

1990 Papermakers Conference draws 1040 registrants to hear presentations about all aspects of papermaking

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The 1990 Papermakers Conference drew 1040 registrants to its sessions on April 22-25 at the Westin Peachtree Plaza Hotel, Atlanta, Ga. This compared with 1011 registrants at the 1989 Papermakers Conference.

William V. Stevens, Hill Engineering, Inc., outgoing chairman of the Paper and Board Manufacture Division and session chairman, welcomed the registrants.

Benjamin A. Thorp, James River Corp., conference chairman, greeted the registrants and said the pulp and paper industry in the U.S. is larger than that of any other country and has a good growth and environmental record.

Division Award

The 1990 Paper and Board Manufacture Division Award and Harris O. Ware Prize were presented to Oscar W. May, development manager, Buckman Laboratories International, for outstanding contributions to papermaking technology and service to TAPPI. The Harris O. Ware Prize includes a \$1000 award and is funded by a gift to TAPPI by Preco Corp.

William V. Stevens, Hill Engineering, Inc., outgoing Division chairman and session chairman, was given the 1990 Division Leadership and Service Award. He also received a TAPPI Certificate of Appreciation for his service as Division chairman from 1988 to 1990.

TAPPI Certificates of Appreciation were also given to Terry J. Bambrick, Albany International, for service as chairman of the Papermakers Committee from 1988-1990; William E. Scott, Miami University, Oxford, Ohio, for service as chairman of the Papermaking Additives Committee from 1988 to 1990; and Ellen B. Warner, for service as chairperson of the Stock Preparation Committee from 1987 to 1990.

The recipients of the Division's four scholarships were not present. They are Christine L. Harrington, Western Michigan University; Calvin D. Hayden, University of Wisconsin, Stevens Point; Sara J. Ruble, Miami University, Oxford, Ohio; and Paula R. Yochum, University of Idaho.

Wet end chemistry

More than 300 registrants attended the session about Wet End Chemistry Optimization. They heard Yuko Irie, research scientist, Jujo Paper, present a novel approach to pitch control using a lipase enzyme. His presentation included laboratory methods along with actual mill trial data.

John Nishimuta, Augusta Newsprint, presented an approach to wet press optimization and felt monitoring

Benjamin A. Thorp, chairman of the 1990 Papermakers Conference, welcomes the registrants.



programs. He provided actual machine data to demonstrate the benefits achieved.

Jerry Gross from Weyerhaeuser Technology Center gave an update on the G/W drainage and retention system. With this laboratory method it is now possible to develop a "feed-forward" type monitoring system for the forming section.

Peter Brower, AVEBE, showed examples to indicate that charge measurement of the particles and the soluble material present is needed to characterize that optimum papermaking is performed at a zeta-potential and a cationic or anionic demand close to zero.

Due to illness, John Nelson was unable to present his paper, "Trends in Regulated Control of Chemical Defoamers." This provided an opportunity to get a critical review of "Press Drying and Impulse Drying" by Ernest Back, a retired professor from Lidingö, Sweden.

Approach flow screening

The session devoted to an approach flow screening roundtable was one of two sponsored at this year's conference by the Stock Preparation Committee. (The other dealt with approach flow screening and is reported

Oscar W. May (left) receives the 1990 Paper and Board Manufacture Division Award from John D. Callahan.



William V. Stevens (left) is given a TAPPI Certificate of Appreciation by John D. Callahan for chairing the Paper and Board Manufacture Division.



later in this article.) The session was held as a roundtable in response to requests from last year's attendees. After a brief presentation by each panel member, a lengthy question and answer period followed.

The session's chairman, Jon Kerr, Bird Escher Wyss, rated the roundtable a success and cited favorable comments made by some of the more than 100 registrants that talked with him after the session ended.

The first presentation, by Wolfgang Siewert, Sulzer-Escher Wyss, dealt with the distinctive features of approach flow screening, and spoke mainly about the purpose, selection, and system integration aspects involved. The pulsation characteristics of approach flow systems were discussed in detail, along with the factors that contribute to its dampening. Siewert also presented data that reviewed the operating principles of pressure screens and indicated how best to design an entire approach flow system for the paper machine.

The second paper was presented by Oliver Heise of Voith, Inc. Heise's topic was "Slotted Headbox Screening for Fine, Publication, and Newsprint Grades." He identified the operating parameters of typical headbox screening systems and the inherent problems they present. He identified the sources of some contaminants that are not removed by a typical system and proposed several screening arrangements, each of which uses slotted screen plates. He also addressed the contaminant issues of both newsprint and coated paper machine approach flow systems. The third topic, discussed by Larry Stowell of Fiberprep, Taunton, Mass., was based on a paper entitled "Slotted Screening in Approach Flow." Stowell covered the rationale behind the utilization of slotted screens in the approach flow system and cited the presence of increased levels of small contaminants and increased requirements for deflocculation as the primary reasons. The paper concluded that the centripetal flow design in the screen contributes to improved operation. It was

suggested that such a design is particularly well suited for slotted plate applications.

Thick stock screens

Thick stock screens were discussed by Robert Drury, Bird Escher Wyss, in a paper entitled "High Consistency Screening for Plastic Removal in Fine Paper Production." Drury approached the subject of contaminant removal in the approach flow system by identifying the problem, then presenting equipment and system selection criteria. The conclusion suggested the installation of thick stock screens between the blend chest and the machine chest of the paper machine. The comments about some mills that operate such a system were also reviewed.

The final presentation was by Larry Fritz, Westvaco, who reviewed the slotted approach flow screening system in use at his mill. The history of the contaminant problem in the Wickliffe mill was presented, along with the selection decision-making strategy used. The thick stock screening system design which resulted from the trial work was presented, along with actual mill data showing the reduction in breaks due to holes in the sheet. Paper machine operating improvements, such as reduced number of holes, elimination of strings, increased wear life of cleaner cones, and reduction of screen sewer losses, were cited.

Following the brief presentations by the panel members, there was a great deal of discussion about the two basic methods presented for debris removal in the approach flow system: slotted headbox screening and slotted thick stock screening. The effects of both methods were reviewed in relation to pulsation generation and efficiency.

Some comments from the audience suggested that the installation of slotted screens in the headbox loop involves a capacity issue, for slotted plates have significantly less open area than conically drilled plates. It was also brought out that in the case of new installations, the headbox screen

Terry J. Bambrick (left) receives a TAPPI Certificate of Appreciation from John D. Callahan for chairing the Papermakers Committee.



William E. Scott (left) is given a TAPPI Certificate of Appreciation by William V. Stevens for service chairing the Papermakers Additives Committee.



could most likely be chosen so sufficient capacity could be designed in, thus allowing the use of slotted plate technology. In that way, the headbox screen would do "double duty" as both protection for the headbox and paper machine wire and as a method for fine debris removal.

Papermaking

The Papermaking session was chaired by Terry J. Bambrick, Albany International. It covered the paper machine from the wet end to the dry end with presentations about forming, pressing, drying, winding, and a computer-based troubleshooting approach for all areas.

Robert C. Smith, Black Clawson-Kennedy Inc., presented a paper about the Bristol Former Expansion at Waldorf Corp. in which he outlined the development of the Bristol Former for cylinder machines and documented a successful startup in the U. S. Significant improvements in basis weight profile and formation were achieved with the new former, he said.

Pressing issues were addressed in a paper entitled "Granite Roll Replacement," which was given by Joseph Parisian, Black Clawson-Kennedy. Parisian discussed both the desirable properties of granite and the problems that have led to restrictions in its use in some countries. He described the development of alternatives, including synthetic stone, sprayed metallic roll coatings, and combination metallic and ceramic rolls. He also discussed the properties and advantages of granite and the various substitutes for it.

G. Walter Rosenberger and Jeffrey R. Reese, Valmet-Enerdry, presented a paper entitled "Profile Testing Improves Dryer Section Diagnostics." Their paper discussed the techniques for measuring complete cross-machine dryer surface temperature and dryer pocket humidity profiles. Surface temperature profiles, they said, have shown the effects of dryer bars, siphon position, differential pressures, and undersized siphons and lines.

Pocket humidity profiles can show the effects of pocked ventilation, fabric permeabilities, and air flows through the dryer hood. The profiles can be related to sheet moisture profiles to determine whether the dryer section is the cause of profile problems.

James W. Atkins, A&F Corp., delivered a paper entitled "Winder Modernization—An Attractive Alternative," in which he discussed the possibilities of rebuilding an existing winder to improve roll quality and increase production. Some areas that can be rebuilt, he said, include ways, slitter mechanisms, bow rolls, drives, unwind stands, brakes, and conversion to shaftless operation. The advantages of winder rebuilds compared to installing new winders were discussed.

All areas of the paper machine were covered in a paper entitled "A Total Quality Approach to Papermaking Troubleshooting Using the Personal Computer," which was given by Jeff Antos, Beacon Hill Technologies. In it, Antos discussed the total quality troubleshooting approach to solving papermaking problems. Mill experts and a computer program are used to establish consistent methods to identify and solve problems. The method has been used successfully in other industries and is now being applied to the paper industry, he said.

Wet and dry strength

The session about advances in wet and dry strength was rated excellent by Elmer D. Martinez, Borden Packaging and Industrial Products, its chairman. The theme was so popular it drew a full house.

Three of the presentations in this session were on the topic of starch performance in papermaking wet-end applications. LeRoy E. Deters, Grain Processing Corp., presented a practical study that compared cationic corn versus potato starch; Alan L. Hippleheuser, A.E. Staley Manufacturing Co., compared starch handling characteristics and equipment for papermakers; and Robert T.

McQueary, National Starch and Chemical Corp., discussed the impact of waxy amphoteric starch on drainage, retention, and strength. The topics emphasized use of starches from laboratory and production trial data.

Two presentations dealt with increasing strength. In one, Makhlof Laleg, Pulp and Paper Research Institute of Canada (PAPRICAN) told how Chitosan as a wet-end additive in a laboratory study, which was found to increase the strength of never-dried webs, dry paper, and rewetted paper, depending on the acidity of stock.

The second dealt with a method for the quantitative evaluation of bonding ability of chemical pulp fibers using "conformability index" and "bond strength index" related to the fiber bond strength per unit bonded area. This paper was given by Kaoru Hieta, Japan Pulp and Paper Research Institute, Inc.

Robert J. Mills, Callaway Chemical Co., gave a presentation about the rapid determination of amine and amide wet strength resins in aqueous solutions and in dry paper and paperboard. The test method provided a rapid means of evaluating resin performance while the paper machine is producing paper.

This session provided the papermaker with practical applications on the use and evaluation of wet end additives as they relate to fiber bonding and strength.

Papermaking additives

The poster session, sponsored by the Papermaking Additives Committee, was a first for the Papermakers Conference. It drew 400 to 500 registrants and was considered very successful. The session focused on seven poster papers displayed in graphs, tables, and other illustrations mounted on display boards. Attendees viewed the displays and discussed the papers with the authors in small groups or one to one.

The paper by William E. Scott, Miami University, session chairman, dealt with factors affecting the stabilization of entrained air in acid and alkaline papermaking furnishes. It investigated the effects of fillers, sizing agents, fiber fines, pH, and furnish temperature on the release of entrained air bubbles from papermaking furnishes. Air content was measured with an ultrasonic device that relied on the attenuation of ultrasound bubbles. Both air content and the release rate could be determined.

"Interfering Substances" was the title of the paper by Terrence L. McComb, Sandoz Chemicals Corp. His objective was to create awareness of the interfering substances and application conditions that can adversely affect the efficiency of fluorescent whitening agents. The factors addressed were pulp types, system water contaminants, fillers, pH, cationic additives, sizes, and coating binders.

Susan M. Ehrhardt, Hercules, Inc., discussed sizing with rosin under neutral conditions, a subject of strong interest in this day of alkaline conversions. Her paper described the limitations imposed by traditional alum-rosin sizing chemistry and the comparative performance to be gained under neutral conditions by the use of a cationic dispersed rosin sizing agent. She reported about both pilot machine and commercial trial experiences.

The background for a paper by Richard D. Harvey,

Ellen B. Warner (left) receives a TAPPI Certificate of Appreciation from William V. Stevens for chairing the Stock Preparation Committee.



Grain Processing Corp., was alkaline papermaking. The paper, entitled "Corn Starches in Alkaline Papermaking," presented comparative data about the retention, strength, promotion, and sizing properties imparted by corn starch and potato starch. It concluded that the two materials were comparable in performance.

Cationic starch

The performance of cationic starch under alkaline papermaking conditions was also the topic of Penelope A. Patton, A. E. Staley Manufacturing Co., in a paper entitled "Optimizing the Properties of Waxy Starches for Alkaline Papermaking." The specific effects of cationic charge, anionic charge, and molecular weight on paper properties were investigated. It was reported that high cationic charge was beneficial to sizing and filler retention; high levels of phosphonation caused decreased sizing; and high molecular weights were beneficial for drainage and retention, while lower molecular weights promoted sizing. It was found that paper strength properties were largely insensitive to changes in starch properties.

Herbert H. Espy and Gordon W. Geist, both of Hercules, Inc., reported about chlorine-free reagents for repulping alkaline-curing wet-strength broke. Chlorine-containing agents should be avoided in repulping due to their propensity to produce organic chlorides in effluents. Persulfate salts appear to be feasible substitutes for repulping broke made with polyamide- or polyamine-epichlorohydrin wet-strength resins. The effects of pH, temperature, and other processing variables were reported.

The final presentation was entitled "Porosity Control via Filler Selection." It was given by Kevin S. Duane, Pfizer Minerals. This handsheet study examined the effect of filler particle size and shape on sheet porosity. A wide range of precipitated and ground calcium carbonate fillers were studied. Duane found these materials could have significant effects on sheet porosity and provide a means to control this property in addition to the usual avenues of fiber selection and refining.

Recycled papers

The Recycled Papers Panel Discussion was rated as an outstanding success by Gordon L. Higbee, Nash Engineering Co., the session's chairman. The panel shared valuable information about recycling newsprint, corrugated containers, office waste, and mixed post consumer waste, and generated many questions from the audience.

The panel members were:

- John Joseph, Garden State Paper Co., who outlined the future direction of newsprint recycling in the U. S. and estimated a future limit of 60% to 65% recycled paper in newspapers
- Jobe B. Morrison, Miami Paper Corp., who gave a highly focused analysis of the paper industry's recycling efforts and compared this with other countries and industries
- Robert Stone, Inland Container, who shared his startup experiences at the mill in Ontario, Calif., which makes linerboard with 100% old corrugated container furnish
- Richard Koffinke, Ahlstrom Machinery, who reviewed the advantages of the high consistency pulping of waste paper and screening in a single drum pulper
- Converse B. Smith, Newark Boxboard Co., who focused the need for the industry to have a proactive involvement in legislative drafting as well as lobbying efforts.

Surface treatment

Nick Dunlop Jones, Sandoz Products, Ltd., was the chairman of the session entitled "Surface Treatment," which dealt with trends in surface treatment technology.

The papermaker has traditionally looked to size press starch application to provide resistance to liquid penetration, internal bond, and surface strength. Today the industry looks to surface chemical treatment with natural and synthetic adhesives, pigments, and functional additives to provide properties that used to be achieved only with furnish changes and wet end additives. Surface treatment can provide better retention of costly additives and reduce the load on effluent treatment systems.

As machine speeds increase, it is necessary to change size press design. Charles P. Klass, Klass Associates Inc., presented a paper entitled "Trends and Developments in Size Press Technology" and concluded that the new generation of premetering size presses can not only solve high speed operating problems, but also reduce after dryer load by application at higher solids.

In a paper entitled "Kaolin Pigments—Their Role in Slightly Coated Papers," Andrew R. Negele and Ronald E. Johns, both of Engelhard Corp., discussed the use of kaolin pigments to produce slightly coated papers using a hydrophilic transfer roll coater. These products, they said, upgrade a newsprint type basesheet to near coated paper printing performance.

Martin F. Kusterman, J. M. Voith GmbH, gave a paper entitled "Pilot Plant Results with a Speed Sizer," in which he discussed pilot plant results with a rod metering size press. High solids and low wet pickup are best for improving properties, whereas medium solids at higher wet pickup are better for improved sizing.

David F. Bailey and Richard Brown, both of ECC International Ltd., presented "The Use of Pigments at the Size Press—A European View." Pigmented size press

treatment, they noted, is the most common precoating method used in Europe.

Mean-Jeng Hou and Sai H. Hui, both of PPG Industries, Inc., presented a paper entitled "Interfacial Phenomena in Surface Sizing," in which they provided a theoretical framework to describe these phenomena. For nonpolar oil holdout, a low dispersive surface energy is desirable, they said, while both dispersive and nondispersive surface energy must be low to achieve mixed fluid holdout.

Drainage

The session about drainage testing and system impact was chaired by Michael A. Schuster, Betz PaperChem Inc., who developed it. It was designed to emphasize developments in drainage testing methodology and ideology. Interest in predictive drainage measurement and its correlation with system chemistry was high, and session attendance totaled more than 200 people.

The papers presented pointed out the diversity of testing procedures used to measure paper machine drainage and dewatering. Much work is being done to find alternative ways to incorporate shear and vacuum into the same test. The work is stimulated by a wish to more accurately simulate the drainage mechanism in the laboratory and by a need to better understand the drainage mechanism and colloidal chemistry.

Chemically induced drainage in a secondary board mill was the first subject of the session. It was given by Madelynn T. Wilharm, Nalco Chemical Co., and dealt with the development of drainage programs that use a selection of synthetic polymers. Free drainage testing to simulate the table of a paper machine was used to assess the impact of the polymers on drainage, fines retention, and fines dewaterability.

Ralph M. Trksak, National Starch and Chemical Corp., delivered a paper entitled "Aluminum Compounds as Cationic Donors in Alkaline Papermaking Systems." Evidence was given to document a net cationic charge in alkaline environments for aluminum-based materials compared with the conventional theory of aluminum hydroxide precipitation. The intensity of this charge and its effectiveness in the papermaking system is dependent upon additional point and contact time in an alkaline environment. Audience interest in this topic was high.

The Dynamic Drainage Analyser (DDA) was the subject of a presentation by Sven Forsberg, Institute for Surface Chemistry. The DDA is a microprocessor controlled vacuum drainage tester that simulates the drainage behavior of pulp in the wet end of paper machines. The device simultaneously measures retention, drainage, porosity, and wet web dryness. A paper by Mark D. Pask and Rudy Lorz, both of BASF, compared the effectiveness of CSF, Schopper-Riegler, and the Britt jar drainage tester in predicting on-machine gravity drainage responses. These tools are adequate for predicting which drainage and retention aid has a probable chance to succeed.

"Cationic Potato Starch and Its Impact on Drainage" was the subject presented by Robert L. Kearney, Penford Products Co. The paper contrasted the effect of cationic potato starch on drainage with the impact of cationic waxy maize starch. Actual mill data was presented.

Modified PCC fillers to reduce sizing demand and

improve runnability were discussed in a paper by Robert A. Gill, Pfizer, Inc. The modified precipitated calcium carbonate was designed to make the sizing of filled sheets more efficient and to reduce the amount of sizing material needed.

Stock prep

Joe Antku, Jr., regional sales manager, Celleco Hedemora, Inc., chaired the session about "New Advances in Stock Prep" for the 1990s. He said the session was very noteworthy. The theme was very popular and an average of 150 people attended.

The session began with a presentation entitled "A New Approach to Critical Factors Affecting Refining Intensity and Refining Result in Low-Consistency Refining." The presenter was Lumiainen Jorma, Sunds Defibrator Oy., who looked at new variables not normally considered in the traditional inch cut per minute refining intensity theory.

The next presentation was by Janet Winter, who focused on how her company, Miami Paper Corp., West Carrollton, Ohio, U.S., uses image analysis to monitor various aspects of the papermaking process. Her paper was entitled "Image Analysis Formation Testing at Miami Paper Corp."

Michael D. Woodworth, Ahlstrom C & V Inc., gave a paper entitled "Comparison of Practical Methods for Air in Stock Measurements." The paper dealt with practical methods of measuring air levels in paper machine stock flow. A comparison of the various air measurement devices was presented along with the pros and cons of each design.

The final paper was given by Alkis Karnis, Pulp and Paper Research Institute of Canada. The subject was the response of mechanical pulps to refining. Of particular interest to the audience was the comparison of high consistency and medium consistency refining to hardwood and softwood pulps. While the medium consistency refining of hardwood and softwood pulp in the stock prep process is not a widely accepted application, the merits of the application were examined.

Panel discussion

The Superintendents' Panel Discussion, entitled "50% Solids after Pressing? These Papermakers are Doing It," was attended by 250 to 300 registrants. The panelists gave excellent presentations of their experiences and operations and the audience was active in questioning them.

The points made included that 50% solids after pressing is being accomplished. The extended press has gone from the lower 40% area to 50% dryness and there is reason to expect higher percentages. This achievement has not been easy, for each mill, product, and fiber mix has been a new challenge.

The session about microbiology was chaired by Jack B. Treas, regional manager, Buckman Laboratories, Inc. The session was well attended and two meeting rooms were combined to accommodate the large turnout. The session was quite interesting, for each of the papers presented involved current topics of interest to the papermaker in microbiology. Each presentation addressed an aspect of concern to those involved in alkaline papermaking or undergoing a conversion from the acid process.

The first paper, entitled "Biocidal Control of Thermo-

philic Bacteria in Size Press Operations," was by R. J. Karbowski and D. J. Schubert, both of Dow Chemical Co. It noted that despite the near 150°F storage temperature, degradation by heat-loving microorganisms continues to be a problem to the papermaker. This paper explored the efficacy of one new compound in controlling these microbes.

Mill safety was the theme of a paper by William T. Robichaud, Betz PaperChem, Inc., entitled "Controlling Anaerobic Bacteria to Improve Product Quality and Mill Safety." These types of bacteria are responsible for the production of harmful gases which can increase corrosion, spoil product quality, and introduce safety hazards by generating other explosive gases. The author suggested methods to monitor and control these populations.

The final paper, by Lawrence A. Grab, was entitled "Glutaraldehyde—A New Slimicide for Papermaking." The efficacy of glutaraldehyde was discussed and confirmed in actual papermaking systems, and field trial results were presented.

Drainage

The session about understanding drainage featured a panel discussion moderated by Philip A. Ford, Allied Colloids, Inc. The panel reviewed the topic and answered questions from the audience.

John E. Unbehend, Empire State Paper Research Institute, led off with an historical perspective of the types of instruments used to evaluate pulp drainage. He showed that the different points of water removal on the paper machine depend on the pulp properties and additives in different ways and require different instruments for analysis.

Lawrence H. Allen, PAPRICAN, then reviewed various categories of drainage aids currently in use. The laboratory and mill data available in the literature were shown and disagreement between the two was pointed out. Allen concluded that careful studies using well-characterized pulps are necessary for further understanding of the effect of additives on drainage.

Arnold F. Giles, Huyck Formex Co., discussed the interactions between forming fabric structure, hydrofoil spacing, and fiber length and their influence on formation and drainage.

Jerome M. Gess, Weyerhaeuser Paper Co., described the G/W drainage tester and interpreted the various "breaks" in the resulting drainage curve in terms of specific regions on the paper machine. He found good agreement between laboratory and mill results.

John G. Langley, Allied Colloids Ltd., showed how the fine floc structure that results from the use of "microparticulate flocculent" systems can improve both formation and drainage.

Finally, Robert A. Stratton, The Institute of Paper Science and Technology (IPST), discussed the effects of drainage aids on the press section. Either positive or negative effects on dewatering can be found here, depending on the properties of the pulp and the additive. Although drainage on the paper machine and the effect of drainage aids is being studied more widely, our current understanding is still at a very elementary level, Stratton said. □