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No. 08

REPORT OF STUDY

ON THE DEVELOPMENT PLAN

OF

INDUSTRIAL PORTS IN MEXICO

1981 March

Japan International Cooperation Agency

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PREFACE

In response to a request of the Government of the Republic of Mexico, the Japanese Government decided to conduct a survey on coastal industrial zone development project in Mexico and entrusted the Japanese International Cooperation Agency (JICA) with the study.

The JICA sent to Mexico a study team headed by Mr. Yoshio Takeuchi three times from July 1980 to February 1981. The team exchanged views with the officials concerned of the Government of Mexico and conducted a field survey in the project areas of the country.

The team, submitting an interim report to the Government of Mexico and having made further studies on the project, has completed the present report.

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

I wish to express my deep appreciation to the officials concerned of the Government of the Republic of Mexico for their close cooperation extended to the team.

March, 1981

Keisuke Arita

Keisuke Arita
President
Japan International Cooperation Agency

LETTER OF TRANSMITTAL

Mr. Keisuke Arita, President
Japan International Cooperation Agency

Dear Mr. Arita,

It is my great pleasure to submit the report for the technical cooperation to C.P.D. on the coastal industrial zone development study in Mexico, in the Republic of Mexico.

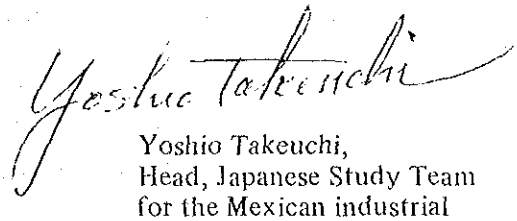
The Japanese study team which I leaded, carried out field surveys in Mexico from 23 July to 12 August 1980, 10 November to 26 November 1980 and 26 January to 15 February 1981, at the request of the Japan International Cooperation Agency. This report was formulated in an intention to contribute the transfer of planning techniques for ports to the Coordinacion de Proyectos de desarrollo in the President office of the Republic, through the discussions and recommendations on the problems and studies accompanied within the planning and construction of new industrial ports in the country.

It is regarded as significant and urgent to complete the port project in Mexico, so I hope the results of our study will contribute to the development of the project.

On behalf of the Japanese Study Team, I would like to express my deep appreciation to the Government of Mexico, Coordinacion de Proyectos de Desarrollo, Secretario de Comunicaciones y Transportes and other organizations concerned for their ultimated cooperation and assistance.

I am also indebted to the Japan International Cooperation Agency, the Ministry of Transport, the Ministry of Foreign Affirs, the Japanese Embassy in Mexico City, the J.I.C.A. office in Maxico and many Japanese companies having branches in Mexico city, for giving us valuable suggestions and assistance in the field study and in the preparation of this report.

Sincerely yours,

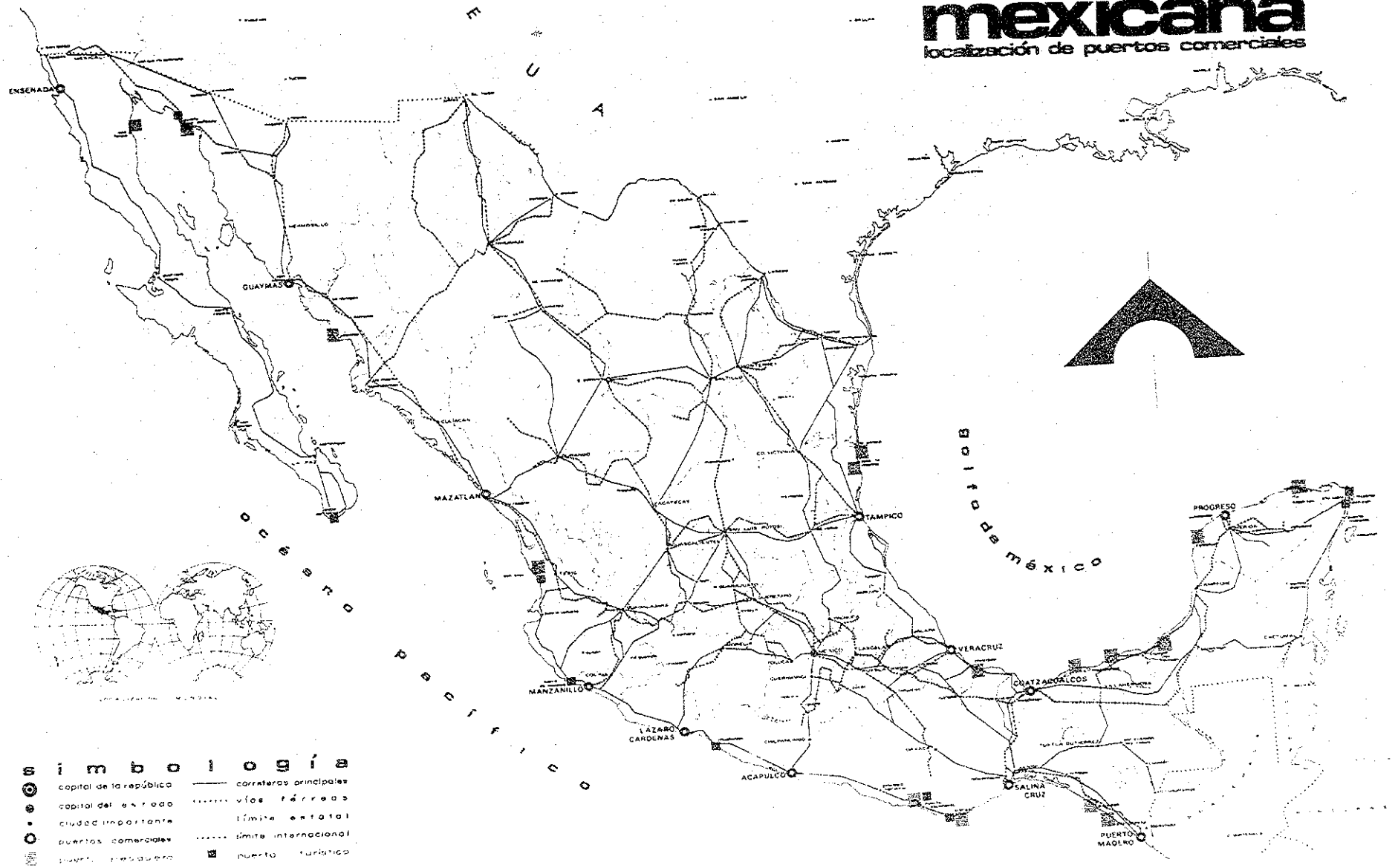


20 March 1981

Yoshio Takeuchi,
Head, Japanese Study Team
for the Mexican industrial
Port Project (President,
Overseas Coastal Area Development
Institute of Japan)

república mexicana

localización de puertos comerciales



simbología

- capital de la república
- capital del estado
- ciudad importante
- puertos comerciales
- puerto petrolero
- carreteras principales
- vías férreas
- límite estatal
- límite internacional
- puerto turístico

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Outline of the Study

Chapter I Outline of the Study

1-1. Background of the Study

After the President of the Republic changed to Mr. Lopez Portillo, the industrial development policy of the nation has turned positive drastically. The petroleum production was limited to the domestic consumption considering reservation of the resource, however, a new policy aims to promote the national industrial development by exporting the oil as a new strategy to introduce a financial base on the project. When the rate priminister of Japan, Mr. Ohira visited the country in May 1980, the oil export to Japan was discussed as a main subject. The relation between Mexico and Japan is getting closer in relation with the petroleum trade.

The government of Mexico has decided to construct four new industrial ports along its coast. The industrial port project includes the ports as follows:

(1) Lázaro Cárdenas, Michoacan, along the Pacific Coast, closest of all to the Mexico city
(2) Láguna del Ostión, Veracruz, along the Gulf, close to the Coatzacoalcos port, expected to develop with petroleum industries
(3) Altamira, Tamaulipas, along the Gulf, close to the Tampico port
(4) Salina Cruz, Oaxaca, along the Pacific coast, expected to develop with petroleum related facilities.

The allocation of the industrial ports are shown in Fig. 1-1-1.

These four new industrial ports are going to be built by dredging into the wide land of lagoons or swamps or unused grassy plains just in a same way as ports of Kashima and Tomakomai in Japan. A large scaled industrial area will be constructed at the new coastal area accompanied by a man made port as its core for each project site. The industrial areas will be as wide as the one in Kashima or twice of that.

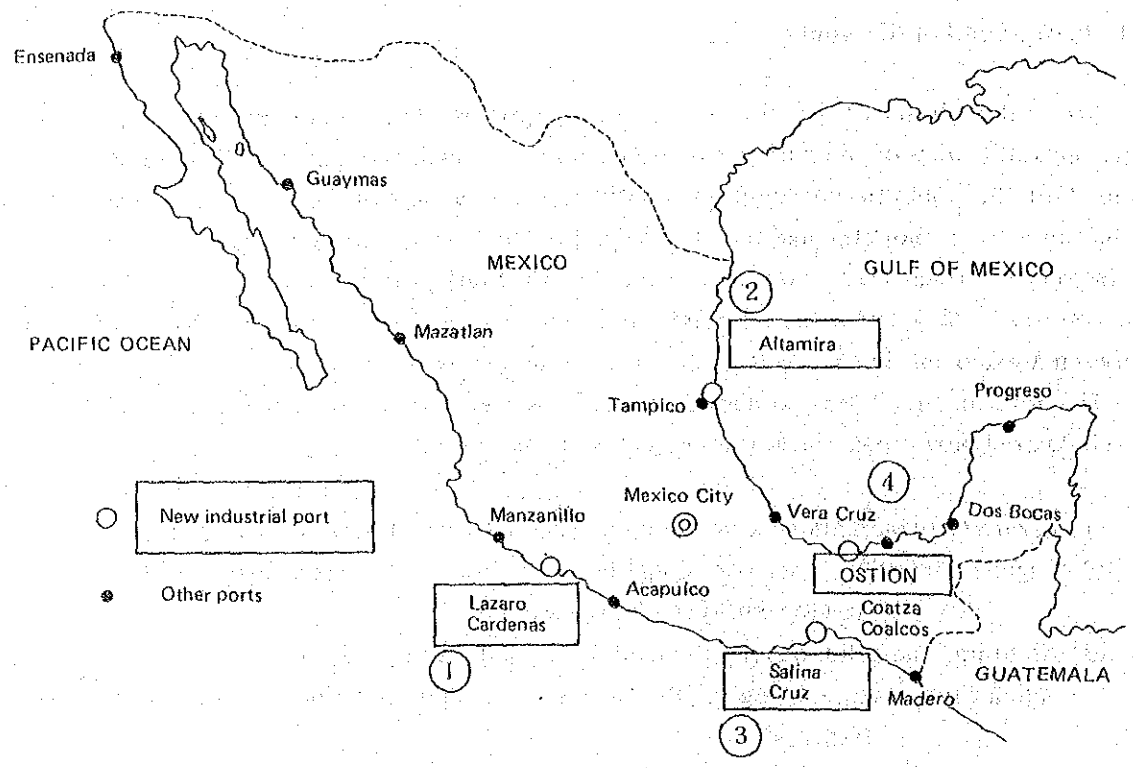
The government of Mexico has invested already a considerable amount at the works in Lazaro Cardenas port, where a steel plant has started its operation in Sicartsa area and the expansion works of port are undergoing. The Altamira port near the Tampico has just commenced its construction works in which a Japanese firm is taking a part in dredging.

1-2. Object and Content of the Study

1-2-1 Object of the Study

The object of this study is to conduct the technical cooperation on the coastal industrial zone construction in Mexico with the concurrence of the government of the Republic of Mexico, through the study we aim to contribute the industrial port planning currently carried out by Coordination de Proyectos de Desarrollo, Presidencia de la Republica by through the discussions and recommendations upon various problems resulted from the planning and execution works for the new industrial ports in the country.

Fig. 1-1-1 The location of new industrial ports in Mexico



1-2-2 Content of the Study

The content of the study is shown as follows:

(1) A Study on the allocation policy of industries and ports in Mexico

to conduct the discussions on the fundamental policy for the national allocation programme of industries and discussions on the fundamental policy for the introduction of a commercial port function into the new industrial ports.

(2) A study on the construction and administrating systems for the industrial port and its realization policy

to conduct discussions on the fundamental policy to establish a powerful port management body and to give prompt functions to the new organization for constructing and managing the new industrial port.

(3) A Study on the problems arrisen during the planning and designing works of the basic facilities of the new industrial ports

to conduct discussions on the planning and designing problems for the basic facilities of the industrial port, such as navigation channel, mooring basin, breakwater, quaywall and so on.

to introduce the examples of our country to ease the solution of the problems

to carry out a individual study on some definite problems technically when inquired by Mexican authorities.

(4) A study on the systematic survey requirement for the industrial port planning

to conduct discussions on a systematic survey for the natural conditions, such as earth sampling, current, wave, sand drift etc., currently carried out by Mexican authorities.

to prepare the most required recommendations on the fundamental articles in the survey plans and survey techniques through the planning and executing processes of the industrial port project.

(5) A study on the man power planning for the construction, management and operation of the industrial ports

to conduct discussions on the education and training system of man power for the industrial ports

to recommend a fundamental policy for the education and training operations.

(6) Data preparation and report making ,which is required after the field surveys and discussions in Mexico.

to conduct the preparation of materials to be accompanied with the visits, making field survey report and some studies on the identified subjects after returning back to Japan.

to submit a interim report in English for each visit to Mexico and a final report in English and one in Japanese.

1-3 Field Studies in Mexico

1-3-1 Method of Study

The method of study could be devided into:

(1) discussion for the reconnaissance

(2) visiting to the planning sites

(3) studying on the source materials

The institutions where the team visited during the study mainly as;

(1) Coordinacion de Proyectos de Desarrollo, Presidencia de la Republica
(C.P.D.) ≒ Cordination of Developing Projects

(2) Secretario de Comunicationes y Transportes
(S.C.T.)
Subsecretaria de Puertos y Marina Mercante
Direction General de Obras Maritimas
≒ Port and Harbour Bureau

(3) Secretaria de Asentamientes Humanes y Obras Publicas
(S.A.H.O.P.)
≒ ministry of public works

(4) Fondo National para los Desarrollos Portuarios
(Fondeport)

(5) Petroleos Mexicanos (PEMEX)

(6) Proyestos Marinos SC (Consultant firm)

(7) CIFSA (Consultant firm)

The sites where the team visited during the three missions are;

(1) Altamira industrial port site,
with Tampico port nearby and a proposed quarry; 160 KM apart

(2) Lázaro Cárdenas industrial port, site,
with Morelia, the capital of Michoacan State

(3) Laguna de Óstion industiral port site
with Coatzacoalcos port and Pajaritos oil loading port nearby

(4) Dos Bocas oil loading port
underconstrucion in Tabasco State

(5) S.C.T. Hydraulic Model Study Station
in Mexico City

1-3-2 The Missions

(1) Three missions are despatched to Mexico, according to the schedule as follows:

First mission:
1980, July 23 – 1980, August 12 — 21 days

Second mission:
1980, November 10 – 1980, November 26 — 17 days

Third mission:
1981, January 26 – 1981, February 15 — 21 days

Leader of the survey team;
Mr. Yoshio Takeuchi (for 1st, 2nd and 3rd missions)
President, Overseas Coastal Area Development Institute of Japan

Member of the survey team;
Mr. Akio Ogo (for 1st and 3rd mission)
Director, Engineering Division, Overseas Coastal Area Development Institute of Japan
Mr. Takao Saito (for 2nd mission)
Advisor, Overseas Coastal Area Development Institute of Japan

(2) Interim Reports

At the end of each mission a Spanish interim report was prepared in Mexico, which was translated into English in returning Japan and was sent to Mexico (for 1st and 2nd mission, 3rd mission report was prepared and contained in the final report)

1-3-3 List of Counterparts in Mexico

The counterparts for the study were as follows:

(1) C.P.D.

Lic. Julio Rodolfo Moctezuma Cid	Director General.
Lic. Enrique Azuara Salas	
Dr. Fernando Resonzweig	Director Gerencia de puertos industriales
Ing. Juan F. Valera Adam	
Ing. Hector Lopez	
Lic. Javier Villegas Serralta	
Lic. Eduardo Pontones Chico	
Ing. Guillermo Macdonel M.	
Lic. Ricardo Ortiz Certucha	
Lic. Felipe Alonzo G.	
Lic. Alfonso Alarcon Morali	Chief Altamira office
Ing. Octavio Diaz de León	
Lic. Mario Aguilar Grajales	Asesor

SAHOP	
Ing. Jaime Luna Traill	Director General de Planeacion
Dr. Daniel Ramos	Fonde Port, Director de Administration de Service Portuarios
Lic. Maria Alma Montaño	Fonde Port, Director *Altamira* Office
SCT	
Ing. Jose Juan Velarde Bonnin	Subsecretario, sub-secretaria de Puertos y Marina Mercante
Ing. Mario Enrique Villanueva Reyes	Director General de Obras Maritimas
Ing. Jaime Jaramillo Vazquez	Director Direccion Genera de Operation Portuaria
Ing. Hiraku Moriguchi	JICA/SCT Expert
Ing. Noriyuki Mochizuki	JICA/SCT Expert
PEMEX	
Ing. Antonio Montes de Oca S.	Gemente de Proyectos y *Construccion*
Ing. Francisco Garcia Mercado	Representante de PEMEX en Proyectos Marinos
Proyectos Marinos	
Ing. Alberto Barnetche	Director General
Ing. Francisco Mendoza von Borstel	Gemente de la terminal Maritima de *Dos* Bocas
Ing. Alfred Lopez Gutierrez	
CIFSA	
Ing. D. Cervantez C.	Director
MICHOACAN STATE	
Ing. Alfonso Vaca M.	Secretario Particular del Gobernador
Lic. Miguel Garcia Flores	Secretario de Fornento Industrial Del Gobierno de Michoacan
JICA	
Akio Suzuki	Director JICA Mexico Office

1-3-4 Record of Visits

The timetables for the three visits to Mexico are attached here according to the visiting order.

(1) RECORD OF THE FIRST SURVEY TO THE MEXICAN INDUSTRIAL PORTS CONSTRUCTION PLANNING STUDY

Date	Time	Place	Remarks
July:			
23 (Wed)	1800 hrs	Arr. at Mexico City	JL62. Met by Director Suzuki of JICA and Expert Moriguchi.
24 (Thu)	10–1400	Japanese Embassy and JICA Office	Briefing on schedule; survey policy confirmed.
25 (Fri)	10–1400	Coordinacion de Proyectos de Desarrollo (CPD)	Discussion, progress of port Altamira.
	16–1800		Discussion, trend in industrial location.
28 (Mon)	9–1400	CPD	Discussion on multipurpose terminal, Altamira.
	16–1900	〃	Discussion on planning theory, and container planning.
29 (Tue)	9–1400	CPD	Discussion on Ostión Port planning and work schedule.
	16–1730	〃	Discussion on Salia Cruz Port planning.
	1730–1900	Japanese Embassy	Meeting with Ambassador Matsunaga and First Secretary Kanno.
30 (Wed)	6–1400	Lazáro–Cárdinas	Field inspection.
	16–1800	CPD	Discussion on policy to induce business to Altamira and location.
31 (Thu)	9–1400	SCT	Hydraulic Laboratory, models of Ostión and Salia Cruz Ports.
	16–1900	CPD	Meeting with a business group on distribution.
August:			
1 (Fri)	9–1400	SCT Obras Maritimas	Discussion on the technical aspect of industrial port planning. Planning and ordering for Altamira Port wharves.
	14–1600	SCT luncheon	
	1630–1800	CPD	Discussion on survey of natural conditions.
	19–2100	Official residence of Ambassador Matsunaga	Party.

Date	Time	Place	Remarks
4 (Mon)	10–1400	SCT Vice-Minister, Bureau of Ports	Discussion on the formulation of a master plan, technical aspect of each port, distribution and earthquake countermeasures.
	16–1930	CPD	
5 (Tue)	630–1900	Field inspection	Salina Cruz – Dos Bocas – Coatza Coalcos – Minatitran – Ostión port site – Tampico.
6 (Wed)	830–1630	Field inspection	Altamira and quarry (160 km Inland) – Mexico City.
7 (Thu)	8–1530	CPD	Preparation of report.
	17–1730	Japanese Embassy	Reporting to Ambassador Matsunaga.
	18–1930	CPD	Preparation of report, translation and typing.
	2000–	Party	Mexican staff of CPD and SCT invited.
8 (Fri)	8–1400	CPD	Spanish translation of report, typing. Discussion on training of Mexican personnel in Japan.
	16–1800	CPD	Final briefing, report to be confirmed.
	2000–	Home of Dr. Rosenzweig	CPD farewell party.
9 (Sat)	11–1300	Home of Mr. Moctezuma, Chairman of Coordinacion de Proyectos de Desarrollo	Reporting to Mr. Moctezuma returning from Brazil in the night of Aug. 8.
10 (Sun)		Leaving Mexico	Via San Francisco.
12 (Tue)	1800	Arriving at Narita	JL001.

(2) RECORD OF THE SECOND SURVEY TO THE MEXICAN INDUSTRIAL PORTS CONSTRUCTION PLANNING STUDY

Date	Time	Place	Remarks
November:			
10 (Mon)	1800 hrs	Arrive at Mexico	JL012, Met by Mr. Ogawa Japanese Embassy and Director Suzuki of JICA
11 (Tue)	1100	Japanese Embassy and JICA Office	Briefing on schedule; survey policy confirmed.
	12–1400	Coordinacion de Proyectos de Desarrollo (CPD)	Briefing on schedule; survey policy confirmed. Discussion on multipurpose terminal, Altamira.
	1630–1900		Discussion on R/D of first mission
12 (Wed)	9–1200	PEMEX, Proyectos Marinos and CIFSA	Discussion on Salia Cruz Port planning.
	12–1400	CPD	Discussion on Ostión Port planning and work schedule.
13 (Thu)	10–1400	SCT	Hydrualic Laboratory, models of Ostión and Salia Cruz Ports.
	17–2000	CPD	Discussion, progress of port Altamira.
14 (Fri)	9–1200	CPD	Project management of Altamira Port
	12–1400	〃	Dredging Programme of TUM of Altamira Port
	16–1730	CPD	Phisycal Distribution system and Inland Transport system of Mexico
17 (Mon)	7–1730	Field inspection	Altamira and Tampico Ports – Villahermosa – Mexico City
18 (Tue)	8–2100	Field inspection	– Dos Bocas – Coatzacoalcos
19 (Wed)	9–1400	CPD	Discussion on site visits, Planning of Altamira. Das Bocas and Ostion Ports Final Report Briefing to Mr. Moctezuma
	18–2000	Japanese Shipping Companies	Meeting on the shipping problems in Mexican Ports.
20 (Thu)		Holyday	Preparation of the Report.
21 (Fri)	900	CPD	Preparation of report.
	1030	Japanese Embassy	Reporting to Ambassador Matsunaga and Director Suzuki of JICA
	1100	〃	Meeting with Mr. Taguchi of IHI
	11–2000	CPD	Preparation of report, translation and typing.

Date	Time	Place	Remarks
24 (Mon)	1100	PEMEX	Meeting with Sr. Montes de Oca (Vice president of PEMEX)
	1600	CPD	Final briefing, report to be confirmed.
25 (Tue)	1000 hrs	Leaving Mexico	
26 (Wed)	1800	Arriving at Narita	JL011.

(3) RECORD OF THE THIRD SURVEY TO THE MEXICAN INDUSTRIAL PORTS CONSTRUCTION PLANNING STUDY

Date	Time	Place	Remarks
1981 JANUARY:			
26 (Mon)	1800 hrs	Arrive at Mexico	JL012 Met by Director Suzuki of JICA
27 (Tue)	10–1400	Coordinacion de Proyectos de Desarrollo (CPD)	Briefing on schedule; survey policy confirmed. Discussion on R/D of second mission.
	17–1900	Japanese Embassy and JICA Office	Briefing on schedule, survey policy confirmed.
28 (Wed)	10–1400	CPD	TUM Planning and Salina Cruz oil loading Port planning.
	1830–2000	CPD	Sister port relation between Lázaro Cárdenas and Kashima.
29 (Thu)	9–1400	PEMEX, Proyectos Marinos and CIFSA	Discussion on Salia Cruz Port planning. Introduction to the Japanese Port planning.
	1730–1930	〃	Continuation of discussion
30 (Fri)	6–1900	Field inspection	– Dos Bocas
FEBRUARY:			
2 (Mon)	930–1400	CPD	Discussion on the function of CPD and masterplanning. Planning of Salina-Cruz port.
	16–2000	CPD	Discussion on Óstion Port planning.
3 (Tue)	10–1400	CPD	Discussion progress of port Altamira.
	16–1745	CPD	Discussion on planning of Lázaro-Cárdinas. Discussion, trend in industrial location. Discussion on multipurpose terminal, Altamira.
4 (Wed)	6–2000	Field inspection	Morelia, Michoacan state Lazaro-Cardenas
5 (Thu)	8–2000	〃	Salina-Cruz Coatzacoalcos Ostion lagoon
6 (Fri)	8–1800	〃	Altamira
9 (Mon)	930–1200	SCT	Hydraulic Laboratory, models of Ostion and Salina Cruz Ports.

Date	Time	Place	Remarks
	12–1400	SCT Obras Maritimas	Discussion on the technical aspect of industrial port planning. Planning and ordering for Óstion and Altamira Port.
	17–1930	CPD	Discussion on the formulation of a master plan, technical aspect of Óstion Port planning.
10 (Tue)	9–1400	CPD	Discussion on the process of sister port relation between Lázaro-Cárdenas and Kashima.
	16–1930	CPD	Report writing during the visit of the President of Mexico to CPD
11 (Wed)	9–1200	CPD	Discussion on the reporting
	16–1730	Japanese Embassy and JICA Office	Schedule of next fiscal year.
	18–2000	CPD	Discussion on the reporting.
12 (Thu)	9–1200	PEMEX	Discussion on Salia Cruz Port planning. Discussion on site visits. Planning of Pajaritos, Das Bocas and Ostion Ports. Report typing.
	16–1730	CPD	Final discussion on R/D of the report.
	1730–1900	CPD	Reporting to Mr. J.R. Moctezuma
13 (Fri)	1030–	Japanese Embassy	Reporting to Ambassador Matsunaga (instead-Endo) and Director Suzuki of JICA.
	1130–1400	"	SAHOP FONDEPORT Mr. D. Ramos briefing Japanese port administration.
14 (Sat)		Leaving Mexico	via Vancouver.
15 (Sun)	1800	Arriving at Narita	JL011.

Chapter 2

Recommendations

2-1 Report of the First Mission

Report of Study of the Development Plan
of
Industrial Ports in MEXICO

Report and Recommendations to
Coordinacion de Proyectos de Desarrollo

Lic. Julio R. Moctezuma Cid;
Presente

8 August, 1980

Yoshio Takeuchi
Head,
JICA Survey Team

It is my pleasure to submit a report herewith on the development plans for Lázaro Cárdenas, Altamira, Ostión and Salina Cruz industrial ports, the report is newly translated into English.

The studies were carried out from July 23 to August 12, 1980 including short visits to the planning sites.

This report is the record of the studies and the discussions during the stay in Mexico upon consultation with the C.P.D. officials in charge.

I would like to express my sincere gratitude to all the Coordinacion de Proyectos de Desarrollo, the Secretario de Comunicationes y Transportes and PEMEX officials concerned and also to the resident representative officials for their cordial cooperation.

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2-1-1 General View

(1) Organization for the development of zones.

The C.P.D. seems to have enforcement its organization in the development of the ports of Lázaro Cárdenas and Altamira with the instalation of local offices.

The local office of C.P.D. is founded in the city hall building of Lázaro-Cárdenas, and the City authority of Lázaro-Cárdenas hopes to establish a sister-city relationship with Kashima, Japan.

These facts indicate the intention of the local administrators for the development of the industrial zones.

According to the information of Mr. Alfonso Alarcón, Representative of the C.P.D. in Altamira and formerly in Lázaro Cárdenas, the increasing thrust for regional evelopment in Lázaro Cárdenas comes not only from the municipal administration, the Mayor, members of the City council, but also the other civic leaders taking the citizens along with them to provide the drive for the development of industrial zones.

The intention to have a sister-city relation between Kashima and Lázaro Cárdenas in just same as of existing one between Caucún and Miami, their intention was felt as the municipalities want to depend not entirely upon the guidance of the federal government for the development of their areas and have started to take their own part in the developing programme leading the citizens.

It may be recommended, that as previously proposed, an organization which functions exclusively for port matters, had better be established at each port area. They are usually called "the Port Authority".

(2) Control of Programmes for the C.P.D.

The work schedule prepared for other Ministries has to be realistic.

If any Ministry accepts an unrealistic schedule for work, the strain will be come out and shifted on to the contractors side, who are usually in a weaker position. The shortening of working period will result in accidents, unsatisfactory work, extension of the work period and other troubles.

As a result, the government may not be able to keep its official time-table which promises the completion of the industrial zones with necessary infrastructure facilities, for the entrepreneurs waiting to invest at the industrial zones, thus undermining the public confidence in the government.

(3) Proposal concerning the system of development planning

In case of Japan, the master plan of a port is decided at the Ports and Harbours council which has long history and is consisted of experienced authorities and government representatives concerned. Port and regional development plans in Mexico had better be decided, since a council takes long time for a decision and the establishing a council will take more time, though

it is the second best method, the C.P.D. formulates the master plan and short-term working plans as described below.

a) Determination of a master plan

The C.P.D. will formulate a master plan for the year 1990 and 2000 covering the development of the port and also necessary infrastructures (roads, railways, industrial water supply, parks, residential areas, commercial areas, sewerage, energy supply, etc.) and the location of each industry. However, the master plan should be flexible, for the moment there will be many undetermined factors left such as the location of the enterprises.

In formulating the master plan, it is necessary to obtain agreements from the other governmental authorities and main entrepreneurs concerned.

Finally the master plan has to be approved by the President of the Federal Republic.

b) Preparation of the working plans

In accordance with the Master plan, the C.P.D. should ask each governmental authority concerned to submit their working schedules aiming the end of 1982, 1983, 1984 and 1985. Each government authority is to submit a work schedule of a realistic, as fast as possible but appropriate to the conditions.

Taking into consideration of the opinions from enterprises who want to locate a factory in the zone, the C.P.D. is to adjust the working schedules submitted by the Ministries concerned.

Finally the comprehensive working schedule will be reported to the President of Federal Republic.

c) Responsibilities of the C.P.D. and the industries

The C.P.D. is to informe the industries of the progress with infrastructure construction at each end of the year 1983, 1984 and 1985, so that they may prepare their own programme for plant and equipment investments on their side.

The C.P.D. is responsible to the enterprises for the provision of necessary and satisfactory infrastructure such as port, road and so on, the enterprises for their part are responsible for their realization of investment schedules and the prevention of pollution.

d) Modification of the master plan

Any change in the Master Plan is to be approved by the President.

(Comments:)

Though the C.P.D. should make every effort to build up a master plan to satisfy all the entrepreneur wishing to locate their factories there by responding to their demands, it does not necessarily mean that it can satisfy them all. It is in fact necessary for the C.P.D. to adjust the various demands in view of the whole even if the enterprises find it partially unsatisfactory.

Further, there will be often areas of dissatisfaction for the entrepreneurs in terms of time scheduling. For instance, the expected degree of completion with the infrastructure at the end of 1982 may not necessarily satisfy all the entrepreneurs. However, the C.P.D. must convince the

enterprises by clearly indicating the expected progress for the end of 1983, 1984 and 1985; the entrepreneurs may then find it easier to prepare plant and equipment investment schedules.

In formulating the master plan, it is necessary to take into account the deployment of those enterprises according to their conditions; those to be located at an early date or those to be located later, along with the small and large scale industries, those which require the water front and those don't need it, etc.

The C.P.D. must also set down conditions for the enterprises with regard to investment schedules, improvement of the environment and the prevention of pollution.

(4) Studies for planning and construction of industrial ports

Wide ranged studies have to be carried out prior to the port planning and the construction works. If, for some reason, construction work has to be executed urgently, for example at Altamira industrial port, the work should commence only within the scope which can be covered with confidence based on past experiences and accumulated knowledge, and while carring out surveys, experiments and analyses at the same time so that the results may be effectively employed into the modifications of the plan.

(5) Specification for natural condition surveys and possible impact of earthquake and wave

a) It will be useful to decide on the method of studies for natural conditions and prepare the standardized specification to be applied in advnace. In C.P.D. Ing. N. Rodriguez, expert of geology, is engaged in research on earthquakes and also in preparing standardized specifications for natural condition surveys and designing of port facilities.

An outline of the Japanese guideline will be forwarded later for reference.

b) According to the study done by Ing. N. Rodriguez, the area of Lázaro Cárdenas is facing a strong earthquake in near future. The foundation of this area consists of rock, river-sand deposits and coastal-sand deposits. In the case of an earthquake, the magnitude of impact will vary depending on the type of foundation, but the magnitude at Fertimex factory site is likely to be larger, observing the foundation condition.

Accordingly it is necessary to select a large designing coefficient for structures such as factory plants and wharves in this area when we design them as the unti-earthquake structures. The design earthquake coefficient for this area is recommended as much as 0.28 by Ing. N. Rodoriguez the value seems to be larger than the highest (0.25) in Japan and it pushes up the construction costs. It is considered advisable to determine the value of design earthquake coefficient for this area after it has been throughly studied by the cooperation of seismologists and civil engineers.

Further, while at the area of Altamira there is no problem for earthquakes, but the areas of Salina Cruz and Ostión may have some possibility to be hit by earthquakes, although they are expected to be smaller in its magnitude comparing with the area of Lázaro Cárdenas.

c) As regards cyclones, they have been recorded since old times in the Gulf of Mexico, however, there have been relatively few on the Pacific Coast.

As most of the Mexican ports have been constructed either on estuaries or on rivers near estuaries, there has been relatively little observation of wave along the coast. However, the newly planned four industrial ports and Dos Bocas are facing open seas and are, therefore, directly exposed to wave action. Furthermore, port area will be subjected to coastal erosion. It will therefore be important to know exactly the characteristics of the waves approaching the coast.

Accordingly, it will be necessary to set up coastal and offshore observation points on a permanent basis to continue wave observation in connection with general meteorological observation.

In Japan, wave observation is almost compulsory at each port. Further, a network of observation stations is organized covering the surrounding sea and ocean coasts, taking data at the depth of -20m. It is planned to add observation points about -70m in depth to be linked on-line to the central processor so that recording and analysis may be made at Port and Harbour Research Institute, several stations of which have already been in operation, but working respectively.

(6) Multi-purpose public terminal

It has been strongly recommended in the previous reports that commercial elements be adopted for each industrial port. A multi-purpose terminal is planned at Altamira, the C.P.D. is carring out studies on the deployment of facilities of the terminal as well as the function and operation of it.

Though many alternative plans may be conceived, an example is given here on the assumption that the terminal will accommodate the oceangoing container vessels with R/O R/O and L/O L/O handling types.

The salient points of the plan are as follows;

- There should be sufficient space reserved for future expantion.
- For the time being, there should be one gantry crane to be supported by a large mobile crane.
- As regards the cargo handling method in yard, two types of them are shown, a) straddle carrier type, b) chassis type.
- An example of a wharf which also can handle grain is annexed for information.
- This wharf should not be opened for domestic ferries or trader, they are usually out-side of custom boundray, except the secondary transportation cases.
- Cargo operation documents in wharf area are attached for the reference showing the Japanese container handling system in it at the same time.

(7) Grain terminal

There are grain import terminal programmes at the port of Altamira and some others. Some informations are given this time on the planning of grain terminals showing the Japanese examples to calculate the capacities of handling machines and the terminal.

(8) Improvement of soft ground

It is recommended that ground improvement methods developed in recent years be studied and employed to utilize the dredged soft materials at Altamira Port and to improve the ground as an earthquake countermeasure for the Fertimex area of Lázaro Cárdenas Port.

(9) On the SCT hydraulic model experiments

We watched preparation works of hydraulic model studies in respect to Ostión and Salina Cruz at the hydraulic station of the SCT. It is the opinion of us that it is sometimes dangerous to rely on the results of experiments at their face value, they should be taken into considerations for reference.

However, it is extremely important to let cooperate the experiment-engineers with basic-scientists who will analyse the simulalities of the model comparing them to the real nature theoretically. The results will contribute to the improving of the experiment thereafter. I recommend that the experiment, now undergoing, may be considered to be the very beginning of the study. Then, professors in Mexican universities should take parts in these hydraulic studies of the industrial ports.

On the other hand, it may also be recommendable to invite experts from abroad, for example, French engineers or experts from the Port and Harbour Research Institute of Japanese Ministry of Transport.

2-2-1 Industrial Ports

(1) Lázaro Cárdinas Port

a) Preparations for port expansion works are in progress.

b) A railway line is under construction along the coast near the area of Fertimex factory. Since this part of coast may be exposed directly to the waves caused by a cyclone, a consideration should be given for the prevention methods (e.g. revetment works).

c) According to Captain Alba Rosas who knows longtime the port of Lázaro Cárdenas, if the main entrance channel is not wide enough, those empty vessels moored on the side of Fertimex will be pulled out to a giant vessel passing aside (for iron ore import). As has been mentioned in the previous reports, the width of the channel should not be rigidly fixed. (be flexible for future improvement).

d) According to the studies done by Ing. Rodriguez, in the area of Lázaro Cárdenas a high probability is expected for earthquakes. As has been said in Section I-5, the influence will be larger at the site of Fertimex factory due to the soft layer there. For its reason, it had better study the application of ground improvement technics and reinforcement of structures around there.

e) Already mentioned in 2-1-1, (1) the interest in regional development is gradually increasing among the citizens of Lázaro Cárdenas. A local representative of C.P.D. has opened their office in the city hall building. The city authority wishes to keep sister-city relations with the port of Kashima in Japan. I think this is a welcome movement.
I hope myself to contribute to promote this sister-city relations between Lázaro Cárdenas and Kashima as much as possible.

(2) Salina Cruz

The SCT is preparing for field surveys and hydraulic model studies in order to plan new Pemex mooring facilities in Salina Cruz for very large oil carriers. These wharves are to be located at western side of the existing port, as recommended previously. The site is favorable due to the depth of sea bed, but the current will be the problem that is said to be strong at the place. Therefore adequate surveys are urgently needed.

The layout of the breakwaters and the width of the entrance channel should be decided after consulting it to the experienced captains who has long worked to handle large vessels.

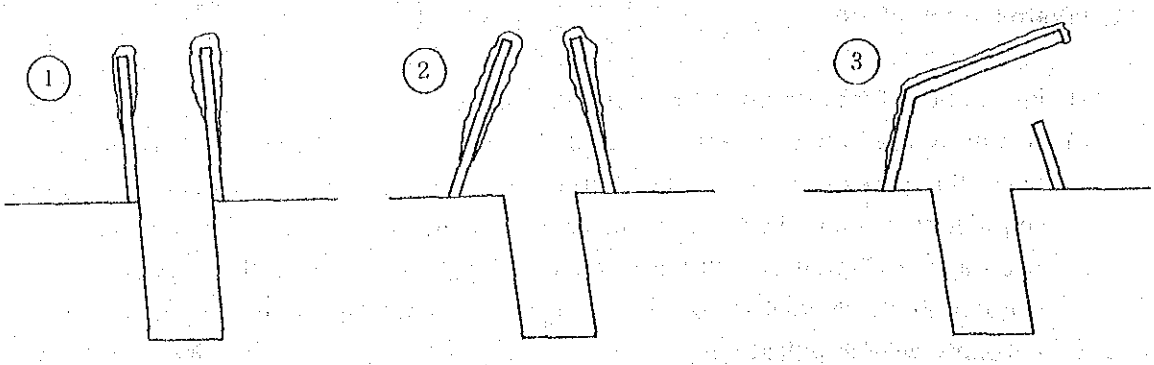
Further, it is important to study the wave schelter conditions in a hydraulic model basin afterwards. But, the most important thing is to collect sufficient natural condition data in site.

(3) Ostión

a) At the Ostión industrial port site, existing data on the natural conditions are being analysed, and further geological surveys are well underway.

b) Hydraulic model basin is going to be built for Ostión Port in SCT laboratoly. Wave agitation paterns should be compared by changing the positons of the breakwaters.

Fig. 2-1-1 Layout of breakwaters for a sandy beach port construction



c) Construction of connecting-roads for the port is seen underway, also an airport is almost completed near the Lake Ostión which is highly commended as it will help the noise reduction around the airport area of Minatitran City.
The new airport will contribute to inducing new business to the Ostión area in future and help the construction works by streamlining the transport.

d) Current pollution of air and water from the existing plants seems to be serious. Wastes out of factories are treated unsatisfactly. Therefore, it is necessary to introduce environmental regulations to control those entrepreneurs wishing to locate in the Ostión industrial port area in the future.

e) The rocky zone is observed in the northwest of Ostión Lake, they could be appropriate resource for rubble mount breakwaters. If the material could be carried out from there by loading to the barges, the cost of rocks for the breakwater will be reduced remarkably.

(4) Altamira Industrial Port

a) In this area established a local representative office of C.P.D. and also of Fondeport, we met Lic. Alfonso Alación Morali and Miss Alma Montaño the chief of the offices respectively. Since Mr. Aralcon has much experiences for the development of industrial port, I hope that he will skillfully conduct the relationship between Federal Government and local authorities.
In this area, the planned site for the industrial development has been almost expropriated, so it may be considered the initial step of the development is successfull.

b) The studies related on the quarrying of breakwater stones and the transportation to the port area is steadily advancing. At the same time, the railways and roads are extending rapidly to the new industrial zone.

c) It is my impression the elaboration of the port plan needs more time, and the working schedule seems to me so short.
I have already referred to the determination of a masterplan, formation of a working schedule and the measures to be taken by C.P.D. for the entrepreneurs investing the new industrial zone in Section I-3.

d) For elaborating the Master Plan of Altamira, it should be taken into consideration that the deployment of industries closely relates to their demand of the waterfront facilities. In many case, the iron and steel mill, grain trade and processing, Aluminum production by importing huge amount of ore and so on require deep sea berths (more than −14m, and −20m in future). Multi-purpose public terminal will need about −12m of the depth. Especially the public water front should be reserved in a plan considering the future expansion. Furthermore, the plan has to be completed taking account of the relations of each industry and necessitated urgencies of locating industries.

   For your reference, OCDI will prepare a plan for the Altamira industrial port and send to C.P.D.

e) If the construction work has to be accelerated, the work should be commenced, carefully, from the part where you have experienced and can execute confidently. On the other hand, the field surveys of natural conditions and hydraulic model studies are to be conducted to finalize a port plan.

f) Large dredgers have to be employed to excavate huge amount of sand in the port area. But special caution will be required at the dredging of entrance area, since the area is exposed to the open sea. It is also necessary to consider rough sea conditions due to cyclones and nothern winds. In the same case in Japan, usually a sheltered small basin is constructed first in keeping a safety-anchorage for the dredgers and work vessels.

   Furthermore, there should organize a system whereby the construction director could learn the whole matter and the line of commanding orders are clearly established. Meteological data is constantly collected and appropriate instructions be given to the working vessels for their going into shelters by order through this organization.

   In some Japanese construction offices, each 24 hour and one week forecast of coming wave characteristics are provided or obtained from the specific firm under a contract.

g) Regarding the multi-purpose terminal, please refer to the plan attached as Annex I-6. Container terminals should be planned considering not only the physical layout of the yard, but also the following operation programme. The training of operators is also important. Herewith we attached the example of Japanese cargo handling documents in a container yard for your reference in Annex.

   It may be good solution to invite a group of operation experts from abroad to the Altamira terminal for a period of 1 year or so, who will take part in operations and simultaneously in training the local operators.

h) As Mexico has to increase her food imports in the future, it will be necessary to build up a food processing complex in the industrial port area. An example of the calculation for a grain handling terminal in Japan is given for reference in Annex I-8.

2-2 Report of the Second Mission

Report of Study of the Development Plan
of
Industrial Ports in MEXICO

Report and Recommendations to
Coordinacion de Proyectos de Desarrollo

Lic. Julio R. Moctezuma Cid;
Presente

24, November, 1980

Yoshio Takeuchi
Head,
JICA Survey Team

It is my pleasure to submit a report herewith on the development plans for Lázaro Cárdenas, Altamira, Ostión and Salina Cruz industrial ports, the report is newly translated into English.

The studies were carried out from November 10 to 26, 1980 including short visits to the planning sites.

This report is the record of the studies and the discussions during the stay in Mexico upon consultation with the C.P.D. officials in charge.

I would like to express my sincere gratitude to all the Cooridinacion de Proyectos de Desarrollo, the Secretario de Comunicationes y Transportes and PEMEX officials concerned and also to the resident representative officials for their cordial cooperation.

INDEX

2-2-1 General View

(1) Planning for the works

Works should be carried out until the completion of the studies and planning. In other words, the detailed design is required in order to be able to bid the work and select the contractors. before the construction is carried out. In order to have harmonic progress, the general programme should be coordinated and reviewed.

a) Project Management

A very good project management system has been achieved in C.P.D.under Mr.Armida as a command: two important aspects are remarked:

i) Wide study and cautious determination of the lay-out.
If you have a defective study and planning, the general project will have mistakes, even if the coordination system is ideal.

ii) Monitoring function.
In the reports that will be given to the highest authorities on the progress of each section, the recommendations are also of great importance.
The high authority should have enough leadership to strictly perform the necessary measurements in each section in accordance to review and investigate the reports.

b) Investigation, planning and construction work.

To decide on the lay out planning is necessary to be supported by studies carefully done.

As it was mentioned in the previous report, 2-1-1, (3), "suggestions on the system for the development plan". All the works should begin and carry on after the lay out has been decided as it is mentioned above.

c) Execution of work.

i) Once the works are started, these should be carried out without any hesitation. If layout is not decided after commencing the work by the contractors, they will get worried.

ii) Even you have a very well prepared design, it will not have any significance, if the works are not executed in accordance. For that purpose a strict supervision is required. It is suggested to contract a consultant for such supervision depending on the needs.

iii) Work supervision structure.
The resident supervisor will be given the necessary power by the superior authority; nevertheless the responsibility will be shared by both parties in the case of any lack of construction material required on the design, because this would create a defect during the construction period.

iv) Works supervision.
An adequate works system is required besides the supervision for the execution of works. It is necessary to review and lead the procedure of the work in the same way as the planning procedure is led by C.P.D.

v) Construction material

The lack of construction material, such as the cement which is necessary for the development of the zone; has a direct influence on each work. If there is a complete supervision and inspection for the works, the responsibility should be one the superior authority. This implies to change the plan or supply the material using any other method. If this is not done, the works will be carried out with some defects.

(2) Physical Distribution

Some aspects observed on the physical distribution system for the country, which is studied by C.P.D.

a) Food distribution System

On the system for the food distribution, it is recomended to study the present situation in Japan.

b) Increase on the port cargo and ship waiting for berthing

In accordance with Japanese Ship Owners, it is very noticable recently the ship waiting for berthing and very slow discharge in the Pacific Ports such as Manzanillo and Acapulco. This is due to the fact that the cargo has been increased and a lack of berths where to unload cargo from ships with a size of 20,000 or 30,000 DWT in order to cover the importation of 9 million tons. of food stuff. On the other hand, imported cargo was increased in 40% yearly (30% between Mexico and Japan in accordance with the expantion of Mexican economy).

This phenomenon was present in Japan during the period of economic expansion and it was said that the ports would be the bottle neck for the development of the country.

Fortunately the basement of the economic development of Japan was achieved by the preparation of ports, there is similitude among the present ports of Mexico with those days ports of Japan.

An adequate policy is required to avoid this bottle neck in the economic development.

c) Basic conditions for containers

C.P.D. considers, as a part of containerization, the construction of the TUM in every industrial port, nevertheless, containerization is not achieved just with the improvement of the port equipment as a fundamental condition; some consideration should be given to the problem of the return cargo and the collection of the empty container. The cost of the containers in a ship is approximately half the cost of the ordinary ship. For the ship owner, containerization will not have any interest if the return cargo is empty, besides there is a probability that the empty container will not return to the port of origin after taking the cargo to its destination. The collection of open containers, in some countries the percentage of which is of the order of 10%, is a big problem, that is the reason why the recollection and destination of the containers should be managed by means of a computer.

d) Container and truck transportation

The container that has been disembarked at the port is taken to its final destination by

means of a truck; but if its required that the container should be changed to another truck, the advantage of the direct transport will lose its efficiency. I have heard that in Mexico, there is a transportation system well established exclusively for each State that does not allow the direct transport, in this case an adequate measurement is required.

e) The reduction of efficiency in the ports operations.

A review of the efficiency at the ports operations is required, customs, quarentine, etc. that could be the origin of the ships paralization as well as the lack of storage. Besides the unloanding equipment should be checked, as they are, in many cases old and inefficient.

(3) T. U. M. – Multipurpose Terminal

It is mentioned in the previous report 2-1-1, (6) TUM berth). Now it is convenient to mention:

a) It would be adequate that for the 1982 plan, TUM in Altamira was considered as an expantion of Tampico Port.

b) The work should be planned in such a way that the berths are built little by little, during the year 82, 83 and 84 without hoping that the works should be finished by 1982.

2-2-2 The Ports

(1) Salina Cruz, Oax.

The hydraulic model study as well as the field investigation is carried out at the moment. As it was mentioned in the previous report, the hydraulic model studies should be carried out taking into account the opinion of big tanker's captains.

(2) Laguna del Ostion, Ver.

The geological study has revealed the existence of soft layer and rock formation at sea bottom. For that reason, some reconsideration should be given to the previous layout. The aspects that should be taken into this review are:

a) Think of the reason why it was chosen the zone of the Laguna del Ostion, among the 4 alternatives for the industrial port on the Coatzacoalcos area – (Taking advantage of the lagoon would be one reason; going to the south, that is, without using the lagoon; it would be necessary to deepen the studies and compare with the alternatives previously mentioned)

b) The Coatzacoalcos area is the most promising zone for the industrial development of the country, that is the reason why should be assured enough room for expansion in the future.

c) There is no need to have straight lines in the perimeter of the lagoon; the present water shape can be kept as much as possible.

d) The soft soil problem can be solved with the present technology, even if it is more expensive, it can be said, this is not an absolute restriction.

e) Ships and the water front of the industries that will be accomodated, have to be taken into account.

f) The south alternative will limit its scale, because the land is already developed at the moment.

g) The north solution depends entirely of the subsoil, a solution by the port location and distribution of industries, should be founded.

(3) Altamira, Tamps.

a) Dein group has been contracted with its collaborator Mitsui & Co., Ltd and Mitsui Harbor and Urban Construction Co., Ltd. for the Altamira port construction, and they have already started their activities. Nevertheless, no definition has been done on the access channel location nor the internal basin, which have to be decided as soon as possible, taking into account for this purpose the needs of the industries and the soil characteristics of the area.

The allocation of industries should be defined, and concerning the subsoil, independently of finding some difficult elements for dredging, such as the partial existence of rock; the definition of the lay out should be defined getting as soon as possible the results of the geophysical studies. Once the lay out has been defined, the work should be done with decission, counting with the proper measurements in case that problems are found with the hard soil. No delay in the decission should happen, leaving the work contractors without work.

b) Independently of the normal procedure for the port construction as in Altamira, where a service port will be built so the dredgers will have a safety place during the bad weather days, due to the tight schedule, some emergency measurement should be taken and the dredgers will enter directly from the sea, blocking its entrance later on. In this case, the delay in the lay out definition would cause troubles with the contracted enterprises. Another important aspect is that the meteorological and oceanographical local conditions in the work site should be informed.

c) Attached to this report, some alternatives different to the one presented by C.P.D. is shown, so a quick decision can be taken on the master plan.

The characteristics of these alternatives are;

Alternative A.

i) The industries that require deep basins are located in the closer areas to the port entrance, therefore, both steel industries are distributed on both sides of the access channel.

ii) CONASUPO and TUM are located in the closest zone to the access channel because they should be ready and partially operating before 1982, and they should be also with an easy land access from the highways. Therefore, they are located in the end of the central channel.

Alternative B.

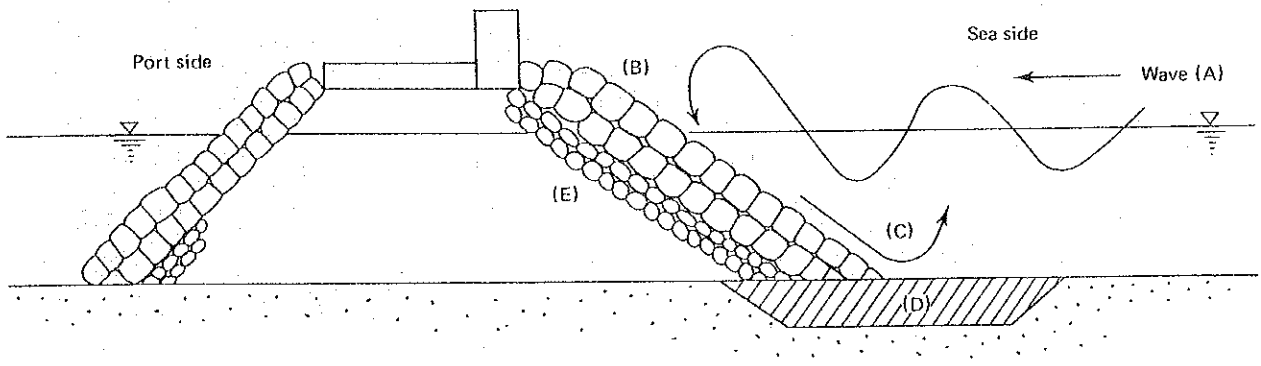
i) The industries that require deep basins are located in the closer areas to the port entrance. Therefore, the two steel plants are located on both sides of the access channel.

ii) CONASUPO and TUM will be established in the zone near the access channel due to the fact that they should be ready immediately, partially operating before 1982 and that this area should have easy land access from the inland. Therefore, they are located at the end of the central basin.

iii) The aluminum industry which will require depths of over 12m. for the ship, will be established in the nearest area to the access channel. Therefore, the access channel is located in the most central position in comparison with alternative A and there is significant reduction to the total length of channel as well as the dredging volume.

(4) Dos Bocas, Tab.

A visit was paid to the PEMEX port at Dos Bocas, it was impossible to make a full analysis due to the bad weather, but some observations are pointed out on the construction procedure of the work. As it was mentioned before, it is wrong if the work is not executed according to the design, which is well done. There is a need of a supervision on the construction procedure, and the personnel devoted to this work is not enough, that is, at the moment there are only 3 supervisors of marine works. It is suggested to contract a consultant who will make the supervision on the breakwater's construction as the design shows. If these works are not built in that way, it is feasible that they can be destroyed and the oil pipelines could suffer from damages as well as the ships anchored at the berths.



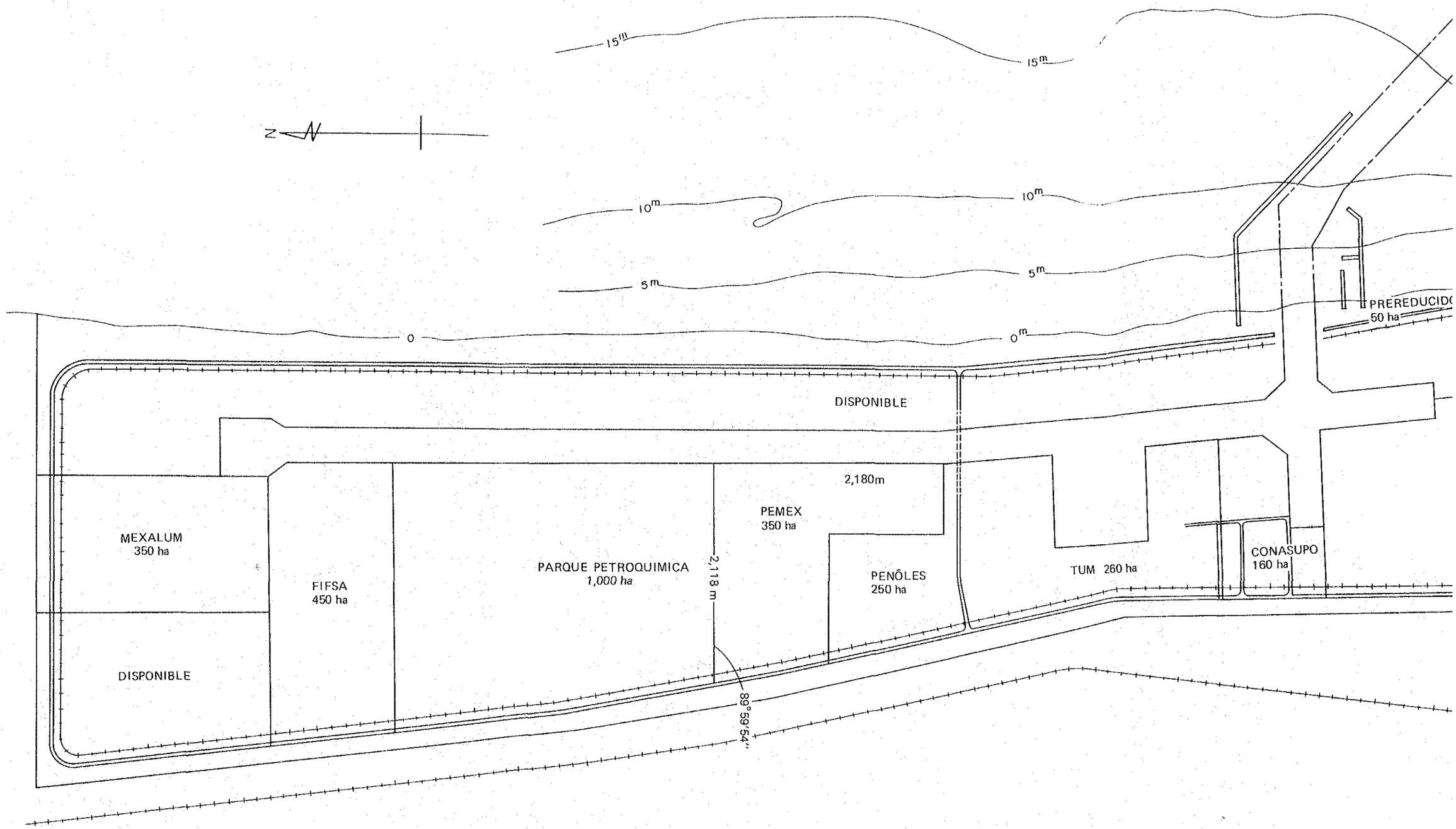
a) The waves from the outside (A) strike the blocks of the cover layer (B) and continue downward (C), hiting the bottom blanket (D). Therefore, the sea bottom is disturbed and the fine sand is moved forming some holes. Consequently, the blocks will collapse (B). To avoid this phenomena, a special design in the zone (D).

Because this zone is underwater, the construction will be made careless if nobody take care, that is the reason why a thorough inspection is required.

b) The size of the rocks (E) are specified in such a way that they can not go through the layer (B). If the size of (E) is less than the indicated in the design, the rocks will be extracted through the voids of (B) and the breakwater will be destroyed. Therefore, the size of rocks (E) should be inspected.

c) For the concrete mixing plant, some continuous measuring and registration equipment are required. Besides, adequate facility for the storage of cement is not found.

The aspects described above are the result of a very short visit. It is recommended that experts prepare a detailed study so that they decide on the inspection method to use at the field.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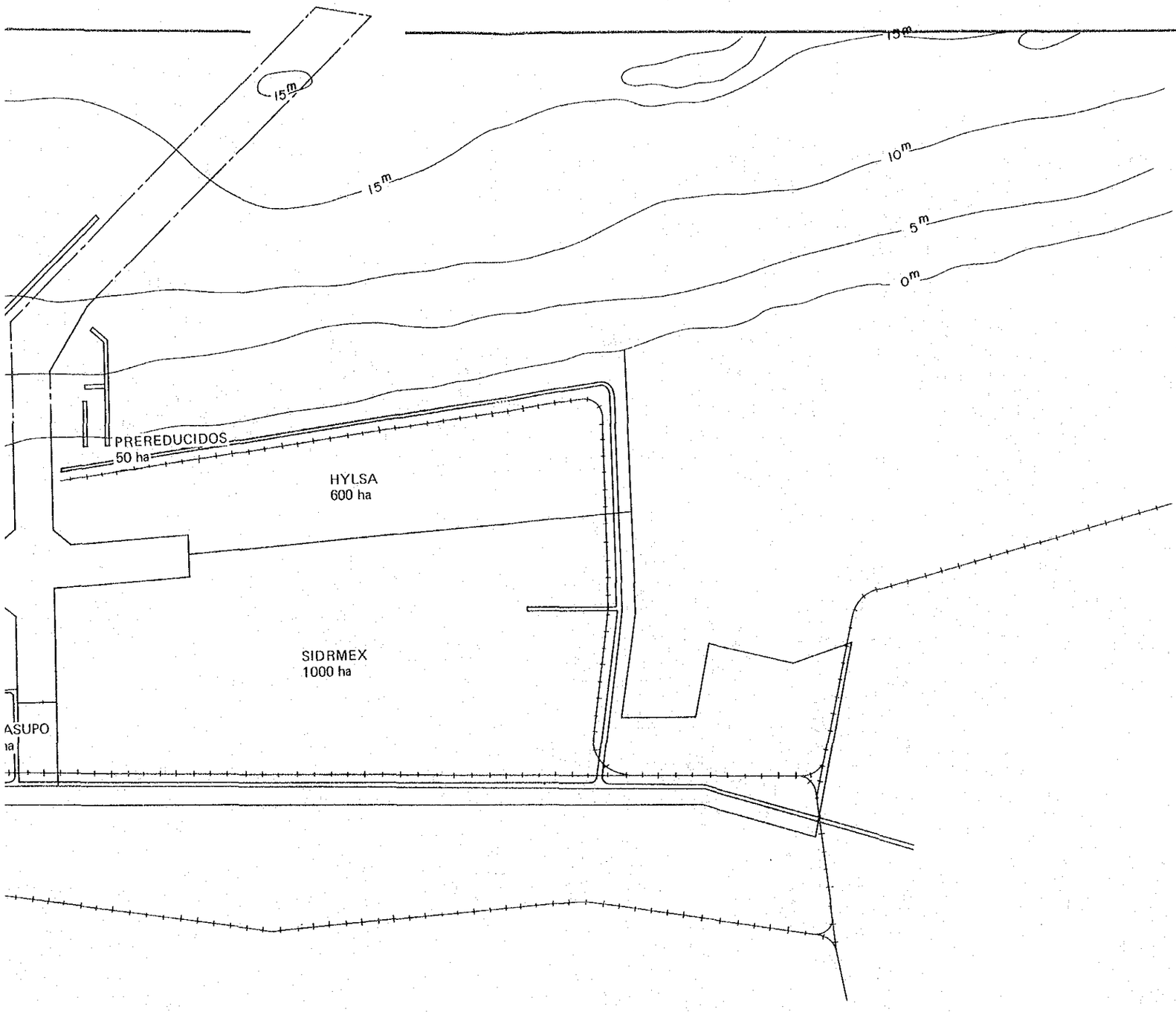

NOTE	
	Channel and Basin
	Wharf
	Future Plan

SCALE 1 : 40,000

500 0 1000 2000 m

November 1980

Fig 2-2-1 A MODIFIED PLAN FROM MASTER PLAN OF C.P.D

2-3. Report of the Third Mission

Report of Study of the Development Plan
of
Industrial Ports in MEXICO

Report and Recommendations to
Coordinacion de Proyectos de Desarrollo

Lic. Julio R. Moctezuma Cid;
Presente

12 February, 1981

Yoshio Takeuchi
Head,
JICA Study Team

It is my pleasure to submit a report herewith on the development plans for Lázaro Cárdenas, Altamira, Ostión and Salina Cruz industrial ports and a record of visits to Dos Bocas and Pajaritos ports, the report is newly translated into English.

The studies were carried out from 27 January to 12 February, 1981 including short visits to the planning sites.

This report is the record of the studies and the discussions during the stay in Mexico upon consultation with the C.P.D. officials in charge.

I would like to express my sincere gratitude to all the Coordination de Projectos de Desarrollo, the Secretario de Comunicationes y Transportes officials, PEMEX staff, consultants concerned and also to the resident representative officials for their cordial cooperation.

INDEX

2-3-1 General View

(1) Setting up a responsible organization for industrial port planning

Each work of the industrial port construction should be executed according to the well established plan which is finally decided through the sufficient physical and socio-economic studies.

At the Altamira industrial post site, I was surprised to here that a new alignment was chosen for the entrance channel recently according to the result of studies by the authorities on earth conditions. The contractors were going to dredge there following the order of the authorities who might depend upon an underfinite plan while the field soil conditions at the site were still under study.

It could be explicable that this decision shows an engineering conscience which aims a better solution technically taking in to the latest studies. However, I feel it should be done before the stages of execution works, since it will create troubles at the work-responsibility to carry out the rigorous works.

As I mentioned already in the former report(dated 8 August, 1980), it must be necessary to establish an attitude in which C.P.D. coordinates as a core to finalize the port plan giving them an authorization before the plan is opened for a tender. An amendment of the plan should be also examined formally through the almost same procedure only when it is ultimately needed.

(2) Giving an official goal to each port planning

During the discussions with many Mexican authorities and consultants during this mission, I have found that they are making plans for ports respectively basing on their own judgement and estimations applying their own source materials.

Even if this situation could be inevitable at the actual stage, it is felt necessary that the real responsible authority(C.P.D. for example) will give a planning policy, target and data which are confirmed by that date for each industrial port project to make sure a balanced study by each authority or consultant on it.

That is to say, C.P.D. should indicate a common goal to each authority or consultant related with this industrial port project, of course the indication will include the latest defined values of the target and some unfinalized ones at the moment, which will be explained in its comment precisely.

(3) Port planning and port safty

Pajaritos port in Coatzacoalcos is observed as over-utilized comparing with its capacity by PEMEX reflecting an increase of related oil production facilities around the port area.

As the access channel to the Coatzacoalcos commercial port is common with Pajaritos oil port facing to the Mexican Gulf, the utilization method and the expansion of Pajaritos oil port has to be of discretion in regard with the safty port operation in general.

I recommend an establishment of an overall port authority which is responsible with the development, planning and management of the port area including both the commercial port of

Coatzacoalcos and the Pajaritos oil port in a single organization abling to control the Pajaritos area at its operation and expansion works from the governmental viewpoint.

(4) Deviation allowance for the construction supervision

A civil engineering structure has to be completed to meet the original design in shape and also in the selection of building materials. The execution can not be carried out in a judgement of a contractor alone.

I think that a standard allowance should be prepared on an agreement between two parties of a construction work to define the allowable deviation for each structure. When I visited the working site of Dos Bocas Port, I have learned the supervisior has no solid standard for controling the accuracy of structural works or selecting of work materials yet. The supervising work should be based on some standards which are decided upon sufficient consultation with the design people.

(5) Working orders of the supervision

For example, I have heard a change in the instruction of the supervising authority at Altamira-dredging-work that the dumping area of dredged spoil has been altered to the lagoon area accompaning with a reclamation work, which was once permitted to dump into open sea. The new work is technically very difficult. The supervisor has to issue an order of work alternation upon a technical confidence backed up an adequate examination for the working procedures. It should be avoided for the authority to ask the contractor to change the works easily at times.

(6) TUM

TUM plays a very important role in the economic development of Mexico. They should be allocated with the first priority among the water front facilities of the new industrial ports even at the planning stage. It is urgent to decide the location in the industrial port such as Lazaro Cardenas and so on.

(7) About the soft ground problem

It will be better to avoid the soft ground basement when we choose an industrial port site, however, the latest soil mechanics has overcome the problems to build port structures upon it in many cases.

For your reference, I submitted a text bood used for our Forum on soft ground foundation (Annex 1).

2-3-2 Industrial Ports

(1) Altamina

a) Breakwater construction works and dredging operation of entrance channel

The location of main entrance channel has not been finally decided, even several months have passed after the construction contract was signed. Especially, the cutting work of the dune at the beginning of channel dredging seems to me a very difficult work, which I have mentioned in the former reports, since the executing method adopted is intending to cut the channel through litral drift area directly from the open sea by a dredger. Generally speaking, breakwaters have to be preceded to ease the dredging work, however, the contract in Altamira orders a risky operation for this part to cut the channel without any shelteration for the dredger at the open sea coast, probably from the limitation of working period.

Neverthless, the final layout of entrance channel and the darcena is not yet known. Further, the dumping area of dredged spoil is also not yet indicated, the contractor is only informed the posibility of change of the area.

Just prior to the very difficult marine works, the situation is woried at the unconcrete policy of the ordering authority or the work. Once the work is decided to start, it should not be altered unless a very significant fact is found to block the execution.

The authority which plans and supervises should lead the contractors showing a firm policy based on the technical confidence of a practical level.

b) The situation is this as a conclusion, the plan was once defined and opened for tender to the contractors, before finishing a sufficient analysis upon the soil conditions, then the soil conditions are made clear one by one which show a relatively soft clay layer spreads over the planned site, the authority is now confused to avoid the area or not. So, the authority, seems to me, has to reflect itself upon two points as shown below.

i) They decided a plan before they terminate a complete physical study.

ii) They showed a vacillation after they took the decision.

I believe the reason is that the real responsible person is not confirmed in the planning and execution procedures.

At this moment of the on-going project, I feel the necessity to finalize the port plan as soon as possible but should be based upon the latest field surveys after consulting with the related authorities, then make the final alternation order to the contractors.

(2) Salina Cruz

a) PEMEX Port for very large tankers

A plan should be prepared after getting the results of marine studies now being carried out at the site.

In order to permit the operation of very large tankers as large as 200,000 DWT by their own propulsion, a very long breakwater is needed to protect the maneuver from waves, the breakwater will be not economical at this site. For an alternative, tug-boats will be attended for the operation. We have to think first where the tug-boats will attend the large tankers in the course to enter the oil harbour.

For example, let's consider that a large tanker reducts its velocity untill 3 knots, which is the minimum velocity abling to operate its rudder, and assuming there is no significant current at the area around the entrance to the port, then the tug-boats attend the tanker to guide it into the harbour. A condsideration on the tanker maneuvering is attached as Annex-2 to this report. If the current exists around the entrance area, the study has to be revised accordingly.

It will depend on the results of the hydraulic model studies and the field surveys currently going on.

b) *Commercial port and industrial port area*

Salina Cruz is situated at the Pacific coast facing to the south of Istmo de Tehuantepec, and connected with the port of Coatzacoalcos beyond 300 km of distance, which is facing to the Gulf of Mexico. This zone along the Gulf of Mexico produces a lot of resources like petroleum, sulphur, hydraulic power resources and others, and the construction of an industrial port at Laguna de Ostión at the zone is very significant.

Port of Salina Cruz which is connected to the port of Laguna de Ostión, will be the key-port in a sense of sea transportation opened not only to the Gulf ports but also to many ports in Far East, Asean Countries, Australia and so on. If the petroleum is embarked for Japan through this port of Salina Cruz, the navigation time will be diminished by half comparing with the transport from Pajaritos Port where is the actual loading point nowadays. Thus, the number of vessels could the cut half accordingly.

At the other hand, a famous Alpha-Omega project is undergoing for the coming operation at this Istmo de Tehuantepec, which aims to make a land bridge across the lower hills of maximum 270 m high and allows the container transport between the ports of Salina Cruz and Coatzacoalcos.

Being very important as a sea port of the Pacific coast, just as mentioned above, however, Salina Cruz has a difficulty to make a reliable future prospect at the present stage for a commerical and industrial port development, excluding some facilities for oil storage and refinary of PEMEX.

So the industrial developement plan should be carefully examined taking into the consideration of the following aspects:

a) The tendency of industrial development along the Gulf of Mexico, the Laguna de Ostión port as its core,
b) The direction of Istmo the Tehuantepec developement,
c) Alpah-Omega Project, in close relation with marchant marine operation to these ports

I am completely sure with the policy of C.P.D. which plans to construct TUM at the first step in a minimum scale while the studies will be carried out for the full scale commercial and industrial port planning.

CIFSA consultants are now working for preparing a future plan of Salina Cruz port, however, C.P.D. should give them a clear developement target of the port and industries for Salina Cruz.

(3) Laguna de Ostión

There exist two alternatives for the site selection of Laguna de Ostión port, one is planned at the lagoon, the other is called Optión Sur that will not built at the lagoon. The points of selection will be ground condition; especially of very soft foundation for structures, fear for inundation, posibility of further developement, urbanization movement around the site and the opositors who will not aggree on the land expropriation for the port and industrial developement.

The plan which utilize the existing lagoon will offer a better ground condition for building factories at the west part heights, however the heights are told not to be easily purchased from the farmers, further the shallow solid layer might disturb the port dredging works. However, I feel the lagoon plan is better than the other, if we consider the further developement of the industrial area. Anyhow it is recommended to compare both site after analysing the soil conditions in detail.

(4) Lázaro Cárdenas

The works are proceeding promptly at the port area. New channel plan of the Balsas river seems to be adequate for the site. A caution should be taken not to create scouring at the water inlet areas, since the short cutting will increase a river gradient as a result.

Future plans are being prepared by allocating the lots for individual industry. TUM for Lázaro Cárdenas has to be decided among them with a high priority.

(5) Dos Bocas

I have seen the construction site of Dos Bocas in a day's trip. Here I would like to introduce a comment made by the JICA/SCT expert Mr. Moriguchi who has accompanied with us. "Execution work of rubble mound breakwater at Dos Bocas port"

It seems to me that the breakwater design is too complicated for a rubble mound structure, these might be mentioned after a more detailed study in reality. I asked whether the cross section could be more simple to the engineers who are now engaging with the work. The answer was they felt no difficulty at the moment and were trying to follow the given design as much as possible.

A civil engineering structure should be build with the selected materials defined in the design and shaping as close as to the design. If the execution is unsufficient and rough, the structure is not getting a designed function, even if the best planning and an excellent structural design were prepared, especially, it is said when the structures are built underwater like our port facilities.

The bottom layer of the jetty which is indicated as thick as 50 cm, is considered to be designed to prevent scouring by waves. I have heard that they fed the rocks more than designed amount because of the sinking into the sand layer, the sinkage was confirmed at the test in-situ preceding the real execution.

This lowest layer is, as mentioned in the former report, the most vulnerable part of this structure, therefore a confirmation of the completed shape is recommended again at the site. The armour larger is designed to use rocks of 2.6 ton in average. I have obsered some smaller rocks included for this armour. A question was arisen to me for the selection of rock weight whether they have an allowance standard for the rock size to allow to lay on the armour layer.

Looking at the concrete blocks for the armour layer and the parapet works, I have found many of them lost their corners because of a very rough transport, which might not be a defect functionally, however some of them have a crack in the body. These cracked concrete blocks should be avoided in a proper use as a matter of course. The cause of the crack is usually by the transport at an unsufficient curing period. The engineers at site explained they have kept 28 days for curing after casting concrete at site. I wonder the way of curing if they have not treated promptly as kept in wet condition during these curing period.

Curing will effect severely on the strength of the concrete structures in general. Even if a test piece in a laboratory showed a designed strength, the real structure might be less strong unless a proper curing is carried out.

I have informed that the quality control is continuously done cooperating with their laboratory, and the strength is obtained ususally more than fc = 200 kg/cm^2 (designed value).

Some concrete blocks showed the segregation of material, which might be resulted from the material control process at the mixing plant. We have encountered a cement strage shed where the packed row cement were piled up as much as 20 sacks.

Then, I would like to comment here on several point after visiting Dos Bocas site, of course, some of them might be uncorrect because of the short visit and having not enough time to examine the basic control data for the execution works. At first, the execution work has to be controled at the most care, thus a standardized allowance for the execution deviations has to be defined between designing and executing engineers, since the deviation from the designed section could not be avoided when we execute any civil engineering structures. So, we are going to control these deviations in some predecided allowances.

In the work at Dos Bocas, I could not find this standard allowance for each work. I would like to recommend to make a standard for deviation control by the supervising engineers after consulting with the designing engineers. Supervising works could be carried out easily when the engineers have this controlling standard. In the course of discussions between design and execution people, some negotiation to determine the deviation allowances will be needed. The deviation allowances will be shown not only for the structural dimensions, but also for the size of rocks of breakwaters.

Regarding the quality of concrete, the strength-test with the test pieces will be supplemented with the assay of fresh concrete.

Furthermore, it is recommended a high consistency concrete has to be introduced for marine structures.

List of Annex

1981, February 12

1. Forum 80 text book held by OCDI
   Port structure upon soft ground
   Regional Development and Ports
2. A consideration on the layout of Salina Cruz oil loading port.
3. Laws and Regulations on Port and Harbours of Japan (M.O.T.)

Chapter 3

Record of Discussions

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– Working Schedule, both Mexico and Japan for the Industrial Port Development –

3-1 The First Mission

1. Mr. Takeuchi's visits to Mexico

During this fiscal year (it terminates March 1981), Mr. Takeuchi will visit Mexico twice, in November 1980 and February 1981. It is agreed that his visits are requested by Mexican Government also during the 1981 fiscal year. So Mexican Government (C.P.D.) will write to Japanese Ambassador in Mexico-City a letter of request accordingly.

2. A Japanese advisor to be sent for the S.C.T. hydraulic model studies, and a survey team to be sent in connection with the construction method of Altamira-port breakwaters.

The S.C.T. will study the possibility and the necessity of each case. The communication will be kept through Expert Moriguchi between S.C.T. and Japanese Government.

3. About five Mexican trainees to be sent to Japan for studing port administration and operation.

Though there is a language problem in Japan, it may be possible to provide short-term training of about one month with trainees split between several ports at the expense of the Mexican Government.

However, the Japanese Government may finance the costs of studying in Japan for a counterpart to our Expert in S.C.T. (Moriguchi and Mochizuki) in the coming fiscal years.

4. Mexican expert acceptance in Japan to study the food distribution system in Japan.

On visiting of Ing. Dias de Leon to Japan at the expense of Mexican Government, he will inform Mr. Takeuchi all his inquiries to the authorities concerned for the study in advance.

Mr. Takeuchi will arrange his appointments prior to his visits to the Ministry of Foreign Affairs, Ministry of Agriculture and Fishery, Ministry of Transport, Economic Planning Agency and so on.

However, Ing. De Leon has to inform the visit also to Japanese Foreign Ministry via Japanese Embassy in Mexico city, in order to make sure our assistance in Japan.

5. Representatives of Japanese business groups to visit Mexico for studing the investment conditions and feasibility at Altamira industrial port area and some other sites in Mexico.

Mr. Takeuchi is to persuade the Japanese Government and enterprises to organize a study mission, if the Mexican Government provides counterparts for them to attend the studies.

6. **The Mexican Government to send two or three participants to join the seminar 'the development of industrial ports' organized by Ministry of Transport.**

Participation in this training is recommendable; it will be held six weeks from February 5, 1981, under the sponsorship of Japanese Government.

7. **Sister-city relations between Lázaro Cárdenas and Kashima**

Port of Kashima is governed by Ibaraki Prefecture and spreads to three municipalities. Some negotiation will be necessary. Upon arrival in Japan, I will inform all the activities concerning this subject to the Japanese Embassy in Mexico.

The communication will be kept between Dr. Rosenzweig of C.P.D. and a copy will be delivered to Ing. Azuara in Lázaro Cárdenas.

8. **List of Works to be finished in Japan and sent to the C.P.D. later on;**

a) Examples of master plan of Altamira industrial port (to Ing. Juan Valera)
b) Outline of Japanese guideline for the natural condition studies for ports (in English) (to Mr. N. Rodriguez)

9. Others

a) Expert Mochizuki, a expert of JICA to SCT, will come to Mexico approximately 5th of September.
b) Mr. Yoshiro Watanabe, JICA expert, will visit in near future Mexico, if SAHOP or C.P.D. has any inquiries for him, we will be to deliver it to him.

– Signed –

Dr. Fernand Rosenzweig
C.P.D., GMM/sve

– Signed –

Yoshio Takeuchi
Leader
Study Team for the Development
Plan of Industrial Ports in Mexico
President OCDI

3-2 The Second Mission

1. Program for the next visit.

From the 26th January, 1981.

2. Expertee for the studies in hydraulic models at SCT.

Mr. Moriguchi, JICA expert at SCT, will proceeds to make the proper announcement to the Japanese Government.

3. Cooperation requirement from the Japanese Government for the Salina Cruz Project.

C.P.D. and SCT decide how to ask for it.

4. Sending a Mexican expert to Japan in the distribution system study

See III-4 from the previous report.

5. Sister port relation between Lázaro Cárdenas and Kashima.

Messrs. Moctezuma and Takeuchi agreed to make their best efforts to obtain this relationship among the two ports, and to do as necessary, before the proper authorities, considering that the relationship is between Ibaraki Prefecture and the Michoacan State.

6. Visit from the Altamira contractors to the Japanese ports

It was agreed that a visit is paid to Japan ports from the Altamira contractors. The date will be decided later on C.P.D. will ask the Ministry of Foreign Affairs of Japan through the Japanese Embassy to make the necessary arrangements. Mr. Takeuchi will help in the preparation of this visit.

7. Delivery of future work to C.P.D.

Dr. Takeuchi will send an idea on the general lay out of Laguna del Ostión, when the data at our discussion on 11th November is obtained for our study.

– Signed –

Dr. Fernand Rosenzweig
C.P.D., GMM/sve

– Signed –

Yoshio Takeuchi
Leader
Study Team for the Development
Plan of Industrial Ports in Mexico
President OCDI