# THE FIELD SURVEY REPORT ON THE BANGKOK FISH MARKET, THAILAND

APRIL 1970

OVERSEAS TECHNICAL COOPERATION AGENCY
TOKYO JAPAN

## Preface

The Overseas Technical Co-operation Agency (OTCA) has the pleasure of presenting the report on Establishment of the Bangkok Fish Market of the Survey Team which was organized and dispatched to Thailand by OCTA upon instruction from the Government of Japan as a preliminary survey on the Establishment of the Bangkok New Fish Market.

E The team stayed in Thailand from 25 September to 25 October 1969 and successfully completed the field survey including discussion with the Authorities concerned, and collection of data with the whole-hearted co-operation from the Government of Thailand and other relevant organizations.

After its return to Japan, the team made further studies on data and information, and the results were hereby compiled into the present report for presentation.

Finally, on behalf of OTCA, I wish to take this opportunity to express my sincere gratitude for the generous cooperation and assistance extended to the team during its stay by the Government of Thailand.

February 1970

Keiichi Tatsuke

Director-General
Overseas Technical
Cooperation Agency
Tokyo, Japan

# C O N T E N T S

## SUMMARY

The Survey Team, consisted of Japanese experts, who had stayed in Bangkok area, Thailand, for approximately one month, and carried out careful survey for providing a construction plan of the Bangkok New Fish Market.

The survey included an analytical study of present conditions of Bangkok Fish Market and of its general circumstances of distribution of fishery products. It was then concluded that it is already impossible for the current Bangkok Fish Market to adapt itself for its current facility needs and that, in order to solve this problem, there are no other ways but to have the Market moved to other place. The principal reason for the above conclusion is that the current fish market is small in size and has no room for future expansion at all, while the amount of fishery products which Bangkok Fish Market must supply will remarkably increase, as the concentration of population into the metropolitan area along with future economic development is keenly anticipated. Another reason for the same conclusion is that the traffic condition around the existing market is extremely poor. Despite the future possibility of great increase in the volume of transportation by trucks and the like, there are no provisions for its improvement.

The survey team thus made a construction plan of the new market that would suit the expected annual total amount of handling in the year 1990, which was estimated after studying various reference materials at 250,000 tons of fresh fish and 17,500 tons of processed fishery products.

The six proposed sites for the construction of the new fish market were suggested by the Thai Government. The team, after careful studies of these sites, confirmed that there are no other places available as additional sites besides these suggested places, and then made a comparative study of these locations.

As the result, the proposed site No. 2 (Yannawa Bend) has been finally selected for the new market because it provides the best circumstances for its needs. The proposed site No. 4 (South Bangkok Power Plant) has some strong points that the proposed site No. 2 does not possess, however, the No. 2 was chosen to be superior after comparing its strong and weak points with those of the No. 4, taking into consideration the future, twenty to thirty years from now.

The expected size and approximate cost of construction are shown in the table below:

Proposed Scale and the Estimated Construction Cost of the New Fish Market

Scale

| | |
|---|---|
| Amount of fresh fish handled in the year 1990 | 250,000 tons |
| Amount of processed fishery products handled in the year 1990 | 17,500 tons |
| Size of the market area | 250,000 $m^2$ |
| Length of the pier with five-meter depth below water level | 770 meters |
| Size of the auction hall for fresh fish and other processed fishery products | 9,000 $m^2$ |

Cost Estimated

| | |
|---|---|
| Purchase of the land | 120,000,000 ฿ |
| Construction cost of fundamental market facilities | 128,000,000 ฿ |
| Construction cost of business office, ice making factory, ice storage and other buildings | 117,000,000 ฿ |
| Total cost | 365,000,000 ฿ |

At the end of the report, suggestions for future improvement in the problems regarding the construction plan, concluded as above, of the new fish market are attached.

In addition, remaining items that have not been discussed this time, and areas of future studies needed are listed as follows.

1. Subjects Necessary to be Discussed in the Survey for Construction of New Market
   - 1- 1. Layouts of the market facilities
   - 1- 2. Geological study
   - 1- 3. Study of the ground level
   - 1- 4. Study of the water depth
   - 1- 5. Geographical study
   - 1- 6. Study of ownership of the land
   - 1- 7. Study on the underground water or river water
   - 1- 8. Structure design of the pier
   - 1- 9. Structure design of other facilities
   - 1-10. Discussion of Construction Process
2. Study on Administration and Management of the New Fish Market

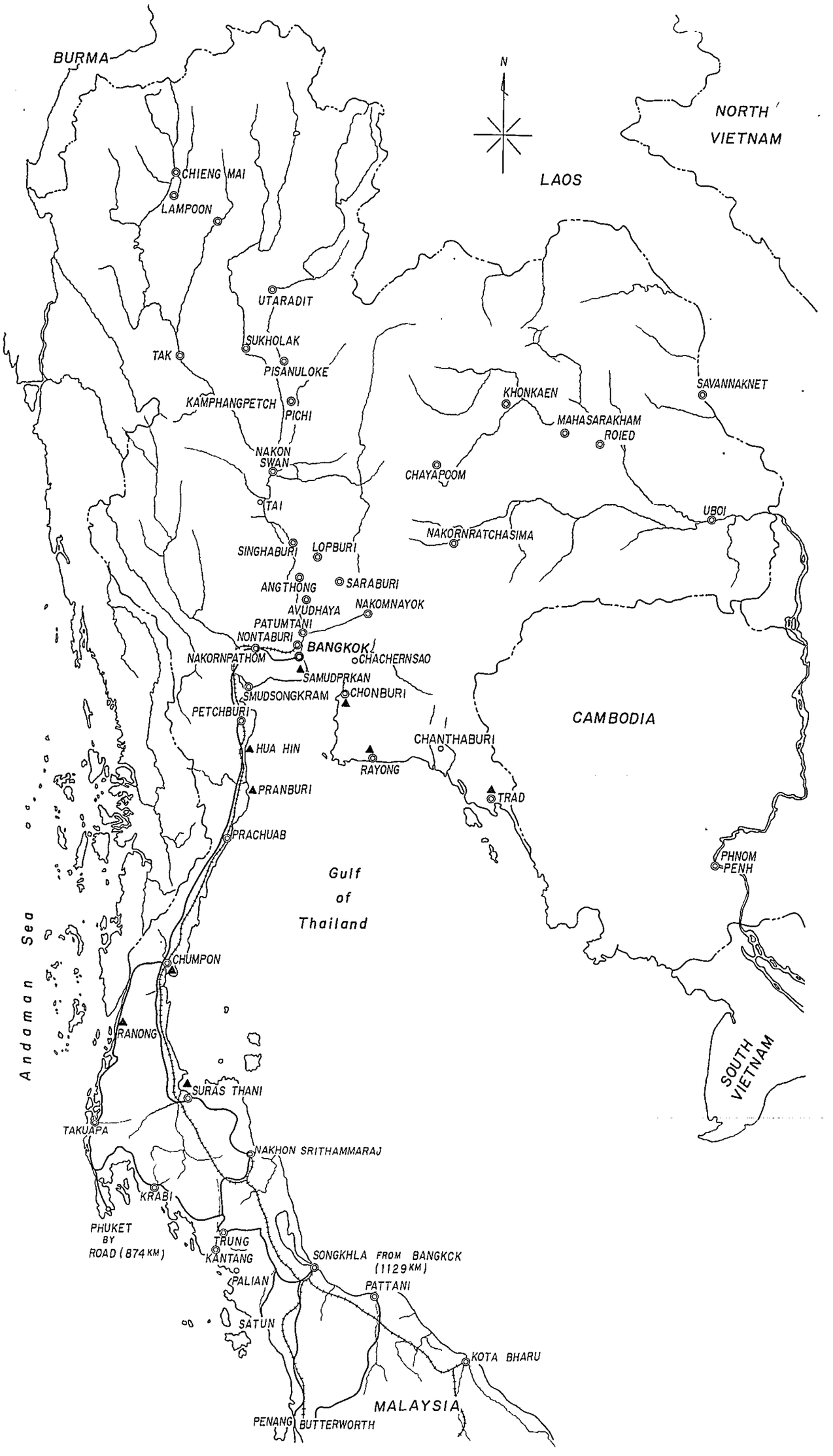

BURMA
N
NORTH
VIETNAM
LAOS
CHIENG MAI
LAMPOON
UTARADIT
SUKHOLAK
TAK
PISANULOKE
KAMPHANGPETCH
PICHI
KHONKAEN
SAVANNAKNET
MAHASARAKHAM
ROIED
NAKON
SWAN
CHAYAPOOM
TAI
UBOI
NAKORNRATCHASIMA
SINGHABURI
LOPBURI
ANGTHONG
SARABURI
AYUDHAYA
NAKOMNAYOK
PATUMTANI
NONTABURI
BANGKOK
NAKORNPATHOM
CHACHERNSAO
SAMUDPRKAN
SMUDSONGKRAM
CHONBURI
PETCHBURI
CAMBODIA
CHANTHABURI
HUA HIN
RAYONG
PRANBURI
TRAD
PRACHUAB
PHNOM
PENH
Gulf
of
Thailand
Andaman Sea
CHUMPON
RANONG
SURAS THANI
SOUTH
VIETNAM
TAKUAPA
NAKHON SRITHAMMARAJ
KRABI
PHUKET
BY
ROAD (874 KM)
TRUNG
KANTANG
SONGKHLA FROM BANGKCK
(1129 KM)
PALIAN
PATTANI
SATUN
KOTA BHARU
MALAYSIA
PENANG
BUTTERWORTH

Fig. - 1

# CHAPTER I

# OUTLINE OF THE SURVEY

## I-1) Background of the Survey

The present fish market in the city of Bangkok has become too small to manage its business because of the increase of fishery products handled there and of the traffic congestion near the market. Transfer of its location to the other suitable place thus has been demanded. The Thai Government made a request to the Japanese Government to submit recommendations regarding such a transfer of the market, i.e., the estimation of the scale of the market, the selection of the location, etc. The Japanese Government sent a team of seven members in September, 1969 to conduct a survey of the construction of the Bangkok New Fish Market. The survey was consigned by Overseas Technical Cooperation Agency, which is one of the executive organizations of the Japanese Government.

## I-2) The Purpose and the Scope of the Survey

The purpose of the survey was to make a preliminary investigation to estimate the scale of the facilities and to select the suitable location for the Bangkok New Fish Market to be constructed.

Items that the survey team investigated for the purpose were as follows:

(1) The present situation and problems of distribution of fishery products in Thailand,

(2) The present situation and problems of Bangkok Fish Market, and

(3) The plan for the construction of Bangkok New Fish Market.

## I-3) The Members of the Survey Team

| member | belonging to | assignment |
|---|---|---|
| Masao Akai (Chief) | Planning Division, Fishery Administration Department, Fishery Agency (F.A.) | overall control |
| Takeshige Yamakawa | Tokai Regional Fisheries Research Laboratory, F.A. | processing |
| Kenichi Kasai | Fishing Boat Division, Production Department, F.A. | fishing boat |
| Ryoichi Ozawa | Fishery Products Division, Fishery Administration Department, F.A. | distribution |

| member | belonging to | assignment |
|---|---|---|
| Juichi Godo | Planning Division, Fishing Port Department, F.A. | fishing port plan |
| Masaomi Sekiguchi | Construction Division, Fishing Port Department, F.A. | fishing port plan |
| Teizo Igarashi | Overseas Technical Cooperation Agency | Coordination |

I-4) Activities of the Survey Team

After arriving at Bangkok, Thailand, on September 25, 1969, the survey team made arrangements for the performance of the survey with officials of the related agencies of the Thai Government, and then acted as the following.

Itinerary

September, 1969

25th The team left Tokyo and arrived at Bangkok

26th After making arrangements at Fish Marketing Organization (F.M.O.) as to the schedule for the survey, visited the Japanese Embassy.

27th After observing the Bangkok Fish Market, confirmed the scope of the survey at F.M.O. and submitted the questionnaire form.

28th Visited Samut Sakorn and made a survey there on the fish market and the situation of the distribution of fishery products.

29th Left Bangkok and studied about the landing facilities and the situation of the distribution of fishery products in the major producing areas, such as Samut Prakarn, Chonburi, Angsila, Sattaheep and Rayong in the provinces of Samut Prakarn, Chonburi and Rayong on the coast in the east of the Thai Bay.

30th Left Rayong and conducted a survey on the landing facilities and the situation of the distribution of fishery products in the major producing areas, such as Ban Pae, Paknam, Thachalape and Klang in the province of Trad and Chantaburi.

October, 1969

1st After making a survey on the landing facilities and the situation of distribution of fishery products in Trad, returned to Bangkok.

2nd Left Bangkok and surveyed the landing facilities and the situation of the distribution of fishery products in the major produc-

| | |
|---|---|
| | ing areas, i.e., Hua Hin, and Pranburi in the provinces of Prachuab Kirikhan, Ranong and Suras-Thani on the coast in the west of the Thai Bay and on the coast of the Indian Ocean. |
| 3rd | Left Hua Hin and made a study on the landing facilities and the situation of the distribution of fishery products in Prachuab Kirikhan and Chumporn, then moved to Ranong. |
| 4th | Made a survey on the landing facilities and the situation of the distribution of fishery products in Ranong and Suras-Thani. |
| 5th | Arranged and examined the results of the surveys made in the producing areas. Moved to Bangkok from Suras-Thani. |
| 6th | Arranged and examined the results of the surveys made in the producing areas. |
| 7-8th | At F.M.O. examined the answers to the questionnaire form with the officials of F.M.O. and Department of Fisheries. |
| 9th | Made a field work in the candidate location on the shore of the Chaophraya Menam for the construction of the fish market on getting on board the survey-boat of the Thai Government. |
| 10th | The survey team was divided into two groups. One of the groups made a survey on the situation of the distribution of fishery products in the cities in the inland area. The other group inspected, using a helicopter, the proposed sites for the construction of the market. |
| 11-12th | Examined and arranged the answers to the questionnaire and the results of the survey. |
| 13-14th | Arranged the results of the survey and exchanged opinions with the officials of F.M.O. and Department of Fisheries. |
| 15th | The team arranged the results of the survey. |
| 16th | Visited Department of Fisheries and exchanged opinions with the Director of Department of Fisheries about the results of the survey. |
| 17th | Arranged the results of the survey with the officials of F.M.O. at F.M.O. |
| 18th-21st | Prepared for the interim report. |
| 22nd | Held a meeting and presented a interim report in the attendance of the officials of F.M.O. and Department of Fisheries. |
| 23rd | Arranged the materials of the survey. |
| 24th | Prepared for returning to Japan. |
| 25th | Left Bangkok. Returned to Japan. |

I-5) Gratitudes

The survey team was given much advice and cooperation from a number of people in various processes of the entire trip. The team wishes to express hearty gratitude especially to the people listed herewith:

Mr. Prida Karnasut

(Director-General, Department of Fisheries, Ministry of Agriculture)

H.S.H. Prince Kosolsuriyathit Suriyong

(Senior Fisheries Technical Officer, Division of Research and Investigation)

Dr. Deb Menasveta

(Senior Fisheries Technical Officer, Division of Research and Investigation)

Mr. Sanan Ruamrak

(Chief, Division of Research and Investigation, Department of Fisheries)

Mr. Udom Mahawangswat

(Deputy Director, Fish Marketing Organization)

Mr. Earn Sukhapinda

(Chief, Division of Bangkok Fish Market, Fish Marketing Organization)

Mr. Tongbai Sirimai

(Chief, Central Division, Fish Marketing Organization)

Mr. P. Uthai

(Chief, Statistics Section, Fish Marketing Organization)

Mr. Nid H. Shiranan

(Chief, Comprehensive Planning Division, Ministry of the Interior)

Mr. Tuanthai Bamrajarinpai

(Secretary-General, Southeast Asian Fisheries Development Center)

Dr. T. Ino

(Deputy Director, Southeast Asian Fisheries Development Center)

Mr. K. Inoue

(Expert on Fisheries Statistics, Department of Fisheries)

# CHAPTER II

# THE CONSTRUCTION PLAN OF BANGKOK NEW FISH MARKET

## II-1) The Fundamental Premises of the Plan

The survey team, in cooperation with the staff of the Thai Government, made a discussion on several items of construction plan for the Bangkok New Fish Market as fundamental premises, which included:

1) The determination of the target year in which the construction plan is to be completed and the market in full operation,
2) The nature and the hinterland of the Bangkok New Fish Market,
3) Various kinds of fishery products that the Bangkok New Fish Market would deal, and amount of each kind,
4) Kinds and each amount of transportation to and from the Bangkok New Fish Market,
5) Systems and method of dealing of fishery products at the Bangkok New Fish Market,
6) Kinds of materials to be supplied for secondary needs at the Bangkok New Fish Market, and
7) Kinds of facilities to be constructed in the Bangkok New Fish Market.

### II-1-1) The Target Year of the Plan

A consideration was given in making the plan that the location of the Bangkok New Fish Market and its total facilities should be convenient and in full operation by the year 1990. The opening of the new market is aimed at 1974. (It does not mean, however, that the Bangkok New Fish Market would not be available for convenient operation after 1990.)

### II-1-2) The Characters and the Hinterland of Bangkok New Fish Market

One of the characters of the current market is "a market in the consuming area" as the supplying center of the fishery products, mostly fresh fish, for people in the Bangkok metropolitan area. The other character, at the same time, is a "distribution market" as it supplies the fishery products for the northern and northeastern part of Thailand. When one accounts on the improvements of highway systems and of the quality control systems of the fishery products, it is expected that the role of the market as "distribution center" will be lessened, while the character of the "market in the consuming area" will be strengthened.

In the presently proposed plan the hinterland of the Bangkok New Fish Market must be defined as Bangkok metropolitan area which includes cities of Bangkok and Thonburi and surroundings for the "market in the consuming area," and as northern part of Thailand for a "distribution market." The amount of the fishery products that the northern part of Thailand would consume through the Bangkok New Fish Market has been assumed to be equivalent to approximately five per cent of the consumption amount of the metropolitan area

II-1-3) Kinds and Amount of Dealings

The kinds of fishery products to be dealt at the Bangkok New Fish Market are defined to be as fresh fish, i.e., marine fish and fresh water fish, and processed products out of these. The total amount of the fresh fish to be dealt at the Bangkok New Fish Market has firstly been mathematically calculated.

According to the materials issued by the Department of Statistics, Thai Government, the total population of the metropolitan area is expected to be 11,895,000 by 1990. The annual consumption amount of the fresh fish by average person living in the above area then has been estimated to be twenty kilograms. In addition, the supplying amount for the northern district, previously estimated as five per cent, has also been accounted for the computation.

The computation formula thus used appears as below.

$$11{,}895{,}000\ \text{persons} \times 20\ \text{kg/yr./person} \times \frac{105}{100} \fallingdotseq 250{,}000\ \text{tons/yr.}$$

Because the future of the fresh water fish industry is not expected to be much prosperous, the amount of this item to be dealt by 1990 was estimated to be equal to that of present.

The managing amount of the frozen fishery products, currently almost negligible and expected to increase in the future, has been accounted for in the above computation.

Various kinds of processed fishery products, hardly existent in the current items dealt in the Bangkok Fish Market, are being sold to a considerable extent in the retail markets in the city. The amount of the processed fishery products to be dealt at the Bangkok New Fish Market, like in the case of fresh fish, should include supplying amount for the metropolitan area and for the part of the northern district. Its estimated amount, according to a survey on household economy made in 1962 among families in the

cities of Bangkok and Thonburi was approximately seven per cent of the supplying amount of fresh fish. The computation formula for the amount of processed marine products in 1990 appears below:

$$250{,}000 \text{ tons/yr.} \times \frac{7}{100} = 17{,}500 \text{ tons}$$

II-1-4) Transportation Systems into and out of Bangkok New Fish Market

The transporting of the fresh fish into the market is being made by cars which transport eighty per cent of the total transporting amount, and by boats, twenty per cent.

The transporting amount of the fishery products into the market by use of boats will increase, as the location of the fishing grounds will become farther, and the larger sized boats will be more popularized.

Although an increase is expected in the amount of marine products from the fishing ground in the Indian Ocean, these products need to be transported to Bangkok via inland transportation system. A sudden uprise in the amount of transported materials by boats therefore is not expected in the future. Thus the estimated ratios in the amount of materials to be transported by cars and by boats are seventy per cent and thirty per cent, respectively. All of the railroads are of single-truck system and the frequency of running is small. Moreover, the geographical availability of railroads for production area is not sufficient. Since no sudden development of the railroad systems around the production area is expected, the amount of materials to be transported by railroad systems into the Bangkok New Fish Market should be considered negligible. The ratio in the forwarding amount of fresh water fish was ninety per cent by cars and ten per cent by boats in 1968. This ratio will be the same in the future.

As far as transportation of the fishery products from the market by boats is concerned, very little amount of it may be done by small boats. This amount, however, is so negligible that it is not accounted for consideration. The transporting method, therefore, is considered to be an exclusive use of cars.

The sizes of the boats are expected to become greater in the future than the current ones, 100 to 150 tons by gross tonnage at the maximum, to 300-ton for trawler boats. The kinds of cars considered to be used for transportation

include ten-wheel, six-wheel and three-wheel cars.

The amounts of arriving materials classified by various transporting routes are shown in Table 2-1.

Table 2-1

| Classification of transportation | 1968 | | 1990 | |
|---|---|---|---|---|
| | annual | daily average | annual | daily average |
| Marine water fresh fish | 102,455 tons | 280 tons | 244,000 tons | 670 tons |
| by cars | 83,212 | 226 | 170,800 | 470 |
| by fishing boats | 19,223 | 54 | 73,200 | 200 |
| Fresh water fresh fish | 5,287 | 15 | 6,000 | 15 |
| by cars | 4,785 | 13 | 5,000 | 13 |
| by fishing boats | 500 | 2 | 1,000 | 3 |
| Total | 107,722 | 295 | 250,000 | 685 |

II-1-5) Dealing Systems and Methods Considered at Bangkok New Fish Market

The systems and methods of dealing fishery products to be adopted at the Bangkok New Fish Market are considered to be fundamentally unchanged from the present style, i.e., the basic method being auction consigned by fishermen. In the construction plan, the auction hall for dealings between the wholesalers and the retailers will be provided, however, the counter for dealings between the middle-men (jobbers) and retailers is eliminated. The latter style of selling is commonly used in Japan, but in Thailand, it is neither currently applied nor assumed to exist in the future.

II-1-6) Kinds of Supplies for Secondary Needs at Bangkok New Fish Market

The Bangkok New Fish Market should be planned to be able to supply various materials which would be necessary for the transportation of fishery products to, from and within the market. Major items among such materials to be supplied are as follows:

a) ice ----- ice which is needed for boats that are going out for fishing, and for cars that are carrying the fish out.

b) water --- water that is necessary for washing the floor of the auction hall, fish, boxes and other things, for producing ice, for drinking water for boats, and for other kinds of drinking water.

c) fuel oil --- fuel oil for boats and cars.

d) boxes and baskets --- boxes and baskets to be used for carrying fresh fish.

II-1-7) Kinds of Facilities to be Constructed in Bangkok New Fish Market Area

The Bangkok New Fish Market should clearly establish the defined market area. In the market area, various facilities for public use should be well distributed, which should be well arranged by the F.M.O. itself. In the outside of the market, processing facilities, dockyard, car repair shop, and etc. should be distributed. For this purpose the F.M.C. may, as one of the market area and provide these lands, after a proper distribution, for related industries. Residences for the officers and workers of the market should be planned in the outside of the market area.

The major facilities that should be established within the market area are listed in the Table 2-2.

Table 2-2

Facilities

For marine water fresh fish

landing pier
shed of the landing pier
resting pier
shed of the resting pier
preparing pier
auction hall
unloading area for cars
loading area for cars
parking area
fish agents' office
ice making factory
ice storage
freezing and cold storage
fuel supplying facility for boats
box storage
basket storage
water supplying facility for boats

For fresh water fresh fish

- mooring facility
- sorting area
- auction hall
- parking area
- fish agents' office
- box storage
- breakwater
- fuel oil supplying facility for boats
- water supplying facility for boats

For processed products

- auction hall
- parking area
- fish agents' office
- box storage

For common use

- water supply facilities in the market area
- electricity supply facilities in the market area
- purification facilities of the river water
- fences
- roads and alleys within the market area
- office buildings for the F.M.O. and B.F.M.
- office buildings for various government agencies
- car-pool station
- welfare facilities
- greens
- filth and sewage processing facilities
- facilities for maintenance of the canals, bridges and revetment
- stores
- car repair shop

II-2) Selection of the Location for New Market

As mentioned before the current Bangkok Fish Market is too small in its size to manage the market functions without difficulties. In order to solve the problem, the following three alternatives were considered; (a) rearrangement of the current market facilities, (b) expansion of the current market, and (c) transfer of the market.

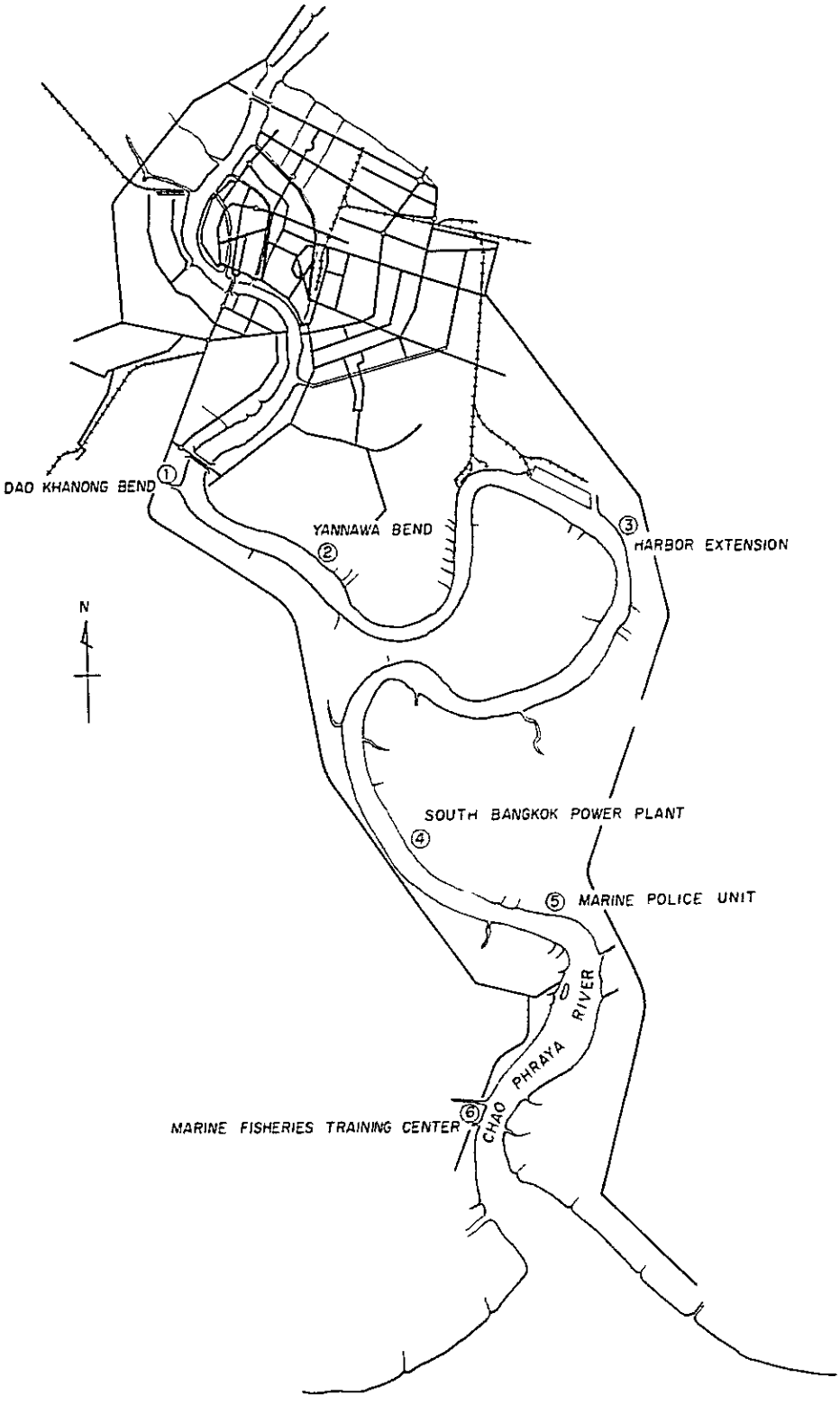

DAO KHANONG BEND
①
YANNAWA BEND
②
③
HARBOR EXTENSION
N
SOUTH BANGKOK POWER PLANT
④
⑤ MARINE POLICE UNIT
CHAO PHRAYA RIVER
MARINE FISHERIES TRAINING CENTER
⑥

Fig. - 2 -1

As far as the first alternative method (a) is concerned, there are various reasons that make the solution impossible and impractical, such as; lack of land, practical and highly effective land usage impossible because of the ruggedness of the land, lengths of pier and shore-line insufficient, narrow roads that lead to entrance and exit gates and difficulty in its expansion, and chronic traffic paralysis of the New Road which is the outgoing trunk traffic line from the market.

The second alternative, method (b) is also impossible because there are a dock-yard on the upstream adjacent area and a large factory on the downstream adjacent area.

The transfer of the market or the third alternative, method (c) is, therefore, the only possible practical solution.

Six sites were proposed by the Thai Government, as shown in Figure 2-1. Since the survey team could not find better site other than these six ones, the team has discussed the strong and weak points of each site and compared these before selecting the one most suitable for the need. The process of discussion will be exhibited hereafter.

II-2-1) Outline of the Proposed Sites

The six sites which were originally suggested by the Thai Government are as follows:

1)-a Site No. 1: Dao-Khanong Bend

1)-b Site No. 2: Yannawa Bend

1)-c Site No. 3: Harbor Extension

1)-d Site No. 4: South Bangkok Power Plant

1)-e Site No. 5: Marine Police Unit

1)-f Site No. 6: Marine Fisheries Training Center

II-2-2) Factors for Selection

The location of the Bangkok New Fish Market should well satisfy, the following twelve conditions. There are other factors as well that would determine the applicability of the general standpoint of fishing market. As far as these six sites are concerned, however, their locations are roughly equal each other, and thus these will not be discussed here.

2)-a Sufficient size of the land,

2)-b availability of the length of the land facing the river,

2)-c the fishing boat traffic near piers being easy and convenient,

2)-d mooring of the fishing boat doesn't affect the traffic of other boats,

2)-e little difficulties in and good balance among the transportation systems from the producing area to the market and from the market to the retailer's market,

2)-f maintenance of the depth of the water for the boat traffic being easy,

2)-g availability of public utility service without difficulty, such as water and electricity supplies,

2)-h not affecting the function of the Commercial Harbor,

2)-i consistency with the specified land usage in the metropolitan construction plans,

2)-j possibility of future development,

2)-k practicality in obtaining the land,

2)-l supply of the labourers without difficulty, and

2)-m construction cost less expensive.

II-2-3) Analysis of Factors for Selection of Each Site

3)-a Sufficient Size of the Land

Sites No. 2, 4, and 5 have enough space of land. Site No. 1 is too small. Sites No. 3 and 6 have enough space for fish market alone, however, each of these stands near related factories, and therefore, cannot be available.

3)-b Length of the Shoreline

Since thirty per cent of the fish dealt at the market are carried there by boats, the pier should have enough length for arrival and moorage of these boats. Its length, as will be calculated later, should be approximately 800 meters. In consideration of the repairing shops for the boats, which may be established in the adjacent areas of the Bangkok New Fish Market, the length to meet such requirement should be taken into account in the calculation of the length of the shoreline facing the river.

Sites No. 1 and 3 have rather short shorelines for the need, while No. 2, 4, 5, and 6 have enough length.

3)-c Conveniency for Boats' Traffic Near the Pier

The degree of difficulty of the fishing boats' sailing to and from the pier of the fish market depends upon the velocity of the stream, visibility at the bend, width of the river, and other similar conditions.

Site No. 1 is located at the bend immediately downstream of krungthep Bridge, where the stream is fast. The visibility from the downstream is, despite the location being at the bend, not poor, while the width is not too enough. As a whole, this site does not have any serious defect.

Sites No. 2, 4, and 6, in general, provide convenient circumstances for boats' traffic near the pier.

Site No. 3 is situated at a rather narrow river width, and in between commercial and navy ports, which, in turn, will produce undesirable competition for fishing boats with these vessels of greater size.

Site No. 5 is located at a bend, with a poor visibility from the downstream. It has not, thus, good conditions for boats' traffic near the pier.

3)-d Moorage at the Pier without troubles to Other Vessels

Site No. 1, because of the narrow river width, and Site No. 3, in the same reasons mentioned previously, stand inferior in this respect.

3)-e Well Balanced Transportation Systems Between Various Related Area

The fundamental premises in judging the conveniency are listed as

follows:

i) Larger number of cars will come from the direction of Malayan Peninsula and thus the location of the market should better be on the Thonburi side of the river.

ii) Larger number of cars will go in the direction of Bangkok City and thus it should better be on the Bangkok side of the river.

iii) The ratio between the numbers of transports by cars coming in and going out of the market is approximately 1/5, and thus it is better to consider the convenience of the cars going out.

iv) No bridges nor ferries may be planned on the downstream side of the Commercial Harbour.

v) According to the draft for the Second New Bridge Construction Plan, the Bangkok Outskirt Loop Highway System would go through Krungthep Bridge, and the site No. 2, is planned in relation to the New Bridge Construction Plan.

vi) All of the roads between Bangkok and Paknam are already crowded.

After discussion in reference to the above premises, Site No. 1 and 6 stand very poorly, while others, sites No. 2, 3, 4 and 5 stand at better conditions, in this order. But as far as Sites No. 4 and 5 are concerned, the poorer coming-in-traffic condition than that of Site No. 2, may not be a serious shortcoming when the completion of the Outskirt Loop Highway System is assumed. For the loss of time by cars of one hour in addition to the longer trip they have made before coming into the metropolitan area may be small enough to be ignored.

The improvement plan of the Bangkok-Paknam Highway System which is already overly crowded, would affect the condition of Site No. 4 in its capacity to bring out the fishery products. If such an improvement plan of this highway system may be realized on the responsibility of the Thai Government, the weakpoint of the Site No. 4 would be lessened.

In conclusion, the Site No. 2 stands at an excellent condition while No. 4 and 5 stay slightly behind in this respect. Whether the highway plan be realized or not would, however, affect the ranking, i.e., Site No. 4 and 5 may not be in a poor condition, and No. 3 may be classified as an intermediate one.

3)-f Ease in Maintenance of Water Depth for Boats' Route

The annual amount of dredging being undertaken on the downstream of the Commercial Harbor is currently more than one million cubic meters.

The new market, therefore, if the enough depth for needs be currently maintained at the place, may need little consideration about this problem from its future standpoint.

Although a detailed study should be conducted for the final conclusion, it generally seems that the necessary water depth for the pier may be obtained at twenty-thirty meters off the current M.W.L. shoreline towards the middle of the river stream, in any of the sites.

3)-g Availability of the Public Utility Service

Sites No. 4 and 5 may not be able to receive such services.

3)-h Little Effect on the Function of the Commercial Harbor

The Site No. 3 is so near the Commercial Habour that it will affect the larger vessels' traffic.

3)-i Consistency with the Metropolitan Land Usage Plans

Since the Site No. 2 and surrounding area are classified as warehouse zone, the availability of this location as a site for the new market should be re-evaluated. The fact that the location of the fish market being in the warehouse zone may not affect other metropolitan functions, however, it will certainly decrease the total area of the warehouse to be constructed in this area. A careful rearrangement of the expected capacity of the warehouses, therefore, should be undertaken in reference to its total capacity already planned.

Other sites do not seem to have any difficulties in this respect.

3)-j Possibility of Future Development

Sites No. 4 and 5 stand at the best condition as viewed from this standpoint. Site No. 2, currently being covered by a vast coconut palm jungle, is well suited for any kinds of usage, however, no space may be available for further development unless the land is preoccupied for the purpose, in the coming twenty to thirty years.

Sites No. 1, 3 and 6 stand poor in this respect.

3)-k Ease in Obtaining the Land

A few houses are currently located along the shore of the river in the land for the Site No. 2, and thus it will be necessary to provide compensative expenses for them.

In the case of Site No. 1, buildings occupy the land along the shore of the river as well as the near side of the location. To obtain the land, if not impossible, may be extremely difficult.

Navy and the Commercial Harbors are currently competing in obtain-

ing the land for Site No. 3, and a difficulty is keenly anticipated for the fish market to begin a negotiation for land purchase.

There are no difficulties in Sites No. 4, 5 and 6.

3)-l Availability of Labour

A careful consideration should be given for the availability of labour, as market labourers naturally work in the early morning. Since many of the workers for the market currently live in the city of Bangkok, the availability in this respect stands in the order of No. 1, 3, 2, 4, 5 and 6.

3)-m Lower Construction Cost

All of the six proposed sites stand on level ground and the similar foundation condition and at the same height from the water level. The construction cost of the fish market then, no matter at which site it will be built, may vary little each other. The total cost may vary considerably according to whether or not the road to lead into the market be built at the expense of F.M.O.

II-2-4) The Selection of the Location

In the table below a series of resultant evaluation scores of proposed sites on each item of selection premise is listed with mark "3" being the best and "1," the poorest (Evaluation by construction cost being excluded).

A mark "0" means a fatal defect for respective factor. Even if other premises are well satisfied, a location which includes such a defect cannot be selected as a site. The total evaluation score with parentheses such a defect location.

Table 2-3 Evaluation of Proposed Sites

| Premise \ Site number | 1 | 2 | 3 | 4 | 5 | 6 |
|---|---|---|---|---|---|---|
| a) sufficient size of land | 0 | 3 | 1 | 3 | 3 | 1 |
| b) length of shoreline | 0 | 3 | 2 | 3 | 3 | 2 |
| c) conveniency for boats' traffic | 2 | 3 | 2 | 3 | 1 | 3 |
| d) anchorage at the pier without troubles | 1 | 3 | 1 | 3 | 2 | 3 |
| e) well balanced transportation | 1 | 3 | 2 | 2 | 2 | 0 |
| f) ease in maintenance of water depth | 3 | 2 | 3 | 2 | 2 | 3 |
| g) availability of public utility service | 3 | 3 | 3 | 1 | 1 | 2 |
| h) little effects on the function of Commercial Harbour | 3 | 3 | 0 | 2 | 2 | 2 |
| i) consistency with the Metropolitan Land Usage Plan | 3 | 2 | 3 | 3 | 3 | 3 |
| j) possibility of future development | 0 | 2 | 1 | 3 | 3 | 1 |
| k) ease in obtaining land | 2 | 2 | 0 | 3 | 3 | 3 |
| l) availability of labour | 3 | 3 | 3 | 2 | 2 | 1 |
| total score | (21) | 32 | (21) | 30 | 27 | (24) |

From the table above, Sites No. 2, 4 and 5 remain excellent. Site No. 5, however, is closely located with Site No. 4 and it may rather be considered as a part of Site No. 4.

A detailed comparison between Sites No. 2 and 4 will be given later. The construction cost for these sites are estimated as follows:

Table 2-4 (unit being ฿)

| Items of cost \ Site number | No. 2 | No. 4 |
|---|---|---|
| 1. Purchase of land (150 rai) | 120,000,000 | 52,500,000 |
| 2. Incoming road construction | 0 | |
| | | (50 rai) |
| * purchase of land | 0 | 17,500,000 |
| construction cost | 0 | 20,000,000 |
| 3. Facilities for electricity and water | 0 | 3,000,000 |
| Sub-total | 120,000,000 | 93,000,000 |
| 4. Construction cost for market facilities** | 245,000,000 | 245,000,000 |
| Grand total | 365,000,000 | 338,000,000 |

* Estimated cost of land purchase has been taken from the materials by Thai Government.

** The construction cost for market facilities has been calculated in reference to Table 2-11.

II-2-5) Conclusion

The survey team has thus selected, based on what has been discussed in preceding sections, the Site No. 2, Yannawa Bend as the point with better conditions for premises. More specific reasons for decisions are:

a) The proposed sites except No. 2 and 4 have been selected out as seen in Table 2-3, and thus the final selection should be made between these two sites.

b) The difference between Sites No. 2 and 4 in the estimated construction cost has been calculated to be approximately 7 per cent of the total construction cost.

c) In the premise item No. (e), i.e., the availability of convenient and well balanced transportation and, traffic systems, which is one of the more important factors surpassing other items, the Site No. 2 stands superior.

For this judgement, the Thai Government will need to determine the final selection of the site applying the following considerations.

a) The cost of the land purchase for this location is quite high in comparison with the maximum estimation, the Site No. 2 will be

favoured more.

b) Sites No. 2 and 4 have been selected with the assumption of the highway construction plan by the Thai Government. The assumption regarding the Site No. 2 is that the Bangkok Loop Highway System is close to its completion, and regarding the Site No. 4, the improvement of the Bangkok-Paknam Highway Line System will be accountably delayed. A possible alteration in the foresight of the completion of presumed highway construction plans, indicated above, would affect the selection premises.

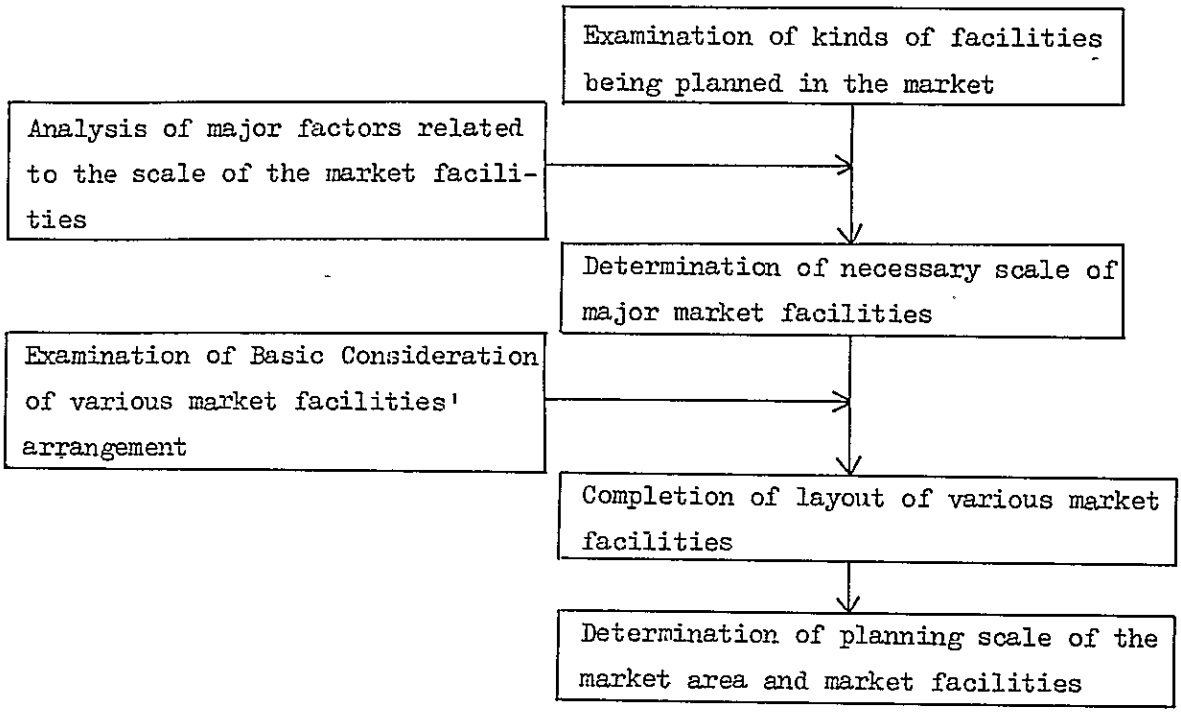
## II-3) Planning of the Market Area and Its Facilities

### II-3-1) Basic Consideration

The planning of the market and its facilities will be made to suit the premises of Site No. 2. In this survey, the scale of the market and its facilities will be discussed, and the resultant outcome will become the conclusion.

Discussions have been made on the layout of the market facilities in order to determine their scale, but not the smoothness and convenience in using these facilities. Further discussion should be conducted for the final layouts from the standpoint of practical usage, in view of the said situation.

The scale of each market facility and the total market area, shown in Table 2-10, should be considered as respective general planning scale. The procedure for the planning of the market area and market facilities, to be mentioned later, is illustrated below:




II-3-2) Analysis of Major Factors Related to the Scale of the Market Facility

a) Nature of the Soil, and Earthquakes

No survey on nature of the soil of the planned location has ever been made in the past. The geographical position of the lower Chaophraya River is assumed to be under the same basic land condition.

Judging from the test materials collected around the Bangkok Commercial Harbor by means of boring indicate, shown in the Appendix, the ground seems to be quite soft. More detailed and accurate data through further surveys are necessary to provide for the future planning. Yet as long as this result is concerned, no plans would conceivably be interrputed in view of the soil condition.

No specific considerations have been given for the possibility of earthquakes.

b) Water Level and the Height of the Reclamation Ground

The water level at the Bangkok Commercial Habor is as indicated in the right-side Figure , the datum level being M.S.L.

| | |
|---|---|
| 1.80 | H.W.L. |
| 0 | M.W.L. |
| 1.60 | L.W.L. |

Although in the past, certain water floods have resulted from this river during the rainy seasons, such floods to a serious extent have been limited to few cases in the recent years, after completion of the dam construction in the upstreams. No adverse stream of considerable amount due to unusual meteorological conditions is observed at all. The height of the ground reclamation, therefore, may be mainly influenced by the viewpoint of convenience for drainage within the market area. The original height of the ground of the planned point is approximately 0.5 meter above mean water level, (though this should be re-examined in the future). It is recommended to make a reclamation of additional 2.5 meters which will make the resultant height of 3.0 meters above mean water level.

c) The Amount of Fishery Products Handled Daily

On the basis of annual amount of materials to be managed by each of various transportation routes (Table 2-1), the amount of fishery products to be handled daily is concluded as shown in Table 2-5. It is then necessary to plan the scale of facilities that can manage above amount.

This "amount for the standard day," larger than the amount of handling for an average day, was obtained after considering that the amount for the standard day should not be exceeded by that of daily handling in more than 90 per cent of the days during the year.

Table 2-5

| Classification | 1968 | | | 1990 | | |
|---|---|---|---|---|---|---|
| | annual total | average day | standard day | annual total | average day | standard day |
| | tons | tons | tons | tons | tons | tons |
| Marine fresh fish | 102,435 | 280 | 340 | 244,000 | 670 | 804 |
| transported by cars | 83,212 | 226 | 290 | 170,800 | 470 | 602 |
| transported by boats | 19,223 | 54 | 85 | 73,200 | 200 | 312 |
| Freshwater fresh fish | 5,287 | 15 | 18 | 6,000 | 16 | 205 |
| transported by cars | 4,785 | 13 | 15.5 | 5,000 | 13 | 17 |
| transported by boats | 500 | 2 | 2.5 | 1,000 | 3 | 3.5 |
| Fresh fish Total | 107,722 | 295 | 355 | 250,000 | 685 | 820 |
| Processed Materials | 857 | 2.3 | 2.3 | 17,500 | 48 | 48 |

d) Analysis of Incoming Boats of the Bangkok New Fish Market (for marine fresh fish)

d-1. Amount of Catch and Annual Frequency of Trips (for Fishing) per Boat of Various Sizes in 1968

Table 2-6*

| Tonnage of Fishing Boats (gross tonnage) | Catch per Trip | Annual Frequency of Trips | Catch per Boat per Year |
|---|---|---|---|
| tons | tons | times | tons |
| -30 | 3 | 100 | 300 |
| -50 | 10 | 30 | 300 |
| -80 | 20 | 20 | 400 |
| -150 | 40 | 12 | 480 |
| -200 | (60) | (9) | (540) |
| -300 | (80) | (8) | (640) |

* From materials of Department of Fisheries, Thai Government, except data with ( ) estimation by the survey team.

d-2. Estimation of Number of Boats Entering Bangkok Fish Market in 1968

On the basis of the materials by F.M.O., the yearly total number of boats entering the port in the year 1968 have been estimated as shown in Table 2-7.

d-3. Estimation of Number of Boats Entering Bangkok New Fish Market in 1990

The number of boats entering the Bangkok New Fish Market in 1990 have been estimated, by use of tables 2-5 and 2-7, as shown in Table 2-8.

Table 2-7

| Tonnage of fishing boats (gross tonnage) | Number of entering boats | Annual frequency trip (for fishing) per boat | Catch per trip | Annual total number of entering port | Annual amount of landing |
|---|---|---|---|---|---|
| tons | | times | tons | | tons |
| -30 | 8 | 100 | 3 | 800 | 2,400 |
| -50 | 20 | 30 | 10 | 600 | 6,000 |
| -80 | 22 | 20 | 20 | 440 | 8,800 |
| -150 | 8 | 12 | 40 | 60 | 2,400 |
| Total | | | | 1,900 | 19,600 |

Table 2-8

| Tonnage of fishing boats (gross tonnage) | total number of trips | 1968 | | |
|---|---|---|---|---|
| | | daily number of entering boats on an average day | daily number of entering boats on a standard day | amount of standard landing on a standard day |
| tons | | | | tons |
| -30 | 800 | 2.2 | 3 | 9 |
| -50 | 600 | 1.65 | 2 | 20 |
| -80 | 440 | 1.21 | 2 | 40 |
| -150 | 60 | 0.16 | 1 | 40 |
| -200 | 0 | - | - | - |
| -300 | 0 | - | - | - |
| Total | | | 8 | 109 |
| (Amount of daily landing on a standard day according to Table 2-5) | | | | (85) |

Table 2-8 (continued)

| Tonnage of fishing boats (gross tonnage) | total number of trips | 1990 | | |
|---|---|---|---|---|
| | | daily number of entering boats on an average day | daily number of entering boats on a standard day | amount of standard landing on a standard day |
| tons | | | | tons |
| -30 | 800 | 2.2 | 3 | 9 |
| -50 | 600 | 1.65 | 2 | 20 |
| -80 | 440 | 1.21 | 2 | 40 |
| -150 | 420 | 1.15 | 2 | 80 |
| -200 | 315 | 0.87 | 3 | |
| -300 | 256 | 0.73 | | 210 |
| Total | | | 12 | 359 |
| (Amount of daily landing on a standard day according to Table 2-5) | | | | (312) |

Table 2-9

| Tonnage of fishing boats (gross tonnage) | Number of Boats arriving | Length of berth | Length of the pier | | |
|---|---|---|---|---|---|
| | | | landing pier | resting pier | preparing pier |
| -30 tons | 3 | 25 meters | 400 meters | 220 meters | 150 meters |
| -50 | 2 | 30 | | | |
| -80 | 2 | 35 | | | |
| -150 | 2 | 40 | | | |
| -200 | 3 | 50-55 | | | |
| -300 | | | | | |

e) Unloading Area for Arriving Cars with Marine Fresh Fish

The unloading area for arriving cars transporting marine fresh fish, when assumed to be established along one of the side-walls of the auction hall, will require a width of ten meters and a length of 200 meters, approximately. The area then should be covered by a roof.

f) Loading Area for Leaving Cars with Marine Fresh Fish

The loading area for leaving cars transporting marine fresh fish,

when assumed to be established along one of the side-walls of the auction hall, will require a width of eight meters and a length of 350-400 meters, approximately. The area then should be covered by a roof.

g) Ice Making Factory

The ice making factory with its daily production capacity being 330 tons which will amount to one half of the daily necessary amount, should be planned for a size of 7,000 to 8,000 square meters.

h) Ice Storage

One large-sized ice storage which can store ice with a capacity of an amount which may be consumed by the Bangkok New Fish Market in ten days, and one small-sized with a capacity for one day consumption, should be planned to conform to respective sizes, 3,000 to 4,000 and 1,000 square meters. The storage should be divided into several units, each less than 1,000 square meters.

i) Box and Basket Storage for Marine Fresh Fish

A basket storage for transporting commercial goods for retailer market, of 700 to 800 square meters as well as box storage for those fishing boats and for cars, of 600 and 4,000 square meters, respectively, should be planned.

j) Market Area for Freshwater Fresh Fish

The market area for freshwater fresh fish is planned to be established independently which will require an approximate size of 5,000 square meters with the following facilities distributed within the area: sorting area, auction hall, agent office building, parking area, box storage, mooring area, etc.

k) Market Area for Processed Products

The market area for processed products, the approximate size of which will require 5,000 square meters, should include facilities, like auction hall, agent office building, parking area, box storage, etc.

l) Residence Area

A residence building consisting of three stories for officers, to include forty five units of seventy square meters each, or total size of land for building of 1,050 square meters, should be planned. In addition, a residence building consisting of four stories for labourers, to include 200 units of sixty square meters each or total size of land for building of 3,000 square meters, should be planned. Twenty thousand square meters of land for the residence area for the buildings, the total size being 4,050 square meters, should be secured.

m) Parking Area of Cars for Fish Transportation

A parking area with its size approximately 20,000 square meters should be planned for cars that will transport marine fresh fish.

II-3-4) Principles of Layout of Each Market Facility

In arranging layout of various market facilities are roughly stated as follows:

a) Facilities of market areas for marine fresh fish, freshwater fresh fish and processed products should be planned to be separately located.

b) The pier for marine fresh fish should be built securing five-meter depth of water from the L.W.L.

c) The pier for marine fresh fish shall be divided for use into three areas, i.e., for fish landing, for resting and for preparation for boats' leaving for catch.

d) The pier for marine fresh fish should be constructed along the shore of the river. For the construction of mooring area by dredging the land from the river has shortcomings such as the difficulty to maintain the water depth at the entrance to the mooring area, expensiveness of the dredging activity, and the sand and mud dredged from this area not being of good enough quality to be used for reclamation.

e) Marine fresh fish is mostly transported into the market and exclusively transported out from there by use of cars. In order to avoid a crowdedness of cars, activities of loading to and unloading from the cars must be planned to be separately conducted each other.

f) Though no box storage exists at present, such a box storage should be planned for new boxes to be provided.

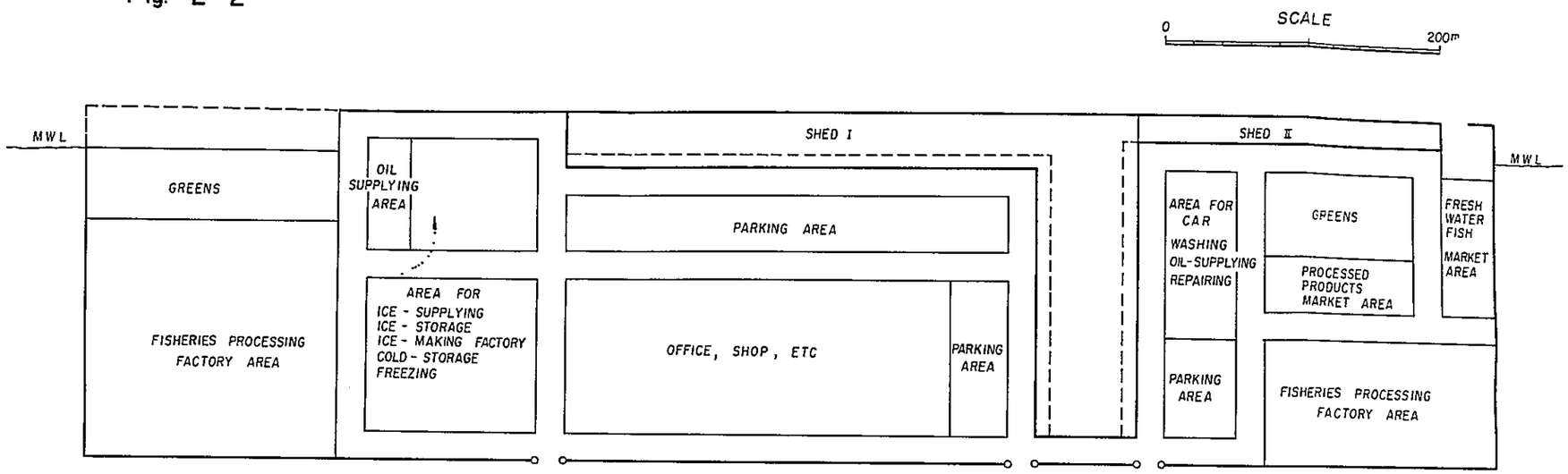
g) A large ice storage which may have a capacity to store an amount of ice equivalent to the consuming amount of the Bangkok New Fish Market in ten days. Several small-sized ice storages should be constructed in other places besides the large one, for the convenient daily use.

h) A small-sized ice storage, box and basket storage and other similar facilities should better be planned, being spread out in the auction hall and the sorting shed.

i) A breakwater is needed as the boats for freshwater fresh fish are of rather small sizes.

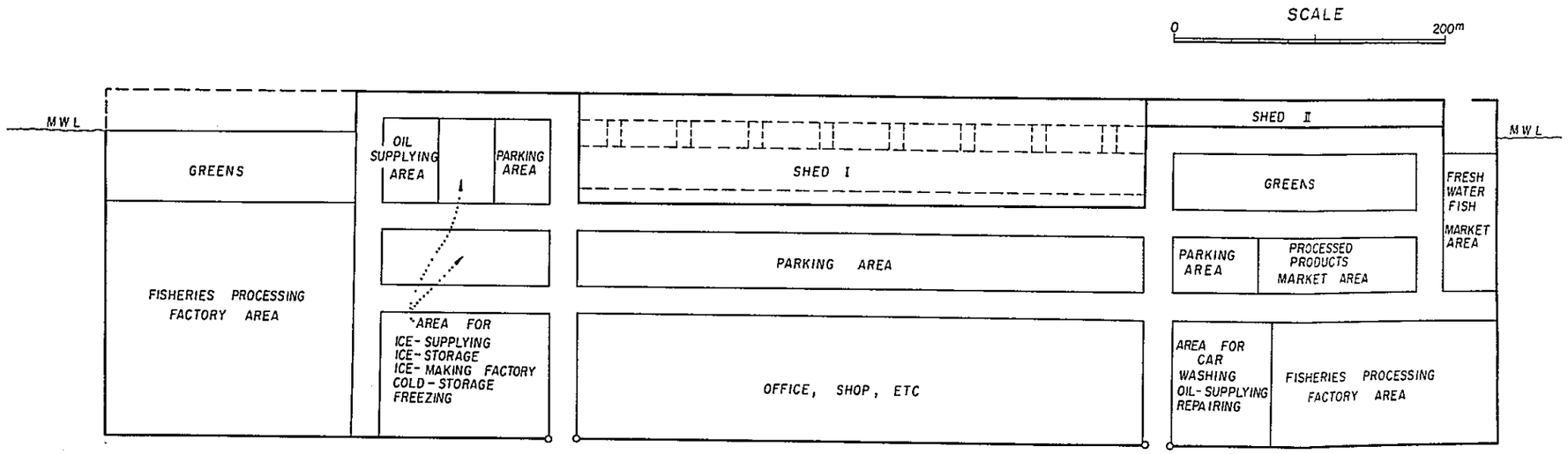
MENAM CHAO PHRAYA

Fig.-2-2




MENAM CHAO PHRAYA

Fig.-2-3



j) The roads within the market area should be planned to have width of twenty to forty meters.

k) The amount of water to be used at the Bangkok New Fish Market yearly is estimated to be 600,000 to 800,000 cubic meters, its usage being for production of ice, washing auction hall floor, supplying to the fishing boats, washing fish, washing cars, general drinking, and others. Since all of the water of such amount can not be supplied via Bangkok municipal water supply system without difficulty, water of river and/or of underground needs to be partly, if not wholely, used. A purification facility of such water is therefore necessary to be constructed.

l) Buildings for F.M.O. and other various agencies should be constructed being concentrated in one area.

m) The total size of the space for the market area should include a certain land space for processing factories, in addition to the land for public facilities directly related to F.M.O. and the Bangkok New Fish Market.

n) The planned location for the proposed construction is presently a marshy area with several waterways existing in it. These waterways include those that may be filled in and those that may be kept as they are now. The latter ones, however, are hoped not to remain in the market area, and in such a case, necessary facilities such as bridges and revetments should be planned for them.

o) Residence for Officers and Labours

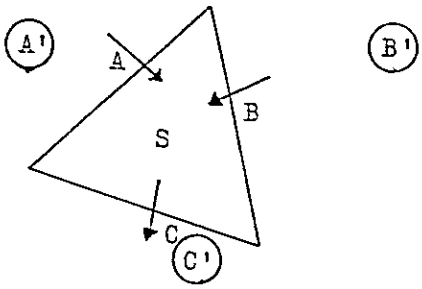
Residential facilities for officers and labours are not necessarily constructed within the market area for the following reasons, though establishment of this facility should be considered. Firstly, within the area, various facilities that are absolutely necessary to be located near the auction hall and the pier should be arranged with a priority. Secondly, the residential area, while more convenient if located closer to the market, does not necessarily need to be located within the immediate market boundary, and may rather stands superior, if aparted slightly from the boundary, as viewed from the standpoint of residential environments.

II-3-5) Examination of the Scale of the Market and the Construction Cost

a) Examination of the Scale of the Market

Although the present survey is primarily of a fundamental nature and has not been planned to include conclusive examination of actual layouts of various market facilities, a discussion of highly fundamental nature about it may be necessary for determining the total scale of the market. Such a discussion will be made hereafter.

The central facility of this market area is the market facilities for marine fresh fish. These facilities may be expressed by an example figure as below.




A: 400-meter long unloading pier
B: 200-meter long car unloading area
C: 300-400-meter long car loading area
S: Shed; sorting area, auction hall, ice storage, box and basket supply. Approximately 12,000-15,000 square meters
A': Resting pier, preparation pier
B', C': Parking area

When planning the locations of A, B and C, the possibilities that may be basicly considered are "⊓", "=", "⊔" and "⊤" types.

A comparative discussion about these lead to a conclusion that two plans shown in Fig. 2-2 and 2-3 are the most convenient layout plans*.

* Explanations on these two plans will be shown in the Appendix.

Fig. 2-2 represents "⌊_" type plan, and Fig. 2-3, "=" plan. Whether one is of better plan than the other, or if any other style is better than these, will have to be decided in the later studies. The market area, as a conclusive plan from the statement above, should better secure, for a sufficient spacing, a rectangle area with a size of 250,000 square meters, or of 1,000 meters long along the river and 250 meters wide.

As far as the long axis of 1,000 meters is concerned, the necessary length to be completed by the year 1990 is 830 meters, and the rest is not an urgent need. As a matter of fact, no pier may not be necessarily constructed for this spare length. There is no spare length, however, considered in the width. In speaking of the total land space of 250,000 square meters, there are certain spare lands which may be afforded for processing factories and greens.

Then the pier line may well be established on the line thirty meters off the shoreline where present M.W.L. exists, toward the center of the river, because it will be convenient for maintenance of water depth at the pier.

The respective scale of various market areas, in referring to Fig. 2-2, is shown as listed below.

Table 2-10

| | | |
|---|---|---|
| Total scale of the market | 250,000 $m^2$ | L = 1,000$^M$, B = 250$^M$ |
| Space of residence area | 20,000 $m^2$ | |
| Facilities for marine fresh fish | | |
| length of landing pier | 400 m | |
| length of resting pier | 200 m | |
| length of preparing pier | 160 m | (including 10-meter long attachment) |
| Shed I | 29,300 $m^2$ | (sorting area, auction hall, car loading and unloading area, ice storage, box and basket storage) |
| Shed II | 4,400 $m^2$ | (fishing tool repairing) |
| Space for facilities of freshwater fresh fish | 5,600 $m^2$ | (including mooring area) |
| Space for facilities of processed fishery products | 4,400 $m^2$ | |

| | | |
|---|---|---|
| Common facilities | | |
| parking area | 20,300 $m^2$ | |
| roads | 57,400 $m^2$ | |
| greens | 15,600 $m^2$ | |
| lands for office, etc. | 29,700 $m^2$ | (lands for F.M.O. office, stores, welfare facilities) |
| lands for facilities of fuel oil supply and storage | 2,400 $m^2$ | (for fishing boats) |
| land for facilities of ice making, storage, and freezing room | 20,400 $m^2$ | |
| lands for facilities of car pool, fuel supply and repair shop | 6,000 $m^2$ | |
| space for the preparing pier | 3,200 $m^2$ | |
| future reclamation land | 5,400 $m^2$ | |
| land for factories | 45,900 $m^2$ | |

b) Construction Cost

The construction cost of the proposed market, in referring to Fig. 2-2, is roughly computed as follows.

Table 2-11

(unit being ฿)

| Item | Cost | Notes |
|---|---|---|
| Cost of land purchase | | |
| a) market area<br>b) residence area | 120,000,000 | a) L = 1,000M, B = 250M - 30 = 220M (area = 1,000M × 220M = 220,000 $m^2$)<br>b) area = 20,000 $m^2$<br>} 150rai |
| Cost of land reclamation | 12,000,000 | reclamation height 2.5 m |
| Piers | 31,000,000 | (depth - 5 m) |
| Shed I | 38,000,000 | |
| Shed II | 4,000,000 | |
| Roads in the area | 12,000,000 | to be paved |
| Parking area | 4,000,000 | to be paved |
| Market for freshwater fish | 13,000,000 | total unit facility |
| Market for processed products | 7,000,000 | total unit facility |
| Attachment facilities | 7,000,000 | revetment, water supply, drainage system, wells, electricity and telephone services, fences, car-pool, etc. |
| (Sub-total) | 248,000,000 | |

| | | |
|---|---|---|
| Office buildings, etc. | 72,000,000 | agencies including F.M.O., fish agent building, residence halls |
| Freezing room, cold storage, ice storage, and ice making factory | 45,000,000 | |
| Total | 365,000,000 | |

In this Table, costs for construction of factories, and for survey of landscape gardening and fuel oil supplying facilities are not included.

## II-4) Conclusion for the Construction Plan of the Bangkok New Fish Market

### II-4-1) Location

The survey team has selected the Site No. 2 as the best place which suits the needs of the Bangkok New Fish Market to be constructed.

### II-4-2) Scale of Market Area and its Construction Cost

a) Scale of Market Area (only principal points itemized)

| | |
|---|---|
| Amount of handling fresh fish in 1990 | 250,000 tons |
| Amount of handling processed marine products in 1990 | 17,500 tons |
| Size of the market area | 250,000 $m^2$ |
| Length of the pier with a depth of five meters | 770 m |
| Size of the auction hall for marine fresh fish | 9,000 $m^2$ |

b) Construction Cost of Market Area

| | |
|---|---|
| Cost of land purchase | 120,000,000 ฿ |
| Construction cost of fundamental market facilities | 128,000,000 ฿ |
| Construction cost of buildings and factories | 117,000,000 ฿ |
| Total | 365,000,000 ฿ |

# CHAPTER III

# FURTHER SURVEYS NECESSARY IN THE FUTURE

## III-1) Necessary Surveys for Planning of the Bangkok New Fish Market Construction Design

### III-1-1) Discussion of Facility Layout

In the report, the scale of each facility has well been discussed, however, as far as its layout is concerned, only a pilot plan has been once mentioned in the preceding chapter. The layout of the market facilities is keenly related with the desirable methods of commercial dealing in the future, and the kind of role the F.M.O. will be playing in this system. It is therefore necessary for the related agencies to repeat discussions further, based on what has been pointed out in this report, in order to produce the most desirable layout plan.

Among these items to be discussed, a consideration how to make the moving of fish -- movement of fish and other materials within the fish market campus -- most convenient and smoothly is of special importance, and thus this factor should be most favoured.

### III-1-2) Geological Survey

The Chaophraya River area has high possibility of soft grounds appearance. The fundamental geological study of the quality of the ground will be quite important, as it will affect the construction cost of the pier and other facilities. The geological survey should be conducted applying following principles.

a) Time of the survey: to be completed before October, 1970.

b) Method : by boring

c) Number of places to be examined: Primarily five points unless the geological environment demonstrated to be of complexed variety, in the case of the latter, additional examinations necessary.

d) Test items : standard penetration test, single axis pressure test, consolidation test, weight per unit test, test of specific gravity of grains, adverse grain test, spacing ratio test.

e) Ground depth to be tested: until the supporting level of the ground (approximately down to twenty meters underground).

III-1-3) Datum Level Survey

The datum level of the Chaophraya River appears to be parallel to the M.S.L. This level should be established in the actual location, in order to determine the datum level for construction. Two bench marks are necessary to be established, and the reclamation height should be finally determined.

III-1-4) Sounding test

The depth of the Chaophraya River, near the planned construction location is needed to be measured, with which the final pier line will be confirmed. A series of depth tests with fifty-meter intervals should be performed along the shore of the river.

III-1-5) Geographical Survey

Studies of inland geography, especially those related to reclamation of small waterways are necessary.

III-1-6) Study of Ownership of the Land

A study of ownership for preparation of land purchase should be planned.

III-1-7) Study of Underground or River Water

The annual amount of water to be used in the Bangkok New Fish Market is estimated to be 600,000 to 800,000 tons. Since it is impossible to provide via metropolitan water supply system alone, the rest will have to be supplied by underground or river water. The study of underground water should include the possible capacity to be raised, the quality of water and water level.

III-1-8) Structure Design of the Pier

The pier is one of the most expensive facilities to be constructed in this market. Whether the pier will have been designed with the greatest efficiency or not will greatly affect the total construction cost.

The structure of the piers often observed in the fish markets in the present day Thailand, considered to match with the Thai natural environments and to be of less expensive, may have to be discussed further before concluding whether this type of pier structure is the best or not. The pier in the new market will need a depth of five meter below the lowest low water level, being considerably of larger type than those at the Bangkok Fish Market and

other F.M.O. markets constructed in the past. The structure design of the pier should be carefully discussed, considering the foundation of the ground, materials to be used for structure of the pier, machines and apparatus to be used for construction works.

III-1-9) Structure Design of Other Facilities

A design plan of the market facilities should be made. The actual activities for this item, including the confirmation of design premises and designing the structures, are recommended to be conducted separately.

III-1-10) Discussion of Construction Time Schedule

There is a need to make a time schedule, aiming at opening of the market by the year 1974. Since the construction time period will not be too long, assuming the construction to start in 1970, the construction plan should be thoroughly prepared.

III-2) Studies on Administration and Management System of the Bangkok New Fish Market

As referred to the beginning of this Chapter, since the administration and management system of the Bangkok New Fish Market is expected to affect the layout of various facilities, it will be necessary to take into account a most adequate administration and management system as of the target year. In this connection, our very short-term survey, with regret, could not reach conclusion on this matter. However, improvement of transaction in the Bangkok New Fish Market, etc. has been referred to in the following Chapter.

# CHAPTER IV

# ADDITIONAL RECOMMENDATIONS REGARDING THE CONSTRUCTION OF BANGKOK NEW FISH MARKET

The outline of the construction plan of Bangkok New Fish Market is as stated before. The problems, which the team has considered in the course of the survey, have been roughly classified into the following three matters:

1. The Marketing of Fishery Products,
2. The Construction of the New Fish Market, and
3. Activities of Fishery Production

The following are the recommendation on orientation of how to improve on the aforementioned matters.

## Marketing of Fishery Products

The marketing activities of fishery products in Thailand has been carried on primarily by F.M.O. The marketing of fishery products has inevitably been largely influenced by the increasing population which swarms into metropolitan ranges, the improvement of transport circumstances such as traffic road networks, the expansion of fishery production, etc., all of which have gone with the economic growth in recent years. Therefore the improvement and rationalization of the marketing system are becoming necessary.

The marketing activities of fishery products can be systematically listed as below from the functional point of view. It goes without saying that the construction plan of Bangkok New Fish Market plays an important role in those circumstances.

In order to make this plan fully effective, however, it is necessary to systematically push forward various activities of fishery-products marketing as mentioned later, with paying attention to mutual relations of these activities.

- Marketing Activities
  - Physical Marketing Activities (Movement of Commodities)
    - Distribution Activities of Commodities (Transportation)
      - (1) Provision of Fundamental Facilities for Transportation
      - (2) Packaging
      - (3) Loading and Unloading
      - (4) Transporting
      - (5) Storing
      - (6) Marketing and Processing
    - (7) Information Activities for Marketing (Communication)
      - Provision of Fundamental Facilities for Communication Transmission
  - Commercial Activities Relating to Marketing
    - (8) Transaction Activities (Commerce)
      - Provision of Fundamental Facilities for Commercial Dealings
- (9) Furtherance of Distribution (Finance, Insurance, Standardization, etc.)

* The arabic numerals in above table indicate those of the respective subjects to be taken up in the following paragraphs.

The following are the recommendations regarding the problems on marketing of fishery products after the items listed.

IV-1-1) Provision of Fundamental Facilities for Transportation

At present as for the provision of the fundamental facilities of transportation such as fishing-ports, ways, railways, etc., the consolidation of traffic network as well as that of fishing-ports by F.M.O., etc. are actively in the process of development. It is desirable that the fundamental facilities of transportation will be furthermore provided, being mutually well balanced among various facilities, for example, among fishing-ports, and among the highways from producing areas to consuming areas.

IV-1-2) Packaging

This field may be currently said as being undeveloped. That is, as for the receptacles for shipments from producing areas, wooden boxes, bamboo baskets, etc. are mainly used, the function of which is nothing but protecting and carrying the contents (fish). Washing these receptacles when used repeatedly seems not to be satisfactorily done, and water being used is unclean and non-sanitary. Packaging receptacles currently used in retail shops do not seem always sanitary. Therefore it is necessary to improve sanitation, such as to introduce new clean containers with which consumers may be satisfied. It is also necessary to make dealings smooth by making the indication (labels) coincide with the quality and quantity of the contents.

IV-1-3) Loading and Unloading

At present loading and unloading activities are rather inefficiently conducted partly because of a plentiful existent labour. There is a need for F.M.O. and the like to introduce some efficient ways of loading and unloading in order to shorten marketing time and keep freshness of fish or to cope with the mounting-up of wage-hike in metropolitan areas in years to come.

II-1-4) Transporting

Transportation is mainly conducted by trucks on account of gradual improvement of highway systems as stated above, but most of fishery products, by the time when they reach consuming areas, are deteriorated in freshness. The consideration of maintaining shipments fresh, therefore, will become necessary to take in the field of transportation. For this purpose, the

extension of the transportation method by use of the trucks in low temperature, etc. should be considered first of all. The Government should give a guidance on the use of the amount of ice proper to the time needed for transporting, because the shortage of ice used is one major cause resulting in deterioration of shipments in the present iced-fish transportation. Furthermore, ice itself is often unwholesome, and improvements of its quality should be made from the sanitary point of view.

IV-1-5) Storing

This field is also backward in development. The present methods of transporting and storing fishery products mostly by using ice should be gradually replaced by the low-temperature method as stated above. For that purpose the facilities of low-temperature storing, such as cold stores and accessory freezing-facilities, should be consolidated. At the same time, it is necessary to reinforce productive capacity of ice in order to solve the aforementioned shortage of ice used. In this case, the facilities for making ice should be consolidated in balance with those of storing ice. The producing and storing capacities of ice should be balanced with the producing capacity of the facilities of low temperature storing.

IV-1-6) Marketing and Processing

At present the marketing and processing activities for marine fish and freshwater fish are being conducted centering on a junior processing. In this case, it will be advisable to prevent deterioration of the quality of finished goods (fishery products), which is caused by using unfresh material -- fish as well as to improve on the use of harmful red colouring agents. The quality of fishery products to be exported, frozen shrimp being principle example, should be improved immediately.

IV-1-7) Information Activities for Marketing

At present the F.M.O. distributes the information about the market conditions of fishery products at the Bangkok Fish Market, etc. to shippers in respective producing areas. It takes a too long time, however, for the information to be available for said shippers under the present system. This function thus may not be considered to be effective. In the future, the measures should be taken that the information such as the prices of fishery products in producing and consuming areas be exchanged more promptly by providing necessary machine and equipment parts in the managerial and operational

aspects of the Bangkok New Fish Market.

IV-1-8) Transaction

There are many points in this field to be improved. The improvement of commercial transaction, however, may actually mean the abolition of the traditional commercial practices of long standing. Therefore, a phased improvement should be pushed forward for it taking a considerable time.

The principal points are as follows:

a) Auction in the market should be made fair and clean, and its opening-to-the-public system should be secured.

b) Enlarging the unit of transaction in the market, thereby achieving the simplification and streamling of dealing.

c) In relation to b) as mentioned above, the shipping-unit from producing areas should be enlarged together with a well programmed system for shipping by establishing a cooperative shipping organization of fishmen's own and the like.

d) In relation to b) above, the purchasing power of retailers in the market should be increased by establishing a cooperative buying-in system of groups of retailers and the like.

e) The traditional relations between the fishermen and wholesalers in producing areas should be improved so that the modernization of the old transaction might be advisably materialized.

f) In the new market the management and operation systems are demanded to be carried on, matched the facilities to be consolidated and the transaction to be modernized in producing areas, etc. As for the adoption of its concrete methods, it is necessary to consider the best ways which should suit the state of affairs in Thailand, because this improvement has close relations with factors such as how fast the modernization of transaction at consuming and producing area is to be achieved, or how the fiscal assistance and the reorganization, therefore, etc. are put into practice.

IV-1-9) Furtherance for Marketing of Fishery Products

Furtherance for marketing activities of fishery products in the past has not been conducted actively. In the future, however, any proper furtherance activities (e.g., the treasury loans and investments) for various marketing activities as mentioned above will be necessary in order to effectively

accomplish the plans for the construction of the Bangkok New Fish Market.

IV-2) Construction of the New Fish Market

Generally speaking, the construction of market facilities for public use need a great expenditure. This cost is so high that it cannot generally be covered by port dues and the facilities rent, etc. This kind of facilities, however, bring much advantage to the people, which is easy to understand by presuming what inconvenience would, otherwise, arise. It is desirable, therefore, in the construction of the new market, to cover the cost for constructing these facilities by the Treasury investments, regarding them as a social overhead capital.

As for the related industries, some sites are planned to be required for processing factories according to the presently proposed plan. The land for processing factories is, however, insufficient. The Government should devise other plans of securing more sites. In this case the means of inviting various factories should be devised so that they could be constructed near the new fish market.

IV-3) Activities of Production

IV-3-1) Enforcement of Fishing-Boat Registration and the Improvement of Shipbuilding Techniques

a) The Government should always have the exact knowledge of the existing force of fishing boats, in order to analyze the tendency of production as well as to enforce the appropriate measures for fishery promotion. For this purpose, Department of Fisheries should enforce the registration system of fishing boats.

b) Large-sized fishing boats have recently been put to use rapidly and its efficiency has been improved. The improvement of techniques such as mentioned above, however, has not obtained excellent results because of the striking shortage of the engineers for shipbuilding, navigation and engines. The Department of Fisheries, therefore, should consider the counter-measures for establishing the standards of shipbuilding, for educating and training engineers, etc.

IV-3-2) The Efficient Use of Resources

Trawling has recently made a rapid progress. This is one of the major

causes of the increase in the total fisnery production in Thailand. A considerable amount of the products by trawling is, however, extremely small Duck Fish for non-human consumption. It is necessary, therefore, to promptly enforce the regulation on the size of meshes, etc. and to plan to make an effective use of fishery resources. Furthermore, as for trawling, the change in recent years of the catch per unit fishing effort, etc. seems to suggest that the enforcement of the license or permission system has become necessary.

## APPENDIX

1. The Layout of the Facilities of the Market

(in the case of the market for marine fresh fish)

1-1) In the Case of the Layout Shaped Like the Letter "L," (see Fig. 2-2)

In this case, fish handled in the market moves as shown in the following Fig. I.

There are advantages; the cars can move smoothly in the market, and fish carried in the market does not cross each other inside the shed.

On the other hand, this type of the location has some weak points; the auction hall becomes too long, and the auction hall for marine products landed from boats is apt to be separated from the auction hall for marine products unloaded from cars. This, having relations with commercial custom, might not be considered as weak point. It will be desirable, therefore, to examine more about it.

Furthermore, in this type of the location, the auction hall and refrigerators will be well located, presuming there is a possibility of refrigerators being used in the future.

Besides, the transportation in transverse directions in the market is inferior to the case shown in Fig. 2-3, because the auction hall, located in the central part of the market, divides the market into two areas.

1-2) In the Case of the Layout Shed like " = ", (see Fig. 2-3)

In this case fish handled in the market moves as shown in the following Fig. II.

In this type of the layout there is an advantage; fish unloaded from cars and landed from boats are carried in, and sold by the same auction hall. On the other hand, there is a weak point, that the cars in unloading fish and the fish carried from boats to auction hall, cross each other. This problem, however, will be solved, if the car unloading area of fish is prolonged by 200 meters. Confusion will not arise as the plan estimates the extension of 400 meters. It may be considered as one of the weak points, however, that the cars waiting in the parking area on the left side of the shed I, have difficulty in seeing through the shed, and judging if there is a vacant place for unloading fish inside the shed. This type of the location may be considered to have a strong point in the respect that nothing obstructs the transverse traffic inside the market.

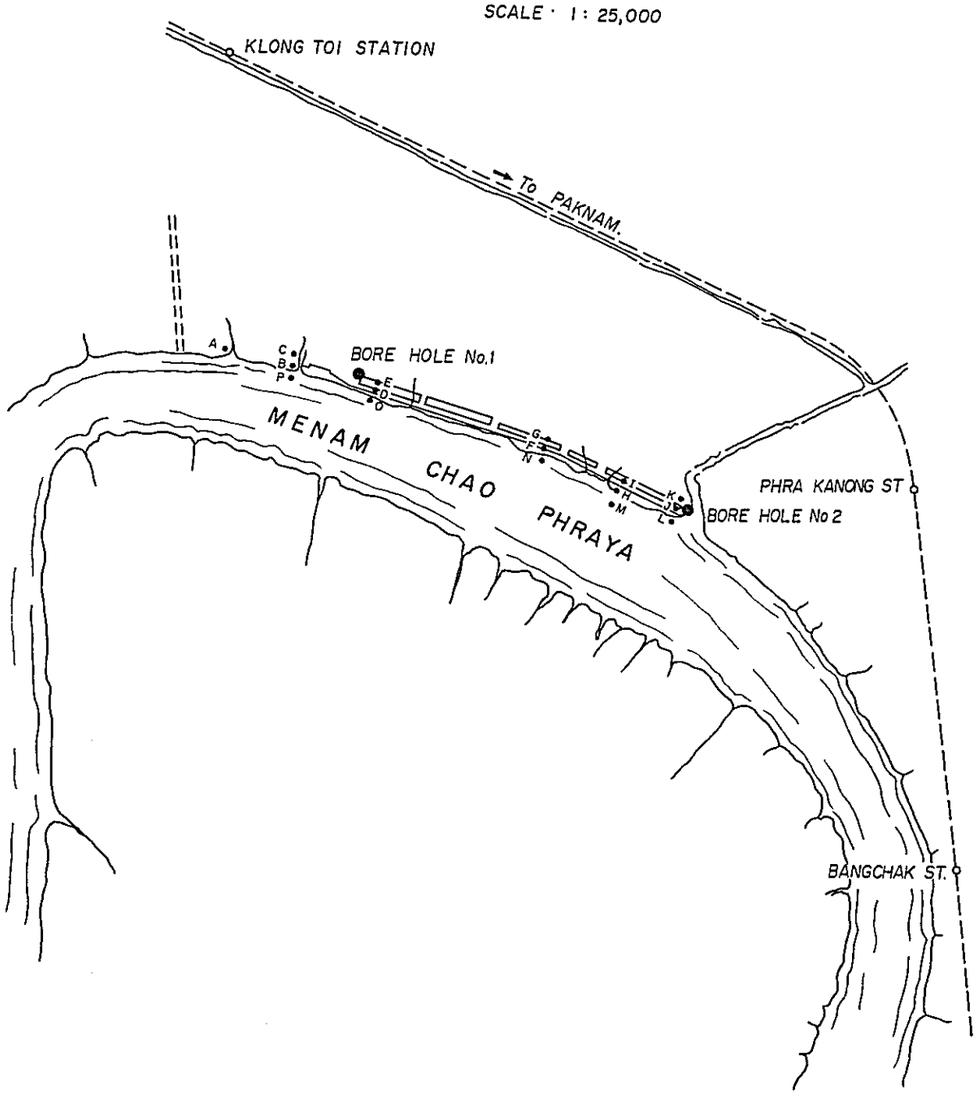
2. Data of Soil

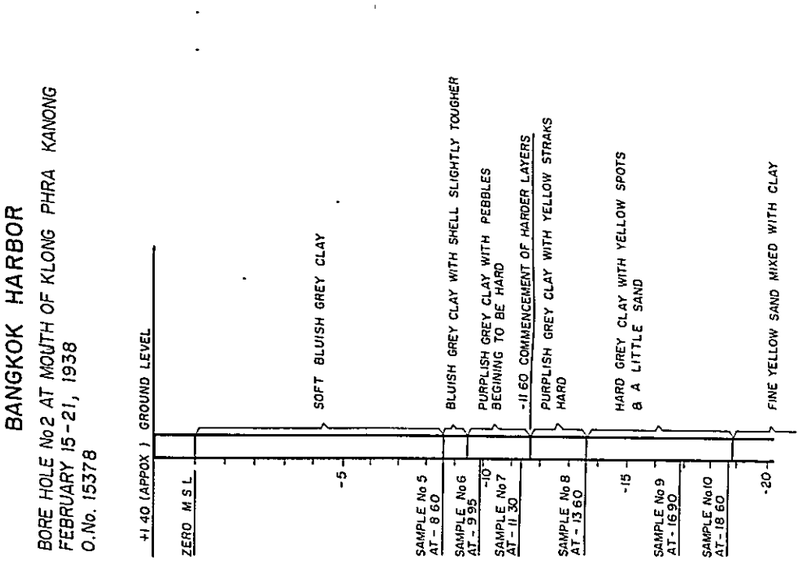
The following figures are the data of the boring in the areas near the Commercial Harbor.

## SITE OF BANGKOK HARBOR

SHOWING POSITION OF BORE HOLES AND WEIGHTED DRILL POINT TESTES.

SCALE · 1 : 25,000



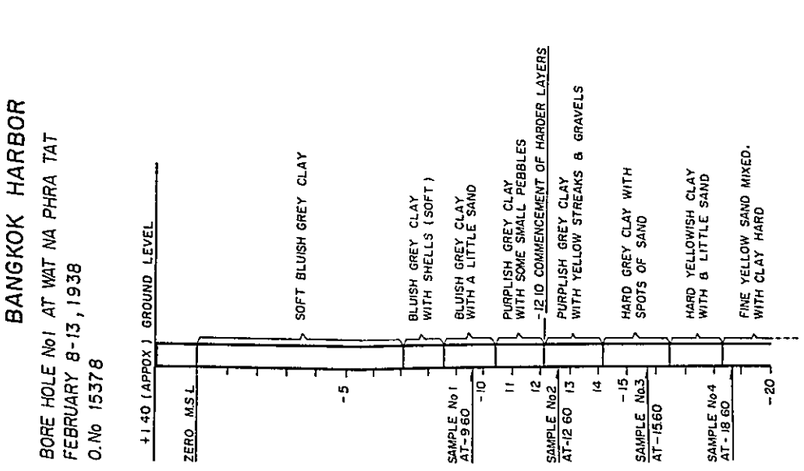
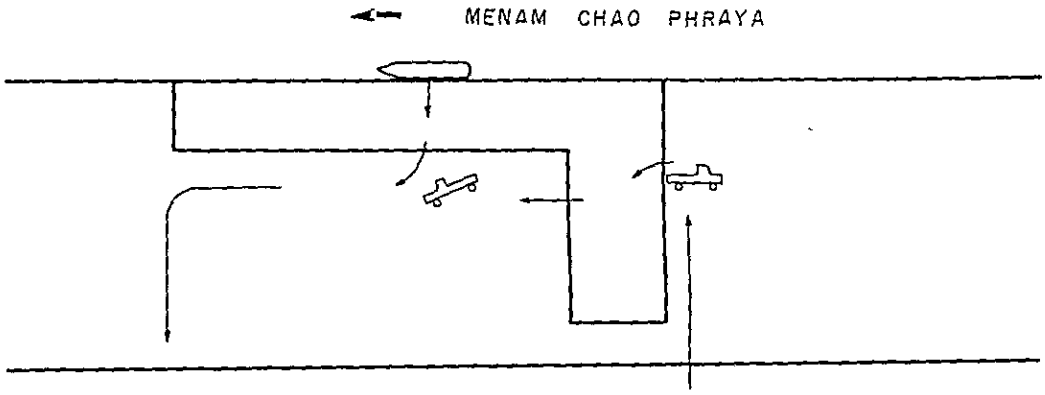




Fig – I



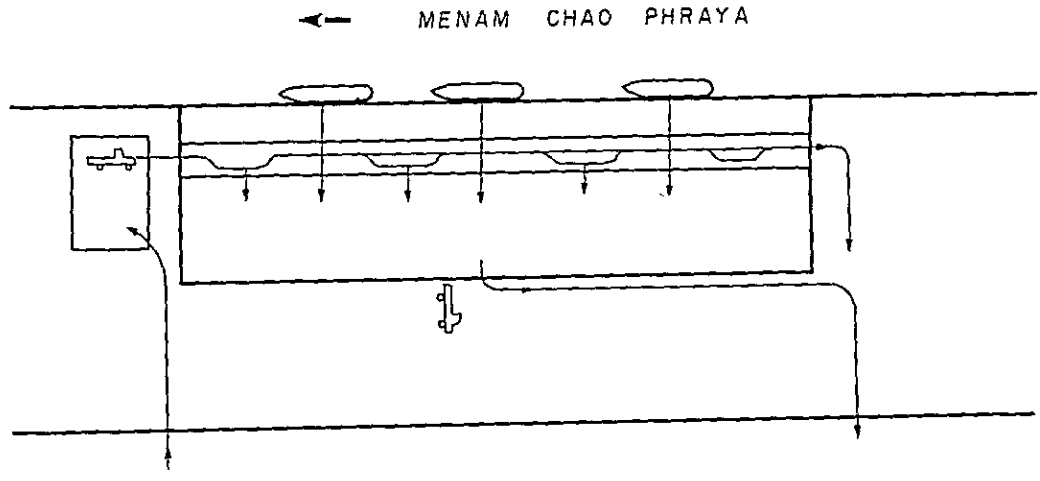
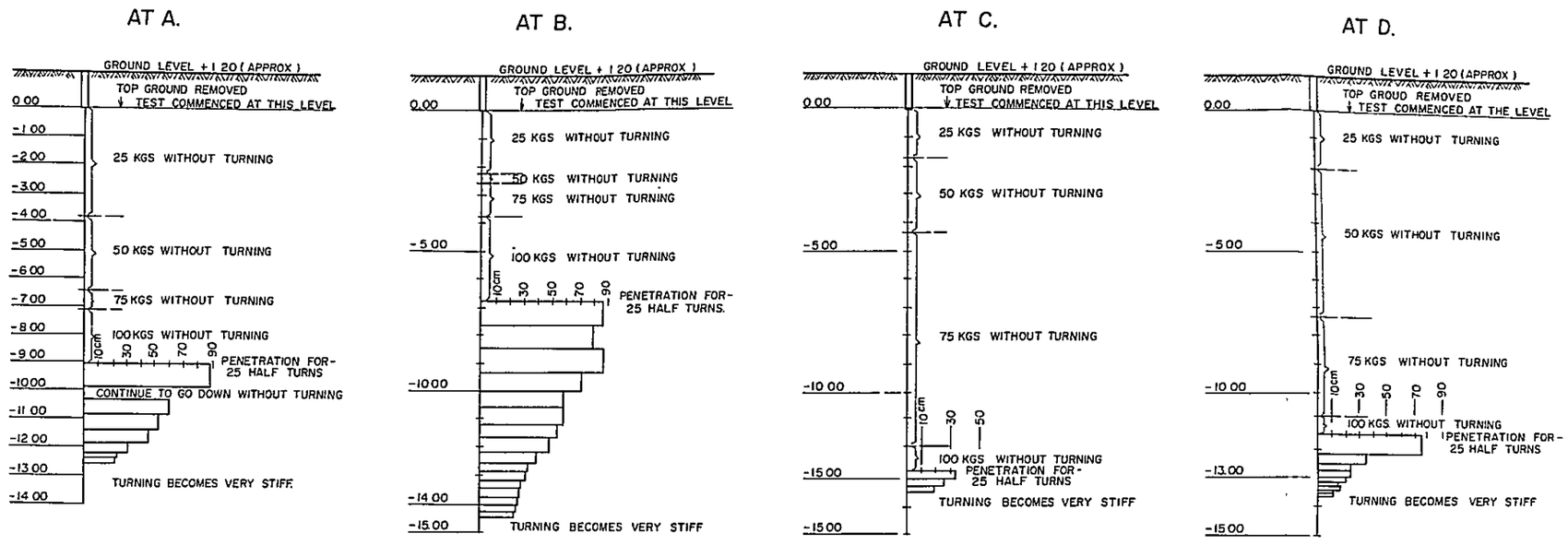




Fig. – II

# RESULTS OF WEIGHTED DRILL POINT TEST AT SITE OF BANGKOK HARBOR



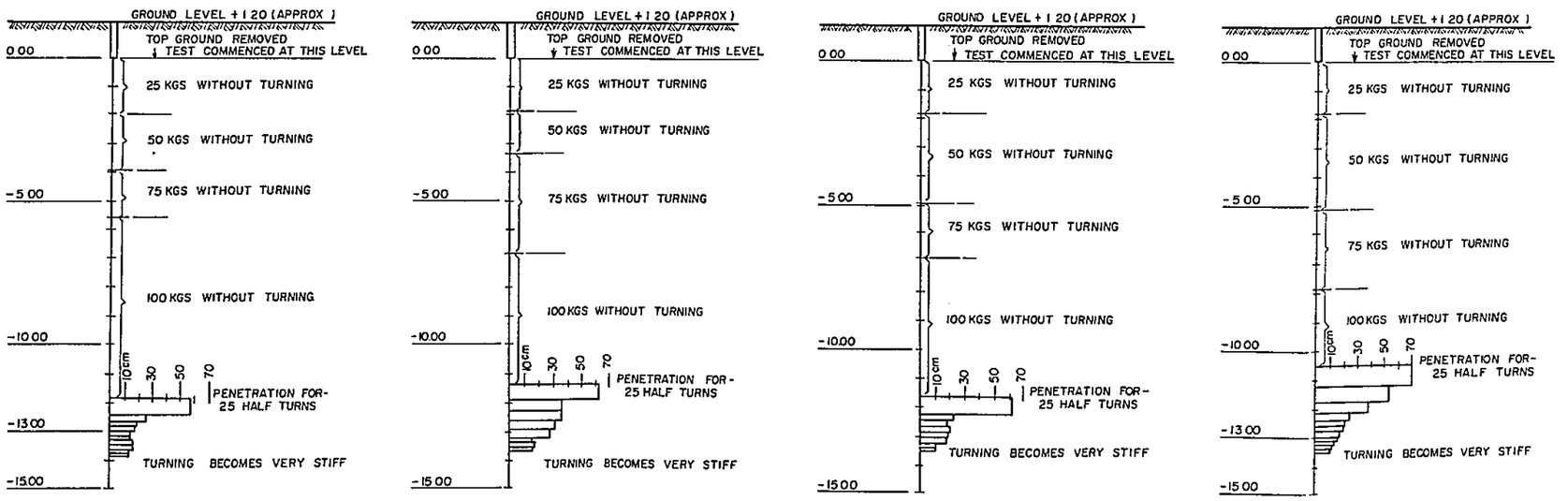
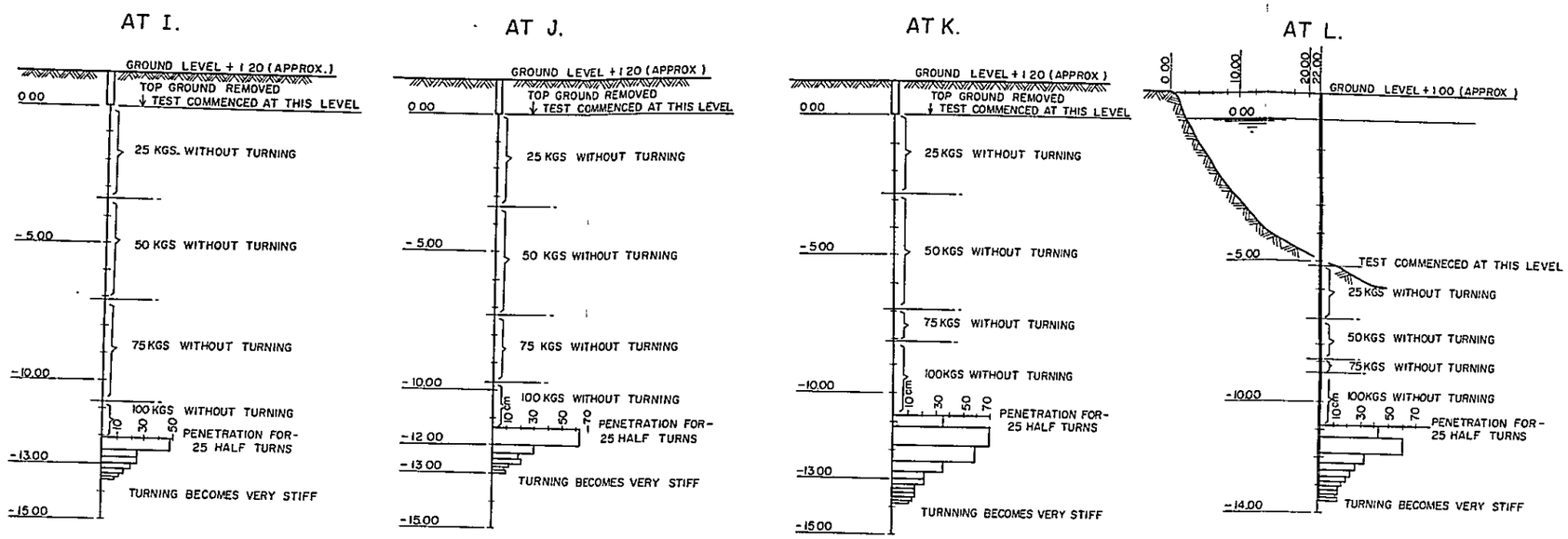




Fig. – III

# RESUTS OF WEIGHTED DRILL POINT TEST AT SITE OF BANGKOK HARBOR



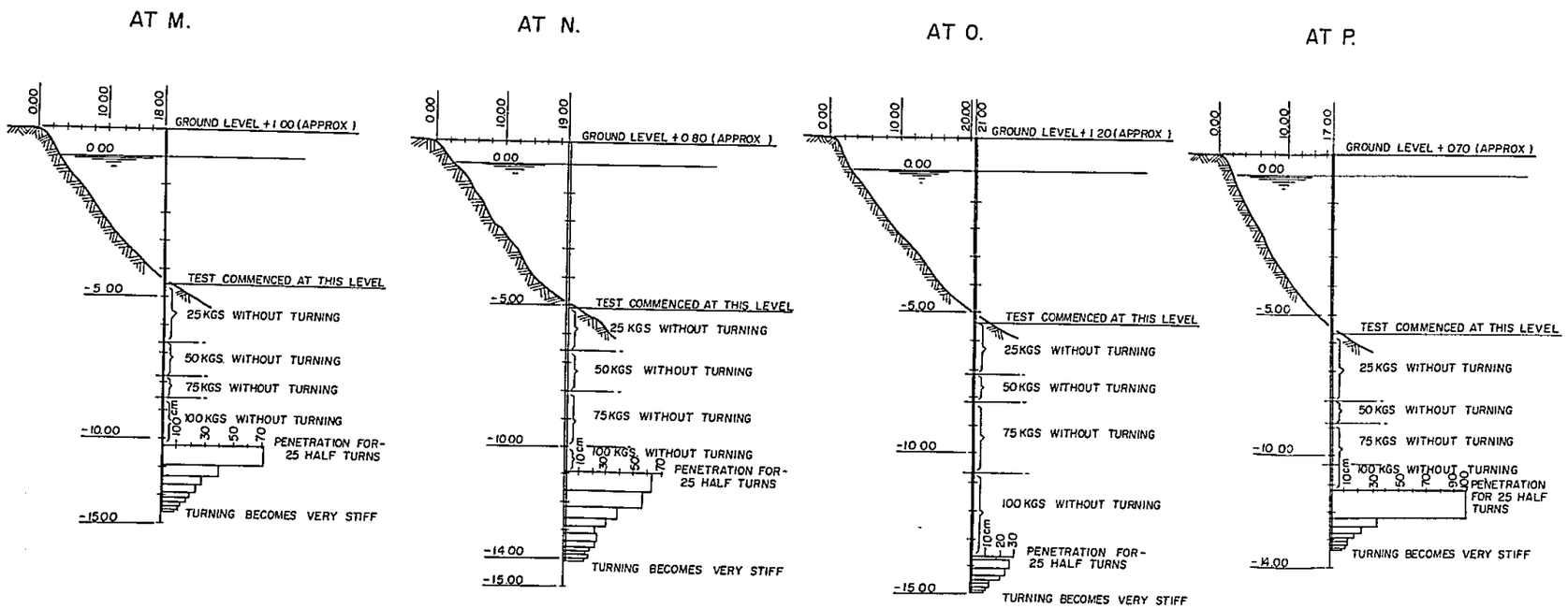




Fig. – IV