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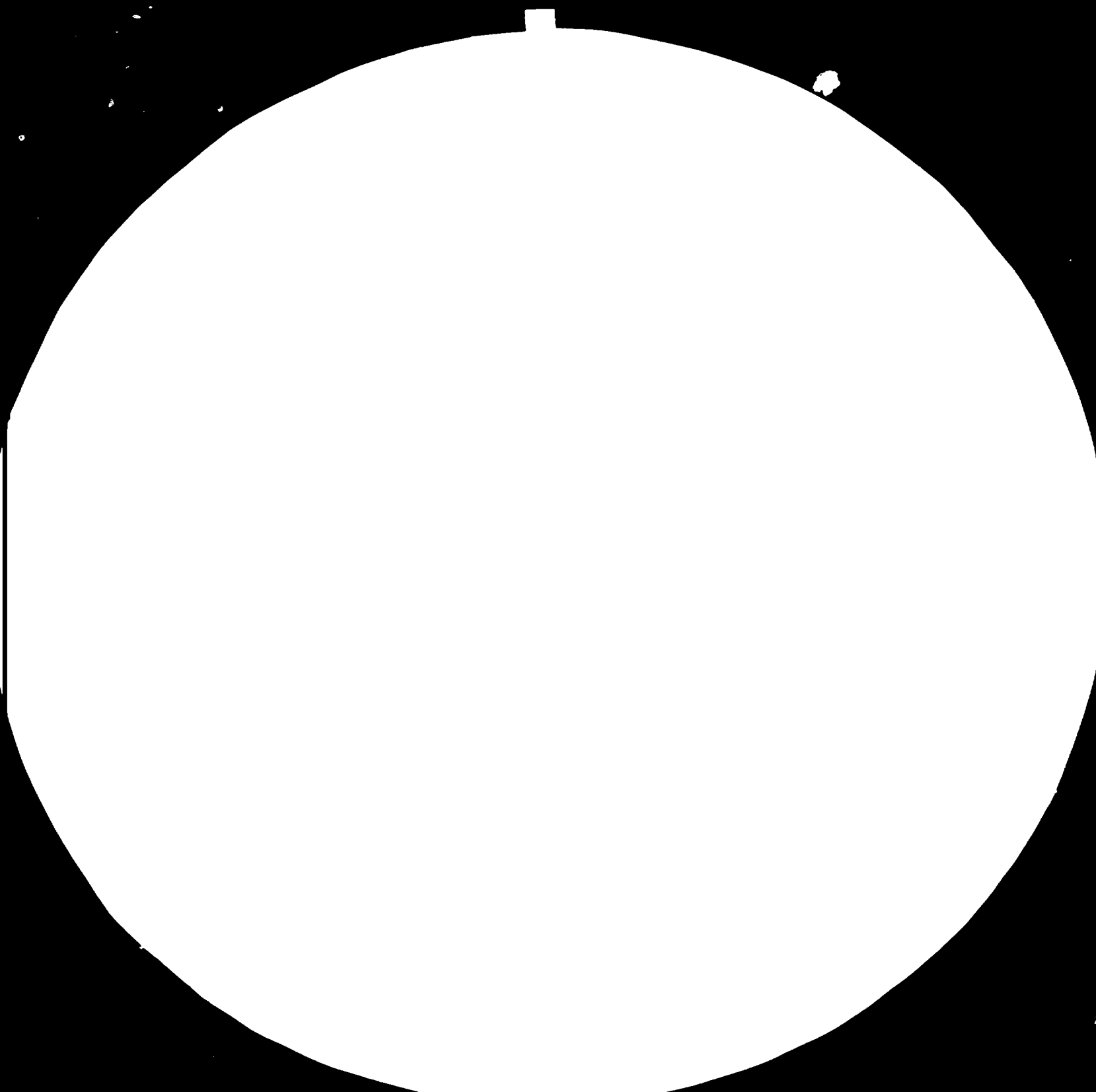

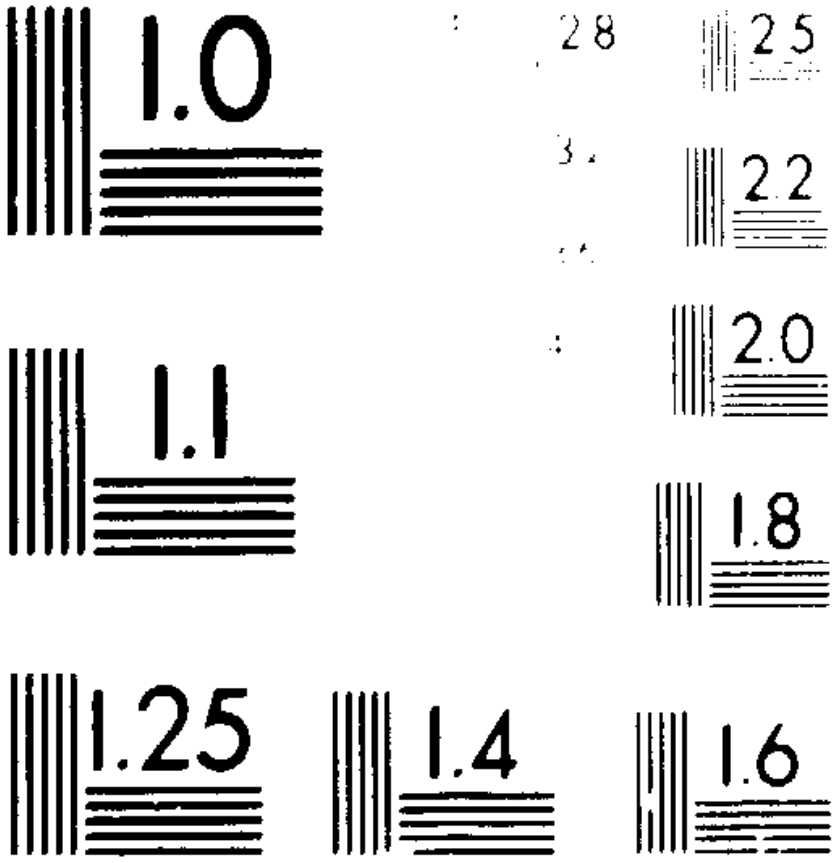

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DP/ID/SER.A/504
14 March 1984
ENGLISH

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 (1st 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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INTRODUCTION

Phase II of this Project began in June 1982 and this document is the Technical Report prepared at the end of the first period of the C.T.A.'s assignment. This first period of three months duration extended from Mid November to Mid February 1984.

It is intended that there should be two further terms each of three months, the last term coinciding with the end of this Phase in 1985. Within this report is a recommendation that the two remaining terms should be split into three so that the C.T.A. can maintain a closer contact with the Project over the remaining life of the Project.

Early in this first term at the time when the C.T.A.'s Work Plan was being compiled it was decided that in order to do justice to the various topics, the main efforts of this term would be concentrated on essential issues, and more detailed study of other topics would be deferred to later visits.

The format of this report is as follows:

- Comments and Findings on the Project, the Industry and general Technical matters.
- A status report on each output as listed in the Project Document, with an extended note on Marketing. Recommendations, as appropriate, are also introduced here.
- Notes on Activities undertaken this term.
- A list of Recommendations.

During later visits the following aspects of the C.T.A.'s work will be dealt with in greater detail, although some initial work has already been started:

- Review of R+D function;
- Review of Technical Service function;
- Joint Research topics;
- Organisation Structure at Knitwear Facility;
- Detailed Marketing Strategy and Plans;
- Information Cell;
- Further monitoring of machinery erection.

The list is not intended to be exclusive.

1. GLOSSARY OF TERMS

1.1 Cut and Sew Knitwear

Using this method of manufacture pieces of fabric are knitted either on a Hand operated machine or an automatic power flat-bed machine (sometimes called V-bed machines). The fabric pieces are then cut to the appropriate shapes i.e. front, back or sleeves before being stitched together to form the garment.

1.2 Fully-fashioned Knitwear

Fabric pieces are knitted to shape by the special automatic machine or on a hand-operated machine, so no cutting is needed and hence there is less waste than with cut and sew garments, but usually the machines do not have the same patterning capabilities.

1.3 Worsted Spun Yarn

During the manufacture of this yarn the raw-material, which need not be wool although the fibres must be about the same diameter and length of wool, is subjected to a combing process which removes 10-17% of the shorter fibres. This gives a yarn with a smoother finish and to enhance the eveness further it is common practice to twist two similar yarns together. When knitted into a fabric the stitch structure is very obvious. When the fibre used is wool it is usual to refer to the yarn as Botany yarn.

1.4 Woollen spun yarn

The main difference between woollen and worsted spun yarn is that no combing takes place during production of woollen spun yarn. Consequently the yarn is more hairy and the stitch structure in garments made from these yarns is not distinct i.e. there is more "cover". Because no fibre is removed during the process, and the process itself is shorter, the yarns are relatively less expensive and usually coarser (i.e. greater weight per unit length).

Note: Although both systems of spinning originated with the wool industry they refer to systems of spinning and not the fibre used. It is possible to have a 100% synthetic woollen spun yarn, the only restriction being that the synthetic fibres must be of approximately the same length and diameter of wool fibres.

2.1 COMMENTS AND FINDINGS ON THE PROJECT

As part of the Self Evaluation exercise carried out during this term there has been the opportunity to study in detail the immediate objectives and the design of the project. Basically the need for the Project is still very valid and if the Inputs as detailed in the Project Document are forthcoming and effective, there is no reason to suppose that the overall effect of the Project will be other than a positive one.

It is the intention at the end of this Phase of the Project, and when all the machinery is fully commissioned, that the Facility will earn some of its income by selling its products and services to the industry.

One of the main sources of this revenue will be the sale of high quality worsted yarns. At present yarns of a comparable quality to those being comtemplated are not available locally.

Although this topic is outside the terms of reference of the Project it would be unfair not to point out that this activity will require a more rigid financial management control than is presently in operation. Also experience of similar operations indicates that a keen commercial sense and practical knowledge of spinning mill management are vital if the venture is to be successful.

So far there has been only limited opportunity to visit the local industry and make contact with those operating in it. It is anticipated that in later terms of this assignment more firms will be visited, and hopefully those industrialists who are currently exercising some reserve may be encouraged to express more forthcoming opinions on how the performance of the Facility is being judged by the Chief recipient of the assistance i.e. the industry itself. Because of this fact it would be premature to make any comment on this topic at this stage, rather it should be left until a future term. The management at the Project should be aware though of the problems facing them in the future implementation. Presently, due in part to the delay in introducing the spinning machinery, motivation of the staff is proving to be more troublesome than if the activity had been erected as planned, although this situation is not helped by the level of pay which generally is lower than in the private sector for positions of equivalent status.

If, because of disparties in pay, the Project were to lose staff already trained at the Facility and abroad, it would be a very serious setback. Already this problem has been highlighted at a recent Board Meeting by one of the Board Members who suggested that salaries should be regularised. This emphasises that the problem is recognised but it still remains a potential source of anxiety.

Specifically there are several technical areas at the Project where further assistance and development are needed. These are detailed below:

Making-up - After a few visits to local manufacturing units it is soon evident to an experienced eye that the techniques and levels of skill in making-up need urgent attention. The local market has become accustomed to the poor level of garment finish and the other main markets, USSR and the Army cannot be classed as quality conscious. Thus it is anticipated that the demand for the Facility's services in upgrading these techniques will grow as more firms try to export to Hard Currency areas. Improvements can already be seen in the quality of samples being produced now, compared to those made six months ago, but there are no provisions so far for introducing skill training in this section.

Workshop facilities - The outputs from the Workshops are not commensurate with the level of technology of the machinery installed at the Project and more extensive and elaborate machines and handtools are required. In this context preliminary discussions have already taken place with the Central Tool Room located nearby, with a view to using their services for repairs etc. which would be outside the scope even of an enhanced Workshop at the Facility. The Central Tool Room is an Indo-German collaboration set up to provide training for machine operators for the higher skilled jobs in the local engineering industry. It is now well established and the initial reaction to the suggestion was very favourable (see confirmation letter Annex X).

Maintenance - The maintenance schedules already provided by the international expert need to be implemented at the Facility. This will serve both the in-house machinery, some of which needs repairing, and also to demonstrate Planned Maintenance to the industrialists as and when it becomes appropriate.

Already there are signs of technology transfer taking place. The most significant example being the Bowe solvent scouring process, first introduced via the Facility, which is now used by six firms within Ludhiana and two more are comtemplating this machine. In fact the machine installed at the Facility is temporarily idle, the acceptance of the technique has been so dramatic.

2.2 Comments and Findings on Technical Aspects

Generally throughout the industry the knitting process is satisfactory, and this is carried out almost exclusively on hand-operated machines. Because of the lack of mechanization at this stage the technical requirements on the yarns are not very demanding, so a low quality of yarn has become the norm. Most of the spinning mills producing this yarn are equipped with very old and out of date machinery, which is incapable of being rehabilitated to a level where acceptable yarns suitable for hard currency export markets could be produced. The only solution which is open to local spinners therefore, if they aspire to operate in hard currency markets, is to re-equip.

Additionally as an increasing number of knitters opt for automatic power machinery, where knitting tensions are higher, so the spinners will be called upon to upgrade accordingly.

Waxing of yarn, now virtually unknown in Ludhiana, will become mandatory for subsequent power-machine knitting.

Reviewing the industry, two features are immediately apparent: firstly, due no doubt to the high incidence of small operators and the relative low cost of labour, fabric is produced on hand-operated flat bed machines. Generally the quality of knitting is very acceptable and the skills are comparable with those in other parts of the world.

However, once the garment panels have been produced they are subsequently cut to shape before being stitched together to form the garment. So the advantage of a very flexible and very cheap machine i.e. the hand flat, which is capable of producing panels exactly to size and thus requiring no further cutting to shape, is being sacrificed because of the methods applied in subsequent make-up.

It is generally accepted that garments made from panels which have been knitted to shape i.e. fully-fashioned, give a better fit and hence can command a higher price than those made via the cut and sew method. So it would seem that by adopting the cut and sew approach the industry is limiting itself to a narrower market segment than if it were to produce fully-fashioned garments for which the existing knitting machinery is most suitable.

Secondly, having knitted the fabric and cut the panels to shape, the common practice of first stitching the seams on a lockstitch machine, and then overlocking the seam to give it a neater finish, leads to a very bulky and ugly looking seam. This detracts from the overall appearance particularly over the shoulder seams. Fabrics which are knitted for the Indian market tend to be quite tightly knit and stiff, which exaggerates the seaming problem further.

Great improvements could easily be made by simply adopting the standard making-up practices widely used elsewhere. Capital Expenditure on machinery for making-up would not be excessive but the present practice of using domestic sewing machines would need to be changed. The Facility can already demonstrate all these techniques, but additional assistance is required (see recommendations).

Furthermore with better factory layout and improved materials handling there is scope for tighter management control over quality and unit cost, both of which will lead to an improved profitability for the companies concerned.

It is significant to note that all the Ludhiana companies include a Dry-Cleaning process in their work flow. Such a process, which adds up to Rs. 1 per garment, could be eliminated if better standards of housekeeping were introduced. This Dry-Cleaning process is not common practice in other countries where similar work is being carried out, and if it could be cut out, an added benefit would be the elimination of the residual smell of Dry-Cleaning agent (Turpentine), which is almost a standard feature of Indian Knitwear. Only a relative few companies have recently introduced modern methods of Solvent Scouring which eliminates this odour, so most of the Knitwear still has this smell.

2.3 Comments and Findings on the Industry

Much has already been written elsewhere on the composition of the industry. Because of its relatively short history most of the participants are industrialists of only one or at most two generations standing, having graduated to their new status from a background of trading. It is only to be expected therefore that their approach to what are now more and more industrial problems is based on experience of trading where long-term planning lays little part in the business life. Consequently the organisational structure in most firms shows little evidence of middle management and what management staff there is has little authority in fact. The salary levels of middle management compared with the shop floor and directors bears out their level of low standing.

Virtually no financial responsibility is passed to the managers down the line so final authority on day to day operations is vested in the directors/owners. Unfortunately these men have little direct technical expertise, and yet are expected to decide on such matters because of their obvious standing.

Additionally the Indian culture does not encourage independent action by the lower levels, so the system is a relatively stable one. For the industry to develop healthily, changes in the local management practices have got to take place, and assistance to bring about these changes will be required. Thus management training can become a possible future role for the Facility. Undoubtably one of the biggest problems facing the Facility at present is the attitude of the industralists, and for some time a major role of the Facility staff will continue to be public relations.

Because the captains of the industry have had little or no technical training, bad working practices prevail in most factories. Machinery is not adequately maintained, layout is bad and good housekeeping is extremely rare. In the spinning units visited, air conditioning is the exception and in fact is decribed as too costly to operate and not necessary.

Possibly it is too early yet to expect the companies to maintain their machinery to what can be described as an adequate level. The benefits would scarcely be noticed. But when more sophisticated equipment is introduced the industrialists must be made aware of the necessity and extra cost incurred in keeping the machinery in good order. Work at the Facility to provide advice and service on this topic is under way.

In spite of this situation, the industry is flourishing, with regular big orders from the Soviet Union and a high local demand which unfortunately has lead to dangerous complacency on the part of the industrialists. Recently more stringent quality requirements have been imposed by the Soviet Union although the accepted quality level is still very low compared with the Hard Currency markets.

Attitudes have begun to change slowly and there is now a growing interest throughout the industry in exporting to H.C. areas and this is where the Facility can play a crucial role over the next few years. By giving a helping hand to the medium to small scale industralists, it can educate and guide these firms into the export markets and eventually, as the original firms graduate to become fully-fledged exporters in their own right, so newer emerging firms will take their place under the umbrella.

3. STATUS REPORT ON OUTPUTS

In this section of the Report the various outputs are listed in the same order as in the Project Document together with comments on status and findings and recommendations for future action.

1. "An operational centre capable of assisting the knitwear industry in adapting modern technologies and processing techniques to meet internationally accepted standards".

The construction work is approximately four months behind the original schedule, due to a problem with supply of materials. This has now been rectified, and a new schedule has been prepared (Annex V). Weekly meetings have been arranged with all the interested parties to monitor the progress.

Consequently the machinery erection schedules will be delayed but it is hoped that this will be kept to a minimum by way of the monitoring programme. Virtually all the machinery is now on site and any damages have been reported.

Annex IV gives a plan of the site indicating the areas under construction. The construction is being phased to best suit the Programme - Spinning Area first followed by extension to the Knitting Area followed by Shrink Resist area.

2. "A team of 15 national experts trained within the centre capable of (i) operating the equipment provided and (ii) assisting the industry in all disciplines such as worsted spinning, dyeing upto woolmark and equivalent standards for other fibres, knitting technology, finishing of knitwear and quality control of the entire process of knitwear industry (iii) carrying out comparative trials on the equipment of the Facility to solve technical problems identified in the industry (iv) training of personnel of various levels (v) dissemination of technology to the industry and (vi) providing marketing assistance to manufacturers individually and collectively".

Upto the present time national experts have been trained on site and elsewhere in the following areas:

Knitting (fully-fashioned, hand-flat and V-bed machines). Winding, Hank and Package Dyeing, some areas of Wet Finishing, Quality Control. In addition there has been some instruction on the introduction of Maintenance procedures, but further work on this topic needs to be carried out. Study tours and/or fellowships are planned and are detailed elsewhere in this report.

The national experts in the main are very capable, and in most cases have carried out trials for the industry and have given practical advice to certain firms. Annex VII is an extract from a report presented to the Project Advisory Committee which details the work carried out to date. Since the Project is only partially completed there are areas where only preliminary work has been undertaken due mainly to the fact that the appropriate Experts have not yet arrived on station. It is anticipated that almost all the Experts will have been provided during 1984, and by virtue of this fact there is no reason to expect that the outputs anticipated will not be realised.

Specifically the areas in which further work is required by International Experts are, Circular Knitting, Worsted Spinning, Designing, Colour Matching, Wet-Finishing, Training and Marketing.

3. "Guidelines on methods and practices for production of worsted spun yarn meeting with the internationally adopted USTER limits".

Because the spinning plant is not operational this output cannot be completed yet, so comment will be reserved until after the Worsted Spinning Expert has had the opportunity to carry through his assignment. The national counterpart has spent a period abroad on a Fellowship Tour and is now back on station.

4. "Guidelines on methods for producing knitwear of dimensional stability and reproducibility".

A list of guidelines has been produced by the Knitting Expert, Mr. Kotesovec as part of his assignment. These are included in his final report. These guidelines will be augmented by the Circular Knitting Expert to cover fabrics produced on circular machinery.

Recommendation: Ensure that this requirement is included in the Job Description of the Expert on Circular Knitting.

5. "A Knitwear Design Unit capable of developing reproducible prototypes of innovative designs meeting with the technical requirement".

A good deal of work has already been accomplished by the Knitting Expert, Mr. Kotesovec. A total of over 100 samples embracing a wide variety of styles have been produced and selections displayed at several national and international fairs. So far the emphasis has been on producing technically acceptable garments, styling at this stage being a secondary consideration due to the fact that no designers were on station, and what information on fashion trends was to hand was of a limited nature. All the samples produced were done so within the constraint known to exist in the industry and thus would be capable of being produced in most of the industrial units in the area.

Recommendations: (i) - After the return of the Designers from their tour, and with guides on target markets having been provided by the Marketing Expert, samples should be made to expose the Designers to practical local constraints and at the same time give the staff at the Facility more practice in producing as many different styles and fabrics as possible. This will strengthen the Facility's capability, and increase the confidence within the staff enabling them to tackle future industrial problems with greater ability.

(ii) - The making-up section of the Knitting Department is in need of advice from an Expert. This activity should cover cutting, stitching, linking, overlocking and auxiliary operations. In addition the Department is too vulnerable and more staff needs to be employed here and suitably trained on all the operations.

6. "Manual on the techniques (system of colour matching) for the local dye houses of industry and on reproducible dye recipes based on indigenously available dyes and chemicals for dyeing of yarns made out of wool and other fibres at economical cost".

This output cannot be completed until the appropriate Expert has been provided, and ICS Colour Matching Computer is not yet operational because the voltage stabilization circuits were unable to cope with the wide swings in the local supply. Alternative stabilizers have now been provided and the manufacturer's representative is due on site in Jan/Feb to commission the equipment.

Recommendation: Ensure that sufficient detail is given on the Job Description so that the Expert can complete this important feature of the assignment.

7. "Manuals for maintenance schedules for the machines and equipment installed in the Facility and in at least 6 selected industrial units, two each at the end of every year".

A Maintenance Expert, Mr. J.A. Nijland has already completed half of the allotted assignment time. The Report of this Expert has been critically examined and the comments are detailed below:

a) Main Body of Report

This is quite brief and contains several statements about the practices in the industry and at the Facility without substantive detail. No doubt the points are correct but background information would have illustrated the facts more clearly and given more emphasis to the underlying need for improvements.

b) Maintenance Schedules for Facility Machinery

This section appears most odd at fist reading. Certain equipment is dealt with in vast detail whilst others are passed over sketchily. For example the Bentley-Cotton Intarsia frame merits 4 brief lines of instruction, yet the Kurt Ehemann Steam Press merits 120 lines of detailed instructions.

This is remarkable since the Bentley machine is a far more complicated and expensive item costing $ 172,000, whereas the Press costing $ 5,500 is a great deal simpler as the relative prices suggest.

Further investigation has shown that maintenance schedules for the items on which there is a vast detail of information had been previously prepared by the Chief Engineer of the Facility who in turn had copied them (for his own benefit) from the manufacturers manuals supplied with each respective machine.

In fact on checking the following brouchers as a sample, one finds that the text of the Report is a word-for-word copy of the appropriate part of the brouchers.

Bowe	Ibis
Kurt Ehemann	Kannegiesser

c) System and Schedules

This section is a reasonable system which could well be adopted and is of the form in general use. The Job Description calls for a Manual to be prepared but this has not been done.

d) Mill Visits

This section is a factual report of the visits, and in view of the low level of maintenance in the industrial units, it is difficult to suggest what further useful advice could be given in the short time available during each visit.

e) Spare Parts Lists

Again further justification or some systematic method of evaluation would have helped to emphasize these needs. Also only 6 machines were covered and all these were all concentrated in the Winding Department.

Recommendations: (i) - Use the unexpired portion of this Expert's assignment to prepare Manuals on Maintenance for machinery installed at the Project, and in doing so instruct the staff in the preparation of such Manuals.

(ii) - Implement the Maintenance Schedules proposed in the Report on the machinery at the Facility. These schedules should then be used continuously to act as a demonstration of the systems to any interested members of the local industry.

8. "Twelve Training courses for industry personnel at various levels".

At the time of writing the Training Expert has only just begun the first period of this split assignment. No doubt this output will be dealt with more rigorously in his report, but the current situation is outlined below and detailed in Annex VIII.

Since the commencement of Phase II (Mid 1982) a total of 7 Training courses have been held to date. These were attended by almost 200 participants and conducted by members of the Facility staff assisted in some cases by staff members of other competent organisations (e.g. I.W.S.). In addition 5 papers were presented on a variety of subjects, these meetings were attended in total by 80 staff members of the industry, and 2 seminars were held attended by over 100 industry personnel.

9. "A core of approximately 100 technicians of industrial units trained in related disciplines".

This topic will be covered in more detail in the Report by the Training Expert. To date however, on request by the industry the following training courses have been held at the Facility involving 38 technicians:

	Number of Participants
- Dyeing	10
- Knitting	14
- Testing and Quality Control	14

10. "Documentation and information dissemination cell on latest technical developments in knitting, spinning and dyeing/ finishing technologies".

Limited progress has been made on this output so far and it is the intention to concentrate more on this topic during the 2nd term of C.T.A.'s assignment. Comments and recommendations will therefore be withheld until that time.

11. A marketing unit for stimulating and co-ordinating export activities.

This is a wide ranging and vital topic and because of this it is dealt with separately in the following section.

12. At least three joint studies of technical problems in co-operation with/interaction and exchange of information with organisations working in related fields.

To date in this Phase the following three studies have been undertaken, and already preliminary discussions are in hand with another organisation concerning future work on wool/synthetic blends.

a) "Survey of the status of Making-up techniques and equipment which is prevalent in the Ludhiana knitwear industry".

This was undertaken jointly with I.W.S. and as a result 24 units installed linking machines, tumble dryers and steam presses, during the follow up. The study was completed in August 1982.

b) In collaboration with the Central Sheep and Wool Research Institute the suitability of indigenous wools blended with polypropylene and spun on the woollen system was tested at the Facility. This involved the complete manufacture of garments from knitting through finishing with subsequent pilling and abrasion testing.

The results were disappointing and modifications in their spinning process were suggested. This study was completed in July 1983.

c) A joint study with ATIRA (Ahmedabad Textile Industry Research Association) in September 1983, concerned the spinning of wool on the open-end system. Yarns made this way were tested at the Facility and found to be more even than locally spun yarn. The knitwear made from these yarns exhibited a higher bursting strength and less pilling compared to similar fabrics from local yarns. ATIRA reported however that they encountered some difficulties in spinning caused by burrs in the wool and with fibres over 65 mm in length, which increased the number of end breaks.

3.1 SPECIAL NOTE ON MARKETING

Marketing, within the context of this Project has many facets which apparently were not fully appreciated at the time when the Project was designed. These are summarized below:

a. The collection and provision of up to date information on target market areas.

b. The markets for related products not presently being produced locally but technically within the industry's capability.

c. The role of the Punjab State Hosiery and Knitwear Development Corporation indirectly promoting export sales.

d. The role in the Domestic Market,

   i) Selling the Services of the Knitwear Facility.
   ii) Selling the production output from the Knitwear Facility.

e. Organisation of promotional activities e.g. Trade Fairs etc.

f. Public Relations work within the local industry and elsewhere.

Items 4, 5 and 6 have not been given a close scrutiny during this term of the C.T.A.'s assignment but will be covered later after the Marketing Expert has had the opportunity to present his views.

There was an opportunity to speak with Mr. A. Hyvarinen the selected Marketing Expert during his brief visit to Ludhiana and Chandigarh on 19/20 January. It became clear that the Marketing study should be conducted on two levels, and ideally at about the same time so that information output is kept coherent.

The high level job is to study the potential export markets as to size, tariffs, prices, distribution practices, duties, labelling etc. The Expert whould then be able to identify those target markets which would be worthy for future consideration, and at this time provide a more detailed list of data on these chosen areas. This is summarized under point a) above.

Presently, as indicated elsewhere, the local industry is manufacturing yarns spun on the worsted system and using hand operated flat-bed knitting machines as the primary producers (See Glossary for details).

There is a market for knitted outerwear produced from yarns of different characteristics and produced by techniques which are within the capabilities of many of the local firms. To be able to assess both the yarns and methods of make-up and at the same time relate these to the potential of the local industry requires a detailed knowledge of the local firms' capabilities and a technical appreciation of the products to be made.

Many industrialists feel that they cannot compete on price with other manufacturers in the Far East.

If this assumption is correct, the reason may be that the garments manufactured the way they are, do not match up with the market needs. To illustrate this a Flow Chart of the "Ludhiana System" and a possible alternative is given in Annex XIII which shows a shorter and less expensive route but to a slightly different end product. This is an important factor and needs investigating thoroughly, and would form a part of that activity summarized under b) above. This more detailed marketing study would need to be carried out by an Expert who has intimate knowledge of the factors outlined.

Looking ahead further and in particular at how the Project is to meet its High Level Objective, has formed the subject of many and long discussions between the National Project Director and the C.T.A. and at times involving Mr. T.K.A Nair, Secretary to the Punjab State Government and Chairman of the Board of Directors of the Company, as well as other Board Members.

It soon became evident that there exists a serious problem within the industry which in turn is having an adverse reaction on the working of the Facility. In the recent past various selling expeditions have been made into several H.C. markets with mixed results. The effect on the industrialists involved has been to lower their morale when they consider the task and cost of the exporting exercise measured against the paucity of tangible results.

The background to the problem is fairly clear and has been mentioned previously but is included here also for the sake of clarity. The Indian market has become accustomed to the local quality level, and since it is a protected market there is no real opportunity of comparison with foreign made goods. The other main markets served by the Ludhiana industry are USSR and the Indian Armed Services, neither of which are very critical consumers, so generally a low quality level has become established.

Business in all three areas is good so when a manufacturer is faced with more expensive selling costs and the likelihood of patchy sales, he is easily diverted back to the customers with which he has already got a good relationship. So the present conditions are stable. Add to this the fact that most of the industralists come from a background of trading, where long-term planning is not a feature of the business, and it is easy to understand why there is a reluctance to look too far into the future, even though they admit that many would be in deep trouble if, for example, Russian orders should come to an abrupt end.

Various promotional institutions like W.W.E.P.C. and I.W.S. have assisted in trying to promote export sales but even with such help the export business has not even begun to take off. The effect is most noticeable with the small/medium manufacturers who have not the wherewithall to mount their own individual market drives.

The larger companies, who incidentially also form the elite club of exporter to Russia, have in the main the financial and other resources sufficient to promote exports to H.C. areas and some are in fact doing this. The problem it would appear is that those companies who most need the help have not the ability to translate what the promotional organisations tell them, into positive action which produces sales. In turn the promotional bodies are permitted to go so far but are prohibited by their very constitutions to act in any other way than in promotion, so the real problem is not being tackled.

Most people involved in the industry accept that if there could be a breakthrough, and the small/medium companies could get the results they expect or are given to understand they might expect, then the position would soon become self-sustaining.

There is here a most useful role for the PSHKDC to play. In fact it has been set up in such a way that it can act as an umbrella organisation in promoting exports by direct help to certain companies. This role, which was discussed at length and finally became clarified at the Board Meeting held on 26 December, is a far reaching one and itself raises problems. If the High Level Objective is to be achieved and Indian Knitwear to take its place in world markets there must be some effort taken to penetrate the barrier described above. If the industry is satisfied with its present lot simply because it can see no satisfactory way of changing course, then providing a Knitwear Facility with the technical capabilities and consultancy staff as is planned will not be sufficient. So from the point of view of the National Government and UNDP - both committed parties - some solution to this problem must be found.

Further resources will be required to tip the scales and thus release the potential will to export which is undoubtedly there. In turn this will put a demand on the considerable capability already available at the Knitwear Facility and which is in the process of being further augmented.

The key to this problem is the provision of a capable national Marketing Manager who is sufficiently qualified and motivated to continue the marketing efforts initiated in the strategy proposed and detailed below.

Marketing Strategy	Time Schedule
A. General overall investigation of potential, possible markets. Objective being to obtain detailed information on marketing channels, distribution practices, mark up systems etc. In addition demands in style, pricing systems and analysis thereof, sizing tables for classics, fashion markets, sportswear etc., packing and labelling requirements, season schedules, buyers shipping preferences, taxes, duties and quota restrictions.	2/3 quarter 1984 UNIDO Marketing Expert

Marketing Strategy	Time Schedule
B. Detailed investigation of markets selected for concerted promotion after general studies outlined at 'A' above. The detailed investigation will include identification of customers, product introduction and obtaining feed back on individual business demands. Projections of capabilities of the Indian industry, quality standards, price levels etc.	3 quarter 1984 Project Team
C. Follow up with samples collection prepared under the guidance of UNIDO fielded Designer at appropriate buying season.	1 quarter 1985 Marketing Manager
D. Follow up visits to the customers in the selected markets.	1 quarter 1985 3 quarter 1985 1 quarter 1986 3 quarter 1986 Marketing Manager
E. Participation in selected fairs/ exhibitions (2 each year)	1985 1986

In accordance with the present arrangement, UNDP assistance to the Project will terminate sometime in 1985. Although results may start forthcoming with the commencement of the selling programme in 1985, for a sustained market build up, efforts will have to be carried through over a period of at least 3 years.

4. NOTES ON ACTIVITIES UNDERTAKEN

1. After having preliminary discussions with Project staff and in particular the National Project Director (N.P.D.), a Work Plan for this the first term of the C.T.A.'s assignment was prepared. This was agreed with N.P.D. and is attached at Annex II.

In preparing the Work Plan, due consideration was given to the fact that relatively few of the Experts authorised had started their assignments, and certain topics would need to be deferred to later visits by the C.T.A.

2. In order to get a quick appraisal of local conditions within the industry a series of brief visits was undertaken along with various members of the Project staff. In this way the visits served two purposes, firstly to introduce the C.T.A., to the industry, and secondly to allow the C.T.A. to become more acquainted with the respective staff members accompanying him.

A list of companies visited is given in Annex XI. It is proposed to extend this activity as time allows towards the latter parts of this first term and also to carry out more extended visits in later terms. Some industrialists have strong views on the work of the Facility and it would be prudent to explore their views more deeply than has been possible so far.

3. A Project Work Plan was asked for during the first weeks of this term and as soon as the initial familiarization had been carried out this document was prepared, agreed with N.P.D. and despatched to UNDP Delhi on 22 December 1983. This important document is to be attached to the Project Document as Annex I and is included in this Report at Annex III.

Phase II of this Project began in Mid 1982, so all activities to which the work plan refers from that date to the date of preparation of the Work Plan (December 1983) are included as and when they actually took place i.e. historically.

4. During briefing in Vienna it was found that an Evaluation of this Project was also due and this exercise was also undertaken by the C.T.A. as soon as he felt capable of completing meaningful documents. These Forms, PCI Parts I and II were despatched to UNDP Delhi on 22 December 1983.

5. During the first weeks of the assignment all the senior managers of the Facility were interviewed by the C.T.A. Their own activities both within and outside the Facility were discussed and this information served as a background for further familiarization of the total picture. Some of the managers are due to undertake study tours or Fellowships during 1984 and their objectives were outlined to the C.T.A.

6. In collaboration with the Technical Co-ordinator, Mr. Vohra the Study Tours and Fellowships were finalised in early January and these are detailed alongwith a proposed time table in Annex IX. The following staff members were proposed for overseas visits:

Technical Co-ordinator
Wet Processing Manager
Quality Control and Tech. Service Manager
Knitting Master
Knitting Supervisor

The Marketing Manager is also due to take part in a Study Tour during 1984. Since the details of this tour will depend upon the outcome of the Marketing Experts' findings and recommendations this Tour will be finalised during a later term of the C.T.A.'s assignment.

7. Because of delays in civil works the schedule for erection and testing of the Spinning machinery had been postponed. To avoid any further delays a tight control was introduced on this work and a critical Path Analysis was carried out. Regular weekly meeting were held at which each critical activity was considered in detail and appropriate action instituted. These meetings involved Chief Engineer, Spinning Master, Technical Co-ordinator and C.T.A. After each meeting a bulletin was prepared and circulated to interested parties, for information or action.

The machinery erection schedules (Annex V) resulted from this exercise and definite timings for erection teams from the respective machinery suppliers were then transmitted to Vienna. Since some machinery already installed under Phase I of the Project is to be used in conjunction with machinery being introduced under Phase II, a review of the present status of installed machinery was also undertaken. This is attached in Annex VI.

Due to the problems with civil works the majority of the new machinery (still in crates) had to be stored outside, and since there was a possibility of some rain during the early part of 1984 it was deemed prudent to relocate as many crates as possible under cover and those others, which due to their bulk had to remain outside, were covered with tarpaulins. This was completed by 17 December.

8. During this 1st term the C.T.A. was also involved in a series of meetings and discussions with various groups and/or individuals who were either visited or themselves paid visits to the Facility. For record purposes these are listed at Annex XII.

5. RECOMMENDATIONS

All the Job Description for the Experts who are still due for assignment have been examined, Recommendations are as follows and a time-table is provided:

5.1.1. C.T.A. (11-01) - The remaining two terms each of three months duration should be split into three terms each of two months duration. In this way the C.T.A. can maintain closer contact with the Project during the remaining time span and the visits will coincide with more Experts on station. The first two months term will cover much of the machinery erection, and the timing of the last two months term has already been agreed with Vienna to comply with the preparation of the Terminal Report. This proposal will be discussed with N.P.D. and during de-briefing before finalisation.

5.1.2 Worsted Spinning (11-03) - The requirement to provide guidelines on methods for production of worsted spun yarns should be included in the Job Description.

5.1.3 Circular Knitting (11-04) - Specific mention of the types of circular knitting machinery i.e. SPJ and RTR should be added to the Job Description alongwith the requirement to provide guidelines according to the Project Document.

5.1.4 Maintenance (11-05) - As given in the body of the report, Manuals on Maintenance should be provided and the schedules already prepared in outline should be implemented at the Knitwear Facility.

5.1.5 Training (11-06/B) - This post has been discussed with the present Training Expert who agrees that there is a great deal of work to be done on the Training aspect. Observations within the industry suggest that the previous focus on abilities to train in knitting is not as important as it first seemed. In addition to the two Knitting Experts already fielded, a Circular Knitting Expert is planned, plus fitters and technicians from the machinery suppliers who all do a certain amount of training so the Facility staff will have had a great deal of exposure to knitting techniques by the end of 1984. Knitting is probably not the weakest area anyway so an Expert with more general background would be as suitable. This Expert may be fielded in mid 1984.

5.1.6 Marketing (11-07) - This assignment should be split into two sections. The first dealing with the High Level approach as described in this report. This work will be split between Ludhiana and the target market area(s). The second dealing with more specific matters and requiring an intimate knowledge of the industry and markets will be undertaken totally in the target market area(s).

5.1.7 Wet Processing (11-08) - The Shrink Resist equipment will not be delivered for some considerable time and it is desirable, since this is a relatively new process, that an Expert is available for instruction at that time. Further assistance in the Dyehouse would certainly be most useful at the present time so a split mission is recommended. The first period of 2 man-months to be undertaken as soon as possible with the remaining 2 man-months reserved for a period after the S/R installation is completed.

5.1.8 Designing (11-09) - It is imperative that this Expert is on station during the period Oct/Nov/Dec of 1984, when sample ranges are being prepared. A second term of three months in Mar/Apr/May 1985 would coincide with the manufacture of the orders enabling a follow-up with the knitters concerned.

5.1.9 Colour Matching (11-10) - I.C.S. the suppliers of the colour matching computer will provide advice on the initial setting of standards, so the Job Description for this Expert may be modified and reduced to 1 man-month and aimed to serve as a follow-up on the work then being undertaken.

5.2 Extra input in the form of an Expert in Making-up is required before August 1984. This Expert should be familiar with all the basic machinery and up-to-date techniques now employed by manufacturers serving Hard Currency export markets. An appropriate length for this assignment would be two months.

5.3 Workshop - The equipment in the Workshop needs augmenting to serve the future needs of the Facility. The list of machinery given below would form a sound basis for the future:

Universal Milling machine
Shaping machine
Lathe (say 4 1/2" centres with 6'0" bed)
Gear Slotting machine
Precision Drilling machine
Pedestal Grinder
Welding equipment
Surface plate and instruments
Power Hack Saw
Hand Drill
Hand Grinder

The staff should include an Electrician with an electronics bias who should be provided with at least the following equipment:

Oscilloscope
Multimeter
Various hand tools

5.4 There are several miscellaneous but most important items concerned with funding which have come to light during this term of the assignment. Recommendations are included below and action needs to be taken promptly for the benefit of the Project.

5.4.1 At the last Tripartite Review Meeting $ 80,000 was approved for spare parts for equipment already provided in Phase I. These spares are necessary for the continued provision of these inputs which are linked with equipment used in Phase II and are most necessary if the Phase II equipment is to be effective. The split between Phase I and II was only made due to constraints of funding. In addition there are a few small items of equipment which will also be needed and which have already been specified and included in the above.

UNDP has agreed to this allocation, but there appears to be a hold up with Central Government.

This matter should be attended to quickly since the parts are urgently required.

5.4.2 Due to shortage of funds at that time two items were omitted from the 1981 budget, namely the S/R treatment equipment and a Fancy Twister. The Tripartite Review Meeting cleared the go-ahead on both items but subsequently the Central government asked the State government to prune the expenditure which they did by deferring the Fancy Twister to an even later date.

In order to provide a complete range of yarn capabilities this machine should now be included.

5.4.3 The Project will suffer a serious set-back unless the State government releases the funds agreed for the financial year 1984-85. This requirement is about 100 lakh Rupees.

5.4.4 A start should be made to examine further funding for the operation of the Project after 1985 when this present Phase comes to an end.

Already other possible areas of activity are emerging e.g. Woollen yarn spinning, finishing of cotton knit goods etc. which will be identified in later terms, but preliminary work could be done prior to this more detailed evaluation if it is the intention to provide further support.

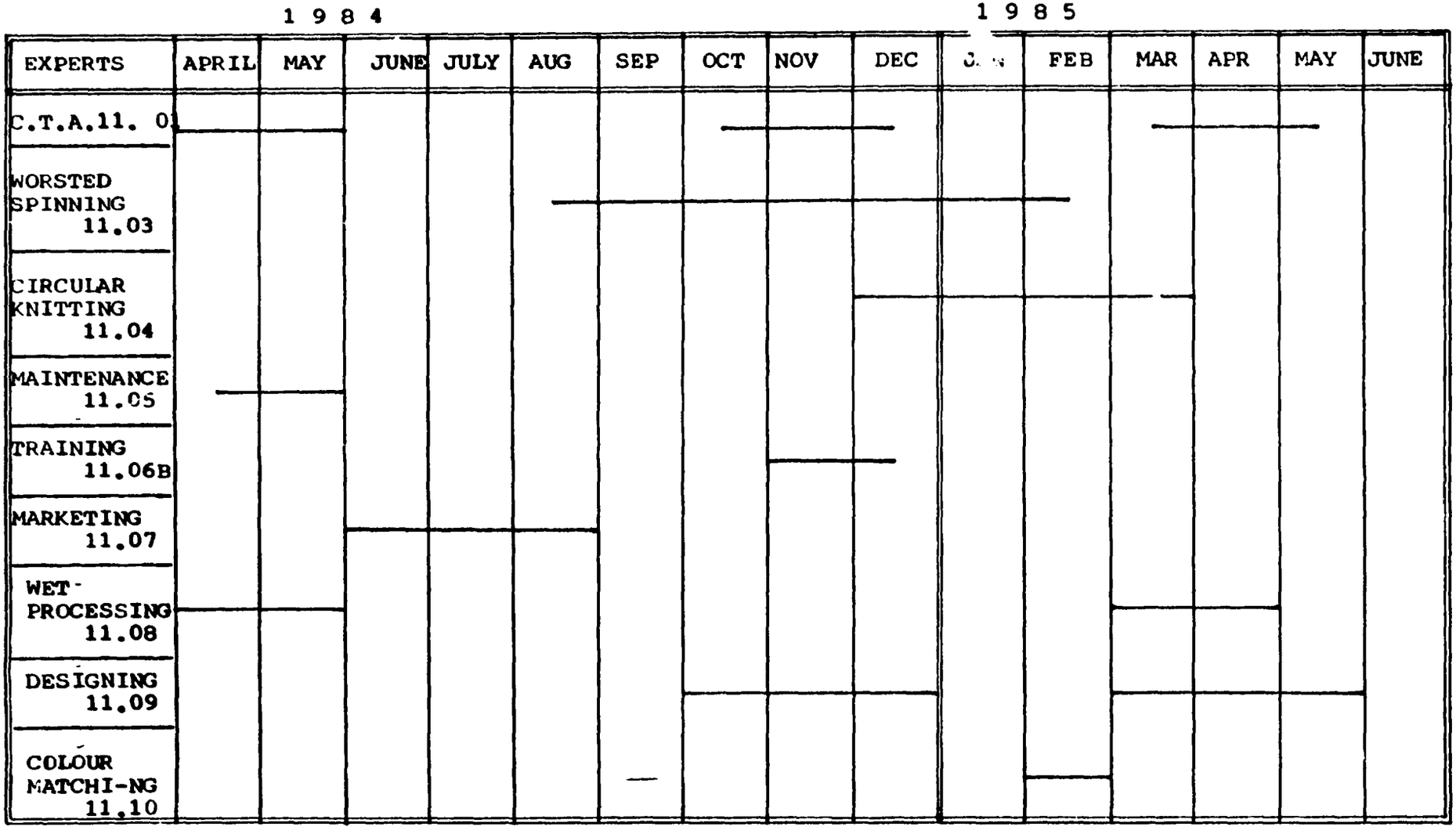
5.4.5 Outside the present budget there will be a need for modest funds to cover the enhanced Marketing exercise. This is currently estimated at $ 10,000.

Assuming the Marketing Plan is adopted, which it must be if the Development Objective is to be achieved, extra funds will be needed to cover 4 or 5 visits to the target markets by the Marketing Manager in 1985/6, and 2 visits by the Design staff in 1986.

The N.P.D. will be processing these needs in the near future.

5.4.6 The general appearance of the documentary outputs from the Facility is poor. Equipment for preparing Training Matter, Newsletters, Handouts, Reports etc. is very rudimentary and the very minimum provision of an electric typewriter and photocopier should be made.

PROPOSED TIME-TABLE FOR VISITING EXPERT



ANNEX I

UNITED NATIONS

UNITED NATIONS INDUSTRIAL DEVELOPMENT ORGANIZATION

UNIDO 25 August 1982

PROJECT IN INDIA

JOB DESCRIPTION

DP/IND/82/006/11-01/31.7.B.

Post title	Chief Technical Adviser
Duration	9 months
Date required	September 1983 (either continuous or split missions of 3 - 4 months each year)
Duty station	Ludhiana
Purpose of project	To strengthen a central knitting industry service and development facility in Ludhiana, established to provide technical services to the knitwear and related industry in the state of Punjab.

Duties

Attached to the Punjab State Hosiery and Knitwear Development Corporation the expert will advise the Executive Director of the Corporation on all matters related to the implementation of the project. Specifically, he will

- guide the Facility's overall work programme;
- supervise the installation and commissioning of project equipment;
- train the Facility's staff and the industry's technical personnel in the production methods covered by the project;
- advise on questions related to technical assistance to the industry;
- advise on the collection and dissemination of technical information for the benefit of the industry;
- advise on questions related to the export of knitwear;
- prepare technical reports, project evaluation reports and, at the end of his assignment, a project terminal report.

..../..

Applications and communications regarding this Job Description should be sent to:

Project Personnel Recruitment Section, Industrial Operations Division
UNIDO, VIENNA INTERNATIONAL CENTRE, P.O. Box 300, Vienna, Austria

V.81-33106

Qualifications	Degree in textile technology or textile chemistry. Extensive experience in the wool knitting industry.
Language	English
Background Information	Attached.

Background Information

The knitwear industry in the Punjab State is concentrated around the town of Ludhiana and comprises about 2,000 manufacturing units. About twenty of these are medium-scale and account for some 97 per cent of the country's knitwear exports. The rest are small-scale units. The industry uses imported wool and acrylics spun by small and medium-scale spinners in Ludhiana and Amritsar. The general practice is to contract out the winding, dyeing and garment finishing operations to small, independent firms. The industry as a whole employs about 200,000 people.

To assist the knitwear industry in improving the quality of its production and in increasing and diversifying its exports the State Government established, in 1980, a common facility for technical services, training and demonstration. UNDP/UNIDO supported this effort by providing technical expertize, financing much of the Facility's equipment and by training its staff through fellowships and study tours abroad. The Facility is now functioning and covers the yarn preparation and dyeing and finishing operations. It is currently being extended to include also worsted yarn spinning, flat-bed and body-length circular knitting and finishing. UNDP/UNIDO assistance will provide expertize in worsted spinning, circular and flat-bed knitting, maintenance, the organization of training programmes, dyeing/ finishing of knitwear, design of knitwear and colour matching. UNDP/UNIDO will further contribute the necessary equipment for the processes mentioned and finance the requisite fellowship training of the Facility's staff.

The Facility's principal equipment items are listed below:

1. Spinning
   - Yarn preparation;
   - Worsted spinning;

2. Knitting
   - Two circular body-length knitting machines with jacquard attachments;
   - Links-links body length machine;
   - Fully-fashioned machine;
   - Automatic jacquard flat-bed machine;
   - Hand flat-bed machine;

3. Dyeing
   - Tumbler drier;
   - Hydro-extractor;
   - Side paddle garment dyeing machine;
   - Hank dyeing machines;
   - Hank drier;
   - Mini boiler;
   - HT package dyeing machine;
   - Sample hand-dyeing machine;
   - Sample package machine;
   - Sample package drier.

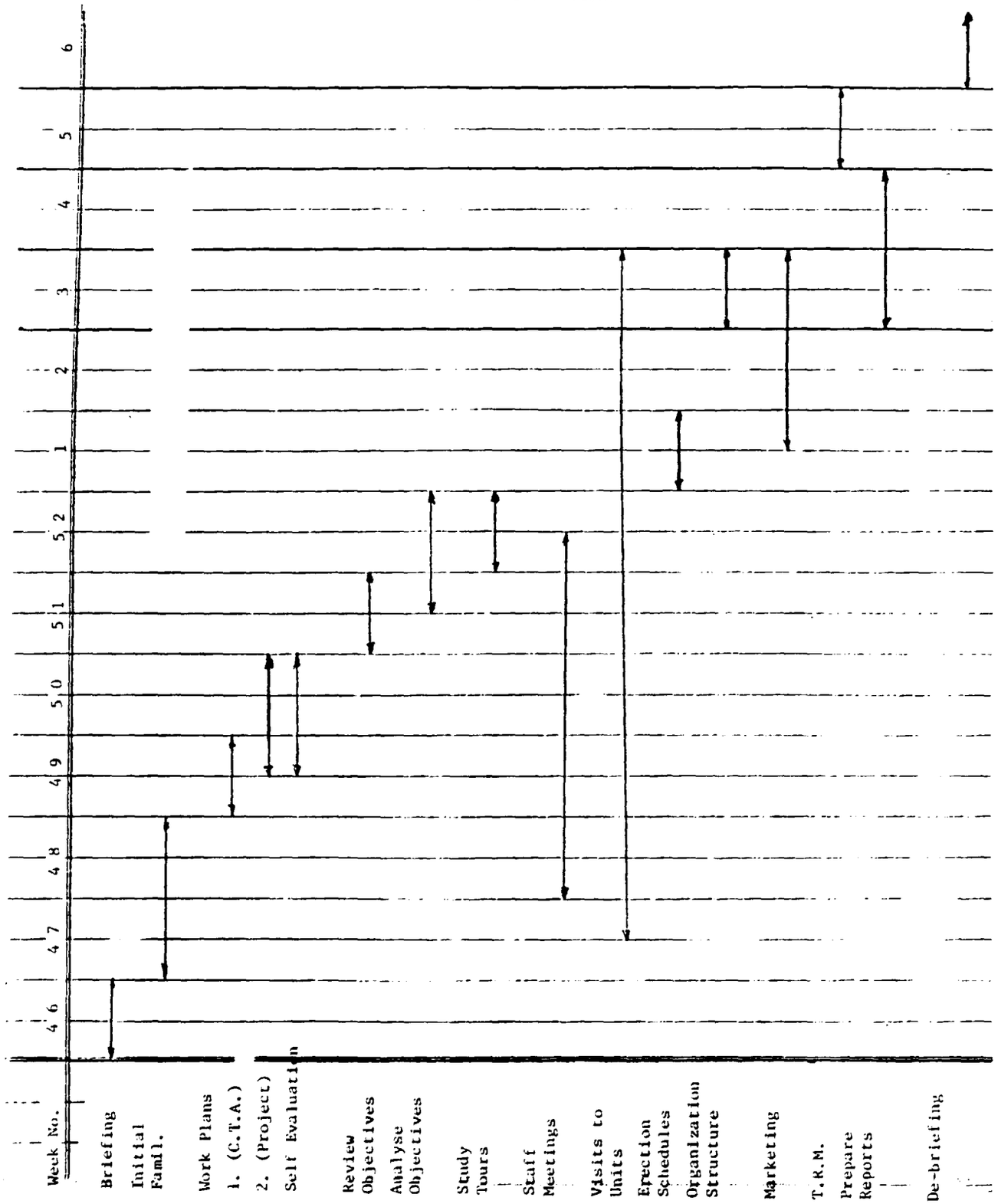
Background Information

4. Dyeing laboratory
   - Single cone package dyeing machine;
   - Beaker dyeing machine;

5. Finishing
   - Spotting table;
   - Solvent dry cleaning and finishing machine;
   - Three-stage finishing machine;
   - Steaming and heat setting press;
   - Air-operated knit goods press;
   - Equipment for shrink-resistant treatment of tops;
   - Winch dyeing and bleaching machine.

ANNEX II

WORKPLAN - 1ST TERM C.I.A.



ANNEX III

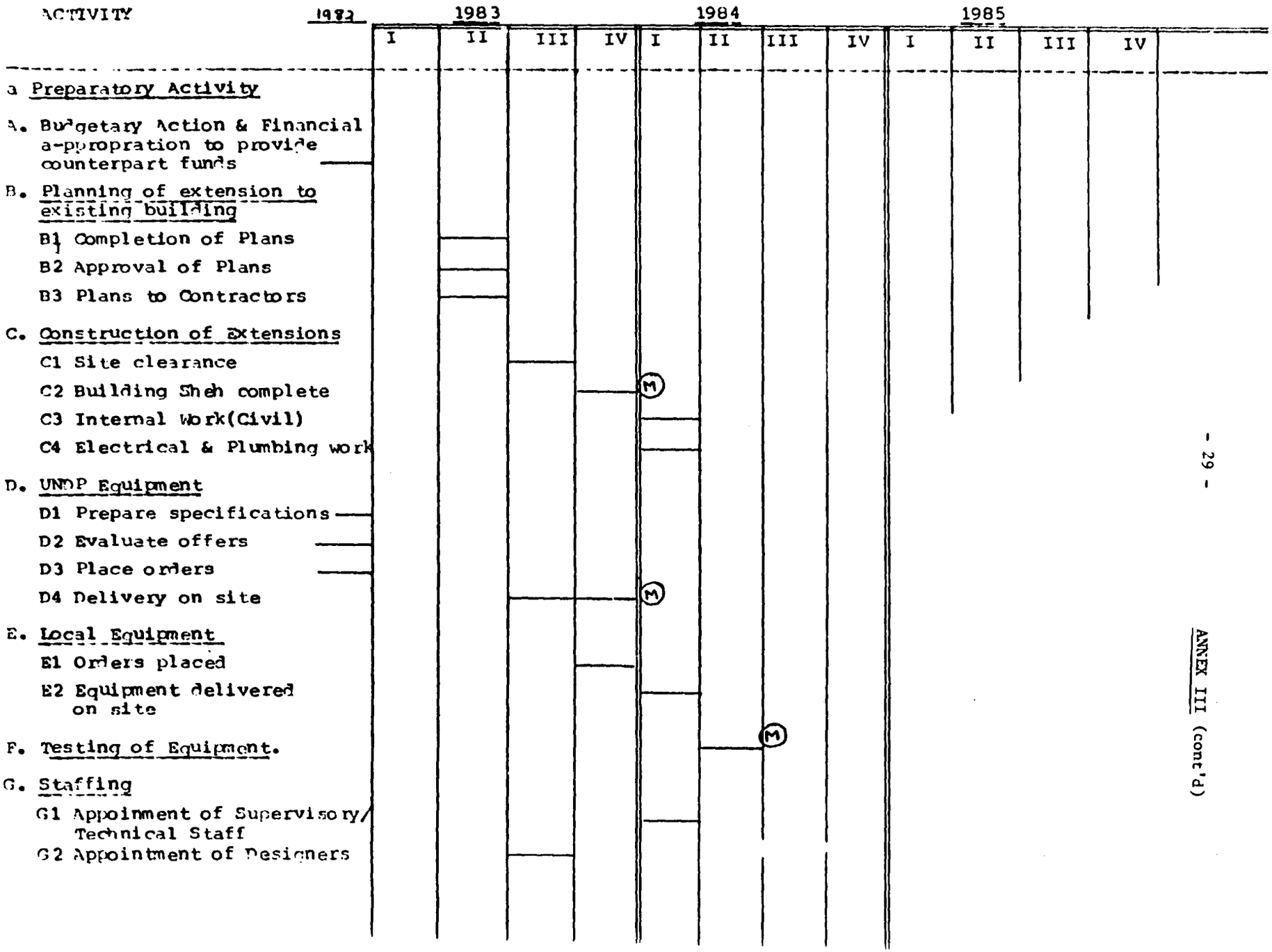
PROJECT WORK PLAN

Note: 1. Events prior to C.T.A.'s arrival at Project (23 November 1983) are included when they actually occurred.

2. "Milestones" are designated thus - (M).

3. Submission of each Report to be designated a "Milestone".

ANNEX III (cont'd)



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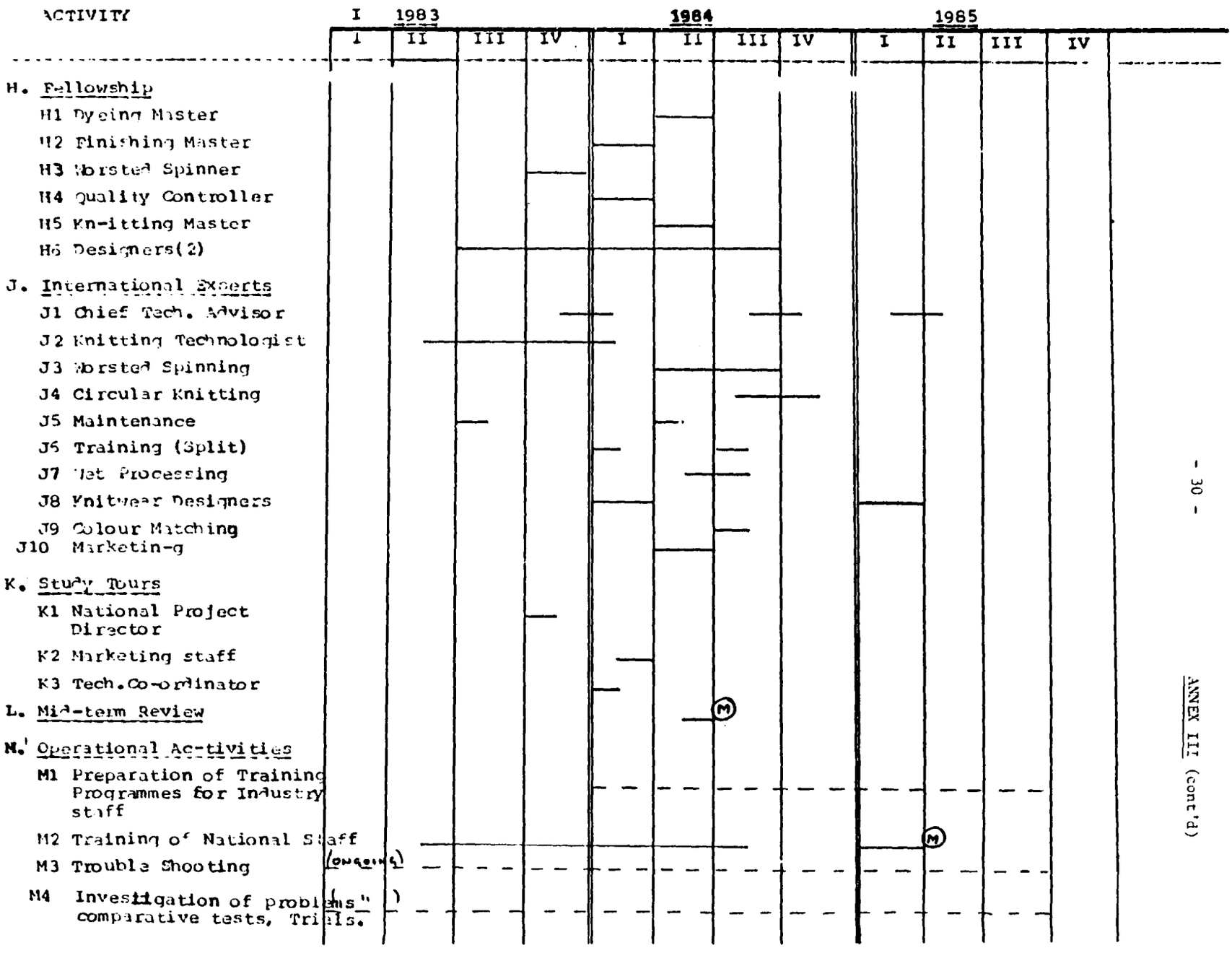

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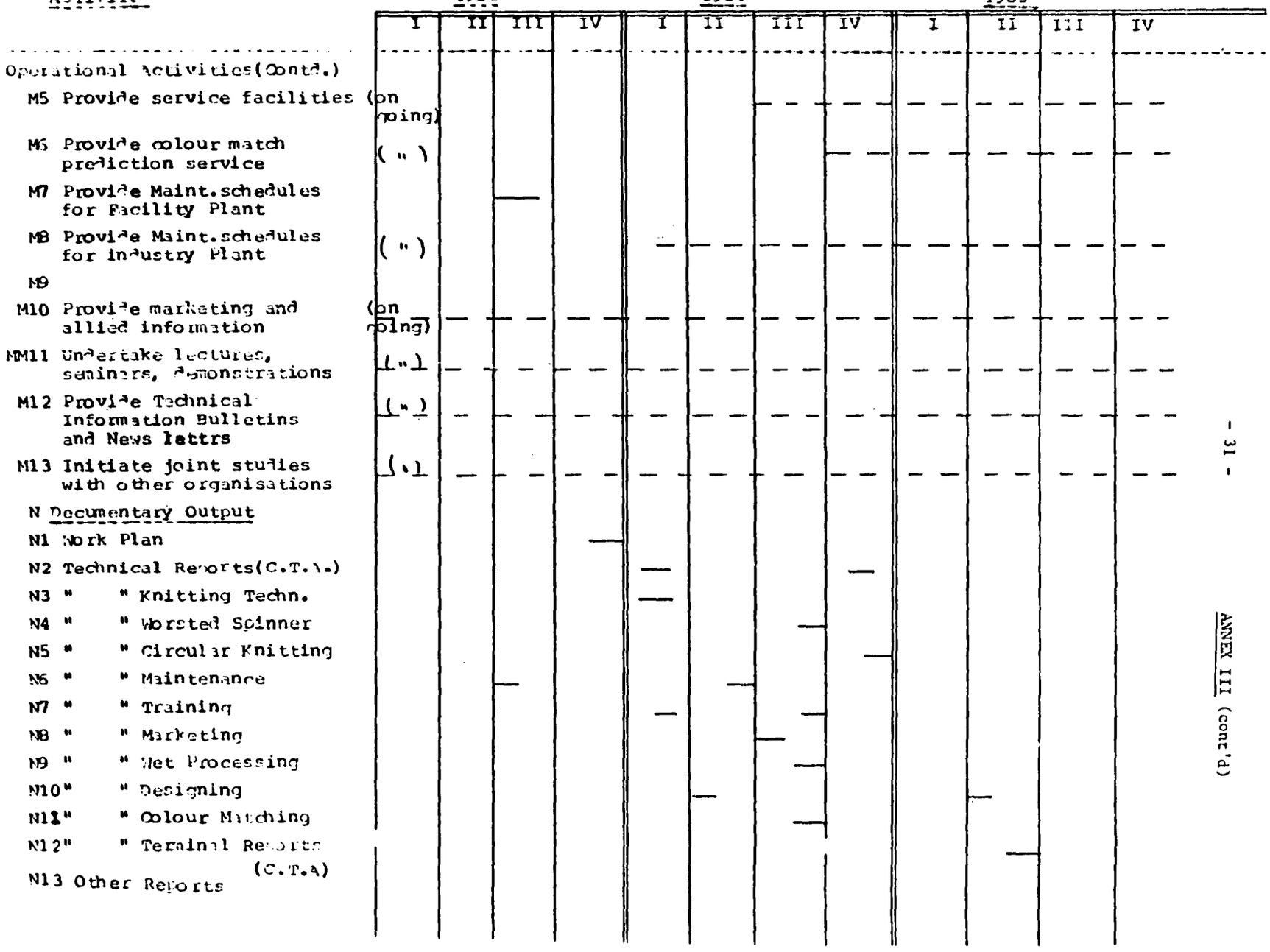
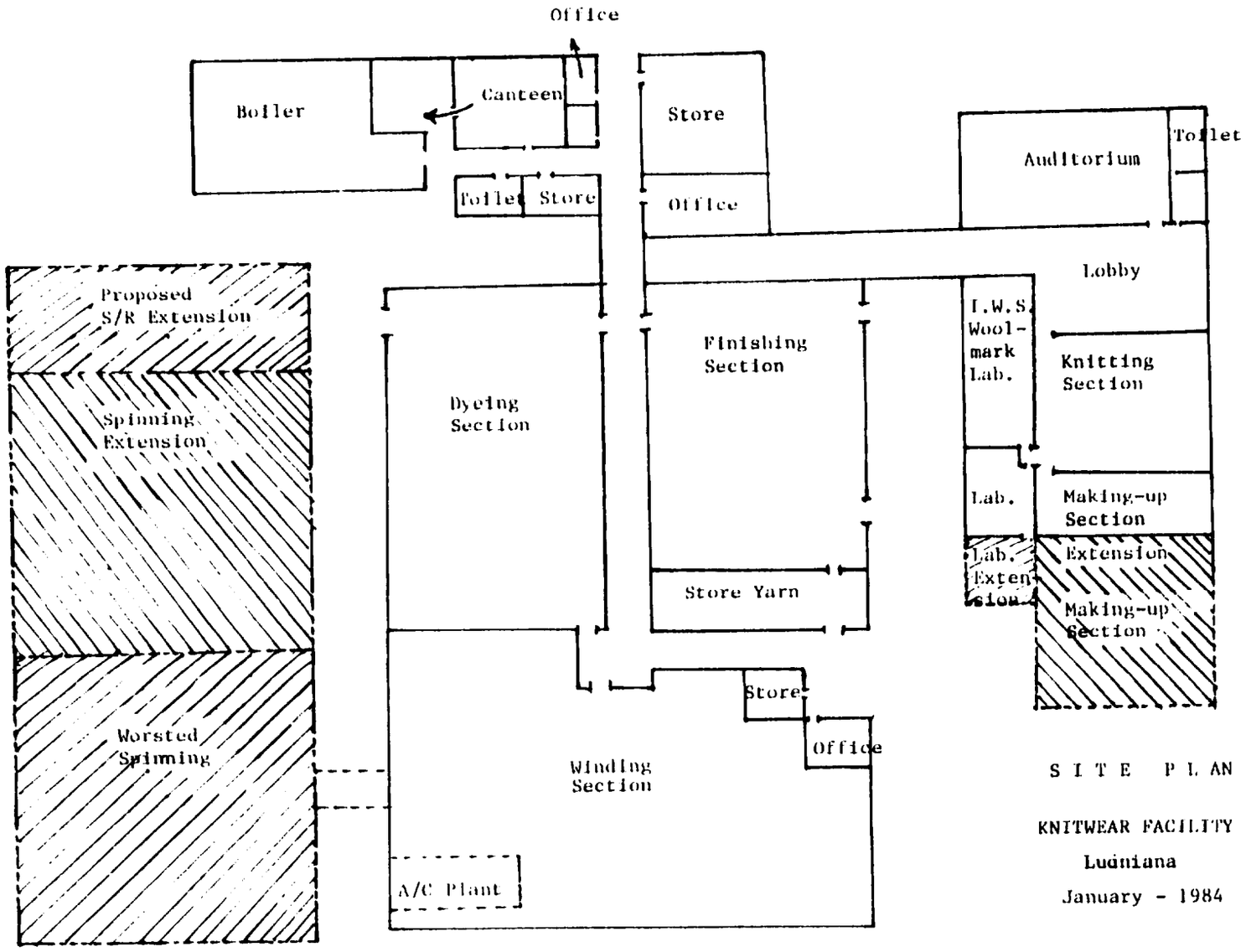




S I T E P L AN

KNITWEAR FACILITY

Ludhiana

January - 1984

ANNEX V

ERECTION SCHEDULE FOR PREPARATION, SPINNING AND KNITTING AREAS

Bulletin

1. Meeting held at 2.00 p.m. Thursday 2 February 1984 attended by J.N. Vohra, D.V. Bist, C.T.A. and Baldev Singh.

2. Review of Critical Activities:

   - The floor laying is exactly on the present schedule, cement will be available as required so no hold up is envisaged.

   - Air Conditioning is still a critical area if it is the intention to have this operational by the time machine erection is completed. Unless details are finalised quickly, the spinning machines will have to be tested in a non-air conditioned atmosphere during summer 1984.

   - The consultant appointed, in conjunction with the Chief Engineer, will submit a Joint Report for the final selection of tenders.

   - A decision will also be required soon on the specification and contractor for Roof Insulation Work.

3. Negotiations on Additives are under way - no further progress to report. This is not a critical area yet.

4. Autoconer Creel - This subject was discussed in detail. Information on the time of erection and other practical operational details are needed. This will then be included in the schedules at a later meeting.

5. Repco Machines included in Schedule. Not critical.

6. Fancy Twister erection included in Schedule.

7. Compressed air will be available in April.

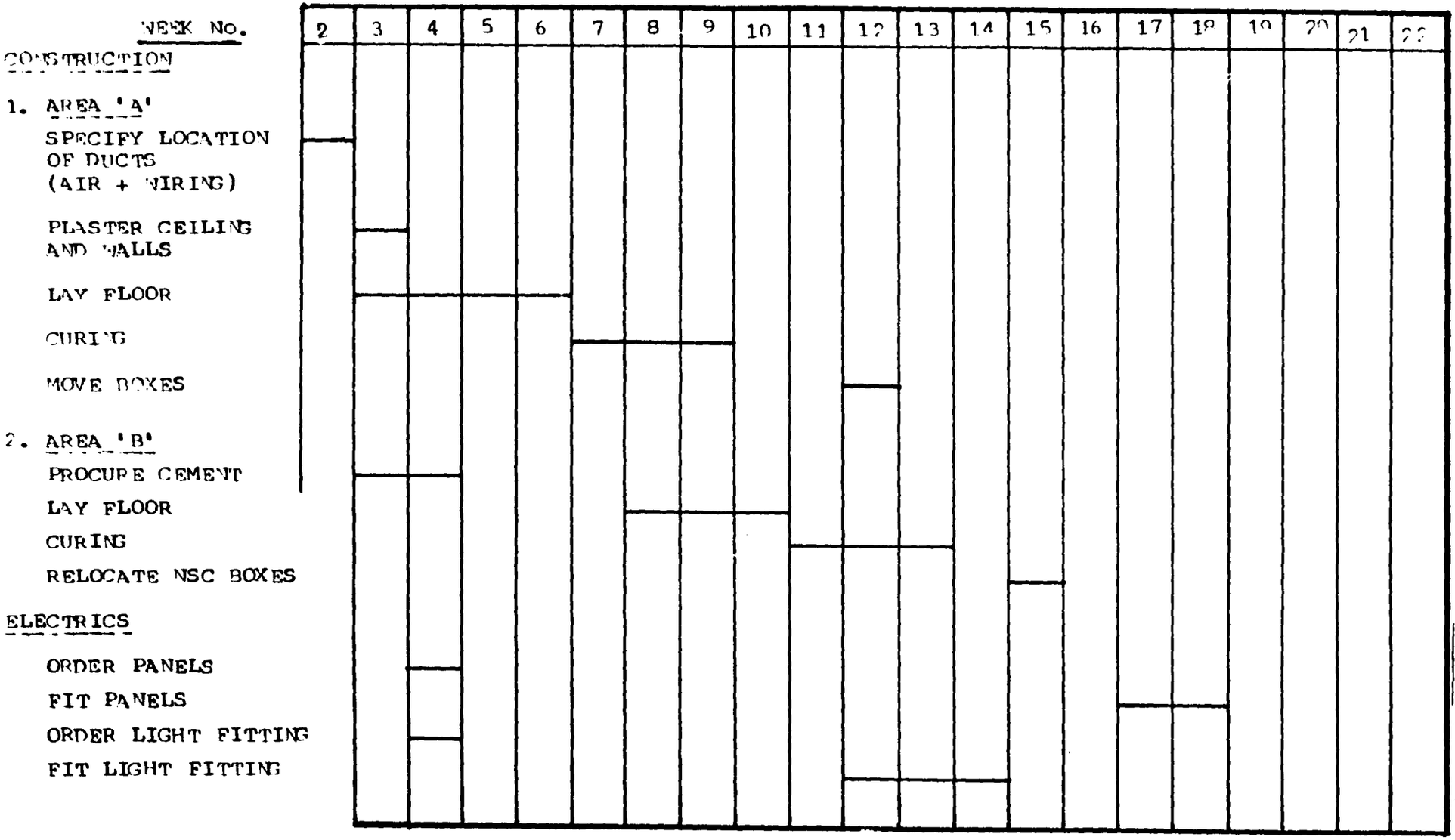
8. Work has already started on the Knitting Area. A skeleton schedule was drawn up and is included in the main schedule.

Dr. S. Brook,
C.T.A.

3 February 1984

cc: N.P. Director
J.N. Vohra
Baldev Singh
D.V. Bist
File (2)

ANNEX V (cont'd)



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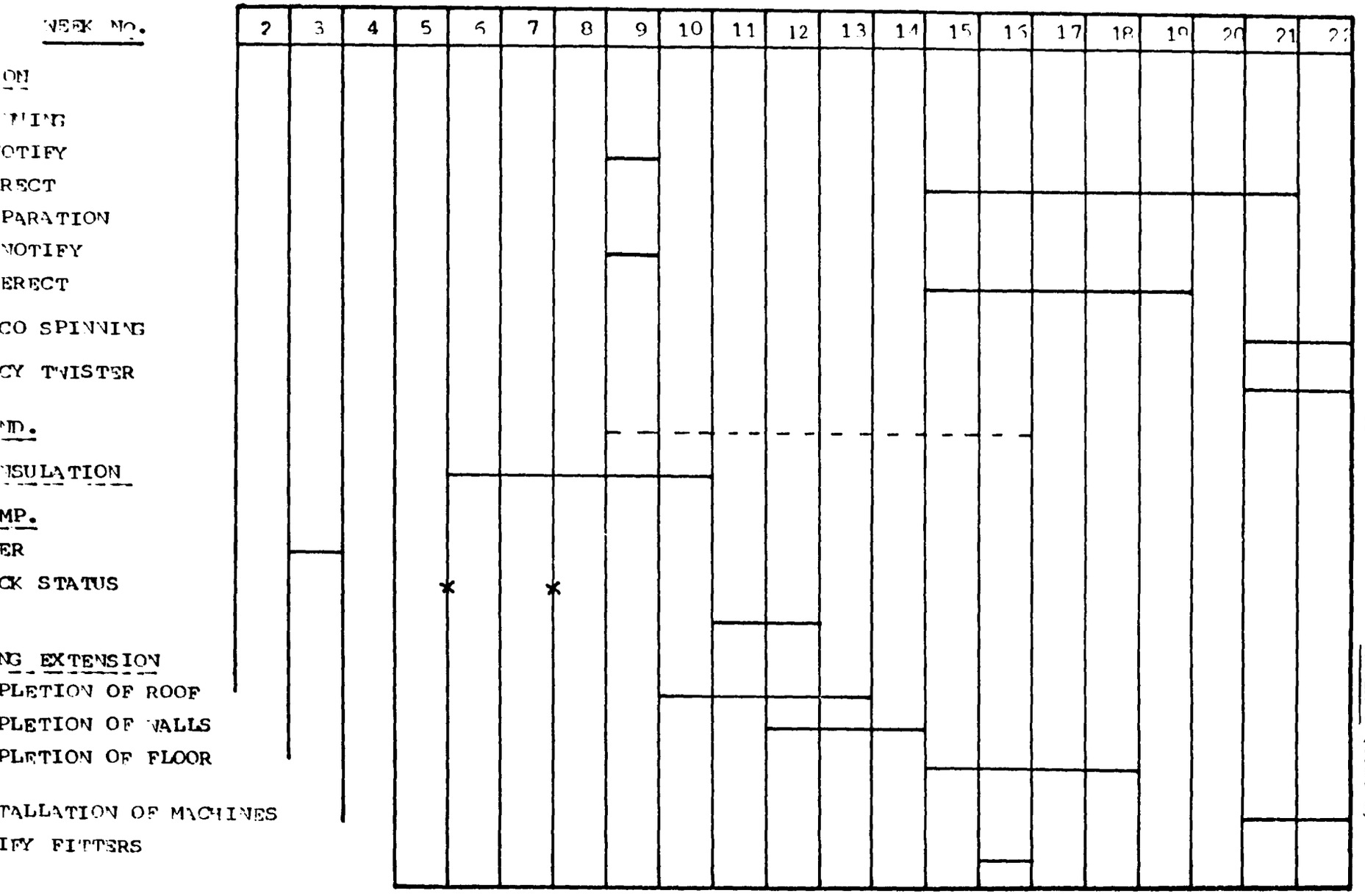

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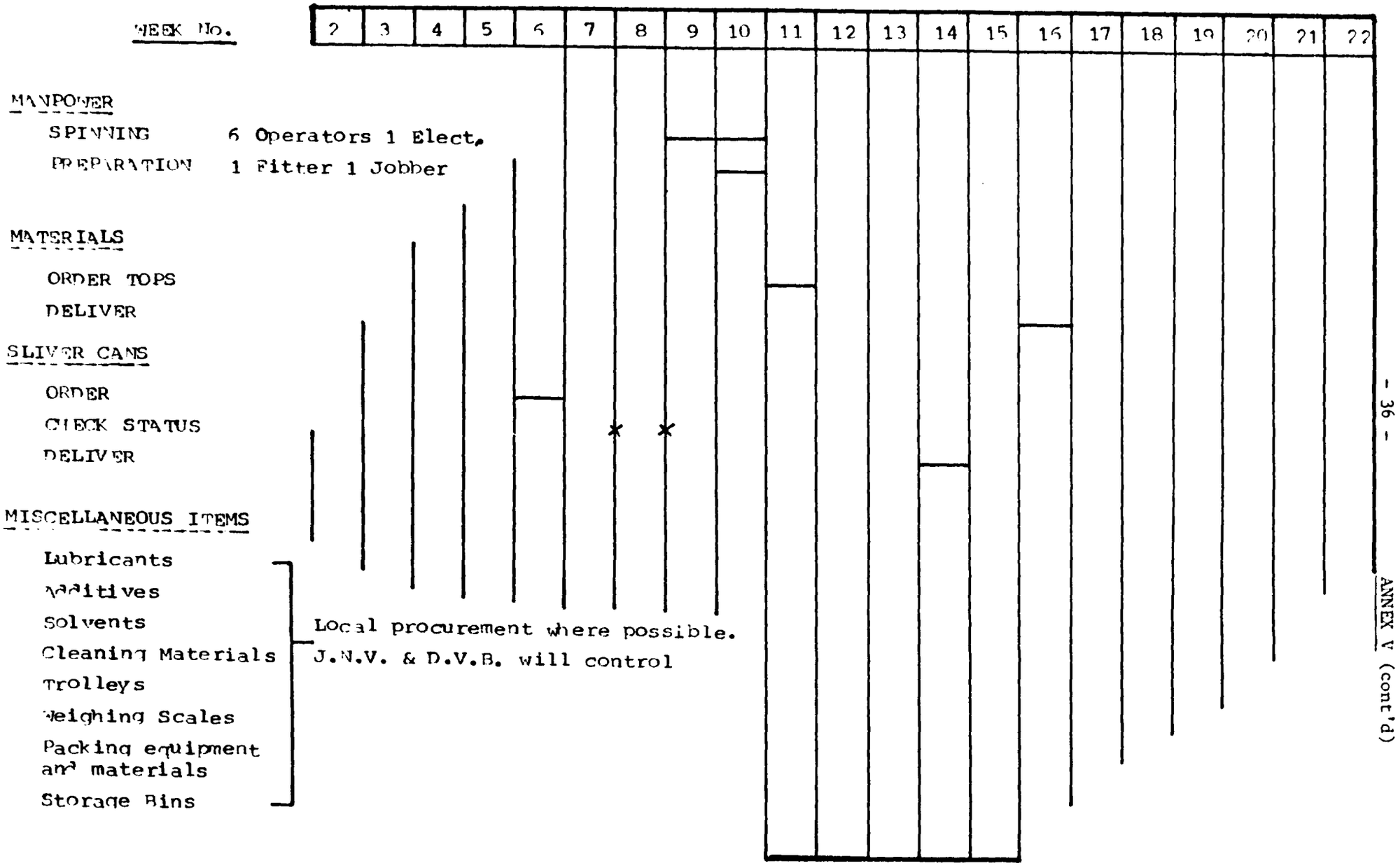


Spindle oil pump	D.V. Bist to follow up
Testing Equipment	" " " " " "
Grinding Equipment	D.V. Bist to follow up also C.T.A. to follow up in Vienna

ANNEX VI

STATUS OF INSTALLED MACHINERY

(December 1983)

With the exception of the machines listed here, all the machinery already installed is in working condition.

Knitting

Bentley-Cotton frame - Problem seems to be in main variable speed drive control. This has been so far past 6/8 months. Local "expert" has examined it with little effect. Have sent symptoms to Cottons for their advice etc.

Durkopp Button-hole - Has been out of action over 1 year. Nobody here seems to be able to fix it.

Winding

Hamel Twister - Tips of mandrels on approx. 12 sections were broken when roof insulation panel fell. Not a big job to rectify.

Schlafhorst Winder - One electronic clearer unit covering a section of heads went U/S after voltage stabilizer was fitted. Several P.C. boards are required as replacements. Compressed air has never been fitted to this machine because 'dry' air is unavailable, but it seems to be working fine without it at present.

Finishing

IBIS steam press was giving a condensate problem so the Chief Engineer here modified it. It is not working 100% and there are several pipes which have been disconnected.

Kurt Ehemann press - Heating elements burnt out approx. 1 year back. It was connected up to steam line and used this way. New elements have recently arrived.

Dyetex machine - This has not been fully operational for the past 2 1/2 years. It was able to be operated manually for a time but this situation no longer applies. Proposed they ask for assistance from manufacturer.

Kannegiesser Style Finisher. Machine has been out of action over 1 year. Various local engineers have examined it with no result. Currently correspondence between Indian agent and Mr. Vohra may produce action.

ANNEX VII

TECHNICAL ASSISTANCE TO THE INDUSTRY

1. Quality Control Section

a) Assistance for yarn development: M/s Oswal Woollen Mills and M/s Kohinoor Woollens Mills, are being actively assisted in development of woolmark quality worsted spun knitting yarns. The assistance provided include yarn evaluation and process quality control.

b) Assistance for maintenance of testing equipment. Assistance has been rendered to the following units in repair, standardisation and installation of their testing equipment:

i) Greatway Woolcombing Unit.
ii) Oswal Woollen Mills.
iii) Malwa Cotton Spinning Mills.
iv) Angora Woolcombers.
v) Nagesh Knitwears.

c) Introduction of inplant quality control in the dyeing and knitting units. The following units were assisted in establishing their quality control system, machinery layout and production procedures, inspection methods etc. After upgrading the following units were licenced for "woolmark":

- Abrol Knitwears.
- Beri and Beri.
- Garg Knitwears.
- Dixon Knitwears.
- Sunflag Knitwears.
- Milan Knitwears.
- Regency Fashions.
- Sirpanch Hosiery Works.
- Joy Hosiery Mills.
- Dinar Knitwears.
- Naw Bharat Knitwears.
- Jain Uday Hosiery.
- Subhash Dyeing Works.
- Punjabi Dyeing House.
- Rampal Scientific Dyeing Works.

d) Assistance in garment inspection for export markets. 4 units viz M/s Oswal Woollen Mills (Export Wing), M/s Jaidka Hosiery Mills, M/s Swadeshi Karyala and M/s Sutlej Hosiery Mills were assisted in upgrading their knitwear for export to USA and Western Europe through quality inspection.

e) Assistance to the woolmark licensee units in-plant quality control and production inspection. The quality controller alongwith the staff of I.W.S. (India) visited 40 knitting units and helped them to update their quality control laboratory test methods and production sequence.

f) Quality control services were provided to 243 units during the period and 1388 tests were carried out as per the following break-up:

Purpose of testing	Test (Nos)	Units (Nos)
Quality process/control	290	72
Raw Material Check	282	71
Product Development	700	83
Investigations of technical problems	94	13
Statutory/Export Inspection	22	4
	1388	243

Besides the local units, services were also rendered to certain units of Amritsar, Jammu, Delhi and Bombay.

2. Winding and Twisting Section

a) M/s Arihant Fabrics were assisted in development of Polyester texturised filament yarn/polyester viscose texturised yarns for their new range of suitings. The developed yarn and the suitings made therefrom were approved by the unit and their customers. So far approx. 2 MT yarn has been twisted for the unit.

b) M/s Kohinoor Woollen Mills submitted yarn samples for examination on Payer Digimat for yarn faults, the party was given necessary advise after the analysis, for overcoming the faults.

c) A survey was conducted for machinery maintenance at M/s Amita Udyog Spinners, and guidelines were prepared and given to them for machine cleaning and scheduled/preventive maintenance.

d) M/s Greatway Private Limited - were assisted by providing technical details for making soft packages for dyeing. Suitable packages for their dyeing unit were prepared for their guidance and reference.

e) Assistance was provided to M/s Sriyansh Knitters for developing a raised yarn equivalent to 3/2/32 NM loopraised mohair yarn using coarse type of mohair tops from which they were not able to spin yarn finer than 12 NM count. The material is now in regular production at the unit.

3. Knitting Section

a) M/s Addicrafts were having operational problems with Camber circular machines due to vibration and longer stitch length at the starting of the machines. The fault was traced to the non-functioning of the brakes due to some defect in the electronic panel. The defect was rectified with the help of their electrician and the machines worked normally afterwards.

The party was also assisted in improving the quality of their knitted plush fabric, in which the stitches used to show up on the reverse side. The problem was found to be due to the use of two yarns having different types of twists (i.e. Z and S). The quality was improved with the use of yarns of same type of twist.

b) Two entrepreneurs Mr. R.P. Jain, who is putting up a full fashioned unit and Mr. Sripal Jain of Decent Fabrics who intends to install circular knitting machines in his unit, have been assisted in preparing the project proposals and in selecting suitable machinery. The work in this area continues.

c) In co-operation with the UNDP Knitting consultant, the following units were provided technical assistance for product development through discussions, visits and training of knitting and making up technicians at the KF:

(i) Modella; (ii) Ess Ess Sales; (iii) Hind; (iv) York; (v) Swadeshi Karyala; (vi) Saab; (vii) Sind; (viii) Nagesh Knitwear; (ix) Vardhman; (x) Rajah.

4. Finishing Section

a) Nagesh Knitwears: The Bowe solvent scouring machine of the unit was erected and commissioned.

b) York Hosiery: The Activa unit of their Bowe Machine was giving difficulty in distillation cycle due to the escaping solvent vapour. The fault was traced to the leaky gasket on the inlet valve of the machine, assistance was provided for its replacement.

c) Hind Hosiery: The imported tumbling machines did not function after installation and could not be operated. The fault was traced to the mechanical safety devices, which were adjusted and the machines were made operationable.

d) M/s Vardhman Export Wing: Assistance was provided in establishing the conditions for milling of lambswool and Angora/Wool garments in acqueous phase.

e) United Trading Company: Assistance was provided for giving sheep skin finish to their 80/30 Acrylic wool plush fabric. After some trials the unit was advised to make 70/30 acrylic wool fabric for getting proper sheep skin finish.

5. Dyeing Section

a) M/s Oswal Woollen Mills are being assisted in rendering superwash finish on knitted wool garments to produce machine washable garments.

b) M/s Swadeshi Karyala have been assisted in producing shrink resist olive green full sleeve vests for defence requirements. The shrink resist treatment and dyeing were carried out at the KF.

6. Engineering Section

a) M/s Suraj Industries: are being assisted in fabricating the solvent recovery plant for dry-cleaning units. The work is in progress, the main items such as drum, blower, condenser, solvent separation tanks etc. have been designed and fabricated. The work is held up presently for the want of suitable butterfly valves. The fabrication, assembly and testing of the plant will be done once the valves are obtained.

b) M/s Greatway installed a package dyeing machine and rapid dryer, which was of different make than the main equipment and did not function properly. After studying the problem at the site and discussion with the supplier's engineers it was found that the fault was due to the carrier design which did not match with the requirements of the dryer. Suggestions were made to suitably modify the carrier, to overcome the problem.

ANNEX VIII

TRAINING COURSES HELD BETWEEN
MID 1982 AND END 1983

	TITLE	Date Held	No. of Participants	No. of Units
1.	TRAINING PROGRAMMES			
1.1	Effect of Post Spinning processes and yarn characteristics on knitting performance and quality of knitwear	31.08.82	18	10
1.2	Aqueous Finishing of Botany Wool knitted garment	09.09.82	29	18
1.3	Application and Selection of dyes	06.11.82	20	5
1.4	Receipe Formulation and Shade Matching	07.02.83	14	14
1.5	Printing of Wool Knitwear	03.03.83	45	34
1.6	Woolmark Quality Control Course	05.07.83	9	9
1.7	Special Finishing of Wool Knitwear	29.07.83	60	48

ANNEX VIII (cont'd)

	TITLE	Date Held	No. of Participants	No. of Units
2.	PAPERS			
2.1	High Pile Knitting	07.10.82	15	5
2.2	Role of Supervising Manager in an Industrial Organisation	17.09.82	10	KF Staff
2.3	Machine Maintenance Management	16.10.82	44	16
2.4	Export Marketing	30.04.83	3	2
2.5	Maintenance	28.07.83	8	KF Staff
3.	SEMINARS			
3.1	Symposium on Machine system for Production of worsted yarn with SLM Manaklal, Bombay	12.04.83	38	33
3.2	Symposium on Acrylic Fibres for knitting industry with IPCL	07.06.83	70	42

ANNEX IX

STUDY TOURS AND FELLOWSHIPS

Technical Controller

1.	Management of a Technical Service and Applied Research and Development Organisation	I.W.S. (U.K.)	5 days
2.	Management of Contract Research Organisation	Shirley Institute (U.K.)	5 days
3.	Organisation and Management of a Knitting Workshop	I.W.S. (Holland)	3 days
4.	Short appreciation course on Knitwear Design	(U.S.A.)	4 days
5.	Discussions on approach to R+D in the Textile Industry	T.R. Inst. (U.S.A.)	2 days

Quality Controller - R + D Officer

1.	Follow up on recent developments in testing and in particular Woolmark testing as well as a study of how R+D activities are planned and executed.	I.W.S. (U.K.)	7 days
2.	Selection, use and maintenance of equipment used in standard testing laboratories, and modifications applicable to these instruments. Instruction on Standard techniques used in woollen spinning industry.	W.I.R.A. (U.K.)	2 days
3.	Design of Projects and methods of implementation within knitwear and allied industry sector.	Aachen (F.R.G.)	3 days
4.	Updating on the latest research on wool and similar fibres, and on current trends in finishes applied to these fibres.	Hart Foundation (Holland)	3 days
5.	Appreciation of large scale projects for contract research as well as aspects of projects on non-wool textiles, effluent and energy conservation.	Shirley Institute (U.K.)	3 days
6.	Specific details of latest techniques for knitwear and new developments in knitwear.	H.A.T.R.A. (U.K.)	2 days

Knitting Master

1.	Instruction on latest developments in circular knitting and in particular in operation of specific machinery supplied.	Bentley (U.K.)	14 days
2.	Study of organisation of a prototype sample making unit. Update on latest trends and techniques in production of knitted outerwear.	I.W.S. (Holland)	5 days
3.	Study of organisation of a prototype sample library and methods of collection and dissemination of information on techniques of manufacture.	I.W.S. (U.K.)	3 days
4.	Visits to representative manufacturing units to have exposure and appreciation of working conditions in modern plants (This to be arranged via Bentley).	(U.K.)	3 days

Knitting Supervisors

1.	Instructions on the operation of modern fully-fashioned machines, translation of designs into pattern instructions and the execution all development of their instructions to produce the required end results.	Bentley (U.K.)	15 days
2.	Instructions on the operation of modern automatic knitting machines. Update on latest technology trends.	Dubied (U.K.)	15 days

Processing Manager

To keep abreast of modern trends and developments it is essential for the Processing Manager to visit a wide variety of firms manufacturing a range of machinery. The areas covered by each firm are detailed overleaf, with a key giving the companies names and the number of days vist recommended.

KEY:

Firm No.	Name	Country	No. of Days
1.	Babcock Textilmaschinen	F.R.G.	3
2.	Bruckner Trockentechnik	F.R.G.	3
3.	Kurt Ehemann	F.R.G.	3
4.	Fleissner	F.R.G.	4
5.	Gaston County	U.S.A.	2
6.	Isotex	Italy	2
7.	Kleinewefes	F.R.G.	2
8.	Jaeggli	Switzerland	2
9.	Muller	F.R.G.	2
10.	Pegg	U.K.	3
11.	Tomlinson	U.K.	2
12.	Tube-Tex	U.S.A.	3

	FIRM NO.											
	1	2	3	4	5	6	7	8	9	10	11	12
Hosiery Dyeing	-	-	-	-	-	-	-	-	-	X	-	-
Shrinking	X	-	X	-	-	-	-	-	-	-	-	X
Coating and Laminating	X	X	-	X	-	-	X	-	-	-	-	-
Knitwear Finishing	X	X	-	-	-	-	X	-	-	-	-	X
Raising	X	-	-	-	-	-	-	-	X	-	-	-
Radiation Drying	X	X	-	-	-	-	-	-	-	X	-	-
Suction Drying	X	X	-	X	-	-	-	-	-	-	-	-
Tensionless Drying	X	X	X	-	-	-	-	-	-	-	X	X
Drying Conveyors	X	X	-	-	-	-	-	-	-	-	X	-
Tunnel Dryers	X	X	-	-	-	-	-	-	-	-	X	-
Shearing	-	-	-	-	-	-	-	-	X	-	-	-
Suede Finish	-	-	-	-	-	X	-	-	X	-	-	-
Flock Printing	-	-	-	-	-	X	-	-	-	-	-	-
Mercerizing	-	-	-	-	-	-	X	X	-	-	-	-
Non-wovens	-	X	-	X	-	-	-	-	-	-	X	-
Foam Finishing	-	-	-	-	X	-	-	-	-	-	-	-

ANNEX X

No. KF/_____ Dated 20th Jan.,84

Dear Mr.Veith,

C.T.R.FACILITIES

I am writing to thank you for allowing us to see your impressive facilities. I am sure that your capabilities would be more than adequate to handle any repairs etc. required by this project.

I have passed on your name and that of your colleague Mr.R.K.Banta to our J.N.Vohra the Technical Coordinator and advised him of the assistance you could possibly provide and the mechanics of setting this in motion.

Once again many thanks for your kind attention.

Yours faithfully,

Dr. Stuart Brook
Chief Technical Advisor

Mr.Hans Veith
German Team Leader
Central Tool Room
A-5, Focal Point
Ludhiana-141010

ANNEX XI

LIST OF INDUSTRY VISITS

23 November	-	Swadeshi Karyala
	-	L.W.S. Knitwears
	-	Companion Knitwears
24 November	-	Shiroga Int.
	-	Ashoka Dyeing and Finishing
	-	Nagesh Hosiery Exports
2 December	-	Oswal Woollen Mills
	-	S.J. Woollen Spinners
3 December	-	Srivallabh Spinning Mills
	-	Raj Mechanical Industries
5 December	-	Abrol Knitwears
	-	Koh-i-Noor Spinners
	-	Jaidka Hosiery
	-	Jain Udhay
7 December	-	Satish Hosiery
27 December	-	Panipat Spinning Mills

ANNEX XII

DAIRY OF EVENTS

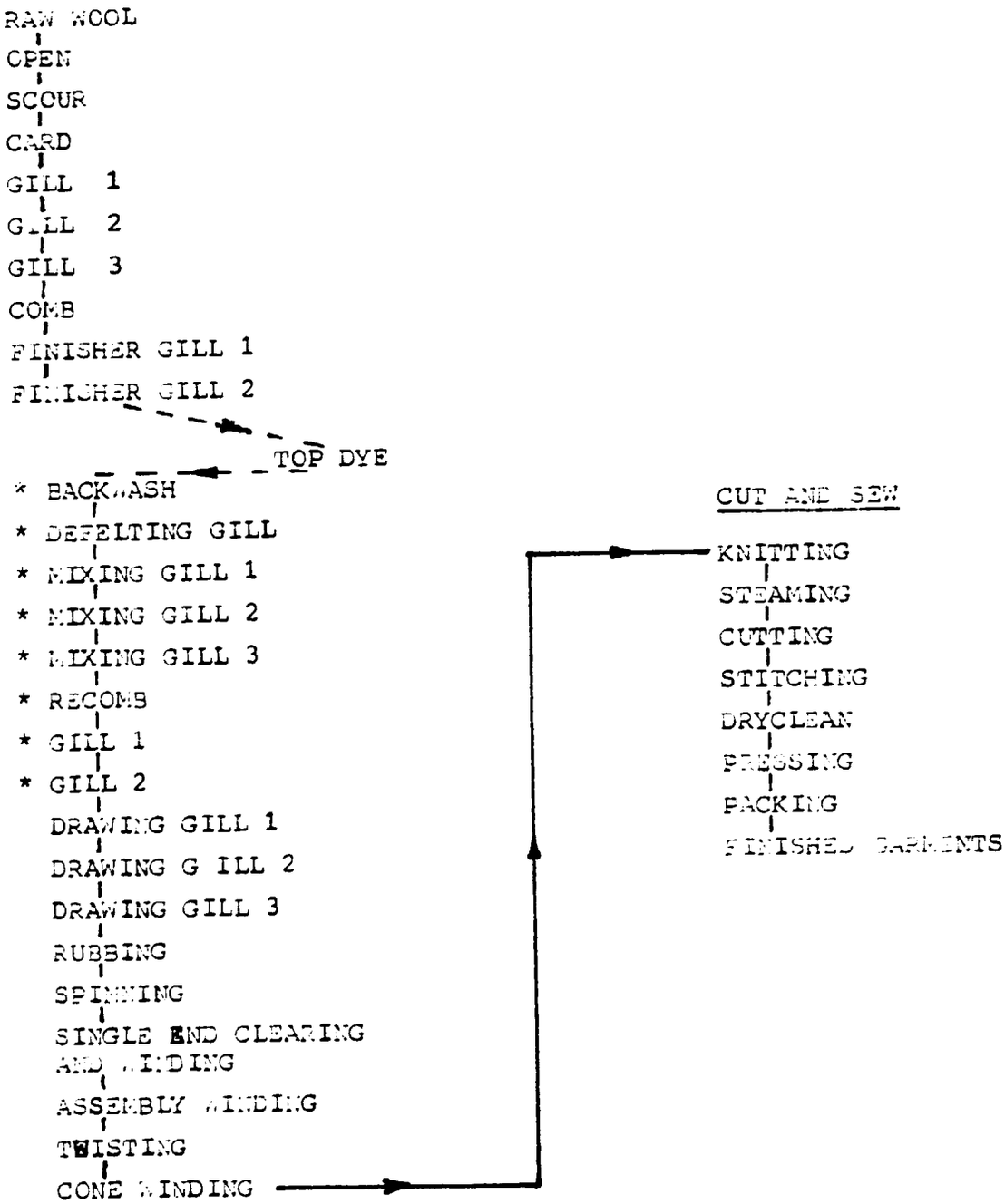
15-16 November	-	Briefing Vienna
18 "	-	Briefing New Delhi
21 "	-	Informal meeting with Mr. T.K.A. Nair, Secretary to the Government of Punjab and Chairman of PSHKDC.
22 "	-	Meeting of Wool and Woollen Exports Promotion Council and I.W.S. at Facility.
29 "	-	Informal meeting with Mr. R. Singh, Assistant to Mr. T.K.A. Nair.
2 December	-	Visit by Mr. D.K. McDowell, New Zealand High Commissioner to India.
13 "	-	Visit by Mr. Ian McWhinney, Australian Wool Board.
22 "	-	First Project Advisory Committee Meeting.
26 "	-	Board Meeting - Chandigarh.
19-20 January	-	Meeting with proposed Marketing Expert Ludhiana/Chandigarh.
23 "	-	Visit by Industries Minister, Government of India.
31 "	-	Meeting with Shri Mani Narayanswami, Secretary to Government of India - Department of Textiles.
1 February	-	Visit to Garment Exporters Association Fair, New Delhi.
4 "	-	Second Project Advisory Committee Meeting.
8 "	-	De-brief New Delhi.
13-14 "	-	De-brief Vienna.

ANNEX XIII

Material Flow Comparisons

a) Worsted Spun Yarn/Cut and Sew make-up

WORSTED SYSTEM



* If the worsted spun yarn is to be cone-dyed, these operations may be omitted.

b) Woollen Spun/Fully fashion