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COTTON YARNS PRODUCED BY SIRO SPINNING (Part 2)

In the October issue of *Textile Topics*, we printed an article on spinning cotton yarns by the Sirospun process. The principle of this system is that of gandrelle yarn production in which two separated rovings are fed through the drafting zone of a ring-spinning machine and the two bundles of fibers are combined by twist at the front rolls. The heart of the process is the break-out device which is a simple mechanical means of causing the yarn to be broken if one of the bundles of fibers is interrupted from combining with its counterpart. We mentioned that the Sirospun process has been successfully applied to the worsted industry but has not been introduced shorter staple machinery to any great extent.

Information on the spinning details was given last month, and we will not offer that again. The data we presented pertained mostly to the spacing of the strands of roving as they pass through the drafting rolls. We reported this to show that increasing the spacing from 0 to 7.9 mm gave a stronger yarn and a reduction in hairiness.

As we did not give a comparison of yarn quality spun from single roving and Sirospun double roving, we thought it appropriate to present that in this issue. The inquiries we have received indicate this may be of interest to our readers. Therefore, we are extracting from the full report two tables that show this comparison. These are reproduced on the following pages.

The first table shows that a single roving was used to spin an 11/1 (N_e) yarn. The second gives the results of Siro spinning two strands of the same roving into the same yarn number. The same cotton was used for both spinning tests and all mechanical details were kept constant. The number of roving strands and the method of feeding these to the drafting rolls were the only variations.

The first observation made when studying these tables is that the Sirospun yarn has greater strength than that produced from single roving. This is illustrated in both the count-strength-product and the single yarn tenacity. The break factor of the Siro yarn(Table II) increased up to a twist multiplier of 4.52, while the yarn from single roving reached its peak of strength at a TM of 4.04. The tenacity of the yarn spun from single roving (Table I) varied more than that coming from Siro spinning, but still measured its greatest strength at a TM of 5.04. This same amount of twist gave the highest tenacity for the Sirospun yarn also, but the strength of this yarn increased steadily without the variation found in the yarn from single roving.

As we have already mentioned, Siro spinning produces a stronger yarn at any twist level and gives maximum strength at higher twist than spinning from a single roving.

Other interesting features of the two yarns are the non-uniformity CV% and hairiness. In both cases, improvement was made by Siro spinning. The non-uniformity of the Sirospun yarn was noticeably better than that made from the single roving, and the hairiness measurement was much improved.

We have found a number of aspects of this study quite interesting and are pleased we can offer excerpts from the full report. As mentioned last month, the report was prepared by John B. Price, assistant director of the International Center. This research was conducted for the Texas Food and Fibers Commission. We appreciate the sponsorship of that agency and its willingness to let us disseminate information generated in this study.

TABLE I

FIBER DATA (Individual Instruments)					
Tensile:	Strength (g/tex)	24.2			
	Elongation (%)	6.5			
Length:	2.5% Span (in)	1.06			
	Uniformity Ratio (%)	43			
Micronaire		2.6			
Pressley Strength (MPSI)		86.6			
Non-Lint Content (%)		2.2			
ROVING		1.8 hank			
Machine		Saco Lowell SCB-17B Spinomatic			
Spinning Procedure		Standard Single Roving			
Ring Diameter (in)		1-7/8			
Spindle Speed (rpm)		8000	9000	10,000	10,500
Traveller		9			
Draft (Break)		1.94			
Draft (Total)		6.71			
Twist Multiplier (α_e)		4.04	4.52	5.04	5.49
Yarn Speed (yd/min)		16.6	16.6	16.6	16.0
Ambient Conditions		72°F/55% RH			
YARN PROPERTIES					
Skein Test:					
	Yarn Number (N_e)	11.21	11.03	11.10	10.83
	CV% of Count	1.6	3.4	1.4	1.3
	Count-Strength-Product	2117	2047	2040	1860
	CV% of CSP	6.2	5.4	7.6	7.9
Single Yarn Tensile Test:					
	Tenacity (g/tex)	14.21	14.14	14.56	13.74
	Mean Strength (g)	749	758	775	752
	CV% of Strength	11.5	12.4	12.8	14.1
	Elongation (%)	8.10	8.04	7.98	8.32
	CV% of Elongation	7.9	10.7	11.8	13.4
	Specific Work of Rupture (g/tex)	0.561	0.561	0.584	0.578
	CV% of Work of Rupture	16.3	19.6	20.8	21.4
	Initial Modulus (g/tex)	127	146	196	192
Uster Evenness Test:					
	Non-Uniformity (CV%)	23.23	23.45	23.60	23.58
	Thin Places/1,000 yds	568	612	629	598
	Thick Places/1,000 yds	865	883	896	906
	Neps/1,000 yds	62	71	59	80
	Hairs/100 yds	1673	1285	1164	971
	ASTM Yarn Grade	D	D	D	D+
PERFORMANCE					
	Number of Breaks/Sample	2	1	1	1
	Break Rate/1,000 Spindle hrs.	200	100	100	100

TEXAS INTERNATIONAL COTTON SCHOOL

One of the benefits of presenting the classes of the Texas International Cotton School is the development of new friends from many parts of the world. We are pleased that those participating in each class can learn about Texas cotton and the International Center. Also, we like to maintain contact with these people through *Textile Topics* and correspondence.

We have had messages from several of the students from the third class, held in October 1990. We cannot reproduce all of these, but we would like to quote from two that seem to represent the feelings of those who studied here.

Larry Frank, who came from Caracas, Venezuela, wrote:

"I want you to know what a pleasure it was to attend your course. I have been through many professional training programs; however, I have not yet encountered a program as well planned and thorough as your cotton course.

"I found the professors extremely well versed in their fields, and the teaching materials were absolutely top-notch. It is clear that a great deal of effort has been put into the preparation of these materials and you can be assured that your students appreciate the time and dedication required to assemble these valuable materials.

"Additionally, I never expected such a variety of 'extra curricular' activities, including the wonderful hospitality of your Lubbock Cotton Exchange members. It was a delightful surprise and certainly remains with your students long after the last class has finished. You can be certain that we will give your Exchange members every opportunity to do business with us, the next time we are interested in importing cotton to Venezuela."

TABLE II

FIBER DATA (Individual Instruments)				
Tensile:	Strength (g/tex)	24.2		
	Elongation (%)	6.5		
Length:	2.5% Span (in)	1.06		
	Uniformity Ratio (%)	43		
Micronaire		2.6		
Pressley Strength (MPSI)		86.6		
Non-Lint Content (%)		2.2		
ROVING		2 x 1.8 hank		
Machine		Saco Lowell SCB-17B Spinomatic		
Spinning Procedure		Sirospun (Double Roving)		
Ring Diameter (in)		1-7/8		
Spindle Speed (rpm)	8000	9000	10,000	10,500
Traveller		9		
Draft (Break)		1.94		
Draft (Total)		ca.12.4		
Twist Multiplier (α_e)	4.04	4.52	5.04	5.49
Yarn Speed (yd/min)	16.6	16.6	16.6	16.0
Ambient Conditions		72°F/55% RH		
YARN PROPERTIES				
Skein Test:				
Yarn Number (N_e)	11.62	11.56	11.59	11.38
CV% of Count	2.0	1.2	1.8	1.7
Count-Strength-Product	2424	2453	2435	2357
CV% of CSP	3.2	4.6	4.5	3.7
Single Yarn Tensile Test:				
Tenacity (g/tex)	14.59	15.54	16.20	15.80
Mean Strength (g)	741	794	825	820
CV% of Strength	9.8	10.2	9.1	12.8
Elongation (%)	7.71	7.91	7.95	7.88
CV% of Elongation	6.7	7.5	8.4	12.5
Specific Work of Rupture (g/tex)	0.565	0.611	0.644	0.632
CV% of Work of Rupture	14.5	15.1	14.7	19.7
Initial Modulus (g/tex)	154	176	203	218
Uster Evenness Test:				
Non-Uniformity (CV%)	20.22	20.11	20.49	20.26
Thin Places/1,000 yds	193	224	240	192
Thick Places/1,000 yds	583	577	620	621
Neps/1,000 yds	60	64	65	80
Hairs/100 yds	1192	895	496	653
ASTM Yarn Grade	C	C	D	D
PERFORMANCE				
Number of Breaks/Sample	2	1	1	3
Break Rate/1,000 Spindle hrs.	267	100	100	300

"Once again I congratulate all those involved, in each and every way. My stay was both memorable and intellectually stimulating and I will have only the highest recommendations for your school and your excellent course."

And from Raquel Zillich who lives in Asuncion, Paraguay, we received the following:

"To all the Texas International Cotton School's staff: Just to let you know, I didn't forget you, and that I will always remember how well 'ya'll' treated us."

It is always good to hear from those who have participated in the Cotton School. Their comments and criticisms are helpful as we attempt to improve the material presented to each class.

We remind our readers that the fourth class will begin on April 1, 1991 and continue through April 19. Anyone interested in more information should contact: **Texas International Cotton School, c/o The Lubbock Cotton Exchange, 1517 Texas Avenue, Lubbock, Texas 79401**.

Their telephone number is (806)763-4646 and FAX number is 806-763-8647.

DONATIONS

We are always pleased to acknowledge donations to our research by companies interested in our activities. We have recently received gifts of machine parts and supplies from two firms, and we would like to express our gratitude for their generosity.

➡ GROZ-BECKERT USA, INC. of Charlotte, NC donated needles for our Supreme MJ20 knitting machine that is currently being utilized in a program to evaluate cottons of different quality by converting yarns spun from them into fabric.

➡ ARMSTRONG WORLD INDUSTRIES, INC. of Lancaster, PA supplied aprons and cots for the drafting rolls on our Platt Saco Lowell worsted spinning machine. This is in continuous use for spinning yarns from Texas wool and mohair and in evaluating nylon in carpet yarns.

We greatly appreciate the assistance these companies have given.

VISITORS

Visitors to the International Center during November included Carl Cox, Texas Food & Fibers Commission, Dallas, TX; Stephen B. Horton, Airport Systems Consultant, Denver, CO; Ward G. Veale, Veale Land & Cattle Co., Breckenridge, TX; J. D. Ladd, Zellweger Uster, Inc., Charlotte, NC; Barbara Shaeffer, Motion Control Inc., Dallas, TX; M. S. Moore, Larry Sims and Carol Gibson, Allied Fibers, Columbia, SC; Roger Bolick, Allied Fibers, Hopewell, VA; Kurt W. Masurat, George A. Goulston Co., Monroe, NC; George L. Akers, Backstage Issue, Westwood, CA; Douglas K. Stutler, Agripro Biosciences, Inc., Waco, TX; and George Blomquist, Parkdale Mills, Gastonia, NC.

Also, Osvaldo Adamicska, Peyerelectronics, Buenos Aires, Argentina; Oscar Antonio Safie, Jr., Hilanderias de Exportacion SA, San Salvador, El Salvador; Mario Emilio Redaelli, Multi-Representaciones, San Salvador, El Salvador; and Jacques Delorme and Guy Mahdavi, Compagnie Francaise pour le Developpement des Fibres Textiles, Paris, France.

Groups included seven members of an international trade team from Korea who were accompanied by Allen Ater, National Cottonseed Products Assoc., Memphis, TN; 50 members of the Farmer's Co-op of El Campo, TX; seven agricultural marketing students from Abilene Christian University, Abilene, TX; seven textile students from South Plains College, Levelland, TX; and 104 students from other area schools and scout groups.