

CSIRO DIVISION OF TEXTILE INDUSTRY

P.O. Box 21,
Belmont, Victoria 3216

By Dr. G.A. Robinson

ARE OUR SPINNING AND FIBRE TESTS RELEVANT
TO OUR MARKETING NEEDS?

Due to the economic pressure being placed on the cotton fibre by increased use of man-made fibres, the revolution in textile processing technology and the current world surplus, research on the quality and value of cotton has become even more important in recent times. Experts, including breeders and producers, spinners, merchants and manufacturers, who see the marketing challenge in every phase of cotton handling, are calling for changes in the system that evolved in an age before the advanced technology of today was realised.

Today's industry faces modernization at every level. Modernization is being applied in machine design, processing concepts, products and management techniques. Modernization of process technology has also been introduced, most notably the establishment of mathematical relationships between fibre properties, processing efficiency and product quality. This development is important for at least three reasons.

The first reason involves management problems. Economic principles, operations research techniques and forms of optimization used successfully in other industries, are now being studied by textile management. The success of these approaches depends largely on what is known about relations between processing conditions, raw material and processing performance.

The development of these quantitative relationships must be based on sound scientific measurements that are repeatable and include all properties necessary for adequate prediction.

The second reason for developing relationships between fibre properties and processing quality involves cotton growers and breeders. Many new and improved varieties are currently being grown commercially and experimentally. In the textile sector, fundamentally new spinning technologies are being developed which place increased demands on the fibre properties. Relationships involving fibre properties and processing quality are necessary to develop the directions needed by breeders and growers to produce the cotton with the desired characteristics.

The third reason for developing fibre property-processing quality relationships is to provide information for the improvement of the marketing system. Research has shown that under the current marketing system, cotton pricing reflects the actual value of the cotton poorly. Relationships are needed that permit the processing performance and subsequent product quality to be predicted with reasonable accuracy so that the manufacturer and producer are protected from the inefficiencies of uncertainty.

The rapid development in recent years of testing instruments capable of fulfilling these requirements has created a growing interest in the use of high volume testing, HVT, and the output from these systems. It has become common knowledge that these systems can provide more information, more rapidly and with a precision at least equal to conventional laboratory methods.

The HVT is a combination of measuring devices used to quantitatively assess Micronaire, yellowness and reflectance, length and length uniformity, strength and elongation.

Mills will now be able to combine information from rapid fibre testing (upto 500 bales in eight hours) with computerized information storage and data analysis. This combination enables mill managemtn to select cotton that will consistently meet yarn and fabric specifications at the lowest cost.

Cotton has been at a disadvantage when it is considered that man-made fibres can be produced for a specific end product and with a reasonably consistent filament profile. Although there is a tendency to consider cotton from the same agricultural area to be similar, characteristics can differ from bale to bale, even from the same farm.

High volume testing data will enable the mill to relate a fibre blend profile to processing efficiency and end product quality through use of regression analysis. This will enable a determination to be made of what effects a change in fibre characteristics - length, length uniformity, strength, etc. - will have on a yarn or fabric. An order of importance for each fibre characteristic can be established and a cotton fibre blend profile best suited for the product provided.

Such an engineered approach to fibre selection will enable bales from a general inventory file to be selected for a blend laydown. The computer will also produce printouts for speeding up bale storage locations and histograms of current inventory fibre profiles for management review.

Even with these benefits, HVT testing has some deficiencies, and this will be discussed during the conference,

along with a review of current research programs aimed at overcoming these problems.

In a recent ITMA survey of six major cotton textile manufacturers, it was stated that 35 to 45% of a cotton fabric's final cost is determined by the price of the raw material. For a cotton yarn producer the figure is 60 to 70%. The current world situation of an available cotton surplus, the ever present competition of synthetic fibres, and the ever changing demands of the textile sector mean the only way a grower can sell cotton is by producing a fibre desirable to the textile mills at a price where both can realize a profit.

High volume instrument testing of cotton is currently expanding in many countries, and it appears that the majority of cotton produced in the USA will be objectively described within a few short years. This will enable textile manufacturers world wide to select cottons that are tailored to their specific end-products. Australian producers should likewise guarantee that their cotton will be similarly sought after in world markets.