KINGDOM OF THAILAND

FEASIBILITY REPORT ON DOCK CONSTRUCTION PROJECT IN BANGKOK

DECEMBER 1972

OVERSEAS TECHNICAL COOPERATION AGENCY
GOVERNMENT OF JAPAN

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PREFACE

The Government of Japan, in response to the request of the Government of Royal Thailand, has decided to undertake a survey on the Floating Dock Construction Project in Thailand and entrusted the Overseas Technical Cooperation Agency with the implementation of the survey.

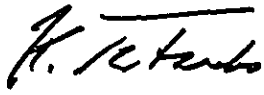
The Agency for its part has selected Mr. Mitsutoyo Okada, Ship Bureau, Ministry of Transport and Mr. Masahiko Noma of the International Division, Ishikawajima-Harima Heavy Industries Co., Ltd. and sent them to Thailand for a feasibility study of the said dock construction project over a period from July 25th to September 22nd, 1972.

Thanks to the kind cooperation of officials concerned of the Thai Government, the mission was able to carry out its field survey smoothly and accomplish its objective. Upon return to Japan the mission made a further study on the findings obtained in the field and complied a report which is now ready for pressentation.

I earnestly hope that this report will contribute to the progress of the proposed floating dock construction project and the further promotion of friendly relations and economic exchange between the two countries.

Finally, I wish to express my gratitude to all personnel concerned in Royal Thailand for their unlimited ccoperation and support extended to the mission during its stay in Thailand.

December, 1972



Keiichi Tatsuke

Director General

Overseas Technical Cooperation Agency

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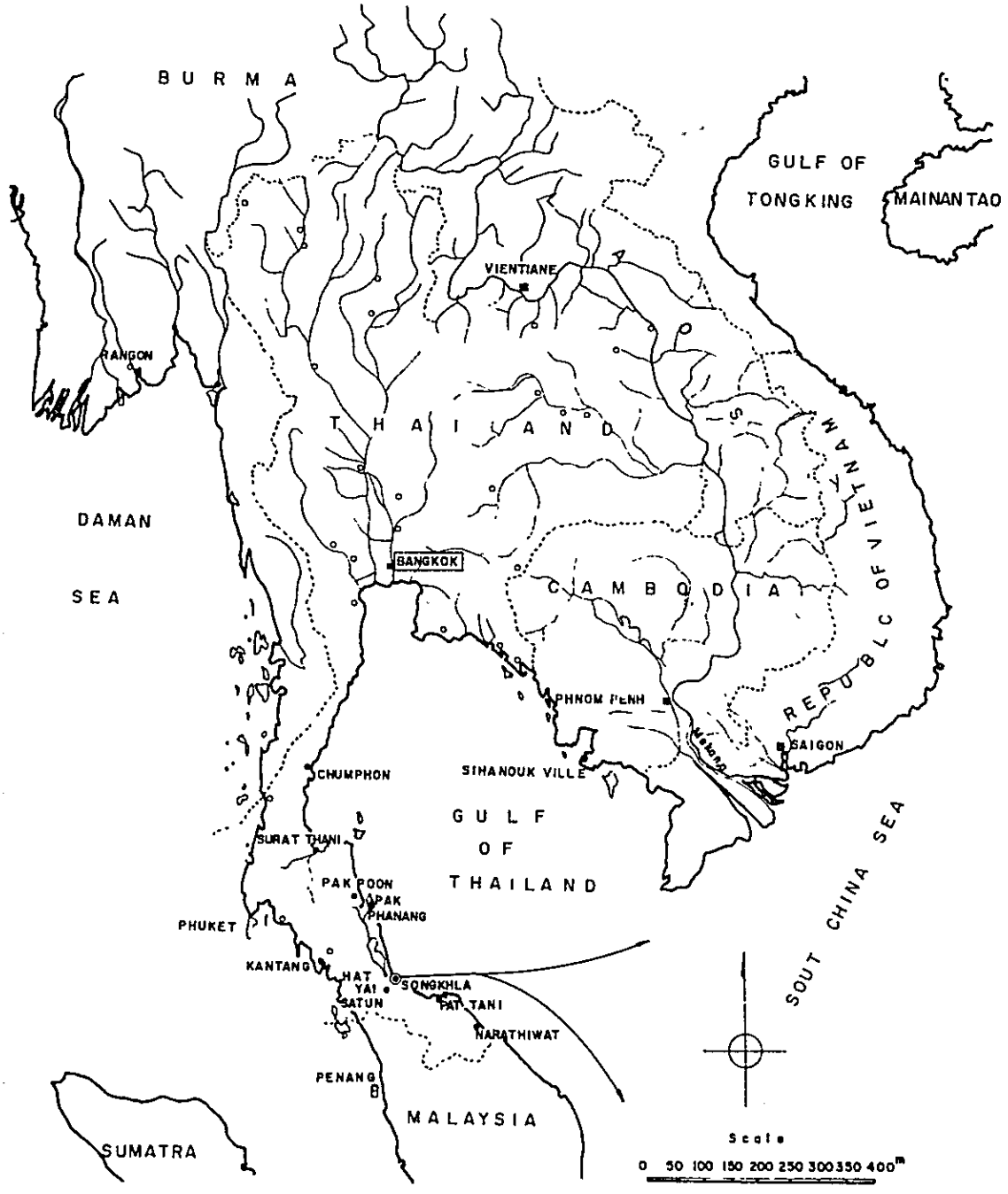

BURMA
GULF OF
TONGKING
HAINANTAO
VIENTIANE
RANGON
THAILAND
SOUTH VIETNAM
DAMAN
SEA
BANGKOK
CAMBODIA
REPUBLIC OF VIET
PHNOM PENH
SAIGON
CHUMPHON
SIHANOUK VILLE
GULF
OF
THAILAND
SURAT THANI
PAK POON
PAK
PHANANG
PHUKET
KANTANG
HAT
YAI
SONGKHLA
SATUN
PAT TANI
NARATHIWAT
PENANG
MALAYSIA
SUMATRA
SOUT CHINA SEA
Scale
0 50 100 150 200 250 300 350 400m

I. Conclusions and Recommendations

The following is a summary of conclusions and recommendations on the basis of the findings.

1. The mission considers it appropriate for Thailand to possess ship-repairing facilities of the following size for the time being.

Facilities	:	Floating dock and appurtenant facilities.
Maximum ship accommodation capacity	:	12,000 GT.
Location	:	West coast of the estuary of the Chao Praya River.
Investment required	:	249,150,000 Bhat

2. The following are recommended as measures to be taken by the Thai Government for the implementation of this project and further development of the Thai economy.

   (1) Special financial measures and other favorable political measures on the basis of the recognition of the significance that shiprepairing facilities may bring to the national economy.

   (2) Establishment of ship administration.

   (3) Close tie-up of marine transport administration and ship administration, and integration of marine transport policy and shipbuilding and maintenance policy.

II. Introduction

1. Purpose of Survey

The purpose of this survey was to investigate the feasibility of the use of a floating dock for shiprepairing in Bangkok, Thailand.

For this purpose, the survey mission made studies of general investment environment in relation to the said shiprepairing facility construction project, particularly of the current situation of shipbuilding and shiprepairing industries in Thailand, determined the optimum size of the project and investigated the feasibility of this undertaking.

2. Background of Survey

Although the Thai Government has been augmenting its domestic merchant fleet in proportion to the growth of the Thai economy, there are no capable facilities in Thailand for repair of these ships. The Bangkon Dock, a state-owned enterprise and the largest repairing facility in Thailand, can only accommodate ships up to the 3,000 G. T. class. Moreover, this dock is located at the river-side with two bridges (drawbridges) spanning downstream. With the recent increase of vehicular traffic crossing the river, opening of these bridges has frequently caused traffic jams on both sides of the river. Besides, there is also a plan for a new bridge (fixed type) and this makes it more difficult for larger ships to approach the dock even when the dock has a capacity to accommodate.

Under these circumstances, there was a pressing need for constructing a large dock at an appropriate location, and consequently, the request was made to the Japanese Government for a feasibility study.

3. Composition of Survey Mission

The survey mission was composed of the following two members.

Mitsutoyo Okada	Shipbuilding Division, Ship Bureau, Ministry of Transport
Masahiko Noma	Marine Consultants Business Department, Ishikawajima-Harima Heavy Industries Co., Ltd.

In addition, full cooperation was extended to the mission throughout the survey period by Mr. Hiroshi Chiba, a resident officer of the Japan External Trade Organization, who participated in the survey as a survey staff of the Ship Bureau, Ministry of Transport.

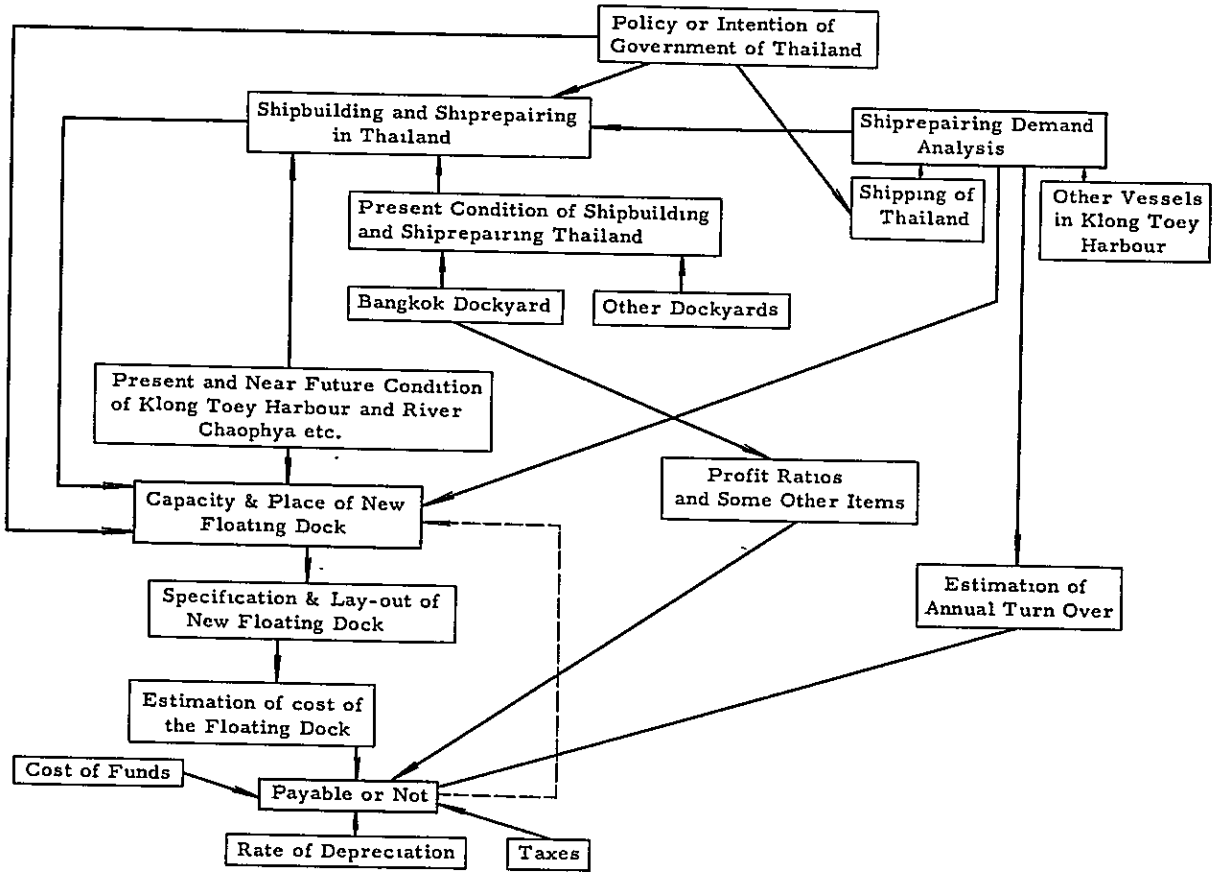
Also through the courtesy of Rear Adm. Tiam Makararanda, Manager of the Bangkok Dock, the following two members were assigned to the survey as Thai counterparts to assist the mission.

Capt. Payoong Sookman	R.T.N.
Commander Banyong Maneede	(Retired)

4. Scope of Survey

The survey covered such fields as the general economy, social conditions, state of marine transport industry and the position of ship-repairing industry, all of which constitute a background for construction of a new floating dock and the subsequent shiprepairing. This concept is shown in Fig. -1.

Fig. - 1



5. Survey Period

July 25th through September 22nd, 1972 (stay in Bangkok).

6. Major Organizations Visited

Bangkok Dock Company (1957) Limited
Office of the Prime Minister
- National Statistical Office
- National Economic Development Board
- Economic Project Division

Ministry of National Development
- Department of Technical & Economic Cooperation

Ministry of Communications
- Office of the Under-secretary
- Harbour Department
  - Office of the Secretary
  - Marine Survey Division
  - Registration Division

The Port Authority of Thailand
- Office of the Director
- Port Operations Department
- Marine Department

Navy Dock

Sattahip Naval Station

Bank of Thailand

Bangthai Company Limited (Shipyard)
Co. Harin Panich (Shipyard)
MR. Kamon (Shipyard)
Bangkok Shipbuilding & Engineering Corp. Ltd. (1968)
Bangkok Shipowners & Agents Association
Thai Mercantile Marine Limited
Thai International Maritime Enterprises Ltd.
The Ben Line Steamers Ltd.

Southeast Asian Fisheries Development Center

N.Y.K. (Thailand) Ltd.
Toyota Motor Thailand Co., Ltd.

Japan Trade Center (Bangkok)
Overseas Technical Cooperation Agency (Bangkok)
Embassy of Japan (Bangkok)

III. Investment Environments

1. Geographical Environment

The territory of Thailand extends over 514,000 km^2 (about 1.4 times greater than Japan) with a population of about 34 million live in the capital zone (Bangkok and Thonburi). Main races of the population are Thai, Laotian, Malayan, Thai of Chinese desent and Chinese, of which Thai race accounts to 80 % of the total population. Of the total Chinese residents, about 400,000 are said to have Chinese nationality and approximately 3.5 million are said to have Thailand nationality. In this country, however, there is hardly any sense of racial opposition which is frequent in other Southeast Asia countries and these races are now growing as a new Thailander. This is attributed to the successful adaptation policy of the Thai Government.

As for climate, the whole territory belongs to the tropics and the annual mean temperature is about 27 degress centigrade with April being the hottest month of the year in which the temperature rises to the maximum 40 degress centigrade. There are the raing season (May - October) and the dry season (November - April) and during the raing season there is a fairly heavy rainfall for about an hour almost everyday but it does not keep raining all day long like in the raing season Japan.

Meteorological data in Phra Nakhon located relatively close to Bangkok are shown in Table 2.

Table 2. Meteorological Data in Phra Nakhon (Lat. 13°44'N, Long. 100°30'E)

	Air temperature in shade (°C)								Mean nebulosity (0-8)		Rainfall (in millimetres)						Percentage humidity				Surface wind (Bf)			
	Monthly mean		Mn. daily range		Extremen high		Extreme low				Total		Max in 24 hours		Days of rain		Monthly mean		Mn daily range		Prevailing direction		Mean force	
	1968	1969	1968	1969	1968	1969	1968	1969	1968	1969	1968	1969	1968	1969	1968	1969	1968	1969	1968	1969	1968	1969	1968	1969
January	26 6	28.2	10.7	08 5	33.8	35.2	15.9	19 6	4.6	5 2	4.6	38.5	4.1	23.5	2	2	70.7	75 9	38.9	36 5	S	S	1.2	1.0
February	27.4	28.6	08.6	09.2	33.9	35 9	21.6	18 2	4.8	5 0	51.2	0 1	14 2	0 1	8	1	76.7	73 4	36 2	37.3	S	S	1 7	1.7
March	29.2	30.1	08.1	07.8	37.8	35.4	22.0	22 7	5.2	5 6	0 4	15.2	0.3	13 8	2	3	75 6	77 2	32.6	30.5	S	S	2 0	1.9
April	29 2	31.0	08 4	07.8	34.7	36 7	22 0	22.4	6 1	5 8	124.7	12 0	45.2	8 9	10	4	77 9	74.8	30 7	31 2	S	S	1 6	1.8
May	29 5	30 5	07.2	08.1	37.7	36.9	23.0	24 0	6.5	6 8	124.4	68.6	85 3	17 3	11	18	79.9	80.4	29 2	29 1	SE	S	1 5	1.2
June	29.2	29.5	07.4	07.9	35 5	35.0	23 5	23.7	7 1	7 4	180.1	280.0	82.4	59.7	17	19	80.3	83.0	26.6	28.3	S	S	1 3	1 1
July	29.4	28 7	07.2	06.9	35.1	35 2	24 6	23.6	7.2	7 5	73.3	78 0	26.0	25.1	14	19	76.4	82.1	27 2	28 5	S	SW	1.2	1.4
August	29.3	28.5	07.8	07.6	35.3	34.7	23 3	22.1	7 3	7.2	269.7	95.6	81.6	29.0	15	17	76.2	84.4	28 6	27 5	SW	S	1.4	1.0
September	28.9	28.3	07 3	07.5	33.8	34.8	22 8	22.8	7 1	7 1	293 7	293 8	153.7	35.5	16	20	80.9	87.6	27.7	24 6	S	NW	0 9	1 1
October . . .	28 4	28 6	07 2	07.2	33.6	34.0	23 4	23 3	6 4	6.6	166 4	159.0	34 8	41 8	16	15	78.7	83.8	29 2	27 1	NE	NE	0.8	0 9
November.. .	28 7	26.6	08 4	08.9	34 2	33.7	22 4	18.0	5 1	5 9	31 5	93.6	13.1	81.2	7	4	74.0	79.5	34.6	33 1	NE	NE	0.8	1.1
December... . .	28.6	25.1	09 9	11.9	34.6	34.9	21.0	15.1	4.8	3 7	-	01 6	-	01.6	-	1	72.4	72.3	38.4	47.8	NE	NE	0 9	1.1
Mean annual ...	28.7	28.6	08.2	10 8	35.0	35.2	20.3	21.3	6 0	6.1														

2. Gross Domestic Product and National Income

The Thai economy has shown a steady growth in the past few years. According to a preliminary report compiled by the National Economic Development Board, the gross domestic product in 1971 amounted to 126,530 million Baht (at 1962 prices), 7.3 per cent up from the previous year (Tables 3 and 4).

According to the United Nations statistics, meanwhile, per capita gross domestic production in Thailand is US$162.00 (in 1962) ranking fourth in Southeast Asia following Singapore, the Philippines and Taiwan.

Table 3. Gross National Product (at 1962 prices)*

(Millions of Baht)

	1967	1968	1969	1970	1971
Agriculture	29.63	32.36	34.49	35.06	36.59
Crops	20.86	22.55	24.17	24.47	25.39
Livestock	3.76	3.76	3.90	3.87	4.15
Fisheries	2.57	3.28	3.68	4.09	4.41
Forestry	2.44	2.77	2.74	2.63	2.64
Mining and quarrying	1.57	1.73	1.78	1.84	1.95
Manufacturing	15.54	16.73	18.73	20.82	23.20
Construction	7.43	7.73	7.75	7.45	7.71
Electricity and water supply	0.98	1.19	1.29	1.44	1.72
Transportation and communications	6.85	6.98	7.57	8.12	8.56
Wholesale and retail trade	15.79	17.55	18.56	20.14	21.12
Banking, insurance, and real estate	2.77	3.19	3.71	4.67	5.78
Ownership of dwellings	2.00	2.09	2.20	2.29	2.41
Public administration and defence	3.97	4.47	4.83	5.27	5.74
Service	8.27	9.20	9.90	10.85	11.75
Gross Domestic Product (GDP)	94.80	103.22	110.81	117.95	126.53
Plus: Net income from abroad	0.06	0.14	0.04	0.14	- 0.20
Gross National Product	94.86	103.36	110.85	118.09	126.33

* Preliminary

Source: Office of the National Economic Development Board.

Table 4. Growth Rates of Gross Domestic Production (at 1962 prices) *

(%)

	1967	1968	1969	1970	1971
Agriculture	-3.7	9.2	6.6	1.7	4.4
Mining and quarrying	10.6	10.2	2.9	3.4	6.0
Manufacturing	12.6	7.7	12.0	11.2	11.4
Construction	32.7	4.0	0.3	-3.9	3.5
Electricity and water works	21.0	21.4	8.4	11.6	19.4
Communications and transportation	14.0	1.9	8.5	7.3	5.4
Wholesale and retail trade	11.8	11.2	5.8	8.5	4.9
Banking, insurance and real estate	5.7	15.2	16.3	25.9	23.8
Housing	3.6	4.5	5.3	4.1	5.2
Public administration and defence	12.2	12.6	8.1	9.1	8.9
Services	-3.2	11.3	7.6	9.6	8.3
Gross Domestic Product	6.3	8.9	7.4	6.4	7.3

* Preliminary

3. National Finance

The fiscal year of Thai's national budget begins in October and ends in September of the following year. In budget allocation the top priority is given to the economic development, followed by education and national defense. The share of customs duty in the Treasury receipts is so great that it accounts to about one-third of the current account. Following this are business tax accounting to about 20 % and income tax accounting to about 9 % (in 1970), showing a small percentage of income tax.

The ratio of currency issuance to the gross national product (Marshall's K) in 1969 was 15.39 (Tables 5, 6 and 7).

Table-5 Trend of National Budget

(Millions of Baht)

	1966	1967	1968	1969	1970	1971
Revenue	12,901	14,777	16,889	18,321	18,795	19,419
Expenditure	13,958	17,329	19,484	21,703	25,135	27,225
Balance	1,057	2,552	2,595	3,382	6,340	7,806

Source: Monthly Report of Bank of Thailand

Table-6 Breakdown of Expenditure

(Millions of Baht)

	Main items				
	Economic services	Social services	National defense	General administrative services	Others
1966	4,155	3,766	2,225	2,694	1,118
1967	5,528	4,446	2,694	2,752	1,909
1968	5,157	4,635	2,998	3,028	3,666
1969	6,210	5,601	3,733	3,149	3,004
1970	7,324	6,662	4,403	3,554	3,192

Source: Monthly Report of Bank of Thailand

Table-7 Breakdown of Revenues

(Millions of Baht)

	Taxes					Receipt from sale and various charges	State-owned enterprises	Others	Total
	Income tax	Import duty	Export duty	Business tax	Others				
1966	1,293	3,496	1,361	2,505	3,189	354	284	419	12,901
1967	1,494	4,285	1,318	2,918	3,554	366	461	380	14,777
1968	1,755	4,994	1,568	3,155	3,963	426	567	490	16,889
1699	2,032	5,437	1,505	3,408	4,421	412	617	489	18,321
1970	2,200	5,404	848	3,698	4,895	483	623	623	18,795
1971	2,436	5,287	414	3,997	5,351	477	784	683	19,419

Source: Monthly Report of Bank of Thailand

4. Taxation System

Main taxes in Thailand are governed by The Revenue Code of Thailand and the Customs Tariff Proclamation. The main tax administration is under the jurisdiction of the Ministry of Finance and the execution of tax administration is the responsibility of the Revenue Department, Customs Duty Department and Consumption Tax Department of the Ministry of Finance.

4-1. Internal Taxes

Internal taxes provided for in the Revenue Code of Thailand include individual income tax, corporate income tax, income transfer tax (profit remittance tax), business tax, advertising tax, stamp duty, and entertainment tax. Other internal taxes are local developement tax and local tax.

(1) Income tax ..... For individual income, a progressive rate of up to 50 % is applied and for corporation profit, tax rates are 15 % for taxable net profit up to 500,000 Baht, 20 % for profit up to 1,000,000 Baht and 25 % for profit over 1,000,000 Baht. For corporations in Thailand, there is no capital gain tax and assessment of corporate tax is made at the ordinary income tax rate. Assessment of taxes for the Japanese enterprises operating in Thailand is adjusted by the Japan-Thailand Taxation Treaty. This treaty provides, for example, (1) that no income tax shall be levied on a Japanese enterprise which has no "Permanent Facilities" (specific place for business activities) within Thailand and (2) that the dividend income tax rate shall be 15 % at the maximum for dividend paid by the industrial business corporation to its parent company and shall be 20 % at the maximum for dividend paid to other than its parent company. The treaty also has a provision prohibiting double taxation.

(2) Income transfer tax (Profit remittance tax) ..... When on association of company or corporate status remits the profit incurred from the business activity in Thailand to an other country, 15 % of the remittance is taxable.

(3) Business tax ..... This tax is different in nature from business tax in Japan and is equivalent to transaction tax or sales tax in Japan. Tax rates and tax payers are listed in the business tax table (see the table below) under the Revenue Code of Thailand. Business tax is imposed at the point of sale of commodity and providing services. For import goods, business tax is payable at the time of the payment of import duty. While the basis of assessment is the total revenue for each taxable month, the tax for import goods is levied on CIF price + import duty + import goods standard profit (provided for in the Import Goods Standard Profit Schedule).

Table-8

Type of business	Tax rate	Tax payer
1. Sale of commodity		
a. Safe of various items	1.5% - 15%	Importers and exporters,
b. Passenger car	30%	wholesalers of the first
c. Liquor	30%	stage & manufacturers
2. Rice polishing, rice transaction and lumbering	3.5%, 4.0%	Operator
3. Contract work	2.0%, 5.0%	Contractor, operator
4. Lease of movable property	2.5%	Lessor
5. Warehouse	2.5%	Operator
6. Hotel, restaurant	2.0%-10.0%	Operator
7. Transportation	0.5%	Operator
8. Pawn-shop	2.5%	Operator
9. Brokerage, agency	5.5%	Broker, agent or service agent
10. Sale of real property for business or profit	3.5%	Seller
11. Banking	2.5%-10.5%	Operator
12 Insurance	2.5%- 3.0%	Underwriter

(4) Stamp duty ..... This tax is applicable to specific certificates and special transactions and is provided for in the Stamp Duty Law.

4-2. Customs Tariff

Import duty was revised drastically (Emergency Decree on Customs Tariff (No. 23) BE 2513) on July 1, 1971 aiming at the increase of revenue, rectification of trade balance, control of domestic consumption and protection of domestic industry.

(1) For tax rate, ad valorem duties are adopted as a rule but there are cases in which specific duties are adopted. When both the ad valorem duties and the specific duties are applicable, whichever the higher is applied.

(2) High tax rates are applied to products which can be manufactured domestically and luxury articles to discourage the import. For example, 80 % tax rate is applied to ordinary passenger car (complete), refrigerator, color television set, air-conditioner and washing machine, 60 % to electric fan and monochrome television set and 60 % to textiles (in part).

(3) The privilege for import duty exemption or curtailment once awarded to licensed company under the Industry Promotion Law for import of raw materials is seldom granted to newly licensed companies at the present stage.

5. Money Market

5-1. Financial Institutions

Central bank - Bank of Thailand

Special banks - Government of Savings Bank

Government Housing Bank

Bank for Agriculture & Agricultural Cooperatives

Industrial Finance Corporation of Thailand

Local commercial bank - 16 banks

Foreign bank - 13 banks

Japanese banks (Mitsui and Tokyo), 3 Chinese banks, 2 American banks, 1 French bank, 1 Malay bank and 1 Indian bank.

5-2. Interest Rate

(1) Interest on loans

Central bank:

Loans on bill against government bonds	9 %
Rediscount of export advance bill and industrial bill	5 %
Savings bank	10%
Industrial Finance Corporation of Thailand	about 9 %
Commercial banks (Ordinary loans)	11 - 14 %
(Export advance bill and industrial bill)	7 %

(2) Interest on deposit

Current deposit	0.01 %
Ordinary deposit	3.5 %

Time deposit - - - - 5 % (3 month), 6 % (5 month), 7 % (one year)

5-3. Recent Money Market

(1) While the deposit shows a steady growth at an annual rate of over 15 % centering on local banks with a well developed branch network, money lending at open market is moving toward a tight money policy in spite of easy money supply in call loan market between banks (supplied by local banks and received by foreign banks) under the influence of light money policy of the Central Bank, coupled with the policy of local banks to restrain lending for fear of uncertaintity in the future domestic economy.

(2) Itemized Deposit Balance of Commercial Banks

(Inter Bank Deposit excluded) (In Million Baht)

	Current deposit	Ordinary deposit	Time deposit	Others	Total
End of 1966	5,743	2,010	9,459	316	17,528
" 1967	6,174	2,195	11,869	351	20,589
" 1968	6,942	2,486	14,309	403	24,140
" 1969	7,103	2,794	17,283	486	27,666
" 1970	7,699	2,934	20,931	420	31,884

(3) Lending of Commercial Banks by Industry

(Loan & Overdraft) (In Million Baht)

	End of 1966	End of 1967	End of 1968	End of 1969	End of 1970
Agriculture	401	473	562	615	596
Mining	197	160	184	253	290
Manufacturing	1,926	2,080	2,279	2,808	3,560
Real estate, construction	1,257	1,665	2,076	2,744	3,226
Import & export	3,214	3,649	3,561	4,293	5,204
Wholesale and retail	1,635	2,149	2,740	3,577	4,471
Service	555	672	974	1,166	1,446
Individuals	1,043	1,257	1,780	1,826	2,032
Others	349	475	474	494	762
Total	10,577	12,590	14,630	17,776	21,587

(4) Deposit-Loan Ratio of Commercial Banks

	Deposit (A)	Loan (B)	Deposit-Loan ratio (B/A)
End of 1966	17,528	10,577	60.3 %
" 1967	20,589	12,590	61.1 %
" 1968	24,140	14,630	60.6 %
" 1969	29,666	17,776	64.2 %
" 1970	31,884	21,587	67.7 %
June, 1971	34,485	22,551	65.3 %

6. Prices

The wholesale price index (1968=100) in Thailand in 1971 was 103.4, a mere increase of 0.6 % over the previous year (102.8) (Table-9). The consumer's prices index (1962=100) in Bangkok and the Thonburi district in the same year was 120.1, an increase of 2 % over the previous year. This increase rate seems to be great when compared with 0.8 % in 1970 but is comparable to 2.1 % in 1968 and 1969 (Table-10).

Table-9 Wholesale Price Index in Thailand (1968=100)

Groups	Weight in percentage	1969	1970	1971	Changes 1/ (percent)
All items	100.00	103.3	102.8	103.4	+ 0.6
Agricultural products	26.43	104.5	100.5	98.4	- 2.1
Food	21.31	98.9	93.7	96.3	+ 2.8
Beverages	3.60	99.8	105.4	111.0	+ 5.3
Clothing and clothes	6.46	104.6	106.9	107.6	+ 0.7
Construction materials	7.66	103.2	105.6	102.6	- 2.8
Chemicals & chemical products	5.50	108.8	116.1	120.0	+ 3.4
Petroleum products	2.49	99.8	99.1	103.7	+ 4.6
Paper and paper products	1.37	103.8	104.1	105.7	+ 1.5
Leather and leather produts	0.26	102.1	99.5	98.3	- 1.2
Rubber and rubber products	3.53	119.2	103.5	88.6	-14.4
Transportation equipment	6.18	100.3	108.9	120.0	+10.2
Machinery and equipment	7.24	100.4	104.2	106.8	+ 2.5
Miscellaneous	5.97	107.7	117.1	112.1	- 4.3
Special groups					
Domestic products	69.23	103.3	99.3	98.8	- 0.5
Imported products	30.77	103.3	110.8	113.4	+ 2.3

1/ Percentage Changes to 1971 from 1970

Source: Department of Commercial Intelligence, Ministry of Economic Affairs.

Table-10 Consumer's Price Index in Bangkok - Thonburi
(1962=100)

Groups	Weight in percentage1/	1969	1970	1971	Changes (percent)2/
All items	100.00	116.3	117.7	120.1	+ 2.0
Food and beverages	53.23	128.6	128.9	129.7	+ 0.5
Clothing	7.92	97.5	99.4	100.2	+ 0.8
Health and personal care	6.69	110.1	110.3	113.1	+ 2.5
Housing, furniture and equipment	17.27	111.3	114.1	117.9	+ 3.3
Transportation	5.78	100.8	101.9	114.5	+12.4
Recreation, reading & education	4.89	103.6	103.4	107.9	+ 4.4
Tobacco and alcohl	4.22	99.9	100.4	101.2	+ 0.8
Special Groups					
Food	53.23	128.6	128.9	129.7	+ 0.6
Non-food	46.77	105.3	106.8	110.7	+ 3.7
Commodities (excluding services)	79.76	118.3	119.0	120.3	+ 1.1
Imported goods	2.72	104.2	104.9	106.4	+ 1.4
Domestic goods	77.04	119.6	120.2	121.5	+ 1.1
Services	20.24	111.6	113.6	120.4	+ 6.0

1/ Weight used for calculating the index in December 1970.

2/ Percentage change to 1971 from 1970.

Source: Department of Commercial Intelligence, Ministry of Economic Affairs.

7. Wages

Characteristics of wages in Thailand way be pointed out as follows.

(1) Regional wage differentials are great and the wage level in and around Bangkok and in southern region is very high compared with that in northeastern and northern regions.

(2) In general wage level of Chinese is higher than that of Thai.

(3) Wage level of university graduates who have completed science courses and engineers is much higher than ordinary workers reflecting the unbalance of demand and supply.

(4) Wage differentials between men and women are not so conspicuous.

(5) The following are excerpts (1971) of "Labor Survey for Foreign Enterprises" conducted by the Japanese Chamber of Commerce and Industry in Bangkok.

Table-11 Initial Wage and Wage a Year Later for Manual Works (Daily Wage)

(In Baht)

Educational background		Completion of primary school (first half) course			Completion of primary school (last half) course			Graduate of junior highschool			Graduate of senior highschool			Graduate of vocational school			Graduate of higher technical school		
		Initial wage	A year later	Rate of increase	Initial wage	A year later	Rate of increase	Initial wage	A year later	Rate of increase	Initial wage	A year later	Rate of increase	Initial wage	A year later	Rate of increase	Initial wage	A year later	Rate of increase
Male	Textile industry	14.6	17.2	17.9	15.4	18.0	16.9	19.5	22.6	15.8	27.4	30.3	10.5	30.0	35.6	18.6	48.0	58.9	20.9
	Metal "	19.6	22.2	15.0	20.6	24.6	19.1	22.0	25 0	13 5	24.2	27.0	11.5	33.3	36.6	10.0	38.3	41.6	8.6
	Automobil "	21.0	23.0	9.2	21.0	23.3	9.3	24 0	26 0	8 7	31.5	33.7	9.2	33.7	36 5	8.6	49.0	54.0	9.5
	Electric "	15.2	17.0	11.8	16.0	17.6	10.5	18.6	21.7	16.6	26.2	32.6	24.3	31.6	37.6	18.9	51.0	60.0	17.7
	Food "	19.4	21.1	7.8	20.7	22.2	7.8	25.6	27.2	6.2	29.4	31.0	5.3	36.0	38.4	6.5	45.5	50.5	10.5
	Chemical "	22.2	24.3	10.0	23.3	25.5	9.4	25.8	28.1	8.8	33.4	37.2	11.2	37.8	42.2	11.5	56.0	61.0	9.0
	Average	18.6	20.6	10.8	18 8	21.2	12 6	21.8	24 6	12.9	28.6	32.2	12.5	33.2	37.6	13.0	46.7	52.8	13.0

Table-12 Initial Wage and Wage a Year Later for Clerical Workers (Daily wage)

(In Baht)

Educational background		Completion of primary school (first half) course			Completion of primary school (last half) course			Graduate of junior highschool			Graduate of senior highschool			College graduate		
		Initial wage	A year later	Rate of increase	Initial wage	A year later	Rate of increase	Initial wage	A year later	Rate of increase	Initial wage	A year later	Rate of increase	Initial wage	A year later	Rate of increase
Male	Textile industry	642	714	11.0	803	873	9.2	986	1,065	5 0	1,350	1,490	10.2	1,745	1,955	12.0
	Metal "	887	868	3 3	900	1,000	11.1	1,100	1,130	3.0	1,375	1,492	8.5	2,520	2,475	2 0
	Automobil "	616	700	13.6	825	900	9.0	1,007	1,101	9 5	1,487	1,625	9.2	2,053	2,270	9.0
	Electric "	625	726	16.0	768	860	10.7	1,125	1,262	12 1	1,316	1,500	14.0	1,962	1,966	0.0
	Food "	562	602	7.0	722	762	5 3	920	1,656	80.0	1,290	1,906	70.0	1,850	2,160	16.8
	Chemical "	671	760	10.0	893	973	9.0	1,091	1,171	7.3	1,360	1,470	8.0	2,020	2,216	9.2
	Average	677	729	7.5	812	888	9.1	1,038	1,184	14.1	1,371	1,562	13.9	2,015	2,152	7.0

Table-13 Initial Wage and Wage a Year Later for Male Technical Workers

(In Baht)

Educational background	Graduate of vocational school			Graduate of higher technical school			College graduate		
	Initial wage	A year later	Rate of increase	Initial wage	A year later	Rate of increase	Initial wage	A year later	Rate of increase
Textile industry	933	1,153	17.2	1,493	1,623	9.2	2,211	2,590	17.1
Metal "	1,151	1,405	20.0	1,624	1,600	1.5	3,000	2,983	0.5
Automobile "	1,310	1,460	11.2	1,660	1,792	8 5	2,800	2,970	6.0
Electric "	1,120	1,222	7.1	1,316	1,533	16 5	2,350	2,660	8.4
Food "	950	1,015	7.0	1,220	1,320	8.1	1,880	2,336	24.0
Chemical "	969	1,064	10 0	1,570	1,690	7.6	2,620	2,818	7.0
Average	1,099	1,228	11.9	1,516	1,628	7.2	2,469	2,693	8.9

Table-14 Standard Wage

(In Baht)

Educational background	Male manual worker, completion of primary school, 3 year in employment	Female manual worker, completion of primary school, 3 year in employment	Male clerical worker, graduate of junior highschool, 3 year in employment	Female clerical worker, graduate of junior highschool, 3 year in employment	Male technical worker, college graduate, 3 year in employment
Textile industry	* 24.2	* 20 1	1,296	1,150	3,260
Metal "	* 26.0	* 33.3	1,110	1,125	3,037
Automobile "	730	557	1,212	1,221	3,556
Electric "	535	493	1,116	1,187	3,275
Food "	657	610	812	832	1,800
Chemical "	744	595	1,215	1,147	3,260
Average	677	543	1,190	1,147	3,203

Note * Indicates daily wage

(6) Wage structure (A survey of Japanese enterprises)

1. A majority of plant workers are paid daily wage.

2. All enterprises adopt the once-a-year wage increase system, and the rate of increase in wage for day workers is 8 - 12 % per annum.

3. A bonus equivalent to a month's wage is paid once a year (in December).

4. Overtime allowance is 50 % higher than hourly rate for week days and 100 % higher for holidays.

5. Wage for employes of local industries is lower than that for employes of Japanese enterprises and wage for employes of Western enterprises is higher than that for employes of Japanese enterprises.

6. Retirement allowance is paid by a majority of Japanese enterprises.

8. Labor Force

8-1. Characteristics of labor situation

(1) While agricultural workers account for 80 % of the population, the ratio of industrial workers in only 5 %. The number of industrial workers is increasing gradually with the progress of industrialization.

(2) Because of the high increase rate of population (3.3 % annually), the number of unemployed is on the increase. Exploitation of employment opportunity is an important task for the government to tackle.

(3) During the off-farming season (January - May) many formers in the northeastern region and northern region come to work in Bangkok and southern Thailand.

(4) The majority of labor force are unskilled workers and there is a shortage of skilled workers.

(5) While the supply of unskilled workers exceeds the demand, recruitment of technical workers and skilled workers is very difficult.

(6) Labor stability is not favorable in general but is improving year by year.

(7) While the rate of familialization to the work is relatively high when the work is simple in nature, there is lack of adoptability and enthusiasm toward work.

8-2. Labor laws and regulations

(1) There is no independent trade union law or labor protection legislation but labor regulations are being enforced in the form of the Revolutionary Group Proclamation (1958) and a notice of the Home Ministry.

(2) The existing regulation does not differ greatly from Japan's Labor Standards Law but it does not contain penal provisions against violators and merely oblegates employers to comply with the advises and recommendations of inspecting officials.

(3) Trade union is outflowed at present but the right to strike is recognized if proper procedures are followed in compliance with the Labor Dispute Settlement Law of 1965.

(4) There has been a strong tendency in the last few years toward consolidation of the existing pertinent regulations and authorization of trade unions and it was reported that a bill was ready for submission to the National Congress to be convened in June 1971 but it was not realized. Because of the change of government in November 1971, submission of the bill to the National Congress is not expected for sometime.

9. Trade and Balance of Payments

The trade policy of Thailand advocate free trade in principle and the restriction of trade is generally lenient. In order to promote exports of domestic products, export license is not required normally. However, approval of the Ministry of Economics must be obtained for export of a limited number of items (rice, tin, maize, etc.) for the maintenance of export prices. As for imports, most commodities may be imported without government license except some special cases. Hems requiring import license are those import of which is restricted as a rule for protection of domestic industries (paper umbrella, used cars) and those import of which is controlled for health or security reasons.

For capital movement, the following exchange control measures are in effect.

(1) All capital outflows to outside of Thailand must be approved by the authorities.

(2) Capital inflows into Thailand are not under restriction but all foreign currencies gained by capital inflow must be sold to exchange banks.

(3) Industries provided for in the "Industrial Investment Promotion Law" are guaranteed of remittance of capital, profit and interest to home c untries. Shipbuilding and ship repai industries are covered by the provisions of this law.

Trade structure of Thailand takes the form of exporting primary products centering on agricultural products and importing various industrial products. Trade balance is constantly in the red.

Dependency of Thai's economy on world trade is fairly high with exports and imports accounting for 13 % and 21 % respectively of the gross national product in 1969. Moreover, the bulk of export consists of primary products and the amount of export of five major items, rice, rubber, tin, maize, tapioca and kenaf accounts for 63 % (1971) of the total export. The economy of Thailand, therefore, tends to be influenced by crop conditions of these major farm products and the condition of world market for these items (Tables 15 and 16).

Table-15 Trade Volume

(Millions of Baht)

Period	Export (F.O.B.)	Import (C.I.F.)	Balance
1967	14,166	22,188	- 8,022
1968	13,679	21,103	- 10,424
1969	14,722	25,966	- 11,244
1970	14,772	27,009	- 12,237
1971p.	17,281	26,794	- 9,513
Q. I	4,610	6,637	- 2,027
Q. II	3,608	6,330	- 2,722
Q. III	3,836	6,385	- 2,549
Q. IV	5,227	7,442	- 2,215
January	1,485	2,128	- 643
February	1,421	2,082	- 661
March	1,701	2,427	- 723
April	1,313	2,273	- 960
May	1,285	1,952	- 667
June	1,010	2,105	- 1,095
July	1,314	2,103	- 789
August	1,224	2,213	- 989
September	1,298	2,069	- 771
October	1,499	2,498	- 999
November	1,794	2,428	- 634
December	1,934	2,516	- 582
1972p.			
Q. I	6,216	7,217	- 1,001
Q. II		7,248	
January	2,040	2,317	- 277
February	1,732	2,205	- 473
March	2,444	2,695	- 251
April	1,660	2,417	- 757
May	1,788	2,465	- 677
June		2,366	

Note: Excluding militery goods.
Including gold imports.
Source: Depertment of Customs.

Table-16 Volume and Amount of Export of Major Items

	Rice		Rubber		Tin		Maize		Teak		Tapioca products		Jute & Kenal						Others	Total
					Metal								Jute		Kenal		Total			
	Metric tons	Millions of Baht	Metric tons	Millions of Baht	Metric tons	Millions of Baht	Metric tons	Millions of Baht	Cubic metres	Millions of Baht	Metric tons	Millions of Baht	Metric tons	Millions of Baht	Metric tons	Millions of Baht	Metric tons	Millions of Baht	Millions of Baht	Millions of Baht
1967	1,482,272	4,653	211,118	1,574	26,997	1,820	1,090,762	1,355	35,716	194	781,357	726	353	1	316,759	865	317,112	866	2,976	14,166
1968	1,068,185	3,755	252,220	1,816	24,017	1,510	1,480,811	1,556	29,446	169	888,854	772	223	-	289,255	674	289,478	674	3,107	13,679
1969	1,023,064	2,945	276,381	2,664	23,431	1,631	1,476,106	1,674	29,003	166	975,091	876	1,349	4	254,629	776	255,978	780	3,986	14,722
1970	1,063,616	2,516	275,610	2,232	22,216	1,618	1,371,474	1,857	28,763	156	1,326,865	1,223	3,757	10	253,906	709	257,663	719	4,451	14,772
1971p	1,651,840	2,901	307,873	1,901	21,703	1,561	1,829,875	2,251	37,491	181	1,112,466	1,229	3,729	9	267,248	924	270,977	933	6,378	17,335
Q. I[r]	305,910	634	82,262	542	5,535	392	713,051	997	7,834	38	313,065	342	1,007	3	70,700	222	71,707	225	1,440	4,610
Q. II[r]	323,813	595	61,859	403	5,157	374	70,158	98	9,666	46	235,723	262	818	2	65,822	234	66,610	236	1,594	3,608
Q. III[r]	446,182	793	87,528	530	5,334	383	187,474	237	9,586	44	192,849	219	542	1	30,325	100	30,867	101	1,529	3,836
Q. IV	585,935	879	76,224	426	5,677	412	859,195	919	10,405	53	370,829	406	1,362	3	100,401	363	101,763	371	1,815	5,281
January[r]	95,036	212	18,571	126	1,981	139	286,103	402	2,809	13	89,294	94	333	1	33,818	106	31,181	107	392	1,485
February[r]	67,151	136	26,181	174	1,321	93	248,517	347	2,048	10	101,945	111	465	1	16,646	55	17,111	56	491	1,421
March[r]	143,723	286	37,510	242	2,233	160	178,431	248	2,977	15	121,826	137	209	1	20,206	61	20,415	62	554	1,704
April[r]	108,018	200	24,827	160	2,184	160	54,092	74	3,363	16	99,397	104	372	1	33,964	117	34,336	118	481	1,313
May[r]	104,140	187	28,371	186	1,550	113	9,303	14	3,506	16	90,710	106	316	1	21,449	83	21,765	84	579	1,285
June[r]	111,655	208	8,661	57	1,423	101	6,763	10	2,797	14	45,616	52	130	-	10,409	34	10,539	34	534	1,010
July[r]	137,000	235	28,793	181	1,727	125	24,783	35	3,416	17	78,097	93	119	-	15,003	54	15,122	54	574	1,314
August[r]	130,074	240	28,537	172	1,575	112	80,815	103	3,202	14	43,347	53	343	1	11,496	35	11,839	36	494	1,224
September[r]	179,108	318	30,198	177	2,032	146	81,876	99	2,968	13	71,405	73	80	-	3,826	11	3,906	11	461	1,293
October	200,972	286	20,909	118	1,590	114	249,462	221	2,960	14	101,826	112	592	1	20,735	67	21,327	68	556	1,489
November	257,938	339	20,971	117	1,931	140	293,852	361	2,945	15	112,960	128	286	1	39,769	139	40,055	140	618	1,858
December	127,025	254	34,344	191	2,156	158	315,881	337	4,499	24	156,043	106	484	1	39,897	162	40,381	163	641	1,934

Note Excluding military goods.
1/ In the from of pellets as from 1969
Source- Department of Customs.

As for trade partners, export to Japan accounts for one-fourth of the total export, for ahead of 13 % to the second place U. S. A. Import from Japan accounts for 38 % or over one-third of the total import in 1971 and import from the second place U. S. A. account for 14 %. (Table 17).

Table-17 Trade Partners

(%)

	Export								Import							
	1964	1965	1966	1967	1968	1969	1970	1971	1964	1965	1966	1967	1968	1969	1970	1971
Japan	22	18	21	21	21	22	26	25	33	33	36	36	34	37	37	38
Malaysia	15	15	8	8	8	7	6	4	1	1	1	1	1	1	1	2
Hong Kong	8	7	7	8	7	8	8	7	3	3	2	2	2	2	1	1
Indonesia	8	2	3	4	1	2	2	1	3	2	2	1	1	1	1	1
Singapore	7	6	7	7	9	8	7	7	2	1	2	1	1	1	1	1
United States	4	7	12	14	13	15	13	13	16	16	16	16	1	15	15	14
Netherlands	5	4	3	5	7	7	9	8	4	3	3	2	2	2	1	1
W. Germany	5	5	4	4	4	3	4	4	8	10	8	9	8	9	8	8
United Dingdom	5	4	4	3	3	3	2	3	9	9	8	7	7	8	7	8
Italy	2	2	2	2	1	2	2	1	2	2	2	2	2	2	2	2
India	1	7	10	5	6	4	1	1	1	1	-	2	1	1	1	1
Saudi Arabia	1	1	1	2	2	1	2	1	-	-	-	-	2	1	2	3
Others	17	22	18	17	18	18	18	25	18	19	20	21	20	20	23	20
Total	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100

Source: Department of Customs.

The pattern of Thailand's balance of payments is such that the previously mentioned constant deficit in trade balance is compenstated by gains from the balance of capital account. The overall balance turned to the red figure from 1969 and recorded a big deficit of 2,652 million Baht in 1970, but in 1971 the deficit was limited to 335 million Baht (Table 18).

Table-18 Balance of Payment

(Millions of Baht)

	1967	1968	1969	1970	1971p
A. Merchandise					
1. Exports, f.o.b.	13,817.2	13,227.6	14,267.2	14,256.4	16,567.3
2. Imports, c.i.f. 2/	-21,813.3	-23,645.8	-25,422.8	-26,406.7	-26,606.1
3. Non-monetary gold 3/	- 145.0	- 231.3	- 142.1	- 107.8	- 26.6
4. Trade balance	- 8,150.2	-10,650.0	-11,297.7	-12,258.1	-10,065.4
B. Services					
1. Receipts	8,434.4	9,249.7	9,736.3	10,099.8	9,790.7
1.1 Freight and insurance on merchandise	541.0	397.3	349.5	313.4	494.2
1.2 Other transportation	230.7	222.3	238 9	298 6	330.8
1.3 Travel 4/	1,211.7	1,255 8	1,770.0	2,175.0	2,100.0
1.4 Investment income	912.6	1,052.5	1,284.6	1,636.6	1,423.4
1.5 Government, n.i.e.	4,880.1	5,571.9	5,287.9	4,839.8	4,514.2
Military services	(4,109 2)	(4,917.8)	(4,629.7)	(4,192.1)	(3,788.5)
Other governmental services	(770.9)	(654.1)	(658.2)	(647.7)	(725.7)
1.6 Other services	628.3	749.9	805.4	836.4	928.1
2. Payments	- 2,521.3	- 3,061.4	- 3,430.9	- 4,058.6	- 4,495.5
2.1 Freight and insurance on merchandise	- 143.9	- 167 6	- 142.4	- 202.9	- 338.7
2.2 Other transportation	- 76.2	- 115.4	- 121.1	- 186.4	- 202.8
2.3 Travel	- 715.3	- 874.2	- 1,001.5	- 1,267.4	- 1,294.5
2.4 Investment income	- 775.1	- 780.3	- 1,058.5	- 1,257.3	- 1,393.8
2.5 Government, n.i.e.	- 261.4	- 477.7	- 452.7	- 395.3	- 399.0
2.6 Other services	- 549.4	- 646.2	- 654.7	- 749.3	- 866.7
3. Net services	5,913.1	6,188.3	6,305.4	6,041.2	5,295.2
Net goods and services	- 2,237.1	- 4,461.7	- 4,992.3	- 6,216.9	- 4,770.2
C. Unrequited transfers	1,198.2	1,547.5	1,187.2	1,011.7	904.1
D. Capital movements (non-monetary sector)	2,254.9	2,401.3	2,597.4	2,220.4	1,605.8
E. Allocation of SDRS	-	-	-	-	398.2
F. Recorded balance (A througt E)	1,216.0	- 512.9	- 1,207.7	- 2,984 8	- 1,962.1
G. Net errors and omissions	97.0	962.0	293.9	332.8	1,626.9
H. Overall balance (F plus G)	1,313.0	449.1	- 913.8	2,652.0	- 335.2
I. Monetary movements	- 1,313.0	- 449.1	913.8	2,652.0	335.2

Source: Bank of Thailand.

10. Education

10-1. General

Elementary education for seven years is compulsory in Thailand but the percentage of school attendance decreases considerably in higher grades. Secondary education consists of the first phase of three years and the second phase of two years but the vocational course requires three years for both the first and second phases. Vocational education, however, is thought little of partly due to unavailability of budget. For higher education, there are ten state-run universities, for private universities, one technical college and one military academy. The number of engineering students, CHULALONGKORN University, a representative university in Thailand, is shown in Table 19.

Table-19 Number of Engineering Students in CHULALONGKORON University

Period	Civil Engineer	Electric Engineer	Industrial Engineer	Mechanical Engineer	Mining Engineer	Sanitary Engineer	Survey Engineer	Master Degree & Diploma	Total
1962	68	68	17	40	10	-	6	5	214
1963	76	55	11	43	24	-	5	1	215
1964	135	38	30	56	9	4	2	-	274
1965	109	47	8	59	9	2	-	14	248
1966	139	64	11	75	9	1	1	-	300
1967	130	58	13	40	9	5	3	-	258
1968	128	44	15	40	5	9	3	-	244
1969	134	62	45	40	8	3	3	-	295

10-2. Marine Engineers

None of the general universities is provided with a course for education of marine engineers. The only educational institution for marine engineers is the Marine Engineering Faculty of the Royal Thai Naval Academy. This is a five-year course and has 8 to 12 students enrolled in each year. Students who have completed five-year secondary education are admitted to this course. Subjects taught by this course are as follows.

(1) General

Law
Economy
Inter-Nations Relations
History of Sea Power
English Language

(2) Science & Engineering

Algebra
Geometric Analysis
Calenlus
Solid Trigonometry
Engineering Mathematics
Chemistry
Engineering Apply Chemistry
Physics
Electricity
Electronics
Computor
Drafting (Engineering Graphical Methods)
Work Shop
Mechanics
Fluid Mechanics
Metallurgy
Strength of Materials
Kinematics
Engines-drawings
Boiler
Steam Engines
Internal Combustion Engines
Thermodynamics
Buoyancy and Stability of Ships
Construction of Ships
Heat Transfer
Work Shops and Laboratory Practice
(Operation and Mainterance)

(3) Military Career

(4) Physical Training

(5) Onboard Offshore Cruising Training

11. Outline of Industrial Activities

11-1. Primary product-orientated economy

Flanked by the Mekong River and the Irrawaddy River on both sides, Thailand has a vast extension of fertile land on the delta area and basins of many rivers including the Menam River. Approximately 80 % of its population are engaged in agricalture and the share of agriculture in the gross domestic production is 29.6 % in 1970. Industiralization is being promoted by domestic and foreign capitals both of which are heavily protected under the government policy for the promotion of industrial investment. The substance of industrialization, however, is the import-substitute industry for the processing of agricultural product and import of raw materials and the trade structure consisting of import of machinery and export of primary products is expected to continue for some time.

11-2. Changes in industrial structure

The share of agriculture in the nations industry has been decreasing gradually with the progress of industrialization and development of the tertiary industry in the past 10 years. Growth of industry, particularly that of munufacturing industry is remarkable with an annual growth rate of about 10 %. While the majority (95 %) of manufacturing industries are the cottage industry type, the share of manufacturing industry is expected to grow further in the future. The construction industry, which expanded rapidly with the rush of construction projects for military bases and related facilities coupled with the economic development project of Thailand, is not so active due to the decrease in the special procurement orders as a result of withdrawal of US Forces. In the communication and transportation sectors, investments for road construction are active and construction and expansion of communication facilities are being promoted, thereby making these sectors the prime motive power of economic growth. While the relative importance of agriculture will be lessened gradually and industrial investments will continue to grow in the future, it is very likely that the investment for agriculture aimed for its stabilization will still continue in the overall economic development project.

11-3. Present state of industrialization

(1) The pace of industrialization is rapid since 1962.

(2) Industrial investment depends mainly on foreign capital and private capital.

(3) The core of industrial policy is induction of foreign capitals under the "Industrial Investment Promotion Law".

(4) Industrial income accounts for 16.6 % of gross national income.

(5) Import-substitute industry centering on consumer goods is the prime mover of industrialization. However, a steel plant and a petrochemical plant are either under construction or under planning and investments are also made for capital goods sector though on a small scale.

(6) The majority of processing industries are still in the stage of assembling and packing and the products, therefore, have a low added value.

(7) Small scale cottage industry-type enterprises with less than 50 employes account for 95 % of industry (most of them are rice mills). Production techniques employed by these industries are mostly out of date and obsolete.

(8) Modern plants are owned mainly by the central government and foreign capitals and are heavily protected under the "Industrial Investment Promotion Law". Most of the government owned plants are under poor management and show a deficit and there is a movement toward the transfer of them to private management.

11-4. Role and substance of the "Industrial Investment Promotion Law"

(1) Although this law came into force in October, 1954 under the administration of Prime Minister Pipun who had foreseen industrialization of Thailand but was left idle without bearing fruit, revisions were made to the law in line with the actual situation in February, 1960 under the administration of Prime Minister Salit who came into power through a revolution paving the way for industrialization. A sweeping revision was made to the law again in February 1962, which greatly contributed to the progress of industrialization thereafter.

(2) Purpose of the "Industrial Investment Promotion Law".

The purpose of this law was to set forth various to accord favorable treatments and guarantee to the industry as a means to induce foreign, as well as to promote and protect private capital.

(3) Favorable treatments and guarantee accorded to the industry covered by the law.

a. Authorization of ownership of real estate by foreign nationals.

b. Exemption of income tax for five years (After inauguration).

c. Special permission of entry of foreign engineers (Industrial visa).

d. Authorization of remittance of capital, profit and interest to home country.

e. Exemption of import duty for construction materials for plant facilities and plant and equipment and business tax.

f. Reduction of import duty for raw materials and business tax for the enterprises specially designated by the government by up to 30 %.

g. Import restriction or increase of import duty for competing goods when necessary. (Note: Tire, bar stee, and used motorcycles are protected by this clause).

h. Stimulation of export through exemption of export duty. (Note: Because of the large share of import-substitute, this clause is not fully applied and both the government and private sector are making an allout effort to find the way to promote export).

i. Restraint of establishment of competing state enterprises and guarantee for not nationalizing enterprises.

(4) Recent trends of foreign capital inducement measures.

a. Reflecting the deficit of trade balance, the government is making an utmost effort to promote the export industry and at the same time is adopting strict screening measures to stave off the import-substitute industry that exists merely for maintaining the market. Establishment of industries that use only the domestic raw materials and the agricultural processing industry is favorably received.

b. There has been an increasingly large number of cases in which the holding of a majority of capital ratio by local capital is requested to promote national capital.

c. There has been a movement to press strongly for the shift of engineers and management techniques to the local national and there has been a case in which the extension of stay is not authorized for foreign engineers.

(5) Progress of industrial investment of foreign capital under the "Industrial Investment Promotion Law".

a. Industries of Japanese capital
Metal (14 companies), automobile and parts (10 companies), electric equipment and machinery (8 companies), textile (29 companies), chemical and rubber (9 companies), food (4 companies), mining and fishery (3 companies).

b. Industries of US capital.
Medicine, tire, dry cell battery, milk, drinking water, retargent, tractor assembly, steel pipe, aluminium sash, tin smelting.

c. Industries of British capital.
Automobile assembly, paint, tractor assembly, oil refining.

d. Industries of European capital.
Paper (France), light bulb (Netherland and West Germany), Medicine (Netherland and Denmark), cement (Denmark).

e. Industries of Asian capital
Food (Israel), iron and steel (India, Hongkong), rubber and plastics (Taiwan).

f. Other industrial products.
Light bulb, paint, fastner, battery, fishing net, automobile parts, motorcycle, automobile tire, matches, glass bottle, glass cup, beer, detargent, radio assembly, motorcycle assembly, shoes, cosmetics.

g. Industries under plan (Those under construction included).
Petrochemical, steel structure, chemical, rerolled steel and sheet metal from scrapped ships.

(6) Issuance of Investment Incentive Certificates

Table-20

	1960 -1962	1963	1964	1965	1966	1967	1968	1969	1970	1971 (Sep.)	Total
Number of certificates issued	115	61	54	40	31	86	93	71	89	56	696
New investment	68	46	35	34	26	74	76	43	67	49	518
Expansion	47	15	19	6	5	12	17	28	22	7	178
Number of industries covered by incentive program	94	47	45	35	27	78	82	53	64	48	573
Thailand	46	16	16	14	10	37	38	26	27	24	254
Thailand	3	1	-	-	2	3	8	1	3	-	21
Joint venture	45	30	29	21	15	38	36	26	34	24	298
Authorized capital (Millions of Baht)	1,272	585	449	205	503	957	615	1,251	1,005	545	7,391
Thailand capital	981	374	241	125	313	710	336	807	663	385	4,940
Foreign capital	291	210	207	80	190	246	278	444	341	159	2,451
Operating capital (Millions of Baht)	3,146	1,599	1,567	536	1,703	4,448	2,561	4,201	2,987	1,398	24,151
Machinery and equipment (Millions of Baht)	1,767	947	819	289	1,028	2,513	1,305	2,585	1,640	780	13,684
Number of Thai employes	23,035	10,460	7,813	5,580	4,342	10,870	10,605	9,440	17,988	12,059	112,192

Source: Investment Committee.

(7) Investments by Foreign Countries (February 1960 - End of September 1971)

Table-21

(Millions of Baht)

	Independent		Joint venture		Total	
	Amount	%	Amount	%	Amount	%
Thailand	1,993.7	86.2	2,940.6	57.9	4,934.4	66.8
Japan	197.6	8.6	650.9	12.8	848.5	11.5
U.S.A.	68.6	3.0	380.8	7.5	449.4	6.1
Taiwan	3.0	0.1	390.4	7.7	393.4	5.3
Britain	11.0	0.5	124.0	2.4	135.0	1.8
Malay	-	-	85.9	1.7	85.9	1.2
Netherland	-	-	50.2	1.0	50.2	0.7
West Germany	16.8	0.7	30.1	1.6	46.8	0.6
Hong Kong	-	-	33.1	0.7	33.1	0.5
India	10.0	0.4	19.6	0.4	29.6	0.4
Singapore	11.1	0.5	14.7	0.3	25.9	0.4

Note: Only authorized capital.

Source: Investment Committee.

(8) Production Capacity of Major Industries

Table-22

Description	Annual production capacity	Description	Annual production capacity
Iron manufacture	18,000 tons	Jute bag	80,000,000 sheets
Steel manufacture	270,000 "	Textile fibers	564,700
Bar steel	300,000 "	Textiles	581,000 yards
Steel pipe	76,000 "	Raw cotton	88,000 tons
Corrugated sheet	154,000 "	Oil refining	50,000,000 barrels
Cement	3,545,000 "	Sugar	450,000 tons
Electric wire (copper)	10,000 "	Manganese steel	15,000 "
Electric wire (aluminium)	10,800 "	Tire	1,765,000 p'cs
Nails and nuts	14,100 "	Feedstuff	378,000 tons
Automobile assembly	10,800	Plywood	3,000,000 sheets
Motorcycle & scooter	69,600	Conned pineapple	1,300,000 p'cs
Life pump	2,000	Conned fish	1,684,000 "
Stationery and printing paper	39,000 tons	Conned vegetables, fruit	19,344,000 "
Wrapping paper	51,000 "	Beer	37,000,000 liter
Glass ware	96,000 "	Tabacco	15,000,000 M/tons
Sheet glass	30,000 "	Petroleum	3,880 million liter

11-5. Electricity

(1) Power generating capacity

As of March 1971, power generating facilities with a total capacity of 1,500,000 kw comprising 480,000 kw of hydro electricity and 1,020,000 kw of thermal electricity are linked throughout the country except southern Thailand and generate approximately 5,000 million KWH annually.

Approximately 80 % of this power energy is consumed in Bangkok at the rate of 0.5 Baht on the average. The present capacity of 1,500,000 kw is expected to be augmented to about 4,000,000 kw in ten years and new facilities with a capacity of about 800,000 kw are now under construction.

(2) Energy charge

There is a wide difference of energy charge between metropolitan area supplied by Metropolitan Electricity Authority and rural area supplied by Provincial Electricity Authority and the energy charge in rural area is nearly two times that in the metropolitan area.

12. Present Situation of Shipping Industry

12-1. Tonnage

A total number of ships registered in Thailand in 1969 was 33,337 with a gross tonnage of 417,436.58 tons, comprising 24,340 steam ships with a tonnage of 204,241.60 tons and 8,997 barges with a tonnage of 213,194.98 tons (Tables 24 & 25). The majority of steam ships are river craft of less than 15 gross tons. Ocean-going ships total 255 with a gross tonnage of about 150,000 tons but more than half of them are fishing boats. Ships of more than 3,000 tons as of September 1972 totaled 14 with a gross tonnage of 63,256.79 tons, which are broken down to 10 freighters and 4 oil carriers (Table 26). The Royal Thai Navy possesses a total of 45 ships of which the largest one has a displacement tonnage of 7,185 tons (100 m long).

Table-23

Power energy for business and industry

Type of contract	Energy charge system (In Baht)						Remarks
General household	Energy charge	Less than 5 KWH	5.5 KWH	50-150KWH	150-500KWH	Over 500 KWH	Basic rate (minimum) 5 B
		5	0.72/KWH	0.63/KWH	0.53/KWH	0.43/KWH	
Small lot less than 300 KW	Energy charge	Less than 5 KWH	KWH 5-10	KWH 50-300	KWH 300-1000	KWH 1000-3000	Over 3,000 KWH	Basic rate (minimum) 10 B
		10	0.73/KWH	0.60/KWH	0.54/KWH	0.49/KWH	0.42/KWH	
Medium lot 300-499 KW	Demand charge	Less than 5 KWH	500 - 200 KWH		Over 200 KWH		D represents 15 minutes demand (KW). Basic rate is set at 60 % of maximum demand in the last 12 months. Demand charges are 3 B for 12 KV, 24 V and 5 B for 69 KV. Discount for each D. charge/KW
		33/KWH	30/KWH		24/KWH		
	Energy charge	Less than 50KWH x D	Less than 50-200KWH x D		Less than 200-400KWH x D	Over 400KWH x D	
		0.36/KWH	0.32/KWH		0.25/KWH	0.18/KWH	
Large lot over 500 KW	Demand charge	Less than 1000 KW			Over 1000 KW		D represents 15 minutes demand (KW)
		22/KW			19/KW		
	Energy charge	Less than 200 KW x D		Less than 200-400 KW x D		Less than 480 KW x D	Basic rate is the same as above. Energy charge shown at left is for 69 KW, and 5 B/KW discount is made for use of 12 KV and 24 V. Discount rate is 7 B for consumption of less than 12 KV.
		0.28/KWH		0.25/KWH		0.17/KWH	

Table-24 Registered Tonnage of Sea-going Ships by Use (1969)

Navigatinal Area \ Use	Total		Passenger boats		Fishing boats		Tug boats		Freighters		Sports, entertainment		Others	
	No.	Gross tonnage	No.	Gross tonnage	No.	Gross tonnage	No.	Gross tonnage	No.	Gross tonnage	No.	Gross tonnage	No.	Gross tonnage
Seagoing steam launches	1	127.44	-	-	-	-	-	-	1	127.44	-	-	-	-
Segoing motor launches	6,500	149,671.37	62	2,431.85	5,610	82,816.36	30	743.55	691	45,932.96	7	65.24	100	17,680.31
River steam launches	2	23.47	-	-	-	-	-	-	-	-	-	-	2	23.47
River motor launches	17,837	54,419.32	7,582	15,545.24	-	-	239	3,105.29	6,936	15,563.67	15	26.16	3,065	20,178.96
Total	24,340	204,241.60	7,644	17,977.09	5,610	82,816.36	269	3,848.94	7,628	61,624.07	22	92.40	3,167	37,882.74

Source: Harbour Department· official records.

Table-25 Registered Tonnage of Ships by Ship Size (1969)

Steam or Motor \ Type	Total		International seagoing vessels		Coastwise vessels (60 ton gross and over)		Coastwise vessels (15.00-59.99 ton gross)		River craft	
	No.	Gross tonnage	No.	Gross tonnage	No.	Gross tonnage	No.	Gross tonnage	No.	Gross tonnage
Steam launches	3	150.91	1	127.44	-	-	-	-	2	23.47
Motor launches	24,337	204,090.69	255	149,671.37	(a)	(a)	6,245	(a)	17,837	54,419.32
Barges	8,997	213,194.98	89	17,972.11	229	4,264.10	(a)	(a)	8,679	190,958.77
Total	33,337	417,436.58	345	167,770.92	229	4,264.10	6,245	-	26,518	245,401.56

Note· (a) Grouped with coastwise vessels, 60 ton gross and over.

Source· Harbour Department: official records.

Table-26 Thailand Registered Ships of 3,000 gross tons or more
(September 1972)

Name of Ship	Length (L) m	Breadth (B) m	Draught (D) m	Gross (GT) Tonnage tons	Net Tonnage (NT) tons
NAKORN THAI	106.26	15.44	8.20	3,635.39	2,229.77
SRI THEP	106.26	15.44	7.54	3,635.39	2,270.07
SRI CHOL	106.21	15.00	7.70	3,366.85	1,865.83
SAMUT PRAKARN	99.41	15.00	7.70	3,427.92	1,824.35
SRI THAMARAJ	109.55	15.80	8.50	4,122.57	2,274.89
PICHIT SAMUTH	108.50	15.61	9.20	4,591.83	1,708.59
KASEM SAMUTH	112.76	16.25	9.15	5,045.78	2,644.86
KRUNG SAIM	105.00	15.80	9.20	4,451.82	2,473.24
KRUNG THAI	112.50	16.70	9.10	4,891.98	2,724.94
KRUNG THEP	121.15	16.00	9.45	4,999.80	2,741.40
SUWANAPUMI	100.52	15.12	7.10	3,138.53	1,450.28
OCEANIC 1	99.77	15.03	7.50	3,330.77	1,912.36
OCEANIC 3	96.00	7.50	7.50	3,446.62	1,767.71
SAIM SUPPLY	637'3"	69'1"	29'7"	11,171.54	6,627.35

Type	Year of construction	Shipyard	Owner	Name of ship
Cargo	-	Mitsubishi	Thai Maritime Navigation Co., Ltd.	
"	-	"	"	
"	-	Osaka	"	Hirashima Maru
"	1958	Shimonoseki	"	Hoko Maru
"	1958	Usuki	"	Kajima Maru
"	1953	Netherland	"	Beninkust
"	1947	Germany	Thai Marcantile Marine Ltd.	Tumlaren
"	1956	Shimonoseki		Enoura Maru
"	1957	Hiroshima		Koshun Maru
"	1957	Osaka	Thai International Maritime Enterprise Co., Ltd.	Shotatsu Maru
Tanker	1968	Scotland	Thai Petroleum Transport Co., Ltd.	
	1965	Nagasaki	Oceanic Transport Co., Ltd.	
	1967	"	"	
	1967	France	Siam Lines	Trigon

12-2. Shipping Industry

(1) Outline

There are three ocean shipping companies, namely, Thai Maritime Navigation Co., Ltd., Thai Marcantile Marine Ltd. and Thai International Maritime Enterprise Ltd. and there are three coastal and inland shipping companies. The three ocean shipping companies have tramper services to Singapore and Malaysia and regular service to Japan. The three ocean shipping companies obtained allotment for a total of 108 services per year in 1972 as members of Japan-Thailand freight conference. However, the Thai government is requesting a higher loading ratio of its shipping fleets and is strongly demanding the conference to increase the number of services. There is a law that any foreign goods purchased by the Thai government must be transported by the Thai vessels. There has also been a movement recently to obligate the use of Thai companies for freight insurance.

Four Japanese shipping companies, three Thai shipping companies (previously mentioned) and six other foreign shipping companies operate regular service between Thailand and Japan, and these 13 shipping companies compose the Japan-Thailand Freight Conference.

Annual cargo traffic between Japan and Thailand and the loading ratio are shown in Table 27.

Table-27 Annual Cargo Traffic Between Japan & Thailand

1,000 freight ton (%)

	Year	Total traffic	Cargo by Thai ships	Cargo by Japanese ships	Cargo by other ships of conference	Cargo by ships other than conference
Japan - Thailand	1969	1,762 (100)	100 (5.7)	1,138 (64.6)	523 (29.7)	-
	1970	1.677 (100)	198 (11.8)	1,021 (60.9)	458 (27.3)	-
	1971	1,739 (100)	264 (15.2)	1,005 (57.8)	470 (27.0)	-
Japan - Thailand	1969	1,265 (100)	120 (9.5)	629 (49.7)	386 (30.5)	132 (10.4)
	1970	1,456 (100)	182 (12.5)	743 (51.0)	451 (31.0)	79 (5.4)
	1971	1,683 (100)	295 (17.5)	949 (56.4)	342 (20.3)	78 (5.8)

(2) Shipping Companies

a. Thai Maritime Navigation Co., Ltd. (TMN)
Thailand/Japan/Thailand (Regular service)
Thailand/Singapore/Malaysia (Irregular service)

This is one of the State Enterprises 100% owned by the Government and is under control of the Ministry of Communications. It operates five vessels on regular service route to Japan. The average duration of a voyage is 45 days and each ship mates 8 voyages a year. It also operates two vessels on irregular service to Singapore and Malaysia. The duration of a voyage is about 15 days.

It intends to increase drastically the number of ships on the route to Japan and is also studying the feasibility of opening an European service route.

Name of vessel	GT	DW	
NAKON THAI	3,635.39	5,680	To Japan
SRI THEP	3,635.39	5,680	
SRI CHOL	3,366.85	5,285	
SRI DHUMARATH	4,122.57	6,451	
SAMUT PRAKARN	3,427.92	5,225	
SAMUT SONGKARN	1,942.00	3,012	To Singapore and Malaysia
SAMUT SAKORN	2,557.00	3,896	

b. Thai Marcantile Marine Ltd. (TMM)
Thailand/Japan/Thailand (Regular service)

This company owns two vessels and charters three vessels of 6,000 - 8,000 D/W, all of which are operated on the regular service route to Japan. It is now studying the passibility of opening regular service to the east coast of U.S.A. in the future.

Name of vessel	GT	DW	
PICHIT SAMUT	4,591.85	6,006	To Japan
KASEM SAMUT	5,044.78	7,070	

c. Thai International Maritime Enterprises Ltd. (TIME)
Thailand/Japan/Thailand (Regular service)
Thailand/Japan/Malaysia (Irregular service)

Name of vessel	GT	DW	
KRUNG SIAM	4,451.82	6,979	
KRUNG THAI	4,891.98	7,562	To Japan
KRUNG DHEB	4,999.80	7,687	

d. Thai Navigation Co., Ltd. (TNC)
Thailand/Singapore
Bangkok/Southern Thailand ports

This company owns five vessels.
(All of which are less than 3,000 GT)

e. Thai Petroleum Transports Co., Ltd.

This company owns five coastal tankers.

Name of vessel	GT	DW	
SUWANAPUMI	3,138.53	4,700	Five vessels
Four other vessels		Each 2,500	

f. C.P. Company Ltd.

This is a 100 % Thai owned company operating a total of 9 vessels, four owned by it and five tankers owned by Oceanic Transport Co., Ltd. (70 % Thai capital). It operates vessels on Bangkok-SonKura-Siracha-Bangkok route. Oceanic 1 and Oceanic 3 shown in the table below are engaged in transportation of crude oil between Bangkok and Sonkura and other vessels are engaged in transportation of product oil.

Name of vessel	Classification of ship	GT	DW	Remarks
Oceanic 1	CR	3,330.77	5,421.76	Crude oil
Oceanic 2	CR	399.50	500.00	Product oil
Oceanic 3	CR	3,446.62	5,416.91	Crude oil
Oceanic 4	TG	384.11	562.00	Product oil
Oceanic 6	BV	371.14	534.53	"
C.P. 1001	TG	490.00	900.00	" (Barge)
C.P. 1	TG	477.79	620.00	"
C.P. 2	TG	469.10	813.00	"
C.P. 3	TG	103.79	-	(Tugboat 500x2ps)

g. Siam Lines

This company transports crude oil from the Persian Gulf. Siam supply (11,171.54 GT) owned by this company was built in France and is the largest vessel in Thailand.

(3) Maintenance of ships

Of the ships owned by TMN, five are too long and too wide to be accommodated in the Bangkok Dock and receive maintenance works in Japan partly because of their operating route and two vessels receive maintenance works in the Bangkok Dock. The average duration of dockage is 10 - 12 days and the cost is estimated at 140,000 - 250,000 yen. For other shipping companies, large vessels undergo repairs and maintenance works in Japan, Singapore and Hong Kong and smaller vessels receive repairs and maintenance works in the Bangkok Dock.

12-3. Problems to be solved in the future

(1) As the first step to become internationally competitive, it is desirable for the management of each shipping company to familarize themselves with international practice and foster international sense in shipping business.

(2) In order for the Thain shipping industry to make steady progress in the future, it is necessary to train superior sailors corresponding to the expected increase of tonnage of ships. For this purpose, it is necessary to establish a regular seamen's training institute in the country to improve the quality of seamen and to meet the increasing demand for sailors.

At present the Harbor Dept. is training 11 navigators on a three year course and 8 engineers on one year course for TMN but the early establishment of a full-fledged seamen's training institute is desirable.

(3) As for the administration, it is important for the Thai government to recognize how the transport sector (shipping industry) can play the leading and fundamental role in all industries for the growth of national economy and to make efforts to promote modernization and rationalization not only of the shipping industry but also of the distribution system, as well as to make a plan for the growth of shiprepairing industry as an intergral part of the shipping industry.

13. Ports and Harbours

13-1. Port administration in Thailand

The port of Bangkok is under the management of the Port Authority of Thailand and other local ports and harbors are under the control of the Harbour Department of the Ministry of Communications.

Among the function of the Harbour Department, those having direct relations with ports and harbours are port and harbour construction, Harbour Master and pilotage. For port and harbour construction, the Department is responsible for the construction of local ports and harbours other than the port of Bangkok and transfers administration of such port facilities as piers to local governments but still administers such facilities as channels, anchorages and basins. The function of the Harbour Master includes port security and berth allocation for all ports and is therefore corresponding to the function of the Port Master of the Maritime Safety Agency in Japan and has close relations with the Port Authority especially of the port of Bangkok.

The Port Authority was established in 1951 and prior to this, the port of Bangkok was placed under the administration of the Port of Bangkok Office of the Dept. of Transportation, Ministry of Communications.

The jurisdiction of the Port Authority extends over a range of about 66 km between the entrance channel and Memorial Bridge (18 km of entrance channel and 48 km between the river mouth and Memorial Bridge).
The fiscal budgets of the Harbour Department and the Port Authority for fiscal 1971 were 50 million Baht and 269 million Baht respectively (revenues in 1969) and the budgets of the Ministry of Communications and the Thai Government in fiscal 1971 were 243 million Baht and 28,600 million Baht respectively.

The Port Authority having seven dredgers directs the dredging of the port of Bangkok and the Harbour Department is directly responsible for dredging channels in southern Thai ports with its six dredgers.

13-2. Present situation of ports and harbours

Major ports in Thailand are the port of Khlong Toei and Sattahip Naval Harbour (180 km southeast of Bangkok). The port of Khlong Toei which handles the greatest port of foreign trade cargo is a river port located 27 km upstream the mouth of the Chaophraya River and is equipped with 10 berths (for a ship size of 565 feet), 7 dolphin berths, 3 berths (for ship sizes of 250 - 400 feet) owned by Thai Maritime Co., 9 oil berths (for ship sizes of 350 - 565 feet) owned either by the State enterprises or by private oil companies, and 31 berths (for ship sizes of 280 - 565 feet) owned by private sectors for a total of 60 berths plus 27 berths anchorages. The Khlong Toei Pier handles 2.7 million tons of import cargo annually.

On the other hand, export cargo consisting mainly of agricultural products is seldom handled at the Khlong Toei Pier but is loaded on ships moored to the dolphins provided along the river course by barge. The export cargo handled at the Cloyton Pier is said to amount to 4.5 million tons annually. With the addition of 3 million tons of petroleum brought in to the oil depot located downstream the Cloyton Pier, a total of 10 million tons of export and import cargo is handled annually in the Cloyton port area.

As a tentative measure to meet the sharp increase in cargo traffic in the port of Cloyton, construction of 6 berths (1,500 m) is planned for downstream the present pier and 4 berths are now under construction as a World Bank financed project.

Since the river port is not expected to be able to handle the ever increasing cargo traffic in the future and the dredging of channels in the river course will only allow navigation of vessels of the 10,000 G/T class at the most, a deep port will have to be provided somewhere else at any rate. For this reason, the Sri Racha district (110 km southeast of Bangkok) and the Sattahip district are being considered as the possible site of a new deep port and a survey is being conducted for the development of Leam Chaban port in the Sri Racha district along with the development of industrial zone. For the development of economy in southern Thailand, meanwhile, development of ports and harbours in south Thai peninsula is also planned and a survey is being conducted in Songkhla port and Puket port.

Table-28 Statistics of Foreign Inward and Outward Vessels and Cargoes in the Port of Bangkok

Year	Number of Vessels				Cargoes in tons					
	Inward				Inward			Outward		
	PAT Wharf	Oil Jetties	Total Inward	Total Outward	PAT Wharf	Other Wharves	Total Inward	PAT Wharf	Other Wharves	Total Outward
1955	636	147	783	895	702,828	674,562	1,377,390	-	-	1,927,683
1956	683	136	819	1,040	742,282	770,970	1,513,252	-	-	1,964,226
1957	719	161	880	1,063	840,036	815,797	1,655,833	23,127	2,207,396	2,230,523
1958	813	137	950	1,033	803,879	912,636	1,716,515	26,053	1,924,631	1,950,684
1959	898	134	1,032	1,200	863,714	983,885	1,847,599	38,548	2,072,377	2,110,925
1960	987	119	1,106	1,388	904,420	1,104,674	2,009,094	64,269	2,580,768	2,645,037
1961	997	143	1,140	1,560	993,387	1,241,757	2,235,144	48,411	3,322,004	3,370,415
1962	1,093	187	1,280	1,520	1,189,079	1,543,806	2,732,885	77,148	3,011,400	3,088,548
1963	1,052	188	1,240	1,545	1,317,691	1,648,835	2,966,526	59,534	3,207,324	3,266,850
1964	1,136	171	1,307	1,902	1,434,411	2,108,508	3,542,949	36,242	4,433,865	4,470,107
1965	1,167	189	1,356	1,895	1,571,116	2,941,441	4,512,557	32,256	4,716,894	4,749,150
1966	1,145	348	1,493	1,869	1,941,917	3,927,350	5,869,267	29,410	4,755,443	4,784,853
1967	1,100	352	1,452	1,603	2,222,025	2,539,209	4,761,234	*48,686	4,340,218	4,388,904
1968	1,196	302	1,498	1,720	2,234,468	2,564,936	4,799,404	*33,369	4,466,800	4,500,169
1969	1,244	223	1,467	1,738	2,268,750	2,766,487	5,035,237	*34,140	4,679,441	4,713,581

* Included Military Cargo

Reference: "The Port of Bangkok" by Port Authority of Thailand 1970

14. Economic and Social Development Programme

14-1. Policy of development

Thailand has so far implemented the First Six Year Programme (January 1961 - September 1966) and the Second Five Year Programme (October 1966 - September 1971) as national economic and social development programme. At present, the Third Five Year Programme (October 1971 - September 1976) is being implemented.

The basic policy of the current programme is as follows.

(i) Improvement of economic structure to increase the gross national product.

(ii) Maintenance of foreign currency reserves at a stable level and immediate solution of problems contributing to the present economic depression in order to stabilize the national economy.

(iii) Promotion of local economic activities to correct income differential.

(iv) Promotion of public welfare.

(v) Development of manpower resources and increase of employment opportunity.

(vi) Encouragement of private sectors in playing the role in development.

14-2. Main objectives

(1) In accordance with the basic policy (i), the garget economic growth rate (real) for the programme period is to be 7.0 % annually and the production goals by sectors are to be as follows. (Table 29).

Since the population is expected to grow at a rate of about 2.5 % in 1976, per capita national income is expected to increase at a rate of 4.5 % in 1976.

Table-29 Target of Gross Domestic Product (at 1962 price)

(Millions of Baht)

	1971 (Estimate)		1976 (Target)		Average Annual Growth rate	
	Value	%	Value	%	1967-71	1972-76
1. Agriculture	37.3	29.5	47.8	26.8	4.1	5.1
1.1 Crop	26.0	20.5	32.5	18.2	2.7	4.6
1.2 Livestock	3.9	3.1	4.7	2.6	2.7	3.4
1.3 Fishery	4.3	3.4	6.9	3.9	17.3	10.0
1.4 Forestry	3.1	2.5	3.7	2.1	6.5	3.4
2. Mining and Quarrying	2.1	1.7	2.8	1.6	8.1	6.0
3. Industry	21.4	16.9	31.4	17.6	9.2	8.0
3.1 Traditional Industry	6.6	5.2	8.3	4.6	5.1	4.8
3.2 New Industry	14.8	11.7	23.1	13.0	11.4	9.2
4. Construction	8.4	6.6	11.7	6.6	8.4	6.5
5. Electricity and Water Supply	1.9	1.5	3.9	2.2	20.7	15.0
6. Communication and Transportation	8.6	6.8	11.5	6.5	7.5	6.0
7. Trade	20.5	16.2	29.3	16.4	7.7	7.0
8. Banking, Insurance and Real Estate	5.1	4.1	11.0	6.2	14.4	15.0
9. Ownership of Dwellings	2.4	1.9	2.7	1.5	4.1	2.5
10. Public Administration and Defence	5.7	4.5	7.6	4.3	10.0	6.0
11. Services	13.0	10.3	18.5	10.3	8.8	7.0
GDP	126.4	100.0	178.2	100.0	7.2	7.0

(2) In accordance with the basic policy (ii), the average growth rate of export is to be set at about 7.0 % and that of import at about 2.8 % in order to stabilize and maintain foreign currency reserves at a high level (Table 30). As one of the measures for this purpose, the goals in the services account are to be as follows.

a. Export of services

Air service and marine transport service are to be encouraged to place them on a firm basis.

b. Import of services

Payment for import of services from foreign countries must be reduced.

(3) Under the basic policy (iii), supply of money is to be held at a growth rate of less than 10 % annually.

(4) In compliance with the basic policy (iii), the growth rate of expenditural development is to be 10 % annually.

(5) In accordance with the basic policy (v), the growth rate of population is to be reduced to less than 2.5 % and the rate of unemployment in urbar area is to be held at less than 3.2 % in 1976.

(6) Under the basic policy (vi), the goal of private investments during the programme period is to be set at 131,000 million Baht.

14-3. Measures planned for the shipping industry.

(1) The shipping industry of Thailand is to be augmented with the addition of freighters of the 18,000 D/W class.

(2) As the importance of the port of Bangkok is expected to remain the same in the future, four new berths are to be added to its facilities and a channel capable of handling a ship 565 feet long will be provided.

Table-30 Goals of Balance of Payments

	1971	1976
1. Merchandise		
1.1 Exports	16.1	22.5
1.2 Imports	26.4	30.3
Trade Balance	-10.3	-7.8
2. Services		
2.1 Exports	8.4	6.7
2.2 Imports	3.9	6.1
Service Balance	4.5	0.6
Current Account	-5.8	-7.2
3. Transfer payments (net)	0.9	1.3
4. Capital movements (net)	2.4	4.3
4.1 Private	2.1	2.0
4.2 Official	0.3	2.3
5. Errors and Omissions 1/	1.1	1.1
6. International reserves movements	-1.4	-0.5

1/ Including SDR

IV. Present Situation of Thai Shipbuilding Industry

1. Present Situation of Shipbuilding Industry

The shipbuilding industry in Thailand comprises 6 shipyard which are experienced in construction and repair of steel vessels and 150 shipyards which construct and repair exclusively small wooden craft used for coastal and river navigation and fishing boats, for a total of 156 shipyards (see a list at the end of the report). The largest steel vessel built in these shipyards is of the 200 GT class at the most. Since Thailand is abundant in good wood resources, almost all the shipyards use wood for construction and repair of ships and an overwhelming majority of them are meager shipyards with several employes. Only the Bangkok Dock Co. one of the State en erprises, is equipped with facilities capable of repairing ships of up to 3,000 GT.

2. Present Situtation of Bangkok Dock Co.

2-1. Outline

The predecessor of the present Bangkok Dock Co. (1957) Ltd. was Bangkok Dock Company Ltd. established by an British enterprise in 1914 for the purpose of repair and maintenance of ocean-going vessels calling at the port of Bangkok. The present company is wholly owned by the government and from a legal point of view, it is one of the State enterprises managed under provisions of the Civil and Commercial Code. The main works of the dock are repair and maintenance of vessels of up to 3,000 GT with its dry dock but it also constructs two or three small steel vessels a year.

Capital :	Registered	6,463,000 Baht
	Paid in	1,200,000 "
	Subsidiary	12,000,000 "
	Fixed assets	28,699,000 "

Table-31 Specifications of Docks

Description	No. 1 Dock (m)	No. 2 Dock (m)
Maximum length	108.5	114.0
Length of base	108.5	114.0
Breadth of entrance	13.7	15.0
Height of sill from the base of dock	1.3	1.1
Depth of sill at spring tide	4.8	5.2
Maximum breadth of vessels to be accommodated	12.8	15.2

2-2. Record of performance

Performance of the dock in the repair of ships in 1971 is as follows.

Merchant ship : GT 200 - 2,700 ..... 22 vessels/year

Military vessel : Disp. 200 - 2,500 ..... 15 vessels/year

While the total number of ships docked is 37, some ships dock two to fives a year and the actual number of ships docked per dock is about 30 a year.

The sales in 1971 was as follows (Table 32).

Merchant ship ..... 6,480,934 Baht

Military vessel ..... 10,390,490 Baht

Table-32 Performance of Bangkok Dock Co. in Ship Repair

	1967			1968			1969			1970			1971		
	No.	Gross tons	Bahts	No.	Gross tons	Bahts	No.	Gross tons	Bahts	No.	Gross tons	Bahts	No.	Gross tons	Bahts
Cargo	9	5,634.42	2,700,033	4	1,545.79	472,050	6	2,378.23	1,241,139	5	2,045.87	765,687	4	6,329.02	2,452,672
Tanker	5	5,120.31	412,975	3	2,066.41	312,702	5	1,184.11	755,736	7	6,865.85	741,415	7	6,348.52	852,723
Dredger	5	7,415.52	2,159,110	3	5,497.54	3,280,859	5	7,282.71	2,486,092	5	7,415.52	2,227,754	6	5,548.10	1,431,138
Others	11	1,697.77	3,039,999	10	2,740.73	3,600,996	10	2,707.48	819,320	13	2,481.94	2,286,392	8	2,937.00	1,743,401
(Total)	30	19,868.02	9,312,117	20	11,850.47	7,666,607	26	13,552.53	5,302,287	30	18,809.18	6,021,248	25	21,157.64	6,480,934
Military	31	22,867.00	7,636,389	24	26,979.00	7,374,375	25	24,306.00	8,126,009	19	16,433.00	8,286,317	31	16,690.00	10,390,490
Grand Total	61	-	16,948,506	44	-	15,040,982	51	-	13,428,296	49	-	14,307,565	56	-	16,871,424

Military vessels = Displacement tons

The total working hours of employes in 1971 were as follows.

Merchant ship ..... 269,578 hours

Military vessel ..... 399,648 hours

The balance sheet of the Bangkok Dock Co. as of the end of September 1971 is shown in Table 33.

Table-33 THE BANGKOK DOCK CO., (1957) LTD

Balance Sheet as at 30 Sept. 71.

Authorised Capital				**Fixed Assets**				
106,711 Ordinary Shares of ฿ 100 each			10,671,100 -	Land			12,273,000 -	
Issued Capital				Work Shop	(Less Depreciation)		2,650,034 96	
106,711 Ordinary Shares of ฿ 100 each fully paid			10,671,100 -	Building	(- " -)		2,762,523 90	
Subsiding			13,650,000 -	Machinery and Equipment	(- " -)		7,159,127 55	
Reserve Account				Dock Yard and other assets	(- " -)		9,774,718 41	
Reserve by Law	425,812 96			Vehicles	(- " -)		147,942 09	34,767,346 91
Reserve for emergency	1,706,551 72		2,132,364 68	**Current Assets**				
Donation Account			1,158,124 61	Stock at 30 Sept. 71			2,563,302 --	
Longterm Liabilities				Work in process			600,329 47	
Loan from Ministry of Finance	880,000 -			Debtors (Less Provision for bad debts)			7,166,599 05	
Borrowed from Ministry of Finance	1,660,000 -		2,540,000 -	Advance			2,700 -	
Current Liabilities				Deposit			4,665 -	
Interest Accrued	435,401 37			Accrued Revenue			126,255 21	
Creditors	224,779 96			Prepaid Expenses			98,435 63	
Deposit	50,461 70			Revenue deducted at payment			157,606 22	
Advance	1,922,970 -			Cash:-				
Accrued Expenses	655,457 37		3,289,070 40	In hand			8,280 60	
Profit and Loss Account				At bank			5,360,305 42	16,088,478 60
Accumulated	14,242,962 24							
Add Profit of the year	3,172,203 58		17,415,165 82					
			50,855,825 51					50,855,825 51

3. Future of Shipbuilding Industry in Thailand

3-1. Outline

As previously mentioned, the present shipbuilding industry in Thailand is merely satisfying the demand for new coastal vessels such as small freighters centering on wooden craft for river navigation, fishing boats and barges. As for repair of ships, only vessels of less than 3,000 GT can be repaired in Thailand because of the limit in the capacity of docks and repair of vessels larger than this is dependent on foreign shipyards as mentioned previously.

However, the importance of inland marine transport as a means of transport has been recognized recently following the expansion of Thai's economy. For the ocean-going shipping industry, there is also a tendency toward the augmentation of its ocean-going fleets in order to obtain more foreign currencies or reduce the outflow of foreign currencies and also to promote the shipping industry as a national policy.

One of the plans worked out in line with these movements is the Large Ship Repair Facilities Construction Project for the Bangkok Dock and the other is the Medium Ship Repair Facilities Construction Project.

3-2. Bangkok Shipbuilding and Engineering Corp. Ltd. (1968)

This company has built a total of 23 ships of the 500 GT class in the past four years at the shipyard located along the Chao Phraya River about 50 km upstream from Bangkok. At present, this company is constructing a new facility capable of constructing vessels of up to 2,000 D/W and a floating dock capable of repairing vessels of up to about 4,000 D/W in Ban Koh Leam along the Chao Phraya river downstream from Bangkok with technical cooperation of Iron Works of Japan.

Contractor : Christiani & Nielsen (Danish)

Site : 16,000 - 20,000 m^3

Slipway : No. 1 2,000 D/W
No. 2 1,000 D/W
For ship building

Floating dock: 90 m x 24.75 m x 19.50 m - For repair

Cost : 35 million bahts (Of this, 23 million bahts is to be covered by special yen (10.5 % interest, 7 year-term) from I.F.C.T. and the remaining 12 million bahts is to be covered by owned capital and appropriated for civil works.)

While the type of management has not yet been determined, the company desires to obtain cooperation of Japanese shipyards in respect of capital investment or at least the technical cooperation.

4. Organization of Ship Administration

Registration and inspection of ships are the responsibility of the Harbour Department, Ministry of Communications (Table 34). Although the registration of business office for the shipbuilding industry is under the jurisdiction of the Ministry of Industry, the government agency responsible for ship administration is not definitely known. The Bangkok Dock is now under the direction of the Ministry of Defense while TMN is under the direction of the Ministry of Communications (Fig. 35, 36 and 37).

Fig. - 35 Organization of the Ministry of Communications

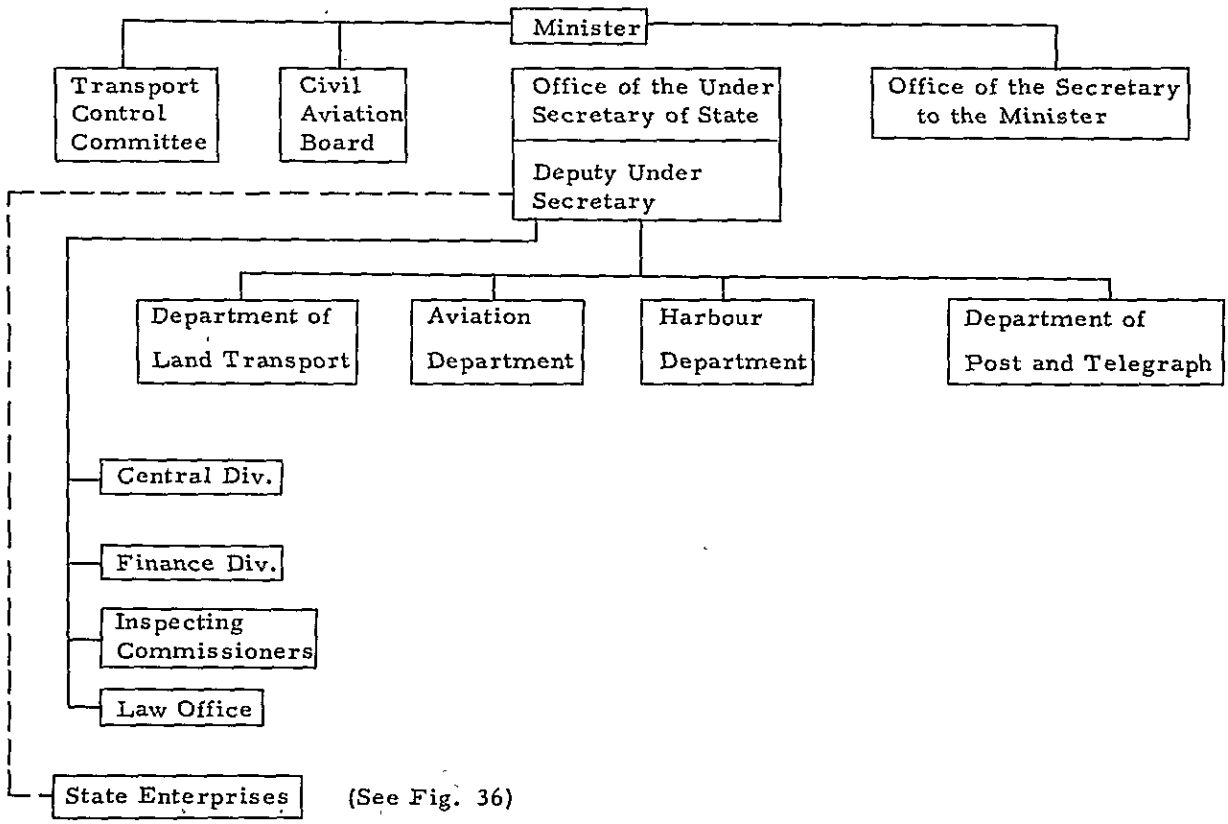


Fig. - 36 State Enterprises under Jurisdiction of the Ministry of Communications (50 % or more owned by the government)

State Railway of Thailand

Port Authority of Thailand

Telephone Organization of Thailand

Express Transport Organization of Thailand

Transport Co., Ltd.

Thai Airways International, Ltd.

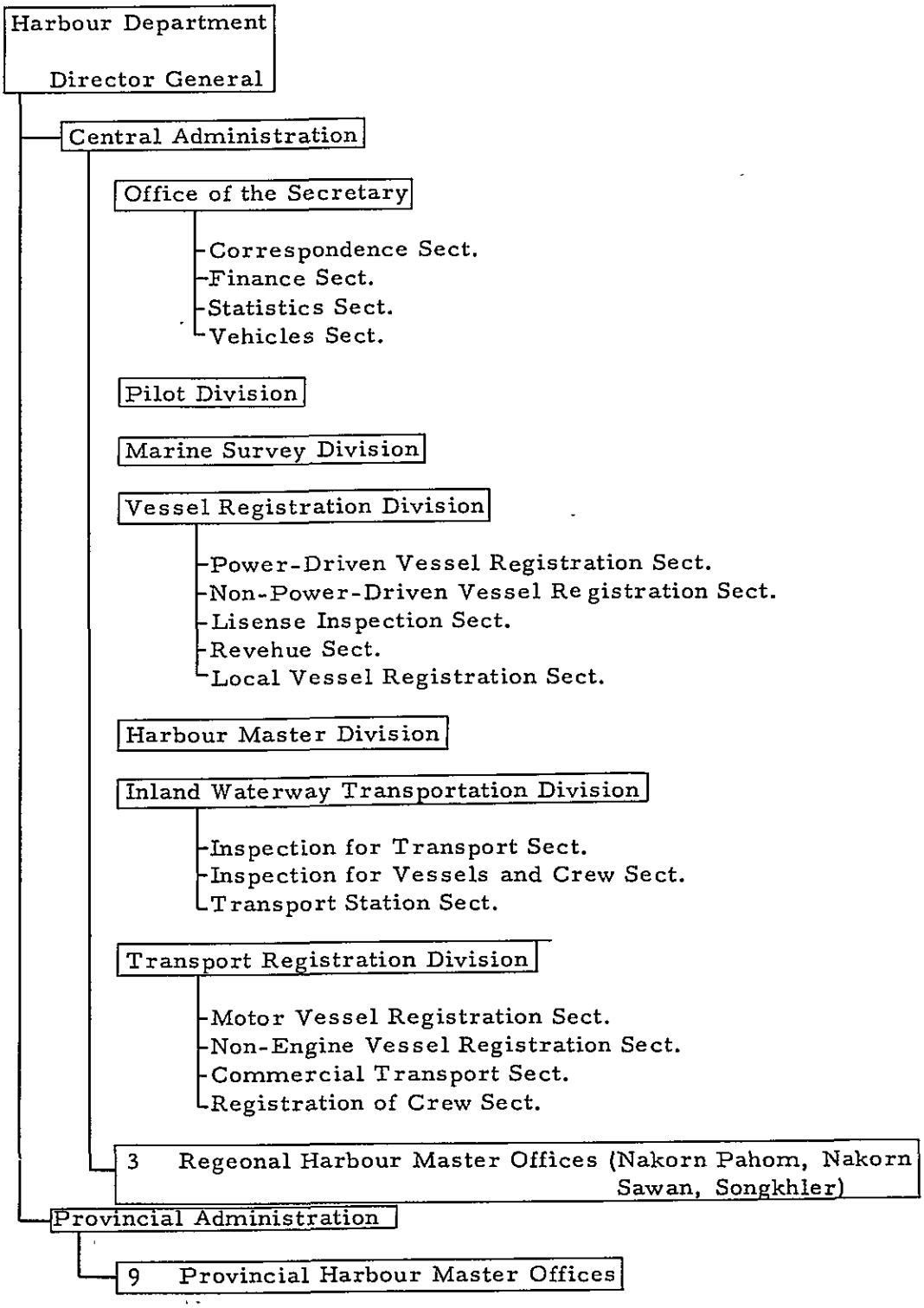
Thai Maritime Navigation Co., Ltd.

Thai Airways Co., Ltd.

Thai Airways and Aircraft Maintenance Co., Ltd.

Aeronautical Radio of Thailand Ltd.

Fig. - 37 · Organization of Harbour Department



5. Problems

The shipbuilding industry is an integrated assembly industry which combines a wide range of products. A ship is an assembly of numberous materials ranging from steel plate composing the hull to interior decorations. Therefore, the shipbuilding industry may be said to consist of every field of industry but on the other hand, the growth of the shipbuilding industry is said to have a far-reaching influence on the industry of various fields both technically and economically. The shipbuilding industry is also a typical labor intensive industry. No matter what technical innovation may be brought to the shipbuilding world, the importance of production elements will continue to increase, but will never decrease. From this point of view, if each of the developing nations makes serious efforts to promote its shipbuilding industry as a national policy under appropriate guidance of advanced nations in shipbuilding such as Japan, industrial potentials ranging from the basic industrial elements such as electricity and industrial water to the related industries will be greatly enhanced and the surplus labor force will be absorbed through the increase of employment opportunity, thus contributing greatly to the increase of national income.

The coastal shipping and inland water transport play an important role in the national economy as a means of transport in place of road and railway in the countries with many rivers and islands. In these countries the growth of the shipbuilding and repair industry has a great significance in view of the need for the improvement of infrastructures.

From this point of view, the following may be pointed out;

(1) Establishment of an administrative organization responsible for the shipbuilding industry.

(2) Establishment of political measures for integrated administration of shipbuilding, shiprepairing and shipping industry.

For this purpose, it may be very effective for this Thai Government to invite long-term advisors from advanced nations experienced in shipbuilding.

V. Construction Project of Floating Dock

1. General

1-1. Premise

The survey was conducted on the premise that the proposed floating dock (GT 12,000) will be constructed in the basin of the MAE NAM river as stated in the Application for Export. When a comparison is made between the floating dock and the graving dock, the following advantages of the former may be pointed out:

(1) Geology is not suitable for construction of a graving dock.

(2) Construction of a floating dock in parallel to the river course is possible with availability of front water area required for entrance and exit of ships and with minimum interference with navigation of other vessels.

(3) Docking is possible even when there is some water area of the river.

(4) Dock side can be used for anchorage of ships.

(5) Relocation of dock is possible.

(6) Pumping requirement may be kept at a minimum.

1-2. Project planning

(1) Extra space should be secured taking account of future improvement and expansion of facilities.

(2) The site should be leased.

(3) Estimate of construction cost and sales should be based on the current unit price (Conversion rate to be used: 1 Baht = ¥148).

(4) Under production plan, it is expected that the working ratio of the dock will be 67 % until the fourth year of operation, that an order for 60 vessels will be received for the fifth year and the working ratio will be 79 % with an order for 70 vessels thereafter.

(5) For capital fund, calculation of capital account was based on long-term low interest loans (6 % interest , payable in 15 years after a grace period of 6 years).

1-3. Problems associated with the graving dock.

In the previous paragraph 1-1 the advantages of the floating dock for the proposed site were touched on briefly. It is worthwhile to give a little more detailed account on the basic problems associated with the graving dock.

(1) Docking operation

For docking, a safer and prompt method must be employed. The more time is required for docking, the less will be working time for repair work. For docking operation, it is desirable as a general rule to secure a water area more than 2.5 times the length of the ship involved at the least. Therefore, the use of the graving dock at the proposed site will completely close the channel.

Furthermore, the data provided by the Port Authority of Thailand shows that approximately 2,300 ocean-going vessels enter the port of Bangkok annually which is located upstream from the proposed site. This means that a total of 4,600 ocean-going ships navigate annually.

Velocity of discharge at the point approximately 3 km downstream is 2.2 - 3.1 kn. at positive flow and 0.2 - 1.6 kn. at reverse flow.

Therefore, the timing of docking is restricted greatly. This situation often makes it impossible to change ship's schedule and confirm ships arrival and possesses a great potentiality of danger. This will also make it very difficult to accomplish 60 - 70 % of the predicted production plan.

(2) Construction of a dock requires such favorable conditions as appropriate depth of bearing stratum of foundation, small coefficient of permeability of soils, availability of an appropriate water depth (-12 m at door) and assurance against change of water depth coursed by deposite of carrier-overs.

Although the following data (data for the point quite far from the site) shows the condition of subsoil up to a depth of -20 m, data on the bearing stratum, defense yellow fine sand, is not available. In planning a dock, therefore, it is necessary to conduct a penetration test at several locations to a depth where sufficient bearing capacity can be obtained.

Engineering Properties of Bangkok Subsoils

by Chai Muktabhant
Pairoje Teerawong
Vichien Tengamnuay

Chulalongkorn University

Because of the reasons stated in paragraph (1), selection of floating dock is considered appropriate.

2. Size of Shiprepairing Facilities

One 12,000 G/T type * floating dock, one mooring quay, work shops and other purtenant facilities will be constructed.

For layout, refer to "Layout of GT 12,000 type repair shop".

Dimensions of dock : 170 m x 37 m (28m) x 15 m (11.5 m)

Mooring quay : 190 m x 1 (one end of floating dock will be used as mooring quay)

Area of land : 70,000 m2 (about 175 acre)

Note: * Ship of the largest size that can navigate the Chao Phraya river at full load.

3. Shiprepairing Demand Forecast.

3-1. General

How many customers (ships for repair) a dockyard can secure solely depends on the level of repair technique, work time and repair cost.

As for the shiprepairing demand in Bangkok, approximately 2,300 ocean-going ships enter the port of Bangkok annually as mentioned in Chapter III, Section 3-2 and it is obvious that there is a considerable potential demand for ship repair.

However, it cannot be said that the shiprepairing industry in Thailand is satisfying the requirements as mentioned in Chapter IV, it is necessary to obligate all Thai registered ships to undergo repair in Thailand for the time being and take measures stated in Chapter 11 to actualize potential demands.

3-2. Domestic Ship

In the early stage of the project when a sizable demand for repair of foreign ships cannot be expected, repair of domestic ships must be aimed primarily once the project is implemented as a State enterprise. For this reason, all domestic vessels of the 3,000 GT class and over were considered as the object of repair in view of the size of the proposed floating dock. Prospects for the increase in the number of general cargo vessels and tankers are as follows.

(1) General cargo vessel

As previously mentioned in Chapter III, 12, cargo vessels of over 3,000 GT registered in Thailand total 10 with about 42,000 GT, consisting of five ships owned by Thai Maritime Navigation, two by Thai Marcantile Marine and three by Thai International Maritime Enterprise. All of these cargo vessels are operating on Japan-Thailand route. Though all the shipping lines intend to expand their bottom, none of them has any definite plan with annual goals.

From a broad viewpoint, however, Thai's shipping fleet which will be operating on Japan-Thailand route in 1979 when the proposed floating dock is expected to begin full operation may be estimated as follows.

First of all, the total export and import of Thailand will increase 1.43 times from 44,075 million bahts in 1971 to 63,200 million bahts in 1979. This figure was obtained by simply applying garget figures of average annual growth rates of export and import (7.0 % and 2.8 % respectively) during the project year of the Third National Economic and Social Development Programme. (1971 - 1976).

The share of trade with Japan in Thai's total export and import in the past six years is 32 % on the average as shown in Table 38. If this ratio remains the same in 1979, trade between Thailand and Japan in 1979 will amount to 20,194 million bahts, an increase of 1.43 times over 1971. Therefore, it can be concluded simply that the bottom in 1979 will increase 1.4 times over 1971 unless there is any change in technical aspects and loading ratio.

On the other hand, the loading rate of Thai's vessels has been increasing steadily as already shown in Table 27 and the average loading rate of export and import has increased from 7.3 % to 16.4 % in the past two years. This tendency is expected to gain strength in the future and the loading ratio of Thai's vessels on Japan-Thailand route will reach 20 % - 30 % in 1979 (16.4 % for 1971). (Fig. 40). The bottom in 1979 corresponding to this increase in the loading ratio will have increase by 1.2 - 1.8 times over 1971 if there is no change in the technical aspect and in trade volume.

As a whole, therefore, Thailand in 1979 is expected to possess bottom 1.7 - 2.6 times greater than that in 1971. If this bottom is to have the average ship size of 10 vessels possessed in 1971 (4,200 GT), the number of cargo vessels in 1979 will be 17 with 71,400 GT at the least and 26 with 109,200 GT at the most.

Conversely speaking, if Thailand does not possess this bottom in 1979, it will be impossible to maintain the loading rate of 20 % for Thai's vessels on Japan-Thailand route.

The above has been a general view of Japan-Thailand service route. As the Thailand-Europe service route is also expected to be opened in the future, vessels to be put on this route will be required additionally.

Table-38 Past and Estimated Trade Volume Between Japan and Thailand

(Millions of Baht)

	Export		Import		Total		
	Total	With Japan (%)	Total	With Japan (%)	Total	With Japan (%)	Remarks
1966	14,099	2,930 (21)	18,504	6,572 (36)	32,603	9,502 (29)	
1967	14,166	3,000 (21)	22,188	8,046 (36)	36,354	11,046 (31)	
1968	13,679	2,874 (21)	24,103	8,274 (34)	37,782	11,148 (29)	
1969	14,722	3,192 (22)	25,966	9,515 (37)	40,688	12,707 (31)	
1970	14,772	3,770 (26)	27,009	10,107 (37)	41,781	13,877 (33)	
1971	17,281	4,277 (25)	26,794	10,093 (38)	44,075	14,370 (32)	
	↓		↓				
1976	24,237		30,761		55,100	(32)	Target
	↓		↓				
1979	29,691		33,418		63,109	20,194 (32)	Estimate

Note: Figures for 1966 - 1971 obtained from Bank of Thailand: Monthly Bulletin (Aug. 1972)

Table-39 Total Annual Cargo Traffic and Average Loading Ratio in Japan - Thailand Trade

(In 1,000 freight tons)

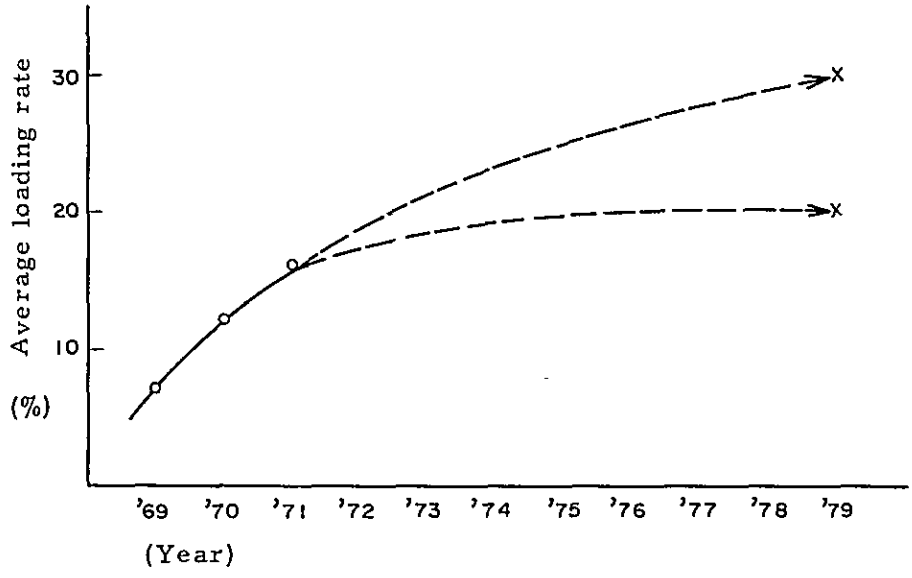
	Total cargo traffic	By Japanese ships	By Thais ships	By other ships	By ships other than onference
1969	3,027	1,767	220 (7.3)	909	132
1970	3,133	1,764	380 (12.1)	909	79
1971	3,422	1,954	560 (16.4)	812	78

Notes: 1. Prepared on the basis of Table 27.

2. Cargo carried by ships other than the Conference ships represents only cargo shipped from Japan to Thailand.

3. Figures in parenthesis show average loading ratio (%).

Fig. - 40 Past end Estimated Average Loading Ratio.



(2) Oil Tanker

The bottom of oil tankers in 1979 was estimated extending the growth rate of petroleum during the Third Project years ('76/'71 $\frac{78 \text{ m barrel}}{41 \text{ m barrel}} = 1.9$) for two years up to 1979 at the same growth rate. Assuming the increase of the bottom of oil tankers corresponding to the production of petroleums in 1979 which is expected be about 2.5 times that in 1971, the bottom of oil tankers is expected to increase from four (one foreign tanker included) totaling 20,900 GT in 1971 to ten with 52,250 GT in 1979.

(3) Foreign Vessels

All of the ships that enter the CHAOPURAYA river do not necessarily come under the category of whips for docking. This is because the inward vessels that are heavily loaded but unload only a small portion of their cargo or add more cargo will never be in ballast or near in ballast when leaving the port. Moreover, the vessel which enters the port in ballast or near in ballast and leaves the port in the original state will be very few except special cases.

Table-41 Number of Inward Foreign Vessels

	In ballast or partly loaded	Total inward vessels
1968	680	2,137
1969	626	2,292
1970	661	2,158
1971	883	2,239

Source: Port Authority of Thailand

Table-42 Number of Outward Foreign Vessels Loaded in Bangkok Port

	In ballast	Total outward vessels
1968	527	2,247
1969	584	2,322
1970	560	2,304
1971	472	2,390

Source: Port Authority of Thailand

From this point of view, therefore, the 883 vessels shown in Table 41 which entered the CHAOPURAYA river in ballast or near in ballast in 1971 are not considered to correspond to the 472 vessels shown in Table 42 which left the port of Bangkok in ballast or near in ballast.

Therefore, the ships which were in ballast or nearly in ballast on the CHAOPURAYA river in 1971 are estimated at 883 + 472 = 1,355. Besides, the vessels which enter the port fully loaded or nearly fully loaded, unload all cargo and then leave the port fully loaded or nearly fully loaded may be in ballast temporarily. However, there is no statistical available for ships of this type and accordingly, they will be excluded from the discussion.

As the average number of trips per vessel is four a year, the total number of ships excluding overlapped ships is 1,355 - 4 = 340.

Since the ship size that becomes the object of the proposed floating dock is GT 3,000 - 12,000, the share of ships under this category in the total number is 3/4 according to the ship size distribution by Berkoff Report (see reference) and the number of whips of this ship size will be 340 x 3/4 = 255 ships.

(4) From the above, ships that become the object of the proposed floating dock (GT 3,000 - 12,000) in 1979 will be as follows.

(i) Thais ocean-going cargo vessels
  (a) Those on Japanese route
    17 vessels with 71,400 GT - 26 vessels with 109,200 GT.

  (b) Other (including European route)
    3 vessels with 30,000 GT.

(ii) Thai's oil tankers
    10 vessels with 52,250 GT.

(iii) Foreign vessels calling at the port of Bangkok
    Approximately 10 % of a total of 255 vessels

Therefore, accomplishment of annual production mentioned in 7-1 will be relatively easy.

Table-43 Foreign Vessels Accommodated by KURONTOI Pier by Year and Ship Length (1967-1971)

Feet \ Year	1967	1968	1969	1970	1971	Average of 5 years
Less than 250	60	70	84	66	49	65.8
251 - 300	67	64	67	73	118	77.8
301 - 350	103	133	106	129	143	122.8
351 - 400	163	184	138	168	187	168.0
401 - 450	170	167	209	217	195	191.6
451 - 500	251	355	353	305	295	311.8
501 - 600	140	180	236	216	119	178.2
601 - 650		29	2		52	16.6
Total	954	1,182	1,195	1,174	1,154	1,132.6

Source: Port Authority of Thailand

Table-44 Ocean-going Vessels Entering Bangkok Port by Year and Ship Type (1967 - 1971)

Year \ Type of ship	1967	1968	1969	1970	1971	Average of 5 years
General cargo vessel	2,057	1,878	1,875	1,879	2,086	1,955.0
Oil tanker	219	243	221	200	149	206.4
Passenger boat	27	27	20	10	13	19.4
Military vessel	113	183	219	153	54	144.4
Others	11	60	17	8	2	19.6
Total	2,427	2,391	2,352	2,250	2,304	2,344.8
Percentage						
General cargo vessel	84.7	78.5	79.7	83.5	90.5	83.4
Oil tanker	9.0	10.2	9.4	8.9	6.5	8.8
Passenger boat	1.1	1.1	0.9	0.4	0.6	0.8
Military vessel	4.7	7.7	9.3	6.8	2.3	6.2
Others	0.5	2.5	0.7	0.4	0.1	0.8
Total	100.0	100.0	100.0	100.0	100.0	100.0

Source: Port Authority of Thailand

4. Location of Floating Dock

a. That the site is close to demand area.

b. That the weather condition is favorable.

c. That the desired water depth is available.

d. That soil condition is favorable.

e. That manpower is readily available.

f. That water and power supplies are readily available.

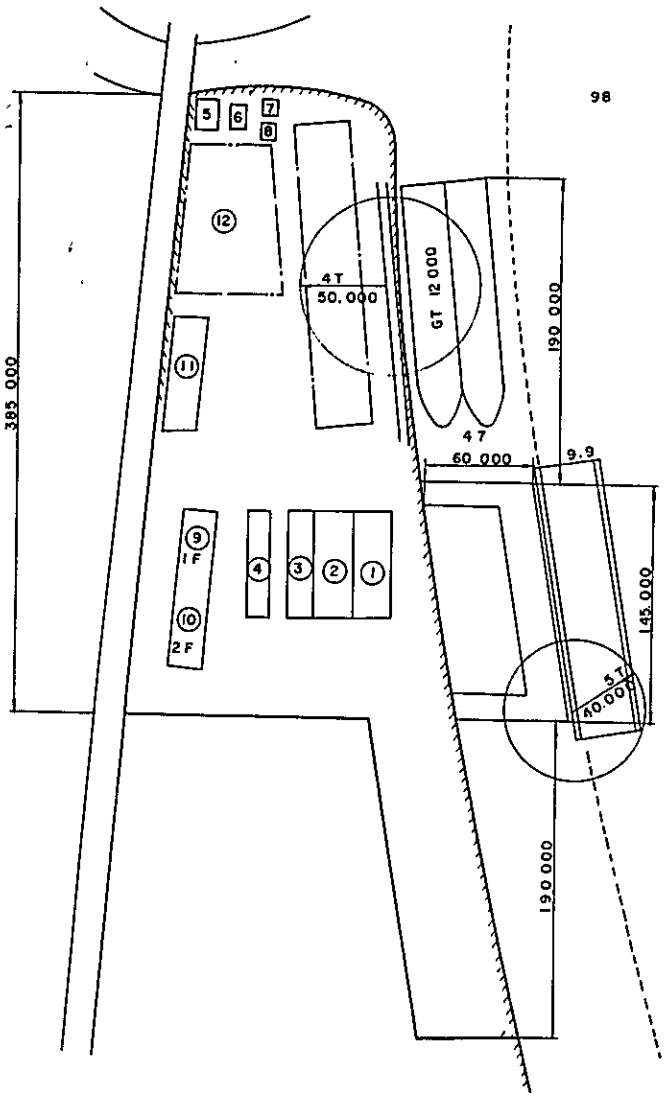
g. That the road conditions are favorable.

On the basis of the above conditions, the updrift and the downdrift of KLONG TOEY HARBOUR were considered as the first and second choices on the map. However, a field survey of these locations revealed that there was already a plan for construction of an oil refinery and extension of the piear for these sites. As the next alternative, therefore, a point on the west bank of the MAE NAM river approximately 3 km from the mouth of the river is considered appropriate.

Fig. - 45 G/T 12,000 Type Repairing Dock Yard

Scale 1/2500

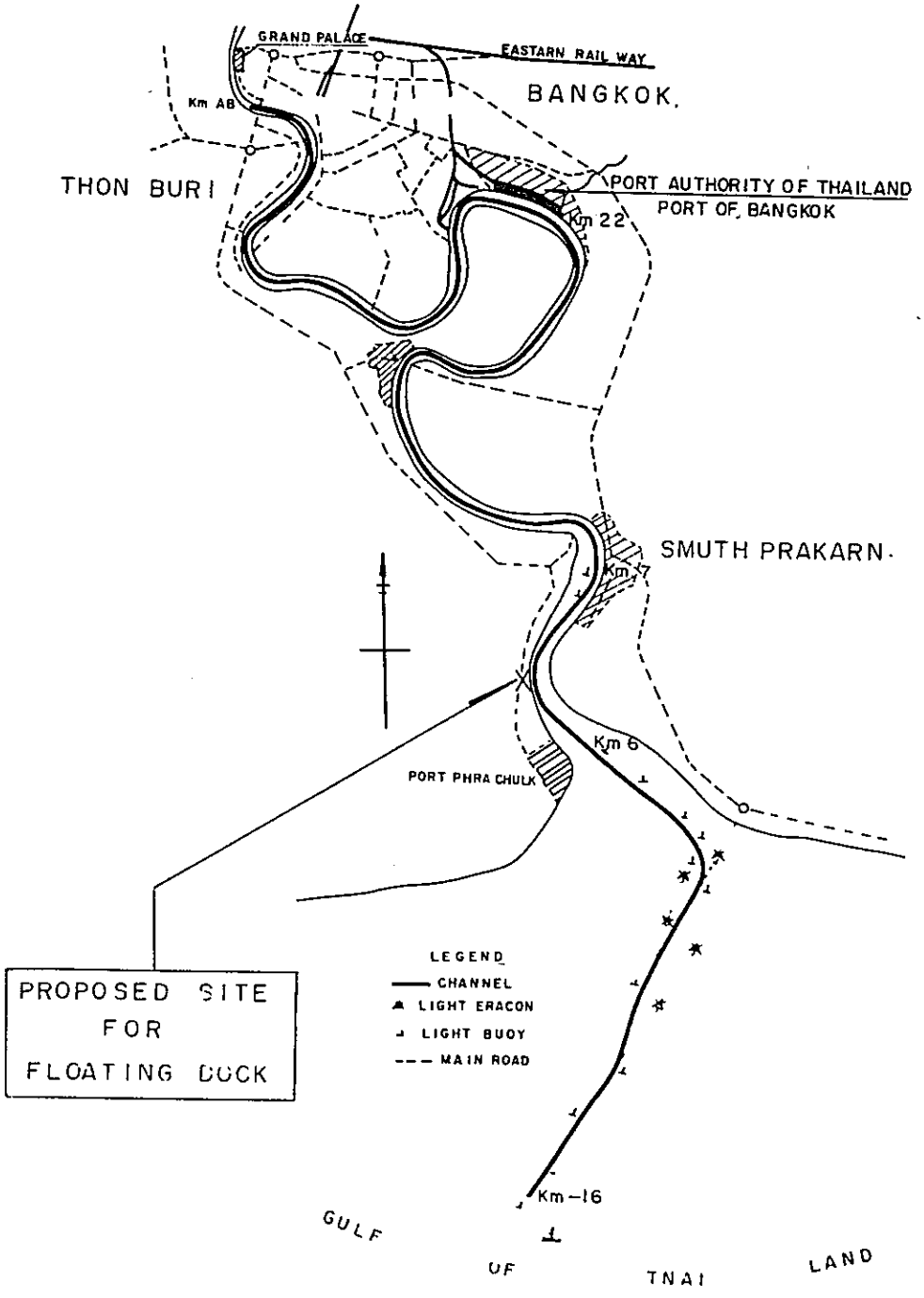
0 50 100 200



NAME OF BUILDINGS

1. OUT FITTING 4 PIPING SHOP
2. MACHINE 4 FITTER'S SHOP
3. CARPENTER RIGGING 4 PAINTTING SHOP
4. STORE
5. TRANSPORMER SUBSTATION
6. AIR COMPRESSOR ROOM
7. OXYGEN ORIGNATE PLACE
8. ACETYLENE GAS PLACE
9. WORKER'S REST SHOP
10. HEAD OFFICE
11. DOCK HOUSE
12. PARKIN 4 ANOTHERS AREA

Fig. - 46 Proposed Site for Floating Dock



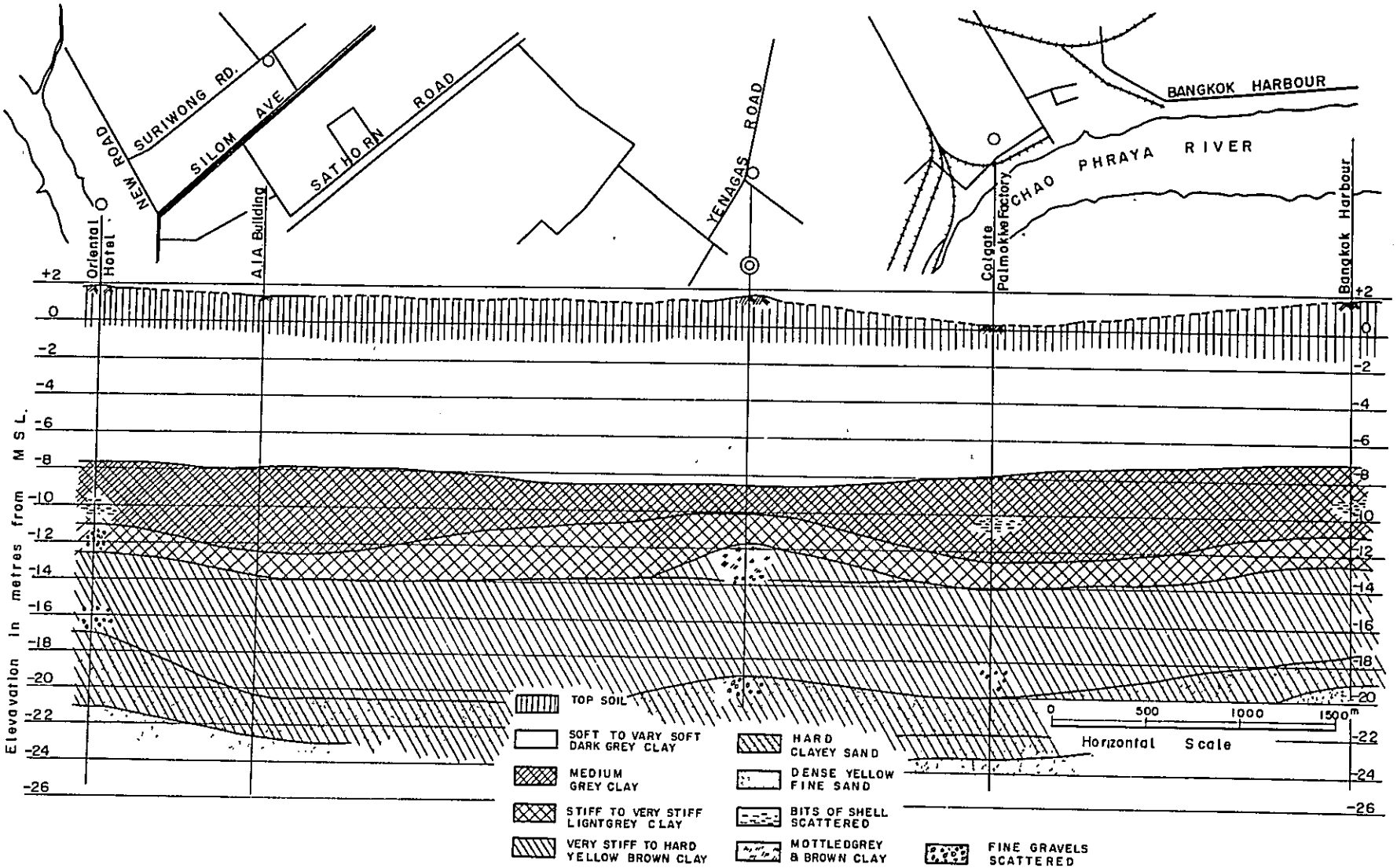
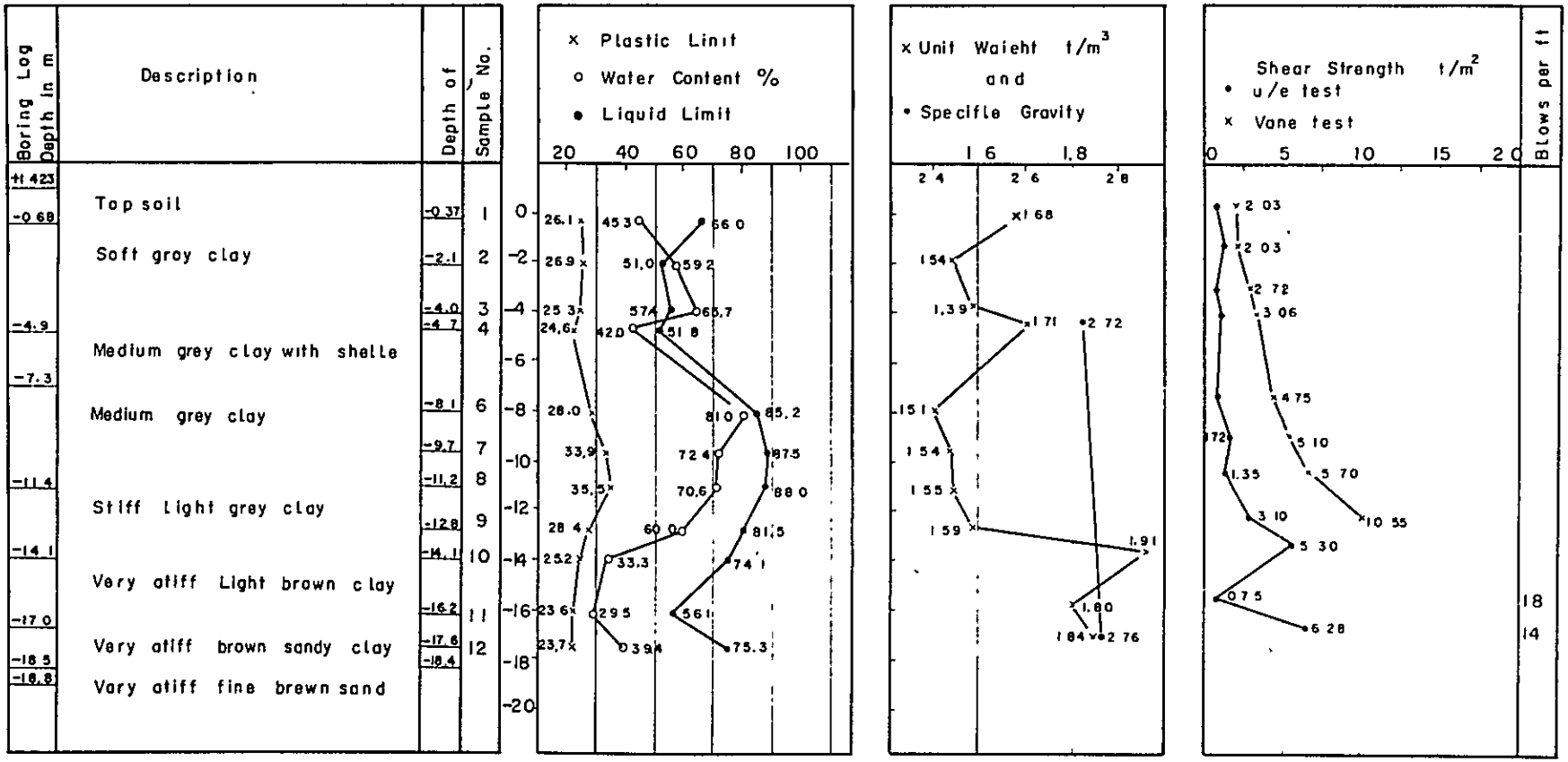
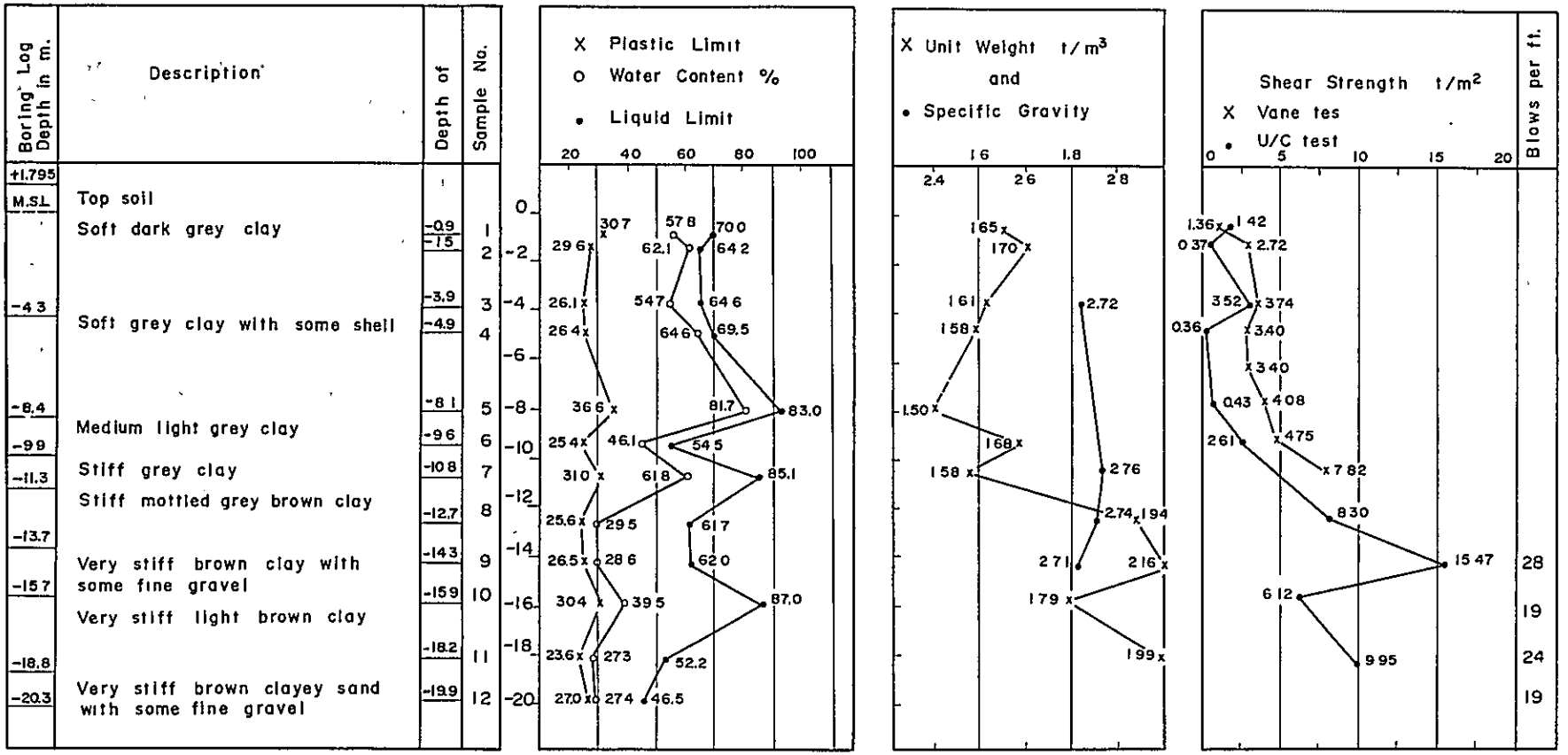


Fig. – 47 Profile of Subsoils along the Alignment of Oriental Hotel and Bangkok Harbour

DIAGRAMMATIC SUMMARY OF TEST RESULTS. BORING N



DIAGRAMMATIC SUMMARY OF TEST RESULTS BORING O



5. Repairing Facilities and Specifications

5-1. Floating Dock

(1) 12,000 G/T type dock is to be equipped with a mooring jetty which is featured by guide rails extended from each of the four dolphins which may be slided when the dock is to sink. The dolphins are joined together to make a pier.

(2) As the repair and maintenance of the dock by self docking is required, the construction of the dock is to be of the sectional pontoon type.

(3) Facilities and main appurtenant facilities of 12,000 G/T type floating dock are as follows (refer to attached tables).

5-2. Civil Work

(1) One 190 m long ship mooring quay (A 6 m water depth at low tide must be secured).

(2) Floating dock mooring quay (An 11 m water depth at low tide must be secured).

(3) Dredging around ship mooring quay and floating dock construction site.

(4) Leveling of ground at the site, pavement of roads and drainage work.

(5) Installation of crane rails and foundation work.

5-3. Buildings

(1) Outfitting & piping shop.

(2) Machine & fitting shop.

(3) Carpenter, rigging & painting shop.

(4) Store

The above will be built of steel frame concrete block.

(5) Workers rest shop

(6) Head office

(7) Dock house

The above will be of simple construction.

5-4. Crane

Jib crane : One 5T/40M Jib crane for dock

One 4T/40m Jib crane for quay

Overhead crane : One 5T/20T crane for machine shop

One 5T/20T crane for outfitting and piping shop

5-5. Service Facilities

(1) Power facilities

Maximum hourly power energy required: 1,500 kw - 1,800 kw

Hourly receiving capacity: 2,000 kw - 2,300 kw

(2) Air compression facilities

Air compressor : 200 HP x 2 units

(3) Gas and water supply

Gas : 7 kg x 300 persons = 2,100 kg/month

Liquid oxygen : M3/0.23 kg x 2,100 kg = 9,000 m^3/month

Maximum hourly supply of water: Approximately 120 T.

Average monthly requirement of water: Approx. 12,000 T.

(4) Tugboat

Although the docking requires three tugboats of 1,000 BHP per vessel, profitability of the dock is not sufficient to maintain these tugboats because of poor working rate. It is desirable, therefore, that the Port Authority of Thailand lease tugboats as may be necessary. For this reason, the cost of tugboat is not included in the project cost.

Table-47 Repair Dock and Auxiliary Facilities Floating Dock (12,000 GT)

Description	Specifications	Remarks
Dock structure	Floating dock	
Slope of dock base, vertical	0	
" " horizontal	1/100	
Height of upper face of board from owl	5.00 m or more	
Height of board	1m60	
Length and breadth of upper face	1.20 x 0.40	
Structural keel board	Concrete and wood	
Working load	80 - 100 T/unit	
Automatic board	Hydraulic or travel type	
Working load of automatic board	50T/unit	
Docking mechanism	Guide rail system, fixed cable and winding wire	
Capacity of docking mechanism	10T/15m/Min.	
Dock side capstan	Dock entrance 5T x 4 units	
winch	Dock head 10T x 2 units	
Flooding apparatus Time required	2 H	
Pumps		
Ballast pump	$100m^3/H$ x 2 units	
High-pressure cleaning pump	$70m^3/H$ x 65 kg/cm^2 x 2 units	
Crane	One unit	
Painting facilities	Four scaling towers	
Power source:	For power supply to ships: 60 600 KVA, 250 KVA For welding machine: 1,500 KVA	
Lighting facilities	For dock side and ships'deck: 600 lux.	
Other supplying system	Water : 100 m^3/H Seawater: 200 m^3/h O_2 acetylene	
Other facilities	Stairways: 4 at the bow and stern	

6. Construction Cost and Others

6-1. Construction Cost

Construction cost was roughly estimated by dividing it into local currency and foreign currency.

Table-48

Classification / Description	Foreign currency		Local currency		Total	
	B1,000	¥1,000	B1,000	¥1,000	B1,000	¥1,000
1. Floating dock (Installation cost included)	113,378		135		113,513	1,680,000
2. Civil work (Quay, foundation of crane, rail, dredging, etc.)	9,792		29,025		38,817	574,500
3. Buildings	6,002		11,478		17,500	251,000
4. Crane	10,775		1,049		11,824	175,000
5. Machine and equipment	18,179		3,337		21,516	318,440
(For dock)	(338)		(1,689)		(2,027)	(30,000)
(For shops & quays)	(17,841)		(1,648)		(19,489)	(288,440)
6. Tools and equipment	2,027				2,027	30,000
7. Service facilities	5,850		4,725		10,575	156,500
Total	166,033		49,763		215,772	3,193,440

6-2. Others

	(B1,000)	(¥1,000)
Land (Preparation of leased land)	5,405.4	80,000
Survey and planning (2 % of construction cost)	4,324.3	64,000
Installation cost	13,513.5	200,000
Working fund	10,135.1	150,000
Total	33,378.3	494,000

6-3. Total Project Cost

	(B1,000)	(¥1,000)
Total of construction cost	215,772	3,193,440
Total of other expenses	33,378	494,000
Grand Total	249,150	3,687,440

7. Production Plan

Production efficiency will be increased through training of workers so that a total of 60 ships can be repaired annually at the fifth year of operation (7 year after the start of construction) as the first step and production will be increased to 70 vessels annually from the fifth year of operation when the workers have attained the required efficiency as the second step.

(1) Annual production

Table-49

Type of work	No. of dock days	No. of vessels/year	Total No. of dock days/year	Sales/vessel	Sales/year
	day	vessel	day	1,000B	1,000B
A. Periodical survey, accident, etc.	7	8	56	1,856	14,860
B. Intermediate survey	4	32	128	1,115	35,700
		42	168		46,900
C. Others	3	20	60	446	8,910
Total		60	244		59,470
		70	288		70,620

Note: The top figures represent the fifth year target applicable up to fourth year of the operation and the bottom figures represent target after the fifth year.

(2) Working Rate of Dock

Up to the fourth year of operation:
244 days ÷ 365 days = 67 %

After the fifth year of operation:
288 days ÷ 365 days = 79 %

(3) Annual Sales

After the fifth year of operation:
70,620,000 ฿/year

(4) Growth Rate of Production

Year	1	2	3	4	5	6	7
Efficiency	←(Training)→		75%	81%	88%	94%	100%
Sales (M฿)			44.5	48.2	52.3	56.0	70.6 (59.5)

8. Manpower Plan

8-1. Direct workers and indirect workers

(1) Sales per direct hours ..... 87.8 ฿

(2) Total working hours versas annual sales

Up to the sixth year from the start of construction:
59,470,000 ฿ - 87.8 ฿ ≒ 680,000 hours

After the seventh year from the start of construction:
70,620,000 ฿ - 87.8 ฿ ≒ 810,000 hours

(3) Working hours per worker

(7H x 25 days x 90 % + 30H) x 12 months = 2,256H/year
(attendance rate) (working hours)

(4) Direct hours per direct worker:

2,256H x 90 % (rate of direct hours by direct workers)
workers) = 2,031 H/year
= 169 H/month

(5) Number of direct workers:

Up to the sixth year from the start of construction:
680,000 H ÷ 2,031 ≒ 330 workers

After the seventh year from the start of construction:
810,000 H ÷ 2,031 ≒ 400 workers

8-2. Manpower Requirement

	Up to the sixth year from start of construction	After seventh year from start of construction	Percentage
Direct workers	330	400	100
Indirect workers	47	55	14
Admin. workers	33	40	10
Total	410	495	

Table-50 Average Annual Cost of Periodical and Intermediate Surveys

G/T	Less than 5 years			Less than 10 years			Less than 15 years			Less than 20 years		
	Yen/1GT	₤/1GT	Million yen	Yen/1GT	₤/1GT	Million yen	Yen/1GT	₤/1GT	Million yen	Yen/1GT	₤/1GT	Million yen
3,000- 4,000	2995	202	1198	3625	249	1476	4080	276	1631	4680	316	1871
4,000- 5,000	2560	173	1281	3150	213	1576	3490	236	1743	4000	270	1999
5,000- 6,000	2270	154	1364	2800	189	1678	3090	209	1856	3550	240	2129
6,000- 7,000	2055	139	1438	2530	171	1769	2785	189	1956	3205	217	2244
7,000- 8,000	1890	128	1513	2325	157	1861	2570	174	2052	2950	199	2860
8,000- 9,000	1760	119	1527	2170	147	1953	2400	162	2158	2750	186	2476
9,000-10,000	1655	112	1653	2035	137	2034	2250	152	2249	2580	174	2580
10,000-11,000	1560	106	1720	1920	130	2116	2125	144	2340	2410	163	2650
11,000-12,000	1490	100	1785	1880	124	2196	2025	137	2429	2320	157	2726

9. Profitability Forecast

9-1. Premise

(1) Though there is a slight gap between the production period and the sales account period, calculation will be made by considering the production as the sales.

(2) Calculation of sales = production will be made at a 5 % growth rate.

(3) It is assumed that the sales comes close to normal gradually as described in Section 7-4 and that the sales attains normalcy in the fifth year of operation.

(4) Calculation of depreciation is to be made by fixed installment method with 10 % residual book value.

(5) Capital raising for construction cost is to be as follows.
Borrowing for total amount ..... 249,150,000 ฿

(6) Terms of borrowing are to be as follows.

Equal payment over a period of 15 years after a five year grace period at an annual interest rate of 5 %.

(7) Amount to be paid as tax (corporate tax) will be added as follows.

Profit before tax x 25 % (only after the elimination of cumulative deficits)

(8) Conversion of all foreign currencies will be made at the rate of 1 Baht = ¥14.8

9-2. Profitability Forecast

Estimated profit and loss calculated on the preconditions described in Section 9-1 are shown in Table 51. The internal rate of return calculated was 10.4 % (Table 52).

Direct material cost (Materials directly turned to products):

1. Base materials such as steel plate, shape steel, pipe, electric wire, lumber, and paint.

2. Machinery such as deck machine, main engine and auxiliary engine.

3. Fittings and hardwares such as valves, cocks, flanges, bolts and nuts.

4. Apparatus and equipment including electric equipment.

Direct labor cost:

Wages paid to workers directly involved in production.

Direct expenses: (Expanses directly required for production:)

Inspection fee, trial run expense, dock charge, towage, engineering fee, transport cost paid, travel allowance for workers.

Direct selling expense:

Cost of mementos for delivery of ships and supervisors' commission.

Indirect cost: (Indirect cost in production sector)

1. Salaries for administrative personnel and supervisors (Foremen) and wages for indirect workers (bonus, retirement allowance and legal social security expenses included).

2. Production support materials such as oxygen, gas and waste cloth and emery paper for repair of ships.

3. Indirect materials consumed in shops and offices (hard hat, gloves, hot water pot and detargent), tools, equipment and furniture and office supplies.

4. Repair and maintenance cost of land, buildings, machinery and apparatus, tools, equipment and furnishings.

5. Travel allowance (Travel allowance not included in the direct cost).

6. Expenses for training of employes.

7. Entertainment expenses, conference expense, miscellaneous expenses, communication expense, membership fee and welfare expenses for employes.

8. Cost of electricity, water and gas.

9. Transport cost

10. Rentals, insurance premium (fire, automobile and repair compensation)
Tax and public charges (real estate tax, automobile tax, etc.)
Fixed costs including depreciation expense.

Indirect selling expense:

Above expense in sales dept.

Administrative expense:

Above expense in administrative department.

Table-51 Forecast of Profit and Loss and Capital Turnover

(Millions of Baht)

	Item	Remarks	1st year	2nd year	3rd year	4th year	5th year	6th year	7th year	8th year	9th year	10th year
Profit and Loss	A Sales	$(1+0.05)^n$			51 60	68.60	67.00	75.00	100 00	105.00	110 00	116 00
	B. Direct material cost	$A \times 0.18 \times 1+0.04)^n$			9 03	10.14	11.46	12.73	16.80	17 50	18 18	18 91
	C Direct cost	$" \times 0.15 \times 1+0.02)^n$			7.10	7.82	8.67	9 45	12.24	12.50	12.75	13.00
	D. Direct labor cost	$9^B \times (1+0.10)^n \times$			8 15	8 96	10 00	10 85	14.20	15.64	17.20	18.05
	E. Indirect cost	$13.5^B \times (1+0.05)^n \times$ "			10.12	11.15	11.71	12.30	15.40	16 20	17.00	17.82
	F Total of cost	B + C + D + E			4 90	38.07	41 84	45 33	58 64	61.8	65.13	68.68
	G Profit before depreciation				16.70	30 83	35 16	39.67	41.36	43.16	44.87	(40 47) 41.32
	H Depreciation cost				10 23	10.23	10.23	10.23	10 23	10.23	10.23	10.23
	I. Administrative expense	A x 0.09			4.64	5.27	6.03	6.75	9.00	9.45	9 90	10 44
	J.		6.75	6 75								
	K. Operating profit and loss		Δ 6.75	Δ 6 75	6.83	5 03	8.90	12.69	22 13	23.48	24.74	26.15
	L Interest on loans	6 %	Δ 0 60	Δ 8.25	15.30	15.30	15 30	15 26	14 71	13.69	12.67	11 65
	M. Interest receivable											
	N. Tax											
	O. Dividend											
	P. Internal reserves		Δ 7 85	Δ 15.00	3 47	10.27	6 40	2 57	7.42	9 79	12.07	15.00
	Comulative total of profit and loss		(Δ 7 35)	(Δ22, 35)	(35 82)	(26.09)	(52 49)	(55 06)	(41.64)	(37 85)	(25 78)	(10 78)
	Q. Operating revenue				51 60	58.60	67 00	75 00	100.00	105 00	110 00	116 00
	R. Operating expenditure		6.75	6.75	39 54	43.34	47 87	52 08	67 64	71 29	75.03	79 12
	S. Balance of operating account		- 6.75	- 6.75	12 06	15 26	19.13	22.92	32 36	33 71	34 97	36 88
	T. Non-operating profit & loss	(Construction cost) 225.50 million Bahts	9.73 9.73	215.77 215.77								
	U. "	(Interest on loans)	0.60	8.25	15.30	15 30	15 30	15 26	14 71	13.69	12 67	11 65
	V. "	(Tax)										
	Balance of total profit & loss		- 17.08	-230.77	- 3 24	- 0.04	3.83	7 66	17.65	20.02	22 30	25 23
	W. Capital											
	X. Borrowings		20.00	235.00								
	Y. Repayment of borrowing							1.30	17.00	17.00	17.00	17.00
	Z Dividend											
	Cash in hand		2.92	7.05	3.97	3.87	7 70	14.06	14.76	17.73	33 03	31.26
	Balance of borrowing		20.00	255.00	255.00	255.00	255.00	253.70	236.70	219 70	202 70	185.70

Table-52 Internal Rate of Return

	Investment	Benefit	Discount Factor		Discount Values	
			10 %	11%	10%	11%
1	17.08	-			- 17.08	- 17.08
2	230.77	-	.909	.900	-209.77	-207.69
3		12.06	.826	.811	9.96	9.78
4		15.26	.751	.731	11.46	11.15
5		19.13	.683	.658	13.07	12.58
6		22.92	.620	.693	14.21	13.59
7		32.36	.564	.534	18.25	17.28
8		33.71	.513	.481	17.29	16.21
9		34.97	.466	.433	16.30	15.14
10		36.88	.424	.390	15.63	14.38
11		37.50	.385	.352	14.44	13.20
12		39.40	.350	.317	13.79	12.49
13		41.50	.318	.285	13.20	11.82
14		43.40	.289	.257	12.54	11.15
15		45.90	.263	.231	12.07	10.64
16		48.00	.239	.209	11.47	10.03
17		50.50	.217	.188	10.05	9.49
18		53.00	.197	.169	10.44	8.95
19		55.50	.179	.152	9.93	8.43
20		58.30	.163	.137	9.50	8.00
					+ 7.65	- 10.46

$$10\ \% + \frac{7.65}{18.11} = 10.4\ \%$$

10. Benefits Derived from Floating Dock

The proposed floating dock not only realize profits as mentioned previously but also brings a direct effect on the increase of employment opportunity in Thailand. Moreover, the shipbuilding industry is an integrated assembly industry, its related industry has to extend to every field of industry. This is also applicable more or less to the ship repair industry. Therefore, the positive steps taken by the central government for the promotion of the ship repair industry will stimulate many other industries and contribute to the growth of economy as a whole.

Transport system is an indispensable factor in the growth of national economy. In particular, marine transport is indispensable for mass and long distance transport in the internationalization of economy. If the marine transport system is likened to a man, the floating dock is a hospital for that man. If sufficient work is to be expected of the man, provision of various facilities required for smooth function of the man will be a must. The basic necessity among these facilities will be a hospital that influences the life of the man.

The floating dock is not only indispensable to the shipping industry as previously stated but will be a great contribution to the savings of foreign currencies amounting to approximately one million dollars which has been paid to foreign docks annually (even though the part of materials required for repair work has to be obtained from foreign countries), as well as to the positive earning of foreign currencies from foreign vessels entering to the port of Bangkok for docking.

11. Problems Related to Repair Shop

11-1. Political measures

(1) Measures will be taken to exempt import duty for equipment and materials.

(2) Protective measures will be taken by prohibiting its own ocean-going vessels to undergo repairs in foreign countries except for special works through establishment of the target year until the dock becomes really proficient.

(3) From a political point of view, this project must be realized at all cost in view of the present trade volume and the number of ocean-going ships entering the port.

11-2. Problems related to facilities

In the present day when the reduction of work time is strongly demanded, efforts must be made to cut the manpower requirement through modernization and mechanization of facilities. In Japan the effort to improve the working rate of the dock is checked by the limited number of quays available. When the demand is stable, it is desirable to provide three quays for each dock but the number of quays will be limited to one and one side of the floating dock will be used as mooring quay at the initial stage of operation. When there is a prospect for the increase in demand and improvement of technology some years often the inauguration, one additional quay will be provided and an additional crane will be installed on another side of the floating dock. A 30 % increase in production will be attained relatively easy through this expansion.

11-3. Technical problems

(1) Approximately 10 % of the total employes, particularly the field workers, will be sent to technically advanced countries for training for about three months in rotation.

(2) Technical assistance by five to six engineers from technically advanced countries will be requested for the initial stage of operation.

(3) Establishment of the dock as an enterprise cannot be expected unless the confidence of domestic ship owners is won and the confidence of foreign ship owners is won for orders of foreign vessels through level up of techniques and reduction of work time by implementing the above.

11-4. Stability and uniformity of rate of operation

While the stability and uniformity of the rate of operation are a precondition of management in any industry, the ship repair industry is recognized as a labor supply type service industry rather than a manufacturing industry. Therefore, the work load and work schedule constantly change for reasons of ships' schedule planned by ship owners and the ship repair industry is considered to follow this schedule as a matter of course. This situation brings about a loss of production resulting from idling facilities on one hand and causes cost up resulting from excess overtime work on the other, thereby causing a great loss to both ship owners and shipyards. This has been taken as a destine of the ship repair industry but the most important and urgent question is to provide a balanced coordination between the marine transport industry and the ship repair industry and make efforts to eliminate waste for efficient management of the enterprise.

11-5. Cooperation of inspection organizations

The inspection system is an important element that has a direct effect on the work time on ships. It is relatively easy to obtain cooperation and appropriate measures from the respective organs for domestic ships. The question is to take appropriate measures to make it easy to obtain cooperation of the respective organs for foreign ships.

11-6. Labor problems

(1) The shiprepairing industry is a highly labor intensive industry which involves many unfavorable working conditions such as "dirty", "dangerous", "heavy manual labor" and "long working hours". For this reason labor safety must be promoted positively. While the shortening of work time is strongly demanded by ship owners as stated previously, it is worthwhile to make a study on the feasibility of implementing overtime work or night shift work in part and on the wage structure.

(2) As already mentioned, this industry is a highly labor intensive industry and unless the workers are trained to possess a positive attitude and a sense of responsibility which paying attention to the importance of education, improvement of productivity cannot be expected.

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Attached Table

Name	Address	Capital (Baht)	No. of workers	Kind of Work						Output	
				Build			Repair			No. of ships built per year	No. of ships built per year
				Steel ship	Wooden ship	Fishing ship	Steel ship	Wooden ship	Fishing ship		
Jitm Por Chai	Nonthabuai		10		o			o		15	35-40
			8					o			20-25
Sampan Nava Dock			4					o			40
Havin Dock			6					o			30
Kan Nail Dock			4					o			30-35
Naiboonmee Dock			5					o			30
Sanga Sungrvang			12		o			o		5-10	30-40
Boon Pan Ya Dock		200,000	16		o						
Cond Yont Dock	Patumthani		6		o			o		3	20-30
Chai SMH Dock	"		5		o			o		5-10	15-20
Sangum	"		6		o			o		5	20-30
Lim Sim Heng	"	40,000	9		o						
Lim Sim Heng	"	100,000	10		o						
Hong Kol Sri Rvput	"	10,000	8		o						
Chon Suri Dock	Chon Bvri		16		o	o				10	
Kanrua Nava Jalocn	"		8		o	o		o	o	3	20-30
Ran Nai Ova.	"		8					o	o		30
Suraj Nava Dock	Suraj Th	20,000	2		o			o			15
Kimlai Sag Haw	"	100,000	6								
Pisit Nava D	"	80,000	25		o			o			
	"	300,000	10		o					6-10	
So Pakd		200,000	10					o			
			12		o		o	o		5	20-30
	Bangkok										
Fug Thai Hpng	(Thori Bu Ri)	20,000	12		o			o			
Rue Kiew	"	200,000	12		o			o			
Thien Song Dock	"	50,000	2		o			o			
So. Po. Dock	"	100,000	5		o			o			
Bangkok No.1 Dock	"	70,000	2		o			o		3	70-80
Woradith Dock	"	100,000	10		o			o		5	5
Thai Rice (Kao Thai)	"	6,000,000	20								

Name	Address	Capital (Baht)	No. of work-ers	Kind of Work						Output	
				Build			Repair			No. of ships built per year	No. of Ships built per year
				steel ship	Wood-en ship	Fish-ing ship	Steel ship	Wood-en ship	Fish-ing ship		
	Bangkok										
Diyayon Dock	(Thonburi)	5,000	4		o			o		7	10
Sangkadee Eng	"	15,000	2								
Thonburi Dock	"	52,000	7					o			
Tun Seng Fud.	"	60,000	9					o			
Din Seng Fud.	"	30,000	5		o						
Hua Heng Long	"	40,000	3		o			o		42	
Somboon Nava	"	100,000	3		o			o		3	5
Thai Chipng Seng	"	10,000	6		o			o		7	7
Haheng Huat	"	10,000	3		o			o		6	6
Thai Heb Heng	"	10,000	4		o			o		5	8
Senglee	"	100,000	5		o			o		8	10-15
Yong Ngonghoad	"	90,000	5		o			o		6	6
Haheng Seng	"	10,000	4		o			o		4	4
Kasem Pradith	"	20,000	2		o			o		6	5
	"	3,000	3		o			o		10	15-20
Mitr Niyom	"	10,000	4		o			o		10	15
Chai Pradith	"	3,000	3		o			o		10	7
Silapachai Dock	"	3,000	3		o			o		8	15
Prayong Lekahat	"	4,000	3		o			o		6	6
Thai Ngon Heng	"	10,000	5		o			o		6	8
Yong Chipng Lee	"	10,000	4		o			o		8	4
Thai Changkol	Thonburi	10,000	22		o			o		3	5
Harin Panich Co.	"	1,000,000	35				o			5	5-10
Thien Lee	"	100,000	30								
S. Panglumphoo Dock	"	1,000,000	14	o	o		o	o		3	5
Ingkarath Dock	"										
	"	120,000	83								
Krung Thon Dock	"		15		o			o		2-4	5-6
Tuan Seng	"		6		o			o		3	5
	"		4		o			o		20	10
Bang Mod Dock	"		4		o			o		20	10
Sroi Fah Dock	"		5		o			o		15	5
	"		4		o			o		10-15	10-15
Ratana Thai Dock	"		4		o			o		10	15

Name	Address	Capital (Baht)	No. of work-er	Kind of Work						Output	
				Build			Repair			No. of ships built per year	No. of ships built per year
				Steel ship	Wood-en ship	Fish-ing ship	Steel ship	Wood-en ship	Fish-ing ship		
Sampao Ship Dock	Thonburi		4		o			o		10-15	10
Klong San	"		30	o	o		o	o		3	6
Kong Seng	"	10,000	4		o			o		5	5
Mitr Sai Chon	"	50,000	4		o						
Teng Yong Sae Heng	"	20,000	4		o			o		3	10
Yong Seng Haud	"	90,000	5								
Bong Kunnon Dock	"		7					o			50-60
Nai Dhun Dock	"		5		o			o		3	40-60
Nai	"		6		o			o		4	40
Nai Suaboon Dock	"		8		o			o		3	30-50
Nailert Co.	Bangkok	80,000	19		o			o		2-3	10-15
Jong Sangon Dock	"	80,000	5	o	o		o	o			
(AR FOOK)	"	30,000	30		o						
Thai Chalern	"	80,000	75		o						
Kwang Seng Fad.	"	3,500	7		o						
Bangkok Dock Co.	"	1,200,000	140	o			o			4-5	10-15
Lee Choon Chieng	"	17,000	20		o						
Sang Hee Dock Co.	"	80,000	45		o						
Suparn Panich Co.	"	1,000,000	90								
Thai Sawad	"	50,000	6		o						
Pitak Panich	"	19,000	4		o						
Haseng Long	"	30,000	5		o			o			
Sengha	"	30,000	6		o					66	
Tun Hear Long.	"	65,000	3		o						
Hong Sawad Panich	"	1,000	3		o			o		15	10
Manas Kijkul	"	10,000	2		o			o		10	7
O. Pradist	"	3,000	3		o					20	
Chai Chalprn	"	2,000	3		o					20	
Thaveepoln JOK	"	3,000	3		o					27	
Boon Chalern Nong	"	5,000	3		o			o		15	10
Soam Rug	"	5,000	5		o			o		8	10
Pravee Gng. Co.	"	60,000	3		o			o		10	5
Samakkee Padriw	"	50,000	5		o			o		15	20
Boonyok Pranich	"		30		o			o		2	4
Yong Ngilong Dock	"		20		o			o		3	4

Name	Address	Capital (Baht)	No. of work-er	Kind of Work						No. of ships built per year	No. of ships built per year
				Build			Repair				
				Steel ship	Wood-en ship	Fish-ing ship	Steel ship	Wood-en ship	Fish-ing ship		
	Samut Prakarn		30		o	o		o	o	10	5
Sri Aroon Dock	"		20					o	o		30
Salng Dock	"		12		o	o				3-4	
	"		18		o	o		o	o	3	10
Siri Prakarn Dock	"		10		o	o		o	o	4	5-10
Nai Lee Dock	"		6		o			o		5	10
Jin Pradit Dock	"		14		o	o		o	o	3	10
Ch. Pradit Dock	"		7		o			o		15	10
	"		6		o			o		10	15
Sook Sawadi Nava Dock	"		16						o		20-25
	"		6		o			o		15	10
	"		6		o			o		10	20
	"	50,000	6		o			o		15	40-50
Hui Sae Yu	"	10,000	4		o			o		10	30-50
	"	50,000	4		o			o		15	40
Cheng Saeheng	"	20,000	3		o			o		10	30-40
Kimsae Sae Wong	"	10,000	13		o			o			
	"		8		o			o		15	40-50
Burana Rom Dock	Samut Sarorn		15		o	o		o	o	3	30-40
Kan Hai Pon	"		8	o	o		o	o		3	60-80
Kan Hai Likit Ravka	"		25		o	o		o	o	3	70-100
Kan Nai Sirivat Jiamvatana Rurk	"		18		o	o		o	o	3	80-100
	"		7			o			o	2	60
	Samut Sarorn	5,000	1		o	o		o	o	3	25-30
Lo. Patama	"	150,000	5		o	o			o	3-5	30-40
Cuai Pichit Dock	"		50		o	o		o	o	3	40-60
T. Som Prasong Chpinavi Dock	"		35		o	o		o	o	3	30-50
Thai Hong Seng	"	10,000	7		o	o		o	o	6	50-70
Prasit Chang Rue	"	20,000	15		o	o		o	o	2	60
Paisal Panich	"	200,000	20		o	o		o	o	3	60-70
Dumrong Thai	"	50,000	2		o	o		o	o	7-10	20-30

Name	Address	Capital (Baht)	No. of work-er	Kind of Work						No. of ships built per year	No. of ships built per year
				Build			Repair				
				Steel ship	Wood-en ship	Fish-ing ship	Steel Ship	Wood-en ship	Fish-ing ship		
Cho Phaya Dock	Samut Sarorn	10,000	1		o	o		o	o	4	30
Ngum Gng. Factory	"	3,000	3		o	o		o	o	3-5	30-40
Hol Leesamul	Samut Songkram	40,000	5		o						
Maeklong Shipdock	"	150,000	2		o			o		3	30-40
Rob Sawang Chitr	"	100,000	6		o	o		o	o	3	30-50
Maeklong Shipdock	"	20,000	1		o	o		o	o	3	30-40
Yokee Sae Dai	"	50,000	6		o			o		2	40
Vayubutr	"	10,000	4		o	o		o	o	3	30-40
Thavee Chai	"	200,000	11		o	o		o	o	3	60-70
Harin Panich Co.	"	30,000	21		o						
Sien Nontharak	"	10,000	4		o	o		o	o	3	40-50
Thanom Sridao Reung	"	65,000	3		o	o		o	o	2	30
	Ayuthaya		5		o			o		3	25-30
Reung Prach	"	30,000	3		o	o		o	o	10	30-50
Knang Ngon Lee	"	70,000	8		o			o		18	40-50
Warn Tanachai	"	50,000	8		o	o		o	o	10	40
Tong Num Lee	"	90,000	13		o			o		6-10	20-30
Num Heng Lee	"	50,000	3		o			o		3-5	30-40
Chai Yontharakij	"	60,000	2		o			o		3	20-30
Sing Chalern Factory	"	60,000	2		o			o			
So. Karnkol	"	60,000	3		o			o		2	30
Sanan Prichadej	"	20,000	3		o	o		o	o	3	20-30
Thai Mitr	"	14,000	4		o			o		4	30
Suk Somboon	"	150,000	8		o			o		3	40
Total	156		1720	5	131	31	6	118	32	858	

Note: Source: Japan Trade Center (Bangkok)