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SHORT FIBERS IN COTTON If the millions of fibers in a bale of cotton were all exactly one-half inch in length, by definition the short fiber content would be 100 percent. The length uniformity index would also be 100 percent.

Beginning with that profound statement, we would like to review some observations on short fibers and their relationship to length uniformity in a given cotton. We are doing this because several friends have recently expressed their thoughts on the value of a short fiber measurement and the effect short fibers have on spinning performance and yarn quality.

Short fibers have been defined as those that are one-half inch (12.5 mm) in length or shorter. The measurement of these can be made by a Suter-Webb array, the Peyer AL-101 instrument, and the Fibrograph. One immediate observation made when studying fiber length is the inverse relationship between short fibers and length uniformity. When one goes up, the other is expected to go down (except in the hypothetical case presented at the beginning of this article). An impressive report on this was prepared by Dr. H. H. Ramey, Jr., Chief of the Standards and Testing Branch, Cotton Division, of the United States Department of Agriculture, Memphis, Tennessee. Dr. Ramey sent us a summary of his report in April 1986, and we feel his statement is still very appropriate for consideration at this time. Therefore, we are presenting part of it below and on the next page.

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"There should be a relationship between the short fiber content and the fiber length uniformity index based on the ratio of mean length to upper half mean length. As short fiber content increases, the uniformity index should decrease. This should also be true of the uniformity index based on the ratio of the 50 percent to the 2.5 percent span length. However, comparisons of the span length ratios can only be made within very narrow ranges of 2.5 percent span length. For samples in which all the fibers are the same length the maximum uniformity index based on span length is 51.3 when the fibers have infinite length, but increases from this value when shorter fibers are considered. This is not the case for the uniformity index based on the mean and upper half mean lengths where the maximum value is 100 for all lengths of fiber.

"Data from tests on 27 bales of staple length standards can be used to show the relationship of short fiber content and fiber length uniformity as reported from high volume instruments (HVI). Ranges of the data are:

Fiber Measure	Minimum	Maximum
Staple (32's)	26	40
Array Upper Quartile Length	.866	1.414
MCI HVI Length	.838	1.248
Peyer Almeter Upper Quartile Length	.750	1.290
MCI HVI Uniformity	79.3	83.5
Array Short Fiber Content	4.4	19.2
Peyer Almeter Short Fiber Content	2.9	27.6

"The simple correlation coefficient between uniformity index and array short fiber

content is r = – 0.95 and between uniformity index and Peyer Almeter short fiber content is r = –0.93. These correlation coefficients approach unity and suggest a strong relationship between short fiber content and uniformity index.

"These data indicate that UI is a meaningful measure of cotton fiber quality and can be just as important as array SF in predicting processing performance and some yarn quality measures. For the other yarn quality measures array SF is no better predictor than UI.

"The industry should consider making immediate use of the readily available UI and not strive for the difficult to measure short fiber content. Some consideration should be given to whether UI should be reported in tenths of units instead of whole numbers as is the case now."

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We thank Dr. Ramey for permitting us to publish a portion of his report.

In our studies here at the International Center, we have collected data that include fiber length and uniformity when testing the cottons included in our annual Texas Cotton Quality reports. We have found an interesting relationship between the length uniformity and short fiber percentage resulting from tests made on the Peyer AL-101. (The uniformity index was obtained by dividing the mean length of each cotton by the upper quartile length, also measured by the Peyer instrument.) The relationship between these two measurements has a correlation of r = – 0.90, which is very near the coefficient given in Dr. Ramey's report.

The following tabulation presents the results of testing the cottons included in our 1986 and 1987 Texas Cotton Quality Evaluations. We feel these data offer an interesting example of the inverse relationship between length uniformity and short fiber content.

Percent Uniformity	Percent Short Fiber	Percent Uniformity	Percent Short Fiber	Percent Uniformity	Percent Short Fiber
83	8.4	82	14.0	77	22.1
81	12.0	83	10.6	77	21.0
81	16.7	80	12.3	77	19.0
83	13 3	82	10.2	78	19.8
80	16.1	81	11.1	78	20.5
83	7 3	80	13.1	75	25.2
82	12.1	80	15.4	75	23.6
81	11.6	81	16.5	77	20.3
79	19.0	76	29.8	77	24.6
82	12.9	80	12.5		
78	20.2	80	12.3		

As mentioned, the uniformity percentages shown were established by using the mean length and upper quartile length determined by the Peyer AL-101. Also, the percent short fiber was measured by the same instrument.

A telephone call to the Peyer Corporation office in Spartanburg, South Carolina, has revealed there are sixteen of their instruments located at various places in the United States. Three of these are at USDA research laboratories, one here at the International Research Center, and one at another research institution. The eleven remaining instruments are owned by textile companies, and they can readily obtain short fiber content of the cottons they use. For everyone else, however, it seems the best thing to do at this time would be to follow Dr. Ramey's suggestion and use a length uniformity measurement as an aid in predicting some yarn quality characteristics. We feel, in view of the fact that USDA instrument classing does not include short fiber content, the uniformity of the cotton length can be helpful.

We are aware that some textile companies are now specifying length uniformity limits when buying cotton, and it may be that this will become as much a part of purchasing considerations as length, micronaire, and strength.

TEXAS NATURAL FIBERS A major objective of the International Center for Textile Research and Development is to conduct research on the three natural fibers produced in Texas to promote the greater utilization of them. These fibers are important to the economy of the State, for their total value each year is substantial. The amount of fiber produced varies from year to year, but Texas consistently produces a significant portion of the annual United States total. Normally, we produce about one-third of the U.S. cotton, around twenty percent of the country's wool, and more than ninety percent of the mohair.

A close approximation of production and value of the Texas cotton, wool and mohair in 1987 is given in the following tabulation:

Fiber	Amount	Value
Cotton	4,700,000 bales	$ 1,200,000,000
Wool	16,300,000 pounds	$ 19,700,000
Mohair	16,200,000 pounds	$ 42,600,000
	TOTAL VALUE	$ 1,262,300,000

The value of the wool shown above was calculated before the current price surge. With wool now selling at a much higher price, the value of the 16 million pounds would be something around $35 million to $40 million. Even with the value calculated at the end of 1987, however, the three natural fibers still made a substantial economic contribution to the State. When considering the total value, it becomes obvious why the International Center for Textile Research and Development has been given the responsibility for promoting the greater use of these fibers.

WE NEED YOUR HELP *Textile Topics* is mailed to more than 2,000 recipients on every continent except Antarctica. With such a broad distribution, it is impossible to keep our mailing list 100 percent accurate, but it is our aim to be as efficient with this as we can. From time to time we receive notices from our readers stating that someone has retired, or requesting that we add a name to the list. We appreciate this sort of help. What we do not want is to send *Topics* to persons who are not interested in it or have moved from the address we have for them.

We are requesting your help to notify us when there is a change in an address in your organization, or a change in personnel. Naturally, we prefer to add a new name rather than delete one, but we will appreciate hearing from you in either case. Not only will this help us keep our mailing list more accurate, but it may also reduce the cost of printing and mailing *Topics*. We publish this newsletter at no charge to recipients, and we would like to keep our expense as low as possible.

VISITORS Visitors at the Center during May included John Rodriguez, J. G. Boswell Co., Corcoran, CA; Diana Landes, Northglenn, CO; Edward S. Owen, American Savio Corporation, Charlotte, NC; Floyd W. McAlister, New Mexico State University Extension Service, Portales, NM; Lloyd L. Call, Board of Economic Development, Portales, NM; Roy Cahill, Southwestern Public Service Co., Portales, NM; Christopher J. Lupton, Texas A&M University, San Angelo, TX; Dan Stokes, Rieter Corporation, Spartanburg, SC; Rudi Scheidt, Hohenberg Bros. Co., Memphis, TN; H. Duanne Littlefield, Allied Fibers & Plastics, Columbia, SC; and Kurt Masurat, Goulston Chemical Co., Monroe NC.

Also visiting were Dr. Garth Carnaby, Wool Research Organization of New Zealand, Lincoln, New Zealand; Roger van Glabeke, COTRACO Textiles BVBA, Gent, Belgium; and Kyung-Baek Kim and Jeung-Kil Kim, Ilshin Spinning Co., Ltd., Seoul, Korea.

In addition to those listed, more than 300 students from area elementary and secondary schools, colleges and universities have come to the Center during these closing weeks of the regular school year. We are always pleased to have such groups visit us.