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UNITED MEXICAN STATES

FEASIBILITY STUDY ON THE REPAIR DOCKYARD IN LAZARO CARDENAS

FINAL REPORT

SUPPORTING REPORT

MARCH 1988

JAPAN INTERNATIONAL COOPERATION AGENCY

SDS

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UNITED MEXICAN STATES
FEASIBILITY STUDY ON THE REPAIR DOCKYARD IN LAZARO CARDENAS
FINAL REPORT SUPPORTING REPORT MARCH

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SUPPORTING REPORT

The supporting report is principally composed of the following supplementary drawings, data and other information.

Group 1 --- Data extracted from Progress Report (I) and (II), which have been indispensable to the preparation for Final Report.

Group 2 --- Reference data which are not shown in the main report because they are columinous.

Group 3 --- Major reference data collected during the site survey. (June 1987 - July 1987)

The details are listed on the following pages.

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Progress Report (I)

- List of Collected Data

LIST OF COLLECTED DATA
DURING 1st. SURVEY

TITLE OF DOCUMENT	PUBLISHER & DATE ISSUED	FIELD
Plan Nacional de Desarrollo Industrial 1979-1982	Secretaria de Patrimonio y Fomento Industrial (1979 Vol. 1)	DF, F/E
Mandato Popular y mi Compromiso Constitucional 1983-1988 Plan Nacional de Desarrollo	Miguel de la Madrid H. Secretaria de Programación y Presupuesto (1983)	DF, F/E
Plan Nacional de Desarrollo Informe de Ejecución	Secretaria de Comunicaciones y Transportes	DF, F/E
Programa Nacional de Energéticos 1984-1988	SEMIP (Secretaria de Energía Minas e Industria Paraestatal) (1984)	DF, F/E
Programa Nacional de Comunicaciones y Transportes 1984-1988	SCT (Secretaria de Comunicaciones y Transportes). (1984)	DF. F/E PL
Programa Nacional de Ecología 1984-1988		DF. PL C/A
X Censo General de Población y Vivienda, 1980 (Vol I)	Instituto Nacional de Estadistica Geografía e Informatica (1984)	DF, F/E
Directorio de la Industria Metal Mecánica	CANACINTRA (Cámara Nacional de la Industria de la Transformación) (1986)	PL
Movimiento de Carga y Buques 1985	Secretaria de Comunicaciones y Transportes	DF
Estadísticas del Movimiento Portuario Nacional de Carga y Buques 1980	Secretaria de Comunicaciones y Transportes	DF

Abbr. DF : Demand forecast,
PL : Dockyard, workshop facilities & operation planning
C/A : Civil & architecture design
F/E : Financial & economic analysis.

TITLE OF DOCUMENT.	PUBLISHER & DATE ISSUED	FIELD
Estadisticas del Movimiento Porturario Nacional de Carga y Buques 1982	Secretaria de Comunnicaciones y Transportes	DF
Puerto Industrial Lázaro Cárdenas	FONDEPORT (Fondo Nacional para los Desarrollos Portuarios)	DF, PL C/A
Boletín de la Marina Mercante	Secrearía de Comunicaciones y Transportes (Año II; Vol. I; No. 1-8 4o. Bimestre)	DF
La Marina Mercante La Latinoamericana La Nacional y el Transporte Maritimo de México (Tomo 1/2)	Comisión Nacional Cooerdinadora de la Industria Naval (1984)	DF
Auver, Un Astillero Mexicano	Astilleros Unidos de Veracruz, S.A. DE C.V.	DF, PL
Proyectos de Reparación Naval Mayor en el Litoral del Oceano Pacífico.	Astilleros Unidos, S.A. de C.V.	DF, F/E PL
X Censo General de Población y Vivienda, 1980 (Vol. II0	Instituto Nacional de Estadistica Geografíca e Informática.	DF, F/E
The Mexican Economy	Banco de México (1986)	DF, F/E
Informe Anual 1985	Banco de México (1986)	DF, F/E
Indicadores Económicos para evaluación financiera	(SOMMEX) (1987)	DF, F/E
Boletín Mensual de Información Económica (1987)		DF, F/E
Estructura Económica del Estado de Michoacán (1970, 1975, 1980)	Instituto Nacional de Estadistica (1987)	DF, F/E PL, C/A
La Marina Mercante La Latinoamericana La Nacional y el Transporte Marítimo de México (Tomo 2/2)	Comisión Nacional Coordinadora de la Industria Naval (1984)	DF

TITLE OF DOCUMENT	PUBLISHER & DATE ISSUED	FIELD
Anuario Estadistico del Comercio Exterior de los Estados Unidos de México 1984	Instituto Nacional de Estadistica Geografia e Informatica (1984)	DF, F/E
La Industria Siderurgica en México, 1986.		DF, PL C/A
Producción Siderurgica Nacional 1981-1985	CANACERO	PL, C/A
Indicadores Básicos de La Industria Asociada	CANACINTRA (Cámara Nacional de la Industria de Transformación) (1986)	PL
Proyecto de un Astillero de Reparación Naval Mayor en el Puerto Industrial de Lazaro Cardenas, Michoacán	Comisión Nacional Coordinadora (1984)	DF, F/E PL
Proyecto de un Astillero De Reparación Naval Mayor en el Puerto Industrial de Lázaro Cárdenas, Mich. Resumen Ejecutivo del Estudio de Factibilidad	Astilleros Unidos, S.A. de C.V. (1984)	DF, F/E
Estudio de Factibilidad de un Astillero de Reparaciones Navales en Lázaro Cardenas, Mich. Construcción por etapas	Astilleros Unidos, S.A. de C.V. (1985)	PL, C/A
Detalle y Desarrollo del Análisis del Mercado Anexo "A"	Astilleros Unidos, S.A. de C.V. (1984)	DF, F/E
Proyecto Astillero Lázaro Cárdenas Tomo I Estudio Geotécnico del Nuevo Astillero que se construirá en el Puerto Industrial Lázaro Cárdenas.	Perforaciones y Cimentaciones, S.A. de C.V. (1982)	C/A
Proyecto Astillero Lázaro Cárdenas Tomo II	Perforaciones y Cimentaciones, S.A. DE C.V. (1982)	C/A

TITLE OF DOCUMENT	PUBLISHER & DATE ISSUED	FIELD
Proyecto Astillero Lázaro Cárdenas Tomo II Planos de los Trabajos de Exploración Geotécnica de los Cortes Estratigráficos A-A' al corte L-L' del Nuevo Astillero que se construirá en el Puerto Industrial Lázaro Cárdenas	Perforaciones y Cimentaciones, S.A. DE C.V. (1982)	C/A
Memoria de Labores 1983	Petróleos Mexicanos (1984)	DF
Programa Nacional de Mineria 1984-1988	SEMIP (Secretaría de Energía, Minas e Industria Paraestatal) (1984)	DF, PL
Indicadores Económicos Febrero 1987	Banco de México (1987)	DF, F/E

LIST OF COLLECTED DATA

DURING 2nd. SURVEY

TITLE OF DOCUMENT	PUBLISHER & DATE ISSUED	FIELD
Import Tariff in Mexico	JETRO	F/E, PL C/A
General Economic Condition in Mexico (1987)	JETRO	F/E
Tax & Investment Profile in México 1986	Sanken de México S.A. de C.V. (JETRO)	F/E
Programa Nacional de Fomento Industrial y Comercio Exterior 1984-1988	Estados Unidos Mexicanos Presidencia de la República (JETRO)	F/E
Decreto que establece los fiscales para fomentar el empleo, la inversión en actividades industriales prioritarias y el desarrollo regional	Secretaria de Hacienda y Crédito Público (JETRO)	F/E
Tax & Tax Incentive System in Mexico	(SOMEX)	F/E
Mercado de Valores 1987 Abril	(SOMEX)	F/E
Tipos de Cambio 1984-1987	(SOMEX)	F/E
Estímulos Fiscales al Desarrollo Regional	Socio del Despacho Price Waterhouse (SOMEX)	F/E
Acuerdo por el que se otorga subsidio a la importación de materias primas partes y componentes cuya oferta nacional es insuficiente.	Diario Oficial 1987, Abril (SOMEX)	F/E

Abbr. DF : Demmand forecast
PL : Dockyard, workshop facilities & operation planning
C/A : Civil & arhitecture design
F/E : Financial & economic analysis.

TITLE OF DOCUMENT	PUBLISHER & DATE ISSUED	FIELD
Decreto por el cual se establecen las zonas geograficas para la descentralización industrail y el otorgamiento de estimulos	Secretaria de Comercio y Fomento Industrial (JETRO)	F/E
Decreto de 23 de Abril de 1985, que establece la devolución de impuestos de importación a los exportadores.	(JETRO)	F/E
Urban Development in Mexico	SEDUE	F/E
Estructura Urbana Estrategia General	Gobierno de los Estados de Guerrero y Michoacán (SEDUE)	F/E
Programa Trianual 86-88 Acciones prioritarias de Lázaro Cárdenas, Mich.	SEDUE	F/E
Integración de la Flota	S.C.T.	DF
Dirección de Comercialización y Proyectos (Feb. 1986)	AUSA	DF
Tarifa General de Maniobras	Servicios Portuarios (L.C.)	PL, C/A F/E
Tablas de Predicción de Mareas (1985)	Universidad Nacional Autónoma de México (Obras Marítimas (L.C.))	C/A. PL
Tablas de Predicción de Mareas (1987)	Universidad Nacional Autónoma de México (Obras Marítimas (L.C.))	C/A PL
Reporte Fotografico (Tomo IV) del Estudio de Mecánica de Suelos	AUSA	C/A
Proyecto Astillero Lázaro Cárdenas, Tomo III (Fig. 173-204)	AUSA	C/A
Costos y Presupuestos - Actualización al mes de mayo de 1987	Costos y Materiales S.A. de C.V. (AUSA)	C/A, PL

TITLE OF DOCUMENT	PUBLISHER & DATE ISSUED	FIELD
Costos y Materiales - Sexta Edición Abril de 1984	Costos y Materiales S.A. de C.V. (AUSA)	C/A, PL F/E
Meteorologic Data at Lázaro Cardenas (1981-1986)	SARH, Dirección General Servicio Meteorologico Nacional (AUSA)	C/A, PL
Acuerdo que establece las Actividades Industriales Prioritarias	Publicado en el Diario Oficial de la Federación del 22 de enero de 1985 y modificado mediante publicación en el del 25 de noviembre de 1986 (SOMEX)	F/E
Decreto por el cual se establecen las zonas geograficas para la Descentralización Industrial y el otorgamiento de estimulos	Publicado en el Diario Oficial de la Federación del 22 de enero de 1985 y modificado mediante publicación en el del 25 de noviembre de 1986. (SOMEX)	F/E
Decreto que establece los estimulos fisclaes para fomentar el empleo a la inversión en actividades industriales prioritarias y el desarrollo regional	Publicsdo en el Diario Oficial de la Federación del 22 de enero de 1986 (SOMEX)	F/E
Reglas de Aplicación del decreto que establece los estimulos fiscales para fomentar el empleo a la inversión en actividades industriales prioritarias y el desarrollo regional	Publicado en el Diario Oficial de la Federación del 3 de junio de 1986. Fe de Erratas publicada en el 10 de julio de 1986. (SOMEX)	F/E
Perspectivas de Desarrollo para la Industria Naval 1982-1992	Comisión Nacional Coordinadora de la Industria Naval Septiembre de 1982 (AUSA)	DF. F/E
Programa de Desarrollo de Recursos Humanos para la Industria Naval. Requerimientos (1981-1990) Tomo I Especialidades, Funciones y Conocimientos Requeridos Nivel Técnico y Obrero.	Comisión Nacional Coordinadora de la Industria Naval Agosto 1981 (AUSA)	PL

TITLE OF DOCUMENT	PUBLISHER & DATE ISSUED	FIELD
Tercer Informe de Gobierno Sector Comunicaciones y Transportes 1985	Presidencia de la República	DF, F/E
Cuarto Informe de Gobierno Comunicaciones y Transporte 1986	Presidencia de la República	DF, F/E

Information Obtained during Site Survey

Organismos y Funcionarios Entrevistados

	Organismo	Funcionario	Información
1)	Petróleos Mexicanos Gerencia de Transporte	Capitán de Altura Jorge Morales Domínguez	- Record de reparación de barcos - Record de operación del Astillero - Sistemas e información de la construcción del Astillero.
2)	Astilleros Unidos, S.A. de C.V., Dirección de Operaciones y Proyectos. Gerencia de Desarrollo de Proyectos	Ing. Vicente Soriano Ing. Arnulfo Díaz Cuellar	- Información general de Astilleros en México - Cuestionarios de Operación de los Astilleros de Veracruz y Ensenada
3)	Grupo I.C.A. Vicepresidencia Ejecutiva Ingeniería de Puertos	Ing. Manuel Salvoch Ing. Heriberto Estrada	Información general del del grupo y experiencia en obras marítimas. Cuestionario relativo a diferentes sistemas de construcción, costos unitarios de equipo y materiales.

4)	Servicios Portuarios de Lázaro Cardenas, S.A. de C.V.	C.P. Carlos Cabañillas Tirado	Información general del Puerto Industrial de Lázaró Cárdenas. Así como el costo relativo a maniobras.
5)	Fondo Nacional para los Desarrollo Portuarios. Sucursal en Lázaro Cárdenas, Mich. Delegado Regional	Arq. Francisco Sánchez	Plano general del Desarrollo del Puerto Industrial, estrategias y políticas. Infraestructura de apoyo. Planos topográficos del sitio. Datos de los canales junio 1985.
6)	Grupo Industrial N.K.S. Director General de Operaciones. Gerente de Ingeniería	Ing. Alfredo Olivares Ing. Luis Guzmán	Información detallada de la obra civil, con énfasis en el sistema de cimentación. - Costos de algunos insumos y detalle de costos de mano de obra. Así como programas de capacitación. Parte de esta información fue captada en cuestionarios.

7)	Comisión Federal de Electricidad Sucursal Lázaro Cárdenas Gerente Regional	Ing. José Manuel García	Información de las capacidades de generación de energía de las hidroeléctricas: La Villita, Infiernillo y el nuevo sistema carboeléctrico de Petacalco, Gro.
8)	Agencia Aduanal Luis Hoyo Sepulveda en Lázaro Cárdenas Mich. Asistente de la Gerencia de Operaciones	Sr. Fernando Ruvalcaba	Información detallada de los sistemas de importación de diferentes productos, tarifas, impuestos, se entregaran formatos para cada procedimiento.
9)	Siderurgica Lázaro Cárdenas-Las Truchas, S.A. Gerente General de Construcción en la 2a. etapa	Ing. Luis Padilla Massien	Detalles específicos relativos a la obra civil, con énfasis en procedimientos de cimentación (muro milano, pilotes de concreto, etc). Sirvió de base esta información para el cuestionario de obra civil.

10)	A.G.A de México S.A. de C.V. Sucursal Lázaro Cárdenas Asesor Técnico	Sr. Erlindo Hernández	Información relativa a costos unitarios de distintos tipos de gases industriales de corte y soldadura. Con uso posible en el Astillero.
11)	Concretos Apasco S.A. Sucursal Lázaro Cárdenas Gerente Divisional	Sr. Luis Manuel Plata	Costos unitarios de diferentes tipos de concreto, bombas de concreto, y capacidades de producción.
12)	Productora Mexicana de Tubos S.A. de C.V. Asesor de la Subdirección de Operaciones	Ing. Kiyo kazu Tonaka	Información relativa a condiciones y características de la obra civil de: cimientos, naves y estructuras. Costos de mano de obra, políticas de incentivos y capacitación.

13)	Dirección General de Obras Marítimas en Lázaro Cárdenas. Residente General Piloto de Puerto	 Ing. Carlos Tostado Paredes Cap. Francisco Alva Rosas	Información estadística de mareas 1984, 1985. Detalles de los canales de navegación. Sondeos batimétricos, condiciones para el dragado y taludes. Detalles e información para realizar la obra civil. Costos de maniobras para el movimiento de barcos información entregada por el piloto del puerto. Costos para los equipos de carga y descarga de barcos.
14)	Fideicomiso Lázaro Cárdenas Director General	 Lic. Guillermo Martín García	Estrategias de Desarrollo Urbano, costos de diferentes tipos de viviendas, y planes para realizar la construcción. Sistemas de financiamiento.
15)	Petróleos Mexicanos Terminal en Lázaro Cárdenas Gerente de Operación	 Ing. Juan Delgado	Capacidad de almacenamiento de: gasolina, diesel, tractomex, combustoleo, turbosinas. Llegada de barcos tanques. Capacidad del muelle, etc.

16)	Cámara de la Industria de la Construcción en Lázaro Cárdenas. Gerente de la Cámara Local	Ing. Juan Manuel Macias	Se llenaron cuestionarios de costos unitarios de materiales de construcción, renta de equipo, costos de mano de obra y sistemas de construcción.
17)	Latinoamericana de Ingeniería S.A. de C.V. Director General Director de Ingeniería	Ing. Héctor Covarrubias Ing. Joaquín Lozano García	Se entregó información relativa a: costos unitarios, materiales de construcción, equipo y maquinaria, costos de mano de obra. Detalles y planos de la cimentación en N.K.S. (Lázaro Cárdenas).
18)	Grupo Marítima Tolteca S.A. de C.V. Gerente de Operaciones	Cap. Eduardo Elizondo	Record de reparaciones de la flota de esta empresa para los años de 1984, 1985 y 1986. Incluyendo costos y astilleros donde fueron realizadas las reparaciones.

19)	Corporación Denver S.A. representantes de Hydra nautics en México. Gerente de Ventas	Ing. Ignacio Cruz	Información obtenida por esta empresa para cotizar un sincroelevador para el astillero de Lázaro Cárdenas, Mich.
20)	Industria del Hierro S.A. de C.V. Gerente Comercial Gerente de Ventas Nacionales	Ing. Eduardo Torres Ing. Raúl Arriaga	Se solicitaron cotizaciones para grúas viajeras, y otros tipos de grúas, equipo y maquinaria pesada.
21)	Dirección General de Obras Marítimas (S.C.T.) Director General	Ing. César Mondragón	Información general relativa a profundidades de los canales de navegación, taludes, políticas de dragado de mantenimiento en el Puerto de Lázaro Cárdenas, Mich.
22)	Universidad Nacional Autónoma de México Instituto de Geofísica Investigador	Ing. Francisco Grivel Pina	Gráficas de mareas para 1986, 1987. Así como los boletines de mareas de 1980 - 1986. Se solicitó detalles técnicos de los efectos del sismo de septiembre de 1985.

23)	Astilleros Unidos S.A. de C.V. Gerente de Desarrollo de Proyectos	Ing. Arnulfo Díaz Cuellar	Entregaron catalogo para el cálculo de precios unitarios (2 tomos) en en materiales de construcción, mano de obra, etc. Datos meteorológicos de Lázaro Cárdenas, Zihuatanejo, Manzanillo, para un período de 5 años. Estudio sismológico editado por la C.F.C., para Lázaro Cárdenas. Respuestas a los cuestionarios 1, 2 y 3.
24)	Astilleros Unidos S.A. de C.V. (Veracruz). Director General	Ing. Guillermo Saki	Respuesta a los cuestionarios del grupo 3 (aspectos de ingeniería civil); grupo 2 (operación y record del astillero A y B).
25)	Petróleos Mexicanos Astillero de Reparación en Ciudad Madero, Tamps. Superintendente Gerencia de Mantenimiento	Cap. Miguel Angel Oviedo Ing. Miguel Domínguez	Record de reparaciones de barcos desde el inicio del astillero, detalles específicos de un barco de la flota petrolera de Pemex. Horas/hombre por actividad en los distintos talleres.

			Programa de mantenimiento de Pemex para su flota en 1987. Informes relativos a la construcción del dique seco.
26)	Secretaría de Desarrollo Urbano y Ecología Director de Operación Urbana Zona Sur	Arq. Arturo Balandrano	Plano regulador de Lázaro Cárdenas, corto, mediano y largo plazos. Programa Nacional de Desarrollo Urbano.
27)	Gobierno del Estado de Michoacán. Secretaría de Desarrollo Industrial y Comercial Director de Desarrollo Industrial.	Lic. Moíses Pardo	Boletín económico. Estado de Michoacán. Directorio de empresa, escuelas técnicas, programas de capacitación. Programas de construcción de carreteras a fin de integrar al Puerto a: Guadalajara, Querétaro, Toluca y México. En lo relativo a exportación e importación.

28)	Secretaría de Comunicaciones y Transportes Servicios de Dragado Director General	Ing. Juan Valera	Se obtuvo información relativa a costos unitarios de dragado de construcción y mantenimiento. Así como las características y especificaciones técnicas de operación de 24 dragas, que se encuentran al servicio de SEDRA.
29)	Hydranautics Inc. Representante de Hydranautic en México	Ing. Juan Mora	Se obtuvo cotización para un sincroelevador.
30)	Fondo Nacional para los Desarrollos Portuarios Subdirector de Proyectos y Construcción Subdirector de Promoción	Ing. José A. Boyer Lic. Julian Tonda	Se obtuvo información relativa a costos de suministro de agua, energía eléctrica en el sitio de construcción en Lázaro Cárdenas. Detalles de la infraestructura y planos topográficos escala 1:2000 con curvas cada metro. Costos de renta del terreno por M^2. Programas futuros de desarrollo del Puerto Industrial y detalles específicos del actual desarrollo portuario.

31)	Astilleros Peredia S.A. en Ensenada B.C. Gerente de Operación	Ing. Naval Martín Hernández	Información general de operación del Astillero, número de obreros, características del dique flotante. Y - programa futuro de expansión con base en un nuevo dique flotante con mayor eslora y manga.
32)	Astilleros Unidos de Ensenada S.A. de C.V. Director General Director de operación	C.P. Miguel Fox Cruz Ing. Evencio Huesca	Características generales de operación. Costos unitarios por actividad de reparación, así como horas hombre/actividad. Record de trabajos realizados en reparación. Programas de capacitación. Se visitó y se pudo observar la operación del sincroelevador que tiene una capacidad de levante de 3 000 ton, con 16 winches. Con tiempo máximo de maniobra de 2 horas. El costo total de este sincroelevador fue de 548 millones de pesos de 1982. construido por la empresa.

33)	Todd Pacific Shipyards Corporation Los Angeles Division Proyec Manager Facilities Development	Mr. Wallace Scott Whipple	Se visitó el sincroelevador más grande en la costa del Pacífico. El cual tiene una capacidad de levante de 22 000 T, operado con 110 winches. Las dimensiones son: 200 m de eslora, 32 m de manga. Este sincroelevador ocupa el 2° lugar mundial, con respecto a su capacidad de levante. Se obtuvieron datos del número de trabajadores y algunos costos de operación y mantenimiento. El costo total incluyendo obra civil sincroelevador y zonas de transferencia fue de 48 millones de dólares de 1981-1982. El tiempo necesario para su construcción y puesta en operación fue de 2 años.
34)	NEL Syncrolift Inc. Consultante	Mr. Walter W. Loke	Se obtuvo cotización preliminar de un sincroelevador que podrá ser utilizado en el Astillero de Lázaro Cárdenas, Mich.

* 35)	Astilleros Unidos de Guaymas S.A.	Ing. Genaro Upalia	Datos estadísticos del Astillero de Guaymas, Sonora
* 36)	Astilleros Unidos de Mazatlán S.A.		Datos estadísticos del Astillero de Mazatlán Sinaloa
* 37)	Servicio de Transbordadores S.A.		Datos estadísticos de la flota de transbordadores
* 38)	Dirección de Puertos Secretaría de Comunicaciones y Transportes		Reporte de frecuencia de llegada de embarcaciones nacionales y extranjeras a los principales puertos del Pacífico

* Información enviada a través de la oficina de JICA en México.

Progress Report (I)

- Premise of Feasibility Study

I. Financial and Economic Analysis

1. Capital financing plan

(1) Project financing mode

Loan : Equity = 1:1

(2) Condition of long term loan

Grace period = 2 years
Repayment term = 10 years
Interest rate = 5% p.a.

(3) Interest rate on short term loan = 8 % p.a.

2. Corporate tax = 42% of profit

3. Dividends: To pay dividend according to the cash-flow situation

(1) Condition : Retained earning > 0 and
net profit of current period > 0

(2) Amount : 50% of net profit of current period

4. Depreciation amortization method

Item	Method	Useful Life	Residual Value
Graving dock	Straight line	20	0
Floating dock	Straight line	20	0
Ship lift	Straight line	20	0
Building	Straight line	20	0
Machinery equipment	Straight line	10	0
Quays	Straight line	20	0
Transportation equipment	Straight line	5	0
Automobiles	Straight line	5	0
Office appliances	Straight line	10	0
Deffered assets	Straight line	10	0

5. Import taxes

(1) Import tax is imposed on the FOB price
The tariff rates are shown in import tax rate table

(2) Other charges on importation

a) Custom clearance fee
6/1000 of FOB price

b) For "Promotion of the exportation (Fomento al comercio exterior)"

5 per cent of the import tax

(3) Custom agent fee
((item 1) + (item 2) + IVA) x 0.045

(4) Others

a) Cargo Handling charge
See the tariff table

b) Warehouse charge
360 pesos/ton·day

c) Fee of port facilities use
85 pesos/ton

6. Tax incentives

(1) Corporate tax incentives

a) Investment tax credit
tax credit amount is 20% of investment and the credit is good for 5 years

b) job creation tax credit
tax credit amount = annual minimum wage *No. of job creation

tax credit is good for 2 years

(2) Import tax incentives

	Export	Domestic
Raw material, parts and other material for operation	exempt (*1)	———
Material, equipment machinery and other parts for construction	exempt (*2)	exempt (*3)

*1 Qualification:
Export amount mayor US$ 1 million or
Export amount mayor 20% of total sales amount

*2 Qualification:
Export amount mayor 30% of total sales amount

*3 In this project the same process line as for export is to be used.

7. Project life : 30 years

8. Prices are shown by US$

The controlled exchange rate of Peso and US$ announced by Bank of Mexico shall be applied.

All future costs and revenues are stated in constant prices as of the middle of 1987.

9. Criteria for profitability of the project

IRR-Before interest tax (BIT)
(NPV (at 16%-DCF) and simple payback period are also calculated)

10. Deferred assets

(1) Start-up cost (establishment expenditure)

(2) Training cost before start of normal operation (dispatched engineers cost; cost of training in abroad)

(3) Financial cost during preparation period

11. Increase of labor cost for increase of productivity and others: profit sharing at 10% of tax profit

12. Cash on hand

3-5% of total operation cost of a year

13. VAT (IVA) is left out of consideration as to the sales amount and cost

14. Cut - off rate (Opportunity cost of capital) : 16%

15. Shadow exchange rate

Exchange rate of Peso and US$ (Controlado in 1982) and inflation rate in Mexico and U.S.A after 1982 are two considerations in calculation of the shadow exchange rate.

"1,200 Peso = 1 US$" is to be applied.

II. Civil Engineering

June 15, 1987

Information from: SERVICIOS PORTUARIOS DE LAZARO CARDENAS, S.A. de C.V.

1. Possibility of direct mooring to the Dockyard site for unloading (after completion of private wharf)

In case of the queywall of the Dockyard site being completed in advance of the whole plant, it can be used for the purpose of unloading materials for the construction of Dockyard and shiprepair operation.

June 15, 16 and 18, 1987

Information from: -FONDO NACIONAL PARA LOS DESARROLLOS PORTUARIOS, SECRETARIA DE COMUNICACIONES Y TRANSPORTES (FONDEPORT) IN LAZARO CARDENAS
-COMISION FEDERAL DE ELECTRICIDAD (C.F.E.)

July 9, 1987

Information from: FONDO NACIONAL PARA LOS DESARROLLOS PORTUARIOS, SECRETARIA DE COMUNICACIONES Y TRANSPORTES (FONDEPORT) IN MEXICO, D.F.

1. Future Expansion

The FONDEPORT's plan, expressed that fifty (50) heavy industries (including SICARTSA, PEMEX, NKS, FERTIMEX, etc.) and two hundreds (200) small and medium scale industries will begin to operate by the end of 2010.

2. Infrastructure for the Dockyard

(1) Road and railway

The road and railway to the Dockyard are incomplete as of June 1987. They say the construction of railway to PEMEX ans NKS plants will be commenced in the near future.

(2) Electricity (interviewed with C.F.E.)

C.F.E. (Comision Federal de Electricidad) will construct a new substation near the Dockyard by 1994.

Capacity: 20MVA X 1 Unit, 115KV/13.8KV

A new access line from the substation to the Dockyard will be connected by C.F.E.

(3) Industrial and Drinking Water Service System

FONDEPORT will supply industrial water for the Dockyard, Drinking water service does not exist in the complex.

FONDEPORT will construct the infrastructure utilities and systems at their cost except railway to the boundary of the Dockyard.

3. Land for the Repair Dockyard

The FONDEPORT is ready to lease the 120 hectares land for the Dockyard. The land can be occupied in part (see Fig. 1), and, if necessary extended more than the proposed site. In the case of Fig. 1, the remaining part for the proposed area will be kept for the repair Dockyard during 5 years. The rent of land is authorized by "Comision de Avaluos de Bienes Nacionales" with a fee of 10 to 15 pesos/m^2/month as of June, 1987.

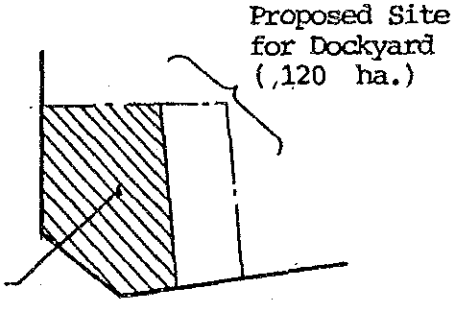


FIG. 1

TABLE I

OBRAS MARITIMAS — JUNIO 7, 1985

DATOS DE CANALES

LOCALIZACION	ANCHO DE PLANILLA		PROFUNDIDAD	
	ACTUAL	PROYECTO	ACTUAL	PROYECTO
CANAL DE ACCESO	150 M	350 M	- 14 M	- 16 M
CANAL (FTE. T. GRANOS)	205	360	- 14	- 14
CANAL ORIENTE	120	300	- 14	- 14
CANAL NORTE	170	300	- 12.5	- 14
CANAL SUR (FTE. SICARTSA)	300	300	- 12 A - 14	- 16
CANAL DE LA ARMADA	60 A 123	300	- 7	- 10

June 19, 1987

Information from: OBRAS MARITIMAS (SCR) AT LAZARO CARDENAS

1. Dredging work

The dredging work at Lazaro Cardenas started on 1972, and the work around the Dockyard site was commenced from 1982. They banked up on the Dockyard site with surplus soil on a level to other area. At present, the dredging work has nos completely finished. According to their project, the width of canal bottom is 300 M. and the depth is -14M.

Fig. 2 and Table I, shows the present state of western side of the Dock yard site as of June, 1987.

They said the remaining area of canal will be dredged by the owner of Dockyard.

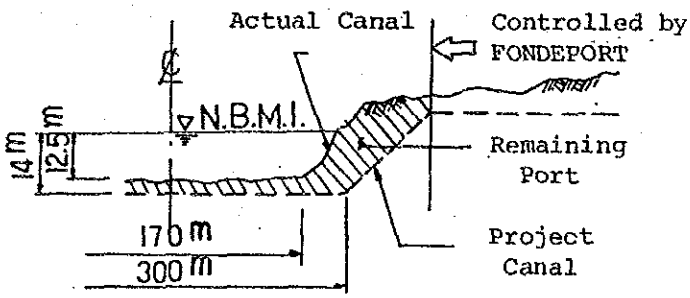


FIG. 2

2. Geographical Condition

The land undulates from + 3.0 M (from N.B.M.T.) to + 10 M approximately. The depth of the canal has not changed since 1982 because drift sand (siltation) does not invade and the bottom is comparatively stable.

3. Boundary Line of the Dockyard

The detailed map for the Dockyard site is provided by SCT. In this map, the coordinates for boundary point of the Dockyard site is described. Also the FONDEPORT's shows the coordinates. But there are some differences between the two. They informed us that FONDEPORT's is correct because they controlled the Industrial Port area.

4. Canal for Navigation

For the navigation, the width of the canal shall be kept as shown in Fig. 3. And the ship shall be moored within the limit of 100 M distance from the boundary line of the Dockyard.

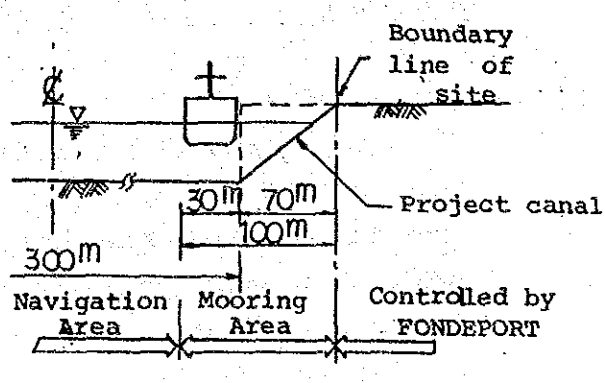


FIG. 3

June 24, 1987

Information from: OBRAS MARITIMAS (SCT) AT MEXICO, D.F.

1. Dredging works

The scope of dredging work done by SCT, is shown in Fig. 4. If the remaining part is an obstacle for navigation, that part shall be dredged by SCT. If the remaining part is an obstacle to construct the queywall, owner of the Dockyard shall dredged it.

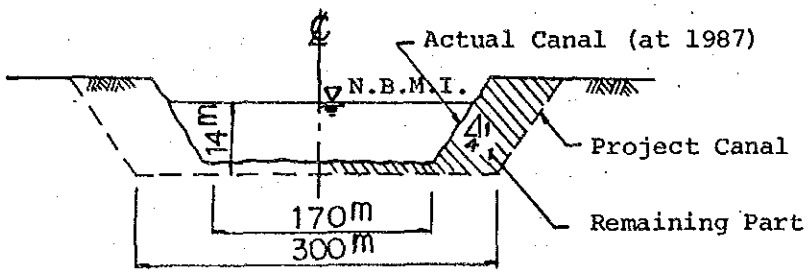


FIG. 4

2. Design Codes

If there is no design code for Port and Harbour Facilities construction, Japanese and U.S.A. codes are applicable.

3. Approval for design

It is necessary to get the approval of design of Port and Harbour Facilities, by SCT (Marina Mercante).

Progress Report (II)

- Summary

1. SUMMARY

1.1 Introduction

The objective of this progress report is to set forth a result of preliminary feasibility study, based upon collected data at the site survey, data in the hands of study team and the result of market study.

The main items of research and study are as follows:

(1) Demand forecast of shiprepair work at a new repair dockyard in Lazaro Cardenas.

(2) Recommendation of Docking System

(3) Feasibility of the Project derived from the result of financial and economic analysis.

The draft final report will then be prepared focussing its attention on the selected docking system.

1.2 Demand for Shiprepair Works

In order to forecast demand for shiprepair works at a new repair dockyard, we have researched and analyzed the correlation among many factors concerned with demand and repair volume.

First of all, we have derived potential demands for shiprepair works from the correlation between ships trading in and out of Mexico and the cargo volume handled at ports, as well as from the vessels passing through the Panama Canal or off the Mexican coast.

Then, we have forecast the repair work volume at a new repair dockyard taking its competitiveness into account.

According to the forecast, the potential demand for repair works in the Lazaro Cardenas area at the time of construction of the dockyard will be sufficient for the new dockyard to operate without depriving existing shipyards in Mexico of any of their works and it is also forecast that the potential demand will be increasing, which could support the dockyard expansion.

However, it is essential for the dockyard to obtain the shiprepair competitiveness in the international market. Otherwise, the expected potential demand would never be turned into actual repair orders.

Appropriate measures as explained in this report being taken, the new dockyard should be able to secure shiprepair orders of 68 ships in 1995, 94 in 2005 and 131 in 2015 on average in sizes between 1,000GT and 50,000GT. (Refer to Table 1.2.1)

Table 1.2.1

SUMMARY OF DEMAND FORECAST OF
SHIP REPAIR WORKS IN NEW REPAIR DOCK YARD

Item \ Year	1984 (Actual)	1995 (Forecast)	2005 (Do)	2015 (Do)
Handled cargo volume on Pacific side (mill.ton)	45.5	58.2 -74.1	78.8 -120.7	112.7 -196.5
Operating ships by Mexican Ship.Firms on Pacific side (No. of ships)	88	112	136	174
Entry foreign Ships in Pacific side ports (No. of ships)	1,444	1,655 -2,120	2,065 -3,180	2,800 -4,900
Potential demand of ship repair (No. of ships)	87	118 -127	146 -165	186 -219
Ship repair work at new ship repair dock yard in Lazaro Cardenas (No. of ships)		62 -72 (average 68)	84 -100 (average 94)	115 -145 (average 131)

1.3 Establishment of Technology of international competence

This report recommends that the new repair dockyard must receive the most advanced technology at least for a certain years at the outset in order to be competitive in the international market. The advanced repair technology and management system to be introduced to the dockyard by way of a technical assistance agreement with overseas leading shipyard should include such content as instruction for managers and engineers on the production control technique and/or repair technique by engineers despatched to the dockyard, training of Mexican engineers, supply of drawings for shiprepairs, etc.

1.4 Recommendable Docking System

Careful researches are made in the four possible alternatives of docking systems presented in the Inception Report, which are Graving dock, Floating dock, Shiplift and Combination. (Refer to Fig. 1.4.1)

The Combination system is a docking facility which combines a floating dock, quays for repair, a transfer system and working bays together.

The repairs of the bigger and/or heavy ship such as a loaded container ship shall be completed in the floating dock. The ships which have lighter weight and require longer working period for underwater repair may be repaired at the working bays, whenever necessary.

Under this system, repairs can be carried out at a floating dock, working bays and quays at the same time.

The Combination system is recommended as a result of the technical and economic investigation and evaluation.

The Combination system has both advantages of a floating dock's efficient operation such as convenience of docking and undocking, prompt start of repair, and a shiplift's flexibility of production control due to using the working bay which has both characteristics of dock and quay, and besides, the estimated construction cost of approximately U.S.$ one hundred million will be the lowest amoung the four alternatives. (Refer to table 1.4.2)

1.5 Feasibility of the Project

The financial and economic analysis on each system is evaluated as follows:

SYSTEM	FIRR %	EIRR %
Graving dock	6.2	6.9
Floating dock	7.3	8.2
Shiplift	4.2	4.7
Combination	9.0	10.0

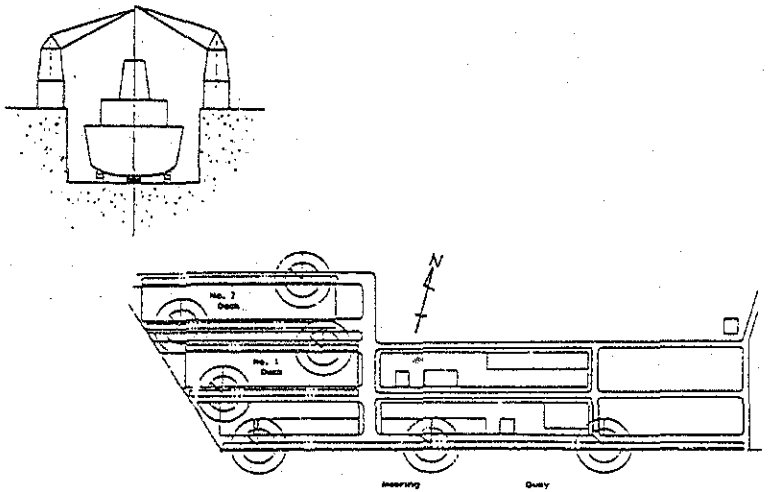
Abbr.: FIRR: Financial Internal Rate of Return
EIRR: Economic Internal Rate of Return

The outcome of evaluation indicates that, if the Combination system is adopted and operated with the competent technology in the proposed Lazaro Cardenas dockyard, this repair dockyard project should be feasible. This is also supported by the fact that the values of IRR are at a level higher than those calculated for new shipyard construction projects in other developing countries.

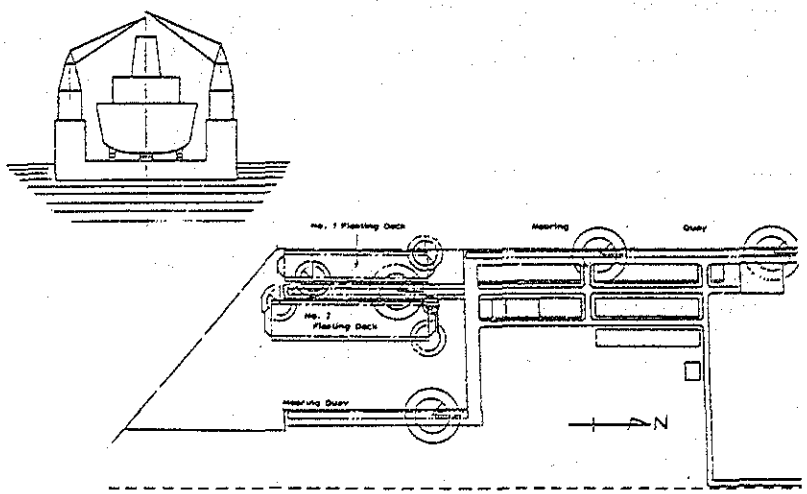
The project team will study in detail again concentrating on the Combination system and will research simultaneously on the way to increase IRR values. Results will be described in the draft final report.

Fig. 1.4.1. OUTLINE OF FOUR DOCKING SYSTEM

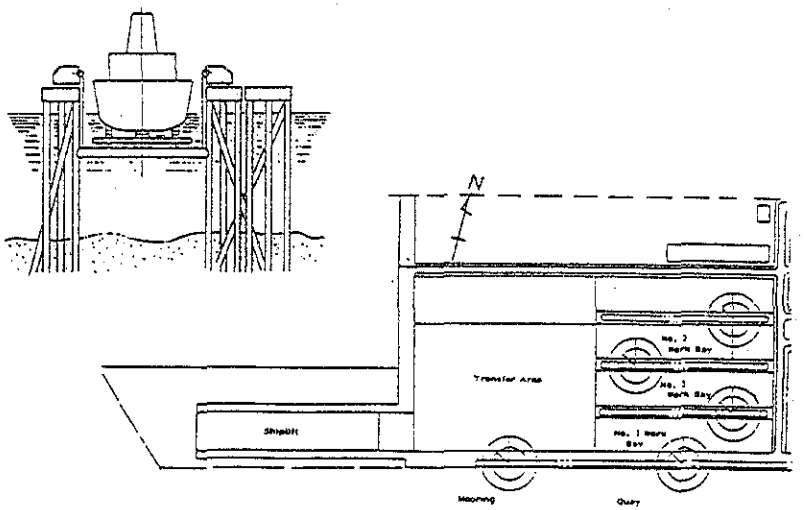
(1) GRAVING DOCK SYSTEM



(2) FLOATING DOCK SYSTEM



(3) SHIPLIFT SYSTEM



(4) COMBINATION SYSTEM

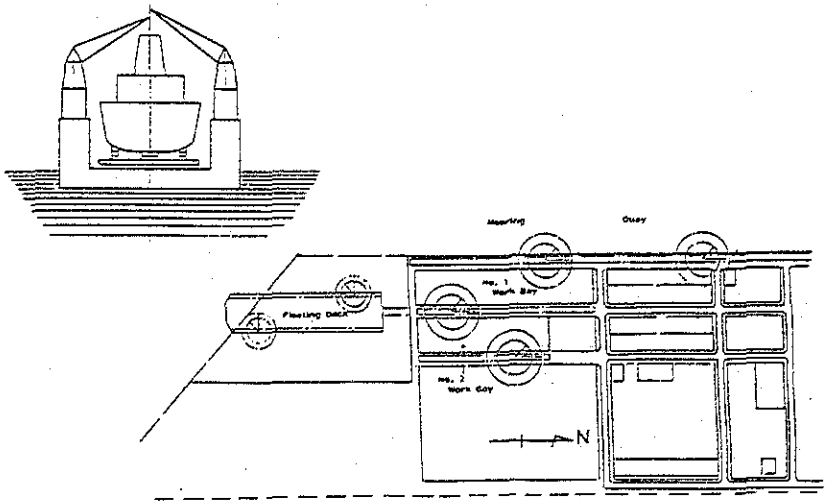


Table 1.4.2 Principal Particulars of Four Docking System

Docking System	Specification of Dock (Length x Breadth)	Specification of Working Bay (Length x Breadth)	Characteristics				Total Investment Cost	Profitability	
			Ch1	Ch2	Ch3	Ch4		FIRR	EIRR
							x 1,000$	%	%
Graving Dock	No.1 250M x 46M No.2 280 x 46	——	long	yes	good	no	119,940	6.2	6.9
Floating Dock	No.1 230 x 38 (L.C 20,000T) No.2 260 x 46 (L.C 37,000T)	——	short	yes	good	no	120,800	7.3	8.2
Shiplift	Elevator 230 x 46 (L.C 33,000T) * (270 x 46)	No.1 260M x 50M No.2 260 x 50 No.3 200 x 50	long	no	poor	yes	159,380	4.2	4.7
Combination	230 x 46 (L.C 33,000T) * (260 x 46)	No.1 260 x 50 No.2 200 x 50	very short	yes	good	yes	101,640	9.0	10.0

Note :

L.C : Lifting capacity in metric ton

*( ) : Figure of future expansion

Ch 1 : Construction period

Ch 2 : Presence of facilities with efficient capacity for ships over 60,000 DWT (approx. 40,000GT)

Ch 3 : Efficient operation, such as convenience for docking and undocking, transferring, prompt start of repair

Ch 4 : Flexibility of production control

Progress Report (II)

- Installation and Construction (of the new dockyard)

5. INSTALLATION AND CONSTRUCTION

5.1 Guidance of Planning

(1) The dockyard should be planned as a specialized repair shop for the merchant ship.

(2) The general layout plan should be made to allow future expansion for the repair and it's relative works.

(3) Investment timing

The investment plan should coincide with the growth of demand. For instance, the required numbers of dock and quay have been planned according to the growth of demand. The relation between facilities and demand growth has been analyzed by the computerized simulation program based on the queuing theory.

The simulation result is as follows:

Year	Numbers of dock	Numbers of quay
1995	2 *1	2
2005	2	3 *2
2015	2	3

Note)

*1 It may be possible to operate with one dock only, but the dock schedule control seems difficult.

*2 It may be possible to operate with 2 quay only, but the dock schedule control seems difficult.

5.2 General Layout Planning

Four alternatives are planned.

(Refer Fig. 5.2.1 - 5.2.4)

(1) Graving dock system

The layout is planned especially taking into consideration the soil condition of proposed area.

No. 1 dock has a enough capacity for PANAMAX (250 x 46 m)

No.2 dock has a sufficient capacity (280 x 46 m) for the bigger ships to be handled in the future.

(2) Floating dock system.

Floating docks are moored directly to the pier by means of the guide rail system.

No.1 dock size is an ordinary PANAMAX (230 x 38 m) size and No.2 dock has a sufficient capacity for the bigger ship (260 x 46 m).

(3) Shiplift

The site for dockyard in this case is selected on the south side for the convenience of workshop location.

For the bigger ships to be handled in the future, the shiplift will only be lengthen since the breadth of the shiplift has a sufficient dimension (46m) from the beginning. The original length of platform (elevator) is 230 m.

The repair quay is planned also in the minimum number for the purpose of works requiring only afloat repair or the dock trial. The working bay of shiplift serves both as dry dock and quay in general. For the shortage of quay in the future, the additional working bay can be provided to cope with the problem. One working bay is arranged for hearier ships and others are preapred for general ships.

(4) Combination system

The floating dock is moored by wires and anchores. Its location is selected to get easiest access to the adjoining working bays by moving sideways whenever working bays are needed for works.

For the bigger ships in the future, the pontoon of floating dock shall be lengthened as in the case of shiplift. The original dimension of the floating dock is 230 m x 46 m.

5.3 Civil Construction and Building

(1) Lazaro Cardenas area was the seismic center of the Mexico city earthquake of September 1985. Therefore, facilities and buildings shall be strong enough against the strong earthquake. The horizontal seismic load factor is assumed 0.27 G.

(2) The construction cost for each of the above alternatives is planned as low as possible taking into account the soil condition and the convenience of repair works.

Some typical construction plans are shown in Fig. 5.3.1 - 5.3.7.

(3) Table 5.3.1 shows the outline breakdown of the total expenditure.

The dredging cost in the Table does not include the portion to be carried out by the port authority in Lazaro Cardenas.

(4) Fig. 5.3.8 shows the outline schedule of construction for each alternative.

(5) For reference, the following drawings are attached to this report:

Fig. 5.3.9 Location of Repair Dockyard.

Fig. 5.3.10 Topographic Map of Present Site.

Fig. 5.3.11 Boundary Line of Site.

5.4 Characteristics Comparison of Docking Systems

(1) Basic condition

The comparison is being made on condition that the new dockyard at Lazaro Cardenas is to carry out repairs on large ships which are 40,000 GT and above but not more than 50,000 GT approximately.

(2) General comparison

Refre to Table 5.4.1.

(3) Comparison from technical view

The comparison will be carried out only from the technical viewpoint and the most suitable system for Lazaro Cardenas will be selected by the premise which has no connection with the investment cost.

a) Shiplift and conventional docking system

Note: Conventional docking systm means the system using graving dock and/or floating dock.

Shiplift system is a unique system which mainly consists of elevator, transfer equipment and working bay. The system is planned for the shiprepair work to be carried out in the working bay. The repair work at the working bay is like that of new shipbuilding. The accessibility to bottom, for example, is better than the

conventional system. Besieds, the shiplift system has an advantage of flexibility of production control, because the working bay has both functions of dry dock and quay.

But, workers should be very carefull, when transferring the bigger ships as a routine work, especially, elevating the container ship with containers loaded onboard. There will be some fear of accident when a strong earthquake occurrs during elevating or transferring the bigger ship, although chances may be slim.

The shiplift is one of the vital facilities in the dockyard, but the shiplift having such a big capacity has not been constructed so far.

b) Combination system and conventional docking system

The combination system is a docking facility which combines a floating dock, quays for repair, a transfer system and working bays together.

The repairs of the bigger and/or heavy ship such as a loaded container ship shall be completed in the floating dock. The ships which have lighter weight and require longer working period for underwater repair may be repaired at the working bays.

In other words, the main work facility is a floating dock and work bays on land are used as auxiliary or supplementary facilities.

The combination system takes advantage of both working efficiency of floating dock as well

as the flexibility of production control which is one of the merits of the shiplift.

These kinds of facilities have already been applied and technical problems are settled. The ships to be transferred to the working bay are in the limited range, so that the possible danger due to earthquakes would be reduced almost to nill.

(4) Recommendation on the selection of dock system

The construction costs of each alternative are shown in Table 5.4.2. The investment cost of combination system is approximately 15 to 35% lower than other alternatives.

Therefore, the combination system is evaluated to be the most suitable system from the technical view as well as economic viewpoint.

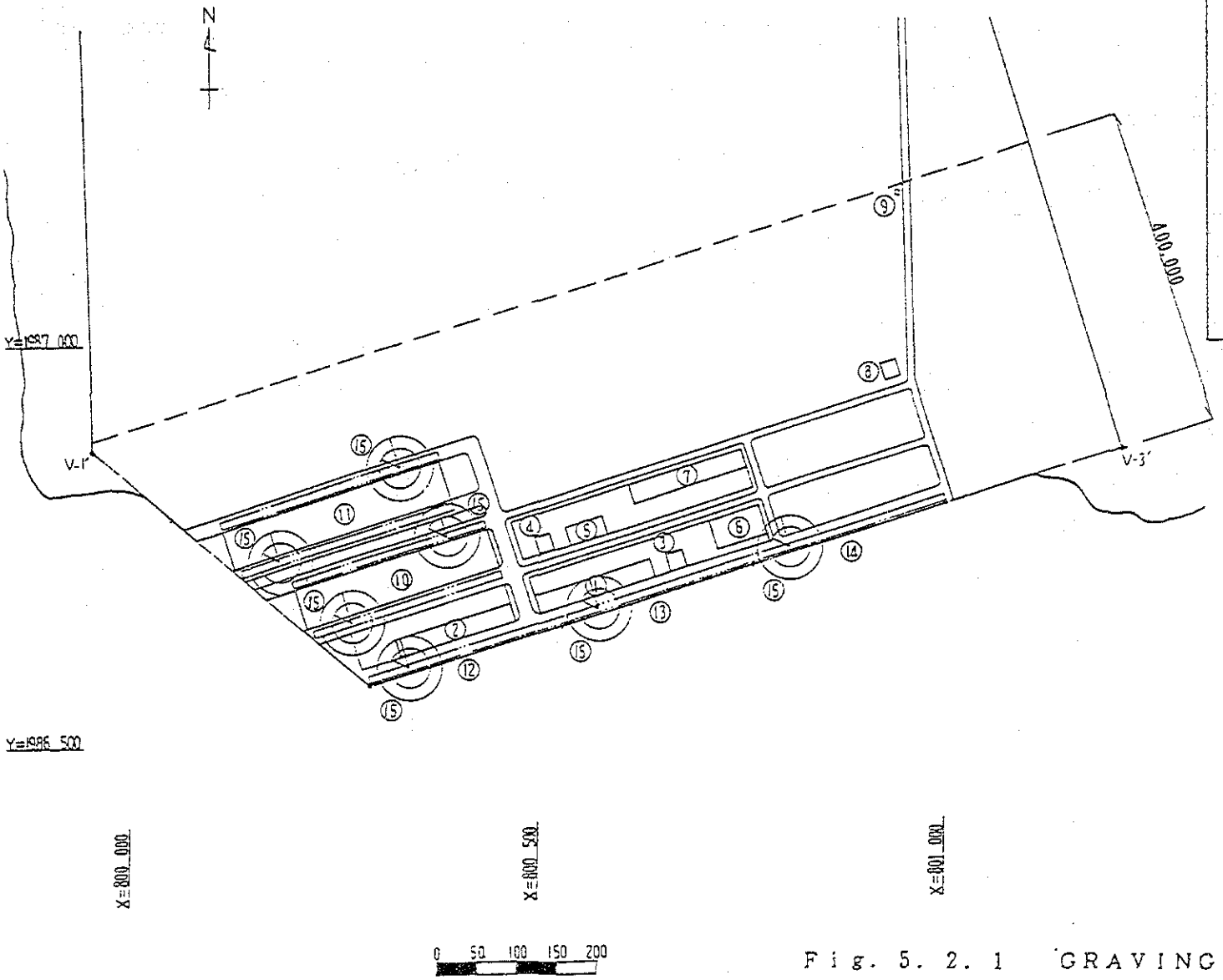
5.5 Outline of Workshops and Equipment

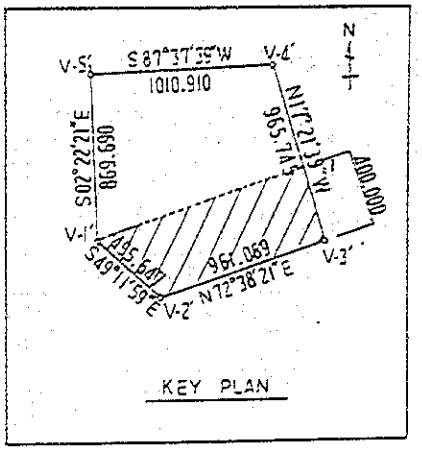
(1) Guidance of planning

a) The machinery and equipment which can be leased from the outside facility should not be invested. Those related to the work to be subcontracted should not be invested either.

For instance, tug boat should be rented from the port authority and the work requiring a shaft lathe, big horizontal boring machine, etc. should be asked to NKS.

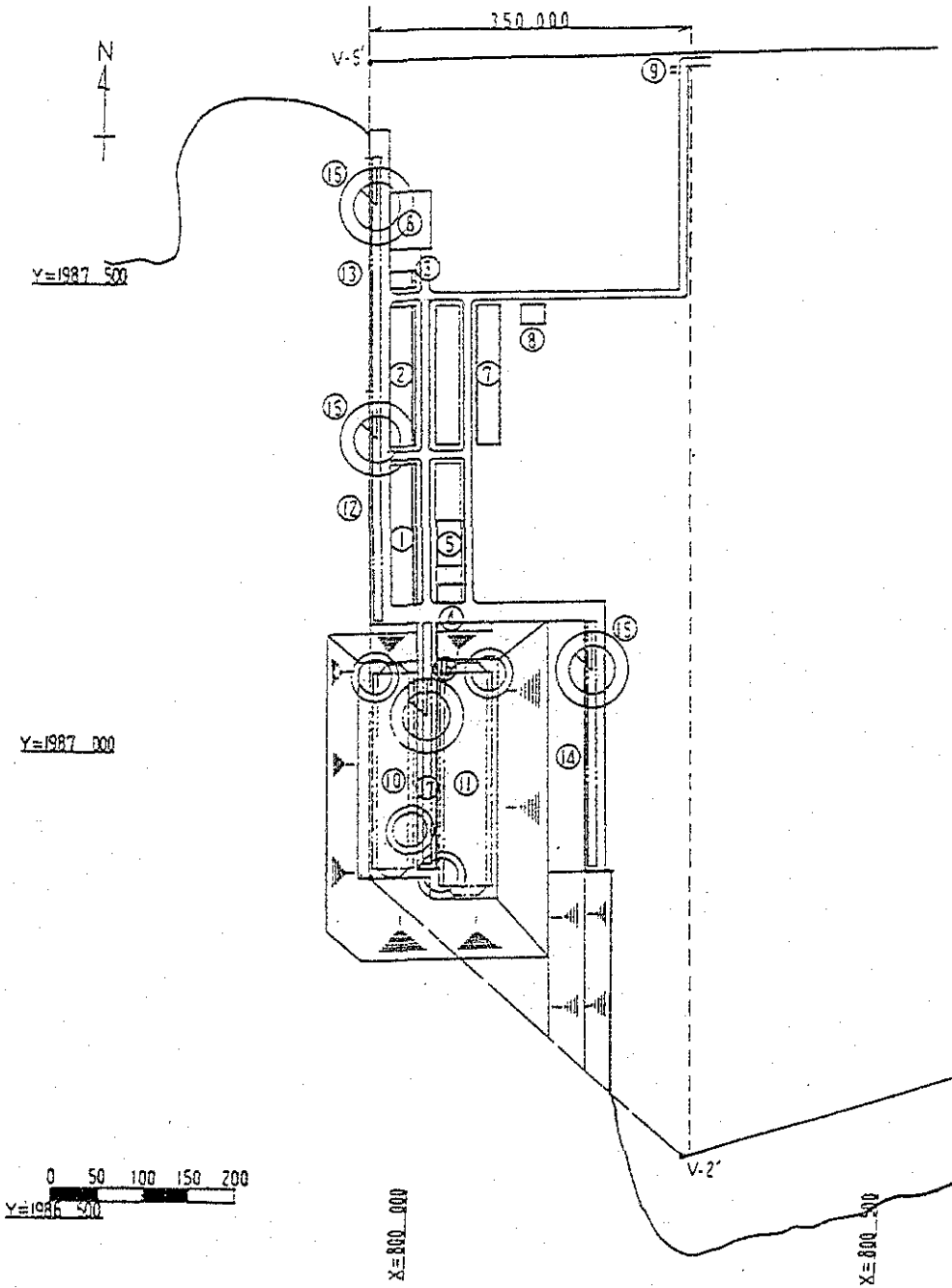
There exist many wooden workshops in Lazaro Cardenas area, so that woodenwork-machining should be subcontracted.

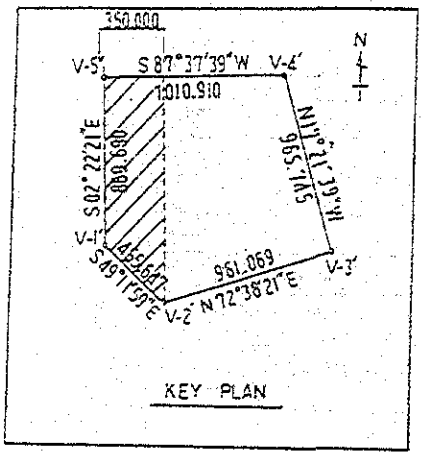




①	Repair Shop
②	Steel Shop
③	Galvanizing Shop
④	Painting Shop
⑤	Warehouse
⑥	Utilities Control Room
⑦	Office
⑧	Dock House
⑨	Guard House
⑩	Graving Dock NO.1
⑪	Graving Dock NO.2
⑫	Quaywall NO.1
⑬	Quaywall NO.2
⑭	Quaywall NO.3
⑮	Jib Crane (30T×25M, 15T×40M)

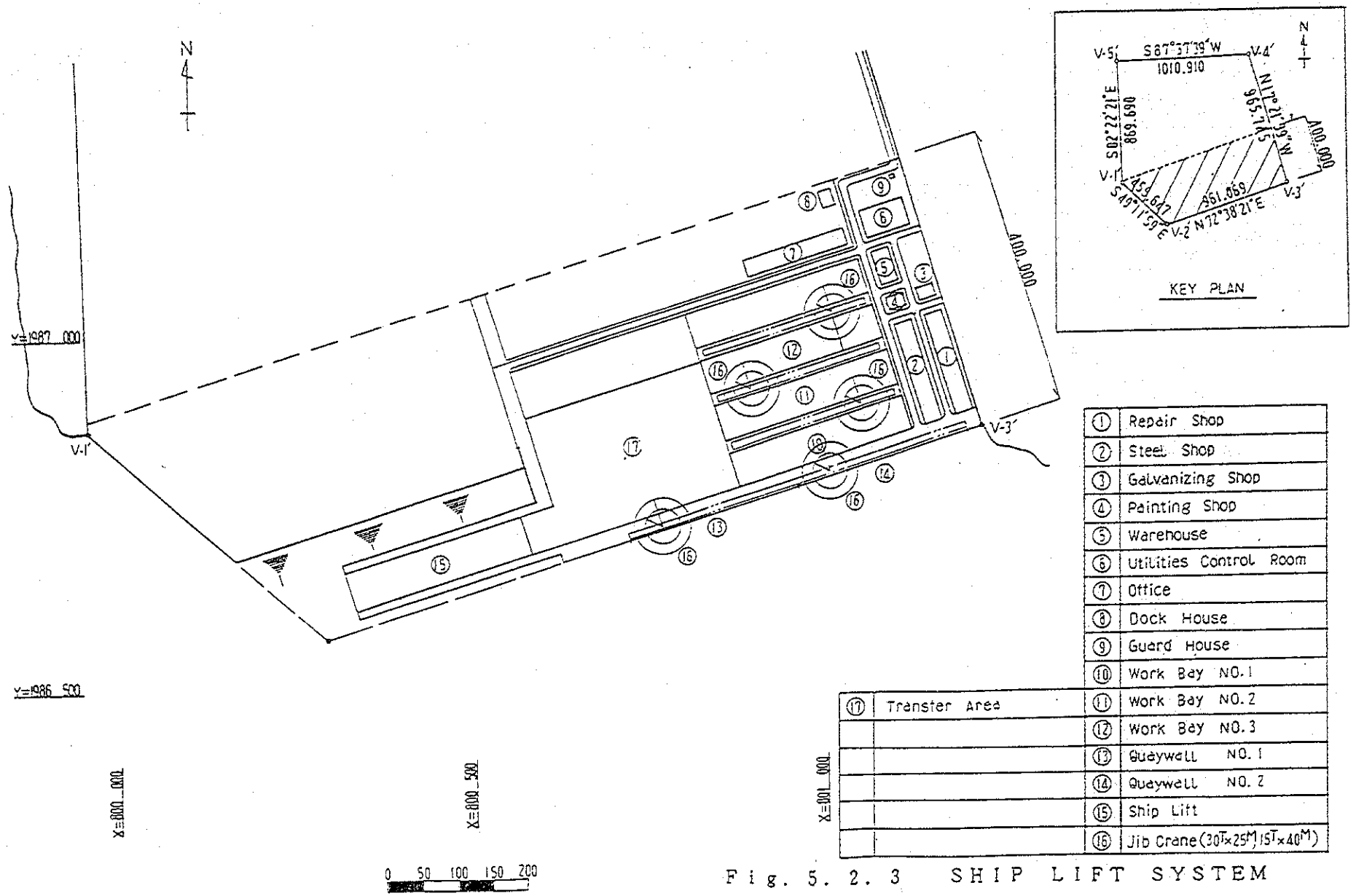
Fig. 5. 2. 1 GRAVING DOCK SYSTEM GENERAL ARRANGEMENT





		①	Repair Shop
		②	Steel Shop
		③	Galvanizing Shop
		④	Painting Shop
		⑤	Warehouse
		⑥	Utilities Control Room
		⑦	Office
		⑧	Dock House
		⑨	Guard House
		⑩	Floating Dock NO.1
⑯	Jib Crane(20T×25M,10T×40M)	⑪	Floating Dock NO.2
⑰	Pier	⑫	Quaywall NO.1
		⑬	Quaywall NO.2
		⑭	Quaywall NO.3
		⑮	Jib Crane(30T×25M,15T×40M)

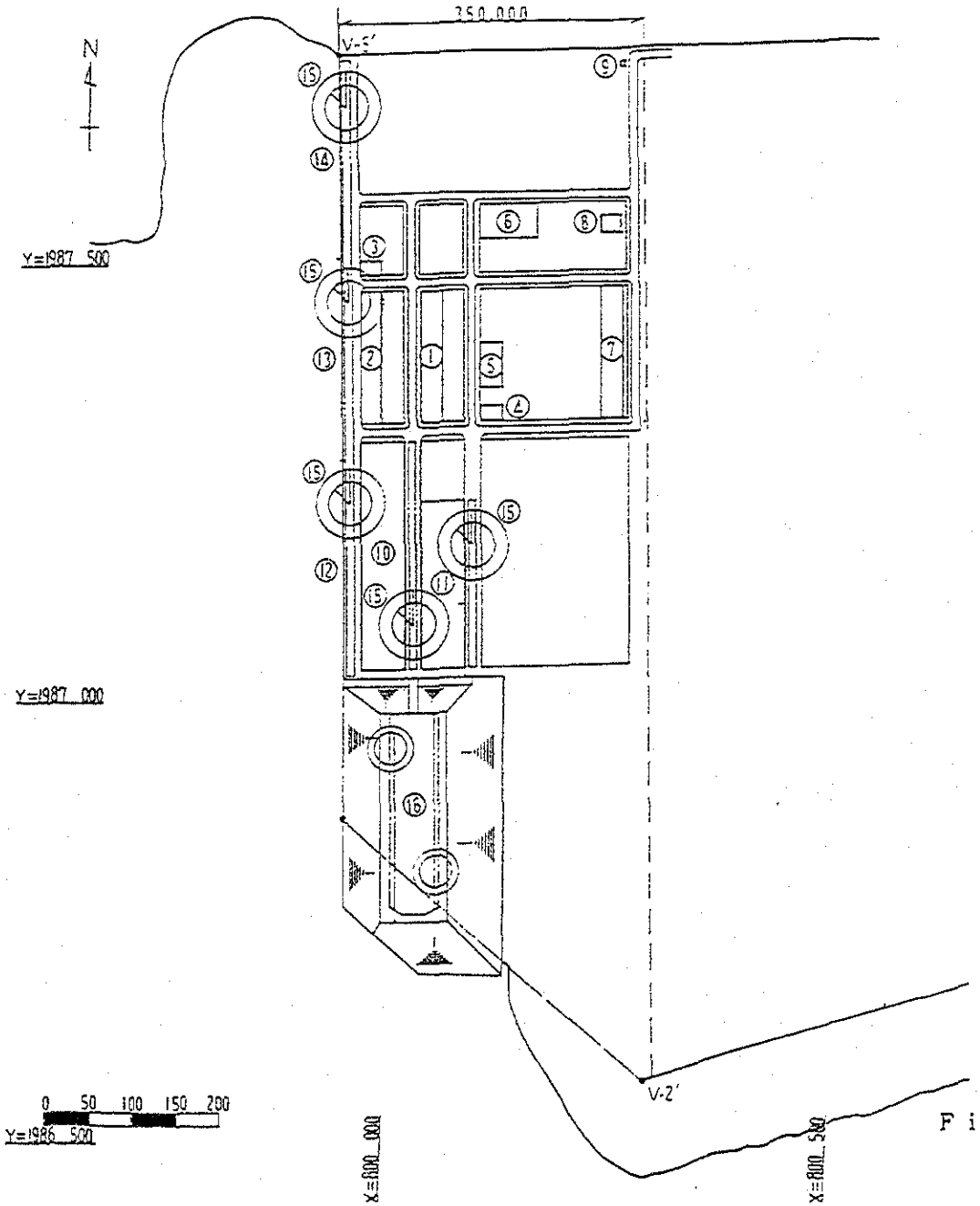
Fig. 5. 2. 2 FLOATING DOCK SYSTEM GENERAL ARRANGEMENT

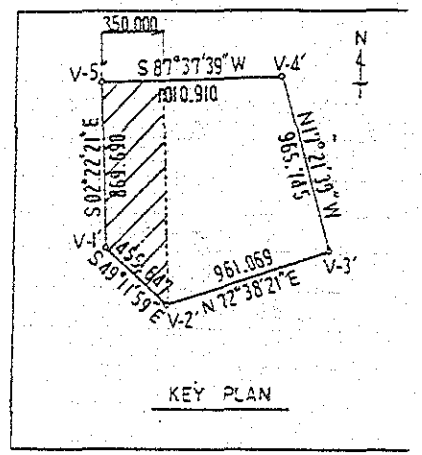


①	Repair Shop
②	Steel Shop
③	Galvanizing Shop
④	Painting Shop
⑤	Warehouse
⑥	Utilities Control Room
⑦	Office
⑧	Dock House
⑨	Guard House
⑩	Work Bay NO. 1
⑪	Work Bay NO. 2
⑫	Work Bay NO. 3
⑬	Quaywall NO. 1
⑭	Quaywall NO. 2
⑮	Ship Lift
⑯	Jib Crane (30T×25M, 15T×40M)
⑰	Transfer Area

Fig. 5. 2. 3 SHIP LIFT SYSTEM

GENERAL ARRANGEMENT





		①	Repair Shop
		②	Steel Shop
		③	Galvanizing Shop
		④	Painting Shop
		⑤	Warehouse
		⑥	Utilities Control Room
		⑦	Office
		⑧	Dock House
		⑨	Guard House
		⑩	Work Bay NO. 1
⑯	Floating Dock	⑪	Work Bay NO. 2
		⑫	Quaywall NO. 1
		⑬	Quaywall NO. 2
		⑭	Quaywall NO. 3
		⑮	Jib Crane ($30^{T}\times25^{M}$, $15^{T}\times40^{M}$)

Fig. 5. 2. 4 COMBINATION SYSTEM GENERAL ARRANGEMENT

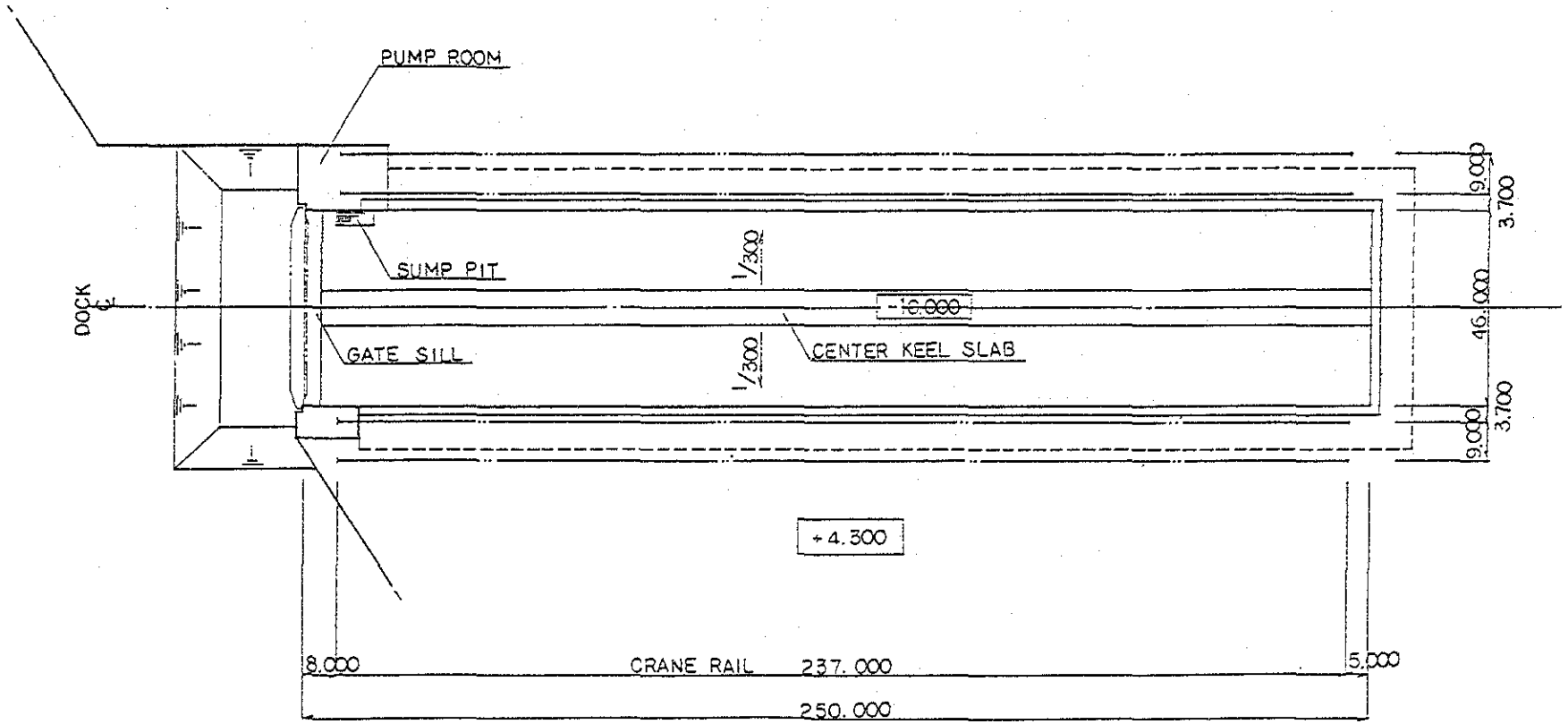
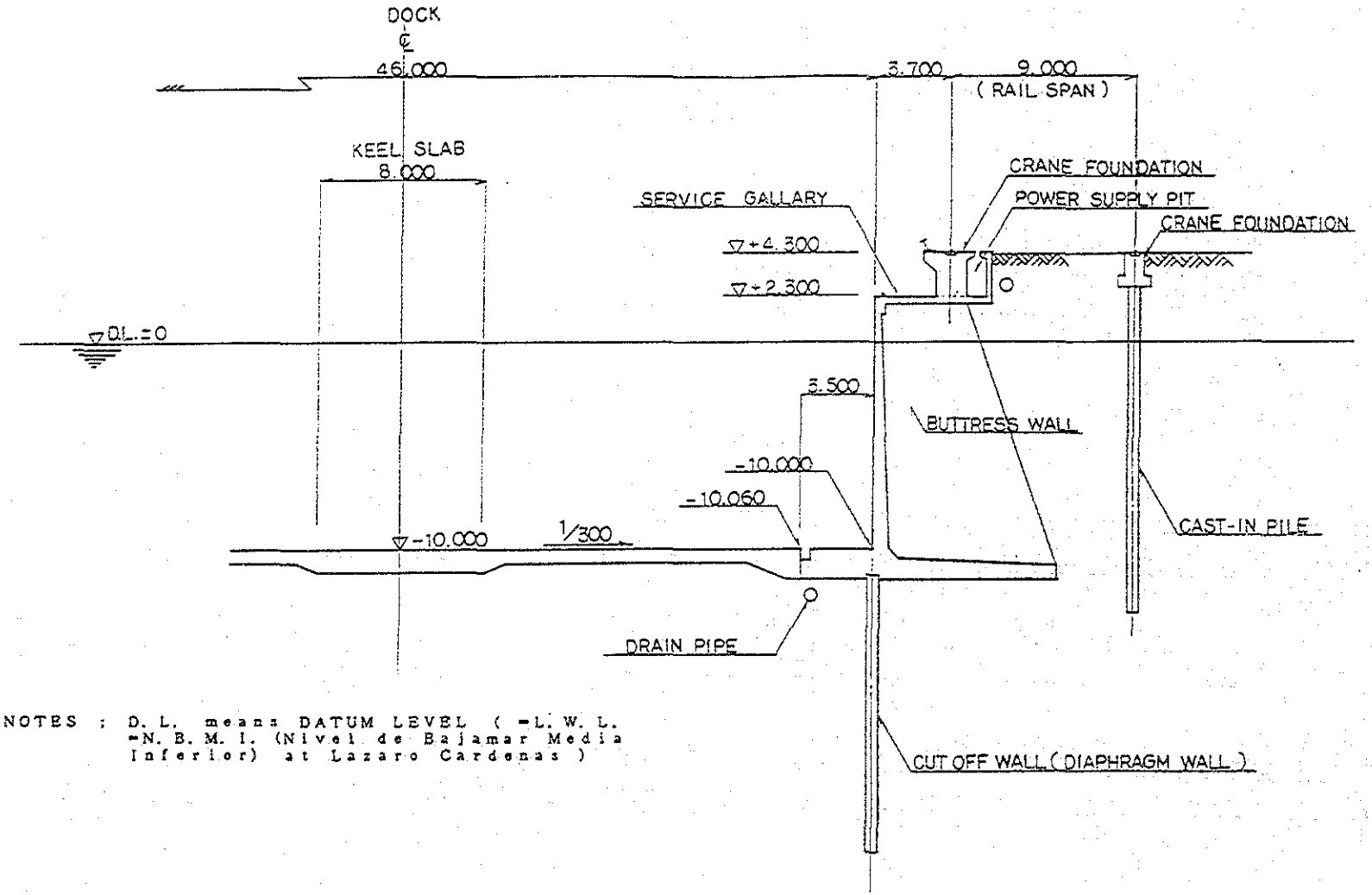


Fig. 5. 3. 1 GRAVING DOCK SYSTEM

DOCK NO. 1 PLAN



NOTES : D. L. means DATUM LEVEL (=L. W. L. =N. B. M. I. (Nivel de Bajamar Media Inferior) at Lazaro Cardenas)

Fig. 5. 3. 2 GRAVING DOCK SYSTEM

DOCK NO. 1 SECTION

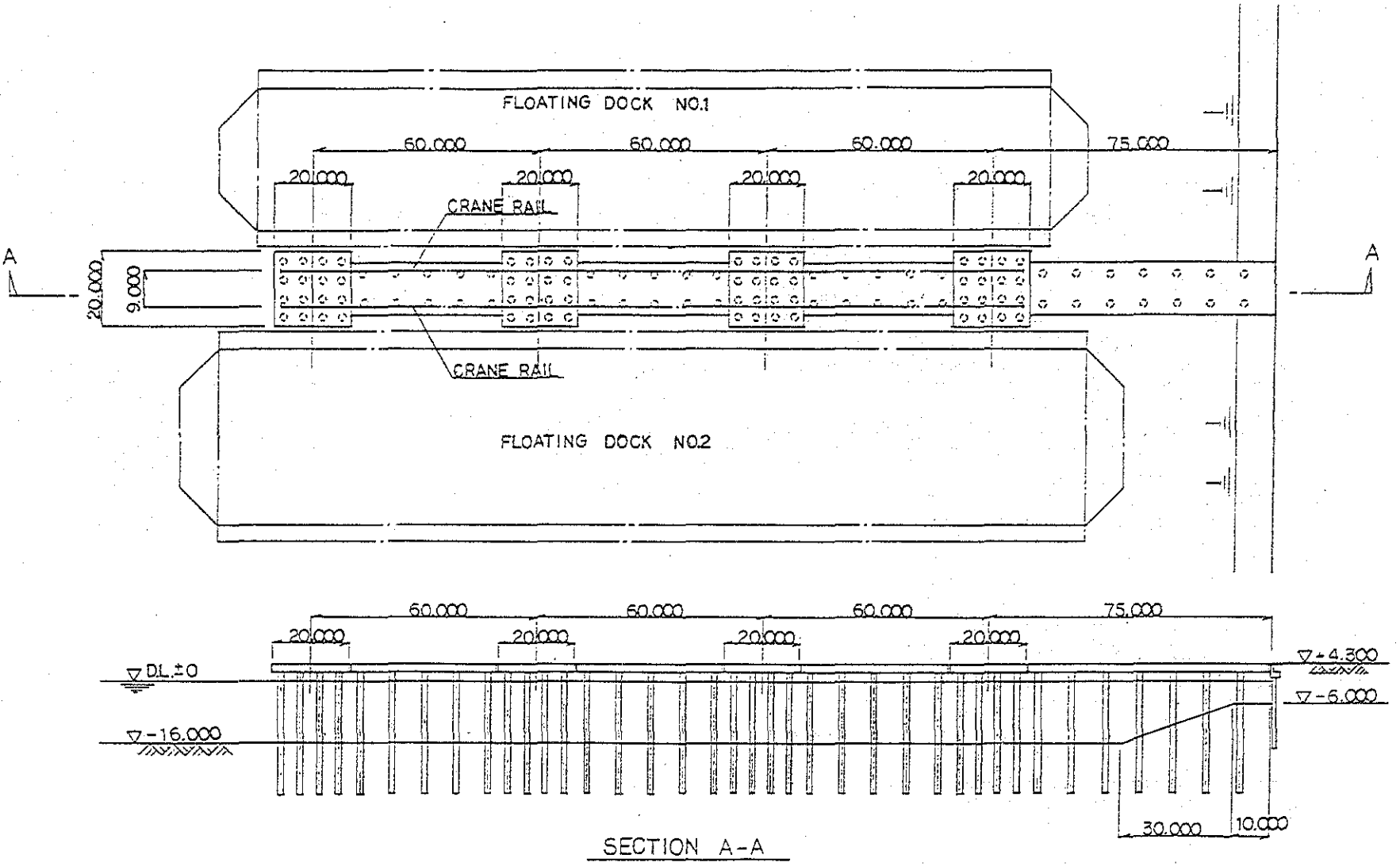


Fig. 5. 3. 3 FLOATING DOCK SYSTEM

PLAN AND SECTION

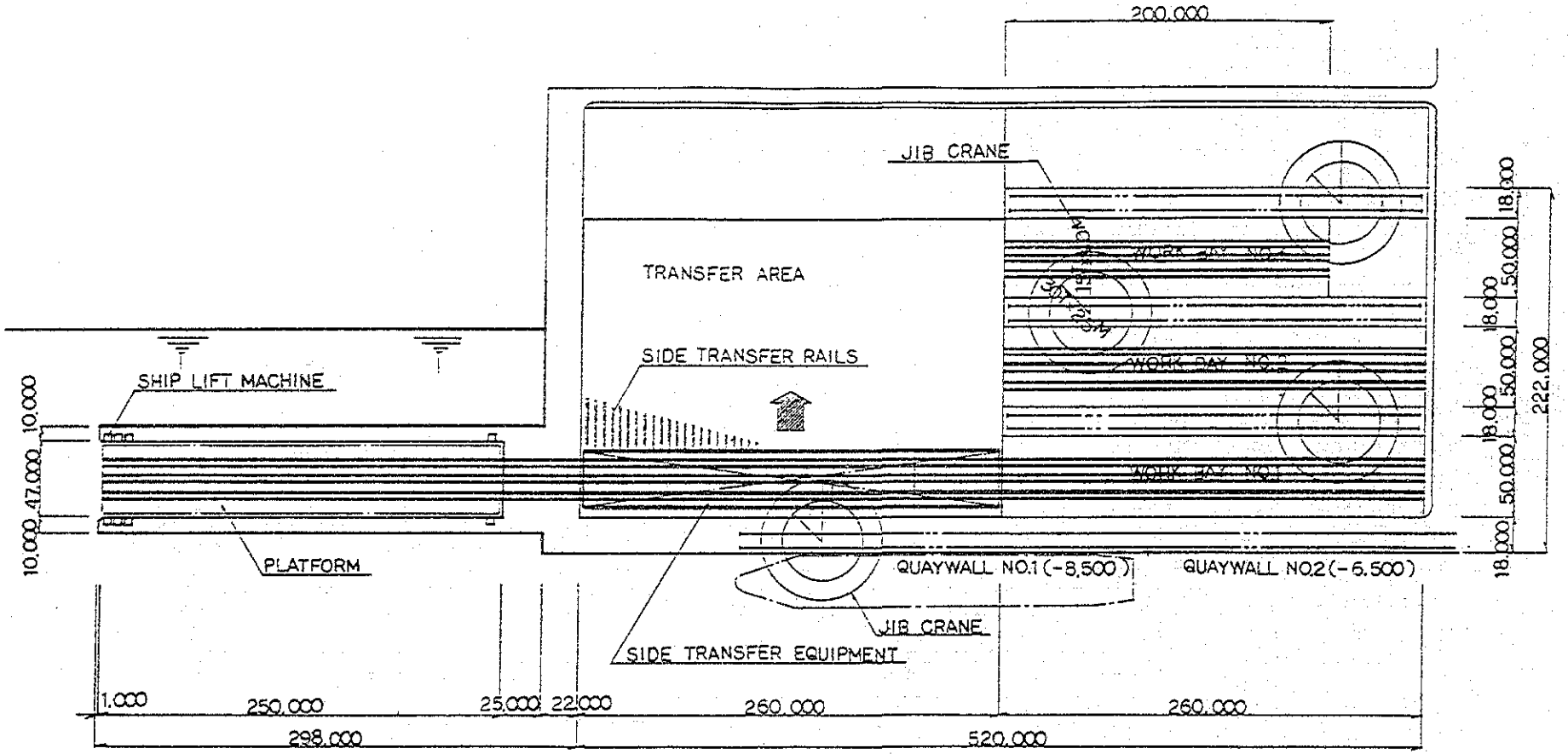


Fig. 5. 3. 4 SHIP LIFT SYSTEM

PLAN

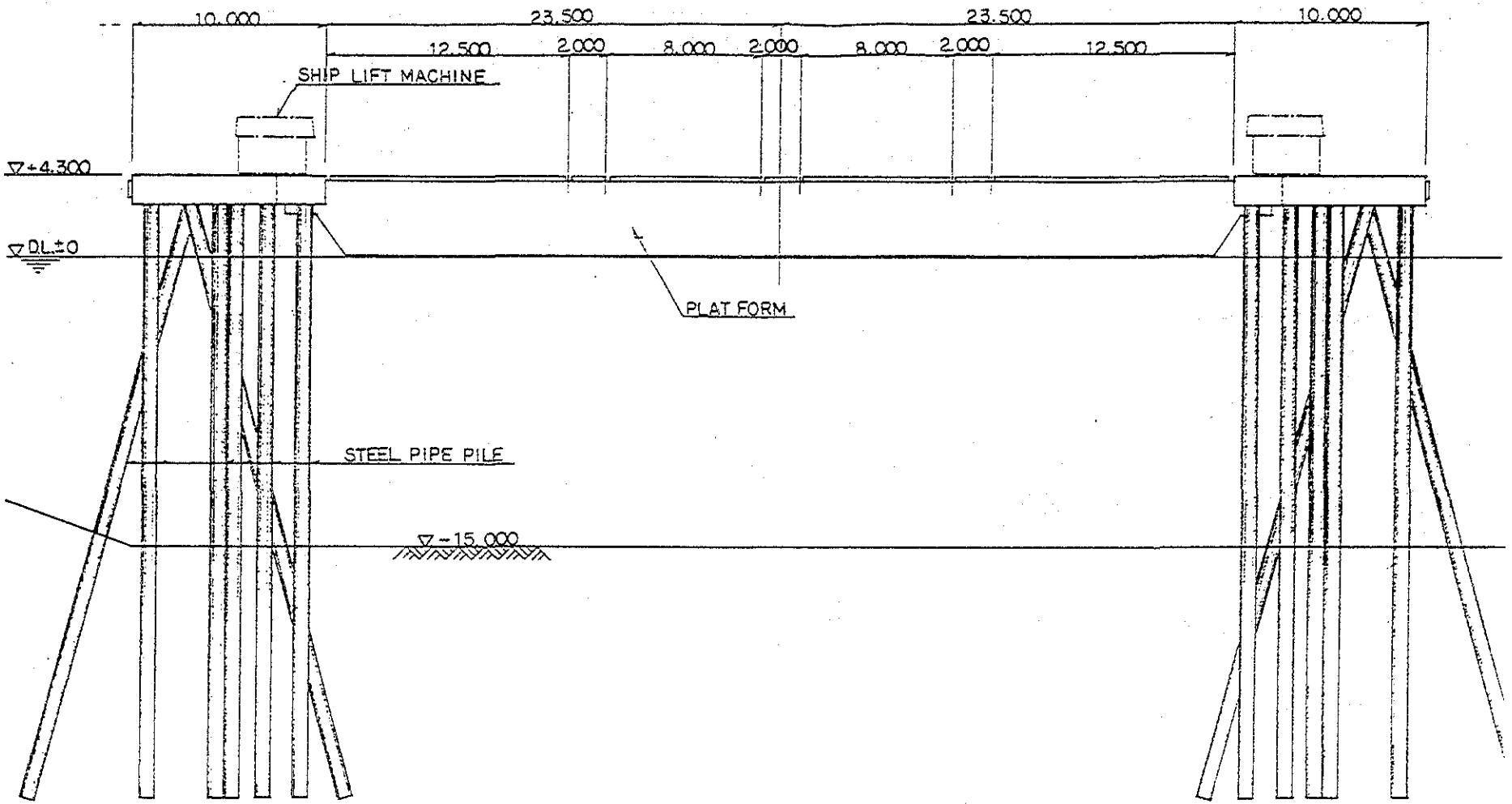


Fig. 5. 3. 5 SHIP LIFT SYSTEM

SECTION

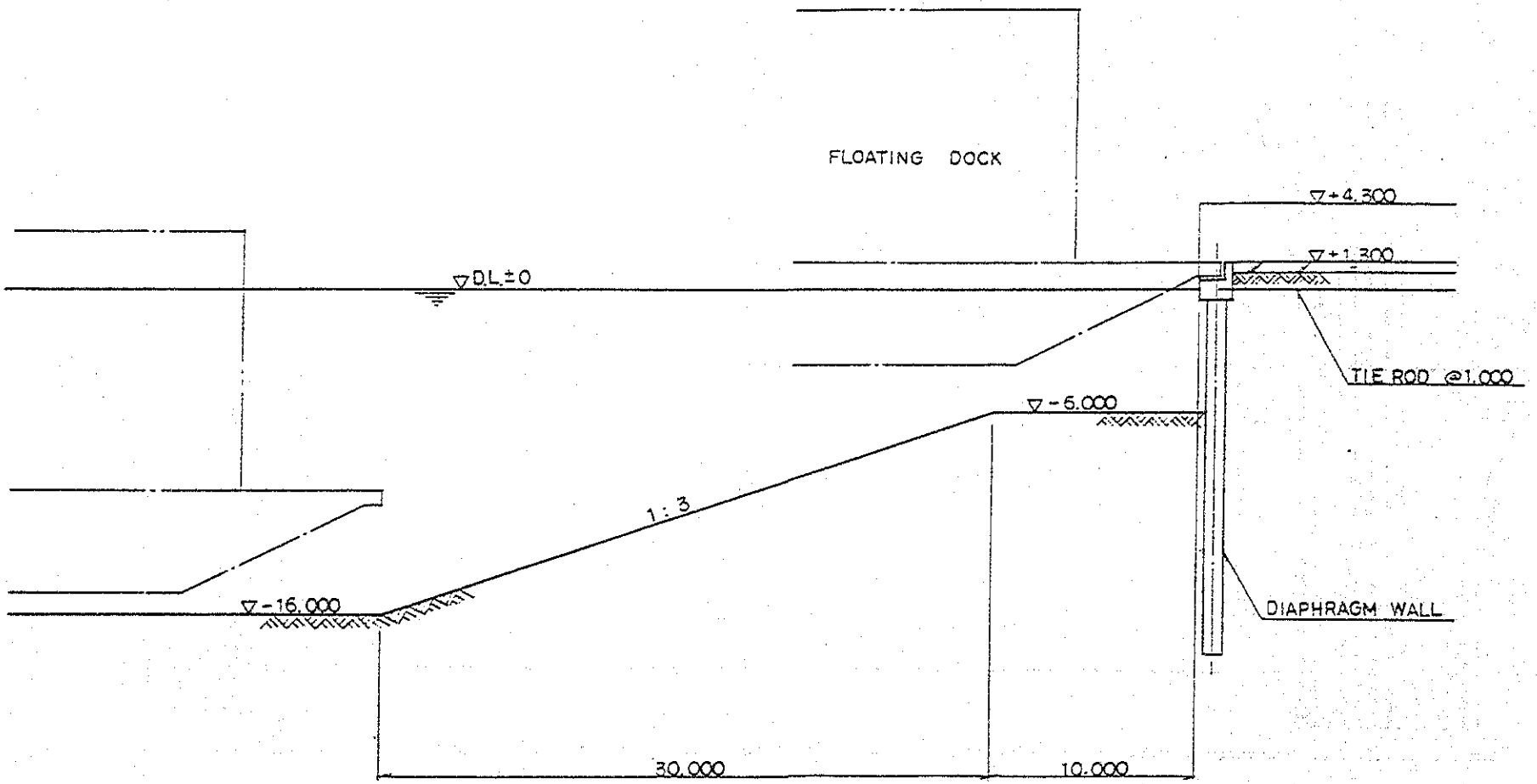


Fig. 5. 3. 6 COMBINATION SYSTEM SECTION

Fig. 5. 3. 8 CONSTRUCTION SCHEDULE OF REPAIR DOCKYARD

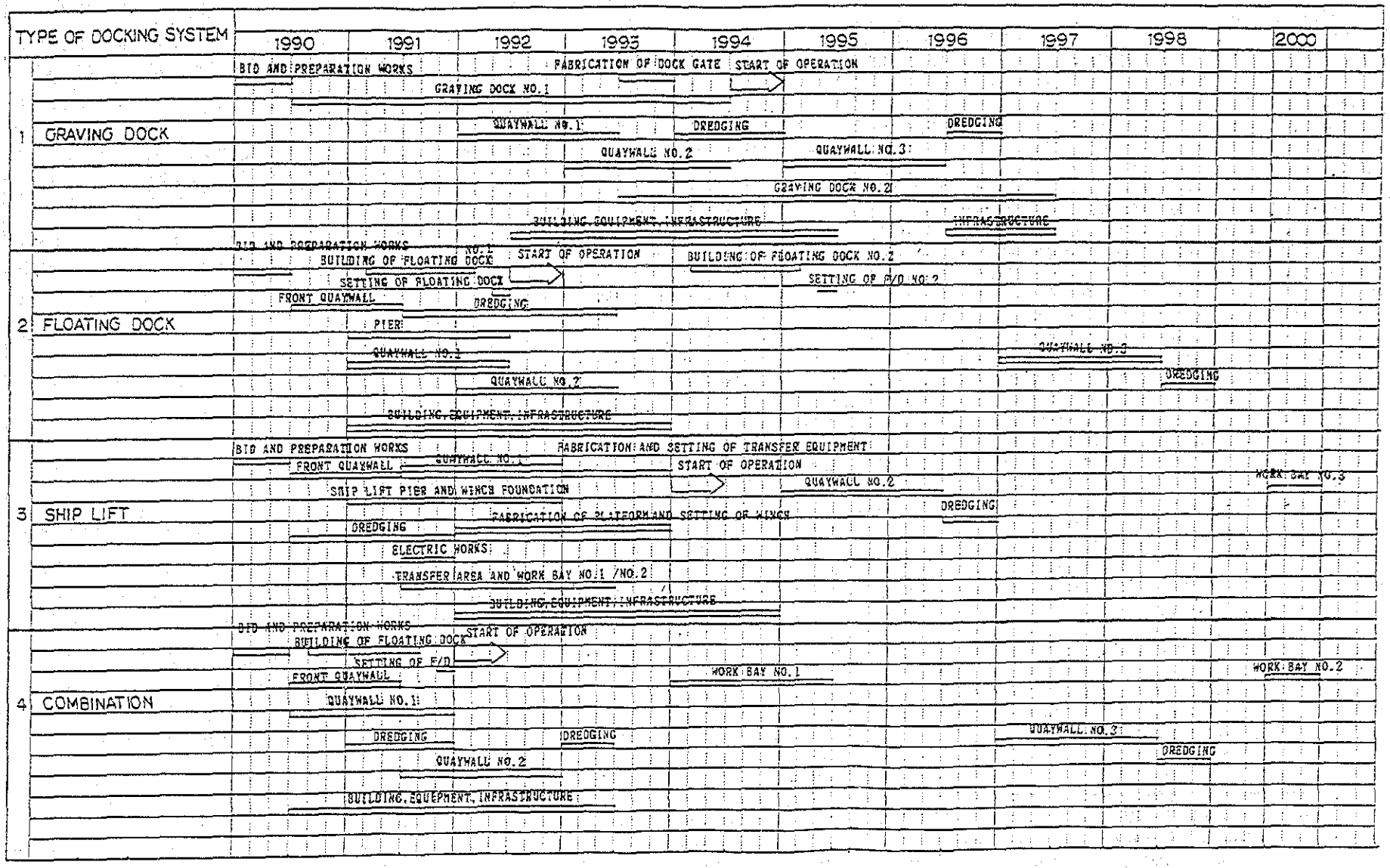


Table 5.4.1. CHARACTERISTICS OF DOCKING SYSTEMS FOR THE CASE OF LAZARO CARDENAS

	Graving dock	Floating dock	Shiplift	Combination
Installation cost	medium	medium	high	low
Period of construction	very long	short	long	very short
Civil engineering problem	big	a little	big	little
Effect by earthquake	big	little	big	none (dock) + big (work bay)
Mech/Shipbuilding engineering prob.	little	medium	big	big
Possibility of resale (dock)	none	big	little	big
Existing facilities for big capacity	many	many	none	many (dock) + some (transfer)
Cost for additional system (expansiveness)	big	big	small	small
Applicability of new shipbuilding	little	little	yes	yes
Maintenance cost	low	medium	high	medium
Convenience of docking operation	not so good	very good	not so good (esp. for transfer)	very good (dock) + not so good (transfer)
Possibility of bigger ship docking (overhang)	uncommon	yes	a little	yes
Possibility for early start of repair work	big	big	little	big
Working condition (crane service, etc.)	good	good	bad (elevator) + good (work bay)	good
Flexibility of production control	small	small	big	big

Shipping in Mexico

EVOLUCION DEL TRANSPORTE MARITIMO EN MEXICO
(Miles de toneladas)

Tipo de mercancía	Tipo de tráfico	Años								
		1970	1975	1980	1982	1983	1985	1995	2005	2015
Total	Altura	13,472	23,213	66,056						
	Cabotaje	12,683	25,310	58,520						
	Suma	26,155	48,523	124,576	150,444	147,913	152,229			
Fluidos	Altura	4,387	10,156	43,786						
	Cabotaje	8,591	20,205	48,446						
	Suma	12,978	30,361	92,232	123,532	117,490	120,197	147,000	197,000	265,000
Graneles	Altura	7,070	10,428	17,522						
	Cabotaje	3,809	4,474	8,000						
	Suma	10,879	14,902	25,522	20,677	24,181	25,244	34,000	45,600	62,400
Carga general	Altura	2,015	2,629	4,748						
	Cabotaje	283	631	2,074						
	Suma	2,298	3,260	6,822	6,235	6,242	6 788			

Handled Cargo Volume in Ports

(Unit: '000t)

Year	Grand Total	Foreign Trade			Domestic Trade		
		Total	Export	Import	Total	Out	In
1970	36,129	13,081	9,705	3,376	23,048	14,183	8,865
1971	38,327	14,791	10,883	3,908	23,536	14,587	8,949
1972	44,388	16,949	11,314	5,635	27,439	15,874	11,565
1973	51,764	20,785	11,286	9,499	30,979	14,005	16,974
1974	54,422	21,014	12,767	8,247	33,408	16,501	16,907
1975	56,414	23,749	15,041	8,708	32,665	16,883	15,782
1976	67,436	22,268	15,109	7,158	45,168	19,474	25,694
1977	63,437	29,154	20,840	8,314	34,283	14,313	19,970
1978	75,504	40,113		10,103	35,391	14,552	20,839
1979	96,036	50,711	39,773	10,938	45,325	19,291	26,034
1980	124,576	66,056	52,536	13,520	58,520	25,215	33,305
1981	131,038	70,781	55,799	14,982	60,257	25,996	34,261
1982	150,444	100,822	88,555	12,267	49,622	21,228	28,394
1983	147,913	103,011	91,710	11,301	44,902	20,481	24,421
1984	153,082						
1985	152,229						

Source: Estadísticas del movimiento portuario nacional de carga y buques (SCT)

Cargo Volume of Export/Import

(Unit: '000t)

Year	Total Cargo Volume			Marine Cargo Volume		
	Export	Import	Total	Export	Import	Total
1970	14,183	8,865	23,048	9,705	3,316	13,021
1971	14,587	8,949	23,536	10,883	3,908	14,791
1972	15,874	11,565	27,439	11,314	5,635	16,949
1973	14,005	16,974	30,979	11,286	9,499	20,785
1974	16,501	16,907	33,408	12,767	8,247	21,014
1975	16,883	15,782	32,665	15,041	8,708	23,749
1976	17,604	11,353	28,957	15,110	7,158	22,268
1977	22,445	12,934	35,379	20,840	8,314	29,154
1978	33,670	14,720	48,390	30,010	10,103	40,113
1979*	43,020	17,930	60,950	39,773	10,938	50,711
1980*	56,817	23,404	80,221	52,536	13,520	66,056
1981*	59,680	23,450	83,130	55,799	14,982	70,781
1982*	92,633	16,248	108,881	88,555	12,267	100,822
1983*	96,339	16,948	113,287	91,710	11,301	103,011
1984	98,790	17,140	115,930	95,899	11,181	107,080
1985	93,680	15,120	108,800	89,158	10,903	100,061
1986						

Note: *Total Cargo Volume is estimated and does not include the exported volume of Natural Gas
Source: DGODP, "Estadísticas del Movimiento Portuario Nacional de Carga y Buques 1983'

Passing Ships Through the Panama Canal

(Source: Panama Canal Co. Annual Report)

Country		Passing Ships of Middle South America's 8–Nations																G. Total of Passing Marchant Ships		
		Argentina		Brazil		Chile		Colombia		Ecuador		Panama		Peru		Venezuela		Total				
Year		Number	x 1000 GT	Number	x 1000 GT	Number	x 1000 GT	Number	x 1000 GT	Number	x 1000 GT	Number	x 1000 GT	Number	x 1000 GT	Number	x 1000 GT	Number	x 1000 GT	Year	Number	PCNT (x 1000)
Total Passing Ship Through Canal	1980	4	33.7	19	195.2	185	1,780.7	161	1,871.8	282	2,323.0	1,228	12,684.3	238	2,724.5	35	90.7	2,152	21,703.9	1960	10,745	58,302
	1981	1	3.3	35	307.5	186	1,861.8	118	1,559.1	270	2,335.3	1,503	15,225.3	261	2,993.4	51	237.1	2,425	24,522.8	1965	11,777	74,735
	1982	1		37	363.4	111	1,077.1	138	1,982.6	273	2,969.9	1,805	20,735.4	315	3,794.7	51	184.6	2,731	31,107.7	1970	13,608	108,142
	1983	1		32	323.1	112	1,409.0	141	2,148.5	358	3,541.6	1,697	20,586.1	272	3,283.2	37	61.4	2,650	31,352.9	1971	13,977	111,006
	1984	2	53.0	32	323.5	100	1,054.3	168	2,551.0	454	4,584.8	1,770	22,318.6	197	2,574.9	87	220.8	2,810	33,680.9	1972	13,714	112,971
Passing Ships on Ballast Condition	1980			1	15.8	17	133.0	14	177.5	28	276.4	273	3,046.4	25	377.3	11	19.5	369	4,045.9	1973	13,796	126,204
	1981	1	2.5	3	14.5	24	201.8	12	142.2	42	380.3	309	3,042.8	25	314.8	16	105.7	432	4,204.6	1974	13,984	135,716
	1982			1	9.6	7	27.6	15	239.0	67	676.8	328	3,993.7	19	266.0	16	50.6	453	5,263.3	1975	13,565	135,054
	1983			4	21.0	16	128.6	15	234.0	90	745.1	333	4,038.1	33	370.3	11	13.5	502	5,550.6	1976	12,123	127,779
	1984			1	5.7	19	178.0	21	246.7	87	1,002.5	296	4,045.9	27	402.9	24	42.4	475	5,924.1	1977	11,868	133,353
																				1978	12,647	156,907
																				1979	12,902	167,471
																				1980	13,476	182,063
																				1981	13,847	188,656
																				1982	13,976	202,884
																				1983	11,668	169,504
																				1984	11,230	
																				1985	11,515	
																				1990	12,000	
																				2000	13,300	
																				2010	17,100	1

Number of Entry Ships and Handled Volume on Ports (Foreign Trade)

(Source: Mexico, Ministry of Communication and Transportation)
(Unit: 1,000 ton)

Year	1979				1980				1981				1982				1983				1984				1985				1986			
	Domestic Ship		Foreign Ship		Domestic Ship		Foreign Ship		Domestic Ship		Foreign Ship		Domestic Ship		Foreign Ship		Domestic Ship		Foreign Ship		Domestic Ship		Foreign Ship		Domestic Ship		Foreign Ship		Domestic Ship		Foreign Ship	
Port	No.	Handled Cargo Volume	No.	Handled Cargo Volume	No.	Handled Cargo Volume	No.	Handled Cargo Volume	No.	Handled Cargo Volume	No.	Handled Cargo Volume	No.	Handled Cargo Volume	No.	Handled Cargo Volume	No.	Handled Cargo Volume	No.	Handled Cargo Volume	No.	Handled Cargo Volume	No.	Handled Cargo Volume	No.	Handled Cargo Volume	No.	Handled Cargo Volume	No.	Handled Cargo Volume	No.	Handled Cargo Volume
Rosarito			2	43			2	24			2	47	–	–	12	225	–	–	–	–	–	–	3	63	–	–	3	77				
Ensenada			74	70			56	102	4	7	47	120	4	4	42	46	2	1	31	77	1		18	25	2	4	17	17				
Isla de Cerdos			88	5,405	1	26	92	5,576			72	4,946	–	–	72	4,305	3	253	60	3,868	9	927	61	3,705	7	817	65	3,749				
San Marcos			85	1,656			66	1,355			64	1,462	2	19	52	1,129	–	–	79	1,706	–	–	79	1,840	–	–	82	1,937				
San Carlos			13	18	2	8	14	31			6	5	3	6	8	11	–	–	6	15	2	13	5	3	–	–	3	24				
La Paz							6	3			4	3	–	–	1		–	–	6	2	–	–	2	1	–	–	–	–				
Guaymas	7	139	112	1,159	3	6	128	1,760	5	29	118	1,899	2	11	108	1,226	7	133	88	1,380	9	73	149	1,767	8	127	103	1,297				
Topolobampo									2	2			–	–	–	–	–	–	–	–	–	–	1	2	–	–	–	–				
Mazatlan	5	22	118	740	1	19	152	958	5	18	145	1,031	10	10	109	625	3	2	84	777	12	67	63	502	8	26	62	611				
Pto. Vallarta							1	1			16	2	–	–	10	1	–	–	–	–	–	–	–	–	–	–	5					
Manzani Llo	24	245	249	1,331	18	40	241	1,310	17	29	220	1,318	29	129	149	764	20	28	155	844	19	41	170	800	34	83	181	1,271				
Lazaro Cardenas	2	22	43	884			42	913	1	54	91	993	8	152	113	728	3	8	136	721	2	9	130	713	12	121	137	1,014				
Acapulco	17	12	98	127	12	8	118	144	12	11	92	124	14	13	58	53	12	6	63	50	10	7	76	58	7	5	83	60				
Salinacuz	3	5	27	125	8	14	16	132	5	9	38	158	17	48	60	2,799	22	173	79	5,555	18	96	84	6,432	16	77	77	6,509				
Others	1	0	5	7							1	5	2	14	–	–	–	–	–	–	–	–	–	–	–	–	–	–				
Pacific Side Total	59	445	914	11,565	45	120	934	12,309	51	159	916	12,114	91	406	794	11,913	72	604	787	14,994	82	1,234	841	15,912	94	1,259	818	16,555				
Tampico	71	495	548	2,890	63	471	613	3,291	58	417	738	4,172	51	434	620	3,458	53	211	679	5,025	54	504	746	4,942	72	496	752	4,138				
Tuxpan	6	21	119	376	1	4	230	610	5	19	298	737	13	54	281	1,950	16	72	304	1,079	18	106	169	939	36	211	104	1,094				
Veracruz	50	242	648	3,074	50	177	679	3,605	48	205	690	3,362	48	158	559	2,671	61	172	480	2,789	75	364	541	2,685	76	371	549	3,085				
Coatza Coalcos	6	26	338	2,265	5	50	290	2,347	10	55	268	2,442	14	36	191	1,740	19	34	184	1,805	32	76	180	1,489	20	26	150	1,420				
Pajaritos	75	2,051	625	25,852	72	1,658	844	40,879	63	1,190	952	42,060	88	2,783	921	44,514	58	1,708	693	34,642	28	404	660	31,590	29	696	604	28,165				
Minatitlan	2	5	33	71	2	4	18	46	1	3	19	41	3	7	24	52	–	–	22	67	–	–	30	107	3	1	28	92				
Nanchital			49	48	1	0	77	76			84	96	–	–	59	67	1	1	–	–	–	–	–	–	–	–	–	–				
Dos Bocas											31	3,205	27	885	253	13,857	30	1,384	270	15,398	4	588	130	17,855	–	–	190	16,449				
Campeche							3	1			2	0	–	–	–	–	–	–	–	–	–	–	1	30	–	–	–	–				
Progreso	14	38	125	239	28	72	142	327	36	90	160	401	4	11	102	250	8	29	137	346	20	66	177	273	21	71	154	268				
Cozumel			12	0	14	2					25	1	–	–	20		–	–	8		–	–	2		–	–	7					
Pto Morelos			53	5	1	1	39	5	2	2	43	9	5	3	41	8	–	–	6		–	–	–	–	–	–	–	–				
Others			22	2			24	2			27	2	29	933	306	14,632	1	142	303	22,511	3	533	624	27,386		140	322	25,524				
M. Gulf Side Total	224	2,878	2,572	35,823	237	2,438	2,959	51,189	223	1,980	3,337	56,528	282	5,304	3,377	83,199	247	3,752	3,084	83,662	234	2,641	3,260	87,294	256	2,012	2,860	80,235				
G. Total	283	3,323	3,486	47,388	282	2,558	3,893	63,498	274	2,139	4,253	68,642	373	5,710	4,171	95,112	319	4,356	3,871	98,656	316	3,875	4,101	103,206	350	3,271	3,678	96,790				

Number of Entry Ships and Handled Volume on Ports (Cabotage)

(Source: Mexico, Ministry of Communication and Transportation)
(Unit: 1,000 ton)

Port	1979				1980				1981				1982				1983				1984				1985				1986			
	Domestic Ship		Foreign Ship		Domestic Ship		Foreign Ship		Domestic Ship		Foreign Ship		Domestic Ship		Foreign Ship		Domestic Ship		Foreign Ship		Domestic Ship		Foreign Ship		Domestic Ship		Foreign Ship		Domestic Ship		Foreign Ship	
	No.	Handled Cargo Volume	No.	Handled Cargo Volume	No.	Handled Cargo Volume	No.	Handled Cargo Volume	No.	Handled Cargo Volume	No.	Handled Cargo Volume	No.	Handled Cargo Volume	No.	Handled Cargo Volume	No.	Handled Cargo Volume	No.	Handled Cargo Volume	No.	Handled Cargo Volume	No.	Handled Cargo Volume	No.	Handled Cargo Volume	No.	Handled Cargo Volume	No.	Handled Cargo Volume	No.	Handled Cargo Volume
Rosarito	72	1,066	8	217	37	633	44	1,033	33	637	52	1,214	37	552	52	962	38	683	40	795	37	791	45	1,015	16	356	66	1,440				
Ensenada	487	456			561	806	43	27	667	1,032			598	925	2	3	601	931	–	–	569	797	5	35	606	956	2	12				
Isla de Cerros	890	5,427			887	3,580	12	106	827	5,137	20	133	669	4,343	15	90	660	4,187	2	29	740	4,625	16	86	828	5,087	–	–				
Starosaua	229	137			220	133			242	157	1	1	182	105	3	26	178	102	1	4	166	94	1	4	194	83	–	–				
San Marcos													2	4	2	4	6	13	–	–	7	16	–	–	–	–	2	5				
San Carlos	10	32	2	4	22	36	6	87	17	68	6	40	32	120	7	47	32	64	6	42	135	61	5	23	97	82	4	47				
La Paz	882	891			956	984			931	1,034	5	83	912	998	10	41	843	967	–	–	892	837	4	17	573	963	–	–				
Guaymas	429	1,836	20	270	469	2,778	22	459	433	2,456	67	771	448	1,921	107	1,386	467	2,517	91	1,130	373	2,060	98	1,495	362	1,650	151	1,701				
Topolo Banpo	301	197			376	261			340	252			376	272	34	141	335	908	33	158	330	1,052	49	431	303	1,118	79	589				
Mazatlan	480	1,657	2	28	538	1,293	47	617	488	1,402	64	505	621	1,549	48	573	510	1,446	41	558	496	1,527	39	527	523	1,565	44	630				
Pto Vallarta	105	79			116	72			103	67	1	4	153	80	–	–	110	67	–	–	86	58	–	–	75	48	–	–				
Manzani Llo	113	840	27	510	148	1,228	80	703	114	626	71	454	135	1,186	80	1,240	145	1,231	81	1,926	139	928	17	2,308	124	707	106	2,610				
Lazaro Cardenas	12	106			14	98	19	74	25	181	24	94	48	256	19	205	30	358	13	211	22	221	12	122	22	212	5	39				
Acapulco	41	297			37	417	2	19	42	445	1	8	44	465	9	131	27	276	10	81	31	334	2	25	46	427	1	1				
Salina Cruz	243	4,121	9	85	107	2,093	269	4,952	287	4,863	129	2,454	210	3,616	188	3,052	262	4,046	132	2,444	262	4,110	130	2,274	230	3,724	156	3,121				
Others					2	0					2	7	233	50	4	77	106	170	11	206	90	141	90	158	90	258	10	232				
Pacific Side Total	4,294	17,142	68	1,114	4,490	16,413	544	8,077	4,529	18,355	443	5,767	4,565	16,442	580	7,978	4,350	17,966	461	7,584	4,375	17,652	513	8,520	4,089	17,236	626	10,427				
Tampico	321	6,719	134	2,723	208	3,506	236	5,371	262	3,560	322	5,921	188	2,194	441	4,681	220	2,088	248	1,800	222	2,429	217	2,330	174	2,351	275	3,161				
Tuxpan	151	1,908	81	876	140	2,152	210	4,443	86	1,432	252	5,781	54	686	173	3,243	53	1,048	76	1,127	72	835	59	986	55	661	126	2,388				
Veracruz	255	2,472	19	151	194	2,064	110	986	196	1,898	169	1,114	124	972	142	1,557	158	1,586	86	569	161	1,506	72	671	131	1,265	78	817				
Coatzacoa Locs	386	409	27	162	244	275	116	405	117	178	96	512	101	106	67	445	89	104	34	122	97	94	30	86	24	31	37	159				
Pajalitos	585	6,913	143	2,927	469	4,427	344	8,064	508	4,392	440	8,416	475	2,980	237	4,136	432	2,892	177	3,681	439	2,357	172	4,897	501	2,494	198	5,194				
Minatitlan	227	691	45	124	227	913	67	190	237	823	119	394	208	723	205	601	193	551	161	677	168	590	99	268	169	583	39	111				
Nanchital	37	16	6	1	1	1	22	13	6	20	16	7	10	7	70	25	4	2	17	8	–	–	–	–	–	–	–	–				
Dos Bocas	197	3			175	3			173	3	5	153	22	32	216	387	163	1,007	186	324	142	788	36	97	106	677	77	398				
Villa Hermosa	129	2			77	1			52	1			48		–	–	32		–	–	54		–	–	6		–	–				
Campeche	479	866			600	1,093			502	700	125	405	100	597	133	490	138	744	69	255	126	781	26	118	122	922	4	15				
Progreso	3	1			7	6			3	3	2	3	–	–	7	11	2		–	–	15	31	13	46	61	159	62	175				
Cozmel	647	61	1	2	552	68			613	64			316	80		–	393	175	–	–	496	162	–	–	576	396	–	–				
Pto Morelos	596	43			574	49			620	54			261	67		–	375	161	–	–	470	141	–	–	554	378	–	–				
Others													501	238	1,711	944	432	95	1,054	337	2,501	200	1,957	416	4,664	216	3,307	1,953				
M. Gulf Side Total	4,013	20,103	456	6,966	3,468	14,559	1,105	19,471	3,375	13,429	1,546	22,706	2,408	8,682	3,402	16,320	2,684	10,453	3,141	8,900	4,963	9,914	2,681	9,915	7,143	10,133	4,203	14,371				
G. Total	8,307	37,245	524	8,080	7,958	30,972	1,649	27,548	7,904	31,784	1,989	28,473	6,973	25,124	3,982	24,498	7,034	28,419	3,602	16,483	9,338	27,566	3,194	18,435	11,232	27,370	4,829	24,798				

Cargo Handled Volume and Entry Ships in Ports

(Source: Mexico: Ministry of Communication and Transportation)

(1) By Coast Side

(Unit: 1,000 ton)

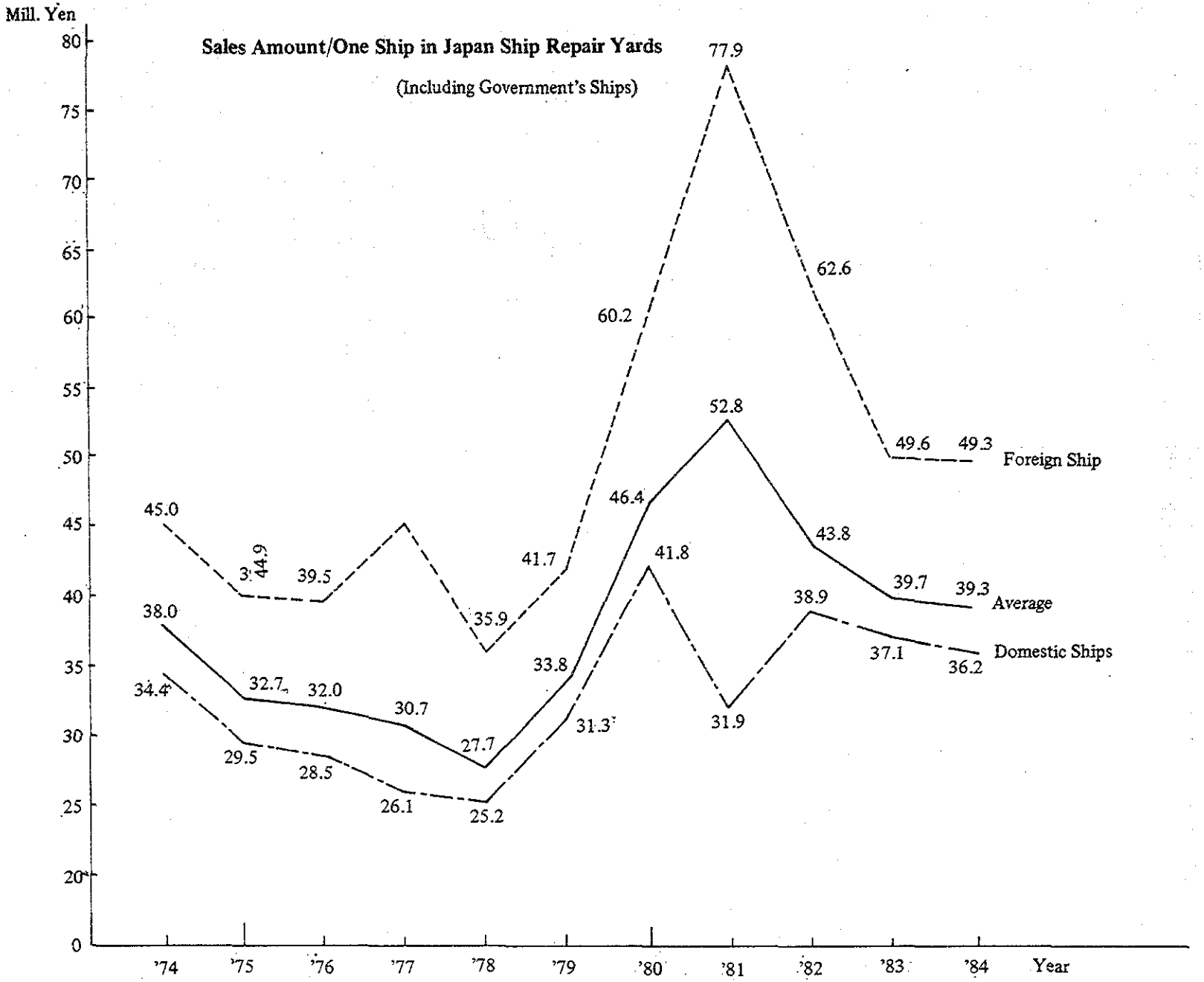
Zone \ Year		1979		1980		1981		1982		1983		1984		1985		1986	
		Number	Handled Vol.	Number	Handled Vol.	Number	Handled Vol.	Number	Handled Vol.	Number	Handled Vol.	Number	Handled Vol.	Number	Handled Vol.	Number	Handled Vol.
Pacific S.	Foreign Trade	973	12,010	979	12,429	967	12,273	885	12,319	859	15,598	923	17,146	912	17,814		
	Cabotage	4,362	18,256	5,034	24,490	4,972	24,122	5,145	24,420	4,811	25,550	4,888	26,172	4,715	27,663		
M. Gulf S.	Foreign Trade	2,796	38,701	3,196	53,627	3,560	58,508	3,659	88,503	3,331	87,414	3,494	89,935	3,116	82,247		
	Cabotage	4,469	27,069	4,573	34,030	4,971	36,135	5,810	25,202	5,825	19,354	7,644	19,829	11,346	24,504		
Total	Foreign Trade	3,769	50,711	4,175	66,056	4,527	70,781	4,544	100,822	4,190	103,012	4,417	107,081	4,028	100,061		
	Cabotage	8,826	45,325	9,607	58,520	9,943	60,257	10,955	49,622	10,636	44,904	12,532	46,001	16,061	52,167		
Total of Pacific S.		(5,335)	(30,266)	(6,013)	(36,919)	(5,939)	(36,395)	(6,030)	(36,739)	(5,670)	(41,148)	(5,811)	(43,318)	(5,627)	(45,477)		
	Foreign Trade		24 %		19 %		17 %		12 %		15 %		16 %		18 %		
	Cabotage		40 %		42 %		40 %		49 %		57 %		57 %		53 %		

(2) Domestic and Foreign Ship

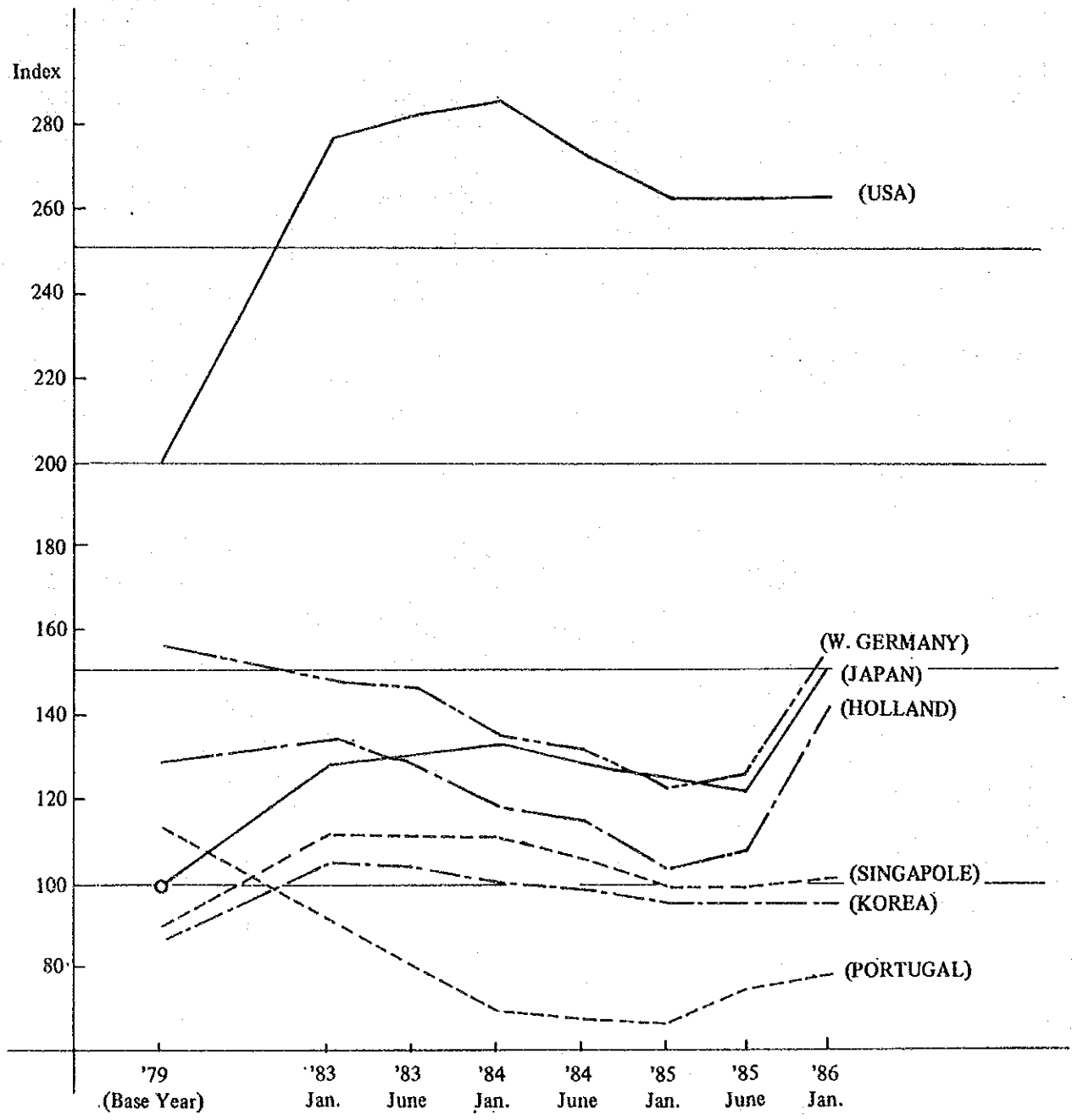
(Unit: 1,000 ton)

Zone \ Year		1979		1980		1981		1982		1983		1984		1985		1986	
		Number	Handled Vol.	Number	Handled Vol.	Number	Handled Vol.	Number	Handled Vol.	Number	Handled Vol.	Number	Handled Vol.	Number	Handled Vol.	Number	Handled Vol.
Domestic Ship	Foreign Trade	283	3,323	2,282	2,558	274	2,136	373	5,710	319	4,356	316	3,875	350	3,271		
	Cabotage	8,307	37,245	7,958	30,972	7,904	31,784	6,973	25,124	7,034	28,419	9,338	27,566	11,232	27,370		
Foreign Ship	Foreign Trade	3,486	47,388	3,893	63,498	4,253	68,642	4,171	95,112	3,871	98,656	4,101	103,206	3,678	96,790		
	Cabotage	524	8,080	1,649	27,548	1,989	28,473	3,982	24,498	3,602	16,483	3,194	18,435	4,829	24,798		
Total	Foreign Trade	3,769	50,711	4,175	66,056	4,527	70,778	4,544	100,822	4,190	103,012	4,417	107,081	4,028	100,061		
	Cabotage	8,831	45,325	9,607	58,520	9,893	60,257	10,955	49,622	10,636	44,902	12,532	46,001	16,061	52,168		
Share of Dome. S.	Foreign Trade		7 %		4 %		3 %		6 %		4 %		4 %		3 %		
	Cabotage		82 %		53 %		53 %		51 %		63 %		60 %		52 %		
G. Total	Handled Cargo Vol.		96,036		124,576		131,035		150,444		147,914		153,082		152,229		
	No. of Ships	12,600		13,782		14,420		15,499		14,826		16,949		20,089			

Data on Shiprepair in Japan


Mill. Yen
Sales Amount/One Ship in Japan Ship Repair Yards
(Including Government's Ships)
80
75
70
65
60
55
50
45
40
35
30
25
20
0
77.9
62.6
60.2
52.8
49.6
49.3
Foreign Ship
46.4
45.0
44.9
43.8
41.7
41.8
39.5
39.7
39.3
Average
38.0
38.9
35.9
33.8
32.7
32.0
30.7
37.1
Domestic Ships
36.2
34.4
31.3
31.9
29.5
27.7
28.5
26.1
25.2
'74
'75
'76
'77
'78
'79
'80
'81
'82
'83
'84
Year

COMPARISON OF INTERNATIONAL COMPETITIVENESS (COST) OF SHIP REPAIR
(Index: Japan in 1979 = 100)



Industrial Port Lazaro Cardenas

FONDEPORT "INDUSTRIAL PORT LAZARO CARDENAS"

INFRASTRUCTURE

Being situated at the estuary of Balsas River in the State of Michoacan, on a border with the State of Guerrero, the Industrial Port of Lazaro Cardenas has the canals of 14 meter of draft, the biggest in Mexico.

The operation was began in 1974 with 2,539 meters of piers, a general cargo terminal, and the most advanced port services, and besides the amplification condinues construction of two canals and their corresponding piers.

Actually, small and middle scale industries parks and a big park for automovil industry are under development. The parks offer all of the fundamental services and facilities for the establishment of big industries with or without the alongside of the sea; the middle and small size industries have an access to the multiple use terminal now in operation.

The parks bears abundant quantity of water of Balsas River, where a water intake is installed for industrial uses with a capacity of 3 m^3/sec. The water quantity of this river is controled by various dams, and at the foot of the two dams, hydroelectric plants with 1,379,000 kw of capacity are constructed and are connected with the national net-line, which secures the energy supply. Additionally, in the State of Guerrero, at 8 km from the port a thermoelectric plant with 1,400,000 kw of capacity is being constructed.

A gas pipeline with 410 milliones $feet^3$ per day capacity transports natural gas, being connected with the national gas pipelines, with which necessary capacity of the gas can be supplied to the industries.

The Industrial Park installs strategical distribution in all of the extension, roads and railways to give services to all of the industries to be established.

COMMUNICATIONS

This port has an important industrial development in it's own land. The area of influence is the central zone of Mexico, where approximately the 60% of the total economic activity is occupied. The port has been connected with the national railway net-work since 1987 and three paved high-ways reach to the port. By them many auto-buses lines cargo-trucks circulate, and also there is an airport of small size planes. Ixtapa-Zihuatanejo international airport is situated to 120 km distance which has commercial airline services.

In the aspect of telecommunications, there are long distance service with direct call, telegraph and telex.

By sea, the distances in nautical miles connect to important ports in the Pacific Ocean: in USA, 1,406 to Los Angeles, 1,759 to San Francisco, 1,603 to Panama, 5,769 to Yokohama.

INDUSTRIES

The Industrial Park located between the arms of Balsas River, in the islands of Cayacal and of Palma, there are 2,660 hectares for big scale industries which can be disposed facing to the sea and enjoy good access to the multiple use terminal; the park for small and middle industry with 240 hectares has a possibility of an access to the multiple use terminal.

On these lands, it is possible to lay the foundation with adecuate technics and any kinds of buildings as the important companies installed show in this area. This port is already established.

Siderurugica Lazaro Cardenas-las Truchas, S.A. (SICARTSA) with a capacity of 1,000,000 tons of steel per year in the first stage, employs 7,000 persons and occupiesa surface of 1,065 hectares and has a 600 meters long water front. Now the second stage is under construction to add 1,500,000 tons per year to the actual production, giving the employ to 6,000 people.

Fertilizantes Mexicanos, S.A. (FERTIMEX) with a capacity of 1,700,000 tons of fertilizers and 2,000,000 tons of intermediate products like as nitro sulpher phosphoric acid; employs 2,000 persons, occupiesa surface of 135 hectares and has 503 meters of wateralongside.

Within the Industrial Park, various industries are installed and under operation, they are;
Productora Mexicana de Tuberia (P.M.T.) with a capacity of 400 tons per year of steel tube of big diameter, employs 656 persons, occupies a surface of 63 hectares and has 350 meters of sea along side. This is a joint venture between Mexico and Japan.

Nafinsa Kobe Steel, SIDERMEX (N.K.S.) with a capacity of 55,000 tons per year of casting and forging, employs 1,800 persons, occupies a surface of 135 hectares and 280 meters long pier. This is also a joint venture between Mexico and Japan.

Compania Nacional de Subsistencias Populares (CONASUPO), a stock and distribution center of grains with a capacity of 80,000 tons, occupies a surface of 51 hectares, has 2,594 meters of water front and gives employment to 127 persons.

Petroleos Mexicanos (PEMEX), a stock and distribution center with a capacity of 410,000 barrels per day of the liquid and gaseous derivative from petroleum, occupies a surface of 175 hectares and has 1,958 meters long water front and has 120 employees.

The under construction plants are as follows;

Secretaria de Communicaciones y Transportes (S.C.T.), a plant for asphalt emulsion with a capacity of 13,000 tons per month, will employ 43 persons in a surface of nine hectares.

Mineria Carbonifera Rio Escondido (MICARE), a carbon stock and distribution plant with a 310,000 ton monthly capacity, will employ 200 persons in a surface of 50 hectares with 700 meter water fron.

The studies and projects are going on:

Pemex, petrochemical refinery which will be constructed in an approximate surface of 175 hectares and will give employment to 3,000 people, with a daily consumption of 200,000 barrels; will produce the derivative like as xylene, bezene, and toluen, and besides of the distilled.

Constructiones y Equipos Lationoamericanos, S.A. (CELASA), fabrication plant from drilling and oil production marine platforms, barges, boiler makings etc., installed in 75 hectares will have a capacity of 102,000 tons per year and will employ 616 persons.

SOCIAL INFRAESTRUCTURA

The actual polulation of the city of Lazaro Cardenas is of 165,000 with a speedy growth because of the industrial development of the region.

To attend the necessities of this population, The Trust of C. Lazaro Cardenas (FIDELAC) was founded to carry out urbanization for housing, city improvement, operation and maintenance of the public service, and regional study and city engineering.

The development of the city has been done by step, in accordance to the model city and the projects for land use, street, infrastructure, service nets work and the location of facilities for balanced development of the community.

The conceptional design of the services determinates the system characters of drinking water, sanitary drain, rain and electric energy.

The drinking water system is integrated by a potable plant, to which the water is provided by a canal, distributes 3,000 m^3 c/u. The residual water is treated by two plants with a capacity of 280 L/sec.

The road structure is based on a road system and integrated transport by regional and principla vias, avenues of penetration and secondry streets connected withplazas and car parkings, from which walkers circulations are developed to connect with the residencial zones and services.

The city is communicated with the rest of the country by many lines of buses, cargo-trucks, and with long distance call telephones and telex. There are a regional hospital of the Mexican Institute of Social Security (IMSS), a clinic of the Institute of Social Security and Services of the State Workers (ISSTE), six health centres of Health Secretariate, as well as three private clinics and the Red Cross.

Through the programed investment by various organizations of the State in the land of FIDELAC, 7,730 houses and 2 markets have been constructed.

Concerning educations, culture, recreation and sports activities, and kinder gardens, 16 primary and 5 secondry schools, and a high school, and four technical education centers are established.

There are various parks and one sport center, five movie theaters, as well as national TV channels and cablevision. The Culture Center has culture programs during the whole year supported by the Public Education Secretariate.

INDUSTRIAL DEVELOPMENT

The goods and raw materials come from the State of Michoacan and Guerrero, which constitute a macroregion of 48,000 Km2.

Concerning metals, important deposits reserve copper, zinc, and kaoline, and besides steels of Las Truchas. Important products of cattle, fishing, of fruites and the cultivated are sent to the interior and exterior markets as well as wooden and resin products.

The regional characters and resources, and basic infrastructure existing in the port offer a good opportunity to establish industries for the following projects:

* Industries derived from the existing industry including now under construction.

* Industries to respond the consumer demand

* Products which utilize national resources of this area

* Industries which give vital power to develop industries of this area

* Complementary industries

* Free zone industries

For the last one, there are good perspectives to open the market of western coast of USA owing to the short distance to th eport, and also, to the low cost of marine transportation.

The existance, in the zone, of Siderurgica Lazaro Cardenas, of N.K.S., of P.M.T., and of Pemex gives big importance to sitimulus of middle and small size companies of metal-mechanical field, which could be exported.

EXPORTATION

Through The Program of Integrate Promotion for Exportation (El Programa de Fomento Integral de las Exportaciones "PROFIEX"), for the incentive and development, the operation mechanisms are descentralized, the procedures are simplified and financial and fisical supports are offered.

The Secretariate of Commerce and Industry Promotion orients the exportation through the technical, juridical and administrative assistance with training program, grants the finance for exportation in coordination with public organization, and supports small-middle size industries established in this port zone, as the case of the Industrial Port of Lazaro Cardenas.

INCENTIVES

The industry development for substitution of importations, increase of the productivy, diversification of the production and the promotion of the exportations is the abse of our policy of industrialization.

As the Industrial Port, Lazaro Cardenas is situated in the Zone LA, to which the National Plan of Development (El Plan Nacional de Desarrollo "P.N.D.") affords priorities, the fisical estimuluses for promoting of employment in preferencial zones by the use of Certificate of Fisical Promotion (Certificados de Promocion Fisical "CEPROFIS") and advanced depreciation to new investments priority activities.
Also, The Certificate of Right to the Importation (Los Certificados de Derecho a la Importacion "DIMEX"), as the name

means, affords to the industries to import goods and marchandises to be exported later.

Besides, PND provides the flexible adjustment of the active rates of the Banks of Fomentation and ample programs for support which includes technical assistances and grants of financial subsidies. The Banks for Development and Multipule Services coordinate in parts through five commissions; among them, a commission for middle and small size industries and the other for big industry are projected. The majority of the resources are given the priorities of development like as; exportations, primary sector, basic products, housing, capital goods. The National Bank of Fishing and Ports (El Banco Nacional Pesquero y Portuario "BANPESCA") offers credits to finance until the 100% of investment in ports and fishing industries, until for 250 million pesos with a period of 15 years.

There are various funds specialized to attend the industrial sectors:
The National Fund of Industrial Promotion (El Fondo Nacional de Fomento Industrial "FOMIN") supports financially the industries with participation as the minor and technical stock holder in the capital of enterprises and grants credit without guarantee.
The Fund of Guarantee and Promotion to Middle and Small Industries (El Fondo de Garantia y Fomento a la Industria Mediana y Pequena "FOGAIN") gives credits to big, middle and small industries at preferencial rates of interests to carry out studies and projects of pre-feasibility, and technical and economical feasibilities.

Among the fisical laws which regulate the activity of any kind of industrial companies in Mexico, the Income Tax Law encourages investments with tax reduction to the investment, and gives favorable treatment to the los. For the foundation of companies with foreign capitals in the Port of Lazaro Cardenas, it is possible to adjudge the lands in leasing or to utilize the legal procedure of trusts.

On the other hands, the Secretariate of Tresury (La Secretaria de Hacienda y Credito Publico) offeres various estimuluses, as the reduction, during the first fisical year, of preoperation expenses of organization and cordination to production companies of new capitals and services, and additionally praedial tax reduction in and around the Port.

TRAINING

As support to the employers as the obligation of training to the workers, the Federal Government established four training centers: two of them related to fishing and port operation, other two in them of direct relation to regional industrial activities. One of them is the National Collage of Professional "CONALEP") which confers the cources of heavy construction, metal fabrication, forging and module: the other is The Technical, Industrial and Service study Center, which confers the cources of industrial maintenance, electricity and community development. Both institutes are ready to add other cources in a relatively short period upon request.

FONDEPORT AND YOU

FONDEPORT, The National Funds for Port Development is ready to offer the specialists groups to attend you and resolve any kind of doubt you have.
We invite you to know the Industrial Port.

* We acompnay you to know and see it.
* We offer you all of advantages.
* We show you all of the facilities.
* We advice you of all you ask.
* We guide and support to financing, municipal, states and federal authorities.

Michoacan State Data

"MICHOACAN STATE DATA (1/2)"

1. POPULATION

1.1 DEMOGRAPHIC INCREASE AND PROJECT

The population of the state of Michoacan in 1980 was of 2 million 869 thousand, being the 6th populated in the country, with the 4.3 % of occupation in the total. For 1986, the estimate done by the National Institute of Stastics, Geography and Information (INEGI) and the CONASPO, 3 million and 282 thousand people will live.

Between 1950 and 1986, the share of the population occupied in the total of the country decreased from 5.5% to 4.1%. If this diminution is going on, the percentage will be the order of 3.8% in the year of 2,000.

The population of Michoacan has experienced an extraordinary increase through the present centry. The people countered in 1900 (935,808) triplicated in 1980 (Graph 1.1), above all during the last four decade. The increasing rates on annual average have been high, although since 1960, the tendency of descent has experienced. In the period 1960 - 1970 the rate was of the 2.3% and 1970 - 1980 descended to 2.04%. It is calculated that for the year of 2010, the population in the country will occupy 4.3 million people.

1.2 STRUCTURE OF THE POPULATION BY AGE

The structure of ages of 1980 shows a young population on the national average: the 66% of the persons had between 0 and 24 years and only 4% exceeded to 64 years.

The most important matters of groups of ages in 2000 INEGI-CONASPO for Michoacan (See table 1.1) include: a

diminution in the group from 0 to 4 years, owing to the decrease of birth which begins about the middle of 1960, from 14% in 1980 to 11% in 2000, reduction which also contains the intervals of 5 to 19 years. An increase of the group from 12 to 64 years forms the density of working force, in part owing to the high birth-rate of the 60's with consecuent enbodiment in the 80's of big blump of people to a labour market. This group increases an average rate of the 2.6% between 1980 - 1990, above the 1% of the total, iniciating the fall of rhythm a part of 1990 and the lost of young age group, and the persons more than 65 years will increase from 4 to 5% between 1980 and 2000 (graph 1.1 and graph 1.2)

1.3 URBAN AND RURAL POPULATION

The urban population of this entity occupies the 53% of the total, being the minor percentage to the nation (66%). The increase of the rural zone in the last decade was of 0.6% against to the national level (1.2%), that of urban areas of 3.5% and 4.4% respectively. The urban growth not only has been bigger than the rural to the interior of the state, but also proportionally less distant of the national average with a tendency to concentrate in the cities from rural areas (Graph 1.3)

1.4 NATALITY, MORTALITY AND MIGRATION

The most important component of increase of the population is the natality and the migration as it is observed in the graph 1.4, the birth rate in Michoacan has been kept higher than that of the nation between 1950 and 1980.

The highest record was registered in the 50's and 60's (47.9 and 48.1 birthes per 1000 people respectively) with a little bit of decrease in the next decade to 47.2 by the drop in birth, unti to reach 44 in 1980. The decrecient tendency will go to a birth rate of 24 per 1000 people in the year of 2000, (Table 1.2).

The general mortality in this state was maintained under the national average between 1950 and 1970. In 1980, the rate of the state was superior to the national (7.6 against 6.5) and it is esteemed that this situation will be maintained until the year of 2000, with rates of 6 and 5 deathes per 1000 persons for Michoacan and the country, respectively.

The migration flow of the population has opposed the effects of so high natural increase. Fro the balance of rates of natality and mortality and of total increase, a migration rate of the order in 1980 can be estimated the 1.1% with which Michoacan is situated inthe states of release immigration problem.

Concerning the analysis of the migratory flows, the table 1.3 shows the distribution of population by place of birth. The born people in this state was of the 93% of the total population, against the 81% to the national level in 1980. The people born in other states are only the 6.1% of the total against 17.2% to the national level, and in foreign countries are the 0.2% to 0.4% of the average in the country.

Being based on the criteria to change living places to calculate migrations, Michoacan presents an important negative balance. In 1980, the emigrants of Michoacan basically went toward the Federal District (26% of the total emigrants), the State of Mexico (25%) and Jalisco (15%). The immigrants principaly come from the same states (the Federal District) 15%, Mexico 14% and Jalisco 11% and of foreign countries 18%. With the above mentioned states, and of the remaining of the country with the exception of Durango, Guerrero, Oaxaca, San Luis Potosi and Zacatecas, Michoacan kept the net negative migrant balance.

To the interior of the State, asattractive centers, the cities of Lazaro Cardenas (with increase rate between the 70's and 80's 9.5%), Morelia (4.8%), Nuevo Parangaricutiro (4.2%) and Sahuayo (3.8%) exceed. On the other hand, Angomacutiro, Tzitzio and Villamar exhaust their people. In general, these migratory flows, from socialeconomic point of view, go to the developed from the underdeveloped.

1.5 SPATIAL DISTRIBUTION

The population of Michoacan, in one parts, concentrates to the principal urban centers, and the other hand, decrease in the remaining places. The average density is of 48 people per km2, over of 31 of the national average. The 21% people of the state live in the cities of Morelia, Uruapan and Zamora. If Zitacuarom Apatzingan, Hidalgo, Lazaro Cardenes y Jaeona are included, the figure arrives at 31% of the people. At the contrast, among 88 of 113 municipals of the state, the percentage of population is less than the 1%. The concentration in urban areas has increased. In this meaning, the participation of Morelia, Urupan, and Zamora in the total of the state was more than 17% in 1970 to 21% in 1980 (Table 1.4).

This demographic concentration in the main municipals of the state consists of the rhythm of increasing. Morelia, Uruapan and Zamora registered the rate of 5%, 4% and 3% respectively during the last decade, exceeding the 2.5% of the state. Thsi phenomenom confirms the concentration of people to atractive centers. To the contrary, the emigration is remarkable in the municipals of Angamacutiro (-2.4%), Tzitzio (-1.9%) and Villamar (-1.3%) with scarcely the 0.5% of the state population.

The municipals where there are more persons, in general, have more density, Morelia, Uruapan and Zamora exceed to 150 people per km2 in comparison with the average density

of the state, 48. By the other hand, in the cities with minor population Jacona and Huandacareo exceed 379 and 207 persons per km2. In the extreme, Areaya, Coalcoman, Tiquicheo, and Tumbiscatio scarcely reach to 5 persons per km2. Table 1.4 and Map 1.1.

Other indicator of the concentration grade of the population shows distributions by size of locality. In case of Michoacan, 21% of the people live in localities from 1 to 499 persons, against 14 of the national level. On the other hand, extremely, 32% of the population of the state is concentrated to nucleuses of 20,000 to 49,999 people of which percentage is superior to that of the country (26%).

A little more than 15% of Michoacans live in the capital, Morelia City. And other big numbers of cities are Uruapan, Zamora, and Apatzingan.

- TABLE -

POPULATION OF MAIN CITIES OF MICHACAN, 1980

NAME OF CITY	POPULATION

Resource: the Xth General Census and Housing 1980

1.6 ECONOMICAL TOTAL AND SECTORIAL ACTIVE POPULATION

The economical active population of Michoacan ascended 873 thousand persons in 1980 representing that the 48% of the total population are working as almost same as of the national situation. On the other hand, as equal as in the country, only 25% of the integration of labour force are occupied by women (Table 1.5).

In Michoacan, there is a relation of dependency of labour force of two persons to one, as equal as to the national

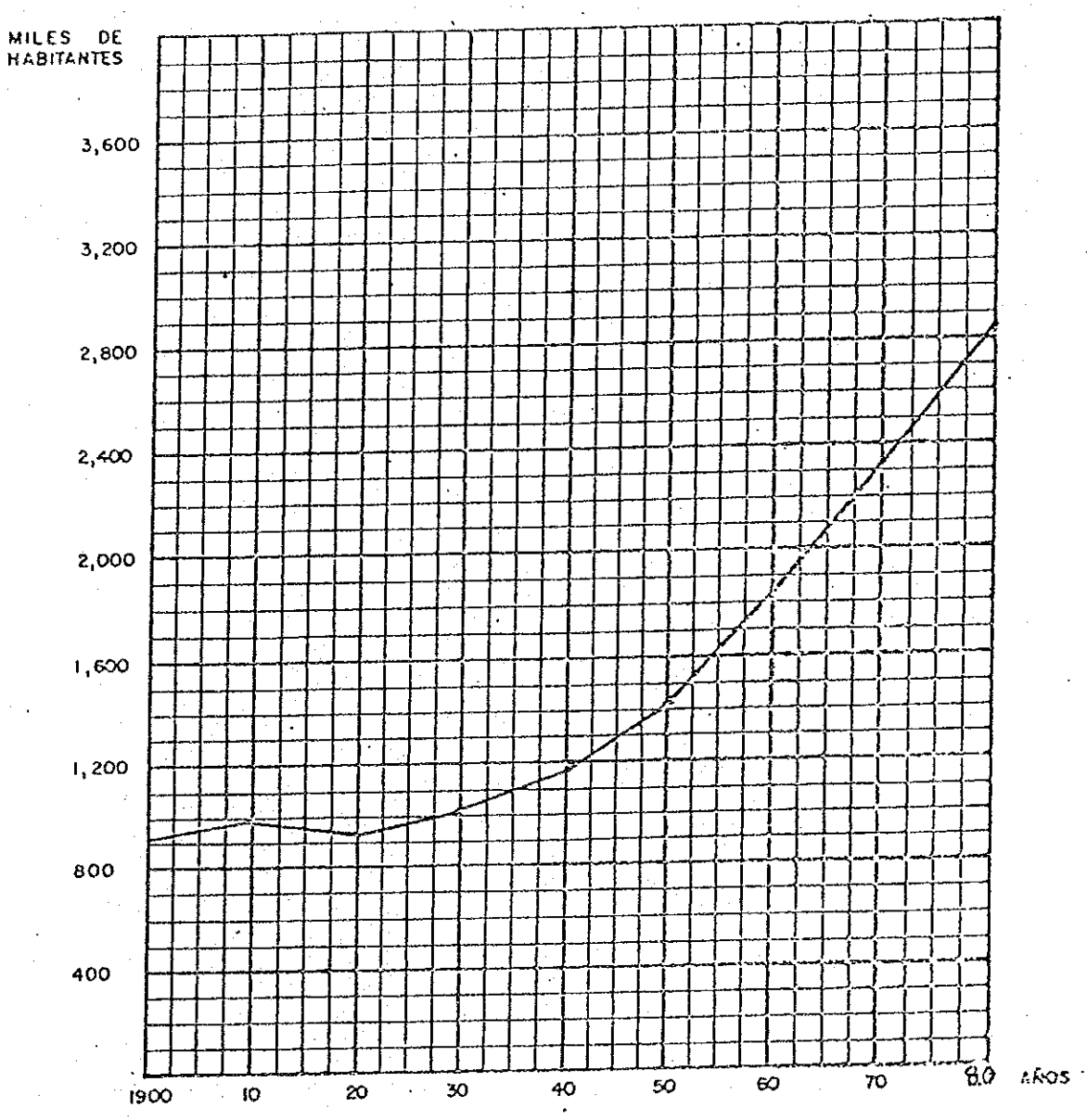
level. At sectional levels, the PEA occupied in primary activities dominates about 40% of the total, the second is communal services (9%) and commerce (8%). The sharing of percentage of labour force explicats economic activities of the most important in each unity. Therefore, the municipals with manufacturing industry give superiority to the percentage of the employed PEA in the state; in Quiroga workers of manufacturing are 32% of the PEA, Sahuayo (19%) Lazaro Cardenas (13%), La Piedad (12%), Morelia (10%) and Uruapan (11%), all of them exceed the 8% of the country.

In commerce; Sahuayo (18.3%), Uruapan (13.8%) and Morelia (13.3%); and in services: Morelia (28.8%), Uruapan (14.1%) and Zitacuaro (13.3%). As observed, there are municipals which exceed the production sector in urban zones which occupies industrial, commercial and of service activities. On the contrary, 64 of 113 municipals in the state are concentrated more than a half of the economicaly active population in the primary sector, which means, a big proportion of the population dedicated in agriculture and forest activities (Table 1.5 and 1.6).

VARIACION DE LA POBLACION EN MICHOACAN

GRAFICA 1.1

1900 - 1980



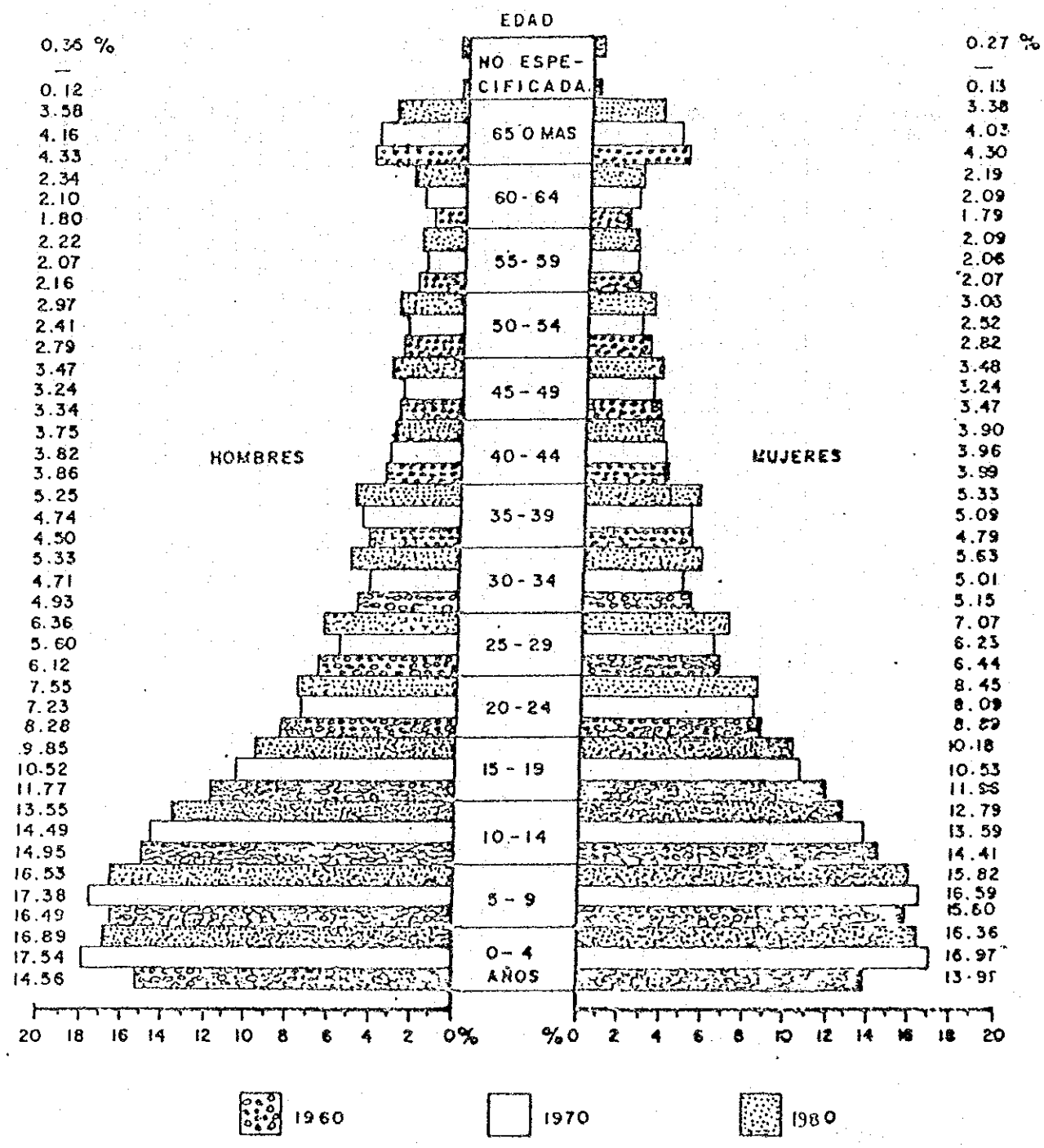
TASA DE CRECIMIENTO :	0.6	-0.5	1.1	1.2	1.9	2.7	2.3	2.1 %

FUENTE : CENSOS GENERALES DE POBLACION Y VIVIENDA 1930 - 1980
SECRETARIA DE PROGRAMACION Y PRESUPUESTO.

PIRAMIDE POBLACIONAL POR EDAD Y SEXO

GRAFICA 1.2

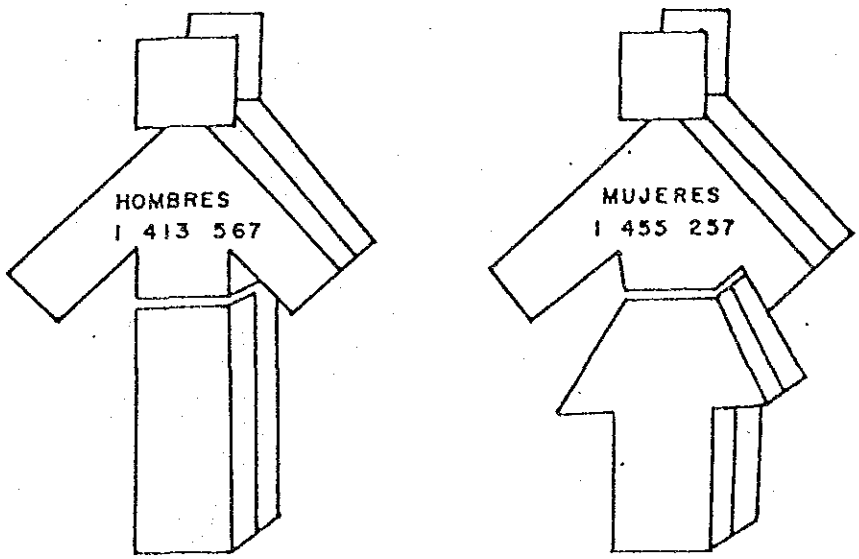
1960 - 1980



FUENTE : CENSOS GENERALES DE POBLACION Y VIVIENDA 1960 - 1980.
SECRETARIA DE PROGRAMACION Y PRESUPUESTO .

POBLACION TOTAL CLASIFICADA POR SEXO EN 1980.

2, 868, 824 HABITANTES



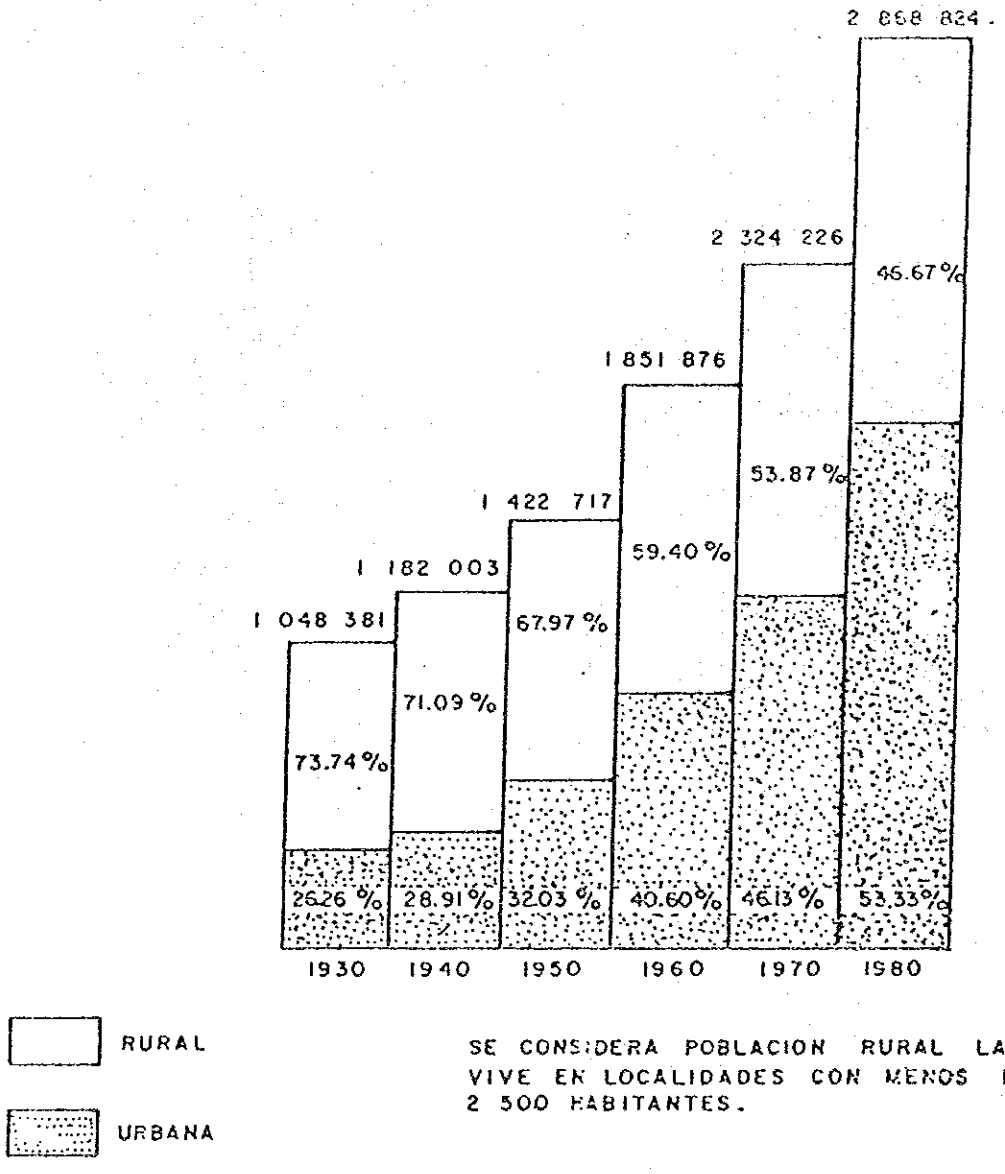
49 . 27 %

50 . 73 %

FUENTE: X CENSO GENERAL DE POBLACION Y VIVIENDA 1980.
SECRETARIA DE PROGRAMACION Y PRESUPUESTO.

POBLACION TOTAL URBANA Y RURAL, 1930 - 1980.

GRAFICA 1.3

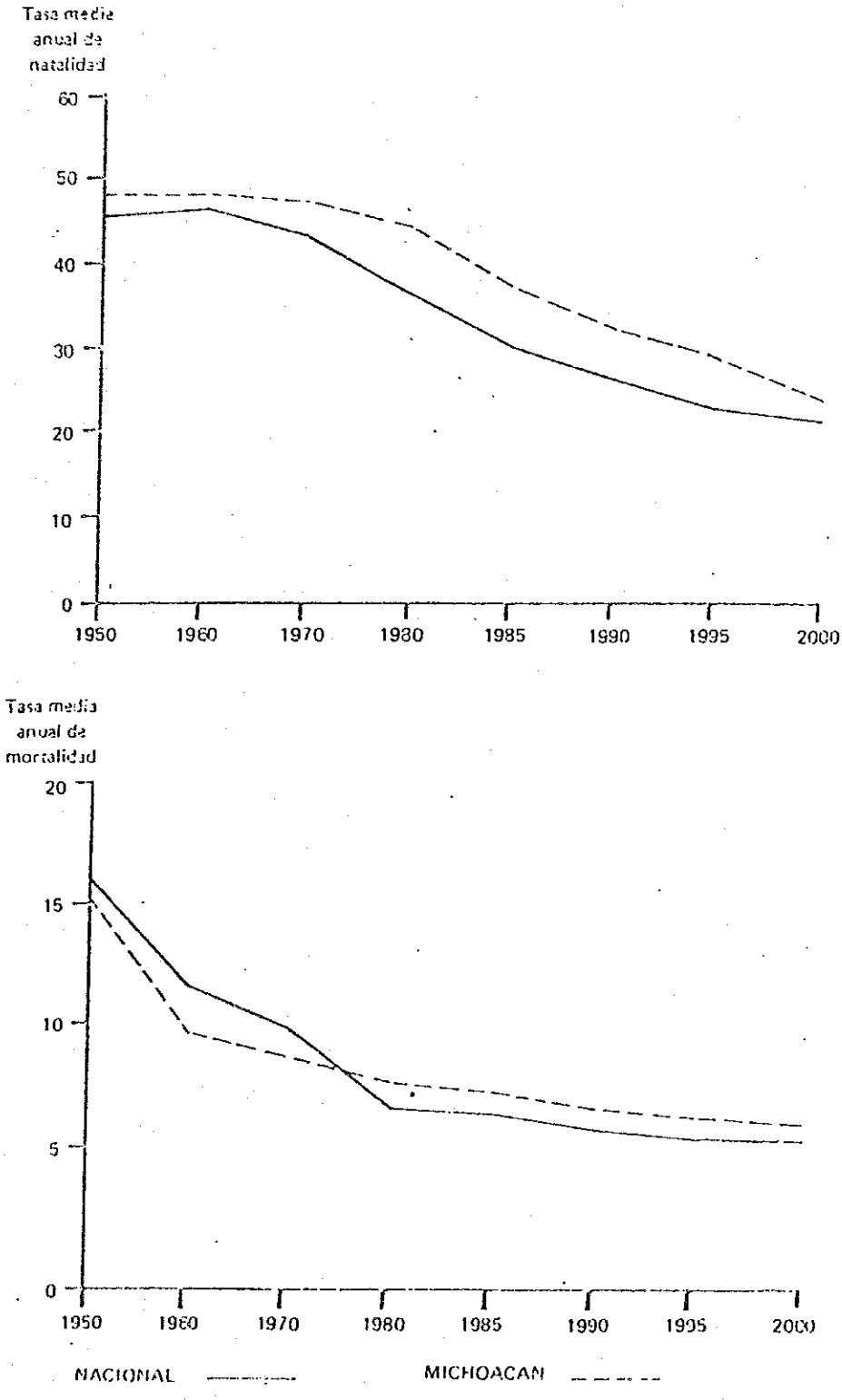


SE CONSIDERA POBLACION RURAL LA QUE VIVE EN LOCALIDADES CON MENOS DE 2 500 HABITANTES.

FUENTE: CENSOS GENERALES DE POBLACION Y VIVIENDA 1930 - 1980
SECRETARIA DE PROGRAMACION Y PRESUPUESTO

GRAFICA 1.4

MICHOACAN: EVOLUCION DE LA NATALIDAD Y MORTALIDAD DEL PAIS Y EL ESTADO, 1950 – 2000



FUENTE: Cuadro I.6

MICHOACAN: POBLACION POR GRUPOS DE EDAD 1980 Y PROYECCIONES 1985-2000

Cuadro 1.1

Edad	1980	1985	1990	1995	2000
TOTAL	2 868 824	3 233 040	3 469 552	3 673 368	3 831 643
0-4	409 369	512 506	498 254	440 548	408 177
5-9	463 047	414 637	468 115	463 534	408 993
10-14	420 987	462 589	396 980	453 318	448 825
15-19	340 387	415 518	442 891	382 013	437 508
20-24	246 368	310 970	379 139	411 769	352 791
25-29	180 212	219 819	274 722	345 669	375 427
30-34	144 658	168 787	198 433	254 261	321 050
35-39	133 260	145 197	156 874	187 212	240 347
40-44	112 673	124 269	137 100	149 777	178 839
45-49	97 833	107 260	118 121	131 443	143 773
50-54	80 375	92 082	101 741	112 941	125 899
55-59	60 648	76 944	86 453	96 270	107 182
60-64	51 573	58 160	70 755	80 201	89 661
65-69	39 013	46 624	51 491	63 301	72 186
70-74	35 571	31 256	38 840	43 399	53 809
75-79	22 688	24 600	23 773	30 077	33 966
80-84	15 672	13 095	16 224	15 982	20 581
85 y más	10 935	8 727	9 646	11 653	12 629
No especificado	3 555	-	-	-	-

FUENTE: Para 1980: Instituto Nacional de Estadística Geografía e Informática, X Censo General de Población y Vivienda, 1980. Resumen General. Para 1985-2000: Instituto Nacional de Estadística Geografía e Informática y CONAPO. Proyecciones de la Población de México y de las Entidades Federativas: 1980-2010.

MICHOACAN: TASAS DE NATALIDAD Y MORTALIDAD 1950-2000

Cuadro 1.2

Años	Tasa Media Anual de Natalidad (por mil)		Tasa Media Anual de Mortalidad (por mil)	
	Michoacán	Nacional	Michoacán	Nacional
1950	47.9	45.5	15.2	16.1
1960	48.1	46.0	9.6	11.5
1970	47.2	43.6	8.6	9.9
1980	40.0	36.3	7.6	6.5
1980-1985	37.5	30.2	7.1	6.3
1985-1990	33.3	26.1	6.5	5.6
1990-1995	27.2	22.4	6.0	5.2
1995-2000	23.9	20.9	5.7	5.1

FUENTE: Para 1950 a 1970: Secretaría de Programación y Presupuesto. La Población de México, su Ocupación y sus Niveles de Bienestar. Para 1980: Instituto Nacional de Estadística Geografía e Informática y CONAPO. Proyecciones de la población de México y de las entidades federativas 1980-2010 . Cuaderno de Información Oportuna Regional.

MICHOACAN: POBLACION SEGUN LUGAR DE NACIMIENTO 1970 Y 1980.

Cuadro 1.3

Año y Lugar de Nacimiento	Michoacán		Nacional	
	Población	%	Población	%
1970				
Población total	2 324 226	100.0	48 225 238	100.0
Nacidos en la entidad	2 235 043	96.2	41 044 073	85.1
Nacidos en otra entidad	86 723	3.7	6 984 483	14.5
Nacidos en otro país	2 379	0.1	191 184	0.4
No especificados	81	...	3 498	...
1980				
Población total	2 868 824	100.0	66 846 833	100.0
Nacidos en la entidad	2 658 472	92.7	54 243 532	81.1
Nacidos en otra entidad	175 167	6.1	11 501 316	17.2
Nacidos en otro país	6 422	0.2	268 900	0.4
No especificados	28 763	1.0	833 085	1.3

FUENTE: Dirección General de Estadística. IX (1970) Y X (1980) Censo General de Población.

MICHOACAN: POBLACION Y DENSIDAD DEMOGRAFICA POR MUNICIPIO, 1980.

Cuadro **1.4**
Primera parte

Estado y Municipio	Población 1970	Población 1980	Porcentaje del Total Estatal	Tasa de Crecimiento 1970-1980	Densidad por km^2 1980
TOTAL	2 324 226	2 868 824	100.00	2.05	47.93
Acuitzio	7 515	7 119	0.25	-0.52	67.09
Aguililla	21 596	23 171	0.81	0.68	14.23
Alvaro Obregón	11 417	15 651	0.55	3.09	74.86
Angamacutiro	15 326	11 876	0.41	-2.43	58.50
Angangueo	8 586	9 266	0.32	0.74	73.90
Apatzingán	66 870	75 805	2.64	1.22	94.17
Aporo	2 167	2 377	0.08	0.90	24.52
Aquila	13 742	19 726	0.69	3.75	7.75
Ario	24 229	25 556	0.89	0.55	41.17
Arteaga	16 506	17 975	0.63	0.83	4.57
Briseñas de Matamoros	7 454	8 487	0.30	1.26	93.82
Buenavista	23 768	30 676	1.07	2.50	43.13
Carácuaro	8 936	10 602	0.37	1.67	25.19
Coahuayana	11 020	11 853	0.41	0.71	23.45
Coalcomán	13 842	17 191	0.60	2.12	4.78
Coeneo	23 670	24 905	0.87	0.49	62.12
Contepec	19 548	19 818	0.69	0.13	60.89
Copándaro de Galeana	6 763	7 744	0.27	1.31	59.34
Cotija	17 630	17 905	0.62	0.15	32.97
Cuitzeo	19 052	21 783	0.76	1.30	88.26
Charapán	8 659	9 363	0.34	1.27	96.91
Charo	11 262	13 782	0.48	1.97	79.05
Chavinda	12 197	12 354	0.43	0.12	84.54
Cherán	10 239	13 267	0.46	2.53	78.45
Chilchota	17 363	17 620	0.61	0.14	38.38
Chinicuila	8 771	8 062	0.28	-0.81	9.98
Chucándiro	8 702	8 398	0.29	-0.34	59.55
Churintzio	10 967	10 190	0.36	-0.71	65.08
Churumuco	10 121	11 711	0.41	1.42	8.43
Ecuandureo	14 301	15 023	0.52	0.48	44.69
Epitacio Huerta	13 389	12 586	0.44	-0.60	71.89
Erongaricuaro	9 470	11 270	0.39	1.70	52.24
Gabriel Zamora	11 295	16 503	0.58	3.73	78.49
Hidalgo	59 845	72 787	2.54	1.91	68.56
Huacana, La	24 016	30 830	1.07	2.44	18.74
Huandacareo	10 057	11 234	0.39	1.07	206.94
Huaniqueo	12 834	12 287	0.43	-0.42	59.36
Huetamo	30 434	35 910	1.25	1.61	24.05
Huiramba	3 983	4 985	0.17	2.18	27.00
Indaparapeo	9 295	12 351	0.43	2.78	68.35
Irimbo	6 490	7 372	0.26	1.24	45.65
Ixtlán	13 397	14 870	0.52	0.66	89.17
Jacona	26 078	35 247	1.23	2.95	379.31
Jiménez	16 997	18 839	0.66	1.00	61.77
Jiquilpan	26 116	32 680	1.14	2.19	112.88

MICHOACAN: POBLACION Y DENSIDAD DEMOGRAFICA
POR MUNICIPIO, 1980.

Cuadro 1.4
Segunda parte

Estado y Municipio	Población 1970	Población 1980	Porcentaje del Total Estatal	Tasa de Crecimiento 1970-1980	Densidad por km² 1980
José Sixto Verduzco	-	24 015	0.84	1/	32.03 2/
Juárez	6 749	7 366	0.26	0.85	45.60
Jungapeo	12 001	14 587	0.51	1.90	29.72
Lagunillas	4 242	4 955	0.17	1.51	57.24
Lázaro Cárdenas	24 319	62 355	2.17	9.52	57.50
Madero	14 538	15 758	0.55	0.78	10.08
Maravatío	36 589	40 660	1.42	1.02	87.40
Marcos Castellanos	6 834	8 902	0.31	2.59	25.94
Morelia	218 083	353 055	12.31	4.76	265.17
Morelos	10 947	11 089	0.41	0.80	55.75
Múgica	22 616	31 061	1.08	3.11	47.57
Nahuatzen	13 370	16 610	0.58	2.12	45.87
Nocupétaro	9 483	8 904	0.31	-0.61	16.12
Nvo. Parangaricutiro	6 581	10 118	0.35	4.24	23.56
Nuevo Urecho	7 020	8 140	0.28	1.44	20.26
Numarán	7 942	9 123	0.32	1.35	90.53
Ocampo	9 272	11 696	0.41	2.27	122.40
Pajacuarán	17 493	20 206	0.70	1.40	120.31
Panindícuaro	18 864	18 054	0.63	-0.42	70.84
Parácuaro	17 674	21 090	0.74	1.72	57.09
Paracho	18 704	23 586	0.82	2.27	84.96
Pátzcuaro	37 615	53 287	1.86	3.42	204.47
Penjamillo	20 475	21 270	0.74	0.37	100.31
Periбán	10 341	13 967	0.49	2.95	32.13
Piedad, La	52 432	63 608	2.22	1.88	234.52
Purépero	12 826	16 133	0.56	2.24	58.66
Puruándiro	67 424	55 853	1.95	1/	220.76 2/
Queréndaro	10 363	12 698	0.44	1.98	68.28
Quiroga	16 004	19 748	0.69	2.05	69.51
Régules	9 528	10 823	0.38	1.24	27.92
Reyes, Los	33 563	38 017	1.33	1.21	72.65
Sahuayo	31 364	46 099	1.61	3.79	217.93
San Lucas	15 408	16 756	0.58	0.81	21.61
Santa Ana Maya	11 455	12 958	0.45	1.21	110.28
Santa Clara	25 354	29 398	1.02	1.44	66.85
Senguio	12 174	14 803	0.52	1.91	50.71
Susupuato	6 906	6 360	0.22	-0.79	40.62
Tacámbaro	36 768	42 777	1.49	1.47	39.47
Tancítaro	16 613	16 578	0.58	-0.02	22.03
Tangamandapio	14 396	16 503	0.58	1.33	64.19
Tangancícuaro	29 528	30 947	1.08	0.45	75.75
Tanhuato	13 138	14 102	0.49	0.69	60.61
Taretán	8 319	11 113	0.39	2.84	31.66
Tarímbaro	20 413	25 503	0.89	2.17	111.58
Tepalcatepec	19 094	23 717	0.83	2.12	33.77
Tingambato	6 466	8 471	0.30	2.64	33.31
Tinguindín	9 974	10 897	0.38	0.86	40.15
Tiquicheo	12 762	15 174	0.53	1.69	5.22
Tlalpujahua	17 020	19 174	0.67	1.16	82.90

MICHOACAN: POBLACION Y DENSIDAD DEMOGRAFICA POR MUNICIPIO, 1980.

Cuadro 1.4
Conclusión

Estado y Municipios	Población 1970	Población 1980	Porcentaje del Total Estatal	Tasa de Crecimiento 1970-1980	Densidad por Km^2 1980
Tlazazalca	11 579	11 735	0.41	0.13	39.46
Tocumbo	10 729	9 837	0.34	0.84	33.49
Tumbiscatio de Ruíz	7 995	8 670	0.30	0.79	5.33
Turicato	23 758	31 514	1.10	2.77	25.87
Tuxpan	14 920	16 722	0.58	1.11	80.98
Tuzantla	13 422	16 429	0.57	1.97	19.88
Tzintzuntzan	9 139	10 440	0.36	1.29	66.78
Tzitzio	15 119	12 386	0.43	-1.91	13.64
Uruapan	102 649	146 998	5.12	3.53	177.49
Venustiano Carranza	18 772	17 926	0.62	-0.44	75.30
Villamar	23 806	20 757	0.72	-1.32	62.39
Vista Hermosa	14 329	15 527	0.52	0.78	77.50
Yurécuaro	19 904	21 547	0.75	0.77	110.40
Zacapu	52 474	62 620	2.18	1.72	194.33
Zamora	82 943	113 474	3.96	3.07	259.39
Zináparo	5 422	5 396	0.19	-0.05	106.96
Zinapécuaro	33 013	37 571	1.31	1.26	72.33
Ziracuaretiro	6 303	7 139	0.25	1.21	49.77
Zitácuaro	70 750	83 649	2.92	1.63	164.78

NOTA: */ Debido a cambios en la división política del municipio la estimación de la tasa de crecimiento poblacional 1970-1980, carece de sentido.

**/ En este caso, la densidad poblacional se estimó mediante el cociente de la superficie territorial entre la población censal, ya que no es posible estimar la población al 30 de junio de 1980.

FUENTE: Dirección General de Estadística. IX Censo General de Población y X Censo General de Población y Vivienda, 1980.

MICHOACAN: POBLACION ECONOMICAMENTE ACTIVA E INACTIVA Y FACTOR DE DEPENDENCIA, 1980

Cuadro 1.5

Indicador	Michoacán	%	Nacional	%
Población de 12 años y más	1 825 979	100.0	43 346 993	100.0
Población Económicamente Activa	872 775	47.8	22 066 084	50.9
Hombres	656 969	75.3	15 924 806	72.2
Mujeres	215 806	24.7	6 141 278	27.8
Población Económicamente Inactiva	953 204	52.2	21 280 909	49.1
Factor de Dependencia	2.29	-	2.03	-

NOTA: Factor de Dependencia = $\frac{\text{POBLACION TOTAL - POBLACION ECONOMICAMENTE ACTIVA}}{\text{POBLACION ECONOMICAMENTE ACTIVA}}$

FUENTE: Instituto Nacional de Estadística, Geografía e Informática, X Censo General de Población y Vivienda, 1980, Resumen General Abreviado.

MICHOACAN: DISTRIBUCION SECTORIAL DE LA POBLACION ECONOMICAMENTE ACTIVA, 1980.

Cuadro 1.6
Primera Parte

Municipio	Total	Agricultura, Ganadería, Caza, Silvicultura y Pesca	Explotación de Minas y Canteras	Industria Manufacturera	Electricidad, Gas	Construcción	Comercio	Transporte, Almacenamiento y Comunicaciones	Establecimientos Financieros, Seguros, Inmuebles	Servicios Comunales	Actividades Insuficientemente Especificadas	Desocupados que no han trabajado
NACIONAL	22 066 084	5 699 971	477 017	2 575 124	115 932	1 296 337	1 729 296	672 111	405 754	2 418 114	6 552 037	124 391
MICHOACAN	872 775	344 325	1 478	69 745	1 165	38 135	70 661	23 603	6 722	77 073	234 062	5 806
Acuitzio	2 194	1 245	0	161	1	65	125	34	10	104	409	40
Aguililla	6 081	3 290	8	313	1	204	395	138	6	306	1 378	42
Alvaro Obregón	5 218	2 821	7	188	3	191	178	67	10	159	1 565	29
Angamacutiro	3 852	2 236	1	134	1	80	144	19	14	133	1 077	13
Angangueo	2 492	672	289	218	9	80	115	57	10	206	757	79
Apatzingán	24 892	6 195	17	1 677	25	1 302	3 225	1 128	293	3 161	7 715	154
Aporo	632	395	0	99	0	29	36	13	2	33	24	1
Aquila	6 270	4 025	11	119	0	176	217	43	8	321	1 340	10
Ario	7 957	3 934	8	343	0	326	565	198	28	624	1 886	45
Arteaga	5 158	2 334	10	100	43	223	390	120	17	398	1 428	15
B.de Matamoros	2 547	1 227	0	151	1	59	106	46	27	81	834	15
Buenavista	8 881	4 668	5	308	1	221	471	161	20	369	2 606	51
Carácuaro	3 370	2 159	0	34	0	38	51	10	0	88	467	523
Coahuayana	3 520	1 577	3	82	1	94	202	55	17	245	1 229	15
Coalcomán	4 922	2 724	37	153	1	164	194	48	11	279	1 274	37
Coeneo	8 209	4 626	4	180	1	147	252	90	8	327	2 537	37
Contepec	6 072	3 882	3	206	65	171	217	57	6	220	1 218	27
Copándaro de Gal.	2 063	1 636	0	13	0	44	25	26	4	54	251	10
Cotija	5 216	2 327	3	476	2	255	486	147	36	276	1 152	56
Cuitzeo	7 048	3 023	0	1 152	4	258	333	53	9	183	2 000	33
Charapán	3 262	1 278	0	319	0	35	166	47	3	138	1 252	24
Charo	4 346	2 610	6	233	0	159	136	76	9	175	928	14
Chavinda	3 507	1 875	0	109	1	140	204	62	7	210	876	23
Cherán	3 982	1 816	7	330	0	109	282	47	10	261	1 063	57
Chilchota	6 237	2 212	6	1 113	12	144	353	82	14	428	1 821	52
Chinicuila	2 494	1 808	0	72	0	36	37	10	4	102	417	8
Chucándiro	2 978	2 132	1	41	0	7	39	2	2	57	686	11
Churintzio	3 054	1 913	0	141	0	69	91	36	9	125	664	6

MICHOACAN: DISTRIBUCION SECTORIAL DE LA POBLACION ECONOMICAMENTE ACTIVA, 1980.

Cuadro 1.6
Segunda Parte

Municipio	Total	Agricultura, Ganadería, Caza, Silvicultura y Pesca	Explotación de Minas y Canteras	Industria Manufacturera	Electricidad, Gas	Construcción	Comercio	Transporte, Almacenamiento y Comunicaciones	Establecimientos Financieros, Seguros, Inmuebles	Servicios Comunales	Actividades Insuficientemente Especificadas	Desocupados que no han Trabajado
Churumuco	4 064	2 376	28	59	1	94	204	45	3	232	888	134
Ecuandureo	4 969	2 804	3	217	0	83	128	42	9	123	1 513	47
Epitacio Huerta	4 269	3 040	13	39	0	42	57	11	2	74	984	7
Erongaricuaro	3 813	1 547	1	561	2	159	176	41	4	198	1 114	10
Gabriel Zamora	4 779	2 788	5	143	7	134	265	121	11	279	1 012	14
Hidalgo	21 917	6 441	31	3 360	52	733	1 871	885	99	1 525	6 834	86
Huacana, La	9 292	4 904	206	250	1	184	467	128	8	430	2 549	85
Huandacareo	3 197	1 375	2	396	2	121	183	49	2	115	910	42
Huaniqueo	4 074	2 718	0	69	2	40	67	10	0	93	1 019	56
Huetamo	10 926	5 745	3	440	11	312	518	122	18	723	2 819	115
Huiramba	1 329	960	0	36	0	82	37	8	1	63	129	13
Indaparapeo	3 586	1 782	2	350	2	115	189	75	5	124	921	21
Irimbo	2 309	1 051	14	245	5	111	129	60	7	72	600	6
Ixtlán	4 593	2 636	1	162	2	126	167	73	7	116	1 270	23
Jacona	9 573	4 048	11	840	12	431	916	289	80	595	2 300	51
Jiménez	6 505	3 462	0	147	3	208	179	61	8	211	2 187	39
Jiquilpan	8 413	2 772	4	598	24	388	756	243	67	914	2 551	96
José Sixto Verduzco	7 787	4 758	0	107	2	114	274	70	36	289	2 089	40
Juárez	2 378	1 681	0	62	1	28	73	30	1	88	410	4
Jungapeo	4 546	2 546	6	154	1	118	225	80	12	174	1 207	23
Lagunillas	1 325	979	0	73	1	50	25	19	0	52	122	4
Lázaro Cárdenas	18 028	2 678	117	2 351	36	1 280	1 541	996	263	2 364	6 275	127
Madero	5 491	3 887	2	176	1	47	122	89	3	108	1 049	7
Maravatío	13 327	7 165	20	483	5	334	813	245	39	784	3 401	38
Marcos Castellanos	2 720	1 217	0	248	0	103	219	113	5	141	678	6
Morelia	106 549	12 601	112	10 838	345	8 622	14 143	4 178	2 526	22 190	30 430	564
Morelos	3 602	2 391	1	92	0	48	87	9	0	97	803	74
Múgica	8 560	3 497	7	416	11	377	808	327	72	705	2 279	61
Nahuatzen	5 493	2 566	1	817	0	243	287	42	9	174	1 348	6
Nocupétaro	2 625	1 605	7	30	0	66	52	15	1	261	580	8
Nvo. Parangaricutiro	2 985	1 276	1	253	0	94	196	62	3	109	987	4

MICHOACAN: DISTRIBUCION SECTORIAL DE LA POBLACION ECONOMICAMENTE ACTIVA, 1980

Cuadro 1.5
Tercera Parte

Municipio	Total	Agricultura, Ganadería, Caza, Silvicultura y Pesca	Explotación de Minas y Canteras	Industria Manufacturera	Electricidad, Gas	Construcción	Comercio	Transporte, Almacenamiento y Comunicaciones	Establecimientos Financieros, Seguros, Inmuebles	Servicios Comunales	Actividades insuficientemente Especificadas	Desocupados que no han Trabajado
Nuevo Urecho	2 305	1 697	0	43	0	36	72	37	0	55	363	2
Numarán	2 413	1 385	1	118	0	61	219	33	8	58	491	39
Ocampo	3 605	1 733	2	223	5	118	82	172	3	224	1 015	28
Pajacuarán	5 400	2 972	1	220	2	151	258	75	8	218	1 471	24
Panindícuaro	6 110	3 739	3	162	19	84	208	29	7	141	1 697	21
Paracuaro	6 700	3 929	5	150	0	91	320	61	8	240	1 875	21
Puracho	6 986	1 525	7	1 965	3	194	525	85	19	785	1 827	11
Pátzcuaro	16 489	4 149	10	1 893	14	977	1 952	662	106	1 871	4 752	169
Penjamillo	7 626	5 131	0	214	0	87	146	47	1	197	1 773	30
Peribán	3 752	2 036	3	113	0	138	225	104	7	145	964	17
Piedad,La	19 687	4 941	13	2 256	27	1 074	2 611	726	268	2 290	5 369	112
Purépero	4 797	1 718	2	676	3	242	413	131	34	416	1 151	11
Puruándiro	19 233	11 014	4	602	26	523	984	232	34	790	4 949	75
Queréndaro	3 624	1 903	0	141	1	133	193	114	12	187	908	32
Quiroga	7 403	1 647	2	2 336	5	209	697	108	17	325	2 134	23
Régules	3 305	1 932	0	112	2	78	173	45	6	112	828	17
Reyes, Los	10 545	3 938	8	1 016	14	546	1 037	300	80	908	2 661	37
Sahuayo	13 009	2 384	2	2 420	9	654	2 380	563	94	1 398	3 031	74
San Lucas	5 650	3 483	0	145	0	131	205	57	19	170	1 401	39
Santa Ana Maya	3 643	2 138	0	193	0	110	97	49	1	96	926	34
Santa Clara	9 138	4 238	10	950	3	246	427	217	14	684	2 294	50
Senguio	4 448	2 512	16	168	8	213	111	45	3	143	1 203	26
Susupuato	2 556	1 894	0	15	0	2	18	3	0	125	487	12
Tacámbaro	13 418	6 312	1	889	6	467	840	358	58	979	3 470	38
Tancítaro	5 266	3 354	0	211	0	73	194	39	0	86	1 274	35
Tangamandapio	5 137	2 604	4	273	0	120	443	52	10	184	1 410	43
Tangancícuaro	10 204	4 456	14	1 005	11	265	563	242	21	582	3 047	45
Tanhuato	4 230	2 394	5	98	1	78	189	44	17	203	1 [illegible]	19
Taretán	2 874	1 369	0	271	0	90	176	53	8	179	705	23
Tarímbaro	7 139	4 346	5	279	7	358	315	94	12	259	1 411	62
Tepalcatepec	7 207	2 978	14	272	2	228	556	165	45	462	2 342	143

"MICHOACAN STATE DATA (2/2)"

3. STRATEGY OF INDUSTRIAL DEVELOPMENT OF MICHOACAN

3.1 Industrial Corridor

The fundamental strategy of industrial development of the State of Michoacan foresees the development of an economic corridor of the Exterior Commerce to the pacific valley; this corridor already has existed partially and is constructed by the Federal District, Toluca-Lerma and Atlacomalco, and the regions, which now neither is communicated nor incorporated to the productive flow shall be integrated to this corridor; as they are; Contepec-Morelia-Uruapan-Lazaro Cardenas, Map 3.1.

Therefore, the Government of the Stated of Michoacan has a plan for the industrial development in the areas along the national high-way Nos. 37 and 15 (they are now on project to be constructed as the principal high-ways) which unite the industrial bases to the central part of the country. This plan denominated industrial corridoar, selects poles of development along the high-ways and develops industrial parks.

The industrial corridor has by object 1) to decide the site of relative industries at the base of Lazaro Cardenas in the interior of the country, 2) to receive factories descentralized from Mexico City and Toluca, and 3) connect on a large scale the industrial development with Foreign Trade; or it means, to try to create economically to the out-side and not be tied exclusively to the consumer centers of the country.

The industrial branches which shall be capable of establishment in the industrial corridoar are classified as per the following characters;

- Industries related to the industrial base of Lazaro Cardenas; Secondary Steel industry, metal-mechanical companies of transformation from raw-materials.

- Transformation industries of agriculture resources (In view of that the State of Michoacan has plenty of agriculture resources.). process industries of cattle breeding products and agriculture machinery and compornent industries.

- Industries which utilize mineral resources... ceramic industry and others which use the mineral resources in abundance in the state, like as copper, silver, gold, manganese, tin, antimony, kaoline, silicious sand, feldespar and silex.

- Connective industries to the new airport of Morelia... Electronics industry and industries related to cameras, watches, measuring instruments, and other kinds of equipment and aparatuses for precision.

- Industries descentralized from Mexico City... machinery industries in general like as machinery and compornents construction for electric generation and machinery for construction, and industries for general consumer goods as food products and clothes.

It is important that the port of Lazaro Cardenas should permit the national production to integrate to economical flow of merchandises in the pacific valley; this region is the most important in the world in this meaning, and the port penetrates in attractive market by itself, as one of the four big industry and commercial ports of the American Pacific; Vancouver, Los Angeles, San Francisco, and Panama.

3.2 Industrial Parks

To support the creation of this economic corridor of Foreign Trade, the Government of Michoacan State developes in the municipal of Contepec, an industrial park for the pourpose of that chemical industries shall be installed to transplant from Mexico City and/or the expansions are expected because of the impossibility in that city.

The integral rehabilitation of the Industrial City of Morelia will be able to utilize regionally the investments done in point of industrial infrastructure, if the disordered industries established in the urban zone of Morelia can be regulated.

In the park, the establishment of metal-mechanical industry can be propiciated, assuming that Morelia is situated on a equidistant position with Lazaro Cardenas where the big steel making industry of the country is constructed, as well as the Federal District, the State of Mexico, and the cities of Guadalajara and Queretaro where the 70% of the production of metal-mechanical industries of the country are concentrated.

Other aspect which strengthens the integration of this economic corridor is to establish an industrial in Uruapan. This park shall be for agroindustries, as well as for free zone, because that its short distance to Lazaro Cardenas gives facilities for importation of raw-materials and the exportation of finished goods.

Complementary actions, but not minor importance, are to construct industrial parks in Zitacuaro, Zamora, Zacapa and La Piedad which are suitable places for industries.

The industrial city of Morelia which was programed in four steps has a total surface of 354.51 hectares, of which 1.17 are for civic and commercial use; 6.8 for living use,

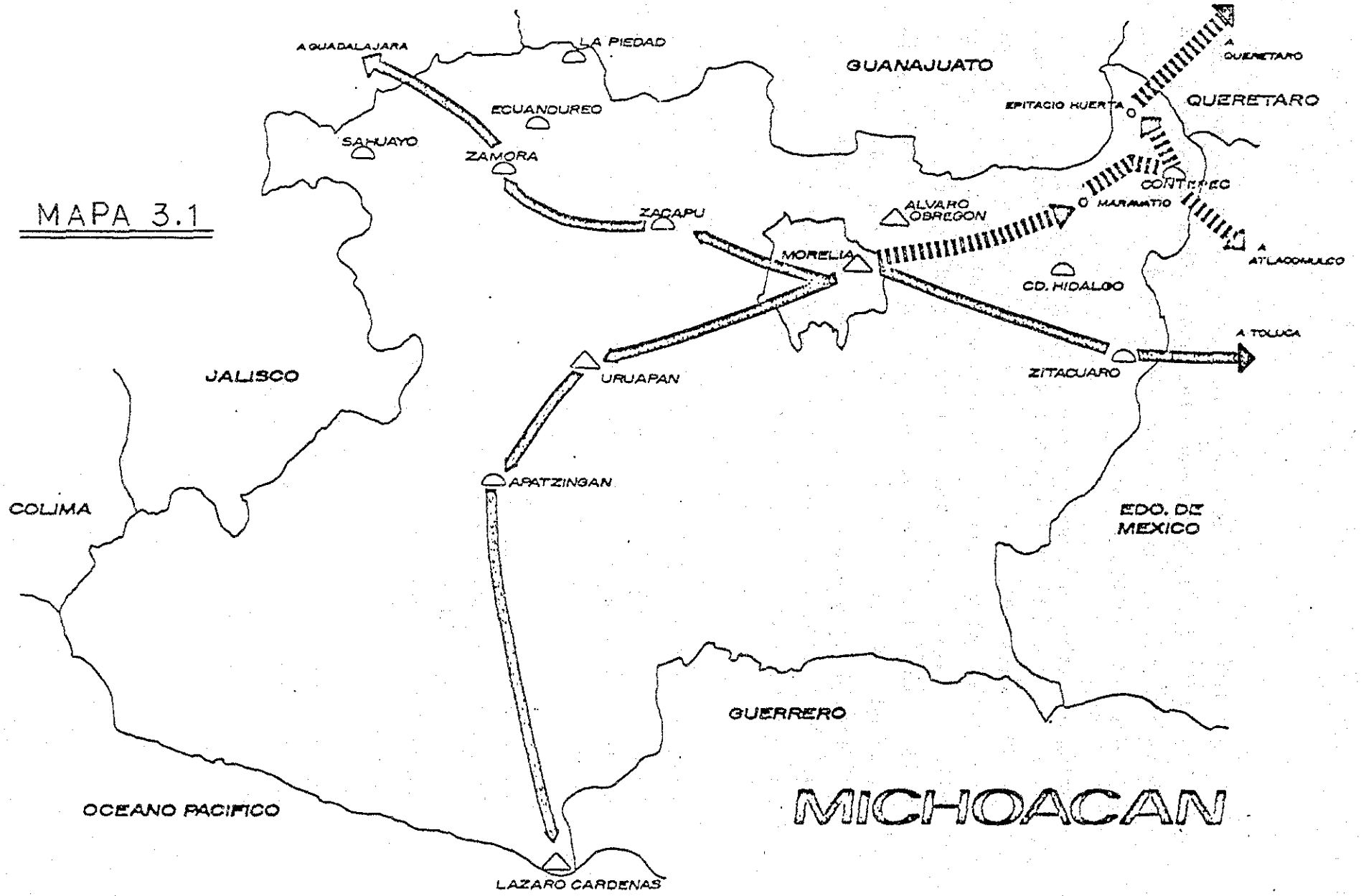
65 for jobs of social benefit, 111 for green and road areas, and 170.41 for industrial use. From the last, the 88.5% which correspond to the first and second steps, are already occupiedby industries.

Actually, the process of the city planning is the third step of this industrial complex, with a surface, on sale, of 39.7 hectares which will enjoy the same services as of the former steps and it is estimated that 126 companies will be established. The industrial park for the small and middle size industries of the City of Lazaro Cardenas, is situated in the island of Cayacal. The project is considered to execute in three stages with a total surfac eof 108 hectares now on sale. The first step is already on operation with a surface of 36 hectares.

The industrial park of Zamora, bears a surface of 59.4 hectares including the project of city planning in three steps. The first is now under construction with a surface of 32.7 hectares of which 238 blocks in 26 lots are now on sale.

In Zitacuaro, the industrial park has the total surface of 64.8 hectares and the project hastens the city planning in three steps including the construction of the first step and it's extension is of 14.23 Has among which 11.49 can be sold.

And the last, the industrial park of Zacapu has a surface of 58.4 Has of which 20.6 Has is now for the first step and put on sale.


MAPA 3.1
A GUADALAJARA
LA PIEDAD
GUANAJUATO
A QUERETARO
EPITACIO HUERTA
QUERETARO
ECUANDUREO
SAHUAYO
ZAMORA
CONTEPEC
MARAVATIO
ZACAPU
ALVARO OBREGON
A ATLACOMULCO
MORELIA
CD. HIDALGO
A TOLUCA
JALISCO
URUAPAN
ZITACUARO
APATZINGAN
COLIMA
EDO. DE MEXICO
GUERRERO
MICHOACAN
OCEANO PACIFICO
LAZARO CARDENAS
CORREDOR INDUSTRIAL
PROYECTO CORREDOR INDUSTRIAL
ZONA I (DE MAXIMA PRIORIDAD NACIONAL)
ZONA II (DE MAXIMA PRIORIDAD ESTATAL)