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ROTOR SPINNING OF WOOL: PART II As stated in the December 1983 issue of *Textile Topics* (Vol. XII, No. 4), we are continuing our report on open-end spinning 100% wool. The first part of the report identified the wool used and presented results obtained from different opening roller types. These were the "vee-notched" and "square-notched" selectors.

This month we are giving the results of spinning the same wool with different twist multipliers and using different navel types. The fiber utilized was that from the mixed lot (ML). (Details of this lot were given in Table II of last month's report.) Navels used in this study were the three standard types manufactured by Suessen, commonly described as smooth, four-grooved and eight-grooved. In addition, two navels having much larger mouths were evaluated. One of these was a modified, four-grooved Ingolstadt navel (4G-I); the other had eight grooves and was the largest and roughest of all. This last navel is identified as 8G-S.

Machine details and the results of spinning with the various navels are presented in Tables V through IX. (Please note that the tables and graphs given in this month's report are numbered following those presented last month.) The data indicate that it was possible to spin at lower twist levels when the rougher navels were used, or when the contact length between the navel and the yarn was increased by the use of a large-mouthed navel. However, it was found that the use of such navels tended to give yarns of inferior properties with lower breaking strengths and elongations. Also, the yarns were more irregular and hairy. Curves indicating these trends are shown in Graphs 5 through 8. Since the minimum twist multiplier for satisfactory spinning was lower when the larger, rougher navels were used, it was presumed that their use would confer stability at higher twist levels. Consequently, the largest, roughest navel (8G-S) was used for further studies.

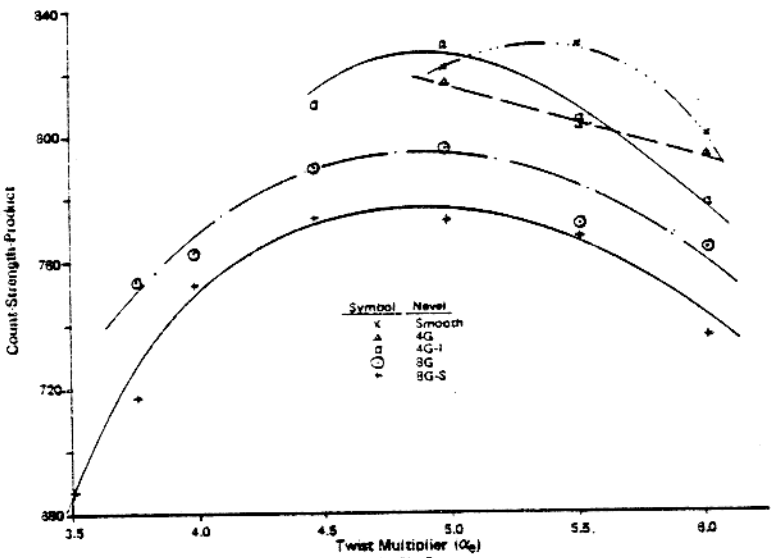
The information given here was taken from a report on research sponsored by the Natural Fibers & Food Protein Commission of Texas. We wish to thank that organization for permitting publication of these data. Additional results from this study will be carried in subsequent issues of *Textile Topics*.

VISITORS We were pleased to welcome Valerie Bendall, 1984 National Maid of Cotton, to the Textile Research Center in January. Valerie was accompanied by Llana Smith, tour director for the Maid of Cotton program.

Other visitors included Michele Whalen and Wolfgang Strahl, Cotton Incorporated, Raleigh, NC; Harvey Campbell, Harvey Campbell Associates, Bakersfield, CA; Duke Kimbrell, Parkdale Mills, Inc., Gastonia, NC; Robert H. Chapman, Jr., Inman Mills, Inman, SC; H. B. Cooper, California Planting Cotton Seed Distributors, Shafter, CA; Debra Hinkel-Larson and Rick E. Leonard, Salyer American, Corcoran, CA; Gil Moody, Bob Gibson, Ricardo Garres and Kenneth Chuchen, Texas Dept. of Agriculture, Austin, TX; Red Barron, Barber-Colman Company, Gastonia, NC; Howard Baker, Don Nordin, Butch Johnson and Jack Crook, Milliken and Company, Spartanburg, SC; Stuart Dyer, John D. Hollingsworth on Wheels, Inc., Greenville, SC; H. A. "Bob" Poteet, Texas Cotton Assoc., Dallas, TX; Jehudi Wilson, W.T.C. Trading, Inc., New York, NY; and Nuty Willner, Kitan Consolidated Ltd., Hadar Yoseph, Israel.

TABLE V – Rotor-Spinning Data (Smooth Navel)

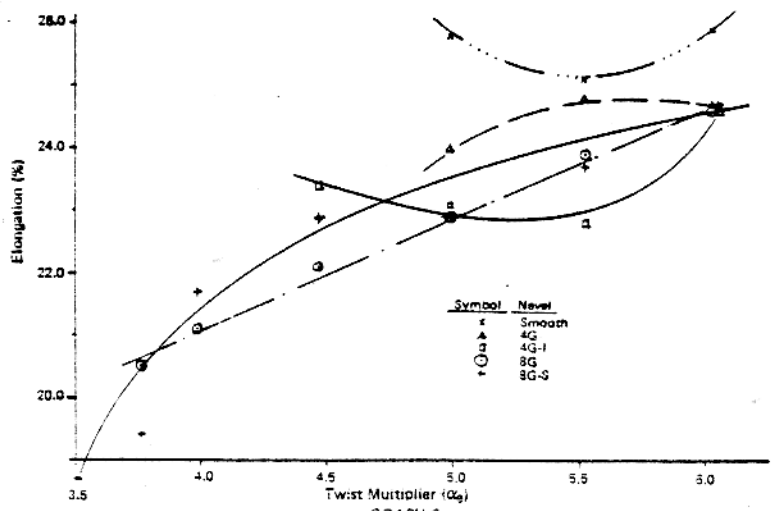
Sliver	70 gr/yd Finisher Drawframe						
Rotor-Spinning Machine	Suessen Spintester, SACM Unit, P.1						
Nominal Yarn No. (N_e)	6 (3.15 Run)						
Rotor Type	66 mm						
Rotor Speed (rpm)	25,000						
Opening Roller Type	Selector – "Vee-Notched"						
Opening Roller Speed (rpm)	5,000						
Draft	49.0						
Twist Multiplier	3.50	3.76	3.99	4.47	4.99	5.52	6.03
Yarn Speed (yd/min)	81	75	71	63	57	51	47
Navel	Smooth						
Ambient Conditions	70°F/56% RH						
Tension Draft	0.99						
Test Duration (minutes)	21	23	24	27	30	33	36
Skein Test:							
Actual Yarn Number (N_e)					5.94	5.90	5.92
CV of Yarn Number (%)					1.0	2.0	3.0
Count-Strength-Product					822	829	800
CV of CSP (%)					1.1	3.9	1.2
Single Yarn Tensile Test:							
Tenacity (g/tex)					5.42	5.37	5.30
Mean Strength (g)					561	526	533
CV of Strength (%)					7.1	7.0	7.8
Elongation (%)					25.8	25.1	25.9
Uster Evenness Test:							
Non-Uniformity (CV%)					15.19	15.11	15.83
Thin Places/1,000 yds					12	20	20
Thick Places/1,000 yds					54	40	74
Neps/1,000 yds					22	40	50
Hairs/100 yds					1665	1888	2207
Performance:							
Number of Breaks					7	0	0



GRAPH 5
Influence of Twist and Navel Type on Yarn Strength

TABLE VI -- Rotor-Spinning Data (4-Grooved Navel)

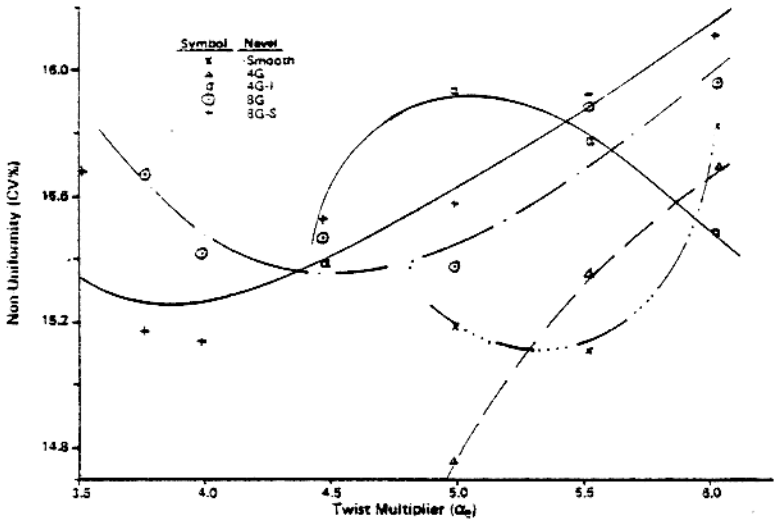
Sliver	70 gr/yd Finisher Drawframe						
Rotor-Spinning Machine	Suessen Spintester, SACM Unit, P.1						
Nominal Yarn No. (N_e)	6 (3.15 Run)						
Rotor Type	66 mm						
Rotor Speed (rpm)	25,000						
Opening Roller Type	Selector -- "Vee-Notched"						
Opening Roller Speed (rpm)	5,000						
Draft	49.0						
Twist Multiplier	3.50	3.76	3.99	4.47	4.99	5.52	6.03
Yarn Speed (yd/min)	81	75	71	63	57	51	47
Navel	4-Grooved						
Ambient Conditions	70°F/56% RH						
Tension Draft	0.99						
Test Duration (minutes)	21	23	24	27	30	33	36
Skein Test:							
Actual Yarn Number (N_e)					5.88	5.86	5.86
CV of Yarn Number (%)					1.2	2.2	2.6
Count-Strength-Product					817	803	794
CV of CSP (%)					0.6	1.4	1.2
Single Yarn Tensile Test:							
Tenacity (g/tex)					5.41	5.39	5.28
Mean Strength (g)					546	542	516
CV of Strength (%)					8.2	7.1	7.8
Elongation (%)					24.0	24.8	24.7
Uster Evenness Test:							
Non-Uniformity (CV%)					14.76	15.36	15.70
Thin Places/1,000 yds					8	6	22
Thick Places/1,000 yds					42	80	80
Neps/1,000 yds					10	54	36
Hairs/100 yds					1833	2083	2572
Performance:							
Number of Breaks					1	0	0



GRAPH 6
Influence of Twist and Navel Type on Yarn Elongation at Break

TABLE VII — Rotor-Spinning Data (8-Grooved Navel)

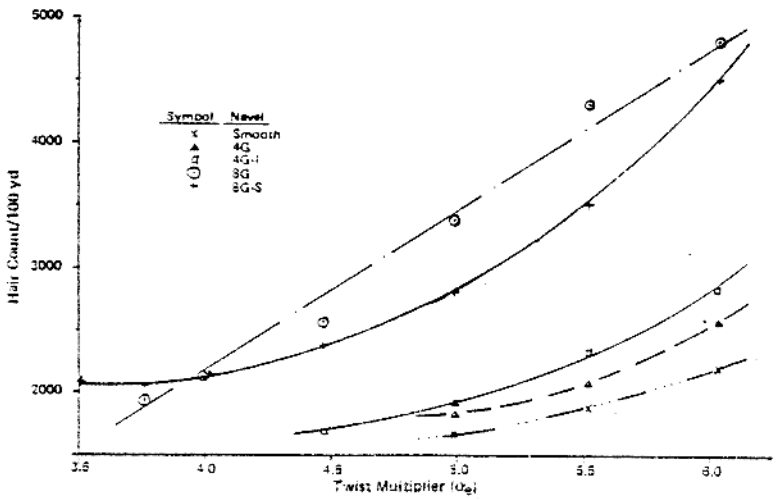
Sliver	70 gr/yd Finisher Drawframe						
Rotor-Spinning Machine	Suessen Spintester, SACM Unit, P.1						
Nominal Yarn No. (N_e)	6 (3.15 Run)						
Rotor Type	66 mm						
Rotor Speed (rpm)	25,000						
Opening Roller Type	Selector — "Vee-Notched"						
Opening Roller Speed (rpm)	5,000						
Draft	49.0						
Twist Multiplier	3.50	3.76	3.99	4.47	4.99	5.52	6.03
Yarn Speed (yd/min)	81	75	71	63	57	51	47
Navel	8-Grooved						
Ambient Conditions	70°F/56% RH						
Tension Draft	0.99						
Test Duration (minutes)	21	23	24	27	30	33	36
Skein Test:							
Actual Yarn Number (N_e)		5.83	5.80	5.86	5.90	5.92	5.92
CV of Yarn Number (%)		0.9	2.1	1.0	1.1	2.5	1.2
Count-Strength-Product		754	763	790	796	772	764
CV of CSP (%)		0.8	2.2	1.9	2.4	2.9	1.1
Single Yarn Tensile Test:							
Tenacity (g/tex)		4.93	4.97	5.18	5.15	5.18	5.08
Mean Strength (g)		481	471	502	511	511	541
CV of Strength (%)		8.1	7.9	7.3	7.6	7.8	9.1
Elongation (%)		20.5	21.1	22.1	22.9	23.9	24.6
Uster Evenness Test:							
Non-Uniformity (CV%)		15.67	15.42	15.47	15.38	15.89	15.97
Thin Places/1,000 yds		28	30	14	22	12	24
Thick Places/1,000 yds		32	42	78	90	126	152
Neps/1,000 yds		6	2	4	8	6	18
Hairs/100 yds		1942	2129	2570	3398	4310	4821
Performance:							
Number of Breaks		7	1	0	0	0	0



GRAPH 7
Influence of Twist and Navel Type on Yarn Evenness

TABLE VIII — Rotor-Spinning Data (4G-I Navel)

Sliver	70 gr/yd Finisher Drawframe						
Rotor-Spinning Machine	Suessen Spintester, SACM Unit, P.1						
Nominal Yarn No. (N_e)	6 (3.15 Run)						
Rotor Type	66 mm						
Rotor Speed (rpm)	25,000						
Opening Roller Type	Selector — "Vee-Notched"						
Opening Roller Speed (rpm)	5,000						
Draft	49.0						
Twist Multiplier	3.50	3.76	3.99	4.47	4.99	5.52	6.03
Yarn Speed (yd/min)	81	75	71	63	57	51	47
Navel	4-Grooved (ex Ingolstadt)						
Ambient Conditions	70°F/56% RH						
Tension Draft	0.99						
Test Duration (minutes)	21	23	24	27	30	33	36
Skein Test:							
Actual Yarn Number (N_e)				5.98	5.89	5.91	5.95
CV of Yarn Number (%)				1.3	1.3	1.1	2.8
Count-Strength-Product				810	829	805	778
CV of CSP (%)				2.1	1.3	0.9	0.7
Single Yarn Tensile Test:							
Tenacity (g/tex)				5.30	5.26	5.21	5.24
Mean Strength (g)				539	527	534	515
CV of Strength (%)				8.0	7.0	7.9	8.2
Elongation (%)				23.4	23.1	22.8	24.6
Uster Evenness Test:							
Non-Uniformity (CV%)				15.39	15.94	15.78	15.49
Thin Places/1,000 yds				18	24	82	20
Thick Places/1,000 yds				56	114	102	108
Neps/1,000 yds				36	82	50	22
Hairs/100 yds				1690	1930	2338	2837
Performance:							
Number of Breaks				2	0	1	0



GRAPH 8

Influence of Twist and Navel Type on Yarn Hairiness

TABLE IX – Rotor-Spinning Data (8G-S Navel)

Sliver	70 gr/yd Finisher Drawframe						
Rotor-Spinning Machine	Suessen Spintester, SACM Unit, P.1						
Nominal Yarn No. (N_e)	6 (3.15 Run)						
Rotor Type	66 mm						
Rotor Speed (rpm)	25,000						
Opening Roller Type	Selector – "Vee-Notched"						
Opening Roller Speed (rpm)	5,000						
Draft	49.0						
Twist Multiplier	3.50	3.76	3.99	4.47	4.99	5.52	6.03
Yarn Speed (yd/min)	81	75	71	63	57	51	47
Navel	8GS						
Ambient Conditions	70°F/56% RH						
Tension Draft	0.99						
Test Duration (minutes)	21	23	24	27	30	33	36
Skein Test:							
Actual Yarn Number (N_e)	5.91	5.99	5.97	6.02	5.97	5.85	5.90
CV of Yarn Number (%)	1.2	1.4	2.6	1.7	1.4	1.3	1.6
Count-Strength-Product	687	717	753	774	773	768	736
CV of CSP (%)	1.2	1.0	1.2	1.9	1.9	1.5	0.8
Single Yarn Tensile Test:							
Tenacity (g/tex)	4.63	4.82	4.97	5.08	5.01	4.98	4.86
Mean Strength (g)	452	476	505	517	503	491	502
CV of Strength (%)	7.1	7.6	6.3	8.7	7.6	7.9	9.0
Elongation (%)	18.7	19.4	21.7	22.9	22.9	23.7	24.2
Uster Evenness Test:							
Non-Uniformity (CV%)	15.68	15.17	15.14	15.53	15.58	15.93	16.12
Thin Places/1,000 yds	30	24	24	28	28	14	8
Thick Places/1,000 yds	50	30	46	58	76	128	166
Neps/1,000 yds	6	0	2	4	6	10	14
Hairs/100 yds	2094	2054	2145	2382	2822	3520	4513
Performance:							
Number of Breaks	3	0	0	0	0	0	0