SAWTRI BULLETIN

SOUTH AFRICAN
WOOL TEXTILE RESEARCH INSTITUTE
OF THE CSIR

P.O. BOX 1124
PORT ELIZABETH

VOL. 13 MARCH, 1979 NO. 1

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Editor: M. A. Strydom

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SA ISSN 0036-1003

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INSTITUTE NEWS

Meetings, Visits and Lectures

Two members of SAWTRI's Textile Chemistry Department, Dr N.J.J. van Rensburg and Mr E. Weideman, attended the 26th Convention of the South African Chemical Institute held at the University of Port Elizabeth during January.

The Director, Dr D.P. Veldsman, was guest speaker at the official opening of the academic year at Port Elizabeth CATE, where he again stressed the growing shortage of competent and trained middle management in the industry and its potential disrupting effect on the economic growth rate.

Four senior staff members (Drs Veldsman and Hunter and Messrs Vogt and Robinson) attended a Clothing and Textile Seminar organised by the Cotton Promotion Council in Bulawayo on March 8th. Dr Hunter delivered a paper on the dimensional stability of cotton fabrics while Dr Veldsman chaired a panel discussion at the end of the Seminar. The SAWTRI/CPC Steering Committee Meetings were also held during this visit to Rhodesia.

Director Appointed to the Editorial Board of the Textile Institute

Dr Veldsman has recently been appointed to the Editorial Board of the Journal of the Textile Institute in Manchester. The Board is responsible for the editorial policy of the Journal and to maintain its high standard of quality as one of the most authoritative sources of scientific information on textiles in the world.

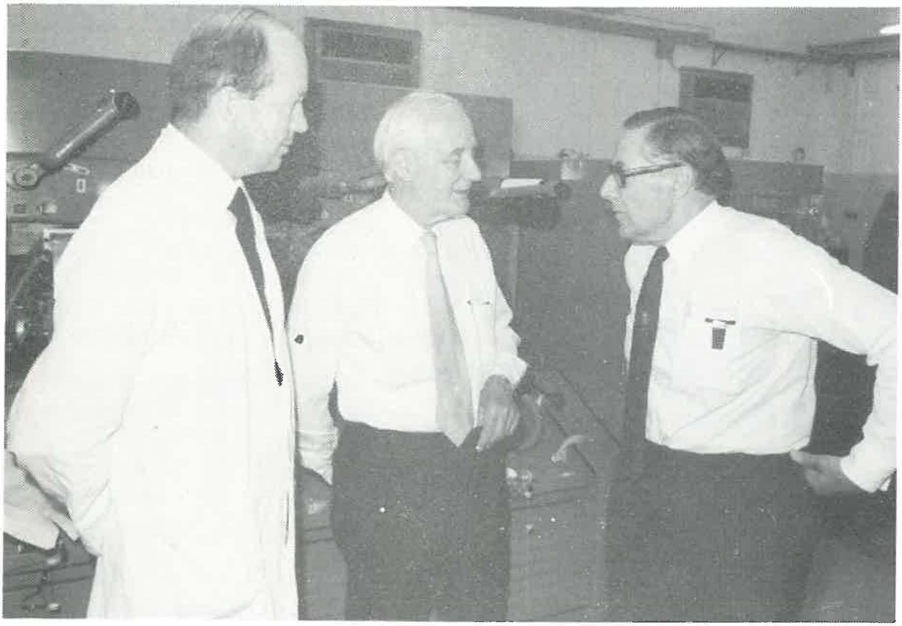
Visitors

Mr J. P de Wit, newly-appointed CSIR Vice President and Member of the Executive responsible for SAWTRI visited the Institute on February 2nd. This was Mr De Wit's first official visit to SAWTRI, the purpose of which was to familiarise himself with the Institute's current activities. Other visitors to the Institute included: *Mr S. A. S. Douglas,* of the Australian Wool Testing Authority in Sydney; *Dr G. Blankenburg* of the Deutsches Wollforschungsinstitut, Aachen; *Prof. C. Scott* of the University of Aston, Birmingham; *Mr R. V. Stroud,* Chairman of the WIRA Council and of Messrs Stroud-Riley, U.K.

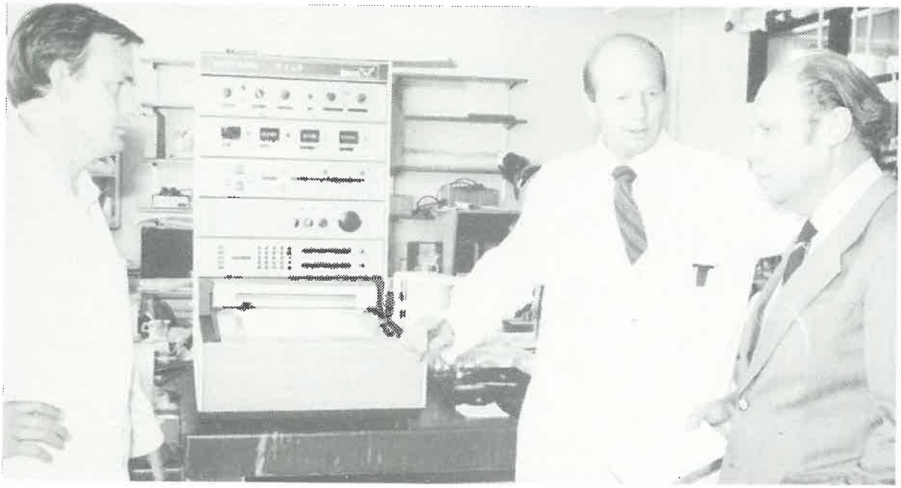
SAWTRI was also very honoured to receive *Professor C. S. Whewell,* President of the Textile Institute. Professor Whewell visited all four local sections of the Textile Institute and the Eastern Cape Section entertained him at SAWTRI on February 23rd. Professor Whewell, although retired from his position as Head of the Department of Textile Industries at Leeds University, is still a world authority on the textile industry. Another eminent British visitor was *Lord Barnby,* well-known industrialist who has been associated with the

Mr S. A. S. Douglas of the Australian Wool Testing Authority, right, discussing the quality of some local wools with Dr D. W. F. Turpie

Mr R. V. Stroud, Chairman of WIRA (right) with Dr D. P. Veldsman.



Professor C. S. Whewell, centre, with Dr L. Hunter and Mr J. D. Spencer of the Cotton Processing Department.



Professor G. Blankenburg, right, talking to Mr S. Smuts and Dr L. Hunter of the Textile Physics Department

The Karakul Board delegation during their recent visit to SAWTRI. In the usual order: Messrs Von Hase, Manning and Rabie.

The first group of loom tuners to complete the training course on the Dornier rapier loom. The course instructor, Mr V. Brust of Dornier GmbH, Germany, is third from left

wool industry for more than 70 years and who has wide interests vested in Southern Africa.

A group of *Phormium tenax farmers* from Natal also visited SAWTRI and had technical discussions with staff members on various aspects of softening and further processing of phormium. On the 20th February members of the SWA/Namibia *Karakul Board* visited SAWTRI with a view to establishing relationships with the Institute, since this Board will in future function autonomously as far as the SWA karakul industry is concerned.

New Subscribers

We would like to welcome Messrs O. S. Blenkinsop (Wool) Pty Ltd, Port Elizabeth, and Intexma (Cape) Pty Ltd, Cape Town, as new subscribers to the work of SAWTRI.

Textile Education: A Revival of Interest

There appears to be a genuine concern emerging about the lack of textile training at middle-management level and the serious effect this can have on the local industry. The problem is not new and there has been considerable effort from SAWTRI's part to stimulate industry in becoming more involved in training on a broad basis. The latest developments in this area has been the decision by the Textile Advisory Committee of the Textile Federation to form a sub-committee to deal with matters relating to training.

Demonstration Courses at SAWTRI

Two of the latest short courses run at SAWTRI have been on the DREF spinning machine and the Dornier rapier loom.

A loom tuner's course on the Dornier was run in three consecutive three-week sessions, with mostly workers from the woollen industry attending. A week-long demonstration course on the DREF spinning machine was also well-attended and it is hoped that SAWTRI'S research projects on the DREF planned for this year will be of great benefit to local spinners.

Staff Matters

Drs D. W. F. Turpie and L. Hunter have been promoted to the newly-established position of Assistant Director. The Cotton processing department under Mr J. D. Spencer is now responsible to Dr Hunter while Dr Turpie has the Technical Services Group under Mr J. Klazar added to his responsibilities.

New appointments to the staff are the following:

Mr A. Maasdorp M.Sc. (UPE) as Research Officer in the Textile Chemistry Division. Mr Maasdorp obtained his M.Sc. degree in Chemistry in 1977.

Miss A. T. Vermooten, B.Sc., (Cape Town) as Assistant Technical Officer in the Textile Chemistry Division.

Mrs E. Landman as Assistant Technician in the Textile Physics Division.

Mr. H. W. Labuschagne as Chief Technician in the Carding and Combing Department.

SAWTRI'S recently installed six-head DREF II OE spinning frame. Mr J. D. Spencer, Group Leader for Cotton Processing (left) discussing a technical point with a DREF installation technician from Dr Ernst Fehrer AG, Austria.

SAWTRI PUBLICATIONS

Technical Reports

No. 436 : Cawood, M. P. and Hunter, L., The Dimensional Properties of Textured Polyester Double Jersey Fabrics, Part I: Influence of Machine Tightness Factor, Run-in-Ratio and Some Yarn Variables (November 1978).

No. 437 : Van Rensburg, N. J. J. and McCormick, S., The Simultaneous Dyeing and Durable Press Treatment of Wool/Cotton Blends (December 1978).

No. 438 : Turpie, D. W. F. and Hunter, L., The Effect of Spindle Speed and Certain Wool Fibre Properties on End Breakage Rate and Yarn Properties (February 1979).

No. 439 : Hunter, L. Robinson, G. A. and Smuts, S., The Effect of Wool Staple Crimp, Resistance to Compression and other Fibre Properties on Certain Woven Fabric Properties (February 1979).

No. 440 : Spencer, J. D. and Taylor, H., Removal of Vegetable Matter from Scoured Wool during the Processing of Wool/Cotton Blends on the Cotton System (January 1979).

No. 441 : Turpie, D. W. F., The Effect of Staple Crimp on the Almeter Length Characteristics of Wool Tops Differing Greatly in Length (February 1979).

No. 442 : Kelly, I. W., The Response of Some South African Cotton Cultivars to Yarn Mercerisation and Fabric Resin Treatment (February 1979).

No. 443 : Hunter, L., Cawood, M. P. and Dobson, D. A., The Dimensional Properties of Interlock and Plain Single Jersey Fabrics Containing Cotton and Polyester (March 1979).

No. 444 : Hunter, L. and Smuts, S. The Effect of Fibre Diameter, Resistance to Compression and Staple Crimp on the Wrinkle Recovery Properties of Some Woven Wool Fabrics (March, 1979).

No. 445 : Cawood, M. P. Robinson, G. A. and Dobson, D. A., The Effect of Positive Yarn Feed Mechanisms and Tension on Stitch Length and Certain Yarn Properties (March 1979).

No. 446 : Hunter, L., Smuts, S. and Kelly, I. W. The Effect of Fibre Diameter on the Wrinkling and Other Physical Properties of Some All-Mohair and Mohair/Wool Fabrics (March 1979).

Other Publications

Turpie D. W. F. and Veldsman, D. P., SAWTRI's Investigations into the Effects of Raw Wool Blending on Subsequent Processing Performance during Worsted Topmaking and Spinning, WIRA Special Report "Implications of Objective Measurement", 21 (December, 1978).

ABSTRACTS

Andrew, W., **Progress in Short Staple Systems Increasingly Dominates Spinning,** *Int. Text. Machinery,* 26 (1978).

The author reviews the latest developments in short staple systems with particular reference to those exhibited at the latest Greenville Show. He reports that the present trends towards *short staple* systems will continue. The processing of shearing wools of about 38 mm in length are being studied in the U.S.A. Well over 90% of all yarns spun in the U.S.A. are spun on some sort of cotton system spinning machinery. It has been predicted, that by the end of the century almost all the machinery shown at the Greenville exhibition will be related to non-wovens, although this is regarded as unlikely.

The automatic feeding of fibres from bales is receiving increasing attention and so is more efficient methods of dust removal during opening. Growing interest is also being shown in vertical column blenders, six vertical columns being a reasonable average. Most of these blending machines can incorporate some form of opener. Taker-in type beaters or rollers are increasingly being used in opening machinery, particularly for improved dust removal for rotor spinning. Chute feeds for cards are now well established although lap feeds are more versatile.

A special fibre cleaning system (Temafa) is of particular interest to rotor spinners, since it is said to be capable of recovering as much as 50% of good fibre from scutcher waste and up to 80% from flat strips. As much as 20% of this fibre can be used for normal spinning while for rotor spinning, 100% can be used for yarns as fine as 50 tex or even finer.

In high production carding, split web deliveries are receiving increasing attention. Machinery manufacturers are also moving more towards encasing their cards. Pneumatic removal of waste from opening machines and cards reduces the amount of dust in the air and which percolates throughout the mill. Waste is also baled so that working conditions become more pleasant for the operative. Some drawframes incorporate suction systems to remove trash and dust, particularly in preparation for rotor spinning.

Single-delivery drawframes operate at speeds as high as 600 m/min and two-delivery machines as high as 500 m/min. Growing interest is apparently being shown in drawframes with vertical drafting systems. Combing speeds of up to 240 nips/min are now possible.

In ring-spinning developments are continuing in automatic doffing and piecing. Marzoli has introduced a modification of the living-ring principle with the yarn driving the ring, giving 100% increase in the spinning speed of coarse yarns and 50% in the case of fine yarns. In place of the usual ring and traveller, a "Diamond Ring" and rider are used and there are only two types of riders, one for each machine model. These are claimed to cater for all requirements.

(LH)

Rowe, M. H., **Desizing/Scouring with Hydrogen Peroxide.** *Text. Chem. & Col.,* **10** (10), 215/22 (October 1978).

The author shows that strongly alkaline solutions of hydrogen peroxide are effective desizers for cotton and cotton/polyester fabrics containing polyvinyl alcohol, starch, or mixtures of these. The addition of a wetting agent and heating the solution up to 140° F facilitates desizing. The most effective desizing pH is around 12 which can be obtained with 2% sodium hydroxide. When 0,1 to 0,3% H_2O_2 is used, the residual size is normally less than 0,2% A combined desize/scour/bleach is also possible but in this case the dwell time has to be 45 min with the cloth in rope form. Most open width ranges with J-boxes and steamers use short treatment times (10 min). It is claimed that this procedure reduces size accumulation on the rollers and other parts of the equipment, improves fabric absorbency and mote removal.

(DPV)

Anon, **Spanish Mill using Ginning Waste,** *Text. World,* **128** (11), 32 (November 1978).

It is reported in a brief note that one Spanish rotor spinning plant is making large profits by processing ginning waste. Although as much as 50% to 60% of all fibre is lost in the spinning pneumatic extraction system (this being used as supplemental boiler fuel), the firm is still spinning an acceptable yarn for non-critical uses.

(LH)

Perkins, H. H., Jr. and Cocke, J. B., **Cotton Dust Levels Reduced with Additives,** *Text. Ind.,* **142,** 92 (November 1978).

The article deals with trials aimed at reducing cotton dust levels during processing by means of additives. The results show that additives can reduce dust levels to as low as 0,3 mg/m^3. To achieve comparable reductions by means of air handling and filtration procedures would require elaborate and expensive equipment.

(LH)

Grignet, J. and Delfosse, P., **The Influence of Fibre Characteristics (Diameter and Length Distribution) on the Frequency and Type of Thickness Faults in Yarn,** *Ann. Sci. Text. Belges,* **25** (2), 197 (December 1977).

The effect of fibre diameter and length distribution on the thick place faults (Classimat) in wool worsted yarns was studied. It appears that the number of relatively short faults (Class A) were mainly related to the percentage of short fibres (shorter than 15 mm giving the best fit, whereas the longer type of faults (Class D) was mainly affected by the average number of fibres in the yarn cross-section. A better correlation was often obtained if, instead of percentage fibres shorter than 15 mm, the percentage fibres shorter than 0,25 x H (where H is Hauteur in mm) is used as independent variable.

(LH)

Leary, R. H., **ATME Review (6): Preparatory Equipment,** *Text. Asia,* **9** (9) 50 (Sept., 1978).

The author reviews preparatory equipment exhibited at the 1978 ATME exhibition.

Because foreign particles cause many end breaks during rotor spinning much more efficient fibre cleaning is required for processing along the rotor spinning route. Automatic bale handling and blending are becoming increasingly common, it being possible to blend different fibres to an accuracy of $\pm 1\%$. The new Crosrol Mk3 DU tandem card has dual sliver deliveries aimed at high card production rates without excessively high sliver speeds while the Mk3 has a single delivery. The heavy webs involved in dual deliveries does, however, cause some deterioration in carding quality. The Mk3 DU produces two 3,9 ktex slivers at total production rates of up to 80 kg/hr. Short-term autolevelling at the card could lead to the elimination of drawing, but if drawing is carried out, long-term autolevelling is adequate. Totally enclosed cards improve card-room environment while vacuum systems are also featured on cards, for collecting dust and waste.

Most drawframes now have vacuum devices to remove the dust liberated in the drawing heads. A crush roller in place of a fluted front bottom roller has also been introduced on one drawframe, it being claimed that it not only gives the same result as a crush roller at the card, but is also cheaper.

(L H)

Looney, F. S., **OE Polyester Selection: Compromise between End Use and Fibre Properties.** *Textile World,* 40 (December 1978).

In deciding on the type of polyester to use, various factors are important, e.g. end-use requirements (pill-resistant or high tenacity) and polyester content in the blend. Very often compromise has to be made, since fibre properties play an important role in rotor spinning. In the opening roller region, low fibre-to-fibre friction but high fibre-to-metal friction are desirable. Within the rotor, however, an entirely different set of conditions is valid. Here high fibre-to-fibre cohesion is an advantage. The extent of wrapper fibres, normally an objectionable factor, will be proportional to the number of fibres per yarn cross-section, the staple length and the twisted length of yarn against the rotor wall. One could expect the lowest level of wrapper fibres with short-stapled, heavy denier fibres.

Spinning efficiency on the other hand will *decrease* with an increase in fibre *denier* but *increase* with increasing twist and increasing yarn linear density. Fibre deposits in the rotor *decrease* as fibre denier *increases.* Generally, *yarn properties* deteriorate as fibre denier increases. Nep contents of OE yarns are normally higher than those for ring-spun yarns.

If a conventional pill-resistant polyester is processed, *heavier* rotor deposits can be expected. Yarn strength depends on fibre strength. However, with OE yarns a 25% increase in fibre tenacity results only in a 10% increase in yarn strength. In general, the use of a *lubricant* will reduce fibre damage in the opening roller section but will adversely affect spinning performance due to lower fibre cohesion at the rotor wall. Thus, although spinning performance may decrease so will rotor deposits. Staple lengths varying between 25 mm and 38 mm has little influence on yarn strength and end breaks. However, yarn uniformity improves with a decrease in staple length from 38 mm to 31,4 mm, but then deteriorates. The difference between the theoretical and actual twist varies with staple length. The optimum staple length is about 31,4 mm . (DPV)

Anon, **Faulty Dyeings on Cotton Fabrics and Possibilities of their Correction,** *Int. Text. Bull.,* Dyeing/Printing: Finishing, 282, 3/78.

The causes of faults that can occur in a dyehouse are discussed. Faulty dyeings can be caused by the quality of raw material, chemical action such as stains, or by the incorrect use of machinery, auxiliaries and dyes. Various recommendations for the correction of faulty dyeings are made. Recipes are given for the stripping, lightening and levelling of most of the important classes of dyestuffs. The following dyestuff classes are covered: direct, diazo, vat, leucoester, sulphur, sulphur vat, naphtol, reactive, phthalocyomine dyes and pigments.
(NJJvR)

Anon., **A Major Development in OE Spinning from Switzerland.** *Text. Month,* 38 (December, 1978).

This article refers to the fundamental problem in rotor spinning of controlling fibre movement between the opening roller and the rotor wall, since there is no possibility of orientation of the fibres by mechanical forces. The fibres in this zone are guided solely by aerodynamic forces. One of the new developments involves a *shortening* of the distance between the feed tube exit and the rotor wall.

As far as the effect of different rotor diameters is concerned it is in the rotor groove zone where untwisted fibres are turned into a twisted yarn, through a so-called "twisting-in torque". With bigger rotors a lower minimum twist can be inserted (i.e. softer twist). It would also appear that with bigger rotors higher delivery speeds can be achieved. This is mainly applicable to synthetics while cotton requires a relatively high twist in any case and the advantage of using a bigger rotor is lost. Consequently, most *cotton yarns* are spun with 45 mm diameter rotors. However, occasionally bigger rotors have to be used for longer fibre lengths or for the production of coarser yarns (i.e. 100 tex and coarser).
(DPV)

Ince, J., **Engineering of Wool Carpet Yarns.** *Text. Inst. & Ind.,* **17** (1), 23 (January, 1979).

The author discusses the basic fibre properties which are important in selecting a raw material for carpet yarns (length, fineness and degree of medullation). The various spinning systems are also considered, viz. semi-worsted, woollen and rotor yarns. As far as the latter is concerned, the author states that for the *DREF system* of spinning, wool selection is not critical and *vegetable matter* no problem. *Minimum twist levels* which produces satisfactory running conditions should be selected for this system. DREF yarns tend to be slightly stronger but less bulky than woollen spun yarns. Attention is also given to *lubrication* and yarn finishing (scouring, milling, twist setting, mothproofing, static control and anti-soil/anti-stain).
(DPV)

THE HAIRINESS OF WORSTED YARNS WOUND AT DIFFERENT SPEEDS ON DIFFERENT WINDING MACHINES

by L. HUNTER

ABSTRACT

The hairiness of an undyed wool worsted and a dyed 45/55 wool/polyester yarn after winding was found to be dependent on both winding speed and the particular winding machine used.

INTRODUCTION

Although the effects of preparation spinning, fibre and yarn parameters and of rewinding and waxing on yarn hairiness have been investigated in some depth, very little work appears to have been carried out on the effects of winding speed and winding machine type on the hairiness of worsted yarns when using modern winders. This report, therefore, deals with a limited study which was carried out to improve our knowledge in this respect. The interested reader is refered to various articles[1–8] which review the work done on yarn hairiness in general.

EXPERIMENTAL

Two tops, viz. undyed all-wool and black 45/55 wool/polyester, were spun into 24 tex Z540 and 19 tex Z600 yarns, respectively, at a spindle speed of 8 000 rev/min. Processing additives and other conditions were in accordance with general commercial practice, the yarns being spun on a double-apron drafting system. After spinning, the two yarns were re-wound on four different winding machines described as follows:

A. Split drum winder, winding onto 9°15' cones.
B. Grooved drum (rotary traverse) winder, winding onto 5°57' cones.
C. Solid drum winder with a yarn guide traverse motion, winding onto 9°15' cones.
D. Grooved drum winder, winding onto 9°15' cones.

On all these winders, the yarn package is driven by frictional contact with the drum. With three of the winders (A, B and D), the yarn is traversed by the winding drum while for the fourth winder (C), the yarn is traversed by an independent yarn guide. The winders were operated within their recommended speed ranges in the normal way, without any wax or other lubricants being applied to the yarn. It is worth noting too, that three of the winders (A, C and D)

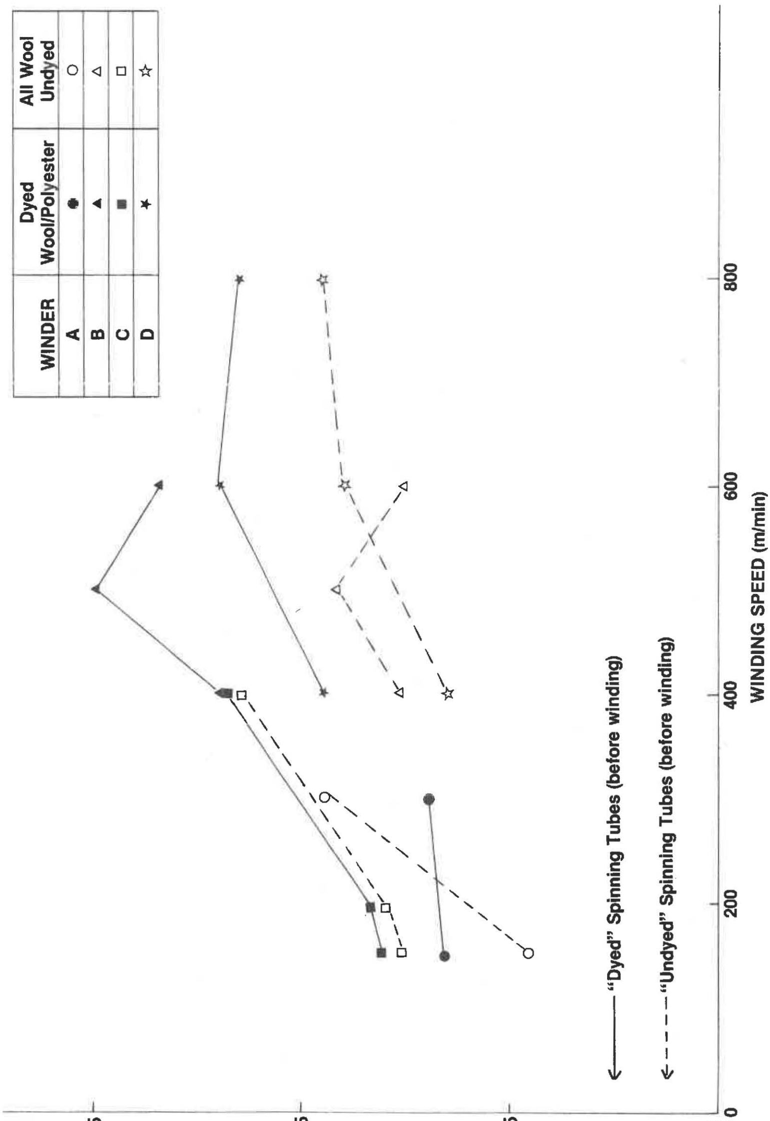


FIGURE 1

The effect of winding speed and machine type on yarn hairiness

wound onto 9°15' cones whereas the fourth (B) wound onto 5°57' cones. The latter type of cone is becoming increasingly popular.

After winding, the yarns were allowed to condition at 20°C and 65% RH and their hairiness then measured on a Shirley Yarn Hairiness meter at the standard distance of 3 mm .

RESULTS AND DISCUSSION

The effects of winder and winding speed are illustrated in Fig. 1. The results obtained on yarn directly from the spinning tubes are given at "zero" winding speed for purposes of comparison. From Fig. 1 it is apparent that yarn hairiness is affected both by the winding speed and the particular winder used. For instance, at a winding speed of 400 m/min. it appears that the winder D gave the lowest yarn hairiness.

It would be possible to reduce yarn hairiness by reducing to a minimum any abrasion on the yarn during winding, for instance, by eliminating unnecessary yarn contacts with any surfaces and by ensuring that all the surfaces with which the yarn comes into contact are not excessively worn and are free of any rough places. It appears too, that where yarn hairiness is a problem, a lower winding speed may prove beneficial.

It may be noted that, in another trial (not reported here), spindle speed (in the range of 7 000 to 9 000 rev/min.) did not have a material effect on yarn hairiness.

ACKNOWLEDGEMENTS

The author is indebted to the various processing departments for technical assistance. A word of thanks is also due to Mrs M. Hill and Miss A. Coetsee for measuring the yarn hairiness.

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A NOTE ON THE EFFECT OF AUTOCLAVE STEAMING OF YARNS CONTAINING VARIOUS SPINNING LUBRICANTS ON STREAKINESS OF PIECE-DYED FABRIC

by D. W. F. TURPIE and S. G. MARSLAND

ABSTRACT

It was shown that both the choice of lubricant applied prior to spinning and the autoclave steaming conditions had significant effects on the resultant streakiness of piece-dyed all-wool fabrics.

INTRODUCTION

As a result of some recent problems encountered with streakiness of piece-dyed all-wool fabrics a limited investigation was carried out to ascertain the possible causes of the observed streakiness. Eventually after a number of fruitless attempts to establish the cause of the streakiness, it became clear that the observed effects were due to some fault associated with the autoclave steaming of the yarns. It was then decided to carry out a short investigation in which both the choice of lubricant added prior to spinning and the autoclave steaming conditions would be varied, the yarns then knitted into fabric, dyed and examined for streakiness.

EXPERIMENTAL

Wool tops having a mean fibre length of 52,7 mm (CV = 48,9%), a mean fibre diameter of 21,4 μm and a dichloromethane extractable matter content of 0,7% were selected for the trials. The tops were backwashed to remove applied lubricants, blended through a gill box while very slightly damp (to avoid static problems) and then divided into seven parts.

One out of a selection of seven lubricants (coded A-G*) were then sprayed onto each part, gilled-in and autolevelled. (Lubricant G was actually an experimental batch for possible substitution of lubricant B.) Application levels were such that about 0,8% of active matter was applied in each case. In the case of the lubricant E a small amount of emulsifier (coded H*) was used. In all cases the pH of the aqueous extract of the tops after lubrication was between 7,4 and 7,6.

*Names available confidentially on request

The tops were drawn and spun on a Rieter worsted ring frame, type H6 (which was of the collapsed balloon type). All yarns had a linear density of 40 tex and a twist of 800 turns/m and were spun at 8 000 rev/min. A no. 21 traveller was used to provide a normal tension, and the yarns were wound onto average quality plastic tubes.

The above yarns were autoclave steamed under various conditions (see Table I). Some were also wound onto dye-cheeses, scoured and then autoclave steamed, the scouring operation presumably removing most, if not all of the applied lubricant. Autoclave steaming was carried out in an Andrews Mini Setter provided with evacuation and steaming cycle facilities (see Table I).

With regard to the yarns which were autoclave steamed on tubes, a small portion, representing the last 100 metres or so of yarn which was spun, was knitted on a sample Lawson circular knitting machine and then dyed with a reactive dye. With regard to the yarns which were autoclave steamed on dye-cheeses, separate samples were knitted from both the outside and the inside layer of the cheese, and then dyed with a reactive dye.

Streakiness was evident in a number of the knitted fabrics, and to assess how the different autoclave steaming conditions and lubricants rated with regard to the streakiness effect, samples representing four levels of streakiness from 1 (poorest rating, or highest streakiness) to 4 (second-best rating, or second-lowest streakiness) were exhibited near the fabrics and six independent judges asked to rate the fabrics from 1 to 5 (this rating representing practically no streakiness at all).

RESULTS AND DISCUSSION

The streakiness ratings for the various autoclave steaming conditions and the different lubricants are presented in Table I.

A 2-factor analysis of variance was carried out on these results with the different judges' ratings being considered as replicates. The analysis showed that *real differences existed* between the results for the various conditions, and between the results for the various lubricants. Mean values for the various conditions and the various lubricants are given in the table, the minimum difference between any two values for significance being 0,34.

The *main* effects showed that lubricant B gave the least streakiness with the others more or less on par with each other, and significantly worse. They also showed that autoclave steaming on *dye cheeses after scouring* produced significantly less streakiness than *autoclave steaming on tubes* when steaming conditions were the same, but that significant improvements in streakiness when autoclave steaming on tube could result by reducing the steaming temperature. Reducing the number of steaming cycles from 2 to 1 improved the fabric appearance in one case but the reverse effect was observed in another case, and this aspect was, therefore, inconclusive. Variations in streakiness are thought to have been brought about by migration of the lubri-

TABLE I
STREAKINESS RATINGS FOR VARIOUS AUTOCLAVE STEAMING CONDITIONS AND LUBRICANTS

(Each block in the table gives the rating of six independent judges, always in the same order
Poorest rating = 1 Best rating = 5)

STEAMING CONDITIONS	LUBRICANT							MEAN VALUE
	G	F	E	D	C	B	A	
Pressure 13,5 kPa 2 cycles x 10 min at 110° C on tube	1 1 1 1 1 1	1 1 1 1 1 1	1 2 1 1 1 1	1 2 1 1 1 1	1 1 2 2 1 1	3 5 4 3 3 3	1 2 2 2 1 1	1,5
Pressure 13,5 kPa 1 cycle x 10 min at 85° C on tube	2 4 3 3 2 3	2 3 2 3 2 2	2 5 3 3 2 2	2 5 2 3 2 2	2 4 3 3 2 2	4 5 4 4 4 4	3 4 3 3 2 2	2,9
Pressure 13,5 kPa 2 cycles x 10 min at 85° C on tube	1 3 4 2 2 1	1 4 2 2 2 1	1 3 3 2 2 1	1 4 2 2 2 1	1 4 3 2 2 1	4 5 4 3 3 3	3 4 3 2 2 1	2,4
Pressure 27 kPa 1 cycle x 5 min at 70° C on tube	3 4 3 2 3 1	3 5 3 3 4 2	3 5 2 2 3 2	3 4 3 2 3 2	4 5 3 3 3 2	4 5 4 4 3 2	4 5 3 3 3 2	3,1
Pressure 27 kPa 2 cycles x 10 min at 70° C on tube	3 4 3 2 3 3	3 4 3 3 3 3	3 5 3 2 3 3	3 4 3 2 3 3	4 5 3 3 4 3	4 5 4 4 4 3	4 5 3 3 4 3	3,4
On dye cheese Scoured then steamed Pressure 13,5 kPa 2 cycles x 10 min at 110° C (Outside layer)	4 4 4 3 4 3	4 4 4 3 4 3	4 4 4 3 4 3	4 4 4 3 3 3	4 4 4 2 3 3	4 5 3 3 3 4	4 4 4 3 4 3	3,6
On dye cheese Scoured then steamed Pressure 13,5 kPa 2 cycles x 10 min at 110° C (Inside layer)	4 5 4 4 4 4	4 5 3 4 4 4	4 4 4 4 4 4	4 5 4 4 4 4	4 3 4 4 4 4	4 4 4 4 4 5	4 5 4 4 4 4	4,1
MEAN VALUE*	2,8	2,8	2,8	2,8	2,9	3,8	3,1	

*Minimum difference for significance = 0,34 cant towards one side of the tube since changes of shade of relatively short frequency were apparent in the knitted fabric, comparable to the distance between the outside and inside of the tube for each wind of yarn.

Taking a closer look at the results pertaining to the lots wound onto *dye cheeses,* there appeared to be no practical difference between the opinions of the judges with regard to lubricants except, perhaps, a marginal difference against the use of lubricant C. In any case, however, this lubricant was a paraffin-based lubricant and is NOT recommended for this particular application. Whilst of possible theoretical interest, the above procedure is not a practical route to follow in the normal course. A procedure involving autoclave steaming on the tube would be far more practical.

Taking a closer look at the results pertaining to the lots which were autoclave steamed on *tubes* it seems that lubricants C, B and A all performed fairly well at a steaming temperature of 70°C and a pressure of 27 kPa. These conditions, however, were too mild for practical purposes and a slight residual torque remained in the yarns. Lubricant B was superior to both lubricant C and lubricant A when the steaming temperature was 85°C and the pressure 13,5 kPa and was also the best lubricant when the temperature was 110°C and the pressure 13,5 kPa. By and large, therefore, it appears that under the conditions described here *autoclave steaming on tube* carried out at somewhere around 85°C in two cycles of 10 minutes and a pressure of 13,5 kPa, together with *careful selection of the lubricant* offered a practical solution to the problem of streakiness. In the present study lubricant B proved superior to all the others which were tried in this respect but it should be noted that the experimental batch (lubricant G) did not compare favourably with the standard grade.

In an industrial situation, where a large autoclave loaded to full capacity, and not a mini-setter, is used, the above conditions may have to be revised. The reader is referred to work carried out by the IWS on optimum conditions for obtaining uniform steaming and on the effects of steam temperature and pH on the yellowing of the yarn of which cognisance should also be taken[1].

ACKNOWLEDGEMENTS

The many members of SAWTRI staff who were involved in this work are thanked for their valued assistance.

PROPRIETARY NAMES

The fact that proprietary names are available confidentially on request in respect of the products coded A to H in this investigation does not imply that SAWTRI recommends them or that there are not substitutes which may be of equal value or even better.

REFERENCE

1. IWS Manufacturing Services Section. "Steaming Wool Yarns on Packages", *Text Manuf.* **93** (1106), 77 (1967).

THE CORRELATION BETWEEN THE PROPERTIES OF ROTOR AND RING YARNS PROCESSED ALONG MINIATURE AND FULL-SCALE ROUTES, RESPECTIVELY

by L. HUNTER and J. D. SPENCER

ABSTRACT

Some eighteen cottons, covering a wide range of cultivars and fibre properties, were processed into drawframe slivers using miniature and full-scale equipment, respectively. The slivers were spun into 30 tex yarns on conventional ring and rotor machines. The physical properties of the yarns were compared and it was found that the tensile, and to some extent irregularity properties of the rotor yarns processed along the two different routes were sufficiently correlated to justify the use of the miniature preparation system for a quick assessment of the potential yarn tensile properties of small quantities of cotton.

INTRODUCTION

Although the miniature spinning system (e.g. Shirley) is widely used for assessing the potential yarn tensile properties of a cotton, it is generally accepted that the properties of such a yarn are not identical to those of yarn spun in full-scale trials. Furthermore, the two sets of yarns may not necessarily be ranked in the same order as far as quality is concerned. In fact, in one study[1] it was concluded that the miniature spinning technique was a poor substitute for pilot plant spinning trials.

In recent years rotor spinning has gained a great deal of ground, particularly in the field of coarse cotton yarns and it has become important to develop a process whereby small quantities of cotton lint can be converted into rotor yarn as in the case of ring yarn, so that the potential of a cotton can be assessed in terms of the rotor yarn properties. It is important to remember though, that such a small-scale test cannot assess rotor spinning performance or the effect of trash accumulation in the rotor on yarn properties and end-breakage rate, it being widely recognised that trash plays a major rôle in rotor spinning. Furthermore, it is also worth noting that the trials may only be relevant to the particular rotor machine used since different rotor machines often give different results and even on the same rotor machine widely different results may be obtained by varying spinning machine parameters such as doffing tube, rotor diameter and groove and opening roller speed and clothing.

Although some work[2] has been carried out on the processing of cotton on small sample equipment followed by rotor spinning, this was limited to one rotor machine (Platt Model 833) and the findings need not necessarily apply to other rotor machines. Furthermore, no attempt appears to have been made to relate the properties of the small-scale trials to those of yarns processed on full-scale equipment. It was, therefore, the aim of this study to determine the correlation between the properties of yarns spun on rotor and ring machines after processing on miniature and conventional (full-scale) machinery, respectively.

TABLE I
FIBRE PROPERTIES

Cultivar	Micronaire	Maturity Ratio	Fineness (m/tex)	2,5% Span Length (mm)	3,2 mm (1/8") Gauge Tenacity (cN/tex)	Extension (%)
Alma C535/311/2/1	4,8	0,95	194	27,3	20,3	8,2
Delmac	3,8	0,84	155	30,6	32,5	6,9
CS2	4,3	0,81	176	26,9	19,7	6,3
Acala SJ 185	4,7	0,92	185	29,2	30,0	6,2
Alma 76	3,7	0,80	170	24,8	18,6	8,9
Deltapine 5826 Dirk	4,4	0,80	188	27,4	26,4	5,6
Albar 10217	4,7	0,78	191	27,7	21,4	6,1
Acala 1517/70	3,6	0,85	158	25,6	27,5	7,0
Deltapine 5826 Deal	4,2	0,87	179	25,3	22,1	7,8
Acala SJ 1	4,0	0,84	175	29,2	28,4	7,3
BSG 31878	3,9	0,75	173	25,8	27,2	7,1
Deltapine 5826 BSG	4,3	0,83	184	28,6	25,6	7,1
Acala SJ 141	5,0	0,93	198	29,5	27,2	7,4
Albar 736	4,9	0,88	187	26,5	23,4	7,6
Deltapine SL	5,2	0,89	—	26,5	22,6	8,1
C 76/2/1/2	3,5	—	—	25,9	14,5	6,7
Alma 535/302	3,5	0,88	154	27,7	27,9	7,4
BSG 21262	3,4	0,79	149	26,3	21,8	6,7

EXPERIMENTAL

Details of the cottons used in this study are given in Table I. For the miniature spinning trials, approximately 100 g of cotton lint was processed on a Shirley Miniature Spinning Plant. One-third of the drawframe sliver (three passages) was spun into 30 tex Z700 yarn on a Shirley Miniature *ring* spinning machine. One-third was spun on a *Rieter Rotondo MO/5 rotor* spinning machine at a rotor speed of 45 000 rev/min, employing pinned opening rollers running at 6 000 rev/min, smooth doffing tubes and a rotor with a diameter of 55 mm. The remaining third of the drawframe sliver was processed on a *Schubert* and *Salzer RU11 rotor* spinning machine at a rotor speed of 45 000 rev/min, employing pinned opening rollers running at 6 000 rev/min, smooth doffing tubes and a rotor with a diameter of 55 mm.

The full-scale spinning trials were carried out and reported[3] earlier. Basically it entailed spinning second drawframe slivers (4 ktex) on the Rieter Rotondo MO/5 rotor spinning machine at an opening roller speed of 6 000 rev/min and a rotor speed of 45 000 rev/min using a 55 mm diameter rotor. The second passage drawframe sliver was also processed into 420 tex roving and then spun into 30 tex Z700 ring yarns on a double apron drafting system.

In all of the rotor yarns a tex twist factor of 48 was used compared to the 38 for the ring yarns.

The processing of all the lots was carried out under the same atmospheric conditions. After the yarns had been conditioned, their physical properties were measured using standard test methods and equipment. The various yarn properties are given in Table II.

RESULTS AND DISCUSSION

The correlation between the various sets of results (see Table II) were determined by carrying out the following regression analyses on the various yarn properties:

1. Miniature ring vs full-scale ring (M_R vs F_R).
2. Miniature rotor (Rieter) vs full-scale rotor (M_{OR} vs F_{OR}).
3. Miniature rotor (Schubert and Salzer) vs Miniature rotor (Rieter) (M_{OS} vs M_{OR}).
4. Miniature rotor (Rieter) vs miniature ring (M_{OR} vs M_R).
5. Miniature rotor (Schubert and Salzer) vs miniature ring (M_{OS} vs M_R).

It must be remembered that, for miniature rotor spinning trials, *only the preparation stages* were on miniature equipment (Shirley system) since spinning took place on full-scale rotor spinning machines.

Tenacity (cN/tex)

The following significant regression equations were obtained for the *tenacity* of the yarns spun on the different systems:

TABLE II

PHYSICAL PROPERTIES OF 30 TEX ROTOR AND RING YARNS

CULTIVAR	TENACITY (cN/tex)					EXTENSION (%)					CSP (Ne x lbf)			IRREGULARITY (CV%)				
	Ring		Rotor			Ring		Rotor			Ring	Rotor		Ring		Rotor		
	F_R	M_R	F_{OR}	M_{OR}	M_{OS}	F_R	M_R	F_{OR}	M_{OR}	M_{OS}	M_R	M_{OR}	M_{OS}	F_R	M_R	F_{OR}	M_{OR}	M_{OS}
Alma C535/ 311/2/1	12,7	–	9,6	–	–	7,5	–	9,2	–	–	–	–	–	16,3	–	15,2	–	–
Delmac	19,2	19,4	12,3	14,5	13,1	5,8	8,2	8,0	9,9	8,2	2611	2080	1937	18,4	14,6	14,2	12,1	15,4
CS2	13,7	13,4	9,5	11,3	9,4	7,0	7,8	7,9	9,6	7,2	2396	1729	1544	16,1	16,9	15,3	13,1	20,0
Acala SJ185	17,4	–	10,9	–	–	6,5	–	7,6	–	–	–	–	–	15,2	–	15,1	–	–
Alma 76	11,2	–	8,6	–	–	7,6	–	10,5	–	–	–	–	–	16,1	–	15,6	–	–
Deltapine 5826 Dirk	16,1	14,7	10,0	10,8	9,2	7,5	10,2	9,4	11,2	8,8	2191	1705	1423	17,0	16,1	15,5	13,4	20,3
Albar 10217	14,9	14,2	10,1	11,6	10,1	6,0	7,4	8,1	9,6	7,4	2419	1829	1656	16,5	16,2	16,3	13,3	18,9
Acala 1517/70	16,0	15,8	9,7	12,5	9,9	7,0	7,2	8,1	9,6	7,0	2430	1852	1727	15,4	15,6	15,0	13,6	18,0
Deltapine 5826 Deal	15,8	14,6	10,4	11,9	10,3	6,8	8,2	8,0	10,2	7,8	2318	1813	1514	16,3	16,2	15,9	13,2	18,9
Acala SJ1	16,8	15,1	10,8	12,9	10,3	6,7	7,6	7,2	9,4	7,2	2282	1939	1660	15,1	15,7	15,3	13,0	18,2
BSG 31878	11,7	11,9	8,1	10,1	8,8	4,9	6,8	7,1	8,9	7,2	2241	1758	1282	18,4	19,0	15,0	12,7	17,7
D/P5826 BSG	14,2	15,3	9,5	11,7	10,1	5,7	9,8	7,7	11,0	8,8	2441	1629	1544	18,2	15,5	15,7	13,3	18,2
Acala SJ141	17,0		11,1	–	–	7,1	–	7,1	–	–	–	–	–	15,1	–	15,1	–	–
Albar 736	13,5	12,3	8,7	10,7	8,4	6,4	8,0	7,7	9,6	7,4	2015	1569	1345	16,1	18,6	16,0	13,7	20,2
Deltapine SL	13,3	12,4	9,2	11,4	9,6	6,3	8,6	8,1	10,8	7,8	2280	1741	1450	17,2	15,9	15,5	13,7	18,7
C76/2/1/2	–	12,6	–	9,6	7,5	–	8,8	–	11,1	8,2	1755	1449	1308	–	16,8	–	13,3	18,7
Alma 535/ 302	–	14,0	–	12,6	10,5	–	8,8	–	10,7	8,0	2323	1637	1577	–	15,7	–	12,6	16,5
BSG 21262	–	13,8	–	11,8	10,0	–	8,0	–	10,8	7,6	2408	1704	1393	–	16,8	–	12,4	18,1

CULTIVAR	THIN PLACES PER 1000m				THICK PLACES PER 1000m				NEPS PER 1000m				HAIRINESS (HAIRS/m)		
	Ring		Rotor		Ring		Rotor		Ring		Rotor		Ring	Rotor	
	F_R	M_R	F_{OR}	M_{OS}	F_R	M_R	F_{OR}	M_{OS}	F_R	M_R	F_{OR}	M_{OS}	M_R	M_{OR}	M_{OS}
Alma C535/ 311/2/1	–	–	6	–	–	–	35	–	360	–	535	–	–	–	–
Delmac	11	1	3	12	482	76	22	58	199	264	361	328	14,6	2,3	4,0
CS2	–	20	7	284	–	220	15	234	376	500	530	850	18,9	3,0	8,1
Acala SJ185	–	–	5	–	–	–	3	–	90	–	307	–	–	–	–
Alma 76	–	–	5	–	–	–	32		307	–	523	–	–	–	–
Deltapine 5826 Dirk	11	18	6	270	465	148	23	258	412	260	363	516	–	2,9	7,3
Albar 10217	11	24	15	220	289	216	26	196	376	498	558	720	22,7	2,2	7,4
Acala 1517/70	–	4	0	118	–	210	27	80	353	600	403	594	16,7	2,1	6,1
Deltapine 5826 Deal	11	12	6	152	165	220	28	210	166	464	369	744	18,8	2,2	10,1
Acala SJ1	–	10	6	112	–	156	26	154	130	376	293	490	17,5	2,3	5,8
BSG 31878	37	44	4	98	362	440	23	74	554	1070	485	794	10,0	3,3	5,4
D/P5826 BSG	56	2	10	72	399	136	44	200	437	368	667	382	22,8	3,2	7,1
Acala SJ141	–	–	5	–	–	–	32	–	93	–	413	–	–	–	–
Albar 736	–	84	20	340	–	340	33	302	224	582	580	944	16,3	3,0	6,6
Deltapine SL	25	20	11	208	216	172	31	188	160	278	393	658	15,8	2,7	7,9
C76/2/1/2	–	8	–	90	–	284	–	182	–	544	–	822	9,1	3,0	9,7
Alma 535/ 302	–	14	–	28	–	172	–	42	–	452	–	362	16,6	2,2	5,5
BSG 21262	–	16	–	90	–	250	–	94	–	672	–	1096	15,4	2,8	7,6

F_R : Full-scale ring
M_R : Miniature ring
F_{OR} : Full-scale rotor (Rieter)
M_{OR} : Miniature preparation (Rieter M0/5)
M_{OS} . Miniature preparation (Schubert & Salzer RU11)

$$M_R = 0{,}94\,F_R + 0{,}36 \quad \ldots\ldots\ldots\ldots \quad (1)$$
$n = 11$; $r = 0{,}92$.

Clearly, the tenacity of the yarns spun on the miniature ring system (M_R) is highly correlated with those spun on the full-scale ring system (F_R). This is illustrated in Fig. 1.

$$M_{OR} = 0{,}98\,F_{OR} + 2{,}1 \quad \ldots\ldots\ldots\ldots \quad (2)$$
$n = 11$; $r = 0{,}90$.

As for the tenacity of the *ring* yarns, the tenacities of the *rotor* yarns processed from slivers prepared on miniature (M_{OR}) and full-scale equipment (F_{OR}), respectively, and spun on the Rieter were highly correlated. The tenacity of the rotor yarns, for which preparation was along the miniature route, was generally higher than that of the yarns where processing was on full-scale equipment (see Fig. 2).

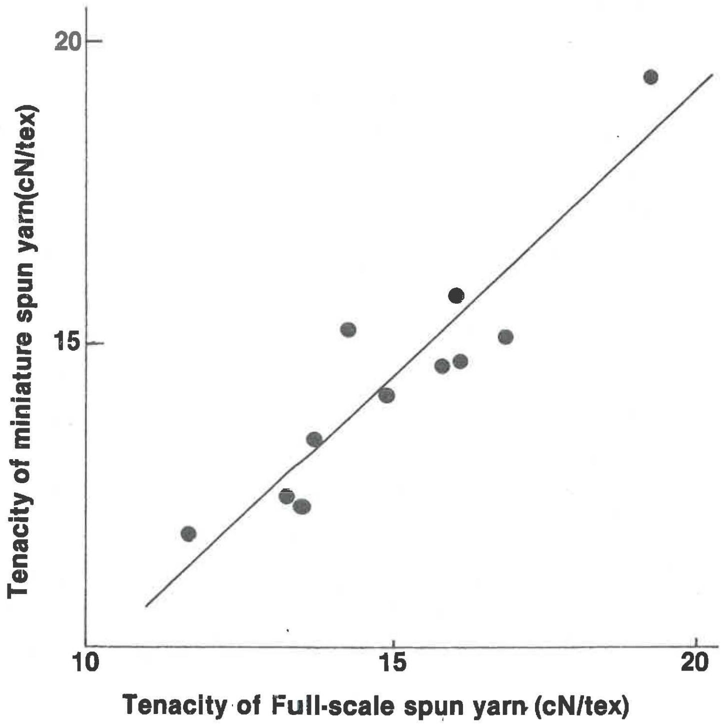

FIGURE 1
Relationship between the tenacities of RING SPUN yarn processed along miniature and full-scale routes respectively.

$$M_{OS} = 0{,}97\ M_{OR} - 1{,}5 \quad (3)$$
$n = 14$; $r = 0{,}94$.

From equation (3) it appears that the tenacities of yarn spun on the two different rotor machines from sliver prepared on the miniature equipment were highly correlated, with the tenacities of the yarns spun on the Rieter generally higher than those of the yarns spun on the Schubert and Salzer (see Fig. 3).

The tenacities of the ring and rotor yarns, respectively, processed along the miniature routes, were also correlated (see below) but not as highly as the previous results:

$$M_{OR} = 0{,}55\ M_R + 3{,}8 \quad (4)$$
$n = 14$; $r = 0{,}85$

$$M_{OS} = 0{,}57\ M_R + 1{,}7 \quad (5)$$
$n = 14$; $r = 0{,}86$.

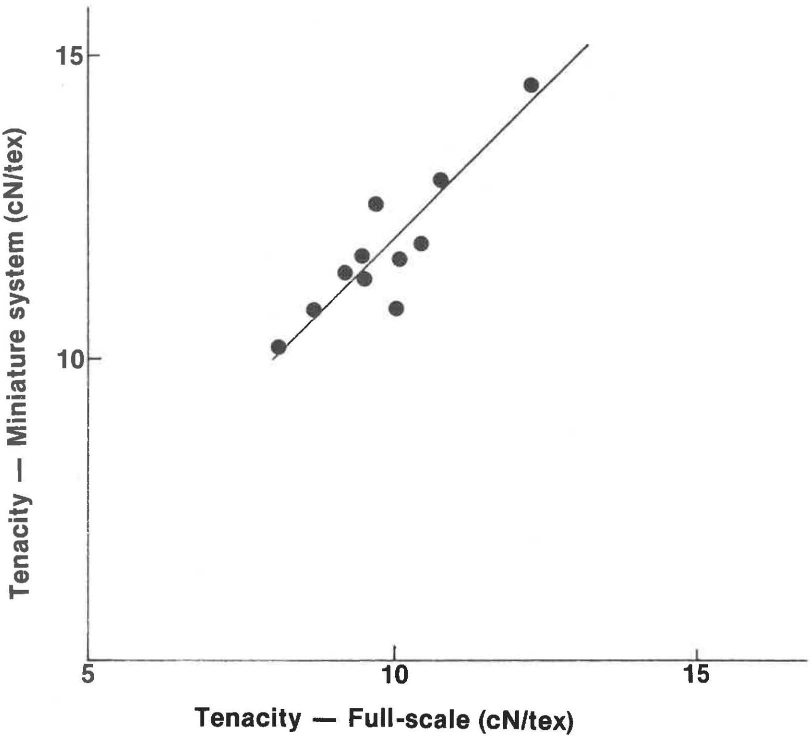

FIGURE 2
Relationship between the tenacities of ROTOR (Rieter MO/5) yarns spun from drawframe sliver prepared on miniature and full-scale equipment, respectively.

Extension (%)

No significant correlation existed between the extension results of the *ring* yarns processed along the two different routes. For the *rotor* yarns, the following statistically significant regression equations were obtained:

$$M_{OR} = 0{,}84\, F_{OR} + 3{,}3 \quad (6)$$
$n = 11$; $r = 0{,}69$

$$M_{OS} = 0{,}63\, M_{OR} + 1{,}3 \quad (7)$$
$n = 11$; $r = 0{,}81$

$$M_{OR} = 0{,}69\, M_R + 4{,}5 \quad (8)$$
$n = 14$; $r = 0{,}87$

$$M_{OS} = 0{,}57\, M_R + 3{,}0 \quad (9)$$
$n = 14$; $r = 0{,}93$

Equation (6) illustrates that the extensions of the rotor yarns processed along the miniature route (M_{OR}) are only poorly, though significantly, cor-

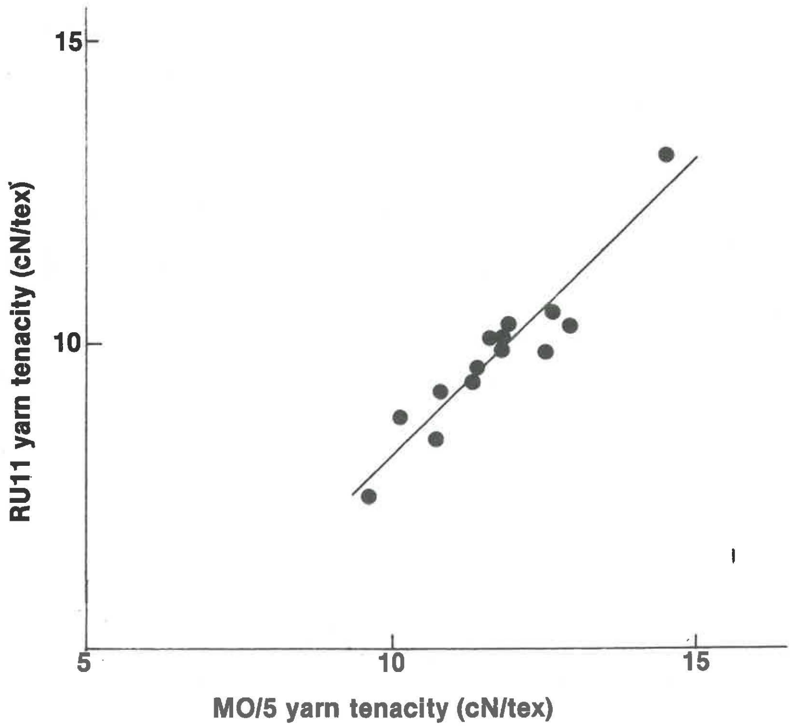

FIGURE 3
Relationship between the tenacities of rotor yarns spun on two different rotor machines (slivers prepared on miniature system).

related with those of the yarns processed along the full-scale route (i.e. F_{OR}), with the extension of the former yarns generally higher than those of the latter (see Table II).

The correlations between the extensions of the yarns processed along the miniature preparation route were generally high as illustrated by equations (7) to (9) and Fig 4. Generally, the yarns prepared on the miniature system and spun on the Rieter machine had the highest extension followed by the ring yarns.

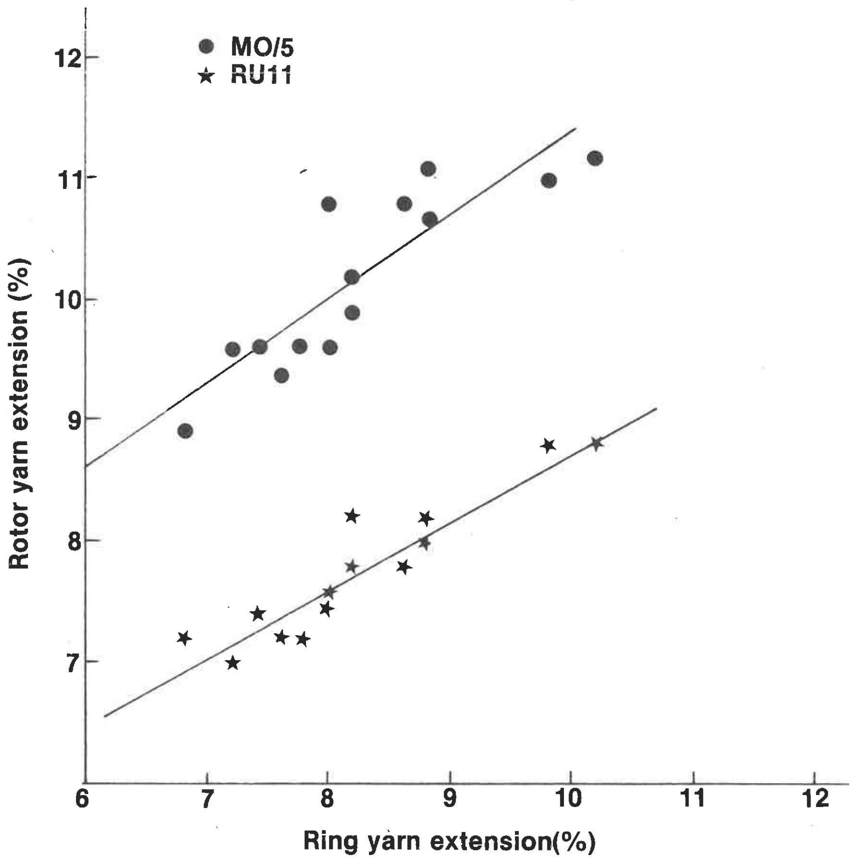

FIGURE 4
Relationships between the extensions of ring and rotor yarns spun from sliver prepared on the miniature system.

Count-strength product (CSP)

No CSP results were available for the yarns processed on the conventional preparation systems, while the following regression equations illustrate the correlations between the various other CSP values:

$$M_{OS} = 0{,}91\ M_{OR} - 56{,}6 \quad (10)$$
$n = 14$; $r = 0{,}79$

$$M_{OR} = 0{,}56\ M_R + 457 \quad (11)$$
$n = 14$; $r = 0{,}74$

$$M_{OS} = 0{,}63\ M_R + 78 \quad (12)$$
$n = 14$; $r = 0{,}73$.

The correlations between the various CSP values were fairly high, with the actual CSP values being highest for the yarns spun on the miniature ring system (M_R) followed by those of the yarns spun on the Rieter machine (M_{OR}). The results are illustrated in Fig. 5.

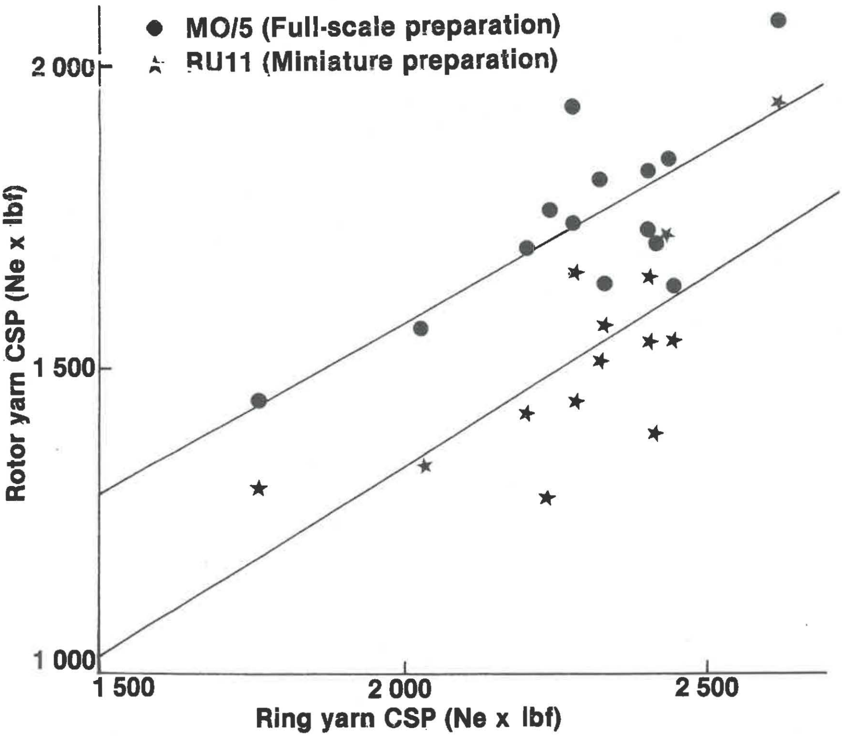

FIGURE 5
Relationships between CSP results of rotor and ring yarns spun from sliver prepared on the MINIATURE system

Irregularity (CV%)

The irregularities of the *ring* yarns processed along the miniature and full-scale routes, respectively, were not correlated. Only the following two significant regression equations were obtained:

$$M_{OR} = 0{,}57\ F_{OR} + 4{,}4 \quad \text{(13)}$$
$n = 11\ ;\ r = 0{,}69$

$$M_{OS} = 2{,}0\ M_{OR} - 8{,}0 \quad \text{(14)}$$
$N = 14\ ;\ r = 0{,}73.$

The irregularity of the yarns processed along the miniature route and spun on the Rieter machine (M_{OR}) was generally the lowest followed by that of the yarns processed on full-scale equipment, followed by rotor spinning on the Rieter machine (F_{OR}). This is illustrated in Fig. 6.

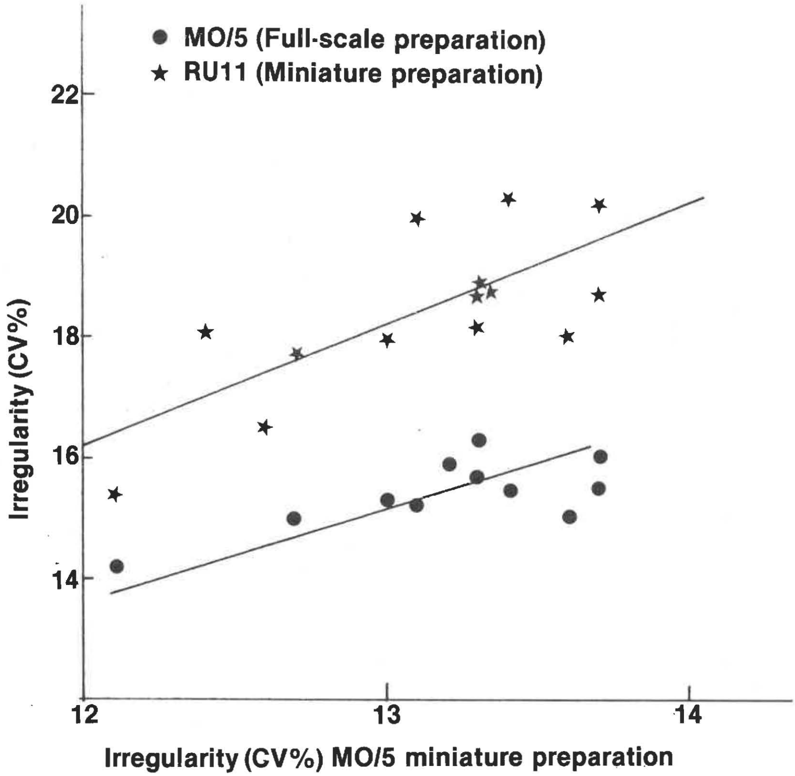

FIGURE 6

Relationships between irregularity results of ROTOR yarns spun from sliver prepared on miniature and full-scale equipment, respectively

Thin Places

Only two sets of thin place results were available, viz. M_R vs F_R and M_{OS} vs M_R. The former were not significantly correlated, whereas for the latter, the following regression equation was obtained:

$$M_{OS} = 2{,}9\, M_R + 92 \quad \text{.......} \quad (15)$$

$n = 14 ; r = 0{,}63$

It is worth noting that the yarns processed along the miniature route and spun on the Schubert and Salzer (M_{OS}) contained more thin places than the other yarns.

Thick Places

As for the thin places, only two pairs of results for thick places were available for analysis, neither being significantly correlated with each other. The yarns processed on full-scale equipment and spun on the Rieter contained far fewer thick places than any of the other yarns.

Neps

Here again, as with the other imperfection results, only two sets of results were available, and only one of these two produced a significant regression equation.

$$M_{OS} = 0{,}63\, M_R + 355 \quad \text{.......} \quad (16)$$

$n = 14 ; r = 0{,}57.$

Generally, the ring yarns contained fewer neps than the rotor yarns.

Hairiness

No correlations, significant at the 95% level of confidence, were obtained. The hairiness of the yarns spun on the Rieter rotor machine was generally lowest, followed by those spun on the Schubert and Salzer (see Table II).

SUMMARY AND CONCLUSIONS

Some 18 different cotton lots, covering a range of cultivars and fibre properties, were processed into drawframe sliver on conventional (full-scale) and miniature processing equipment, respectively. The drawframe slivers were spun into 30 tex yarns on full-scale rotor and ring spinning machines and also on a miniature ring frame. The tex twist factor of the ring yarns was 38 (4 English cotton) and that of the rotor yarns was 48 (5 English cotton).

For both *ring* and *rotor* spinning, the miniature and full-scale preparation processes produced yarns of which the single thread *tenacities* were *highly correlated*. Furthermore, the tenacities of the yarns, both ring and rotor, which were spun from drawframe sliver prepared on the *miniature* system, were also highly correlated. Similarly, the extension results were also highly correlated. Thus is appears that the single thread tensile properties of rotor and ring yarns spun from drawframe sliver processed on *miniature* equipment are sufficiently highly correlated with the results obtained on yarns processed on conventional full-scale equipment to justify the use of the miniature system for assessing the potential yarn tensile properties of a cotton. The *absolute values* were, however, not identical. The CSP and irregularity of yarns processed along the different routes were generally also correlated but not as highly as the single thread tensile properties. Too few results were generally available for yarn imperfections and hairiness to draw any definite conclusions but these properties did not appear to be as highly correlated as the abovementioned properties.

Therefore, from the results obtained in this study on 30 tex yarns spun from a wide range of cottons, it appears as if processing on a Shirley miniature system, followed by rotor spinning on conventional machines offers an acceptable method for assessing the potential yarn tensile properties, and possibly irregularity. Of course, for quality control laboratories, rotor machines such as those developed by Suessen and Dyson as well as the 580 Rotoring built by Spinlab may be preferable to full-scale machines. Clearly, however, the long term effect of trash and dust on yarn properties, as well as potential end breakage rates can only be assessed by spinning for long periods on specific types of rotor machines. It may be noted, too, that the two rotor machines used in this study, gave significantly different yarn properties even though the values were correlated.

ACKNOWLEDGEMENTS

The authors are indebted to the Cotton Processing Department for technical assistance. A word of thanks is also due to Mrs M. Hill and Miss A. Coetsee for testing the yarns and to Mr E. Gee and Mrs C. Bellingan for the statistical analysis of the data.

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ERRATUM : SAWTRI BULLETIN 13 (1)

MARCH, 1979, p. 5

The statement that the Textile Advisory Committee of the Textile Federation is attempting to revive interest in textile education in South Africa is incorrect. This Committee has no official connection with the Federation. We apologise for this error.

Published by
The South African Wool and Textile Research Institute,
P.O. Box 1124, Port Elizabeth, South Africa,
and printed in the Republic of South Africa
by Nasionale Koerante Beperk, P.O. Box 525, Port Elizabeth.