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ROTOR SPINNING OF AMERICAN COTTONS (Part II) In the previous issue of *Textile Topics*, we presented the first part of a report on research that evaluated the rotor spinning performance of cottons from four major production areas in the United States. The study was sponsored by W. Schlafhorst Company, Monchengladbach, West Germany, and American Schlafhorst Company, Charlotte, North Carolina. In the introduction, we mentioned that the complete report was too extensive to carry at one time and we would serialize it in four issues of *Topics*.

Therefore, this issue includes the second installment, which is an immediate continuation of that given last month. To obtain the full report, our readers will need to receive and retain the various parts in proper sequence. We encourage anyone who fails to receive any part to contact us, and we will be pleased to send the missing portion.

With this background, we continue the report entitled "The Suitability of Certain American Cottons for the Production of Fine Count Rotor-Spun Yarns."

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After all preliminary trials, which also included optimization of winding tension and other machine settings, the following spinning specifications evolved (see Figure 7 below).

FIGURE 7: FINAL AUTOCORO SPINNING SPECIFICATIONS

Type Cotton	California Delta Texas			Pima		
Yarn Count Ne	30	35	40	30	35	40
For a Filling Yarn						
Rotor Type	G 33 D			G 33 D		
Rotor Speed rpm	90,000			100,000		
Combing Roll Type	OB 20			OB 20		
Combing Roll Speed rpm	7,000			7,000		
Navel	KN4 + 0			KN4 + 0		
Twist TM	4.9	5.0	5.2	4.9	5.0	5.2
Delivery in yds/min	93	84	76	103	93	84
For a Warp Yarn						
Rotor Type	T 33 D			T 33 D		
Rotor Speed rpm	90,000			100,000		
Combing Roll Type	OB 20			OB 20		
Combing Roll Speed rpm	7,000			7,000		
Navel	KN4 + 1.5			KN4 + 1.5		
Twist TM	4.9	5.0	5.2	4.9	5.0	5.2
Delivery in yds/min	93	84	76	103	93	84

It is to be noted that the major difference in the spinning specifications for a "filling yarn" and a "warp yarn" is the rotor configuration. The "G" profile is known to produce a bulkier and softer, but also a somewhat weaker yarn than the "T-rotor," whose particular groove configuration results in a somewhat leaner, but also stronger yarn that is particularly suitable for warp.

While the studies used exactly the same cottons, they were run at different times, the G-rotor in late 1986, the T-rotor in mid-1987. Consequently, other minor differences in the AUTOCORO setup are included, reflecting some differences in the state of the art between 1986 and 1987.

5. YARN QUALITY

From complete measurements of the yarn quality achieved in spinning the four different cottons, only the most important are shown in Figures 8 through 13. (See following pages.)

The trends depicted in these graphs involve not only a change in yarn count, but also an increase in yarn twist. The Pima cotton was also spun at a higher rotor speed.

The general trends in yarn properties indicate that yarn strength decreases with increased yarn count (Figures 8, 9). Pima cottons produce the strongest yarns, followed in turn by California, Texas and Delta cottons. The Texas and Delta cottons' yarn strengths were of similar order.

Yarns from Pima cotton had the greatest elongation at break (Figure 10), followed by yarns from Texas, California, and Delta cottons.

The most regular yarns were produced by the longer cottons (Figures 11, 12). The Texas cotton produced a more even yarn than the Delta cotton, probably because of its fineness. Excepting the Texas cotton, therefore, yarn regularity improved with increased fiber length.

Pima cotton produced the hairiest yarns (Figure 13), whereas the California cotton gave the least hairy yarn. In cases other than that of Pima cotton, the hair count of yarn was indirectly related to fiber length.

The influence of cotton on yarn properties merits discussion: the selection of Delta, California, and Pima cottons provided a series of cottons of similar micronaire values whose length and strength increased together. Although the micronaire values of these cottons were similar, there were differences in fineness. The addition of the Texas cotton to the set provided a fiber of similar strength to Delta cotton, although shorter and of lower micronaire value.

The overall trend suggests that fiber tenacity is solely responsible for yarn tenacity. Other studies have shown that yarn strength is also influenced by fiber length and fineness or micronaire value. If this is so, then the similarity in strengths of yarns spun from Texas and Delta cottons must be due to the compensation of the negative influence of yarn strength caused by the shortness of the Texas cottons, by the positive influence of their fineness.

The longer and finer fibers of the Pima cotton were responsible for the superior evenness of yarns produced from such cotton. California cotton produced more regular yarns than Texas cotton, which in turn provided more even yarns than Delta cotton. The superiority of the Texas cotton over the Delta cotton

FIGURE 8: COMPARISON OF YARN SKEIN STRENGTHS

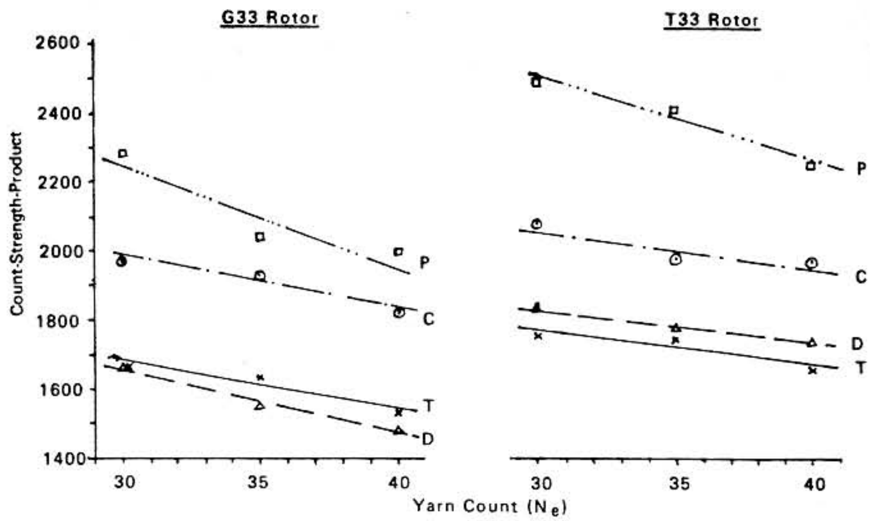


FIGURE 9: COMPARISON OF SINGLE YARN TENACITIES

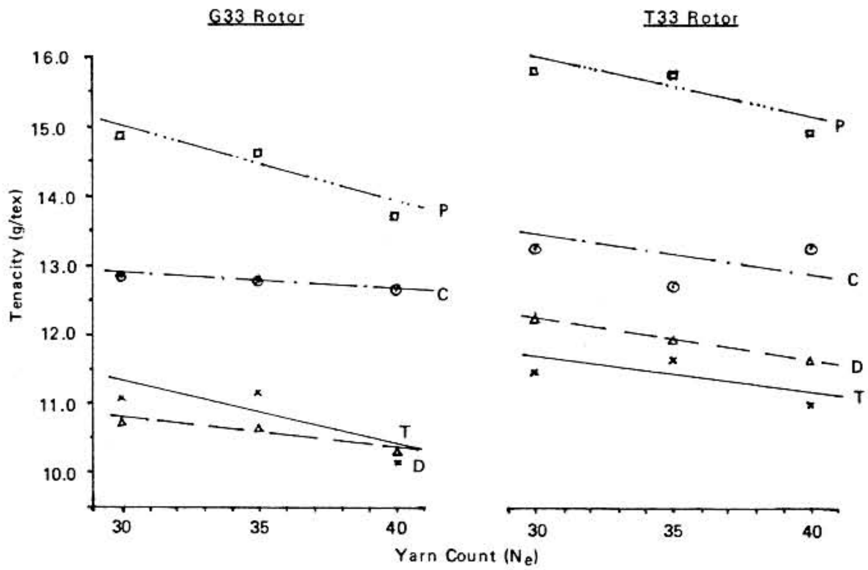


FIGURE 10: COMPARISON OF YARN ELONGATIONS AT BREAK

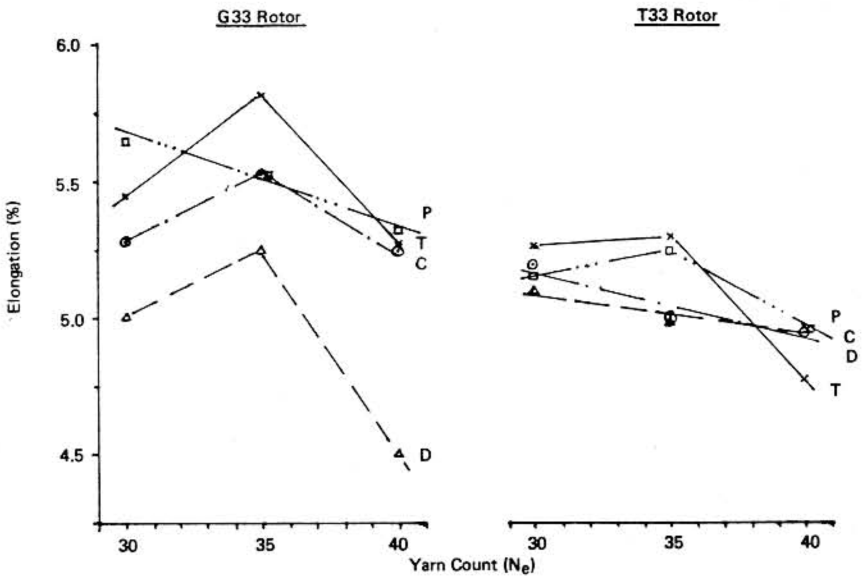


FIGURE 11: COMPARISON OF YARN EVENNESS DATA

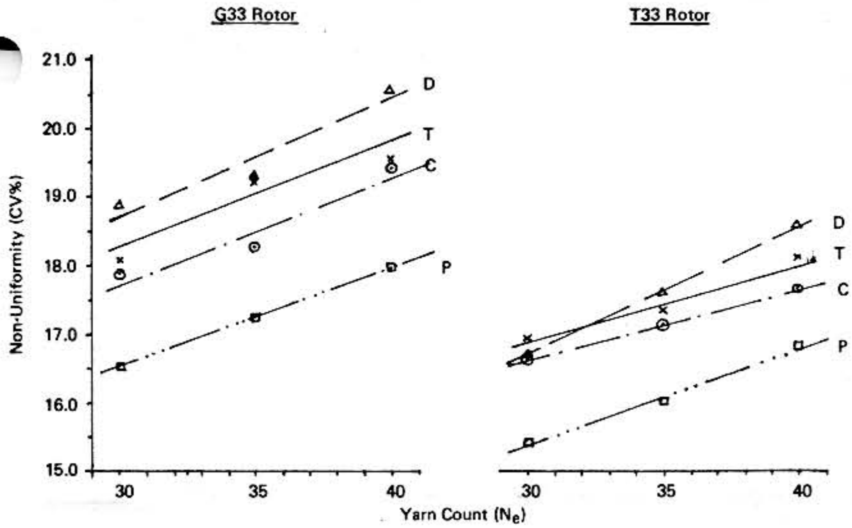


FIGURE 12. COMPARISON OF TOTAL YARN IMPERFECTIONS

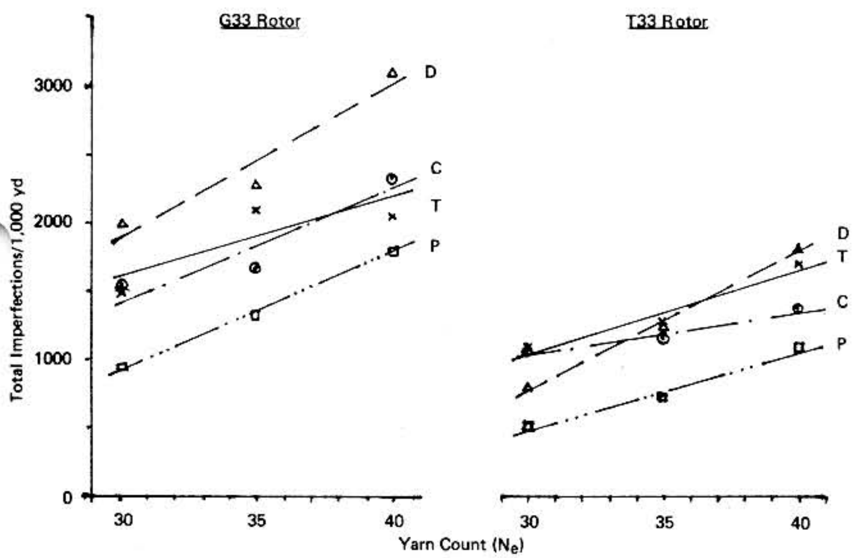
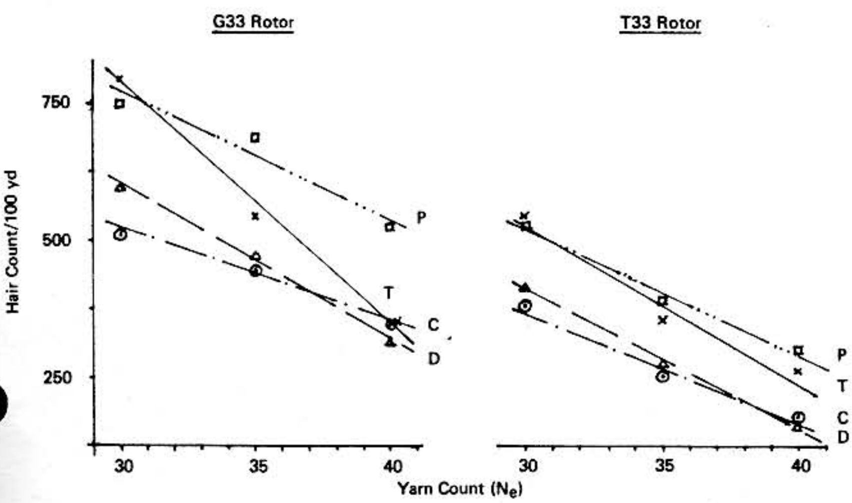


FIGURE 13: COMPARISON OF HAIR COUNTS



in this regard must be ascribed to the fiber fineness, at least in part.

The hairiest yarns were produced by the Pima cotton, followed by Texas cotton. California and Delta cottons produced yarns of similar hair count. The higher hair count of yarns spun from the Texas cotton could be expected from the shortness of fibers, but the high hair count of the Pima cotton could not be so explained.

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We have presented above Part II of this report. Parts III and IV will be given in subsequent issues of *Textile Topics*.

TEXAS STATE SENATE HEARING CONDUCTED AT INTERNATIONAL CENTER The State Senate Agricultural Sub-committee on Natural Fibers held a hearing in the auditorium of the International Center for Textile Research and Development on January 26, 1988. The purpose of the hearing was to gather facts on the natural fibers produced in Texas and the potential for greater utilization of these fibers within the state. At the present time, virtually all the cotton, wool and mohair produced in Texas is sent to other states or is exported to other countries.

Senator Bill Sarpalius of Amarillo is chairman of the sub-committee, and Senator Bill Sims of San Angelo is vice chairman. Also present at the hearing was Representative Dudley Harrison of Sanderson.

A number of area fiber producers and agri-businessmen spoke before the sub-committee, giving testimony on various aspects of Texas natural fibers. Dr. Lauro Cavazos, President of Texas Tech University, welcomed the group and stated the importance of research on cotton, wool and mohair to the state. Others attending and giving testimony were Dr. Walter J. Walla, Assistant Director for Agricultural and Natural Resources, Texas Agricultural Extension Service; Sal Valdez, Director of Agricultural Development, Texas Department of Agriculture; Tommy Fondren, Lubbock-area cotton producer; Carl Cox, Executive Director of the Natural Fibers and Food Protein Commission of Texas; Myrl Mitchell, President of Plains Cotton Growers, Inc.; Glenn Fisher, General Manager, Sonora Wool & Mohair Company; and Gregory Letterman, Chairman, World Trade Council.

We were pleased to have this committee meet at the Center. We extend an invitation to Senators Sarpalius and Sims to use our facilities whenever they schedule a hearing in the Lubbock area.

VISITORS January visitors to the International Center for Textile Research and Development included Helmut Deussen, American Schlafhorst Company, Charlotte, NC; Ludwig Neuhaus, W. Schlafhorst Company, Monchengladbach, West Germany; Dan Stokes, Rieter Corporation, Spartanburg, SC; B. T. Reiser and H. Duane Littlefield, Allied Fibers & Plastics, Columbia, SC; Susan Kerr, Allied Fibers, Petersburg, VA; Roger Bolick, Allied Fibers, Hopewell, VA; Gregory E. Ulvestad, Dameron Manufacturing Corp., Midland, TX; Rodger S. Dameron, Dameron Petroleum Corporation, Midland, TX; Anne McCready and Carl Edwards, Women's Wear Daily, Dallas, TX; Tom Vernon, Burckhardt of America, Greensboro, NC; and Ted Morley, Hohenberg Bros. Co., Memphis, TN.

Also visiting were Margaux A. Beauchamp, Agricorp Limited, Melbourne, Australia; Ernst Rutishauser, Gugelmann & Co. Ltd., Langenthal, Switzerland; Gerard Lombard, Textile Technology Centre, Saint-Hyacinthe, Canada; Joan Gelderman, Cotonniere d'Agence et de Commission, Marcq-en-Barceul, France; and Horst Hasselmann, Ralli Cowatex, Nordhorn, West Germany.

In addition, eighteen students from Southland High School, Southland, TX came to the Center for a fiber-to-fabric textile study.