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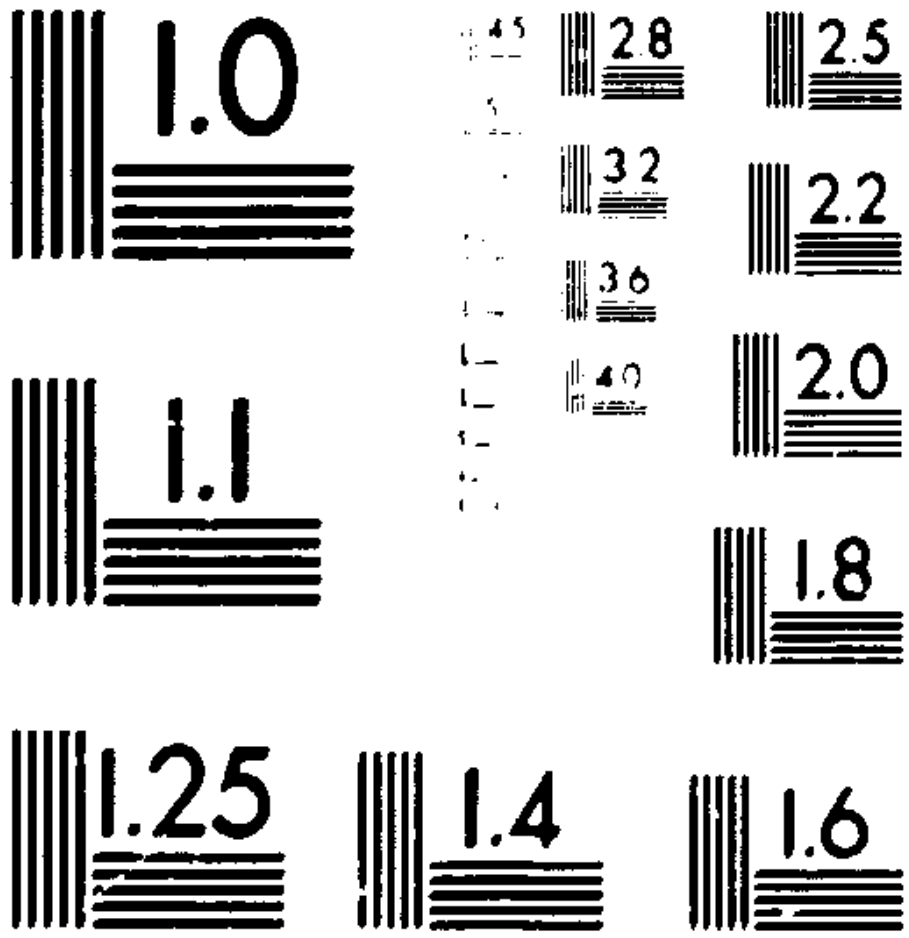

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India.

# DEVELOPMENT OF HOSIERY AND KNITWEAR INDUSTRY, LUDHIANA, PUNJAB (PHASE II)

DP/IND/82/006

INDIA

Technical Report: Chief Technical Adviser's Technical Evaluations of Project Status (3rd Mission)*

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

Based on the work of Stuart Brook,
Chief Technical Adviser

United Nations Industrial Development Organization
Vienna

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## 1. INTRODUCTION

This Report covers the 3rd mission of the C.T.A. The mission was of 2 months duration from January 1985 to March 1985. Originally it had been intended to commence in October 1984 but due to political problems the date was delayed.

Specific items mentioned during briefing were:

i) To clarify the situation regarding power supplies for the Japanese High-Tech. knitting Machine;

ii) Project Document Outputs have been re-drafted and these were to be cleared by the Project authorities or modified if it was necessary;

iii) A Project Evaluation was needed during February based on the Revised Outputs mentioned in (ii) above.

The Dyeing/Finishing Expert Mr. G. Meier had to leave the Project due to ill health.

The two Designers on Study Tour/Fellowship in the U.S.A. for the past year, seem to have disappeared, and so alternative arrangements may have to be made as indicated within this Report.

The Design Expert Mrs. Kirpal Marwaha Housley carried out the first part of the Design commitment, and generated a great deal of interest among some of the medium/small manufacturers. These smaller firms have formed a Knitwear Club an idea which arose at the suggestion of UNIDO's SIDFA Dr. Hussein. It has turned out to be one of the best avenues so far for linking the Project to the industry. The Club was officially inaugurated on 29 January 1985 and the membership promises to be a lively group indeed.

The Project is suffering badly from a variety of causes. Without doubt the most serious in the short term is the lack of progress in erecting and commissioning the equipment in the spinning and Preparation Dept. This delay has given the opportunity to a large local company to erect its own plant and pre-empt the Facility in supplying the market with good quality yarns.

Longer term problems are the lack of regular electric power supply, which is such a common feature it is almost a way of life, and the lack of adequate transport. Because the Project is some 15 km. from that part of the city, where most of the smaller firms are situated, it is being felt that contact is being lost between them and the Facility to the detriment of both.

Labour relations are not of the best at present, and currently there is a dispute between the management and staff at the Facility.

Although the Technical Service Dept. is not prominent in the Outputs under Phase II, it is steadily developing and extending its activities, but it was thought appropriate to make a separate comment on it in this Report. An interesting feature worthy of mention, is its venture into consultancy of a more managerial than technical nature. This looks like being a fertile area for it to develop into further, and thus the total activities of the Project can become more diverse and of greater lasting benefit.

At the end of this mission the SIDFA accompanied by the Resident Representative paid a visit to the Project.

## 2. REVISED OUTPUTS

Major steps to improve the clarity of the Prodoc. have been taken by the Backstopping Officer. The main changes were associated with the Outputs section. Based on his re-draft each Output was carefully scrutinized and discussed with the Project staff, and with the exception of Output 11 - Marketing, there were few modifications needed. The minor changes, with the exception of the Marketing Output, which was omitted, were included in the Re-drafted Outputs document dated 15 February 1985 which is attached here in Appendix II. It is anticipated that a final consensus of this Re-draft will be taken in Vienna at a joint meeting between Backstopping staff, N.P.D. and C.T.A.

Also at the same meeting, the topic of Marketing will be discussed so that this section may be included in the Re-draft thus completing this document.

## 3. STATUS OF INPUTS

### Government

Buildings - Mostly provided or in process of completion. Those under construction are according to Revised Work Plan and on schedule.

Staff - Majority provided. The following will be appointed as and when their respective equipment is ready:

i) Asst. Finishing Master - No. 6 on Prodoc.

ii) Deputy Spinning Master - No. 11 on Prodoc.

Circular Knitting Officer - (No. 14 on Prodoc. was appointed but has since left).

UNDP/UNIDO

Machinery - With exception of a few small items all the machinery has been provided. One Knitting machine has not yet been shipped, and the Shrink-resist equipment has not yet arrived on site but has arrived in India.

The following equipment needs commissioning:

i) NSC Preparatory Equipment (Spinning)

ii) Zinser Spinning Equipment

iii) Dubied SDR-2 Knitting Machine

iv) K. Ehemann Mini Stenter

v) Saurer Allma Fancy Twister.

Experts - The following Experts still have to be provided, for the man months indicated below before the end of the Project (Index numbers from Prodoc. Page 23):

| | | |
|---|---|---|
| b) i) | Worsted Spinning | 6.0 m/m |
| iv) | Designer | 4.0 m/m |
| v) | Marketing | 5.0 m/m |
| vi) | Training | 1.5 m/m |
| vii) | Wet Processing | 3.5 m/m |
| viii) | Colour Matching | 2.0 m/m |

(Extra to Prodoc.) - Garment Technologist 2.1 m/m

Fellowships/ Study Tours - Three national staff to undertake Study Tours this year. For details see Section 4.9 on Status of Outputs.

## 4. STATUS OF OUTPUTS

Based on the Revised Outputs (Appendix II) the current status of all the Outputs, with the exception of Output 11 - Marketing, is well covered in the P.E.R. which was carried out during this mission. For details the reader is referred to this document.

Where it was thought necessary to add further commentary on any Output for clarification or amplification this has been done in the following sub-sections:

4.1 Spinning

Since the end of my last mission in June 1984, there has been virtually no progress in the erection of machinery in this department. This is nothing short of tragic, because it is holding up the development of the whole Project and at the same time creating a terrible impression within the industry. Continuously, the Facility staff are being asked when the promised high-quality yarn is going to be available and excuses are starting to look hollow.

The reason for the delay is in the main due to administrative problems in the aftermath of the political unrest in the Punjab. Entry permits take a long time to organize and because of other work, fitters from the machinery suppliers cannot always be available at convenient time to coincide with each other. Every effort must be made by all parties to remedy this situation speedily.

Erection of the non-critical machinery such as Fancy-Twister and Repco is in hand already, or soon to be started.

The air conditioning system is partially installed and now most of the overhead work on ducting is finished. Compressors and other items of plant are awaited.

In spite of efforts to keep the equipment clean, dust and other dirt is lying on the partly erected machinery, and this could mean that before re-starting the erection work, some parts may need to be dismantled, cleaned and then replaced.

Additionally before erection all parts had to be cleaned of corrosion-proof coating which is applied at the works before shipment. Once this is removed any bright metal parts are liable to corrode unless they are kept lubricated during normal use. Of course, this has not been possible since June 1984, so there may be other corrosion problems to add to the problems of dust.

This is without doubt the most critical area of the Project at this time.

4.2 Knitting

The Dubied SDR-2 machine has arrived and is in site but sustained some superficial damage in transit. This is now awaiting an Erector.

During the Design Expert's mission, this Department was very involved with sampling, and produced some original stitch and knit effects. The limitation as always is the lack of variety of texture and colour of the yarns which are available to work with.
Unfortunately the Circular Knitting Technologist has left the Company and unless he decides to return soon, should be replaced.

Both the Knitting Master and Assistant Knitting Master are due for Study Tours which were arranged during this mission. Capabilities in this Department are well up to standard and many visitors came for advice and to see the new samples being produced during this 3rd mission.

The power supply for the High-tech knitting machine (Shima) was discussed at length with N.P.D. and Chief Engineer. No satisfactory conclusion could be reached, due to lack of information, but it is hoped that this information will be available in time for the joint meeting in Vienna scheduled for 7 March, when a final decision will be taken.

4.3 Making-up

Because we have been unsuccessful in finding a suitable Expert to date, the work in this Department is dragging behind schedule. The Design Expert was able to test the capabilities of the present staff and found them very acceptable. My own opinion is that given a little coaching by the right Expert they will gain the confidence and polish which we expect from this section.

Some machinery is still to be provided, and the linking machine which arrived recently came with a Handbook in German so could not be used right away. This ommission has now been rectified. Additionally action has been taken on the rectification to the Durkopp Button-Hole machine, which was delivered under Phase-I but never worked.

4.4 Dye House

Activity at this time of the year is low due to the seasonality of the trade. The Expert on Dyeing and Finishing Mr. Meier arrived on station on 15 January but unfortunately became ill and was advised to leave on medical grounds on 20 January. During his short stay, however, he was able to visit a few firms and give some advice and spent the majority of his available time with the counterpart.

The Shrink-resist Plant, the responsibility for which falls to this Department, has not yet arrived on site (25 February) but the building will be completed on schedule. The shipment has arrived in Bombay so assuming the usual clearance and delivery times we can expect to begin erection in May. By this time power, water and steam will all be provided but there appears to be insufficient information to allow for an unevenful commissioning. This situation it is hoped to rectify during the visit of N.P.D. and C.T.A. to Europe, and this topic is covered in a letter from C.T.A. dated 25.2.85. Erectors are still awaited for the Ehemann Mini-Stenter which has been on site since June 1983.

Also faults with the Dyetex machine (Phase-I) have been analysed and action will be taken by N.P.D. to get a technician to this machine which has not run since end 1979.

The Assistance Dye Master is due for a Study Tour which it is hoped can be arranged by the Dye/Finish Expert, and this will take place in New Zealand with a possibility of a few days in Australia at CSIRO in transit. This visit to Australia we may not be able to fix in time, because it is essential for the candidate to be back on station in time for the start of the season end April.

The I.C.S. Colour Matching Computer is now functioning but there is a permanent problem due to erratic power supplies. Even the stabilizers which were built into the unit at the request of N.P.D. cannot cope with a complete power cut without warning, and this happens each day. There is a strong case for an independent and continuous power supply for this equipment, and indeed for any other which uses a computer which has a volatile working memory.

The room in which the computer is housed is not in the best location. On one site the air conditioners are drawing air from the Finishing room, which could become filled with steam when the stenter and pressing equipment is in operation. On the other side the room leads into the dyehouse area, which is also usually humid. This causes problems with maintenance of constant conditions, and computers are prone to high humidity. Re-location of this equipment should be given serious consideration.

The data bank for all dyestuff types used at the Facility for dyeing wool has now been completed. The service is on offer to the industry but as yet uptake by them is slow. As more industrialists call for the service it is the intention to build up the data bank as required for other substrates.

4.5 Maintenance

In the Report on CTA's 2nd Mission an outline scheme for machinery maintenance was prepared for introduction at the Project by the Chief Engineer.

This system has been adopted with minor modifications and is being introduced. A clerk has been appointed to help set up and subsequently run the system under the Chief Engineer's supervision. Progress has been slower than expected due in part to the political unrest which threw extra work on to the staff, and the fact that the Chief Engineer was in hospital for a period. It is anticipated that the scheme will be progressively introduced in the next few months throughout all the machinery at the Project.

Because the Spinning equipment needs more regular and more specialised attention, it has been decided to appoint an Engineer responsible to the Spinning Master who will be concerned with the maintenance of all Drawing, Spinning and Twisting machinery. Where common service or plant facilities exist (i.e. compressors, power lines, air conditioning) then these should still remain the responsibility of the Chief Engineer's department. The line of demarkation between the responsibilities needs to be carefully spelt out so that there is no overlapping or mismatch of the respective duties. The Technical Co-ordinator will need to ensure that both parties know where their areas of responsibility lie.

The maintenance system used by the Spinning Maintenance Supervisor will follow the same lines as that used throughout the rest of the Project, with modifications if required.

The Revised Outputs which applies to Maintenance calls for a spare-parts management and recording system. This I understand is being carried out by a local consultant appointed by the Co-operation in conjunction with other work which he has undertaken.

To date no Report is available on this aspect.

4.6 Training

In the Report following the CTA's 2nd Mission, mention was made of the Advanced Training Institute as a source of assistance which was available locally in Ludhiana. This organisation was due to provide training for the staff during late 1984, but due to the political problems this was delayed. Since that time several approaches have been made to the Institute but up to the present time no firm date has been fixed for them to carry out this work. Another approach is now being made.

It was the intention that during this mission the CTA would assess the impact of the Institutes work at the Facility and then decide with the Project staff if a further Training Expert, or another visit from the previous Expert, would be necessary. It has been decided that the remaining time allocated under Training (11.0) should be used, and CTA and NPD will discuss this topic during their visit to UNIDO Vienna. A candidate for this post submitted by Vienna was considered but found unsuitable.

4.7 Information

The Department is producing the outputs as per usual but there has been little progress towards forming an enquiry service, and work on up-dating the library has not passed beyond the embryo stage.

In view of this slow progress and bearing in mind the present Information Officer's background, which is not textiles, it is recommended that a junior be appointed who has had a general training in textiles. This person would need a short training in librarianship or library management, which training is available locally. He or she would then be required to comply with the needs of the Project and provide the Outputs designated in the Revised Outputs document.

4.8 Marketing

This topic was discussed at length during the mission. The I.T.C. proposal, which includes a lengthy study of the woollen knitwear industry, was only available in outline and thus could not be given full consideration. For this reason and others outlined below, the acceptance by the Project staff of the Revised Output No. 11 - Marketing as drafted by the Backstopping Officer was reserved for the time being. It was decided to use the visit of NPD to UNIDO Vienna at the same time as the CTA's de-briefing to discuss this topic and finalize this Output.

The main points of contention are as follows:

i) The ITC proposal is still some way from implementation and even further from fruition. The industry has now been brought to a state of readiness to begin to penetrate hard currency markets, and further delay will lead once again to their disillusionment.

ii) The proposal will be directed towards woollen knitwear, whereas the Project is not wholly concerned with this fibre, and should be seen by the beneficiaries that it has a multifibre outlook.

iii) WWEPC has been chosen as the counterpart agency, and as stated several times in other documents this council is limited by its constitution to promotional activities, and does not have the staff or experience to provide the services urgently required by the industry and in a timely fashion.

There is no doubt that after its successful completion, the study proposed by ITC will provide much useful information and systems, which will be invaluable to that section of the industry to which it applies. Because its scope is extensive it will obviously take some time to generate results and thus it may not be of use to the beneficiaries when they most need it. It is hoped to arrive at a satisfactory solution in Vienna by picking out the more salient features from this study and the work which the Project proposed to do, and which was agreed in principle at the TPR. This will avoid duplication without diluting the impact which the Knitwear Facility is now having.

Since the Revised Marketing Output was not accepted, it has not been included in the P.E.R. carried out during this mission. It can easily be included once it has been refined and a consensus reached.

4.9 Study Tours

During this mission the following Study Tours were finalized:

i) Asst. Dyeing Master

ii) Knitting Master

iii) Asst. Knitting Master

i) The Dyeing/Finishing Expert, Mr. Meier suggested that the Assistant Dyeing Master would be able to gain experience on all the types of machinery and techniques which are relevant at the Project, by a visit to New Zealand. Mr. Meier also offered to arrange suitable visits and training via his contacts in New Zeland, sufficient for a tour of about four weeks. In addition to this it was suggested that since the candidate would be passing by Australia, it might be useful for him to visit C.S.I.R.O. or some similar establishment in that country at marginal extra cost. The Technical Co-ordinator at the project is presently trying to arrange for these extra visits.

The present status is that news is awaited from Mr. Meier and from Australia. When positive reaction is forthcoming the Technical Co-ordinator will finalize the details and inform Vienna. During de-briefing in Vienna CTA will up-date the Training Section there on the status of this and the other Study Tours.

ii) The Knitting Master is due to visit machinery makers in U.K. and also the IWS Workshop in Holland. Since his assistant will also be on a Study Tour this year it was decided to defer the Knitting Master's visit until towards the end of the Project so that he would benefit from any new developments, currently underway in Europe.

CTA will arrange visits as and when required. Since this Tour is some time away the details have not yet been fully finalized.

iii) Asst. Knitting Master is also due to visit machinery makers in U.K. and for the reasons given in (ii) above it was decided to time this Tour for the early part of this year.

CTA will finalize details on his return to U.K. and inform Vienna and the Project of the proposed itinerary. Already one manufacturer (Dubied) has suggested that the candidate should visit their Training School in Switzerland, so this also might be included if it is found appropriate.

Because the Project appears to have lost its two Designers, it will be necessary to make good this deficiency most probably by sending a member of the Knitting Workshop and another person, yet to be recruited, on a truncated Study Tour/Fellowhsip.

The N.P.D. during his forthcoming European visit will initiate action to this end.

## 5. EXPERTS

During this mission there were two Experts on station; the Design Expert Mrs. Kirpal Marwaha Housley and Mr. Gotthard Meier the Wet Processing Expert.

Mrs. Housley arrived on 17 December 1984 and departed 8 February 1985. During this time she prepared samples with the help of the Knitting and Make-up Departments. Her report covers the activities in detail but it would be unfair not to comment on the enthusiasm of the response, mainly from the medium scale manufacturing units. Through a series of meetings with individual industrialists, both at their own factories and the Facility, and through an open meeting with members of the recently formed Knitwear Club, her styling and fabrics gained wide exposure.

Many of the manufacturers were surprised to realise that the softer fabrics to which she introduced them were the qualities sought after in the Export Markets. Previous designers who had visited Ludhiana had concerned themselves with the larger companies here who are aiming at a low-priced area within the target markets, so Mrs. Housley's designs had a more fashionable appearance.

Mrs. Housley's opinion of the market area which these manufacturers in Ludhiana should aim at, coincides with the views expressed by CTA in the various documents on Marketing. The impact on the industrialists of only a few weeks of her work, demonstrate the potential which we all feel exists.

In spite of using local yarns which are not of the best quality, and only available in limited and either subdued or very bright extremes of shade, the results were very acceptable and saleable. CTA pointed out to the Club members that all the garments were produced in local yarn by local people on locally-made machinery, and this telling factor went home to those present with the result that several manufacturers commented that they now had more confidence that they would be able to export successfully.

Both NPD and CTA each had had private doubts about introducing a woman, and an Indian woman, into the local industry but their doubts it seems were unfounded. Because Mrs. Housley speaks Punjabi, in fact turned out to be a big advantage.

Unfortunately, Mr. Meier's mission was not so satisfactory because he became ill shortly after arriving and on medical advice had to resign and return home. Whilst he was on station however, he was able to provide useful advice to his counterpart and make one or two visits, details of which he will include in his own report.

Although the Project is due to end in December 1985, there is a strong case for a further extension if only to make up for the time lost due to the political problems in the Punjab last year.

According to the latest Budget revision, almost 60% of the total man-months of Experts input has to be provided in 1985, compared with 21% for each of the previous two years. A complete breakdown is shown in Appendix VI. It is appropriate therefore, to recommend that this unbalance is given serious consideration, and steps taken to improve the uneven spread of Expert's time.

## 6. PROJECT EVALUATION

A P.E.R. due to be completed in February 1985. This was undertaken in conjunction with the appropriate managers or section heads. Following the drafting of status for each output the Technical Co-ordinator was consulted so that he could have an overview of the comments made.

The Report was based on the Revised Outputs mentioned above, even through at that time they had not been finally agreed. Also a Revised Work Plan for the Project was prepared on the basis that the project will end in December 1985, as agreed at the last T.P.R., and this is included at Appendix III.

Because the Marketing Output was still due for discussion with N.P.D. and backstopping staff in Vienna as noted above, this was omitted completely from the P.E.R. Otherwise the P.E.R. represents a critical assessment of progress in the opinion of all those who took part.

The P.E.R. was completed by 18 February 1985.

## 7. TECHNICAL ASSISTANCE

This section is maintaining its penetration into both the local industry and now further afield. As the capabilities of the Facility become wider known, the users are realizing that its outputs, whilst specifically set up to assist the Knitwear Industry based in Ludhiana, can be applied to other areas both within the textile industry and outside.

In fact there is ample justification to change the name of the organization, because to an outsider it can appear too restrictive in outlook, when in fact this is not the case.

For example during the last year or so 26 units outside Ludhiana city have been in contact with the Facility for help. A complete list of the type of assistance provided is given in Appendix V.

Comparing the character of this Facility with other national institutes, it is obviously different. Other national institutes have been set up with a bias towards more fundamental research and are usually headed by scientists, some of very high repute.

Also the demand on these other institutes and their financing is different. The industries which they serve are in general composed of larger, professionally run units, which is in contrast to the local industry in the Ludhiana area, where 95% of the units are run by the owner and his family. Between small knitwear units and larger scale, more capitally intensive organizations, the needs are different. So, since it was primarily set up to help the local industry it is not surprising that the Facility has a different character. It can and already is capitalising on this difference.

During this mission the CTA in conjunction with the Technical Service Manager visited a company, which, after analysis, was found to have two major problems. One a technical problem with which the Facility is familiar and has dealt with for other firms before, and a second which was a problem in Industrial Engineering. Because the unit is not very sophisticated, the problem, once identified and outlined, could easily be tackled by the Technical Assistance Manager and his staff. This problem in fact was caused by too high work-in-progress stock due to an inadequate system of production planning and control.

Because the Owner/Manager can easily quantify, in money terms, the benefits which accrue from introducing systems such as the one proposed, it will encourage him to use the Facility's services more often.

By this route, contact will be made with many other firms, and the Facility's services will reach a wider audience. Firms which become introduced to the Facility by way of this aspect of the services offered, and who may not realise that they suffer from technical problems as well, can then be persuaded to allow the Facility to solve the technical as well as the managerial problems. So this will further increase the revenue input to the Project.

There seems to be a lot of scope for developing the Technical Service aspect via managerial consultancy like the project mentioned above, and this need not be confined to the Ludhiana area. In fact it need not apply only to the textile industry, and with a history of demonstrably successful assignments in its portfolio, the Facility could easily spread its activities locally, nationally or even internationally depending upon the demand and the abilities of its staff.

Already one financial institution (I.D.B.I.) has recommended that the Facility act as consultants to a new venture which was seeking financing.

Appendix V includes a list of projects which have already been carried out on a fee-paying basis.

## 8. CONCLUSIONS

Without doubt the Project is maturing. The number of visitors has risen on average from approx. 1 1/2 per day a year ago and is now running at an average of 6 per day. There is also a knock-on effect which is hard to quantify, but arises when one industrialist taking advice from the Facility engages several sub-contractors to do work for him. Any techniques he acquires are then transferred to the smaller units. So the statistics which might only reflect the parent firm are slightly misleading, and the Facility's impact in reality is bigger than we think.

The impact which the Project is having on the industry has been demonstrated more forcibly this mission and this is in no small measure due to the activities of the Knitwear Club. This has been one of the most encouraging features of recent months.

On the debit side the problems with supplying erectors and the perennial problems of power and transport still hamper the effective running of the unit.

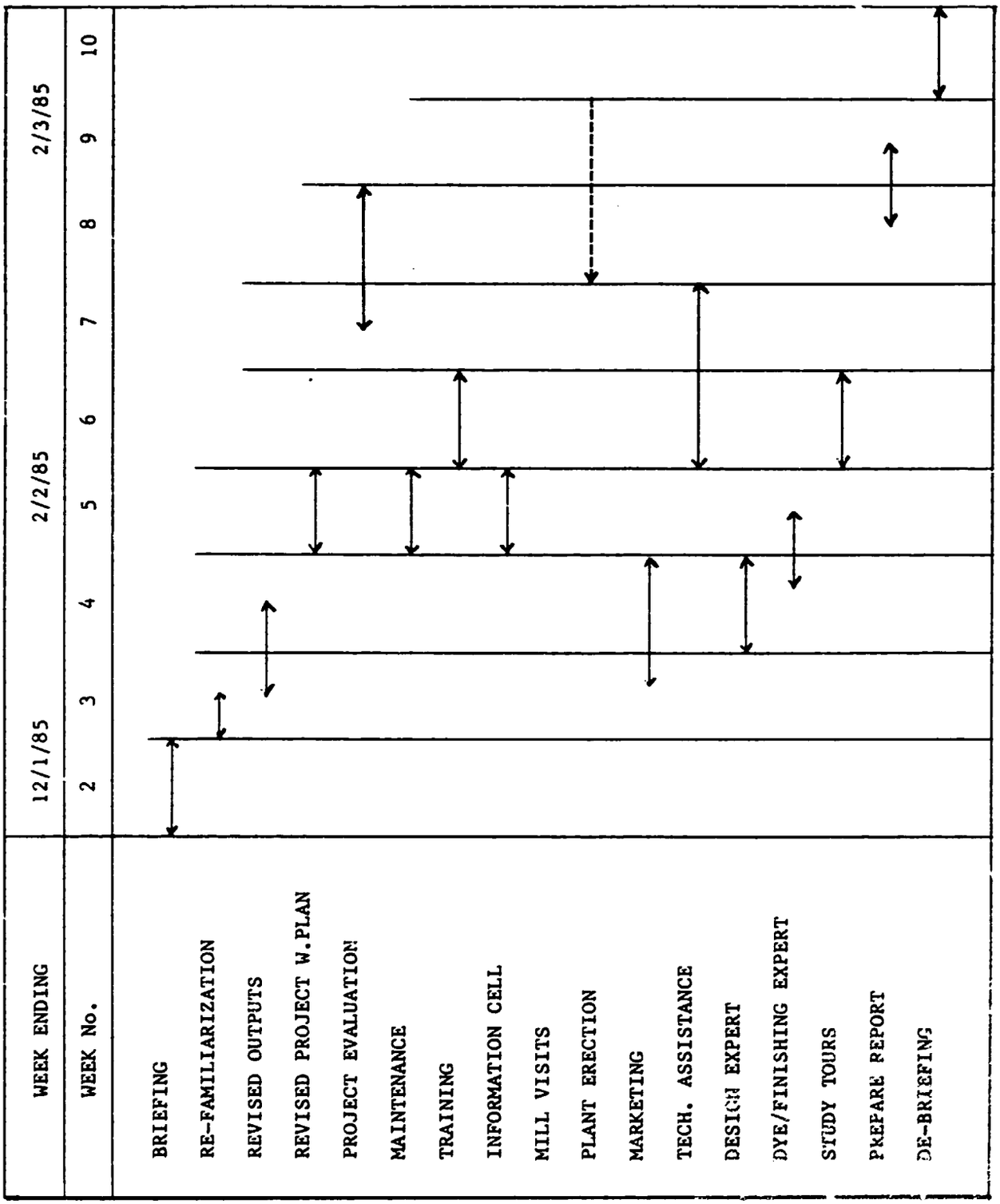
During the mission all machinery installed in both Phase I and II has been examined and action taken to tidy up a lot of loose ends which previously could not be dealt with because of lack of time.

Once all the outputs are up and running, the Facility should engage in more Public Relations work to help dispel once and for all the suspicious which at one time prevailed. These were obviously in the minds of many industrialists who were ready to accuse the Facility as a competitor. Happily this situation is rapidly becoming a thing of the past.

With these bridges almost crossed it would be appropriate now to consider in detail what Post Project activities are expected, and plan so as to give these a good change of succeeding. These activities have been voiced in several documents, but I would stress that they need now to be more clearly defined. This would allow ample time for those concerned to ensure that there is a smooth run down of U.N. involvement with a correspondingly smooth uptake by the Project staff.

## Appendix I

## CTA Work Plan - 3rd Mission



Appendix II

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## RE-DRAFT OF REVISED OUTPUTS

## DP/IND/82/006 - Developmentof Hosiery and Knitwear Industry, Phase II

### Outputs

In accordance with the objectives the project will establish an operational centre supporting the Punjab Knitwear Industry in upgrading its products upto a level acceptable to target markets in the hard currency countries 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 & Knitwear Dev.Corpn.Ltd.which latter acts as the National Project Director.

1.1 Spinning Plant

A completely installed spinning plant for the manufacturing of worsted yarn (in particular wool and acrylics) complete with preparatory equipments and trained local staff and operators according to the following schedule for mill working conditions.

2 Managers
3 Maintenance
1 Clerical
30 Operators/Shift

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;

b) providing the knitting industry with a wide range of yarn types and counts (wool Nm 12-60), (acrylics 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 areas;

c) providing consultancy service to industry through 4(four) trained local technicians; 1(one) in blending and roving, 1(one) in spinning technology; 1(one) in preventive maintenance of spinning frames;

d) conducting seminars for the staff of the local industry on the experiences gained in the spinning plant.

1.2 1 (one) senior local staff of the spinning plant trained abroad. (for detailed sub-outputs refer to paragraph on "Training" item iii of Prodoc.)

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

2.1 YARN PREPARATION UNIT

A yarn preparation unit for twisting, cone-winding, dye-cheese winding, yarn clearing (Inputs Phase I), fancy-yarn twisting (ref.item 4 of Input list annex IIIA) capable of providing the following to the spinning, knitting and dyeing industry:

a) demonstration and common facility services;
b) in-plant training to industry personnel;
c) consultancy service to industry.

2.2 2(two) trained technicians in the fore-mentioned techniques with acquired practical experience of consultancy services gained during the lifetime of the Project in at least 10(ten) local manufacturing units and in processing of at least 1,000 Kg.of yarn on each of the different types of machinery installed in the Centre.

## 3.1 Dyehouse

A Dyehouse for dyeing of worsted spun knitting yarn and yarn manufactured from other fibres such as cotton, cotton blends, acrylics, polyamides etc. 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.

Specific sub-outputs of this phase are :

i) a data-bank for dye recipes;

ii) 2(two) trained rechnicians capable of :
   a) continuously updating the data-bank,
   b) advising the dye-house personnel in the industry on techniques required to put to practical use recipe predictions made via the computer system.

The Dye-house will also include an installation for shrink-resist treatment for wool tops in accordance with the processing technology required to meet I.W.S. Superwash standards. (Item 1-3 of UNDP/UNIDO inputs as listed in Annex II of Project Document).

Sub-Outputs for this section will comprise : -

- a manual on processing technology for shrink resist treated wool tops up to Superwash standard, and related dyeing techniques;

- 2(two)local technicians trained by international staff in these techniques and capable of providing consultancy services on dyeing of shrink-resist treated wool and wool tops up to Superwash standard.

- 2 (two) staff trained abroad.
  (in accordance with Training, Items i and ii)

4.1 Knitting Workshop, installed with machinery Input of Phase I and completed with machinery items 1-7 Annex IIIA, for training of national staff and for developing knitting samples in co-ordination with the Design Centre.

4.2 4(four) 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(two) fellowships abroad according to Training v.

The staff will be capable of

a) sampling on the machinery installed;
b) providing technical consultancy service to industry;
c) training industry staff in the use of the machines at the rate of 12 per year upon request from the industry.

5.1 Design Centre

An established design centre with 2 (two) overseas trained staff (Training vi) in designing of knits and styling of knitted garments capable of:

- making sample collections on machinery installed in the knitting workshop as a service to the export-oriented industry to the level suitable for industrial exportable products;
- advising industry on garment construction and syling;
- conducting training courses at the Centre in their field of experience and training for industry staff (10 personnel per year).

6.1 Unit for making up of knitwear

A small unit will be established for training of local staff and to give an advisory service to industry on making up of knitwear. 2(two) staff trained by international experts in making up of knitwear, 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;

b) advisory service in their fields to the local industry (10 mills).

7.1 Quality Control and testing laboratory

The addition to the capabilities acquired on working with laboratory equipment installed in Phase I, during the second phase, the laboratory will comply with the following specific sub-outputs: outputs :

a) 1(one) staff member trained through a fellowship arrangement in the above mentioned technology in accordance with Training iv of Prodoc:

b) 2(two) trained staff capable :

i) Providing consultancy services on establishing testing and quality control laboratories at industrial units (upon request from the industry):

ii) implementing tests for common facility production carried out by the various units of the Facility, and establishing records of tests in the following areas :

- Quality performance of the processing line for producing Superwash tops.
- Quality performance of the spinning units for wool yarns including Woolmark standard.
- Quality performance of the spinning units for synthetic fibre yarns;

iii) establishing a system for control and recording of knitting parameters, complying with the objective of reproducing knitwear of dimensional stability;

iv) carrying out tests on seaming.

c) - Standards for in-house processes including spinning, winding, colour matching, dyeing, knitting and making-up of garments.

8.1 Maintenance Unit

The establishment of a maintenance unit equipped with tools and equipment provided by GOI and with manuals acquired from machine manufacturers and with specialized manuals on preventive maintenance prepared by international experts. The unit will be composed of 3(three) trained staff (in-plant training by international experts) for :

a) implementation and maintaining a model preventive maintenance scheme at the Facility.

b) introducing this scheme for new machinery installed in the industry upon request from the industrialists.

c) establishing a spare part management system, including a stock level recording and ordering system.

9.1 TRAINING UNIT

The establishment of a Training Unit, comprising 1 Training Coordinator in conjunction with all the Heads of the Technical Departments, which will be capable of assessing specific areas of training requirements within the industry or within individual firms.

This staff will be trained by international experts and will be expected to carry out the following activities during the lifetime of the Project;

a) designing and organising at least 2 training course on each of the 12 technological fields of the Project;

b) 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;

c) training technical staff of the Centre in lecturing;

d) selecting the most appropriate technical skills, both from the Centre and from outside sources, for conducting the courses.

After the termination of the project, the unit will be capable of continuing these a ctivities at the same level.

10.1 Information Cell

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 a national staff member with textile background and library experience capable of:

a) establishing an enquiry service for the industry;
b) establishing an organised library system;
c) identifying the needs for keeping the library up-to-date.

11.1 Marketing

The establishment of an export marketing and promotional organization, serving the small and medium scale knitwear manufacturers in their efforts to effectively penetrate into two or three selected overseas target markets.

12.1 Joint Studies

At least 3 (three) joint studies (one every year of the Project) concerned with technical problems and in co-operation with, inter-action with, and exchange of information with, organizations working in related fields.

The National Project Director together with the Technical Co-ordinator of the Facility will

a) determine the nature of the studies, initiate the contacts with other organizations, and draft the terms of reference for the joint studies;

b) 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 organizations;

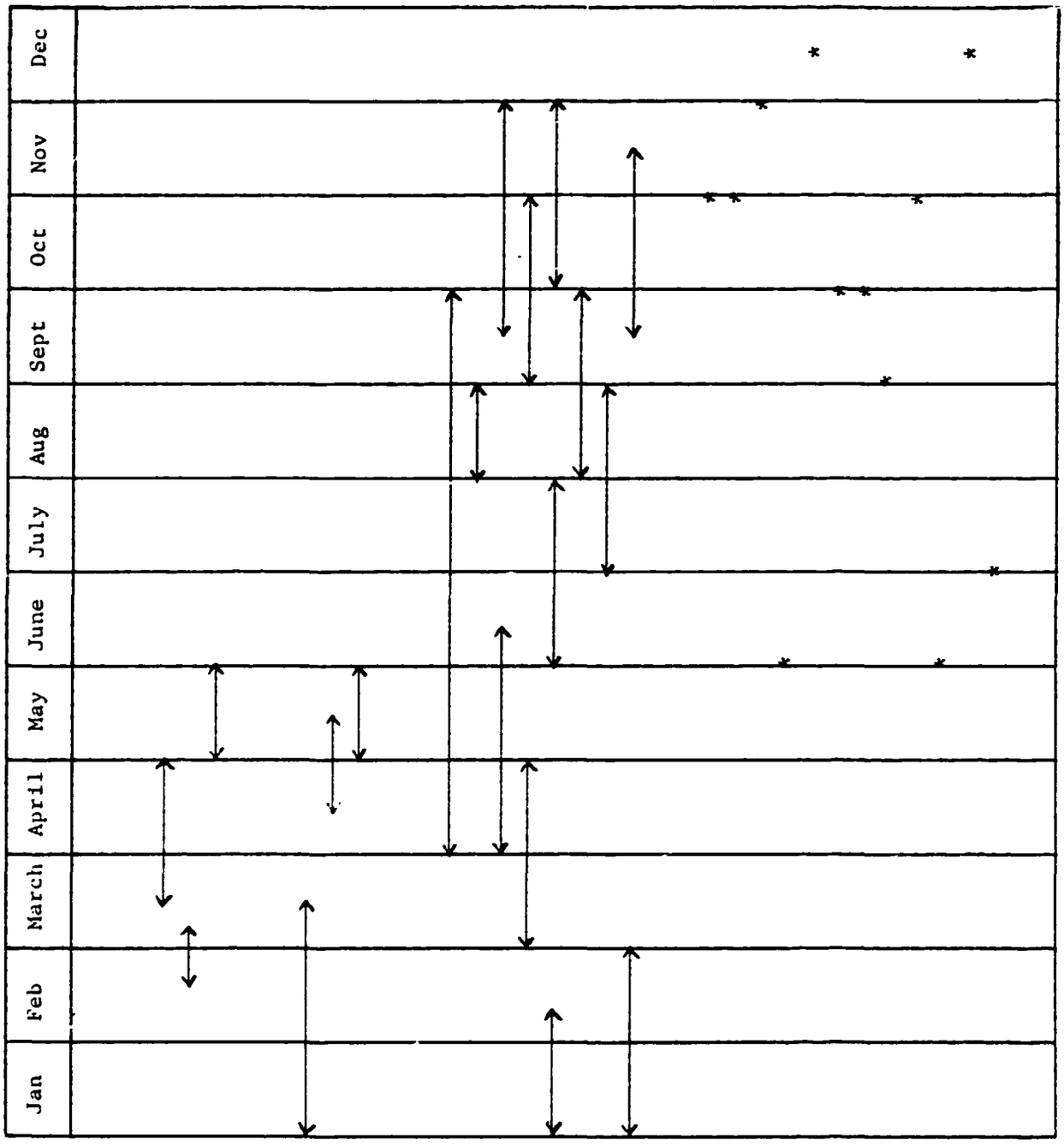
c) supervise the progress of the studies;

d) summarize the results of the studies and recommend further actions to be taken to the co-operating organizations and the Government.

After the termination of the project, the unit will be capable of continuing these activities at the same level.

## Appendix III

### Revised Project Work-Plan, February 1985




**Spinning:**

- Commission
- Repco
- Twisting

**Shrink-resist:**

- Civil work
- Erection
- Commission

**Experts:**

- Spinning
- Training
- Marketing
- Wet Processing
- Design
- Colour Matching
- Garment Technologist
- C.T.A.

**Output Completion:**

1. Spinning
2. Twisting
3. Wet Processing
4. Knitting
5. Design
6. Making-up
7. Quality Control
8. Maintenance
9. Training
10. Information
11. Marketing
12. Joint Studies

## Appendix IV

### Check list of Items Requiring Action

#### Technical Co-ordinator

1. Follow up on all action required by other Managers.
2. Fix details of Study Tour for Assistant Dyeing Master and process application documents.
3. Follow up action on Durkopp machine.
4. Follow up Cot Grinding machine replacement.
5. Ensure Quality Controls are set up for Spinning Department.
6. Replace or re-employ Circular Knitting Technician.
7. Obtain report on Spare Parts management system.
8. Ensure Maintenance System is applied in Spinning Department with clearly defined lines of demarkation between this Department and the Engineering Services Department.
9. Follow up A.T. Institute for Training Course.
10. Appoint Information specialist.
11. Arrange for anti-bird grills on windows.

#### Chief Engineer

1. Provide estimate of repairs to de-felting gill-box.
2. Level floor in Spinning and Preparation Department.
3. Check Air-conditioning plant is giving specified outputs.
4. Implement Maintenance System as agreed.
5. Coat floor in Spinning and Preparation rooms with anti-dust preparation.

#### Technical Assistance

1. Follow up and implement Management Information System for client.

#### Spinning Master

1. Introduce Spinning Maintenance System.

#### C.T.A.

1. Investigate Power Supply for Shima machine.
2. Fix Study Tours details for Assistant Knitting Master.

## Appendix V

### Linkages with the Industry of Punjab (other than Ludhiana)

After an exhaustive coverage of industrial and other units in Ludhiana City, in the last two years linkages have already been established with 16 outstation units within the state. Eleven of these units have themselves sought K.F.'s assistance, time and again. In the year 1984-85 it was proposed to cover 14 relatively large outstation units. However, due to the disturbed condition in the State, the Knitwear Facility (KF) staff could cover only six units. The distribution of the number of Knitting, Spinning and vertical units in the State of Punjab with whom linkages have been established is as follows:

| Station | Total no. of units |
|---|---|
| Amritsar | 9 |
| Dhariwal | 1 |
| Ropar | 1 |
| Barnala | 1 |
| Malerkotla (incl. Kup Kalan and Ahmedgarh) | 3 |
| Jallandhar | 2 |
| Kharar | 2 |
| Mangarh | 1 |
| Phagwara | 1 |
| Bhatinda | 1 |
| Total: | 26 |

Establishment of linkages with industry through providing of Technical Services

| Sl. No. | Type of Industry | In Ludhiana City | Within the State | Outside the state | Total |
|---|---|---|---|---|---|
| 1. | Knitwear Manufacturing Units | 141 | 5 | 6 | 149 |
| 2. | Spinners | 38 | 7 | 2 | 50 |
| 3. | Dyers | 16 | - | 1 | 17 |
| 4. | Vertical large size units | 4 | 6 | - | 10 |
| 5. | Machinery Manufacturers | 7 | - | 2 | 9 |
| 6. | Weaving Units | 23 | 2 | 4 | 29 |
| 7. | Woolcombing Units | 4 | 1 | 1 | 6 |
| 8. | Others (Hand-knitting yarn manufacturers, fibre yarn, fabric dealers, buyers and fibre manufacturers) | 20 | 3 | 13 | 36 |
| 9. | Educational Institutions | 2 | 2 | 3 | 7 |
| 10. | R + D Institutions | - | - | 5 | 5 |
| 11. | Government Organizations | 4 | - | 6 | 10 |
| | | 259 | 26 | 93 | 328 |

Note: List available at the Knitwear Facility (KF)

Type of Technical Assistance sought by the Visitors to the Knitwear Facility

1. Development of shoe lining fabric from imported sample after analysing of the samples.

2. Guidance for selection of laboratory equipment for a large scale vertical textile unit.

3. Testing the performance of solvent recovery unit developed indigeneously for an imported solvent finishing plant.

4. Request for in-house check for quality control and movement of material in a medium sized knitting works.

5. Carry out specialised tests for research projects for Masters degree in Textile Technology.

6. Advice on repair of steam press for knitwear.

7. For repair of testing equipment.

8. Advice on setting up of quality and process control systems, for upgradation of knitting and dyeing units.

9. Design development for knitwear.

10. Investigation and fault analysis of textile materials (fibre, yarn, fabric, etc.).

11. Training in dyeing, finishing, twisting, winding, knitting and quality control techniques.

12. Demonstration of dyeing, finishing, twisting, winding, knitting and testing methods and/or equipment.

13. Advice for selection of proper raw materials for spinning, dyeing, knitting and weaving.

14. Selection of specialised testing equipment.

15. Information on source of availability of new and used machinery for dyeing, spinning, knitting and testing etc.

16. Information on export markets.

17. For common facilities of winding, twisting, dyeing and knitting.

18. Testing and analysis of raw materials and finished products, such as fibres, dyes, chemicals, tops, yarn, knitted and woven fabrics, water, buttons leather cloth, foan and zips etc.

19. Advice on fibre blending for spinning of speciality yarn.

20. Dyeing of plastic zips, information on methods and technology.

Type of Consultancy sought by the Visitors to Knitwear Facility

1. Consultancy for setting-up of a dyeing plant, (fee paid basis).

2. Formulation of standards for acrylic worsted yarns, (fee paid basis).

3. Information on generation of process waste in manufacture of acrylic hand knitting yarn on worsted and woollen system of spinning, (fee paid basis).

4. Preparation of a project proforma for installation of a 72 spindles Wrap Spinning Plant, (fee paid basis).

5. Preparation of project profile for a viable worsted spinning unit, (fee paid basis).

6. Project proposal for setting-up of a Circular Knitting Unit for producing 30,000 lbs per month of cotton knitted fabric for shoe lining, (fee paid basis).

7. Consultancy for setting-up of a viable hand flat knitting and finishing unit for a UNDP project, (fee paid basis).

8. Consultancy and assistance in manufacture of HT/HP vertical package dyeing and drying machine, (fee paid basis).

9. Consultancy and assistance in manufacturing solvent scouring machine, (fee paid basis).

10. Assistance in development of package dyeing machine, (fee paid basis).

11. Guidance for developing of power driven and multi-feeder flat knitting machine, (fee paid basis).

12. Scheme for anti-pilling and shrink resist treatment of wool knitwear in Bowe Solvent Finishing machine, (fee paid basis).

13. IFCI reference of a tubular fabric processing project for vetting by the Knitwear Facility, (fee paid basis).

Types of Technical Assistance provided by K.F. Staff when visiting the Units

1. Trouble shooting in operation of computerized power flat machines, repair of the fault in electronic panel.

2. Trouble shooting in operation of imported Circular Knitting machine.

3. Demonstration of design transfer from pattern paper to drums of jacquard knitting machine.

4. Setting up of the creel of Camber Stripper Circular knitting machines.

5. Design development.

6. Matching of the finish of cotton knitwear with the sample, by milling and tumbling.

7. Demonstration of dyeing of viscose tops and standardisation of the method of dyeing.

8. Trials for importing anti-pilling finish to wool knitwear using side paddle machine.

9. Standardisation of milling treatment of wool/angora hand knitting yarn on Bowe Solvent Scouring machine.

10. Standardisation of the anti-pilling and S.R. treatment of wool knitwear in Bowe Solvent Scouring machine.

11. Demonstration of dyeing of wool tops in HP vertical dyeing machine.

12. Survey for modernisation of spinning units.

13. Development of solvent recovery system for Solvent Scouring machine.

14. Trial with the dryer unit of HT/HP package dyeing machine.

15. Survey and advice on preventive maintenance in spinning mills.

16. Installation and commissioning of imported and indigenous laboratory testing equipment.

17. Repair of imported laboratory testing equipment, and standardisation of such equipment.

18. Surveying and advice for quality and process control systems for upgradation of knitting, spinning and dyeing units.

19. Investigations on the shop floor in conneciton with trouble shooting jobs.

20. Sample collection for product inspection.

21. Reflectance values of P/V blended fabrics on Colour Matching Computer.

Appendix VI

## Yearly Breakdown of Expert Man Months

Details from Revision "G"

| | | 1983 | 1984 | 1985 | (m.months) |
|---|---|---|---|---|---|
| 11.01 | C.T.A | 1.6 | 3.4 | 4 | |
| 11.02 | Knitting Technologist | 8.5 | 0.5 | - | |
| 11.03 | Worsted Spinner | - | - | 6 | |
| 11.04 | Circular Knitting | - | 4 | - | |
| 11.05 | Maintenance Eng. | 1.4 | - | - | |
| 11.06 | Trg.Specialist | - | 1.8 | 1 | |
| 11.07 | Mktg.Consultant | - | - | 5 | |
| 11.08 | Wet Processing | - | - | 4 | |
| 11.09 | Knitwear Designer | - | 0.5 | 5.5 | |
| 11.10 | Colour Matching | - | - | 2 | |
| 11.11 | Knitting Technician | - | 0.6 | - | |
| 11.61 | Garment | - | - | 2.1 | |
| | Total: | 11.5 | 10.8 | 29.6 | = 51.9 |
| | | (21%) | (21%) | (58%) | = (100%) |

Assuming remaining m.m for Post 11.05 Maintenance is not used 1.6

53.5

Appendix VII

## DIARY OF EVENTS

| | | |
|---|---|---|
| JAN | 9TH | BRIEFING |
| | 10TH | VISIT SCHOLLER - ZURICH |
| | 12TH | ARR. LUDHIANA |
| | 22ND | VISIT H.OFFICE CHANDIGARH |
| | 25TH | VISIT BY GROUP FROM IFKT CONFERENCE |
| | 26TH | KNITWEAR CLUB MEETING - DESIGN |
| | 29TH | OFFICIAL INAUGURATION OF KNITWEAR CLUB |
| FEB | IST | MEETING WITH FINANCE HOUSE REPS. |
| | 13TH | VISIT DEESONS FACTORY(TECH.ASSISTANCE) |
| | 22ND | VISIT OF TEXT.COMMISSIONER FOR INDIA MR. S.RAMAMURTY |
| | 26TH | P.A.C. MEETING |
| | 27TH | BOARD MEETING CHANDIGARH |
| MAR | 2ND | VISIT TO PROJECT BY |
| | 3RD | RES REP AND SIDFA |
| | 4TH | LEAVE LUDHIANA |
| | 7 TH | DE-BRIEFING |