1992 Nonwovens Conference covers technical developments

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The TAPPI Nonwovens Conference was held May 10–13 at Marco Island, FL, once the home of the Calusa Indians. In spite of the ailing economy, more than 250 individuals attended. In between the keynote address and 34 technical papers, many found time for leisure activities ranging from fishing and sailing, to tennis and golf, to walking or just lying in the sun.

The primary purpose for attending the conference was, of course, the meetings and technical program. Division steering, council, and committee meetings also were held to evaluate the conference and work out future plans and directions for the Division and its committees.

The awards banquet was, as always, well attended with F. Keith Hall, TAPPI president, being the speaker. Hall reviewed the status of TAPPI. TAPPI is operating in the black and its 34,000 membership is growing about 1% per year. Attempts are being made to reduce expenses with the possibility of combined courses and functions as one way to reduce costs.

In trying to expand foreign interest in membership, the old Soviet Union, Hungary, and Czechoslovakia were all visited. The many stories told gave a sense that industries, procedures, and economics there are in a tizzy and it will be some time before things settle down.

To bolster research, TAPPI has begun supplying grants to universities totaling US$ 250,000 for seed money for four years, Hall said. The program is presently in the second year. It is hoped that the universities selected will obtain matching funds from the National Science Foundation to further enhance the grants.

Keynote speaker

This year's keynote speaker was K. Wayne Hays, consultant, Freudenberg Nonwovens North America. In his presentation on "The future of nonwovens," he predicted that sales of adult incontinence products will reach US$ 750 million and grow at a rate of 25% per year. Whole blood and pesticide protective clothing also will be in demand. The federal Clean Air Act and the interest in the greenhouse effect will bolster the development and use of filters for both particulate matter and volatiles. They will also encourage the development of materials that are safe and enhance the environment. Geotextiles will be used more for interstate highway improvements. Because of health hazards, replacements will need to be developed for some raw materials and products, Hays said. Lastly, the anticipated consumption of nonwoven roll goods is expected to reach US$ 43.5 million (2.7 billion pounds) by the year 2000.

Nonwovens Conference attendees talk shop during a break between sessions



Technical program

With three sessions and nine papers, the Process Technology Committee had the most sessions and papers. Thermomigration of binder during drying, its effect on the properties of nonwovens, and means and benefits achieved in controlling it were presented. Foam application of binder permits higher concentrations of binder solids, a wide range of foam densities, uniform application, excellent wetting and penetration, and increased line speeds of up to 300%. The various methods of on-line basis weight and defect measurement of sheets, the advantage and disadvantage of each, and the benefits achieved when basis weight is controlled, were discussed. An instrument that automatically measures zeta potential and enables the control of fourdrinier drainage by proper paper wet end chemistry was discussed. Improvement in drainage can be doubled and with it, improvements in fines retention and sheet formation. Another instrument was described that enabled continuous real time analog measurement of the web cross tension, variables affecting tension, and the benefits achieved by their control. One speaker discussed the relationship between in-plane permeability and pressing, water removal, and pore structure. A means for measuring and controlling consistency using mass gauge

measurements was shown to affect sheet quality and provided a means to improve sheet quality.

Fibers

The Fibers Committee had two technical sessions and seven papers presented. In one paper, the chemistry for producing sulfar PPS fiber was described. Because of its excellent dimensional stability and resistance to high temperatures, it has been found as an excellent choice for the filtration of flue gases from coal fired boilers and incinerators. The use of a formation index equation was shown to be useful in predicting glass paper tensile strength. It has been concluded that formation pH and drying temperature may affect glass types differently. The relationship of lubricant and antistatic finishes on bleached cotton fiber on carding rate was presented. In addition, a fiber friction device was described that permitted carding properties to be assessed with testing equipment.

Pitch-based carbon fibers were shown to offer a range of unique mechanical, thermal, electrical, and chemical properties and specific end use products were suggested. Using PET polyester microfibers as small as 0.2 denier, fiber handsheets having excellent formation have been produced. Dispersion time was shown to be critical and affects caliper, density, formation, and mean pore size. The advantage, uses, and consumption of polybutylene terephthalate, PBT, a semicrystalline thermoplastic polyester with a lower melting temperature and better dimensional stability than PET, was described. As a result of such properties, PBT is a good candidate for melt-blown nonwovens.

A workshop gave the basic concepts of natural and synthetic polymers.

Filtration media

The Filtration Committee had two papers in their session. An excellent paper was presented on wet-laid flash spun polyolefin pulp filter media. In addition to having good mechanical properties, one variety of product offered superior permeability, filtration rate, water flow rate, and particulate retention. The material would be excellent for air and liquid filtration for ecological purposes. The use of microfiberglass media has permitted filters to be produced with 99.9+% efficiency in filtering 0.1 micrometer diameter particles. The filters are so efficient that using average particulate retention is no longer acceptable. So, the 95% upper control limit value was suggested as an alternate and more meaningful value to categorize the super ULPA filters.

Binders and additives

The Binders and Additives Committee had five papers presented. Because of the Clean Air Act, tighter restrictions on the permissible level of formaldehyde in the workplace or environment is a must. Examples of an alternate latex with little or no free formaldehyde produced are the newly developed ultra-low formaldehyde and vinyl acrylic latexes. These can be used in wipes, filter media, and coverstock. Pre-cross link acrylic and starch graft copolymer latexes have been developed that exhibit substantial reductions in formaldehyde emissions with retention of stringent requirements on physical properties. Latex emulsion binders fortified with wax emulsions of different particle size were evaluated and reported upon. Poly (lactic acid) degradable plastics, coatings, and binders were shown to have merits for cost-effective degradable polymers. A comparison was made between nonwovens bonded using acrylic latex and ultrasonically bonded nonwovens. The latex is superior for preventing fiber transfer. However, ultrasonic bonding produced a softer, more tear-resistant nonwoven.

Product quality and assurance

The Product Quality and Assurance Committee had five papers presented. One paper described an apparatus using conical needles for measuring bond rupture energies of resin bonded webs. High-quality needle-punched felts used in polishing semiconductor wafers for the electronic industry were shown to be possible based on a total quality approach to establish requirements for the purchase of new equipment and improve the manufacturing process.

The sound absorption properties of needle-punched nonwoven fabrics were evaluated and statistical models developed that permitted structural parameters to be evaluated for sound absorption performance in low frequency ranges. Another paper investigated high loft air-laid nonwovens bonded using bicomponent binder fiber. Models were developed that evaluated the effect of the amount of binder fiber, bonding temperature, and basis weight on shrinkage, compressive thickness, energy, resilience and compressive linearity, thermal transmission CLO value, and insulation ratio. Another apparatus was developed for determining absorbency on porous nonwoven materials. The unique design permitted the measurement of both perpendicular and lateral liquid absorption having rapid rates of absorption.

Building and industrial mats

The Building and Industrial Mats Committee had five papers presented. The use and benefit of fiber dispersants and formation aids or viscosity modifiers was dramatically demonstrated. Several papers emphasized quality. One described the steps and criteria for achieving world class quality status. Another presented a systematic approach for avoiding failure when developing new products and the fitness of the product for use. The quadratic loss curve or Taguchi loss curve is said to present an alternate to specifications and will permit substantial cost reductions and improved profitability. The initial cooperation among supplier, customer, and end user in order to comply with environmental regulations in future years is essential. In addition, the public must be educated and informed to eliminate prejudicial biases that unjustly cause firms to be regulated out of business. □