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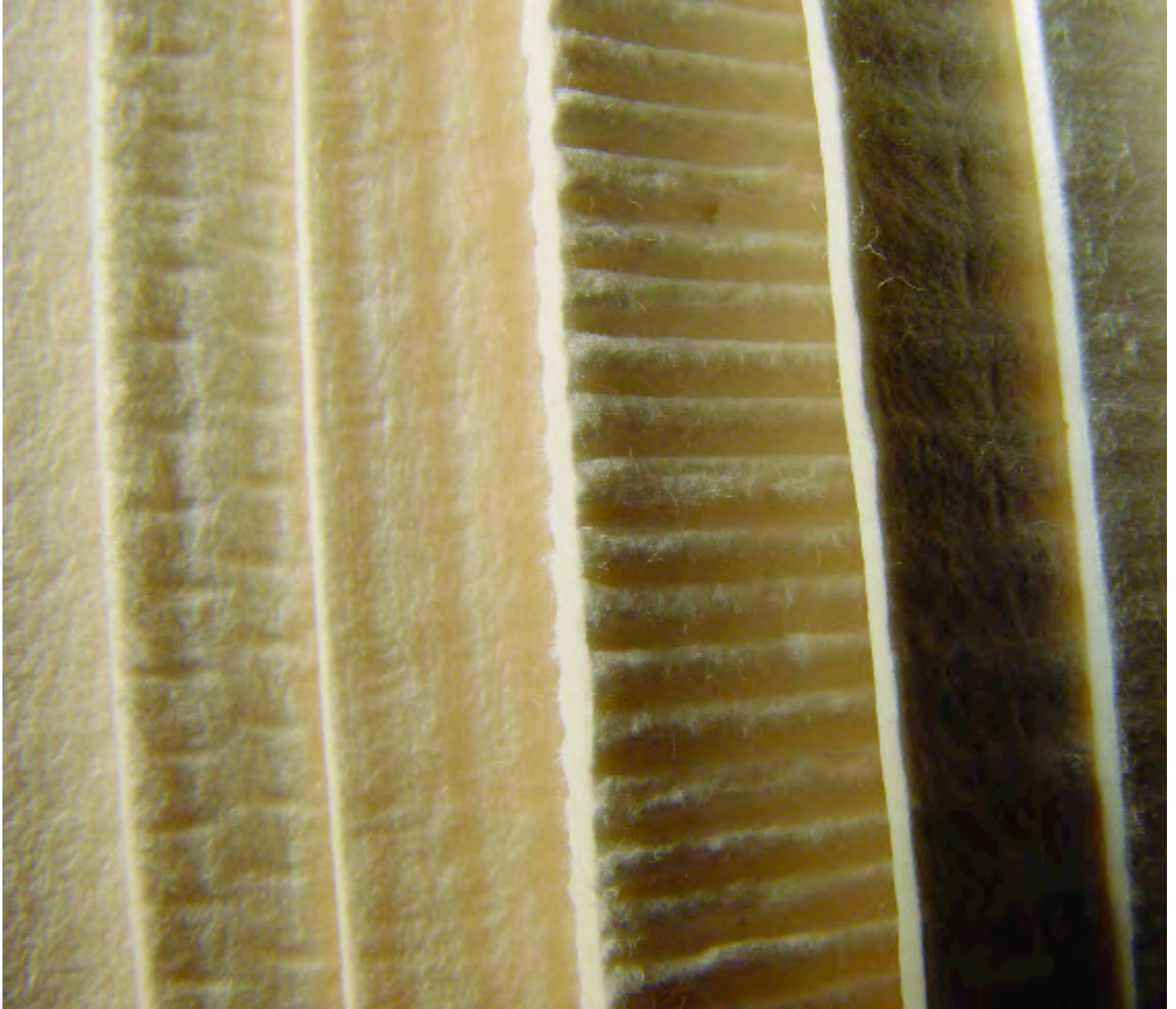


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Chapter I



PHOTOGRAPH BY ROBERT HILL

What is Market Pulp?



This book is named *The World of Market Pulp* because it is the intention of the authors to provide a comprehensive work detailing every aspect of market pulp — dealing first with the individual fibers and their specific construction, through the physical and aesthetic laboratory evaluation of each pulp and proceeding to the practical aspects of each pulp's most appropriate end-use application(s).

Another motive in choosing the title was to emphasize the global aspect of the market pulp industry. It is indeed worldwide, since market pulp is currently being produced in over 20 countries in all parts of the world.

Traditional market pulp powerhouses such as Canada, the United States, Finland and Sweden have been joined by relative newcomers like Brazil, Chile and Indonesia. These newcomers have three advantages not universally enjoyed by the others: (1) newer equipment utilizing the latest technology; (2) plantation-grown trees; and (3) single species pulps possessing highly regarded attributes for some specialized products.

Market pulps also are currently being produced in Russia, Poland, Austria, Germany, Finland, Sweden, Norway, France, Portugal, Spain, Morocco, Canada, the USA, Argentina, Brazil, Chile, South Africa, Swaziland, Thailand, Indonesia and New Zealand. It is expected that Australia will join this number within the next few years.

WHAT IS MARKET PULP?

The commonly accepted definition of market pulp is that it is any one of a variety of pulps produced in one location, dried, securely wrapped (in almost all cases) and then shipped to another location for further processing. This pulp can be bleached or unbleached, hardwood or softwood, chemically cooked, mechanical or high-yield chemithermomechanical (often called CTMP or BCTMP), fully dried to 100% Air Dry or wet lap (50% moisture – 60% Air Dry), virgin fiber or recycled fiber from post-consumer-waste (MDIP).

Any of these products can be delivered to the customer in a variety of forms:

a. Sheeted bales that measure approximately 27" to 32" wide x 35" to 37" long x 17" to 18" high. These bales are carefully controlled to weigh 250 kg.

b. Flash dried bales that are less densely pressed and which weigh only about 195-200 kg. Note: Both sheeted

bales and flash dried bales are unitized for overseas shipments. A unit consists of 8 bales securely wire-tied with 7 or 8 strands of heavy steel wire. Eight bales of sheeted pulp typically weigh 2 metric tons. A unit of flash dried bales weighs considerably less because of their less dense compression.

c. Rolls that measure as little as 7" in width (feminine hygiene products) but can be as wide as 55". These rolls often (but not always) measure 58" to 60" in diameter.

d. Wet lap skids/pallets of very thick sheets that are 50% moisture.

The exact size of sheets in bales often varies slightly among producers but is always maintained within certain prescribed parameters. The determining factor for the size of the bales is the overall dimensions of the hold in the huge dedicated vessels designed to carry pulp. The size of the eight-bale units must be such that they fit tightly in the hold. If they are too large, the stevedores won't be able to fit the required number of units in each direction and if too small, the sides of the units will chafe. This chafing causes the wrappers to become scuffed off in transit.

COMMON PULP FORMS

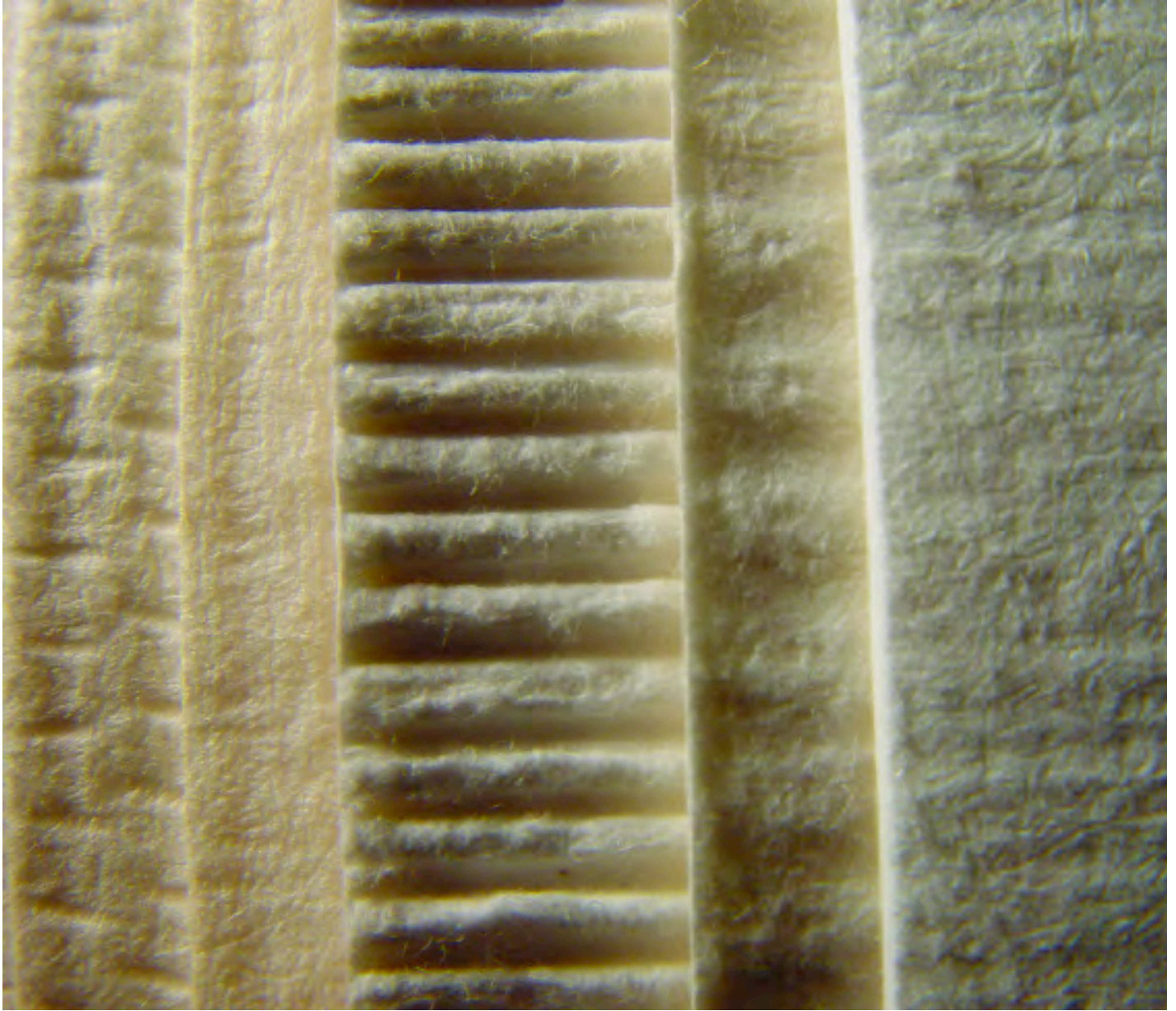
100% Air Dry. This is the term for pulp that is dried to approximately 10% moisture. This pulp commonly goes to market in the form of sheeted bales weighing 250 kg, wrapped with a repulpable wrapper usually of the same grade pulp and secured with 2 or 4 steel wires. When exported, eight bales are secured with six or seven strands of heavier steel wire creating a "unit" weighing approximately 2 metric tons (2200 lbs. = 1 metric ton).

Roll (or Reel) Pulp. The most common grade is fluff pulp for diapers, adult briefs, incontinent pads and feminine hygiene products. Most non-traditional uses for market pulps are shipped in rolls (reels) and often go through a comminution process to shred, cut or defiber the pulp. In most cases roll pulp is drier than baled pulp, often being dried down to as little as 5% or 6% moisture.

Air Dry Allowance. Since the mid 1940s it has been an accepted industry standard to invoice customers for an inherent 10% moisture in the pulp. This is known as *100% Air Dry*. A metric ton of pulp therefore is only about 2000 lbs. of pulp, the other 200 lbs. being water. This 10% water is necessary to minimize the fiber-to-fiber bonding within the pulp sheet and to permit the pulp to disperse quickly



Chapter II



PHOTOGRAPH BY ROBERT HILLS

The Variety of Market Pulps



In this chapter the various grades of market pulp are discussed, with an elaboration on their distinctive features and distinguishing attributes. Since these pulps are generated in more than 20 countries, links to the appropriate country and regional maps are provided by clicking on the subhead (also see [Pulp Atlas/Chapter 7](#) for additional information).

I. Northern Bleached Softwood Kraft (NBSK)

This grade is, by far, the most diverse of all the market pulp categories. Its diversity can be traced to three root causes: climate, geography and the fiber species' morphology.

Climate. A good contrast in climate effects is found in the cedar, Douglas fir, hemlock, larch and spruce trees that grow along the coastal region of British Columbia, which benefit from an almost year-around growing season due to the mild climate caused by the Japanese equatorial current. The old growth trees here have been known to have longer fiber lengths and larger diameters than anywhere else in the world (with the exception of California redwood).

At the other end of the spectrum are the pine, spruce and larch trees that grow in northern Siberia, where the growing season is as short as four months and the winters are extremely harsh. These fibers tend to be somewhat shorter and thinner than those found in NBSK pulps from Europe or Canada.

Geography. The eastern slope of the Rockies, with elevations reaching 10,000 feet, has been called the most hostile growing area in North America, with wintertime temperatures of -40°C, only 13" of annual rainfall and only a thin layer of topsoil from which to draw nutrients. The trees on these slopes grow in spite of the environment rather than because of it and, in so doing, develop fibers with extremely high tensile strengths.

Morphology. Fiber species also differentiates one NBSK pulp from another. Cedar and Douglas fir are two of the best examples.

In cedar's case, fiber walls are very thin, giving it a very low specific gravity of .28. Douglas fir, growing alongside the cedar trees in coastal British Columbia, has the thickest fiber walls of any northern conifer, giving the wood a specific gravity of .54. Only (southern US) slash pine's .56 is higher.

COASTAL BRITISH COLUMBIA

The species of trees in this region include Douglas fir, cedar, hemlock, larch, Sitka spruce and white spruce. The old-growth trees, especially hemlock, display marked differences from second-growth trees. Hemlock fiber's wall thickness, for example, in second growth trees is considerably thicker than in old growth. Environmentalists have been very active over the past two decades in greatly reducing (and almost eliminating) all logging of old-growth and rain forests. In some cases this has required the pulp mills to extend their logging operations farther and farther from the mill site and to purchase chips from distant sawmills. As a consequence, the pulp mills in B.C. have some of the highest wood costs in the world. The considerable diversity between cedar and Douglas fir has caused the coastal pulp mills to segregate these two species and to create two different pulp grades. Cedar has long been a favorite of papermakers who require high fold properties and a pulp with a prompt response to refining. In both cases, cedar excels. Douglas fir fiber, with its higher bulk and openness, has been used in toweling and some latex saturating applications. More recently, though, it has come to be specified by those customers producing cement products because of its high zero span tensile strength and exceptional reinforcing properties. Hemlock, lacking the properties that have made cedar and Douglas fir popular, has been used successfully in the production of dissolving pulps for rayon viscose.

With the cost of rail transportation making shipments to eastern Canada and the US almost prohibitive, the coastal B.C. mills have chosen to find markets best served by sea. Attractive ocean freight rates helped these mills develop extensive markets in all the Pacific Rim countries. In 2004 it was possible to ship to Japan, Korea and China for as little as US\$35-40/mt. And, on top of this, container rates for a while were even lower when the supply of empty containers became a pressing problem. Unfortunately, this proved to be only a temporary situation.

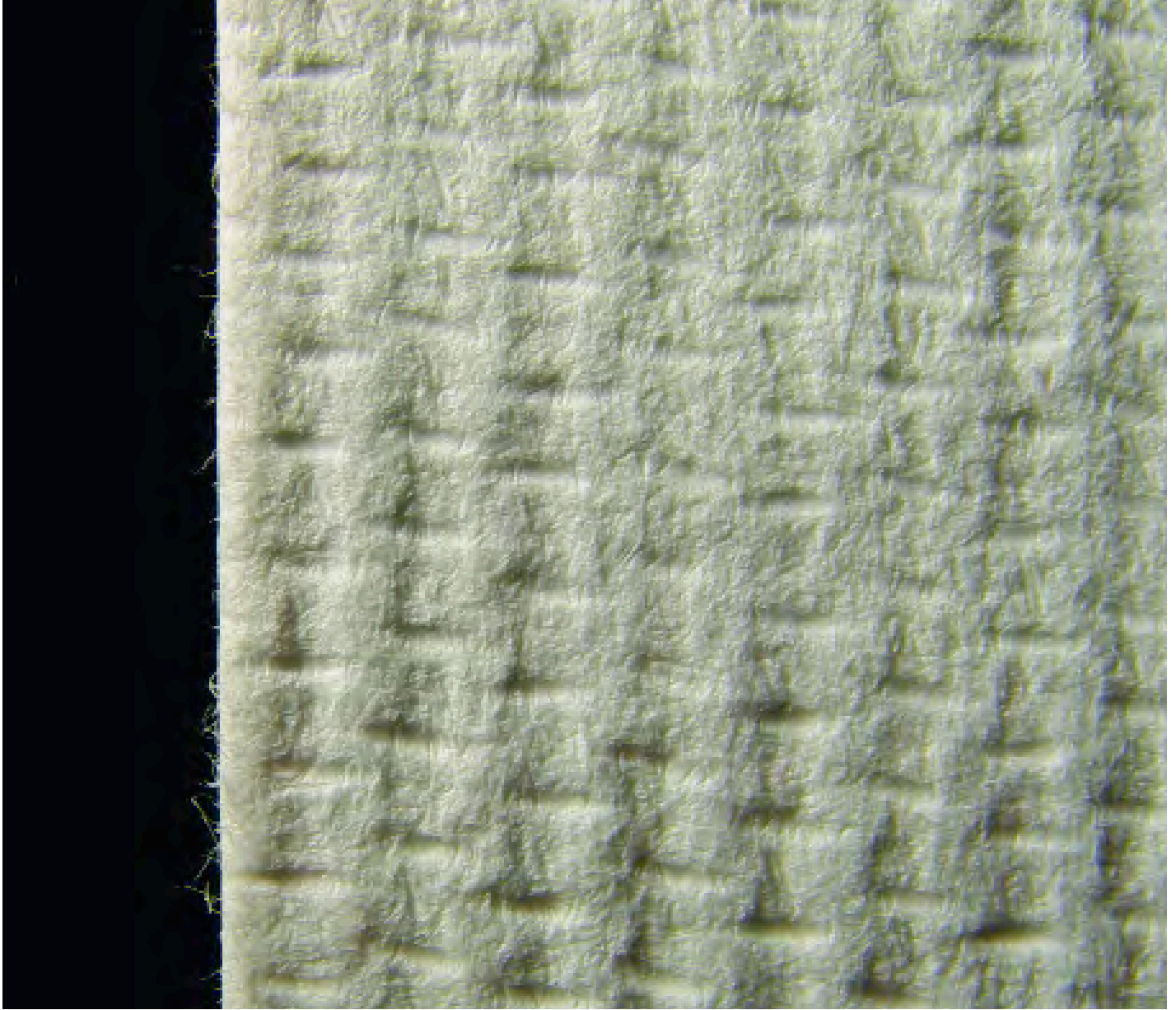
INTERIOR BRITISH COLUMBIA (THE MACKENZIE VALLEY)

This long valley runs the length of the province between the coastal range to the east and the Rockies to the west. The region is populated by a great many species of conifers



Chapter III

PHOTOGRAPH BY ROBERT HILL



Selecting Market Pulps



Part I: How to Select Market Pulps for Various Applications

APPLICATIONS OF PULP FOR PAPERMAKING

Most papers are made from a combination of long fiber softwood and short fiber hardwood pulps. Within the softwood pulps there are primarily two types, northern and southern. Southern pulps are mostly produced from southern pines and radiata pine (which is actually a transplanted northern pine, Monterey pine). Northern softwood pulps are produced from a wider variety of species (northern pines, spruces, firs, hemlocks, cedars, Douglas fir and larches). Northern pulps constitute a major part of the world of market pulp and serve, in the following discussion, to illustrate many of the aspects of pulp applications for papermaking. Hardwood pulps are from a much more diverse group of species as is illustrated below. A third pulp category is the high yield BCTMP, which has its own unique balance of properties for both hardwood and softwood species.

Northern Bleached Softwood kraft (NBSK) market pulps are used primarily as reinforcement fiber in paper grades such as newsprint, supercalendered (SC), coated mechanical fiber (LWC, MWC and HWC), coated freesheet, specialties and tissue, towel and napkin. NBSK pulps are used at levels ranging from as low as a few percentages in some newsprint to approximately 35% in the ultra lightweight coated (ULWC) papers, coated freesheet and tissue, towel and napkin grades, and up to 100% in some specialty grades. NBSK provides a long, strong fiber network to increase wet web strength and runnability on the paper machine, printing press and other converting operations.

The wood species used in bleached hardwood kraft (BHK) market pulps range from 100% aspen, maple or birch to mixed northern or southern hardwoods and 100% eucalyptus. BHK pulps are used primarily for their ability to provide better formation, smoother surfaces, finer pore structures and higher opacity. In tissue and napkins, they provide softness and a velvety surface feel. They are used in most paper grades, except mechanical fiber papers, at levels that range up to 100%, but they are more typically 50% to 80% of the fiber furnish. Since market pulps are classified into various categories based on the type of fiber, pulping process and degree of bleaching, this often leads to pulps in a category (NBSK, for example) being treated as a

commodity. On closer examination of the properties of the NBSK pulp category in the **World of Market Pulp Atlas (Chapter 7)**, however, one finds that there is considerable difference in fiber morphology and performance capabilities. This provides an example of how improved performance and reduced cost may be realized from proper analysis of market pulp characteristics.

DIFFERENCES IN PULP PROPERTIES

Figure 3-1 {NBSK Tbl vs revs} shows that net refining energy is as much as 70% less for the best pulp to reach the same intermediate level of tensile breaking length (8 km). At that tensile, even **Atlas Pulp No. 6** (a sawdust containing pulp) is excluded, tear values can be as much as 67% higher (**see Figure 3-2**) **{NBSK Tear vs Tbl}**, bulk 10% higher and freeness nearly 35% higher for the highest versus the lowest (**see Figure 3-3**) **{NBSK CSF vs Tbl}**. The fiber strength is 25.9% higher for the strongest fiber NBSK pulps compared to the lowest.

In the area of fiber morphology, the longest average fiber length pulp can be 37% longer than the shortest. Coarseness of the finest fiber pulp is 32% lower than the coarsest. The ratio of coarseness to fiber length, a key predictor of reinforcement potential, is nearly 50% better for the lowest ratio compared to the highest, even if we exclude **Atlas Pulps No. 6** and **No. 12**, a flash-dried NBSK (**see Figure 3-4**) **{NBSK C/Lw}**. Depending on the particular paper grade and process capabilities, as this information indicates, it is possible to make significant improvements in product performance by selecting the best NBSK from the commodity pulps available in the marketplace.

While NBSK is a large and fairly diverse pulp group, there are similar relative differences in fiber morphology and performance capabilities within most commodity pulp groups. The broad and narrower pulp groups that make up the bleached hardwood chemical pulp category will be examined later in a look at hardwood pulp for coated freesheet papers.

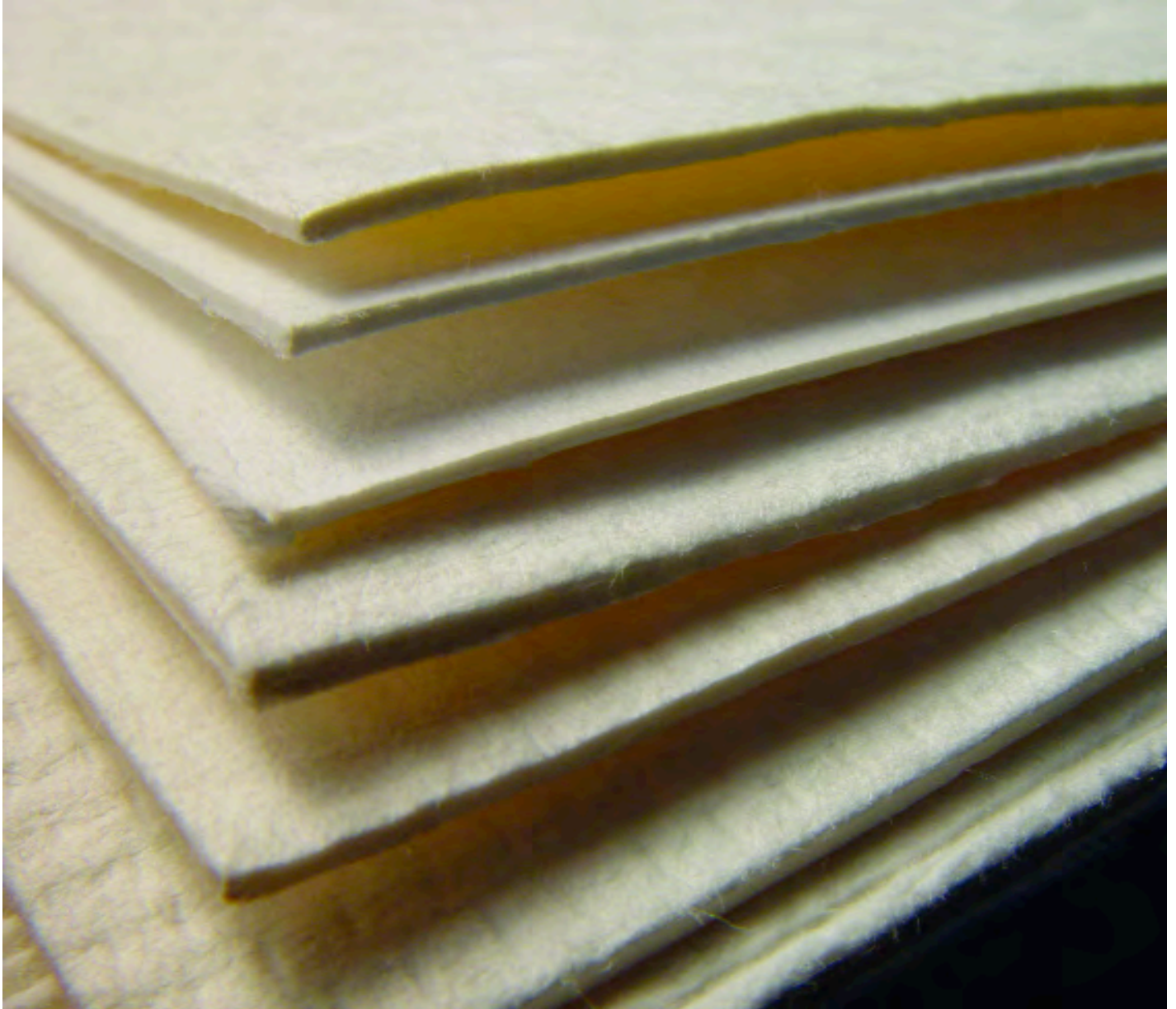
PRINTING AND WRITING PAPERS

Uncoated and Coated Mechanical Pulp Papers

Mechanical printing papers range from low-cost uncoated grades of newsprint and machine finished specialties (MFS) to supercalendered (SC, SC-A, -B, -C) and coated grades of



Chapter IV



PHOTOGRAPH BY ROBERT HILL

Quality Aspects of Market Pulps



Part I: What Affects the Quality of Market Pulps?

In previous chapters the wide variety and range of pulps available in the market were presented. This chapter examines key pulp characteristics, primarily from the perspective of what influences the morphology of the fibers. Among the most obvious of these influences are the species of the trees or nonwood plants that are processed into pulp.

A major part of this chapter is devoted to the morphology differences among wood fibers. The reasons for this are two fold. First, wood fibers are far and away the dominant source of fiber for market pulp, and, second, morphology is determinant as far as paper structure is concerned. Beyond considering pulp in broad commodity classes (NBSK, NBHK, etc.), the paper industry has given morphology little consideration.

This section will review the many facets of fiber morphology that control the papermaking potential of a pulp and determine the stability of that potential over time. After the morphology discussion, some of the process variables that are the keys to realizing the performance inherent in the wood fibers will be highlighted.

INFLUENCE OF TREE AND NONWOOD PLANT SPECIES: FIBER POPULATION

By far the biggest factor in a market pulp's qualities is whether hardwood or softwood was used to produce the pulp. The huge difference between these two major groups is best illustrated by the consistent difference in their fiber populations. As **Figure 4-1 {Soft & Hardwood FF Population}** shows, fines-free softwood market pulps range from 2.3 to 5.2 million fibers/g, while fines-free hardwoods range from 9.8 to 27.6 million fibers/g. This fundamental difference can be visualized by considering that for every fiber in a sheet of paper made from softwood pulp, there would be, on average, five fibers if the paper was made from hardwood pulp.

SEMs of the surface of handsheets made from an NBSK, Atlas Pulp No. 8, and a flash-dried BEK, Atlas Pulp No. 36 (**Figure 4-2A**, right top, and **Figure 4-2B**, right bottom, respectively) further support this picture. Given the sharp difference in the paper structure that these two groups of pulp produce, it is not hard to understand why most papers are made from a mixture of hardwood and softwood pulps.

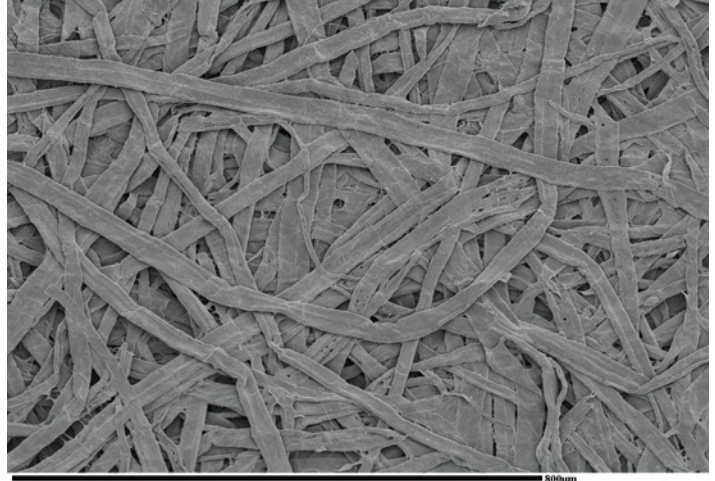


Figure 4-2A

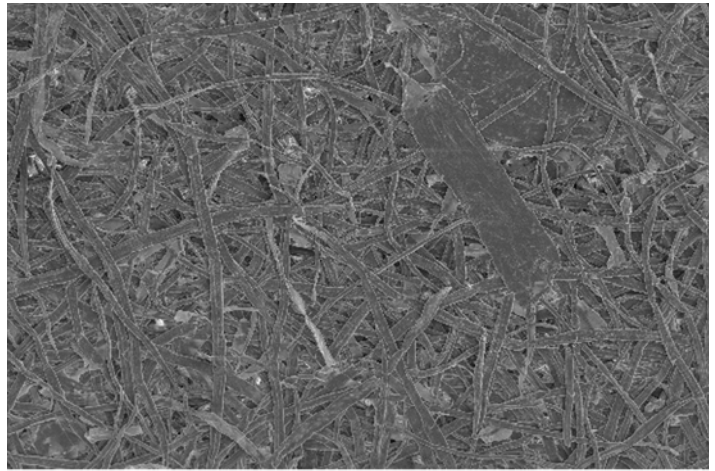


Figure 4-2B

FIBER LENGTH

These population patterns result from consistent differences in fiber length and coarseness. In both of these measures of fiber morphology there is a distinct separation. The average length-weighted fiber length (L_w) of the softwood chemical pulps in **Figure 4-3 {Softwood & Hardwood Fiber Length}** range from 1.8 to 2.7mm, while the shorter hardwoods range from 0.58 to 1.1 mm. These data show that softwoods are, on average, approximately 2.5 times longer than hardwood fibers. The implications of these



Chapter V



PHOTOGRAPH BY ROBERT HILL

How to Evaluate Market Pulps



Chapter 5: How to Evaluate Market Pulps

This chapter focuses on the process of evaluating pulp in general and market pulp in particular. It is common for the evaluation process to be either minimal, or excessive to the point that it includes a refiner curve (obtained by at least one of several methods) with handsheets evaluated by every traditional test in the lab. The over-evaluation can include fiber measurements by optical and screen classification methods, water retention values, air dry percentage, dirt count, species, cationic demand, stickies (in recycled pulps) and freeness. A minimal evaluation might include the commodity pulp type, brightness and dirt level.

Which approach is appropriate? The answer is that it depends on the process and product application, but it is likely that neither is what is needed. A minimal evaluation is not sufficient, because, as shown in the pulp testing database, there can be major differences within commodity pulp categories. Extensive testing, in addition to being costly, may actually provide so much data that the analysis will lack the clarity needed for good decision making.

To get the most useful outcome, tests should be selected for their reflection of the key fundamental pulp properties that are relevant to the intended use. The following text discusses testing principles, pulp attributes to be measured, testing methods and an efficient, effective evaluation process. It is presented from both the pulp producer and papermaker perspectives.

I. TESTING PRINCIPLES

A. Why Should We Test?

Pulp producers should test their pulp primarily to avoid loss from an out-of-control process; i.e., to avoid producing pulp that will not be saleable or meet customer needs in use.

Testing provides data for control of the production process and for sharing with customers to assure them that the pulp they receive is from a stable process and meets their needs. Testing of finished pulp should not be utilized in a “quality-by-inspection” approach to meeting customer needs. The regime chosen should include only those tests providing data that will be acted upon, either for control of the process or to meet the information needs of the customer. Collection of testing data that will not be utilized is a waste of resources.

Pulp users can start the evaluation process by comparing supplier data. It’s rare, however, to find comparable tests and testing standards from different pulp sources. In addition,

most pulp supplier data are based on traditional testing. It is necessary, therefore, that pulp users generate their own data in a consistent manner. The set of pulps being tested should, if possible, include a pulp with performance known in the user’s system and products. There is also value in periodic pulp testing by the user to supplement the data pulp suppliers provide and maintain the connection between the evaluation process and pulp performance.

B. Where Should We Test?

Pulp producers have two principal, somewhat divergent, needs to address in deciding where to test. There is the immediate need of testing for process control and longer-term need for data to transmit to pulp customers. The need for rapid, minimal, but sufficient testing can be reasonably filled only by well-trained operating personnel and/or an in-mill laboratory. Testing cycles, from sample collection to actionable data, probably need to be less than one hour in duration. Measurement procedures need to be within control and have minimal variation. This can often be best achieved by testing with in-line sensors and automated sampling and testing equipment. This information is most beneficial if it is combined in a multivariate predictive model of the process and pulp properties.

Testing to provide data to pulp customers involves primarily finished market pulp. It is historical in nature and should confirm that the pulp the customer receives came from an in-control process and is performed by a single laboratory. The laboratory could be at the mill site, a central company location or at an external pulp testing service. Measurement control procedures need to be employed, as elaborated below.

Pulp users should have all testing performed by a single laboratory, if possible. A review of TAPPI testing procedures clearly shows that the differences in testing results from two or more laboratories can be great. An example is given in the precision statement of TAPPI test T494 om-01¹ for the measurement of tensile properties of paper and paperboard. It shows measurement repeatability for one laboratory ranging from 5% for tensile strength up to 16% for TEA. When these same samples were tested in 20 different laboratories the variation in test result increased to a reproducibility ranging from 10% for tensile up to 36% for TEA.

Since fiber is typically about 40% of the paper cost, it’s important to know the value of competing pulps as precisely as possible. Testing variability, therefore, must be



Chapter VI



PHOTO COURTESY CELSO FOELKEL

Essays on Market Pulp



The Market Pulp Industry in Retrospect

By Dave Hillman

There is very little documentation concerning the global market pulp business prior to World War II, but it can be imagined that it took place on a very limited scale and shipping was restricted to relatively short distances from the producing mills. Eastern Canadian pulp producers shipped to the New England and upper Midwest states while Scandinavian mills shipped primarily to the European continent. Of course there were exceptions; Swedish and Finnish Birch was highly regarded by the US papermakers in New England and Scandinavian NBSK was shipped to southeast Asia and the Pacific Rim countries, but not in large quantities.

Buyers and sellers tended to maintain close long-term relationships. Producers did not seem especially anxious to penetrate new markets since this would have involved different currencies, import regulations, unknown buying practices, etc. Everyone's comfort level was maintained by simply selling all the available tonnage into traditional, established markets where trusted local agents understood the business.

During the 1950s, producers began to build new mills to supply the growing markets in eastern Canada, the northern part of the USA and throughout Europe. As time passed these mills began to expand their outreach to southeast Asia and the Pacific Rim countries. Except for South Africa there were few markets in the Middle East or Africa.

Shipments of pulp were handled by regular commercial freighters since the tonnage did not warrant building vessels specifically designed for break-bulk shipments of market pulp. Loading and unloading facilities were, by today's standards, quite primitive. As the US and European economies grew, so did their appetites for magazine paper, newsprint, printing and writing grades, OTC, and a wide variety of specialty grades such as cable wrap, glassine and greaseproof papers, single service bakery products, etc. The high purity sulfite mills were kept busy making high alpha dissolving pulps for rayon producers for fabric and tire cord, for photographic coatings, nitrocellulose gun-cotton, cellophane and cellulose derivatives such as CMC, HEC and MEC.

It was obvious that the demand for higher and higher

quality virgin market pulp was going to continue to grow, so more and more mills were built. The province of British Columbia proved to be many companies' first choice for mill sites. There were mature forests of high quality wood that seemed to go on forever, fresh clean water was abundant and ocean shipping ports were close by in Vancouver. In the southern part of the USA, most of the mills built during this time were completely integrated, with production of the pulp and paper mills in balance. To these mill owners, it seemed to make much more sense to sell a finished product at higher prices (and greater profit) than to simply sell a raw material for someone else to convert a value-added product. The Scandinavian paper industry, on the other hand, had to think in terms of market pulp since continental Europe offered the expanding potential of state-of-the-art, newly built paper mills. The market pulp industry at that time began to take on an identity and to refer to itself as NORSCAN. In the beginning Canada, the USA, Sweden and Finland made the vast bulk of the shipments. Norway had very little to contribute in those early days.

With large amounts of capital dollars not nearly as readily available as they are today, these new mills were kept in size to a rather moderate scale. Most mills built in the 1950s and 1960s were designed to produce 500 or perhaps 750 mtpd. Each mill coming on stream only contributed about 250,000-260,000 tons to the world's total capacity. This new pulp was quickly absorbed by both new and rebuilt paper machines so that the supply and demand balance was maintained just as if it had been regulated — which it wasn't. From the close of WW II until the oil embargo of 1973, the price of pulp remained amazingly constant. NBSK sold for US\$135/admt and NBHK sold for US\$120/admt — a \$20/admt spread. A new market pulp mill would start up and be accompanied by the simultaneous startup of 3, 4, 5 or 6 paper machines. There seemed to be no shortages and no build up of inventories. Today, by comparison, the three new greenfield mills slated to start up in the fourth quarter of 2004 will be introducing, respectively, 800,000, 895,000, and 1 million mtpy. These truly are "world class mills" not only for their production rates, but also for their use of cutting edge



technology, effective use of nearby forests or plantations, and, most especially their high level of environmental compliance. As late as 1993 the two (then) “world class” mills which started up in the province of Alberta were each slated to produce 700,000 mtpy.

During the 1950s and 1960s, all market pulp was sold through agents. The North American agents were almost always headquartered in New York City and handled waste paper, ONP, OCC, cotton trimmings from textile mills, etc., as well as a variety of market pulps from as many as a dozen kraft and sulfite producers. During these years there was a huge demand for premium quality cotton-content papers.

The agents in those days, as today, usually were paid a commission that amounted to 2% of the mill’s net price (after all the freight costs were paid). Of course, if the agent was willing to accept the credit risk (known as “del credere”), he might be paid 3% or even 3½%. While 2% may seem quite low, it must be remembered that the tonnage levels were considerable.

As an illustration, a typical customer in those days might buy 10,000 mtpy of NBSK at \$135 less 2% discount. Discounts fell into three categories: (1) a large tonnage discount, (2) a three-year contract discount and (3) a fidelity discount for consistent/long-term loyalty). Taking into consideration the discount, the selling price then became \$132.35 and from this came the freight cost of delivering the pulp to the customer’s mill. A market pulp mill’s list price always included “full carload freight allowed,” which meant that it was to the customer’s advantage to buy in full carload lots. Buying only a 20-mt truckload meant that the customer had to pay the difference in freight costs. For example, it might have cost the mill \$700 to deliver a 70-mt carload in those days, which worked out to a per-ton cost of \$10. The truck cost (containing 20 mt) might be \$250 or \$12.50/ton. The paper mill would then have to pay the difference to the producer — a total of \$50. These numbers are used simply to illustrate the point being made and should not be construed as reflecting actual freight costs back then.

Another illustration that might be helpful to understand the way business was conducted when all pulp was sold through agents, is the traditional contract-signing trips that took place every three years. A New York-based agent’s vice president or executive vice president might travel to Kalamazoo, Michigan, or Appleton, Wisconsin, and spend a week at one of the major hotels. His regular pulp buyers would have been invited to join him for either a breakfast, lunch or dinner (depending upon their buying levels). As many as 15–20 meetings would be held that week at which three-year contracts would be signed there at the table. Discounts were discussed, tonnage levels established and

grades of pulp outlined. Prices seldom came up because they were so constant. By today’s standards it is difficult to imagine business being handled in that manner.

In the late 1960s some market pulp producers decided they could handle the larger accounts themselves (and save the 2% commission as well) so they began to set up their own sales offices. Appleton, Kalamazoo and the Miami Valley in Ohio were favorite locations. Agents were given a severance package that sometimes meant receiving the regular 2% commission for one to two years for all the pulp sold directly by the producer. In other cases the agent was allowed to keep all the smaller accounts or those located in out-of-the-way places.

As time went on, as companies started up new mills and as mills increased their production levels, it began to make more sense for producers to have their own sales staffs for all market pulp sales. Agents began to dwindle in number and to contract. Some, however, having adequate financing, were able to begin to act as brokers and to perform a valuable function for smaller customers or customers who were able always to pay within the required 30-day period. These agent-brokers were able to purchase large blocks of tonnage at discounted prices and resell it in smaller blocks at higher prices — often accepting extended terms from buyers who may have had credit problems.

In the 1990s, widespread consolidation resulted in a significant reduction in the number of independent pulp producers and market pulp sales people. Many familiar names disappeared from the list of market pulp producers: Brown Co, St. Regis, Crown Zellerbach, Great Northern Nekoosa, Federal Paperboard, Hammermill, Union Camp, Champion International, Chesapeake Corp, Allied Paper, and REPAP. While this is not a complete list, it illustrates the breadth of the consolidation. Added to the reduction in producers for the market was the extent to which many integrated mills increased their paper production and thus began to use 100% of their pulp production. The expansion of paper production in the southern USA has greatly reduced the sheeted bales of market pulp shipped each year. This has been somewhat balanced by the growth in fluff pulp shipments, now is estimated at over 3½ million mtpy. Thick-walled southern slash pine appears to be an ideal fiber for use in diapers (nappies), adult briefs, incontinent pads, and feminine hygiene products, as well as airlaid non-wovens.

With a career spanning 30 years, Dave Hillman (dhillman87@juno.com) is an internationally recognized Market Pulp Consultant who specializes in determining an individual fiber’s attributes/distinctive features and then relating them to its most appropriate end use application.

