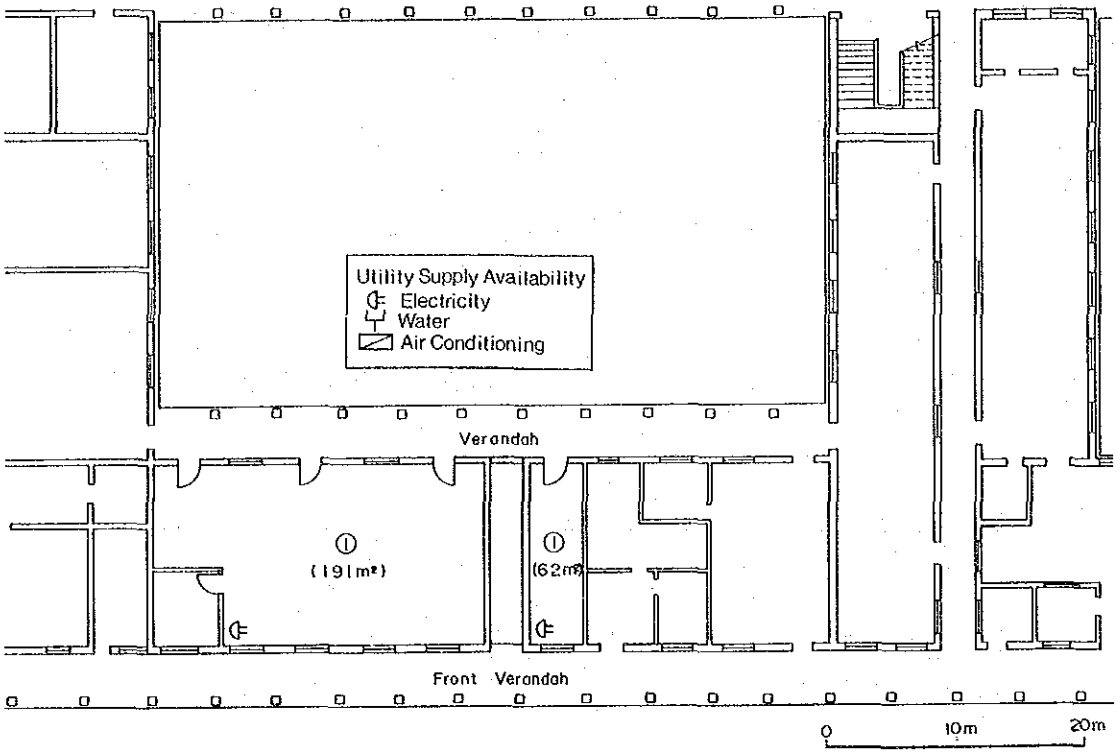
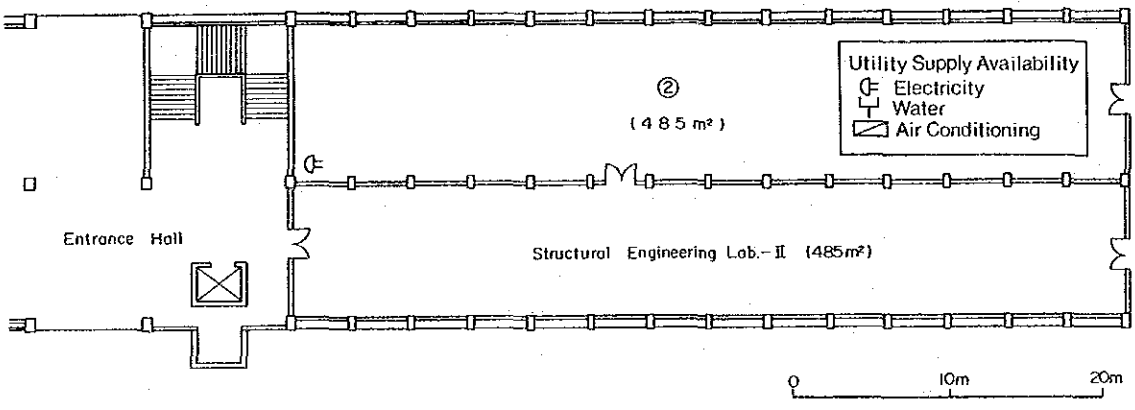


Old Academic Building

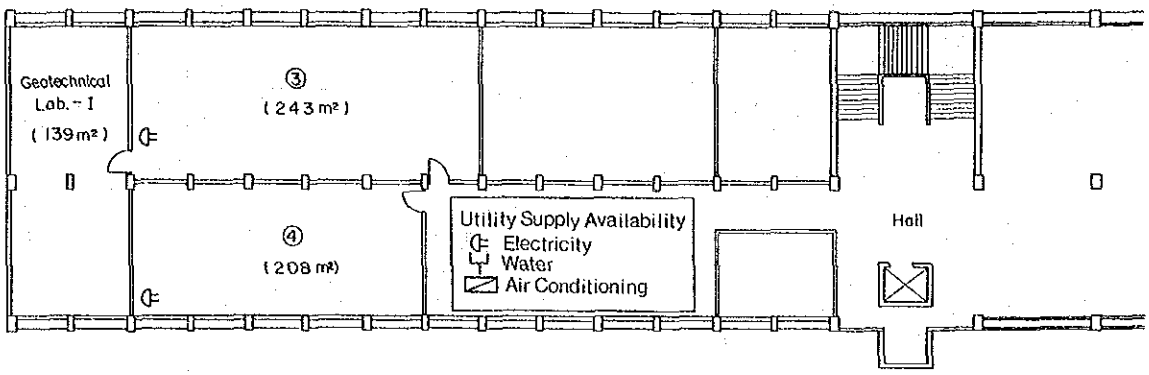
Lab. No.	Name of Laboratory	Name of Equipment to be Installed	Q'ty	Utilities Required	
				Electricity	Others
①	Transportation Lab.	CBR Marshal tester	1	--	--
		Electro-optical distance meter	2	--	--
		Bench-mounted digital thermometer	1	Yes	--
		TRRL compactibility apparatus	1	Yes	--

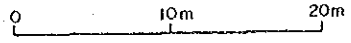


Ground Floor, Civil Engineering Building

Lab. No.	Name of Laboratory	Name of Equipment to be Installed	Q'ty	Utilities Required	
				Electricity	Others
②	Structural Engineering Lab.-I	Structural testing frame	1	Yes	--
		Data logger with 100 channels	1	Yes	--

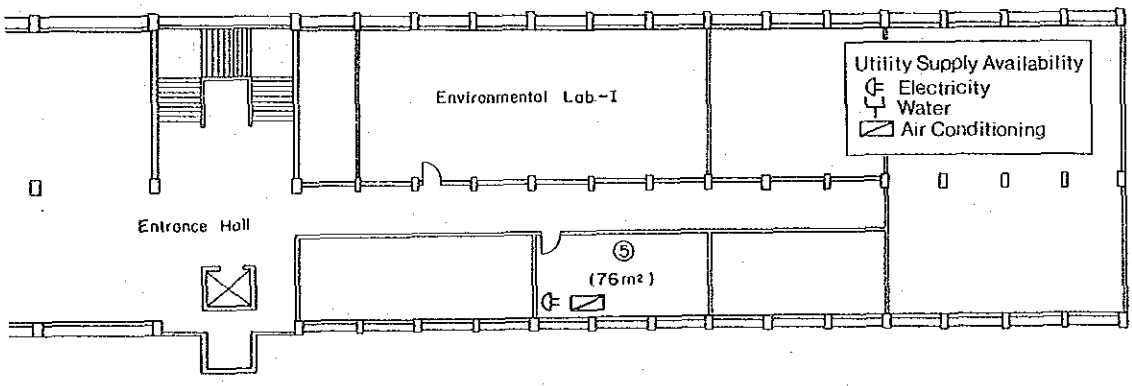
Figure 4-4 Equipment Layout Plan (11) (Bangladesh University of Engineering and Technology, Dept. of Civil Engineering)





Second Floor, Civil Engineering Building

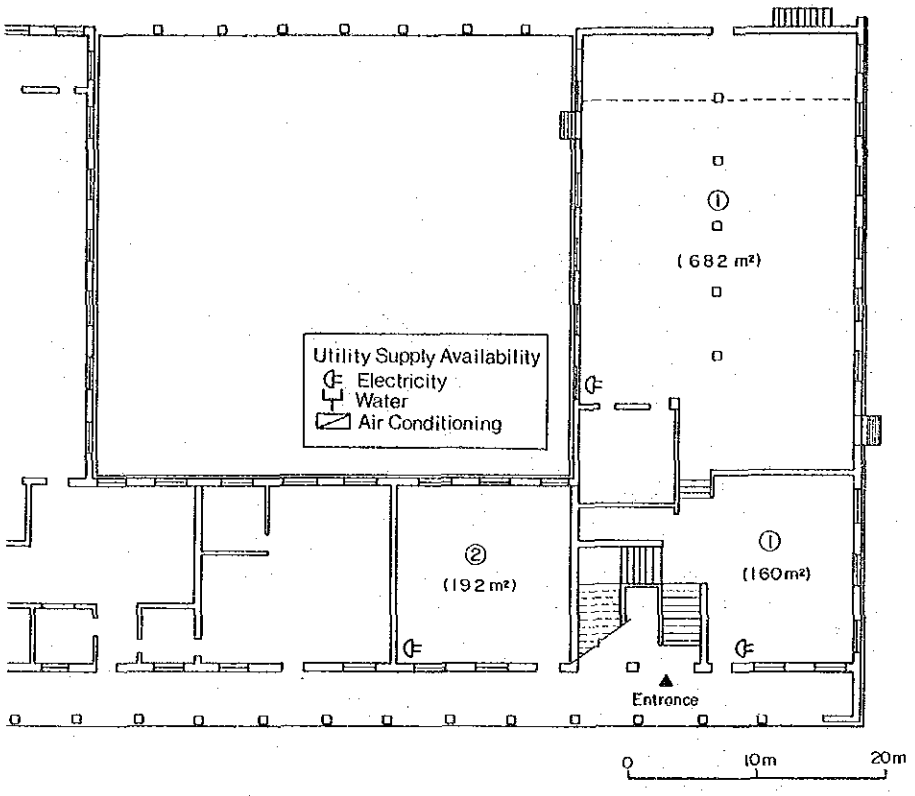
Lab. No.	Name of Laboratory	Name of Equipment to be Installed	Q'ty	Utilities Required	
				Electricity	Others
③	Geotechnical Lab.	Rowe consolidation apparatus	1	Yes	--
		Sieve set	1	--	--
		Consolidation permeability cell	1	Yes	--
		Freeze-drying apparatus	1	Yes	--
		High pressure mercury porosimeter	1	Yes	--
		Data recorder for porosimeter	1	Yes	--
		Bearing plates with bearing set	1	--	--
④	Traffic Engineering Lab.	Vehicle speed recorder	1	--	--
		Traffic counter	1	--	--
		Friction tester	1	--	--



Third Floor, Civil Engineering Building

Lab. No.	Name of Laboratory	Name of Equipment to be Installed	Q'ty	Utilities Required	
				Electricity	Others
⑤	Environmental Lab.-I	Atomic absorption and flame emission spectrophotometer	1	Yes	N_2O, N_2, Ar
		Air pollution analysis kit	1	--	--
		Polarizing microscope	1	Yes	--
		Total carbon analyser	1	Yes	--

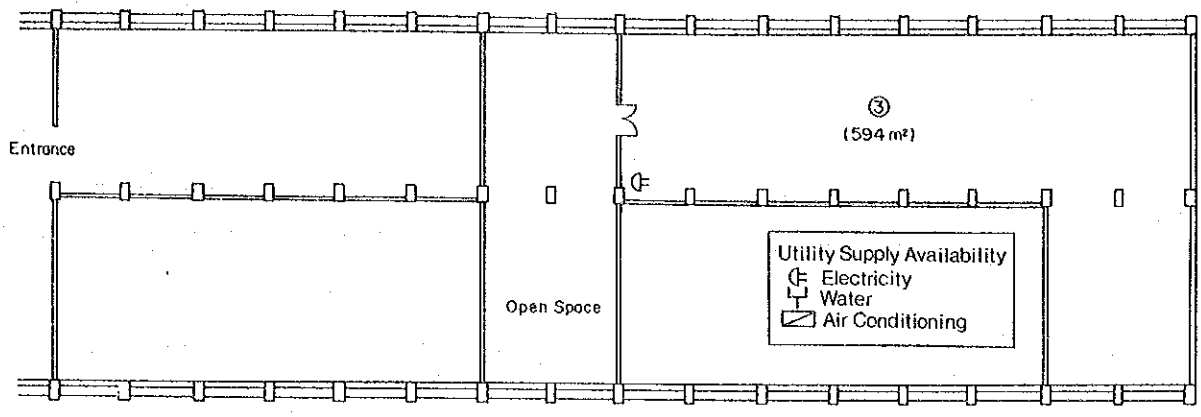
Figure 4-4 Equipment Layout Plan (12) (Bangladesh University of Engineering and Technology, Dept. of Civil Engineering)



Old Academic Building

Lab. No.	Name of Laboratory	Name of Equipment to be Installed	Q'ty	Utilities Required		
				Electricity	Water	Others
①	Heat Engine Lab.	Petrol engine and test bed	1	Yes	--	--
		Frequency analyser	1	Yes	--	--
		Transducer system	1	Yes	--	--
		Digital multimeter	1	--	--	--
		Gas turbine and test bed	1	Yes	Yes	--
		Dynamometer	1	Yes	--	--
		Sound level meter	1	--	--	--
		Instrument for measuring vibration	1	Yes	--	--
		Fuel injection test bench	1	Yes	--	--
②	Air Conditioning Lab.	Refrigeration test bed	1	Yes	--	--

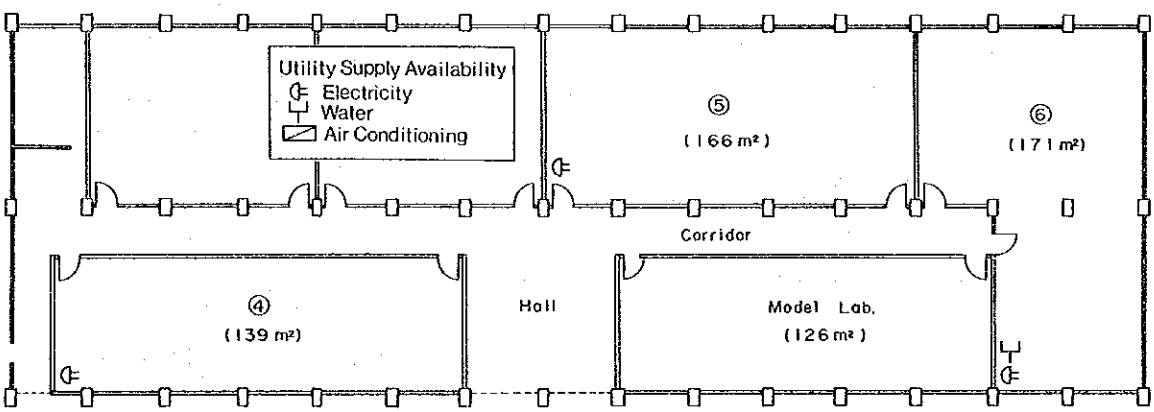
Figure 4-4 Equipment Layout Plan (13) (Bangladesh University of Engineering and Technology, Dept. of Mechanical Engineering)



Ground Floor, EME Building

0 5m 10m

Lab. No.	Name of Laboratory	Name of Equipment to be Installed	Q'ty	Utilities Required	
				Electricity	Others
③	Fluid & Aero Lab.	Flow measurement apparatus	1	Yes	--
		Digital Manometer	1	Yes	--
		X-Y-Z co-ordinate measuring device	1	Yes	--
		Water hammer demonstration apparatus	1	Yes	--
		Two-pen chart recorder	1	Yes	--
		Pressure transducer	1	Yes	--
		Transducer	1	Yes	--
		Transducer system	1	Yes	--
		Digital multimeter	1	--	--
		Dual trace memory oscilloscope	1	Yes	--
		Sound level meter	1	--	--
		Centrifugal compressor	1	Yes	--



Fourth Floor, EME Building

0 10m 20m

Lab. No.	Name of Laboratory	Name of Equipment to be Installed	Q'ty	Utilities Required	
				Electricity	Others
④	Control Engineering Lab.	Pneumatic control training equipment	1	Yes	--
		Hydraulic control training equipment	1	Yes	--
⑤	Applied Mechanics Lab.	Impact testing machine	1	Yes	--
		Ultrasonic Flaw detector	1	Yes	--
		Universal testing machine	1	Yes	--
		Dynamic balancing machine	1	Yes	--
⑥	Fuel Testing Lab.	Bomb calorimeter	1	Yes	--
		Electronic Balance	1	Yes	--

Figure 4-4 Equipment Layout Plan (14) (Bangladesh University of Engineering and Technology, Dept. of Mechanical Engineering)

4-4-2 Utilities

Utilities required for the proposed equipment are electricity, water, compressed air, medium gas and air-conditioning as shown in Figure 4-4.

(1) Electricity

1) Capacity of electric substation

Capacity of the substations in each University are summarized in Table 4-5.

Table 4-5 Capacity of Substations in the Universities (at present)

	Sub-stations		Capacity
The University of Dhaka	Existing-I	(Note 1)	500 KVA
	Existing-II	(Note 2)	200 KVA
	Under planning-III	(Note 3)	500 KVA
Bangladesh University of Engineering and Technology	Existing-I	(Note 4)	250 KVA
	Existing-II	(Note 4)	300 KVA

Note 1: Supplied to the departments of chemistry/biochemistry/zoology/ botany/pharmacy/soil science, and some teacher's and student's dormitories in the university campus.

Note 2: Supplied to the departments of physics/applied physics/geology, and some teacher's and student's dormitories in the university campus.

Note 3: Planned for the new scientific faculty building (under construction, 6 stories).

Note 4: Supplied to the whole campus.

At the two campuses, most of electric power is used for lighting in class rooms, faculty offices, faculty housing, and student dormitories. Their existing substations have capacity allowance of around 100KVA for each University, which is sufficient for the equipment.

2) Electric sources in laboratories

Every laboratory to be installed with the equipment has been already equipped with outlet sockets through distribution boxes of sufficient capacities and quantity for electricity supply.

(2) Water supply

Water is supplied to the Universities from deep wells (90 - 100m depth) in the campuses. Water is abundant under the ground as Dhaka is located in an alluvion surrounded by Meghna and Ganges river and faces Burhi ganga river (a branch of Ganges). Water supplied through the deep wells is soft and neutral.

Quality of Water Supplied through Deep Wells

pH	:	6.1 - 7.0
Hardness (mg-$CaCO_3$/lit.-water)	:	80 - 100

(3) Other utilities

Some of the equipment requires compressed air and gases. An independent small compressor shall be attached to the equipment which requires compressed air. Gases, except fuel gas, shall be supplied through high pressure cylinders. Table 4-6 shows gases required as medium for the proposed equipment, all of which are available locally.

Table 4-6 Types and Purity of Required Gases

Name of equipment	Name of gas	Purity	Capacity of standard cylinder	Consumption (pressure)
Gas chromatograph	H_2	More than 99.99%	47 lit.	50 ml/min (31 - 4 kg/cm^2)
	N_2	More than 99.99%	47 lit.	50 ml/min (7 - 8 kg/cm^2)
	He	More than 99.99%	47 lit.	50 ml/min (7 - 8 kg/cm^2)
Atomic absorption spectrophotometer	N_2O	More than 98%	30 lit.	8.0 l/min (3.5 kg/cm^2)
	C_2O	More than 98%	47 lit.	8.0 l/min (0.9 kg/cm^2)
	Hz	More than 99%	47 lit.	30 l/min (0.9 kg/cm^2)
	Ar	More than 99%	47 lit.	13 l/min (3.5 kg/cm^2)
Flame analyser	LPG	More than 80%	5 kg	1 l/min (0.7 kg/cm^2)

4-4-3 Foundation works

Foundation works for installation of anchor bolts or vibration isolating pads are required for some of the equipment to be installed at Bangladesh University of Engineering and Technology, as shown in Table 4-7. These works shall be carried out by the University prior to installation based on the information prepared by the Japanese side.

Table 4-7 Equipment Required Foundation Works

( ): Floor to be installed

Structural testing frame (Ground floor of civil engineering dept.)
Petrol engine and test bed (Ground floor of old building)
Impact testing machine (Ground floor of new building)
Universal testing machine (Ground floor of new building)

4-4-4 Dispatch of experts

The proposed equipment includes large equipment and precision equipment, which require supervisory works for installation, adjustment and operation training. For these purposes, Japanese experts will be sent to Bangladesh.

4-5 Transportation of Equipment

The equipment will be packed and put in 20-feet containers, and transported by ship from Yokohama to Chittagong via Singapore at a distance of 4,452 nautical miles. The trip usually takes 14 days, with some allowance required for transit at Singapore. The Port of Chittagong is equipped with handling facilities and a railway siding for containers. After customs clearance at the port, the containers will be transported to Dhaka via railway. The transportation route from Chittagong to Dhaka is illustrated in Figure 4-5.

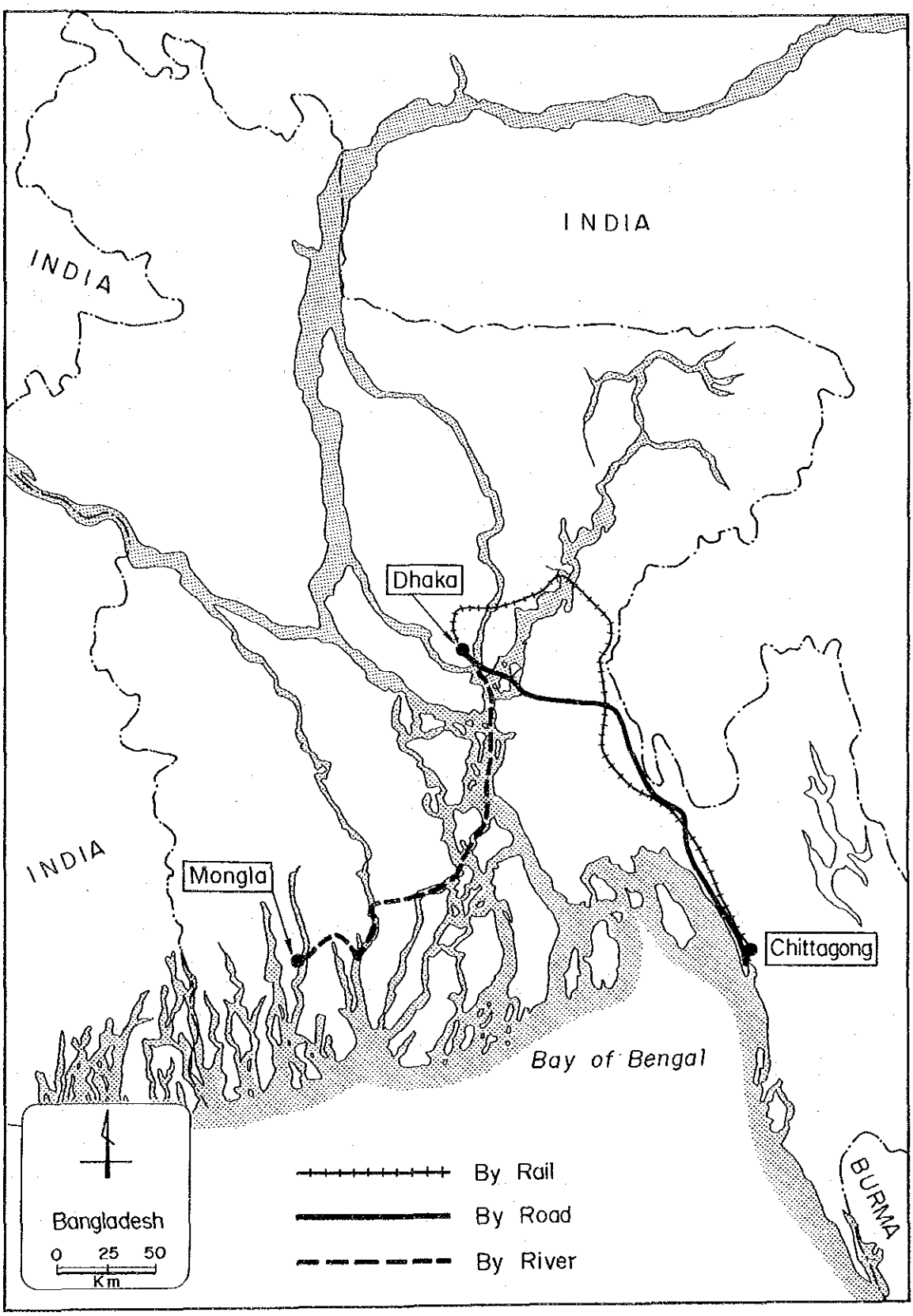


Figure 4-5 Inland Transportation Route of Equipment

Dhaka Station has an inland container depot (ICD) which can stock 82 units of 20-feet container and have a 25-ton forklift. The equipment will be assorted at the ICD according to final destinations and loaded on truck to be transported to each university at a distance of 5 km. After unloaded at each campus, the equipment will be carried into temporary storage spaces of departments. Each campus has access roads to the spaces.

Figure 4-6 illustrates the work flow from the manufacturer of the equipment to the acceptance by the Universities. Railway from Chittagong to Dhaka runs about 330 km, and transportation takes about 24 hours. However, it is estimated to take 12 days for the whole process from the arrival at Chittagong Port to the temporary storage at each department, including customs clearance, railway transportation, unloading, and unpacking.

Although container trailer service is available between Dhaka and Chittagong on road (traveling time of 24 hours), that is less economical than the railway as shown below.

Transportation Cost Per 20-feet Container (Estimated)

(i) Railway: 22,200 Taka
(ii) Trainer: 26,000 Taka

In addition, road transportation must use ferry boat services twice to cross rivers, so that it is less convenient nor safer than railway transportation.

Alternative route of transportation is via Mongla Port next to Chittagong, as shown in Figure 4-5. .However, the handling capacity of the port is much smaller than Chittagong Port. Moreover, the port is in the west of Bangladesh and has not railway nor roads connected to Dhaka, so that the equipment must be transported by barge on river water. Thus, the route via Mongla Port will be alternatively used only when Chittagong Port is not available for some reason or other.

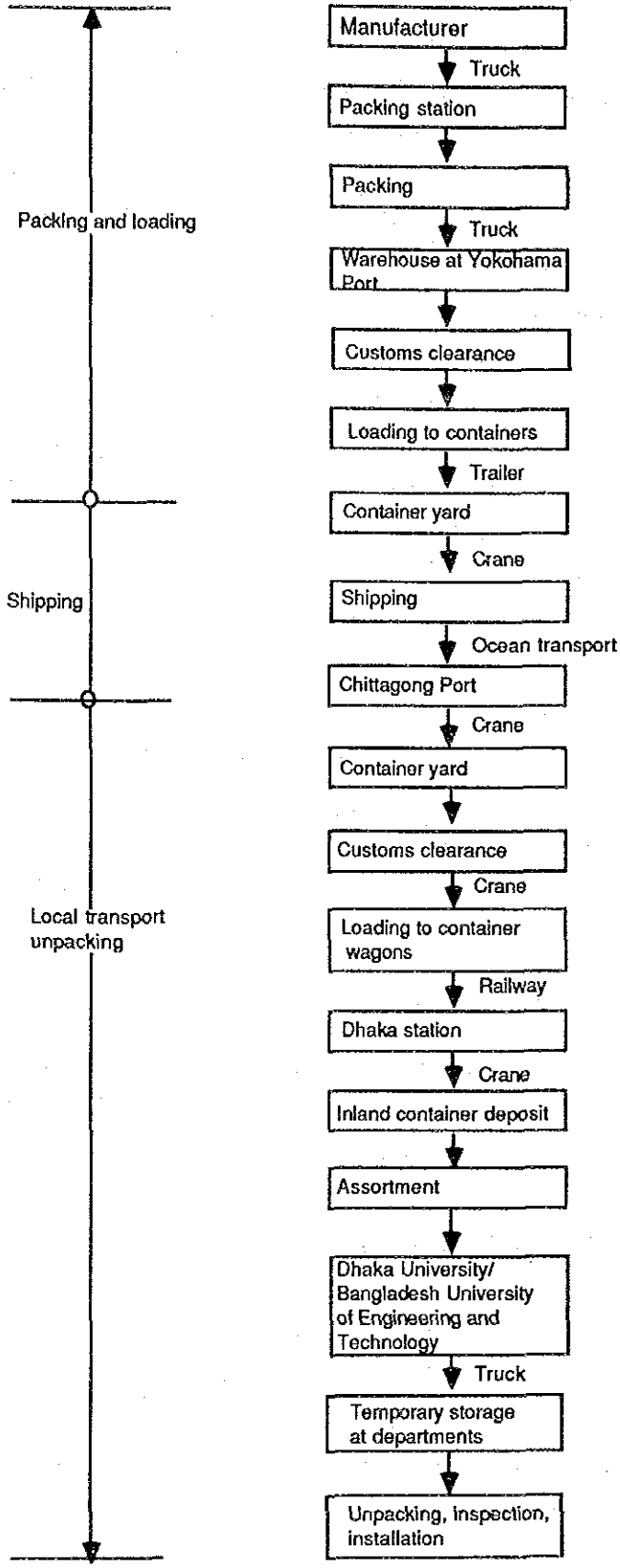


Figure 4-6 Work Flow of Purchased Equipment up to the Universitites

4-6 Project Implementation Plan

Project will be implemented after the Japanese Government and the Bangladesh Government exchange note (E/N).

The project implementation body of the Bangladesh side is UGC. UGC and a consultant to implement the Project on behalf of the Bangladesh Government, shall be responsible for system design and tender process to select a supplier of equipment to be procured. Finally, UGC will conclude a procurement contract with the equipment supplier. Thus the Project will be implemented by UGC, the consultant and the equipment supplier. Under the arrangement, this chapter proposes undertakings of the Bangladesh and Japanese sides and project schedule.

4-6-1 Undertakings

On the Japanese side, a qualified equipment supplier will be responsible for procurement, ocean transport, inland transport (in Bangladesh), installation, adjustment, and instruction in operation of the equipment, and a consultant shall be responsible for system design, tender procedure, and supervision. On the other hand, the project implementation body on the Bangladesh side will be responsible for the following:

(1) To secure equipment installation spaces.
(2) To construct or provide foundation, anchor bolts and/or vibration isolating pads (applicable to Bangladesh University of Engineering and Technology only) required for specified equipment.
(3) To install, provide and connect sources of electricity, water and gas required for equipment operation, including outlets, faucets, drain and draft.
(4) To establish an organization and budgetary allocation related to maintenance and operation of the installed equipment.
(5) To secure prompt unloading, customs clearance and inland transport services for the equipment after arrival at the port in Bangladesh.

(6) To arrange tax exemption for import and other taxes on the implementation and the equipment to be installed, and income and other taxes on Japanese citizens who are engaged in the Project.

(7) To provide and manage temporary storage for the equipment at the Universities.

(8) To arrange effective implementation of instruction in equipment operation.

(9) To administer the payment procedure for the consultant and the supplier (B/A and A/P)

4-6-2 Implementation system

To execute the Project, UGC will enter into a contract with the consultant. The contract shall be subject to verification of the Japanese Government. At the same time, they will conclude a banking arrangement (B/A) with Japanese banks via the Bangladesh Government to secure payment for the Japanese side.

In the project implementation, the University of Dhaka and Bangladesh University of Engineering and Technology which will receive the proposed equipment cooperate with UGC.

4-6-3 Implementation schedule

After the conclusion of the Exchange of Notes on the plan to upgrade educational equipment at universities between the two governments, a consulting contract will be concluded between and a Japanese consulting firm. The consulting firm will make detailed design for the Project and prepares specifications, drawings and other documents required for the tender procedure for the Project.

Upon completion of the Tender Documents, the tender procedure for procurement of the equipment will be administered after the approval of the Bangladesh Government. The successful bidder will conclude a procurement contract with UGC, and then with the verification of the Japanese Government, the bidder will procure, manufacture, and install the equipment and deliver them to the Bangladesh side.

Technical experts will be send to the sites for the works of delivery and installation. The Project will be completed upon delivery and installation of all the equipment on the Bangladesh side.

The Project implementation schedule is summarized in Figure 4-7.

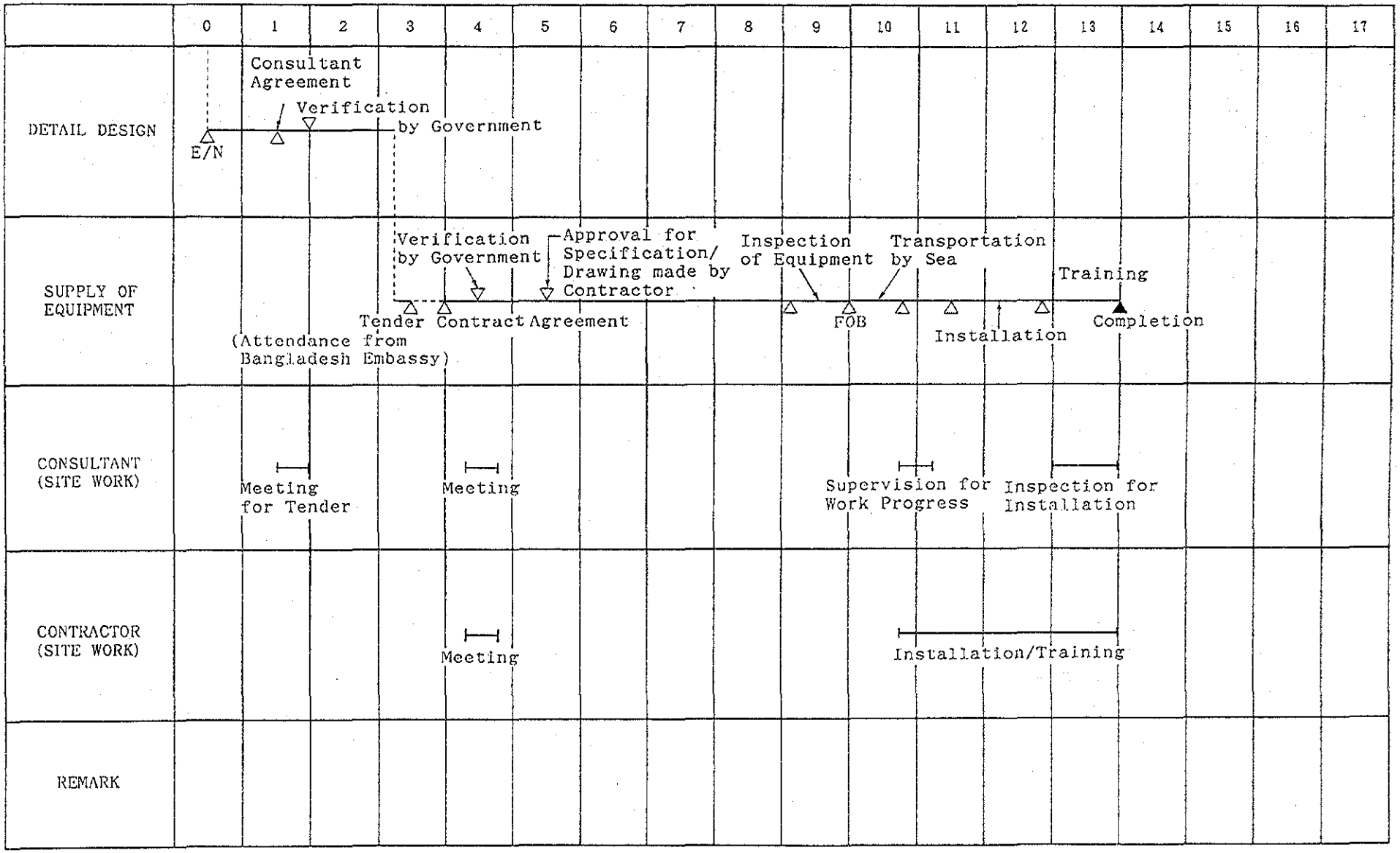


Figure 4-7 Project Implementation Schedule

4-7 Estimated Project Cost

The project cost shared by Bangladesh side is estimated at Tk. 937 thousand (3,780 thousand yen) which is composed of the following expenses.

Labor Costs	:	Tk. 82,000
Material Costs	:	Tk. 855,000
Total	:	Tk. 937,000

4-8 Maintenance of Equipment

4-8-1 The present situation of equipment maintenance

In the faculty of science and the faculty of biological Science of the University of Dhaka, equipment is controlled by each department, and individual equipment is maintained by each laboratory's instructor. Procurement of new equipment is controlled within the development budget, and incorporated into an overall plan after coordination. Bangladesh University of Engineering and Technology has the P&D department which is responsible for planning, procurement and maintenance of equipment and materials for the whole university. Equipment is controlled by each department in centralized storage.

The Universities have facilities for machining and repairing, which employs full-time technicians. However, these facilities cannot handle repairs requiring advanced technology, which are left to outside repair shops. Costs and expenses of replenishment of minor repairs and expendables are allocated under the revenue budget, whereas those of major repairs, replacement and procurement of equipment are secured under the development budget. The revenue budget increases gradually in accordance with inflation, and the development budget is adopted upon application and varies with years. Table 4-8 shows the 1987/88 budget.
At present, most of the revenue budget is disbursed to salary and general administration expenses, and little allowance is made for equipment repairs and replenishment of expendables at both the Universities. The development budget is only sufficient for replenishment of small equipment at present, so that large equipment deteriorates due to aging.

However, Bangladesh University of Engineering and Technology carries out research projects under contract with a third party, from which some equipment is obtained.

Table 4-8 Budget for Maintenance for Each Department (1987/88)

(Unit: 1,000 Tk)

	Revenue Budget	Development Budget
The University of Dhaka		
Department of Physics	420	400
Department of Chemistry	520	400
Department of Botany	295	500
Bangladesh University of Engineering and Technology		
Department of Electric & Electronic Engineering	550	550
Department of Civil Engineering	600	600
Department of Mechanical Engineering	550	500

4-8-2 Budget for maintenance

At present, the existing equipment is maintained well. If new equipment is added to the existing stock, repair and consumable expenses will increasebecause of more frequent use of equipment, while repair expenses are saved for old equipment which is disposed. Also, utility expenses - in particular, medium gas for gas chromatograph etc. - will be increased.

Since the proposed equipment is highly reliable except some precise equipment and electronic parts, there are little risk of having trouble, except necessity of minor repairs at the existing Universities' shops or other local facilities. Neverthless, budgetary allocation should be made for an increase in repair, consumable and utility expenses.

The maintenance expenses for the Project is estimated at Tk 2,622,000 at the moment.

The amount includes the following items:

(1) Consumables
(2) Repair parts
(3) Labor
(4) Electricity, gas (medium), fuel

It should be noted that the existing repair facilities and staff at the Universities are assumed to be available for the new equipment without additional expenses.

Estimated maintenance expenses for each University are summarized in Table 4-9.

Table 4-9 Maintenance Expenses (1991 Price)

(Unit: Tk)

Item	The University of Dhaka	Bangladesh University of Engineering and Technology
Consumables	392,547	179,651
Repair parts	741,634	538,754
Import duties	170,127	107,760
Labor	81,436	81,713
Electricity/gas/fuel	184,436	143,123
Total	1,570,457	1,051,001
Grand total	2,621,458	

CHAPTER 5 PROJECT EVALUATION

CHAPTER 5 PROJECT EVALUATION

The Bangladesh Government has an urgent task to develop the nation's economy in order to improve the living of the people. The government aims at improvement of the productivity in the agricultural and industrial sectors through its Third Five-Year Plan. Competent engineers and scientist who lead the industries and agriculture to higher productivity, are expected to be educated in universities.

This Project is designed to consolidate the base of education by supplying equipment to the major six departments of science and engineering which are educating potential industrial leaders in that country, therefore it has considerable significance for the country's future.

Following effects are expected by the Project:

1. Introduction of new equipment will open practical education in remarkably advancing technology such as electronics and automation and will promote technical transfer related to these fields from advanced countries, thus lead the nation's industries to higher productivity.

2. Instrumentation with new technology will improve the research level of students in especially master's and doctor's courses, then more useful researches will lead the country's industries and agriculture to development.

3. Better and more frequent opportunities of experimental study are afforded to students by the supply of new basic educational equipment, and teachers will also educate the students more efficiently by them, thus the graduates from these departments of the Universities will be adequately trained as engineers or scientists to make the nation's industries and agriculture more active.

4. A considerable number of graduates from these departments are expected to be teachers of higher educational schools throughout the country. Therefore the Project will gradually make effect to improve scientific and engineering ability of a large number of the people in the whole country.

5. Most of the professors in the University of Dhaka and Bangladesh University of Engineering and Technology got their doctorates from universities in foreign countries such as the U.K. and the U.S.A. Young candidates for professors are greatly depending on overseas education. The Project will improve the situation by providing adequate equipment for the study in the doctor's course.

Looking the above-mentioned effects, the Project will not only bring improvement of the university education but contribute to the Bangladesh economy by raising more competent engineers and scientists, thus produce an effect on the better living of the people in the nation.

Therefore, it is evaluated that the Project is worth as a Japanese grant aid.

CHAPTER 6 CONCLUSION AND RECOMMENDATION

CHAPTER 6 CONCLUSION AND RECOMMENDATIONS

Bangladesh is making efforts to improve the people's living through the Third Five-Year Plan. It is indispensable to introduce new technology from advanced countries as well as to develop technology for its own traditional industries to lay the economic foundation for the people's living.

The Project is designed to assist Bangladesh by providing educational equipment to the major six departments of science and engineering of the two Universities in order to contribute to the country's prosperity through the improvement of education for young leaders of that country.

Followings are recommended for the Project:

(1) Implementation organization

UGC will be positioned as an implementation agent of the Bangladesh Government. The equipment will be installed in laboratories of the two Universities, therefore, UGC shall appoint each person responsible for the smooth implementation of the installation in each University and entitle him to undertake necessary procedures requested by the Japanese side.

(2) Foundations

The Bangladesh side shall prepare the foundations specified in this report, in the designated laboratories of Bangladesh University of Engineering and Technology.

(3) Space and utilities

The Bangladesh side shall secure the adequate space and utilities for the new equipment by removing unnecessary equipment.

(4) Maintenance of the equipment

The Bangladesh side shall make budgets and establish organizations in the Universities to maintain the equipment properly. In addition, it is necessary to renovate the equipment periodically to avoid obsolescence.

(5) Repair shop

It is advisable to organize a better repair shop to put the modern precision instruments and electronic equipment in order.

(6) Utilization of the equipment

It is to be desired that each department adopts centralized control of the equipment and makes periodical maintenance for better availability.

APPENDICES

Appendix 1 Minutes of Discussions

MINUTES OF DISCUSSIONS

THE BASIC DESIGN STUDY

ON

THE PROJECT FOR PROCUREMENT OF SCIENTIFIC EQUIPMENT

FOR UNIVERSITIES

IN

THE PEOPLE'S REPUBLIC OF BANGLADESH

In response to the request of the Government of the People's Republic of Bangladesh, the Government of Japan decided to conduct a basic design study on the project for Procurement of Scientific Equipment for Universities (hereinafter referred to as "the Project"), and entrusted the study to the Japan International Cooperation Agency (JICA). JICA sent to Bangladesh the study team headed by Dr. Tomoya Shibayama, Associate Professor, Department of Civil Engineering, Faculty of Engineering, Yokohama National Universities from December 16 to January 4, 1989.

The team had a series of discussions on the Project with the officials concerned of the Government of Bangladesh headed by Professor M.A. Bari, Chairman of University Grants Commission and conducted a field survey in Dhaka.

As a result of the study and discussions, both parties agreed to recommend to their respective Governments that the major points of understanding reached between them, attached herewith, should be examined toward the implementation of the Project.

Dhaka, December 22, 1988

柴山知也

Dr. Tomoya Shibayama
Leader
Basic Design Study Team
Japan International
Cooperation Agency

Shamidullah
Secretary
University Grants
Commission

1. TITLE OF THE PROJECT

The title of the Project is "Project for the Procurement of Scientific Equipment for the Universities in the People's Republic of Bangladesh".

2. OBJECTIVES OF THE PROJECT

The objectives of the Project are to procure necessary equipment for the improvement of education for the University of Dhaka and Bangladesh University of Engineering and Technology in order:

1) to enhance the quality of training of undergraduate students.

2) to strengthen equipment for research by post-graduate students in order to enhance the Universities' current contribution to national development.

3. IMPLEMENTING AGENCY

The Implementing Agencies for the Project are the University of Dhaka and Bangladesh University of Engineering and Technology under the supervision of University Grants Commission.

4. PROJECT SITE

The sites of the Project are located at Science Department of the University of Dhaka and Bangladesh University of Engineering and Technology as shown in ANNEX 1.

5. SUMMARY OF REQUESTED ITEMS FOR THE PROJECT

The summary of the requested equipment is shown in the attached ANNEX 2 reflecting the priorities of the requested equipment.

6. GRANT AID PROGRAM

1) The Bangladesh side has been appraised the system of the Japan's Grant Aid Program explained by the Team which includes a principles for use of a Japanese consultant firm and Japanese contractors for the implementation of the Project.

T.S.

2) The Bangladesh side will undertake to ensure the necessary budget and personnel for the proper and effective operation and maintenance of equipment provided under the Grant Aid.

3) The Team will carry to the Government of Japan the request of the Government of Bangladesh that the former takes necessary measures to provide necessary equipment under the Japan's Grant Aid Program.

7. NECESSARY MEASURES TO BE TAKEN BY THE GOVERNMENT OF BANGADESH

The Government of Bangladesh will take the necessary measures as shown in ANNEX 3, on condition that Japan's Grant Aid is extended to the Project.

8. FORWARD OF EQUIPMENT LIST

1) Appropriateness of the request of equipment will be examined by the Team in Japan and the resultant equipment list will be sent to the Bangladesh side by the end of February 1989 for confirmation of the list. Bangladesh will forward the comment on the said list by 15th of March, 1989 through the JICA office, Bangladesh, otherwise the said list will be deemed as agreed by the Bangladesh side without any comment.

2) The Bangladesh side has understood that along with the comment no request for additional equipment will be made.

9. FINAL REPORT

10 copies of the final report will be submitted to the Government of Bangladesh side by early May, 1989.

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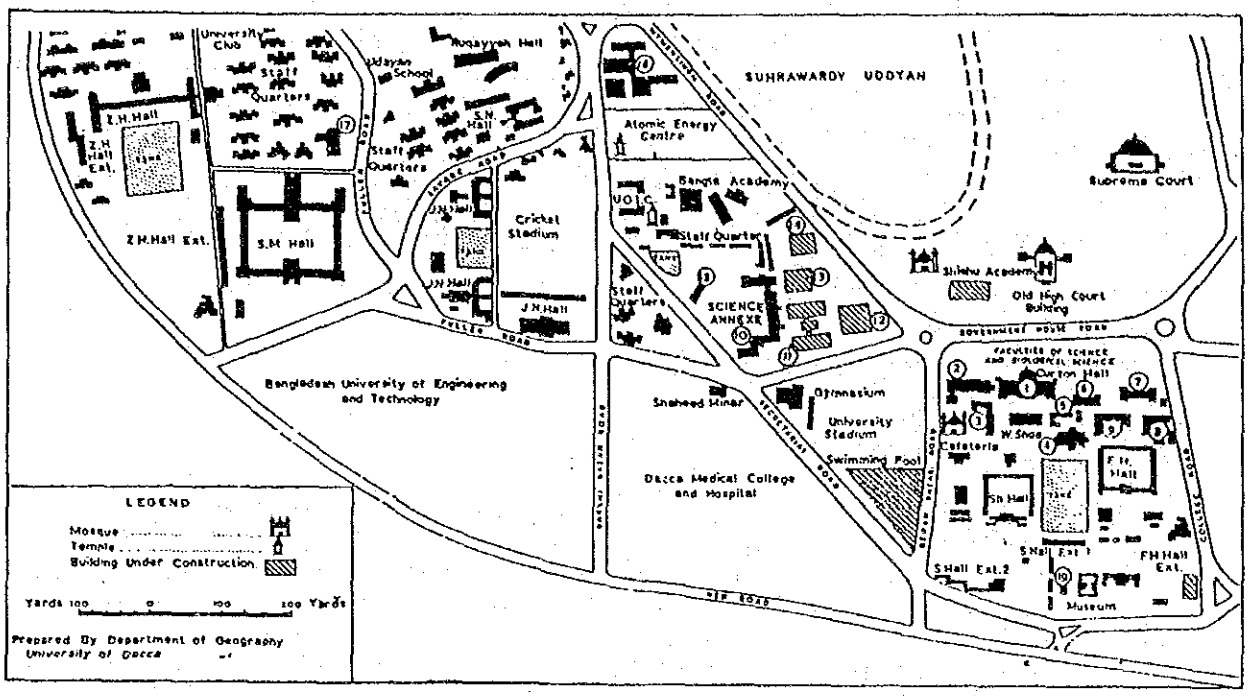
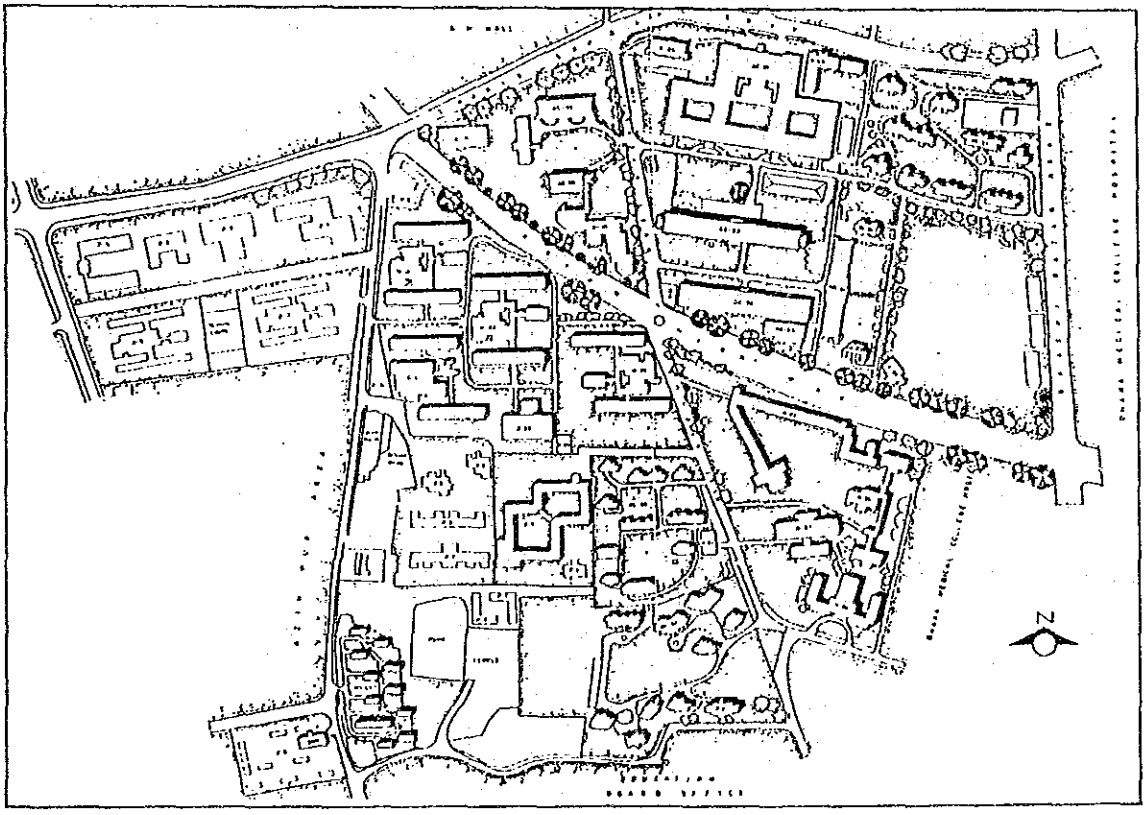
ANNEX 1 PROJECT SITE (Existing Lay-out)

1. University of Dhaka



2. Bangladesh University of Engineering and Technology



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ANNEX 2 SUMMARY OF REQUESTED ITEMS

1. University of Dhaka

Department	A	B	C	N.R.I
1) Physics	21	10	26	2
2) Chemistry	12	2	4	4
3) Botany	31	15	16	0
Total	64	27	46	6

2. Bangladesh University of Engineering and Technology

Department	A	B	C	N.R.I
1) Civil Engineering	17	4	4	4
2) Electrical Engineering	5	3	3	1
3) Mecahnical Engineering	15	10	30	5
Total	37	17	37	10

(Note)

Priority A : Items requested with the first priority

Priority B : Items requested with the second priority

Priority C : Items to be deleted from the original request

N.R.I. : Newly requested items due to revision

T.S.

ANNEX 3 NECESSARY MEASURES TO BE TAKEN BY THE GOVERNMENT OF BANGLADESH

1. To provide clear and accessible space for installation of the equipment under the Grant, by removing hampering facilities.

2. To provide facilities for the distribution of electricity, water supply, drainage, local telephone and other incidental facilities.

3. To ensure prompt unloading and customs clearance at port of disembarkation in Bangladesh and prompt internal transportation of the products purchased under the Grant.

4. To exempt Japanese nationals from custom duties, internal taxes including value added tax and other fiscal levies which may be imposed in Bangladesh with respect to the supply of products and services under the verified contracts.

5. To accord Japanese nationals whose services may be required in connection with the supply of the products and the services under the verified contract such facilities as may be necessary for their entry into Bangladesh and stay therein for the performance of their work.

6. To maintain and use properly and effectively the equipment purchased under the Grant.

7. To undertake incidental civil and utility-related works for expansion/reconstruction of laboratory, increase electric power capacity etc., if needed.

8. To bear the commission of authorization to pay (A/P) for the banking services based upon banking arrangement (B/A).

T.S.

LIST OF ATTENDANTS

IN THE MEETING

BANGLADESH SIDE :

Ministry of Education

Mr. Hedayet Ahmed
Secretary

Mr. Akmal Husain
Joint Secretary (Development)

University Grants Commission of Bangladesh

Professor M.A. Bari
Chairman

Professor M.S. Huq
Member

Mr. A.H. Chowdhury
Advisor (Planning)

Mr. Shahid Ullah
Secretary

Planning Commission

Mr. Kazi Fazlur Rahman
Member

External Resources Division

Mr. Enam Ahmed Chowdhury
Secretary, ERD

Mr. Md. Wasim
Deputy Secretary
Ministry of Planning

Mr. Kamal Uddin Ahmed
Resources Officer

T. S.

University of Dhaka

Professor Abdul Mannan
Vice - Chancellor

Dr. M.M. Maniruzzamn Miah
Professor of Geography & Dean, Faculty of Science

Dr. Aminul Islam
Professor, Soil Science and Dean, Faculty of Biological Sciences

Dr. Kh. M. Mannan
Professor, Physics Department (in-charge procurement)

Dr. M.S. Islam
Professor, Physics Department (Acting Chairman)

Dr. A.J. Mahmood
Chairman, Professor of Physical Chemistry

Dr. M.R. Khan
Chairman, Professor of Botany

Bangladesh University of Engineering and Technology

Dr. M.H. Khan
Vice - Chancellor

Dr. Alamgir M. Hoque
Director, Planning and Development

Dr. Main uddin Chowdhury
Assistant Director (P&D)

Dr. Mir Shahidal Islam
Dean, Faculty of Architecture and Planning

Dr. Alamgir Habib
Dean, Faculty of Civil Engineering

Dr. Sayed Fazle Rahman
Dean, Faculty of Electrical and Electronic Engineering

T.A.

JAPANESE SIDE :

1. Dr. Tomoya Shibayama
   Team Leader
   Associate Professor
   Department of Civil Engineering, Faculty of Engineering
   Yokohama National University

2. Dr. Hiroyuki Ohno
   Education Planner
   Associate Professor
   Department of Polymer Engineering
   Faculty of Technology
   Tokyo University of Agriculture and Technology

3. Mr. Hideo Morikawa
   Project Coordinator
   Public Relations Division, General Affairs Department
   JICA

4. Mr. Kazuo Yamane
   Equipment Planner (Project Manager)
   TECHNO CONSULTANTS, INC.

5. Mr. Masaaki Awamoto
   Equipment Planner
   TECHNO CONSULTANTS, INC.

6. Mr. Kouhei Komiyama
   Equipment Layout Engineer
   TECHNO CONSULTANTS, INC.

7. Mr. Shizuo Kamikura
   Cost Estimater
   TECHNO CONSULTANTS, INC.

T.S.

Appendix 2 Formation of The Basic Design Survey Team

Dr. Tomoya Shibayama	Team Leader	Associate Professor, Department of Civil Engineering, Faculty of Engineering, Yokohama National University
Dr. Hiroyuki Ohno	Education Planning	Associate Professor, Department of Polymer Engineering, Faculty of Technology, Tokyo University of Agricultural and Technology
Mr. Hideo Morikawa	Project Coordination	Public Relation Division, General Affairs Department, JICA
Mr. Kazuo Yamane	Equipment Planning	Project Manager Techno Consultants, Inc.
Mr. Masaaki Awamoto	Equipment Planning	Engineer Techno Consultants, Inc.
Mr. Kouhei Komiyama	Equipment Layout Planning	Engineer Techno Consultants, Inc.
Mr. Shizuo Kamikura	Cost Estimation	Engineer Techno Consultants, Inc.

Appendix 3 Survey Schedule

Date	Content of Work	Visiting Site
Dec. 16(Fri.)	LV. Narita AR. Bangkok	
Dec. 17(Sat.)	LV. Bangkok AR. Dhaka	
Dec. 18(Sun.)	Courtesty call, explanation of field survey work, and meeting on its work schedule	University Grants Commission (UGC)
		External Resources Division (ERD) of Ministry of Planning
		Ministry of Education
		JICA office
Dec. 19(Mon.)	Explanation of field survey work and its work schedule, and observation of laboratories, equipment ect.	University of Dhaka (DU), Bangladesh University of Engineering and Technology (BUET)
Dec. 20(Tue.)	Survey on background	DU, BUET
Dec. 21(Wed.)	Survey on executing organization and maintenance organization	DU, BUET
	Preparation of Minutes of Discussions	UGC
	Report for survey work	Embassy of Japan
Dec. 22(Thu.)	Report for survey work, conclusion of Minutes of Discussion	UGC
	Survey on requested equipment and specification	BUET
	Field trip for visiting to IPSA labolatory	Institute of Postgraduate Studies in Agriculture (IPSA)
	Data collection (Inland transportation)	International Packers & Shippers
Dec. 23(Fri.)	Leave for Japan (Dr. Shibayama, Dr. Ohono, Mr. Morikawa)	
	Survey on port facilities in Dhaka	Dhaka port
Dec. 24(Sat.)	Survey on requested equipment and specification	DU, BUET
Dec. 25(Sun.)	Background survey and data collection (Inland transportation)	Chittagong station

Date	Content of Work	Visiting Site
Dec. 26(Mon.)	Survey on educational system	UGC
	Survey on each laboratory	DU
	Background survey and data collection (Inland transportation)	Chittagong Port Authority
		Chittagong Customs House
Dec. 27(Tue.)	Survey on each laboratory	DU, BUET
Dec. 28(Wed.)	Progress reporting	JICA office
		Embassy of Japan
	Survey on each laboratory	DU, BUET
Dec. 29(Thu)	Survey on each laboratory	DU, BUET
	Progress reporting	ERD
	Survey on economic condition	Bangladesh Bank
	Survey on power supply condition	Power Development Board
Dec. 30(Fri.)	Internal meeting	
Dec. 31(Sat.)	Survey on each laboratory, confirmation of equipment specification	DU,BUET
	Data collection (Tax, Import duty)	National Bureau of Resources (NBR)
	Final reporting and greeting	ERD
Jan. 1(Sun.)	Final reporting, schedule meeting and greeting	UGC
	Confirmation of equipment specification	DU, BUET
Jan. 2(Mon.)	Final meeting and greeting	DU, BUET
Jan. 3(Tue.)	LV. Dhaka AR. Bangkok	
Jan. 4(Wed.)	LV. Bangkok AR. Narita	

Appendix 4 List of Offices Visisted and Persons Interviewed

1. Ministry of Education

Dr. Hedayet Ahmed	:	Secretary
Dr. M. Akmal Husain	:	Joint Secretary (Development)

2. Planning Commission

Dr. Kazi Fazlur Rahman	:	Member

3. External Resources Division

Dr. Enam Ahmed Chowdhury	:	Secretary
Dr. Md. Nasim	:	Deputy Secretary ERD (Ministry of Planning)
Dr. S. R. Alom	:	Deputy Chief
Dr. Kamal Uddin Ahmed	:	Resources Officer

4. University Grants Commission of Bangladesh

Dr. M. A. Bari	:	Chairman
Dr. M. S. Huq	:	Member
Dr. A. H. Chowhury	:	Advisor (Planning)
Dr. Shahid Ullah	:	Secretary

5. Department of Planning

Dr. M. H. Chowdhury	:	Joint Chief (Economist)

6. National Bureau of Revenue

Dr. Sheikh Hafizul Kabir	:	First Secretary (Customs)

7. Chittagong Port Authority

Dr. Noshin Tarker	:	Director Traffic

8. Customs House

Dr. K. G. Sarwar	:	Collector

9. Bangladesh Bank

Dr. Nazmul Hasan	:	Joint Director (Exchnage Control Dept.)

10. The Japanese Technical Cooperation Team

Dr. Yoshio Yamada
Dr. Kazuro Ohno
Dr. Yoshinobu Kawamitu

11. Daewoo Corp. Dhaka Liaison Office

Dr. Young-Won Kang

12. The University of Dhaka

Dr. Abdul Mannan	:	Vice-Chancellor
Dr. M. Maniruzzaman Miah	:	Professor of Geography and Dean, Faculty of Science
Dr. Aminul Islam	:	Professor of Soil Science and Dean, Faculty of Biological Science
Dr. M. S. Islam	:	Acting Chairman of Dept. of Physics, Professor of Bio-medical Physicis
Dr. Kh. M. Mannan	:	Professor of Polymer Physics (in charge of procurement)
Dr. K. S. Rabbani	:	Professor of Medical Physics
Dr. A. J. Mahmood	:	Chairman of Dept. of Chemistry, Professor of Physical Chemistry
Dr. S. Z. Haider	:	Professor of Inorganic Chemistry
Dr. S. N. Nabi	:	Professor of Inorganic Chemistry
Dr. A. J. Mian	:	Professor of Organic Chemistry
Dr. M. G. Ahmad	:	Professor of Organic Chemistry
Dr. R. J. Mannan	:	Professor of Physical Chemistry
Dr. M. R. Khan	:	Chairman, Professor of Dept. of Botany
Dr. Quazi Abdul Fattah	:	Professor of Plant Physiology & Ex-Chairman of Dept. of Botany
Dr. A. K. M. Nurul Islam	:	Professor of Dept. of Botany (Phycology, Limonology)
Dr. M. Akhtarjuz Zaman	:	Professor & Director, Biotechnology Research Centre

Dr. Syed Hadiuz Zaman	:	Professor of Dept. of Botany (Higher Cryptoganos & Plant Tissue Cidame)
Dr. A. Z. M. Nowshe A. Khen	:	Professor of Dept. of Botany (Mycology and Plant Pathology)
Dr. A. S. Islam	:	Professor of Dept. of Botany (Plant Tissue & Plant Breeding)
Dr. R. H. Sarker	:	Lecturer of Dept. of Botany

13. Bangladesh University of Engineering and Technology

Dr. M. H. Khan	:	Vice-Chancellor
Dr. Alamgir M. Hoque	:	Director, Planning and Development
Dr. Syed Fazli Rahman	:	Dean, Faculty of Electrical and Electronic Engineering
Dr. Alamgir Habib	:	Dean, Faculty of Civil Engineering
Dr. M. Anwarul Azim	:	Dean, Faculty of Mechanical Engineering
Dr. Mir Shahidal Islam	:	Dean, Faculty of Architecture and Planning
Dr. Md. Abdul Matin	:	Head, Department of Electrical and Electronic Engineering
Dr. M. Ali Murtuza	:	Head, Department of Civil Engineering
Dr. A. M. Azizul Huq	:	Head, Department of Mechanical Engineering
Dr. Md. Humayun Kabir	:	Professor of CE Geotechnical Eng. Lab., Dept. of Civil Engineering
Dr. M. Feroze Ahmed	:	Professor of Dept. of Civil Engineering, Environmental Eng. Lab.
Dr. Abu Taher Ali	:	Professor of Dept. of Mechanical Engineering
Dr. Dipak Kanti Das	:	Professor of Dept. of Mechanical Engineering

Appendix 5 List of Documents Obtained

The Third Five Year Plan 1985-90
Planning Commission Ministry of Planning

List of Projects of Third Five Plan 1985-90
Planning Commission Ministry of Planning

List of Aid Worthy Project 1988
Planning Commssion Ministry of Planning

Annual Development Programme 1988-89
Planning Commission Ministry of Planning

Bangladesh Education in Statistics 1985
Bangladesh Bureau of Statistics

Statistical Pocket Book of Bangladesh 1987
Bangladesh Bureau of Statistics

Report on Labour Force Survey 1984-85
Bangladesh Bereau of Staistics

Foreign Trace Statistics of Bangladesh 1984-85
Bangladesh Bureau of Statistics

1987 *Statistics* Yearbook of Bangladesh
Bangladesh Bureau of Statistics July 1988

Bangladesh Trade & Industry Directory 1988

Export Policy July 1988-June 1989
Ministry of Commerce July 1988

Industrial Investment Schedule for TFYP(1985-90)
For Private Sector Department of Industries

Annual Report of Bangladesh Bank(Bengali) 1987/88
Bangladesh Bank

University Grants Commission Annual Report 1985
UGC

Higher Education and Employment in Bangladesh
The University Press Limited, Unesco

Bangladesh Educational Statistics 1987
BANBEIS Ministry of Education

Education in Bangladesh
BANBEIS June 1985

Primary Education in Bangladesh
Banbeis Ministry of Education Jan. 1987

Invitation to Educational Planning
S. A. Chowhury University Press
Sep. 1986

The History of the University of Dacca
M. A. Rahim University of Dacca
Sep. 1981

Budget of University of Dhaka (Bengali) 1988/89

Annual Report of the Dhaka University (Bengali) 1988

The Dhaka University Studies Part B (Science) Vol.36 No.2

Syllabuse (Dhaka University)

Faculty of Biological Science for B. Sc. (Subsidiary & Honours)

Department of Pharmacy for B. Pharm (Honours) and M. Pharm

Courses 1982

B. A./B. Sc. (Pass & Subsidiary) Courses 1986

Faculty Biological Sciences B. Sc. (Subsidiary & Honours) &
M Sc. Courses

B. Sc. Honours & Subsidiary Courses 1985

Faculty of Science for Master Courses 1986

Financial Rules and Account Manual
M. A. Afzal Comptroller BUET June 1986

Calendar 1985-86 (Syllabus)
BUET

Department of Chemical Engineering
BUET

Proceeding of National Symposium on Monitoring of Environmental System of Chemical Industries in Bangladesh 30 Jan. - 4 Feb. 1988
DU

Bangladesh Journal of Botany vol. , 17 No.1 June 1988/No.2 Dec. 1988

Journal of Bangladesh Academy of Science vol.12 No.1 1988

Proceedings of the Regional Wrokshop on Tissue Culture of Tropical Corp Plants, Dhaka 12-17 Sep. 1987

Yearbook The Chittagong Part Authority

Electricity Tarrif Bangladesh Power Development Board