CHAPTER 3 IMPLEMENTATION PLAN

3.1 Implementation Plan

3.1.1 Bridge Material Transportation Plan

The materials procured under Japan's Grant Aid will be delivered by sea from Japan to Chittagong International Seaport in Bangladesh. The materials will be transported by truck from Chittagong International Seaport to the LGED Gajipur Stockyard after clearing customs.

3.1.2 Bridge Erection Plan

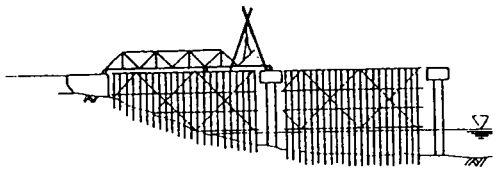
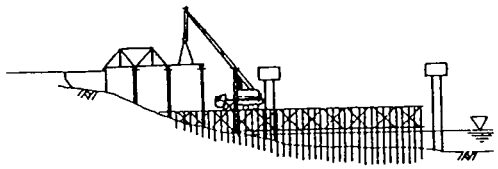
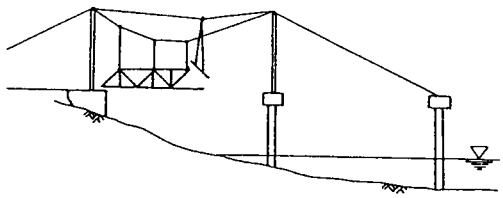
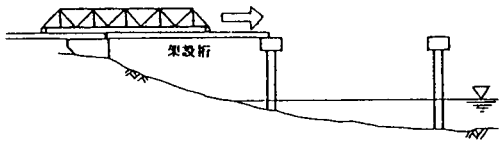
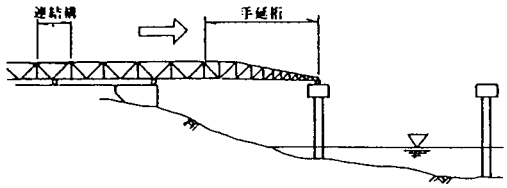
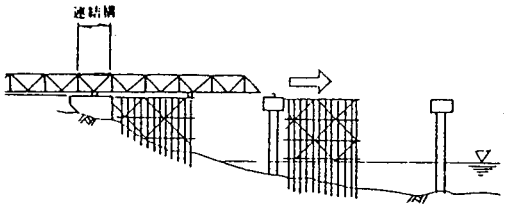
(1) Erection Method

Comparative schemes of erection methods and evaluations are shown in Table 3.1.2-1. As a result, the launching on staging method is proposed. The features of this method are as follows:

- The bridge can be assembled on the approach road, so, assembly will be efficient and accurate.
- No special machines or skilled techniques are required, so, the erection cost is low.
- For erection of portable steel bridges, assembly on staging is the common method in Bangladesh. This method was introduced to improve the speed and accuracy of the assembly on staging method.

Conceptual figures of the launching on staging method are presented in Appendix 6.

Table 3.1.2-1 Comparative Study of Erection Methods

Comparative Erection Schemes		Evaluation	Easi-ness	Cost	Speed	Conclu-sion
Assembly on staging		• impossible during flood season • difficult where river is deep • need small tools only • no need skill	B	A	C	B
Truck crane & bent		• impossible during flood season • need access road for truck crane • need staging for truck crane • no need skill • fast execution	C	B	A	C
Cable suspension		• no need large machine • need skill	C	A	B	C
Erection girder		• erection girder is large • no need skill • fast, easy and accurate assembly	A	C	A	B
Erection girder		• extension girder is large • no skill • fast, easy and accurate assembly	A	C	A	B
Assembly on staging		• impossible in flood season • tools are small • no need sill • fast, easy and accurate assembly	B	A	A	A

Note) A : good,
B : fair,
C : poor

(2) Erection tools

The items and quantities of assembly and launching tools necessary with the launching on staging method were studied.

The proposed items and quantities per set of assembly tools and launching tools are presented in Table 3.1.2-2 and 3.1.2-3, respectively.

According to the implementation schedule of the project proposed by LGED, the erection of the bridges in each phase is schedule for 6 months. Based on a study of the implementation schedule in each phase, the necessary quantities of tool sets are proposed as follows:

Table 3.1.2-2 Assembly Tool List

Item	Designation	Quantity /Set	Phase 1 Quantity	Phase 2 Quantity	Planning Quantity	LGED Owned Quantity	Quantity of Supply
[Survey Tools]							
· Level Gauge	ST 900	1 ea.	9 ea.	11 ea.	11 ea.	8 ea.	3 ea.
· Steel Measuring Tape	50m	1 ea.	9 ea.	11 ea.	11 ea.	9 ea.	2 ea.
[Erection Tools]							
· Torque Wrench	7500QLE	4 pcs	36 pcs	44 pcs	44 pcs	38 pcs	6 pcs
· Socket Wrench	60° ×36mm	6 pcs	54 pcs	66 pcs	66 pcs	40 pcs	26 pcs
· Single Offset Wrench	60° ×22mm	10 pcs	90 pcs	110 pcs	110 pcs	106 pcs	4 pcs
· Sledge Hammer,Dbl Face	#8 (3.5kg)	2 pcs	18 pcs	22 pcs	22 pcs	18 pcs	4 pcs
· Hand Hammer,Dbl Face	#3 (1.3kg)	10 pcs	90 pcs	110 pcs	110 pcs	99 pcs	11 pcs
· Lever Block	1ton	2 pcs	18 pcs	22 pcs	22 pcs	17 pcs	5 pcs
· Bolt Clipper	KKW-2	1 pcs	9 pcs	11 pcs	11 pcs	10 pcs	1 pcs
· Wire Rope Clip	10φ	20 pcs	180 pcs	220 pcs	220 pcs	185 pcs	35 pcs
· Crow Bar	L=1.0m	1 pcs	9 pcs	11 pcs	11 pcs	8 pcs	3 pcs
· Crow Bar	L=1.5m	1 pcs	9 pcs	11 pcs	11 pcs	10 pcs	1 pcs
· Erection Bolt	M22×50	300 pcs	2,700 pcs	3,300 pcs	3,300 pcs	2,800 pcs	500 pcs
· Drift Pin	φ24.5	150 pcs	1,350 pcs	1,650 pcs	1650 pcs	1,500 pcs	150 pcs
[Lifting Equipment]							
· Three Pronged Lift	2 ton	2 pcs	18 pcs	22 pcs	22 pcs	21 pcs	1 pcs
· Pully Block	1S-Hook type	4 pcs	36 pcs	44 pcs	44 pcs	38 pcs	6 pcs
· Shackle	5/8"	4 pcs	36 pcs	44 pcs	44 pcs	21 pcs	23 pcs
· Pipe	60.5× 7m	6 pcs	54 pcs	66 pcs	66 pcs	66 pcs	0 pcs
· Nylon Sling	1.5ton× 3m	8 pcs	72 pcs	88 pcs	88 pcs	80 pcs	8 pcs
· Portable Winch	NPW2000	2 Ut.	18 Ut.	22 Ut.	22 Ut.	22 Ut.	0 Ut.
· Steel Wire Rope	9φ ×45m	2 roll	18 roll	22 roll	22 roll	22 roll	0 roll
· Stay Wire Rope	9φ × 3m	2 pcs	18 pcs	22 pcs	22 pcs	22 pcs	0 pcs
· Base Beam	H-150×1.5m	2 pcs	18 pcs	22 pcs	22 pcs	0 pcs	22 pcs
[Scaffolding]							
· Scaffolding Frame	KA3055A	4 set	36 set	44 set	44 set	15 set	29 set
· Stage Plank	HPS5183	2 pcs	18 pcs	22 pcs	22 pcs	14 pcs	8 pcs
· Jack Base	KA752	8 pcs	72 pcs	88 pcs	88 pcs	0 pcs	88 pcs
· Ladder	KA3055S	2 pcs	18 pcs	22 pcs	22 pcs	9 pcs	13 pcs
· Bracing	KA14	4 pcs	36 pcs	44 pcs	44 pcs	0 pcs	44 pcs

Table 3.1.2-3 Launching Tool List

Item	Designation	1 Span Type 1 Quantity	2Span Cont. Type 2 Quantity	3Span Cont. Type 3 Quantity	Phase 1 Quantity (Type2x9set)	Phase 2 Quantity (Type1x2+Type3x9)	Planning Quantity	LGED Owned Quantity	Quantity of Supply
[Erection Truss]									
・Tie Beam	H-150	— set	1 set	2 set	9 set	18 set	18 set	16 set	2 set
		(0.00t)	(0.53t)	(1.06t)	(4.77t)	(9.54t)	(9.54t)	(8.48t)	(1.06t)
[Launching Rail]									
・Launching Rail	73.8kg/m	39m×2	51m×2	63m×2	459m×2	645m×2	645m×2	582m×2	63m×2 (9.30t)
			(39m+12m)	(39m+12m×2)	(39m×9+12m×9)	(39m×11+12m×18)	(39m×10+12m×18)	(39m×10+12m×16)	(39m×0+12m×2)
・Base Plate	t=25mm	0.50 ton	0.67 ton	0.85 ton	6.03 ton	7.80 ton	8.65 ton	9.13 ton	0.00 ton
		28 pcs	38 pcs	48 pcs	342 pcs	440 pcs	488 pcs	516 pcs	(0 pcs)
[Launching Equipment]									
・Roller	TIL-TANK25	4 pcs	6 pcs	8 pcs	54 pcs	80 pcs	80 pcs	48 pcs	32 pcs
・Screw Clamp	T-100	16 pcs	24 pcs	32 pcs	216 pcs	320 pcs	320 pcs	188 pcs	132 pcs
・Portable Winch	NPW2000	2 Ut.	2 Ut.	2 Ut.	18 Ut.	22 Ut.	22 Ut.	24 Ut.	0 Ut.
・Pully Block	3S-Hook	— pcs	2 pcs	2 pcs	18 pcs	18 pcs	18 pcs	14 pcs	4 pcs
・Pully Block	2S-Hook	2 pcs	2 pcs	2 pcs	18 pcs	22 pcs	22 pcs	11 pcs	11 pcs
・Pully Block	1S-Hook	2 pcs	— pcs	— pcs	— pcs	4 pcs	4 pcs	0 pcs	4 pcs
・Stay Witre Rope	9φ× 2m	6 pcs	6 pcs	6 pcs	54 pcs	66 pcs	66 pcs	72 pcs	0 pcs
・Steel Wire Rope	9φ×150m	2 roll	— roll	— roll	— roll	4 roll	4 roll	4 roll	0 roll
・Steel Wire Rope	9φ×200m	— roll	2 roll	2 roll	18 roll	18 roll	18 roll	18 roll	0 roll
・Roller Staging Bean	H-150×4m	4 pcs	6 pcs	12 pcs	54 pcs	116 pcs	116 pcs	104 pcs	0 pcs
・Filler Plate	200× 6 ×200	16 pcs	24 pcs	32 pcs	216 pcs	320 pcs	320 pcs	336 pcs	0 pcs
・Filler Plate	200×25×200	8 pcs	12 pcs	24 pcs	108 pcs	232 pcs	232 pcs	123 pcs	109 pcs
・Filler Plate	200×10×200	8 pcs	12 pcs	24 pcs	108 pcs	232 pcs	232 pcs	126 pcs	106 pcs
・Winch Staging Beam	H-150×1.5m	6 pcs	6 pcs	6 pcs	54 pcs	66 pcs	66 pcs	72 pcs	0 pcs
[JackUp/Down Equipment]									
・Mechanical Jack	15t Slide	4 pcs	4 pcs	4 pcs	36 pcs	44 pcs	44 pcs	24 pcs	20 pcs
・Mechanical Jack	30t	2 pcs	2 pcs	2 pcs	18 pcs	22 pcs	22 pcs	20 pcs	2 pcs
・Saddle	H-150×0.5mR	32 pcs	32 pcs	32 pcs	288 pcs	352 pcs	352 pcs	394 pcs	0 pcs

3.1.3 Consultant Supervision

(1) Detailed Design

Related to procurement of the Materials and Tools, the following items will be prepared in detailed design by the Consultant:

- Detailed design report
- Drawings and specifications
- Procurement plan and cost estimation report
- Tender and contract documents
- Soft components

(2) Tendering

Relevant to tendering for procurement of the Materials and Tools, the following services will be provided by the Consultant:

- Tender notice
- Tender pre-qualification
- Tendering
- Tender evaluation

(3) Supervision

The Consultant will execute the following services in supervision:

- Inspection of shop assembly of the portable steel bridges
- Inspection of delivery and handover of the Materials and Tools
- Soft components

3.1.4 Procurement Plan

Considering costs, quality control and the time for delivery of the Materials and Tools for implementation of the project, the Materials and Tools will be procured in Japan.

3.1.5 Soft Components

The Government of Bangladesh is responsible for constructing the bridges with a 2-year period after the delivery of the Materials at delivery sites in Bangladesh.

For the smooth implementation of the Project, the followings shall be considered at early stage.

① To ensure an accuracy and adjustment between Basic Design and Detailed Design & Supervision by Bangladesh Government.

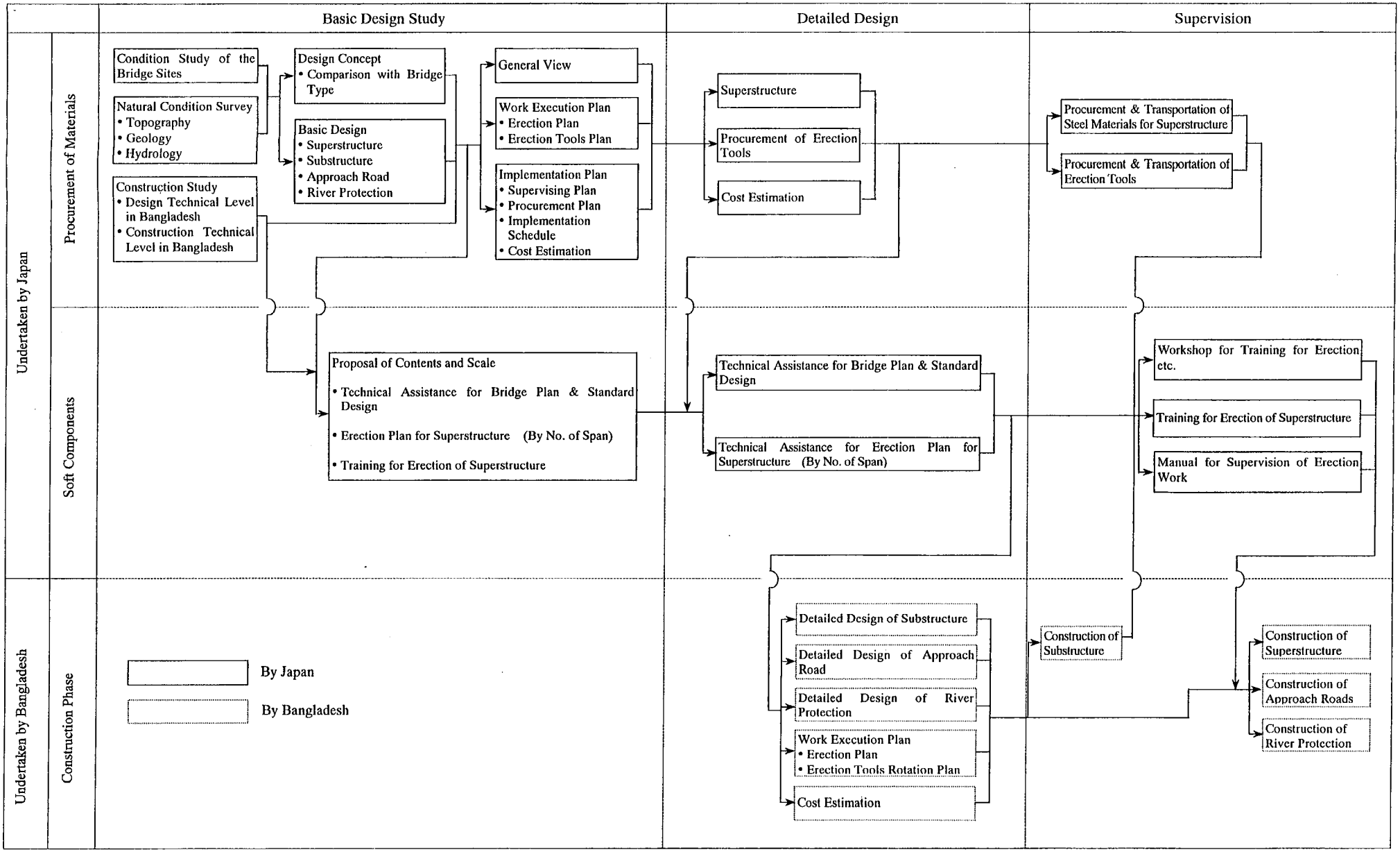
② To solve the following items in technical level of design and implementation by Bangladesh Government;

- Bridge Plan and Design Method of bridges in Catchment Area or River System.
- Adjustment between Design of Superstructure and Design of Substructure.
- Adjustment between Structure of Superstructure and Election Method.
- Tolerance of erection and Safety Implementation.

Necessary technical assistance and training should be contained in Soft Components under Japan's Grant Aid for effective and smooth implementation of the Project at detailed design stage and supervision stage.

Major contents of soft components are summarized in Table 3.1.5-1.

Table 3.1.5-1 Flowchart of Technical Relations between Undertaking of Both Governments and Soft Components



3.1.6 Implementation Schedule

The portable steel bridge materials, erection tools and bridge erection training to be procured under Japan's Grant Aid is planned to be implemented in 2 Phases as shown in Table 3.1.6-1.

Phase-I contents 2 and 4 span bridges (Total No. of bridges : 35).
Phase-II contents mostly 1, 3, 5 and 6 span bridges (Total No. of bridges : 45).
(Refer Table 2.3.5-7, Figure 3.1.6-1)

Table 3.1.6-1 Procurement Plan

Procurement Stage		Phase-I	Phase-II	Total
Portable Steel Bridge Materials	For 15m spans	13	19	32
	For 20m spans	41	41	82
	For 25m spans	44	47	91
Erection Tools	Assembly tools	9 sets	11 sets	11 sets (LGED owns some)
	2 launching tools	9 sets	18 sets	18 sets (LGED owns some)
Soft Components		2 bridges	2 bridges	4 bridges

The implementation schedule of the project is shown in Table 3.1.6-2.

3.1.7 Obligations of the Government of Bangladesh

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

(1) To conduct detailed design and construction of substructures, approach roads, river protection and other necessary works for the Project.

(2) To conduct erection work of the bridges.

(3) To provide data and information necessary for the Project.

(4) To secure the land necessary for the execution for the Project.

(5) To clear the sites prior to the commencement of the construction.

(6) To remove existing properties/obstacles such as houses, electric poles, etc. in the right of way.

(7) To bear commissions to the Japanese foreign exchange bank for its banking services, based upon the Banking Arrangement, namely the advisory commission of the "Authorization to Pay" and payment commission.

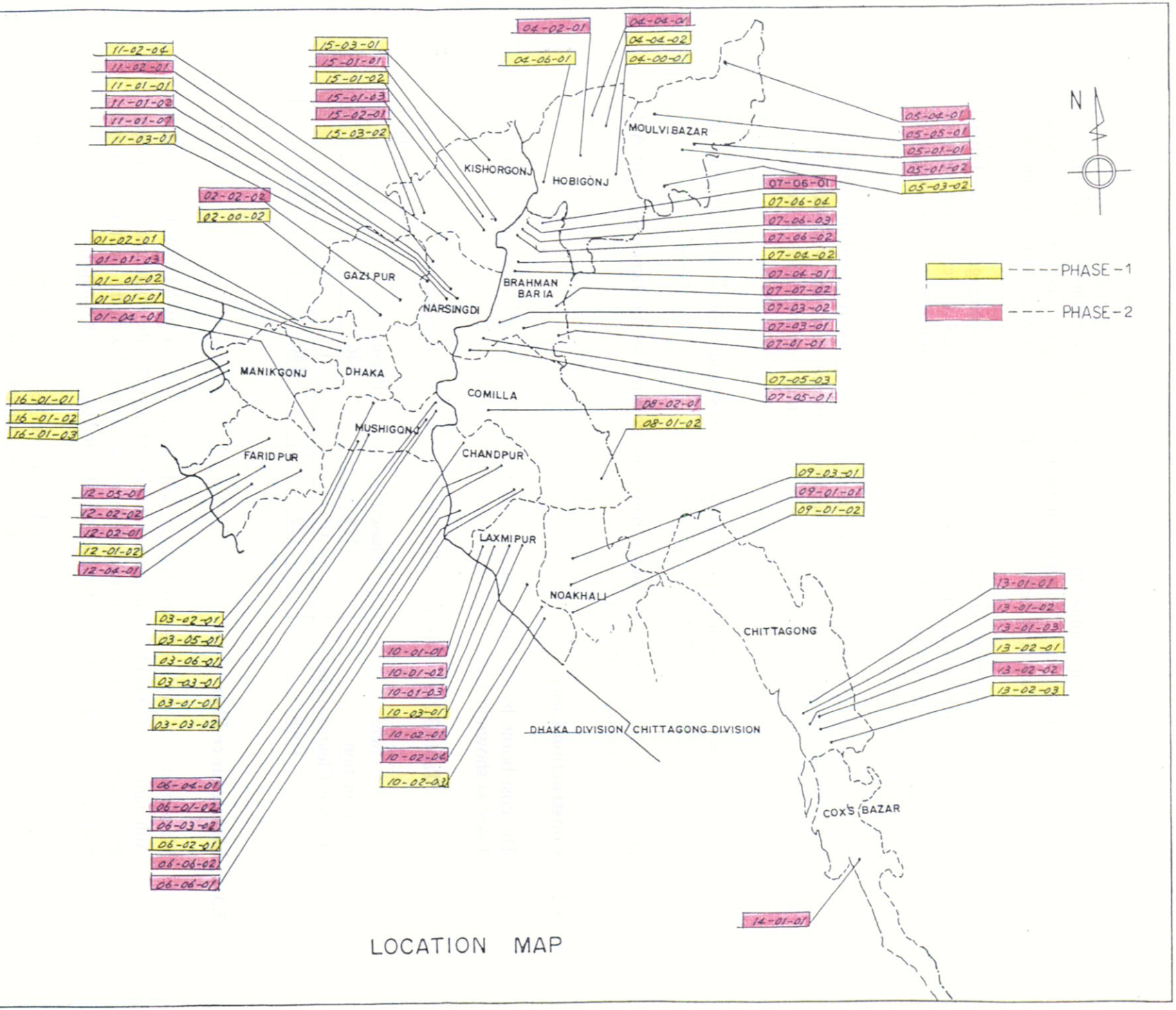


Figure 3.1.6-1 Phasing of Project Bridges

(8) To ensure prompt unloading, tax exemption, customs clearance at the port of disembarkation in Chittagong International Seaport, and prompt internal transportation therein of the materials for the Project purchased under the Grant Aid.

(9) To exempt Japanese juridical and physical nationals engaged in the Project from customs duties, internal taxes and other fiscal levies which may be imposed in the People's Republic of Bangladesh with respect to the supply of the products and services under the verified contracts.

(10) 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 the People's Republic of Bangladesh and stay therein for the performance of their work.

(11) To provide necessary permissions, licenses and other authorizations for implementing the Project, if necessary.

(12) To bear all the expenses, other than those covered by the Japanese Grant Aid, necessary for the Project.

3.2 Construction Cost

The cost borne by the Government of Bangladesh is roughly estimated at Million Taka, as shown in Table 3.2-1 and Appendix 7.

Table 3.2-1 Cost Borne by the Government of Bangladesh

(Taka in Million)

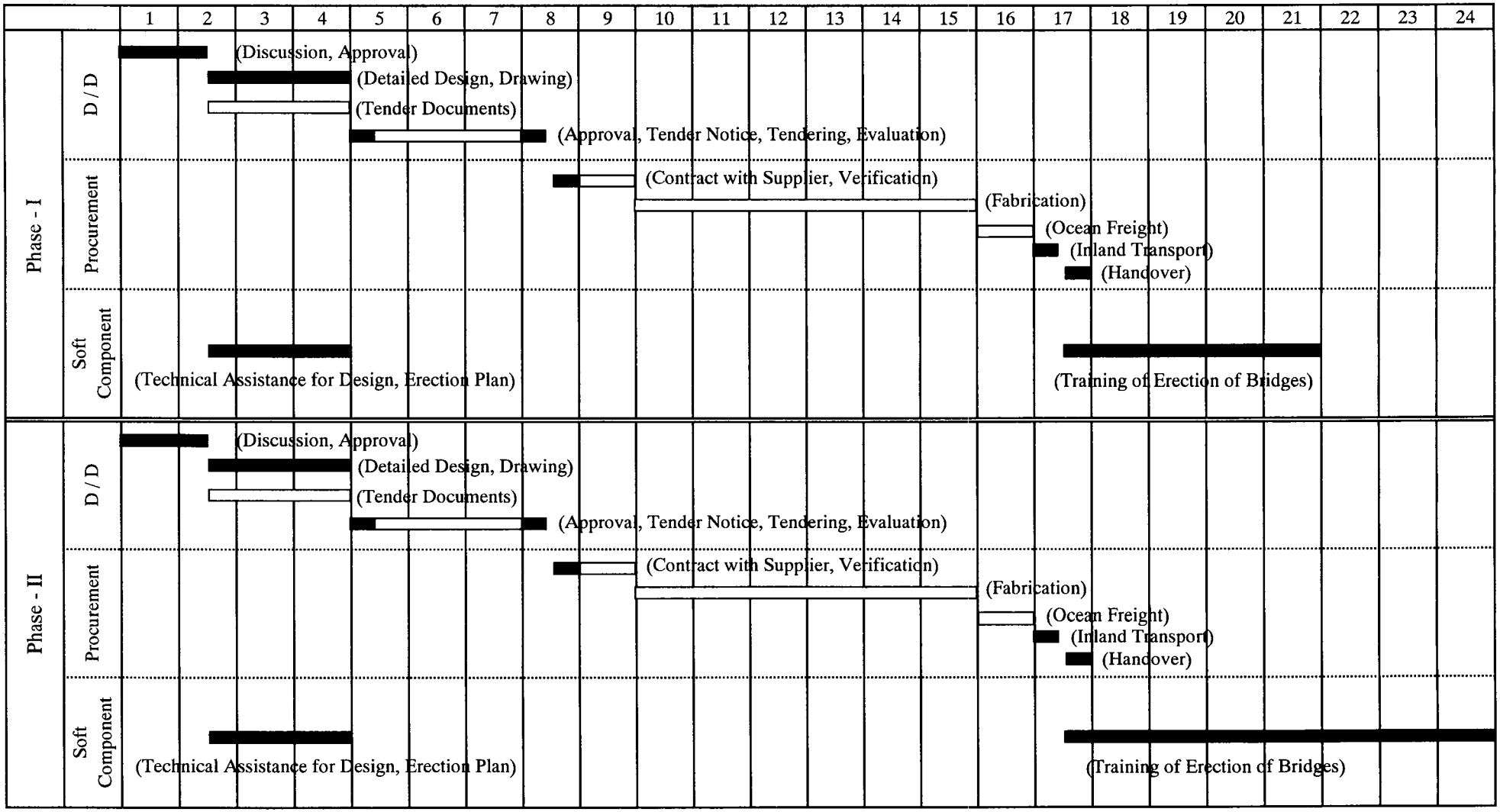
Item	Phase 1	Phase 2	Total
Construction	129	146	275
Custom Clearance Fee	0	0	0
Total	129	146	275

3.3 Maintenance Plan

Maintenance of the roads and bridges will be carried out by LGED Thana office. Although each Thana office has neither sufficient budget for the maintenance of bridges, the Steel Portable Bridge is more durable when compared with the existing temporary bridge, and is expected to largely reduce the time and expense for maintenance.

Routine maintenance of roads and bridges should be executed. Routine maintenance crews shall be set up and operated under the supervision of the Government. As remarkable defects are found on roads during routine maintenance, the Government should formulate special maintenance projects, based upon detailed inspections.

Table 3.1.6-2 Implementation Schedule



Note: ▭ : In Japan
▬ : In Bangladesh

CHAPTER 4 PROJECT EVALUATION AND RECOMMENDATION

4.1 Project Effect

This project aims to provide safe and reliable transportation facilities to promote social and economic development in rural areas of Bangladesh by constructing bridges along rural roads.

The project roads connecting growth centers, villages, markets and farms support rural people's livelihoods and economic activities.

The bridges in 16 districts for the project replace those being damaged or washed out by floods or are new bridges over rivers which cut roads and obstructs travel and transportation. 75 bridges have been selected for the project as having high priority.

The bridges will be constructed by the Government of Bangladesh with steel materials procured under Japan's Grant Aid.

The implementation of this project will benefit 44 million people who reside within an affected area of 33,000 sq.km.

The direct effects and extent of improving the present situation by implementing the project are summarized in below.

Direct effect	Expected effect by the Project
• Safety and comfort for traffic	• Driving and walking will be more safe and comfortable across a river on a bridge in stead of dangerous bamboo bridge and boat.
• Improvement of inhabitants convenience	• Accessibility to public facilities such as school, hospital, etc. will be improved.

4.2 Recommendation

This Project will contribute to a rise in living standard and promote socio-economic development in rural areas, it is concluded that it is appropriate to implement this Project under Japan's Grant Aid.

Further, the Government of Bangladesh can cope with the construction and maintenance of the project.

To realize and sustain the Project effects at maximum, the Government of Bangladesh should do the following:

- To carry out routine inspection / maintenance and repair works as necessary to well maintain road and bridges along the Project road section.
- To secure the budget for the above.