

**PUBLICATION NOTICE** We have received several inquiries in recent months about the slow delivery of *Textile Topics*. While we normally blame delays on the United States Postal Service, such is not the case this time. The Textile Research Center is simply behind with the preparation and publication of *Topics*. The main reason has been the initiation of several new and rather unusual research programs which have required more than the normal amount of our time. These have come while we have been involved in extra duties at Texas Tech University.

Currently we are about two months behind in issuing *Textile Topics*. We are attempting to rectify the situation but, until it is corrected, we want our readers to know that the information given in this publication is current, even though the date is not. We will do our best to bring our research results and the date of publishing *Topics* more nearly in line. In the meantime, we ask that you accept our publication without worrying too much about the date.

**A STUDY OF COTTON AGING - PART II** In the July 1984 issue of *Textile Topics* (Vol. XII, No. 11), we began a report on research conducted at the Textile Research Center that investigated the effects of cotton aging. We presented fiber testing results from individual bales that had aged for approximately 2½ years. The cotton used in the program was harvested during the latter part of 1981. The first testing was done in June 1982 and further testing was conducted on a regular basis until May 1983. At that point, the remaining cotton from each bale was set aside for annual evaluation, and the next testing was conducted in April 1984. The remainder of each bale is being held in storage for one more evaluation in 1985.

In this issue of *Topics* we are giving spinning and yarn testing results. We should point out that the fiber testing results on the following pages were obtained from blending samples of the six bales. Therefore, results shown under June 11, 1982, for example, are not from any single bale but rather from a blend of the six bales. The blend for each date was then spun into two yarn numbers (N<sub>6</sub> 6 and 22) on a Rieter M1/1 rotor-spinning machine.

When spinning tests are conducted on the same equipment and under the same conditions, changes in yarn strength may well be a reflection of the strength of the fiber used. A study of the fiber testing data for the blends at the various dates shows that the strength during June 1982 was about 26 grams/tex. This measurement varied throughout the testing period, but it appears there was a general decline until April 1983 when the fiber tenacity leveled off at about 24.5 grams/tex. The strength of the two yarns and the fiber strength appear to run parallel during the entire testing period. It will be interesting to see what change, if any, has occurred when the remaining portion of the cotton is blended and tested in April of 1985.

As for the yarn strength, the count-strength-product of the 6/1 yarn was more than 2400 during the early testing but declined to approximately 2300 eleven months later and seemed to stay at that level, as shown by the testing in April 1984. This same general trend was evident in the single-yarn tenacity. After starting at about 13.5 grams/tex there was a decline during 1983, at which time testing results show that the yarn tenacity leveled off. This trend was also found for the 22/1 yarn, both in the count-strength-product and in the single-yarn tenacity.

It will be noted that the single-yarn tenacity results for both the 6/1 and 22/1 yarns in April 1984 show an increase above the level measured when testing was completed in May 1983. In October of that year a new Uster Tensorapid instrument was installed at the Textile Research Center, replacing the old Uster single-yarn strength tester. The new instrument was used for the evaluation in 1984, and we feel

TABLE VII  
FIBER TESTING DATA

Testing Date	6/11/82	6/25/82	7/9/82	7/23/82	8/6/82	8/20/82	9/3/82	9/17/82
Micronaire	3.65	3.50	3.45	3.30	3.50	3.55	3.55	3.45
UHM Length (in)	1.010	1.013	1.008	1.000	1.043	1.020	1.018	1.033
Uniformity Ratio (%)	78.3	77.5	77.8	77.0	78.5	80.3	78.8	78.0
1/8" Gauge Strength (g/tex)	26.25	26.00	24.25	23.50	25.50	25.25	29.50	24.50
Elongation (%)	5.45	5.40	5.43	5.60	5.65	6.25	6.05	5.95
Leaf Grade	40	40	40	40	30	30	30	20
Gray	27.5	35.8	31.8	35.0	37.3	36.5	37.0	27.0
Color	30.3	36.8	32.8	34.0	33.8	35.0	31.5	40.3
Grade	22-2	32-2	32-1	32-1	32-2	32-2	32-2	23-2
McBeth 1500 Colorimeter C.I.E. "x"	71.4	71.4	70.6	69.5	69.9	70.4	69.8	69.9
"y"	72.9	72.9	72.0	70.8	71.3	71.8	71.1	71.3
"z"	72.2	71.8	71.1	70.1	69.6	70.5	69.5	70.2
Yellowness Index	20.41	20.93	20.77	20.63	22.02	21.39	21.98	21.18

ROTOR-SPUN YARN PROPERTIES

Spinning Date	6/11/82	6/25/82	7/9/82	7/23/82	8/6/82	8/20/82	9/3/82	9/17/82
Nominal Yarn Number (N <sub>e</sub> )	6							
Skein Test:								
Actual Yarn Number (N <sub>e</sub> )	6.01	6.00	5.90	6.06	5.93	5.97	5.95	5.90
CV% of Yarn Number	0.8	0.8	0.8	1.0	0.6	1.0	0.6	0.9
Count-Strength-Product	2430	2448	2416	2451	2412	2391	2392	2432
CV% of CSP	1.3	1.4	1.9	1.3	2.3	1.5	4.0	2.1
Single Yarn Tensile Test:								
Tenacity (g/tex)	13.48	13.37	13.41	13.40	13.43	13.62	13.65	13.51
Mean Strength (g)	1328	1330	1358	1312	1338	1356	1360	1358
CV% of Strength	5.3	6.6	6.2	6.9	5.2	5.7	5.7	6.5
Elongation (%)	9.8	10.7	10.5	10.2	10.9	10.6	10.4	10.6
Uster Evenness Test:								
Non-Uniformity (CV%)	13.67	13.85	13.46	13.96	13.52	13.69	13.71	13.65
Thin Places/1,000 yds	4	2	2	4	1	1	0	0
Thick Places/1,000 yds	37	50	33	33	49	33	43	22
Neps/1,000 yds	33	33	23	38	29	36	29	38
Hair Count/100 yds	469	504	470	489	508	527	536	460
ASTM Yarn Grade	A	B+	B+	A	A	A	B+	B+
Nominal Yarn Number (N <sub>e</sub> )	22							
Skein Test:								
Actual Yarn Number (N <sub>e</sub> )	21.91	22.22	21.77	22.42	21.82	21.93	22.16	21.85
CV% of Yarn Number	1.1	0.7	1.2	1.2	2.1	1.6	0.9	0.6
Count-Strength-Product	1970	1961	1963	1971	1941	1922	1955	1927
CV% of CSP	3.2	2.1	1.9	2.0	1.8	3.1	2.1	2.1
Single Yarn Tensile Test:								
Tenacity (g/tex)	12.61	12.15	12.26	12.48	11.71	12.13	12.05	12.21
Mean Strength (g)	337	336	333	327	316	325	321	328
CV% of Strength	6.4	8.8	8.3	8.1	8.0	6.7	6.7	7.5
Elongation (%)	6.2	7.1	7.0	6.8	7.2	7.3	7.3	7.1
Uster Evenness Test:								
Non-Uniformity (CV%)	16.53	16.99	16.55	16.88	16.97	17.10	16.90	16.96
Thin Places/1,000 yds	50	93	46	59	56	88	104	72
Thick Places/1,000 yds	216	284	220	258	275	234	255	262
Neps/1,000 yds	435	631	503	528	616	482	499	518
Hair Count/100 yds	250	214	201	241	164	173	171	168
ASTM Yarn Grade	A	B	B+	A	B+	B+	B	B

TABLE VIII  
FIBER TESTING DATA

Testing Date	10/15/82	11/15/82	12/10/82	1/11/83	2/16/83	3/11/83	4/7/83	5/11/83
Micronaire	3.40	3.50	3.55	3.45		3.55	3.45	3.80
UHM Length (in)	1.050	1.010	1.038	1.020		1.018	1.045	1.028
Uniformity Ratio (%)	79.0	79.5	80.5	79.5		80.3	79.8	79.3
1/8" Gauge Strength (g/tex)	25.50	25.75	26.75	23.25		25.75	23.75	24.25
Elongation (%)	5.95	5.85	6.13	6.93		5.73	5.50	7.03
Leaf Grade	35	40	30	30		30	30	35
Gray	65.3	31.0	30.5	29.8		28.8	25.8	33.3
Color	51.0	35.3	37.8	35.0		40.8	33.8	36.0
Grade	83-2	32-1	32-1	22-2		23-2	22-2	32-1
MacBeth 1500 Colorimeter C.I.E. "x"	70.2	69.5	70.5	70.5	70.0	69.4	70.4	70.2
"y"	71.5	70.9	71.9	71.9	71.4	70.7	71.9	71.5
"z"	70.3	68.4	70.5	70.3	70.2	69.0	70.6	70.7
Yellowness Index	21.33	23.27	21.49	21.89	21.34	22.13	21.36	20.84

ROTOR-SPUN YARN PROPERTIES

Spinning Date	10/15/82	11/15/82	12/10/82	1/11/83	2/16/83	3/11/83	4/7/83	5/11/83
Nominal Yarn Number (N <sub>e</sub> )	6							
Skein Test:								
Actual Yarn Number (N <sub>e</sub> )	5.89	6.01	6.00	5.96	5.93	5.97	5.91	5.92
CV% of Yarn Number	0.8	1.0	0.8	1.0	0.6	1.0	1.2	1.3
Count-Strength-Product	2337	2381	2342	2367	2281	2314	2308	2301
CV% of CSP	1.7	2.2	1.8	2.1	1.3	2.0	1.6	1.7
Single Yarn Tensile Test:								
Tenacity (g/tex)	13.29	13.04	13.30	13.42	12.76	12.99	12.89	12.87
Mean Strength (g)	1340	1278	1278	1334	1282	1268	1284	1288
CV% of Strength	5.3	5.9	5.6	6.0	6.6	6.2	6.3	5.4
Elongation (%)	11.1	10.1	9.6	10.4	10.2	9.7	9.9	9.7
Uster Evenness Test:								
Non-Uniformity (CV%)	13.11	13.75	13.41	13.34	13.35	13.31	13.58	13.65
Thin Places/1,000 yds	1	0	2	0	1	1	1	1
Thick Places/1,000 yds	20	36	28	23	31	23	34	33
Neps/1,000 yds	10	21	27	11	25	12	84	37
Hair Count/100 yds	526	526	484	533	522	558	532	559
ASTM Yarn Grade	A	B+	A	B	B	A	B	B
Nominal Yarn Number (N <sub>e</sub> )	22							
Skein Test:								
Actual Yarn Number (N <sub>e</sub> )	21.39	22.18	22.13	22.13	21.98	21.95	21.70	21.94
CV% of Yarn Number	1.3	1.3	0.7	0.9	1.1	0.7	0.8	1.5
Count-Strength-Product	1940	1991	1824	1836	1793	1874	1870	1862
CV% of CSP	3.0	2.1	2.9	2.6	1.9	2.1	3.3	2.1
Single Yarn Tensile Test:								
Tenacity (g/tex)	12.17	11.62	11.97	11.63	11.43	11.40	11.43	11.55
Mean Strength (g)	334	309	318	314	308	310	317	311
CV% of Strength	8.1	7.8	7.8	7.8	8.6	7.6	8.7	7.9
Elongation (%)	7.3	6.8	6.5	7.3	7.3	6.8	7.0	6.6
Uster Evenness Test:								
Non-Uniformity (CV%)	16.21	16.82	16.45	16.32	16.43	16.21	16.57	16.84
Thin Places/1,000 yds	40	64	48	31	34	41	41	81
Thick Places/1,000 yds	179	244	200	204	200	188	235	226
Neps/1,000 yds	272	402	351	367	285	278	383	391
Hair Count/100 yds	174	180	170	214	221	167	184	220
ASTM Yarn Grade	B+	B+	C	B	B+	B+	C+	B

TABLE IX  
FIBER TESTING DATA

Testing Date	4/2/84	4/16/84	4/23/84
Micronaire	3.45	3.50	3.50
UHM Length (in)	1.033	1.033	1.010
Uniformity Ratio (%)	78.5	79.5	79.75
1/8" Gauge Strength (g/tex)	24.5	24.5	24.5
Elongation (%)	6.05	5.98	5.93
Leaf	30	30	20
Gray	28.5	21.8	21.3
Color	38.5	47.0	39.8
MacBeth 1500 Colorimeter C.I.E. "x"	70.2	69.5	70.2
"y"	71.5	70.8	71.6
"z"	69.3	68.6	69.8
Yellowness Index	22.86	22.99	22.24

ROTOR-SPUN YARN PROPERTIES

Spinning Date	4/4/84	4/18/84	4/23/84
Nominal Yarn Number (N <sub>e</sub> )	6		
Skein Test:			
Actual Yarn Number (N <sub>e</sub> )	5.90	5.95	5.91
CV% of Yarn Number	0.7	0.6	0.7
Count-Strength-Product	2317	2357	2376
CV% of CSP	2.1	1.7	1.2
Single Yarn Tensile Test:			
Tenacity (g/tex)	13.75	14.21	13.95
Mean Strength (g)	1376	1410	1394
CV% of Strength	5.9	6.2	5.3
Elongation (%)	9.06	9.29	9.42
Uster Evenness Test:			
Non-Uniformity (CV%)	13.97	13.96	14.04
Thin Places/1,000 yds	2	2	2
Thick Places/1,000 yds	42	34	47
Neps/1,000 yds	39	38	46
Hair Count/100 yds	469	440	415
ASTM Yarn Grade	B	B	B
Nominal Yarn Number (N <sub>e</sub> )	22		
Skein Test:			
Actual Yarn Number (N <sub>e</sub> )	22.00	22.06	22.00
CV% of Yarn Number	1.4	1.0	1.3
Count-Strength-Product	1903	1905	1905
CV% of CSP	2.1	2.3	2.0
Single Yarn Tensile Test:			
Tenacity (g/tex)	12.33	12.66	12.07
Mean Strength (g)	331	339	339
CV% of Strength	8.7	8.4	8.1
Elongation (%)	6.07	6.37	6.33
Uster Evenness Test:			
Non-Uniformity (CV%)	16.69	16.80	17.08
Thin Places/1,000 yds	40	49	70
Thick Places/1,000 yds	294	303	322
Neps/1,000 yds	508	511	773
Hair Count/100 yds	159	162	151
ASTM Yarn Grade	C+	B	B

the increase in yarn tenacity is due to a change in instruments rather than any contribution of the cotton fiber itself. We believe this is confirmed by the fact that it was only the single-yarn tenacity that showed an increase. The same skein breaking machine and yarn balance that were utilized throughout this study have been used for developing count-strength-products since long before this program began.

As mentioned, this study is still underway. Because there is only a small amount of the six bales remaining, it is expected that the last fiber testing and spinning will be done during the period from April to June 1985. When that is completed we will carry additional results of our testing in *Textile Topics*.

As stated last month, this project is sponsored by the Natural Fibers & Food Protein Commission of Texas. Fiber testing was performed by the staff of our materials evaluation laboratory under the direction of Mrs. Reva E. Whitt, and the rotor-spinning was done by John B. Price and the members of TRC's open-end spinning research department.

**VISITORS** Visitors to the Textile Research Center during August included Cindy Stefko and Lewis McMahon, Texas Instruments, Dallas, TX; Merrill Q. Garvin, Western Electric Products, Norcross, GA; Scott Gessner and Marvin White, Dow Chemical Co., Freeport, TX; R. H. Lott and Charles Volk, Beech Aircraft Corporation, Wichita, KS; Carolyn Snyder, Technicon, Spring, TX; Wade H. Webb, Valdese Manufacturing Co., Inc., Valdese, NC; Tom Quinn, Peyer Corporation, Spartanburg, SC; H. Georg Braunschweiler, Refindus Holding AG, Zurich, Switzerland; Romano Bonadei, Filati Filartex, Pancrazio, Italy; A. Subramaniam, Madura Coats Ltd., Madurai, India; Thomas Hong-Chi Lee, The Chinese University of Shantin, Hong Kong; Jerry Olson, The University of Texas at Austin, Austin, TX; and Abd-Alhamid A. Nomeir, Cotton Research Institute, Giza, Egypt.

Also visiting were Mike Putnam and Si A. Moss, Chicopee, Benson, NC; Ralph Tompkins and William Rose, Chicopee, New Brunswick, NJ; Conrad C. Buyofsky, Chicopee, Milltown, NJ; Helmut Ruef, Fleissner Inc., Charlotte, NC; and Roman Knaus, Fleissner GmbH, Egelsbach, West Germany.

In addition, a group of textile executives from People's Republic of China came to the Center. These included Jiang Hong Zhi, Zhou Yi Guo, Zhu Shu Zin and Han Bao Jun, HeBei Han Dan Cotton Machinery Factory, WuAn, HeBei; Yang Mingn, Sandang Cotton Soc., Shandang; and Xu Xiao Dong, China National Machinery and Equipment Import & Export Corporation, Shijiazhuang.