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SOUTH AFRICAN WOOL AND TEXTILE RESEARCH INSTITUTE OF THE CSIR

Telephone: (041) 53-2131

Teletex: 24-5183

Fax: (041) 53-2325



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P.O. Box 1124
Port Elizabeth 6000

EDITORIAL COMMITTEE

Dr D. W. F. Turpie, Chairman

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Dr N. J. J. van Rensburg

P. Horn

G. A. Robinson

INSTITUTE NEWS

Romatex and SAWTRI in a Research and Development Agreement

Romatex, the giant textile group, is to occupy an office/laboratory on SA WTRI's campus in Port Elizabeth as from 1st August to facilitate research and development, as well as technology transfer, according to an agreement signed on June 25th between these two concerns.

This bold move, initiated by SAWTRI management and announced jointly on the 30th June by Mr W J E Wilson, Director of Romatex, and Dr D W F Turpie, Chief Director of SAWTRI, will forge closer ties between the textile industry and SAWTRI, which is in line with the CSIR's current drive and strategy to promote a market-orientated approach and to have a greater commitment towards collaboration with industry.

It was felt that this step would enable Romatex to carry out its own research and development in confidence while having virtually instant access to SAWTRI's comprehensive range of machinery, equipment and scientific and technological expertise on the one hand, with, on the other hand, an added advantage being the close proximity of the University of Port Elizabeth and the Port Elizabeth Technikon in the event of specialised non-textile analytical services and other expertise being required.

It is expected that other textile companies will follow suit to help create a textiles R & D environment which would not only be unique, but which could also lead to a stronger and more effective R & D effort in South Africa to meet the industrial and economic demands of the future.

Overseas visits of Chief Director

The Chief Director of SAWTRI, Dr D W F Turpie, visited the UK in May to attend the Joint Meeting of R & D Chiefs and Technical Managers of the International Wool Secretariat as well as the IWS Board R & D Advisory and Co-ordination Committee Meeting. At the first meeting Dr Turpie presented a report entitled: "An introductory study on the mild carbonising of raw wool and mohair". Dr Turpie also made use of the opportunity to have discussions with senior staff of various textile industries and educational institutions and to exchange views on matters of mutual interest.

In June Dr Turpie attended the 56th Conference of the International Wool Textile Organisation in Rio de Janeiro and addressed delegates on the subject of mild carbonising of raw wool and mohair, before flying to Edinburgh, Scotland, where he addressed delegates at the 14th Annual Conference of the International Mohair Association on "Mohair Fibre Research at SAWTRI". Carbonising, medullation, dyeing behaviour of medullated and non-medullated fibres and the identification and quantitative estimation of mohair in wool/mohair blends, were some of the aspects of research covered in this presentation.

Early in May Mr John Cameron, Chairman of the EEC Advisory Committee on Sheep Meat, Chairman of the Meats Group, IFAP, and Chairman of the UK Sheep Consultative Committee, visited the Institute to exchange views with senior staff. Mr Cameron, who is also a past President of the Scottish National Farmers' Union, visited South Africa and Port Elizabeth as a guest of the S A Wool Board, National Wool Growers' Association and the Farmers' Brokers Co-operative Ltd.

Some 50 farmers from the Cathcart district, all members of the South African Federation of Group Breeders, were received at the Institute towards the end of May. They were informed on the activities at SAWTRI through a slide show and a guided tour of the various processing departments.

The winner of the Cooper's Golden Fleece Award for the East London region, Mr Glen Cottrell, accompanied by his wife, paid a visit to SAWTRI and were taken around the Institute to familiarize themselves with the activities and facilities of the Institute.

Staff News

Dr C G McLeod, who holds a Ph.D. degree in Microbiology from the University of Cape Town, has been appointed as Acting Head of the Short Staple Processing Department. Mr P Grobler, who completed a B.Sc. degree in Chemical Engineering at the University of Cape Town, has taken up a position as Acting Head of the Long Staple and Woollen Processing Departments. Mr R L Levendal has rejoined the Institute from the 1st of June as Technical Assistant in the Weaving Department. Mr F Botha has been appointed as Senior Storeman.

Six members of SAWTRI staff retired recently. Mr G A Gustafsson, employed in the Machine Development and Innovation Department, made an important contribution to a number of machine development projects such as the SAWTRI Gill Box, SAWTRI Comb, SAWTRI Autocreel and the SAWTRI loose stock chlorination system in his long and fruitful association with the Institute of some 19 years. Mr M J Ngqonjane, who became a staff member in 1979, proved to be a very reliable and responsible worker and was in charge of the gardeners and also responsible for certain aspects of security in the absence of the Caretaker. Mr N Peach, appointed as Fitter and Turner in 1974, will be remembered for the important role he has played in the maintenance of equipment and machines, and his valuable contribution towards First Aid-related activities at SAWTRI. Mr P C M Shorthouse, appointed from abroad, spent six years at the Institute as Head of the Knitting Department. He played a valuable role in work on the blending of synthetic filaments with wool and mohair, and achieved particular success with the utilisation of mohair yarns and fibres in men's and ladies' wear. Mrs J H Snyman, who served the Institute with distinction for some twenty years as Personnel Officer, will be remembered for her devotion to her job and for

managing to always stay abreast of ever-changing service regulations and conditions. Mr M A Thomas joined SA WTRI in 1981 as General Assistant and in this relatively short period he made an important contribution towards the beauty and maintenance of the gardens on the campus. Mr N J Vogt, who distinguished himself as businessman in the international wool trade before joining SAWTRI and the CSIR some sixteen years ago, left indelible footprints at SAWTRI in his dual capacity as Group Leader of Publications and Information and Industrial Liaison, as well as being in charge of the Regional Office of the CSIR in Port Elizabeth. His vast experience and expertise in the wool trade and his exceptional ability to organise and run international textile symposia, will be sorely missed.

SAWTRI PUBLICATIONS

Since the previous edition of the Bulletin, the following papers were published by SAWTRI.

Technical Reports

- No. 589 Smuts, S. and Hunter, L., Medullation in Mohair, Part II: Geometrical Characteristics and the Relationship between Various Measures of Medullation (March 1987).
- No. 591 Hunter, L. and Gee, E., Isolated Weak Places and Other Physical Properties of Commercial Cotton and Cotton Blend Ring and Rotor Yarns (May 1987).
- No. 592 Hunter, L., The Effect of Cotton Fibre Quality on Dimensional and Other Properties of Knitted Fabrics (March 1987).
- No. 593 Barkhuysen, F.A., Van Rensburg, N.J.J. and Harwood, R.J., Continuous Dyeing Using Radio Frequency Energy, Part VIII: RF Dyeing of Polyester (May 1987).
- No. 594 Hunter, L. and Gee, E., The Physical Properties of Commercial Wool and Wool/Polyester Two-ply Worsted Yarn (May 1987).

Papers by SAWTRI Authors Appearing in Other Journals:

McMahon, J.F., Der Einfluss verschiedener Garnverbindungen auf die Fadenspannung. *Melliand Textilberichte*, Vol. 68 (1), 20 (1987).

Van der Merwe, J.P., Woollen Spun Yarn in One Operation. *S.A. Journal of Science*, Vol. 83 (3), 122 (March 1987).

Weideman, E., Gee, E., Hunter, L. and Turpie, D.W.F., The Use of Scale Height to Distinguish Between Mohair and Wool. *The Angora Goat and Mohair Journal*, 29 (1), 122 (March 1987).

Galuszynski, S., Some Aspects of the Mechanism of Seam Pucker Caused by the Drop-feed Mechanism. *J.S.N. International*, Vol. 87 (2), 20 (February 1987).

WOOLLEN SPUN WRAP YARNS

by

A. G. BRYDON

INTRODUCTION

The woollen spinning system is one of the shortest methods of yarn production. Over the years, various workers have suggested ways of further shortening the system¹⁻⁶ by either linking the carding and spinning operations or combining them on one machine. A recent example of the latter has been the development by SAWTRI of a method of wrap spinning directly on the condenser of a woollen card⁷. The resulting yarns have been termed woollen spun wrap yarns. The same term could be applied to wrap yarns which have been produced by wrap spinning woollen slubbings on a separate machine. The development of such a machine has recently been announced⁸. The commercial feasibility of woollen spun wrap yarns is currently being evaluated by members of the textile industry. Meanwhile SAWTRI has been carrying out investigations into various yarn and fabric properties, taking into consideration various processing variables. The following reviews some of the initial findings.

Yarn production

As has been described⁷⁻⁹, hollow spindles were fitted directly on the condenser of a woollen card between the rubbing aprons and the surface drums. The principle is shown in Figure 1. The effects of various processing parameters on the physical properties of woollen spun wrap yarns were investigated using standard test methods. Further details can be obtained from the original reports¹⁰⁻¹²

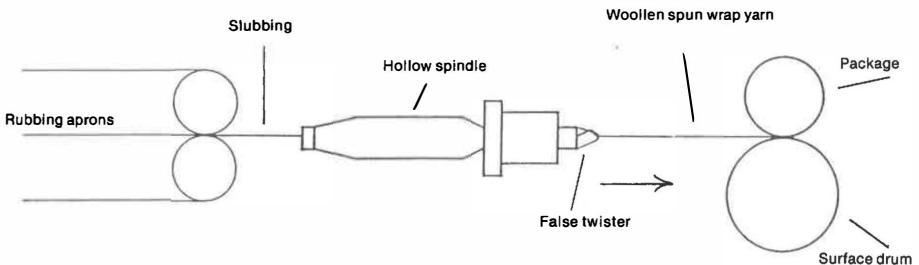


Fig. 1: Wrap spinning directly on a woollen condenser.

Use of a false twister

It has been noted¹³ that false twist is accomplished by frictional forces, with or without the use of a twisting element. When investigating the properties of woollen spun wrap yarns, it was found that it was necessary to use a false twist element in order to impart adequate tension to the wrapper filament. Spinning without the false twister caused a loss of control over filament tension and hence the compressive force exerted by the filament coils was too low to impart sufficient cohesion to the staple core¹⁰. This resulted in premature rupture of the staple core, and abnormally high values of extension at break, due to fibre slippage.

Wrapping density and filament linear density

In agreement with work carried out by Lawrence *et al*¹⁴ on wrap yarns produced from worsted rovings, the tenacity of woollen spun wrap yarns was found to be dependent on wraps per metre and the linear density of the wrapper filament. Increases in either of these factors resulted in an increase in tenacity (Table 1). Additional associated factors are the physical properties of the wrapper filament and the increase in wrapping tension resulting from an increase in the number of wraps per metre¹⁴. Yarn extension increased with filament linear density but not with wrapping density. Yarn imperfections and irregularities were unaffected by either parameter. Although yarn hairiness was not significantly affected by changes in filament linear density, it decreased as the number of wraps increased.

Drafting

The woollen carding machine is the most important piece of equipment in the production of woollen spun yarns. The spinning machine plays the comparatively minor role of drafting and applying twist to convert the

TABLE 1
SOME TYPICAL VALUES OF YARN PROPERTIES FOR 120 TEX WOOLLEN SPUN WRAP AND RING YARNS USING A BLEND OF WOOL 25,2 μm IN MEAN FIBRE DIAMETER AND 74,1 mm IN MEAN FIBRE LENGTH.

Filament linear density	22 dtex			44 dtex			Ring Yarn
	200	300	400	200	300	400	
Wraps/turns per metre	200	300	400	200	300	400	S210
Tenacity cN/tex	3,1	3,9	4,3	4,0	4,7	5,5	4,1
Extension %	18,5	17,2	15,0	21,0	18,8	18,8	10,3
Irregularity CV%	12,5	12,3	12,8	12,4	12,9	12,3	13,7

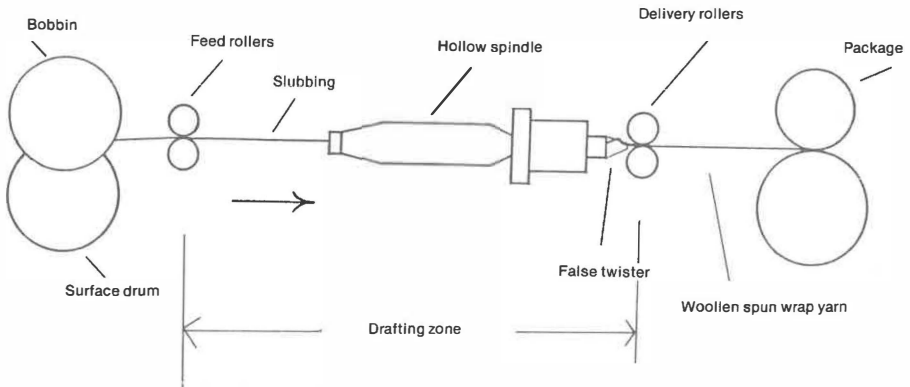


Fig. 2: Apparatus for drafting woollen slubbings during wrapping.

slubbings into yarn. Wrap spinning directly on the condenser of the card eliminates the need for a separate twisting process. However, the previously described assembly does not allow the application of draft. It is conceivable that drafting facilities may be desirable from an industrial point of view, the main reason being that the slubbing could be condensed to a heavier linear density, thus increasing the production rate of the card. It has been noted that this feature is particularly important to the fine woollen trade¹⁵.

For reasons of convenience a small wrap spinning frame was constructed (Fig. 2) which allowed drafting to take place whilst the slubbings were wrap spun. Since the hollow spindles were mounted horizontally, the machine effectively simulated wrap spinning directly on the card, but with the addition of drafting facilities. 150 tex slubbings were wrap spun using various levels of draft. There was therefore an associated decrease in yarn linear density as the level of draft increased. Results showed that drafted wrap yarns were more tenacious than undrafted wrap yarns and tenacity increased as the level of draft increased. Undrafted yarns were found to be more regular than drafted yarns and regularity decreased as the level of draft increased. Yarn extension decreased as the level of draft increased, the highest value being given by the undrafted yarn. The latter effects were probably due to the decrease in linear density.

Wrap vs ring

Throughout the investigation, properties of the wrap yarns were compared to that of ring yarns of the same linear density. It was found that wrap yarns equivalent to ring yarns in terms of tenacity, could be produced by selecting the appropriate filament linear density and number of wraps per metre. The extension of the wrap yarns was generally higher and they were less

hairy. When converted into plain knitted fabrics, the wrap yarns appeared to give a more uniform loop formation and effected a higher degree of cover, resulting in a lower permeability to air. The fabrics knitted from wrap yarns were also softer and more voluminous. Pilling propensity and abrasion resistance of the wrap yarn and ring yarn fabrics were similar.

CONCLUDING REMARKS

The technique of producing wrap yarns directly on a woollen card appears to offer exciting possibilities. To the yarn manufacturer it may mean no separate spinning process, no folding and possibly no rewinding. The garment manufacturer may benefit from the better cover provided in terms of more garments per unit mass of yarn, while bulkiness and loftiness is retained without sacrificing qualities such as strength and appearance¹⁰.

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