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(R) INDIA : DEVELOPMENT OF HOSIERY AND KNITWEAR INDUSTRY.

LUDHIANA (PUNJAB), PHASE II

DP/IND/82/006/11-01

INDIA

Terminal Report*

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

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GLOSSARY OF TERMS

The Monetary Unit in India is the Indian Rupee (Rs) which has an approximate Rate of Exchange with the US Dollar of :-

12 Rs = 1 U\$

In addition to abbreviations in common use, the following are used within this report:-

G.O.I.	-	Government of India
PSH & KDC	-	Punjab State Hosiery & Knitwear Dev.Corpn.
K.F.	-	Knitwear Facility
M.D/N.P.D	-	Managing Director/National Project Director
Lakh	-	100,000
Crore	-	10,000,000
Q.C.	-	Quality Control
Rs	-	Rupee
G.C.A/H.C.A	-	General Currency Area/Hard Currency Area

ABSTRACT

This report explains the objectives and logic of the project, describes the activities carried out and the outputs produced, discusses the achievements and the extent to which the project results are being utilized and ends with the findings and recommendations. Detail is given in the 19 Appendices.

Under this project a Centre known as the Knitwear Facility has been set up in two phases. Its function is to provide assistance to the Indian Knitwear industry to enable that industry to improve its products to the level where it can compete in Hard Currency Area markets.

Almost all the Outputs have been provided and Immediate Objectives attained. A test-market Study Tour has also confirmed that the industry's products are now most acceptable in the target markets.

Another achievement is the full-scale operation of a worsted spinning plant which now provides the local firms with some of the much needed high-grade yarns. This department also provides an income which is used to offset the costs of other service departments. The plant can process a wide range of fibre types including wool both untreated and shrink-resist treated, which latter process is also carried out at the Centre.

During the life of this project there has been a marked change in attitude of the manufacturers. They have been stimulated by the introduction of new design concepts, and now produce styles of greater aesthetic appeal.

Introduction of high-technology knitting and finishing machinery into many firms is helping to achieve the ultimate goal.

The Centre also now provides a full range of technical and consultancy services including an information service and quality control and testing facilities.

BACKGROUND AND OBJECTIVES OF PROJECT

Background Information

General -

This report refers to the second Phase (DP/IND/82/006) of a larger project. The first Phase (DP/IND/73/021) originating in the early 1970s after a survey of the Knitwear industry in Ludhiana had been undertaken by the Punjab State Government, in collaboration with the International Wool Secretariat (IWS). The start of Phase-I was delayed till September 1976 and this phase was completed in June 1981.

Ludhiana, Punjab. was chosen for the survey because approximately 90 percent of the wool and other fibre, hosiery and knitwear industry is concentrated in the city and surrounding areas, and provides direct and indirect employment for over 200,000 people.

The estimated Knitwear production for 1986 is over \$ 100 million, therefore the knitwear industry plays an important role in the economy of Punjab State, and, to a lesser extent, the economy of the country as a whole.

Basically, the knitwear industry is divided into medium and small-scale units that produce knitted garments of multi-fibre types for export, home market and government requirements.

The conditions that led to the request for UNDP assistance, were the technology lag of the knitwear industry in general, the industry's inability to provide an adequately sound foundation, from both technological and marketing aspects and to increase and diversify exports, particularly into hard currency markets.

Financial resources to provide the required technology and marketing expertise were also limited, mainly because the knitwear industry consists of medium and small-scale or cottage type units.

The conclusion was that although the money could be made available, assistance would be required for the foreign exchange expenditure.

Although it would have been desirable to introduce all the technology associated with the total project at one time, the split resulted in some machinery being introduced out of phase. This led to problems of under-utilization and a lack of proper balance until the associated machinery had been provided at a much later date. In fact spinning, even though considered critical, was deferred to Phase-II, and finally, due to a variety of problems, only became operational in July, 1985.

The original document for the first phase was approved in 1977 and since that date the two executing agencies (State Govt. of Punjab and UNIDO) acting for their respective principals have set up a Technical Centre in Ludhiana known as the Knitwear Facility. The initial steps taken were to provide technical assistance to the industry with a project cost of some 5 million US\$. International Experts have been provided, and national technicians have been trained on high-technology machines similar to those installed at the Facility. Additionally senior staff and counterparts have visited installations where compatible activities are carried out in Western Europe.

Staffing -

But the project has had serious recruitment problems in the last two years. Some key posts such as manager technical assistance and consultancy services are still vacant. It is hoped that with a return to normalcy in the State of Punjab, the situation will be rectified. It is, however, also understood that qualified professional people are not keen to work at up-country places due to lack of housing, social and other facilities. Furthermore in the metropolitan areas where job opportunities are better, there is more chance to improve salaries and widen experience due to the higher incidence of job mobility.

Inputs -

Most of the Inputs have been completed already and by the end of this project in DEC 1986 all of the Inputs will have been provided. At the current rate of progress all the Outputs will have materialized by that time, and this is in spite of the problems suffered by the Punjab during this period. The impact which the project has had, and is continuing to have on the industry is well illustrated by the statistics which are included in various Appendices.

Linkages and Technical Assistance -

The project has already established linkages with 250 local companies in Ludhiana, 26 outstations in the Punjab and 93 elsewhere in the country. All of them have received assistance from the project at one time or the other, many on a continuing basis.

Linkages have also been formed with other Research and Development organisations in India e.g.

ATIRA, IIT-Delhi, North India Textile Research Ass.,

Technical Institute of Textiles, Wool Research Ass.

and also with similar Institutions overseas.

More significant than this is the change in attitudes of the majority of local industrialists. Most of them originate from a background of trading, and had little knowledge of the finer points of technical aspects of their businesses. This situation is changing fast, and during the past 5 years the Facility has given technical assistance to over 120 companies.

In addition to technical assistance the Facility is also advising them how to manage their operations more efficiently.

It is the accredited IWS Woolmark Testing House, and has been instrumental in setting up over 50 testing laboratories in industrial units. Calls for assistance are being received from organisations and individuals as far

afield as Maharashtra and there is a close link with a U.K. Research Institute which is the main source of information on textile matters throughout the world.

Before this project began operations, there were a number of problem areas within the industry. Technical assistance provided by the project has helped and is continuing to help eradicate these problems. The problems ranged from the use of out-dated machinery and techniques, and lack of appreciation of the latest technology in dyeing and finishing. There were two main areas however which continued to be barriers to the production of high quality knitwear. These were the lack of good high-quality yarns and the need to improve garment styling. During the year 1985 the new spinning department at the Facility has come on stream and is now providing yarns upto international standards.

It may be claimed that the project has also stimulated another sister spinning unit, set up by the private sector. Both are doing well. So, for the first time the knitters are now getting a supply of first-class raw materials.

Designing -

The other serious impediment to progress, namely styling, has been tackled by the introduction of a European-based Design Expert, who will have made three missions to the project at appropriate times before the closure in DEC 1986. Through the efforts of this Expert an increasing number of local firms are turning out more stylish garments, to the extent that several of them were able to participate in a test-market Study Tour in W.Europe which demonstrated that Indian Knitwear is now very acceptable there. The details of this exercise and comments from the buyers are well covered in the Report of the Marketing Expert.

Marketing -

The main export activities of the knitted outerwear industry are still directed towards the USSR market. A select few of the larger companies in Ludhiana are involved in this export business, but the quality demanded is well below the level needed to feed the H.C. markets. At the present time the production from the remainder of the industry is feeding the domestic market with only a very small penetration into the Hard Currency export areas. But the time is now ripe to alter this balance in favour of the H.C. area markets. The fact that the new yarns and improved styles can now be seen in the local markets is a very healthy sign. Sound export sales can only result from a solid domestic base, and there is a well-established pattern in all countries for the natural progression from domestic to export sales.

Over the past 10 years attempts have been made to penetrate W.European markets by a broad-front approach through garment exhibitions and the like. In spite of the enormous work put in by the promoting agencies, the export statistics bear out the fact that these approaches have only been marginally successful. Up to the present time the product in general has been well below the standard required. Having ensured that good yarns are available, and styling has improved enormously, a fresh approach was made by a team from the project who met and worked with selected buyers in W.Europe to develop styles and so open the door for export orders. On the completion of this exercise the final link in the chain of Outputs will have been provided.

The marketing effort cannot and must not stop there however. This approach is the first of its kind and will not produce overnight results. Future marketing exercises will need to be mounted and must include an increasing number of associated manufacturing companies if results are to be sustained and the markets developed.

Generation of income -

Future demands from the industry can only be satisfied successfully if the technology and current practices adopted by the Facility at any one time are always at least one step ahead of the industry it is serving. Thus to maintain its leading position, the project has to generate sufficient funds to provide itself with the most up-to-date equipment and keep its staff abreast of the latest developments and techniques.

The project has been designed to be self-sustaining. There is one main revenue producing department (Spinning) which, as stated above, is also providing the industry with some of the much needed yarns. Other departments, by virtue of the extension work they perform, are primarily technical demonstration units and unlike the spinning department they are not running under true mill conditions. In fact revenue from the spinning department is already covering the cost of these other service departments, although each in turn collects some fees for sampling, testing, consulting etc.

Premises -

The site occupying an area of approximately 30,000 m² is situated to the south of the town of Ludhiana and some 12Km from the town centre. In Phase-I 6,664 m² of covered area was built followed by the Spinning Department and Shrink Resist Department (2,205 m² together) under Phase-II of the project.

Construction of the Spinning Department got off to a slow start. Work began in April 1984 but by November 1984 the roof had barely been completed. External pressure was brought to bear and by June 1984 the civil work was sufficiently far enough ahead to allow erection of machinery to begin.

About this time the Punjab was struck by political disturbances which stopped erection work until March 1985. Erection of Spinning machinery was completed by May 1985 and it was commissioned at that time.

Construction of the Shrink-Resist building was started in April 1985 and this machine commissioned in Aug/Sept 1985.

Air-conditioning plant for the Spinning area came into full operation in mid May 1986.

A plan giving the lay-out of the site and disposition of the main departments is given in Appendix I.

Equipment -

All the equipment provided by UNDP has been received, installed and commissioned, with the exception of one knitting machine. This was damaged very seriously and needs replacing under the insurance cover. Apart from this machine all the rest are being used for demonstration, training and extension work. The Spinning Dept. is being run under full mill conditions and provides high-quality yarns for the industry.

The total value of equipment provided by UNDP under Phase-II is 2,017,386.00 U\$ and the main items are listed in Appendix X. Equipment provided from other local sources is listed in Appendix XI and totals 11,319,000.00 Rs.

International Staff -

The latest budget (Revision 'J') allows for 56.4 m.months of international project personnel which should have been provided in total by the end of the project.

In the second half of 1986 prior to the project closure the following experts are scheduled for visits :

		<u>m.months</u>
11.01	C.T.A.	1.0
11.03	Worsted Spinner	2.0
11.09	Knitting Designer	1.5
11.10	Colour Matching Specialist	1.8
11.60	Making-up Specialist	1.5

Full details of International Staff are provided at Appendix VIII.

Counterpart Staff -

Seventeen national counterparts have worked with the UNIDO experts and have undergone on-the-job training. There has been a turnover of staff during the time span of the project and some difficulties in recruiting replacements due to the political problems in the Punjab at the time.

Additionally, the drain on staff resources due to the more lucrative pay in the private sector has no doubt had its effect. In cases where previous KF staff members take up responsible positions in the industry, this must be claimed as beneficial and leading towards the objectives of the project. Counterpart staff details are given in Appendix IX.

Fellowships and Study Tours -

During Phase II six Fellowships were awarded and five Study Tours undertaken. Full details are given in Appendix XIX. Because two staff on Design Fellowships to U.S.A did not return on completion of their mission, alternative arrangements had to be made to ensure the Design Output was provided.

Thus a further six month Fellowship was awarded to Mr. S.S.Pathania as indicated.

Project Management -

The current organization chart is given in Appendix IV. Day to day management is carried out under the supervision of the Technical Coordinator/Works Manager, who reports directly to the Managing Director/N.P.D.

In turn the M.D. reports to the Board of Directors. The membership of the Board is given in Appendix V.

Additionally to this structure, a Project Advisory Committee has been formed to act as a steering group and the membership is given in Appendix VI.

To link the smaller manufacturers and give them a voice in the operation of the Facility, a further association known as the Knitwear Club has been formed. This has been and is still a very active group. Its membership is listed in Appendix VII.

All these organisations act and react to provide a platform for the promotion of the Facility and also form a strong feedback link to the project administration.

On paper the structure should be capable of providing the management needed to operate the Facility in the post-project phase. It will need close attention from the Board of Directors to ensure that all the aspects are interacting effectively in the future.

Conclusion -

In conclusion therefore the project has become well established and is a most valuable part of the local scene. It has assisted a great many industrialists to improve both technically and managerially through its consultancy services. It also demonstrates how a modern efficient plant should be run.

At the same time it has widened its scope beyond the local scene and is assisting other industry sectors outside in Punjab and elsewhere in India. Plans are being formulated to provide complementary functions which will enhance the projects capabilities even further so that it will soon become a national institution.

Development Objective

The development objective, as defined in the Prodoc submitted for Phase-II, reads as follows:

"to improve the technology status of the Indian Knitwear industry (Punjab in particular), to produce knitwear of internationally acceptable standards, through institution-alised technical assistance and diversification of export product lines."

Immediate Objectives

The immediate objective of this project is to supplement and upgrade capability of facilities already set up during Phase-I, to provide technical consultancy and common service facilities for transfer of modern technology in knitting, spinning, dyeing and finishing as well as practical development work pertaining to knitwear by - :

- i) Imparting technical know-how:
 - a) to adopt modern worsted spinning techniques and produce worsted type yarns meeting internationally adopted Uster quality parameters.
 - b) for appropriate knitting, dyeing and finishing relative to the requirements of manufacturing of knitwear garments of dimensional stability.
 - c) to produce knitwear of dimensional stability in particular to meet IWS standard of wool materials and equivalent standards of other materials.
- ii) Developing technological and practical procedures in dye recipe formulations for indigencous dyes and chemicals.

- iii) Providing a means whereby standards of machinery maintenance can be established, and these standards implemented in a practical preventive maintenance system.
- iv) Creating within the Facility a unit as a nucleus for designing assistance and prototype development of knitwear for the industry.
- v) Improving the training capabilities of the Facility to enable it to disseminate its technical and managerial skills to the industry.
- vi) Establishing a cell for disseminating information on new technological developments and results of practical work done for the industry.
- vii) Creating a cell to stimulate drives for export of Indian knitwear to sophisticated markets.

ACTIVITIES, OUTPUTS AND STATUS

General -

It was realised early in 1985 that the Outputs as defined in the Prodoc were not specific enough and in some cases were not practically attainable. These were re-drafted in close consultation with UNIDO H.Q. and are given below.

In accordance with the objectives the project will establish an operational centre supporting the Punjab knitwear industry in upgrading its products up to a level acceptable to target markets in the Hard Currency Areas by demonstration of modern technologies, providing training in those techniques to industry staff, providing testing and technical facility services including pilot and trial production on equipment installed in the centre, providing continuous information on new technological developments and on results of practical work done for the industry, and by assisting the industry to penetrate into target markets.

In particular, at the end of the project the centre will have established the following units reporting to the Technical Coordinator, Deputy to the Executive Director of the Punjab State Hosiery and Knitwear Development Corporation Limited who in turn acts as the National Project Director.

Output 1 & 2 - Spinning Plant

Achievements -

The following main equipment is installed, and operating under true mill conditions in this section:

Preparatory machinery consisting of:

- Defelting, blending and gilling line
- Rubber Finisher

Spinning consisting of:

- | | | |
|------------------|---|--------|
| - Ring Frames | - | 7 Nos. |
| - Repco Spinners | - | 2 Nos. |
| - Fancy Twister | - | 1 No. |

Post spinning (supplied under Phase-I) consisting of:

- Autoconer
- 2x1 Twisting
- Stage Twisting
- Hank to cone winder
- Reeling Machine

The Spinning Expert completed his first mission of six months in October, 1985. He returned in Feb., 1986 to continue the work already started. There is one further important part to be added to the work already begun and this is the development of fancy twist yarns. The fancy twister was erected in December, 1986, i.e. after the expert had left duty station on the first mission. In later missions the expert will consolidate the work already done, carry out product development on new blends, and the development of fancy yarn effects. Other duties, namely consultancy service and conducting seminars will also be completed.

- 3 senior officials (2 managers & 1 Asstt.manager for maintenance), 2 fitters (maintenance), 38 workmen (machine operators) have been fully trained under the expert and are now running the department.
- Yarn qualities in the top quartile of world (Uster) standards have been achieved.
- A fully documented scheme for cleaning, routine and preventive maintenance machines has been put into operation.
- By 31st January,1986, 88 MT of yarn in count ranges 4/16 Nm, 2/32 Nm, 1/40 Nm,2/48 Nm (Wool and acrylic) was supplied to the industry.
- 2 training programmes (i) Operators training for drawing & spinning (ii) Processing through modern post spinning equipment have been prepared and conducted six times.
- 2 seminars (i) modern machinery for worsted yarn spinning, (ii) acrylic fibre for knitwear industry have been organised.
- Consultancy service has been provided to 3 units for setting up new ventures and to 1 unit for modernisation.
- Technical assistance has been provided to 22 spinning units.
- 16 spinning units are now utilising testing facilities on a regular basis.

Expert -

Mr. G.A.Heeley	6 months	May - Oct'85
	4 months	Feb - June'86

Fellowships -

Spinning Master	1 month	Oct - Nov'83
	15 days	Feb'85

Outputs -

A completely installed spinning plant for the manufacturing of worsted yarn

- Spinning plant installed, commissioned and working on sound basis.

The spinning plant and its technical staff will be capable of

a) Demonstration of modern processing technology to the local spinning industry under continuous mill working conditions and management.

- More than 80 industrialists and technicians have inspected the plant working since it started in July'85.

b) providing the knitting industry with a wide range of yarn types and counts (Wool Nm 12-60, Acrylic Nm 20-48). Complying with standards within internationally accepted Uster values necessary for producing a variety of knitwear at quality levels acceptable to target markets in Hard Currency Markets.

- 88 MT yarn supplied upto 31.1.86.

c) Providing consultancy service to the industry through 4 trained local technicians 1 in blending and roving, 1 in spinning technology, 1 in preventive maintenance of spinning frames.

- Consultancy given to 4 industrial units for project feasibility study through 4 trained staff.

d) Conducting seminars for the staff of local industry on the experience gained in the spinning plant.

- 2 seminars organised:-
 - 1) Modern machine practices for worsted yarn spinning.
 - 2) Acrylic fibre for knitwear industry.

The technology used in the spinning plant will be explained in manuals prepared by international experts and suppliers of equipment for spinning of acrylics and blend yarns.

- Provided by Expert.

Yarn preparation unit for twisting, cone winding, dye cheese winding, yarn clearing, fancy yarn twisting capable of providing the following to the spinning, knitting and dyeing industry.

- Provided partly under Phase-I, completed under Phase-II.

a) demonstration & common facility services

b) in-plant training to industry personnel

c) consultancy service to industry.

2 trained technicians in the aforementioned techniques, with acquired practical experience of consultancy for technical assistance services gained during the life-time of the project in at least 10 local manufacturing units and in processing of 1000 kg. of yarn on each of the different type of machinery installed in the Centre.

- Consultancy undertaken with 12 spinning mills.

Status -

These two Outputs are regarded as completely provided.

Output 3 - Dyehouse Section

This Output comprises the following 4 sub-sections:-

Dyeing
Computer Colour Matching
Finishing
Fleissner Shrink-Resist

For the sake of clarity each sub-section will be dealt with separately.

Dyeing sub-section

Achievements -

The Dyehouse proper was set up under Phase I when the following machines were provided:-

- Daiwa spray hank dyeing machine x 2
- Pegg hank dyeing machines x 2
- Dyetex garment dyeing machine x 1
- Side-paddle machine x 1
- Pegg high temperature HP cone dyeing m/cs x 4
- Pegg HP cone dryer x 1
- Tumble drier x 1
- Lab cone dyeing machines x 2
- Lab hank dyeing machine x 1

Besides the capabilities to dye wool fibre, this department can also dye cotton, cotton blends, acrylic, polyamide and polyester fibres.

All machines in this section except the Dyetex machine for garment dyeing are now in good working condition and are used regularly. Under the present scheme about 10 MT of dyed yarn (own manufacture) is supplied to industry and 6 MT is commission dyed per month.

The Dyetex machine has developed a major fault and due to lack of funds will not now be replaced. This machine was introduced under Phase I of the project.

Low utilisation of the dyehouse for commission work (before commencement of the spinning section) has been the subject of discussion and criticism. The industrialists complained of delays in returning their dyed yarns, but even though the service was usually good from a technical standpoint, they were not prepared to wait. In addition, technical problems also arose at times which were traced to heterogeneous blend composition of yarns. The delays in returning material were occurring because overall volume was low and it was uneconomical to run the boiler every day so instead of being able to dye commission work as and when it arrived, some work had to wait until sufficient work had accumulated to justify the boiler operation. At present the dyehouse is running everyday, and therefore requirements of industrial units can be fully accommodated.

Expert -

Mr. G. Meier	-	2 months	Oct - Dec '81 (Phase I)
	-	*2 weeks	Jan '85
	-	1.5 months	April - May '85

* This mission was cut short due to illness.

Fellowships -

Mr. Venkatesh	-	1 month	Jan '80
Mr. J.S. Saini	-	1 month	Nov '85

- 3 senior officers & 2 supervisors trained under experts are carrying out activities in this section.
- Data Bank for 180 dye recipes for wool, acrylic, polyester, viscose, cotton and blends has been prepared manually and is well documented.
- 2 training programmes have been prepared and conducted 6 times.
- 18 industrial staff have been trained in recipe formulation, shade matching, and dyeing techniques on modern machinery.
- Consultancy has been provided to 2 units for modernisation.
- Technical assistance has been given to 16 dye-houses.
- 220 MT of yarns have been dyed up to specified standards of fastness.
- 25 MT of yarns have been treated for S.R. and moth-proofing.

Outputs - See Phase-I Project Document.

Status - Provided under Phase-I.

Computer Colour Matching Sub-Section

Achievements -

The crucial problem fundamental to the operation of this section is that the computer has not been in continuous working order. The expert finished his first mission on 11 Oct.1985. He will return again now that the computer has been repaired, and is soon to be re-commissioned. On his first mission the expert provided basic training to the project staff to operate the system. Dye recipes are being formulated as instructed by expert.

Outputs -

- a) In addition to the achievements of Phase I
a system for computerized colour matching and determination of reproducible dye recipes based on indigenously available dyes and chemicals will be set up. This system will be used for dyeing of yarns made out of wool and other fibres at economical cost and will serve both the dyehouse at the Centre and dyehouses of the local industry..
- b) a data-bank for dye recipes - In progress
- c) 2 trained technicians capable of:
 - continuously updating the data-bank;
 - advising the dye-house personnel in the industry on techniques required to put to practical use the recipe predictions made via the computer system.- Work started, Output yet to be provided.

Status -

The output has not been completely provided due to the Computer being inoperative for such a long period. The entire software was corrupted (probably because of a hardware fault on the disc drive), but ICS the suppliers will replace this now that the hardware has been checked by one of their engineers.

Problems in obtaining Entry Permits for Punjab, at times when ICS engineers were available proved difficult due to the long lead time (up to 3 months) required by the Ministry involved.

Air conditioning and general cleanliness of the Computer Room was not satisfactory initially, but now all these factors have been overcome and an ICS applications engineer is due to visit the project and set up the system from scratch. If possible the expert will be fielded to coincide with the engineers visit so it is anticipated this Output will have been provided by the project timetable date or soon thereafter.

Finishing Sub-Section

Achievements -

The main features of Phase I input were solvent scouring, pressing and steaming. Solvent scouring has been adopted by a section in the industry and efforts are now underway to introduce it to other section. Pressing and steaming equipment is used from time to time but the disadvantage here is the movement of materials from industrial premises which are some distance from the project.

- 200 MT of garments have been solvent scoured, 2 MT superwashed in Bowe machine.
- 6 industrial units have installed solvent scouring plant and assistance was provided by project staff to commission the machines and set up the process.

The Ehemman Mini-stenter has been commissioned, but is not being utilized. It was the intention to use this machine for the pressing of piece goods containing man-made fibres. When such work is carried out on a commission basis, the goods are subject to a levy at the finishing stage, and thus permission is needed from the Excise authorities. To date this permission has not been given.

Fellowships -

Mr. K. P. Janakiraman -	1 month	Jan '80
	1 month	Nov '84

Outputs -

There are no specific Outputs related to this sub-section in the Prodoc. since it is closely related and dependent on other departments.

Fleissner Shrink-Resist Sub-Section

Achievements -

This equipment was commissioned in August 1985 and 5 MT have been processed to-date. The results were good and the material subsequently processed satisfactorily in the preparation and spinning departments.

The process and facilities have been demonstrated to combers, and they have been invited to send material for commission processing. Here again approval of excise authorities has to be obtained.

The processing manager obtained useful information on shrink-proofing technology during his study tour in Nov/Dec. 1984, and the information collected by him has been used in consultancy work.

A finishing Consultant from IWS assisted in the initial commissioning of this equipment and also provided training to staff and made useful suggestions which have been implemented.

Outputs -

- A manual on processing technology for shrink-resist treated wool tops up to IWS superwash standard and related dyeing techniques. - Provided by IWS Commissioning Expert.

- 2 local technicians trained by international staff in these techniques and capable of providing consultancy and technical assistance services on dyeing of shrink-resist treated wool & wool tops up to superwash standard. - Provided

- Two staff trained abroad - 6 units assisted for shrink-proofing of tops and yarns

- one unit for SR garments.

- Provided via study tours.

Status -

This Output has been completely provided as per Prodoc. Based on a survey of the industry carried out by the K.F. it is anticipated that some 60% of the yarns spun at K.F. will pass through this process.

Output 4 - Knitting Workshop

Achievements -

The following equipment is installed and operating in this section:

- Bentley Cotton full fashioned knitting machine with lace & intersia attachments.
- SDR Power flat knitting machine with computer programming.
- JDR Power flat knitting machine.
- SPJ Circular body length knitting machine.
- RTR Jacquard Circular Bodylength knitting machine.
- 202 F Shima Electronic Power Flat knitting machine.

All equipment is in operation except the Shima Electronic knitting machine, received in Sept.85, but damaged during transit. This machine is due to be replaced.

- 4 staff have been trained in the operation & maintenance of knitting machines under the supervision of UNIDO experts and are carrying out activities in this department.
- 30,000 garment panels have been commission knitted on fully fashioned machines.
- 4 MT of fabrics have been commission knitted on power flat & circular knitting machines in wool and acrylic materials.
- 3000 garments have been produced with Intarsia mechanism.
- 200 garments have been produced using the lace attachment on the fully-fashioned knitting machine.
- Technical Assistance has been provided to 50 units.
- Consultancy for preparation of project feasibility reports and modernisation scheme have been provided to 2 units.

- 48 technicians from the industry have been trained in the operation of high technology machines.
- 2 training programmes have been prepared and conducted three times each.
 - i) Basic weft knitting techniques
 - ii) Modern methods of making up of knitted garments.

Experts -

Mr. Paul Kotesvec, Knitting Technologist.	6 months	April - Oct'83
	3 months	Jan - Feb'84
Mr. Malcolm Bithell, Circular Knitting Technologist.	2 months	Feb - May'84
Mr. John Slack, Knitting Technician.	0.5 month	Sep'83
Mr. George Miller, FF Knitting Technician.	2 months	Jan - Feb'84

Fellowships -

Mr. Himmat Singh, Asstt..Knitting Master. 2 months Oct - Nov'85

Mr. Manjjit Singh, Knitting Manager, is due for his fellowship abroad in the year 1986.

Outputs -

Knitting workshop installed with machinery under Phase-I and completed with machinery items under Phase-II, for training of national staff and for developing knitting samples in coordination with the Design Centre. - Provided

- 4 staff trained in fully utilizing the features of modern automatic V-bed knitting machines, fully fashioned flat bed machines with intarsia, tuck and lace attachments, circular body length knitting machines, and capable of producing knitwear of dimensional stability. Training through international experts and 2 fellowships abroad.
- a) Staff capable of sampling on the machinery installed. - 250 samples produced to-date.
 - b) Staff capable of providing consultancy to industry. - 12 fully trained staff provided.
- Consultancy given to 2 industrial units for modernisation and setting up new ventures.
 - c) Staff capable of training industry staff in the use of the machines. - 48 technicians from industry trained for operation of high-tech knitting machines.

Status -

This Output has been completely provided and is operating well.

The staff provide and advisory service to the manufacturers, evaluating new machinery which they are contemplating. They also develop stitch and style effects and approximately half the knitting capacity is devoted to commission work for local firms.

Output 5 - Design Centre

Achievements -

The following equipment is installed in the design centre:

- Dubied Hand Flat knitting machine
- Domestic model of Hand Flat knitting machine
- Dummy model for garment fitting
- Inspection tables, cutting tables, mirror, drawing and sketching tools.

The sample room is fully equipped for prototype development and production.

Two persons deputed for fellowship training in design did not return to the project after completion of training in the USA in 1984. Another person has been deputed for a condensed training course in U.K. and he is due to return in July,86.

Two sample collections were prepared under the expert's supervision which were shown to the industry personnel. The second collection was prepared for carrying to Europe as part of a test marketing study tour. Four local manufacturing units received assistance for the preparation of sample collections for hard currency markets.

Experts -

Mrs. K.Marwaha	2 months	Dec 84 - Feb 85
	2 months	Nov 85 - Jan 86

There is a provision for a further mission of 1.5 months in 1986.

Fellowship -

Mr. S.S.Pathania	6 months	Jan 86 - July 86
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Outputs -

Design centre capable of;

1. Making sample collections on machinery installed in the knitting workshop as a service to the export oriented industry.
 - Prototype making fully provided.
 - Designing will be provided after fellowship training (Mr. Pathania) is completed in July 86.
 - Assistance given to WVEPC and silk EPC and 10 units to prepare samples for export.

2. Advising industry on garments construction and styling.
 - Styling function provided.

Status -

This Output is linked with the Making-up Unit and since this unit is not fully operational minor parts of the Design Output are yet to be provided.

Output 6 - Making-up Unit

Achievements -

The following equipment is installed in this unit:

- Linker seamer 8 gg
- Linking machine 12 gg
- Durkopp button-holing machine
- Rimoldi cup seaming machine
- Rimoldi overlocking machine
- Durkopp chain stitching machine
- Pfaff jig jag sewing machine
- Electric shears
- Linking machine 4 gg
- Linking machine 8 gg
- Linking machine 12 gg
- Steam Ironing Table
- Juki Button-holing machine
- Variolox inspection machine
- 4 needle flat lock machine

Except for the Durkopp Button-Holing machine all other machines are in operation and being used. An expert in Making-up is yet to be fielded.

2 members of staff are in position in this unit.

Outputs -

The unit will be capable of:-

- a) applying the installed machinery at the centre for giving the garments the appearance, trims, special effects and appropriate stitching, linking etc. up to a level as required by target markets.
 - Part provided through training by Knitting Technologist and Designer.
 - 2 mill technicians trained.
 - Output to be completed by Making-up expert.
- b) providing an advisory service in their fields to the local industry (10 mills)
 - 10 mills assisted to introduce paper patterns.
 - to be completed after fielding of expert.

Status -

To date no suitable expert has been contacted for this assignment. Before the Output can be claimed as provided, this expert needs to complete the work already started by others.

Output 7 - Quality Control and Testing Laboratory

Achievements -

Testing facilities have been made available to the local spinners and this has encouraged 12 spinning mills to set up their own laboratories. Prior to this the project laboratory served as test centre for quality control of their operations. Where mills do not have their own facilities, raw material and yarns are sent to the laboratory for routine testing. In addition samples are also received for Test Certificates which are required to meet statutory requirements of export and supply to the Govt. departments. Garments panels or knitted fabric pieces are received from industry for fault analysis. Testing work in connection with post graduate projects at TIT, Bhiwani (7) and IIT, New Delhi (1) has been done. Training courses are available for industry personnel.

Q.C. routines have been adopted for yarn spinning, dyeing and finishing within the project, and the necessary tests are carried out regularly. In addition, the laboratory has undertaken testing for 20 investigations and 3 R&D studies.

The laboratory has three trained persons. But due to the resignation of the Dept. Head, it is at present under the charge of Spinning Master (Technical) who is a qualified textile technologist and also possess industrial experience. A replacement for this post was recruited but did not join the staff.

- Consultancy has been provided to 48 knitting, 4 spinning and 3 dyeing units to set up testing laboratories.
- 10,037 tests have been carried out for industry on raw materials, yarns & knitted fabrics.
- 271 certificates for statutory purposes have been issued.
- 56 units are seeking test facilities on a continuous basis.

- 3 training programmes, (1) IWS test methods, (2) yarn testings, fault analysis and interpretations, (3) identification of components of a blended yarn through chemical & microscopic tests have been prepared and conducted 9 times.
- 55 mill technicians have been trained.

Experts -

Mr. John Tindall	1.5 month	Jan'80 (Phase-I)
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Fellowships -

Mr. P.T.Banerji	1 month	Dec'80
(since resigned)	1 month	Dec'84

Outputs -

- One staff trained through a fellowship arrangement in the above-mentioned technology.
- Two trained staff capable of:
 - providing consultancy services on establishing testing and quality control laboratories at industrial units upon request from the industry;
 - carrying out tests for common facility production carried out by the various units of the Facility and establishing records of the following tests on:
- Provided but the person left the project in May'85 and has joined a local company in Ludhiana. This post is still open.
- Provided 48 knitting units, 4 spinning units and 3 dyeing units assisted in setting up Q.C. labs.
- Provided A schedule of testing has been prepared and is carried out regularly.

- Quality performances of the spinning unit for Superwash and Woolmark standards yarns
 - Quality performance of the spinning unit for synthetic fibre yarns
 - Quality performance of all dye lots processed in the dyehouse of the Facility
- Provided
- Following standards set :-
- Yarn regularity - Uster standards.
 - EYC settings for each yarn count.
 - Single yarn strength for hosiery and weaving yarns.

establishing a system for control recording of knitting parameters complying with the objective of producing knitwear of dimensional stability

- Provided
- System consists of checking knitting parameters for garment panels and recording same.

carrying out tests on seaming

- Provided
- Seam thread strength and colour fastness tests carried out.

Standards for in-house processes, spinning, winding, colour matching, dyeing, bleaching, knitting, garment make-up, etc.

- Provided
- Colour fastness (IWS Standard)
Knitting parameters
Knitting tensions
Stitch length in relation to machine gauge and yarn count

Status ..

Extension to the work carried out under Phase I has been completed. This Output can be regarded as completely provided. once a competent manager has been installed.

Output 8 - Maintenance Unit

Achievements -

A Maintenance unit has been set up and is now equipped to attend to basic repairs and maintenance of electrical, electronic & mechanical aspects of all machinery and service equipment provided.

The following equipment is installed in the workshop:-

- Lathe machine
- Pillar drilling machine
- Hand drilling machine
- Welding set
- Grinder

Equipment list for electrical work:

- Multimeter
- Megger Tester
- Phase Tester
- Continuity Tester

UNIDO has been requested to purchase a printed circuit board tester for Zinser Ring frames. The project authorities intend to purchase an oscilloscope and IC Tester in the near future.

Maintenance Team -

- Two Engineers (Chief Engineer + Electrical Engineer)
- One Foreman
- 2 mechanics
- 2 electricians
- 6 others (helpers)

- Maintenance schedules for all equipment have been completed and the system introduced by CTA is implemented.
- The work schedules are well documented and manuals prepared by Experts are used for reference.
- Two lectures on machine maintenance have been organised.
- The engineering dept. provided consultancy service to 3 units to fabricate; (1) HTHP dyeing machine (2) Solvent scouring & recovery plant (3) Conversion of Hand Flat Knitting machine into Power flat.

The original objective to specify maintenance standards for all equipment in the industry was modified in Feb. 1985 when it was decided that maintenance of equipment in the project should be done on a model basis, and assistance should be provided to industrial units who set up new equipment.

Full details of the Maintenance Scheme are included in the manual prepared by CTA. This has been implemented in all departments at the Knitwear Facility.

Expert -

Mr. J.A.Nijland	1.5 months	July'83 - Sept'83
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Outputs -

- | | |
|---|--|
| a) implementation & operation of a model preventive maintenance scheme at the Facility; | - in operation in all Depts. |
| b) introducing this scheme for all new machine to be installed in the industry | - No requests received from the industry as yet. |

- c) **establishing a spare parts management system, including a stock level recording and ordering system.** - This work was undertaken by a local consultant employed by the project authorities.

Status -

This Output as re-defined has been completely provided. Manuals are available for use by industrial units, and work is in hand to inform and explain the value of Preventive Maintenance to the industry.

Output 9 - Training Unit

Achievements -

The project has a qualified training officer who acts as coordinator. The project is provided with necessary audio-visual aids. The six heads of technical departments i.e. spinning, dyeing, finishing, knitting, quality control and engineering, are used as technical resources. The concept of pedagogy was introduced to all dept. heads by the training expert and subsequently a special pedagogy training course was arranged for them at ATI, Ludhiana. The staff has thus gained sufficient expertise and practice in preparing lectures and delivery.

Training is intended to help technicians from industry to improve skills, (basic trade training is not included as part of this project), supervisors to learn improved processing and shop floor supervision techniques, qualified industry personnel for exposure to new developments in technology, and industry owner/managers to inform them of the economic and qualitative benefits of modern machines. A series of management development programmes for owner/managers has been started in association with the Business Management Department of Punjab Agricultural University.

- 14 training programmes have been conducted 39 times.
- 4 seminars already organised and scheduled in 1986.
- 29 lectures and demonstrations organised.

Expert -

Mr. J.A.Smith 1.5 months Jan'84 - Feb'84

Outputs -

The establishment of a Training Unit, - This is now established
comprising 1 Training Coordinator in and operating.
conjunction with all the Heads of the
Departments, which will be capable
of assessing specific areas of training

requirements within the industry
or within individual firms;

- | | |
|--|--|
| designing and organising at least two training courses on each of the 12 technological fields of the project; | - 14 training programmes covering 12 technological fields have been designed and organised 39 times. |
| conducting 6 seminars on selected subjects related to the project outputs for the benefit of industry staff, by the technical staff of the Facility and by international experts from various sources; | - 4 seminars already organised, 2 planned in 1986. |
| training technical staff of the Centre in lecturing; | - completed |
| selecting the most appropriate technical skills, both from the Centre and from outside sources, for conducting the courses. | - 7 experts from R&D and educational institutions have delivered lectures to-date. |

Status -

This Output has been completely provided.

Output 10 - Information Cell

Achievements -

The cell provides information on processing techniques, technology development, marketing management and other topics of interest to industry on a regular basis. The media used are Technical Bulletins and Newsletters, which are published at regular intervals, and lectures.

The Training Officer is designated Information Officer also. The library is looked after by a trained librarian. Lists of new publications as and when received are scanned by Dept. heads who input their findings into the information system and at the same time make recommendations for purchase of new books.

Journals subscribed	19
Books in Library	102
Books on order	55
Newsletters issued	12
Technical Bulletins issued	45

A system for collection and dissemination of information was prepared by C.T.A.

Outputs -

An information cell, adequately furnished with standard books, periodicals and manuals on all technologies applied in the Knitwear Facility and the local industry. The information cell will be headed by national staff member with textile background and library experience. - Provided

establishing an enquiry service for the industry; - Provided

establishing an organised library system; - Provided

identifying the needs for keeping the library up-to-date. - Provided

Status -

This Output has been completely provided.

Output 11 - Marketing Unit

Achievements -

The C.T.A carried out the post of Marketing Expert and in fact had been working on this topic to some degree during each of his missions. The proposed marketing plan was approved by the government and a Test-market Study Tour was undertaken in April 1986. The outcome of this Tour was very encouraging and full details are included in the Marketing Expert's report.

An interesting feature of the Tour was that it provided the project the opportunity to test its potential to achieve the Development Objective i.e. to produce knitwear of internationally acceptable standards. From the comments and reactions of independent buyers who were contacted during the Tour, it would seem that the Development Objective has been reached.

Responses from the Associated manufacturers and others to the results of the marketing exercise so far are enthusiastic, and they are keen to continue working with the Project's development staff towards an increasing level of exports.

Expert -

Dr. Stuart Brook	3 months	Mar - June'86
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Study Tour -

Mr. A.S.Grover (N.P.D)	4 weeks	Apr 7 - Apr 25'86
Mr. M.S.Malhotra (Knitting Manager)	"	"
Mr. A.P.Sinha (Export Executive)	"	"

Outputs -

Five trained staff to carry out product development for export markets with overseas clients on a continuing basis.

A range fully acceptable garments for 6/8 clients in 2/3 markets on basis of which orders can be placed.

An export marketing and promotional organisation with an established workable promotion strategy.

Marketing contacts established with at least two buyer organisations in each of the 3 selected overseas markets.

Status -

This Output has been provided with encouraging portents for the future. In addition to the 3 staff members who took part in the Study Tour the associated staff of the Making-up unit should be included in this Output because of the close link between the two sections.

Output 12 - Joint Studies

Achievements -

Three joint studies on following topics have been completed:

1. Status of making up techniques & improvement needed in the knitwear industry. - Jointly with IWS
2. Uses of wool/poly-propylene blended yarns for the manufacture of knitwears - Jointly with CSWRI
3. Feasibility of using lambswool for the manufacture of yarns on open-end system. - Jointly with ATIRA

The topics for these studies were chosen with two objectives in view;

- i) Likely applications of results in local industry
- ii) To gain experience and establish working relationship with other organisation.

A decision on the topics was made after interaction with the concerned organisations over a long period of time.

Study 1

Using its findings, the IWS have made it mandatory for all licences to install equipment recommended by this study.

Study 2

The study was to determine if Indian wool and polypropylene blend are suitable for knitwear. It was found that even though the materials blended well, the compositions investigated did not provide a satisfactory yarn.

Study 3

The study was carried out to establish the nature of lambswool yarns spun on the open-end system and whether an acceptable yarn, resembling material spun on woollen system, could be obtained.

The study concluded that the performance of the lambswool (45 mm length x 20 micron) on the machine used i.e. Schubert and Salzer C.E. spinner, was not satisfactory and the resultant yarn contained too much medium term variation.

Outputs -

determine the nature of the studies, initiate the contacts with other organisations, and draft the terms of reference for the joint studies; - Provided

appoint the technical staff of the Facility with the appropriate technical skills to participate in the team which will be jointly established between the co-operating organisations; - Provided

supervise the progress of the studies; - Provided

summarize the results of the studies and recommend further actions to be taken to the cooperating organisations and the Government. - Provided

Status -

This Output has been provided to date. The project must now continue with this work and it is well equipped to do so.

ACHIEVEMENT OF IMMEDIATE OBJECTIVES

The Immediate Objectives have been clearly detailed in the Project Document, so it would be most appropriate to comment on their achievement in the same order. Minor amendments to the Intermediate Objectives, as recommended at the T.P.R. Meetings have been incorporated in the listing given elsewhere in this document.

- i) Imparting technical know-how in worsted spinning, knitting, dyeing and finishing to produce goods of an internationally accepted standard -

Two major factors illustrate the extent of achievement of this objective:

- a) A modern worsted spinning plant has been set up and is in continuous operation producing yarns up to specification. Over 15 tonnes of yarn is being produced per month and the plant is now totally run by the national staff.
- b) There has been a tremendous improvement in the quality of garments produced by certain sectors of the industry. Samples from these units were used in a test-market tour and were found to be most acceptable to W.European buyers. This was a dramatic change in attitude on the part of the buyers, as compared to their responses on previous marketing visits. Although a limited number of firms at present are capable of this high level of quality, the trend is upwards as more and more firms install modern machinery.

- ii) Developing procedures in dye recipe formulation -

To date (Aug 1986) initial work only has been performed towards this objective. The reason is that the ICS Colour Computer has not been functioning, so the fielding of the appropriate expert has been delayed. This situation will be corrected soon.

- iii) Establish standards of machinery maintenance, and implement in a practical scheme -

A Maintenance Manual has been prepared and the suggested scheme is now in full operation in every department of the centre. Few industrialists have shown interest in adopting any maintenance systems in their own mills, but it is expected that as they introduce more sophisticated and expensive machinery they will call upon the centre for assistance with maintenance advice.

- iv) A nucleus for Design and prototype development -

The extent of achievement of this objective is more easily seen than written about. The fact that critical buyers operating in the leading markets of Western Europe now view Indian knitted outerwear as comparable with any in the world, is sufficient evidence that at least a start has been made towards widescale H.C. market penetration. Visits by the Design expert always create a lot of interest among the industrialists.

- v) Improving the Facility's training capabilities -

All the Managers have recently undergone instruction in pedagogy. At the project, training is interpreted in its widest sense, and the technical and managerial skills are being continuously passed on by way of Mill Visits, Consultancy etc. Some 600 visits have been made to local companies. In addition lectures and formal training courses are a constant feature of the Facility's Work Program.

- vi) Establishing an information cell -

The Facility does disseminate information on new technology and machinery, but in most cases it falls on deaf ears. Because of the structure of the industrial companies, the average industrialist is a practical man rather than a reading man. Therefore much of what

is published is not even read. Eventually as more professional managers are introduced, the value of the information within the Facility will, one hopes, become better appreciated and made use of. In the meantime, the efforts will continue as planned.

vii) **Creating an export marketing cell -**

Marketing was never the strong point of this project. Greater emphasis was placed on this objective because it afforded a means whereby the manufacturers could be shown, by example, what was required of them. To this end this objective linked together the better quality yarns, better dyeing and better styling, all of which were developing at their own rates. This unit is now in a position to give first-hand practical advice to any exporter and more. Its scope has been augmented to the extent that it can lead the potential exporters right into the market place. This is a very valuable asset indeed to an Indian manufacturer.

It would be fair to say that whilst most of the other Immediate Objectives have already been achieved or are beginning to be achieved, this last objective has exceeded original expectations and is pointing firmly towards the Development Objective.

UTILIZATION OF PROJECT

Virtually the whole of the Outputs set out in the Pro. Doc. are now provided. There is a sound basis for the work being carried out now and for future extension. A comprehensive list of seminars, lectures, visits etc are given in the Appendices and the back up reports for the visits etc are held at the Knitwear Facility.

The impact that the project has had and is having is well acknowledged by the majority of the industry.

Typical Services provided -

- i) Extension work in dyeing and finishing for the small manufacturers with limited resources.
- ii) Technical assistance with dyeing and finishing problems.
- iii) Trouble shooting and technical consultancy (all topics) (App. XVI and App. XVII).
- iv) Commission knitting.
- v) Commission spinning of customers own materials.
- vi) Fancy yarn development.
- vii) Management consultancy.
- viii) Dissemination of technical information by Bulletins (App. XV), Seminars (App.XIV), Lectures (App.XII).

The above list is by no means comprehensive, and an idea of the extent and diversity of the work carried out can best be realised by a study of the various Appendices mentioned above.

FINDINGS

Many of the items mentioned in this section will have been covered in various experts' reports. They are included here for the sake of completeness and their own merit.

Reviewing the project's history, this must always be set against the prevailing political conditions in the Punjab at the present time. This has had its effect on the smooth operation of this project in several ways. Good calibre staff are difficult to get in any case, because Ludhiana is not an attractive area. Although it is a centre of industry, well qualified people prefer to live in the major cities where mobility and living standards and amenities are higher.

The project has had its share of resignations for the above reason and the fact that there is political unrest.

Being a State run Corporation the project is also at a disadvantage from the point of view of monetary rewards. Industry can always entice a man away from the Facility, and the Corporation can do little by way of salary adjustments etc. to prevent this. So this exacerbates the same basic problem.

The local situation caused a complete stoppage at a critical time in the project's life, when technicians and experts were called out of the Punjab. This meant that the life of the project had to be extended. In addition the protracted procedures for obtaining Entry Permits to the Punjab for foreigners adds to delays in commissioning and repairing the equipment provided by UNDP.

There has always been a cash flow problem and this still persists. Either the original budget for funding was underestimated or the funds have not been released. The writer has been present on several occasions when N.P.D has requested that Government funds should be made available. But there does not seem to be any Government officer who is associated with the project, who can instruct that funds are released and in fact ensure that they are

available when required. Because of this, at times critical lack of cash, wages and salaries have either been withheld or "temporary arrangements" have had to be made to meet these and similar needs. Bills have been left unpaid for long periods which forces the Facility staff into deviations which are both time consuming and costly. Furthermore the reputation of the Facility which is trying to act as an example, has been harmed.

Surely if the Government has embarked upon a project which is so costly both to themselves and UNDP, it is their responsibility to make sure that funds are available.

There still appears to be some misunderstanding at all levels as to the prime function of the project. The writer has been present at various meetings in Punjab and in the Ministries in Delhi when discussions have taken place as to whether the Facility should be regarded as a training establishment or should it be allowed to operate with the appropriate licence as a commercial entity.

An organisation with less than 2,400 spindles does not require an Industrial Licence (I.L). Obviously with 3,472 spindles the Facility is outside this category. But since it is to be used as a demonstration and training establishment the Ministry of Industrial Development ruled that it could operate and sell its produce without licence.

When the Facility wishes to provide itself with a stable source of supply (wool) of suitable quality for high-quality yarns it will wish to import the raw material rather than involve a middle man. This it is unable to do because import needs an I.L.

Similarly if blended yarns are to be produced and offered to the industry, Excise permission needs to be granted. This also cannot be obtained without an I.L.

The full significance of this statutory requirement did not become apparent until the second visit of the Spinning expert (Feb. '86 - June '86). During this mission he demonstrated how to process blends so that the Facility could offer a wider variety of yarns to the manufacturers. Unless permission to sell blended yarns is given to the Facility, much of its work will be of no value.

The project authorities knew of the need for an I.L. and in fact this was a subject discussed between the N.P.D. and the Secretary of Textiles, Mr. Mr. Shrimari Sharma and his staff on 9th July 1986 in the CTA's presence. It is a serious omission and must have been known about when the Spinning plant was being planned.

So that there are no statutory restriction on the plant's future operation the situation must be rectified immediately. After all the project is a Government undertaking so there should be no valid reason why special status cannot be granted.

When this situation is being clarified the ruling which UNDP have regarding commercial operations should also be taken into account.

Apart from the statutory obstacles the lack of sufficient working capital is preventing the Facility from efficient operation, in particular in the spinning department. Raw material has to be purchased short-term at disadvantageous rates and quality. Regular supplies of standard quality should be available if the spinning operation is to be demonstrated as an efficient unit. This point was continuously made by the Spinning expert.

Day-to-day management at the project is not as effective as it should be. This could be improved by changing the style of management from authoritative to participative management. It is going to be difficult to do this because the culture in India has evolved a distinct class system which is very entrenched. The pecking order is well delineated and of course everybody wants to be a boss. Status is highly important, and the idea of participation in a team is a difficult idea to put over let alone put into practice. To substitute for this deficiency in management then, a careful planning and tight control of operations is needed but as yet it is not in operation.

It would have been beneficial if the CTA had been appointed earlier in the project life, and more time allowed in the budget for his visits. With a project as large and complicated as this one it has been difficult to pick up the pieces at the start of each mission, and there have been occasions when, due to ignorance of events which have taken place in his absence, the CTA has taken action which has caused confusion.

In addition to this the time lag in communications means that, with the best intentions, action has to be taken before all the involved parties have made their views known. Subsequent communication can then only confuse the issues even further, and unless controlled, decisions and counter-decisions get entangled in tailchasing. The load on the Backstopping Officer resulting from this situation has consequently been disproportionately high.

Considering now the different sections of the project, which as a whole is running well, there has been a tremendous interest shown by the local industrialists in the various machines introduced at the Facility. Many have purchased similar machines and this is a growing trend. Private companies have started or are planning to start worsted spinning plants almost identical to the one installed at the Facility. More and more automatic knitting machines are being acquired.

The old method of garment cleaning is gradually disappearing as firms adopt the solvent scouring techniques to them via the Facility.

Once convinced, the local industrialist is not afraid to speculate in new equipment even if only to prevent a competitor from gaining too much.

Shrink-resist treatment is still at an initial stage so it would be unwise to pass more than superficial comments at this stage.

Although improvements have been made, the plant at the Facility is still not sufficiently well protected and maintained for such a dangerous reagent as chlorine. Parts of the main machine are already starting to corrode, which in turn will adversely affect the material being processed. House-keeping in this department is not up to standard and needs corrective action.

There have been several occasions when material has passed through the machine but has not been adequately treated. This did not come to light immediately because the department had run out of testing chemicals. These had been requested from Europe but had not arrived.

This example along with others illustrates that the project is still too ready to fall back on UNDP/UMDO resources. Obviously it is far less trouble to use an office in Vienna which can contact suppliers with ease. But during recent months it has been the specified intention of experts to withdraw from day-to-day involvement in the project to further encourage the project staff to seek out their own lines of supply.

The unserviceability of the ICS Colour Computer is still a major disappointment. There remains a great deal of work to do in this area but it is anticipated that this will soon be underway when the expert is fielded. This equipment in particular has suffered from the restrictions on travel to the area.

The level of service from the Q.C. laboratory has deteriorated since the manager left the Corporation. So far no replacement has been appointed, and because there is no longer a senior man in full control, the laboratory and the servicing of its equipment are getting a low priority. In the past the impact of this section on the industry has been very substantial but there is a marked nurtured into using correct test procedures but if the service from the Facility is not up to standard they will go elsewhere, and already another organisation in the private sector has been nominated as an IWS Testing Ho use.

Engineering Services are generally improving. Several areas of the buildings are still causing problems by way of roof leaks. Repairs are underway but it is important that these are finished before the monsoon season. It is also most crucial that there is no opportunity for the ingress of water into the I.C.S. computer room.

Power failures are part of the way of life, but there is usually adequate cover from the generators which provide a supply to essential areas.

Maintenance is improving all round and is very evident in the spinning department. There are one or two notable exceptions where maintenance has lapsed but this is due to not having suitably trained technicians and spares to hand.

The impact of new designs and shade combinations on the manufacturers cannot be overstated. They realise that much of the development was technically well within their own capabilities, but until the Design Expert's first visit they had shunned this responsibility. Since then they have become very active and some of the designs which had such a favourable response on the test-market tour were entirely of their own origination.

The marketing output of this project was interpreted in such a way that it provided practical advice and assistance to the industry in its efforts to reach H.C. markets. It also provides a stimulus to those interested in exporting and is the start of what could be a significant change in the industrys' outlook.

In addition, the marketing concept allowed the project the chance to test that it was being effective, because it clearly demonstrated in an unbiased way that the efforts made are beginning to have an effect. The Development Objective is to improve technology so that internationally accepted knitwear can be produced. Whilst it cannot be claimed that there is a massive change in products or methods there certainly is evidence that the Development Objective has been achieved, if on a limited scale, but certainly within the lifetime of the project.

RECOMMENDATIONS

1. Further Development -

In addition to consolidating the work so far carried out the main function of the project must be to provide a lead in the application of technology and techniques for the benefit of the industry. So the project has to continually make provisions for providing the most modern machinery and methods. It is anticipated that this will be financed from the revenues brought in by the full-time operation of the spinning plant which will probably be the largest single source of income.

2. Management -

An in-depth scrutiny of the present system of management and management controls is needed. Attempts to date have not been really possible due to pressure of work from other directions and the fact that some managers are stretched due to staff shortages at this level.

Lines of communication must be kept tight and the fact that the N.P.D is moving his base to Ludhiana will be an advantage. There will still be two offices even then and this will lead to duplication of effort and records and impair efficient operation. Consideration if all staff could be located at the Facility merits careful attention, for this reason.

Since the principal function is service, and since service depends upon qualified staff, it is imperative that the staff complement is brought up to standards.

3. Equipment and Operation -

With few exceptions all equipment is installed and fully operational. It must be kept operational. Some high-tech machines are suffering due to lack of trained maintenance personnel, so where training courses are available they should be used. During the T.P.R. meeting it was suggested

that a separate unit should be set up to provide training in maintenance for the high-tech machines now becoming more popular. The project needs to be formally proposed and the indications are that it will meet a favourable response. Financial problems as outlined previously in this report must be thrashed out at the highest level, otherwise the future of the entire project will be impaired. Any statutory problems such as licences will need to be resolved. UNDP assistance should be called upon if felt necessary.

4. Maintenance -

This activity is going well within the department at the Facility. It should be expended to cover firms installing new equipment. The Maintenance Manual has been prepared to illustrate how a professional document should look. This or similarly prepared manuals can be used to "sell" the idea to reluctant industrialists, but this effort will need the full participation of the maintenance department staff also.

5. Training -

The training programme and all the associated means whereby the information and technology is disseminated must be pursued. So far the record is good and for the project's sake it must remain so.

6. Public Relations -

There is still a selling job to be done with many industrialists. Too many do not understand what the Facility can do for them and many do not realise how much more profitable they could become if they took it's advice. This is an area where constantly all the managers must be acting. It is not only in the technical field where contact and consultancy will be needed. There have been several instances where a clear-thinking informed approach to management problems has shown benefits.

7. Conferences, Seminars Cooperation -

Keep up with this inter-course because it spreads the word and widens the net of potential involvement. This project has some unique features so it is worthwhile sharing experiences with similar institutions both within India and abroad.

8. Designs and Marketing -

Both these facts are interlinked. To maintain impetus both will need much more attention in the future. Of the two the Design concept is the better established but it will need concentrated efforts to maintain its effect.

Consider the possibility of employing a Design Coordinator who is operating in the target markets. This person should feed back information on styles, colours etc. and act as a screening medium for designs either bought from independent designers or commissioned. This method will avoid the possibility of the design look becoming stereotyped.

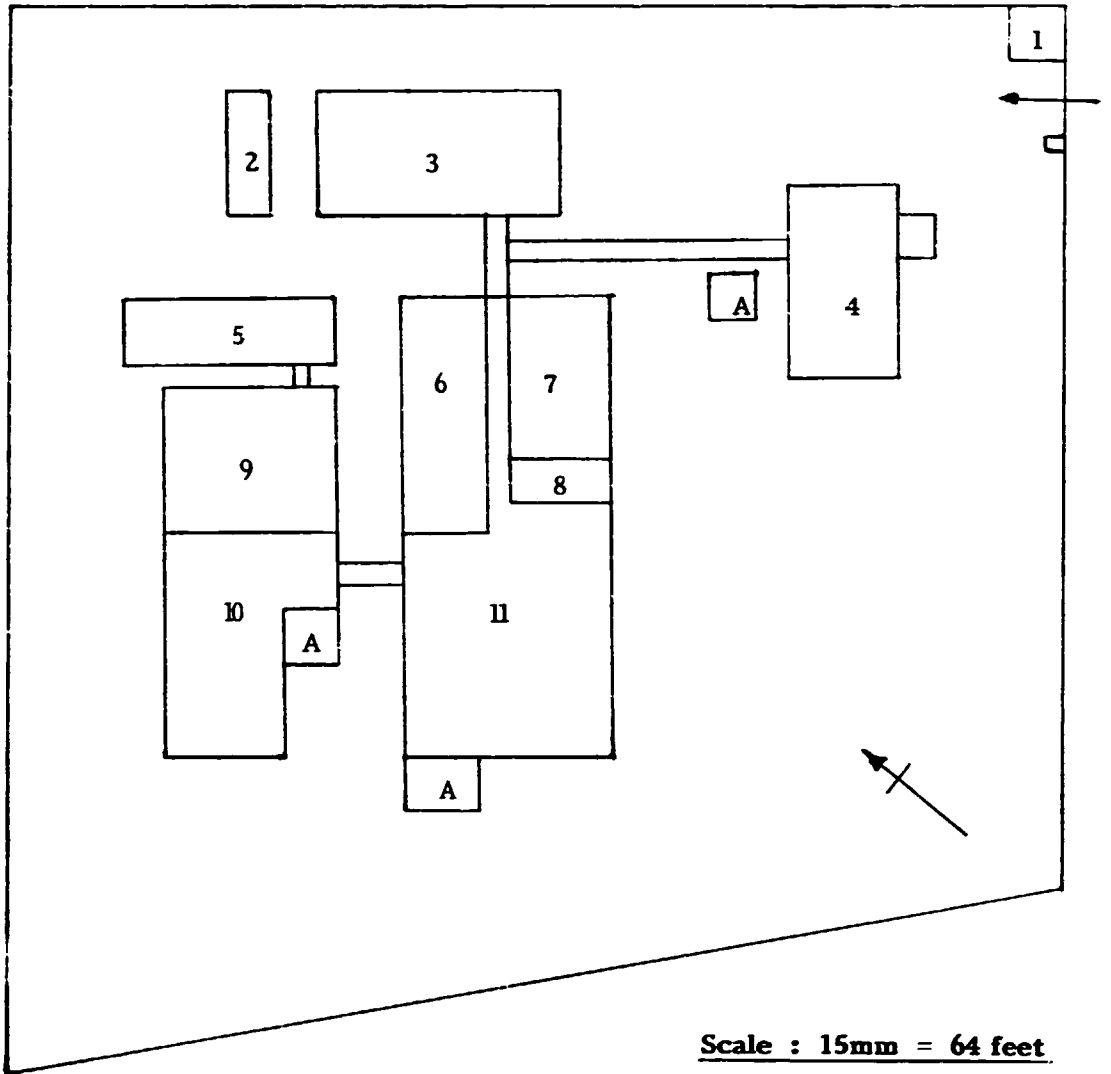
Similarly marketing activity should be continued now that the ice has been broken. A comprehensive marketing effort is called for, well outside the scope of this project, but ideas formulated already within this project could well be incorporated since they seem to be having the desired effect.

9. In-depth Evaluation -

As recommended at the TPR Meeting, an In-depth Evaluation which is a mandatory requirement, should be held as soon as possible now that the project is terminating.

Punjab State Hosiery & Knitwear Development Corporation

PLAN of SITE



Scale : 15mm = 64 feet

- Key :**
- | | |
|-------------------------|----------------------------|
| 1 = Gatehouse | 2 = Boiler |
| 3 = Services Block | 4 = Admin.+Knitting + Q.C. |
| 5 = Shrink-Resist | 6 = Dyehouse |
| 7 = Finishing | 8 = Yarn Store |
| 9 = Preparation | 10 = Spinning |
| 11 = Winding + Twisting | A = Air Con. Plants. |

COST OF LAND AND SITE DEVELOPMENT

Approximate Area of Site = 30,000 m².

	('000)Rs.
Cost of Land	598
Earth Filling and Site Development	48
Internal Roadways	97
Perimeter Wall	125
	—
Total :-	868
	—

AREAS AND COSTS OF BUILDINGS

	Areas m ² .	('000Rs.)
Processing Department	4362	
Admin. + Security	1372	
Knitting Workshop + Testig Laboratory	662	
Dyeing Laboratory	268	

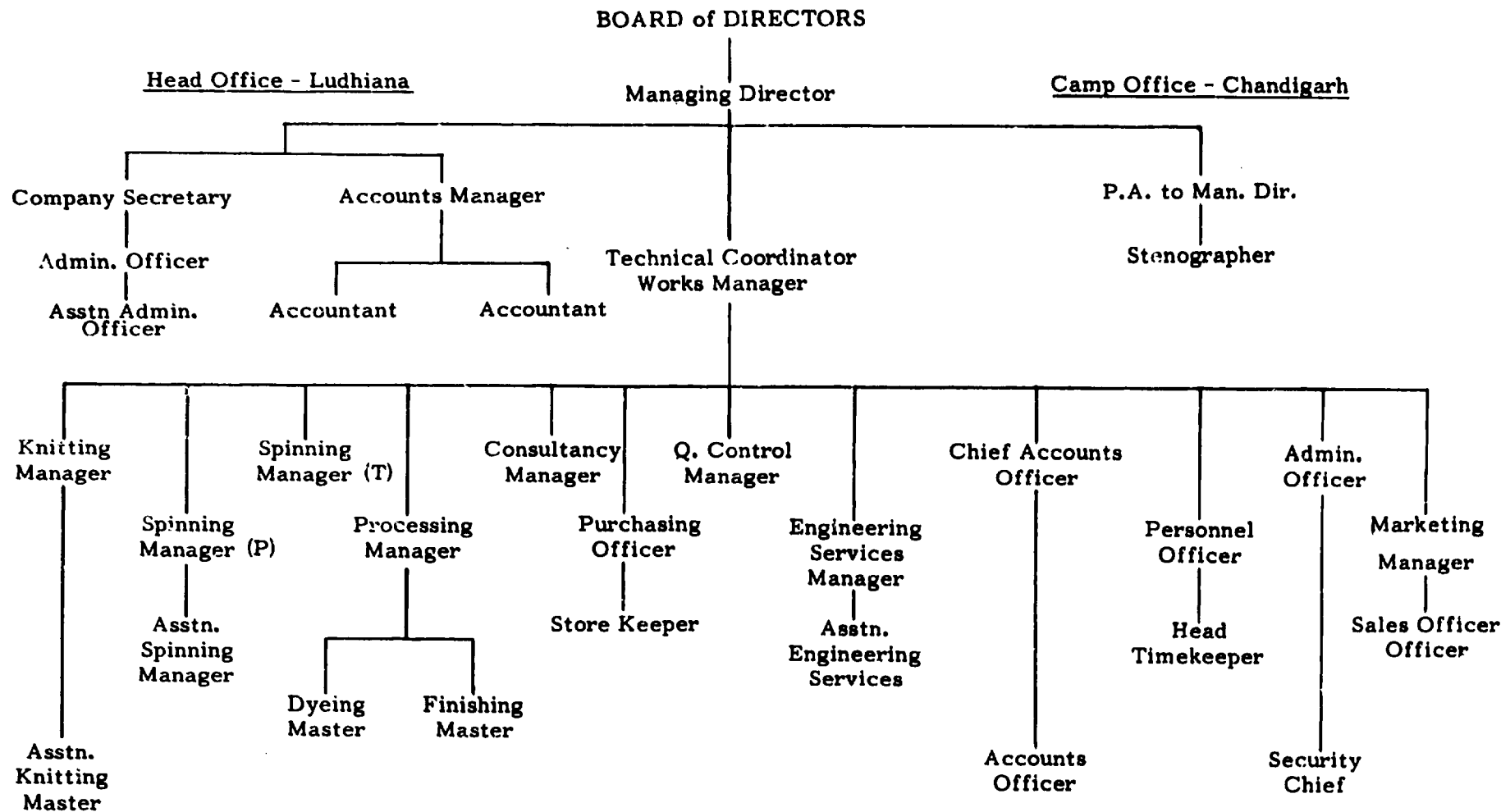
	6664	3137
Spinning Building	1665	
Shrink - Resist Department	540	

	2205	2646
Boiler House Extension	170	
Electrical Services Extension	25	

	195	195
Miscellaneous		40

Totals:-	9064	6018
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ORGANISATION CHART



BOARD OF DIRECTORS January 1986

A.S. Chatha IAS, - Chairman	Sec. Govt. of Punjab, Dept. of Industry.
S. Singh IAS	Joint Sec. Govt. of Punjab Dept. of Finance.
H.S. Bains	Industrial Adviser, Director of Industry.
D.R. Dhand	Vice Chairman, WWEPC.
J.L. Oswal	Oswal Woollen Mills.
S.P. Kapoor	Ludhiana Wool Syndicate.
D. Singh	Pres. Small-scale Woollen Manuf. Assoc.
S.P.M. Jayan	International Wool Secretariat.
A.S. Grover	Man. Director PSH & KDC.

PROJECT ADVISORY COMMITTEE MEMBERS - October 1986

S. Chaudhry	Sind Knitwear Ltd.
S. Ram	Nav Bharat Knitwear.
A. Nehra	Nagesh Knitwear.
M.S. Bhalla	Winterland International Knitwear.
D.R. Dhand	Alps Hosiery Mills.
M. Adya	Rai Bahadur Knitting Works.
R. Behl	Kohinoor Woollen Mills.
Capt. Verma	Punjab Syntex.
V. Shardha	Subash Dyeing Factory.
T.C. Jain	Surjeewan Knitwear.
P.C. Sachdeva	K. Knitwear.
H. Singh	Elson Knitwear.
A. Kapoor	Kapoor & Kapoor Hosiery.
K.L. Bajaj	Kashmir Bajaj Hosiery.
P. Chopra	Minerva Hosiery Mills.
G. Kapoor	Ludhiana Wool Syndicate.
A. Deewan	Deesons Hosiery.
Dr. K.M. Hussein	U.N.I.D.O.
Mrs. N. Ranjan	W.W.E.P.C.
K.H. Kumar	I.W.S. Bombay.
Dr. U. Nandurkar	Wool Research Assoc.
A.S. Grover	PSH & KDC.
State Textile Officer	Directorate of Industry.
Managing Director	Punjab Finance Corp.
Technical Coordinator	Knitwear Facility.

KNITWEAR CLUB EXECUTIVE COMMITTEE MEMBERS

P. C. Sachdeva	K. Knitwear & Co.	Pres.
V.K. Thapar	Thapar Hosiery Mills	V. Pres.
J.L. Takkar	Oslo Knitwear	V. Pres.
A. Kapoor	Kapoor & Kapoor	Gen. Sec.
H. Singh	Elson Knitwear	Sec.
S. Bahn	Hallena Textiles	Treas.
G.D. Premi	Knitwear Facility	Jt. Sec.
K.C. Markan	Amber Knitting Mills	Member
R.L. Khosla	Rajah Hosiery Mills	-
K. Sood	K.B. Knitwears	-
T. Kapoor	Regency Fashions	-
S. Singh	Amphora Knitwear	-
R. Behl	Kohinoor Woollens	-
N. Sharda	Punjabi Dyeing	-
K.K. Gulati	Soha Knitting Works	-
G. Kapoor	Ludhiana Wool Syndicate	-

INTERNATIONAL STAFF

11.01	Dr. Stuart Brook (U.K.)	C.T.A.	Nov. '83	3.0	m.months
			Apr. '84	2.0	"
			Jan. '85	2.0	"
			Oct. '85	2.0	"
			Jun. '86	2.0	"
11.02	Mr. Paul Kotesovec (Switzerland)	Knitting	Apr. '83	6.0	"
			Dec. '83	3.0	"
11.03	Mr. G.A. Heeley (U.K.)	Spinning	May '85	6.0	"
			Feb. '86	4.0	"
11.04	Mr. M.J. Bithell (Australia)	Circular Knitting	Feb.'84	4.0	"
11.05	Mr. J.A. Niiland (Holland)	Maintenance	Jul. '83	1.5	"
11.06	Mr. J.A. Smith (U.K.)	Training	Jan. '84	1.5	"
11.07	Dr. S. Brook (U.K.)	Marketing	Mar. '86	3.0	"

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INTERNATIONAL STAFF Cont'd

11.08	Mr. G. Meier (New Zealand)	Dyeing & Finishing	*Jan. '85 Apr. '85	0.5 m.months 1.5 "
11.09	Mrs. K. Marwaha (U.K.)	Designer	Dec. '84 Nov. '85	2.0 " 2.0 "
11.10	Dr. Robert Hirschler (Hungary)	Computer Colour Matching	Sep. '85	1.0 "
11.11	Mr. John Slack	Knitting Technician	Sep. '83	0.5 "

* Curtailed Due to Illness.

NATIONAL COUNTERPART STAFF

Mr. P.T. Banerji	Manager - Technical Ass.	Diploma Textile Technology	Dec '78 - June '85
Mr. K.P. Jankiraman	Processing Manager	M. Tech.(Textiles)	Aug '78
Mr. M.R. Venkatesh	Dyeing Master	B. Sc. Textiles	Aug '78 - June '82
Mr. D.V. Bist	Spinning Master (Technical)	B. Tech. (Textile Technology)	June '79
Mr. Baldev Singh	Engineering Services Manager	B.E.(Mech.), MBA	Sept '78
Mr. G.D. Premi	Training Officer	B.E.(Chem), Dipl. in Training	July '81
Mr. J.N. Vohra	Tech. Coord. / Works Manager	M.Sc. Textiles	Feb '82
Mr. G.B. Prasad	Processing Manager	Dipl. in Textiles	June '82 - June '83
Mr. R.N. Dutt	Marketing Manager	Dipl. in Marketing Management	June '82 - Jan '84
Dr. Rama Swami	Manager Knitting and R & D	Ph. D. Textiles	May '82 - Sept '83
Mr. Manjit Singh	Manager Knitting	Dipl. in Knitting	July '83
Mr. A. Sinha	Executive Export Development	M.Sc. Management	Nov '85 - July '86
Mr. Daljit Singh	Spinning Master (Production)	B. Sc.	July '85
Mr. A.D. Trivedi	Asst. Spinning Master	Dipl. in Textile Technology	Oct '84
Mr. J.B. Singh	Electrical/Electronic Engineer	B.A. Dipl. in Electronics	Oct '85
Mr. Jasbir Singh	Asst. Dyeing Master	Dipl. in Textile Chemistry	May '84
Mr. P.K. Bhardwaj	Development Officer Knitting	B.A.	Jan '82 - Mar '83

EQUIPMENT PROVIDED BY UNDP/UNIDO - Cont'd

Spinning -

US Dollars

1	Open Gill De-felter DGS-6-S Type 15	34,768.00
1	Intersecting Gill-Box GN-6 Type 16	
1	-0- Type 91R	
1	-0- Type 15	
1	-0- Type 73	
1	High-Draft Rubbing Frame Type FM-6N	294,647.00
7	ZINSER Ringspinning Frames Type 319L, 1,496 Spls., 82.5 gauge	
2	Overhead Travelling Cleaner Installations	555,887.00
1	Hollow-Spindle Fancy Twister, 8 Spindle	72,688.00
2	REPCO Spinners Mark 1 Type 888	39,486.00
1	Conversion Set for Autoconer	
5	Empty Tube Conveyor with belt Drive 10 Spinldes each.	33,304.00
1	YT 220A TEXTTEST Lab. Spinner with Zinser Drafting	16,364.00
	 /3

EQUIPMENT PROVIDED BY UNDP/UNIDO - Cont'd

Spinning - Cont'd

US Dollars

1 Precision Cylindrical Grinding Machine	
1 SKF Centreless Grinding Attachment for Zinser	
1 Mounting Tool for Zinser Ringspinner	36,569.00

Dyehouse -

1 ICS Computer Colour Match Prediction System	
1 Recipe Bulking Software	
1 Stock Control Software	
1 X-Y Graph Plotter + Interface	
1 Dye-Weighing Terminal, Keyboard Unit, Scale and Interface	109,310.00

Finishing -

1 Mini-Stenter Type Combistenter	
1 ROLLEX Steaming, Shrinking, Decatizing and Setting M/c.	74,404.00

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EQUIPMENT PROVIDED BY UNDP/UNIDO - Cont'd

Shink - Resist

US Dollars

1 FLEISSNER Complete Back-Wash Line

422,963.00

Making - Up

1 T-263-46-SKD-05 3 Needle 5 Thread Interlock Machine

3,720.00

1 4 Needle Oversew Link/Seamer Type KMF Class 764

6,453.00

3 KMF Linking Machines 4, 10 and 18gg.

14,000.00

1 RIMOLDI Inspection Machine

768.00

1 OSAKA Mini Steam Ironing Equipment

3,060.00

1 JUKI Button-Hole Machine

3,876.00

Sundry Items

Miscellaneous

4,025.00

TOTAL :-

2,017,386.00

DETAILS OF MACHINERY FROM OTHER SOURCES

Machine Description	Quantity	Supplier	Cost ('000 Rs.)
Bundling Press - 10 Kg. Capacity	1		16
Workshop Equipment	-		820
Package Drier plus Access.	1	Staff/ATE	674
Hank Drier, Cabinet 120 Kg.	1	Mackneil	66
Hydro-extractor	2	Kilburn	39
Yarn Steaming Machine	1	Staffi	301
Sample Dyeing Machine	2	Monika	40
Air Conditioning Plant	2	Utility	2557
Steam Boiler	1	Premier	1372
Tube well	1		308
Generators 2 x 110 KVA	2	Batliboi	3200
Generators 2 x 250 KVA	2	Elektromek	1800
Compressors	3	Kirloskar	126
		Total	11319

LECTURES GIVEN

Title	Date	Attendance
Job Effectiveness Speaker - K.C. Dhanda	19.6.82	15
Marketing Concepts and Functions Speaker - K.C. Dhanda	20.1.82	21
Pilling - Its Causes and Remedies Speakers - J.N. Vohra, D.V. Bist, G.D. Premi, A.K. Abraham	30.6.82	33
Role of the Supervising Manager Speaker - K.C. Dhanda	17.9.82	10
High Pile Knitting Speaker - L.F. Andruezyk	7.10.82	15
Importance of Quality Control Speakers - P.T. Banerji, G.D. Premi	5.12.82	42
Printing of Wool Knitwear Speakers - J.N. Vohra, P.H. Kumar, G.B. Prashad	3.3.83	45
Export Marketing Speaker - R.N. Dutt	30.4.83	15
L.W.S. Spring/Summer Presentation	31.5.83	21
Newer Technology for Wool Knitwear Speakers - J.N. Vohra, Dr. S. Brook, P.T. Banerji, V. Sharda	3.2.84	37
Control of Quality and Dimensional Properties of Knitted Fabrics and Garments Speaker - Dr. S. Anand	17.9.84	21

Knitwear Designing and Styling for the European Market	26.1.85	30
Speaker - Mrs. K. Marwaha		
Waste Control in Spinning Mills	17.5.85	4
Speaker - G.A. Heeley		
Preparation of Yarns for Hosiery Industry	14.6.85	39
Speaker - G.A. Heeley		
Quality Control in Spinning Mills	29.5.85	6
Speaker - G.A. Heeley		
Orlon Fibre	6.8.85	8
Speaker - V. Prakash		
Management Principles and Human Behaviour	26.8.85	20
Speakers - Dr. M.A. Zaheer, Dr. D.R. Singh		
Marketing Management	27.8.85	22
Speakers - Dr. D.R. Singh, Dr. O.P. Sahni		
G.C.A. - An Exporter's Perspective	5.2.86	5
Speaker - A.P. Sinha		

TRAINING PROGRAMMES

Title	Dates	Attendance
Dyeing Methods and Practices on Hi-Tech M/cs.		
1. M.R. Venkatesh	13.2.82	12
2. G.B. Prashad	2.11.82 to 6.11.82	3
3. G.B. Prashad	11.12.83 to 17.12.83	4
Selection, Application, Recipe Formulation and Shade Matching for Wool Materials		
1. G.B. Prashad	6.11.82	12
2. G.B. Prashad, G.D. Premi	7.2.83	4
3. G.B. Prashad	4.4.84	6
Modern Techniques for Finishing Knitwear		
1. K.H. Kumar, J.N. Vohra	7.9.82 to 9.9.82	20
2. K.H. Kumar, G.D. Premi, P.T. Banerji, D. Jhangiani	29.7.83	16
3. J. Jackson	28.8.85 to 29.8.85	5
Identification and Methodology for Stain Removal		
1. K.P. Jankiraman	17.6.82 to 19.6.82	3
2. K.P. Jankiraman	3.8.82 to 4.8.82	2
3. K.P. Jankiraman	16.9.83	4
Operator Training in Drawing and Spinning		
1. D.V. Bist	29.10.84	4
2. G.D. Premi, G.A. Heeley	20.6.85	16
3. D.V. Bist, G.A. Heeley	9.7.85	3

Post Spinning Processes on Modern Machinery

1.	J.N. Vohra, D.V. Bist	31.8.82	12
2.	G.A. Heeley	30.7.85 to 31 7 85	6
3.	G.A. Heeley	1.8.85 to 2.8.85	4

Methods of Testing, Inspection for Yarn Faults

1.	P.T. Banerji, D.V. Bist	8.12.83 to 15.12.83	4
2.	P.T. Banerji, D.V. Bist	11.9.84 to 14.9.84	3
3.	P.T. Banerji, D.V. Bist	14.1.85 to 16.1.85	5

Woolmark Test Methods and Quality Control

1.	J.N.Vohra, P.T. Banerji, A.B. Roy	9.2.82 to 13.2.82	29
2.	J.N.Vohra, P.T. Banerji, A.B. Roy A.K. Abraham	24.5.82 to 28.5.82	20
3.	P.T. Banerji, A.B. Roy, G.D. Premi, S.B. Hardas	5.7.85 to 9.7.83	9
4.	P.T. Banerji, A.B. Roy, G.D. Premi	6.8.84 to 11.8.84	14

Preventive Maintenance for Dyeing Equipment

1.	J.A. Nijland	28.7.83	8
2.	Baldev Singh, G.D. Premi	12.4.84	6
3.	Baldev Singh, G.D. Premi	18.6.85	10

Machine Maintenance in Spinning Mills

1.	S.L. Sehgal	16.10.82	14
2.	Baldev Singh, G.D. Premi, D.V. Bist	24.12.84 to 29.12.84	4
3.	Baldev Singh	7.11.85	8

Weft Knitting

- | | | | |
|----|----------------------------|------------------------|---|
| 1. | P.K. Bhardwaj | 12.4.82 to
22.4.82 | 5 |
| 2. | Manjit Singh, P. Kotesovec | 1.12.83 to
17.12.83 | 8 |
| 3. | Manjit Singh, P. Kotesovec | 2.1.84 to
7.1.84 | 3 |

Modern Making - Up Techniques

- | | | | |
|----|-----------------------------|------------------------|----|
| 1. | Manjit Singh | 19.3.85 to
30.3.85 | 12 |
| 2. | Manjit Singh, S.S. Pathania | 13.8.85 to
28.8.85 | 11 |
| 3. | Manjit Singh | 5.10.85 to
30.10.85 | 4 |

Training of Trainers

- | | | | |
|----|-----------------------------|------------------------|---|
| 1. | Advanced Training INstitute | 5.12.85 to
13.12.85 | 6 |
|----|-----------------------------|------------------------|---|

Methods of Designing and Conducting Training Programmes

- | | | | |
|----|------------|-----------------------|---|
| 1. | J.A. Smith | 27.1.84 to
28.1.84 | 7 |
|----|------------|-----------------------|---|

LIST of 1 - DAY SEMINARS HELD

Title	Date	Attendance
International Marketing of Knitwear in the 80's	20.5.82	79
Speakers - G.P. Sahi, B.K. Zutshi, P. Behl, R.M. Sorbie, A.Radin, K.K. Adya.		
Machine Systems for Worsted Yarn Production	12.4.83	38
Speakers - J.N. Vohra, G. Kleindienst, H.R. Verma, D.V. Bist, K.H. Kuamar.		
Acrylic Fibre for the Knitting Industry	7.6.83	78
Speakers - A.S. Grover, T.K.A. Nair, N. Jagganathan, B.D. Chatterjee, C. Battacharya, H.C. Bhatia, J.N. Vohra, D.V. Bist, P. Kotesovec		
No Needle Knitting	14.2.86	31
Speakers - M. Tyagi, J. Carr Doughty, P.C. Sachdeva, G.D. Premi.		
Acrylic Fibre	23.5.86	130
Speakers - G.H. Singhanian, Dr. G.H. Singhanian, S.P. Oswal, A.S. Grover, Dr. O.P. Singh, Dr. A. Vaida, G.A. Heeley.		

TECHNICAL BULLETINS PUBLISHED

1982

- Jan. Concept and Function of Preventive Maintenance.
- Feb. Problems Encountered in Dyeing of Wool.
- Mar. Importance of Training.
- May Pilling and Worsted Yarn Hairiness.
- June -0- (Concluded)
- July Development of Con Holder for Correct Positioning
of Cones on Hand-operated Flat Knitting Machines.
- Aug. Finishing of Wool Garments.
- Sept. Quality in 1983.
- Oct. Ways to Eliminate Pilling.
- Nov. Quality Dyeing.

1983

- Jan. Felting of Wool.
- Feb. Dimensional Stability of Knitted Cotton Goods.
- Mar. -0- (Concluded)
- Apr. Super Shrink-Resist Treatment for Wool.
- May Influence of Needle Defect on Knitted Fabric Quality.
- June Ways to Minimise Needle Breakage in Circular Knitting.
- July Man-made Fibres - Introduction.
- Aug. Man-made Fibres - Non-Cellulosic.
- Sept. Man-made Fibres - Cellulosic.
- Oct. Stitch Transfer on Automatic Purl Machines.
- Nov. Causes of Streaks in Knitted Fabrics.
- Dec. Dimensional Stability of Knitted Woollen Goods.

1984

- Jan. Dimensional Stability of Wool Knitwear.
Feb. Light - Weight Knitted Fabrics - A New Approach.
Mar. New Concepts in Spun Yarn Twisting.
Apr. Development of Lustrous Wool Yarns for Knitwear.
May Elongated Stitch and Press Off Patterns.
June Relief Knitwear - A New Development.
July A Study of Rotor Spun Woollen Yarns for the Knitting Industry.
Aug. Upkeep of Hand Flat Machines.
Sept. A Study of Rotor Spun Yarns (Concluded).
Oct. Minimisation of Twist Variation in Ring Spinning & Twisting.
Nov. Dyeing Problems with Superwash Wool.
Dec. Testing of Polyester Fibres.

1985

- Jan. Testing of Polyester Fibres.
Feb. -0- (Concluded)
Mar. Dyeing and Finishing of Acrylic Knitted Garments.
Apr. -0- (Concluded).
May Fancy Yarns.
June -0- (Concluded).
July Basic Weft Knitting Structures Used in Knitting Industry.
Aug. Modern Finishing Techniques for Wool.
Sept. -0- (Concluded).

- Oct. Use of Retarders in Acrylic Dyeing.
- Nov. Incentives for Export of Woollen Knitwear.

1986

- Jan. Dimensional Stability of Plain Weft Knitted Fabrics.
- Feb. GCA - An Exporter's Perspective.
- Mar. In-plant Quality Control Checks for Worsted Mills.
- Apr. Processing of Cotton Knitted Fabrics - Recent Developments.
- May -0- (Concluded).

MILL CONSULTANCY

Mill/Topic	Consultants	Date
C/1 Greatways	P.K. Bhardwaj, J.N. Vohra	Dec. 1982
- Replacement/Modernisation of Knitting Machines		
- Replacement/Modernisation of Knitting Machines		
	-0-	
C/2 Hind Hosiery	J.N. Vohra, D.V. Bist	May 1983
- Modernisation of Spinning Unit		
	-0-	
C/3 Amita Udhyog	J.A. Nijland	Aug. 1983
- Maintenance of Spinning Plant		
	-0-	
C/4 Nagesh Knitwear	K.P. Jankiraman	Aug. 1984
- Anti-pilling treatment on Woollen garments in Bøwe Machine		
	-0-	
C/5 Ajit Spinning & Weaving	K.P. Jankiraman	Aug. 1984
- Top Dyeing of Viscose		
	-0-	
C/6 Sanjeev Woollen Mills	P.T. Banerji, D.V. Bist	Aug. 1984
- Processing work in manufacture of acrylic Hand-Knitting Yarns		
	-0-	
C/7 Suraj Industries	Baldev Singh,	1984/85
- Solvent Recovery Plant		
	-0-	
C/8 Elax Engineering	Baldev Singh	1985/86
- Development of Power Flat Machines with multi-feeders		

C/9	Suraj Industries	Baldev Singh	1985/86
	- High Temperature, High Pressure Dyeing Machine Development	-0-	
C/10	Sanjeev Woollen Mills	J.N. Vohra	1984/85
	- Modernisation of Spinning Plant	-0-	
C/11	Deesons Knitwear	P.T. Eanerji, Dr. S. Brook	Mar. 1985
	- Management Information System	-0-	
C/12	Monika India	D.V. Bist	Dec. 1985
	- Wastage in Carding with Tow wastes	-0-	
C/13	Bhilwara Processing Ltd. Jammu	J.N. Vohra, K.P. Jankiraman	Nov. 1985
	- Balancing of Cotton Dyeing & Finishing Unit	-0-	
C/14	Small Industries Service Inst.	D.V. Bist	Mar. 1986
	- Modernisation of Tanjeja Woollen Mills	-0-	
C/15	Puja Traders	D.V. Bist	Mar. 1986
	- Setting up Quality Control Laboratory	-0-	
C/16	Monika India	D.V. Bist, J.N. Vohra	Mar. 1986
	- Solvent Scouring Machine Development	-0-	
C/18	Govt. of Jammu & Kashmir	Manjit Singh	In Progress
	- Setting up of Knitting Unit		

WORK PROGRAMME DETAILI Extension Services

Common service facilities have been provided to the local industry in the area of dyeing, finishing, spinning, twisting, winding, and quality control as below:-

<u>Year</u>	<u>1982-83</u>	<u>1983-84</u>	<u>1984-85</u>	<u>1985-86</u>
<u>Description</u>				
Dyeing(Tons)	90	76	65	113
Finishing(")	160	30	-	-
Spinning, Twisting and Winding(Tons)	48	40	45	103
<u>Quality Control</u>				
No.of tests done for the industry	1688	3200	3075	2074
No.of tests for KF	6173	6224	4134	4418

II Technical Assistance

Following technical assistance was rendered to the local industry during the period:-

<u>Year</u>	<u>No. of advices given</u>			
	<u>1982-83</u>	<u>1983-84</u>	<u>1984-85</u>	<u>1985-86</u>
<u>Description</u>				
Quality Control	60	52	94	28
Dyeing	17	14	23	27
Finishing	14	16	8	-
Spinning, Twisting & Winding	20	26	18	28
Knitting	12	36	42	40

..../2

III Trouble Shooting

Knitting

- T/1. To set right the striping release system on their supreme striper sinkerbody machine - Venus Fabrics, Ludhiana
- T/2. Setting of unbalanced sinker disc of chamber circular knitting machine causing streak of irregular stitch length - Hind Hosiery & Woollen Mill, Ludhiana.
- T/3. Problem in production of double-jersey fabrics, proper knowledge of patterning imparted - Basant Fabrics, Ludhiana.
- T/4. Assembling of creel and machine setting for comber striper circular knitting machine - Venus Fabrics, Ludhiana.
- T/5. Variation in stitch length and machine vibration while starting up comber circular knitting machine - Addicrafts, Ludhiana.
- T/6. Plush loops showing stitches at back of fabric (yarn 'Z' & 'S' and sinker adjustment required - Addicrafts, Ludhiana.
- T/7. Assistance in controlling variation in pile loop height in production of loop pile circular knitted fabrics - Hind Hosiery & Woollen Mills, Ludhiana.
- T/8. Assistance in erection and commissioning of second hand power flat knitting machine (STOLL) - Modela Knitwears Ltd., Ludhiana.

Dyeing & Finishing

- T/9. Erection and commissioning of BOWE solvent scouring machine - York Hosiery Mills, Ludhiana.
- T/10. Shearing machine (Frank Muller) assistance in erection, commissioning and personnel training - Hind Hosiery & Woollen Mills, Ldh.

- T/11. Erection & commissioning of solvent scouring machine - Greatways(P) Ltd., Ludhiana.
- T/12. Standardisation of production parameters in aqueous milling garments- Vardhman Spinning & General Mills, Ludhiana.
- T/13. Commissioning of Bowe solvent scouring & drycleaning machine - Nagesh Knitwears, Ludhiana.
- T/14. Commissioning of two Table Drying machines - Hind Hosiery & Woollen Mills, Ludhiana.
- T/15. Improvement of pilling properly of Angora Shawls - Kumaon Woollen Mills, Nainital.
- T/16. Milling of Lambs wool garment - Greatways (P) Ltd., Ludhiana.
- T/17. Improvement in washing fastness, rubbing fastness of Acrylic/Nylon blended fabrics - Ashoka Dyeing, Ludhiana.

Spinning and Quality Control

- T/18. Commissioning of Uster evenness tester etc., - Malwa Cotton Spinning Mills, Ludhiana.
- T/19. Reduction of Twist C.V - L.W.S. Spinning Unit, Ludhiana.
- T/20. Reduction of worsted yarn hairiness by controlling factor related to processing and machinery - Amita Udyog - Ludhiana.
- T/21. Formulation of suitable package density standards for cotton yarn dye packaging - Vardhman Spinning & General Mills, Ludhiana.
- T/22. Complaint of package hardness by knitters in the units yarn (1/40 acrylic yarn)-correct hardness packages prepared and shown to the unit - Sidha Syntex, Udaipur.

- T/23. Soft package winding of testurised triacetate filament yarns on normal winding machine for spun yarns - Sarjeevan Knitwears, Ludhiana.
- T/24. Excessive traveller wear and fly - Punjab Worsted Mills, Ldh.
- T/25. Maintenance schedules for entire spinning plant - Jain Traders.
- T/26. Controlling of yarn unevenness problems - Kohinoor Woollen Mills, Ludhiana (T-26).

IV. Investigations

Dyeing & Finishing

- I/1. Investigation/trials for satisfactory milling effect & shrinkage levels in Merino wool 8 and 10 gg flat knitted garments - K.L. Rajkumar & Sons, Ludhiana.
- I/2. Investigation/trials into causes of unsatisfactory milling in Shetland/Merino wool garments - K & K Knitwears, Ludhiana.
- I/3. Investigations/trials for process standardisation for aqueous milling of wool-garments in newly installed local Tumble Dyer - Nagesh Export Knitwears, Ludhiana.
- I/4. Investigations/trials for controlled milling in aqueous and solvent media - Standard Hosiery, Ludhiana.
- I/5. Investigations/trials for lambs, wool-angora trials for satisfactory milling - Ludhiana Wool Syndicate, Ludhiana.
- I/6. Trials for requisite milling effect with shetland garments made from 16Nm, 32Nm - Knitter International, Ludhiana.
- I/7. Investigation trials for sheep skin finish in pile fabric - Sethsons International, Ludhiana.

- I/8. Investigation into causes of bleeding in aqueous finishing of acrylic-wool blended yarn garments - Teeknit International, Ludhiana.
- I/9. Investigation into problem of non-reproducibility of dyeing in circular knitted velour fabrics - Shiroga International, Ludhiana.

Quality Control

- I/10. Investigation into causes of weft bars in all wool shawls - Central Woollen Mills, Ludhiana.
- I/11. Investigation into causes of poor rubbing fastness of Mohair in natural black shade - Adya Industries, Ludhiana.
- I/12. Identification of spots and streaks in pieces of dyed cotton knitted fabric - Nagesh Knitwears, Ludhiana.
- I/13. Investigation into causes of shade difference between two portions of knitted panel (fabric) - Vardhman Spinning & General Mills, Ludhiana.
- I/14. Investigation into causes of uneven appearance of fabrics (long streaks, shade variation) - Nagesh Knitwears, Ludhiana.
- I/15. Investigation into causes of defects (holes) in all wool gents pullover 30" size - International Wool Secretariat, Bombay.
- I/16. Investigation into use of reclaimed wool in ladies garments - International Wool Secretariat, Bombay.
- I/17. Investigation for number of denier and number of fibres in the yarn cross-section - Punjab Fibres Ltd., Hoshiarpur.
- I/18. Investigation into causes of shade variation in the P/V knitted fabric - Hero Fibres, Ludhiana.
- I/19. Investigation into causes of weft stripes in 100% Polyester filament fabrics - B.S.Kohli Synthetics Pvt.Ltd., Ludhiana.

- I/20. Investigation into causes of dark and light weft bars in 100% polyester fabrics - B.S.Kohli Synthetics Pvt.Ltd., Ludhiana.
- I/21. Investigation into causes of discolouration of garment and their remedy- Jaidka Hosiery Factory, Ludhiana.
- I/22. Investigation into causes of stripiness in the knitted dyed acrylic fabric- Chenab Textile Mills, Ludhiana.
- I/23. Inspection of round neck, stripped, ladies pullover for export to U.S.A. under I.W.S.T.M. 206 - Oswal Woollen Mills, Ludhiana.
- I/24. Inspection of round neck, stripped, ladies pullover for export to U.S.A. under I.W.S.T.M. 206 - Oswal Woollen Mills, Ludhiana.
- I/25. Investigation of yarn and fibre parameters of imported socks for product development - Merino Knitting Industry, Bombay.
- I/26. Investigation of Twist in acrylic yarn for socks - Merino Knitting Industry, Bombay.
- I/27. Investigation of cause of shade difference between two different portions of all wool knitted fabric - Ashoka Dyeing & Finishing Mills, Ludhiana.
- I/28. Investigation of non-wool content in yarn being used for Woolmark garment - International Wool Secretariat, Bombay.
- I/29. Investigation of causes of shade variation in yarn and knitted panels - Modella Knitwears Ltd., Ludhiana.
- I/30. Investigation into causes of appearance of dark patches in the knitted material - Modella Knitwears Ltd., Ludhiana.
- I/31. Investigations of causes of white fibre in dyed yarn samples - Hero Fibres Ltd., Malerkotla.
- I/32. Investigation of causes of damage to all wool garment due to appearance of holes & discolouration due to usage - Oswal Woollen Mills Ltd.,Ldh.

- I/38. Regarding control of relaxation shrinkage in Knitwears - Swadeshi Manufacturing Syndicate.
- I/39. Investigation into causes of scale deposition in fabrics - Mahavir Woollen Mills, Ludhiana.
- I/41. Investigation into causes of scale deposition in fabrics finished with silicone yesins - Ashoka Dyeing Works, Ludhiana.
- I/43. Measurement of metal to yarn friction - Hind Hosiery & Woollen Mills, Ludhiana.
- I/44. Investigation into causes of shade variation - Hero Fibres, Ludhiana.
- I/45. Investigation into appearance of dark patches in the knitted material - Modella Woollen Mills, Ludhiana.
- I/46. Investigation into causes of barriness/streakiness in polyester texturised fabrics - Lotus Hosiery Factory, Ludhiana.

Spinning

- I/33. Investigation into causes of varying grindle effect in knitted garments - Mahavir Woollen Mills, Ludhiana.
- I/34. Investigation into causes of complaints of bad knots in the machine knitting yarn - Companion Hosiery Factory, Ludhiana.
- I/35. Investigation into causes of neps speches in top dyed hosiery yarn and its rectification - Shreevallabh Woollen Mills, Ludhiana.
- I/36. Investigation into causes of yarn unevenness and their rectification - Nagesh Knitwears, Ludhiana.
- I/37. Investigation/trials for Polyester Texturised filament yarn twisted with P/V spun yarn - Arihant Fabrics, Ludhiana.

- I/40. Reduction of process losses in Mohair yarns - Hind Hosiery & Woollen Mills Pvt. Ltd., Ludhiana.
- I/42. An exploring investigation of wool quality, waste and process control for upgrading quality for hosiery yarns - Amita Udyog, Ludhiana.

LIST OF REPORTS ON UNITS VISITED**Quality Control**

- visits by Mr. P.T. Banerji - Q.C. Manager

QC/21	Subash Dyeing Works	June 1982
QC/22	Greatway Pvt.	"
QC/23	Sohana Woollen Mills	"
QC/24	Punjab Agricultural University	"
QC/25	Satish Hosiery Factory	"
QC/26	Wool & Woollens Export Promotion Council	"
QC/27	Bussey Hewitt	"
QC/28	Shriyansh Knitwear	"
QC/29	Madura Coats	"
QC/30	Jay Jay Woollens	"
QC/31	D.G.S & D	"
QC/32	Sailopal Dyeing Works	"
QC/33	Kohinoor Woollen Mills	"
QC/34	Shriyansh Knitters	"
QC/35	Knitwear Facility	"
QC/36	Angora Woolcombers	"
QC/37	D.G.S & D	"
QC/38	Kohinoor Woollen Mills	"
QC/39	Ashoka Dyeing & Finishing Mills	"
QC/40	OWM Woolcombers	"
QC/41	P.H.Jain Hosiery	"
QC/42	Ashoka Dyeing & Finishing Mills	"

LIST OF REPORTS ON UNITS VISITED Cont'd

QC/43	Everwear Mfg. Company	July 1982
QC/44	P.L.Oswal Hosiery	"
QC/45	Manoj Hosiery Factory	"
QC/46	Ashoka Dyeing & Finishing Mills	"
QC/47	Kalia Hosiery Works	"
QC/48	Satish Hosiery Factory	"
QC/49	Vandana Hosiery	"
QC/50	Ravindra Hosiery Mills	"
QC/51	Standard Dyeing	"
QC/52	M.R.Oswal Hosiery Factory	"
QC/53	Kapoor & Kapoor Hosiery	"
QC/54	Rita Hosiery Products	"
QC/55	Kohinoor Woollen Mills	"
QC/56	Pringleknit Knitwears	"
QC/57	Rita Hosiery Products	"
QC/58	Quality Marking Centre	"
QC/59	World Trade Enterprise	"
QC/60	Jay Hosiery Mills	"
QC/61	Jay Hosiery Mills	"
QC/62	Klassik Knitwears	"
QC/63	Mahavir Woollen Mills	"
QC/64	Nagesh Hosiery Exports	"
QC/65	Ravindra Hosiery Mills	"
QC/66	Nagesh Hosiery Exports	"
QC/67	Jaykay Knitwears	"

LIST OF REPORTS ON UNITS VISITED Cont'd

QC/68	D.G.S. & D	July 1982
QC/69	Nagesh Knitwear	"
QC/70	Punjab State Handloom	"
QC/71	Amber Knitting Mills	"
QC/72	Amber Knitting Works	"
QC/73	Indian Dyeing House	"
QC/79	Punjab Wool Combers Ltd.	August 1982
QC/80	Ashoka Dyeing Factory	"
QC/81	D.G.S. & D	"
QC/82	Central Woollen Mills	"
QC/83	Quality Marketing Centre	"
QC/84	Rai Bahadur Knitting Works	"
QC/85	Kohinoor Woollen Mills	"
QC/86	Nagesh Knitweares	"
QC/87	Garment Exporters Association	"
QC/88	Ashoka Dyeing	"
QC/89	Amarson Woollen Mills	"
QC/90	Satish Hosiery Works	"
QC/91	Nagesh Hosiery Exports	"
QC/92	Swastika Woollen Mills	"
QC/93	Kohinoor Woollen Mills	"
QC/94	Sutlej Hosiery Mills	"
QC/95	Nagesh Textile Mills	"
QC/96	Quality Marking Centre	"
QC/97	Rai Bahadur Knitting Works	"

LIST OF REPORTS ON UNITS VISITED Cont'd

QC/98	Milan Knitwear & Amber Knitwear	August 1982
QC/99	K.Kalia Hosiery & Satish Hosiery	"
QC/100	6 Nos. Units Woolmark Licencees	"
QC/101	Subhash Dyeing Works	"
QC/102	16 Nos. Units Woolmark Licencees	"
QC/103	Kapoor & Kapoor Hosiery and Vandana Hosiery	"
QC/104	Gay Style Knitwear	"
QC/113	Bhadohi Woollen	September 1982
QC/115	Angora Woolcombers	"
QC/116	O.P.Hosiery & Jullundur Hosiery Factory	"
QC/117	T.C.M. Woollen Mills	"
QC/118	6 Nos. Units Woolmark Licencees	"
QC/119	Indiana Dyeing Works	"
QC/120	Companion Hosiery Factory	"
QC/121	S.T.Woollen Mills	"
QC/122	5 Nos. Unit Woolmark Licencees	"
QC/123	Addicrafts	"
QC/124	Quality Marking Centre	"
QC/125	Jawahar Hosiery	"
QC/126	Greatway Pvt. Ltd.	"
QC/127	Shriyansh Woollen Mills	"
QC/128	Sethsons International	"
QC/129	A.K.Silk & Murari Woollen Mills	"
QC/130	Satish Hosiery Factory	October 1982
QC/131	Nagesh Knitwears	"

LIST OF REPORTS ON UNITS VISITED Cont'd

QC/132	Kohinoor Woollen Mills	October 1982
QC/133	Shri Vallabh Spinning Mills	"
QC/134	Nagesh Knitwears	"
QC/135	6 Units Woolmark Licencees	"
QC/136	Hind Woollen Mills	"
QC/137	C.S.W.R.I.	"
QC/138	Sandox(India) Ltd.	"
QC/139	Kohinoor Woollen Mills	"
QC/140	Gay Style Knitwears	"
QC/141	National Fertilizers Ltd.	"
QC/142	Shri Vallabh Spinning Mills	"
QC/143	Doon Valley Knitting Mills	"
QC/144	Kohinoor Woollen Mills	"
QC/145	Sind Knitwears	November 1982
QC/146	Vardhmaan Spinning & Gen.Mills	"
QC/147	Gaystyle Knitwear	"
QC/148	Angora Woolcombers	"
QC/149	Vallabh Woollen Mills	"
QC/150	Greatway Unit No.2	"
QC/151	Addicrafts Pvt. Ltd.	"
QC/152	Garments Exporters Association	"
QC/153	M.R.Oswal Hosiery	"
QC/154	Quality Marking Centre	"
QC/155	Angora Woolcombers	December 1982
QC/156	Angora Hosiery Mills	"

LIST OF REPORTS ON UNITS VISITED Cont'd

QC/157	Nagesh Knitwear Ltd.	December 1982
QC/158	Rahon Hosiery	"
QC/159	Panipal Woollen Mills	"
QC/160	Nagesh Knitwears	"
QC/161	R.S.Saluja Hosiery	"
QC/162	Oswal Woollen Mills	"
QC/163	Modella Knitwears Ltd.	"
QC/164	Prolific Engineers	"
QC/165	Greatway Pvt. Ltd.	"
QC/166	Kohinoor Woollen Mills	January 1983
QC/167	Oswal Woollen Mills	"
QC/168	Nav Bharat Textile Processors	"
QC/169	Sutlej Hosiery Mills	"
QC/170	Flora Dyeing House	"
QC/171	I.W.S. Indian Branch	"
QC/172	Sport King	"
QC/173	Minverva Hosiery Mills	"
QC/174	Modella Knitwears	February 1983
QC/175	Ashoka Dyeing Works	"
QC/176	I.W.S (India)	"
QC/177	I.P.C.L.	"
QC/178	Punjab Fibres Ltd.	"
QC/179	Satish Hosiery	"
QC/180	Kohinoor Woollen Mills	"
QC/181	Shri Vallabh Spinning Mills	"

LIST OF REPOTS ON UNITS VISITED Cont'd

QC/182	Angora Wool Comber	February 1983
QC/183	Ashoka Dyeing Works	"
QC/184	Greatway (P) Ltd.	"
QC/185	Oswal Woollen Mills	"
QC/186	Shivalik Woollen Mills	"
QC/187	Nav Bharat Knitwears	"
QC/188	Rampal Scientific Dyers	March 1983
QC/189	Behari Lal Chawla & Co.	"
QC/190	Indian Dyeing Works & Punjabi Dyeing House	"
QC/191	25 Nos. unit Woolmark Licencees	"
QC/192	Atul Consultants	"
QC/193	Saab Knitwears	"
QC/194	Shree Textile Mills	"
QC/195	Garg Knits and K & K Knitwears	"
QC/196	Milan Hosiery	"
QC/197	O.P.Hosiery	"
QC/198	Space Knitters	"
QC/199	Flora Dyeing Mills	"
QC/200	Ajanta Knitwear , R.N.Oswal Hosiery & Vandan Hosiery	"
QC/201	K.K.Knitters	April 1983
QC/202	Pahwa Hosiery Works	"
QC/203	Atul Knitwears	"
QC/204	Prospective Woolmark Licencees 7 units	"
QC/205	Oswal Fabrics	"

LIST OF REPORTS ON UNITS VISITED Cont'd

QC/206	Sewak Hosiery Mills	April 1983
QC/207	Prospective Woolmark Licencees 12 units	"
QC/208	Vardhmaan Export Wing	"
QC/209	Saab Knitwear	"
QC/210	Amita Udyog	"
QC/211	Punjab Fibres Ltd.	"
QC/212	Priti Knitcrafts	"
QC/213	Quality Marking Centre	"
QC/214	M.R.Oswal Hosiery Mills	"
QC/215	Elson Knitwear	"
QC/216	Krishna Goyal Hosiery	May 1983
QC/217	S.G.Dyes & Chemicals	"
QC/218	Rampal Dyeing	"
QC/219	O.W.M. Woolcombers	"
QC/220	Amita Udyog	"
QC/221	Vardhman Spinning & Gen. Mills	"
QC/222	Saab Knitwear	"
QC/223	Prospective Woolmark Licencees 4 units	"
QC/224	Jain Udhey Hosiery	"
QC/225	Atul Knitwear	"
QC/226	M.R.Oswal Hosiery Factory	"
QC/227	Hero Fibres	"
QC/228	Woolmark Licencees 23 units	"
QC/229	Woolmark Licencees 5 units	June 1983

LIST OF REPORTS ON UNITS VISITED Cont'd

QC/230	Woolmark Licences 4 units	June 1983
QC/231	Topaz Textile	"
QC/232	Woolmark Licences 4 units	"
QC/233	Woolmark Licences 8 units	"
QC/234	Amita Udyog	"
QC/235	Rahon Hosiery	July 1983
QC/236	Amita Udyog Spinners	"
QC/237	Woolmark Licences 20 units	"
QC/238	Woolmark Licences 10 units	"
QC/239	Existing Woolmark Licences 25 units	"
QC/240	Khaitan Petrochemicals Ltd.	"
QC/241	B.S.Kohli Synthetics	"
QC/242	Ajanta Knitwears and Kapoor & Kapoor	"
QC/243	Shipley Hosiery, Jitendra Knitwear, Sagar Knitwear & Standard Knitwear	"
QC/244	Jaidka Hosiery	August 1983
QC/245	Woolmark Licences 2 units	"
QC/246	Beri & Beri and Teeknit	"
QC/247	Chenab Textile Mills	"
QC/248	Greatway Ltd.	"
QC/249	Merino Knitting Industries	"
QC/250	Woolmark Licences 10 units	"
QC/251	Oswal Woollen Mills	"
QC/252	Woolmark Licences 50 units	September 1983
QC/253	Oswal Woollen Mills	"

LIST OF REPORTS ON UNITS VISITED Cont'd

QC/254	Preeti Knitcrafts	September 1983
QC/255	Red Rose Knitters	"
QC/256	Swadeshi Karyala	October 1983
QC/257	Ashoka Dyeing & Finishing Mills	"
QC/258	U.P.State Textile Corpn.	"
QC/259	Woolmark Licencees Units 21	"
QC/260	I.W.S.	"
QC/261	Matchwell Knitwear	November 1983
QC/262	Woolmark Licencees 17 units	"
QC/263	Dy.Director Industries(Hosy.)	"
QC/264	Rajneesh Dyeing Works	"
QC/265	21 Units	May 1984
QC/266	Nagesh Knitwear	June 1984
QC/267	Kumaon Woollen	July 1984
QC/268	17 units	"
QC/269	Kumaon Woollen	"
QC/270	50 units	"
QC/271	20 units	August 1984
QC/272	R.N.Oswal Hosiery Factory	"
QC/273	Cambridge Woollen Mills	"
QC/274	J.K.Knitwear	"
QC/275	Kohinoor Woollen Mills	"
QC/276	Rai Bahadur Knitting Mills	"
QC/277	Deesons Knitwears	February 1985
QC/278	Murari Woollen Mills	"

LIST OF REPORTS ON UNITS VISITED Cont'd

QC/279	Kansal Knitwear	February 1985
QC/280	Relax Knitwear	"
QC/281	Jaykay Hosiery	"
QC/282	Kesarla	"
QC/283	Pankaj Hosiery	"
QC/284	Jaytee	"
QC/285	Inspecting Asstt. Commissioner of Income Tax	March 1985
QC/286	T.I.T. Bhiwani	"
QC/287	Kirloskar Consultants	"
QC/288	AF. Ferguson & Company	"
QC/289	Camel Knitting & Textile Mills	"
QC/290	Bhadohi Wollen Ltd.	April 1985
QC/291	Universal Traders	"
QC/292	Madan Textiles	"
QC/293	M.R.Oswal Hosiery Factory	May 1985
QC/294	Punjab Worsted Spinning Mills	June 1985

LIST OF REPORTS ON UNITS VISITED

Quality Control

- visits by Mr. A.K.Abraham - Q.C.Manager

QC/74	Kashmiri Bajaj Hosiery	July 1982
QC/75	U.P.State Textile Corporation	"
QC/76	U.P.Industrial Corporation	"
QC/77	Ashoka Dyeing	"
QC/78	Kuku Hosiery	"
QC/105	Quality Marking Centre	September 1982
QC/106	Addicrafts	"
QC/107	Govt.Institute of Technology & Textile Chemistry	"
QC/108	Jawahar Hosiery	"
QC/109	Entrepreneur	"
QC/110	Super Dyers	"
QC/111	Shree Vallabh Spinning Mills	"
QC/112	Punjab Spinning & Weaving Mills	"
QC/114	Associated Sales & Exports	"

LIST OF REPORTS ON UNITS VISITED

Dyeing & Finishing

- visits by Mr. K.P.Janakiraman - Oricessing Manager

DF/20	R.N.Oswal	June 1982
DF/21	York Hosiery Mills	July 1982
DF/22	Vardhman Spinning & Gen.Mills	"
DF/23	Deeson	"
DF/24	Hind Hosiery	September 1982
DF/25	Standard Hosiery	October 1982
DF/26	Deeson	"
DF/27	Rajesh Hosiery	"
DF/28	L.W.S	"
DF/29	Naresh Textile Mills	"
DF/30	Hind Hosiery	November 1982
DF/31	York Hosiery	"
DF/32	Greatway Pvt.Ltd.	"
DF/33	Greatways	December 1982
DF/34	Greatways	January 1983
DF/35	York Hosiery	February 1983
DF/36	York Hosiery	"
DF/37	Knittex Internattional	"
DF/38	Greatway Pvt. Ltd.	"
DF/39	Sethsons International	March 1983
DF/40	Greatway	"
DF/41	Sri Textiles	"

LIST OF REPORTS ON UNITS VISITED Cont'd

DF/42	York Hosiery	April 1983
DF/43	Sarpanch Hosiery	May 1983
DF/44	Vardhman Unit III	June 1983
DF/45	Teeknit International	"
DF/46	Nagesh Knitwears	"
DF/47	United Trading Co.	July 1983
DF/48	Vardhman Unit III	"
DF/49	Hind Hosiery	August 1983
DF/50	York Hosiery	"
DF/52	Ajit Spinning & Woollen Mills	March 1984
DF/73	Ramphal Dyeing	"
DF/74	Pearl Export & Imports	"
DF/75	Selection Hosiery	"
DF/76	Kashmir Trade Centre	"
DF/77	K.K.K. Hosiery	"
DF/78	Navrang Enterprises	August 1984
DF/79	Bhandari Hosiery Ltd.	"
DF/80	Ajit Spinning & Woollen Mills	"
DF/81	Nagesh Knitwear	"
DF/82	Kumaon Woollens	July 1984
DF/83	Rajah Hosiery	"
DF/84	Vardhman Spinning & Gen.Mills	June 1984
DF/85	Oswal Woollen Mills	"

LIST OF REPORTS ON UNITS VISITED Cont'd

DF/86	Punjab Syntex	September 1984
DF/87	Dyal Furnishing Pvt.Ltd.	"
DF/88	Punjab Wool Combers	"
DF/89	Kohinoor Mills	"
DF/90	Teeknit	"
DF/91	United zippers	"
DF/92	Greatway Pvt. Ltd.	December 1984
DF/93	Vardhman Unit III	January 1985
DF/94	O.W.M.	February 1985
DF/95	Oslo Knitwear	"
DF/96	Greatway	March 1985
DF/97	O.W.M.	"
DF/98	Shriyoga	April 1985
DF/99	Vardhman Unit III	"
DF/100	York Knitwear Pvt.Ltd.	"
DF/101	Deesons	May 1985
DF/102	Nagesh Knitwear	July 1985
DF/103	Ajit Spinning Mills Ltd.	"
DF/104	Nagesh Knitwear	"
DF/105	Ajit Spinning Mills	August 1985
DF/106	Hind Hosiery	"
DF/107	Rainbow Scientific Dyers	"
DF/108	Shree Vallabh Yarn	"
DF/109	Ajit Spinning Mills	September 1985
DF/110	Nagesh Knitwear	October 1985

LIST OF REPORTS ON UNITS VISITED Cont'd

DF/111	Ajit Spinning Mills	December 1985
DF/117	Rai Bahadur Knitting Works	January 1986
DF/112	Nagesh Knitwear	April 1986
DF/113	Ujjwal Ltd.	"
DF/114	Shivalik Woollen Mills	"
DF/115	Ajit Spinning Mills	"
DF/116	Deesons	May 1986

LIST OF REPORTS ON UNITS VISITED

Knitting

- visits by Mr. P.K.Bhardwaj

K/11	K.Knitwear	June 1982
K/12	Kashmir Bajaj Hosiery	"
K/13	Bhandari Hosiery Mills	"
K/14	Punjabi Dyers	"
K/15	Subhash Dyeing	"
K/16	Sriyansh Knitters	"
K/17	Nagesh Hosiery Exports	"
K/18	Jawahar Hosiery Mills	"
K/19	Ajanta Knitwear	July 1982
K/20	Khanna Knitwear	"
K/21	Standard Knitwear	"
K/22	Greatway Pvt.Ltd.	"
K/23	Vardhman Garments Unit	"
K/24	Modella Knitwear Ltd.	"
K/25	Teeknit International	"
K/26	Oslo Knitwear	August 1982
K/27	Himaiaya Hosiery Works	"
K/28	L.C.Oswal Hosiery Mills	"
K/29	Elson Knitwears	"
K/30	Vardhman Export Unit	"
K/31	Sarjeevan Knitwears	"
K/32	Hind Hosiery	"

LIST OF REPOTS ON UNITS VISITED Cont'd

K/33	Ess Ess Sales Corpn.	September 1982
K/34	Greatway Knitwear	November 1982
K/35	L.W.S.Knitwear	December 1982
K/36	Nagesh Knitwear	"
K/37	Modella Knitwears	"
K/38	Himalaya Hosiery Works	"
K/39	Jawahar Hosiery Mills	February 1983
K/40	Sarjeevan Knitwear	"
K/41	Prayag Hosiery	"
K/42	Companion Hosiery Factory	"
K/43	Kashmir Bajaj Hosiery	"
K/44	Oslo Knitwear	"
K/45	Nagesh Exports	"
K/46	Modella Knitwear	"
K/47	Silk & Rayon Export Promotion Council	"
K/48	Surender Export	"

LIST OF REPORTS ON UNITS VISITED

Knitting

- visits by Mr. Manjit Singh - Manager Knitting

K/49	Popular Mechanical Works	September 1983
K/50	Elex Mechanical Works	"
K/84	Addicrafts	February 1984
K/87	Addicrafts	May 1984
K/78	Venus Fabrics	June 1984
K/80	Venus Fabrics	"
K/82	Venus Fabrics	"
K/77	Jain Udhay Hosiery	July 1984
K/90	Jain Udhay Hosiery	"
K/79	Basant Fabrics	August 1984
K/85	Venus Fabrics	November 1984
K/86	Hind Knitwear	"
K/88	Venus Fabrics	"
K/91	Hind Knitwears	"
K/51	Rosy Knitwear	January 1985
K/52	Elson Knitwear	"
K/53	Deeson Hosiery Knitwears	"
K/54	Ashing Knitwear	February 1985
K/55	Oslo Knitwear	"
K/56	Tulip Knitwear	"
K/57	Punwac Bal Bhawan	March 1985
K/58	Volga Knitwears	"

LIST OF REPORTS ON UNITS VISITED Con'd

K/59	Deesons Knitwears	April 1985
K/60	Regency Fashions	"
K/61	Tulip Knitwear	"
K/62	D.C.Parbhakar	"
K/63	Punwac	May 1985
K/64	Jolly Hosiery Factory	"
K/65	Vicky Knitwears	June 1985
K/66	B.S.Waina	July 1985
K/67	Arctic Knitwears	"
K/68	Punwac	"
K/69	UNDP Sponsored unit of J & K	"
K/70	Elex Mechanical Works	"
K/71	Merado Centre	"
K/72	Deesons Knitwears	November 1985
K/73	Teeknit Knitwears	"
K/74	Rajah Knitwear	"
K/75	Tulip Knitwear	"
K/82	Venus Fabrics	"
K/76	Asian Knit	December 1985
K/83	Elex Mech. Works	"
K/92	Deesons Knitwears	Jan - March 1986
K/93	Rajah Hosiery	"
K/94	Teeknit International	"
K/95	Jolly Hosiery	"

LIST OF REPORTS ON UNITS VISITED

Dyeing & Finishing

- visits by Mr. M.R.Venkatesh

DF/51	Rajesh Dyeing	January 1982
DF/52	Jain Dyeing	"
DF/53	International Textile Mills	February 1982
DF/54	Ashoka Dyeing	"
DF/55	Kohinoor Woollen Mills	"
DF/56	Jain Dyeing	"
DF/57	Rajesh Dyeing	"
DF/58	Shreeyans Knitters	"
DF/59	Techno Dyeing & Bleach Works	"
DF/60	Super Dyers	"

LIST OF REPORTS ON UNITS VISITED

Dyeing & Finishing

- visits by Mr. G.B.Prasad

DF/62	Adhya Industries	January 1983
DF/64	Hero Fibres Ltd.	"
DF/65	Rahon Hosiery Mills	"
DF/66	Hero Fibres Ltd.	"
DF/67	Rai Bahadur Hosiery Mills	"
DF/69	Mahavir Woollen Mills	"
DF/70	Laxmi Hosiery, Sutej Hosiery & Rahon Hosiery Mills	February 1983
DF/71	K.K.K.Mills	"

LIST OF REPORTS ON UNITS VISITED

Spinning

- visits by Mr. D.V.Bist - Tech. Service Manager

S/14	Kohinoor Woollen Mills	June 1982
S/15	Prabhat Woollen Mills	"
S/16	Kohinoor Woollen Mills	"
S/17	Centex Shawla	July 1982
S/18	Nagesh Hosiery & Exports	"
S/19	Mahavir Woollen Mills	"
S/20	Nagesh Knitwears	"
S/21	Mahavir Woollen Mills	August 1982
S/22	Rai Bahadur Knitting Works	"
S/23	Mahavir Woollen Mills	"
S/24	Sutlej Hosiery Mills	"
S/25	Shrevallabh Spinning Mills	"
S/26	Mahavir Woollen Mills	"
S/27	Rajah Hosiery	September 1982
S/28	Hind Hosiery & Woollen Mills	"
S/29	Kalia Machinery Corporation	"
S/30	Vardhman Spinning & Gen.Mills	"
S/31	Sarjeevan Knitwears	"
S/32	Hind Woollen & Hosiery Mills	October 1982
S/33	Navrang Dyeing Works	"
S/34	Kohinoor Woollen Mills	"
S/35	Sanjeev Woollen Mills	"

LIST OF REPORTS ON UNITS VISITED Cont'd

S/36	Mahavir Woollen Mills	October 1982
S/37	Sind Knitwears	November 1982
S/38	Sarjeevan Knitwears	"
S/39	Rajah Hosiery	December 1982
S/40	York Hosiery Mills	"
S/41	Sutlej Hosiery Mills	January 1983
S/42	Oswal Woollen Mills	"
S/43	Shreevallabh Spinning Mills	"
S/44	Nagesh Hosiery Exports	February 1983
S/45	Amita Udhyog Ltd.	"
S/46	Mahavir Spinning Mills	"
S/47	Sutleuj Hosiery Mills	"
S/48	Nagesh Hosiery Exports	March 1983
S/49	Imperial Woollen Mills	"
S/50	D.G.S & D and W.W.E.P.C.	April 1983
S/51	Kohinoor Woollen Mills	"
S/52	Amita Udhyog	"
S/53	Sutlej Hosiery Mills	May 1983
S/54	Amita Udhyog Mills, Central Woollen Mills & Rai Bahadur Knitting Works	"
S/55	Supertex Engineers, Lamba Spinning Mills & Amita Udhyog	"
S/56	Hind Woollen & Hosiery Mills	"
S/57	Amita Udhyog	"
S/58	Sriyansh Knitters	July 1983

LIST OF REPORTS ON UNITS VISITED Cont'd

S/59	Greatways Mills	July 1983
S/60	Greatway Pvt.Ltd,Sutlej Hosiery Mills, York Hosiery & Nagesh Knitwears	"
S/61	Amita Udhyog	"
S/62	Amita Udhyog	"
S/63	Kohinoor Woollen Mills	"
S/64	Kohinoor Woollen Mills	August 1983
S/65	Arihant Fabrics	"
S/66	Arihant Fabrics	December 1983
S/67	Amita Udhyog	"
S/68	Dhawan Thread Processing Co.	January 1984
S/69	Amita Udhyog	February 1984
S/70	Kohinoor Woollen Mills	"
S/71	Arihant Fabrics	"
S/72	Wool India Ltd.	March 1984
S/73	Nagesh Hosiery Exports	"
S/74	Subhash Dyeing Works	April 1984
S/75	Mahavir Woollen Mills	June 1984
S/76	Kohinoor Woollen Mills	"
S/77	Nagesh Knitwears	"
S/78	Arihant Fabrics	July 1984
S/79	Neomer Ltd.	August 1984
S/80	Amita Udhyog	"
S/81	L.W.S	"
S/82	B.S.Kohli Synthetics	"

LIST OF REPORTS ON UNITS VISITED Cont'd

S/83	Central Woollen Mills	August 1984
S/84	Ideal Woollen Mills	October 1984
S/85	Central Woollen Mills	"
S/86	S.K.Oswal Hosiery	"
S/87	Ideal Woollen Mills	November 1984
S/88	Venus Fabrics	December 1984
S/89	Ajit Spinning & Weaving Mills	"
S/90	New Era Woollen Mills	"
S/91	W.W.E.P.C	January 1985
S/92	Sherman Woollen Mills Pvt.Ltd.	"
S/93	Punjab Syntex	"
S/94	Versatile Fabrics	February 1985
S/95	Kirloskar Consultants	"
S/96	Youngman Woollen Mills	"
S/97	Arihant Fabrics	March 1985
S/98	Saujeev Woollen Mills	April 1985
S/99	Punjab Worsted Spinning Mills	May 1985
S/100	Addicrafts	June 1985
S/101	Veekay Spinning Mills	"
S/102	Amita Udhyog	"
S/103	International Woollen Mills	"
S/104	Amita Udhyog Spinning Mills	July 1985
S/105	Kohinoor Woollen Mills	"
QC/295	M.R.Oswal	"
QC/296	Arihant Texturising	August 1985

LIST OF REPORTS ON UNITS VISITED Cont'd

S/106	Triveni Woollen Mills	August 1985
S/107	Arihant Spinning Mills	"
QC/297	Central Sheep & Wool Research Inst.	September 1985
S/108	Mahavir Woollen Mills	"
S/109	Subhash Dyeing	"
S/110	Arihant Fabrics	October 1985
S/111	Director of Revenue Intelligence	"
S/112	Veekay Woollen Mills	November 1985
QC/298	T.I.T. Bhiwani	"
S/113	Grewal Spinning Mills	December 1985
S/114	Shree Durga Spinning Mills	"
QC/299	Jain Mufflers	"
QC/300	Veekay Woollen Mills	"
QC/301	Youngman Woollens	January 1986
QC/302	Lotus Hosiery Factory	"
QC/303	Entirely Hosiery Factory	February 1986
QC/304	Arihant Fabrics	"
QC/305	Ess Ess Woollen Mills	March 1986
QC/306	R.K.Dhir Hosiery Factory	"
S/115	Arihant Fabrics	"
S/116	B.S.Kohli Synthetics	"
S/117	Neomar Ltd.	April 1986
S/118	Teeknit International	"
S/119	Indian Oil	"
QC/307	Bhilwara Processors	"
QC/308	Neomer Ltd.	"

STUDY TOURS AND FELLOWSHIPS

Study Tours

Mr. J.N.Vohra - Technical Coordinator/Works Manager

Duration - 14 Mar. - 12 Apr. 1984

Organisations Visited -

Switzerland	:	Schoeller Dubied
W.Germany	:	Saurer Allma Zinser Fleissner Various Spinning & Dyeing Mills
France	:	Schlumberger Review of Retail Outlets
United Kingdom	:	I.W.S. Courtaulds Shirley Institute Various Mills and Retail Outlets
Holland	:	I.W.S Delft

Mr. P.T.Banerji - Manager Technical Service and Quality Control

Duration - 22 Nov. - 13 Dec. 1984

Organisations Visited -

United Kingdom :
I.W.S
Shirley Institute
Courtaulds
L.C.I. Fibres

Switzerland :
Siegfried Peyer SA
Institute for Textile Technik

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Mr. A.S.Grover - Managing Director

Mr. M.Singh - Knitting Manager

Mr. A.P.Sinha - Executive Export Development

Duration - 7 Apr. - 25 Apr. 1986

**Organisations Visited - Various stores and buying organisations
in Dusseldorf and Hamburg.**

W.Germany :

Holland :
Importing and Import Promotion
Organisations and knitwear buyers.

United Kingdom :
Retail outlets in London and Multiple
store buyers in London & provinces.
Winchester College of Art.

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Fellowships

Mr. D.V.Bist - Spinning Master (Technical)

Duration - 18 Oct - 18 Nov 1983

Organisations Visited -

United Kingdom : Wool Industries Research Association
Switzerland : Textest
W.Germany : Zinser Textilmaschinen GmbH
Saurer Allma GmbH
W.Schafhorst & Co.

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Mr. K.P.Janakiraman - Processing Manager

Duration - 21 Nov - 18 Dec 1984

Organisations Visited -

United Kingdom : I.W.S
Courtaulds
Corah
I.C.S
HATRA
Meridian Knitwear
Shirley Institute
W.Germany : Kurt Ehemann
Frana Muller
BOWE
Switzerland : Scholler

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Mr. J.S.Saini - Asstt. Dyeing Master

Duration - 31 Oct - 29 Nov 1985

Organisations Visited -

**Australia : Various Mills in Geelong area.
CSIRO Text Industry Div.
School of Text Tech Univ. N.S.W.**

**New Zealand : Various Mills in Levin area
Bayer - New Zealand**

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Mr. Hirmat Singh, Knitting Supervisor

Duration - 8 Oct - 24 Nov 1985

Organisations Visited -

Switzerland : Dubied

**United Kingdom : Bentley Engineering
William Cotton**

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Mr. S.S.Pathania - Sample Room Supervisor

Duration - 18 Jan - 8 July 1986

**Organisations Visited - Winchester College of Arts
Various Retail Outlets
Southampton Institute of Higher Education
Exhibitions and Fashion Shows**

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Mr. Babu Ram - Designer
Mr. Amrik Singh - Designer

Duration - Aug 1983 - (9 months)

Organisations Visited -

United States : Fashion Institute of Textiles - New York.