of computer diagnostics in smart control systems.

"Our institutional research is fragmented, and as a result, we lack centers in technical excellence. Contributions to the fundamental research symposium held every four years in Oxford and Cambridge are mostly from European[s] and Scandinavians, and most recently, from the Japanese.

"Our industry remains divided over the value of institu-

The CEO Panel featured, l to r, panelists **Robert C. Williams, Wyatt W. Shorter, Bernt Löf,** and moderator **F. Keith Hall.**



tional research and related education. Technology alliances between paper companies in our industry [are] somewhere between difficult and impossible to illegal," he said, and such entities as API and IPST remain independent. Williams raised two questions. First, should these entities remain independent? Second, how well coordinated is TAPPI with the activities in these areas and institutions?

Wyatt W. Shorter, president of MacMillan Bloedel, focused his comments on free trade. "There is a middle ground between free trade proponents and protectionism. It is called strategic trade policy."

Shorter suggested that there are several actions that can be taken to enhance free trade. "First, be careful about being taken in under protectionism. In the U.S., we have more than enough structural safeguards available. Second, support free trade to your congressman. Third, working with your people, preach and act the gospel of quality and service. We have spent long-term money, now it is important that we get the returns to our investors. Don't let protectionist[s] lock us out of our global markets," he said.

"When a paper industry is international, we must defend ourselves against those who would close the border doors. Our goal should be zero, zero: zero tariffs on imports, zero tariffs on exports."

Bernt Löf, president and CEO of Mo Och Domsjö Ab in Sweden, concluded the session with a 21st-century view of how the European paper industry developed its competitive edge during the 1990s. In his rear-view mirror perspective, the industry became competitive not by developing new products and ways to produce them, but by reorganizing companies' knowledge and skills. A company on the cutting edge, said Löf, was one that could keep pace with customers' demands for higher and higher quality requirements that included information about how to use a product, when to use a product, where to use it, why it should be used, how to distribute it, and how to transport it. "We became aware that the focus had to be in marketing, sales, distribution, and development."

Strategic issues and trends

"It is the hope of this panel that our presentation today will help you better understand the nature of the public challenges this industry faces, and that we can enlist you—as industry stakeholders—in helping advance the industry's interests," said American Paper Institute (API) President Red Cavaney as he opened the session on strategic issues and trends in the pulp and paper industry. By stakeholders, Cavaney includes all those who have an interest in the livelihood of the U.S. pulp and paper industry including employees, their immediate and extended families, citizens of mill-based communities, vendors, suppliers, customers, and stockholders.

Over the past year, API reviewed its members' *macroconcerns* for the 1990s, said Cavaney. Macroconcerns are issues so large, and of such consequence, that they are absolutely vital to the industry's continued profitable existence; they are too big for even the biggest companies to handle alone, he said. The top five macroconcerns are: cost/availability for capital, environmental/mill operations, municipal solid waste/recycling, forest resource management, and international trade.

To advance the macroconcerns, industry leaders concluded that working solely with public officials on public policy

TAPPI 92 drew 12,200 attendees from 17 countries



issues that concern the industry is no longer sufficient. Communication technology has broadened the scope of public awareness and empowered the consumer to be a direct participant in the public policy process. This empowerment, in turn, has changed the communication activities of the pulp and paper industry, an industry that has historically confined its communication activities to areas other than the broader, general public, said Cavaney.

"We need to make it much easier for people to understand how we look at the future and, generally, what we are about," said Cavaney. As the first step in disseminating the industry's news to the general public, API premiered a new publication at Paper Week (March 8-10, 1992) entitled *Paper: Linking People and Nature.* Intended for the general public, the publication is designed to give a sense of what the pulp and paper industry is like, the scope of its products, and the steps paper companies are taking to safeguard the environment, said Cavaney.

"Being concerned about the environment has become somewhat of a litmus test lately for becoming a good neighbor," said Cavaney. "Our industry has long labored to protect the environment well before the term *environmentalist* even became fashionable, but to those whom falls the task of converting the earth's raw materials to the products that society demands, also falls the difficult task of explaining that not everyone's view of perfection is realizable overnight."

The dioxin issue: who benefits?

Ronald J. Slinn, vice president of pulp, materials, and technology for API, dovetailed Cavaney's environmental comments with his perspective on bleaching chemicals and the effluent and discharges related to that process. The unexpected detection of trace amounts of dioxin in the sludge from two bleach pulp mills in 1985 made the chlorinated organic issue a priority for the U.S. pulp and paper industry, said Slinn. Prior to chemical detection technology reaching this new high, the association of trace levels of dioxin with the traditional processes of bleaching wood pulps had not been recognized. Concentrations are now measured in parts per trillion and even parts per quadrillion, which a chemist considers 10^{-16}.

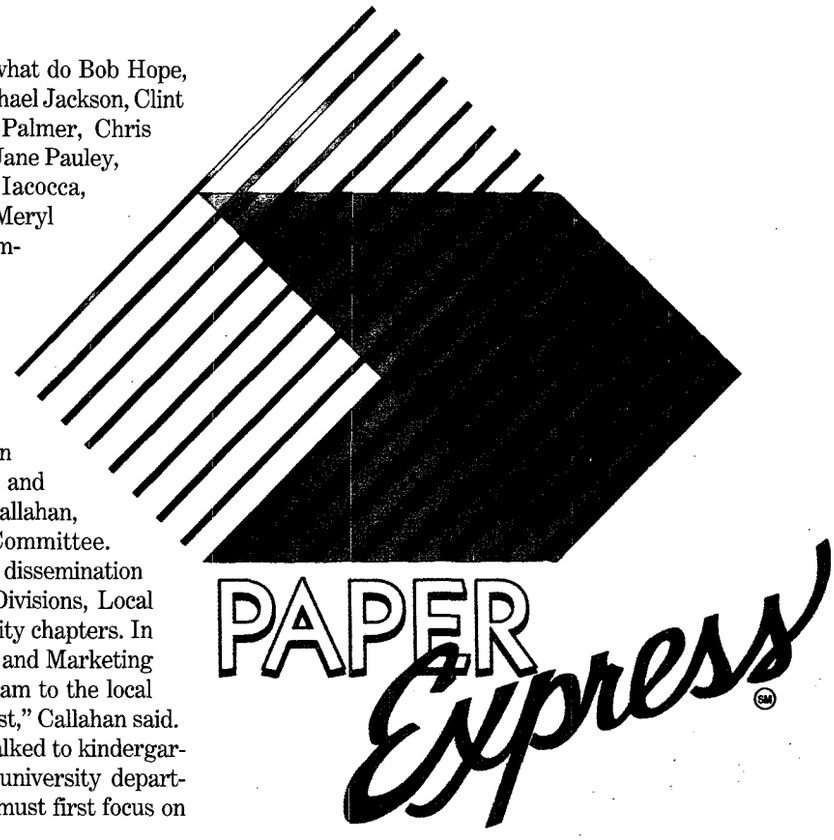
More than US$ 1 billion later, the dioxin levels from the 105 U.S. bleach pulp mills have been reduced by more than 75%, and now account for less than 1% of the total thought to be released annually into the environment by all natural and manmade sources in this country, Slinn noted. The industry worked closely on the dioxin issue with the Environmental Protection Agency (EPA), the Food and Drug Administration (FDA), and the Consumer Product Safety Commission. According to Slinn, these agencies based their dioxin toxicity conclusions on experiments where rats were exposed to massive doses of dioxin that produced cancerous lesions.

After re-examining these findings, the director of the Centers for Disease Control, who is also considered by many to be the best-known expert on the subject, reconsidered his original determinations regarding the toxicity of dioxin. Additionally, the three agencies differ on the toxicity of dioxin among each other and with comparable agencies in other countries.

Under the *safe risk* specific dose assumed by the FDA, the average person's risk from exposure to dioxin through the use of all bleached paper products manufactured in the

Climb aboard TAPPI's Paper Express

In addition to their celebrity status, what do Bob Hope, Elizabeth Taylor, Jimmy Stewart, Michael Jackson, Clint Eastwood, Robin Williams, Arnold Palmer, Chris Evert, Art Buchwald, Connie Chung, Jane Pauley, Tom Brokaw, Jack Lemmon, Lee Iacocca, Deborah Kerr, Mary Tyler Moore, Meryl Streep, and Randy Travis have in common? They are among more than 120 celebrities who have endorsed Paper Express, TAPPI's new educational initiative that premiered at TAPPI 92.



Paper Express is TAPPI's response to the significant downturn in interest of America's youth in math and science, according to John "Jack" Callahan, chairman of TAPPI's Marketing Committee. "TAPPI's focus has always been on the dissemination of technical information through its Divisions, Local Sections, TAPPI PRESS, and university chapters. In 1990, members of TAPPI's Education and Marketing Committees decided to direct a program to the local schools to address the declining interest," Callahan said.

"They conducted market surveys, talked to kindergarten and grade school educators and university department heads, and concluded that they must first focus on grades K-12 in the local schools.

"If we could get the youth of America refocused from their day-to-day problems and interest them in math and science, we could worry later about interesting them in the paper industry," said Callahan. "After all, we would have the engineers we needed, the pulp and paper industry is attractive, and the rest would take care of itself.

"Getting the youths' attention was our first real challenge," Callahan recalled. "Have you ever asked a person where paper comes from, or, better still, where the paper bag came from? You generally get a blank stare."

The committee members worked with TAPPI staff to develop Paper Express, a program designed to attract youth to careers in the paper and related industries. Through Paper Express, TAPPI provides materials for industry members to use in their local communities with students and youth organizations. The first materials offered through the program include a Wizard Program manual and training video, logos, ads, and posters.

The Wizard Program allows members of the industry to conduct science experiments with middle school students in their local communities. Companies can purchase a Wizard Kit that contains all of the materials needed to conduct all of the science modules. An individual or group of volunteers in each company can work with teachers in local schools to set up sessions.

"By participating in this program, companies and employees are filling a real need in the community," said Pam Sweat, TAPPI's public relations manager. "Teachers welcome new opportunities to motivate students and to utilize new resources that aren't readily available to them through the school systems. Youth groups and organizations such as the Boy Scouts or Girl Scouts frequently seek guest speakers and will welcome Wizard demonstrations."

Another piece of the Paper Express program is a lively, fun-filled video entitled, "Paper: The Video." Through rap music and animation, a fast-paced story about paper's history and contributions to society unfolds. Aimed at students in grades 5-12, the video illustrates the part paper plays in our everyday lives, and what life would be like without paper.

The video can be a valuable discussion tool for teachers that can be used as a follow-up to the Wizard Program experi-

The best way to predict

Performing a cryogenics experiment, **Laura Thompson**, IPST Ph.D. candidate, prepares to submerge a balloon in liquid nitrogen. Cryogenics is one of four science modules in the Paper Express Wizard Program.



The Paper Express exhibit contained photographs and momentos from 120 celebrities as tokens of their support of the project.



ments. Companies can promote it through ads and posters.

"These programs are really outstanding and they do several things for the industry," said James C. Farrand, a member of TAPPI's Marketing Committee, "especially for local operations, whether it's a mill or a research center. First, it attracts people to science. Second, it attracts them to our industry. Third, it attracts local students, which we have a better chance of hiring and retaining, which is a more difficult thing to do today; that's a really big plus."

"Paper Express has been designed for corporate America to promote the industry through their local units," said Callahan. "The youth of America now have a program that will expose them to math and science and most of all to the paper and its related industries.

"You can't help but come away with that warm, fuzzy feeling that we care about their future and the future of the globe. All aboard!"

For more information about TAPPI's Paper Express Program, contact Pam Sweat at TAPPI headquarters, telephone: (404) 446–1400, ext. 218.

the future is to invent it.

United States is less than that associated with eating one peanut butter sandwich every nine months, drinking one can of beer every four years, or eating eight ounces of char-broiled steak every five months, Slinn pointed out.

The EPA has also proposed water quality guidelines with an upper limit for dioxin concentrations of 0.013 parts per quadrillion, which according to Slinn is approaching the detection limit for a molecule. And, he added, it's premature to speculate what new parameters the EPA will choose to regulate, since many of the effluent guidelines will be based on the best available technology, expected to be available in mid-1993.

Meanwhile, regulators in other countries embrace an analytical technique for measuring chlorinated organics and mill effluents known as absorbable organic halides (AOX). As an environmental parameter, Slinn said, AOX has been thoroughly discredited in the United States because it neither relates to nor measures an actual effect on human health or on the environment. Nonetheless, bleached pulp mills in other major producing countries are faced with imposed AOX discharge regulations.

Amid these regulations, the world's largest producer of market pulps recently informed its global customers that there is no scientific basis for the argument that human health will in any way be threatened if pulps are bleached with chlorine dioxide in the carefully controlled, multistage processes that have been developed, said Slinn.

Burn, bury, recycle

Recycling is another key public policy issue for the pulp and paper industry. An API poll in 1989 suggested that three out of four people in the United States felt that municipal solid waste is a very serious problem, while another 21% said it was somewhat serious, said Richard Storat, vice president of economic and financial services at API.

Paper comprises some 40% of the solid waste stream. To address this problem, the paper industry advocates a plan that integrates landfilling, waste to energy, composting, market base source reduction, and recycling, said Storat.

As with the environment, the industry was recycling before the term hit the general public's hot-button. When recycling became a public issue in the mid-80s, the industry was already recovering some 20 million tons of paper annually, but, said Storat, it was clear that the industry needed to do more; it would tackle the problem at the source.

A tally of the investments made to reach the 40% recovery goal by 1995 includes a minimum of US$ 3 billion in approximately 91 projects, some 41 of which came on stream in 1990–91. When all are on stream, said Storat, they will sop up 5.25 million tons of paper that otherwise would be destined for the solid waste stream.

Another challenge faces those who are responsible for solid waste management policies: recognizing that several additional options exist that can be integrated into a coordinated strategy.

The EPA estimates that 13% of the nearly 200 tons of municipal solid waste generated annually in the United States is recycled, while 14% is burned in waste recovery energy plants and incinerators. Despite environmentalists' opposition in the United States to burning, the option is acceptable in several other environmentally sensitive countries, Slinn pointed out. The capital investment required to build and operate environmentally sound burning facilities and collect the waste, as well as the EPA's incinerator regulations that limit the proportion of fuel used in an industrial boiler to 30% municipal solid waste, threaten the option to burn.

However, according to Slinn, opportunities appear to be expanding for individual pulp and paper mills to demonstrate how they may relieve pressures on local government agencies that are faced with the unpopular options of waste disposal. "It's been demonstrated that if [nonrecyclable] material is burned at prescribed temperatures, and appropriately controlled air flows, paper can indeed, be an environmentally benign fuel."

Composting, once perceived as a very low-tech backyard operation, is now proving to be high-tech and commercially viable on a surprisingly large scale, said Slinn. Estimates indicate that 5% of the 200 million tons of solid waste produced annually in the United States is now being composted.

Forest resource management is defined as a macroconcern because it places forest resource use at odds with protecting endangered species. Citing, among other examples, the plight of the northern spotted owl, Slinn pointed out that "there are currently no less than 6060 animals, birds, reptiles, plants, and fish listed or proposed by the Fish and Wildlife Service for classification as threatened or endangered. One can only imagine, with alarm, the consequences if public and private forestland is set aside for all of them on the scale considered appropriate for the spotted owl."

International trade rounded out the venue of macroconcerns. API advocates free, equitable, two-way trade, said Slinn. "A look at our exports over the last 10 years will show since the middle of the 1980s, we have enjoyed double-digit growth every single year, and that's a trend we hope to continue into the future."

Environmental issues

Dennis Sasseville of Environmental Science & Engineering, Inc. moderated this three-part session designed for both the environmental and nonenvironmental pulp and paper manager. The first section consisted of three speakers directing their comments to the strategies needed to handle the growing public concern for the environment.

Isaiah Gellman, president of National Council of Air and Stream Improvement (NCASI), identified the need to develop a response to three societal sectors: the preservationist/activist community, the regulatory structure, and the consumer groups. Gellman notes a growing expectation of each of these sectors that the industry create operations based on "sustainable development."

Several factors make fulfilling this expectation a serious challenge. These include a range of global concerns such as air pollutants, rising CO_2 levels, wildlife and biodiversity, forest wetlands, and forest watershed levels; as well as the difficulty in gaining approval for "greenfield" projects and increasingly restrictive regulatory proposals. Gellman recognizes the need for documentation of all progress to meet everyone's information needs.

Fifty-seven "Run the Wave"

On the morning of March 3, 57 runners lined up in downtown Atlanta for a special edition 5K "Run the Wave" Paper Chase. Organized by BE&K Engineering and Construction as a special edition of the 10-year-old Paper Chase traditionally run at the TAPPI Engineering Conference, the race was sponsored by Brand, BTG, Columbia Concrete Sawing, Gorman-Rupp Company, Hansen Transmission, HUB, Industrial NDT Company, Longview Inspection, Lorentzen & Wettre USA, Magnesium Elektron, Marathon Electric, Nalco Chemical Company, Pacific Saw and Knife Company, Peerless Pump Company, Santasalo North America, SCAPA, Southern Environmental, System Works, Tampella, and William Kenyon & Sons.

Jamie Dodd of DuPont in Richmond, VA, placed first with a time of 16:55. Ken Dreon of Rust International crossed the finish line second with a fininishing time of 18:12. He was followed by Dan Guss of Hansen Transmission, who finished at 18:28.

Institute of Paper Science and Techology Ph.D. candidate Laura Thompson placed first in the women's division with a time of 23:59. She was followed by Christine Moran of Nalco Chemical Company who captured second place with at time of 25:22. Marianne Kormann of James River took third place with a time of 26:37.

The 10th Anniversary Paper Chase will be held in Boston, MA, on Sept. 15, 1992, during TAPPI's Engineering Conference.

"Run the Wave" Paper Chase winners include, l to r, **Jamie Dodd** of DuPont, 1st place, men's division; **Laura Thompson**, IPST, 1st place, women's division; **Dan Guss**, Hansen Transmission, 3rd place, men's division; **Marianne Kormann**, James River, 3rd place, women's division; **Ken Dreon**, Rust International, 2nd place, men's division; and **Christine Moran**, Nalco Chemical, 2nd place, women's division.



Photo by Bob Jones, courtesy of SKF Condition Monitoring

Mark A. Luttner gave an update on the work done by the Pulp and Paper Cluster, an internal organization of the Environmental Protection Agency. Made up of EPA senior managers, the cluster's primary goal is to prevent pollution. While US$ 1.25 billion was invested by the paper industry in 1989–91 toward reducing pollutants, the industry is still the fourth largest source of pollutants and the largest industrial source of chloroform emissions.

The Pulp and Paper Cluster has two assignments: to coordinate regulatory efforts and to keep all interested parties informed through a public outreach program.

In September 1988, the Chemical Manufacturers Association adopted the Responsible Care® program. Lori M. Raymons, director of Responsible Care, explained that this voluntary initiative is designed to improve performance in health, safety, and environmental quality. This program is unique in that it is a requirement of membership in CMA and it requires direct public involvement.

Developed in response to the low public opinion of the chemical industry, Responsible Care is a public commitment based on 10 guiding principles. The codes of responsibility serve to give Responsible Care public accountability and include: pollution prevention, distribution, product stewardship, and process safety.

Each member must submit an annual "report card" to CMA to self-evaluate the program. Responsible Care also has a 15-member Public Advisory Panel, consisting of a cross-section of citizens throughout the United States who provide their opinion on the success of the program. The prevailing attitude of the public sector to Responsible Care seems to be one of "cautious optimism." CMA has also developed an advertising campaign as part of their public outreach program.

A panel discussion on the different aspects of risk assessment and risk communication followed the speakers' presentations. Bradley W. Schwab of Environmental Science & Engineering, Inc. defined health risk assessment as "an objective, technical means for estimating the probability of health impact for specific conditions of exposure or use." William J. Gillespie of NCASI and Susan Santos of ABB Environmental Services also participated in this discussion.

Covie Quick and Mary Scherzinger followed the panel discussion. The Oregon grade-school teachers presented "Paper Rap: Paper in Our Lives," a program developed to educate students in grades 1-12 about topics relating to the pulp and paper industry. This program was profiled in *Tappi Journal* (July 1991, p. 221).

Papermaking

This session provided an overview of the trends and challenges of papermaking including advances in wet-end technology and information and control systems, emerging papermaking technologies, and how environmental issues are influencing product design.

Walter P. Dorn, technical services representative from EZE Products, Inc., began with "Advanced topics in wet-end chemistry." Noting that there is a correlation between pulp consistency and sheet formation on the wire, Dorn suggested that by evaluating such variables as pulp consistency, pH, and chemical additives, a mill can formulate an improvement strategy and adopt a formal program. In newsprint mills, pitch can be a major problem affecting machine runnability and paper quality. Dorn outlined an ideal pitch control program for a mill, noted actual mill conditions that contribute to pitch problems, and defined some practical actions to take to minimize pitch deposition.

An ideal pitch control program, said Dorn, is one that implements post-harvesting storage that enables chips to be stored long enough for the pitch to change biochemically, yet short enough to avoid brightness problems. Pitch should be distributed evenly throughout the wood in the ray cells or resin ducts. Uniformly distributed pitch is dispersed by heat, shear, and colloidal stabilization.

Pitch control is affected when large pitch masses cannot be emulsified due to insufficient heat and mechanical energy. Pitch within tissue envelopes escapes the refiners, but extrudes out at screen baskets and impellers.

To minimize pitch deposition, Dorn recommended that the amount of depositable (insoluble) pitch be minimized by: maintaining a high system, temperature and minimizing fresh water makeup, chelating calcium to prevent calcium soap formation, promoting any means of breaking chemical bonds within pitch molecules, such as oxidation hydrolysis or enzyme breakdown, and stabilizing pitch by charge mechanisms, which encourages attachment to fiber surfaces.

Additional measures that Dorn recommended to reduce pitch buildup include: measuring such process variables as free aluminum; surface charge, and pitch count; maintaining wire cleanliness, wet felt cleanliness, and dryer felt cleanliness; and conducting regularly scheduled boilouts.

Roger A. Denny, marketing support manager for Spirax Sarco Inc., examined how much steam is used in the papermaking process, how much condensate is recovered, and how much it is worth.

In 1990, said Denny, the U.S. pulp and paper industry spent some US$ 4.7 billion for steam, and some US$ 1.9 billion in condensate was wasted.

Unfortunately, said Denny, the evolution of the paper industry is outpacing the revenues. Denny predicts that condensate recovery will compensate for this difference. Savings are achieveable, he said, by increasing condensate return rate from the current best rate of 60–65% to a target 75%, reducing the volume of makeup water, and utilizing flash steam for low-pressure steam heating.

Condensate causes system damage and poor heating efficiency. These problems result in maintenance downtime and increased expense, and can be resolved by: developing a closed-loop system that includes flash steam recovery, training on operation and maintenance, and monitoring, maintaining, and reporting system operation.

As emphasis on the need to capture quality data from papermaking operations continues to push the expectations mills place on process control equipment, Ole K. Fadum, president of Fadum Enterprises, reminded us that the quality data we are collecting only has value if we use it as a tool to evaluate and improve control of our papermaking operations. "We get enamoured by technology; it's the applications we need to get enamoured with."

Clearly, said Fadum, the emphasis to improve quality in the 1990s is moving upstream to the quality of the furnish. With so many data collection points along the paper machine, said Fadum, total quality awareness is the essence of profitable papermaking. Mills need a quality information system that brings together data from raw materials testing, process lab tests, process measurements, online product measurements, and finished product measurements, he said. Those companies that are successful will build systems that address production, quality, cost, environmental, and safety concerns.

As we search for better ways to monitor production quality and processes, the technology involved in making paper continues to evolve. Duke N. Sims, director of engineering at Beloit Corporation, pointed to four changes that influence papermaking: increased machine speed, increased wire width, reduced basis weight, and greater fiber utilization. These trends, Sims said, will influence stratification, presssing, drying, forming, and finishing.

Increases in machine speeds can be attributed to the twin-wire former and fewer dryer draws and, said Sims, most of the technology is already in place to design an 11-m (33-ft) wide machine. Basis weight is being driven down due to environmental influences, he said.

Increased use of secondary fiber will require adjustments

in the paper machine that will help the sheet to remain stratified. A single-tier arrangement, said Sims, with no open draws will restrain the sheet to retain strength and reduce CD shrinkage. Dryers will evolve to be single-tier, with larger diameters and fewer dryers, said Sims, while soft-nip, high-temperature calenders will become a standard.

Anna Maija Leskinen, senior consultant for Jaakko Pöyry Consulting Inc., concluded the session with a look at how environmental concerns and the "green movement" are influencing pulp and paper manufacturing. The technology and knowledge exist to produce "environmentally correct" paper, said Leskinen; however, a few changes will need to take place: mill location, types of furnish used, and more fillers and coating. Mills are located near the source of their material. Traditionally, they are found in wooded areas that are often rural. Today, however, a mill may find itself closer to a recycled fiber source in a more urban location.

Furnish developments will also change from chemically brightened pulps to pulps that use more hardwood, more and better mechanical pulp, and more recycled fiber. Recycled fiber furnish will impact brightness and sheet strength, she said.

Brightness achieved by traditionally adding chemicals to the pulp will be attained through more fillers and coating. "Mastering wet-end chemistry and retention issues will be one of the most valuable and valued papermaking skills," she said. "Papermakers will need to adjust to weakened fiber," she said. Surface sizing of newsprint will be possible, but will prohibit ink drying. Infared dryers can compensate for the drying problem.

Pulping, bleaching, and recovery

Of all the strategic issues and technical trends affecting pulping and bleaching, the environment has and will continue to have the most impact during the 1990s.

Jurgen D. Kramer, director of Simons Brasil, identified some of the key issues influencing market pulp. They include efforts by Greenpeace to reduce virgin fiber content of paper to 25–40% and legislation in Germany to restrict purchases to totally chlorine-free pulp.

Although forecasters have traditionally projected an eternally growing demand for pulp, there is the potential for no growth through the first decade of the 21st century. But Kramer doesn't believe that needs to be the case if managers expand their view of market forces.

For example, the product manufactured is traditionally determined by available resources: pine, spruce, oak, etc. A more relevent driving force might be the product's end use, which might suggest market opportunities.

Narrow profit margins would seem to favor low-cost producers in South America and the Pacific Rim. Yet some advise that North American pulp producers can remain competitive by economizing, specializing, and integrating, Kramer noted. A number of other opportunities might also arise as managers deal with solid waste, recycling, and forest resources management issues.

Indeed, such environmental issues will be among the main driving forces for pulping technologies over the next 10 years, according to Hasan Jameel, associate professor at North Carolina State University.

In response, several new pulping processes are being investigated. Among those Jameel outlined were modifications to the kraft process and nonconventional technologies. The hope is to reduce or eliminate the use of chlorine, yet achieve a kappa of 15 and maintain good pulp quality. Extended modified continuous cooking could, in combination with oxygen bleaching, reach a kappa of 8, he said. The drawbacks, however, include greater capital costs and increased solids in the recovery boilers.

Nonconventional methods use pure solvents to remove lignin, inorganic-organic solvent processes, and biopulping. Among those under development are the ASAM, Organocell, Alcell™, ACETOSOLV, and Milox methods.

Thomas McDonough, group leader for pulp bleaching at the Institute of Paper Science and Technology (IPST), reviewed some of the recent and developing methods for pulp bleaching.

Even with pressures to find alternatives to chlorine bleaching, chlorine and chlorine dioxide will still be in use at the turn of the century, McDonough asserted. But extended delignification, enzyme pretreatment, ozone delignification, and other methods are being considered as alternatives to reduce or eliminate dioxin and AOX discharges.

David R. Forbes, vice president for pulp and recovery technology at Jaakko Pöyry in Raleigh, NC, discussed some of the reasons for modernization and the need for thorough research and planning.

The ultimate goal of any modernization is survival of the mill. To survive, the mill must remain competitive. To do that, the mill will periodically need to modernize to keep costs in line, to improve quality, or to comply with environmental and other regulations.

Among the first things to do before embarking on a modernization is to establish a baseline:

- What problems do you want to overcome?
- What is your present performance (vs. desired performance)?
- What are your capacity limitations and bottlenecks?

Then decide whether you can achieve the desired results by overcoming those problems or running your processes more efficiently or determining whether you actually need to add capacity.

If the decision is to move ahead with a modernization, develop a thorough review, get the facts, do a cost-benefit analysis, and then prioritize. Remember especially, Forbes said, every error in the review and planning stages increases the cost of a project.

Process control issues for the '90s

Chris L. Liakos, president of Liakos, Inc., moderated a panel of experts who discussed process stewardship, managing total quality, utilizing data from information systems, integrated paper machine control systems, the process of engineering the system, maintaining system integrity, involving

the operator for successful system development and implementation, and process control staffing. The session was designed by the Process Control Committee of TAPPI's Engineering Division and in addition to being one of the feature technical sessions of TAPPI 92, it was the opening session of the 1992 Process Control Conference, held in Atlanta March 3–5. A complete report of this session and the entire Process Control Conference will be published in *Tappi Journal*'s June 1992 edition.

Outlook for communication papers—2000

The speakers in this session addressed the internal and external forces that will drive the industry into the next decade. The common thread that ran through all of the presentations was the unavoidable trend toward environmentally driven demand, technology, and production methods. Common themes among the panelists were:

- Recycling is here to stay
- The trend toward lower basis weight papers will continue
- Although conditions will necessitate the use of larger percentages of recycled fiber, nontraditional hardwood fiber, and fillers and extenders, end users will not lower their standards for quality
- The distinctions between grades and classifications of paper are already blurred and will virtually disappear
- As nontraditional sources of pulp emerge internationally, new mills will be built nearby to reduce shipping costs and serve growing markets.

Robert W. Hagemeyer, session moderator and speaker, opened the session with a demand forecast for communication papers. His analysis showed that 1990–2000 demand growth in Japan and Western Europe would slightly outpace North America's. One factor affecting these numbers is the economic recession in North America early in the decade.

Factors in his report included changing availability of raw materials, the prospect of selling to a united Europe, and varied and ever-changing environmental regulations. Worldwide factors on the positive side are the rising level of literacy and education level, increased leisure time and affluence, a trend toward direct mail and catalog shopping, the proliferation and ease of use of xerographic printing and fax transmissions, and the growing impact of color in printed advertising. Negative factors were increased real costs, environmental regulations, recapture and disposal costs, and electronic media competition.

Mitchell H. Koppelman of Pfizer Inc. listed the drivers for change in fiber composition. With softwood prices destined to rise as the supply gradually dwindles we will see greater use of recycled fiber and hardwood fiber from outside North America. Nontraditional sources like eucalyptus will in some cases affect when and where new mills are built. The trend toward using lower basis weights will be accelerated by postal increases.

The leading consumers in the recycled fiber market of the future wil be government document printing, copier papers, and envelopes.

Robert E. Klem of J.M. Huber talked about pigments in communication papers. Growth in the use of fillers and extenders from 1990–95 is expected to be 5%, with precipitated calcium carbonate accounting for most of the growth. Klem noted an interesting trend of retail advertisers willing to sacrifice some quality to reduce spending.

Charles P. Klass of Klass Associates discussed trends in machinery and equipment. He described a tough marketplace in which world-class machines create superior products for an international market and response is quick. To remain viable, mills will rebuild existing machines to create value-added specialties for regional markets.

Big trends include: more surface sizing in all grades (including newsprint-like grades), more pigmentation, premetering sizing presses, and ceramic surface rolls. Process control and preventive maintenance will pay for themselves even more quickly.

M. Bruce Lyne of International Paper Company spoke about environmental pressures in four areas of printing. Flexography is moving toward water-based chemistry, with water wash plates creating fewer traditional environmental hazards than solvents. Lyne said that flexography will gain market share in printing because photopolymer plates and vastly improved four color registration techniques at low-end line screens make it an attractive alternative.

Offset lithography will also move toward water-based systems. Changes in fountain chemistry involve replacing the low alcohols currently used with surfactants. Likewise, soy-based inks and pigments will be used in the process as a replacement of aromatic compounds. Offset plate manufacturers are now trying water-soluble polymers that eliminate solvent contact during the platemaking process. The downside of this "ideal" system is that this combination of fountain/ink/plate/paper is nearly impossible to run on press and will require much operater skill and time.

The gravure process will continue to decline because of the growth of cheaper and better processes. Environmental concessions in gravure will include solvent recovery systems, water-based chemistry, shallower engraving, and replacement of copper sleeves with plastic.

Xerographic reproduction continues to improve. Two color webs are being tested using liquid toner and the quality is quite good. This process can't compete with offset or flexography in the near future for speed or cost, but for jobs with many originals on a short run xerography should have a large impact.

Recycling

Speakers from both the pulp and paper industry and the private sector presented material at this session. As session co-chairman Theodore H. Wegner pointed out, wastepaper recycling is of primary concern to the public.

Brian A. Day of the U.S. Conference of Mayors explained how the National Office Paper Recycling Project is trying to maximize the recycling of office wastepaper and minimize its disposal in an effort to assuage this concern. The project is a collaborative effort by paper manufacturers, printers, col-

lectors and recyclers, and the public sector. Some of these corporations include Boise Cascade Corporation, Eastman Kodak Company, Green Bay Packaging Inc., Weyerhaeuser Company, National Solid Wastes Management Association, National League of Cities, and the U.S. Conference of Mayors. In an effort to develop a national strategy to recycle office wastepaper, the project has produced two pamphlets: "Office Paper Recycling Guide—How Your Office Can Participate in the Recycling Process" and "Buy Recycled Paper Products—How Your Office Can Help Complete the Recycling Loop."

The recent successes in collecting recyclable materials has moved the Environmental Protection Agency to try and develop new markets for these materials. Robert W. Dellinger of the EPA reported on some of the market development projects that are currently under way. The EPA is supporting the U.S. Conference of Mayors' "Buy Recycled" program. They are developing a list of local access contacts and market data bases. As well as funding multistate purchasing cooperatives, the EPA is providing technical assistance to different projects.

According to Ronald J. Slinn of API, the paper industry has reached a 29% utilization rate of recovered paper in 1991. This percentage is very close to the goal of 40% recovery set by the industry in 1990 to reach by 1995. Exports maintained a rising trend, approaching 7 million tons in 1991.

Recycling alone will not solve the challenge of managing paper in solid waste. An integrated approach is necessary, including options such as composting and using nonrecyclable material as fuel in industrial boilers.

Efforts are being made to solve the confusion in trying to define recycling terms and the use of the recycling symbols.

Finding acceptable landfill sites for municipal solid waste (MSW) continues to be a problem in the United States. One-hundred-and-thirty million tons of the 180 million tons of MSW currently generated is going to landfills.

Thomas E. Hamilton explained how the USDA U.S. Forest Service believes that increasing the recycling rate for wastepaper and wood products is an important step in solving this landfill problem.

The Forest Service, in conjunction with more than 50 paper companies, governmental agencies, and academia, has developed a research program to research technological barriers to recycling and to identify other material products of wastepaper recycling.

The three main objectives of this program are enhanced paper recycling technology, alternative material technologies to use waste fiber, and ongoing economic evaluation of new technologies to help establish research priorities and facilitate technology transfer.

Business meeting and awards ceremony

Introduced by TAPPI Vice President Ronald B. Estridge, TAPPI President F. Keith Hall began the annual business meeting by focusing on three challenges: a sluggish economy, the industry's public image problem, and viewing education as a life-long process.

"We in TAPPI may not be able to alter the course of politics or economics, but we can continue to utilize professional development opportunities that will help industry members to work smarter and more efficiently to solve problems more cost effectively and to manage more productively," said Hall. "The only way to consistently improve productivity is to bring more and better information to bear on all types of problem-solving and decision-making for all employees.

Reflecting on his observations during a TAPPI study tour to Eastern Europe and the former Soviet Union, Hall said: "The information exchange available to all of us through TAPPI and its publications is virtually unknown in Russia and its sister states. They are plagued with problems because of it. However, this is a country with vast opportunities and the challenge before us is to develop our relationship with it as our Association strives to gain a greater international role."

The industry's image was also on Hall's agenda. "Many of the problems facing our industry today stem from misinformed attacks by the environmentalists and the press....We now find ourselves on the defensive," he said.

TAPPI's Goals and Planning Committee established guidelines for TAPPI and its members to address the environmental concerns and public criticism in our industry, said Hall. These actions include encouraging members to be informed about the facts and science surrounding the major issues; providing educational opportunities and materials; providing factual information about the industry and its products, their benefit to society and our significant environmental progress; encouraging members to participate in developing and communicating factual information and positions; developing messages and white papers that can be communicated by members; encouraging research on important environmental issues; and coordinating with the API and with the National Council to ensure consistency in the industry's messages to the public.

Hall is a self-proclaimed believer in education as a life-long process. "If we think we can survive on education gleaned through early textbooks and technical courses, we are destined to a life of professional failure and minimum self-worth. The times demand that we take advantage of every training and development opportunity available and thanks to TAPPI, we have many opportunities available at our fingertips."

He pointed to the Association's professional development opportunities; the TAPPI Research Initiative; an ad hoc committee that is reviewing the multitude of educational activities undertaken by TAPPI members and committees; and TAPPI's Paper Express Program as examples of steps TAPPI is taking to cultivate those opportunities.

"If we do not move with the times, the world will surely move on without us," he said.

Rather than publish a full annual report this year, a report summary is available in this edition of *Tappi Journal* (p. 188). Hall introduced Stuart D. Alexander, David J. Bentley Jr., Keith M. Bentley, Bo Fahlin, and Paul W. Magnabosco, the five new directors for 1992 who will serve on TAPPI's Board for a term of three years each. Current members of the Board of Directors and Officers and retiring board members were also recognized.

Hall concluded the 1992 business meeting and began the TAPPI 1992 Awards Ceremony. Representatives from TAPPI's sister associations—API, CPPA, PCA, PIMA, FPE,

Michael J. Kocurek, left, the 1992 Distinguished Service awardee, shares his exuberance with **William H. Griggs**.



Jasper Mardon, right, presented the 1992 Gunnar Nicholson Gold Medal Award to **Per Borje Wahlstrom**.



NCASI, SPCI, Korea TAPPI, and Hungary—were acknowledged as distinguished guests.

Keyes Fiber Supply and Weyerhaeuser Paper Co. were acknowledged as 50-year sustaining member companies.

William H. Griggs presented the 1992 TAPPI Distinguished Service Award to Michael J. Kocurek. The 1992 Gunnar Nicholson Gold Medal Award was presented to Per Borje Wahlstrom by Jasper Mardon.

Complete remarks of the award presenters and the recipients, as well as transcripts of the technical sessions will be included in the full conference proceedings. Conference registrants will receive a copy by mail. To order additional copies, contact TAPPI PRESS, telephone: (800) 332–8686 in U.S., (800) 446–9431 in Canada, or (404) 446–1400 in other countries. Reference publication #01050192. □