

**BASIC DESIGN STUDY REPORT
ON
THE PROJECT FOR INSTALLATION OF EQUIPMENT
IN DAMASCUS INTERMEDIATE INSTITUTE
FOR TEXTILE INDUSTRIES
IN
SYRIAN ARAB REPUBLIC**

July 2002

**JAPAN INTERNATIONAL COOPERATION AGENCY
UNICO INTERNATIONAL CORPORATION**

PREFACE

In response to a request from the Government of Syrian Arab Republic, the Government of Japan decided to conduct a basic design study on the Project for Installation of Equipment in Damascus Intermediate Institute for Textile Industries in Syrian Arab Republic and entrusted the study to the Japan International Cooperation Agency (JICA).

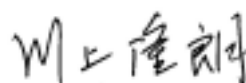
JICA sent to Syria a study team from January 13 to February 7, 2002.

The team held discussions with the officials concerned of the Government of Syria, 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 Syria in order to discuss a draft basic design, 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 Syrian Arab Republic for their close cooperation extended to the teams.

July, 2002



Takao Kawakami

President

Japan International Cooperation Agency

July, 2002

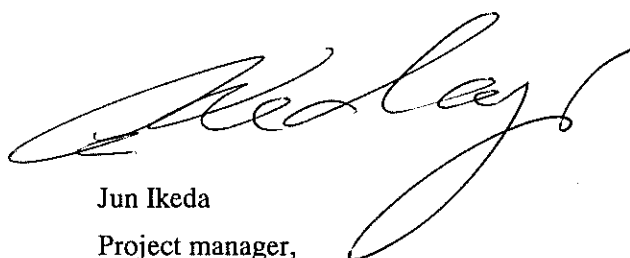
Letter of Transmittal

We are pleased to submit to you the basic design study report on the Project for Installation of Equipment in Damascus Intermediate Institute for Textile Industries in Syrian Arab Republic.

This study was conducted by UNICO International Corporation, under a contract to JICA, during the period from January, 2002 to July, 2002. In conducting the study, we have examined the feasibility and rationale of the project with due consideration to the present situation of Syria and formulated the most appropriate basic design for the project under Japan's grant aid scheme.

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

Very truly yours,

A handwritten signature in black ink, appearing to read 'Jun Ikeda', is written over the typed name and title.

Jun Ikeda

Project manager,

Basic design study team on

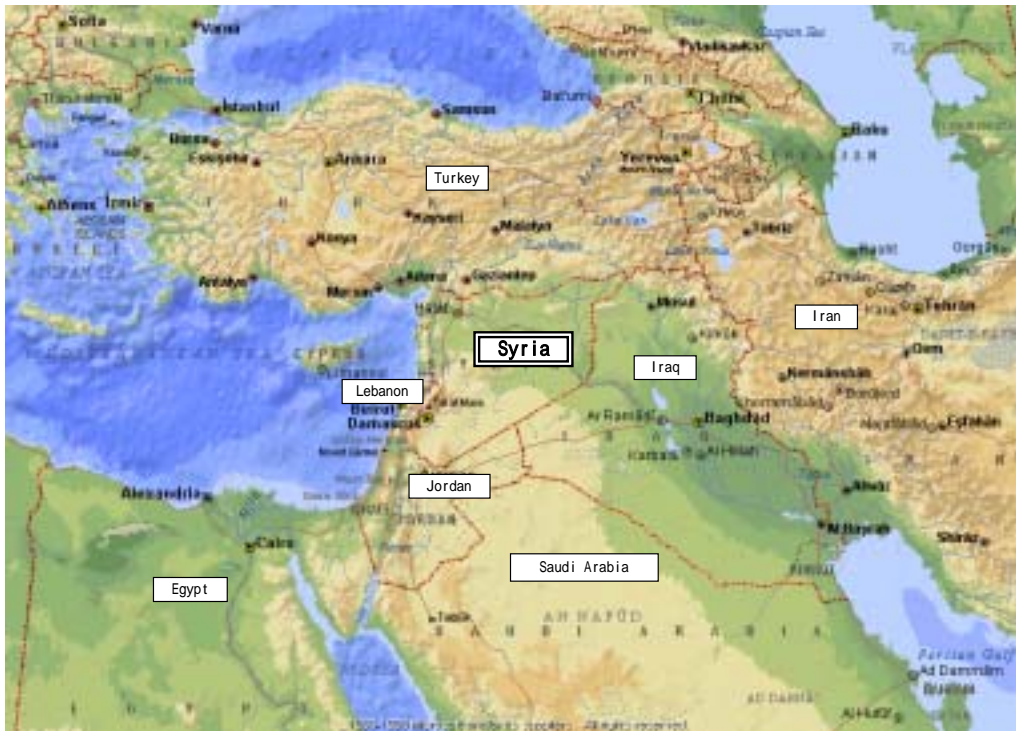
the Project for Installation of Equipment

in Damascus Intermediate Institute for Textile Industries

in Syrian Arab Republic

UNICO International Corporation

Syrian Arab Republic and Surrounding Countries



Location of the Site



List of Figures and Tables

【Tables】

1	Comparison of Old and New Departments	2-8
2	Employees in Public factories	2-9
3	Production of Textile industry (1998)	2-9
4	Machinery and Equipment Requiring Air-conditioning	2-10
5	Composition of Lecture and Practical Training (Weekly Hours)	2-10
6	Weekly Study Schedule	2-11
7	Time Table for Practice (existing condition)	2-12
8	Time Schedule for Practice (existing condition)	2-12
9	Fare for Public Transportation.....	2-13
10	Comparison of Vehicle Operation Costs	2-13
11	Time Table for Practice (future plan)	2-14
12	Time Schedule for Practice (future plan by one bus)	2-15
13	Fare for Public Transportation.....	2-15
14	Time Schedule for Practice (future plan by two buses).....	2-16
15	Practice of Computer.....	2-18
16	Study result of the request.....	2-23
17	Major Equipment List	2-31
18	Implementation Schedule.....	2-41
19	Recent Changes in DIITI's Revenues and Expenditures.....	2-44
20	Increase of Expenditure by Planned Equipment	2-44
21	Direct Benefits	3-1

【Figures】

1	Sewing Machine and Parts	2-21
2	Layout Plan for Major Equipment	2-34
3	Implementation Organization.....	2-36

Abbreviations

A/P	Authorization to Pay
CAD	Computer Aided Design
CIM	Computer Integrated Manufacturing
DIITI	Damascus Intermediate Institute for Textile Industries
E/N	Exchange of Notes
GDP	Gross Domestic Product
GOTI	General Organization for Textile Industry
IEC	International Electrotechnical Commission
ILO	International Labour Organization
ISO	International Organization for Standardization
JICA	Japan International Cooperation Agency
min.	minute
MOI	Ministry of Industry
OECD	Organization for Economic Cooperation and Development
QR	Quick Response
SEBC	Syrian-European Business Centre
SP	Syrian Pound
UNDP	United Nations Development Programme

Summary

Summary

After its independence from France in 1946, Syria built a nation under the close relationship with the defunct Soviet Union and promoted the state-planned economy through land reforms and nationalization of large enterprises and banks. The Asad regime, which inaugurated in November 1970, implemented economic reforms in line with a more realistic policy. However, the economy stagnated due to the bottleneck of the planned economy, followed by the collapse of the Soviet Union, which resulted in a significant decline in merchandise trade. Direct causes for the economic downturns are the lack of international competitiveness due to poor quality of manufactured goods, inefficient management of state enterprises under the socialist regime, agriculture susceptible to weather conditions, and volatile oil prices due to the unstable conditions in the international market.

In an attempt to revitalize the economy, the government enacted a new investment law in May 1991 to promote participation of the private sector in industrial activities, including investment. While economic liberalization has been progressing gradually and the international balance of payments has been improving, trade deficits continue. The Ninth Five-year Plan (2001 – 2005) addresses the problem by emphasizing development of industries which are less affected by weather or international market conditions and can use abundant and low-cost labor. Under the recognition that internationally competitive products and volume production hold the key to effective industrial promotion, further development of the textile industry - which already occupies the leading position in terms of exports, GDP and employment – is given of priority. And the plan emphasizes the needs for education and training to teach skills and techniques required in the labor market.

Damascus Intermediate Institute for Textile Industries (DIITI) is a major institute to train engineers and technicians who can form the core part of labor force in the textile industry. Its machinery and equipment, however, is very old. Shuttle looms made more than 70 years ago and spinning frames of more than 50 years old are still in use. Due to the lack of repair parts, many of them do not function properly or are unserviceable. While practical training constitutes an important part of vocational training and accounts for one half of DIITI's curriculum, the shortage of training equipment affects the quality of education, e.g., instructors have to explain a machine's mechanism using a blackboard. As a result, DIITI fails to fulfill its role as a specialized educational institution to produce textile engineers and technicians who have knowledge and skills demanded by the industry.

The need for modernization of DIITI's training equipment was first recognized in 1997, when Japan International Cooperation Agency (JICA) conducted a study on the textile industry in the country. Entitled the "Study on the Development of the Textile Industry in the Syrian Arab Republic," the study report makes a wide range of recommendations for the industry, covering foreign trade, state and private enterprises, export promotion, quality control, productivity improvement, and human resource development. In the area of human resource development, the report recommends modernization and upgrading of training equipment at DIITI.

In July 2000, the Syrian government made a formal request for grant-in-aid to the Japanese government, with regard to the assistance for DIITI in improving its practical training program by modernizing and upgrading aged

equipment for the purpose of training textile engineers and technicians who have internationally competitive skills.

The Japanese government decided to provide the assistance as a “basic design study,” and through JICA, it sent a basic design study team to Syria from January 12 through February 8, 2002. The study team discussed with the Syrian government and other parties and conducted field surveys in the area to be covered by the basic design study. After a follow-up research and study in Japan, the study team developed and presented a draft basic design to the Syrian counterpart between May 17 through 28, 2002. The present report has been compiled to reflect the results of the extensive and insight study and discussion.

Essentially, the study has selected a minimum required set of textile machinery and equipment that is used for education and training of basic skills and techniques at textile mills, covering the operations and mechanisms that form essential elements of the textile production process. Selection has been made in consideration of the current levels of technology and equipment used by textile manufacturers in the country (both state and private enterprises), worldwide technology trends, and local conditions and factors, including availability of space and human resources, operation and maintenance costs, and operational efficiency. The equipment list so selected is summarized below.

Name of Department	Name of major equipment
Spinning	Drawing frame, Roving frame, Ring spinning frame, Open-end spinning machine, Winding machine
Weaving	Air jet loom, Rapier loom, Gripper loom, Flat knitting machine
Chemistry	Computer color matching system, Auto-screen printing machine, Heat setting machine, Continuous pad drying machine, Fade meter, Launder meter
Ready made garments	Sewing machines, Training implements for the sewing
Laboratory	Single fiber tensile strength tester, Yarn tensile strength tester, Evenness tester, Universal textile abrasion tester, High magnification microscope, Lea strength tester, Hairiness tester
Auxiliary	Generator, Personal computer, Printer, Transportation bus

If the project is to be implemented as a grant-in-aid project of the Japanese government, the Syrian government is expected to spend as much as 1,350,000 yen on its part. The project is estimated to take about 15 months including detailed design.

The project is characterized as a project to support the upgrading of technical skills trained at DIITI, rather than to increase the number of engineers and technicians to be trained. By upgrading and adding training equipment, the project allows DIITI trainees to spend more time on actual operation of equipment used at textile

mills, thereby to help achieve the goal of developing skills demanded by the industry. In particular, the project allows practical training for 20 out of 28 basic textile production processes, including spinning, weaving, chemistry and ready-made garment, compared to only 9 processes that are covered in the present curriculum. As a result, DIITI trainees will be able to learn practical skills using equipment that is actually used on the shop floor where they work in the future. Furthermore, the reopening of a course on ready-made garment production means that DIITI will produce 20 technicians in the final step of the textile production process training and fully meet the industry's demand for human resources. Finally, the project emphasizes laboratory equipment that is indispensable for quality control. DIITI will be able to contribute to quality improvement in the textile industry by teaching necessary knowledge and skills for operation of latest testing and analytical equipment.

DIITI, positioned as the core element of human resource development for the textile industry, is under supervision of the Training and Qualification Directorate, Ministry of Industry and maintains its own financial source and manpower to operate and maintain machinery and equipment to be upgraded under the project. The machinery and equipment require adequate levels of knowledge and skills to operate and does not have significant environmental impacts. As a result, the project can be implemented as the grant-in-aid project of the Japanese government without much difficulty.

To ensure effective and efficient implementation of the project, the following recommendations are made.

(1) Upgrading of textbook

DIITI is currently using textbooks, which are based on the old machinery and equipment and should be updated to teach the mechanisms and operations of the new machinery to be procured under the project. Also, the curriculum needs to be revised to reflect the increased variety of machinery.

(2) Effective use of “senior overseas volunteers”

Senior overseas volunteers – the program to send retired Japanese engineers and technicians for technical assistance – are requested by DIITI in the fields of spinning, weaving and chemistry, and those specialized in spinning operation are already working. As the project plans to procure machinery and equipment that is used in the Syrian textile industry and incorporates technology at world standards, senior overseas volunteers will be able to teach advanced skills and techniques to both instructors and students.

Table of Contents

Preface	
Letter of Transmittal	
Location Map	
List of Figures & Tables	
Abbreviations	
Summary	
Chapter 1	Background of the Project..... 1-1
Chapter 2	Contents of the Project..... 2-1
2-1	Basic Concept of the Project 2-1
2-2	Basic Design of the Requested Japanese Assistance 2-2
2-2-1	Design Policy 2-2
2-2-2	Basic Plan 2-4
2-2-3	Basic Design Drawing..... 2-34
2-2-4	Implementation Plan..... 2-36
2-2-4-1	Implementation Policy..... 2-36
2-2-4-2	Implementation Conditions 2-36
2-2-4-3	Scope of Works..... 2-37
2-2-4-4	Consultant Supervision..... 2-38
2-2-4-5	Procurement Plan 2-39
2-2-4-6	Implementation Schedule 2-40
2-3	Obligations of Recipient Country..... 2-42
2-4	Project Operation Plan 2-44
Chapter 3	Project Evaluation and Recommendations..... 3-1
3-1	Project Effect..... 3-1
3-2	Recommendations 3-2
Appendices	
1.	Member List of the Survey Team..... A-1-1
2.	Study Schedule..... A-2-1
3.	List of Parties Concerned in the Recipient Country..... A-3-1
4.	Minutes of Discussions A-4-1
5.	Cost Estimation Born by the Recipient Country..... A-5-1
6.	Equipment List..... A-6-1

Chapter 1 Background of the Project

Chapter 1 Background of the Project

In Syria, further development of the textile industry is considered to be an urgent task, and education of engineers and technicians who have high skills demanded by the industry is one of the most important factors for achieving the goal. While training of industrial workers is conducted at vocational training schools or in-house training programs of manufacturers on a short-term basis, Damascus Intermediate Institute for Textile Industries (DIITI) plays a central role in systematic skill training to produce engineers and technicians who can serve as the core work force in the textile industry.

While practical training governs the effect of technical education and constitutes a major part of DIITI's curriculum, its machinery and equipment is very old. Shuttle looms made more than 70 years ago and spinning frames of more than 50 years old are still in use. Due to the lack of repair parts, many of them do not function properly or are unserviceable. The shortage of training equipment affects the quality of education, e.g., instructors have to explain a machine's mechanism using a blackboard. In consequence, DIITI fails to fulfill its role as a specialized educational institution to produce textile engineers and technicians who have knowledge and skills demanded by the industry.

In July 2000, the Syrian government made a formal request for grant-in-aid to the Japanese government, with regard to the assistance for DIITI in improving its practical training program by modernizing and upgrading the aged equipment for the purpose of training textile engineers and technicians who can contribute to the manufacture of internationally competitive products.

In fact, the need for modernization of DIITI's training equipment was first pointed out in 1997, in JICA's report entitled "Study on the Development of the Textile Industry in the Syrian Arab Republic." The report makes a wide range of recommendations for the industry, covering foreign trade, public and private enterprises, export promotion, quality control, productivity improvement, and human resource development. In the area of human resource development, the report recommends modernization and upgrading of training equipment at DIITI.

Chapter 2 Contents of the Project

Chapter 2 Contents of the Project

2-1 Basic Concept of the Project

(1) Basic Concept of the Project

The Syrian government sets forth priority in the Ninth Five-year Plan, among other things, to the enhancement of the education and vocational training sector that produce human resources demanded in the labor market. Within the framework, this project is designed to reinforce the function to train engineers and technicians with knowledge and skills that meet the actual needs of textile companies in the country by reinforcing training resources and activities

(2) Project Outline

The project is designed to serve the above purpose by providing textile machinery and equipment that replaces the old ones owned by Damascus Intermediate Institute for Textile Industries (DIITI), together with testing machinery and auxiliary equipment that contributes to quality improvement of textile products made by the industry. It also includes education and training to learn operation of textile machines in each process and to practice inspection and testing for quality improvement. In particular, the project will procure production machinery and equipment used for training in spinning, weaving, chemistry and ready-made garment courses, as well as testing and auxiliary equipment, thereby enabling the institute to provide comprehensive education and training relating to the textile industry and its production process by using modern machinery and equipment.

2-2 Basic Design of the Requested Japanese Assistance

2-2-1 Design Policy

(1) General Framework and Scope

Subject of assistance: Damascus Intermediate Institute for Textile Industries (DIITI)

Reason: DIITI is virtually only one training institute specialized in textile production, and public factories and government offices are required to hire DIITI graduates when they wish to recruit junior engineers in the textile field. There is no other institute that provides similar levels of education and training in the trade.

Scope of assistance: Textile machinery and equipment used for training by DIITI's departments, namely spinning, weaving, chemistry and ready-made garments, including testing and auxiliary equipment

Reason: The machinery and equipment is required for high levels of technical education that is strongly demanded by the textile industry, both public and private factories.

Product grade: A standard set of machinery and equipment which performance and other specifications are same as those used by the textile industry, including public and private factories.

Reason: As DIITI graduates are expected by the industry to have practical knowledge and skills that can be readily applied to the shop floor operation, it is important to conduct training by using machinery that is actually used by the industry.

(2) Environmental Conditions

As physical properties of fibers vary with temperature and humidity conditions, textile companies strictly control environmental conditions within factories and laboratories at constant levels of temperature and humidity in order to ensure stable quality of textile products. For instance, textile manufacturers and companies specialized in inspection and testing of textile products maintain their testing laboratories, where tests relating to physical properties are conducted, at 20 ± 2 and $65\% \pm 2\%$. On the other hand, DIITI does not require such strict environmental control because its laboratory is used to learn operation and performance of textile machines as well as their role in the production process. Nevertheless, as the country's weather conditions vary relatively largely throughout the year, e.g., temperature ranges between the minimum level of -7.2 in winter and the maximum level of over 40 in summer, a certain level of environmental control is required to minimize a measurement error caused by the changes in weather conditions.

In addition to the annual variation of temperature, the country belongs to the dry climate area (annual precipitation of 150mm in Damascus). DIITI is situated in a dry area, and dust caused by a passing vehicle enters buildings even if no wind blows.

In these unfavorable environmental conditions, training and testing needs to be conducted in an enclosed room. Together with laboratory rooms where testing equipment is kept, rooms that accommodate equipment having precision mechanisms and computers should be air-conditioned.

(3) Procurement Conditions and Requirements Relating to the Industry's Conditions and Business Customs

Some manufacturers establish territories for distributors, which are generally designated for each country where their products are supplied or customers exist. As a result, a manufacturer may deliver a product through a distributor outside Syria, which covers the country as its territory. In this case, it should be confirmed that the local distributor provides maintenance and technical assistance services after installation. Moreover, to export computers and related equipment (both hardware and software) to Syria, an approval from the U.S. government is required. As the equipment manufacturer is required to make an application for such approval, it must be included in the conditions of the tender for equipment procurement.

(4) Use of Local Contractors

The textile industry in the country largely uses world-class machinery and equipment, and manufacturers provide good maintenance service. They have local distributors, mainly in Damascus or Aleppo, which have 15 – 40 employees each, including 5 – 10 engineers and service personnel. These distributors not only function as sales agents but also provide broad engineering services, ranging from factory design (both new construction and modification), to equipment layout, employee training, and after-sales service. Thus, machinery and equipment procured under the project will be well maintained so long as their manufacturers have local distributors. It is therefore desirable to select key machinery and equipment (including expensive ones) that are supplied by manufacturers with local service systems, while textile machinery and quality inspection equipment used in the production process will be maintained by DIITI instructors (assigned by public factories).

(5) Operation and Maintenance Capabilities of the Implementation Organization

It is important to ensure that operation and maintenance costs for the new equipment should be funded by operating budgets of DIITI and MOI without difficulty. Also, DIITI will have more diverse machinery and equipment, which is latest in design and performance. As its instructors (part-time) come from six public factories and use modern equipment at their own factories, DIITI is ready to operate and maintain new equipment to be introduced. However, most instructors and other staff at DIITI do not understand English, operation and maintenance manuals for machinery and equipment, which require complex operation procedures, should be written in Arabic.

(6) Machinery and Equipment Grades

To ensure that DIITI students can learn technologies and skills that are readily applicable to actual operations of textile factories in the country, machinery and equipment that is widely used by public or private factories and allows the learning of the basic production processes, will be procured.

(7) Procurement Method and Schedule

As special machinery and equipment accounts for large portions of the proposed purchase, it often takes a relatively long period of time to make and deliver. It is therefore very difficult to complete the project in a single year. The entire project period is thus assumed to take 15 months.

2-2-2 Basic Plan

(1) Overall Plan

DIITI is located in a site bounded by fences and has a two-story main building (reinforced concrete) and two annex buildings. While the buildings are equipped with electrical installations, water supply and sewerage systems, power supply is not stable due to the poor condition of the grid system to cause frequent power shortage or low voltage. Thus, the current power supply system is not sufficient to meet electricity demand from machinery and equipment to be procured under the project, and installation of an additional generator is essential. It should be noted that there are sufficient spaces for installation of large machinery and equipment as they replace the existing ones.

(2) Equipment Plan

The textile industry consists of spinning, weaving, chemistry and ready-made garment (sewing) processes, all of which can be taught and trained at DIITI. While it is ideal to provide a facility simulating an actual textile factory, the project will provide standard machinery and equipment to allow education and training for basic operations in each process, including the learning of fundamental mechanisms. On the other hand, it is very difficult and even danger for trainees to check a mechanism or operate machinery at an actual textile factory, and one can only learn a general flow of the production process. Basic operation of each process is described below.

[Spinning]: To fabricate continuous yarns of uniform size by arranging and bundling relatively short fibers, stretching them in a fiber direction, and twisting them to prevent fibers from sliding.

[Weaving] : This process is divided into weaving and knitting. In the weaving process, warp and weft threads are intersect in a specific pattern to form a smooth fabric structure. It is further divided into a weaving preparatory process and a weaving process. In the knitting process, a yarn is formed into a loop through which the yarn crosses to form another loop until smooth knitted fabrics are formed.

[Chemistry] : This is divided into the dyeing process to color fibers with a dye to give a color or a pattern, and the finishing process to provide a desired feeling, quality and performance of fabrics.

[Ready made garment] : While sewing is an integral part of the ready made garment process, the process is divided into preparatory (design), fabrication (sewing) and finishing.

[Laboratory] : As garments are required to meet a variety of qualification requirements, ranging from performance (wearing comfort, heat retaining property, durability) to fashionability, and throughout the production stages (from cotton fiber to garment), a variety of tests are conducted.

To teach each of the key processes described above, design policy for machinery and equipment used in each course is established as follows.

For the spinning and weaving department, standard equipment that is widely used by the textile industry will primarily be selected.

For the chemistry department, an emphasis should be placed on printing, dyeing and finishing that require certain levels of technologies and skills, whereas preparatory (cloth inspection, end stitching, etc.), scouring and bleaching are relatively simple processes. However, if equipment that is required to perform operations at the level of laboratory chemical experiment, large equipment for factory use will not be used.

For the ready made garment department, the project will provide sewing and finishing machines, while simple tools such as scissors and measuring tapes will be provided by DIITI. As industrial sewing machines are increasingly specialized and are available in diverse types, such as button holing and overlock machines, they will be selected according to the expected frequency of use.

The laboratory is currently capable of performing tests related to spinning and weaving. As comprehensive tests are desirable to ensure quality improvement, the equipment should be upgraded to allow the use by all the courses by introducing standard and sharable equipment.

Auxiliary equipment should be selected from the standpoint of developing the environment to support efficient education and training in classrooms and laboratories.

Important Considerations

1. Need and rationale for ready made garments department

(1) Role of the ready made garments sub-sector in the textile industry

In the textile industry, spinning, weaving and chemistry sub-sectors supply raw materials for manufacture of final products. On the other hand, the ready made garments is only one sub-sector responsible for processing and fabrication of raw materials into garments. It is the process to create a product (function) that meets the consumer needs. Thus an important function expected for the ready made garments industry is to relate raw materials and their producers (spinning, weaving and chemistry) to products that meet the market needs. In this perspective, the ready made garments industry must attain knowledge and experience on raw materials and processing (sewing) methods, based on which it must provide feedback information for both upstream and downstream sub-sectors, as to what materials should be developed and produced to make products that meet the market needs, and how raw materials should be processed (sewed). In reality, however, the ready made garments industry is far from fulfilling such function as it fabricates products according to the purchase order from apparel manufacturers, where products are designed by designers with little experience in ready made garments and have various problems relating to the design and function.

Ideally, the ready made garments industry should provide technical advice (input) to apparel companies, concerning design modification (raw materials, sewing method, and design) that delivers a specific performance at a lower cost or a better performance. This means, ready made garments engineers are expected to obtain knowledge and experience relating to the entire textile production process. It is therefore important to teach them broad knowledge on spinning, weaving, chemistry, quality and performance testing at the vocational training school.

(2) Former ready made garments department

DIITI's Ready Made Garments Department was inaugurated in 1990 and was operated until 1997. During the period, over 80 people completed the program and were employed by public factories. However, the department used very old sewing machines for practical training and did not have much equipment to test property and quality of fabrics, except for very old ones that did not meet the industry needs.

The department taught simple techniques on garment design, measurement, drafting, cutting, sewing, and sewing machine operation in a belief that the role of the sewing industry should be confined to manufacturing. In fact, these skills should be mastered by field workers in the sewing shop, DIITI graduates are expected to have higher levels of knowledge and skills.

Ready made garments engineers should be able to understand properties of various textile materials (yarns and fabrics) and determine as to which materials should be used to make a product that meets the market needs, and how they should be processed (sewed). However, public factories that sent instructors to the former department emphasized the traditional aspect of sewing operation and few instructors were able to teach advanced skills including the management aspect of the sewing process. As a result, DIITI graduates from the department received poor rating from their employers and DIITI discontinued the department by accepting that it was unable to provide adequate education.

(3) New department

The new ready made garments department will aim to train ready made garments engineers who have broad knowledge and skills relating to the textile industry, thereby contributing to development of the industry with international competitiveness. To achieve the goal, it will teach knowledge on garment design, product development, textile materials and sub-materials (buttons and core fabrics) from the viewpoint of developing: (1) the ability to select adequate materials for products that meet the market needs, (2) knowledge and experience on appropriate sewing methods; (3) knowledge on garment design, product design in general, and raw materials including sub-materials (buttons and interliners); (4) basic knowledge on “quick response (QR)” (flexible production management to adjust the production schedule to the sales one and increase production according to actual sales) and IT use for the industry (procurement of raw materials, outsourcing, and product shipment); and (5) knowledge on ISO 9002.

(4) Comparison of old and new ready made garments departments

Table 1 Comparison of Old and New Departments

	Old ready made garments department	New department
Course elements	Lecture on classification of textile materials	Lecture and practical training on classification of textile materials (use of projectors and microscopes to be procured under the project)
	Lecture on properties of fabrics and quality inspection	Lecture and practical training on properties of fabrics and quality inspection (practical training to strengthened due to procurement of inspection equipment)
	Lecture and practical training on textile design	Lecture and practical training on textile design, product development and sub-materials
	Lecture and practical training on textile design, measurement, drafting, cutting and sewing	Lecture and practical training on textile design, measurement, drafting, cutting and sewing (practical training to strengthened due to procurement of sewing machines)
	Lecture and practical training on the sewing machine and its mechanism, overhauling, assembly, and working efficiency	Lecture and practical training on the sewing machine and its mechanism, overhauling, assembly, and working efficiency (practical training to strengthened due to procurement of sewing machines)
	Lecture on sewing factory design	Lecture on sewing factory design
	Factory training	Factory training
		Lecture and practical training on quality control (ISO9000)
		Lecture on quick response (QR) and IT application
Educational materials/course materials	No textbook was used and instructors prepared course materials as required.	Textbook on the sewing industry prepared by ILO
Instructors	Engineers working for public factories	Engineers of public factories, plus instructors for ISO and QR sent by Standardization Center and Productivity Improvement Center under MOI
Practical training	Within the department, practical training focused on sewing practice using old sewing machines (donated by factories), but it was not effective due to obsolescence of the machines. No practical training for measurement and inspection of yarns, fabrics and garments to evaluate properties and performance was provided.	Practical training will cover measurement and inspection of fibers and their properties in each stage of the textile production process to teach knowledge on raw materials, together with sewing techniques by introduction of new machines.

(5) Demand for graduates from the ready made garments department

Five public factories claim that there are the shortages of workers, totaling 354 including general workers. (Table 2) Furthermore, production data on private enterprises (Table 3) indicate that there is strong demand for ready made garments engineers. Thus, as DIITI supplies graduates to the industry, it is expected to receive increased demand from private enterprises, thereby contributing to the development of the textile industry as a whole.

Table 2 Employment in Public factories

Name of Public factory	Number of Employee	Shortage of Employees
Al Shark Underwear's General Company	1,020	115
Arab Underwear's General Company	208	23
General Synthetic Yarns Crimping & Stocking Co.	463	24
Syrian Company for Ready-made Garment	943	71
Industrial Company for Ready-made Garment	760	121
	3,394	354

Source : DIITI

Table 3 Production of Textile industry (1998)

Name of production (units)	Public Sector	Private Sector	Public and Private ratio
Cotton textiles (ton)	13,212	11,890	0.9
Underwear (1,000)	887	4,000	4.5
Clothes (1,000)	666	26,900	40

Source : Statistical Abstract 2000-Office of the Prime Minister, Syria Arab Republic

2. Need for Electric Generator

In the area where DIITI is located, power shortage presents a serious problem to cause significant voltage fluctuation that cannot be handled by the automatic voltage regulator. DIITI installs a generator that is often used to ensure stable electricity supply, but its capacity only covers electricity demand from existing machinery and equipment. As machinery and equipment to be purchased under the project will require stable power supply, and in light of the fact that it is difficult for DIITI to secure the government budget to purchase expensive equipment such as the generator, installation of an addition generator as part of the counterpart's work is very difficult. Thus, it is recommended to include a new generator in the purchase list under the project.

3. Need for Environmental Control and Selection of Machinery and Equipment Requiring Air-conditioning

As mentioned in **2-2-1 (2) Environmental Conditions**, under the harsh environmental conditions, precision equipment and computers must be kept in enclosed rooms, which cannot be opened to protect equipment from dust that presents throughout the year. Thus, rooms that accommodate specific machinery and equipment (Table 4) should be air-conditioned.

Table 4 Machinery and Equipment Requiring Air-conditioning

	Room	Size	Environmental conditions	Reason
Equipment for Quality examination	Spinning and Weaving Lab.	10mx10m	To be shielded from dust. Temperature at 28 or less	Dust may enter the measuring instrument.
Knitting equipment	Weaving Office	4mx6m		Dust may enter the knitting machine.
Equipment for Chemical examination	Chemical Lab.	4mx7m		Dust may enter the measuring instrument
Computer	Computer room	5mx9m		Dust may enter the computer.

4. Vehicle Operation Plan

As DIITI's education emphasizes knowledge and technology that is useful in field operation, practical training accounts for 44 – 50% of course hours. (Table 5) Furthermore, practical training is somewhat characterized as dual system to incorporate education and training at factory. In fact, periodical factory training is included in the curriculum. (Table 6)

Table 5 Composition of Lecture and Practical Training (Weekly Hours)

Name of department	Spinning		Weaving		Chemistry		Ready made garment	
	1	2	1	2	1	2	1	2
Theoretical	18(53%)	20(56%)	20(56%)	20(56%)	22(61%)	18(50%)	18(51%)	16(50%)
Practical	16(47%)	16(44%)	16(44%)	16(44%)	14(39%)	18(50%)	17(49%)	16(50%)
Factory training	4(25%)	8(50%)	4(25%)	6(38%)	6(43%)	6(50%)	6(35%)	6(38%)
Total	34	36	36	36	36	36	35	32

Table 6 Time Table for Practice (existing condition)

Name of Company for Practice	Spinning		Weaving		Chemistry	
	United Industrial Commercial Co.		United Arab Company for Industry		Maghazel Spinning & Weaving Co.	
Distance from DIIT(km)	4km		6km		18km	
shifting Time by owned bus (minutes, one way)	15		20		40	
Shifting Time by public bus (minutes, one way)	40		60		70	
	1st year	2nd year	1st year	2nd year	1st year	
Number of Students	80	86	80	70	40	
Saturday						
8:00 ~ 9:40					P-D	
10:00 ~ 11:40						
12:00 ~ 13:40						
14:00 ~ 15:40	P-D		Weaving (1)			
16:00 ~ 17:40			Group A, B			
18:00 ~ 18:50						
Sunday						
8:00 ~ 9:40			Weaving (1)	P-D	P-D	
10:00 ~ 11:40			Group C, D			
12:00 ~ 13:40	Spinning (1)	P-D				
14:00 ~ 15:40	Group A, B					
16:00 ~ 17:40						
18:00 ~ 18:50						
Monday						
8:00 ~ 9:40	Spinning (1)		P-D	Weaving (2)		
10:00 ~ 11:40	Group C, D			Group A, B	Chemistry (1)	
12:00 ~ 13:40					Group A, B	
14:00 ~ 15:40						
16:00 ~ 17:40						
18:00 ~ 18:50						
Tuesday						
8:00 ~ 9:40	P-D	Spinning (2)	P-D	P-D	P-D	
10:00 ~ 11:40		Group A, B		P-D		
12:00 ~ 13:40						
14:00 ~ 15:40						
16:00 ~ 17:40						
18:00 ~ 18:50						
Wednesday						
8:00 ~ 9:40						
10:00 ~ 11:40		Spinning (2)				
12:00 ~ 13:40		Group C, D		Weaving (2)		
14:00 ~ 15:40				Group C, D		
16:00 ~ 17:40						
18:00 ~ 18:50						
Thursday						
8:00 ~ 9:40						
10:00 ~ 11:40						
12:00 ~ 13:40						
14:00 ~ 15:40						
16:00 ~ 17:40						
18:00 ~ 18:50						

Note: (1) P-D means Practice in DIITI. Others means Practice in Companies.

(2) This time table shows existing condition.

(3) The reasons which Shifting Time by public bus takes long time are

1) 20 students can not get on the same bus at the same time.

2) The students have to change the bus to get the companies.

Table 7 Weekly Study Schedule

	Sunday		Monday	
Spinning department 1st grade : 80 students	Practice in factory 40students	Group A:20	Practice in DIITI 40students	Group A+B:40
		Group B:20		
	Practice in DIITI 40students	Group C+D:40	Practice in factory 40students	Group C:20

DIITI conducts practical training for the group of 20 students on account of efficiency and the factory's ability to take care of students. For the first year of Spinning Department, for instance, 80 students are divided into two groups: factory training and school training. Each group is further divided into groups each consisting of 20 students. (Table 7) At the factory, two groups are engaged in practical training, generally according to a separate schedule. (Table 8)

Table 8 Time Schedule for Practice (Existing condition)

Day/course	School		Training	Factory	
	Departure	Arrival		Departure	Arrival
Saturday					
1st year, weaving Group A	14:00	14:20	3:30	17:50	18:10
Group B	14:40	15:00	3:30	18:30	18:50
Sunday					
1st year, weaving Group C	8:00	8:20	2:20	10:40	11:00
Group D	8:40	9:00	2:20	11:20	11:40
1st year, spinning Group A	12:00	12:15	2:40	14:55	15:10
Group B	12:30	12:45	2:40	15:25	15:40
Monday					
1st year, spinning Group C	8:00	8:15	2:40	10:55	11:10
Group D	8:30	8:45	2:40	11:25	11:40
2nd year, weaving Group A	(*1)8:00	9:00	3:40	12:40	13:00
Group B	(*1)8:00	9:00	4:20	13:20	13:40
1st year, Chemistry Group A	(*1)10:00	11:10	3:20	(*1)14:30	15:40
Group B	(*1)10:00	11:10	3:20	(*1)14:30	15:40
Tuesday					
2nd year, spinning Group A	8:00	8:15	6:40	14:55	15:10
Group B	8:30	8:45	6:40	15:25	15:40
Wednesday					
2nd year, spinning Group C	10:00	10:15	7:55	(*1)18:10	18:50
Group D	10:30	10:45	7:25	(*1)18:10	18:50
2nd year, weaving Group C	12:00	12:20	5:30	17:50	18:10
Group D	12:40	13:00	5:30	18:30	18:50
Thursday					

Note: (*1) denotes public bus
Number of each group is 20 students.

DIITI has a bus to send students to and from the factory, but if the number of students exceeds the bus capacity (e.g., two groups go to the factory at the same time), some of them have to use public transportation service, resulting in time loss or additional cost. In particular, factory training relating to spinning, weaving and

chemistry is concentrated on Mondays and nearly one half of students receiving factory training go to the factory by using public transportation service. Moreover not all the students in the same group (20) cannot take the transportation service at the same time and transfer is required on the way to the factory, it takes much longer time for all students to arrive at the factory. Thus, the training schedule shown in Table 8 which is based on the assumption that all students arrive on time according to the public transportation schedule. Note that DIITI pays for the public transportation charge on Mondays and Wednesdays when students cannot use its bus. It costs a total of 1,400SP per week, or 61,600SP per year. (Table 9)

Table 9 Fare for Public Transportation

Monday	Fare	Total fare to the factory		Total fare to school	Sub-total
2nd year, weaving Group A	5SP	100SP	1 Group : 20	-	100SP
Group B	5SP	100SP		-	100SP
1st year, chemistry Group A	13SP	260SP		260SP	520SP
Group B	13SP	260SP		260SP	520SP
Wednesday					
2nd year, spinning Group C	4SP	-		80SP	80SP
Group D	4SP	-		80SP	80SP
				Total	1,400SP

If all the departments including the ready made garment are operated (Table 11), required training hours can be maintained by rearranging the factory training schedule (Table 12), but many student will still have to use public transportation service and the transportation cost will increase to 1,920SP per week (Table 13), totaling 84,480SP annually. (Table 10) If two buses are owned by DIITI, training efficiency will be improved as all students will arrive at the factory within a shorter period of time, thereby to allow the increase in training hours (Table 14).

Table 10 Comparison of Vehicle Operation Costs

	Old training schedule	New training schedule	
	One bus (existing)	One bus (existing)	Two buses (old + new)
Increase rate of training hours	1	1	1.12
Annual public transportation cost	61,600SP	84,480SP	0
No. of drivers	3	3	3
Weekly running distance	280km	392km	688km
Weekly fuel cost	400SP	550SP	1,000SP
Annual fuel cost	17,600SP	24,200SP	44,000SP
Annual maintenance cost	150,000SP	150,000SP	180,000SP
Annual total cost	229,200SP	258,680SP	224,000SP

Table 11 Time Table for Practice (future plan)

Name of Company for Practice	Spinning		Weaving		Chemical		Ready-made	
	United Industrial Commercial Co.		United Arab Company for Industry		Maghazel Spinning & Weaving Co.		Syrian Company for Ready made Garment	
Distance from DII(km)	4km		6km		18km		10km	
Shifting Time by owned bus (minutes, one way)	15		20		40		30	
Shifting Time by public bus (minutes, one way)	40		60		70		60	
Number of Students	1st year	2nd year	1st year	2nd year	1st year	2nd year	1st year	2nd year
	80	80	80	80	40	40	20	20
Saturday								
8:00 ~ 9:40					P-D		Ready (1)	
10:00 ~ 11:40								
12:00 ~ 13:40								
14:00 ~ 15:40	P-D		Weaving (1)					
16:00 ~ 17:40			Group A, B					
18:00 ~ 18:50								
Sunday								
8:00 ~ 9:40			Weaving (1)	P-D	P-D			
10:00 ~ 11:40			Group C, D					P-D
12:00 ~ 13:40	Spinning (1)	P-D					P-D	
14:00 ~ 15:40	Group A, B							
16:00 ~ 17:40								
18:00 ~ 18:50								
Monday								
8:00 ~ 9:40	Spinning (1)		P-D	Weaving (2)				
10:00 ~ 11:40	Group C, D			Group A, B	Chemistry (1)		P-D	
12:00 ~ 13:40					Group A, B			P-D
14:00 ~ 15:40								
16:00 ~ 17:40								
18:00 ~ 18:50								
Tuesday								
8:00 ~ 9:40	P-D	Spinning (2)	P-D	P-D	P-D	P-D		P-D
10:00 ~ 11:40		Group A, B		P-D				
12:00 ~ 13:40								
14:00 ~ 15:40								
16:00 ~ 17:40								
18:00 ~ 18:50								
Wednesday								
8:00 ~ 9:40						P-D	P-D	Ready (2)
10:00 ~ 11:40		Spinning (2)						
12:00 ~ 13:40		Group C, D		Weaving (2)				
14:00 ~ 15:40				Group C, D				
16:00 ~ 17:40								
18:00 ~ 18:50								
Thursday								
8:00 ~ 9:40						Chemistry (2)		
10:00 ~ 11:40						Group A, B		
12:00 ~ 13:40								
14:00 ~ 15:40								
16:00 ~ 17:40								
18:00 ~ 18:50								

Note: (1) P-D means Practice in DII. Others means Practice in Companies.

(2) This time table shows future plan.

(3) The reasons why Shifting Time by public bus takes long time are

1) 20 students can not get on the same bus at the same time.

2) The students have to change the bus to get the companies.

Table 12 Time Schedule for Practice (future plan by one bus)

Day/course	School	Factory	Training Period	Factory	School
	Departure	Arrival		Departure	Arrival
Saturday					
1st year, ready-made garments	8:00	8:30	4:40	13:10	13:40
1st year, weaving Group A	14:00	14:20	3:30	17:50	18:10
Group B	14:40	15:00	3:30	18:30	18:50
Sunday					
1st year, weaving Group C	8:00	8:20	2:20	10:40	11:00
Group D	8:40	9:00	2:20	11:20	11:40
1st year, Spinning Group A	12:00	12:15	2:40	14:55	15:10
Group B	12:30	12:45	2:40	15:25	15:40
Monday					
1st year, Spinning Group C	8:00	8:15	2:40	10:55	11:10
Group D	8:30	8:45	2:40	11:25	11:40
2nd year, weaving Group A	(*1)8:00	9:00	3:40	12:40	13:00
Group B	(*1)8:00	9:00	4:20	13:20	13:40
1st year, chemistry Group A	(*1)10:00	11:10	3:20	(*1)14:30	15:40
Group B	(*1)10:00	11:10	3:20	(*1)14:30	15:40
Tuesday					
2nd year, spinning Group A	8:00	8:15	6:40	14:55	15:10
Group B	8:30	8:45	6:40	15:25	15:40
Wednesday					
2nd year, ready made garments	8:00	8:30	4:20	12:50	13:40
2nd year, spinning Group C	10:00	10:15	7:55	(*1)18:10	18:50
Group D	10:30	10:45	7:25	(*1)18:10	18:50
2nd year, weaving Group C	12:00	12:20	5:30	17:50	18:10
Group D	12:40	13:00	5:30	18:30	18:50
Thursday					
2nd year, chemistry Group A	8:00	8:40	3:50	(*1)12:30	13:40
Group B	(*1)8:00	9:10	3:50	13:00	13:40

Note: (*1) means By Public Transportation.

Table 13 Fare for Public Transportation

Day/course	Fare	Total fare to the factory		Total fare to School	Sub-total
Monday					
2nd year, weaving Group A	5SP	100SP	1 Group : 20	-	100SP
Group B	5SP	100SP		-	100SP
1st year, chemistry Group A	13SP	260SP		260SP	520SP
Group B	13SP	260SP		260SP	520SP
Wednesday					
2nd year, spinning Group C	4SP	-		80SP	80SP
Group D	4SP	-		80SP	80SP
Thursday					
2nd year, chemistry Group A	13SP	-		260SP	260SP
Group B	13SP	260SP		-	260SP
				Total	1,920SP

Table 14 Time Schedule for Practice (future plan by two buses)

Day/course	School	Factory	A : Training period (hours and minutes)	Factory	School	B : Training period by 1 bus (see Bus Schedule based on future plan which operated by one bus)	A-B : Time difference between 1 bus and 2 buses (minutes)	Improvement (%) A/B
	Departure time	Arrival time		Departure time	Arrival time			
Saturday								
1st year, ready-made garments	8:00	8:30	4:40	13:10	13:40	4:40	0	0
1st year, weaving Group A	14:00	14:20	4:10	18:30	18:50	3:30	40	19
Group B	14:00	14:20	4:10	18:30	18:50	3:30	40	19
Sunday								
1st year, weaving Group C	8:00	8:20	3:00	11:20	11:40	2:20	40	28
Group D	8:00	8:20	3:00	11:20	11:40	2:20	40	28
1st year, Spinning Group A	12:00	12:15	3:10	15:25	15:40	2:40	30	18
Group B	12:00	12:15	3:10	15:25	15:40	2:40	30	18
Monday								
1st year, Spinning Group C	8:00	8:15	3:10	11:25	11:40	2:40	30	18
Group D	8:30	8:45	2:40	11:25	11:40	2:40	0	0
2nd year, weaving Group A	8:00	8:20	5:00	13:20	13:40	3:40	80	36
Group B	8:40	9:00	4:20	13:20	13:40	4:20	0	0
1st year, chemistry Group A	10:00	10:40	4:20	15:00	15:40	3:20	60	20
Group B	10:00	10:40	4:20	15:00	15:40	3:20	60	20
Tuesday								
2nd year, spinning Group A	8:00	8:15	7:10	15:25	15:40	6:40	30	7
Group B	8:00	8:15	7:10	15:25	15:40	6:40	30	7
Wednesday								
2nd year, ready made garments	8:00	8:30	4:40	13:10	13:40	4:20	20	16
2nd year, spinning Group C	10:00	10:15	8:20	18:35	18:50	7:55	25	5
Group D	10:00	10:15	7:50	18:05	18:20	7:25	25	5
2nd year, weaving Group C	12:00	12:20	5:30	17:50	18:10	5:30	0	0
Group D	12:00	12:20	6:10	18:30	18:50	5:30	40	12
Thursday								
2nd year, chemistry Group A	8:00	8:40	4:20	13:00	13:40	3:50	30	13
Group B	8:00	8:40	4:20	13:00	13:40	3:50	30	13
							Average	12

5. Enhancement of Computer Resources

(1) Need for computer education

Today, Syria makes computer education as one of national priorities; under the presidential decree No.152 of 1997, computer education is mandatory at all departments of universities and colleges. Computer education is also becoming compulsory at the secondary education level under the jurisdiction of the Ministry of Education, including technical institutes, general secondary schools, and intermediate vocational institutes. Growing recognition of importance and the needs for IT education is also evidenced in a new curriculum for primary education – introduction of concept of information science. As a result, technical institutes conduct computer education totaling three hours per week in commerce courses and two hours in industrial courses. Thus, computer education is being incorporated into general education at the primary and secondary education levels.

(2) Use of computers in the textile industry

In the textile industry, computers are increasingly used in virtually every field, including production control, process control, stock control, quality control, operation of production machinery and equipment, and product design. They are becoming an indispensable tool for the country's textile industry to survive in the global competition by using latest production equipment and maintaining world-class production management systems. Some of private enterprises have already introduced a computer integrated manufacturing (CIM) system (a computer-based factory operation and management system) to achieve centralized control of raw materials, production and other processes, inventories, and other production elements. Other enterprises also use production machinery and equipment that incorporates a computer system that requires special knowledge to operate. For instance, the spinning process widely uses a computer system to monitor production and efficiency of each spinning machine, while the weaving process adopts CAD systems for textile design, design pattern making and similar works.

(3) Computer education at DIITI and resource situation

DIITI has been requesting budget allocation for computers to the MOI for five years and purchased six computers (one for instructors and five for students) in 2000. Now, an introductory course (one credit (100 minutes) per week) is offered for first-year students at all the departments to teach word-processing, spreadsheet and simple illustration. In the second year, an advanced computer course will be offered for quantification of technical information in each field, data manipulation, CAD, and design. The current computer class consists of 20 students and each computer is shared by four students, thus allowing each student to use the computer for 15 – 20 minutes in each class.

As computer education at primary and secondary schools in the country has only started recently, students entering DIITI do not have basic computer knowledge and skills. For the time being, DIITI has to give an

introductory course that should consist of introduction to personal computers (90 minutes x 2), basic operation (90 minutes x 2), word processing (90 minutes x 6), spreadsheet calculation (90 minutes x 6), totaling 1,440 minutes. As the introduction to personal computers is basically a lecture, 1,260 minutes are required for actual computer training. This means, at least 63 weeks are required to complete the introductory course if training is conducted at a rate of 20 minutes per week, and it may even take longer in consideration of the fact that actual progress is likely slow due to the lack of intensity in training. As the academic year at DIITI consists of 44 weeks, the current introductory course is at least 30% short of the hourly requirements, suggesting the unsatisfactory level of education. (Table 15) Furthermore, new machinery and equipment to be provided under the project will require special knowledge and skills to operate properly. For instance, the knitting machine and the loom for weaving department and the computer color matching system for chemical department will require data input skills using the keyboard. Also, the fiber strength and elongation tester and the tension testing machine require computer skills. As these machines and systems are limited in number, it is not difficult to teach their operations properly to students unless they do not have adequate computer knowledge and skills.

Table 15 Practice of Computer

Subject	Teaching Time				Benefit
	Standard	Existing	Lack of Time	Plan	
Introduction (Theory)	180min. (2weeks)	180min. (2weeks)	0	360min. (4weeks)	Better education
Practice (Hours/person weeks)	1person/each (90min.)	4person/each (20min.)		1person/each (90min.)	
Introduction	180min. (2weeks)	140min. (7weeks)	40min.	540min. (6weeks)	Better and longer practical training
Word processing	540min (6weeks)	400min. (2weeks)	140min.	1,080min. (12weeks)	Ditto
Spread sheet	540min. (6weeks)	300min. (15weeks)	240min.	1,080min. (12weeks)	Ditto
Mechanical drawing				450min. (5weeks)	Expanded scope of education
Graphic				450min. (5weeks)	Ditto
Total	1,440.min (16weeks)	1,020min. (44weeks)	420min. (21weeks equivalent)	3,960min. (4+40)weeks	

(4) Need for enhancement of computer training

To upgrade technical knowledge and skills of DIITI graduates to the levels that can be readily used on the shop floor, it is imperative to teach them basic knowledge and skills to allow them to operate or learn to operate machinery and equipment that are used at today's factories. In particular, operation of computer-controlled machinery and CAD or similar computer-based design systems takes long time to learn, and most factories cannot afford to teach new employees at their own cost. DIITI should therefore provide extensive computer training to make students ready to learn operation of computer-controlled machinery quickly, and operation of standard

production machinery and equipment used in the textile industry (e.g., the knitting machine, the loom, and the computer color matching system). This way, DIITI can expect its graduates to be recognized by employers as personnel qualified to become competent engineers and technicians. As the project will allow DIITI to increase time allocated to practical training by two or three times the present level, together with the enhanced courses on drawing and introductory graphics that are basic knowledge and skills required by second-year students. To achieve the goal, it is imperative to procure additional computers. Note that the computer course is currently taught by three instructors (one university graduate and two DIITI graduates) and three more instructors will be hired for advanced computer education in the second year.

6. Selection of sewing machines

Practical training in the ready made garments department consists of basic operations in the sewing process, including the use of a sewing machine according to the part of a garment to be fabricated, the understanding of a sewing machine and its mechanism, and maintenance techniques. In particular, sewing techniques required for production of shirts, trousers, and underwear are highly demanded by the industry in Syria. The selection of sewing machines to be procured under the project should therefore give priority to standard machines that are frequently used in the sewing process for the above products. Furthermore, machine configuration should allow students to understand the whole process of making standard cloths in the course of education and training

In consideration of the above factors, the following types of sewing machines are to be selected.

1-needle lockstitch machine: This is used to sew about 50% of garment parts and is a basic machine to understand the mechanism of a sewing machine in general and its operation. Therefore, more time should be spent to learn operation of the machine and the number of machines to be procured under the project is determined to allow two students to share one machine in a 20-person group.

1-needle 3-thread overlock machine: This is a standard sewing machine for loosed textile preventing from loose threads,

2-needle 4-therd overlock machine: This is also a standard sewing machine for knitting (a T-shirt, underwear, etc.) preventing from loose threads (because knitting is easy to loose threads and requires structural firmness).

These machines in and above are frequently used in the sewing process, next to the 1-needle lockstitch machine and two sets each will be purchased.

Flat bed 3 needle top-and-bottom covering stitch machine: This is a standard sewing machine used for straight line sewing on a common bed, used frequently for knitting of sweat suits, swimming suits, T-shirts, and underwear,.

Cylinder bed 3-needle top-and-bottom covering stitch machine: Although the stitch is the same as

that of above-mentioned , the machine is designed to have a cylindrical head for sewing parts which are relatively small and cylindrical in shape, such as a head and a sleeve part. It is also used as a basic sewing machine.

Lock stitch buttonholing machine: A standard machine use to sew hole.

Single thread chain stitch button sewing machine: This is a standard sewing machine for button sewing,

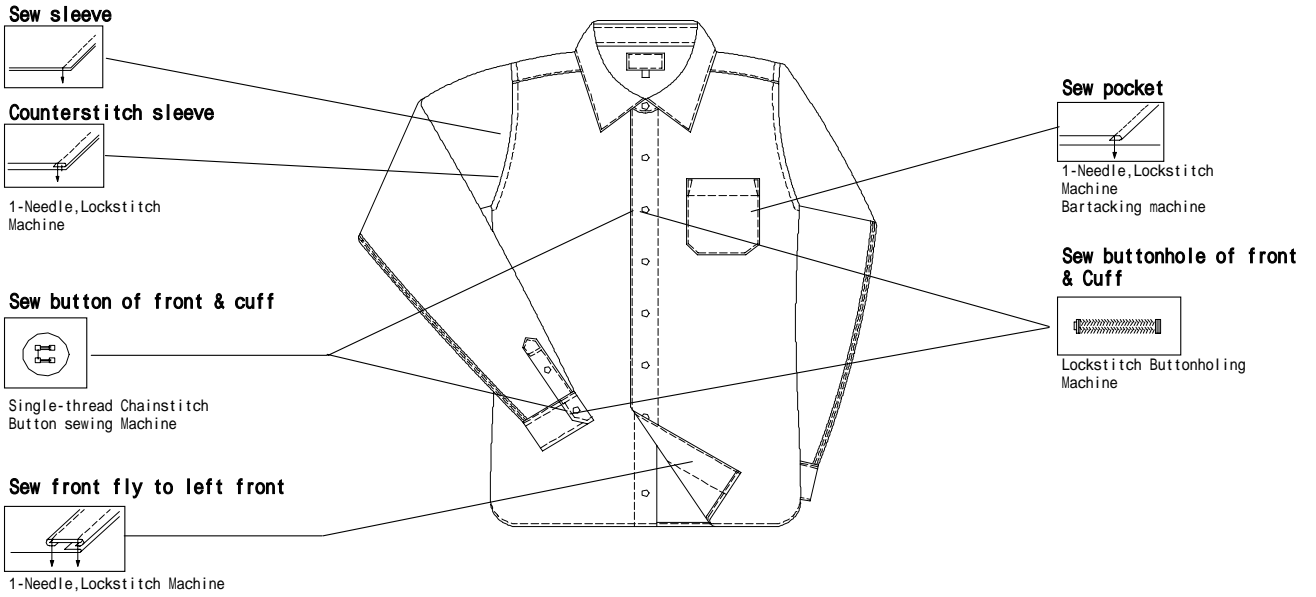
Bartacking machine: This is a standard sewing machine for reinforcing a sewed part (such as a pocket) against external force.

1 needle lockstitch zigzag stitching machine: This is a standard sewing machine use to sew the parts (underwear for women etc.) that require expansion and contraction.

Although operating frequency is not so high as 1-needle lockstitch machine, the machines in to have peculiar characteristics in terms of sewing stitches and mechanisms that should be understood by sewing engineers and technicians. Thus, the project will procure one unit for each type.

As reference, Fig.1 illustrates which machine is used to sew which part.

USING MACHINE of EACH PROCESS : MEN's SHIRT



USING MACHINE of EACH PROCESS : POLO SHIRT

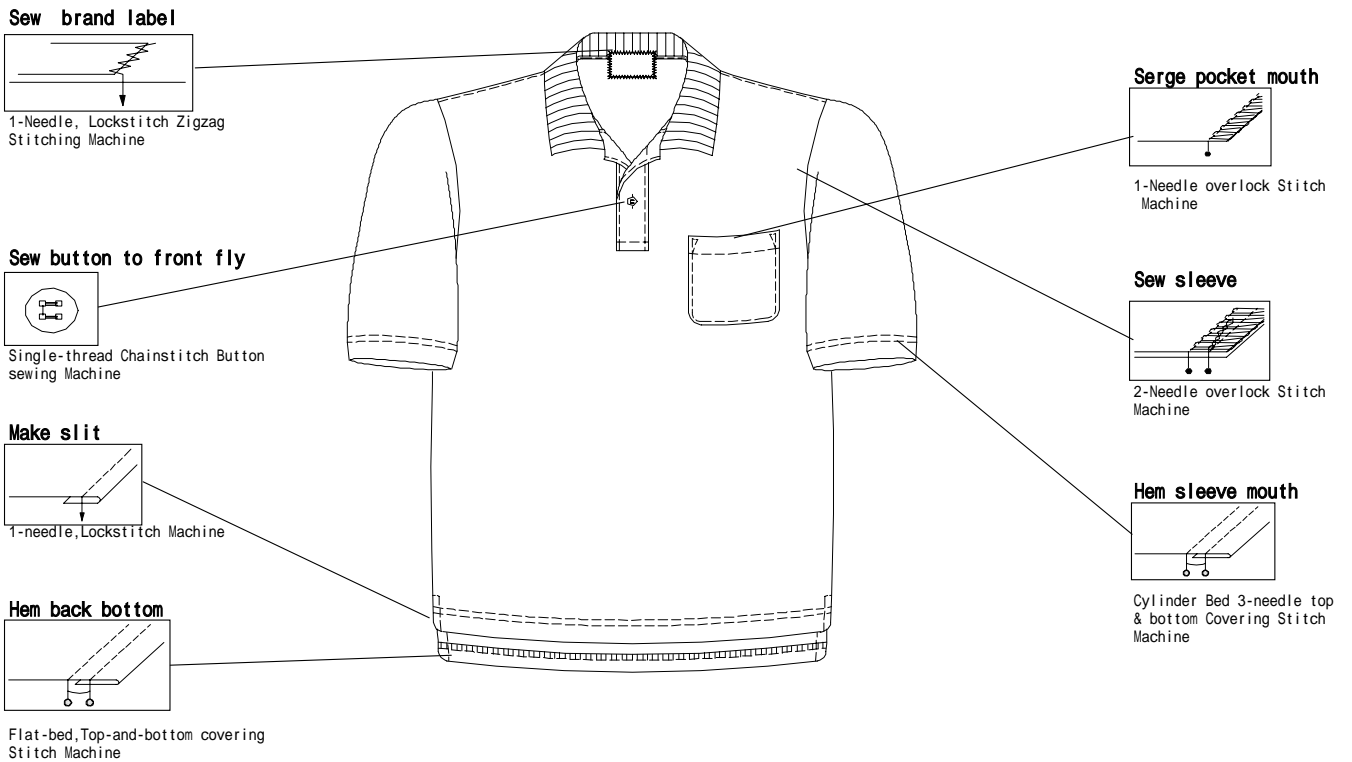


Fig. 1 Sewing Machine and Parts

7. Selection of auxiliary equipment

While sewing operation represents main portions of the ready made garments process, its upstream and downstream processes - cutting and finishing – are fundamental fields and are indispensable in understanding the textile industry. As DIITI has small items (scissors, measuring tape, compasses, and etc.) required for cutting operation, the project will purchase apparel design tables and clippers which fix textiles to the table. Moreover, finishing is the process which makes a final silhouette to cloths, and the result determines reputation of the product in the market. Vacuum boards (ironing tables) and irons will be purchased for the process. As it is easy to understand operations in these processes, since a mechanism is not complicated, two sets will be provided to allow 10 students to share one set. Thread clippers will be supplied in quantity required for two tables.

The results of the overall evaluation made above are summarized in Table 16 “Study result of the request.” Note that the following criteria (rating standard) were used to evaluate appropriateness of equipment selection as well as the current state.

Criteria for evaluation of appropriateness

- A: Equipment conducive to improvement of the present levels of education and training
- B: Equipment serving as replacement of existing equipment that is entirely or partially unserviceable due to aging
- C: Equipment to create an open space around it to improve operability or safety
- D: Equipment related to textile education, rather than general purpose
- E: Equipment to be frequently used

Current state

- A: Out of service due to deterioration or failure (unrepairable due to serious damage or lack of availability of parts because of non existing of the manufacturer)
- B: Deteriorated yet serviceable (the specific service life has reached)
- C: Serviceable

Table 16 Study result of the request

1 Spinning Department

No.	Name of Equipment	Necessity		Validity					Study	Judgement	Existing Equipment			Planned Quantity	
		Purpose of Use	Judgement	A	B	C	D	E			Judgement	A	B		C
1	Opening and Cleaning line	To mix different types of raw cotton and removing dust through beating so as to render raw cotton uniform in overall property, as well as for making laps of certain thickness			×		×	×	Space is not available. Mechanism is simple.	×	1 1949			0	
2	Blow units for the above line				×	×		×		×	×				0
3	Mixing Machine and Feeder for above line				×	×		×		×	×				0
4	Carding Machine	To make uniform slivers by removing a multitude of tangles, impurities, fibers not suited for spinning, short fibers and fibers lumps							Proper equipment is not available in the market.	×		1 1984		0	
5	Drawing Frame with auto leveler and automatic can changer (Drawing frame)*	To make uniform slivers by removing unevenness in lap thickness and to make individual fibers run in a desired direction										1 1948			1
6	Roving Frame	To make uniform slivers of a thickness suited for spinning by the spinning machine by making slivers thinner and increasing the parallel alignment of individual fibers										1 1950			1
7	Ring Spinning Frame with automatic doffing device (Ring spinning frame)*	To rend roving to a predetermined thickness and to wind it around the cop									1 1948		1 1984	1	
8	Open-end Spinning machine	To rend roving to a predetermined thickness and to wind it around the cop			×									1	
9	Winding Machine with splicer and automatic doffing device (Winding machine)*	To wind up the cop of an appropriate size and a predetermined length by removing threads over the predetermined range of thickness or those with impurities			×									1	

10	Set of display unit for each machine (gearboxes-bobbin building system-P.I.V. regulator-drafting system...etc.)	Model showing mechanical principle				×						Not available in the market	×				0
11	Sets of display including catalogues, explanation CDs and photographs for machine	Technical materials				×						Not available in the market	×				0
12	Industrial tools for the maintenance of each equipment	To maintain equipment				×						To be supplied as a part of equipment	×				0
13	Industrial cupboard for the saving the tools	To keep tools				×						To be supplied as a part of equipment	×				0

2 Weaving Department

No.	Name of Equipment	Necessity		Validity					Study	Judgement	Existing Equipment			Planned Quantity			
		Purpose of Use	Judgement	A	B	C	D	E			Judgement	A	B		C		
1	Air Jet Loom	To weave with warp and weft threads. Weft threads to be fed by air jet.										1 1970				1	
2	Rapier Loom	To weave with warp and weft threads. Weft threads to be fed by gripper rod or gripper band.			×											1	
3	Gripper Loom	To weave with warp and weft threads. Weft threads to be fed by metal shuttle.			×											1	
4	Training Units for assembling and dismantling specially designed for weaving & spinning operation	To understand mechanical principle			×							Not available in the market	×				0
5	Warping Machine	To prepare warps of cotton for weaving by looms				×			×			Space is not available. Mechanism is simple.	×	1 1930			0
6	Sizer	To size cotton to avoid friction			×	×		×	×			Space is not available. Mechanism is simple.	×				0
7	Braiding Machine	To use for knitting braids and narrow cotton fabrics		×	×	×		×	×			Special use	×				0
8	Loom for Towels fabrics	To weave towels fabrics		×	×	×		×	×			Special use	×				0
9	Computerized flat Knitting machine (Flat knitting machine)*	To knit with weft thread			×												1
10	Sets of display unit including photographs, catalogues and video for maintenance workings and for the running of machines	Practical use			×							To be supplied as a part of equipment	×				0
11	Industrial tools for the maintenance of each of the above equipment	To maintain equipment			×							To be supplied as a part of equipment	×				0

3 Chemistry Department

No.	Name of Equipment	Necessity		Validity					Study	Judgement	Existing Equipment			Planned Quantity	
		Purpose of Use	Judgement	A	B	C	D	E			Judgement	A	B		C
1	Viscosity meter	To measure the viscosity E87			×										1
2	Hardness tester	To measure the hardness of cheese			×										1
3	Computer color matching system	To evaluate the color of textile materials and preparation of dyeing solution by using prepared dye staff and chemicals			×										1
4	Auto-screen printing machine	To use for testing screen prints on various woven fabrics and knitted fabrics			×										1
5	Heat setting machine	To use for testing the drying and heat treatment of various fabrics			×										1
6	High temperature 12 color pot dyeing machine	To test the dyeing fabrics			×										1
7	Continuous pad drying machine	To use for testing the dipping, padding and drying of finishing agents or liquid of dyes			×										1
8	Pad steamer	To use for testing the fixing of dyes to printed portions			×										1
9	Ball mill grinder for pigment	To mix pigments			×										1
10	Digital pH meter (pH meter)*	To measure the hydrogen ion concentration			×										1
11	High temperature dyeing machine for rope form	To use for testing the low liquor ratio dyeing of fabrics and mixed spun fabrics			×	×		×	×	Special use	×				0
12	Automatic pressure jigger	To test for the high temperature dyeing of cotton fabrics or mixed spun fabrics in the open form and the dyeing of other fabrics				×		×	×	Special use	×		1 1975		0
13	Laboratory padder	To use for testing the finish treatment and the pad of liquid of dyes			×										1

5 Laboratory

No.	Name of Equipment	Necessity		Validity					Study	Judgement	Existing Equipment			Planned Quantity
		Purpose of Use	Judgement	A	B	C	D	E			Judgement	A	B	
1	Shirley Analyzer for trash determination (Sliver trash tester)*	To measure ratio of immatured cotton, seed cotton, soil										1 1974		1
2	Comb sorter for measuring cotton fibers length (Comb sorter)*	To measure the ratio of long, short fiber									1 1974			1
3	Cotton fineness meter (Wira)	To measure the thickness of row cotton							Included in 5-34	×		1 1974		0
4	Wool fineness meter	To measure the thickness of row wool							Included in 5-35	×		1 1974		0
5	Fiber strength and elongation tester (Single fiber tensile strength tester)*	To use for tenacity and elongation test for staple of cotton, synthetic fibers		×										1
6	Electric moisture meter	To measure moisture content of cotton yarn										1 1974		1
7	Micro-Macro-projectio (Universal projector)*	To observe fiber, yarn, fabrics		×										1
8	Yarn reel	To use for the measurement of thread length		×					See 5-37	×				0
9	Yarn quadrant - scaled balance	Balance for measuring of yarn count		×										1
10	Twist counter	To use for counting twists of raw cotton										2 1974		1
11	Tension testing machine for yarn (Yarn tensile strength tester)*	To measure tenacity and elongation of spun yarn and filament yarn									1 1987			1
12	Yarn appearance testing machine (Yarn inspector)*	To evaluate the quality of cotton's surface		×										1
13	Uster evenness tester (Evenness tester)*	To evaluate the intensity of variation of yarn in the spinning process		×										1
14	Large universal measuring magnifier /2/ (High magnification microscope)*	To observe and to make photographic record of sliced fiber, yarn, fabrics		×										1
15	USO meter for testing wear abrasion effect on friction on print (Universal textile abrasion tester)*	To measure abrasion resistance of woven and knitted fabrics									1 1974			1
16	Tension testing machine for weaving	To measure tensile strength of woven fabrics		×					See 5-38	×				0

6 Auxiliary

No.	Name of Equipment	Necessity		Validity					Study	Judgement	Existing Equipment			Planned Quantity
		Purpose of Use	Judgement	A	B	C	D	E			Judgement	A	B	
1	Overhead projector + screen (Overhead projector)*	To enlarge textbooks, catalogs										3 1975		4
2	Samples slides for the spinning and weaving and Laboratories	To enlarge technical information		×						Not available in the market	×			0
3	LCD Projector	To record and show video to students		×										1
4	Photo copy machine	To print educational materials										1 1984		1
5	Generator	To supply stable electricity								See the text		1 1970		1
6	Personal computer	General subject and Technical subject								See the text			6 1999	1set
7	Laser printer	General subject and Technical subject										1 1999		1
8	Inkjet printer	General subject and Technical subject		×										1
9	UPS	General subject and Technical subject											1 1999	1
10	Transportation Bus	To shuttle the students to factories								See the text		1 1974		1
11	White board + accessories (White board)*	To use in classrooms and workshops												8
12	Air conditioner	To adjust the room temperature		×						See the text				1set
13	Foreign Language Laboratory (English/French)	To study foreign languages	×	×	×			×		For general purpose	×			0
14	Explanation boards concerning the mechanics of the spinning and weaving machines & chemistry	To enlarge technical information		×				×		Not available in the market	×			0
15	Van	To shuttle students to factories								See 6-10.	×			0

Note : * means final equipment name.

Table 17 Major Equipment List

1. Spinning Department

Name of Equipment	Main Specifications	Q'ty	Purpose of Use
Drawing frame	(1)Staple fiber: Cotton, man made or blended fibers (2)Head delivery : 1H×2D (3)Delivery speed : 600m/min or larger (4)Can changer : Supplied (5)Feed cans layout : Double line (6)Doubling : 6 ~ 8 (7)Draft range : 5 ~ 12	1	To make uniform slivers by removing unevenness in lap thickness and to make individual fibers run in a desired direction
Roving frame	(1)Staple fiber : Cotton, man made or blended fibers (2)Max. spindle speed : 1,200rpm or larger (3)Automatic roving tension controller :With (4)Auto counter : With (5)Automatic sliver stop motion :With (6)Roving stop motion : With (7)Front safety cover : With	1	To make uniform slivers of a thickness suited for spinning by the spinning machine by making slivers thinner and increasing the parallel alignment of
Ring spinning frame	1)Staple fiber : Cotton, man made or blended fibers 2)Spindle gauge : 70mm 3)Max. spindle speed : 20,000rpm or larger (mechanical) 4)Spinning yarn count : Ne 12 ~ 60's 5)Automatic speed controlled by inverter 6)Automatic doffer : Without 7)Top clearer : With	1	To rend roving to a predetermined thickness and to wind it around the cop
Open-end spinning machine	1)Staple fiber : Cotton, man made or blended fibers 2)Number of spindles : Minimum number of spindles 24 3)Spindle speed : 40,000rpm or larger 4)Spindle gauge : 200 or 230mm 5)Yarn count : Ne 8 ~ 40 6)Yarn length measuring device : With	1	To rend roving to a predetermined thickness and to wind it around the cop
Winding machine	1)Staple fiber : Cotton, man made or blended fibers 2)Number of winding drum : 5 ~ 10 3)Shape of package : 5°57 4)Bobbin supply : By magazine 5)Auto doffer : With 6)Yarn clearer : With 7)Automatic yarn piecing device :With 8)Yarn length measuring device :With	1	To wind up the cop of an appropriate size and a predetermined length by removing threads over the predetermined range of thickness or those with impurities

2. Weaving Department

Name of Equipment	Main Specifications	Q'ty	Purpose of Use
Air jet loom	1)Reed widths : 190cm 2)Shedding motion : Dobby 3)Mechanical speed : 700 picks or larger 4)Selvage : Leno or tucked-in 5)Weft selection :4 colors or more 6)Beam flanges : 600mmΦ	1	To weave with warp and weft threads. Weft threads to be feeded by air jet.
Rapier loom	1)Reed widths : 190cm 2)Shedding motion : Electric controlled Jacquard 3)Mechanical speed : 300 picks or larger 4)Weft selection : 4 colors or lager 5)Weft insertion : Flexible band system 6)Selvage : Leno or tucked-in	1	To weave with warp and weft threads. Weft threads to be feeded by gripper lod or gripper band.
Gripper loom	1)Reed widths : 190cm 2)Shedding motion : Tappet motion 3)Mechanical speed : Max.400 picks or lager 4)Weft selection : 2 color ,With 2 heads and cone 5)Selvage : Leno or tucked-in 6)Electronically controlled weft break	1	To weave with warp and weft threads. Weft threads to be feeded by metal shuttle.
Flat knitting machine	1)Knitting width : Variable stroke Max. 127cm 2)Gauge : 7 3)Stop motion : Yarn break, large knot, needle break, wraparound check etc, 4)Safety device : With	1	To knit with weft thread

3. Chemistry Department

Name of Equipment	Main Specifications	Q'ty	Purpose of Use
Computer color matching system	For dip dyeing application (1)Spectrophotometer 1)Wave length : 380 ~ 720nm 2)Interval of weave length : Below 20 nm (2)Personal computer and software (3)Color monitor and printer (4)Mother solution make-up equipment (5)Equipment for dispensing liquid dyestuffs	1	To evaluate the color of textile materials and preparation of dyeing solution by using prepared dye staff and chemicals
Auto-screen printing	1)Squeegee working width : Approx.300mm 2)Squeegee method :Roller and rubber 3)Squeegee working length : Max.380mm for roller squeegee Max.310mm for rubber squeegee 4)Squeegee working speed :0 ~ 15m/min 5)Squeegee angle : 0 ~ 20°	1	To use for testing screen prints on various woven fabrics and knitted fabrics
Heat setting machine	1)Test fabric feed : Continuous, pin tenter type 2)Test cloth width : 150 ~ 300mm 3)Total length of set zone : Approx. 800mm 4)Max. temperature : 230	1	To use for testing the drying and heat treatment of various fabrics
High temperature 12color dyeing machine	1)Number of pots : 12 pots 2)Dyeing pots size : 300 ~ 500cc 3)Liquor ratio : 1:5 ~ 1:30 4)Specimen weight :3 ~ 10gr 5)Max. temperature :130	1	To test the dyeing fabrics
Continuous pad drying machine	1)Mangle type : Vertical Roller : 2 rubber roller, Approx. 400mm width Max. applicable pressure : 2,000 kg 2)Max. air pressure : 5 kg/c m ² 3)Test cloth width : Approx.300mm 4)Max. temperature : 230	1	To use for testing the dipping, padding and drying of finishing agents or liquid of dyes
Pad steamer	1)Mangle type : Vertical 2)Test fabric feed : Continuous type 3)Test fabric :Approx.300 mm (Width) 4)Max. temperature, : 100 ~ 103	1	To use for testing the fixing of dyes to printed portions
Laboratory padder	1)Type : 2 vertical rollers 2)Roller size : 125Φ×450mm (W) 3)Max. applicable pressure : 2,000kg 4)Max, air pressure : 5kg/c m ² 5)Safety equipment : With	1	To use for testing the finish treatment and the pad of liquid of dyes
Fade meter	1)Lamp : Xenon arc lamp 2)Cooling method : Air cooling 3)Standard irradiant : Approx. 300 ~ 400nm 4)Control range of temperature : 45 ~ 90 5)Testing condition : Dry (no use water)	1	To measure color fading of woven and knitted fabrics caused by the sun beam
Mixer	1)Number of mixing pots : 6 ~ 10 pots 2)Pots capacity : Approx.300cc 3)Capacity of solution : Approx.150g 4)Revolutions : Approx. 200 ~ 1700 r.p.m	1	To mix pigments

4. Ready made garments Department

Name of Equipment	Main Specifications	Q'ty	Purpose of Use
Sewing machines	1.1-needle lockstitch machine 10 units 2.1-needle 3-thread overlock machine 2 units 3.2-needle 4-therd overlock machine 2 units 4.Flat bed 3needle top-and-bottom covering stitch machine 1 5.Lockstich buttonholding machine 1 unit 6.Single-thread chainstitch button sewing machine :1 unit 7.Single thread chainstich button sewing machine :1 unit 8.Bartacking machine 1 unit 9.1 needle lockstitch zigzag stitching machine :1 unit	1 lot	To train major sewing machines

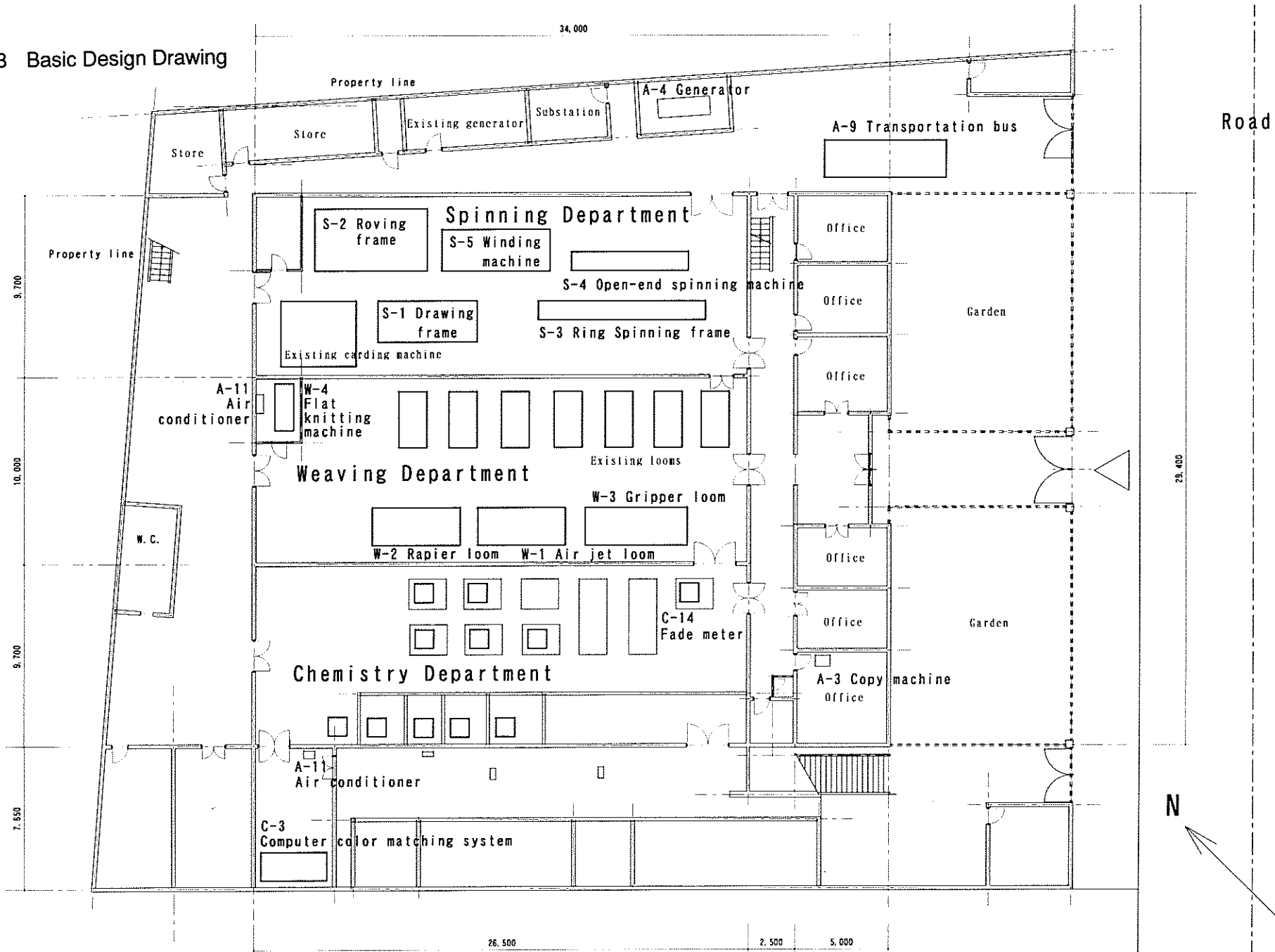
5. Laboratory

Name of Equipment	Main Specifications	Q'ty	Purpose of Use
Single fiber tensile strength tester	(1)Measuring range of force :0 ~ 1000cN or larger(Max.20 N) (2)Elongation range : Max.50 % or larger (3)Testing fiber length : 25-50mm (4)Accuracy : Force : better than 1 % Elongation : ±0.1 %	1	To measure strength and elongation of cotton, synthetic fiber
Yarn inspector	(1)Measuring range of force : ~ 2kg or larger (2)Length of test sample : 200 ~ 500mm (3)Elongation : 0 ~ 50% or larger	1	To measure tenacity and elongation of spun yarn and filament yarn
Evenness tester	(1)Measuring range :Yarn Nm250 ~ sliver80g/m or 1 tex to (2)Numerical output of results A: Unevenness U% B: Coefficient of variation CV C: Deviation rate DR% D: Imperfections	1	To measure evenness of fabric
High magnification microscope	1.Biological microscope 1 unit with CCD color video camera(or digital camera) 2.Stereoscope microscope 1 unit with CCD color video camera(or digital camera) 3.Personal computer 1 unit 4.Color monitor 1 unit 5.Color printer 1 unit	1	To observe and record sections of fiber, yarn, fabrics
Lea strength tester	(1) Measuring range : 100kg or larger (2)Readability : 5og (for 100kg) (3)Elongation : ~ .30% or lager	1	To measure the strength of threads under the twisted form
Hairiness tester	(1)Type : Optical type (2)Measuring range :0 ~ 20mm (3)Precision of hair length setting : 1/100 mm (4)Resolution : 0.3mm (5)Materials : Spun yarn (6)Data processing unit : Built-in	1	To measure number and length of fuzz of yarn
Cloth tensile strength tester	(1)Load measuring range : 5 ~ 100N or larger (2)Load cell : Manufacture's standard (3)Clamps : For cloth (4)Elongation : 0 ~ 50% or larger	1	To measure tensile strength of woven fabrics
Test press machine	(1)Pressure : 0.1 ~ 0.4kg/cm ² (2)Temperature range : Nor. ~ 180 or more	1	To measure shrinking to pressed fabrics

6. Auxiliary equipment

Name of Equipment	Main Specifications	Q'ty	Purpose of Use
Generator	(1) Engine Type : Diesel (2) Output : 200kVA or more (3) Rated Speed : 1,500rpm or more (4) Fuel Tank Capacity : 300 lit. or more (5) Power source : 3 phases 380V 50Hz	1	To supply the stable electricity to new equipment
Personal computer	1.Computer for Server 1 unit (1) Processor : Pentium III 1133MHz (2) CD-ROM : 48X (3) Video RAM : 8MB (4) Display : 17"XGA 2.Computer for Students 20 units (1) Processor : Pentium IV 1500MHz (2) CD-ROM : 48X (3) Display : 15"XGA	1 lot	Understanding of Computer, learning of basic operation, mechanical drawing, designing
Transportation bus	(1) Seating Capacity : 26 seats or more (including auxiliary and driver seat (2) Engine displacement : Diesel, approx. 4,200cc (3) Transmission : 5-speed manual	1	To shuttle the students to factories
Air conditioner	1.Air conditioner (A): 1 unit (1) Cooling capacity : 42,000 Btu / hr (12.3kW) or more 2.Air conditioner (B) : 3 units (1) Cooling capacity : 24,000 Btu / hr (7kW) or more	1 lot	To protect lab.equipment from dust and keep the temperature at same level

2-2-3 Basic Design Drawing



2-34

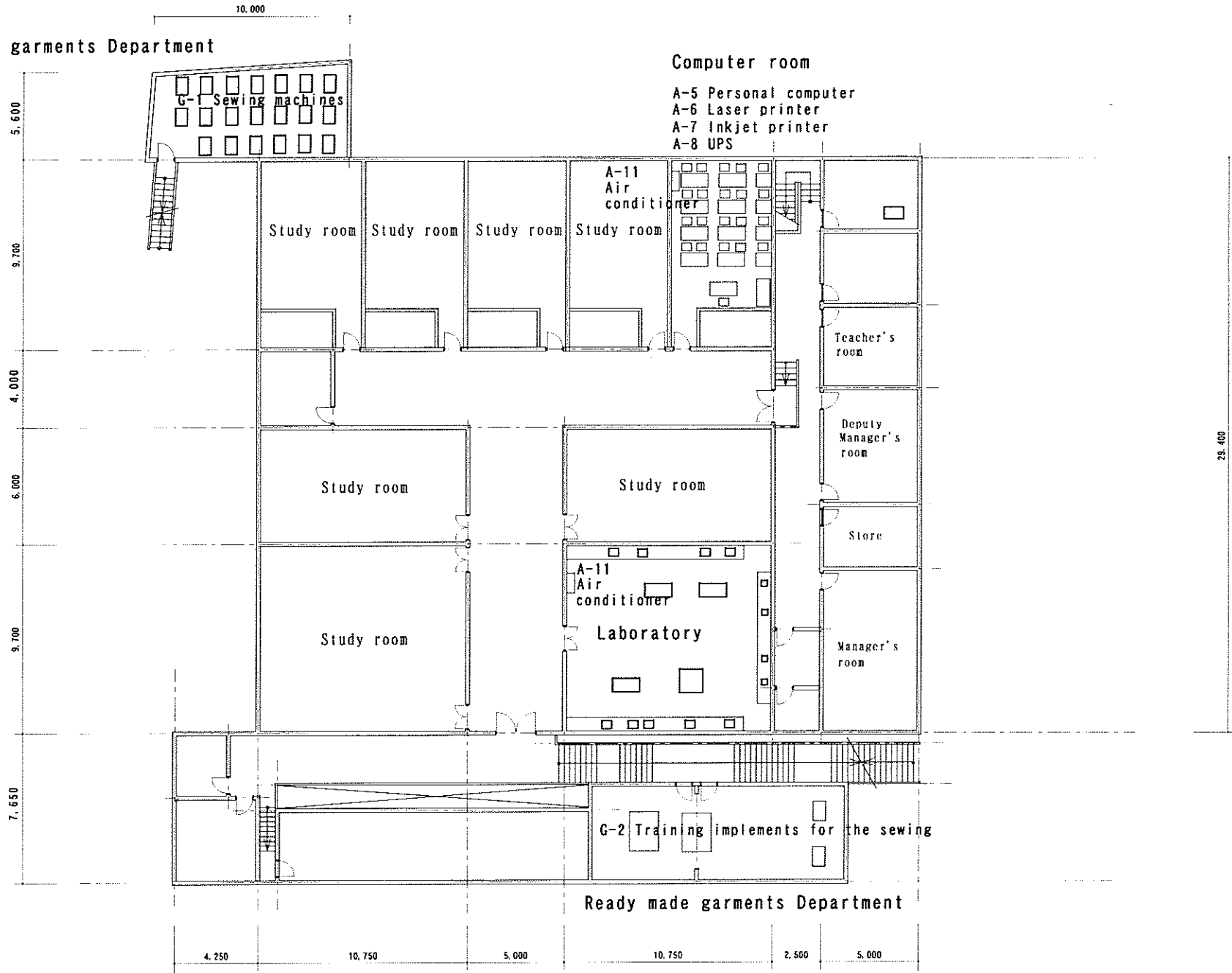
Fig. 2 Layout plan for major equipment (1st floor)

Scale = 1:285

Ready made garments Department

Computer room

- A-5 Personal computer
- A-6 Laser printer
- A-7 Inkjet printer
- A-8 UPS



Layout Plan for major equipment (2nd floor)

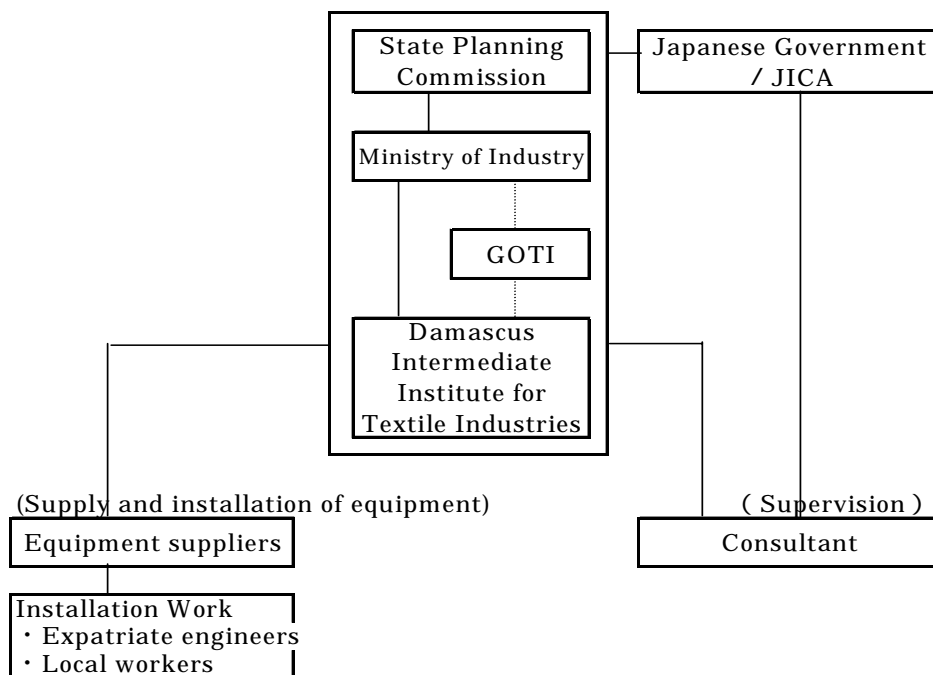
Scale = 1:285

2-2-4 Implementation Plan

2-2-4-1 Implementation Policy

The project is designed to provide a defined set of machinery and equipment for DIITI in Damascus, Syria, as a grant-in-aid program implemented by the Japanese government. The MOI, the implementation organization of the project, will entrust to a Japanese consultant key activities relating to project implementation, including detailed design, preparation of tender documents, tender evaluation, supervision of equipment installation. The MOI will also enter a supply contract with a Japanese supplier who will deliver and install machinery and equipment and provide guidance and training for operation and maintenance. Field installation, from unpacking to installation, will be carried out by local workers under the supervision of a Japanese engineer, who will be responsible for subsequent wiring and hookup. The engineer will also be responsible for adjustment, commissioning, and guidance and training for equipment operation and maintenance.

Fig.3 Implementation Organization



2-2-4-2 Implementation Conditions

(1) Overall schedule

Textile machinery is highly customized, particularly spinning and weaving machines (which often take eight months from the purchase order to factory shipment), and installation and training before delivery take two months for some machines. It should therefore assume the project period of around 15 months. The detailed project schedule is shown in **2-2-4-6 Implementation Process**.

(2) Work period

As DIITI starts its academic year in September, it will overlap with the work period when equipment delivery and installation, followed by guidance for operation, will take place. This may affect work efficiency and the detailed schedule should be carefully planned.

2-2-4-3 Scope of Works

(1) Works to be conducted by the Japanese side

Procurement of machinery and equipment, transportation to the project site, and installation
Commissioning and adjustment of machinery and equipment delivered, and guidance and training for maintenance
Installation of a generator and wiring and connections to each machinery
Piping from each machinery to water supply or sewerage pipes (which should be connected to mains by the Syrian counterpart)
Consulting services related to detailed design, preparation of tender documents, tender evaluation, factory inspection, pre-shipment inspection, supervision of installation work

(2) Works to be conducted by the Syrian side

Securing of a route for transportation of each machinery from outside to the room where it is installed
Securing of a safe storage place for machinery and equipment after delivery and before installation
Securing of rooms to install machinery and equipment, and disposal of machinery and equipment to be replaced
Piping (water supply and sewerage) to rooms where machinery and equipment is operated or connected
Provision of office furniture, including laboratory tables, desks and chairs
Payment of banking service charges to a foreign exchange bank approved by the Japanese government
Payment of customers clearance charges
Application for approvals and permits relating to landing and customs clearance of equipment and materials to be imported
Support and assistance related to entry, exit and residence permit procedures for Japanese personnel who is involved in the project and its implementation
Other services associated with the project

2-2-4-4 Consultant Supervision

(1) Basic policy

The consultant for the project will organize a project team responsible for detailed design and supervision in accordance with the grant-in-aid program policy, on the basis of the consulting service agreement and the intent of the basic design. The project team will be responsible for project implementation up to the completion. In the supervision stage, the project team will ensure smooth progress of work by sending an engineer to perform relevant services, such as the approval of equipment manufacturing drawings, attendance at shop inspection and field installation, and inspection upon delivery. The consultant will monitor the works to be performed by the Syrian counterpart to see if they progress smoothly to allow proper acceptance of machinery and equipment and may make recommendation if any delay occurs in order to control the overall implementation.

(2) Scope of services

- Discussion and confirmation of detailed specifications of machinery and equipment
- Preparation of tender documents and equipment procurement agreements
- Tender notification and supervision
- Contract administration and work supervision (approval and post-shipment inspection of machinery and equipment, supervision of shipment, transportation and installation, supervision of work performed by the Syrian counterpart)
- Issuance of progress reports and certificates
- Attendance at acceptance and delivery of machinery and equipment (The consultant will confirm that each machinery has been installed according to the respective contract and attend at its delivery until it is officially accepted by the Syrian counterpart.)

(3) Project team members and responsibilities

1) Project manager

- General management of the consultant's services
- Contracting and discussion with related organizations in Syria
- Discussion and confirmation of detailed specifications of machinery and equipment
- Preparation of tender documents and attendance at tender procedures
- Attendance at acceptance and delivery of machinery and equipment

2) Person in charge of equipment planning

- Discussion and confirmation of detailed specifications of machinery (spinning, weaving and ready made garment) and equipment
- Preparation of tender documents and attendance at tender procedures

- Approval and post-shipment inspection of machinery and equipment, supervision of shipment, transportation and installation
 - Attendance at acceptance and delivery of machinery and equipment
- 3) Person in charge of equipment planning
- Discussion and confirmation of detailed specifications of machinery (chemistry and laboratory) and equipment
 - Preparation of tender documents and attendance at tender procedures
 - Approval and post-shipment inspection of machinery and equipment, supervision of shipment, transportation and installation
 - Attendance at acceptance and delivery of machinery and equipment

2-2-4-5 Procurement Plan

As textile machinery governs success of the industry, i.e., its performance is directly related to quality and availability of textile products, machinery having the highest level of performance gains popularity and tends to dominate the market. In fact, machinery and equipment selected for the project includes those provided by a limited number of manufacturers. Textile companies in Syria also use machinery and equipment of specific brands, which should therefore be used at DIITI to train its students as engineers and technicians who are familiar with latest technologies and skills. Such machinery will be purchased through the tender procedure by reissuing the request for quotation or obtaining a statement of confirmation when tender documents are prepared, and then the procurement method may be adjusted due to the response from the suppliers..

Note that most machinery and equipment to be procured under the project is not locally made, except for hand tools, furniture and electrical equipment. And locally made products, excepting furniture, are not suitable for training purposes in terms of performance, quality, durability and/or safety. Most industrial products are imported from Japan or other OECD countries and are supported by local after-sales service systems. They should therefore be imported from these countries. Note that those available in Syria should be originated in Japan or other OECD countries. Also, those available in Japan will be similarly imported, while products made and sold by Japanese companies outside Japan may be procured by specifying their country of origin. It should be noted, however, that imports of computers and related equipment made in the United States into the country require the approval of the U.S. government , which takes around two to four months until the certificate is issued.

2-2-4-6 Implementation Schedule

Assuming that the project will be implemented under the grant-in-aid program of the Japanese government, the preliminary implementation schedule is outlined as follows.

(1) Detailed design

Based on the basic design study report, detailed specifications of machinery and equipment will be determined and tender documents will be prepared, followed by approvals of the Syrian and Japanese governments. The process will take 2.5 months.

(2) Tender procedures

Upon completion of detailed design, tender procedures will be initiated in Japan by issuing a public notice. Tenders will be accepted and opened under the attendance of related parties. The successful tenderer will be selected on the basis of evaluation of its proposal and will sign an agreement with the Syrian counterpart. The process will take 1.5 months.

(3) Manufacture, delivery and installation work

Upon the conclusion of the supply contract, the supplier will procure machinery and equipment under the approval of the Japanese government. The supplier will be responsible for preparation of approval and production drawings, manufacture of machinery and equipment, and their shipment to Syria. The supplier will then be responsible for all local activities, from customs clearance, transportation to the project site, to completion of test operation.

(4) Completion procedures

Upon installation, test operation will be conducted for each machinery under the attendance of representatives of the MOI and DIITI, the consultant, and other related parties. Once it is confirmed that all machinery and equipment conform to contract specifications, they will be delivered to the Syrian counterpart and the installation work will be completed. The certificate of completion will be issued by the Syrian counterpart. If the installation work and related activities progress smoothly, it will take 11 months between the signing of the supply contract and completion of the installation work.

The preliminary implementation schedule is shown in Table 18.

Table 18 Implementation Schedule

	1	2	3	4	5	6	7	8	9	10	11	12
Detail Design & Tender				(Detail Design)								
				(Field Survey)								
				(Preparation of Tender Documents)								
				(Tender & Evaluation)								
Procurement & Installation									(Procurement)			
							(Transportation)					
				(Approval)		(Installation, Operation)						

2-3 Obligation of the Recipient Country

When this project is implemented under the grant-in-aid program of the Japanese government, the Syrian counterpart is required to perform the following activities that are essential in ensuring the smooth progress of the project.

- To secure an adequate space required for the project;
- To remove machinery, equipment and materials that are to be replaced;
- To secure a route to transport and deliver machinery and equipment for installation;
- To provide a safe storage place for machinery and equipment after delivery and before installation;
- To secure electricity supply, water, sewerage and other utilities;
- To provide office furniture, including laboratory tables, tables and chairs, which are not supplied under the project;
- To obtain documents required for obtaining the approval or permit for landing and customs clearance of machinery and equipment to be imported for the project, together with the budgeting of necessary expenses including charges and fees;
- To ensure that Japanese companies and individuals engaged in the project be exempted from customs duties and taxes that would otherwise be imported in relation to equipment supplied or service rendered under the approved contract;
- To provide necessary support and assistance for Japanese personnel who is required to enter and stay in the country for the purpose of supplying equipment and providing service under the approved contract;
- To ensure the effective use of machinery and equipment to be supplied under the project in good condition, maintain them in good conditions, and secure manpower required for proper maintenance;
- To pay banking service charges to a Japanese bank for foreign exchange service ; and
- To bear all costs and expenses that are not included in the grant-in-aid program implemented for the project.

When this project is implemented under the grant-in-aid program of the Japanese government, the Syrian counterpart is required to bear various costs and expenses, which are estimated according to the conditions shown in (2), as follows.

(1) Cost estimation

The total cost to be borne by the Syrian counterpart is estimated at 486,000SP, with the cost breakdown being summarized below.

Remodeling of existing rooms	306,000SP
Removal of existing machinery and equipment	50,000SP
Addition of electrical installation and wiring	42,000SP
Addition of water supply and sewerage facilities and piping	28,000SP
Furniture for computers and laboratory equipment	60,000SP

It will be also necessary to pay the cost of bank commissions or fee to a Japanese bank when a formal banking arrangement (B/A) is signed, an Authorization to Pay (A/P) is issued and payment is made, or in the event that the A/P is amended at a later stage.

(2) Basis for estimation

Base period: April 2002

Foreign exchange rate : US\$1= 128.62 yen, 1SP= 2.74 yen

Implementation period: As shown in the implementation schedule.

Other: The project will be implemented according to the rules and procedures for the grant-in-aid program of the Japanese government.

2-4 Project Operation Plan

The annual budget of DIITI is usually larger than actually needed as only 70% of the budget are actually disbursed. (Table 19) This reflects the fact that the Ministry of Industry intends to support DIITI's operation and maintenance by providing sufficient funds. Thus, while the total operating cost increases by approximately one million SP according to the preliminary estimation (Table 20), the cost increase can be fully absorbed by the present budget.

Table 19 Recent Changes in DIITI's Revenues and Expenditures

	(1,000SP)					
	1997	1998	1999	2000	2001	2002
Personnal	4,600	4,600	4,100	3,800	4,000	4,500
General Adiministration	1,850	2,100	2,250	2,600	2,650	2,700
Operational	600	800	600	1,000	2,500	2,450
General Treasury Obligations	450	400	400	400	350	350
Total Budget	7,500	7,900	7,350	7,800	9,500	10,000
Total Expenditure	5,461	6,048	4,676	6,460	5,216	-
Consumption	73%	77%	64%	83%	55%	-

Table 20 Increase of Expenditure by Planned Equipment

Item ¹⁾	Annual Consumption	Unit Price	Amount	Remarks
Electricity	22,704KWh ²⁾	1.6SP / KWh	36,326SP	
Water	88m ³ ²⁾	7.0SP / m ³	616SP	
Materials			182,850SP ³⁾	
Consumables			912,000SP ⁴⁾	
Bus fare			- 34,680 ⁵⁾	
			1,097,112SP	

Note 1):Estimated to cover only machinery and equipment covered by the project.

2):Calculated under the assumption that practical training is conducted for 44weeks/year, 8hours/week, with the equipment operation rate at 25%

3):Including lap, yarn, fabrics, textile and dyestuff

4):Equivalent to1% of the total cost for equipment that requires consumables

5):Reduction of the public transportation cost due to the purchase of an additional bus

Chapter 3 Project Evaluation and Recommendations

Chapter 3 Project Evaluation and Recommendation

3-1 Project Effect

(1) Direct benefits

Table 21 Direct Benefits

Current state and problem	Improvement to be made (project content)	Upgrading effect
1. Training machinery and equipment is old and dilapidated. Also it falls short of a standard set of equipment to teach knowledge and skills required for major production processes	- To procure machinery and equipment that is same as or equivalent to those used by textile manufacturers in the country, forming a standard set of equipment required for effective training in the fields of spinning, weaving, chemistry, ready made garment , as well as testing laboratory.	- The number of processes to learn through practical training and actual machinery operation will increase from 9 to 20, allowing students to learn practical knowledge and skills in wider perspectives, thereby to help skills improvement.
2. The lack of the ready-made garment (e.g.. sewing) course results in the lack of training for the important element of the textile industry.	- To reopen the ready-made garment course.	- 20 engineers and technicians specialized in garment production will be trained each year.

(2) Indirect benefits

Most graduates from DIITI are working with public factories as engineers or technicians. As the public factories cover the entire range of textile production, from spinning to ready-made garment, the project will contribute to the upgrading of production and quality control skills and techniques in all the processes, leading to the improvement of productivity and quality of the public factories as a whole.

At present, 85% of textile products produced are supplied to the domestic market. As product quality improves, manufacturers will be able to export internationally competitive products.

3-2 Recommendations

To ensure effective and efficient implementation of the project, the following recommendations are made.

(1) Upgrading of textbook

DIITI is currently using textbooks, which are based on the old machinery and equipment and should be updated to teach the mechanisms and operations of the new machinery to be procured under the project. Also, the curriculum needs to be revised to reflect the increased variety of machinery.

(2) Effective use of “senior overseas volunteers”

Senior overseas volunteers – the program to send retired Japanese engineers and technicians for technical assistance – are requested by DIITI in the fields of spinning, weaving and chemistry, and those specialized in spinning operation are already working at various factories. As the project plans to procure machinery and equipment that is used in the Syrian textile industry and incorporates technology at world standards, senior overseas volunteers will be able to teach advanced skills and techniques to both instructors and students.

Appendices

Appendix-1-1 Member List of the Study Team
(Basic Design Study)

- 1) Team Leader
Mr. Hirotaka **NAKAMURA**
First Project Management Division, Grant Aid Management Department
Japan International Cooperation Agency (JICA)
- 2) Chief Consultant
Mr. Jun **IKEDA**
UNICO International Corporation
- 3) Equipment Planner 1
Mr. Taneo **MAEDA**
UNICO International Corporation
- 4) Equipment Planner 2
Mr. Yasuo **UESUGI**
UNICO International Corporation
- 5) Cost Estimator
Mr. Kaoru **TAJIMA**
UNICO International Corporation

Appendix-1-2 Member List of the Study Team
(Explanation of Draft Final Report)

- 1) Chief Consultant / Operation and Maintenance Planner
Mr. Jun **IKEDA**
UNICO International Corporation
- 2) Equipment Planner 1 / Education Planner
Mr. Yasuo **UESUGI**
UNICO International Corporation

Appendix-2-1 Study Schedule
(Basic Design Study)

No.	Date			Government Official	Consultant				
				Nakamura	Ikeda	Uesugi	Maeda	Tajima	
1	Jan. 12	Sat	London	Narita, Kankuu	London, Paris				
2	Jan. 13	Sun.	Damascus	London, Paris	Damascus				
3	Jan. 14	Mon.	Damascus	Courtesy call on JICA, State Planning Commission (SPC)					
4	Jan. 15	Tue.	Damascus	Discussion with Damascus Intermediate Institute Courtesy call on Emabassy of Japan					
5	Jan. 16	Wed	Damascus	Survey of Damascus Intermediate Institute					
6	Jan. 17	Thu	Damascus	Meeting with General Organization for Textile Industry (GOTI) Survey of the textile industries (United Commercial Industries.Co.)					
7	Jan. 18	Fri	Damascus	Internal meeting					
8	Jan. 19	Sat	Damascus	Survey of the textile industries (Majed & Mohamed Zayed & Partners, Bahra & Co.)				Narita Paris	
9	Jan. 20	Sun	Damascus	Discussion with Damascus Intermediate Institute and Ministry of Industry				Paris Damascus	
10	Jan. 21	Mon	Damascus	Discussion with Ministry of Industry					
11	Jan. 22	Tue	Damascus	Signing Minutes of Meeting Report to JICA, Embassy of Japan					
12	Jan. 23	Wed	Damascus	Damascus	London	Discussion with the Institute (1)			
13	Jan. 24	Thu	Damascus	Narita		Discussion with the Institute (2) Dscussion with Ministry of Industry, SPC			
14	Jan. 25	Fri	Aleppo			Shift to Aleppo			
15	Jan. 26	Sat	Latakia			Survey of Aleppo Intermediate Institute Survey of the textile industries (Sabbagh and Sharabati, Industrial Company for Ready-made Garment), Shift to			
16	Jan. 27	Sun	Damascus			Survey of the textile industries (Latakia Cotton Spinning Co.), Shift to Damascus			
17	Jan. 28	Mon	Damascus			Discussion with the Institute (3) Discussion with UNDP, Syrian-European Business Centre, SPC			
18	Jan. 29	Tue	Damascus			Discussion with the Institute (4), GOTI Discussion with Damascus Chamber of Industry			
19	Jan. 30	Wed	Damascus			Discussion with the Institute (5)			
20	Jan. 31	Thu	Damascus			Discussion with the Institute (6)		Departure Paris	Discussion with the Institute
21	Feb. 1	Fri	Damascus			Internal Meeting, Market Survey		Narita	Discussion with the Institute
22	Feb. 2	Sat	Damascus			Discussion with the Institute (7)			Survey of agents
23	Feb. 3	Sun	Damascus			Discussion with the Institute (8)			Survey of agents
24	Feb. 4	Mon	Damascus			Discussion with the Institute (9) Survey of Textile company (Syrian Company for Ready-made Garment)			Survey of agents
25	Feb. 5	Tue	Damascus			Discussion with the Institute (10)			Survey of agents
26	Feb. 6	Wed	Damascus			Report to JICA, Embassy of Japan			Report to JICA, Embassy of Japan
27	Feb. 7	Thu				Damascus Paris			Departure Paris
28	Feb. 8	Fri		Narita, Kankuu		Narita			

Appendix- 2-2 Study Schedule

(Explanation of Draft Final Report)

No.	Date			Consultant	
				Ikeda	Uesugi
1	May 17	Fri	London	Narita London	Kankuu London
2	May 18	Sat	Damascus	London Damascus	
3	May 19	Sun	Damascus	Meeting with JICA Courtesy call on State Planning Commission Discussion with Ministry of Industry Discussion with Emabassy of Japan	
4	May 20	Mon	Damascus	Discussion with the Institute Market Survey (Computer, Generator and Air conditioner) Survey of the textile industries (Dabboul)	Discussion with the Institute Survey of the textile industries (Dabboul)
5	May 21	Tue	Damascus	Discussion with the Institute Market survey (Electrical equipment)	Discussion with the Institute
6	May 22	Wed	Damascus	Discussion with the Institute Market survey (Piping equipment) Discussion with Ministry of Industry	Discussion with the Institute
7	May 23	Thu	Damascus	Internal meeting, Market survey (Spinning, weaving machine)	
8	May 24	Fri	Damascus	Discussion with the Institute Market survey (Textile products)	
9	May 25	Sat	Damascus	Discussion with the Institute Market survey (Knitting machine) Discussion with senior volunteer	
10	May 26	Sun	Damascus	Signing Minutes of Meeting Report to JICA Discussion with the Institute	
11	May 27	Mon		Damascus London	
12	May 28	Tue		Narita	Kankuu

Appendix- 3-1 List of Parties Concerned in the Recipient Country
(Basic Design Study)

1. State Planning Commission

M. Bassam Al Sibai Director of Technical & Scientific Cooperation

2. Ministry of Industry

Dr. Isam Al-Za-eem Minister

Barakat Shahine Director of Private Sector

Homan Jaza-iri Secretary

3. Damascus Intermediate Institute for Textile Industries

M. Mo'tasem Al Husaini Principal

Khaled Al Na'al Assistant

Muhy Al Dier Bawab Accountant

Spinning Department

Ziad Nashawati Head of Spinning Department

Mueen Ibrahim Teacher

Khaled Jazairi Teacher

Mohammad Al-Mahameed Teacher

Abdel Rahman Qasem Teacher

Ghassan Ballor Teacher

Textile Department

Ali Al-Halabi Head of Textile Department

Ballouk Moh Ali Teacher

Mohammad Deiri Teacher

Jawad Tabban Teacher

Hassan Ghassal Teacher

Abdel Halim Falion Teacher for theoretical subject

Chemistry Department

Mirii Shini Head of Chemistry Department

Walid Arja Teacher

Ready made Garment Department

Sa'id Ramadan Engineer

Ahmad Hafyen Assistant Engineer

Jalal Mille Assistant Engineer

Mahmud Daher

Spinning & Weaving Laboratory

Ahmad Jawdat Jazmati Teacher

4. General Organization For Textile Industries

Ghazi Al-Khadra	General Manger
Sameer Romman	Deputy General Manager
Dr. Jamal Al Omar	Technical Manager
Saed Barazi	Manager of Production Control Center
Bade'a Affarah	Manager of Spinning Department
Majed Katranji	Planning Manager
Jamal Al-Omar	Technical Manager

5. Intermediate Institute in Aleppo

M. Maan Jathbeh	Principal
-----------------	-----------

6. UNDP

Abdallah Dardari	Assistant Resident Representative
------------------	-----------------------------------

7. Syrian-European Business Centre

Alf Monaghan	Director
Poul Gadegaard	Business Counsellor

8. Chamber of Industry in Damascus

A Bashar Hatahet	Member of Chamber's Board
------------------	---------------------------

9. Industrial School of Garment

Ghasan Flehan	Managing Director
---------------	-------------------

10. United Commercial Industries Co. (Khoumassieh)

Tahjah Al Kheder	General Manager
Muaffak Mahamid	Planning Manager
Elias Al-Hayek	Production Manager
Yehya Al-Samkari	Manager of Spinning Department
Fayez Smodi	Deputy Manager of Spinning Department
Muhammad Al-Taweel	Manager of Weaving Department

11. Majed & Mohamed Zayed & Partners (adidas)

Majed Al Zayed	Chairman – General Manager
Mohamed Zayed	Agency & Marketing Managing Director

12. Bahra & Co.
Dr. Mamoun Bahra General Manager
Abdel Ellah Bahra
Josef Doumani Manager of Doumani & Co.
Jassin Mufechi Manager of Mufachi & Co.
Ali Tabbaa Manager of Tabbaa & Co.
M. Rifai Manager of Rifai & Co.
13. Sabbagh & Sharabati Co. Ltd.
MD. Sabbagh Sharabati Managing Director
14. Industrial Company for Garments
Hasan Abbds Managing Director
15. Lattakia Cotton Spinning Corporation
Abdul Karim Hasan Director of Manufacturing
Raid Jannoud Engineer
16. Syrian Company for Ready-made Garment
Muhamad Ubadeh Assistant Engineer

Appendix- 3-2 List of Parties Concerned in the Recipient Country
(Explanation of Draft Final Report)

1. State Planning Commission

M. Bassam Al Sibai Director of Technical & Scientific Cooperation

2. Ministry of Industry

Mr. Barakat Shahine Vice Minister

Mr. Fayez El Neoume Director of Training and Qualification

3. Damascus Intermediate Institute for Textile Industries

M. Mo'tasem Al Husaini Managing Director

Khaled Al Na'al Assistant

Muhy Al Dier Bawab Accountant

Spinning Department

Ziad Nashawati Head of Spinning Department

Mueen Ibrahim Teacher

Khaled Jazairi Teacher

Mohammad Al-Mahameed Teacher

Abdel Rahman Qasem Teacher

Ghassan Ballor Teacher

Textile Department

Ali Al-Halabi Head of Textile Department

Ballouk Moh Ali Teacher

Mohammad Deiri Teacher

Jawad Tabban Teacher

Hassan Ghassal Teacher

Abdel Halim Falion Teacher for theoretical subject

Chemistry Department

Mirii Shini Head of Chemistry Department

Souad Kamel Teacher

Matanus Nasim Teacher

Ready made Garment Department

Khaled Na'al Head of Ready made garment Department

Sa'id Ramadan Engineer

Mohammed Abadeh Engineer

Ahmad Hafyen Assistant Engineer

Jalal Mille Assistant Engineer

Spinning & Weaving Laboratory

Ahmad Jawdat Jazmati Teacher

4. Dabboul

Zaher Sabbag Manager

MINUTES OF DISCUSSIONS
ON
BASIC DESIGN STUDY ON THE PROJECT
FOR
INSTALLATION OF EQUIPMENT
IN DAMASCUS INTERMEDIATE INSTITUTE FOR TEXTILE INDUSTRIES
IN SYRIAN ARAB REPUBLIC

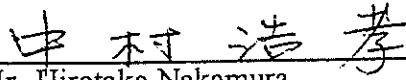
In response to a request from the Government of Syrian Arab Republic (hereinafter referred to as "GSA"), the Government of Japan decided to conduct a Basic Design Study on the Project for Installation of Equipment in Damascus Intermediate Institute for Textile Industries in Syrian Arab Republic (hereinafter referred to as "the Project") and entrusted the study to the Japan International Cooperation Agency (hereinafter referred to as "JICA").


JICA sent to Syria the Basic Design Study Team (hereinafter referred to as "the Team"), which is headed by Mr. Hirotaka Nakamura, First Project Division, Grant Aid Management Department, JICA, and is scheduled to stay in the country from January 13 to February 7, 2002.

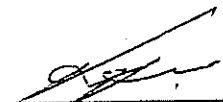
The Team held discussions with the officials concerned of GSA and conducted field survey in the study area.


In the course of the discussions and field survey, both sides have confirmed the main items described on the attached sheets. The Team will proceed further works and prepare the Basic Design Study report.

Damascus, January 22, 2002


Mr. Hirotaka Nakamura
Leader
Basic Design Study Team
Japan International Cooperation Agency


Eng. Mohammad Moutasem Husaini
Director
Intermediate Institute for Textile Industries
Ministry of Industry


Mr. M. Bassam Al Sibai
Director of Technical and Scientific
Cooperation,
State Planning Commission


Mr. Mohamed Kheir El Gaza'iry
Training and Qualification Directorate
Ministry of Industry

ATTACHMENT .

1. Objective

The objective of the Project is to improve present training and education circumstances regarding textile industry in Damascus Intermediate Institute for Textile Industries. (DIITI)

2. Project Site

The Project Site is DIITI.

3. Responsible and Executing Organization

- (1) Responsible organization of the Project is Ministry of Industry.
- (2) Executing organization of the Project is DIITI.

Organization chart of the above organizations is described in Annex 1.

4. Items requested by the Syrian Side

After discussions with the Team, items listed in Annex 2 were finally requested by the Syrian Side.

However, the final components of the Project will be decided after further studies and analysis.

5. Japan's Grant Aid System

- (1) The Syrian side has understood the system of Japanese Grant Aid Program explained by the Team, described in Annex 3.
- (2) The Syrian side will take necessary measures described in Annex 4-5 for the smooth implementation of the Project, on condition that the Grant Aid Assistance by the Government of Japan is extended to the Project.

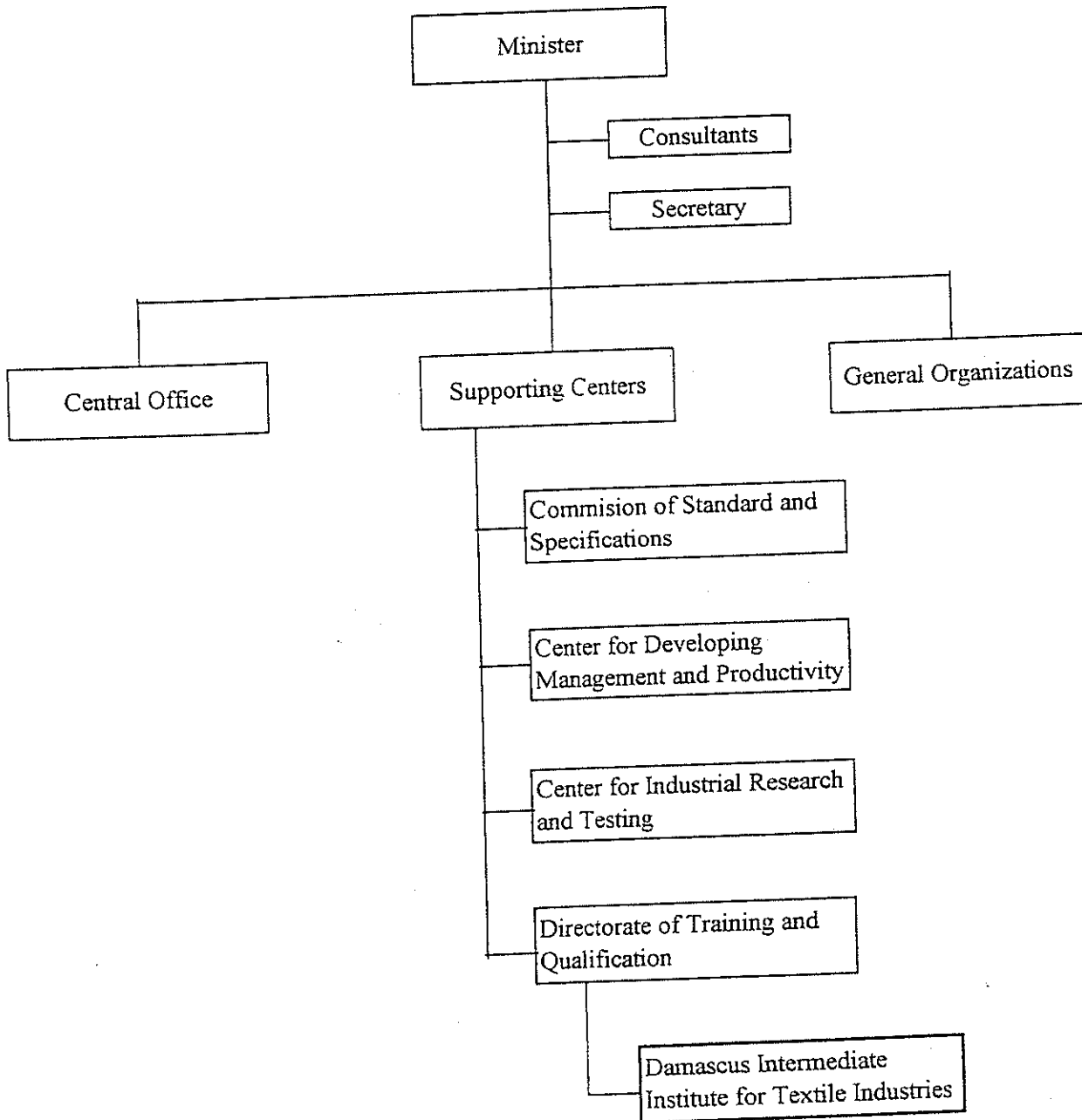
6. Schedule of the Study

- (1) The consultants will proceed to further studies in Syrian Arab Republic until February 7, 2002.
- (2) Based on the Minutes of Discussions and technical examination of the study results, JICA will prepare a draft report and dispatch a mission in order to explain its contents around April, 2002.
- (3) In case that the contents of the draft report are acceptable in principle by the Syrian side, JICA will complete the final report and send it to GSA around June, 2002.

7. Other relevant issues

- (1) The name of the Project
Both sides confirmed that this Project would not include Quality Research Laboratory which was under the control of General Organization for Textile Industry. Hence it followed that the name of the Project was "Installation of equipment in Damascus Intermediate Institute for Textile Industries".
- (2) Examination for new equipment
The following data will be examined by the Japanese side in order to estimate proper size and grade of new equipment to be procured under the Project;
 - financial and technical competence of DIITI for maintenance and operation;
 - curriculum of each department;
 - inventory data for existing equipment;
 - personnel and financial affairs;
 - number of students and graduates;
 - socio-economic data (type and grade of equipment used in private companies); and
 - others.
- (3) Criteria for equipment selection
Equipment requested by the Syrian side will be examined in accordance with the criteria listed in Annex 6.
- (4) Ready made garments department
DIITI is not opening a course in Ready made garments while it has a specific room and a syllabus. Therefore, the installation of new equipment will not be considered unless the Syrian side submits a concrete document to reopen this course to the Japanese side by February 2, 2002.
The document should include purposes to reopen, allocation plan of teaching staff, budget, the number of students to be accepted and demands from companies.
- (5) Effective operation of equipment
Equipment procured under the Project should not be used for display, but for teaching with effective operation at DIITI.
- (6) Equipment for Laboratory
The Syrian side explained that equipment for laboratory was used in common for all (Spinning, Weaving, Chemistry and Ready Made garments) department.
- (7) Items to be submitted by February 2, 2002
The Syrian side shall submit the following items to the Japanese side by February 2, 2002;
 - layout plan of equipment at DIITI;
 - operation plan and record for a transportation bus;
 - type and grade of softwares for personal computers; and
 - document to reopen Ready made garments course (mentioned above).
- (8) Environmental pollution
Both sides agreed that it was important to take measures to meet the environment in terms of noise, liquid waste from an institute, and others.
- (9) Privatization
The Syrian side assured that privatization policy would not be effected on the Project.
- (10) Others
Renovation of the DIITI building including utilities main is not included in the Project.

Annex 1 Organization Chart of the Ministry of Industry



[Handwritten signature and scribbles]

Annex 2 Equipment List Requested by the Syrian Side

Note; Priority A : Essential Priority B : Needs examination Priority C : Low necessity

1 Spinning Department

No.	Name of Equipment	Priority
1	Opening and Cleaning line	C
2	Blow units for the above line	C
3	Mixing Machine and Feeder for above line	C
4	Carding Machine including : * Auto leveler, opening and carding units * Control by micro-computer * Automatic can changer	C
5	Drawing Frame with auto leveler and automatic can changer	A
6	Roving Frame	B
7	Ring Spinning Frame with automatic doffing device	B
8	Openend Spinning machine	B
9	Winding Machine with splieer and automatic doffing device	A
10	Set of display unit for each machine (gearboxes-bobbin building system-P.I.V. regulator-drafting system... etc.)	B
11	Sets of display including catalogues, explanation CDs and photographs for machine	B
12	Industrial tools for the maintenance of each equipment	B
13	Industrial cupboard for the saving the tools	B

2 Weaving Department

No.	Name of Equipment	Priority
1	Air Jet Loom	A
2	Rapier Loom	A
3	Gripper Loom	A
4	Training Units for assembling and dismantling specially designed for weaving & spinning operation	B
5	Warping Machine	C
6	Sizer	C
7	Braiding Machine	C
8	Loom for Towels fabrics	C
9	Computerized flat Knitting machine	B
10	Sets of display unit including photographs, catalogues and video for maintenance workings and for the running of machines	B
11	Industrial tools for the maintenance of each of the above equipment	A

3 Chemistry Department

No.	Name of Equipment	Priority
1	Viscosity meter	A
2	Hardness tester	A
3	Computer color matching system	A
4	Auto-screen printing machine	A
5	Heat setting machine	A
6	High temperature 12 color pot dyeing machine	A
7	Continuous pad drying machine	A
8	Pad steamer	A
9	Ball mill grinder for pigment	A
10	Digital pH meter	A
11	High temperature dyeing machine for rope form	B
12	Automatic pressure jigger	B
13	Laboratory padder	A
14	Hot plate with stirrer	A
15	Laundry meter	B
16	Fade meter	B
17	Dyeing stuff samples for the dyeing and printing usage in the chemical department	B
18	Modernized drying unit (electric oven) for different and several	B
19	Photo units for the printing operation sensitivity	B
20	Meter for testing wear, absorption effect of friction on print textile	B
21	Tincture samples for different kind of materials	B
22	Mixer for Printing Materials	A
23	Electronic balance	A
24	Camera for remaking copies of the original film	B

4 Ready Made Garments Department :

No.	Name of Equipment	Priority
1	Sewing machines	A
2	Chain stitch machine	A
3	Training aids for the different mechanical operation in the sewing machines together with the teaching boards for all operations	B

5 Laboratory

No.	Name of Equipment	Priority
1	Shirley Analyzer for trash determination	B
2	Comb sorter for measuring cotton fibers length	A
3	Cotton fineness meter (Wira)	A
4	Wool fineness meter	A
5	Fiber strength and elongation tester	A
6	Electric moisture meter	A
7	Micro-Macro-projection (projectina)	A
8	Yarn reel	A
9	Yarn quadrant - scaled balance	A
10	Twist counter	A
11	Tension testing machine for yarn	A
12	Yarn appearance testing machine	A
13	Uster evenness tester	A
14	Large universal measuring magnifier /2/	A
15	USO meter for testing wear, abrasion effect of friction on print textile	A
16	Tension testing machine for weaving	A
17	Tear tester	A
18	Bursting tester	A
19	Crease recovery tester	A
20	Lea strength tester	A
21	Warp tension meter	A
22	Digital vibration meter	A
23	Digital thermo hygrometer	A
24	Refractometer	A
25	Tension meter	A
26	Motor driven yarn reel	A
27	Over feed fin tester	C
28	Blending and mixture for preparation	A
29	Electric oven for drying	A
30	Digital thermometer	A
31	Single pan electric balance	A
32	Sample cutter for fabrics	A
33	Rubbing fastness tester	A
34	Fineness and maturity tester	B
35	Yarn count analysis system	A
36	Hairiness tester	B
37	Wrap reel	A
38	Cloth strength tester	A
39	Elemendorf's textile tearing tester	A
40	Portable cloth balance with separate cutter for circular fabric	A
41	Filling tester	B
42	Multi-purpose absorption tester	B
43	HVI	C
44	Stroboscope	A
45	Mini-Uster	C
46	Perspiration Tester	A
47	Drv heating tester (sublimation tester)	A
48	Multi-function Day light and Gray scales	A
49	Test press machine	B
50	Density Meter	A
51	Laundry shrinkage tester (Washer)	B
52	Tumble dryer	B
53	ICI-type pilling tester	A
54	Water repellency Tester	A

6 Auxiliary

No.	Name of Equipment	Priority
1	Overhead projector + screen	A
2	Samples slides for the spinning and weaving and Laboratories	C
3	LCD Projector	A
4	Photo copy machine	B
5	Generator	C
6	Personal computer	B
7	Laser printer	B
8	Inkjet printer	B
9	UPS	B
10	Transportation Bus	B
11	White board + Accessories	A
12	Air conditioniner	B
13	Foreign Language Laboratory (English/French)	C
14	Explanation boards concerning the mechanics of the spinning and weaving machines & chemistry	C
15	Van	C

Annex 3 Japan's Grant Aid Program

The Grant Aid Scheme provides a recipient country with non-reimbursable funds to procure the facilities, equipment and services (engineering services and transportation of the products, etc.) for economic and social development of the country under principles in accordance with the relevant laws and regulations of Japan. Grant Aid is not supplied through the donation of materials as such.

1. Grant Aid Procedures

(1) Japan's Grant Aid Scheme is executed through the following procedures.

- Application (Request made by a recipient country)
- Study (Basic Design Study conducted by JICA)
- Appraisal & Approval (Appraisal by the Government of Japan and Approval by Cabinet)
- Determination of Implementation (The Notes exchanged between the Governments of Japan and the recipient country)

(2) Firstly, the application or request for a Grant Aid project submitted by a recipient country is examined by the Government of Japan (Ministry of Foreign Affairs) to determine whether or not it is eligible for Grant Aid. If the request is deemed appropriate, the Government of Japan assigns JICA to conduct a study on the request. If necessary, JICA send a Preliminary Study Team to the recipient country to confirm the contents of the request.

Secondly, JICA conducts the study (Basic Design Study), using Japanese consulting firms.

Thirdly, the Government of Japan appraises the project to see whether or not it is suitable for Japan's Grant Aid Programme, based on the Basic Design Study report prepared by JICA, and the results are then submitted to the Cabinet for approval.

Fourthly, the project, once approved by the Cabinet, becomes official with the Exchange of Notes signed by the Governments of Japan and the recipient country.

Finally, for the implementation of the project, JICA assists the recipient country in such matters as preparing tenders, contracts and so on.

2. Basic Design Study

(1) Contents of the Study

The aim of the Basic Design Study (hereinafter referred to as "the Study"), conducted by JICA on a requested project (hereinafter referred to as "the Project"), is to provide a basic document necessary for the appraisal of the Project by the Government of Japan. The contents of the Study are as follows:

- a) confirmation of the background, objectives and benefits of the Project and also institutional capacity of agencies concerned of the recipient country necessary for the Project's implementation;
- b) evaluation of the appropriateness of the Project to be implemented under the Grant Aid Scheme from the technical, social and economic points of view;
- c) confirmation of items agreed on by both parties concerning the basic concept of the Project;
- d) preparation of a basic design of the Project; and
- e) estimation of costs of the Project.

The contents of the original request are not necessarily approved in their initial form as the contents of the Grant Aid project. The Basic Design of the Project is confirmed considering the guidelines of Japan's Grant Aid Scheme.

The Government of Japan requests the Government of the recipient country to take whatever measures are necessary to ensure its self-reliance in the implementation of the Project. Such measures must be guaranteed even though they may fall outside of the jurisdiction of the organization in the recipient country actually implementing the Project. Therefore, the implementation of the Project is confirmed by all relevant organizations of the recipient country through the Minutes of Discussions.

(2) Selection of Consultants

For the smooth implementation of the Study, JICA uses a consulting firm selected through its own procedure (competitive proposal). The selected firm participates the Study and prepares a report based upon the terms of reference set by JICA.

At the beginning of implementation after the Exchange of Notes, for the services of the Detailed Design and Construction Supervision of the Project, JICA recommends the same consulting firm which participated in the Study to the recipient country, in order to maintain the technical consistency between the Basic Design and Detailed Design.

3. Japan's Grant Aid Scheme

(1) Exchange of Notes (E/N)

Japan's Grant Aid is extended in accordance with the Notes exchanged by the two Governments concerned, in which the objectives of the project, period of execution, conditions and amount of the Grant Aid, etc., are confirmed.

- (2) "The period of the Grant" means the one fiscal year which the Cabinet approves the project for. Within the fiscal year, all procedure such as exchanging of the Notes, concluding contracts with consulting firms and contractors and final payment to them must be completed.

However, in case of delays in delivery, installation or construction due to unforeseen factors such as weather, the period of the Grant Aid can be further extended for a maximum of one fiscal year at most by mutual agreement between the two Governments.

- (3) Under the Grant, in principle, Japanese products and services including transport or those of the recipient country are to be purchased.

When the two Governments deem it necessary, the Grant Aid may be used for the purchase of the products or services of a third country.

However, the prime contractors, namely consulting, constructing and procurement firms, are limited to "Japanese nationals". (The term "Japanese nationals" means persons of Japanese nationality or Japanese corporations controlled by persons of Japanese nationality.)

- (4) Necessity of "Verification"

The Government of the recipient country or its designated authority will conclude contracts denominated in Japanese yen with Japanese nationals. Those contracts shall be verified by the Government of Japan. This "Verification" is deemed necessary to secure accountability to Japanese taxpayers.

- (5) Undertakings required to the Government of the Recipient Country

In the implementation of the Grant Aid project, the recipient country is required to undertake such necessary measures as the following:

- a) to secure a lot of land necessary for the construction of the Project and to clear the site;
- b) to provide facilities for distribution of electricity, water supply and drainage and other incidental facilities outside the site;
- c) to ensure prompt unloading and customs clearance at ports of disembarkation in the recipient country and internal transportation therein of the products purchased under the Grant Aid;
- d) to exempt Japanese nationals from customs duties, internal taxes and fiscal levies which may be imposed in the recipient country with respect to the supply of the products and services under the verified contracts;
- e) to accord Japanese nationals whose services may be required in connection with the supply of the products and services under the verified contracts such facilities as may be necessary for their entry into the recipient country and stay therein for the performance of their work;
- f) to ensure that the facilities constructed and products purchased under the Grant Aid be maintained and used properly and effectively for the Project; and
- g) to bear all the expenses, other than those covered by the Grant Aid, necessary for the Project.

- (6) "Proper Use"

The recipient country is required to maintain and use the facilities constructed and equipment purchased under the Grant Aid properly and effectively and to assign the necessary staff for operation and maintenance of them as well as to bear all the expenses other than those covered by the Grant Aid.

- (7) "Re-export"

The products purchased under the Grant Aid shall not be re-exported from the recipient country.

(8) Banking Arrangement (B/A)

- a) The Government of the recipient country or its designated authority should open an account in the name of the Government of the recipient country in a bank in Japan (hereinafter referred to as "the Bank"). The Government of Japan will execute the Grant Aid by making payments in Japanese yen to cover the obligations incurred by the Government of the recipient country or its designated authority under the verified contracts.
- b) The payments will be made when payment requests are presented by the Bank to the Government of Japan under an Authorization to Pay (A/P) issued by the Government of recipient country or its designated authority.

(9) Authorization to Pay (A/P)

The Government of the recipient country should bear an advising commission of an Authorization to Pay and payment commissions to the Bank.



Annex 6 **Criteria for equipment selection**

1. To be appropriate in order to improve the present training situation;
2. To be renovated for existing equipment which is over-aging and does not satisfy its basic function;
3. To have enough space to store itself;
4. To be related to textile education, not for general use;
5. To be frequently used(operated) ; and
6. To be properly maintained financially and technically.

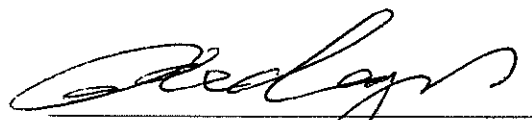
MINUTES OF DISCUSSIONS
ON
BASIC DESIGN STUDY ON THE PROJECT
FOR INSTALLATION OF EQUIPMENT
IN DAMASCUS INTERMEDIATE INSTITUTE FOR TEXTILE INDUSTRIES
IN SYRIAN ARAB REPUBLIC
(EXPLANATION ON DRAFT REPORT)

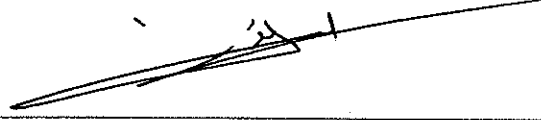
In August 2002, the Japan International Cooperation Agency (JICA) dispatched a Basic Design Study Team on the Project for Installation of Equipment in Damascus Intermediate Institute for Textile Industries (hereinafter referred to as "the Project") to Syrian Arab Republic (hereinafter referred to as "Syria"), and through discussions, site surveys and technical examination of the results in Japan, JICA prepared a draft report of the study.

In order to explain and to consult the Syrian side on the components of the draft report, JICA sent to Syria the Draft Report Explanation Team (hereinafter referred to as "the Team"), which is headed by Mr. Jun IKEDA, UNICO INTERNATIONAL CORPORATION, from May 18 to May 27, 2002.


As a result of discussions, both sides have confirmed the main items described on the attached sheet.

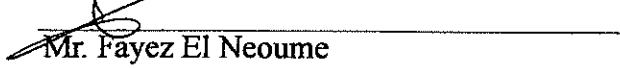
Damascus, May 26, 2002



Mr. Jun IKEDA
Leader
Basic Design Study Team
JICA


Eng. Mohammad Moutasem Husaini
Director
Intermediate Institute for Textile Industries
Ministry of Industry

(Witness)


Mr. Katsuhiko OZAWA
Resident Representative
JICA Syria Office


Mr. Fayez El Neoume
Director of Training and Qualification
Ministry of Industry


Mr. M. Bassam Al Sibai
Director of Technical and Scientific
Cooperation,
State Planning Commission

ATTACHMENT

1. Contents of the draft report

The Team explained that the number and grade of equipment to be procured under the Project were properly examined based on the curriculum at DIITI.

The Syrian side agreed and accepted in principle the contents of the draft report proposed by the Team.

2. Japan's Grant Aid Scheme

The Syrian side understood the Japan's Grant Aid Scheme explained by the Team and described in Annex3-4 of the Minutes of Discussions signed by both parties on January 22, 2002.

3. Final Report

JICA will complete the final report in accordance with the result of discussions and forward it to the Syrian side around August, 2002.

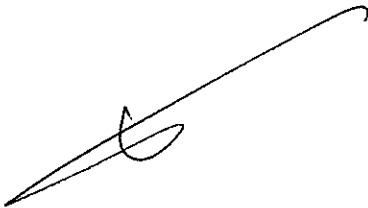
4. Other relevant issues

- 1) On condition that the Grant Aid Program by the Government of Japan is extended to the Project, the Syrian side shall take necessary measures described in Annex-1 for the smooth implementation of the Project.
- 2) The Syrian side shall secure rooms or spaces in which the procured machinery and equipment would be installed, by completing all of the necessary renovation including utilities mains and the removal of old machinery and equipment. As for Spinning and Weaving Department, some existing machinery and equipment should be removed from the building and/or transferred in the building.
- 3) The Syrian side shall renew the training curricula based on the new machinery and equipment which clearly shows the relationship between new machinery, equipment and each subject.
- 4) The Syrian side shall secure necessary trainers to reopen the Ready made garment department.
- 5) The Syrian side shall allocate sufficient budget for the maintenance of machinery and equipment.
- 6) Both sides confirmed that the contents of the draft report should be confidential. In order to keep the confidentiality, both sides should not disclose the contents to the third parties and should not duplicate the draft report itself.
- 7) The Syrian side explained that existing generator has no power enough to spare for new machinery and equipment and it takes a lot of time for addition of generator or renewal of existing generator as far as existing generator works. Japanese side understood the circumstances and decided to supply a generator on condition that connections to new generator are limited to new machinery and equipment.

Annex-1 The necessary measures to be taken by the Syrian side

The following necessary measures should be taken by the Syrian side on condition that the Grant Aid by the Government of Japan is extended to the Project.

- (1) To secure adequate rooms and spaces required for the project;
- (2) To remove machinery, equipment and materials that are to be replaced;
- (3) To secure a route to transport and deliver machinery and equipment for installation;
- (4) To provide a safe storage place for machinery and equipment after delivery and before installation;
- (5) To secure electricity supply, water, sewerage and other utilities;
- (6) To obtain documents required for obtaining the approval or permit for landing and customs clearance of machinery and equipment to be imported for the project, together with bearing necessary expenses including charges and fees;
- (7) To exempt Japanese nationals from customs duties, internal taxes and other fiscal levies which will be imposed on the supply of machinery and equipment or services under the approved contracts;
- (8) To provide necessary support and assistance for Japanese nationals who are required to enter and stay in the country for the purpose of supplying equipment and providing services under the approved contract;
- (9) To ensure the effective use of machinery and equipment to be supplied under the project in good condition, maintain them in good conditions, and secure manpower required for proper maintenance;
- (10) To pay banking service charges to a Japanese bank for foreign exchange service; and
- (11) To bear all costs and expenses that are not included in the project.



Appendix-5 Cost Estimation born by the Recipient country

1. Renovation of the rooms	
(1) Removal of existing wall	500SP
(2) Repairing of wall	2,000SP
(3) Repairing of floor	3,500SP
(4) <u>New building for generator</u>	<u>300,000SP</u>
Subtotal	306,000SP
2. Removal of existing equipment	
(1) Removal of spinning machines	25,000SP
(2) Removal of weaving machines	20,000SP
(3) <u>Removal of sewing machines</u>	<u>5,000SP</u>
Subtotal	50,000SP
3. Additional electrical wiring and power outlet	
(1) Power outlet	3,000SP
(2) Wiring	9,000SP
(3) <u>Switch and cabinet</u>	<u>30,000SP</u>
Subtotal	42,000SP
4. Additional water supply and drainage pipes	
(1) Water tap	2,000SP
(2) Water supply pipe	14,000SP
(3) <u>Waste pipe</u>	<u>12,000SP</u>
Subtotal	28,000SP
5. Furniture	
(1) Table and chair for computer	50,000SP
(2) <u>Laboratory table</u>	<u>10,000SP</u>
	60,000SP
	<u>Total 486,000SP</u>

Appendix 6 Equipment List

1 Spinning Department

No.	Name of Equipment	Quantity
S-1	Drawing Frame	1
S-2	Roving Frame	1
S-3	Ring Spinning Frame	1
S-4	Open-end Spinning machine	1
S-5	Winding Machine	1

2 Weaving Department

No.	Name of Equipment	Quantity
W-1	Air Jet Loom	1
W-2	Rapier Loom	1
W-3	Gripper Loom	1
W-4	Flat Knitting machine	1

3 Chemistry Department

No.	Name of Equipment	Quantity
C-1	Viscosity meter	1
C-2	Hardness tester	1
C-3	Computer color matching system	1
C-4	Auto-screen printing machine	1
C-5	Heat setting machine	1
C-6	High temperature 12 color pot dyeing machine	1
C-7	Continuous pad drying machine	1
C-8	Pad steamer	1
C-9	Ball mill grinder for pigment	1
C-10	PH meter	1
C-11	Laboratory padder	1
C-12	Hot plate with stirrer	1
C-13	Launder meter	1
C-14	Fade meter	1
C-15	Dyeing stuff samples	1
C-16	Electric oven	1
C-17	Crock meter	1
C-18	Mixer	1
C-19	Electronic balance	1

4 Ready made garments Department

No.	Name of Equipment	Quantity
G-1	Sewing machines	1set
G-2	Training implements for the sewing	1set

5 Laboratory

No.	Name of Equipment	Quantity
L-1	Sliver trash tester	1
L-2	Comb sorter	1
L-3	Single fiber tensile strength tester	1
L-4	Electric moisture meter	1
L-5	Universal projector	1
L-6	Yarn quadrant - scaled balance	1
L-7	Twist counter	1
L-8	Yarn tensile strength tester	1
L-9	Yarn inspector	1
L-10	Evenness tester	1
L-11	High magnification microscope	1
L-12	Universal textile abrasion tester	1
L-13	Bursting tester	1
L-14	Crease recovery tester	1
L-15	Lea strength tester	1
L-16	Warp tension meter	1
L-17	Vibration meter	1
L-18	Thermo hygrometer	1
L-19	Refractometer	1
L-20	Tension meter	1
L-21	Wrap reel	1
L-22	Thermometer	1
L-23	Single pan electric balance	1
L-24	Sample cutter for fabrics	1
L-25	Martindale abrasion tester	1
L-26	Fineness and maturity tester	1
L-27	Yarn count analysis system	1
L-28	Hairiness tester	1
L-29	Cloth tensile strength tester	1
L-30	Elemendorf's textile tearing tester	1
L-31	Portable cloth balance with fabrics cutter	1
L-32	Stroboscope	1
L-33	Perspiration Tester	1
L-34	Dry heating tester	1
L-35	Multi-function Day light and Gray scales	1
L-36	Test press machine	1
L-37	Density Meter	1
L-38	Laundry shrinkage tester	1
L-39	Tumble dryer	1
L-40	ICI-type pilling tester	1
L-41	Water repellency Tester	1

6 Auxiliary

No.	Name of Equipment	Quantity
A-1	Overhead projector	4
A-2	LCD date projector	1
A-3	Copy machine	1
A-4	Generator	1
A-5	Personal computer	1set
A-6	Laser printer	1
A-7	Inkjet printer	1
A-8	UPS	1
A-9	Transportation Bus	1
A-10	White board	8
A-11	Air conditioner	1set