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TABLE OF CONTENTS

INTRODUCTION

This report covers the activities of the dyeing and finishing consultant during the first mission to UNIDO executed Project DP/ROK/82/027 (Textile Dyeing and Finishing Research Centre).

In this report the consultnat presents the main findings during his one month mission and offers recommendations for further action.

Purpose of the Project:

The Government of the Republic of Korea has set high priority on modernising the country's textile industry in order to facilitate the growth of textile exports.

In order to reach this goal it is considered necessary to improve the competitiveness of the textile industry by steering its development in the direction of higher quality and technologically advanced textile products. It is within this framework that the government, with UNDP assistance, is establishing the Dyeing and Finishing Research Centre with the main aim of helping the Korean textile industry to improve the quality of their products mainly in the export markets.

Immediate Objectives:

The immediate objectives of the project is the establishment of a Dyeing and Finishing Research Centre to provide assistance to small and medium industry and related textile services institutes.

The Centre will comprise the following:

1. A textile testing and process development laboratory.
2. A routine chemical analysis laboratory.
3. A dyeing and finishing laboratory.
4. A comprehensive textile chemical information, education, training and demonstration service.

Duties:

As one of the two short term consultants attached to this project, the consultant will work in close co-operation with the counterpart, Project Director and her staff and is expected to provide assistance in textile dyeing and finishing production processess (pilot-plant scale) specifically, expected to:

1. Assist in the installation and commissioning of the pilot-plant equipment and assist in starting up its operation.

2. Visit Korean factories to identify critical problems and use these to design a work plan for the pilot-plant.

3. Investigate new dyeing and finishing techniques in the pilot-plant and introduce suitable techniques in Korean factories.

4. Develop a training programme at the pilot-plant for factory personnel.

TEXTILE DYEING AND FINISHING RESEARCH CENTRE (TDFRC)

The TDFRC, Project DP/ROK/82/027, is established within the premises of the Korea Research Institute of Chemical Technology (KRICT), Daejeon, to which the Government has mandated the implementation of this project.

The main mission of KRICT is to contribute to the advancement of chemical technologies in Korea and its R/D activities covers the area of organic and inorganic chemistry, polymers, life sciences, chemical engineering, and now one more last addition, the TDFRC.

During my stay I had an office-room next to the Project Director and was supplied with required facilities of telephone connections, typing facilities and transport. The counterpart Project Director, Dr. Sea Wha OH, has been accompanying me in mills and other institution visits.

Laboratories:

The existing laboratory is 200 sq.mtr. and mainly involved in research work dealing with the synthesis as well as chemical/physical analysis of textile dyes and chemicals. It contains the following equipment:

1. TLC Scanner
2. GC (Gas Chromatograph)
3. HPLC (High Performance Liquid Chromatograph)
4. UV-260 (Ultraviolet-Visible Spectrophotometer)
5. Moisture Balance
6. Sensitive Balances (3)
7. Microscope
8. Melting Point Apparatus

Concerning the required equipment for the application and textile testing functions, three requisitions No. 86/1, 86/2 and 86/3 have been sent to UNIDO, Annex I.

According to the Project Document some of the ordered equipment are not to be supplied by UNIDO. Also in our opinion they do not represent a priority at this early stages of the project.

After reviewing these requisitions, it can be seen that:

- A faster start to the operation of the laboratories can be achieved by acquiring the needed equipment as per Annex II.

- According to the Project Document, the equipment to be supplied by UNIDO consists of:

1.	Colour Matching Computer	- $ 100,000
2.	High Performance Liquid Chromatograph	- $ 15,000
3.	M.W. Distribution Measuring Apparatus	- $ 5,000
4.	Coulter Counter	- $ 30,000
		$ 150,000

Now the position has changed as items 1 and 2 are being purchased by the Government.

Under the present circumstances, and for quick functioning of the Centre's laboratories, I would recommend to consider the purchase of items included in list Annex II.

The equipment needed and priorities of procurement were discussed in detail with the Project Director and agreed upon. Specifications for the needed equipment are indicated in Annex III.

As mentioned in the Project Document the Centre is in need of 900 sq.mtr. Now the available area is only about 250 sq.mtr., so another area is to be made available to accommodate the centre activities. Annex IV gives a proposal for the areas to be considered for future planning.

Staff:

In addition to the Project Director, three Junior Researchers have been assigned to the Project and another three supported by D/F research grant joined the Project recently. They are all University graduates in Chemistry with experience of one to five years in the field of organic synthesis and chemical analysis, but none of them had experience in D/F industry.

Due to the delay in starting the Project Activities, other members of the staff should be appointed in the near future so as to cover the prescribed activites of the Centre.

For future appointments especially those of the senior staff, it is recommended that the Centre appoints chemistry graduates who have been working in the D/F industry and are interested in carrying out R/D activities in their field.

Fellowships:

There are six fellowships and a study tour for the Project Director. Delay in the nomination of candidates has been due to language difficulties and not having enough Centre staff. So far only two candidates have passed the English language tests. The Project Director has nominated another five from the Dyes Synthesis Project to sit for the language test, in the event of any of them achieving success, they will be transferred to TDFRC. On the other hand none of the nominees has a knowledge of the Japanese language, so it is equally difficult to propose Japan for training.

A proposal for the Study Tour of the Project Director and three Fellowships covering training in textile printing and dyeing, quality control and D/F machinery is given in Appendix V.

Library and Information Service

KRICT has a central library including a variety of books, references and journals dealing with the different chemical industries. The section concerning D/F have about 120 books and 14 textile periodicals.

As the TDFRC is a new addition to the activities of KRICT, the present collection of literature is not sufficient and needs to be expanded by adding more of the required material in the field of D/F.

A list of books and periodicals has been suggested to the Project Director and it is hoped that they can be aquired in the near future. I brought with me some selected publications and studies in D/F. Photocopies of

these were made and added to the library collection. Some of the dyestuff producers supplied catalogues and other useful publications.

I would also request UNIDO to supply the Centre with a copy of UNIDO monographs and publications in the field of textiles.

DYEING AND FINISHING MILLS

The Korean textile industry employs nearly 738,000 people representing 22% of the total working force, thus greatly contributing to the nations economy and keeping its position as the main-stay industry.

In 1985 exports of textiles from Korea amounted to US$ 7.078 billion accounting for 24% of the nations total exports, while the set goal by the Government is to attain US $ 10 billion exports by end 1986. The main reason for not achieving the planned export figures lies in the fact that, so far, the industry has mainly relied an increasing export volume rather than shifting to higher-value textiles. To obtain higher income from textiles it will be necessary now to move towards quality in D/F, also improvement in fashion and design.

The total number of D/F firms is about 600. They are practically concentrated in three main areas around Seoul, Daegu and Pusan. Big industrial estates having central effluent treatment and power facilities have been established in these areas by the Government.

D/F sectors capacity and productivity is as follows:

	Capacity in '000 yds.	Production in '000 yds.	Utilisation (%)
Woven Fabrics			
Cotton & Cotton blends	668,679	459,160	68.7
Synthetics	1,939,226	1,143,399	59.0
Silk	107,280	67,059	62.5
Knitted Fabrics	650,550	445,218	68.4
Others	163,134	113,546	69.6
Total (1000 yds.)	3,528,869	2,228,382	63.1
Yarn	in Kgs.	in Kgs.	
Synthetics	156,861	115,635	73.7
Cotton & Cotton blends	15,223	8,606	52.6
Total (Kg.)	172,084	123,641	71.8
Printing	in '000 yds.	in '000 yds.	
Woven prints (1000 yds.)	219,393	125,730	57.3

During my stay I had the opportunity to visit ten companies ranging from big to medium and small mills.

Findings:

1. The Labour force is industrious and well disciplined. The performance of the labour has been one of the key factors in the rapid growth of the industry but it needs now to be supported by advanced technology and sufficient knowledge of the demand in the world market.

2. The quality of yarn, woven and knitted fabrics supplied to the D/F mills are of reasonably good standard. It now remains with the D/F sector to produce attractive fabrics and to raise the quality and value added of the Korean textiles.

3. Six of the visited mills lack facilities for water treatment. While others can economise in caustic soda consumption if they have caustic recuperation plants. These mills use caustic soda on a big scale in mercerising and softening treatment for polyester fabrics. They can only reuse a limited portion of the wash dilute caustic solution.

4. In one of the printing mills it was noticed that the design being printed has poor fittings and sometimes the overlapping of the design is substantial. Such faults should be traced in all stages of preparing and application of the printing screens.

   At another mill the prints with reactive colours should be more brilliant, also a compound shade showed some colour separation.

5. In some cases the machinery used is of old designs which cannot be easily controlled, examples;

   - Gear design of Jigger creates fabric tension and causes creases.
   - Constant need of adjustment for one flat screen printing machine probably due to problems in the pitching device.
   - Colour migration due to uneven hot air distribution inside drying chambers.

   or sometimes because of non-availability of the proper machine, alternatives are used which cannot give the required effect, example:

- Because of the absence of a special machine for mercerising circular knitted goods, the knits were simply treated on a chainless mercerising machine. This type of machine is specially designed to treat woven fabrics and will never confer a reasonable mercerising effect to circular knitted goods.

6. From the ten mills visited only two were performing adequate quality control on their products, another one has a moderately equipped testing laboratory which is carrying out occasional tests on the products.

7. The condition and maintenance of machinery varies from one mill to another. In some cases the automatic control instruments of machines were out of order.

8. The majority of machines are locally manufactured and some are old versions of Japanese and Europeon machines. The other few lack control, fine adjusting devices, and up-to-date concepts of energy-conservation. A recent survey of D/F machines (Business Korea, November 84) showed that approximately 50% of the machines used are older than 15 years.

D/F Machines by Age

Years old	25	20	15	10	5	Total
%	4.9	14.2	31.5	33.7	15.7	100

D/F Machines by Country

Country	Korea	Japan	USA	UK	Germany	Others	Total
%	74	17.5	0.3	0.8	4.6	2.8	100

9. Four of the mills visited are quite old and it seems that little attention has been paid to the great savings in cost and improvement in output that can be chieved by insuring that the plant is correctly laid out.

10. In one of the mills visited and dealing with D/F of cotton and cotton polyester woven fabric, cloth handling was on carts. For better efficiency and productivity, wherever possible batch system of handling cloth has always proved to be more efficient. This view is supported by the various work study surveys carried out in many D/F mills. Use of the batch system will also minimise the staining of fabrics with rust and dirt during processing. However, this can be achieved gradually as a number of machines in use need to be fitted with batching devices in addition to the pleating devices they already have.

TRAINING AND TESTING INSTITUTES

Kyeong-Buk Textile Technology Promotion Centre (KTTPC), Daegu

This Centre was established in 1978 with the aim of serving the textile industry in Daegu area. The Centre has a good collection of testing and pilot-plant equipment but lacks a chemical laboratory which is a pre-requisite to carry out basic training on D/F.

Now it seems that very little activity is taking place in the Centre. As a service to the industry some tests are being done, while a newly acquired colour matching computer is starting to have increasing use by the industry.

In the field of training, the Centre carried out what is considered to be introductory training in D/F. Only one general D/F course in two levels is being done. Ninety percent of the course is theory, very little is done in laboratory and practical aspects of D/F.

Daegu Vocational Training Centre, Daegu

The activities of this centre covers various industrial fields like engineering, electronics and textiles. About 600 high school graduates join the Centre each year. From these 60 train on weaving and another 60 in D/F.

The duration of training in D/F is for one year. Thirty percent of the course is theory and seventy percent is spent in chemical/pilot-plant laboratory and other practical aspects of D/F, including two weeks training in a D/F company. At present the Centre is considering to increase the training period by another year to include more advanced courses in the field of D/F.

Korea Yarn & Fabric Inspection Testing Institute (FITI), Seoul Daegu, Pusan and Daejeon

This is a private establishment which has started its function in 1969. It's primary mission is to inspect export textiles and also conduct inspection for buyers upon request. They have four laboratories situated in Seoul, Daegu, Pusan and Daejeon. Because of their good performance they were designated by the Government as sole inspectors for textile exports.

We had the chance to visit two of their laboratories at Seoul and Daegu. The laboratories are well equipped and we were impressed by their high performance and ability. They are also offering training in testing and inspection for quality control personnel from the mills.

Korea Textile Inspection & Testing Institute (KOTITI), Seoul

Like FITI they are a private establishment having their laboratories at Seoul. They carryout testing for spinning, weaving and knitting industries to test the physical properties of the fabrics and yarns. For the D/F sector the majority of tests carried out deal with the measurement of colour fastness.

RECOMMENDATIONS

1. Mills to produce more quality goods:

Mills should concentrate on producing quality goods in accordance with the requirements of local and foreign consumers. The export oriented textile industry of Korea has to meet severe competition in the world market by evolving new techniques and production methods to suit demand trends. Product development functions can be established in each mill for recommending fashion colours, print designs, and collecting overseas information concerning market trends and new products.

2. More mills to establishquality control laboratories:

Competition is export markets is a major factor to improve quality. An important point is that the first objective should be to improve the over-all quality for export. Industry should become more accustomed to quality production methods so that the quality of textile goods for the continually changing export market can be maintained.

It is recommended that, the many mills which do not have Q.C. facilities or possess inadequate quality control facilities, start establishing laboratories and carry out a complete quality control function including process control.

3. Emphasis to modernize printing technology:

Special emphasis on modernizing printing technology should be a priority. The methods used in designing and engraving needs to be updated with advances in this field. It is time that more mills introduce photo-engraving techniques in preparation of the print designs. More accurate and flawless designs, shades, chalk effects, continuous tones, etc. ..... are needed to keep up with advances in the printing field. With the high competition in the market customers look for prints with:

- the finest designs
- beautiful fashionable shades
- live and brilliant shades

4. More contact between technical personnel:

One of the impressions felt during mill visits is the lack of contact between the technical staff of different mills. It would be helpful for the industry, if close contacts exists between technical people. Seminars are occasionally arranged by foreign dyestuff manufacturers but only on a limited basis. Seminars and technical discussions can be arranged through specialized technical institutes. Some of these already exist but with little such activity. However, the TDFRC, KTTPC and FITI can play a role in the future,organizing specialized training programmes and seminars.

5. Textile education to consider early specialization:

An outstanding difficulty encountered by the industry is the shortage of qualified textile chemists in the D/F sector. There are numerous engineering colleges in the country where students get degrees and even Ph.D. in textile engineering. The studies cover mostly spinning and weaving but very little is taught about the chemistry of D/F. The textile chemistry course given to the students is mostly theoretical and very limited practicals or in-plant training in D/F companies. It may be worthwhile that one or two of the existing textile engineering courses be revised to allow for early specialization. This needs syllabus revision and consideration for early specialization for students who wish to join the D/F industry.

6. Big and medium mills to have training departments:

Training of mill personnel should be looked after as a long term investment in the right direction and should be supported by mill's managements. Few mills have training departments. It is now necessary to establish organised training departments in each mill where suitable training programmes for its employees can be organised. Apprenticeship schemes practiced by some mills and under which mills employ apprentices, train them and later employ them as regular officers, is a step in the right direction.

7. KTTPC to have active role in training:

The training activities performed by KTTPC at Daegu is not at all sufficient. At present this Centre carries out what is considered to be introductory training in D/F. Only one D/F course in two levels is offered of which 90% are general lectures but very little is done in laboratory and practical aspects of D/F.

While this Centre has a comprehensive range of testing and pilot-plant equipment (also acquired lately a colour matching computer) it lacks the facilities of a chemical laboratory as well as experienced staff in the field of D/F.

Being the major textile training institution in the country, KTTPC should plan for and carry out specialized training in the different aspects of D/F. It is not enough, neither is it recommended, to go on giving only one general D/F course. There should be specialised and separate courses on raw materials, bleaching, dyeing, screen/roller/rotary printing, finishing and quality control. The Centre should add a chemical laboratory and increase practicals as this will help in giving practical knowledge to the trainees and making the Centre's efforts a success.

On the other hand the Centre does not have, at present, enough D/F staff to carryout its activities in a perfect way.

It is necessary to get assistance from specialized D/F personnel. Those can be from:

- Textile Departments, Universities
- Technologists, D/F mills
- TDFRC staff
- Textile inspection and testing institutes staff
- Local dyestuff producers
- Foreign dyestuff companies

8. TDFRC to represent the co-ordinating core for R/D activities:

As a service and research Centre in the field of D/F, the Centre should represent the co-ordinating core for textile chemistry research and development objectives. With the support of KRICT, close contacts with the managements of the following institutions is necessary:

- Korea Federation of Dyeing Industry.
- Educational and training institutions in the field of D/F (KTTPC, Daegu Vacational Training Centre, Daegu Young Nam University, Seoul National University).
- Textile Inspection and Testing Institutes (FITI, KOTITI).
- Dyestuff companies (Korea Dyestuff manufacturing association and technical representatives of foreign dyestuff companies).

Co-ordination and intimate contact with KTTPC of Daegu is essential for the mutual progress of both institutions and the resulting benefit to the industry. Each can utilise equipment facilities not available to the other. Also the staff of TDFRC can assist in carrying out D/F training courses at KTTPC.

9. Concluding recommendation:

The TDFRC Project has been long delayed. It is now necessary to expedite efforts to purchase the needed equipment, avail the necessary space for the laboratories, appoint staff and activate the required fellowships.

APPENDIX I

Ordered Equipment (UNIDO)

	$	Purchase Order No.
- Microscope, trinocular		86/1
- Balance, digital 150-200g		86/1
- Balance, electronic (two sets) 0-400g		86/1
- M.P. apparatus, electrothermal		86/1
	30,000	
- Weatherometer & Accessories*	30,000	86/2
- Laundrometer with dyeing system*	15,000	86/2
Computer digital controlled dyeing system (microprocessor & upto 40 specimens)		
- Softness-stiffness tester	2,500	86/2
- Flammability tester*	4,500	86/2
- Electrical resistence tester*	2,000	86/2
- Spectra light (colour matching cabinet)*	4,500	86/2
	58,500	
- High performance liquid chromatograph	50,000	86/3

Total - 138,500

* Instruments already included in list of required equipment (Appendix II).

APPENDIX II

Required Equipment for TDFRC Laboratory

A. Testing Instruments	$
Perspirometer	400
Electrical resistance tester*	2,000
Crease recovery tester	300
Rubbing fastness tester	300
Spray rating tester	300
Thermo tester	2,000
Abrasion tester	4,100
Flammability tester*	4,500
Colour matching cabinet*	4,300
Weatherometer*	30,000
FTIR Spectrometer	50,000
	98,200

B. Laboratory Machines	
Laundrometer with dyeing system*	15,000
One position universal dyeing machine (equipped with process controller)	12,000
Laboratory 2 bowl padder with patching system	8,000
Laboratory H.T. steaming, curing and setting machine	25,000
	50,000

* Mentioned overleaf, i.e. Appendix I.

APPENDIX III

Specifications for required Equipment

Perspirometer

To estimate the colour fastness of dyed fabrics against sweat, sea water, fresh water and change during storage.

Crease Recovery Tester

Can assess crease recovery properties of a fabric.
- Holds one sample at a time

Rubbing Fastness Tester

To test the colour fastness of dyed or printed fabrics against rubbing and abrasion.

Spray Tester

Tests resistancy of fabric to surface wetting.

Thermo Tester

Used to estimate the resistance degree of coloured textile to the changes in colour and hue caused by dry heat, also heat resistance of fibres.

- Equipped with 10 heat plates
- Temperature range 100-250°C and temperature difference of 10°C between plates
- Automatic thermo-controller
- Testing pressure of 30gm/cm^2
- Power Source: 120V AC, 60Hz

Abrasion Tester

To measure wear and abrasion resistance of fabrics.

- Can take up to 4 samples
- Power Source: 120V AC, 60Hz

N.B. Testing instruments to meet with AATCC, ASTM, ISO Standards.

Universal Dyeing Machine

- Has one controllable dyeing position
- Suitable for both normal and H.T. dyeing
- Has process controller with time and temperature values displayed on screen
- Power Source: 120V AC, 50Hz

Laboratory Two Bowl Padder

- Table model, horizontal type
- Roller width 350mm
- Heated liquor trough, capacity 300ml
- Mechanical load adjustment
- Fabric speed 2-10m/min, Gear wheels for the drive of both rollers
- Supplied with patching device
- Power Source: 220V AC, 50Hz, 3 phase

H.T. Steaming, Curing and Setting Machine

- Suitable for steaming with saturated steam upto 102°C also H.T. steaming upto 250°C, with moisture regulation 10-98%.
- Suitable for dyeing curing and setting with adjustable temperature range of 100-250°C.
- Automatic feed and delivery
- Dwell time adjustable 8 sec to 60 min
- Fitted with own steam generator
- Power Source: 220V AC, 60Hz, 3 phase

F.T.I.R. Spectrometer

For identification of fibres and coated resins, to determine the degree of surface coating in addition to the qualitative and quantitative analysis of finishing agents including trace components.

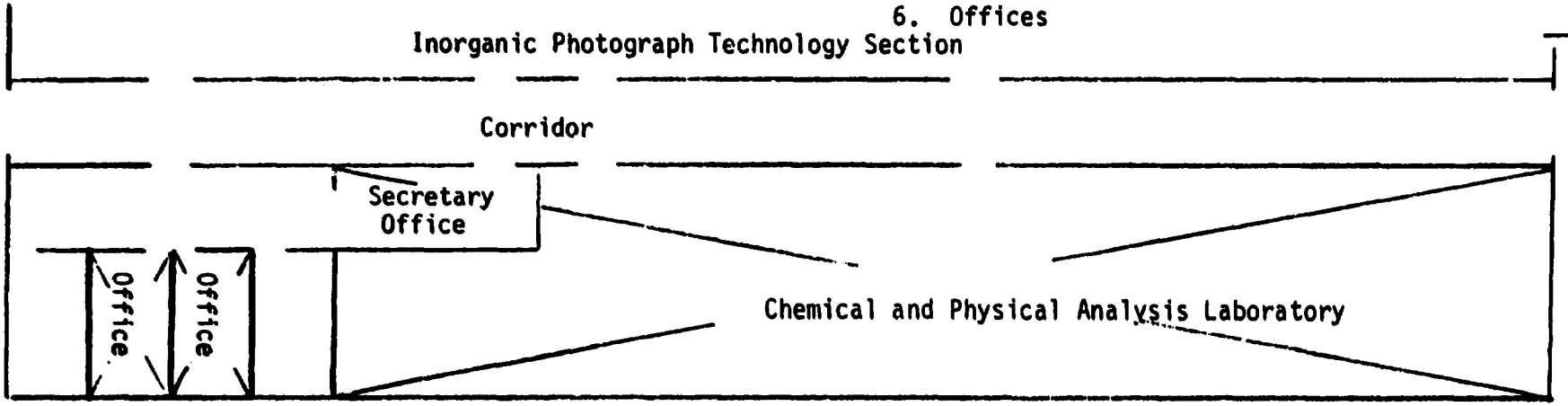
Spectral range	4400-400cm^{-1}
sample optics	dual beams
Resolution	max 3 sec
	low 1 sec
Wavenumber repeatability	± 0.01cm^{-1}
Scanning Rate	Variable
ATR function for surface analysis	
Diffuse/specular reflectance accessory	
DATA Processor	2.4Mb flexible discs and multiple communication ports
Digital plotter	
Power Source: 220V, 60Hz, 3 phase	

APPENDIX IV

Existing and needed area for TDFRC

Existing area for TDFRC	sq. meters
Chemical & Physical Analysis Laboratory	200
Offices	50
	250

Needed area	sq. meters
1. Dyeing & Finishing Laboratory	200
2. Textile Testing Laboratory	150
3. Routine Chemical Analysis Laboratory	100
4. Sample Office and Dyes & Chemical store-room	40
5. Laboratory and Technical Information Office	100
6. Offices	60
	650



APPENDIX V

Study Tour and Fellowships Programme

A. Study Tour for Project Director

Country		Place	City	Days	Total
SRI LANKA	-	Textile Training & Service Centre (to see one of UNIDO Projects)	Colombo	1	
		Textile Mill		1	2
ENGLAND	-	International Colour System ICS (supplier for computer colour systems)	London	1	
	-	Shirley Institute (Activities in the field of service and research)	Manchester	6	7
GERMANY	-	Textiforschungszentrum (review research activities)	Krefeld	4	
	-	Hoechst (fabric preparation, finishing and dyeing with emphasis on naphtol and sol. vat dyes, nylon and silk dyeing)	Frankfurt	3	
	-	BASF (dyeing and printing on P/C fabrics with emphasis on pigment printing, wool and acrylic dyeing)	Ludwigshafen	3	10
SWITZERLAND	-	Ciba-Geigy (Cotton dyeing and printing also resist and discharge styles, P/C, wool and natural silk dyeing and printing)	Basel	5	
	-	Ahiba (laboratory dyeing equipment)	Basel	1	
	-	Federal Institute of Technology (activities in the field of textile education and research)	Zurich	2	
	-	Werner-Mathis (laboratory dyeing equipment)	Zurich	1	
	-	Textile printing mill (P/C and blends)	Zurich	1	10
ITALY	-	Textile dyeing and printing mill (silk)	Como	1	1
			Total 30 working days - 6 weeks		30

B. Fellowships in the fields of:

I. Textile printing and dyeing techniques - TDFRC

II. Textile dyeing and finishing machinery - TDFRC

III. Quality control in dyeing and finishing - KTTPC

- It is suggested that all the three fellows attend the training course to be held at Shirley Institute by mid-June, 1986 for six weeks and covering the following aspects:

  Practicals on dyeing and printing of cotton and man-made fibre fabrics. Covers batch and continuous dyeing: roller, flat-screen, rotary screen, and transfer printing: dyes and chemicals: machinery and equipment: faults: testing: quality control: effluent treatment: energy saving.

- Fellows No. I and III attend training for two weeks at Ciba-Geigy on the following:

  Cotton, P/C, wool, acrylic and natural silk dyeing and printing, resist and discharge printing styles.

- Fellow No. II to have field visits for two weeks to Brugman and Stork machinery companies in Holland as well as Bruckner and Kleinewefers Co. in Germany.

N.B. It is recommended that before proceeding to the above fellowships, the candidates should be trained at FITI laboratoreis and a local D/F company for one month.
This can be very useful.

- Because of language difficulty it is suggested that the three candidates attend together same course starting mid-June 1986, at Shirley Institute, U.K.

APPENDIX VI

Companies and Institutions visited

A. Companies:

Chung Nam Spinning Co. Ltd., Daejeon

Dr. H. Kim - Managing Director
Mr. D.K. Ro - Manager

This is a big integrated textile mill having half a million spindles, 5500 looms and a daily production in D/F of 480,000 meters of cotton and cotton/polyester fabrics. 20% of the produced fabrics are printed, 70% dyed and the rest finished in white.

They have nearly all types of D/F machinery including two rotary screen printing machines.

Tae Chang Textile Co. Ltd., Iri

Mr. J.E. yang - Manager

They are a specialized knitting company producing 20 tons daily of finished goods mainly made from cotton. Most of their production is white or dyed but some are printed. They produce socks, stockings, underwear and fashion dresses also silk and wool knits.

They dye on winches and jet dyeing machines and mercerise on a chainless mercerising machine.

Cheil Wool Textile Co. Ltd., Daegu

Mr. C.J. Choi - Research Director

Integrated worsted wool company, has a daily production of 34,000 yards mostly of wool. One of the largest wool companies in Korea.

They are dyeing on beam and jet dyeing machines, also as tops and yarn. Has modern laboratory, computer for colour-matching and good quality-control function.

Dong-A Silk Co. Ltd., Seoul

Mr. Y.B. Song - Director, Production

Daily production is 40,000 meters of natural silk fabrics of which 30% is dyed and the rest is printed. They dye an winches and print on screen printing tables, also have hand painting.

Yuhan Weaving & Dyeing Co., Daegu

Mr. J.D. Bae - Director

Daily production in 80,000 meters of which cotton and polyester/cotton are 80% and the rest rayon, linen and ramie blends.

They have pad-steam range, thermosol and jet dyeing.

Dae Han Dyeing & Finishing Co. Ltd., Daegu

Mr. H.G. Kim - President

Daily production is 50,000 meters of synthetic fabrics.
They have winches and jet dyeing machines.

Kuk Jae Dyeing & Weaving Co. Ltd., Daegu

Mr. K.H. Oh - Director

This is a 100% woven polyester dyeing and finishing company producing daily 60,000 meters. They specialize in soft handle polyester fabrics.

They dye on beam, jet and thermosol dyeing machines.

E-Hwa Dyeing & Weaving Industrial Co., Daegu

Mr. K.S. Sin - Manager

This is mostly a 100% woven polyester printing company producing daily 40,000 meters.

They have 2 locally produced flat bed screen printing machines also table printing.

Gyung IL Co. Ltd., Daegu

Mr. P.K. Hwan - Director

Daily production about 60,000 meters of which cotton/polyester is about 80% of the production and the rest other blends.

They are dyeing on jets, winches and thermosol machines. This factory has a well equipped laboratory and carries out occasional quality and process control tests.

Wha-Nam Inc., Iri

Mr. S.C. Oh - Director

They manufacture fur coats mostly from imported mink hides. They are not satisfied with the dyeing quality they get from commission dyers and are now planning to erect their own dye-house.

B. Institutions:

KRICT

Korea Research Institute of Chemical Technology, Daejeon

Dr. Y.B. Chae - President
Dr. S.B. Rhee - Research Manager
Dr. S.W. Oh - Project Director
Mr. H.K. Pyo - Public Relations Officer

KTTPC

Kyeong-Buk Textile Technology Promotion Centre, Daegu

Mr. Y.L. Lee - Manager

Daegu Vocational Training Centre, Daegu

Mr. K.S. Han	-	Director
Mr. Lim	-	Assistant Director
Mr. J.B. Kim	-	Department Head
Mr. B.S. Hwang	-	Lecturer

FITI

Korea Yarn & Fabric Inspection Testing Institute

Mr. K.C. Wie	-	Director, Seoul Branch
Mr. K.S. Jo	-	Director, Daegu Branch
Mr. K.J. Bu	-	Director, Busan Branch

KOTITI

Korea Textile Inspection & Testing Institute, Seoul

Mr. C.J. Chang	-	Director, General
Mr. K.Y. Pyoo	-	Director
Mr. Y.C. Ryou	-	Chief, Technology
Mr. K. Hur	-	Lab. Manager

C. Local Dyestuff Producers:

Sam Won Industrial Co. Ltd., Seoul

Mr. J.M. Lee - President and Chairman,
Korea Dyestuff & Pigment Industry Co-operative

Manufacturer of optical whiteners for textiles.

Kyungin Carpo Co. Ltd., Seoul

Mr. R.K. Sung - President and Director,
Korea Dyestuff Manufacturing Association

Manufacturer of reactive and disperse dyestuffs.

Dae Young Industrial Co. Ltd. Seoul

Mr. M.J. Park - Managing Director

Manufacturer of disperse dyestuffs.

D. Others:

Marubeni Corporation, Seoul

Mr. Y. Tatsuta - Manager, Textiles

Ciba-Geigy, Seoul

Mr. J.O. Seiler - Area Manager

BASF Korea, Seoul

Mr.S.Y. Oh - Sales Manager

Hoechst Korea, Seoul

Mr. P.H. Waersegers - General Manager
Mr. S.W. Won - Manager

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9 April 1986

AH/ss