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Vienna International Centre, P.O. Box 300, 1400 Vienna, Austria
Tel: (+43-1) 26026-0 · www.unido.org · unido@unido.org

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URGENT ASSISTANCE TO THE ARGENTINE WOOL INDUSTRY

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THE ARGENTINE REPUBLIC

Technical report: Finishing of wool and wool blends*

Prepared for the Government of the Argentine Republic
by the United Nations Industrial Development Organization,
acting as executing agency for the United Nations Development Programme

Based on the work of Donald Terrington
Expert in wool and wool blends finishing

Backstopping officer: J.P. Moll, Agro-based Industries Branch

United Nations Industrial Development Organization
Vienna

* This document has not been edited.

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ABBREVIATIONS

%	Percentages
60/40	Ratios
2/50 Nm	Metric count
m	Metres
gm	Gramme
°C	Degrees Centigrade
A	Austral (Argentine currency)
i./c	In-charge
AAQCT	Asociación Argentina de Químicos y Coloristas Textiles
CIT	Centro de Investigaciones Textiles
FITA	Federaciónde Industriales Textiles Argentina
GCA	General Currency Areas
KD	High pressure decatizing
V	Visit
W	West
UK	United Kingdom
USA	United States of America
R & D	Research and Development
L	Linear

ABSTRACT

From the start of the mill visits it became obvious that to further improve quality of finished wool and wool rich blends both for worsted and woollen manufacture, additional equipment was necessary particularly in the areas of humidification, conditioning and relaxing, which at the present time does not exist in most of the industry. Further, some of the older equipment needs to be replaced as soon as possible, whilst some of the newer equipment could be upgraded by the purchase of accessories which are now available from most machine manufacturers, e.g., weft straighteners, metal detecters, cooling units, conditioning units, automatic controls and measuring devices to name but a few. The expert believes that indigenous manufacture of modern finishing equipment is not feasible or economically viable.

Apart from the traditional products as now porduced by the wool and wool rich blend manufacturers, consideration should be given to diversify some of the production into differe. end products such as industrial wool felts, furnishings, and other similar outlets. Chemical processing should be introduced over a period, such as mothproofing, bacteria proofing, anti-mildew, flameproof, waterproof, shrink proof as and when desirable, particularly to promote exports. Consideration to improvequality of fabrics in finishing by the use of chemical products through processing should also be considered, such as softeners, glazing finish and handle finish (weighting/stiffening) where desirable. Water is an important commodity in wool

finishing and it should be ensured that soft water 2.5-3.5 English hardness and filtered is used in all wet processes.

Because of restriction on time, technical assistance in the mills was limited to general advice on processing and machine operation and review of possible modernisation programmes. The seminar was also oriented to provide additional theoretical knowledge on finishing of wool fabrics and modern equipment, quality control and observations and recommendations of the wool industry in Argentina.

Promotion for exports was also outlined particularly for the smaller units by the possible formation of an Export Promotion Council. The larger units by diversifying into making up plants to produce finished garments for the export markets.

Under the prevailing circumstances, when and wherever possible, training has been provided to the trainee, much time being devoted to lengthy discussions and explanations during mill visits and report writing.

Detailed recommendations have been given and it is hoped that over a period of time most of them will be implemented, and the anticipated increase in exports achieved.

ACKNOWLEDGEMENTS TEXTILE RESEARCH CENTRE (C.I.T.)

Ing. Héctor J. Vázquez - Director

Lic. Susana Del Val - Chemical laboratory in-charge

Ing. Carmen Varela - Management of quality

I would like to express my appreciation to the above members of the C.I.T. staff for their help and assistance during my three and a half weeks' visit as UNIDO expert in wool finishing from 20 July to 15 August 1988.

Having received excellent assistance from: -

Ing. Patricia Marinó - Sub Director

Ing. Patricia L. Barés - Servicios Especiales,

particularly in translation into Spanish, it gives me pleasure to especially mention their names.

I hope that Patricia L. Barés, my counterpart and trainee, will continue in the future in the same manner, which we have planned and worked together in the past few weeks.

ASSIGNMENT

Post Title - Wool finishing expert

Duration - Four weeks

Duty Station - Buenos Aires

Duties - To assist the Argentine Textile Research Centre (C.I.T.)

1.- Give practical advice to five exporting woollen and worsted mills.

2.- Give a technical report on quality requirements and suggestions on processing technologies and practices to meet there requirements, at the same time introducing up-to-date technologies and suggesting developments in fabric finishing.

3.- Training of at least one C.I.T. staff member trained in this subject enabling them to carry out advisory services to industry.

4.- Giving a 3-day seminar to industrialists and managers about the findings of this mission in comparison to modern dyeing and finishing methods.

The expert will also be expected to prepare a final report, setting out the findings of the mission and recommendations on further action which might be taken.

1. ACTIVITIES

1.1. Introduction

The raw wool production in Argentina is approximately 151,950 metric tons. The bulk of which is exported as greasy wool, scoured wool, tops, carbonised and slipes. This is per annum.

Yarn produced in Argentina is about 14,850 metric tons per annum, of which 1,350 metric tons is manufactured into woollen yarns some of which are blended with acrylic and some with waste.

13,500 metric tons per annum of worsted yarn is manufactured in pure wool and blends with acrylic, polyester, viscose, linen, cotton and a small amount of other fibres.

Approximately 16,000 metric tons per annum of wool and blended fabrics is produced per annum.

There is sufficient greasy wool available for a potential increase in fabric manufacture for export to G.C.A. countries, limitation being the quantity of fabric which can be produced indigenously. However, providing fabric meets design requirements, standards amd specification requirements for export they can be increased. The larger mills have very good experience of exporting, but,, one of the main drawbacks is the indigenous requirement of fabric inrelation to productivity, there is no reason in exporting top class worsteds if imports have to replace them, which leads back to an opinion, of objections by the general public against the export. If wool textile manufacturing can be increased, all problems would be resolved. Financial strains, however, may prevent this.

It is of interest to note that a small quantity of Australian wool

tops are imported. It is not clear if this is done under an export incentive.

Most of Argentina's wool textile mills are located in the Buenos Aires area, one large unit being situated at Santa Fe, about 250 km North of Buenos Aires. There are small units spread about the country, either as subsidiaries of the larger mills in Buenos Aires, or individual. In almost all cases the woven cloth comes to Buenos Aires for finishing and dyeing if necessary.

Apart from finished wool and wool/blend fabrics being exported, which is the bulk export, Men's made up two-piece suits in a small quantity are also exported.

1.2. Mill Visits

Mill visits of extended duration were restricted to I.V.A., Linkolan, Wells all in the Buenos Aires area, and Cilsa situated at Santa Fe. All these mills were vertical units, that is they processed from greasy wool to finished fabric. The problems observed during these visits were very similar from mill to mill which is outlined in 2. Recommendations. One commission finisher Cofia was visited in the Buenos Aires area who finish both worsteds, woollens and blends. Almost all of the commission finishing units have closed over the past few years, the tendency of the larger manufacturers being to have their own dyeing and finishing plant, under their own control, which in turn make their own colours and designs confidential.

In some cases machine and/oroperative methods require modification for further improvement of quality. The machines themselves require better maintenance in addition to improvement to the services supplied to them. Technical staff members to keep up-to-date on technical matters, though technical meetings and collection of Internationally available information. This could

be organised periodically by the C.I.T.staff.

Upgrading of technical control over individual machine operations by periodical observation, checking (preventive maintenance) and instructions as required. This is particularly so where no operative training is done. Improvement in services and material transportation should be made.

If modernisation is being seriously considered for the finishing section, a selective procedure should be adopted so that machines which urgently require replacement, or new machines which need to be introduced are done on a priority basis. For detailed information on individual mills the Appendix may be referred to.

1.3. Seminar

1.3.1. Introduction

After consultation with concerned staff and their requirements at C.I.T. (Centro de Investigaciones Textiles), it was decided a three-day seminar from 0900 hours to 1300 hours with about a 30-minute recess between 1045 and 1115 hours was desirable. The venue to be the head office of F.I.T.A. (Argentine Textile Industries Federation) which is situated in the centre of Buenos Aires. Selected dates 10 to 12 August, 1988, Wednesday to Friday.

Eight lectures to be presented in English, translated into Spanish by Mr. Alvaro Miró who is a private consultant in textiles and has an excellent knowledge of English, particularly technical terminology.

1.3.2. Seminar Lecture Subjects

Lecture 1. Practical aspects and machinery requirements for woollen and worsted cloth finishing.

Part 1. Wet processing and piece dyeing.

Part 2. Dry finishing.

Lecture 2. Finishing routines for all wool and wool/polyester fabrics.

Lecture 3. Instruments and quality control in finishing.

Lecture 4. Modern trends in finishing all wool products.

Lecture 5. Research and development; Relevance to market trends.

Lecture 6. Competitive operation of woollen and worsted finishing.

Lecture 7. General discussions on textbooks, magazines and design services.

Lecture 8. Comments and observations on the finishing industry in Argentina. Question time.

1.3.3. Synopsis

A synopsis was prepared for each of the lectures which had a Spanish translation underneath. These are attached for reference purposes of the lecture contents. Full lectures are not included, having been left with C.I.T. for eventual translation into Spanish. The full text and a Spanish ocnversion when complete will be forwarded by C.I.T. to UNIDO Vienna. The originals in English to be sent on to the Expert. Estimated time to complete the translations is approximately 3-4 months, from mid August 1988. This will also include a summary of questions and answers, which cannot be included in the final report because of limitation of time, i.e. Friday last day of lecture, week-end, flight departure 1200 hours Monday.

1.3.4. Synopsis of the Eight Lectures

These have been copied direct from the C.I.T. translations below the English text. A copy of the invitation to the seminar is also enclosed for information on the subjects. These can be found under Appendixes 4.1 and 4.2.

2. RECOMMENDATIONS

2.1 Introduction

During mill visits recommendations were given for each individual mill and can be referred to in section 1.2 and Appendix 3.1 to 5. Out of the five mills visited four were vertical mills, that is, they processed from the greasy wool to finished fabric. Only three out of the four mills exported fabric, one which had the bulk of exports in men's ready to wear two-piece suits, which were tailored outside the factory. It is of interest to note that none of these four mills were interested in having their fabrics commission finished. The main reason given was confidentiality of designs and fabrics, also quoted was poor quality of finish in the psat, no control, expensive and costly due to damage and rejected pieces. Quality control systems for finishing chemical processing and general improvements in standard processing techniques, including economic and commercial studies particularly for exports should be introduced.

The only commission finisher visited, finished fabric woven by large and small individual weaving units, who more often than not purchased yarn from spinners, who in turn purchased combed tops. Either top or yarn can be purchased in dyed form. Over the past few years most of the commission finishers have closed down, their equipment being purchased by larger production units who have installed the equipment to become vertical. It was considered a difficult proposition for this commission finisher to modernise and out of the question for continuous wet and dry finishing, not only financial restraint,but the quality of fabric to be processed in

similar qualities, weight and width, was not available.

Only the one mill gave the reason for not exporting because it was not viable due to economics and the rate of exchange Austral to dollars. Even so, theirproduction quality wise was up to standard for exports and they produced fabric in the top quality bracket. Probably an incentive by the Government, which has been done in other countries, will make exports more attractive. Lecture 8 (App. 4.3) gives detailed comments and observations on the finishing industry in Argentina.

2.2 General

Before exports are considered, to be increased to any larger quantities, a study must be undertaken to quantify the maximum productivity attainable under full (24 hour) working conditions, in relation to indigenous requirements and quantity available for export, of all the wool and wool rich blend producing units in Argentina. Providing this is viable, the expertise already exists to increase exports. Non-exporting untis could be encouraged by incentives from the Government to export, such incentives to be available for the present exporters also. An association for exporters and on behalf of exporters could be introduced to provide feedback for all the exporting units from the export target markets.

Commission finishing being the international trend, it is recommended that a more in-depth study be undertaken on the possibility of introducing a modern finishing plant.Possibly the larger units may be encouraged to introduce continuous finishing for their own production and undertake commission finishing for smaller units, to make such a plant viable for the large unit and indirectly for the small producer.

Consideration should be given especially by the larger units to introduce their own modern making up plant, i.e. for men's wear and possibly ladies', thereby enabling more foreign exchange to be made. Such a plant could also be on a commission basis after due attention to requirements in relation to the present making up production.

2.3 Training

Ing. Patricia L. Barés (Servicios Especiales) was designated counterpart for training, and considering the limited time available, has done very well in absorbing the major points. It is proposed, for consideration, that Ing. P. L. Barés be nominated for a UNIDO fellowship for further training abroad, in finishing wool and wool rich blends. It is essential this is done under actual industrial conditions, initially in Spain if possible, and one other country dependant on ability to speak the language, particularly technical terminology. The training should be such, to enable Ing. Barés to undertake technical service and quality control in finishing through, and on behald of C.I.T. in the actual mills, including chemical processes, e.g., anti-shrink, flame proofing, etc.

Training was given by three distinct methods:- Practical training during the five mill visits, discussions, recommendations and suggestions being translated into Spanish for better clarification. These visits proved an excellent background for training, particularly so as two of the larger vertical mills were kind enough to show us round the entire plant. One in particular was excellent because every process machine-wise was explained in detail.

Assistance and explanations in ENglish during the write up for each

mill proved very rewarding, especiallyas one of the jobs allotted to the trainee during mill visits was to note types of machines in the wet and dry finishing, along with the manufacturer's name and country of origin.

Detailed explanations with schematic drawings of the different machines in wet and dry finishing was given when at C.I.T. To a lesser extent dyeing piece form and chemical processing was discussed.

2.4 Tecnical Service

In the near future C.I.T. will have a pilot spinning plant both for woollen and worsted yarn, also a computer for design development, which it is assumed will be used for technical service to the mills in addition to R and D. Technical service and quality control are an important function which should be undertaken more vigorously by C.I.T. as most of the mills visited were lacking in quality control and so far as finishing was concerned, almost non-existent for all the mills.

In reference to C.I.T., providing overseas training is given to the trainee outlined in 2.3 and additional equipment procured as outlined in Lecture No. 3 --Instruments and quality control in finishing-- which is mostly for physical testing and the necessary equipment obtained for the chemical laboratory, particularly for the water analysis. Technical service in finishing should be undertaken, which over a period of time can be extended into dyeing.

The system or questionnaire used during the mill visits is reproduced for information, and development for similar ones to be produced for other areas of textile manufacture. It is hoped that these important functions as outlined above will be instigated by C.I.T. Details of the questionnaire

follows:-

a) Housekeeping, lighting, noise control and services

b) Water supply, chemical and dye storage and dispensing

c) Separate processing areas for woollens and worsteds

d) Transportation, handling and waste control

e) Maintenance and preventive maintenance

f) Material flow, machine-wise

g) Observe equipment, assess quality it produces

h) Quality control methods, equipment, and application of results

i) Types and quantity of fabrics produced. Interest in commission finishing.

j) Finishing routines for different qualities

k) If necessary review modernisation and productivity

l) Fabric printing, or any other specialised process.

m) Humidification, conditioning and relaxing, particularly for wool and wool rich blends

n) Membership of federations, etc., both national and international

o) Personal assessment of financial ability for improvement

p) Export figures, types exported and potential for export improvement

q) Any problems, any other points, e.g., chemical processing.

2.5 Machine manufacturing

There are some standard finishing equipment manufactured in Argentina, but no modern technology equipment observed during the mill visits. There was one which has apparently closed down. It would be a difficult exercise to research and develop up-to-date equipment for finishing. In fact, some

of the well known manufacturers oriented to export as well as to home market have gone out of existence, or been taken over by other manufacturers. A good example of this is Menschner's take over of Kettiing and Braun, the latter a very well known textile finishing machine manufacturer in West Germany.

The most logical approach to manufacture finishing equipment in Argentina is by the well known method of collaboration for technical know how with a well established firm such as Menschner, Hemmer's or Sellers. Whilst at the same time negotiating an agreement on the countries to which equipment can be exported under license, for instance South AMerican countries only. Unless there is adequate outlet for indigenous manufactured equipment, it will not be viable, as the Argentine requirements will be small and the expert believes at this stage should not be considered.

2.6 Exports

At the present time there is certainly spare capacity in the wool finishing industry in Argentina for increased production for exports. The larger units who already export or who have exported in the past have the technical expertise and the know how to export.Improvements which can be made in quality control and equipment for specific end products to meet required specifications is outlined for individual mills in Appendix 3.1 to 3.5. But, what is necessary is some kind of incentive to encourage exports and make it lucrative to the manufacturers or at least a little better than the home market profit wise, to export. This can only be done by the Argentine Government.

The smaller manufacturers could also be further encouraged to export, possibly by the formation of an Export Promotion Council, with the same

incentive as offered to the larger units. Exports being controlled for specifications by one or two of the large commission finishing plants, who already finish fabrics for export by the small weaving units, therefore have the necessary knowledge and equipment to finish fabric to export standards, in addition to the laboratory for quality control to meet the required specifications. This would be the most logical step with overall control by the Export Promotion Council for and on behalf of the small manufacturers, and would also include Government involvement, possibly through C.I.T.

App. 3.1.

APPENDIX 1

VISIT TO I.V.A. TRADING UNDER THE NAME SPENCER: BUENOS AIRES SAN MARTIN ON 25-26 JULY 1988

SUMMARY

The visits were made to examine and assist in the finishing department, processing all-wool, wool-blends and multi-fibre blends.

To give advice and assistance on any problems encountered, observe and suggest modifications to imrpove the process routines and quality control procedures, review the finishing department in general and give recommendations where necessary, including possible modernisation.

This mill was found to be very modern with good all-round equipment, technical staff were updated, and both the mill and staff were on par with international standards. Several small items were observed and discussed with the staff. There were no major problems as such. Modernisation already in hand was on correct lines. 90% of production was exported.

ACKNOWLEDGEMENTS

I.V.A.; Ing. Darío Bottos - Director Técnico

Ing. Tomás Garay - Gerente de Apresto

C.I.T. Staff member; Ing. Patricia I. Barés - Servicios Especiales

The staff member to be trained in consultancy work.

INTRODUCTION

I.V.A. is a vertical mill multi-fibre oriented in the private sector. Purchases wool at Argentinian sales, sorts and blends the wool, and where required other fibres e.g. polyester, nylon, acrylic, cottcn and linen. There is not necessarily wool in all the blends. The visit was only concerned with the finishing department. Particularly note must be made, however, that the finishing section only, also finishes fabric produced by three other companies owned by I.V.A. Therefore the finishing production figures concerns all four production units.

BACKGROUND INFORMATION

The finishing department works two full shifts and a partial third, processing approximately 300,000 linear metres per annum. 90% of which are woollen and 10% worsted. The fabrics consist of 100% wool, wool/polyester blends, wool/nylon blends, wool/acrylic blends, cotton/polyester blends and linen/polyester blends. The breakdown, quality wise processed in finishing over a period of 7½ months, which embraces all summer months, approximately October to May (southern hemisphere), is 80% wool 20% mixtures; 4½ months of winter, June to September approximately, the breakdown quality wise is 60% wool 40% mixtures. I.V.A. is a member of F.I.T.A. (Federación de Industriales Textiles Argentina).

MODERNISATION

Apart from modernisation already decided and planned in the re-combing section, I.V.A. are giving thought to updating and modernising the finishing section, to cope with anticipated increased production in about 7 to 8 months' time. At the present time they are interested in semi and/or full continuous processing both for the wet and dry finishing sections. Production will be doubled to about 250,000 linear metres for export alone.

WET AND DRY FINISHING

GENERAL

The wet and dry finishing department is housed in a modern single storey building, only few of the machines are of the older type, housekeeping and maintenance was good. However, more detail can be given to preventive maintenance and machine check lists instigated. Additional imrpovement could be colouring of all service supply pipes and machine areas with defined material movement lanes up to international standards. Consideration may also be given to correct lighting efficiency for a particular working area. Philips are represented in Argentina who will have staff members fully conversant with light requirements for different processing areas according to international standards. It may be a useful exercise for the entire mill to be checked. In addition to lighting, noise control should be reviewed. Machine manufacturers now make special equipment to reduce noise, due to legislations brought in to safe-guard workers, who under certain severe conditions could only work for ½ hour in any one hour.

These last few remarks apply not only to the finishing, but to the entire mill, the objective being to improve worker environment aspects and

because of this, higher production, improved efficiency and superior quality, as the human element plays an important part, particularly in labour intensive and batch operation production.

EXPORTS

I.V.A. export 80% of total production of the vertical mill, about 220,000 linear metres, per annum, therefore their total production is approximately 300,000 linear metres/annum, which leaves a balance of 175,000 linear metres per annum produced by the other three mills. The intention in the near future is to export over 250,000 linear metres per annum. The mill will then be on four shifts, working six days a week. I.V.A. made the statement they export 50% of all indigenous exports, which is quite feasible. However, special note must be made that out of the figure of 100,000 linear metres, only 10% i.e., 10,000 linear metres is exported in fabric form, the balance 90,000 metres being made up into finished garments, mostly men's, but some ladies' also. Making up is commissioned out by I.V.A. who control the quality and are directly responsible for the export.

EQUIPMENT INSTALLED.

WET FINISHING

1 - Gas singening - Ernest Taylor - U.K.

1 - Piece carbonising - Famatex - W. Germany

1 - Kontilana continuous crabbing - Hemmer - W. Germany

2 - old single bowl crabbing - not in use

5 - scour/mill - Mat Mapervio - Italy

2 - open width scourers - Hemmer - W. Germany

1 - Selvedge straightening and ironing machine - Ciatti - Italy

1 - Foulard - before tenter used for removing excess moisture and chemical application when required.

1 - 7 layer single pass tenter, automatic guides, heat setting overfeed and cooling system at exit - Artos - W. Germany

1 - Old tenter - not in use - SMIT - Italy.

DRY FINISHING

2 - Shearing machines single blade - SMIT - Italy

2 - Shearing machines double blade - SMIT - Italy

1 - Grinding machine for ledgerblade and spirals - SMIT - Italy

1 - Steam and brushing machine

1 - Brushing only

12- Mending tables for intermediate and final mending

1 - Atmospheric decatising machine - not in use - only for worsteds

1 - Automatic full decatising machine - Biella - Italy

1 - Automatic full decatising machine - not in use - Kettling and Braun - W. Germany

1 - Raising machine with light touch roller - Franz Muller - W. Germany

1 - Rotary press - Nuova Pignone - Italy - with metal detector

1 - Old rotary press - only used when production demands

1 - Full width rolling machine - OMEZ - Itlay

1 - Cuttling and rolling machine - OMEZ - Itlay

OBSERVATIONS AND RECOMMENDATIONS

No problems of any significance were put forward by ..V.A. and the expert would be inclined to agree with this, but note should be taken of

the points raised in the section WET AND DRY FINISHING GENERAL. Correct processing routines were being carried out, but, with a few exceptions which will be noted later. Transportation in cuttle form was correct from process to process, however improved handling can be adopted. Serious consideration to layout should be given when new equipment on continuous lines is installed to ensure semi-continuous is feasible also. In fact a feasible study shoould be undertaken as a first step, to look into production potential and cost of setting up continuous processing in relation to anticipated future production. It was unfortunate that worsted and woollen processing were in the same area. Possibility of screening off high flywaste machines should be considered.

There appeared to be little variation in the handle feel, and finish of the different types of fabric. This is only an observation and may be the effect desired. Possibly it is due to the water used in processing, which I was given to understand is under review, and more than likely a base exchange water softening plant will be installed to supply both the dyeing and finishing sections: - The following observations and suggestions are made

1) No control of moisture particularly in all wool and blends with wool, a dewing or damping machine will be an advantage.
2) An automatic weft straightener prior to dyeing to ensure straight pieces.
3) Moisture meter, direct reading in percentage at outlet of Artos tenter will improve processing. Wool requires between 14-16% moisture content for best processing conditions.
4) Shearing machines require replacing with modern equipment in the near future. One high speed cutter (1 back - 2 face) will produce the same amount as the current 4 machines.

5) Fabric printing may be considered; a) some of the fabrics produced will lend themselves ideally. However, a market study should be undertaken; this remark particularly applies to wool and wool blends.

6) Consideration to introduce garment making up within the factory should be made, thereby giving complete control from raw material (fibre) to finished garment. This approach has been done in countries like India, for instance, with great success, particularly with exports to G.C.A. (General Currency Areas) where labour costs are high.

7) Steaming and relaxing machines or so called shrinking machines will improve all wool and wool/polyester blends by removing most stresses and strains imparted during finishing prior to full decatising.

8) Some of the all wool and wool blend fabrics would be imporved by a light steaming at the final process, giving a softer fuller handle.

App. 3.2.

APPENDIX 2

VISIT TO LINKOLAN: BUENOS AIRES

SAN MARTIN ON 27-28 JULY 19888

SUMMARY

The visits were made to examine, advise, give assistance to improve process routines and quality control in the finishing department. If required discuss modifications and modernisation.

Finishing equipment was old with low production and low maintenance. Only one technician who had to be a Jack of all trades, in both the wet and dry finishing sections. Nevertheless, considering all the aspects, the finished fabric was quite good. Extensive discussions held on possible small modernisation, apparently finance was the major problem.

ACKNOWLEDGEMENTS

Linkolan; Mr. Pablo Linkowski - Presidente

Ing. Alfredo Nicotra - Gerente Industrial

Mr. Bernardo Throm - Finish Manager

C.I.T. Staff members; Ing. Patricia Marino - Sub-Director

Lic. Susana Del Val - "/c Chemical Lab.

Ing. Patricia L. Barés - Servicios Especiales.

INTRODUCTION

Linkolan purchases its own raw wool, has it commissioned loose stock dyed, combed and spun. Polyester, cotton, viscose and linen are also processed on their behalf, dyed and blended when necessary and spun. The factory then warps, weaves and processes its own fabrics in wet and dry finishing and finally cuttled and rolled for despatch.

BACKGROUND INFORMATION

The finishing department process fabric only from its own production unit, which has an annual production of 150,000 linear metres per annum. 30% of production is all wool, 40% wool/polyester 45/55 blend, 25% polyester/viscose 60/40 blend, 5% other blends such as linen cotton. Their present productionis intended for summer sale 250/260 gms per metre. Heavier qualities are produced in summer for winter sale. Kinkolan is a member of F.I.T.A. and an exporting association. A small quantity of production is exported fabric form 10-15% of production.

MODERNISATION

All the wet and dry finishing equipment was purchased second hand piecemeal in January this year 1988. Most of the equipment is over 30 years old, however, one or two machines are between 10-15 years. If you consider to keep updated, textile equipment requires replacing between 10-15 years modernisation becomes quite a problem.

Because of varying climatical conditions throughout the year, humidifying or moisturising machines with automatic moisture content direct % reading controls were discussed in detail.

Distorted check pieces were observed in finished fabric which lead to a detailed discussion on automatic weft straighteners.

Lastly because of surface fibres on finished cloth, high speed shearing machines, 3 shears 1 back 2 face were gone into in detail. This included dust extractors, butt end sewing machines and spiral and ledger blade.

Obviously a complete new finishing plant, custom built, equipment wise, for the fabric production would be ideal. Financial restrain does not permit therefore step by step modernisation should be undertaken.

WET AND DRY FINISHING

GENERAL

This department is housed in a single storey building. Housekeeping was average, maintenance, particularly preventive maintenance needs to be introduced. Only one service supply line was coloured gas (yellow) according to international standards. This should be extended to other services. No raising or napping equipment was available, the question did not arise for separate processing areas for woollen and worsted. Lightweight fabric

250 gm/metre is produced from 2/50 Nm. No quality control undertaken within the mill only visual assessment was done, any physical testing carried out for them at C.I.T. This could be extended into chemical testing and visual assessment quantified.

EXPORTS

All the export from Linkolan is by linear metres, U.S.A. and W. Germany particularly mentioned. At this point of time no further increase in exports is anticipated. This is probably due to the limited production in relation to home market requirements.

EQUIPMENT INSTALLED

WET FINISHING

10 - Mending tables for greasy and intermediate finished mending

1 - Gas singeing double burners - Osthoff - W. Germany - separate area

2 - Scourmill 4 draft with double roller - MAT Manervio - Italy

2 - Piece scouring machines - old

1 - Atmospheric dye winch used for scouring lightweight fabrics

1 - Standarded milling machine - old

1 - Single bowl crab - used for 100% wool fabric

1 - Slot water extractor - Benninger - W. Germany

1 - Hydroextractor - for all wool pieces - Argentine

1 - Foulard

1 - Tenter overfeed - Thermosett - manual weft straightener - Famatex - W. G.

1 - Steam brush with metal detector

DRY FINSHING

1 - Selveedge opening and ironing - not in use

1 - Shear - not in use - two cutts

1 - Shear - Vollenweider - Swiss - not used - with dust extractor

1 - Atmospheric decatiser with vacuum - single roll

2 - Rotary press - with steaming

1 - KD semi-automatic full decatising - Italy

1 - Full width rolling

2 - Perch final and intermediate inspection

1 - Cuttle rolling onto boards

Note:- No woollens processed consequently no raising or teazle machines.

A good base exchange water softening plant installed, softens to 5-7.5 Franch hardness. One heat unit for preheating boiler feed water and a Thermopac vertical boiler. The water steam equipment all manufactured under license in Argentina by Industrial Technia Aire.

OBSERVATIONS AND RECOMMENDATIONS

Housekeeping in the finishing section was average, old unused equipment was lying in the department, and a vigoreaux printing sett with thermo, backwash dryer. Both maintenance and waste control should be improved. Processing of water and steam was good modern equipment.

Considering the age of the equipment which was purchased second hand and commissioned January 1988, the finish achieved was acceptable except for a few minor points itemised at the end of this chapter. Linkolan only finish their own production.

Material flow could have been improved if all the old and printing

equipment had not been installed, by having the wet processing on the entry side, water extraction and drying at the end of the shed and dry finishing on theexit wall side. The centre part used for storage and incidental items, such as intermediate inspection. As observed in other mills, no moisture control of all wool and wool blend fabrics, which is desirable with all hygroscopic fibres.

Information and detailed drawing supplied on chemicalstorage and dispensing tanks for scourmill. Detailed discussions took place on tentering and heat setting no more than about 10% moisture retention before Thermosett at about 180°C and 30 seconds dwell, being done by two passes possible by one. Transportation cuttle form by cart liable to crease fabric, triangular botes or cones under cuttles of machines recommended. If the atmospheric decatiser is being used the piece must be reversed and steamed two ends. Ideal if all wool and wool blends could have moisture added and stood overnight to condition 18% on bone dry weight recommended.

The possibility of participating in a modern finishing complex on commission basis was not agreeable to Linkolan, the main objection put forward was confidentiality.

Distortion of fabrics, particularly in checks was observed, discussions took place on automatic weft straighteners for improvement. Surface fibres particularly in all wool fabrics was noticed on initial inspection not seen, until a slight rubbing effect was given. To improve this a 3-blade 1-back 2-face high speed shearing machine was discussed along with dust extractor and butt end sewing machine. Because all the dry finishing was carried out under total dry conditions, satisfactory for synthetic fabrics, all wool fabrics in dry finishing (possibly missnamed) are improved by addition of moisture 14-16%

just prior to processing. It is essential, though, to have an even distribution over the entire piece. Therefore for instance pieces should be slightly over dried to about 10% moisture off tenter and allowed to condition back, otherwise an uneven finish through the fabric will result. Therefore humidifying, conditioning and relaxation machines were discussed. Due to the previous discussions on surface fibre and shearing, details were given on grinding machines for ledger blades and spirals, and the various systems available when shearing thick selvedges, such as sliding beds, and piano beds.

It was noted that thermo paper was available through:-

Paper Thermo-meter Co.,

105 Fagg Drive

Natick, Massachusetts, U.S.A.

Quality control within the mill was done by visual assessment only, C.I.T. carry out some tests for Linkolan, but, minimum testing facilities should be available at the mill. In this respect a format was given for testing finished cloth which also pinpoints areas where corrective action should be instigated. Tests necessary for checking water was also provided, it is assumed that hardness, the most important factor is tested on a regular basis throughout the day.

App. 3.3.

APPENDIX 3

VISIT TO WELLS: BUENOS AIRES

SAN MARTIN ON 1-2 AUGUST 1988

SUMMARY

The visits were made to give assistance and advice on finish processes, quality control and if necessary to discuss modernisation and modifications.

Flat-setting, full thermo-decatising machine manufacturers and finishing routines were discussed in detail. Finished samples assessed and suggestions made for possible imporvement. This factory was using traditional equipment to a high standard and produced good results. They were in the upper end of the trade producing light to medium weight fabrics for summer trade from blends varying from 55/45 wool-polyester upwards to 100% worsted fabrics. Heavier cloths from the same blends are manufactured for winter trade, produced in summer.

ACKNOWLEDGEMENTS

Wells (Argentina) S.A.: Ing. Héctor Horacio Marsan - Gerente Industrial

Antonio Andreano - Jefe Dpto. Acabados

C.I.T. Ing. Patricia Marino - Sub-Director

Ing. Patricia L. Barés - Servicios Especiales

Ing. Carmen Varela - Management of Quality

INTRODUCTION

This vertical factory produces 3,200 m/day, approximately 900,000 linear metres per annum, working 2 shifts of 8 hours each plus ½ day four hours. Weight of summer fabrics 260 gm/metre are manufactured during winter and weight of winter fabrics 360-500 gms/metre manufactured during summer.

Breakdown of production quality and fibre blend-wise are 100% wool, 65% wool/35% polyester, 70% wool/30% polyester, 90% wool/10% polyester. No other blends are manufactured, and no woollens are made. Therefore as it is a vertical factory producing all wool and wool-rich blends, no contamination from woollen finishing. About 200 metres per day are processed for other manufacturers.

BACKGROUND INFORMATION

The production of all wool is 40% of production.

65% wool/35% polyester is 55% of production.

70% wool/30% polyester under 5% of production.

90% wool/10% polyester small amount of production.

Therefore this factory is wool oriented aiming at the top quality bracket in the home market only. Wells is a member of F.I.T.A. and also International

design services, for up-to-date predictions of forward fabric designs.

MODERNISATION

Dependant on availability of finance, and as stated by "Wells" the market at the present time is depressed economically and the wool price high. Nevertheless they are looking at modernisation for the entire factory and priorities observed. Particularly for the finishing section combined scour/milling machines, scutcher, automatic weft straightener, humidifying, conditioning and relaxation machines. In addition a water softening, filtration plant. The water for processing was very saline, but it was stated only 5-7.5° French hardness. Discussions took place on fully automatic thermo-set decatising.

WET AND DRY FINISHING

GENERAL

The wet and dry finishing is in a single storey building, although rather limited for space, is adequate. The flow pattern was satisfactory from storage of the pieces from weaving, to finished fabric warehouse. Services were adequate, however lagging of steam pipes require re-doing in some areas. Interesting to note the services were coloured according to International standards. This should be completed, especially because of the space available, it would be an advantage to have machine areas marked off and movement areas clearly defined by the standard black and yellow stripings. Attention to walls and ceiling in the finishing section would certainly be an imporvement; otherwise housekeeping was good. Transportation and handling was in carts, cuttle-wise 8-10 pieces per cart.

The possibility of having fabric finished in a modern finishing plant was not desirable by Well's. Preferred to have the finishing under their own control. Reasons put forward from previous experience of commission finishing, no control over finish, poor finish results,it was expensive because the commission finisher spoiled fabric.

EXPORTS

No exports at present but have done in the past. Reason put forward was that it was uneconomical because of the US$ exchange rate. Therefore the home market was more lucrative in terms of income in Australs.

EQUIPMENT INSTALLED

WET FINISHING

1 - Singeing - separate area not in use

6 - Standared milling machines - R. Rinaldi - Hemmer

2 - Rope scourers - Hemmer - W. Germany

2 - Open width scourers

2 - Single bowl crabs - with vacuum water extraction - Kettling & Braun - W. Germany

1 - Tenter (vertical) - with thermosetting - Famatex - W. Germany

DRY FINISHING

1 - Steaming and inspection machine

2 - Shearing - French - one discarded

1 - Rotary press - Kettling and Braun - W. Germany

1 - Atmospheric decatising - single roll double action - Kettling & Braun - W. Germany

1 - Semi-automatic decatizer - KD - Biella - Italy

1 - Foulard

1 - Piece carbonising unit

1 - Cuttle and folding machine

1 - Rolling machine

OBSERVATIONS AND RECOMMENDATIONS

In general correct processing routines were carried out. It was observed that singeing was not done, probably because low pill polyester fibre was being used. In any case singeing of wool/polyester blend fabrics should only be carried out if it is essential and necessary for finish of clear, clean cut fabrics and to avoid pilling. The processing routines through all the finishing department was satisfactory taking into consideration the type of equipment available. However, more control over actual machine operations should be evolved, to standardise a finish on individual fabrics, and to some extent an acceptable variation in finish between all wool fabrics and 65% wool/35% polyester fabrics. Unless, of course, one is attempting to have a stereotype finish and have all fabrics a similar standard for handle, bulk, shine and visual appearance.

Waste control was carried out, e.g. quantity of tab ends, shearing waste, and amount of damage through processing. The latter to ensure no repetitions in subsequent processing take place. An example of this could be damage at the shearing machine either in the body of the fabric or selvedges.

Quality control in finishing is by checking the fabric for creases after wet processing, occasionally on the finished fabric, grease and oil content, pH and shrinkage. Length, width and weight loss and observation for fautls on a continuous basis. New production in particular are checked for cover and pilling. Check for handle and visual appraisal a continuous operation on all qualities. An in-plant quality control would be an advantage on the lines outlined in Paper No. 3, Instruments and quality control in finishing, which include several other parameters for finished fabric.

Discussions and recommendations took place on several subjects which are itemised as follows: -

Flat setting (chemical) in detail.

Automatic thermo-decatizing (Seller, U.K.)

Manufacturers of finishing equipment.

Chemical storage and dispersing equipment. Details and drawing was provided as a basic requirement.

Details of chemicals available for finish processes, including chemical processing and dyeing.

Processing routines discussed in depth.

A visual appraisal and hand of fabrics produced against similar fabrics produced in Europe.

App. 3.4.

APPENDIX 4

VISIT TO CILSA: SANTA FE

VILLA CONSTITUCION ON 4 AUGUST 1988

(250 km North of B.A.)

SUMMARY

The visit was to give advice on finish processes, modernisation, assistance in quality control and discuss any problems which Cilsa may have.

Problems encountered were diagonal elasticity in some fabrics, fibre fuzziness on the surface of the fabric, tight warp ends, moiré effect, and light and dark streaks in lightweight fabrics. These problems were discussed in detail and methods of approach to solve them given.

In depth discussions took place over scouring, milling, crabbing, shearing and full decatizing. The presentation of the cuttled rolled fabric was discussed, as was the comparison by hand and visual appearance of Cilsa's fabric and fabrics made in Europe.

ACKNOWLEDGEMENTS

CILSA Ing. José María Martinel - Gerente de Producción

Carlos Catani - Finish Manager

C.I.T. staff member Ing. Patricia Marino - Sub-Director

Ing. Patricia L. Barés - Servicios Especiales

INTRODUCTION

Cilsa is a vertical mill in the private sector with worsted system only, manufacturing all-wool and high blend wool fabrics. Purchase their wool requirements direct from the wool grower, who requires payment within a month of purchase. The only other fibre used is polyester. The visit was only concerned with the finishing department who finish cloth only from their own production. However, being invited we had a tour of the entire mill, which was good insight and training for Patricia L. Barés. According to Cilsa, 80% of all indigenous wool is exported. Only 20% consumed in Argentina.

BACKGROUND INFORMATION

The finishing department works two full shifts, and a partial third shift on occasions, processing is mainly for menswear, of which 80% is for the home market and 20% is exported. Because of the high price of indigenous wool and no long term credit, wool content of fabrics has now been reduced to blends of 90/10 wool-polyester, 70/30 wool polyester, 50/50 wool polyester and pure wool mostly for exports. The opinion was expressed by Cilsa, that the top end of the trade, i.e. pure new wool and rich wool blends was not very active in the home market.

MODERNISATION

The company is interested in modernisation, but not continuous processing (correct analysis) only in batch processing, to update present equipment and introduce some machines for new technology. The question of availability of the finance required to do this seems to be the main drawback. The technical staff realise what is necessary such as, automatic weft straightener, and automatic high pressure decatizing machines, also humidifying, cooling conditioning machine which would all be new equipment. Additional equipment for combined scour mill and carbonizing will increase and standardise production and quality in these areas. It was very interesting to note that although the machines were not new, in some cases Cilsa were introducing modern control and visual information display equipment on some of the machines.

WET AND DRY FINISHING

GENERAL

The wet and dry finishing sections were housed in a single storey building. It was interesting to note that the greasy mending from loom was carried out in this department. Initial perching for marking faults and time estimation to complete mending was being carried. Mending in the finishing department, or under control of the finishing manager appears to be the trend in Argentina. There are many possible advantages one could think of to substantiate this mehtod.

Housekeeping was good, but only six mechanical engineers to maintain the entire plant. Services to finishing department should be suitably coloured. Water is supplied from the river and siutably processed, tube

well water is also used, but, hardness not known or any chemical analysis of the water. It would be an advantage to have machine areas and transport lanes for material flow high lighted by proper demarkation lines. As most textile concerns in Argentina, Cilsa is a member of F.I.T.A.

EXPORTS

All the exports are sent to U.S.A. This consists of about 20% of the present production, which at the present time they are negotiating to increase to 40%. Exports consist of pure wool and wool rich blends. The procedure adopted by the mill is standard practice. The representative or agent in U.S.A. against standard samples produced by the mill organises sales. A sample of the standard acceptable to the importer and Cilsa retained for comparison., the usualstandards are fibre content, length and width, colour and fastness, shrinkage, handle plus any other standards agreed on by the two concerned parties. If it is a large bulk order some countries send their representative for inspection before despatch. Exports in general were discussed, particularly to become more viable by exporting to other countries. If the export target figure is reached, 40% of the total production per annum will be for export.

EQUIPMENT INSTALLED

WET FINISHING

20 - Mending tables (one used for pre-examination and marking)

1 - Scourmill combine - MAT di Beroldi - Italy

2 - Dolly scourers - Flaminor Regis - Italy (one dismantled)

4 - Standard Milling - Flaminor Regis - Italy (2 with new control systems)

1 - Mini Konti Crab - Hemmer - W. Germany

1 - Piece dye vessel (used for carbonising)

1 - Slit vacuum water extractor

1 -Tenter with thermoset - Famatex - W. Germany

DRY FINISHING

2 - Shearing - Biella - Italy (one discarded)

1 - Rotary press sated 1925

1 - Uncurling and selvedge ironing - Biella - Italy

1 - Manual high pressure decatizer - Kettling and Braun - W. Germany

1 - Rigging and cuttling - Dema

1 - Rolling machine

OBSERVATIONS AND RECOMMENDATIONS

The general run of processing was being carried out, but it should be remembered that machines can have more than one function. For instance, on the Mini-Konti-crab fabric could be processed as a first operation to set the fabric and stabilise it for subsequent operation. As it is used now to consolidate the fabric after previous scour mill as a first operation, but it must be remembered that at the same time crabbing also sets the fabrics. Therefore if the fabric is in a distorted condition, it will be difficult to remove in further processing. Crabbing should be 108°C maximum for all wool and wool-rich blends, otherwise degradation of the wool fibre takes place. This also applies to the dyeing operation tmeperatures of about 107°C are ideal in high temperature wool dyeing to expedite the process; above this temperature wool preservatives must be used which speaks for itself.

It was observed in scouring during the soda ash treatment that the fabric coloured the scouring liquor. This could be attributed to insufficient fixation in dyeing, or washing off, alternatively too severe a scour i.e. alkali, or too high a temperature of scour liquor. Suggested modifications to scouring were a double scour first with soda ash and a detergent, warm wash and second scour detergent only, temperatures no more than 40°C liquor to goods ratio about 5:1. Efficiency of scouring can be checked by the percentage of grease and oil in the scoured fabric about 1%. The minimum amount of chemicals particularly soda ash at a given temperature can then be calculated to avoid over processing. An improvement to washing off could be addition of a double jet of water in the front of the scouring machine through which the pieces in rope form could pass, may also help to increase productivity.

Shrinkage in milling of 15% appeared to be excessive, usually about 8-10%. No definite reasons forthcoming, may have been done to consolidate picks and attain correct weight for linear metre, and a required fuller hand to meet specificaitons. An important point observed in both milling and scouring, fabric must not be run in such machines in rope form in a dry condition.

No weft straightener at the start of the drying operation which would certainly eliminate bowed checked fabrics, observed in the rolled and finish condition. Good to note a scutcher was used prior to drying to open the fabric after wet processing in rope form, or to the Konti-crab.

The entire dry finishing could be looked at with a possibility of modernisation as soon as possible, on the lines discussed. Not only because of improvements which could be made in the dry finishing of the top

grade fabrics, but also to improve productivity and more easily meet the specification requirements for the U.S. A. export market. Particular mention was made of humidifying, conditioning and relaxation equipment re: - modernisation.

Interest in the use of a modern commission finishing plant if available was negative. No waste control undertaken in finishing. Quality control was limited to observation of faults, resistance to shrinkage, steam ironing, % loss in length, width and weight and visual appraisal. Discussions took place on how C.I.T. can assist in quality control by taking occasional samples for complete testing as outlined in quality control and finishing. Periodic testing of water will also be useful.

The cuttled and rolled fabric presentation needs to be improved on the lines discussed, after all visual appearance of the rolled fabric is important too. If framed paper covers are used, apart from less weight, the firm's logo can be printed on the paper. You never know where these boards get to, therefore full name and address may be helpful as well.

Problems discussed in detail were as follows: -

Cross checks in fabric, i.e. non-alignment

Diagonal elasticity

Surface fibre fuzziness

Tight warp ends

Light and dark appearance, possible thick and thin yarn

Moiré effect

Comparison of finish by hand and visual appraisal with all wool and polyester blends made in Europe.

Various lines of action were outlined to tackle these problems for improvement and to rectify the causes. C.I.T. was in the position to carry out all the tests, both physical and chemical.

App. 3.5

APPENDIX 5

VISIT TO COFIA: BUENOS AIRES

SAN MARTIN ON 08 AUGUST 1988

SUMMARY

This very large commission finisher was the only one visited, multi-fibre oriented in separate dyeing and finishing areas for wool and wool-rich blends, cotton and mixtures and synthetics. The maximum production was substantial, but the factory was working at less than half its capacity, probably less than 50% in the wool section. Cofia process both woollens and worsteds in the same area. One interesting observationwas the wet chlorination and printing of all wool fabrics, lightweights for ladies' wear, with a good clear distinct print. Some of the raised fabrics was good quality, of special interest was a raised fabric made from llama fibre. They are also processing cloth which is exported to U.S.A., Canada and Europe.

ACKNOWLEDGEMENTS

COFIA; Mr. Héctor Augusto Bado - Director

Mr. Boris Gretschischkin - Finish Manager

C.I.T. Staff members; Ing. Patricia Marino - Sub-Director

Ing. Patricia L. Barés - Servicios Especiales

INTRODUCTION

Cofia is alarge commission finisher processing wool and wool rich blends, in a separate shed from cotton, blends of cotton and synthetics. The pieces for processing in the wool finishing section are collected from several manufacturers. Most of the manufacturing units have spinning and weaving, some of the smaller units weaving only. The total number of such units is about twenty, who on an average send approximately 3,000 linear metres of fabric per month for finishing and in most cases for piece dyeing. One of the larger spinning and weaving units who also have four other subsidiary weaving units, send to Cofia for finishing and in most cases dyeing approximately 60,000 linear metres per month. Cofia estimate there are in operation at the present time five commission finishing units. Maximum production at Cofia per annum working full capacity is about 5,400,000 linear metres, calculated on an average weight per linear metre of 335 gms. Breakdown of production is 70% worsteds of which 30% is blends with acrylic, polyester and other fibres, and 30% woollens. All the fabrics for processing come from the Buenos Aires area.

MODERNISATION

All the processing is done batch wise, at the present moment of time

are not interested in either continuous or semi-continuous processing. Whatever modernisation is undertaken is done machine-wise according to requirements. However, providing similar qualities and widths, colours to a certain extent are available. Cofia's production is ideally suited for continuous processing.

WET AND DRY FINISHING

GENERAL

The finishing section is housed in a single storey building, housekeeping was average and lighting in some areas inadequate. Maintenance was done by a separate engineering department, particularly when one considers the age of some of the equipment in the finishing section, producing good results. The water supply was soft 3-4 French hardness for all wet processing and boiler feed water. Checked by an adequate laboratory, which also carries out physical, chemical tests and sample dyeing for the entire factory. Actual quality control in the finishing itself was to examine incoming fabric, and check length and width on dispatch. Visual appraisal and hand was always done, tensile and elongation strength for warp and weft occasionally in the laboratory. It is of interest to note that the water was 20-21° French hardness before treatment.

Except for standard carbonising with sulphuric acid, drying, baking and dry milling , no other chemical processes was undertaken. Printing was done on wool lightweight fabrics after wet chlorination. Equipment was adequate for batch processing but additional equipment would be an advantage as outlined in recommendations. Transportation of fabrics was by hand carts made of wood for wet processing and metal for dry. Waste control for piece

ends and damages was carried out. Cofia is a member of F.I.T.A.

EXPORTS

Being commission finishers, no direct exports is done by Cofia. They do process fabric for customers 20-30 metric tons, about 90,000 linear metres per month which are for export. The present day finishing and dyeing production is less than half of maximum production for all three finishing plants. Observation during a tour would put the wool finishing at well below this figure. Because of the depressed home market, Cofia believe that the extra production from the smaller units which they process can be directed to exports, particularly in wool and rich wool blend fabrics. The expert believes it is not necessarily a depressed home market, but the change in dress habits; no longer are two-piece suits, sports coats and trousers for men, and two-piece suits for ladies in demand as they were in the past, e.g. jeans and knitwear for the teenagers and twenties.

EQUIPMENT INSTALLED

WET FINISHING

2 - Inspection tables

2 - Selvedge bagging machines

2 - Combined scour/mill - Hemmer - W. Germany

4 - Standard milling - Kettling and Braun - W. Germany

7 - Rope scour machines - stainless steel

2 - Open width scourers

1 - Continuous mini crab - Hemmer - W. Germany

1 - Dry cleaning vessel

2 - Hydro Extractors

1 - Foulard and carbonising range - indigenous manufacture

4 - Dry milling (standard) manufactured under license with Raxhon - Belgium

14 - Dye vessels piece - stainless steel

2 - Wet tenters vertical with overfeed and thermoset - Famatex and an old Kettling and Braun - W. Germany

DRY FINISHING

2 - Foulards prior to wet tenters

2 - Rotary press - SMIT

2 - Shearing double blades

1 - Full decatizer, manual - Kettling and Braun - W. Germany

1 - Atmospheric decatizer - Kettling and Braun - double action - one cylinder

! - Continuous atmospheric decatizer - Fitz - Spanish

3 - Inspection and mending tables

OBSERVATIONS AND RECOMMENDATIONS

No problems were put forward by Cofia. Services in finishing could be improved by colouring to International standards and re-painting undertaken. The lighting efficiency should be checked. Correct processing routines were being carried out with machines available.

Consideration may be given in the future to install equipment particularly for all wool worsteds and rich wool worsted blends for humidification, conditioning and relaxing. Even the one cooling unit after a particular hot process was not used, which would allow the fabric to condition. Prepared chemical storage for a day's production used during

scouring and milling, ensures standardisation for future processing if supervised correctly. Printing of wool fabrics was generally discussed, particular reference was made to the International Wool Secretariat's process.

4.1. Synopsis of Lectures

Lecture N°1 PRACTICAL ASPECTS AND MACHINERY REQUIREMENTS FOR WOOLLEN AND WORSTED CLOTH FINISHING

Part 1 Wet Processing and piece dyeing

Part 2 Dry Finishing

SYNOPSIS

Part 1 of the paper deals with wet processing and piece dyeing. The later is included because it is an integral part at wet processing, particulary where self shades are concerned. Together they are one at the most important textile processing stages, as the correct application of the various techniques outlined, improves the appearance, handle, lustre, drape and wearing properties of a fabric.

Both Part 1 and 2 (Dry finishing) discusses the processing conditions and machinery required for finishing woven fabrics made of woollen and worsted spunyarns (knitted fabrics have only been mentioned as an incidental item) in all wool and blends of wool and synthetic fibres.

Continuous wet and dry processing has been outlined and providing that the limitations of continuous processing are understood, no difficulties will occur, particularly if it is introduced along with a modernisation programme in conjunction with a reputable Textile Finishing Machinery Manufacturer.

1 ASPECTOS PRACTICOS Y REQUERIMIENTOS DE MAQUINARIA PARA TERMINACION DE TEJIDOS CARDADOS Y PEINADOS

1°Parte: Procesos húmedos y tintura de piezas

2°Parte: Procesos secos

Sinopsis

La 1° parte trata de los procesos húmedos y tintura en pieza. Este último se incluye debido a que es una parte integral del proceso húmedo, particularmente cuando conciernen matices propios. Juntos son una de las más importantes etapas del proceso textil, y la correcta aplicación de las técnic[illegible]sbozadas mejora la apariencia, mano, lustre caída y propiedade[illegible] uso de un tejido.

En ambas partes (terminación en seco y en húmedo), se discuten las condiciones de proceso y el requerimiento de maquinaria para la terminación de tejidos planos realizados con hilados cardados y peinados (los tejidos de punto han sido mencionados sólo como un punto menos trascendente), en todos los casos en lana y mezclas de lana y fibras sintéticas.

Los procesos secos y húmedos contínuos han sido detallados y, siempre que las limitaciones de los procesos contínuos sean entendidas, no habrá dificultades, particularmente si se introduce un programa de modernización, conjuntamente con constructores de maquinarias de terminación textil de prestigio.

Lecture N° 2 FINISHING ROUTINES FOR WORSTED AND WOOL/POLYESTER FABRICS

SYNOPSIS

The object of cloth finishing is basically to improve the aesthetic characteristics and wearing performance of the woven fabrics. Colour, appearance and handle are factors which influence the acceptability of a fabric. To achieve this requires the application of mechanical, physical and chemical principles during the cloth finishing processes. Consequently the paper outlines reasons for a specific process and results expected.

Finishing processes may vary from those given in this paper and in fact between factory and factory, because there is no definate routine for finishing a specific fabric. They are given as a guide line only, but it must be remembered that any excess deviations will not attain the desired results.

Variations in finishing routines are due to many reasons, the main one of which is unfortunately availability of the required equipment. Finishing is not an exact science, but basically one of experience and application of this knowledge, with adjustments to meet the required end product specifications. One must not overlook the operator of a machine, for he has more intimate knowledge of its characteristic.

2 RUTINAS DE TERMINACION PARA TEJIDOS PEINADOS Y DE LANA POLIESTER

Resumen

El objetivo de la terminación del tejido es básicamente mejorar las características estéticas y su performance al uso de los tejidos planos. El color, apariencia y mano son factores que influyen en la aceptación de las telas. Para lograrlo se requiere la aplicación de principios mecánicos, físicos y químicos du-

rante el proceso de terminación. Consecuentemente se delinea las razones de los procesos y los resultados esperados.

Los procesos de terminación pueden variar según los principios mencionados y de hecho entre fábricas debido a que no hay una rutina definida para la terminación de un tejido específico. Se dan sólo como guía pero es necesario recordar que cualquier desviación excesiva no dará los resultados deseados.

Las variaciones en las rutinas de terminación se deben a muchas razones, la principal es la desafortunada disponibilidad del equipamiento requerido. La terminación no es una ciencia exacta, y se basa en la experiencia y aplicación de ese conocimiento, con los ajustes necesarios para llegar a las especificaciones del producto final. No se debe desechar al operador de la máquina, ya que él tiene un mayor conocimiento de sus características.

Lecture N° 3 INSTRUMENTS AND QUALITY CONTROL IN FINISHING

SYNOPSIS

Testing in itself, does nothing to improve quality, but the proper use of instrumentation can lead to improved quality and increased productivity, therebye to reduce production costs, penetration of new markets and repeat orders. Testing procedures should be revised periodically to ensure the aims and objectives are defined and logical. That the work programme methods of testing, recording and presenting of results are satisfactory. Unless testing is carried out with due attention to detail, the results are of little value. The quality control for fabric only is outlined including necessary tests for textile water supply and a chart for ensuring standardisation of fabric produced. The chart can be extended as desired by the addition of further tests outlined in the paper.

3 INSTRUMENTOS Y CONTROL DE CALIDAD EN TERMINACION

SINOPSIS

Los controles en sí mismos, nada hacen para mejorar la calidad, pero el uso apropiado de este instrumento permite mejorar la calidad e incrementar la productividad, con lo cual se reducen los costos de producción, permitiendo penetrar en nuevos mercados y mantenerlos. Los procedimientos de ensayos deben ser revisados periódicamente para asegurarse que las metas y objetivos son definidos y lógicos. Los programas de control que registran y presentan los resultados son satisfactorios. A menos que el ensayo se lleve a cabo con la debida atención al detalle, los resultados son de poco valor. El control de la calidad para tejidos sólo es estructurado incluyendo los ensayos necesarios para el aprovisionamiento de agua y una hoja de ruta que asegure la normalización del tejido producido. Esta hoja de ruta puede ser tan extensa como se desee mediante la adición de ensayos extra.

Lecture N°4 MODERN TRENDS IN FINISHING ALL WOOL PRODUCTS

SYNOPSIS

The preparation of fabric for modern continuous finishing requires special organization, colour wise, uniform width, similar linear weight and raw material composition, otherwise problems arise. The larger the batch, the easier and more economical the process becomes.

Semi-continuous and continuous wet processing are carried out in machines with automatic dosing equipment for all chemicals and dyestuffs if required standardisation of chemicals is therefore imperative.

The lecture covers developments from mid seventies to mid eighties. For various reasons wool and wool rich blends in fabric have been forced into being finished in a multi fibre environment with as few wool specific operations as possible. Pressure arising from increases in energy prices, environmental protection and ever increasing costs for labour and other resources. There has also been a strong trend toward reduced water consumtion and the improvement of dryer efficiency. The lecture examines these trends in relation to wool finishing.

4 TENDENCIAS MODERNAS EN EL ACABADO DE PRODUCTOS DE PURA LANA

SINOPSIS

La preparación de tejidos para los procesos contínuos de terminación modernos, requiere una especial organización: uniformidad del color, ancho uniforme, peso lineal y composición similar, de otra manera podrían surgir problemas. Las partidas más grandes son las más fáciles y económicas de procesar.

Los procesos húmedos semi-contínuos y contínuos se realizan con maquinaria con dosificador automático de los productos químicos y colorantes requeridos. Por lo tanto la normalización de productos químicos es imperativa.

La conferencia abarca los desarrollos que tuvieron lugar entre 1975 y 1985 aproximadamente. Por varios motivos los artículos de pura lana y sus mezclas más ricas han sido debido a adaptarse a un medio de diversas fibras donde la terminación se realizó con la menor cantidad posible de operaciones específicas para lana. Esto se ha traducido en una presión ejercida por los incrementos de los costos de energía, protección del medio ambiente y el creciente costo de la mano de obra y otros recursos. Ha habido también una fuerte tendencia a reducir el consumo de agua y a mejorar la eficiencia de los secaderos. La conferencia analiza estas tendencias con relación a la terminación lanera.

Lecture No. 5 RESEARCH AND DEVELOPMENT: RELEVANCE TO MARKET TRENDS

SYNOPSIS

The relationship between Research and Development on the one hand and the Marketing Organization on the other have altered radically in industrial firms over the last few years. The terms "Research and Development" and "Marketing" cover a wide variety of activities; the article seeks to establish a definition valid for a manufacturer of textiles.

The question also arises as to the importance of basic research with respect to the textile finishing industry. This industry is well matured, and althoughmany chemical and physical phenomena are still clearly understood, the pressure would appear to be concentrated on application and improvement of known methods rather than on basic research.

R & D costs in rleation to sales are nowadays a dominant theme, as is also the way in which research projects are planned, run and monitored. It is pointed out that the MarketingOrganization has something of a leadership function here without however directly influencing R & D activities.

5 INVESTIGACION Y DESARROLLO: IMPORTANCIA DE LAS TENDENCIAS DEL MERCADO

SINOPSIS

La relación entre Investigación y Desarrollo por un lado y el Estudio de Mercado por el otro, ha alterado profundamente a las industrias en los últimos años. Los términos"Investigación y Desarrollo" y "Marketing" cubren una gran variedad de actividades; el artículo busca establecer definiciones válidas para un productor textil.

Surge también la cuestión sobre la importancia de la investigación básica respecto a la industria de terminación textil. Esta industria está bien madurada, si bien algunos fenómenos físicos y químicos aún no se comprenden claramente, la presión parecería estar concentrada en la aplicación y el mejoramiento de métodos conocidos, más que en investigación básica.

Los costos de Investigación y Desarrollo en relación con las ventas, en la actualidad son un tema dominante puesto que I y D es el modo mediante el cual se planean, ejecutan y controlan los proyectos de investigación. Esto sería lo que la organización de Marketing tiene aldo de liderazgo, por lo tanto influye directamente las actividades de Investigación y Desarrollo.

Lecture No. 6 COMPETITIVE OPERATION OF WOOLLEN AND WORSTED FINISHING

SYNOPSIS

The paper outlines in detail; Labour deployment and the relationship to productivity. Both these points, namely productivity per man hour and the minimum or optimum number of units which can be operated efficiently, are dealt with on an example basis, throughout the presentation.

Data sheets are provided which illustrate the labour deployment. The basic purpose of the descriptive matter is to point out the duties of the people undertaking the assignments shown. Some labour saving techniques are given with the process and job and a summary of labour saving techniques follows each section.

Futhermore the paper includes a unit labour costs of woollen and worsted manufacture. Although not relevant to finishing, is I am sure of much interest to hte participants of the Seminar, as also will be the section on spinning and weaving studies.

Quality control in finishing is given in depth and includes major causes of fabric defects by departments, possible causes and suggested remedies. Waste controls for the complete manufacturing processes for woollens and worsteds is gone into in depth. The paper concludes with an outline on personnel hiring, training and retraining of textile operatives.

6 OPERACION COMPETITIVA DE TERMINACION DE CARDADO Y PEINADO

SINOPSIS

El trabajo describe en detalle el despliegue de mano de obra y la relación con la productividad. Ambos puntos, productividad por hora hombre y el número óptimo de unidades que pueden ser operados eficientemente son tratados sobre una base de ejemplo.

Las hojas de datos que son provistas ilustran el despliegue de mano de obra. El propósito básico de la materia descriptiva es señalar los deberes del personal que responde a las asignaciones mostradas. Se dan algunas técnicas de ahorro de mano de obra con el proceso y el trabajo y un resumen con técnicas de ahorro de mano de obra sigue a cada sección.

El trabajo incluye algo más que costos de mano de obra en la producción de tejidos de lana. Aunque no es relevante en el terminado de , estoy seguro que es de mucho interés para los participantes este este seminario , como lo será también la sección sobre hilatura y tejeduría.

El control de calidad en la terminación está dado en profundidad e incluye las causas principales de defectos de tejido por departamentos,causas

posibles y sugiere soluciones. El control de desperdicios para los procesos de termiación completa para peinado y cardado también está dado en profundidad. El trabajo concluye con un bosquejo de reclutamiento de personal, entrenamiento y reentrenamiento de operaciones textiles.

Lecture No.7 GENERAL DISCUSSIONS ON TEXTBOOKS, MAGAZINES AND DESIGN SERVICES

SYNOPSIS

There is little one can say in regard to textbooks, what was in mind, was the sources of textbooks so far as the U.K. was concerned, including magazines and publications. It is essential to read such articles to keep updated. For any company or individual interested all the information will be left with C.I.T.

Design as such is specific to weaving, but, also to some extent concerns finishing. Sources for fabric design and colour well in advance of seasons are outlined in the paper. More important for the finisher is a sample book of all wool Scottish fabrics, which are outlined in the paper itself. Again this book will be left with C.I.T. for anyone who wishes to examine it.

7 DISCUSIONES GENERALES SOBRE LIBROS DE TEXTOS, REVISTAS Y SERVICIOS DE DISEÑO

SINOPSIS

Es poco lo que se puede decir con respecto a los libros de texto. Lo que se tenía en mente era las fuentes de los libros de textos en cuanto a lo que concierne al Reino Unido, incluyendo revistas y publicaciones. Es esencial leer tales artículos para mantenerse al día. Para cualquier compañía o individuo que esté interesado, toda la información se dejará en el C.I.T.

El diseño como tal es cuestión específica del hilado, pero también hasta cierto punto tiene que ver con el terminado. En el trabajo se delinean las fuentes para el diseño de tejidos y colores con mucha antelación a las estaciones. Lo que es más importante para el que hace terminaciones es un libro de muestras de los tejidos escoceses de pura lana, los cuales están esbozados en el trabajo mismo. Este libro también estará a disposición de quienes deseen examinarlo en el C.I.T.

Lecture No. 8 COMMENTS AND OBSERVATIONS ON THE FINISHING INDUSTRY IN ARGENTINA

SYNOPSIS

It must be realised that the comments and observations are made after a very limited time to assess. A more in depth study would be necessary to form definite opinions. Nevertheless they are put forward with the intention of promoting food for thought and discussions.

Before any major step is taken towards semi-continuous processing and particularly continuous processing a feasibility study should be undertaken, keeping in mind the points raised in the lecture on this subject. One of the main factors being the quantity necessary of similar fabrics for processing.

It has been mentioned on several occasions, the possibility of a commission finishing plant, but in most cases turned down the main objection being confidentiality, and the commission finishing plants the last two years have all become defunct in almost all cases.

Most of the finished fabrics examined have had a similar hand irrespective of blend composition, only the variation in weight gave a somewhat different hand, and to a certain extent the wool content.

8 COMENTARIOS Y OBSERVACIONES SOBRE LA INDUSTRIA DEL TERMINADO EN LA ARGENTINA

Se debe tener en cuenta que los comentario y las observaciones se hacen después de un período muy limitado para aseverar. Se necesitaría un estudio más profundo para formar opiniones definidas. No obstante, se presentan con la intención de dar en qué pensar y dar piéa discusiones.

Antes de que se tomen medidas de importancia hacia un procesado semicontínuo y especialmente hacia un procesado contínuo, se debe llevar a cabo un estudio de factibilidad, teniendo en cuenta los puntos planteados en las charlas sobre el tema. Uno de los factores principales es la cantidad necesaria de tejidos similares para su procesado.

Se ha mencionado en varias ocasiones la posibilidad de una planta de terminado a comisión, pero ésta ha sido rechazada, siendo la principal objeción la confidencialidad, y las plantas de terminado a comisión han perecido todas en los últimos dos años.

4.2. Invitation

Buenos Aires, julio de 1988

Este Centro, a través del Programa de las Naciones Unidas para el Desarrollo, cuenta en esta oportunidad con la visita de Mr. Donald Terrington, experto en terminación de tejidos de lana y mezclas.

Mr. Terrington fue director de proyectos del Secretariado Internacional de la Lana y su actual actividad es ser consultor en países en desarrollo.

Durante su estadía en la Argentina realizará visitas a empresas laneras verticales y dictará un seminario auspiciado por el CIT y la Asociación Argentina de Químicos y Coloristas Textiles (AAQCT), que constará de los siguientes temas:

a) *Aspectos prácticos y requerimientos de maquinaria para terminación de tejidos peinados y cardados.*

b) *Rutinas de cardado para telas de lana y lana poliéster.*

c) *Instrumental y control de calidad en terminación.*

d) *Tendencias modernas en terminación de productos de lana.*

e) *Investigaciones y desarrollos: tendencias del mercado.*

f) *Operaciones alternativas en el acabado de productos de cardado y peinado.*

g) *Discusiones generales: textos, revistas y servicios de diseño.*

h) *Comentarios y observaciones sobre la industria de terminación de tejidos en la Argentina.*

Dicho seminario tendrá lugar los días 10, 11 y 12 de agosto en el salón de la FITA (Leandro N. Alem 1067, 8° piso)de 9 a 13.

No dudamos que usted sabrá apreciar el esfuerzo que realiza el CIT y las Naciones Unidas para transformar a la industria argentina en una industria realmente competitiva.

NOTA: CONFIRME SU ASISTENCIA, A LA BREVEDAD, EN NUESTRO CENTRO

INSCRIPCION: Socios A 300.-
No Socios A 500.-

4.3 Lecture 8. Comments and Observations on the finishing industry in Argentina

One must appreciate it is a difficult task at any time, to assess a country's ability and technique in a particular section, in this case wool finishing within the textile industry. More so when one considers that it is done after only three and a half weeks, therefore any comments, observations or suggestions put forward which may be slightly inaccurate may be excused.

4.3.1. Introduction

The initial impression of a crcss section of the finishing industry in Argentina is good. Equipment wise, in all cases varying in degrees, certain machines required to be replaced to improve the finish imparted to the cloth. Having made this statement, no objection is implied to machines which are on the older side, providing they have been well maintained and are capable of performing the work for which they are intended, and to the high standard which they are capable of, but, it must be remembered there are limitations. It is usual in the textile industry as a whole to replace equipment after 10-15 years, not only because of the time factor, but also to introduce new technologies evolved over the period. A factory cannot be expected to be competitive internationally if processing speeds of about 7 m/min are the average, when other firms are processing about or in excess of 20 m/min. Not only do new machines process faster, but also incorporate new technologies. However, traditional textile finishing equipment can still produce excellent results, but at a financial disadvantage and low productivity.

4.3.2. Finished Fabric

All the finished fabrics appeared to have a stereotype finish. Little difference was observed except for fabric thickness, handle was more or less a constant factor, even taking into consideration the different fibre blends. Improvements may be made particularly with blends with high wool content if consideration is given to moisture content. This particularly applies to fibres which are hygroscopic and wool is. A special mention must be made, that whilst visiting finishing departments of a cross-section of the finishing industry in Argentina, no humidifying, conditioning or relaxation equipment was observed.

4.3.3. Quality Control

Little, if any at all, quality control for finishing was practised. In almost all cases it was brought down to visual appraisal and handle only. It would be an advantage if tests are selected from the paper on quality control in finishing. This will, in addition to controlling present on-line production, point out areas where improvement is desirable and necessary, thus improving the end-product. On the other hand, it is of little benefit to enhance the finish, if it is what the buyer and/or customer desires. Unless some specific or financial gain is made, i.e., improved quality and appearance, therefore improved sales, exports and increased prices over competitors.

4.3.4. Modernisation

It is often thought that the terminology dry-finishing is missnamed particularly in the case of finishing all wool and wool-rich blends, or blends contianing a proportion of wool or other hygroscopic fibres. But, in the observations of the present method of finishing that is exactly what is

being carried out in Argentina. ANy moisture applied, if at all, has only been via a light steaming. It cannot be mentioned often enough wool fabrics require moisture through dry-finishing normally 14-16% regain in some cases as high as 18% regain. This particularly applies after hot dry processes, e.g., rotary press. Not only humidifying may be considered, but cooling also to avoid evaporation. In the paper "Modern trends in all wool finishing" liquid nitrogen spray equipment has been mentioned for moisture retention for up to 24 hours.

Most, if not all, modern day equipment manufactured is capable of being integrated into continuous line processing, this is particularly so in the continuous dry-finishing line. Therefore even though a finishing department is batch processing, consideration may be given to this fact. Many manufacturers alsomake equipment which can be an add-on to standard machines --automatic weft striaghteners, humidifying cooling units, metal detectors, to name a few. Therefore consideration may be given to upgrade machines. These days even when purchasing new equipment you buy the standard machine price, but, then there are additional accessories which in some cases can almost double the basic cost of the machine. Consequently, even if a company at the moment cannot afford finance to purchase complete new equipment, consideration may be possible to up-grade equipment already installed. There are several instances during the visits where such an approach would be advantages and in some cases being done.

Careful consideration must be given by any company contemplating continuous or semi-continuous wet and dry processing. Firstly there is the production to contend with at least a 1000 Lm/hour and the requirement of big batches of similar quality and width sorted shade wise. Such plants

will process the entire production of most mills in Argentina, working two to three shifts in a couple of hours or so.

4.3.5 Exports

Most of the larger units are exporting a considerable amount of their production, and contemplating the increase of exports. Exports are mainly to neighbouring South American countries. U.S.A, Canada and West Germany have also been mentioned. One interesting facet of exports was in ready-made suits. The fabric manufacturers control the tailoring, but it is done by outside tailors. It may be worthwhile for the larger manufacturing units to look into the feasibility of installing a modern automatic tailoring plant, thereby processing from the basic fibre to the finished garment within one factory. Manufacturers of knitwear, whether it be flat or ciruclar knit, produce a finished article ready to wear. It is the next logical step in cloth manufacture, and several vertical mills to my knowledge have extended their operation into this field.

Most of the exporting manufactures have contacts or agents in the countries to which they export. Feedback is supplied, standard specification samples produced by the manufacturer and agreed between them and the importer. Opportunity exists to expand exports to other areas on similar methods as described, particularly in North America and Europe where fabric manufacture has declined over the years. However, some urgency is necessary before other countries in similar situations as Argentina fill the gap.

Probably, to attract smaller manufacturers into export, a modern commission finishing plant should concentrate on exports to ensure the finished

fabric is up to specifications and standards. However, on enquiring with several manufacturers, it seems undesirable mainly because of confidentiality. It is interesting to note that in North America and Europe, other countries also,commission finishing plants are increasing. This seems to be the trend at the present time, obviously there are many reasons for this.

4.3.6. Housekeeping and services

In general the housekeeping was good, neat, tidy and clean. Consideration may be given to dispensing units for wet processing. More attention should be given to the quality of processing water and boiler feed water; service lines within the factory coloured according to International Standards, e.g. red - steam, yellow - gas, blue - water, etc.; steam pipe lagging done. and where necessary replaced; steam traps installed in the supply line to machines such as decatizing to ensure dry steam is used for processing.

In some cases it may be an improvement to have a lighting engineer check that the light efficiency, machine wise is up to the recommended International standards, thereby avoiding faults apart from providing a better working environment.

Waste control in the wet and dry finishing was nearly always a negative reply. Apart from fibre waste at shearing, and the piece ends at the final rolling, one can assume that no other damage occurs at scouring, drying, shearing, etc. What is also intended by waste controls is to analyse how such damages occurred to rectify and ensure there is no repetition in the future.

4.3.7. Conclusion

Although the equipment is acceptable, in a few years' time or earlier if possible it must be replaced, especially in some cases, with up-to-date equipment. Immediate consideration to be given to humidifying, conditioning and shrinkage or relaxation equipment. As mentioned previously, moisture is required to finish wool and wool rich blends. No such equipment seemed to be available in Argentina. The question of manufacturing finishing equipment in Argentina appears to be uneconomical, mainly because of the home market demand, which is very limited. The obvious alternative is collaboration with a reputed manufacturer and agreement to export machines tospecific countries to enable the indigenous manufacturer to be viable, but whatever the circumstance, it is doubtful it would be successful. I believe an agreement with a Belgian firm was operating in Argentina but the factory closed down and also the firm in Belgium.

As regards finish, additional equipment and a more inventive approach to finishing will give improved results. The trend should be towards more variation in the finished end product to highlight the different aspects.

There are exceptions, but, quality control in general should be improved, particularly where it does not exist at all for finishing.

Modernisation has been discussed over and over again and all the technicians realise the areas where this should take place.

In reference to exports the home market at the present time appears to have reduced their demand. This has caused a vacuum in production, which can be filled through increased exports. The ability and know how already exists in Argentina to do this, in particular to countries like U.S.A., Canada and

Europe. However, urgency is required as other countries like India, South Korea, Taiwan and Pakistan to name a few are exporting textiles to the same areas. Argentina must certainly keep their present export levels, and over the next year increase to the fullest, thereby, the mills will be working to full capacity, providing employment and national income to the country.