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THE EFFECTS OF LINT CLEANING ON FIBER AND YARN QUALITY: Part 2

In last month's issue of *Topics* we began a report dealing with the effects of cleaning at the gin on fiber properties and yarn quality. We mentioned that the study was conducted in two segments, the first of which maintained constant cleaning of the seed cotton, and the second part exploring the effects of utilizing a new Multistage extractor that has been developed at the USDA Ginning Research Laboratory in Lubbock. The diagram we gave showing the machines utilized at the gin was for Segment 1 only and did not include the Multistage cleaner. The report we are offering in this issue of *Topics* is a continuation of Segment 1. We will not be able to give all the results coming from the study, but the information presented should be sufficient to show the effects of a constant seed cotton cleaning followed by variations in the number of lint cleaners after seed removal. Information on Segment 2 will be given in subsequent issues.

The primary concern of cleaning at the gin is fiber damage which is usually accompanied by a reduction in length and an increase in short fiber content. Table I at right presents some of our findings when testing fiber from bale samples. Please note that this testing was done by using several different instruments in order to determine as thoroughly as possible the true fiber quality.

It is obvious that several things happened when using additional lint cleaners. To begin with, the non-lint content decreased considerably from zero lint cleaners to two. At the same time, the 2.5% span length decreased slightly, although there is some question as to whether this would be noticeable in processing. The uniformity ratio as measured by the Fibrograph also declined by two percent, and the same measurement on a high volume instrument system was reduced by an identical amount. When measuring the fiber properties in sliver on the Peyer AL–101, we found fiber length was reduced with the addition of lint cleaners. At the same time, the short fiber content increased by about one percent.

After the fiber utilized in the program was received at the International Center, it was opened and cleaned through a series of machines prior to carding. Figure 2, given last month, showed that after the fiber was blended and opened by hopper feeders, it passed through a Monocylinder and two ERM cleaners. Table II on the following page gives the percentage of waste removed by each of these machines. A study of the data in this table shows again what happens by the addition of lint cleaners. With zero lint cleaning, the total waste percentage removed at opening and carding was 10.2%. When one lint cleaner was employed, the waste removed declined to 6.2%, and a second lint cleaner reduced this even further to 5.6%. This shows that when the foreign material is not removed at the gin, it can be extracted during cleaning and carding at textile processing. It becomes a matter of deciding the most desirable point for trash removal.

TABLE I

INFLUENCE OF LINT CLEANERS ON FIBER QUALITY

Test (Bale Samples)	Number of Lint Cleaners 0	1	2
Shirley Non-lint Content (%)	6.5	2.9	2.2
Fibrograph:			
2.5% Span Length (in)	1.04	1.02	1.02
Uniformity Ratio (%)	49	48	47
HVI Uniformity Ratio (%)	84	83	82
Peyer AL–101: (Sliver Sample)			
Upper Quartile Length (in)	1.03	1.03	1.01
Mean Length (in)	0.85	0.83	0.82
CV of Length (%)	34.6	33.3	33.8
Short Fiber Content (%)	13.7	13.2	14.5

TABLE II

INFLUENCE OF LINT CLEANERS ON PERCENTAGE OF WASTE AT OPENING AND CARDING

Cleaning Point	Number of Lint Cleaners 0	1	2
Monocylinder	2.3	0.7	0.5
ERM 1	2.0	0.9	0.7
ERM 2	1.0	0.6	0.5
Card	4.9	4.0	3.9
TOTAL	10.2	6.2	5.6

TABLE III

INFLUENCE OF LINT CLEANERS ON YARN QUALITY

Test	Sample	Number of Lint Cleaners 0	1	2
Count-Strength-Product	Initial	1898	1900	1879
	Final	1861	1869	1857
Yarn Tenacity (g/tex)	Initial	11.73	11.55	11.57
	Final	11.49	11.56	11.42
Elongation (%)	Initial	6.02	5.95	5.98
	Final	5.93	5.95	5.92
Non-Uniformity (CV%)	Initial	14.37	14.35	14.46
	Final	14.80	14.76	14.76
Total Imperfections/1,000 yds	Initial	104	102	106
	Final	146	133	128
Hair Count/100 yds	Initial	555	543	576
	Final	1356	1338	1339

Initial = At beginning of spinning
Final = After 8 hours of spinning

TABLE IV

INFLUENCE OF LINT CLEANERS ON SPINNING PERFORMANCE

Parameter	Number of Lint Cleaners 0	1	2
Breakage Rate (per 10^3 rotor hours)	172	181	183
Trash Related Breaks (%)	5.3	4.6	4.2
Entanglement Related Breaks (%)	88.9	89.6	90.3
Unknown (%)	5.8	5.8	5.5

Table III (middle left) gives the influence of lint cleaning on yarn properties. Please note that testing was done on yarns at the beginning of spinning and then again after eight hours. A review of the data will show very little difference in yarn quality, regardless of how many lint cleaners were used. If anything, the use of one lint cleaner seemed to give a slightly better yarn both from a standpoint of strength and a measure of the imperfections. However, differences between the three yarns are so slight that it is difficult to determine whether lint cleaners are helpful or not.

Table IV shows that the use of lint cleaners may have contributed to a higher yarn breakage rate. These breaks were caused by something other than trash, however, for it can be seen very quickly that two lint cleaners resulted in fewer trash-related breaks. Entanglement breaks increased slightly with the use of two lint cleaners.

The results presented so far do not reveal much beyond what would be expected. Information to be presented in future issues of *Topics* will include the influence on fiber properties and spinning performance when cleaning cotton with a Multistage extractor. Also, data developed by using a variety of cleaning and carding arrangements will be given.

We have already stated that it is not practical for a textile company to purchase cotton without some cleaning at the gin, and the optimum point in this likely would need to be determined by the type of cotton purchased and the end product manufactured from it. We are aware that some companies prefer a lower quality cotton with a higher percentage of non-lint material, while others insist on a very high quality, clean fiber for their use. It would appear that the ultimate arrangements for cleaning at the gin and in the textile mill will likely result from a complete understanding on the part of the farmers and ginners about what is good for the spinner, and a similar understanding by the textile processors of the problems at harvesting and ginning.

This report will be continued in next month's *Topics*. We encourage our readers to save each copy of the serialization so they will have a continuously running review of the study.

This research was sponsored jointly by the Texas Food and Fibers Commission and the Agriculture Research Service of the United States Department of Agriculture. The report to those agencies was prepared by John B. Price, assistant director at the International Center.

ORGANIC COTTON

Last month we carried an article on the organic cotton being produced in Texas and other areas of the southwestern U.S. We stated that the Texas Department of Agriculture has included cotton in its code for the production of organic agricultural products. This was done to offer a fiber that can be used in manufacturing garments for persons who are allergic to certain chemicals that may be used in the production of cotton or during textile processing.

Those of us not allergic to anything (with the possible exception of work) find it difficult to understand how the use of beneficial chemicals can create problems, but apparently that is the case. We know of a lady in Lubbock who has such an extreme problem that she can wear cotton clothing only and must have 100% cotton sheets and pillow cases, and all of these must be washed in hot water only. Even detergents used in laundering create an allergy problem for some persons.

Apparently the interest in and demand for organic cotton is greater than we anticipated. Recently we received a telephone call from Portland, Oregon asking where T-shirts and pajamas made from organic cotton can be purchased. At the time, we had no idea where such could be obtained. Coincidentally and quite fortunately, a representative of a clothing company in South Hackensack, New Jersey stopped by for a visit only two days after the inquiry from Portland. This person was here to study the processing of organic cotton into yarns and fabrics. (Actually, the mechanical processing is just the same as for any other cotton, but close attention must be given during processing to ensure that no chemicals are added at any point in spinning, warp preparation, weaving or knitting.)

The company in South Hackensack uses organic cotton in the production of T-shirts, sleepwear, children's clothing and certain types of underwear. We were pleased we could have the representative from that company call Portland and respond to the inquiry we had received. It would appear that the two companies were able to work together with one supplying theneeds of the other.

We feel our readers will be interested to know that much of the colored cotton we process here is produced organically. The interest in naturally colored cotton seems to be growing rapidly, and we feel it is good that some of this is grown organically. Certainly the colors are limited to various shades of brown and green, but these can be made into fabrics without dyeing or the use of chemicals. Some of the stripes and plaids we have produced are quite attractive and can be used in sport shirts, blouses and dresses.

As the development of textile materials from naturally colored and organic cottons progresses, we will give periodic reports on our research. We will be pleased to hear from any of our readers who would like to have more specific information about the availability and use of this type of cotton.

MEANS OF ACCOMPLISHMENT

The winter season is usually the busiest for the International Center, as the normal amount of research has to continue while we are asked to measure the quality of some 85,000 cotton samples coming from a just-completed harvesting season. This seasonal HVI testing (usually September through April) keeps many of our technicians occupied at a time when other fiber samples, yarns and fabrics still must be evaluated as part of our ongoing research.

It is important that we conduct our work as punctually as possible, and we utilize whatever means are available to accomplish this. Recently we have extended our working day by dividing the time our technicians are on the job so that we can begin at 5:00 a.m. and continue until 8:00 or 9:00 in the evening. Additionally, we have stretched our week to six days. This scheduling keeps everyone busy, but we really prefer this. The International Center depends heavily on funding from research sponsors. To say that we stay busy is an understatement, and when work becomes a necessity we are pleased to do it.

Related to all these activities, we are constantly aware of the need for instruments and machines with which to conduct our research. Also, we realize the need for state-of-the-art equipment so that the results from our work will be meaningful to industry. It is somewhat of a struggle to purchase and operate the needed equipment when we are on a limited budget, but so far we have managed to keep ourselves sufficiently up to date to attract an increasing amount of testing and research. We recently ordered a new fadeometer, officially known as an Atlas SunChex Xenon Exposure System. We also are currently negotiating for a new air-jet weaving machine and new instruments for yarn quality evaluation. These three pieces of equipment will go well with the additions we made in processing machinery during the past year.

It does not appear that a research institution such as ours will ever be satisfied with the equipment it has, but we manage to conduct a great number of programs by altering our work schedule as needed and utilizing the best equipment available to us. It is a challenge to find a means of accomplishment in a situation like this.

VISITORS

January visitors to the International Center included Dana King and Jerry G. Bush, Western Chemical Corp., Ft. Worth, TX; Lou Ann Gregory, B K Geans, Inc., Clarendon, TX; and Gary Coltharp, Coltharp Seed Cleaning, Seymour, TX.

From other parts of the world: Andy Austin, Steel Heddle, Greenville, GA; Jim Green and Jay B. Rappaport, E. I. DuPont De Nemours & Co. (Inc.), Wilmington, DE; Fred Reever and Hamid M. Gharashi, E. I. DuPont De Nemours & Co. (Inc.), Richmond, VA; Lee Morris and Phil Sheehan, B. F. Goodrich Co., Pueblo, CO; Susan Matsuda and Debra Dean, Levi Strauss, San Francisco, CA; Jack Rogers, Lindale Mills, Lindale, GA; Steve Urner, Greenwood Mills Marketing Co., Mercer Island, WA; Sally V. Fox, Natural Cotton Colours Inc., Wasco, CA; and Hans Drews, Paul Drews & Co. AB, Göteborg, Sweden.

"HOW TO" COLUMN – TIPS ON HOW TO RUIN YOUR DAY Without Really Trying

Professionals in behavioral sciences at the University of Oklahoma Health Sciences Center offer the following suggestions to add unneeded tension to an otherwise uneventful day. We thought our readers might be interested.

1. Plan to do twice as much as you actually can accomplish. (Overscheduling is the easiest way to drive yourself crazy.)
2. Worry about anything and everything – even those things over which you have no control.
3. Become inflexible. Demand everyone do things your way – an attitude guaranteed to raise your blood pressure.
4. Take things personally. Figure that any mistake was aimed at you.
5. Demand perfectionism. That way, you've earned the right to be miserable when something goes wrong.
6. Leave your sense of humor at home. Treat everything, no matter how trivial, as a matter of life and death.