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Workshop on the Production
of High-Quality Cotton Knitgoods*

Sao Paulo, Brazil, 2-6 June 1986

REPORT**

*Organized by the International Institute for Cotton (IIC) and
the United Nations Industrial Development Organization (UNIDO)

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BACKGROUND

Cotton accounts for approximately 50% of world consumption of major textile fibres. It is grown in about 70 developing countries including 16 of the 31 countries classified in 1980 by the United Nations as "least developed". For many of these countries it is a key commodity. The total value of the exports of raw cotton and cotton seed products was about \$ 570 million in 1980-81 (IMF data).

The share of the developing countries in the growth of world cotton production is increasing. Over the last 20 years the average production of the developing countries has risen by approximately 50%, whereas the production of the developed world has declined by 6%.

Cotton is one of the most important generators of employment and economic activity in the Third World. It is estimated that at least 125 million people (cotton farmers, farm workers and their dependents) in the developing countries derive their livelihood from growing and handling raw cotton. A high proportion of these people live in countries where unemployment and under-employment are problems of the highest priority.

Cotton provides the spearhead of industrial development for many countries of the Third World. Some 45-50 million people are dependent on the jobs which have already been created by the rapidly developing cotton textile processing industries in these countries. In order to ensure maximum employment in the rural areas of the cotton producing countries it is essential that their textile industries continue to use cotton as their basic raw material.

Cotton and cotton products provide the developing nations with a major source of foreign exchange. The annual value of the combined exports of raw cotton, cotton seed products and cotton textiles from the developing countries is currently about \$ 7,000 million. Raw cotton and cotton seed products ranked either first or second in importance as agricultural export earners in about 22 developing countries in 1979/80 and accounted for more than 20% by value of agricultural exports in 15 of these countries.

Cotton is also an important source of food. The cotton seed is the world's fourth most important source of edible oil and the meal provides a valuable cattle food. If fully utilized it could provide 5-6% of the world's total requirements of crude protein.

The growing, processing and exporting of cotton and its products provides an almost ideal means of social and economic development and it is not therefore surprising that the development plans of many of the developing nations are based on the assumption that production of cotton and cotton textiles will remain a major growth factor in their economies. These plans could, however, be frustrated if they had to compete between themselves for a static or declining market.

Although world demand for textiles is forecast to expand at an average of about 1.5-2.0% per year it does not follow that cotton will automatically share in this expansion. The man-made fibres have already captured major sections of the market and, although in absolute terms raw cotton production is at record levels, cotton's share of world fibre consumption has dropped from 72% in 1954 to about 50% in 1984.

Encouraged by their great advances in the 1960's, the man-made fibre producers embarked on massive expansion programmes aimed at capturing an even greater share of the world's textile markets, including the local textile markets of the cotton producing countries themselves.

The Technical Research Division of the International Institute for Cotton (IIC) was set up in 1967 to undertake technical activities necessary to safeguard cotton's position in world markets. Much of its work is concentrated on products or processes which offer the greatest growth potential for cotton and on solving problems which, if unresolved, might lead to loss of markets. In order to remain competitive it is absolutely essential to upgrade the performance of the product at every level.

One of the areas which offers considerable growth potential for cotton is knitted outerwear. There is a strong consumer demand for garments which combine comfort and fashion appeal and which conform to the more relaxed life-style of today. Cotton has always enjoyed great popularity in knitted underwear. The production processes and performance standards for underwear are relatively undemanding but the production of high-quality, dimensionally stable cotton outerwear in attractive colours and fashionable styles introduces completely new considerations. The cotton processor is often faced with unacceptable uncertainties in attempting to produce in volume for the new market.

About seven years ago IIC's Technical Research Division, with substantial financial support from the Overseas Development Administration of the UK Government, embarked on an in-depth programme involving extensive full-scale trials and development work, aimed at putting the manufacture of knitted cotton fabrics on a sound technical base, to encourage the production of high quality products by a larger number of companies.

The project established quantitative relationships between the knitting parameters, the finishing routes and the final product performance for the most important cotton knit constructions. The enormous body of data which was generated (over 1,700 separate fabric samples were produced) has been converted into user friendly programmes which can be handled by semi-skilled personnel on inexpensive computers. Thus, for example, whenever there is a change either in customer specifications or in the finishing process, the knitter can quickly calculate, without resorting to trial and error, what his new knitting parameters should now be. In this way manufacturing risks, development time and cost can be very much reduced and new markets can now be opened up in knitted outerwear from which cotton has hitherto been excluded.

implicit in the agreement with the ODA was the obligation to disseminate this new knowledge as widely as possible in both developed and developing countries so as to create new markets for cotton and thereby increase cotton utilisation to the benefit of the producing countries. Cotton processors in other countries are now showing an interest in this work and the time is opportune to make this knowledge available to processors in the developing world.

During the course of its work IIC also acquired a great deal of experience and information on many aspects of knitgoods production and this too should be made available to knitters in the developing countries some of whom may not yet aspire to the production of quality knitted outerwear.

Financed by the UK Government's Special Purpose contribution to UNIDO, the IIC organised, in April 1984, a seminar in Manchester to discuss recent developments affecting quality and efficiency in the processing of cotton knitgoods. These included the results of recent research and development work by IIC and demonstrations of the Institute's computerised predictive models, designed to reduce time spent on empirical trials and to ensure greater consistency of product quality.

As a follow-up of the seminar a workshop was held at the South India Textile Research Association (SITRA) in Coimbatore, India from 15th to 19th October, 1984. It was conducted by two IIC experts, Mr. R.D. Leah and Mr. J.T. Eaton. SITRA was responsible for the organisation of the workshop and its technical staff assisted in the practical demonstrations that formed part of the workshop.

A second workshop was held in Mexico City from 19th to 23rd November, 1984 at the premises of the Camara Nacional de la Industria Textil (CANAINTEXT). It was also conducted by Mr. Leah and Mr. Eaton.

Because of savings accrued from the seminar and the two workshops, sufficient project funds remained to consider holding a third workshop. It was agreed by the UK Government and UNIDO that the location of this extra workshop should be in Brazil which has a large cotton knitting industry.

The proposal was greeted with enthusiasm by representatives of the Brazilian knitting industry and of Centro de Tecnologia da Industria Quimica & Textil (CETIQT), four of whom had attended the original seminar in April 1984.

The staff of CETIQT offered full cooperation to IIC and one of their representatives visited the IIC laboratories for two weeks in February 1986 in order to become familiar with all aspects of the IIC knitgoods work including the use of the computer programmes.

The workshop was held from 2nd to 6th June, 1986 in the facilities of CETIQT and was attended by about 25 senior technical staff from the major knitgoods producers in Brazil. Two directors from SENAI and the UNIDO

representative from Brasilia also attended the opening session. The workshop was again conducted by Mr. Leah and Mr. Eaton from IIC Manchester.

CONCLUSIONS

The knitting and finishing facilities in Brazil are in general very sophisticated and extensive but the concepts behind the IIC knitgoods work and the ways in which these concepts could be used to improve product quality generated very keen interest.

The IIC experts explained what factors must be controlled, how such control could be achieved and what quality improvement could be expected. This information was readily accepted by the delegates and will undoubtedly be put into practice. Indeed, when the IIC experts later visited a mill whose staff had attended the earlier seminar in Manchester, they noted that several of the IIC recommendations had already been implemented.

The IIC programme which was demonstrated on CETIQT's HP 85 computer certainly caught the imagination of the participants and all were keen to explore its potential for their own fabrics. The fact that most participants did not have sufficient data about their own production (e.g. stitch length, number of needles, yarn count) for correct computer inputs vividly demonstrated the need to measure and control all essential production parameters accurately in order to make use of the system. The participants also appreciated immediately the value of the programme for the development of new products.

All delegates contributed actively to the workshop and there were many animated discussions in both Portuguese and English. All agreed that the event had been very fruitful and helpful.

The tremendous assistance which the IIC experts received from the staff at CETIQT and especially from Professor G. Rena must be recorded. Portuguese translations of the Manchester seminar papers, of the IIC methods and of the captions on the numerous visual aids were provided by Professor Rena and he was very heavily involved in giving translations during the workshop. The staff of CETIQT also gave demonstrations and explanations of the various test methods advocated by IIC and provided classroom accommodation, transportation, meals and refreshments for all involved in the workshop.

FOLLOW-UP

1. IIC had provided CETIQT with copies both of the simplified (HP 85) and of the comprehensive versions of the knitgoods programme. The latter will be converted by CETIQT to run on their own computer.

However, before mills in Brazil can make full use of the computer outputs, they must adopt the correct test and quality control methods. To assist them, Professor Rena will visit all the mills represented at the workshop to explain the most effective ways in which they can take advantage of the new knowledge. He has been given the full backing of CETIQT for these servicing activities.

2. All participants received extensive advice, copies of test procedures and other information in Portuguese and English to enable them to implement the appropriate quality control measures quickly.
3. Later in the year, Professor Rena will visit IIC Manchester again to review the progress made and discuss the problems he has encountered.
4. The enthusiasm shown both by CETIQT and by the industry representatives leaves little doubt that the information provided by the experts will be applied.

LIST OF PARTICIPANTS/OBSERVERS

PARTICIPANTS

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Prof. Lauro Dio de Miranda
Technical Director
SENAI

Mr. Victor Pellegrini
Director (Brazil)
IIC

BRAZILIAN KNITGOODS WORKSHOP

JUNE 2nd - 6th, 1986

P R O G R A M M E

DAY 1 Opening ceremony and presentations to senior management
 on the STARFISH concept

Robert D. Leah/James T. Eaton

DAY 2 COMMENCEMENT OF WORKSHOP

- Introductions and welcome
 by
 Prof. Alexandre Rodrigues (CETIQT)
- Short individual statements by delegates
- INTRODUCTION TO AND OUTLINE OF THE IIC APPROACH
 by
 Robert D. Leah
- Coffee
- TERMINOLOGY
 by
 James T. Eaton
- ADJUSTMENTS AND MONITORING OF FABRIC QUALITY ON THE
 KNITTING MACHINE
 by
 James T. Eaton

PRACTICAL SESSIONS

- Measurement of yarn count on cone
- Measurement of yarn count from fabric
- Measurement of stitch length from fabric

(CETIQT Staff)

DISCUSSION

- DAY 3
- KNITTING TO A SPECIFICATION
by
James T. Lator.
 - Coffee
 - OUTLINE OF USEFUL YARN TESTS
by
James T. Eaton
 - AN ASSESSMENT OF THE QUALITY OF BRAZILIAN YARNS
by
Prof. Isaura Lopes Ferreira, CETIQT

PRACTICAL SESSIONS

- Measurement of courses and wales
- Measurement of weight
- Measurement of spirality
- Measurement of shrinkage
- Measurement of yarn strength
- Measurement of fabric strength

(CETIQT Staff)

DISCUSSION

- DAY 4
- THE SETTING OF REALISTIC FINISHING TARGETS
by
Robert D. Leah
 - Coffee
 - ACHIEVING THE FINISHING TARGETS IN PRACTICE
by
Robert D. Leah
 - THE "STARFISH" PREDICTIVE SYSTEM
 - (a) Description and outline
 - (b) Practical application
 - (c) Demonstration of computer
- by
Robert D. Leah/James T. Eaton

DAY 5

- DEVELOPMENTS IN KNITTING MACHINERY AND INSTRUMENTATION
by
James T. Eaton

- DEVELOPMENTS IN DYEING/FINISHING
by
Robert D. Leah

- KNITGOODS MERCERISING
by
Robert D. Leah

- APPAREL INDUSTRY IN BRAZIL
by
Prof. Almir Teixeira de Souza, CETIQT

Final discussions and closure of workshop.

Presentation of certificates by Mr. Edgard J. Arp