

1993 TAPPI Nonwovens Conference

J. ROBERT WAGNER

Nonwovens Editor, *Tappi Journal*, and Professor of Textiles,
Philadelphia College of Textiles and Science

In addition to the Annual Meeting, this year the Nonwovens Division and the Paper and Board Manufacture Division held a joint conference at the Marriott Marquis in Atlanta on April 18–21, 1993. Attendance exceeded 1000 for the three functions.

The opening session and awards ceremony for Nonwovens began with retiring Division Chairman Albert G. Hoyle making opening remarks and presenting division awards. The Nonwovens Division Leadership and Service Award was presented to Ricardo L. Herrera, vice president, corporate engineering and technology, Fleetguard Inc. Larry C. Wadsworth, professor and director of the Textiles and Nonwovens Development Center, University of Tennessee, was awarded the Nonwovens Division Technical Award and Mark Hollingsworth Prize. Hoyle received the outgoing Division Chairman Certificate of Appreciation. G. Paul S. Kochar received a Certificate of Appreciation as the Technical Program Chairman. Outgoing Committee Chairman Certificates of Appreciation went to Peter D. Wallace of the Nonwovens Binders and Additives Committee, James M. Paul of the Building and Industrial Mat Committee, Bhupender S. Gupta of the Nonwovens Product and Quality Assurance Committee, Ruth H. Lawson of the Nonwovens Fibers Committee, and Michael P. Sneath, retiring chairman of the Nonwovens Process Technology Committee.

By holding the joint Papermaking and Nonwovens conferences concurrently, attenders could network between the various sessions or papers, depending on their interest. There were nine sessions at the Nonwovens Conference with a total of 46 papers presented, not counting the keynote address by incoming TAPPI President Ronald B. Estridge, and the technical papers in the Papermakers' sessions. The Nonwovens papers included the following:

Patents, copyrights, and trademarks

The first session consisted of four papers on patents and related items. The first presentation was an introductory paper on patents, copyrights, and trademarks. It was followed by a paper on the methods and benefits of doing patent searches and considering prior art in patent strategy. Another paper reviewed recently issued patents relating to fibers, formation, bonding processes, and other nonwoven end-use patents. The fourth paper dealt with the reasons and proper manner for maintaining a laboratory notebook. It listed 16 recommendations that would assure the

acceptance of the laboratory notebook by the courts in establishing the first invention date.

Building and industrial mat

The Building and Industrial Mat Committee had five speakers. A forming fabric supplier indicated that as fiberglass mat demands increase, companies will either have to speed up old machines or build new ones. Forming-fabric demands for new designs will require that consideration be given to abrasion resistance, drainage, fiber retention web release, and dimensional stability. In addition, improved communication between fabric suppliers and their customers will be essential. Another speaker discussed the problems associated with wet sheet–open draw transfers and recommendations given to improve sheet transfer. One paper reported the results of an investigation of vinyl acetate modifiers for urea-formaldehyde resin and the significant improvement in tear strength of fiberglass mats that can be realized with the proper resin chosen. Another author discussed the white water system composition and the effects of consistency, temperature, agitation, pH, calcium ions, and biocides. Conclusive findings and recommendations were given in this regard. The advantages of using certain types of modifying polymers to improve drainage, machine speed, and tensile strength were also discussed.

Product quality and assurance

The Product Quality and Assurance Committee presented five papers. One paper reported the absorption behavior of nonwovens when using superabsorbent fibers with polyester and rayon and additional variables of needle-punch density, fluid type, and pressure. Another paper dealt with laminates containing activated-carbon battle-dress overgarments and the effect of design parameters on absorption and breakthrough of trichloroethylene gas. One author described the use of an image analyzer for assessing a range of wet-laid nonwovens for quality and established both a mean index and a root mean square index for quality ranking. Several joint authors presented their findings on the optimization of thermal bond patterns where breaking strength and energy-to-break were generally found to increase with percent bond area and fiber elongation. Another author established that wicking test procedures were not sufficiently sensitive or accurate for comparing in-plane absorption capabilities. Instead, an alternate method was shown to be reliable in determining

1. TAPPI President **Ronald B. Estridge**, left, presents **Larry C. Wadsworth** with the 1993 Nonwovens Division Technical Award.



2. **Ricardo L. Herrera**, recipient of the 1993 Nonwovens Division Leadership and Service Award



permeability capillary pressure and uptake capacity in a single series of in-plane flow measurements on a given specimen.

Nonwoven process technology

The Nonwoven Process Technology Committee had three different sessions with a total of 16 papers being given. The first paper dealt with a water-soluble, biodegradable, melt-blown nonwoven produced with partially hydrolyzed polyvinyl alcohol. Another paper on melt blowing described the benefits of tailoring polypropylene polyethylene, polystyrene, and polymethylpentene. One presenter discussed the benefits of idealized melt-blowing equipment that is capable of producing significant increase in resin throughput with reduced power consumption yet maintain fine fiber diameter and basis weight uniformity. Another presenter reviewed numerous patents on melt blowing. He made the point that research should start in the library. Otherwise time and effort spent on a given idea or project may be for naught because of prior patent protection. The use of trial data and regression analysis was shown to be useful in relating the characteristics of the web on basis weight, fiber diameter, and solidity.

In the second session, the benefits of compressive compaction was demonstrated. With only minor amounts of compaction, significant increases in thickness and stretch and ultimate softness characteristics were realized. Several other authors described the development of a simple model for predicting the bending behavior of thermally bonded spunbonded and carded polypropylene nonwoven fibers. Another paper gave the basic parameters and variables for thermal bonding calendars along with benefits, limits, and recommendations. Hydroentangled nonwovens and the influence of specific energy used during hydroentangling on thickness, tensile strength, grab strength, elongation, bursting strength, Elmendorf tear, flexural rigidity, and fiber loss was discussed. Another paper discussed a mathematical model for thermal bonding that correlated well with the average temperature as the sheet leaves the bonding area and the relationship with nonwoven physical properties. Several authors reported on the

study of thin-bed absorption media, activated carbon-loaded, melt-blown laminates. The work indicated that absorption capacity increased linearly as the activated carbon was increased.

The third nonwoven process technology session described a full spectrum infrared sensor that permitted the measurement of moisture, binder concentration, and fiber blend that was not previously possible. A paper on sensors described their benefits for on-line quality measurement. The benefits of optical microscopic techniques with and without stains and refractive index reagents has been shown to be helpful in analyzing unknown nonwoven samples, determining fiber components, and determining their percentage in a product. A fabric supplier described a single-jet traversing hot-water shower and full-width air knife for cleaning forming fabrics. One author gave data and equations interrelating total porosity, relative porosity, water retention ratios, permeability, and solids.

Nonwoven fibers

The Nonwoven Fibers Committee presented five papers. The first paper related needle-punch density to breaking strength, elongation, tear strength, air permeability, and ballistic tests using ultrahigh-tenacity fibers. Another paper described the limitations, benefits, and applications of first-, second-, and third-generation acrylic fibers and pulps and their physical, chemical, and environmental properties. Several authors described the development of crimped carbonaceous fibers and the benefits of a high-loft bat for resistance to thermal conductivity. One paper described the use of articles or additions that come in contact with food. It detailed regulatory concepts and means of testing being developed by the Food and Drug Administration and the scientific community.

The winning Best Student Paper was presented by award recipient Ashish Mathur. The paper dealt with the effects of chemical aging on the physical and mechanical properties of geotextile nonwovens.

Conference Report

Nonwovens filtration media

The Nonwovens Filtration Media Committee had a total of five papers presented. The first paper discussed thin melt-blown, activated-carbon-loaded absorption media for military protective clothing, hazardous waste cleanup, and other uses. A second paper dealt with the use and calibration of particle counters for use in assessing liquid filtration. Latex spheres and ultrafine test dusts were used in the calibration. Another paper reviewed the purposes of the ASTM F 1215 Standard Method in combination with inexpensive PC-compatible multichannel analyzer cards to enhance the utility of the method. Two authors discussed the procedures, equipment, and other items that affect multipass filter test results. The president of a differential pressure air-permeability tester manufacturer gave particulars on the history, calibration, uses, and precautions of this type of tester. Recommendations for its care and use were also given.

Binders and additives

The Binders and Additives Committee had six technical papers. The first paper discussed the chemistry, design, and performance of two new classes of acrylic emulsions. In this presentation both

formaldehyde-free and high-temperature and non-yellowing acrylic binders were discussed. Two other authors discussed an ethylene-derived, low-molecular-weight, water-dispersed, formaldehyde-free binder. The binder was shown to exhibit excellent properties when compared with other commercial binders. Another paper discussed the effects of silicone antifoam on latex binder wetting and adhesion used on polyester webs. The study found that fabrics produced using the silicone antifoam would not wet out well and would have lower peel strength. However, another paper discussed the advantage of using silicone treatments for its lubricant and release property, hand, or as antifoams. One presenter discussed the growth, advantages, and uses of the various types of bonding nonwovens. The last binders and additives paper discussed the analytical techniques for determining the amount of formaldehyde in binders.

The quality of papers this year was excellent, and they covered a range of material or items. During the exhibits, in addition to plenty of food and refreshments, attendees had the opportunity to network with friends, business associates, and clients. The conference this year offered a high level of satisfaction for all attendees. ■