

JAPAN INTERNATIONAL COOPERATION AGENCY
THE PEOPLE'S REPUBLIC OF BANGLADESH
MINISTRY OF TEXTILES

BASIC DESIGN STUDY REPORT
ON
THE PROJECT FOR ESTABLISHMENT
OF
NATIONAL INSTITUTE OF
TEXTILE TRAINING, RESEARCH AND DESIGN
IN
THE PEOPLE'S REPUBLIC OF BANGLADESH

JANUARY, 1994

YAMASHITA SEKKEI INC.

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JAPAN INTERNATIONAL COOPERATION AGENCY

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YAMASHITA SEKKEI INC.

PREFACE

In response to a request from the Government of the People's Republic of Bangladesh, the Government of Japan decided to conduct a basic design study on the Project for Establishment of National Institute of Textile Training, Research and Design and entrusted the study to the Japan International Cooperation Agency (JICA).

JICA sent to Bangladesh a first study team headed by Mr. Takashi Hatakeyama, Dy. Director, First Project Management Division, Grant Aid Project Management Department, JICA and constituted by members of Yamashita Sekkei Inc., from June 13 to June 25, 1993 and a second study team headed by Mr. Toshikazu Isomura, Official, South-West Asia Division Office, the Ministry of Foreign Affairs from July 30 to August 28, 1993.

The teams held discussions with the officials concerned of the Government of Bangladesh and conducted a field study at the study area. After the team returned to Japan, further studies were made. Then, a mission was sent to Bangladesh in order to discuss a draft report, and as this result, the present report was finalized.

I hope that this report will contribute to the promotion of the project and to the enhancement of friendly relations between our two countries.

I wish to express my sincere appreciation to the officials concerned of the Government of the People's Republic of Bangladesh for their close cooperation extended to the teams.

January, 1994



Kensuke Yanagiya

President

Japan International Cooperation Agency

January, 1994

Mr. Kensuke Yanagiya
President
Japan International Cooperation Agency
Tokyo, Japan

Letter of Transmittal

We are pleased to submit to you the basic design study report on the Project for Establishment of National Institute of Textile Training, Research and Design in the People's Republic of Bangladesh.

This study was conducted by Yamashita Sekkei Inc., under a contract to JICA, during the period June 7, 1993 to January 31, 1994. In conducting the study, we have examined the feasibility and rationale of the project with due consideration to the present situation of Bangladesh and formulated the most appropriate basic design for the project under Japan's grant aid scheme.

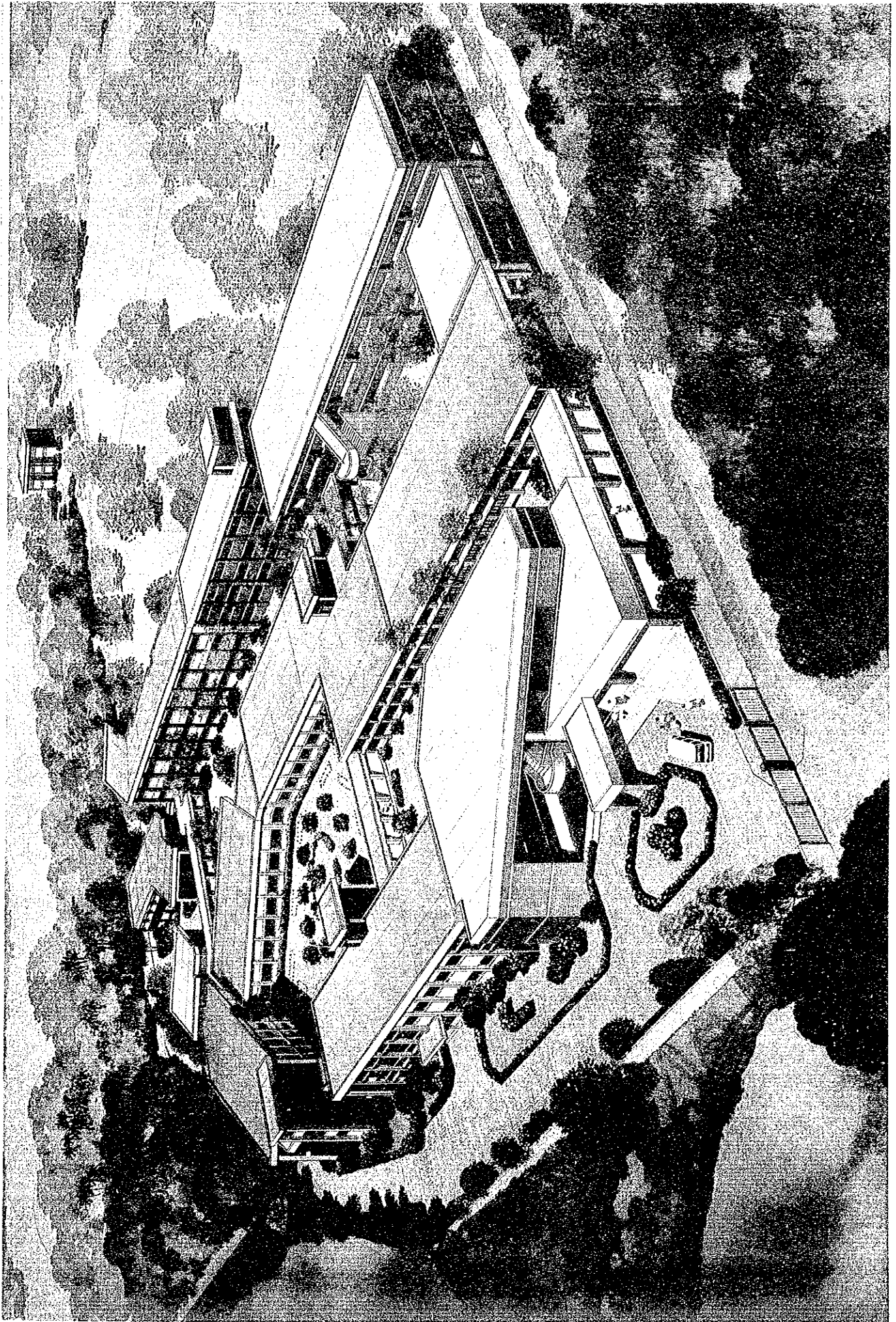
We wish to take this opportunity to express our sincere gratitude to the officials concerned of JICA, the Ministry of Foreign Affairs, and the Ministry of International Trade and Industry. We would also like to express our gratitude to the officials concerned of the Ministry of Textiles, the JICA Bangladesh office, the Embassy of Japan in Bangladesh for their cooperation and assistance throughout our field survey.

Finally, we hope that this report will contribute to further promotion of the project.

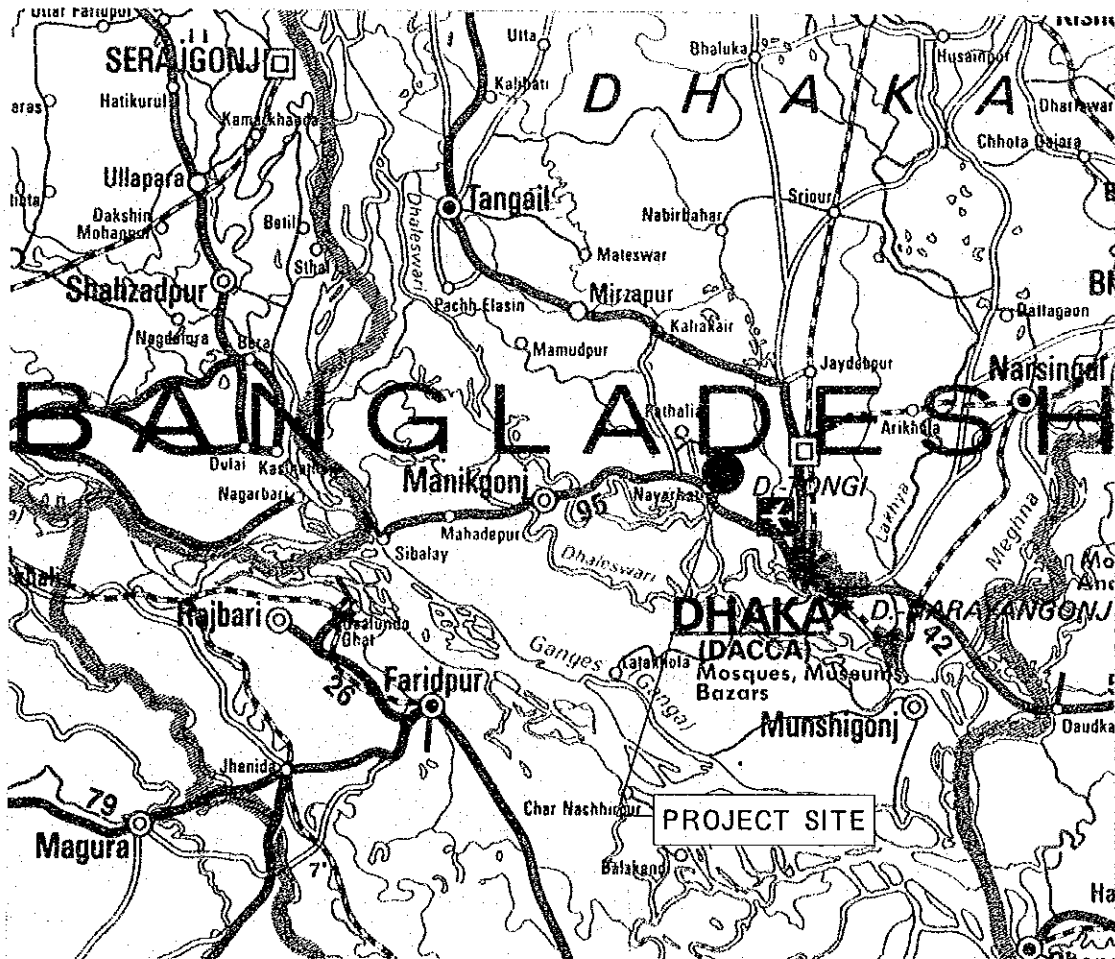
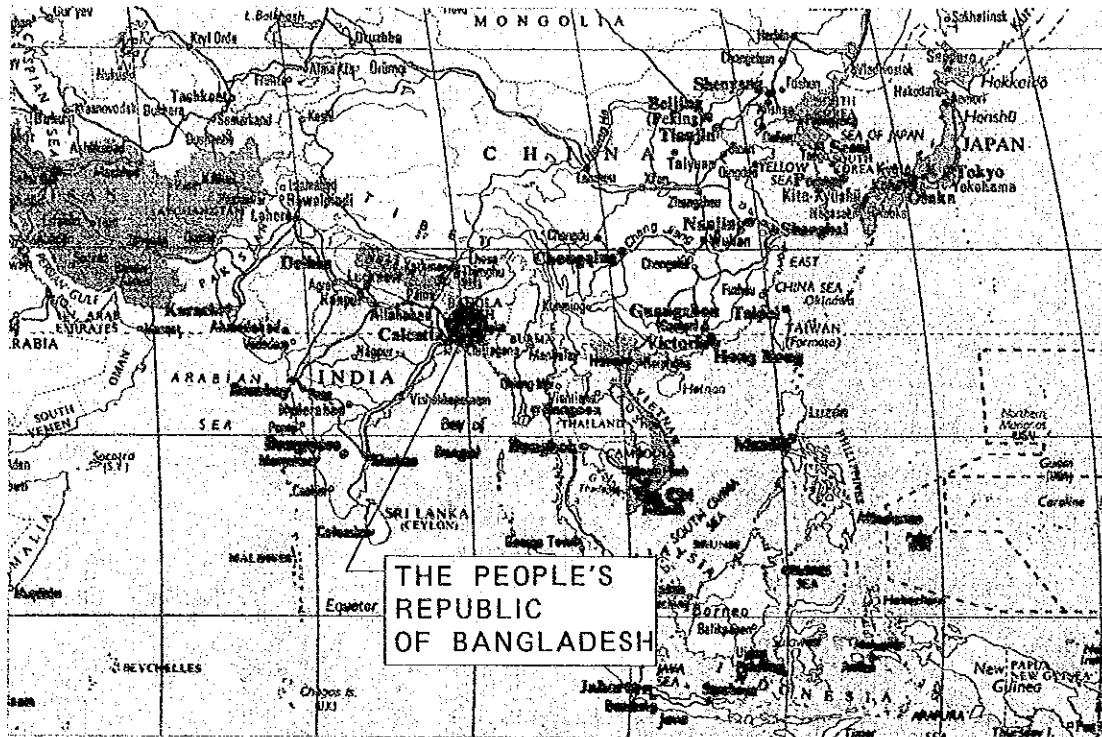
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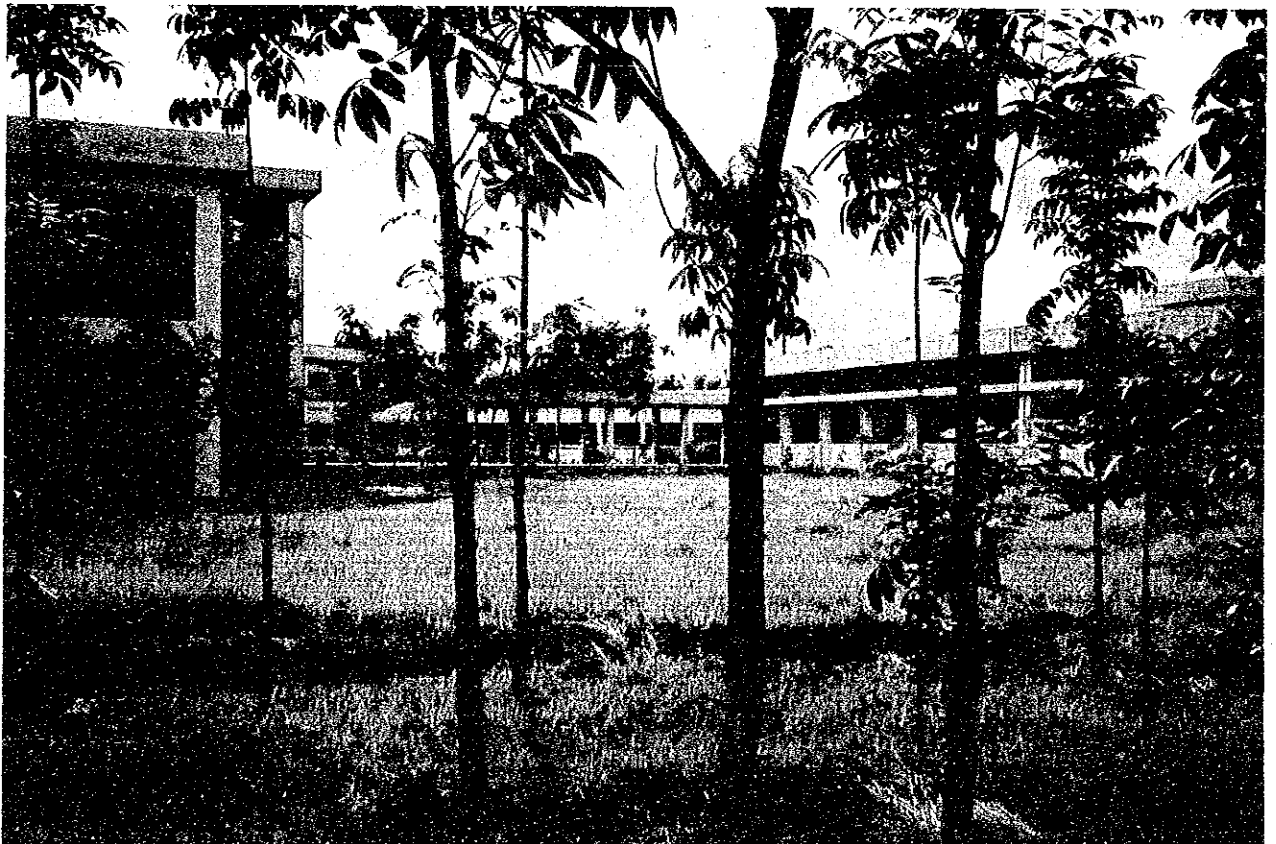
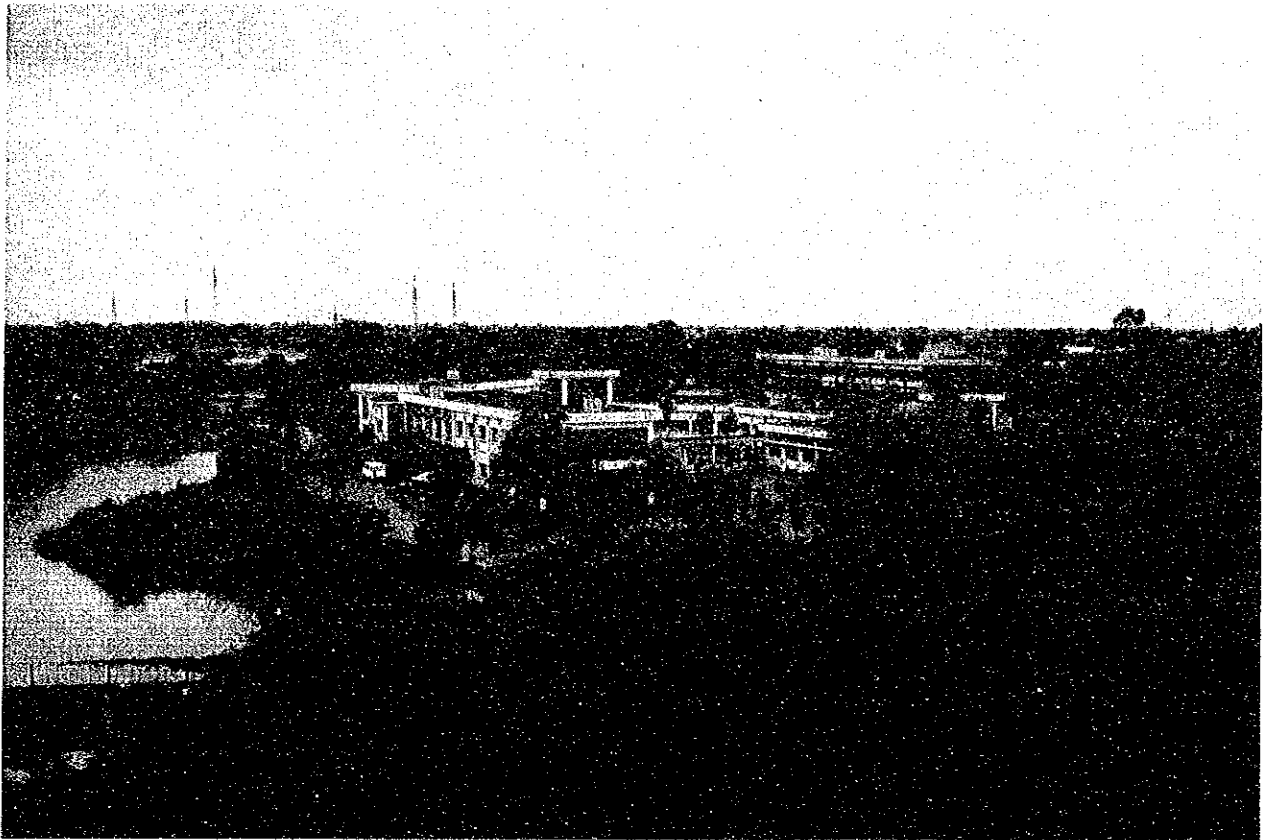
Minoru Tanaka
Project Manager
Basic design study team on
The Project for Establishment of
National Institute of Textile
Training, Research and Design
Yamashita Sekkei Inc.



PERSPECTIVE



SITE LOCATION MAP



PROJECT SITE

SUMMARY

SUMMARY

The textile industry of Bangladesh plays significant role in the country's economy. In particular, the export oriented ready-made garments (RMG) sector has grown remarkably; achieving a growth rate of about 230% during the past five-year period (1986-1991). According to the country's industrial statistics for 1990-91, textile products accounted for 50% of the country's total exports during that period. Thus textiles are the country's largest export industry. The textile industry also ranks first in terms of employment, representing about 65% of the total employment of the country's industry. As is clear from the above description, textiles are the country's most important industry in terms of creation of employment opportunities and acquisition of foreign currencies. However, most of raw materials such as cotton, yarn and gray cloths are imported from other countries due to low productivity of local quality products. Local products for internal market can not compete with imported products due to their poor design. The ratio of imported materials make up about 20% of country's total imports. As a result, acquisition of foreign currencies through the textile industry is being hampered.

At present in Bangladesh, the Textile Industry Development Centre (TIDC) carries out a training, research and testing in the field of spinning, weaving and dyeing, mostly for the government mills under the Bangladesh Textile Mills Corporation (BTMC). TIDC attached to BTMC, was established in 1979 under the financial aid of UNDP as an institute of textile training, research and testing. At the time of its establishment, most of the country's textile mills were operated and managed by the government. Recently, private textile sector is more advanced in technology as well as productivity than government sector and taking

leadership in the industry. The government of Bangladesh realized the necessity of activation of textile industry, formulated a plan to privatize all the government mills. It was planned that 10 of the 41 government mills would be privatized by December 1993 and remaining 31 mills by the end of 1998.

Under these circumstances, the government of Bangladesh realized the need to establish a training, research and testing centre that will contribute extensively to the growth of the country's textile industries, and so worked out a plan to establish an autonomous institute under its Fourth Five-Year Plan (1990-95). With this background, the government of Bangladesh requested the government of Japan to provide grant aid for the project for establishing the National Institute of Textile Training, Research and Design (NITTRAD) by reorganizing the existing Textile Industry Development Centre (TIDC), which is organized under the Bangladesh Textile Mills Corporation (BTMC).

In response to the request, the government of Japan decided to conduct a basic design study concerning the project. The Japan International Cooperation Agency (JICA) dispatched a first study team on June 1993 and a second study team on July 1993 to Bangladesh.

The teams discussed details of the project with the Bangladesh side, investigated the proposed construction site and collected relevant data and information, and prepared this basic design study report after the explanation to the Bangladesh side in December, 1993.

As a result of the basic design study, it was concluded that the TIDC's existing facilities were not sufficiently provided with required function nor equipment to contribute extensively to the growth of the country's textile industries as a training, research and testing centre.

In this project, facilities and equipment are planned to be able to cope with the necessary contents of training, research and testing services.

The Ministry of Textiles, Bangladesh is the organization responsible for the implementation of this project, and NITTRAD which will be established by reorganizing existing TIDC is to take charge of the operation and management of the facilities and equipment which will be provided under the project. NITTRAD is planned to be operated by a staff of 150, and will have four departments. These are: Training/Operation; Testing/Research; Design; and Administration Departments. The number of staff will be increased from existing 95 to 150 in order to cope with the expansion of their services. As for the recruitment of staff members, in a new Design Department, an expert from BTMC in print design has already been assigned, and expected to recruit other staff members of the print design division. The recruitment of staff members in Administration Department which were increased due to its increase in administrative activities, will have no problems since recruitment of clerical staff members is easy at present in the country.

The Bangladesh side has already calculated an annual operation and maintenance budget in the amount of 29,110,000TK for NITTRAD, and it is already approved by the government of Bangladesh, there will be no problem with budgetary appropriations for this project.

In the basic design of the facilities, local construction materials are utilized as much as possible and measures to economize running costs of the facilities are taken. Also, items of equipment are selected in consideration of maintenance systems. Thus there will be no problem with the management, budgetary appropriations, and the maintenance and

operation of the facilities and equipment after the completion of this project.

The outline of facilities and equipment which are necessary to attain the above objective of this project are listed below.

- Proposed construction site: Nayarhat, Savar, Dhaka
(on the premises of the existing TIDC)

- Outline of facilities: Total floor area approx. 3,400 m²
 - Administration Building 840 m²
Director's office, Accounting office, Officers' rooms, Admin. office, Engineer's office, Library, Toilet, etc.

 - Laboratory Building 1,450 m²
Print-screen-making workshop, Tracing workshop, Teachers' rooms, Darkroom, Photo-processing lab, Testing lab, Toilet, etc.

 - Hostel Building 800 m²
12 units

 - Canteen and others 310 m²

- Outline of equipment:
 - Spinning equipment
Card, simplex, ring frame, cone winder with auto splicer etc.

 - Weaving equipment
Rapier loom, air jet loom, mechanical dobbie, etc.

 - Dyeing & finishing equipment
Sample jet dyeing machine, stenter machine, steamer, etc.

- Knitting equipment

Single plain jersey knitting machine, single knit double fleece knitting machine, double knit double plain jersey knitting machine, double knit rib machine, flat knitting machine, etc.

- Sewing machine

Various types of sewing machine, cloth laying table, steam iron, circular knife, etc.

- Testing equipment

Double sorter, stelometer with torsion balance, testing device for honey dew content in cotton, pilling tester, yarn tension meter, fabric abrasion tester, fabric stiffness tester, fabric drapemeter, coarse length tester, fabric bursting strength tester, launder meter, water repellency tester, spray rating tester, fabric crease recovery tester, etc.

- Design equipment

Day light film developing machine, negative positive copying machine, step and repeat machine, stretching machine with adhesive chemicals, tracing & masking table, etc.

- Workshop equipment

Gas welding machine, tool bit sets for lathe machine, tool bit sets for drilling machine, shaper machine, power hand grinder with spare blade, induction current testing set, wheatstone bridge, oscilloscope, etc.

- Supporting equipment

Desk and chairs for training, white board, etc.

• Others

Photocopy machine, duplicating machine, typewriter, personal computer, microbus, etc.

If this project is to be implemented under Japan's grant aid, construction period will take about 12 months to complete, judging from the scale and contents of the proposed facility, and the situation of the local construction industry. The works to be done by the Bangladesh side are estimated to be 770,000TK. Besides this, the following expenses shall be borne by the Bangladesh side.

- Formalities of obtaining building permit
- Customs duties on imported equipment and materials
- Banking arrangement and other related charges
- Internal taxes, value added tax and other fiscal levies
- Construction of staff quarters with a floor area of 930 m²

When this project is completed, the expansion of service activities, the improvement in the quality of facilities and equipment as well as the technical level of operation will be realized, and NITTRAD will be able to establish its leading role in the textile industry. As the result, human resources with expertise in production and quality control technologies in upstream sub-sectors such as spinning, weaving and dyeing will be developed, and will thereby contribute the implementation of the textile policy of Bangladesh. The plan to improve the facilities and equipment of testing and research will enable NITTRAD to become country's leading testing institution, consequently contribute to enhancement of the technical standard of quality control in the textile industry. Also by establishing a new Design Department in NITTRAD to conduct technical training and research in the field of print design and fashion design, the

technical level of domestically made print designs will be enhanced and local apparel products will become more competitive with imports.

As is clear from the above descriptions, great effects can be expected of this project, and it is of great significance to implement this project under Japan's grant aid. It is necessary, on the other hand, for the government of Bangladesh to make efforts on implementation of appropriate personnel plan, budgetary appropriations for operation and maintenance, smooth implementation of the government policy for textile industry development, establishment of export inspection system, and procurement of technical cooperation from international cooperation agencies. Such efforts will maximize the effects of this project.

ABBREVIATIONS

ABBREVIATIONS

(in alphabetical order)

NAME IN FULL

ASTM	American Society for Testing and Materials
AVO	Ampere Voltage Ohm
BDS	Bangladesh Standard
BGMEA	Bangladesh Garment Manufacturers Exporters Association
BMR	Balancing, Modernizing, Rehabilitation
BMRE	Balancing, Modernizing, Rehabilitation, Expansion
BS	British Standard
BSTI	Bangladesh Standards and Testing Institution
BTMC	Bangladesh Textile Mills Corporation
°CDB	Degree Celsius Dry Bulb
EC	European Community
F _c	Compressive Strength
F _t	Tension Strength
GL	Ground Level
IEC	International Electrotechnical Commission
ISO	International Organization for Standardization
IVR	Induction Voltage Regulator
MDF	Main Distribution Frame
NITTRAD	National Institute of Textile Training, Research and Design
RAJUK	Rajdhani Unnyan Katripakha
REB	Rural Electrification Board
RH	Relative Humidity
RMG	Ready made Garments
TIDC	Textile Industry Development Centre
TK	Taka
UNDP	United Nations Development Programme
UNIDO	United Nations Industrial Development Organization

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CHAPTER 1 INTRODUCTION

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The textile industry of Bangladesh plays a significant role in the country's economy. In particular, the export oriented ready-made garments (RMG) sector has grown remarkably; achieving a growth rate of about 230% during the past five-year period (1986-1991). According to the country's industrial statistics for 1990-91, textile products accounted for 50% of the country's total exports during that period. Thus textiles are the country's largest export industry. The textile industry also ranks first in terms of employment, representing about 65% of the total employment of the country's industry. As is clear from the above description, textiles are the country's most important industry in terms of creation of employment opportunities and acquisition of foreign currencies. However, most of raw materials such as cotton, yarn and gray cloths are imported from other countries due to low productivity of local quality products. Local products for internal market can not compete with imported product due to their poor design. The ratio of imported materials make up about 20% of country's total imports. As a result, acquisition of foreign currencies through the textile industry is being hampered.

Under these circumstances, the government of Bangladesh realized the need to establish a training, research and testing centre that will contribute extensively to the growth of the local textile industries from a view point of creation of employment opportunities and acquisition of foreign currencies, and so worked out a plan to establish an autonomous institute under its Fourth Five-Year Plan (1990-95). With this background, the government of Bangladesh requested the government of Japan to provide grant aid for the project for establishing the National Institute of Textile Training, Research and Design (NITTRAD) by

reorganizing the existing Textile Industry Development Centre (TIDC), which is organized under the Bangladesh Textile Mills Corporation (BTMC).

In response to the request, the government of Japan decided to conduct a basic design study concerning the project. The Japan International Cooperation Agency (JICA) dispatched a first study team headed by Takashi Hatakeyama, Deputy Director, First Project Management Division, Grant Aid Project Management Department, JICA from June 13 to 25, 1993 and a second study team headed by Mr. Toshikazu Isomura, Official, Southwest Asia Division, the Ministry of Foreign Affairs from July 30 to August 28, 1993 to Bangladesh, to examine the necessity and appropriateness of the project. The study teams investigated the following:

- (1) Background and details of the request
- (2) Present state of the textile industry of Bangladesh
- (3) Past achievement, existing facilities and equipment, and problems of Textile Industry Development Centre (TIDC)
- (4) Outline of the project for the establishment of NITTRAD and the operating and management plans under the project
- (5) Situation of construction and textile equipment in Bangladesh

After returning to Japan, the study teams analyzed the results of its surveys and prepared a draft report. In December 1993, a study team visited Bangladesh to brief the representatives of the government of Bangladesh on the draft report and discuss its details with them. As the result of the discussion both sides agreed on the contents of the draft report.

A list of the members of the study teams, the survey schedule, a member list of concerning parties in Bangladesh and the minutes of discussions are attached at the end of this report.

CHAPTER 2 BACKGROUND OF THE PROJECT

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2-1 Outline of the Textile Industry of Bangladesh

2-1-1 Present State and Problems of the Textile Industry Sector

The textile industry of Bangladesh, particularly the export oriented ready-made garments (RMG) sector has grown remarkably achieving a growth rate of about 230% during the past five-year period (1986-1991). According to the country's industrial statistics for 1990-91, textile products accounted for 50% of the country's total exports during this period. Thus the textile industry is the country's largest export industry. The textile industry also ranks first in terms of employment, representing about 65% of the total employment of the country's industrial sector. On the other hand, imports of yarn and cloth made up 20% of the country's total imports.

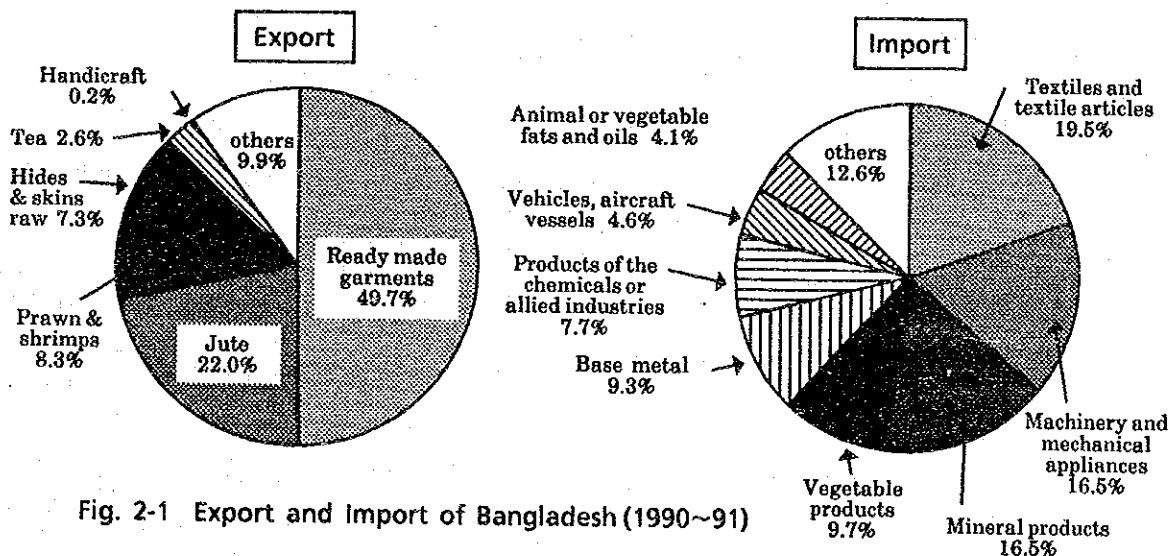


Fig. 2-1 Export and Import of Bangladesh (1990~91)

All of the country's spinning and weaving mills were, in the past, operated and managed by the Bangladesh Textile Mills Corporation (BTMC) of the Ministry of Textiles. Since the 1980s, however, there has been a marked increase in the number of private mills appearing in the textile industry. At present, private textile mills are more advanced in

technology as well as productivity than government mills. Under such circumstances, the government of Bangladesh formulated a plan to privatize all the government mills. It was planned that 10 of the 41 government mills would be privatized by December 1993 and all the rest privatized by the end of 1998.

(1) Spinning sub-sector

In Bangladesh, spinning generally refers to cotton spinning, and the ratio of blend spinning is low. Cotton yarn ranging from 30s to 80s in thickness is produced, but productivity is as low as 50% of their capacity at most spinning mills. Since quality control at each stage of the spinning process is insufficient, the industry is faced with problems related to product quality. All this has led to rises in product costs, which in turn has made it difficult for the Bangladesh textile industry to compete with imports from India and other countries in terms of price and quality.

Table 2-1 Installed Spindles, Production Capacity and Actual Production
(Large Scale Mills Sub-sector)

(Production in million Kg)

Year	BTMC Mills			Private Sector Mills			Total (Spinning)		
	Installed Spindles (thousand)	Produc. Capacity	Actual Produc.	Installed Spindles (thousand)	Produc. Capacity	Actual Produc.	Installed Spindles (thousand)	Produc. Capacity	Actual Produc.
1986-87	725	71.70	35.70	523	51.70	29.30	1,248	123.40	65.00
1987-88	722	71.50	34.50	591	58.50	30.00	1,313	130.00	64.50
1988-89	730	72.30	38.20	663	57.77	30.67	1,393	130.07	68.87
1989-90	763	75.50	42.80	735	64.05	34.00	1,498	139.55	76.80
1990-91	773	76.50	42.50	803	70.00	37.15	1,576	146.50	79.65
1991-92	774	76.60	42.20	871	75.70	40.30	1,645	152.50	82.50

(Source: Ministry of Textiles)

(2) Weaving sub-sector

Annual demand of cloth for domestic use in Bangladesh is about 1,200 million metres, of which only 55% to 65% are produced locally. The

remainder is imported. Annual demand of cloth for export oriented RMG is about 1,000 million metres, of which over 97% are imported, due to their poor productivity and quality.

Table 2-2 Installed Looms, Production Capacity and Actual Production
(Large Scale Mills Sub-sector)

(Production in million metres)

Year	BTMC Mills			Private Sector Mills			Total of Mill Sector (Weaving)		
	Installed Looms	Produc. Capacity	Actual Produc.	Installed Looms	Produc. Capacity	Actual Produc.	Installed Looms	Produc. Capacity	Actual Produc.
1986-87	3,106	68.30	37.70	3,201	65.79	25.07	6,307	134.25	62.77
1987-88	3,104	68.20	41.30	3,202	59.92	22.68	6,306	139.12	64.99
1988-89	3,262	71.70	44.60	3,698	69.20	23.52	6,966	140.90	68.12
1989-90	3,480	76.50	51.90	3,014	56.40	35.00	6,494	132.90	86.90
1990-91	3,626	79.70	47.40	2,838	53.10	32.12	6,464	132.80	79.52
1991-92	3,626	79.70	47.80	2,838	53.10	32.12	6,464	132.80	79.92

(Source: Ministry of Textiles)

Table 2-3 Installed Looms, Production Capacity and Actual Production
(Specialized and Power Loom Sector)

(Production in million metres)

Year	Specialized looms	Power looms	Total looms	Production Capacity	Actual Production
1986-87	18605	2561	21166	365.7	217.9
1987-88	21453	2953	24406	404.3	253.2
1988-89	23230	3198	26428	457.1	274.2
1989-90	24626	3390	28016	484.3	290.1
1990-91	25178	3410	28588	494.9	272.2
1991-92	25178	3466	28644	513.6	262.7

(Source: Ministry of Textiles)

(3) Sewing sub-sector

The sewing sub-sector plays an important role in the economy of Bangladesh. Particularly, the export oriented RMG sector has grown rapidly during the past five years (1986-1991), achieving a growth rate of about 230% during that period. About 95% of the total exports of RMG are for EC countries and the United States. On the other hand, locally made cloth is of poor quality, and most of cloth for RMG is imported. This condition hampers acquisition of foreign currencies.

Table 2-4 Export Oriented Ready-Made Garments (RMG) Industry Production Capacity, Actual Production and Exports

(Million Pac.)

Year	No. of Units	Production Capacity	Actual Production	Growth (%)	Exports (Core TK)	Growth (%)
1986-87	749	489.30	255.11	(12.50%)	907.7	—
1987-88	759	489.90	285.50	11.91%	1,342.1	47.86
1988-89	762	489.66	296.46	3.83%	1,494.3	11.34
1989-90	770	497.30	394.82	33.16%	3,038.5	36.42
1990-91	836	546.10	588.76	49.12%	3,005.6	47.44
1991-92	1195	887.61	729.11	23.84%	4,502.6	49.81

(Source: Ministry of Textiles)

There are many garment manufacturers, who are exporting mainly to EC countries and the United States, in and around Dhaka city. These garment manufacturers constitute the Bangladesh Garment Manufacturers Exporters Association (BGMEA). Table 2-5 gives an outline of the representative members of the BGMEA.

Table 2-5 Outline of Survey Result of Garment Manufacturers (8 Companies)

Company	No. of Employees	Business Status	Main Products	Material Procurement	Material/product Testing	Training
A	approx. 550	Export oriented RMG to U.S. Canada	T-Shirts, blouses, underwear, pajama, polo shirts (25,000dz/day)	60%imported 40%local	Tested at Hong Kong office	Planning to send 2 employees each to BGTTC's pattern process and quality control training courses.
B	approx. 1,300	Export oriented RMG to Italy, England, U.S., Sweden	Shirts, blouses, knitwear, children's clothes	Only for T-shirts local, others imported	Tested at reliable testing institutions in importer's country. knitwear materials, only weight test is conducted at the company.	Only on-the-job training is conducted. Has strong need to train managers.
C	approx. 1,500	Export oriented RMG to U.S.	Shirts, trousers, underwear 520~750pcs/day	Knitwear material is 100% imported.	Shrinkage & washing tests are conducted at the company. Others are conducted at institutions outside the country	Has employed Sri Lankan engineer for technical guidance to managers
D	approx. 500	Export oriented RMG to Italy England, Sweden, Canada	Shirts (22,000dz./mon.), Trousers (5,000dz./mon.), T-shirts(9,000dz./mon.)	Import 100% from Hong Kong & Korea	Only shrinkage test is conducted at the company. Others conducted at the testing inst. in importer's country.	Sent 2 employees to S. Korea for equipment maintenance training. Has strong need in pattern making & design training.
E	approx. 2,000	Export oriented RMG mainly to U.S.	Jeans, trousers, short-pants, knitwear (10,000dz./mon)	Import from Hong Kong, China, Japan	Tested at Hong Kong	Has employed instructors from abroad, conduct on-the-job training. Employed 3 foreign instructors for equipment maintenance.
F	approx. 1,300	Export oriented RMG to U.S. (60%), EC(40%)	Knitwear(15,000~18,000dz/mon), Dress-shirts (700~800dz/mon), Knit cloth (1,500kg/day)	Yarn from India, cloth from Hong Kong, Korea, Indonesia	Conduct lab-scale dye test at the company	Has strong need in pattern making training.
G	approx. 800	Export oriented RMG to U.S., EC	T-shirts (1,200dz/mon), Polo-shirts (4,000dz/mon), Dress-shirts (3,000dz/mon)	Tested and certified yarn for knitwear imported from India, Pakistan, Italy.	Import certified materials. For products, tested at foreign testing inst.	Has strong need in management control, quality control, equipment maintenance training
H	approx. 200	Export oriented RMG to U.S. (95%), EC	Sports wear, knitwear, shirts (7,000~10,000dz/mon)	Fabric, knit from Hong Kong, dye chemical from Japan, Hong Kong, Taiwan	Utilize Textile Tech. College testing facilities	Has strong need in sawing & printing training

As shown in Table 2-5, typical private Bangladesh garment manufacturers are taking the form of earning processing fee by exporting T-shirts, underwear and other RMG which are produced by using imported yarn, fabric and knit material based on design sketches provided by buyers. Since there are very few reliable testing institutions in the country, they are dependent on foreign testing institutions for most testing requirements. Although the RMG sub-sector is playing an important role in acquisition of foreign currencies on the strength of its international competitiveness which is attributable mainly to cheap labor, it is clear that its strength is not rooted in the industrial base of the textile industry as a whole and that its main objective is still to earn incomes in the form of processing fees. In view of the need to place a greater emphasis on products of high added value so that the textile industry may make greater contributions to the growth of the economy of the country, the government of Bangladesh has drawn up policy measures to improve the quality of such upstream sub-sectors as spinning, weaving, and dyeing/finishing, as well as of the RMG sub-sector.

2-1-2 Condition of Education, Training and Research in the Field of Textile Technology

(1) Textile Industry Development Centre (TIDC)

TIDC is the country's only training, testing and research organization for the textile industry. It was established in January 1979 as an organization attached to BTMC under UNDP's financial aid. Because of its organizational structure, its main tasks are training, research and testing for government mills of spinning, weaving and dyeing/finishing sub-sectors. Every year about 1,300 trainees receive training at the centre, of which only around 60 are from private sector.

(2) College of Textile Technology

College of Textile Technology, founded in 1950, is the country's only institution of higher education that offers a textile technology course. It is a 4-year college and admits 60 students every year. Its curriculum is summarized below:

- 1st year : General art
- 2nd year : Spinning and weaving
- 3rd year : Spinning, weaving, dyeing, textile chemistry
(2-month OJT)
- 4th year : Optional special subjects
(spinning, weaving, dyeing, textile chemistry)

Every year, 50 to 60 students graduate from this college, of whom about 10% go to the EC countries, Pakistan and other countries to receive further education. The remaining 90% find employment at textile companies in the country.

(3) Bangladesh Standard Testing Institution (BSTI)

BSTI is Bangladesh's official industrial standard testing institution. BSTI has so far established more than 1,300 Bangladesh Standards (BDS). Since it is a member of the International Standardization Organization (ISO), its industrial standards are generally based on ISO standards, but some of them are based on British Standards (BS). Of the total number of the industrial standards established by the BSTI, about 250 apply to raw cotton, jute, synthetic fibres, yarn, cloth and garments. The BSTI's textile department is conducting about 20 sample tests of imported materials and products per month at the request of customs and some private enterprises.

2-2 Outline of Relevant Plan

2-2-1 The Fourth Five-Year Plan

The government of Bangladesh had implemented three five-year plans by 1990, and currently it is in the process of implementing its Fourth Five-Year Plan (1990-1995). The following three points are the major objectives/basic policies of the Fourth Plan:

1. Accelerating economic growth. It is envisaged that the annual growth rate of GDP would be 5% during the plan period.
2. Poverty alleviation and employment generation through human resource development.
3. Increased self-reliance.

In the Third Five-Year Plan, its goals - increased yarn production, elimination of the supply-demand gap, and increased weaving and dyeing capacity - were not achieved due to unbalanced programme for spinning, dyeing, printing and finishing, institutional constraints like poor administrative frame work and lack of management skills including skilled manpower, adequate research & development, and service related to this industry. The present Fourth Five-Year Plan has as its goals for the textile industry, an appropriate backward linkage between the export-oriented RMG sub-sector and the local spinning, weaving, printing and finishing units.

2-2-2 The Textile Policy 1989

The government of Bangladesh formulated the Textile Policy 1989 under its Five-Year Plan. Its major objectives are:

1. to augment production in a manner such that the local and export demands are met adequately.
2. to establish new capacities in spinning, weaving, knitting, dyeing and finishing facilities required for the above purpose.
3. to undertake BMR/BMRE of the existing enterprises for improvement of both quantity and quality of products.
4. to promote and develop proper linkage of RMG with other textile sub-sectors for ensuring local supply of quality fabrics.
5. to ensure credit facilities on easier terms and conditions for BMR of existing facilities and creation of required new capacity in the private sector.
6. to give priority to foreign investment through joint-venture in the textile sector.
7. to allow incentives for import of textile raw materials of all kinds in order to make the local fabrics competitive in the international market.
8. to take appropriate measures for improving the manpower skills engaged in the different existing industries of different textile sub-sectors, and the new units which are coming up to develop backward linkage with the export-oriented RMG industry.

9. to ensure development of skilled manpower; to create appropriate facilities for testing, research, design; to create advisory services for existing and new sponsors. Also to ensure programmes for upgrading the existing TIDC which have been taken up to convert it into a National Institute of Textile Training, Research & Design.

In order to achieve these objectives for the textile sector, the government of Bangladesh has planned following strategies:

1. to privatize all the government textile mills which hang low in their performance by the end of 1998 to revitalize the textile industry.
2. to reorganize TIDC into an autonomous body, which at present is a training, testing and research institution attached to the BTMC, and restart it as NITTRAD to operate under the direct supervision of the Ministry of Textiles so that it may contribute in developing human resource/technology and offer testing services to both public and private organizations
3. to withdraw taxes and duties on the import of all sorts of raw materials (raw cotton, yarn, gray cloths, chemicals, machines etc.) used in the textile industry
4. to provide bonded warehouse facilities to direct exporters of the textile sector, and simplify the customs system

2-3 Outline and Problems of the Textile Industry Development Centre (TIDC)

2-3-1 History

The objective of the establishment of the Textile Industry Development Centre (TIDC) was to increase productivity and improve quality of textile products by developing the expertise and efficiency of the workers, staff and officers of all levels, working in different mills under BTMC. It was established on 1st January 1979 under the financial aid of UNDP as a training, research and testing institution attached to BTMC, the Ministry of Textiles. Initially the centre was operated by the joint effort of UNDP counterparts and BTMC counselors. At present, it is operated by BTMC alone.

2-3-2 Organization and Staffing

Figure 2-2 gives an outline of TIDC's organization and Staffing.

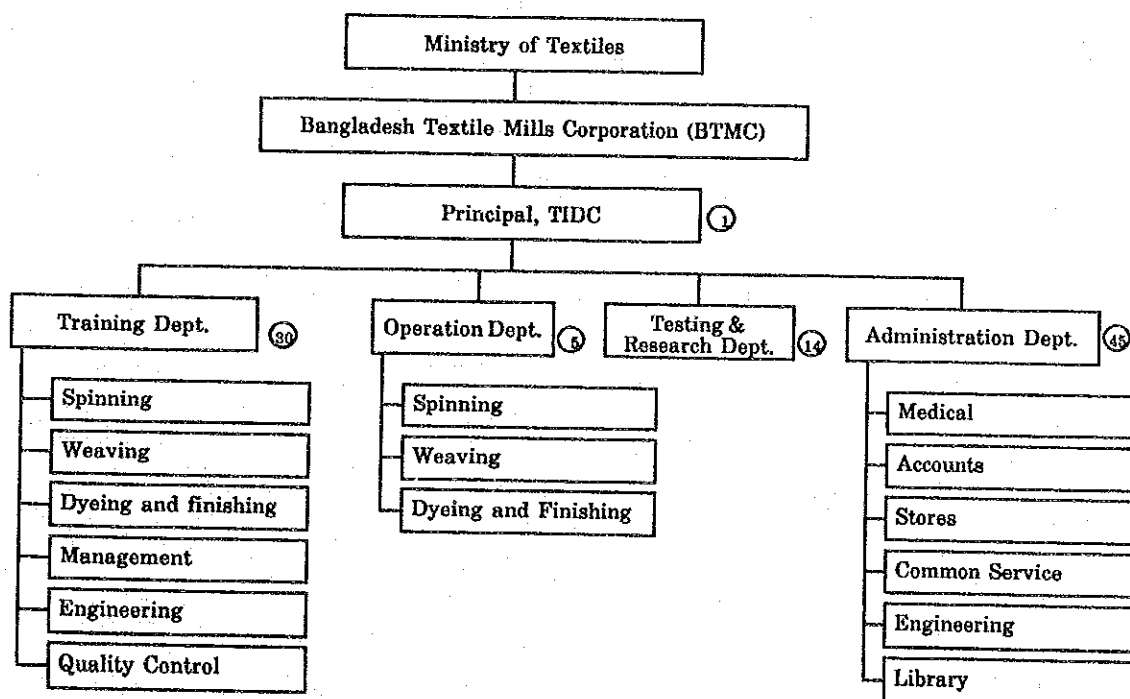


Fig. 2-2 Organization of TIDC

2-3-3 Operation and Budget

TIDC is positioned as a training, research and testing institution attached to BTMC, and is now offering services to government textile mills with a staff of 95. Its annual budget is included in BTMC's annual budget. Table 2-6 shows changes in the size of its annual budget over the past five years.

Table 2-6 Annual Budget of TIDC

(lac. TK)

Item \ Year	1988/89	1989/90	1990/91	1991/92	1992/93
Personnel Expenses	32.88	33.09	42.74	46.40	49.72
Administrative Expenses	25.56	21.16	27.02	26.02	30.55
Capital Expenses	9.00	20.00	21.50	3.87	1.10
Total	67.44	74.25	91.26	76.29	81.37

(Source: TIDC)

2-3-4 Activities

(1) Training

TIDC accepts an average of 1,300 trainees annually, and offers about 70 training courses in spinning, weaving, dyeing/finishing, management, quality control, and engineering.

Two-week theoretical training courses in management and quality control are offered. Also, theoretical and practical training in spinning, weaving and dyeing is conducted for a period of one to two weeks. The number of trainees for each course ranges from 15 to 20.

Table 2-7 Trainings Held at TIDC

Fiscal year	Nos. of courses	Nos. of participants from BTMC mills	Nos. of participants from private mills	Total Nos. of participants
89/90	70	1,739	28	1,767
90/91	74	1,374	18	1,392
91/92	66	1,305	54	1,359
92/93 (As of April)	53	1,001	65	1,066

(Source: TIDC)

An outline of the training programme presently conducted at TIDC is as follows:

- Spinning : Raw cotton processing & maintenance of blow room; Maintenance and overhauling of carding; Maintenance & overhauling of drawing & simplex; Maintenance & overhauling of ring frame; Maintenance & overhauling of combing; In-plant training on spinning.
- Weaving : Faults in winding & their remedies; Production calculation in weaving; Faults in sizing & their remedies; Setting, gauging & maintenance of loom; Process and waste control in weaving; Defects of cloths & their remedies; Faults in warping & their remedies; In-plant training on weaving.
- Dyeing : Dyeing of cotton fabrics with sulphur & vat dyes; Classification & properties of different types of dyes; Preparation of textile fabrics for dyeing & printing; Printing of polyamide silk and polyester fabrics; Printing with reactive azoic & pigment dyes; In-plant training on dyeing & finishing.
- Managing : Labour laws; Employee discipline and accounting management; Employee relations & elementary knowledge of accounting management; Techniques of supervision record management & important function of accounting management; Absentism and labour turn over and accounting management; Important aspects of marketing management; Stores organization and its control;

Labour laws analysis; Induction training & recruitment; Industrial relations and integrated accounting; Communication, motivation labour law analysis & important functions of accounting management.

Quality control : Practical training on fibre & yarn testing; Raw cotton classification & grading; Analysis & evaluation of user evenness test results; Practical application of statistical methods in the textile industry; Fabric analysis & test methods.

Engineering : Casting process and heat treatment; Energy conservation technology of industrial boiler; Methods of bearing fittings technology; Humidification & air condition technology related to textile industry; Basic electronics; Workshop machine tools operation; Quality production & maintenance; Hydropic & pneumatic control system; Trouble shooting and maintenance of electrical machines.

(2) Testing

Textile mills in Bangladesh, with the exception of two or three private mills, do not have material/product testing facilities. The only in-house testing conducted at most mills is visual inspection. Export oriented RMG are usually tested at foreign testing institutions such as those of importing countries. The local textile industry demands that a reliable testing institution be established in the country. Under such circumstances, TIDC's testing department is in great demand among government mills and private mills. The department actively conducts tests such as shrinkage, rubbing fastness, washing fastness, raw cotton moisture content, and length measurement among others.

Table 2-8 Annual Performance of Tests Held at TIDC

Name of Tests	BTMC Mills	Private Mills	Total
Seam Slippage	—	118	118
Shrinkage	42	523	565
Ends/Picks	120	218	338
Weight	32	163	195
Rubbing Fastness	80	429	509
Washing Fastness	80	446	526
Light Fastness	—	10	10
Construction	168	—	168
Width	84	—	84
Crimp Test	40	2	42
Cover Factor	42	—	42
Pick-up	4	—	4
C. S. P.	220	36	256
T. P. I.	110	6	116
Count of Yarn	220	55	275
Uster Test	276	53	329
Hanks Condition	36	—	36
Comb Sorter	536	16	552
Trash	236	18	254
Cleaning Efficiency	36	—	36
Micronair	350	11	361
Pressely	200	4	204
Maturity	50	5	55
Moisture Content	10	2	12
Fibrograph	8	10	18
Tensile Strength	—	11	11
Lustre	—	5	5
Type of Woven	—	5	5
Chemical	—	20	20
Physical	—	10	10
Total	2,980	2,176	5,156

(Source: TIDC)

Above data is summarized as percentages in terms of fields of testing.

Table 2-9 Ratio of Performance of Test by Fields

	BTMC Mills	Private Mills
Raw Materials	47.9%	5.4%
Yarn	28.9%	6.9%
Fabric/Garments	23.2%	87.7%
	100.0%	100.0%

2-3-5 Existing Facilities and Equipment

(1) Existing facilities

The existing facilities at TIDC consists of the rooms described in Table 2-10.

Table 2-10 Present Situation of TIDC Facilities

	Name of Rooms	Area (m ²)	Remarks (changes after established)
Admin.	Principal	37.2	No change
	Head office (Admin., Account)	37.2	Initially planned as the vice principal room
	Administration office	55.7	Initially planned as the teachers' room
	Account office	41.8	No change
	Clinic	9.3	Initially planned as a committee room
	Engineers' office	9.3	Ditto
	Conference room	111.5	No change
	Library	74.3	No change
	Total	376.3	
Training	Lecture hall	92.9	No change
	Classroom (2)	46.5×2	No change
	Store	47.6	Initially planned as the common room
	Teachers' room	185.8	Initially planned as classrooms
	Total	419.3	
Laboratory	Weaving workshop 1	223.0	Initially planned as the spinning workshop
	Weaving workshop 2	185.8	No change
	Spinning workshop	223.0	Initially planned as the erection room
	Total	631.8	
Testing	Machinshop	148.6	No change (Teachers' room is partitioned)
	Testing and fabric analysis lab	260.1	Ditto
	Dyeing printing & finishing workshop	148.6	No change
	Textile chemistry lab	148.6	No change
	Total	705.9	
Dormitory	Hostel	37.8×24	Two units are used as security rooms
	Dining hall	62.7	
	Kitchen (including pantry)	33.7	
	Servant bed room	7.4	
	Common room	62.7	
	Total	1,073.7	

(2) Existing equipment

The condition of existing equipment is described in Table 2-10.

Table 2-11 Condition of Existing Equipment of TIDC

	Spinning workshop	Weaving workshop	Dyeing/ finishing workshop	Textile chemistry lab	Testing	Machine-shop	Total
Usable	1	1	12	6	29	32	81 sets
Unusable	16	8	1	2	1	0	28 sets
Total	17	9	13	8	30	32	109 sets

List of existing equipment:

1. Spinning workshop

• Superannuated unusable equipment

- 1) Finishing Scutcher 1 set
- 2) Trash Analyzer 1 set
- 3) Carding Machine 2 sets
- 4) Drawing (Old One) Frame 2 sets
- 5) Roving Frame 1 set
- 6) Ring Spinning Frame 3 sets
- 7) Twisting Frame 1 set
- 8) Simplex 1 set
- 9) Comber 2 sets
- 10) Ribbon Lap Machine 1 set
- 11) Sliver Lap Forming Machine 1 set

• Equipment requiring repairs

- 1) Draw Frame 1 set

2. Weaving workshop

• Superannuated unusable equipment

- | | |
|-------------------------|--------|
| 1) Cone Winding Machine | 1 set |
| 2) Reeling Machine | 1 set |
| 3) Loom | 6 sets |

• Equipment requiring repairs

- | | |
|------------------------|-------|
| 1) Pin winding Machine | 1 set |
|------------------------|-------|

3. Dyeing printing & finishing workshop

• Superannuated unusable equipment

- | | |
|-----------------------|-------|
| 1) Horizontal Paddler | 1 set |
|-----------------------|-------|

• Usable equipment

- | | |
|--|--------|
| 1) Screen Printing Machine | 1 set |
| 2) Centrifugal Separator | 1 set |
| 3) Gyroscopic Washing Machine | 1 set |
| 4) Steamer | 1 set |
| 5) Hank Dyeing Machine | 1 set |
| 6) Jigger Dyeing Machine | 1 set |
| 7) Single Bath Dyeing Unit | 1 set |
| 8) Winch Dyeing Machine | 1 set |
| 9) Dyepet Super High Temperature
High Pressure Dyeing Machine | 1 set |
| 10) Distiller | 2 sets |
| 11) Stirring Mixer | 1 set |

4. Textile chemistry lab

• Old and impractical equipment

- | | |
|----------------------------|-------|
| 1) Washing Fastness Tester | 1 set |
| 2) Crockmeter Balance | 1 set |

• Usable equipment

- | | |
|----------------------------|-------|
| 1) Hydrostatic Head Tester | 1 set |
| 2) Light Fastness | 1 set |
| 3) Color Matching Cabinet | 1 set |
| 4) Shirley Viscometer | 1 set |
| 5) Flammability Tester | 1 set |
| 6) Distiller | 1 set |

5. Testing and fabric analysis lab

• Superannuated unusable equipment

- | | |
|-----------------|-------|
| 1) Auto Sampler | 1 set |
|-----------------|-------|

• Usable equipment

- | | |
|---------------------------------|-------|
| 1) Trash Selector | 1 set |
| 2) Accelerator | 1 set |
| 3) Electronic Balance | 1 set |
| 4) Digital Fibrograph | 1 set |
| 5) Uster Evenness Tester No.1 | 1 set |
| 6) Twist Tester | 1 set |
| 7) Crimp Tester | 1 set |
| 8) Yarn Counting Balance | 1 set |
| 9) Comb Sorter | 1 set |
| 10) Wrap Reel | 1 set |
| 11) Lap Tester | 1 set |
| 12) Single Yarn Strength Tester | 1 set |
| 13) Moisture Testing Oven | 1 set |
| 14) Movistorb | 1 set |
| 15) Lea Strength Tester | 1 set |
| 16) End Picks Table | 1 set |
| 17) Reflector Meter | 1 set |

18) Plastic Shirley Parallel Line Grating Imperial	1 set
19) Plastic Shirley Type Line Grating	1 set
20) Whirling Hygrometer	1 set
21) Moisture Meter	3 sets
22) Precision Wrap Block for Roving Sliver	1 set
23) Microscope	1 set
24) Crease Recovery Tester	1 set
25) Fineness Maturing Tester	1 set
26) Analytical Balance	1 set
27) Oven	1 set

6. Machineshop

Usable equipment

1) Power Hacksaw	1 set
2) Bench Grinder	1 set
3) Bench Drill Machine	2 sets
4) Spray Paint Set	1 set
5) Lathe	1 set
6) Milling	1 set
7) Table Vice	24 sets
8) Electric Welder	1 set

2-3-6 Present Problems

(1) Problems with operation

- 1) Since, at present, TIDC is operated under BTMC, training, research and testing programmes are intended for BTMC mills. The trainees are mostly staff members of BTMC mills. Although the number of trainees from private mills is on the increase, they accounted for only 6% of the total trainees in 1992-93.

- 2) As the centre is carrying out training and test programmes mainly for BTMC mills, it lacks technical capabilities in the field of sewing, which is not included in BTMC mill operations. This makes it difficult for TIDC to take leadership in developing the textile industry of the country.
- 3) Most of the centre's trainees are sent from BTMC mills, therefore the centre does not function to actively recruit trainees from the private sector.
- 4) Although the training department and the operation department deal with common fields, they are running separately. This causes duplication of personnel and an inefficient personnel system.
- 5) Since research functions are not provided for TIDC, the demands of the textile industry are not properly grasped.
- 6) Since technical books and magazines are not sufficiently provided for TIDC, it is difficult to obtain the latest information regarding textile technology.

(2) Problems with existing facilities

- 1) Since only three lecture rooms are currently available for six training divisions, lectures in the spinning and weaving divisions are given at the workshops.
- 2) The testing/research department does not have a teachers' room. Instead, part of the laboratory is partitioned to be used for this purpose.

- 3) The centre has no accommodation for the security guards who are working 24 hours, and therefore, 2 units of the trainees' hostel are occupied by them.

(3) Problems with existing equipment

- 1) Spinning and weaving division

Most items of equipment for use in training of spinning and weaving were made during the 1950s and the 1960s, and have deteriorated. Most have become superannuated. A set of equipment is operable for each of spinning and weaving. However, other necessary equipment to process materials are superannuated. Therefore, the operable equipment is not being utilized practically due to unavailable materials. Consequently training for these fields is limited to lectures such as production control, maintenance, and solution of technical problems.

- 2) Dyeing/finishing division

Both old and new types of equipment are installed. Most of them are still operable. However, the problem is that all of the dyeing/finishing equipment installed are of the "batch type". Therefore, trainees are not able to learn continuous dyeing techniques which are used at modern dyeing factories. Some equipment are superannuated with the rubber roller of the paddler hardened as a result of age, making it difficult to obtain an accurate pick up.

3) Testing division

Old-fashioned testing equipment is being used. The testing laboratory is air conditioned, but equipment to maintain constant temperature and humidity (necessary for precision testing) is not provided. Some of the testing equipment are superannuated. Even relatively new ones are badly worn and damaged. It sometimes happens that more than 500 tests are conducted a year by the use of a single testing equipment. In the case of some items of testing equipment, the number of units is not enough.

4) Machinshop

The workshop equipment such as lathe, bench drill machine, milling machine etc., are well maintained, but their attachments are in short supply.

Due to the lack of basic maintenance devices such as measuring metres, maintenance training and overhauling of training/testing equipment are hindered.

2-4 Background and Contents of the Request

2-4-1 Background of the Project

The textile industry in Bangladesh offers approximately two million employment opportunities, or roughly 7% of total employment and about 65% of total industrial employment. It also accounts for approximately one-third of added value for the industry sector. The industry sector consists of sub-sectors such as spinning, weaving, dyeing and finishing, RMG, etc. The RMG sector has earned foreign exchange amounting to 30 billion Taka (1990-1991), or about 50% of the total earnings of the country. Thus the textile industry holds a prominent position in terms of its contribution to employment, income generation, and foreign exchange earnings/savings. It is considered as the industry that can make the most substantial contribution to poverty alleviation, which is the top priority objective of the country.

It is said that locally made textile products are not competitive with imported ones in the domestic market due to low level technology in fabric quality, weaving, design and outdated facilities. Also, since the RMG industry, which contributes substantially to earning foreign exchange, depends mostly on imported materials, it is imperative to improve the domestic spinning and weaving industry in view of enhancing utilization of locally made materials for increasing higher value addition.

Thus the government of Bangladesh stated in the Textile Policy 1989, and in the Fourth Five Year Plan (1990-1995), the need for re-organizing the existing Textile Industry Development Centre (TIDC) into the National Institute of Textile Training, Research and Design (NITTRAD) to benefit widely both the government and public sector of the textile industry nationwide. NITTRAD is projected to be the centre of research and

development for new technology and design in the textile industry, giving training courses for the personnel engaged in the industry as well as providing technical services for quality control, for both government and private sectors.

The existing TIDC is not capable of the above activities since its equipment are outdated and facilities are not sufficient.

With this background, the government of Bangladesh has requested grant aid assistance from Japan for construction of facilities and procurement of equipment necessary to establish NITTRAD.

In response to the request, the government of Japan decided to conduct a basic design study concerning the project. The Japan International Cooperation Agency dispatched a first study team from June 13 to 25, 1993, and a second study team from July 30 to August 28, 1993 to Bangladesh. The study teams have made the survey to examine the appropriateness of the request and possibility of grant aid assistance for the project.

2-4-2 Contents of the Request

The contents of the request made by the government of Bangladesh are understood to be the following:

(1) Objective

To improve and expand TIDC's existing facilities and equipment to establish NITTRAD. NITTRAD will serve both government and private sectors of the Bangladesh textile industry by contributing to human resource development and international competitiveness in the textile industry.

(2) Project implementing organization

The Ministry of Textiles, The People's Republic of Bangladesh

(3) Project site

Nayarhat, Savar, Dhaka (on the premises of the existing TIDC)

(4) Contents of the major activities

- 1) Training and research in spinning, weaving, knitting, dyeing, sewing, management, quality control, engineering and design
- 2) Technical advisory services and trouble shooting services to the entire textile industry
- 3) Testing services for the entire textile industry

(5) Contents of the facilities:

- | | |
|-------------------------------|---|
| 1) Institute building | 2,928.0 m ²
(including connecting corridor) |
| 2) Administration building | 232.0 m ² |
| 3) Hostel building | 930.0 m ² |
| 4) Dinning hall | 111.5 m ² |
| 5) Staff quarter | 2,046.0 m ² |
| 6) Other necessary facilities | (septic tank, pump house etc.) |

(6) Contents of equipment:

1) Training equipment

1. Spinning:

High Speed Card, Lap Former, Comber, Simplex, Ring Frame, Cone Winder, Open-End Spinning, Air Jet Spinning, Auxiliary Equipment & Accessories

2. Weaving:

Power Loom, Terry Shuttle Loom, Rapier Loom, Air Jet Loom, Water Jet Loom, Gripper Shuttle Loom, Auxiliary Equipment and Spares

3. Dyeing/Finishing:

Singeing Machine, Pressurized Scouring Machine, Cloth Mercerizing Machine, Sample Jet Dyeing Machine, Stinter Machine, Padding Mangle, Jigger, Drying and Curing Machine, Steamer, Yarn Mercerizing Machine, Sanforizing Machine, Felt Calender Machine, Raising Machine, Steamer Calender

4. Knitting:

Warp Knitting Machine, Weft Knitting Machine, Narrow Trimmings & Elastics Machine, Designing of Fancy Edgings Machine, Flat Knitting computerized design making, Hosiery Double Cylinder Machine, Trials Plain Socks Knitting Machine, Rachel Sampler, Tricot Sampler, Elementary Knitting Machine, Link Grinding, Winding Machine, Spares and Accessories

2) Testing equipment

Double Sorter, Cotton Grade Box, Fiber Strength Tester, Stelometer, Testing device for Honey Dew content in Cotton, Microscope, Precision Polarizing Microscope, Trash Analyzer for Raw Cotton, Electronic Balance, Educational Testing Kit for Fiber Identification, Warp Reel, WIRA Fineness Meter, Twist Tester, Lea Strength Tester, Electronic Tensile Tester, Yarn Crimp Tester, Electronic Single Yarn Strength Tester, Pilling Tester, Digital

Tachometer, Yarn Tension Meter, Fabric Thickness Tester, Fabric Abrasion Tester, Fabric Stiffness Tester, Digital pH Meter, Analytical Digital Balance, Fabric Drapemeter, Coarse length Tester, Elemendorf's Tearing Tester, Portable Yarn Counting Balance, Fabric Bursting Strength Tester, Micro Computer with printer, Overhead Projector, Slide Projector, Spindle Vibration Tester, Audio-visual Facility, Yarn Hairiness Tester, Fabric Washing Machine, Drying Machine, Gray Scale, Water Repellency Tester, Spray Rating Tester, Hydrostatic Head Tester, Sample & Pattern Cutter, Electronic Coarse Counter, Snag Tester & Viewing Cabinet, Perspirometer, Air Permeability Tester, Uster Tester, Mini Ring Frame, Split Type Air Conditioner, Uster Auto Sorter, Spectrophotometer, Liquid Crystal Projection System, Multimedia System, Nep Tester, Yarn Package Hardness Tester, Yarn Friction Tester, Yarn Filament Counter, Fabric Crease Recovery Tester, Shirley Tog Meter, AATCC Wrinkle Tester, Chemicals, Dyes & Accessories, Uster Classimat, Thermograph, Micrometer

3) Design equipment

1. Creative design:

Set Square, T Scale of Board, Steel Scale, Covered Scale, Small Pantograph, Rotor Pen Set, Design Table & Chair, Tracing Table, Table Lamp, Parallel Scale, Paper Desk, Colour Desk, Scissors, Paper Cutting Knife, Protector, Clip Board, Air Cooler

2. Photographic design:

Day Light Film Developing, Developing Machine, Negative Positive Copying Machine, Auto Developer and Dryer, Photo Enlarger, Line Camera, Tracing & Masking Table, Graphic Design Table and Chair, Table Lamp, Hair Dryer, Rotor Fan, Steel Scale, Film Cutting Knife, Step and Repeat Machine, Air Cooler for Dark & Design Room, Film Cutting, Enlarger Machine, Developing Bath and Fixing Bath, Film, Compact Camera Set, Zoom Lens, Tele Lens, Different Lens Filters, Camera Stand, Developing and Fixing Chemicals, Dryer, Photo Copying Machine, Slide Projector, Air Cooler, Photographic Chemicals & Films

3. Fashion design:

Ordinary Sewing Machine, Automatic Sewing Machine, Cutting Table, Design Table & Chair, Scissors

4. Clothing:

Lock Stitch, Single Needle, Overlock, Twine Needle 5 Thread, Interlock, Twine Needle 5 Thread, Lock Stitch, Single Needle, Lock Stitch, Single Needle Component Feed, Bar-Track, Button Hole, Button Sewing Machine, Double Chain Machine (2-Needle), Double Chain Stitch Machine (3-Needle), Blind Stitch Machine, Lock Stitch (2-Needle), Double Chain Stitch, Single Needle, Double Chain Stitch, 4-Needle Elastic Attacher, Double Chain Stitch, 4-Needle Shirt Fronting, Double Chain Stitch, 4-Needle Waist Bending, Button Hole (Eyelet) Machine, Lock Stitch Pocket Welting, Table (Cloth Laying), Straight Knife, Circular Knife, Band Knife Cutting Unit, End of Lay Cutter, Cloth

Drill, Die Cutter, General Purpose Finishing Board, Steam Iron, Fusing Press, Shirt Folder, Thread Cleaner, Pocket Creaser, Collar Turner, Leg Press, Top Press, Body Press, Metal Button Chalker, Shape Fastener, Vacuum Pump, Steam Generator, Colour Grading and Marking work station, Pattern Input Work Station, Maker Plotter, Software, Documentation, Mini Graphics Scope Emulators, Assembly Kit

5. Weaving/knitting design:

Pit Loom, Semi-Automatic Loom, Power Loom, Dobby, Jacquard Machine, Card Punching Machine, Drawing Table & Chair, Wool Knitting Machine

6. Embroidery design:

Ordinary Sewing Machine, Zig-Zag Machine, Fashion making Diskmatic, Ordinary Embroidery Machine, Cutting Table & Tools, Instruments for Making Pattern, Almirah for keeping Cloth

7. Print design:

Block Design, Rotor Pen, Screen Cam, Hammer, Weighing Scale, Colour Pots, Colour Mining Stirrer, Oven, Stretching Machine, Embossing Machine Table, Screen Drying Chamber, Suction Machine, Metal Frame, Printing Table, Rotary Screen Printing Machine, Decrease Tank, Polymerizer/Dryer, Coating Machine, Climatizer, Exposure Machine, Spray Gun, Stand with Lighting System, Ending Gluing Machine, Ending Removing Machine, Stripping Tank, Screen Washing Equipment, Packing Screen Separating, Squeeze Washing Machine, Screen Washing Machine,

Hand Coating Machine, Ending Gluing Table, Refrigerator, Air Cooler, Analytical Digital Balance

4) Computer

Personal Computers, Colour Monitors, Colour VGA Monitor, Colour Printer, Dot Matrix Printer, Laser Printer, Automatic Voltage Regulator, Back up Battery

5) Workshop

Gas Welding Set, Tool-bit of Lathe Machine, Drill-bit of Drill Machine, Milling Cutters, Compressor Machine, Shaper Machine, Hardness Measuring Instrument, Leveling Plate, Dial Indicator for Measuring Eccentricity, Flow Meter, Air Velocity Meter, Hygrometer, Clip-on-Ammeter, Induction Current testing set, Meter (KW, KWH, KVA, KVAR), Voltmeter, Ammeter, HT Equipment, Transformer, Switch Gear, HT Potential Transformer, Current Transformers, AVO-Meter, Whetstone Bridge, Digital AVO-Meter, Pneumatic Valve, Pneumatic Solenoid Valve, Piston Cylinder Arrangement, Compressor

6) Administration & Management equipment

Chair of the trainees, Table, White board, Bookshelf, Steel cabinet, Wooden round tool, Laboratory table with basin, Refrigerator (Chemical), Secretariat table, Chair, Bed, Pillow, Mosquito net, Reading table, Reading chair, Photocopy machine, Duplicating, Stencil Cutting, Type Writer, Library Books, Vehicle (Wagon type), Microbus

CHAPTER 3 DETAILS OF THE PROJECT

CHAPTER 3 DETAILS OF THE PROJECT

3-1 Objective of the Project

The Textile Industry Development Centre (TIDC), which operates under the Bangladesh Textile Mills Corporation (BTMC), has been offering training, research, and testing services in the fields of spinning, weaving and dyeing mainly for the government textile mills. When TIDC was established in 1979, most of the textile mills in the country were government ones. Since then, however, the number of private textile mills has increased. At present, the structure of the country's textile industry is characterized by the private sector's predominance in terms of both production and technology. In view of this fact, the government of Bangladesh formulated a policy to privatize the BTMC textile mills. Under the policy it is planned to privatize 10 of the 41 BTMC textile mills by December 1993, and the remaining 31 mills by the end of 1998. Concurrently with the implementation of this policy measure, the government of Bangladesh plans to convert TIDC to an autonomous institution named the National Institute of Textile Training, Research and Design (NITTRAD) to operate directly under the Ministry of Textiles, which will then offer technical services to the country's entire textile industry. NITTRAD is planned to have a design department, which will conduct research and training in print design, aimed at increasing competitiveness of locally manufactured textile products in the domestic market, as well as research and training in fashion design, aimed at strengthening the country's RMG industry which is now the country's top export industry. The objectives of this project are to expand facilities and to procure equipment for NITTRAD so that it can fulfill its role in the development of the textile industry of Bangladesh as envisaged in the government's textile policy.

3-2 Examination of the Request

3-2-1 Examination of the Appropriateness and Necessity of the Project

In the textile industry of Bangladesh, private textile mills own more advanced production machines and perform with higher operating rates than the government mills. Therefore, upon converting TIDC into NITTRAD, if TIDC's technical services, which have so far been offered mainly to the BTMC mills, remain unchanged, what NITTRAD can contribute to the development of the textile industry is limited. And in order to raise the textile industry's technical level and to increase the industry's international competitiveness, the improvement of the testing system in the country for quality control purposes is indispensable. For these reasons, it is necessary to improve TIDC's present testing and research operations to allow NITTRAD to provide testing data which satisfy international levels. The implementation of this project to expand the existing facilities and to procure equipment for NITTRAD so as to meet private mills' technical requirements is conformable to the present situation of the country's textile industry. And it is in line with the government policy to increase the international competitiveness of the textile industry, and therefore the project is considered appropriate and urgently needed.

It is also urgently necessary to raise design levels of local textile products in order to enhance competitiveness vis-a-vis imported products. In this connection, it is considered appropriate to establish a design department in NITTRAD as the core for design development of the country, where research and training in transferring techniques from created designs to manufacturing products will be conducted.

3-2-2 Examination of the Implementing System

(1) Examination of the personnel plan

TIDC consists of four departments: training; operation; testing/research; and administration departments, and has a staff of 95. The operation department, which is responsible for technical guidance to textile mills, is to be integrated into the training department to form the Training/Operation Department under this project. NITTRAD is planned to be operated by a staff of 150, and will have four departments. These are: Training/Operation; Testing/Research; Design; and Administration Departments. Table 3-1 shows a comparison of TIDC and NITTRAD in terms of the size of staff.

Table 3-1 Staff Numbers of TIDC and NITTRAD

a: Senior staff b: Supporting staff c: Faculty staff

Department	Training/Operation			Testing/Research			Design			Administration			Total
	a	b	Total	c	b	Total	c	b	Total	c	b	Total	Total
TIDC	24	11	35	7	7	14	-	-	-	10	36	46	95
NITTRAD	28	21	49	9	6	15	9	9	18	14	54	68	150
Increase	4	10	14	2	-1*	1	9	9	18	4	18	22	55

* While 3 lab. assistants and 3 lab. boys are assigned at the testing/research dept. of TIDC, NITTRAD will have only 5 lab. assistants for improving quality of supporting staff.

At the Training/Operation Department of NITTRAD, divisions of sewing and knitting are planned to be added to the present training fields carried out at TIDC. It will therefore be necessary to newly recruit 2 faculty staff members in the sewing division and 3 faculty staff members in the knitting division. Since the number of faculty staff members in charge of the dyeing and management divisions is to be decreased by two (one each in the two divisions), and that for faculty staff members in charge of the weaving division is to be increased by one, the number of

faculty staff members in total will be increased by four in the Training/Operation Department. Also, the number of supporting staff members such as head fitter, helper etc., is planned to be increased by 10 under this project. In the Testing/Research Department, the amount of test equipment is planned to be increased in order to expand the scope of testing services. For this reason, it is necessary to improve the quality of supporting staff members. In keeping with the increase in the number of testing service items, the number of faculty staff members is to be increased by two. The post of lab boy will be taken out from the supporting staff members. The supporting staff consists of only five lab assistants, but is still sufficient to improve the quality of operations. The personnel plan for the Training/Operation and Testing/Research Departments is based on TIDC's past achievements as well as on the future increase in Testing/Research Department's operations, and is therefore considered appropriate. There will be no difficulty in recruiting additional staff members for these departments in light of TIDC's past achievements in recruitment.

Since the Design Department is a new one, all its staff members need to be newly recruited. The Design Department will consist of a print design division, and a fashion design division, and will have a staff of 18. Its faculty staff members will consist of a chief faculty member, 6 faculty staff members in charge of print screen making, and 2 faculty staff members in charge of pattern making and material science. Its supporting staff will consist of 2 tracers, 1 engraver, 5 technicians and 1 MLSS. In the request of Bangladesh side, it was envisioned that the Design Department would have a staff of 23 to cover creative design, studio design, print design, woven & knitting, embroidery and fashion. Under this plan, however, a relatively small number of staff members are

to cover a wide variety of fields. For this reason, the number of divisions is decreased to two, namely print design, and fashion design divisions. As for the recruitment of staff members, an expert from BTMC with experience in print design has already been assigned, and is expected to be responsible for recruitment of other staff members of the print design division. However, no concrete recruitment plan has yet been worked out for the fashion design division, and therefore it will be necessary to train instructors under technical cooperation programmes by international donor organizations such as UNIDO.

In the process of converting TIDC to NITTRAD, it is planned to increase the annual numbers of trainees and testing services. To cope with the possible increase in administrative activities due to the expansion of those operations, it is planned to increase 22 staff members of the Administration Department. While at TIDC, security officer, assistant engineer, and accounts officer etc. are positioned directly under the principal, at NITTRAD they are to belong to either the administration system or the accounting system. The two systems are to be managed by a secretary and an assistant chief accountant respectively. In addition, staff members to take charge of operation of personal computers, which are to be installed in order to cope with the possible increase in data processing, will be newly recruited. Thus, the number of the Administration Department's senior staff members will be increased by four in total. The number of the department's supporting staff members such as typists, drivers, telephone operators, security guards etc. will be increased by 22 in total. Increase of security guards is three, which is necessary to protect expensive equipment to be provided under this project. The improvement in the personnel of the Administration Department is necessary to operate NITTRAD as an autonomous institution,

and the planned increase is based on TIDC's past achievements. For these reasons, the personnel plan is considered appropriate. There will be no problem with the recruitment of additional staff members of this department since recruitment of clerical staff members is easy at present in the country.

(2) Operating budget plan

Following is the operating budget plan of NITTRAD approved by the Bangladesh side:

Raw materials & supplies	2,400,000 TK/year
Fuel and power	1,913,000 TK/year
Manpower	13,738,000 TK/year
Other costs (including 9,799,000 TK of depreciation expenses)	11,059,000 TK/year
<hr/>	
Total	29,110,000 TK/year

The amount of 19,311,000TK is the above total minus 9,799,000TK (depreciation expenses), and is necessary to be appropriated for NITTRAD's annual operation. This amount, which is more than the amount as tentatively estimated in "3-3-5 Maintenance and Operation Cost", is considered appropriate. Therefore, there will be no problem with the operation and management of NITTRAD as long as the budget is ensured.

3-2-3 Examination of the Relations with Similar Projects

TIDC was established in 1979 by the financial assistance of the United Nations Development Program (UNDP). For a few years after its founding, the institution received technical cooperation from UNDP. At present, the United Nations Industrial Development Organization (UNIDO) is

showing an interest in extending technical cooperation for NITTRAD. And UNIDO is now conducting coordination concerning the feasibility of implementing technical cooperation in the form of dispatch of experts in case this project is implemented. UNIDO has had experience offering technical cooperation in the field of textile technology to the country - for example, dispatch of experts to the College of Textile Technology and the Bangladesh Standards and Testing Institute (BSTI). Since UNIDO has sufficient information on the country's textile-related organizations, it is important to keep in contact for coordination purposes in order to avoid overlap with similar projects. And also it is important to continue to keep in close contact with BSTI because it formulates testing standards under of the Ministry of Industries, and NITTRAD's testing and research activities will be carried out in collaboration with BSTI.

3-2-4 Examination of the Project's Constituents

(1) Training

The textile industry is the country's top export industry. However, locally made materials are seldom used for production of export ready made garments (RMG), most of them being imported from abroad. While the textile industry is contributing to the country's exports, imports of materials for use in the industry account for about 20% of the country's total imports. Therefore, it is most important for the country to increase the added value of RMG products. For this reason, the government of Bangladesh has been trying to strengthen the upstream sub-sectors such as the spinning, weaving, and dyeing sub-sectors in addition to the downstream RMG sub-sector, to increase the utilization ratio of locally made materials and to increase the added value of the export-oriented RMG

products. The government listed "To promote and develop proper linkage of RMG with other textile sub-sectors for ensuring local supply of quality fabrics" in its Textile Policy 1989. At TIDC, training in spinning, weaving and dyeing has been offered mainly to BTMC mills which are not as advanced as private mills. Therefore, training quality standard of TIDC has not yet reached the international level. The Training/Operation Department of NITTRAD will have knitting and sewing divisions in addition to the existing TIDC's divisions to meet the actual situation of the textile industry. Since the types of sewing machines used in the process of apparel manufacturing varies widely according to the sewing method and the sewn portion, it is imperative for factory managers to have a sound knowledge of sewing machines for factory operations and production line planning. It is therefore appropriate to newly establish an sewing division in the Training/Operation Department to conduct training for senior factory personnel.

This project, whose main objectives include the improvement of training in production technologies and quality control will contribute to strengthening the upstream industry and is considered quite appropriate.

(2) Testing/Research

TIDC's testing/research department has so far conducted more than 5,000 tests in the fields of spinning, weaving and dyeing every year. Compared with the College of Textile Technology and the Bangladesh Standards Testing Institution, both of which have similar facilities, TIDC has a better testing system. However, its existing facilities and equipment are not sufficient. There are instances when the institution has to refuse requests for testing because of the shortage of equipment. On the other hand, many private textile mills tend to contract out tests to foreign testing institutions for the reason that there is no reliable

testing institution in the country. It is desirable that the testing/research department of TIDC be strengthened so that its operations may reach the international level.

It is urgently necessary, therefore, to improve the testing/research department of TIDC to establish NITTRAD.

In Japan, an export inspection system was introduced to ensure that all export products meet product quality requirements, and as a result Japanese-made products gained international recognition in terms of product reliability, and Japan's export industries have grown. When an export inspection system is established in Bangladesh, it is most likely that NITTRAD will be the organization to supervise the implementation of the system, although the government of Bangladesh has not yet drawn up concrete measures to establish such a system. It is therefore significant to improve the Testing/Research Department of NITTRAD in terms of future prospect.

(3) Design

Locally made textile products are not competitive with imported ones even in the domestic market. The main reason for this is their poor quality in terms of print design. The print-screen-making technology, with which original designs are incorporated into manufactured textile products, is indispensable in improving the quality of print design. However, there is no institution in the country which conducts research and training in this technology. It is therefore appropriate to include print-screen-making in the functions of the Design Department of NITTRAD.

The country's RMG factories commonly produce samples based on fashion idea sketches provided by foreign buyers for approval upon starting mass production. Since such fashion idea sketches are seldom specified in