

Chapter 3 Implementation Plan

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This Project will be implemented with Japanese Grant Aid fund and Egyptian fund. In this chapter the implementation plan for Japanese Grant Aid portion will be described.

3-1 Implementation Plan

3-1-1 Construction Concept

The Project proposes to construct a long span cable-stayed bridge over the Suez Canal. The description of the implementation method is made under this concept.

- In consideration of the various constraints and to keep the construction costs low, the total construction period is planned to be completed in 45 months.
- In order to keep the construction costs low, it is proposed to reuse the bridge erection equipment, general construction equipment and temporary materials to the greatest extent. Local construction materials will be procured where their quality is satisfactory, and their quantities procured are sufficient.
- Since there is few experience in Egypt of a huge bridge construction project similar to this project and the cable stayed bridge requires high level accuracy in design and construction, it is planned to dispatch from Japan a group of specialists and experienced engineers in order to assure accuracy and smoothness of the Project.
- Since the bridge construction will be performed over the Suez Canal, construction methods will be selected to permit the construction time over the canal as short as possible.
- The length of the approach bridge to be constructed by the Japanese side will be 1,120 m, and the length to be constructed by the Egyptian side will be at 2,043 m, and so the construction methods selected will be of a type that will permit the construction times for the superstructure and the substructures to be kept as short as possible.
- In the course of organization for construction supervision, whole construction programme management will be formulated in order to cope with the problems, which might occur from differences of financial sources and contractors.

3-1-2 Construction Method

The type of bridge selected for the construction was based on comparison of the construction conditions, maintenance and operation and construction costs, and the following type was selected in the feasibility study (F/S):

Main Bridge	Foundation:	Reinforced Concrete Caisson
	Substructure:	Reinforced Concrete Piers (side spans)
	Superstructure:	Steel Cable-Stayed Bridge with reinforced concrete pylons
Approach Bridges	Foundation:	Cast-in-Place Piles, 1.5 m Diameter
	Substructure:	Reinforced Concrete Piers
	Superstructure:	PC Box Girder constructed with Movable Scaffolding

(1) Description of the Construction Method

1) Temporary Facilities

For the temporary facilities, the steel girder assembly yard and ordinary temporary facilities yard (construction material stock yard, concrete plant, re-bar, PC materials, concrete form fabrication yard, field office, etc.) will be required. Since there are constraints on acquiring land on the west bank, the yard for assembly of the steel girders will be established on the east bank, and ordinary temporary facilities yard will be set up on both the east and west banks.

A schematic plan of the steel girder assembly yard is shown in Figure 3-1, and a plan for ordinary temporary facilities will be as shown in Figure 3-2.

2) Main Bridge

Caisson Foundation

The caisson foundation will be performed in the following order:

- a) excavate the foundation base
- b) install the cutting edge
- c) manufacture the No. 1 Segment
- d) excavate and lower the caisson
- e) repeat items c) and d)

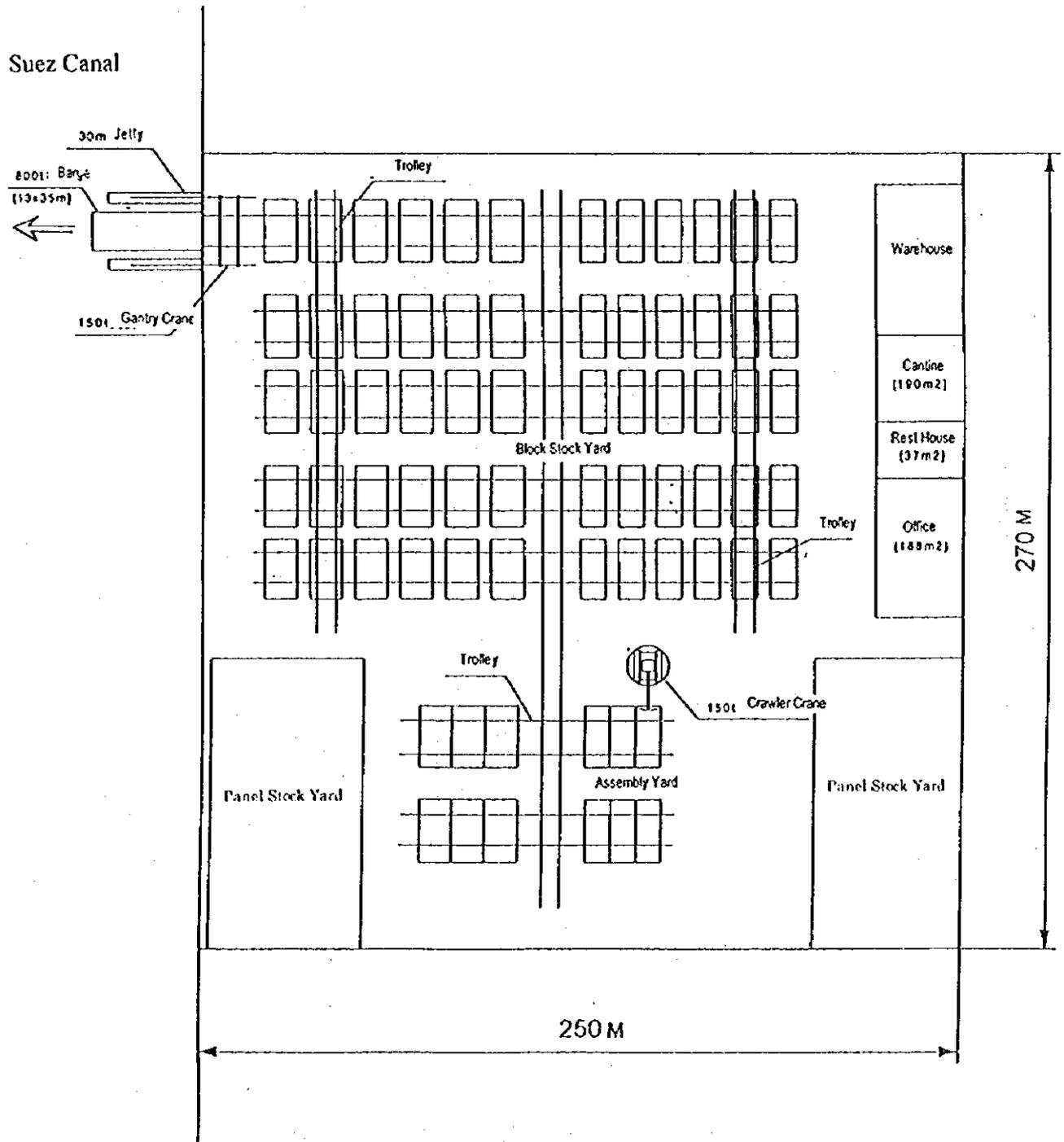


Figure 3-1 Steel Girder Assembly Yard (East Bank)

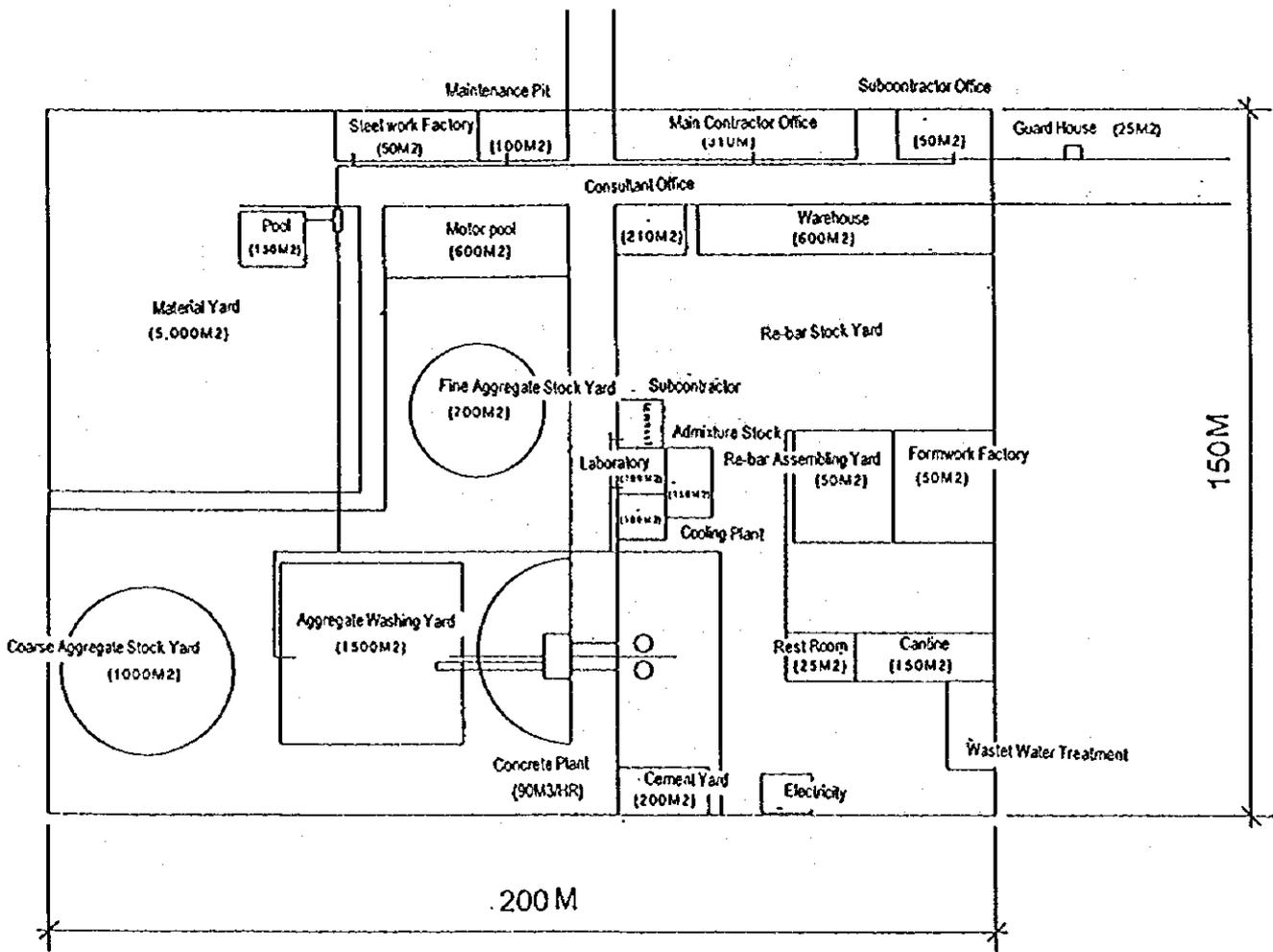


Figure 3-2 Ordinary Temporary Facilities

- f) place the base concrete
- g) backfill intermediate with soil
- h) place the top concrete

Excavate inside the caisson with hammer-grab. To perform the friction cut at the perimeter of caisson and the outside soils, use water jet to perform the friction cut, and when the resistance of the perimeter soils exceed the lowering of the self-weight of the caisson, earth anchors and hydraulic jacks will be used to accelerate the lowering of the caisson.

Main Pylon Construction

The main pylon will be constructed of reinforced concrete to a final height of approximately 153 m. The pylon will be constructed using climbing forms. The hoisting of the concrete forms and reinforcing steel will be performed using tower cranes. And to lift the general construction materials and laborers, elevators will be used. To place concrete, concrete pump trucks shall be used up to a height of 7.5 m from the top of the caisson on a solid concrete base, and for greater heights than this, tower cranes shall be used.

Superstructure (Cable-Stayed Bridge)

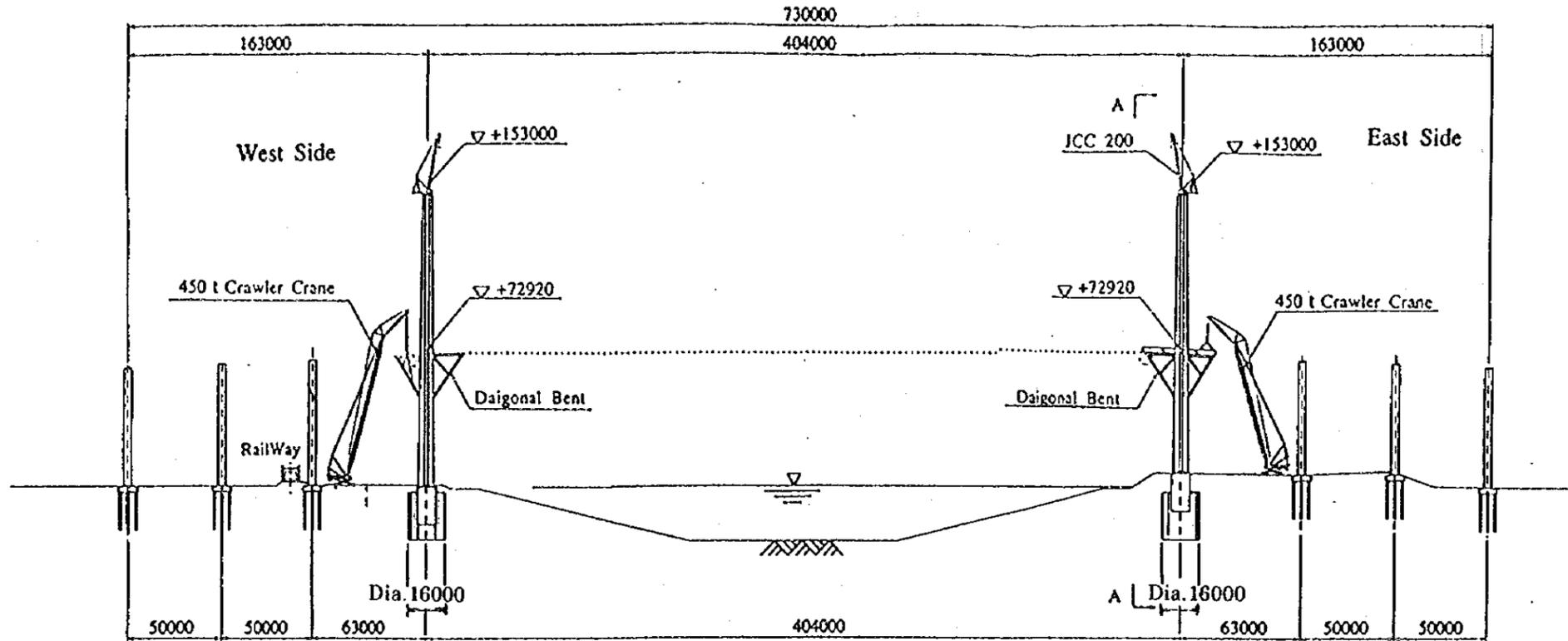
A conceptual drawing for the construction sequence is shown in Figure 3-3. The main girder will be of the box type. Since the transportation costs of the girder will be excessively high if manufactured and assembled outside Egypt, they will be assembled in Egypt. The concept for assembly is that they will be fabricated in components of panels of 12 m and 10 m length, and shipped to Egypt by marine transportation. The panels will be transported to the assembly yards constructed near the bridge site. The girders will be assembled into bridge girders 12 m long for the central span, and 10 m for the side span. The adjoining blocks shall be machined at the assembly yard to match with each other, and assembled.

The completely assembled girder blocks shall be placed in storage until they are ready to be erected into the bridge.

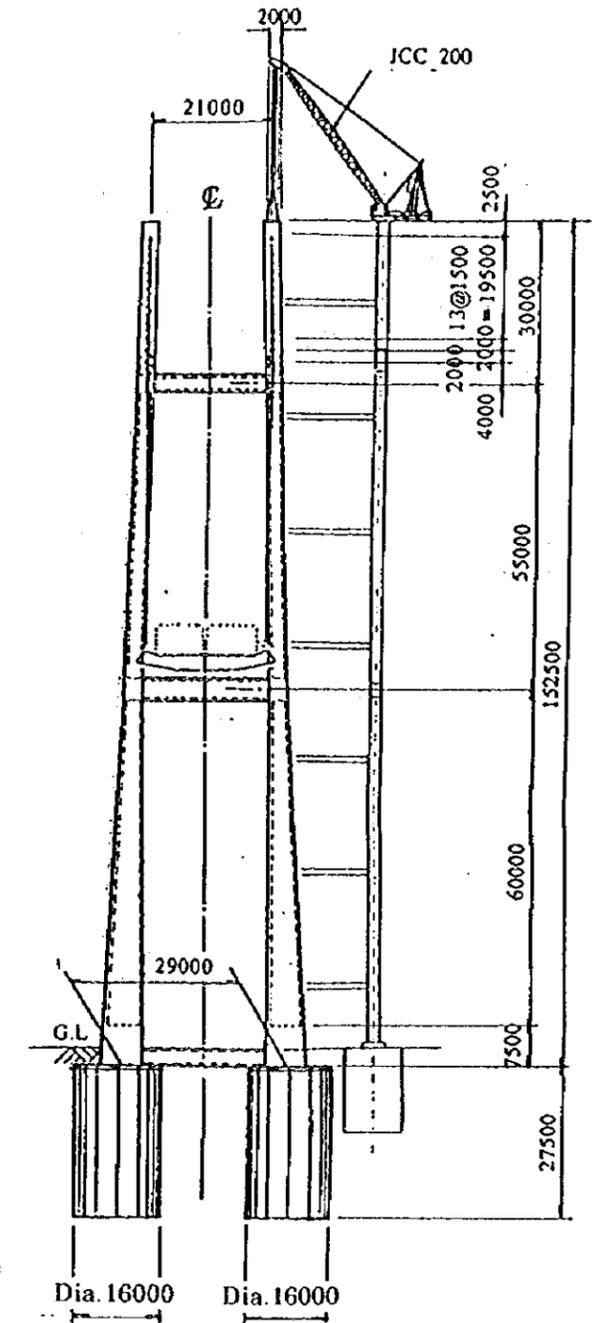
The steel girders near the main pylons shall be hoisted into place progressively on the diagonal bents (brackets) with the crawler cranes. After the girder has been placed, it shall follow the cantilevering in parallel with stressing of the stay cables.

Stage 1. Preparation Work

Side View (1) S=1:1500



A-A Section S=1:600



Stage 2. Balanced Cantilever Erection

Side View (2) S=1:1500

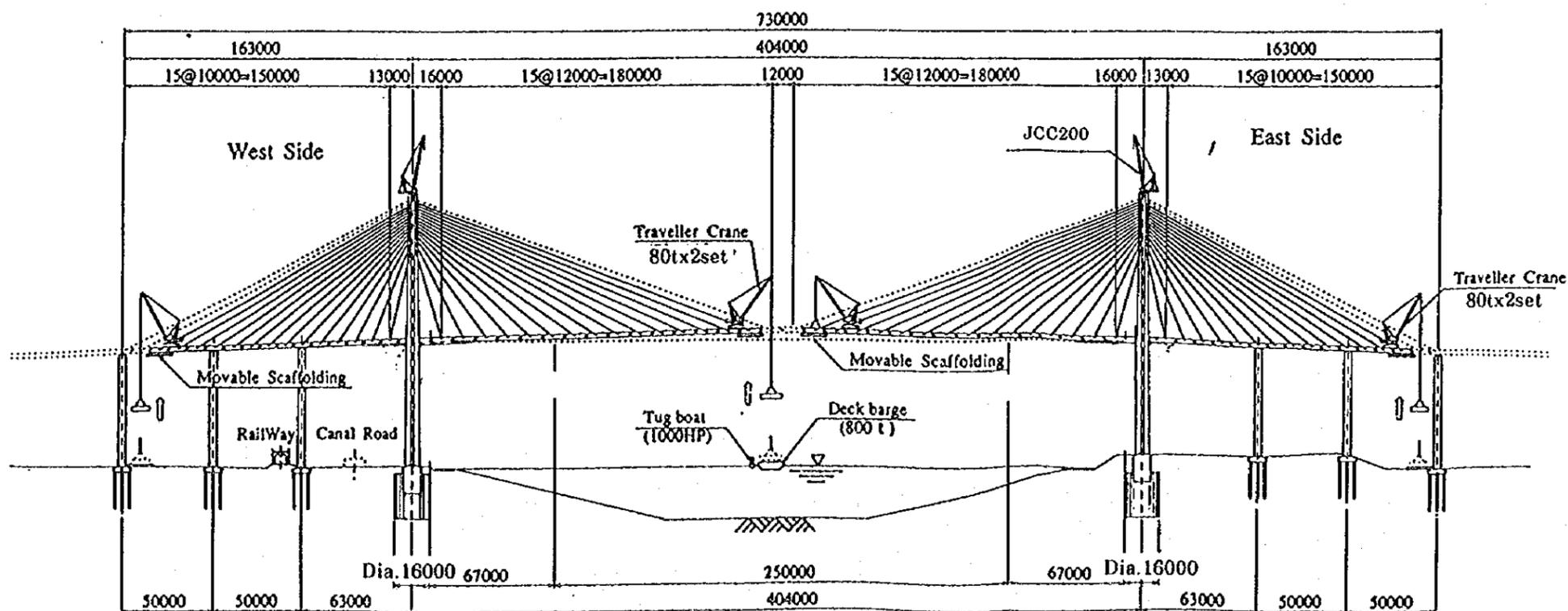


Figure 3-3 Conceptual Construction Sequence for Cable Stayed Bridge

The girders for the main bridge will be hoisted vertically into place. The girders for the side spans shall be positioned in place on land using the heavy-load carriers and hoisted into place. For the girders for the center span, they shall be hauled to the jetty with heavy-load trolley then towed into position under the bridge with the 800 ton barge. The girder block shall then be lifted with two traveller cranes into position and connected with the adjacent girder. The connection shall be made by field welding and bolts.

After the closing girder for the center span has been placed, the stay cables shall be adjusted for their overall tension.

Side Span Bridge Piers (Auxiliary Piers)

After the concrete pile for the cast-in-place $\phi 1.5$ m piles have been placed, the bridge piers shall be constructed using climbing forms. The bridge piers shall be approximately 65 m high. Tower cranes (90 t.m) shall be used to install the concrete forms, install the reinforcing steel, and cast concrete.

3) Approach Bridges

Foundations

The foundations for the approach bridges shall be cast-in-place concrete piles $\phi 1.5$ m. The bearing strata for the entire construction area will consist of hard fine sand layer extending from the surface to a depth of approximately 7 to 10 m. It is expected that a bearing strata can be obtained at a comparatively shallow area. However, the pile length shall be planned for a bearing (friction bearing) of a long pile, with a length of 10 times the diameter (1.5 m), for a length of 15 m.

Bridge Pier

The bridge piers will vary in height from approximately 43 m to 62 m in Japanese grant aid portion, and 43 m to 7 m in Egyptian portions. The construction of the bridge piers shall be performed using the tower crane (90 t.m) and climbing forms.

Superstructure

The superstructure for the bridge of 7-span continuous girder shall comprise of cast-in-place concrete PC-box girders on high piers spaced 40 m apart. As the work base is very high, heavy-duty movable scaffolding will be used. The

system of construction is shown in Figure 3-4. The lowest height of span will be constructed on the shoring system from the ground. After the first span is constructed, the heavy-duty movable scaffolding will be assembled on top of the girder. A conceptual drawing of the heavy-duty movable scaffolding is shown in Figure 3-5. The heavy-duty mobile scaffolding will be launched as the work progresses, and the cast in situ PC-girder is constructed. After completion of the main girders, the movable scaffolding will be returned to its starting position and be slid to the bridge of another bound, and continue with its girder casting work. After the girder construction work is completed, the heavy-duty movable scaffolding will be dismantled, and the operations is completed.

(2) Points to keep in Mind when performing the Works

The characteristics of this project is that the construction of a cable-stayed bridge over the Suez Canal will be carried out at a height of 70 meters. The Egyptian side does have experience in use of movable scaffolding, but it must be borne in mind that their cycle time is 30 to 40 days and is slow.

The points to keep in mind are as follows:

- During the construction of the main bridge, the steel girder blocks will be loaded on barge decks, and will cross the Suez Canal, therefore it will be required to keep close coordination with the Suez Canal Authority for the safety of the canal traffic.
- As the bridge construction will take place over the Suez Canal, close attention must be paid to falling objects and falling into the canal by laborers, and strict standards of safety must be observed.
- As construction operations will take place at high places, at highest 150 meters, safety of the work site must be enforced to the greatest extent.
- The Project is divided into three sections, the main bridge and the approach bridges on the east and west banks, implemented under the Japanese Grant Aid, and the approach bridges and approach roads on the east and west banks, constructed by the Egyptian side, and consist of 3 contract areas, therefore close control of the construction programming as a whole Project must be maintained for smooth progress of the works.
- As the steel girders will be premanufactured in a foreign factory and transported to Egypt, import procedures must be processed with the concerned Egyptian authorities beforehand in order to prevent delays of the Project.

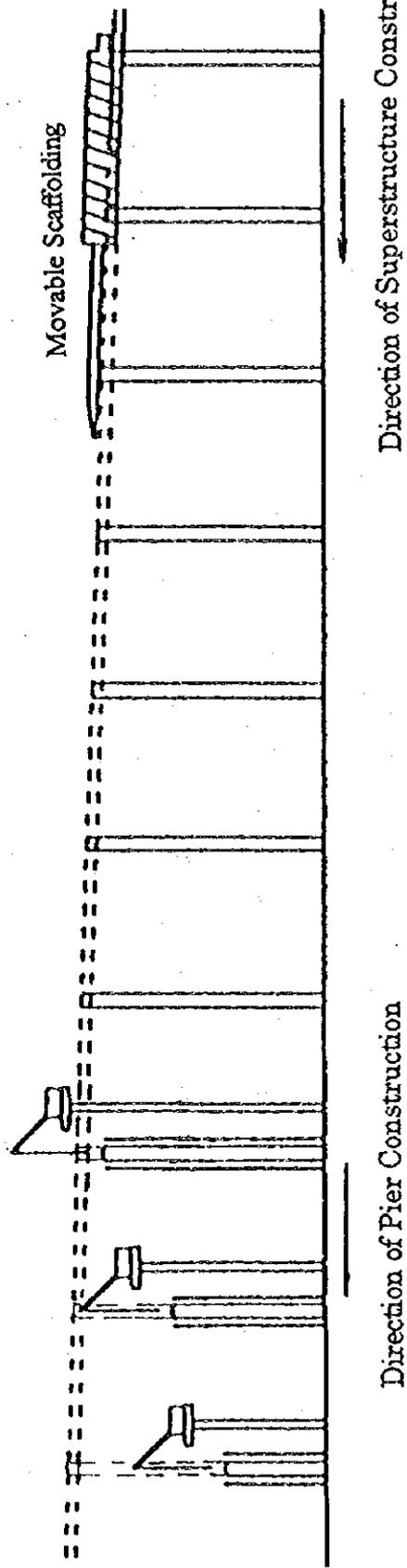


Figure 3-4 Construction System with Movable Scaffolding

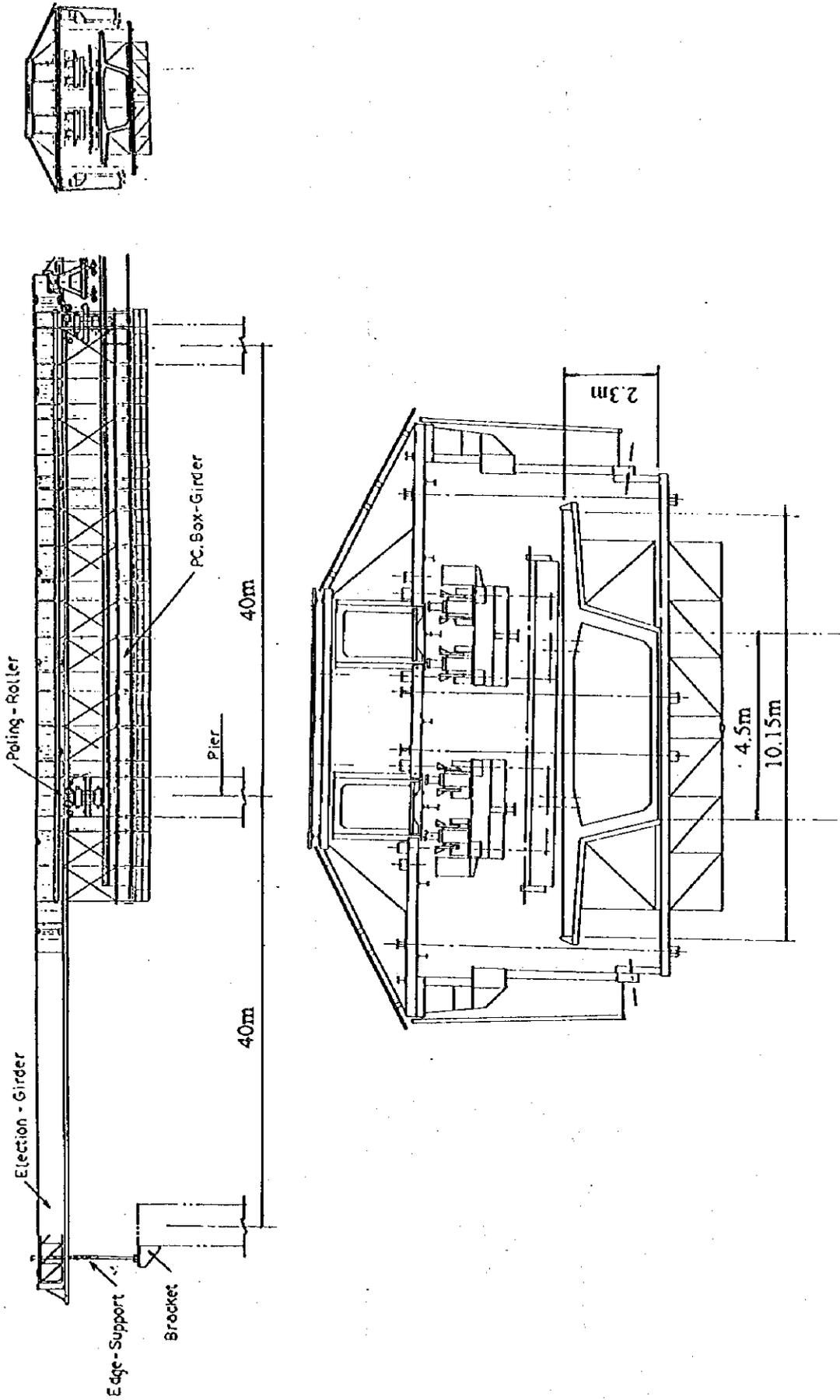


Figure 3-5 Movable Scaffolding

3-1-3 Work Allotment

The Project is divided into 2, the portion of works to be constructed under the Japanese Grant Aid Programme (main bridge + approach viaduct; $h \geq \text{FL } 49.5$), and the portion constructed by the Government of Egypt (approach bridges, $h \leq \text{FL } 49.5$ + approach roads), as shown in Figure 3-6.

(1) The Work Portion to be borne by the Japanese side

- Construction of the bridge under the Japanese Grant Aid.
Main Bridge: L=730 m
Approach Bridge: East Bank L = 560 m
West Bank L = 560 m
- The roads required in connection with the construction works (bridge, piers), the construction of temporary facilities and their removal.
- Procurement of materials and equipment required in connection with the above construction works and their transportation, and the dispatch of laborers.
- Contractor's field supervision of the above construction works.
- The consulting services including coordination and management required for the construction operations (whole Project including Egyptian portion).

(2) The Work Portion to be borne by the Egyptian side

- The construction of works to be implemented by the Egyptian side
Approach Bridge: East Bank L = 880 m
West Bank L = 1,162.9 m
Approach Road: East Bank L = 3,745 m
West Bank L = 1,562.1 m
- The roads required in connection with the construction works (bridge, piers), the construction of temporary facilities and their removal.
- Procurement of materials and equipment required in connection with the above construction works and their transportation, and the dispatch of laborers.
- Contractor's field supervision of the above construction works.

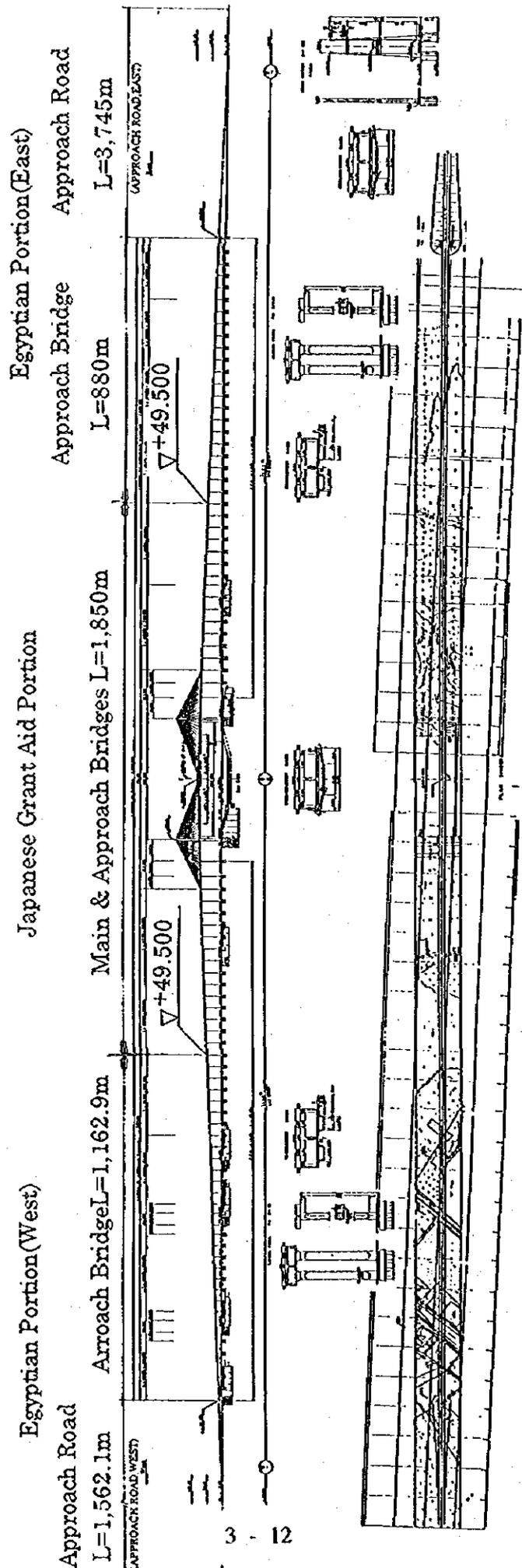


Figure 3-6 Work Allotment

3-1-4 Undertaking by the Egyptian Side

The following works will be undertaken by the Egyptian side for the implementation of bridge construction under the Japanese grant aid.

- 1) To provide data and information necessary for the Project.
- 2) To secure the land necessary for the execution of the Project, such as the land for bridge, temporary offices, working areas, storage yards and others.
- 3) To clear the sites prior to the commencement of the construction.
- 4) To provide facilities which are essential for execution of the Project, such as water and electricity.
- 5) To bear commissions to the Japanese foreign exchange bank for its banking services based upon the Banking Arrangement, namely the advising commission of the "Authorization to Pay" and payment commission.
- 6) To ensure prompt unloading, tax exemption, customs clearance at the port of disembarkation in Egypt and prompt internal transportation therein of the materials and equipment for the Project purchased under the Grant Aid.
- 7) 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 Egypt with respect to the supply of the products and services under the verified contracts.
- 8) 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 Egypt and stay therein for the performance of their work.
- 9) To provide necessary permissions, licenses and other authorizations for implementing the Project, if necessary.
- 10) To maintain and use properly and effectively the facilities constructed under the Project.

- 11) To coordinate and solve any issues related to the project which may be raised from third parties or inhabitants in the Project area during implementation of the Project.

3-1-5 Construction Supervision

(1) Basic Policy for Detailed Design and Construction Supervision

Detailed design for whole section, including Japanese grant aid portion and Egyptian portion will be executed under the Japanese Technical Assistance.

Also it has been decided that construction supervision will be executed for whole section under the Japanese grant aid scheme by the Japanese consultant.

The basic policy for the detailed design will be as follows:

- 1) The field studies for the detailed design will be to collect data necessary for the detailed design and will be based on the field work, operations, cost estimates obtained through the confirmation of requirement of the Egyptian side against the field investigations, additional surveys, and detailed design.
- 2) Detailed design covers both Japanese grant aid portion and Egyptian portion. Construction will be implemented, for Japanese portion by grant aid, and for Egyptian portion by Egyptian Fund. Therefore two different tender documents will be prepared.
- 3) After the detailed design is completed, the context of the detailed design will be explained to the Egyptian side and discussions will be held.

The basic policy of the construction supervision works will be as follows:

- 1) As the main bridge and part of approach bridges constructed under the Japanese grant aid programme, and the Egyptian approach bridges and roads will be constructed in parallel at the same time, the construction supervision will be conducted simultaneously by both the Japanese and Egyptian engineers. The transfer of technology will be performed to the Egyptian engineers at this time through daily works.
- 2) Construction supervision services cannot be commenced before the Exchange of Note, since these services will be made under the Japanese grant aid scheme. It means that the Japanese consultant cannot perform the works for tender assistance

and construction supervision, if tender and construction for Egyptian portion would commence earlier than those of Japanese grant aid scheme.

- 3) The construction supervisory engineers will perform the operations described in the following Paragraph (2).

(2) Construction Supervision Works

For the Japanese grant aid portion the following works shall be performed by the Japanese consultant teams.

1) Review of Detailed Design

Detailed design will be reviewed in advance before tender commences. When required, the documents will be amended.

2) Approval of Project Plans and Construction Drawings

The project plans, schedules, construction drawings furnished by the contractor shall be checked to see whether or not they conform to the contract agreement, contract drawings and specifications. Then indicate approval of the documents.

3) Construction Schedule

After a briefing from the contractor on the project status, give the necessary recommendations for the completion of the project by the planned completion date.

4) Quality Assurance

Check the quality of the construction materials and the quality and workmanship of the construction performance to see whether they conform to the contract drawings and specification requirements, and give approval when they meet with the requirements.

5) Check of Work Performed

The cross sections and dimensions of the finished work shall be checked for their conformance to the control standards, and at the same time check the quantities installed.

6) Issue of Certificates

Issue the necessary certificates for payments to contractor, completion of works, and defects liability certificate.

7) Submission of Reports

Inspect the monthly reports, as-built drawings, project photographs prepared by the contractor for submittal to the Japan International Cooperation Agency and the Egyptian government. Also after completion of the project prepare an overall report in accordance with the "Guideline for the Preparation of the Final Report of Project under the Japanese Grant Aid Programme" for submittal to the Japan International Cooperation Agency.

To the Egyptian portion the following works shall be performed by the Japanese consultant teams.

1) Review of Detailed Design

Detailed design and tender documents will be reviewed in advance before tender commences. When required, the documents will be amended and submitted.

2) Approval of Project Plans and Construction Drawings

The project plans, schedules, construction drawings furnished by the contractor shall be checked to see if they conform to the contract agreement, contract drawings and specifications. Then indicate approval of the documents.

3) Construction Schedule

After a briefing from the contractor on the project status, give the necessary recommendations for the completion of the project by the planned completion date.

4) Quality Assurance

Check the quality of the construction materials and the quality and workmanship of the construction performance to see whether they conform to the contract drawings and specification requirements, and give approval when they meet with the requirements.

5) Check of Work Performed

The cross sections and dimensions of the finished work shall be checked for their conformance to the control standards.

6) Estimate of Work Performed

Estimate work performed each month.

7) Issue of Certificate

Issue the certificate of periodical payment in accordance with the results of periodical works performed.

8) Issue of Work Completion Certificate

When construction has been completed, inspect whole construction works and issue completion certificate together with necessary lists of remedial works to final completion.

9) Submission of Reports

Inspect the periodical reports, as-built drawings, project photographs prepared by contractor for submittal to the Egyptian and Japanese governments.

(3) Organization Chart for Construction Supervision

The formation of the Japanese engineers and the Egyptian engineers engaged in the construction supervision will be organized into the arrangement by the type of construction operations and time schedule shown in Figure 3-7.

ORGANIZATION CHART FOR CONSTRUCTION SUPERVISION

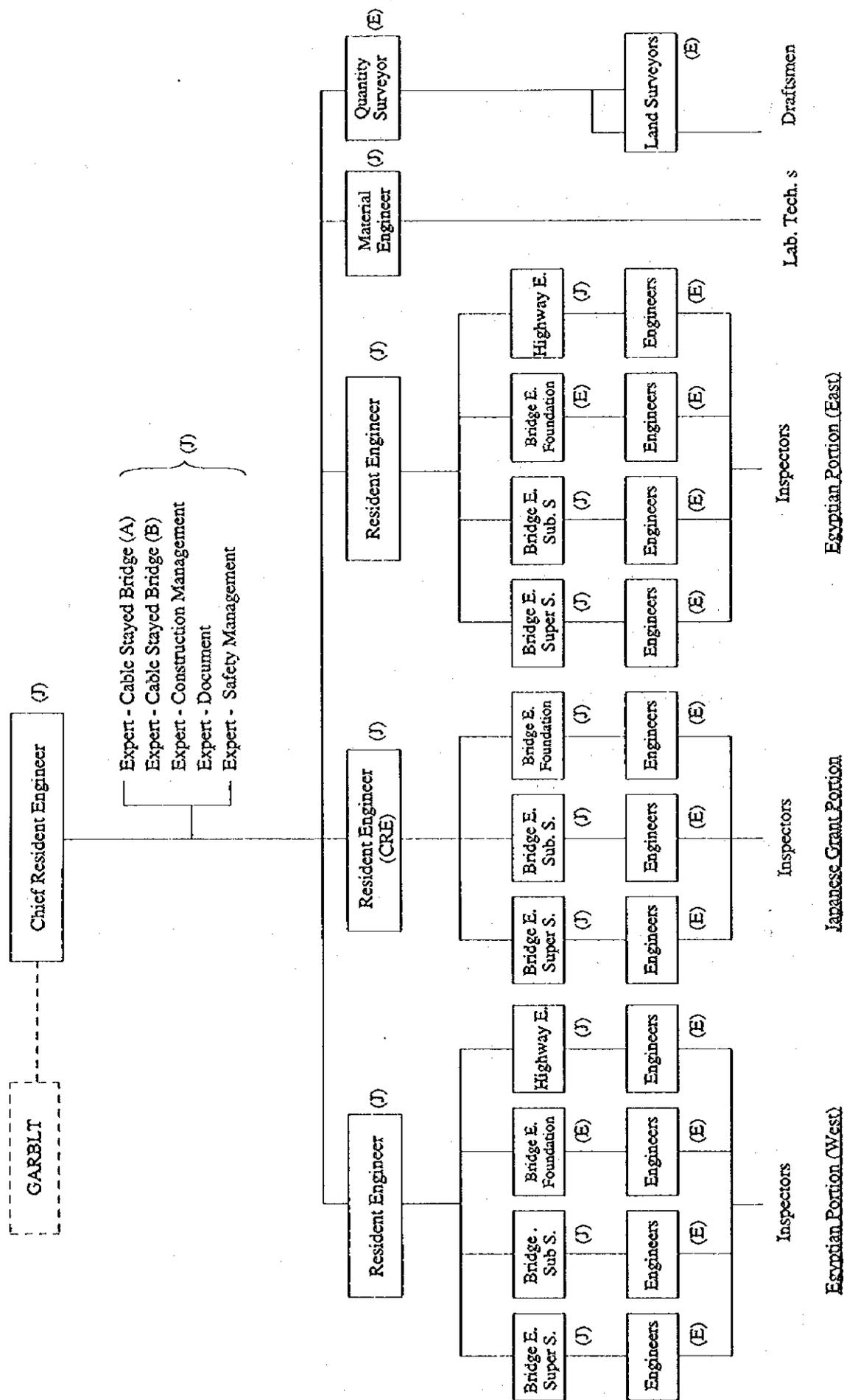


Figure 3-7 Organization of Construction Supervision Team

3-1-6 Procurement Plan

Time required for taxes exemption by the People's Assembly decree takes 30 to 60 days after the Exchange of Notes for this project.

Procurement schedule of the Japanese grant aid portions is described as follows:

(1) Materials

1) Basic Policy

Of all the materials required, the items that can be procured locally will as a general rule be obtained from local sources. If the item can be obtained freely in the local markets, the items scheduled for import shall be procured locally. If there are any problems concerning their quality, or procurement period, the item will be procured from Japan or third countries.

2) Materials Procurement Plan

The method of procurement for the major materials for this project shall be in accordance with the results of the local procurement investigation as shown in "Table 3-1 Procurement Plan for Principal Construction Materials".

- Cement

Cement can be obtained locally from cement factories such as the Alexandria Cement Co.

- Reinforcing Bar

Deformed reinforcing bars up to 29 ϕ mm are manufactured in Alexandria of with the specifications in accordance with British Standards Specifications. Reinforcing bars of 35 ϕ mm can be obtained if ordered in sufficient quantities.

- Stay Cable, PC Tendon and Related Products

Stay cables for cable-stayed bridges, PC stranded wires, PC tendon anchors, PC wire sheaths, and other related accessories are not manufactured in Egypt, and will have to be procured from third countries.

- **Steel Girders and Structural Steel**

It will be possible to procure structural steel angles 100 x 100 mm, channels 200 x 75 mm, H-beams 200 x 200 mm, steel tubing of ϕ 1 m from local sources in Egypt. However, structural steel shapes not manufactured in Egypt will be procured from third country sources.

- **Concrete Formwork**

Almost all lumber and waterproof plywood are imported and available in Egypt. So concrete formwork will be procured locally from imported sources. Structural steel formwork also will be procured locally from imported sources.

- **Sands, Aggregates**

Sands and aggregates of good quality are available from Fanar approximately 10 km west of Ismailiya. Also good quality crushed rock aggregates are available from Ataq approximately 20 km west of Suez. Thus sand and aggregates will be procured from local sources.

- **Asphalt Concrete Hot Mix**

They will be procured locally.

Table 3-1. Procurement Plan for Principal Construction Materials

Name of Material	Egypt	Japan	Third Country	Remarks
Embankment Fill	○			
Aggregates	○			
Sands	○			
Asphalt Emulsions	○			
Portland Cement	○			
Admixtures	○			
Reinforcing Steel	○			
Plywood (Formwork)	○			
PC Stranded Wire			○	12 T, 15.2
PC Wire Sheath			○	
PC Tendon Anchors			○	12 T, 15.2 Use
Stay Cable			○	
Steel Pipe			○	
Bearing			○	
Expansion Joints			○	
Asphalt Hot Mix	○			

(2) Construction Equipment

1) Basic Policy

The procurement policy for the construction equipment will be similar to the policy for the construction materials. And they will be procured locally to the greatest extent. Construction equipment for common use will be basically be procured locally, and equipment, however for large scale equipment, will be basically imported from Japan or third countries in order to avert breakdowns or malfunctions. Since the schedule and progress of the work will be greatly affected especially in the case of cable-stayed bridge.

2) Procurement Plan for Construction Equipment

The procurement plan for the major construction equipment required for this project will be in accordance with the local investigation result as shown in "Table 3-2, Procurement Plan for the Major Construction Equipment".

- **Earth Moving Equipment**

It will be possible to procure earth moving equipment such as bulldozers, backhoe, pile-drivers, vibro-hammers, and similar equipment locally.

- **Pile Foundation Equipment**

It is planned to order outright cast-in-place concrete pilings from local contractors.

- **Freight handling and Transportation Equipment**

Common transport such as cargo trucks, tip trucks, trailer trucks are easily procured locally. Truck cranes and tower cranes are commonly used by local contractors. But heavy capacity crawler cranes and traveller cranes are not readily available so that they will be brought in from Japan or third countries.

- **Movable Scaffolding**

Main girders will be manufactured locally. But the hydraulic and electric control drives and monitors related with movable scaffolding will be procured from third countries.

(3) Transport Routes for Materials and Equipment

1) **Marine Transport**

The port of delivery of goods by sea will be Alexandria.

2) **Inland Transport**

The materials and equipment procured from abroad and from Cairo and other countries will be delivered to Qantara via inland routes.

Table 3-2 Procurement Plan for the Major Construction Equipment

Description	Specification	Egypt	Japan	3rd Country	Remarks
Bulldozer	3 t, 15 t	○			
Backhoe	0.35 m ³ , 0.6 m ³	○			
Tractor Shovel	1.2 m ³ , 2.1 m ³	○			
Clamshell	0.8 m ³			○	
Dump Truck	8 t, 20 t	○			
Trailer Truck	Low-bed	○			
Motor Grader	3.1 m	○			
Road Roller	10 ~ 12 t	○			
Tire Roller	8 ~ 20 t	○			
Vibrating Roller	0.8 ~ 1.1 t	○			
Auger Borer	φ1.5 m	○			Steel Casing
Vibro-Hammer	40 KVA	○			
Truck Crane	Hydraulic, 20, 30, 40 t	○			
Truck Crane	Mechanical, 135 t	○			
Truck Crane	Mechanical, 150 t			○	
Truck Crane	Hydraulic, 160 t			○	
Crawler Crane	45 t	○			
Crawler Crane	150 t			○	
Crawler Crane	450 t		○		
Tower Crane	90 tm (pier)	○			
Tower Crane	192 tm(pylon)			○	
Deck Barge	800 t	○			
Tug Boat	1,000 HP	○			
Movable Scaffolding	Main Girder	○			
Movable Scaffolding	Elec., Hydr.			○	
Concrete Plant	1.5 m ³ Batch			○	
Agitator Truck	4.5 m ³	○			
Concrete Pump Truck	w/Boom; 30 m ³ /h			○	
Cooling Plant	200 JRT			○	
Generator	125 KVA			○	
Generator	450 KVA			○	
Air Compressor	3.7, 7.6 m ³ /min			○	

3-1-7 Implementation Schedule

(1) The flow of activities of the Project under the Japanese grant aid can be divided as follows:

1) Detailed Design

Detailed design for both the Japanese grant aid portion and the Egyptian portion will be executed under Japanese Technical Assistance.

2) Pre-Qualifications

After review of evaluation criteria of contractor's qualifications with JICA, obtain their approval beforehand, and then perform the contractor's qualifications. This process will be conducted by the Japanese consultant as the executing agency for the Egyptian Government.

3) Tendering, Contract Award

a) Tendering, Contract Award

The selection of the contractor will be witnessed in the presence of JICA and attended by the consultant, government representatives of the Egyptian government, and the tenderers. The tender award will be made at the tender opening. The contract will be a direct agreement between the government of Egypt and the Japanese contractor (consultant and construction contractor). The contracting will be conducted under open tender system rules with Japanese contractors.

b) Bank Arrangement

In parallel with conclusion of contract, the government of Egypt will make arrangement with Japanese foreign exchange bank to open the account for receiving of Japanese assistant fund and paying to Japanese contractors. This bank arrangement will be the ground for Authorization to Pay (A/P) issued by the government of Egypt which is necessary for the application to obtain the export approval from the Ministry of International Trade and Industry and to receive the advanced payment under the clause of contract payment.

c) **Verification of Contract**

“Verification of Contract” means the Japanese government confirms that the contract above mentioned is eligible as the object of this grant aid project, which is the condition for effectuation of this contract.

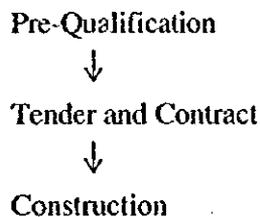
d) **Execution of Contract**

The Japanese contractor shall execute the terms of the contract upon receipt of the Contract Authentication and A/P documents.

4) **Construction**

The construction consists mainly of mobilization and preparation, the construction of the bridges and approach roads, and demobilization. The mobilization and preparation will comprise procurement of the necessary materials and equipment immediately after the contract signing together with the setting up the transportation, temporary facilities at the site (assembly yard for the steel girders, establishing the concrete plant, PC concrete yard, reinforcing steel yard, concrete formwork fabrication yard, and the site office). The demobilization will comprise the removal of the materials and equipment upon completion of the works, removal of the temporary facilities, and overall clean up.

(2) The flow of the activities of the Project under the Egyptian portion can be divided as follows:



When the implementation of the Egyptian portion is carried out simultaneously with the implementation of the Japanese Grant Aid portion, the Japanese consultant will assist the Egyptian government for Pre-Qualification, Tender and Contract. However, if the implementation of the Egyptian portion is commenced prior to the Exchange of Notes (E/N), the Egyptian government has to carry out Pre-Qualification, Tender and Contract.

(3) Construction Schedule

The bridge construction work will consist of the main bridge and the approach bridges. The main bridge work will consist principally of the foundation work, pylons, bridge piers, steel girders (manufacture, assembly, erection), bridge surfacing; and the approach bridge work will consist of foundations, substructure, superstructure, and bridge surfacing.

Table 3-3 shows the tentative construction schedule.

(4) Planning of Construction Schedule (Programme)

In the course of construction programming the following cycle time for each activity is used.

Main Bridge (Japan grant portion)

a) Caisson Work

Inner form	3
Rebar	4
Out form	2
Concrete	1
Cure	7
Sink	8
Total	25 days

b) Main Pylon Foundation

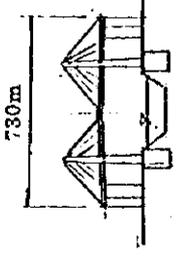
Open caisson, Dia. 16 m Depth 27.5 m

On each bank 2 Nos., Equipment 2 sets

- Ground Anchor 2 mon.
- Metal Tow Setting 1 mon.
- Sinking 25 day per 4 m lift (lot)
 $27.5/4 = 7$ lift
 $25 \times 7 \times 1/25 = 7$ mon.
- Bottom Concrete 1 mon. (in the water)
- Sand Filling 0.5 mon.
- Top Slab Concrete 0.5 mon.

Table 3-3 Tentative Construction Schedule

	1st Year			2nd Year			3rd Year			4th Year			5th Year			6th Year								
	1	3	5	7	9	11	1	3	5	7	9	11	1	3	5	7	9	11	1	3	5	7	9	11
Detailed Design				5 m																				
Japanese Grant Aid Portion																								
EN				▽																				
Tender							3 m																	
Contract							▽																	
Construction													45 m											
Egyptian Portion																								
Tender							3 m																	
Contract							▽																	
Construction																			42 m					
East Bank																								
West Bank																								



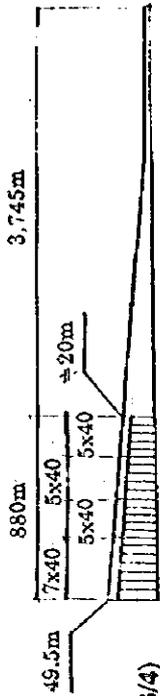
TENTATIVE CONSTRUCTION SCHEDULE (1/4)

Japanese Grant Portion Main Bridge (730 m)	1st Year			2nd Year			3rd Year			4th Year			5th Year			6th Year			Remarks
	1	3	5	7	9	11	1	3	5	7	9	11	1	3	5	7	9	11	
Contract																			
Mobilization & Preparation																			
a) Pylon Foundation																			
Metal Tow Set																			
Ground Anchor																			
Sinking																			
Bott. Slab/Fill																			
Top Slab																			
b) Main Pylon																			
Shaft (38 lifts)																			
Cross Beam																			
c) Auxiliary Pier																			
Foundation																			
Pile Carp																			
Pier																			
d) Steel Girder																			
Fabricate/Transport																			
Site Assembly																			
Erection On bent																			
Cantilever																			
Stay Cable Adjust																			
e) Accessory Exp. Jt. Rail etc.																			
f) AC Pavement																			
g) Demobilization																			
	<p>25 d/4 m</p> <p>10 d/14 m</p> <p>9 d/16 m</p> <p>Goose Asph. 1 m</p>																		



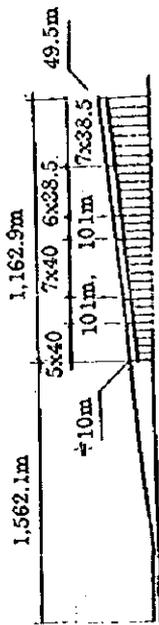
TENTATIVE CONSTRUCTION SCHEDULE (2/4)

Japanese Grant Portion Approach Bridge (560 mea.)	1st Year			2nd Year			3rd Year			4th Year			5th Year			6th Year			Remarks
	1	3	5	7	9	11	1	3	5	7	9	11	1	3	5	7	9	11	
Contract	▽																		
Mobilization & Preparation	5 m																		
a) Foundation	8 m																		1.6 d/No
b) Pile Cap	8 m																		2 sets
c) Pier	9 mon. (N)																		6 sets
d) PC Girder	3 m (N)																		M. Scaffolding
1st span on stage	3 m (S)																		2 sets
Assemble	2 m																		
Construction (N)	10 m (N)																		20 d/span
Shift, Assemble	1 m																		
Construction (S)	10 m (S)																		
Dismantle	0.5 m																		
e) Accessory Exp. Jt. Rail etc.	8 m																		Conc. Rail
f) AC Pavement	3 m																		
g) Demobilization	2 m																		
45 mon. (3yr. 9 mon.)																			



TENTATIVE CONSTRUCTION SCHEDULE (3/4)

Egyptian Portion	1st Year		2nd Year		3rd Year		4th Year		5th Year		6th Year		Remarks					
	1	3	5	7	9	11	1	3	5	7	9	11		1	3	5	7	9
Contract	V																	
[East Bank]																		
• Approach Bridge (880 m)																		
Mobilization																		
Foundation																		
Pile Cap																		
Pier																		
PC Girder 1st span on stage (None)																		
Assemble																		
Construction (N)																		
Shift, Assemble																		
Construction (S)																		
Dismantle																		
Accessory																		
A.C. Pavement																		
Demobilization																		
• Approach Road (3,745 m)																		
Embankment																		
Access Road																		
Subbase/Accessory																		
A.C. Pavement																		
	<p>1.6 d/No</p> <p>2 sets</p> <p>8 sets</p> <p>M. Scaffolding</p> <p>2 sets</p> <p>20 d/span</p>																	



TENTATIVE CONSTRUCTION SCHEDULE (4/4)

Egyptian Portion	1st Year		2nd Year		3rd Year		4th Year		5th Year		6th Year		Remarks					
	1	3	5	7	9	11	1	3	5	7	9	11		1	3	5	7	9
Contract																		
[West Bank]																		
• Approach Bridge (1,162.9 m)																		
Mobilization																		
Foundation																		
Pile Cap																		
Pier																		
PC Girder 1st span on stage (None)																		
Assembly																		
Construction (N)																		
Shift, Assembly																		
Construction (S)																		
Dismantle																		
Accessory																		
A.C. Pavement																		
Demobilization																		
• Approach Road (1,562.1 m)																		
Embankment																		
Access Road																		
Subbase/Accessory																		
A.C. Pavement																		

c) Main Pylon Shaft (152.5 m high)

On each bank 1 No., H-shape, 2 sets of climb form used

Concrete 2,400 m³, Rebar 600 t for 2 shafts

10 days per 4 m lift (lot)	
38 lifts x 10 days x 1/25 = 15 mon.	
Move scaffold/form	1
Formwork Inside	1
Rebar	3
Socket Setting	1 (stay cable)
Formwork Outside	1
Conc.	0.5
<u>Cure</u>	<u>2.5</u>
Total	10 days

- Cross Beam 2 layers 1 mon. per layer

d) Auxiliary Piers (for both banks)

- Foundation cast in situ pile $\phi 1.5$ m x 15 m
 $12 \times 4 = 48$ Nos.
 1.6 days per pile
 $48 \times 1.6 \times 1/25 = 3$ mon.

Breakdown of bored cast in situ piles

Setting & lower casing pipe	1
Excavation	6
Slim treatment	1
Concrete	1
Waiting	1
Extract casing & set to new	1
Total	11 hours
Working hours	7 hours

$11/7 = 1.6$ days

Per week 4 days piling works & 2 days auxiliary works

- Pile Cap 4 Nos. Conc. Approx. 500 m³/No.
1 mon. per No.
4 mon.
- Pier 8 Nos. 65 m high, 2 sets of climb form
7 days per 4 m lift
8 Nos x 16 lifts x 7 days x 1/25 x 1/2 = 18 mon.

e) Steel Girder 7,381 ton

- Procurement and transport 20 mon.
- Site Assembly 30 ton per day
7,381 x 1/30 x 1/25 = 10 mon.

f) Steel Girder Erection

On diagonal bent both side pylon 2 mon.

On center span 16 segments

9 days per segment

Erection 1 day

Weld & bolt 8 days

Total 9 days

16 x 9 x 1/25 = 6 mon.

Approach Bridge (Japan Grant Portion) (per each bank)

g) Cast in situ pile Same as Auxiliary piers
φ1.5 m x 15m

15 pile caps x 16 No. = 240 Nos., 2 sets equip.

240 x 1.6 x 1/25 x 1/2 = 8 mon.

h) Pile Cap Conc. Approx. 500 m³/No.

15 Nos., 1 mon. per No., 2 sets of crew

15 x 1 mon. x 1/2 = 8 mon.

i) Pier

2 x 15 = 30 Nos. Ave. 53 m high

7 days per 4 m lift, 6 sets climb form

30 Nos. x 13 lifts x 7 days x 1/25 x 1/6 = 18 mon.

j) PC Girder $2 \times 14 = 28$ spans Conc. $270 \text{ m}^3/\text{span}$

Movable Scaffolding (1 set)

Assemble 60 days

Dismantle 15 days

Construction of 1 span 20 days

As per Table in next page

North side bridge $14 \times 20 \times 1/30 = 10$ mon.

(Including curing on holiday, 30 calendar day per month used.)

Approach Bridge

(Egyptian portion)

East bank $L = 880$ m, 22 spans

k) Cast in situ pile

22 pile carps $\times 16$ No. = 352 Nos. 2 sets equip.

$352 \times 1.6 \times 1/25 \times 1/2 = 12$ mon.

l) Pile Carp

22 Nos. $\times 1$ mon. $\times 1/2 = 11$ mon. 2 sets of crew

m) Pier Ave. 33 m high 8 sets climb form

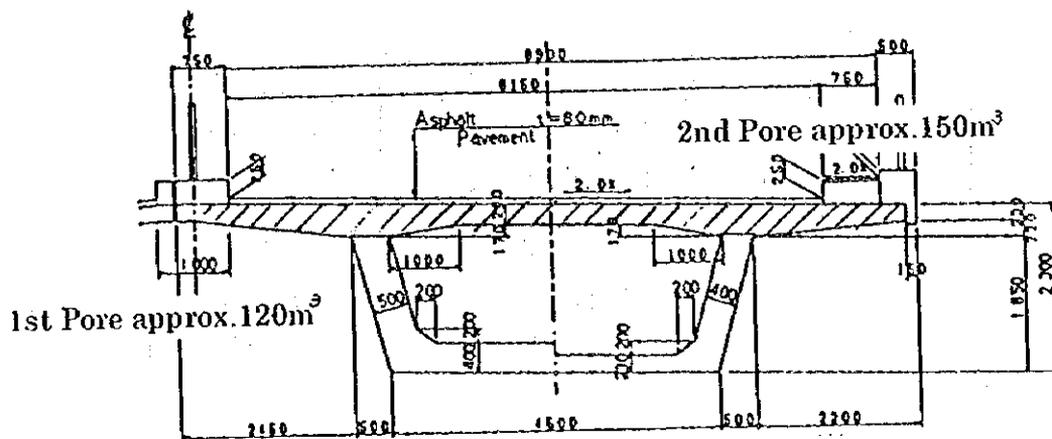


44 Nos. $\times 8$ lift $\times 7$ days $\times 1/25 \times 1/8 = 12$ mon.

n) PC Girder $2 \times 22 = 44$ spans, 2 sets of M. Scarffolding

Per line $22 \times 20 \times 1/30 \times 1/2 = 8$ mon. (per north or south)

		20 days									
		1	3	5	7	9	11	13	15	17	19
Prestress		[Timeline bar from day 1 to 20]									
Prepare to shift		[Timeline bar from day 1 to 20]									
Shift, fix		[Timeline bar from day 1 to 20]									
Formwork		[Timeline bar from day 1 to 20]									
Rebar, PC (bott. & web.)		[Timeline bar from day 1 to 20]									
Conc. (bott. & Web.)		[Timeline bar from day 1 to 20]									
Rebar (top)		[Timeline bar from day 1 to 20]									
Conc. (top) 150 m ³		[Timeline bar from day 1 to 20]									
Cure		[Timeline bar from day 1 to 20]									
Deform (inside)		[Timeline bar from day 1 to 20]									



Concreting Sequence

Approach Bridge

(Egyptian Portion)

West Bank L = 1,162.9 m, 31 spans

o) Cast in situ pile

31 pile caps x 16 = 496 Nos., 3 sets equip.

496 x 1.6 x 1/25 x 1/3 = 11 mon.

p) Pile Carp 31 Nos., 3 sets of crew

$31 \times 1 \text{ mon.} \times 1/3 = 11 \text{ mon.}$

q) Pier Ave. 27 m high

10.0 - 2.5



$62 \text{ Nos.} \times 7 \text{ lift} \times 7 \text{ days} \times 1/25 \times 1/8 = 15 \text{ mon.}$

r) PC Girder 2 x 31 = 62 spans, 2 sets of M. Scaffolding

Per line $31 \times 20 \text{ days} \times 1/30 \times 1/2 = 11 \text{ mon.}$

3-1-8 Others

Liability

The general idea for liability is described as follows:

Work Allotment	Japan Grant Aid	Egypt Portion
Design	Consultant (Japan)	Consultant (Japan)
Supervision	Consultant (Japan)	Consultant (Japan)
Construction	Contractor (Japan)	Contractor (Egypt)

As to the liability of the detailed design, during of short period prior to the review of the detailed design by the Japanese consultant, after E/N, the liability will be borne by the Egyptian government.

3-2 Operation and Maintenance Plan

(1) Maintenance Organization

Road construction and rehabilitation is generally carried out under contract with the GARBLT Head Quarters by the public construction companies and private contractors. Routine maintenance is executed by the direct labor organizations of the GARBLT Headquarters in nine district offices. The amount allocated to routine maintenance was LE (5) million for bridges in 1995/96. The construction costs of bridges were LE220 million in the same year. Therefore, the ratio of maintenance to construction is considered 1 to 44. The maintenance plan is shown down below.

(2) Maintenance Plan

Since bridges are designed to be used for 50 to 100 years, it is vital to continue inspections and repair from the consistent point of view for a long term. Therefore, a maintenance manual based on the clear basic idea should be prepared and, even when maintenance managers are replaced, the maintenance should be executed in same manners according to the manual. Outside Japan, the AASHTO Manual (1978) and the DIN Manual 1976 (1983) are distinguished for manuals/standards of bridge maintenance and inspections. In Japan manuals to repair road bridges are available.

On making a maintenance plan of cable-stayed bridges, which should be in accordance with those manuals/standards, characteristics of the cable shall be grasped. In case of past damage examples of cable-stayed bridges, cable damage is often found such as the Kohlbrand Bridge in Germany, the Wye Bridge in the United Kingdom and the Maracaibo Bridge in Venezuela. The damage is mainly caused by corrosion, fatigue and vibration. To maintain main girders, just the same as the case of girder and suspension bridges, the system shall be established to inspect weakened conditions of painting, corrosion of steel materials, deformation, distortion and cracks of members, loosening and damage of bolts, and wetting and standing of rain water and the like. Functions of shoes and expansion joints should be also checked up. Facilities to maintain cable-stayed bridges are mostly the same as those of ordinary bridges except cables. Basically the facilities should be designed to approach a required area of bridge structures, and for this purpose inspection vehicles, elevators, gondolas, inspection paths, ladders, manholes, metal anchors and lighting are set up.

To maintain the outer surface of main girders, inspection vehicles and/or scaffoldings are generally used, and to maintain the inner one, inspection paths are in use. On the other hand, to maintain the outer surface of pylons portable gondolas are utilized, whenever necessary, by the use of metal anchors on the top of pylons. Generally cable painting or its protective cover is visibly inspected by binoculars from the bridge, and when closer inspection is necessary truck cranes are used. However, it is recommended that inspection vehicles especially designed for cable be made use of, as the truck cranes cannot be very tall nor very safe.

1) Inspection

Maintenance of any bridge follows the process of inspections. In the case of the Suez Canal Bridge, it is recommended that an inspection be conducted periodically and

whenever damage or a defect is found out. A thorough examination shall be made and a report, prepared detailing actual problems. The thorough investigation shall be conducted whenever necessary, and recommendations for repairs shall follow. Repairs shall be made in a timely fashion as it is important to fulfill functions of the bridge. The maintenance plan of the Suez Canal Bridge should be based on the following three inspections:

- i) Daily Inspection
- ii) Periodic Inspection
- iii) Provisional Inspection

i) Daily Inspection

The daily inspection shall consist of ocular observation from patrol cars and shall be carried out on a daily basis. Items to be inspected are as follows:

Roadway Surface Condition (frequency: once daily)

road marking, pavement status, expansion contraction joints, objects of litter, etc.

Roadway Accessories (frequency: once daily)

railings, curbs, road signals, lighting, toll gate facilities, etc.

Sub-surface Condition (frequency: once weekly)

structures, embankments etc.

ii) Periodic Inspection

Approach bridges, excluding the main bridge over the canal, shall be inspected from below, by observing with binoculars and/or taking pictures while walking so as to record any distortion or damage and/or progressive damage of structures.

The cable-stayed bridge over the canal shall be inspected by using a movable inspection scaffolding.

iii) Provisional Inspection

If any emergency repairs become necessary due to occurrence of traffic accidents, earthquakes, and/or any unpredictable accidents happen and

cause damage for the bridge, an inspection shall be undertaken provisionally.

Any records of inspections shall be kept in file.

2) Maintenance Works

According to the maintenance plan, the following works are deemed to be necessary.

i) Routine Maintenance

It is proposed that every year four engineers, six assistant engineers and ten scavengers be available to execute routine maintenance. The maintenance work of patrol cars for road inspection is indispensable. Concerning seven hundred and forty street lamps, since 50 percent of their bulbs have to be replaced every year and the lighting consumes a quite amount of electric power, considerable cost should be appropriated.

Furthermore, maintenance cost of emergency telephones is necessary.

ii) Repavement

As the roadway surface condition becomes damaged, the surface should be peeled and repaved once every seven to ten years.

iii) Repainting

As well as repainting of steel railings, repainting of main girders by using a inspection gondola is needed once every ten years.

iv) Other Partial Restoration

In addition to the mentioned above, repairs including partial restoration from damages and partial replacement would be needed once every ten years.

(3) Maintenance and Management Costs

Maintenance and management costs for whole project (Japanese Grant Aid portion and Egyptian portion) are estimated per year as follows according to the maintenance plan.

Routine maintenance	2,032,000 LE
Pavement renewal	3,911,000 LE
Repainting	345,000 LE
Inspection and partial restoration	77,000 LE
Total	6,365,000 LE

Breakdown is shown below:

Routine Maintenance

Labor costs	204,000 LE
Patrol cars	120,000 LE
Lighting power and bulbs	677,000 LE
Telephone	15,000 LE
Indirect costs	1,016,000 LE
Sub-total	2,032,000 LE

Repavement (Once per 7 years)

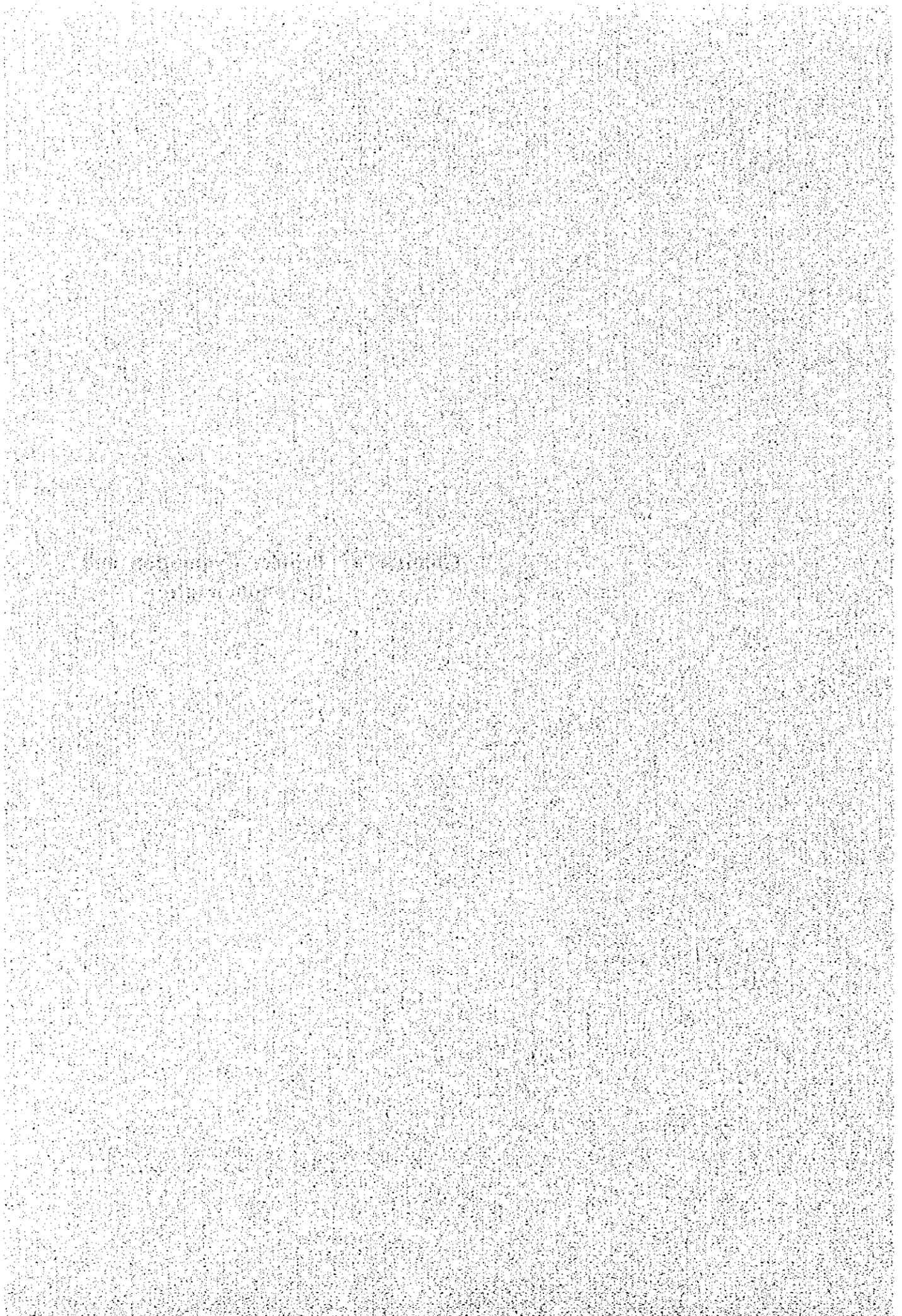
Removal of pavement	$18.6 \text{ m} \times 9,200 \text{ m} \times 120 \text{ LE} \times 1/7 = 2,933,000 \text{ LE}$
Repavement	$18.6 \text{ m} \times 9,200 \text{ m} \times 40 \text{ LE} \times 1/7 = 978,000 \text{ LE}$
Sub-total	3,911,000 LE

Repainting (Once per 10 years)

Steel girder	$26 \text{ m} \times 730 \text{ m} \times 150 \text{ LE} \times 1/7 = 285,000 \text{ LE}$
Steel railings	$1.5 \text{ m} \times 2 \times 4,000 \text{ m} \times 15 \text{ LE} \times 1/10 = 60,000 \text{ LE}$
Sub-total	345,000 LE
Inspection and partial restoration (0.025% of construction cost)	77,000 LE

Chapter 4 Project Evaluation and Recommendation

Chapter 4 Project Evaluation and Recommendation



Chapter 4 Project Evaluation and Recommendation

4-1 Project Effect

The National Project for the Development of Sinai (NPDS) is a part of the whole national land development for each industrial and each area, and is deemed as a main objective of the national growth. Through the course of implementation of development plans, traffic demands to cross the proposed bridge site is expected to increase, and the traffic volume of the bridge is forecast as 28,000 vehicles/ day in the year 2017.

In Qantara, where the proposed bridge will cross the Suez Canal, the west bank has been developed already. However on the east bank at present development is proceeding. Therefore the development of the whole region of east and west banks will be advanced more, when the Suez Canal Bridge is completed, and it will contribute greatly to the regional development.

As mentioned above, construction of the bridge will provide a big effect to the region and the country. Therefore, it is considered that implementation of this project under the Japanese Grant Aid Scheme is appropriate. It is expected that the existing organization of General Authority for Roads, Bridges and Land Transport (GARBLT) will manage fully operation and maintenance of the bridge.

4.2 Construction Supervision of Egyptian Portion and its Theme

This project was assigned as the Japan-Egypt Joint Project and the share of the implementation costs was agreed.

Detailed design will be carried out by Japanese Technical Assistance, and Construction Supervision will be carried out by Japanese Grant Aid Assistance. As to Egyptian portion a contractor will be selected by the Egyptian Government through a tender, and the construction of the portion will be supervised by a Japanese consultant. The ICB type of tender and contract will be employed for the Egyptian portion, while the Japanese Grant Aid portion will employ the lump-sum tender and contract. Therefore organization system of the construction supervision will be complicated. Also Egyptian portion will be constructed by Egyptian contractors, and more careful supervision will be required by a Japanese consultant.

Therefore the size and contents of the construction supervision works will be much different from the ordinary construction supervision for the normal Japanese Grant Aid Project.

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Appendices

Appendices

APPENDICES

1.	Member List of the Study Team.....	A - 1
2.	Survey Schedule.....	A - 2
3.	List of Party Concerned in the Recipient Country	A - 3
4.	List of Party Concerned of Japanese Side	A - 4
5.	Minutes of Discussion.....	A - 5
6.	Cost Estimation Borne by the Egyptian Side.....	A - 33
7.	References	A - 34

1. Member List of the Study Team

- First On-Site Survey

- **Team Leader** : Mr. Nobuhiko Hanazato
Second Project Study Division, Grand Aid
Project Study Department, JICA
- **Grant Aid Program** : Mr. Takanobu Kuroda
Grant Aid Division, Economic Cooperation
Bureau, Ministry of Foreign Affairs
- **Consultants** : Mr. Hiroyuki Endo
Chief Consultant
Mr. Yasuo Furukawa
Construction Planner
Mr. Kenichi Nakane
Quantity Surveyor

- Second On-Site Survey

- **Team Leader** : Mr. Kenji Iwaguchi
Managing Director, Grant Aid Project Study
Department, JICA
- **Grant Aid Program** : Ms. Hiroko Yamamoto
Grant Aid Division, Economic Cooperation
Bureau, Ministry of Foreign Affairs
- **Project Coordinator** : Mr. Nobuhiko Hanazato
Second Project Study Division, Grand Aid
Project Study Department, JICA
- **Consultants** : Mr. Hiroyuki Endo
Chief Consultant
Mr. Yasuo Furukawa
Construction Planner
Mr. Kenichi Nakane
Quantity Surveyor

2. Survey Schedule

First Field Survey (August 9, 1996 to August 18, 1996)

Day	Date	Day of Week	Survey Contents
1	8/9	Fri.	Travel
2	8/10	Sat.	Arrive in Cairo
3	8/11	Sun.	Courtesy Call on JICA, Japanese Embassy Courtesy Call on GARBLT, Explanation, Discussion of Basic Design Study with GARBLT
4	8/12	Mon.	Explanation, Discussion of Basic Design Study
5	8/13	Tue.	Discussion and Signing of Minutes (PM 8:30)
6	8/14	Wed.	Field Survey Jointly with GARBLT
7	8/15	Thu.	Report of Survey Results to JICA, Japanese Embassy
8	8/16	Fri.	Travel
9	8/17	Sat.	Travel
10	8/18	Sun.	Return to Japan

Second Field Survey (September 9, 1996 to September 18, 1996)

Day	Date	Day of Week	Survey Contents
1	9/9	Mon.	Travel
2	9/10	Tue.	Arrive in Cairo
3	9/11	Wed.	Courtesy Call on JICA, Japanese Embassy Courtesy Call on GARBLT, Explanation, Discussion of Draft Final Report with GARBLT
4	9/12	Thu.	Explanation, Discussion of Draft Final Report
5	9/13	Fri.	Meeting with the Survey Team
6	9/14	Sat.	Discussion and Signing of Minutes (PM 12:30) Team Leader & Grant Aid Program, Project Coordinator Discussion of S/W (up to 9/16)
7	9/15	Sun.	Discussion of S/W
8	9/16	Mon.	Discussion and Signing of S/W (Consultants Travel)
9	9/17	Tue.	Report to JICA, Japanese Embassy (Consultants Travel)
10	9/18	Wed.	Travel (Consultants Return to Japan)
11	9/19	Thu.	Travel
12	9/20	Fri.	Return to Japan

3. List of Party Concerned in the Recipient Country

Ministry of Foreign Affairs

Amb. Osama El Oshery Director of Japan & Two Korea's Department
Mr. Hany Salah Japan Department

Ministry of Economy & International Cooperation

Mr. Ahmed Ragaei First Under Secretary
Mr. Hassan Gaafar Japan Department
Mrs. Sabah Japan Department

Ministry of Transport & Communications

Eng. Fouad A. Khalil Chairman of Board of General Authority for Roads,
Bridges and Land Transport (GARBLT)
Mr. M. Sabry Selim Head of Land Transport & Financial Sector (GARBLT)
Eng. Mohamed Sharaf Head of the Central Department for Bridges (GARBLT)
Eng. Samir Labib Advisor (GARBLT)
Eng. Sanyout Welson Central Department for Bridges (GARBLT)
Mr. Onsy Fahim Transportation Planning Authority
Dr. Mourad M. Bakhoun Professor of Bridges, Cairo University
Eng. Alaa Mostafa Technical Office (GARBLT)
Eng. Emad Eldin Nabil Technical Office (GARBLT)

Suez Canal Authority

Eng. Imbabi Ismaiel Deputy Director of Engineering Department
Eng. Ali M. Abdel Fattah Manager of Works, Engineering Department

Ministry of Planning

Dr. Rashad El Mitiny Regional Planning Expert - United Nations Projects

4. List of Party Concerned of Japanese Side

Embassy of Japan in Egypt

Mr. Kunio Katakura	Ambassador
Mr. Mitsu Sakaba	Minister
Mr. Nobuhiko Ito	First Secretary
Mr. Akihiko Yahiro	First Secretary
Mr. Masahiro Danno	First Secretary

JICA Egypt Office

Mr. Shinichi Suzuki	Resident Representative
Mr. Hisatoshi Naito	Deputy Resident Representative
Mr. Yosuke Tamabayashi	Assistant Resident Representative

Minutes of Discussions
on
the Project
for
Construction of the Suez Canal Bridge

(Grant Aid Contact Mission- 4)

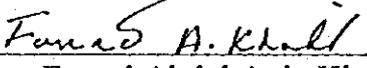
Subject : Basic Design Study
Duration : From 11th to 13 th August 1996
Place : Head Quarter
General Authority for Roads, Bridges and Land Transport.
Participants : Refer to Annex 10

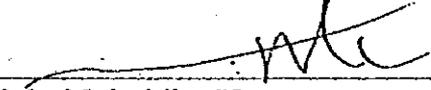
The Japan International Cooperation Agency (JICA) dispatched a study team to Egypt to conduct a study concerning the Basic Design Study on the Project for Construction of the Suez Canal Bridge. The Team held a series of discussions with the concerned officials of the government of Egypt from 11 to 13 August 1996.

As a result, both sides confirmed the items shown in the attached sheets.

The Team will continue the Study to prepare the Draft Basic Design on the Project.

Cairo, 13 August 1996


Eng. Fouad Abdel Aziz Khalil
Chairman of Board
GARBLT


Mr. Nobuhiko Hanazato
Leader
JICA Team

in witness 
Mr. Ahmed Ragaei
First Under Secretary
Ministry of Economy and
International Cooperation

1- Objective :

The objectives of the Project is to construct the Suez Canal Bridge which is essential to facilitate the development process of the Sinai Peninsula planned under NPDS, and hence to enhance development of the national economy.

The bridge's political importance is that it would connect two major continents, i.e. Africa & Asia, by providing a direct connection which is considered as one of the strong demands of the Organization of African Unity and the Arab League.

2- Role of Basic Design Study :

The Project will be implemented as a joint project by Egypt and Japan, and both sides will financially contribute to the Project (Egyptian side's construction share :40%, Japanese side's construction share :60%). The Japanese side will contribute to the Project by the Japan's Grant Aid Program. The Japanese side has so far made as much effort to respond to the Egyptian request for expediting the preparation of the Project through setting Basic Design and Detailed Design studies, which normally starts after completion of Feasibility Study, to be conducted in parallel with Feasibility Study. The Egyptian side draw the attention that the Study must abide with the date of the DPS approved before and the minutes of meetings that the end of the Study is by beginning of November 1996. The Egyptian side repointed that the Detailed Design and preparation of the Tender Documents are to be carried out in parallel to the Study to be finished at the same time. The Japanese side stated that this point will be conveyed to the concerned Japanese Authorities, although that the submission of the Detail Design's Final Report in the beginning of November is physically impossible. The Feasibility Study for the Project commenced in June 1995, is now progressing and of which the design work expected to be prepared in August 1996. Therefore, major role of Basic Design of the Project is to complete cost estimation in line with the Japan's Grant Aid Program.

3- Responsible Organization and Implementing Agency :

General Authority for Roads, Bridges and Land Transport (GARBLT).

4- Project Site :

The Project site is shown in ANNEX-1. The centerline of the bridge is at the location of 48 km + 505 m along the Suez Canal.

5-Work Allotment :

1- The construction works to be carried out by the Japanese side under the Japanese Grant Aid Program, and the construction works to be carried out by the Egyptian side are shown in ANNEX-2 (divided at F.L. 49.50 m).

2- Engineering works which consist of D/D, supervision for the whole bridge construction and design revision are to be carried out by the Japanese side.

6-Project Implementation Formation of the Egyptian side :

The ways & means of the Project Implementation of the Egyptian side, viz. budget allocation, tendering procedure, supervision are proposed by the Egyptian side as shown in ANNEX- 3.

7- Supervising Organization :

An organization for construction supervision for whole Project is proposed by the Japanese side as shown in ANNEX-4.

8-Land Acquisition :

The ways & means of land acquisition for the Project site were studied by both sides as shown in ANNEX-5. The Egyptian side assured that the period for land acquisition will be about three months.

9. Customs Duties and Sales Taxes:

Both sides confirmed that the customs duties concerning the Project will be exempted by the Egyptian People's Assembly decree.

The goods & services subject to Sales Taxes exemption, those rates and the procedure & time required for the taxes exemption are shown in ANNEX-6.

10- Liability for the Japanese Grant Aid :

The liability for the Project is explained in the schematic drawing shown in ANNEX-7.

11- Technology Transfer :

The ways & means of " on the job training " is proposed by the Japanese side as shown in ANNEX-8.

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12- Japanese Grant Aid Scheme :

The Egyptian side has understood the system of the Japanese Grant Aid explained by the Study Team of which the main feature is shown in ANNEX- 9.

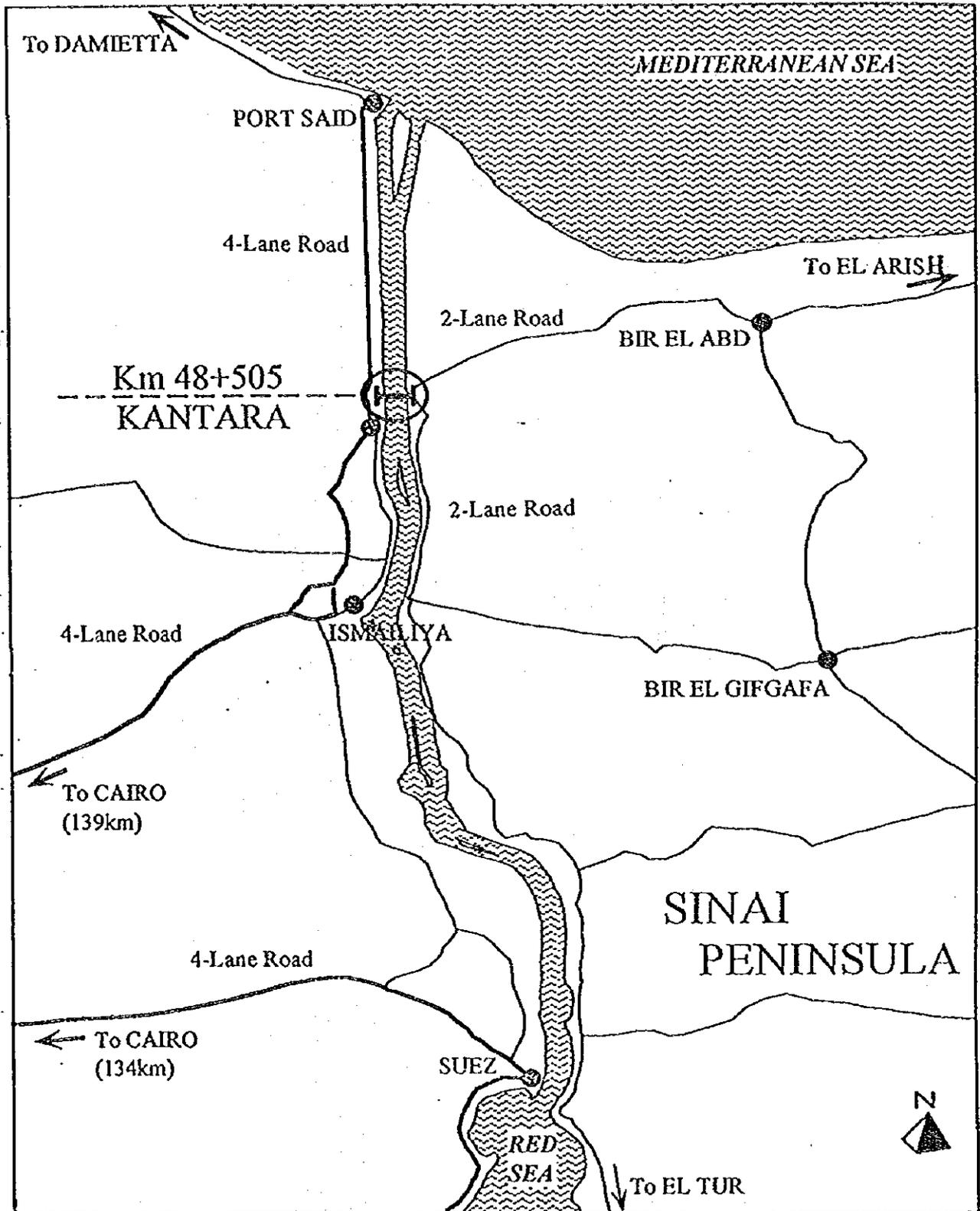
13- Further Schedule of the Study :

Based on the results of the Study, JICA will prepare a Draft Basic Design and dispatch a team in the beginning of September in order to inform the Egyptian side of the contents of the Draft Basic Design.

14- Schedule of the Relevant Studies Planned by JICA:

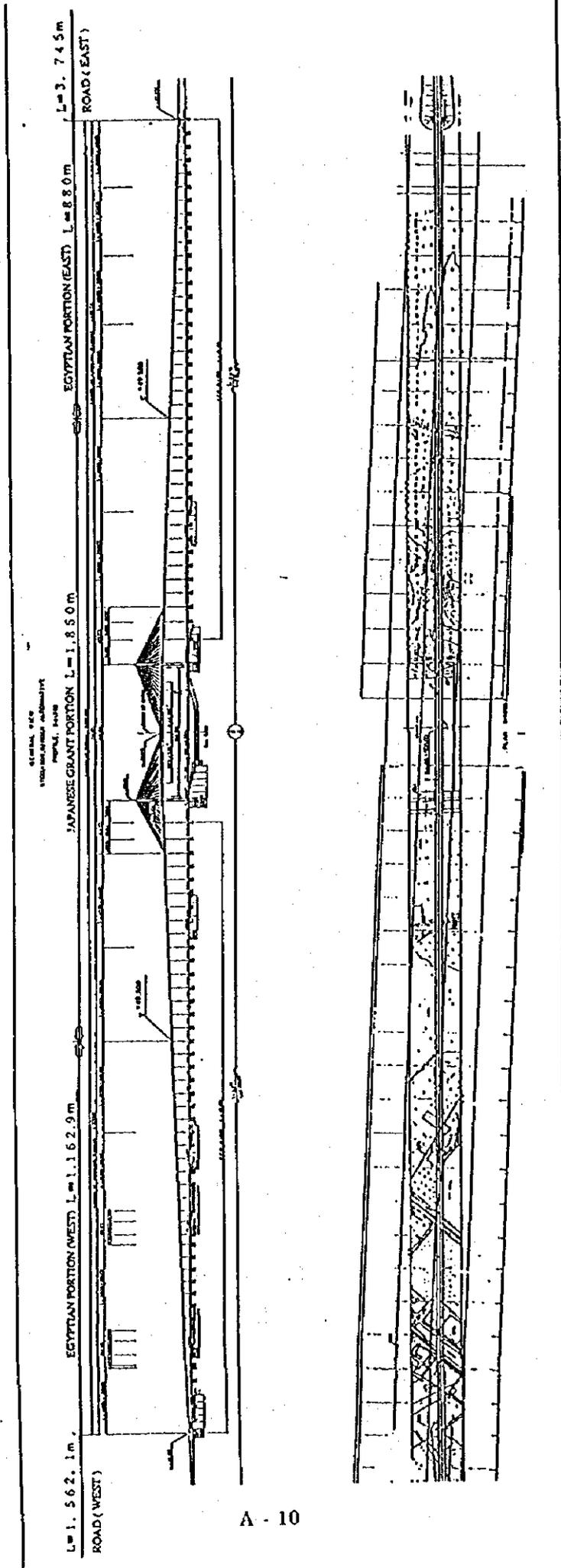
- 1) The Draft Final Mission for the Feasibility Study will be dispatched in the end of August 1996 in order to inform the Egyptian side of the contents of the Draft Final Report.
- 2) The Preliminary Study for the Detailed Design (to set up the Scope of Works for the Detailed Design) will be carried out by the official mission members of the Draft Basic Design Study Team in September 1996.

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Project Location Map.

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Project Implementation Formation of the Egyptian Side

THE PROJECT BUDGET :

The total share of Egypt is approximately US\$ 55.6 million which equals approximately L.E. 189.00 million L.E. plus about L.E. 97.90 million for costs of Egyptian undertakings.

GARBLT has requested the Ministry of Planning to allot the following allocations in its budget of the fiscal year 1996- 1997 which begins from first July 1996.

L. E. 3.00 Million for land acquisition and compensations
L. E. 38.00 Million as the advance payment representing 20% of the
works to be implemented by the Egyptian side

L.E. 41.00 Million in the budget of 1996/97

GARBLT has requested the Ministry of Planning to include the remaining budget of the project as follows :

1997-1998	L.E. 81.90 Million
1998-1999	L.E. 81.90 Million
1999-2000	L.E. 81.90 Million

- The above mentioned budget includes the Egyptian share in the direct cost of the project in addition to the taxes , customs duties , banking fees , connections of water and electricity to the site , land acquisition , etc. Which will be born by the Egyptian side.

TENDERING AND CONTRACTING :

The tendering of the Egyptian part will be made after receiving the D/D and tender documents.

- The Tender will be made separately for the work on each side of the Canal (Two Contractors).

- The Tender will be a short list tender between the specialized contractors registered at GARBLT.

- The closing date of the offers is tentatively planned to be at the beginning of Feb. 1997.

- Contractor selection and order to start is tentatively planned to be at the beginning of April 1997.

CONSTRUCTION SUPERVISION :

- Construction supervision for the whole project will be carried out by the consultant

GARBLT will provide an organization to supervise and follow up the work of the consultant according to the drawings and specifications to be prepared by the Consultant. The Supervising organization will constitute of :

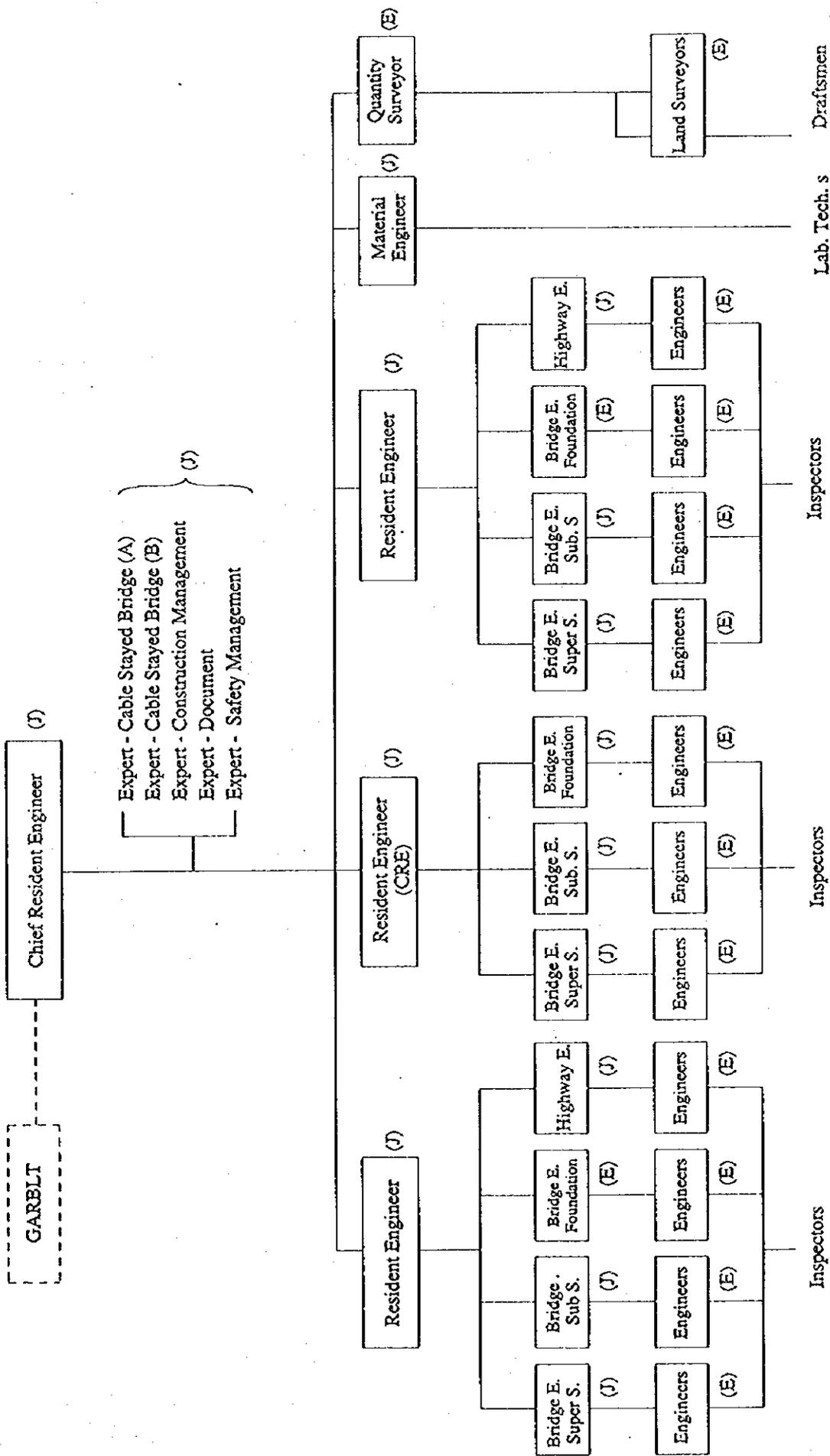
- PROJECT MANAGER	1
- CONSTRUCTION MANAGEMENT	1
- DOCUMENT MANAGEMENT	1
- SAFETY MANAGEMENT	1
- SUPERVISING SITE ENGINEERS	4
- MATERIAL TESTING ENGINEER	1
- CABLE STAYED BRIDGE ENGINEER	2
- QUANTITY SURVEYOR	1
- LAND SURVEYOR	2
- HIGHWAY ENGINEER	2
- TECHNICAL OFFICE	1
- QUALITY ASSURANCE	1

18 Engineers

The project Manager will coordinate the Project implementation with the Japanese consultant Firm.

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ORGANIZATION CHART FOR CONSTRUCTION SUPERVISION



Egyptian Portion (East)

Japanese Grant Portion

Egyptian Portion (West)

LAND ACQUISITION

TIME SCHEDULE OF LAND ACQUISITION :

- Three months after receiving the maps of the centerline of the bridge and the areas required for the implementation of the project which are currently prepared by the Japanese Consultant.

PROCEDURE FOR LAND ACQUISITION

- 1- Receiving the maps from the Japanese Consultant.
- 2- Approval of the maps after reviewing from the local councils of the Governorate and the Ministry of Agriculture.
- 3- Estimation of the compensation according to current prices.
- 4- Transfer of the compensation value to the account of the Survey Department. The Survey Department will pay the compensation amounts to the owners of lands and buildings.
- 5- The Prime Minister will issue a decree for acquisition of the required land.
- 6- The Survey Department will delineate the land on the site and hand it over to the implementing contractors.

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CUSTOMS DUTIES AND SALES TAXES

Sales taxes are fixed by law as 10% for equipments and rate with about (2-3%) on contracts of works, but the custom duties are decided according to the type of imported commodities. The re-export of the equipment owned by the Japanese Contractor is ruled by the Customs Regulations according to the type and condition of the equipment. The Custom Regulations does not include any objection to the re-exporting of an equipment that entered Egypt under temporary custom release.

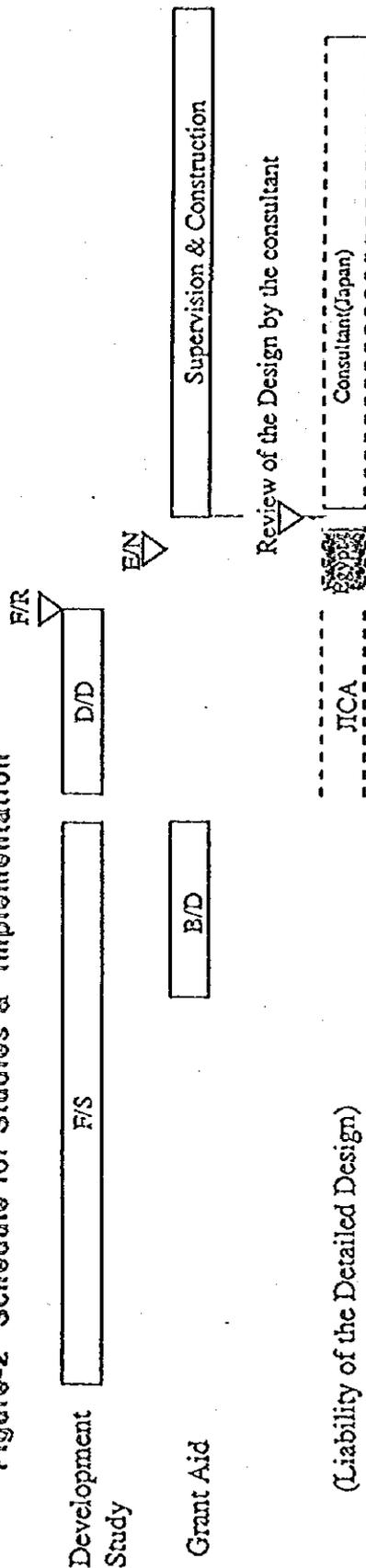
Time required for taxes exemption by the People's Assembly decree takes 30 - 60 days after the Exchange of Notes.

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Figure-1 General Idea for Liability

Work allotment	Egypt	Japan (Grant Aid)	Egypt
Design	Consultant (Japan)	Consultant (Japan)	Consultant (Japan)
Supervision	Consultant (Japan)	Consultant (Japan)	Consultant (Japan)
construction	Contractor (Egypt)	Contractor (Japan)	Contractor (Egypt)

Figure-2 Schedule for Studies & Implementation



(Liability of the Detailed Design)

Note: Liability for the Design will be born by the consultant after his design check (Review of the Design)

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TECHNOLOGY TRANSFER THROUGH ON-THE-JOB-TRAINING (OJT)

Technology Transfer will be performed in the course of the Consultant's Construction Supervision and Contractor's Construction Work , as follows:

(1) Construction Supervision

1) Technical Analysis Meeting

During the Construction Supervision Phase, Technical Meetings will be held for the benefit of the Egyptian Engineers at a suitable time where the Japanese Engineer will perform on the Lecture, which will include a Question/Answer sessions and exchange of ideas can take place. It is recommended that such sessions be held at least once a month.

2) On-the-Job-Training

In the performance of the daily work it is expected that the Egyptian Engineers will become acquainted with the Construction Supervision Methodology and learn the know-how through the joint work, the meetings and briefings.

(2) Construction Operation

1) Holding of Seminars

It is planned to hold Seminars for appropriately a group of GARBLT Engineers for about 2 weeks and lecture on Job Planning, Project Scheduling, Materials Quality Control, in the classroom and in the field. It is recommended that the Seminars be held 2 to 3 times a year.

2) OJT through Actual Field Work

It is expected that OJT of the long spanned cabled-stayed bridge, the toll pylons, high piers, and movable suspended staging which are all a part of this project and the effects of this process will be very large.

The groups in need of the OJT will be large and should be provided separately for Engineers and Supervisors.

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The Engineers and Supervisors should be provided with OJT for Quality Control, Scheduling, Safety, and Operations. This project will feature works to be performed in high places and over the Suez Canal and safety should be the key word in these sessions. The construction work will be conducted at 3 areas, and they will be internally inter-related and therefore the Scheduling should be addressed fully and conducted by the Japanese Engineers.

The OJT will be provided to Supervisors everyday through construction works on the site, and Supervisors will be accustomed with their works day by day.

The field works will have to be fully acquainted by Supervisors and Workers, and this will help to shorten the cycle terms.

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Japan's Grant Aid Scheme

1 Grant Aid Procedures

- 1) Japan's Grant Aid Program 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 Government 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 (the 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 (Japan International Cooperation Agency) to conduct a study on the request.

Secondly, JICA conducts the study (Basic Design Study), using (a) Japanese consulting firm (s) .

Thirdly, the Government of Japan appraises the project to see whether or not it is suitable for Japan's Grant Aid Program, 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 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 Japanese Government. The contents of the Study are as follows :

- a) Confirmation of the background, objectives, and benefits of the requested 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

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the Grant Aid Scheme from a technical, social and economic point 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
- e) Estimation of costs of the Project

The contents of the original request are not necessary 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 smooth implementation of the Study, JICA uses (a) registered consultant firm(s). JICA selects (a) firm(s) based on proposals submitted by interested firms. The firm(s) selected carry(ies) out a Basic Design Study and write(s) a report, based upon terms of reference set by JICA.

The consulting firm(s) used for the Study is (are) recommended by JICA to the recipient country to also work on the Project's implementation after the Exchange of Notes, in order to maintain technical consistency and also to avoid any undue delay in implementation should the selection process be repeated.

3. Japan's Grant Aid Scheme

1) What is Grant Aid?

The Grant Aid Program 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.

2) 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.



- 3) "The period of the Grant Aid" means the one fiscal year which the Cabinet approves the Project for. Within the fiscal year, all procedures such as exchanging of the Notes, concluding contracts with (a) consultant firm(s) and (a) contractor(s) and final payment to team 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.

- 4) Under the Grant Aid, 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.)

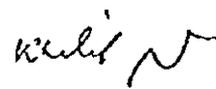
- 5) Necessity of "Verification"

The Government of 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.

- 6) Undertakings required of 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 :

- (1) To secure land necessary for the sites of the Project and to clear, level and reclaim the land prior to commencement of the construction.
- (2) To provide facilities for the distribution of electricity, water supply and drainage and other incidental facilities in and around the sites.
- (3) To secure buildings prior to the procurement in case the installation of the equipment.
- (4) To ensure all the expenses and prompt execution for unloading, customs clearance at the port of disembarkation and internal transportation of the products purchased under the Grant Aid.
- (5) To exempt Japanese nationals from customs duties, internal taxes and other fiscal levies which will be imposed in the recipient country with respect to the supply of the products and services under the Verified Contracts.



- (6) 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.

(7) "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 staff necessary for this operation and maintenance as well as to bear all the expenses other than covered by the Grant Aid.

(8) "Re-export"

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

(9) Banking Arrangements (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 an authorized foreign exchange 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 issued by the Government of the recipient country or its designated authority.

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List of Participants**A- Egyptian Side****Ministry of Foreign Affairs**

Amb. Osama El Oshery Director of Japan & two Korea's
department .

Mr. Hany Salah Japan Department

Ministry of Economy & international Cooperation

Mr. Ahmed Ragaei First under secretary .

Mr. Hassan Gaafar Japan department .

Mrs. Sabah Japan department .

Ministry of Transport & Communications

Eng. Fouad A. Khalil Chairman of board of General Authority for
Roads, Bridges and Land Transport
(GARBLT) .

Mr. M. Sabry Selim Head of Land Transport & Financial Sector
(GARBLT) .

Eng. Mohamed Sharaf Head of the Central department for bridges
(GARBLT) .

Eng. Samir Labib Advisor (GARBLT) .

Eng. Sanyout Welson Central department for bridges (GARBLT)

Mr. Onsy Fahim Transportation Planning Authority

Dr. Mourad M. Bakhoum Professor of bridges, Cairo university .

Khalil N

Eng. Alaa Mostafa

Technical office (GARBLT).

Eng. Emad ELDin Nabil

Technical Office (GARBLT).

Suez Canal Authority

Eng. Imbabi Ismaiel

Deputy director of engineering department .

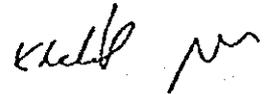
Eng. Ali M. Abdel Fattah

Manager of works, engineering department .

Ministry of Planning

Dr. Rashad El Mitiny

Regional Planning Expert - United Nations
Projects



B: Japanese Side:-

Grant Aid contact Mission -4 :

Mr. Nobuhiko Hanazato	Second Project Study Division
Leader	Grant Aid Project Study Department
	Japan International Cooperation Agency (JICA).
Mr. Takanobu Kuroda	Grant Aid Division, Economic
Grant Aid Program	Cooperation Bureau, Ministry of Foreign Affairs.
Mr. Hiroyuki Endo	Pacific Consultant International
Chief Consultant	
Mr. Yassuo Furukawa	Pacific Consultant International
Construction Planner	
Mr. Kenichi Nakane	Chodai
Quantity Surveyor	

Embassy of Japan:

Mr. Masahiro Danno 1.st Secretary

JICA Egypt Office:

Mr. Yosuke Tamabayashi Assistant Resident Representative .

Mr. Mahmoud Abdel Halim

STUDY TEAM :

Dr. Nabil Sehsah PCI Cairo office

Nabil N

Minutes of Discussions
on
the Basic Design Study
on
the Project for Construction of the Suez Canal Bridge
in
the Arab Republic of Egypt

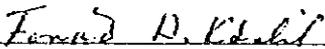
(Explanation on the Draft Basic Design)

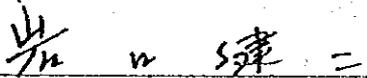
In August 1996, the Japan International Cooperation Agency (hereinafter referred to as "JICA") dispatched the Basic Design Study Team on the Project for Construction of the Suez Canal Bridge (hereinafter referred to as "the Project") to the Arab Republic of Egypt (hereinafter referred to as "Egypt"). After the assessment of the data and information obtained through the study, JICA has prepared the Draft Basic Design on the Project.

In order to explain and consult the government of Egypt on the components of the Draft Basic Design, JICA sent to Egypt a Study Team headed by Mr. Kenji IWAGUCHI, Managing Director, Grant Aid Project Study Department, JICA, which is scheduled to stay in the country from September 10 to 14, 1996.

As a result of the discussions , both parties have confirmed the main items described in the attached sheets.

Cairo, September 14, 1996


Eng. Fouad Abdel Aziz Khalil
Chairman of Board
GARBLT


Mr. Kenji IWAGUCHI
Leader
JICA Team

in witness


Mr. Ahmed Ragaci
First Under Secretary
Ministry of Economy and
International Cooperation

ATTACHMENT

1. OBJECTIVE

The objective of the Project is to construct the Suez Canal Bridge which is essential to facilitate the development process of the Sinai Peninsula planned under NPDS, and hence to enhance development of the national economy.

The Project proposes measures to cope with the increase in the road traffic across the Suez Canal in the form of a road bridge. The road bridge construction is already fixed as a part of the development scheme and has a large political and economical importance. The Suez Canal Bridge will be a symbol of progress for the Middle East peace process and is also expected to contribute to the development of not only Egypt but also the whole North and East Mediterranean area, as it connects the two major continents of Asia and Africa.

2. PROJECT IMPLEMENTING AGENCY

The General Authority for Roads, Bridges and Land Transport (GARBLT), Ministry of Transport and Communications, is responsible for the administration and execution of the Project.

3. PROJECT SITE

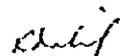
The Project site at Qantara is shown in ANNEX-1. The centerline of the bridge is at the location of 48km +/- 505m along the Suez Canal.

4. DRAFT BASIC DESIGN

The Egyptian side has agreed in principal to the components of the Draft Basic Design proposed by the Team, with some comments made to the Draft Final Report of the Feasibility Study which will be incorporated into the Final Report of the Feasibility Study and Basic Design Report.

5. JAPANESE GRANT AID SCHEME

Both sides reconfirmed the understanding of the Japanese Grant Aid Scheme as mentioned in the Minutes of Meetings signed 13 August 1996.



6. CONSTRUCTION SCHEDULE

The Japanese side explained the detailed construction schedule referring to the Draft Basic Design Report (2-1-7, Implementation Schedule).

The Egyptian side stated that the construction period of three (3) years nine (9) months is too long, and can not be accepted as the elongated estimated time for certain items. The Egyptian side requested the Japanese side to shorten the total construction period to be not more than three (3) years.

The Japanese side stated that the proposed schedule is technically the most appropriate construction schedule according to the data and information available at present. The Japanese side stated that they will further review the construction schedule through the Detailed Design.

Both sides, however, agreed that the construction schedule should be fixed by the beginning of November 1996, for the smooth implementation of the Project.

7. NECESSARY MEASURES TO BE TAKEN BY THE EGYPTIAN SIDE

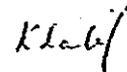
The Egyptian side will take necessary measures described in Annex-2 for smooth implementation of the Project on condition that the Grant Aid by the Government of Japan is extended to the Project.

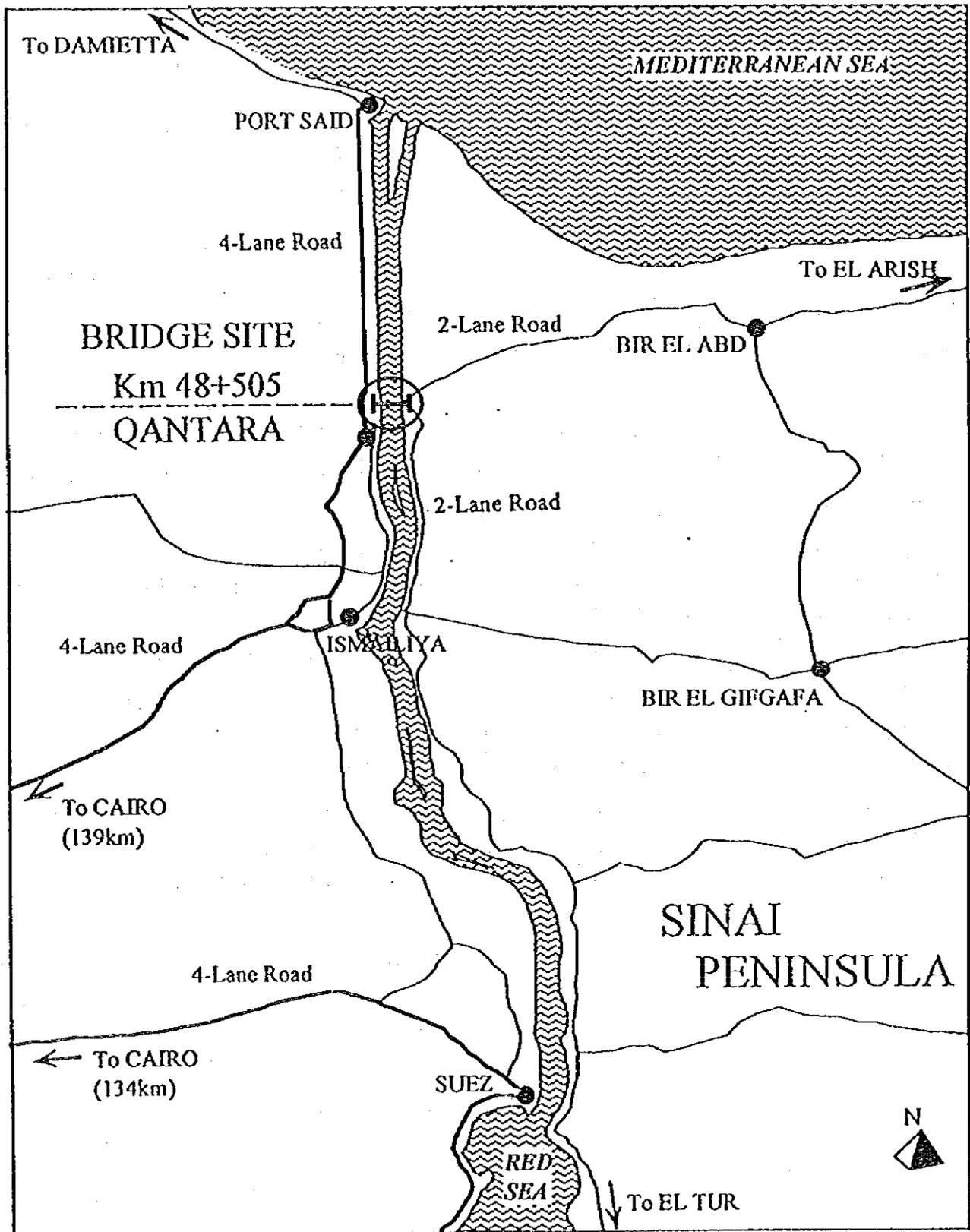
8. FURTHER SCHEDULE OF THE STUDY

JICA will complete the Basic Design Report and forward it to the Egyptian side by the end of October 1996.

9. PARTICIPANTS OF THE MEETINGS

List of the participants is shown in Annex-3.





Project Location Map

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NECESSARY MEASURES TO BE TAKEN BY THE EGYPTIAN SIDE

Following necessary measures should be taken by the Egyptian side on condition that the Grant Aid by the Government of Japan is extended to the Project:

1. To provide data and information necessary for the Project.
2. To secure the land necessary for the execution of the Project, such as the land for bridge, temporary offices, working areas, storage yards and others.
3. To clear the sites prior to the commencement of the construction.
4. To provide facilities which are essential for execution of the Project, such as water and electricity.
5. To bear commissions to the Japanese foreign exchange bank for its banking services based upon the Banking Arrangement, namely the advising commission of the "Authorization to Pay" and payment commission.
6. To ensure prompt unloading, tax exemption, customs clearance at the port of disembarkation in Egypt and prompt internal transportation therein of the materials and equipment for the Project purchased under the Grant Aid.
7. 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 Egypt with respect to the supply of the products and services under the verified contracts.
8. 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 Egypt and stay therein for the performance of their work.
9. To provide necessary permissions, licenses and other authorizations for implementing the Project, if necessary.
10. To maintain and use properly and effectively the facilities constructed under the Project.
11. To coordinate and solve any issues related to the project which may be raised from third parties or inhabitants in the Project area during implementation of the Project.

List of ParticipantsA- Egyptian side

1) Ministry of foreign affairs

Mr. Ahmed Shahin 3rd secretary , Japan and two Koreas department

2) Ministry of economy and international cooperation

Mr. Ahmed Ragaie First under secretary
Mr. Hassan Gaafar Japan department
Mr. Sabah Fahim Japan department

3) Ministry of Transport and Communications:-

Eng. Fouad A. Khalil chairman of board of General Authority for Roads, Bridges and land Transport (GARBLT)

Eng. Mohammed Sabry Seleem Head of land Transport and financial affairs sector (GARBLT)

Eng. Mohammed Sharaf Head of Bridges department (GARBLT)

Eng. Samir Labib Consultant of Bridges (GARBLT)

Eng. Sanyout Welson Director of Bridges department

Mr. Onsy Fahim National planning Authority

Dr. Mourad M. Bakkoum Professor of Bridges, Cairo University

Eng. Alaa Moustafa Technical office

Eng. Emad ELDin Nabil Technical office

4) Ministry of planning

Dr. Rashad ElMitiny Transport planner, UN project



B- Japanese side

1) Japanese Mission

Mr. Kenji Iwaguchi Leader	Managing Director, Grant Aid Project Study Department (JICA)
Mr. Nobuhiko Hanazato Coordinator	Second Project Study Division Japan International Cooperation Agency (JICA)
Ms. Hiroko Yamamoto Grant Aid Program	Grant Aid Division, Economic Cooperation Bureau, Ministry of Foreign Affairs
Mr. Hiroyuki Endo Chief Consultant	Pacific Consultant International
Mr. Yasuo Furukawa Consultant planner	Pacific Consultant International
Mr. Kenichi Nakane Quantity Surveyor	Chodai Consultant

2) Embassy of Japan in Egypt

Mr. Akihiko Yahiro	1 st Secretary
Mr. Masahiro Danno	1 st Secretary

3) JICA Egypt office

Mr. Hisatoshi Naito	Deputy Resident Representative
Mr. Yosuke Tamabayashi	Assistant Resident Representative
Mr. Mahmoud Abdel Halim	Project Coordinator

4) Study Team

Dr. Nabil Sehseh	PCI Cairo office
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Kenji



6. Cost Estimation Borne by the Egyptian Side

The portion of the construction cost to be borne by the government of Egypt is estimated to be 60 million US\$.

Unit: million US\$

(1)	Construction cost	58.5 M\$
	a. Net construction cost	(42.1)
	b. Site overhead cost	(14.3)
	c. Common temporary works	(2.1)
(2)	Land acquisition, etc.	1.5 M\$
	Total	60.0 M\$

Condition for estimation:

- 1) Date of estimation: July '96
- 2) Exchange rate: US\$1 = 3.4 LE
- 3) Duration of construction: 5 years. The duration for work facilities, construction, material supply for each year is as indicated in the work schedule.

7. References

- A. Sector Brochure of GARBLT, GARBLT
- B. Bridge Construction Examples, GARBLT (Arabic)
- C. Design Standard of Highway, GARBLT
- D. Design Standard for Road Alignment, GARBLT
- E. Truck Type for Special Highway, GARBLT
- F. Preparation and Implementation of Road Projects, GARBLT (Arabic)
- G. Seismic of Egypt, JL. Egyptian Society of Engineers
- H. The Vessel Traffic Navigation System, SCA
- I. Geotechnical Survey Report, SCA
- J. Investigation of UBC - Equivalent Seismic Zonation for Cairo, Egypt, Bechtel Geotechnical and Hydraulic Engineering Services

JICA