



THE EFFECTS OF LINT CLEANING ON FIBER AND YARN QUALITY – AFIS INSTRUMENT TESTING

The Uster Advanced Fiber Information System (AFIS) is a highly specialized instrument used to measure important fiber properties; neps, length and diameter and trash content. The measurements and results are used to evaluate the efficiency of machinery used in the cotton gins and textile mills by simulating the opening and cleaning processes. The foundations of the AFIS are a fiber individualizer, electro-optical sensor and a data acquisition board. The fiber individualizer feeds fibers into an airstream, separating them for measurement and analysis. The electro-optical sensor measures the individual fiber properties as they penetrate a beam of light. Sensitive detectors transmit this information as characteristic waveforms which are analyzed by the computer and displayed on the screen and in printed form. The AFIS has three specialized modules to measure and analyze neps (AFIS-N), length and diameter (AFIS-L & D) and trash content (AFIS-TRASH).

In three previous issues of *Textile Topics* (Vol. XX, Nos. 4, 5 & 6), we introduced and reported results from one year's work of a three-year study devoted to lint cleaning. Samples of cotton (referred to in the accompanying tables as Lots A through G) which had received various degrees of cleaning at the gin were tested on Uster's Advanced Fiber Information System. The cottons had been evaluated in a previous study (*Textile Topics*, Vol XX, No. 4, December 1991).

Results of the AFIS testing together with non-lint data from the Shirley Analyzer are seen in Table I at the bottom of this page.

Table II shows a strong relationship between the number of particles of either type (dust or trash) and the total number of particles per gram. This suggests that as cleaning proceeds and the total number of particles is reduced, the dust particles approach zero in number and are presumably effectively removed. The relationship with trash particles may be more complex, the tendency being for the number of trash particles to retain an increasingly greater proportion of the total as the total number is reduced. This indicates that cleaning treatments are not as effective at removing larger particles as dust particles. As the number of total particles reduces, so the mean

TABLE II
TEST DATA

Lot	Cleaning At Gin		AFIS-TRASH					Shirley Analyzer Non-lint Content (%)
	Seed Cotton Cleaning	Lint Cleaners	Total Particles (No./g)	Mean Size (µm)	Dust (No./g)	Trash (No./g)	Visible Foreign Matter (%)	
A	Standard	0	1160	282	1013	145	2.075	6.48
B	Standard	1	518	309	448	68	1.082	2.93
C	Standard	2	286	324	238	48	0.725	2.15
D	Multistage Cleaner Only	0	1434	297	1230	203	2.809	8.20
E	Multistage Plus	0	1081	274	957	124	2.008	6.56
F		1	570	309	480	89	1.276	2.79
G		2	345	309	294	50	0.704	1.81
H	Standard	2	386	339	311	73	1.012	2.38

TABLE I
TEST DATA

Lot	Cleaning At Gin		AFIS-TRASH					AFIS-N Neps/gram	AFIS-L & D Weight-biased Distribution Data				Shirley Analyzer Non-lint Content (%)
	Seed Cotton Cleaning	Lint Cleaners	Total Particles (No./g)	Mean Size (µm)	Dust (No./g)	Trash (No./g)	Visible Foreign Matter (%)		Upper Quartile Length	Mean Length	CV% of Length	Short Fiber Content (%)	
A	Standard	0	1160	282	1013	145	2.075	193	1.13	0.94	29.9	7.0	6.48
B	Standard	1	518	309	448	68	1.082	278	1.10	0.91	30.2	7.6	2.93
C	Standard	2	286	324	238	48	0.725	270	1.09	0.91	30.1	7.7	2.15
D	Multistage Cleaner Only	0	1434	297	1230	203	2.809	154	1.15	0.96	28.7	6.1	8.20
E	Multistage Plus	0	1081	274	957	124	2.008	220	1.14	0.96	28.2	6.2	6.56
F		1	570	309	480	89	1.276	278	1.11	0.93	28.7	6.6	2.79
G		2	345	309	294	50	0.704	342	1.13	0.94	28.5	7.2	1.81
H	Standard	2	386	339	311	73	1.012	303	1.12	0.94	29.4	6.8	2.38

particle size increases, substantiating the argument that dust particles are more easily removed.

Figure 1 is a graph of the visible foreign matter determined by AFIS plotted against the non-lint content. The scatter of the data about the line indicates that there is a close correlation of the data.

There was no consistent evidence that the relationship between particle counts or particle mean count and either total particle count or visible foreign matter was influenced by the seed cotton cleaning process.

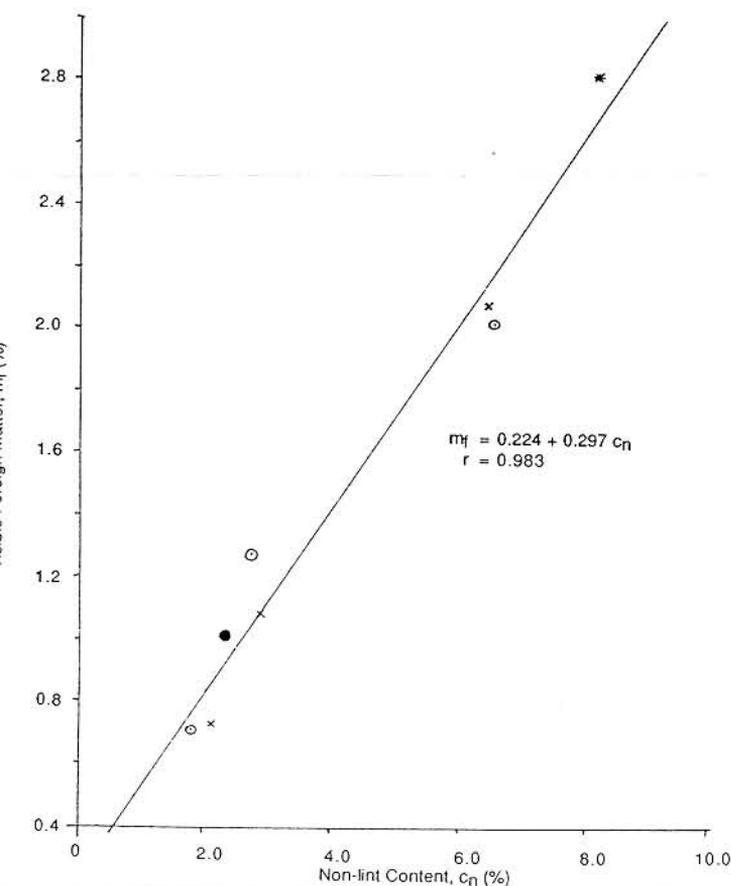


FIGURE 1: AFIS VISIBLE FOREIGN MATTER VS. NON-LINT CONTENT

There is an apparent association between nep frequency and short fiber content. Both increase as the number of lint cleanings increase, as shown in Table III. The relationship differed from one run (A, B, C) to another (D to H). Higher nep frequencies resulted from the use of the Multistage Extractor. The lowest nep frequency and short fiber content was recorded when minimal cleaning was employed (Figure 2).

TABLE III
TEST DATA

Lot	Cleaning At Gin		AFIS-N Neps/ gram	AFIS-L & D Weight-biased Distribution Data			
	Seed Cotton Cleaning	Lint Cleaners		Upper Quartile Length	Mean Length	CV% of Length	Short Fiber Content (%)
A	Standard	0	193	1.13	0.94	29.9	7.0
B	Standard	1	278	1.10	0.91	30.2	7.6
C	Standard	2	270	1.09	0.91	30.1	7.7
D	Multistage Cleaner Only	0	154	1.15	0.96	28.7	6.1
E	Multistage Plus	0	220	1.14	0.96	28.2	6.2
F		1	278	1.11	0.93	28.7	6.6
G		2	342	1.13	0.94	28.5	7.2
H	Standard	2	303	1.12	0.94	29.4	6.8

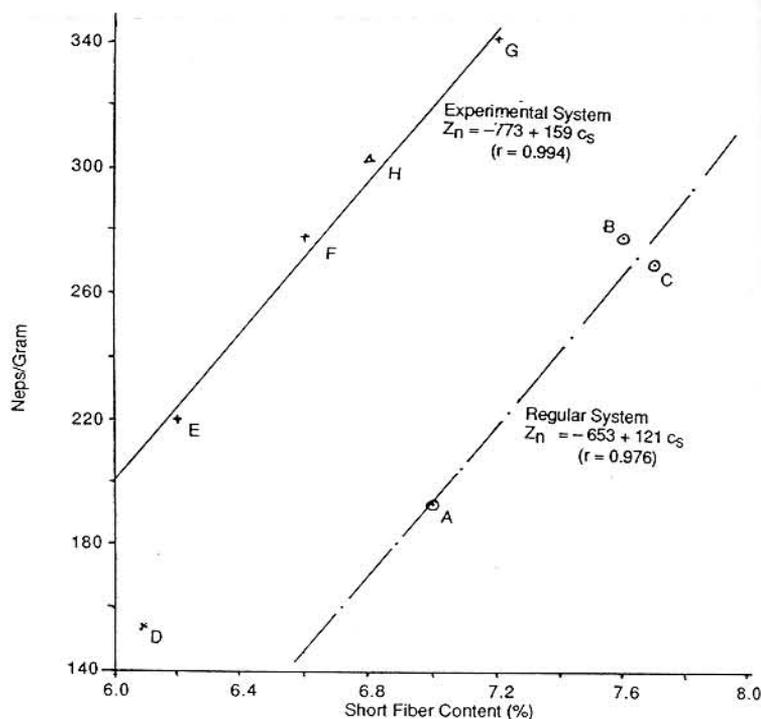


FIGURE 2: RELATIONSHIP BETWEEN NEP COUNT AND SHORT FIBER CONTENT

By the fact that the AFIS instruments' data show the trends in fiber properties which are expected by variation in the severity of cleaning at the gin, the instruments are capable of providing useful data in the cotton gins and textile mills.

The study was arranged by Mr. Norbert Stuhlfauth of Fils Textil, Reichenbach/Fils, Germany and sponsored in its entirety by the Texas Food and Fibers Commission. This report was prepared by John B. Price, assistant director of the International Center for Textile Research and Development.

PROGRESSING COTTON TECHNOLOGY SEMINAR

The International Center for Textile Research and Development, with the Reiter Corporation of Spartanburg, South Carolina, presented a seminar on Progressing Cotton Technology on July 22, 1992, in Lubbock. Texas Tech University's Vice Provost for Research, Dr. Robert Sweazy, welcomed seminar participants on behalf of the university and the International Center.

The seminar was held in conjunction with the dedication of the new Rieter opening line and combing system recently installed at the International Center for Textile Research and Development. Rieter officials here for this special occasion were: from Rieter Corporation, Spartanburg, SC; Executive Vice President and CEO, Euli Schmid; Manager of New Products, Hansuli Suter; and Regional Sales Manager, Dan Stokes. Dipl. Ing. Ulf Schneider represented Maschinenfabrik Reiter AG, Winterthur, Switzerland; and A. A. Ball represented Schubert & Salzer Machine Works, Ingolstadt, Germany.

Presentations on the developments and direction of research in the areas of cotton fiber properties and the ginning of cotton, as well as the preparation of cotton for spinning, were given by Dr. John R. Gannaway, Associate Professor, Texas A&M Experiment Center, Lubbock; Roy V. Baker, Research Leader, USDA-ARS Ginning Laboratory, Lubbock; and John B. Price, Assistant Director of the ICTRD.

Industrial assessments on the progress of cotton were presented by George Blomquist, Parkdale Mills, Gastonia, NC; Hansuli Suter, Rieter Corporation, Spartanburg, SC; and A. A. "Tony" Ball, Schubert & Salzer Machine Works, Ingolstadt, Germany. Laurence A. Christiansen, Editor-in-Chief and Publisher of Textile World, Atlanta, GA, gave an insightful and entertaining presentation on the future of textiles.

A buffet reception at the Lubbock Plaza Convention Center during registration for the seminar featured a fashion show presented by Texas Women for Natural Fibers. All garments modeled were made from TEXCELLANA, a blend of Texas cotton and Texas short-shorn wool developed by the ICTRD.

YOUR ATTENTION PLEASE ! WE HAVE A CHANGE IN OUR ADDRESS

We have been notified by the U.S. Postal Service that the Zip Code in our address has been changed from 79417-5888 to **79408-5888**.

This means that our address now is:
International Center for Textile Research and Development, P. O. Box 5888, Lubbock, TX 79408-5888.

We will be certain of receiving your mail if it is sent using the new Zip Code. (Who knows **where** it may go, otherwise.)

WORDS OF WISDOM

When we have space in this newsletter, we like to print a few "words of wisdom" which we have found interesting. We recently were given the following:

KEYS TO LIVING LIFE GRACEFULLY

- Focus on what you can do – not on what you cannot!
- Be your own person.
- Examine what you need and want and develop a plan to strive for it.
- Take time for yourself and give some to others.
- Listen, learn and laugh!
- Love yourself. Begin today to look at yourself positively.
- Appreciate your accomplishments and accept your mistakes.
- Be emotionally honest in a tactful manner with all people.
- Set time limitations and emotional and physical boundaries to avoid overload.
- Nurture your soul. Spend time in silence and quiet reflection.

These thoughts are from Grace J. Baucum, M.Ed., L.P.C., Consulting Psychotherapist to Willowbrook Hospital in Waxahachie, TX.

HOLIDAY CLOSING

We remind our readers that, as every year, the International Center for Textile Research and Development will be closed for the Christmas and New Year holidays. We will be closed from December 24, 1992 through January 1, 1993 so our staff can enjoy the season with their families.

We take this opportunity to wish all our friends a Happy Holiday Season and a Prosperous New Year.

VISITORS

The International Center for Textile Research and Development was pleased to have Consul Ma. Luisa Y. Langcauon from the Consulate General of the Philippines, Houston, TX, visit with us on June 12. Consul Langcauon was accompanied by Maria Victoria Baltazar of the consulate.

Other visitors during June and July included Weyland Eubanks, Ti-Caro Knits, Jefferson, SC; Joe M. Rees, Dixie/Ti-Caro Yarn Group, Chattanooga, TN; Ryan Sarnataro, Maggie's Organic Products, San Francisco, CA; Martin McKinnon, Caro-Knit, Newton, NC; Sandy Elias, Caro-Knit, New York, NY; Milton Breeze and Greg Russell, Burlington Industries, Stonewall, MS; Lee Morris, B. F. Goodrich Aerospace, Pueblo, CO; Jimmy Pope, Zellweger Corp., Charlotte, NC; George Smith and Gary Wells, J. D. Hollingsworth, Greenville, SC; W. H. Jewelle, Picanol, Greenville, SC; Dr. & Mrs. James M. Summers, The Living Source, Waco, TX; Kelley E. McRae, Phyto-gen, Corcoran, CA; Heinzbert Reiners, Mike Rodriguez and Andy Talbott, Schlafhorst Inc., Charlotte, NC; Ricardo Gabriel Novick, Catamarca, Argentina; and Manish N. Sheth, C. A. Gauakotwana & Co. Ltd., Bombay, India.

Visiting groups included 30 cotton producers from Australia, accompanied by Dr. Bob Metzger, Texas A&M University, College Station, TX; eight representatives of Monsanto Chemicals who were meeting in Lubbock; and five members of the Midland Industrial Development Commission, Midland, TX, accompanied by Lawrence Hahn, also of Midland.

4-H Club groups visiting during the two months included 20 members from Stanton, TX; 7 from Terry County 4-H, Brownfield, TX; and 30 4-H Exchange members from Fredricksburg, TX and Slaton, TX.