JAPAN: A SURVEY OF PORTS, DEEP WATER TERMINALS, AND VESSELS

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CORPS OF ENGINEERS
DEPARTMENT OF THE ARMY

JAPAN: A SURVEY OF PORTS, DEEPWATER TERMINALS & VESSELS JUNE 1973

GRIER

JAPAN: A SURVEY OF PORTS, DEEP WATER TERMINALS, AND VESSELS

A Report Prepared for

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BACKGROUND AND ACKNOWLEDGEMENTS

The author was invited in the fall of 1971 to make a presentation at the Second Pacific Regional Science Conference held at the University of Tokyo, Japan. To gain a by-product from the author's presence in Japan, Robert Harrison, Director of the Center for Economic Studies, IWR, suggested a challenging trip extension. This was to learn as much as possible about the Japanese experiences in port development on a first-hand basis. Hopefully, this information would be useful to the Corps of Engineers in carrying out regional deepwater port investigations.

Thus, in a short span of two weeks, visits were made to the Ports of Tokyo, Yokohama, Kawasaki, Osaka, Kyoto, and Oita. Typhoon Trix interrupted a visit to the Port of Kashima. These visits were arranged by the central government's Bureau of Ports and Harbors, Ministry of Transport, on very short notice. The author was able to interview high-ranking officials in the local port authorities visited and toured their facilities. The Bureau also provided a very informative briefing and overview of Japanese port developments. The Bureau's technical staff was very responsive to questions and candid in their answers. All of this invaluable help was made possible through the good auspices of Dr. Eng Yoshiaki Kurisu, Director-General for the Bureau, and his Deputy Director, Michio Morihira. Mr. Morihira was particularly helpful because of his fluency

in English and was very generous with his time. The author is very much indebted to Dr. Kurisu and Mr. Morihira for their contributions to this report. The author is also grateful for the unexpected attention provided by the local port authorities visited.

Time did not permit too many contacts in the private sector; however, the author was able to make lengthy interviews with officials of the Japan Land Development Company, Tokyo, and Nippon Steel Company, Oita. Additionally, considerable information and daily assistance was provided by the U. S. Army; specifically, Colonel Stanley Gillette and his staff at Camp Drake and Tokyo, and Lieutenant Colonel Jack Dunn and Richard Romane, U. S. Transportation Corps, Yokohama. For their help, the author is grateful.

The author is indebted to the Regional Science Conference sponsors; Dean Shokichi Endo, former Dean Yasuhiko Oishi, Professors Genpachiro Konno, and Yukihide Okano, Faculty of Economics, University of Tokyo. Throughout the stay in Japan, the author experienced the very gracious hospitality of the Japanese people. It is this uniquely pleasant experience which will always be remembered.

At home, the author would like to acknowledge the perceptive leadership of Major General Frank A. Camm, Division Engineer, and Kermit V. Speeg, Chief of the Planning Division, South Pacific Division, for permitting

this trip. In Washington, D. C., long-standing thanks are due Robert W. Harrison not only for his timely suggestions but also for his patience while the author continually delayed completion of this report because of the press of other duties.

TABLE OF CONTENTS

		Page
I.	INTRODUCTION	1
	A. Purpose and Scope	2
	B. Reasons for Studying Port Developments in Japan	3
	C. General Geographic Description	3
II.	FINDINGS AND GENERAL VIEWS OF JAPANESE PORT PLANNERS	5
	A. Institutions and Planning	6
	B. Maritime Practices and Technology	7
	C. Environment	17
III.	JAPAN'S GLOBAL REQUIREMENTS AND ITS MARITIME SYSTEM	19
	A. Foreign Resources Requirements	19
	B. Vessel Requirements	20
IV.	PORT AND SHIP TECHNOLOGY	25
	A. Important Japanese Ports	25
	B. Iron Ore Facilities	27
	1. Oita	28
	C. Crude Petroleum Facilities	31
	1. Dredged Facilities	31
	2. Offshore Sea Berths	33
	3. Offshore Buoy Systems	35
	D. Container Terminal Facilities	36
	1. Osaka	36
	2. Kobe	37
	E. Container and LASH Vessels	37

Page

V. ENVIRONMENT 40

A. Past Practices. 40

B. Public Awareness. 41

C. Growth and Imbalances 42

VI. SUMMARY 43

ANNEX

A. Major Tanker Berths and Port Facilities A-1

BIBLIOGRAPHY. B-1

I. INTRODUCTION

Recent developments have provided the United States with incentives to make major revisions in its maritime capability.

The greatest incentive comes from the Nation's current energy crisis (oil and gas shortages) which will become more acute in future years. Massive importation of crude oil signifies the use of very large carriers (VLCC) over 200,000 dwt. Currently, the United States does not have any VLCC in service although several are being constructed. The major constraint on the use of VLCC's is the lack of suitable ports. The typical channel depths for U. S. ports are between 35 and 45 feet while VLCC's require depths between 65 and 100 feet.

Other incentives involve the innovative changes in general cargo handling methods and ship designs. General cargo traffic is being subject to high-speed containerships (30 knots or more) and lighter-aboard-ship (LASH) which require new intermodal systems combining air, overland and sea transport facilities. These changes will also mean additional port developments and changes in the U. S. fleet.

In light of these planning challenges, the Corps of Engineers initiated a review of foreign experiences in deep water port development. The purpose of the review was to inform Corps port planners on the foreign planning process, the alternatives considered, the actual construction, the impacts involved, and the direction of future plans. The principal review was prepared by the consultant firm Arthur D. Little, Inc. Their report entitled, "Foreign Deep Water Port Developments, A Selective

Overview of Economics, Engineering, and Environmental Factors" was completed in December 1971 and is published as IWR Report 71-11, available from the National Technical Information Service.

Within the Corps, selective reviews were undertaken to augment the A. D. Little report. Last year, a team of Corps engineer planners surveyed major deep water facilities in the Persian Gulf and Northwest Europe. A report on this survey has been completed by George Makela, Institute for Water Resources, Corps of Engineers.

The report presented here is also a part of the broader Corps effort to learn more about foreign port developments. The central theme is the Japanese experiences in shipping and port technology.

A. Purpose and Scope

The basic purpose of the report is to provide U. S. port planners with a general knowledge of Japanese port developments. Hopefully, awareness of the Japanese experience will assist in the planning of U. S. port facilities. The contents will be principally a presentation of the factual information collected.[1/] The information is based on a two-week field survey of important Japanese ports and interviews with top Japanese port planners conducted in Fall 1971. The report also draws on literature collected in Japan and available sources in the U. S.

1/ It is intended that the information presented be in sufficient detail for the reader to judge of its applicability to the U. S. deepwater port problems.

Overviewed will be general cargo ports as well as deep water port facilities. The emphasis will be on port and ship technology. Presented will be the economic, engineering, environmental, and institutional aspects of Japanese port development at a reconnaissance level.

B. Reasons for Studying Port Developments in Japan

The most important justification for being knowledgeable about Japan is that their experience is the most advanced and actual. Japan, in port development, has done what most other nations are only planning to do.

In terms of economics and engineering, Japan's maritime success is a brilliant showcase for others. The rapid and heavy industrialization of their economy depended a great deal on maritime capability. In technology, Japan has pioneered the development of modern ships and port facilities. Accordingly, many valuable lessons can be learned with respect to economic growth and maritime achievements.

Environmentally, the Japanese experience in port development may offer another kind of lesson. In many ways, their experience can be examples of what not to do. Their aggressive industrial growth and related port developments have resulted in very severe effects on the environment. Perhaps, this may be the most propitious lesson of all. Thus, we can learn from Japan's mistakes as well as their just success.

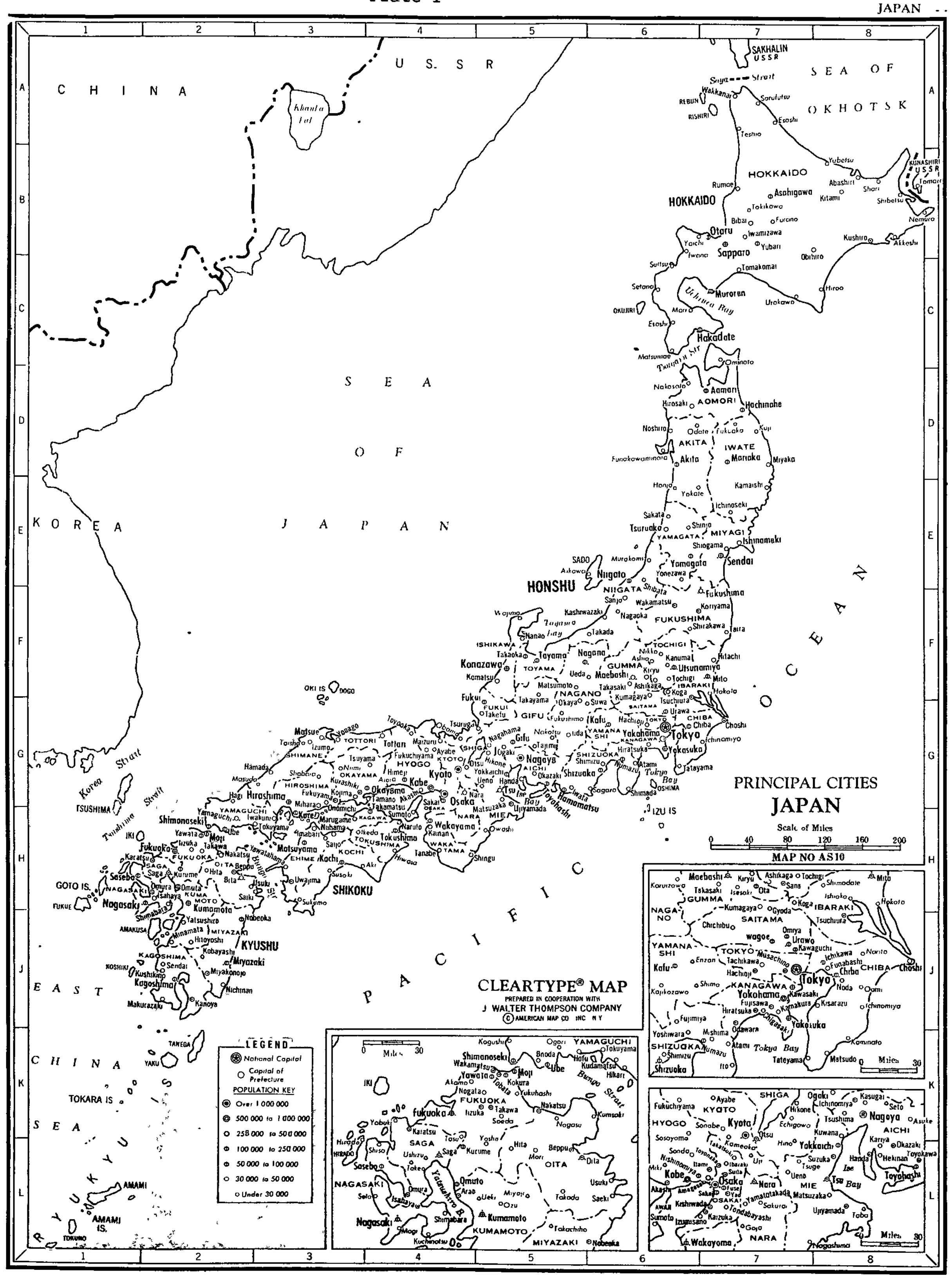
C. General Geographic Description

For orientation purposes, Plate 1 shows a general map of Japan.

The land area of this island nation is approximately 143,000 square miles and holds a population of slightly more than 103 million. In comparison, California is larger in land area (159,000 square miles) and has only one-fifth the population (20 million). Also, population density in Japan is approximately 708 per square mile, whereas the United States' population is 58 per square mile.

More importantly, usable land in Japan is very limited because of mountainous terrain. Forests cover almost two-thirds of Japan's land area. Accordingly, most of the population and industry are distributed along the flat areas of the coastline, particularly on the Pacific Ocean side of Honshu.

Plate 1



PREFECTURES

(46 Prefectures)

Name of prefecture followed by population in thousands, to nearest thousand, then location on map

Aichi, 3,391 G 5
Akita, 1,309 D- 6
Aomori, 1,283 D- 7
Chiba, 2,139 G- 6
Ehime, 1,522 H- 3
Fukui, 752 G- 5
Fukuoka, 3,530 H 2
Fukushima, 2,062 F- 6
Gifu, 1,545 G- 5
Gumma, 1,601 F- 6
Hiroshima, 2,082 G- 3
Hokkaido, 4,296 B- 7
Hyogo, 3,310 G- 4
Ibaraki, 2,039 F- 6
Ishikawa, 957 F- 5
Iwate, 1,347 D 7
Kagawa, 946 G 4
Kagoshima, 1,804 J- 2
Kanagawa, 2,488 G- 6
Kochi, 874 H 3
Kumamoto, 1,828 H- 2
Kyoto, 1,833 G 4
Mie, 1,461 H- 5
Miyagi, 1,663 E- 7
Miyazaki, 1,091 J- 2
Nagano, 2,061 F- 5
Nagasaki, 1,645 H- 1
Nara, 764 H- 4
Niigata, 2,461 F 6
Oita, 1,253 H- 2
Okayama, 1,661 G- 3
Osaka, 3,857 G 4
Saga, 945 H 2
Saitama, 2,146 G- 6
Shiga, 861 G- 5
Shimane, 913 G 3
Shizuoka, 2,471 G- 6
Tochigi, 1,550 F 6
Tokushima, 876 H- 4
Tokyo, 6,278 G- 6
Tottori, 600 G- 3
Toyama, 1,009 F- 5
Wakayama, 982 H 4
Yamagata, 1,357 E- 6
Yamaguchi, 1,541 H 2
Yamanashi, 811 G- 6

Total JAPAN 83,200.

CITIES

Name of city followed by population in thousands, to nearest thousand, then location on map

Abashiri, 39 B- 8
Aikawa, 9 E- 6
Aioi, 28 G- 4
Akama, 6 K- 4
Akashi, 66 G 4
Aki, 12 H- 3
Akita, 126 D- 6
Akkeshi, 14 B 8
Amagasaki, 279 L- 7
Aomori, 106 D- 7
Arao, 64 L- 4
Asahigawa, 123 B- 7
Ashikaga, 53 F- 6
Ashio, 19 F- 6
Asuke, 4 K- 8
Atami, 35 G- 6
Ayabe, 34 G- 4
Beppu, 93 H- 2
Bibai, 87 B- 7
Chiba, 134 G 6
Chichibu, 32 J 7
Chigasaki, 47 J- 7
Choshi, 74 G- 7
Echigawa, 7 K- 7
Enzan, 15 J 6
Esashi, 10 C- 6
Esashi, 10 A- 7
Fujimiya, 43 J- 6
Fujisawa, 85 J- 7
Fukuchiyama, 45 G- 4
Fukui, 101 G- 5
Fukuoka, Fukuoka, 393 H- 2
Fukuoka, Iwate, 4 D- 7
Fukushima, Nagano, 9 G- 5
Fukushima, Fukushima, 93 F- 7
Fukuyama, 67 G- 3
Funabashi, 83 J- 8
Funakawaminato, 15 D- 6
Furano, 20 B- 7
Fuse, 150 L 7
Gifu, 212 G- 5
Gojo, 13 L- 7
Gyoda, 32 H- 7
Hachinohe, 104 D- 7
Hachioji, 83 G- 6
Hagi, 42 G- 2
Hakodate, 229 C- 7
Hamada, 40 G 3
Hamamatsu, 152 G- 5
Handa, 63 G- 5
Hekinan, 43 L- 8
Hikari, 35 K- 6
Hikone, 49 G 5
Himeji, 212 G 4
Hino, 8 L- 7
Hirado, 17 L 3
Hiratsuka, 52 G- 6
Hiroo, 10 C 8
Hirosaki, 66 D 6
Hiroshima, 286 G- 3
Hita, 48 H 2
Hitachi, 56 F- 7
Hitoyoshi, 45 J 2
Hiwasa, 6 H- 4
Hofu, 71 K- 5
Honjo, 19 E- 6
Hokota, 6 F- 7
Ibaraki, 35 L- 7
Ichikawa, 103 J- 8
Ichinomiya, Aichi, 71 K- 8
Ichinomiya, Chiba, 7 G- 7
Ichinoseki, 36 E- 7
Iida, 33 G- 5
Iizuka, 54 H- 2
Ikeda, 10 H- 3
Imabari, 60 H- 3
Isahaya, 65 H 2
Isesaki, 9 H 7
Ishinomaki, 52 E- 7
Ishioka, 26 H- 7
Itami, 56 L- 6
Ito, 36 K- 7
Iwakuni, 62 H 3
Iwamizawa, 48 B 7
Iwanai, 23 B 6
Iwata, 36 G- 5
Izumisano, 32 L- 7
Izumo, 46 G- 3
Kagoshima, 229 J 2
Kainan, 35 G- 4
Kaizuka, 54 L- 7
Kajikazawa, 6 J 6
Kamaishi, 35 E- 7
Kamakura, 85 J- 7
Kameoka, 10 K- 7
Kanazawa, 252 F- 5
Kanoya, 64 J- 2
Kanuma, 32 F- 6
Karatsu, 52 H- 2
Kariya, 31 L- 8
Karuizawa, 14 H 6
Kashiwazaki, 37 F 6
Kasugai, 48 K- 8
Kawagoe, 53 J- 7
Kawaguchi, 125 J 7
Kawasaki, 319 J- 7
Kiryu, 96 F- 6
Kisarazu, 38 J- 8
Kishiwada, 99 L- 7
Kitami, 46 B- 8
Kobayashi, 41 J- 2
Kobe, 765 G 4
Kochi, 162 H- 3
Kofu, 122 G- 6
Koga, 31 F 6
Kogushi, 5 K- 5
Kojima, 34 G- 3
Kokura, 199 K- 5
Komatsu, 63 F- 5
Kominato, 4 J- 8
Koriyama, 71 F 7
Kuchinotsu, 11 L- 4
Kudamatsu, 40 K- 6
Kuji, 10 D 7
Kumagaya, 65 F- 6
Kumamoto, 268 H- 2
Kunizaki, 11 K- 6
Kurashiki, 53 G 3
Kure, 188 H 3
Kurume, 101 H 2
Kushikino, 34 J 2
Kushiro, 93 B- 8
Kuwana, 41 K- 8
Kyoto, 1,102 G 4
Maebashi, 97 F- 6
Maizuru, 92 G- 4
Makasato, 6 D- 6
Makurazaki, 34 J- 2
Marugame, 37 G- 3
Masuda, 22 G- 3
Matsudo, 53 J- 8
Matsue, 74 G- 3
Matsumae, 7 C- 6
Matsumoto, 86 F- 5
Matsuyama, 164 H- 3
Matsuzaka, 49 G- 5
Mihara, 55 G- 3
Miki, 15 L- 6
Minamata, 44 J- 2
Mishima, 47 K 7
Mito, 67 F- 7
Miyaji, 6 L- 5
Miyako, 39 D- 7
Miyakonojo, 75 J- 2
Miyazaki, 103 J- 2
Mogi, 13 L- 4
Moji, 124 H 2
Mori, Hokkaido, 24 C- 6
Mori, Oita, 9 L 5
Morioka, 118 D 7
Murakami, 16 E- 6
Muroran, 110 C- 7
Musashino, 73 J- 7
Nagahama, 47 G- 5
Nagano, 101 F- 5
Nagaoka, 67 F 6
Nagoya, 1,031 G 5
Nagasaki, 242 H- 2
Nagashima, 7 L- 7
Nagasu, 11 K- 5
Nakatsu, Oita, 51 H- 2
Nakatsu, Gifu, 23 G- 5
Nanao, 40 F- 5
Nara, 78 G 4
Narita, 14 J- 8
Naruto, 43 H- 4
Nemuro, 20 B- 8
Nichinan, 41 J- 2
Niigata, 221 E- 6
Niihama, 57 H 3
Niimi, 7 G 3
Nikko 29 F- 6
Nishinomiya, 127 L 6
Nobeoka, 88 J- 2
Noda, 39 J- 8
Nogata, 54 K- 5
Noshiro, 49 D 6
Numazu, 102 G- 6
Oami, 4 J- 8
Obama, 15 G- 4
Obihiro, 52 B- 7
Odate, 23 D- 6
Odawara, 75 J- 7
Ogaki, 75 G 5
Ogori, 13 K- 5
Oita, 94 H- 2
Okaya, 36 G- 5
Okayama, 163 G- 4
Okazaki, 96 G- 5
Ominato, 14 C- 7
Omiya, 100 J- 7
Omura, 56 H- 2
Omuta, 192 L- 5
Onoda, 53 K- 5
Onomichi, 61 G- 3
Osaka, 1,956 G- 4
Ota, 50 H- 7
Otaru, 178 B 7
Otsu, 85 G 4
Owashi, 19 H 5
Ozu, 9 L 5
Rumoe, 33 B- 7
Saga, 67 H- 2
Sagara, 15 G- 6
Saijo, 47 H- 3
Saiki, 40 H- 2
Sakai, 214 G- 4
Sakata, 54 E- 6
Sakurai, 17 L- 7
Sanda, 8 K 6
Sanjo, 47 F- 6
Sano, 55 H- 7
Sapporo, 314 B 7
Sarufutsu, 7 A- 7
Sasayama, 8 K- 6
Sasebo, 194 H 1
Sendai, Kagoshima, 42 J- 2
Sendai, Miyagi, 342 E- 7
Setana, 6 C 6
Seta, Aichi, 46 K- 8
Seto, Nagasaki, 7 L- 4
Shari, 15 B 8
Shibata, 36 E 6
Shibetsu, 21 B- 8
Shimabara, 41 H- 2
Shimada, 32 G- 6
Shimizu, 88 K- 6
Shimodate, 16 H 7
Shimonoseki, 194 H- 2
Shimo Yoshida, 19 J- 6
Shingu, 34 H- 4
Shinjo, 31 E- 6
Shiogama, 46 E- 7
Shirawaka, 32 F- 6
Shisa, 10 L- 4
Shizuoka, 239 G- 6
Shobara, 9 G- 3
Soeda, 25 K- 5
Sonobe, 9 K- 7
Suita, 78 L- 7
Sukumo, 14 H- 3
Sumoto, 37 L- 6
Susaki, 16 H- 3
Suttsu, 6 C- 6
Suwa, 35 G- 6
Suzuka, 69 L- 8
Tachikawa, 52 J- 7
Taira, 43 F- 7
Taisha, 11 G- 3
Tajimi, 38 G- 5
Takachiho, 14 L- 5
Takada, Niigata, 36 F 6
Takada, Oita, 14 L- 5
Takamatsu, 125 H- 4
Takaoka, 142 F- 5
Takasaki, 93 F 6
Takatsuki, 43 L- 7
Takawa, 88 H 2
Takayama, 43 F 5
Takefu, 40 G- 5
Takeo, Saga, 15 L- 4
Takikawa, 29 B- 7
Tamano, 44 G- 4
Tanabe, 38 H- 4
Tateyama, 37 G 6
Teshio, 9 A- 7
Toba, 11 L- 8
Tobata, 88 K 5
Tochigi, 42 F- 6
Tokushima, 121 H- 4
Tokuyama, 63 H- 2
Tokyo, 5,385 G- 6
Tomakomai, 39 C- 7
Tondabayashi, 30 L- 7
Tosu, 17 K- 4
Tottori, 62 G- 4
Toyama, 154 F- 5
Toyohashi, 146 G- 5
Toyokawa, 55 L- 8
Toyonaka, 86 L 7
Toyooka, 32 G- 4
Tsu, 76 G- 5
Tsuchiura, 62 F- 6
Tsuge, 5 L- 7
Tsuruga, 31 G- 5
Tsuruoka, 44 E- 6
Tsushima, 31 K- 8
Tsuyama, 52 G- 4
Ube, 129 H- 2
Ueda, 43 F- 6
Ueki, Kumamoto, 2 L- 5
Ueno, 47 G- 5
Uji, 15 L- 7
Ujiyamada, 69 G- 5
Urakawa, 14 C- 7
Urawa, 115 G- 6
Ushizu, 6 L- 4
Usuki, 31 H- 2
Utsunomiya, 107 F- 6
Uwajima, 57 H 3
Wajima, 16 F- 5
Wakamatsu, Fukuoka, 90 K- 5
Wakamatsu, Fukushima, 60 F- 6
Wakayama, 191 G- 4
Wakkanai, 35 A- 7
Yamagata, 105 E- 6
Yamaguchi, 78 H 2
Yamatotakada, 31 L- 7
Yao, 67 L- 7
Yatsushiro, 48 J- 2
Yawata, 210 H- 2
Yawatahama, 40 H 3
Yobuki, 10 K- 4
Yoichi, 26 B- 6
Yokkaichi, 124 L- 8
Yokohama, 951 G- 6
Yokosuka, 251 G- 6
Yokote, 27 E- 6
Yonago, 59 G- 3
Yonezawa, 55 E- 6
Yoshii, 6 L- 5
Yoshiwara, 33 K- 6
Yubari, 100 B- 7
Yubetsu, 2 B- 8
Yukuhashi, 16 K- 5

II. FINDINGS AND GENERAL VIEWS OF JAPANESE PORT PLANNERS

This chapter recounts the summary of thoughts and findings of the trip. Also compiled here are the general views of port planners obtained from numerous interviews.

Because of time limitations, the interviews made do not cover all groups which should be considered. For example, no interviews were made with any major organizations that solely represented environmental concern. At the time of the visit, the cabinet-level Environmental Agency had just come into existence. 2/

Those interviewed were officials belonging to:

a. The Bureau of Ports and Harbors, Ministry of Transport.

b. Local port authorities.

c. Private firms.

d. Universities.

The interviews covered many subjects, most of which will be discussed in more detail in subsequent chapters.

2/ The Environmental Agency was formed in July 1971 as Japan's first unified administrative body to study - not regulate - environmental problems.

A. Institutions and Planning

Harbors in Japan are under the jurisdiction of local government agencies. However, construction and maintenance of principal harbors and port facilities are the responsibility of the central government when these have been designated "important harbors". Examples of designated "important harbors" are Tokyo, Yokohama, Kobe, and Osaka.

Once a harbor has been designated "important" by the central government through the Ministry of Transport, plans are made for enlargement and renovation with national funds budgeted for this purpose. National expenditures scheduled for port development from 1971 through 1975 total ¥1,865 billion ($6.2 billion).[3/]

The kinds of works financed by the central government include harbor surveys and improvements, dredging of channels and anchorages, construction of wharves, reclaiming of waterfront land and construction of shoreside facilities.

In general, it appears that when an important port plans a project and has insufficient financing, the central government will allocate funds for the new development. The amounts allocated will vary on a case-by-case basis.

3/ New Economic and Social Development Plan: 1970-1975, Economic Planning Agency, Government of Japan, May 1970.

For resources where supply diversifications are possible, the Japanese business community is sponsoring many new joint ventures in Southeast Asia, Australia, Latin America, and Africa. Heavy capital investments are being made in Australia and Brazil to develop supplies of iron ore, coal, and liquified natural gas.

The Japanese are also aware that some countries are very sensitive to massive "exploitation" of their natural resources. Australia is a case where concern has been raised about increasing economic dependency on Japanese purchases. To counter such problems, Japan plans to build many new industrial plants abroad as joint ventures. In fact, there are plans to build new aluminum and steel plants in Southeast Asia and Africa as well. This will also alleviate domestic pressures to expand industrial capacity in highly congested Japanese cities where pollution problems are great. Risks involved in building plants abroad are a concern but there may be no other alternative.

The development of new industrial plants abroad may relieve some of the pressures on Japan's maritime capability. But it is not expected to offset the increasing maritime requirements associated with the diversification of supply sources.

B. Maritime Practices and Technology

Central to all the interviews was the acquisition of first-hand knowledge about Japanese port technologies, practices, and experiences.

Port Planning. Port planning in Japan is undergoing some important spatial changes. The national strategy is to develop new port facilities away from densely populated metropolitan areas. The Five-Year Plan calls for government studies of new industrial ports located in medium-to-low density population areas. These sites are:

a. Tomacomai

b. Akita

c. Shibushi

d. Ogawara

e. Suonada

f. Omori

g. Oita

Planning of new ports away from densely populated areas will assist dispersal of industry and population. One uncertainty is the environmental consequences of this strategy. It may also result in a dispersion of environmental degradation if adequate safeguards are not provided.

One of the most important problems concerning Japanese business is the continued and increasing dependency on foreign resources. Their business strategy appears to be diversification of source of supply to insure stability in the flow of intermediate goods. Presumably, this will minimize disruptions to the economy if one supplier becomes unavailable. Sole source suppliers situations will be avoided. For some resources, however, diversification of sources of supply may not be possible. This is particularly true for crude petroleum from the Middle East which supplies approximately 90% of Japan's requirements.

Particular emphasis was placed on port facilities for handling the movement of crude petroleum. Since Japan is one of the world's largest importers of oil, it is understandable that their technology in crude handling is highly developed.

Certainly, there can be no comparison between U. S. port facilities for crude petroleum vis-a-vis Japan. For instance, the U. S. does not have VLCC's in service while Japan is building VLCC's up to 500,000 dwt. There are no monobuoy or offshore sea berth systems operating in the U. S. while Japan probably has more of these systems than any other country.

Ship Technology. Japan is the world leader in shipbuilding and their development of mammoth-size ships is well known. In oil tankers, the Nippon Oil Company will break the world's record with their 477,000 dwt tanker. It will have a draft of 28 meters (approximately 92 feet). Moreover, plans are drawn for 750,000 and 1,000,000 dwt tankers. Table 1 provides data on Japanese tanker capability.

In iron ore ships, their record-breaking designs continue. The world's largest iron ore ship is the "Japan Olive" which is 147,000 dwt. When

TABLE I

JAPANESE OIL TANKER DATA

Tanker	Tokyo Maru	Idemitsu Maru	Universe Ireland	Nisseki Maru	Globtik Tokyo
Length	306.5 meter (1,005.5 feet)	342.0 meter (1,122.0 feet)	346.0 meter (1,135.1 feet)	347.0 meter (1,138.4 feet)	379.0 meter (1,243.4 feet)
Width	47.5 (155.8)	49.8 (163.3)	53.0 (173.8)	54.5 (178.8)	62.0 (203.4)
Depth	24.0 (78.74)	23.2 (76.1)	32.0 (104.9)	35.0 (114.8)	36.0 (118.1)
Draft	16.03 (52.59)	17.65 (57.9)	24.78 (81.2)	27.0 (88.5)	28.0 (91.8)
Gross ton	94,630	107,957	149,608	186,500	235,000
DWT	153,685	206,005	326,585	372,400	477,000
Main engine	Turbine 30,000-h.p.	Turbine 33,000-h.p.	Turbine 37,400-h.p. (18,700X2)	Turbine 40,000-h.p.	Turbine 47,700-h.p.
RPM	97	101	93	90	90
Cruising speed	16.0 knots	16.5 knots	14.6 knots	14.5 knots	14.3 knots
Year completed	Jan. 1966	Dec. 1966	Sept. 1968	May 1971	1972
Shipyard and Builder	Yokohama IHI	Yokohama IHI	Yokohama IHI	Kure IHI	Kure IHI

Source: Japan Times Supplement, February 1971

loaded, this ship can carry 133,148 tons of fines. It will be used in the trade routes between the Port of Dampier, Western Australia, and Japan. At Oita, it was learned that Nippon Steel eventually plans to build an iron ore carrier up to 350,000 dwt. Port facilities have been built to accommodate ships in this range.

Containership information was also obtained. Here ship length, and not depth, is a controlling factor in design. According to those interviewed, 50,000 dwt appears to be the current optimal size for containerships. These ships are approximately 1,000 feet long and capable of traveling at high speeds (30 knots or more).

Sea Berths (Offshore Platforms). In Japan, the predominant means for handling the unloading of crude petroleum from VLCC's are sea berths. These sea berths are fixed offshore terminals capable of handling VLCC's up to 500,000 dwt. The sea berths are secured by vertical pilings into the ocean floor. The piling can be as long as 90 meters.[6/] Each sea berth has breasting and mooring dolphins. The number of dolphins depends on the range of tanker. The service platform usually has five or more loading arms (16 inches). Four or more of the loading arms are devoted to crude oil handling and one to ballasting and bunkering. The service platform is usually a concrete structure.

The depth of water alongside a sea berth can be as great as -30 meters (98 feet). Some sea berths may be protected by breakwater barriers while others are in open seas. The proportion protected by breakwater barriers is not known. VLCC's are towed alongside the service platforms by tugs.

6/ 1 meter = 39.37 inches or slightly more than 3 feet.

The Japanese prefer the fixed sea berth facilities because of their operational status under adverse weather conditions. It was difficult to obtain any specific costs on the sea berths used in Japan. However, it was revealed that their capital cost can range between 25-40 million dollars per platform. The costs are a function of ocean depth, distance offshore, and composition of ocean floor. Operation and maintenance costs will range between 1-3% of capital costs. Maintenance costs are a function of the platform's exposure to open seas.

For their situation, Japanese port planners consider offshore sea berths to be the best available offshore system for accommodating VLCC's.

Monobuoy Systems. Another offshore method for handling VLCC's is single-buoy mooring systems (SBM). In Japan, there are at least nine such systems being used. They are:

	Location	User	Date Installed
a.	Oita[7/]	Kyushu Oil Corp.	1963
b.	Chiba	Maruzen Oil Corp.	1965
c.	Koshiba	U.S. Army	1967
d.	Hakozaki	U.S. Army	1968
e.	Hakodate	Asia Oil Corp.	1968
f.	Toyama	Japan Sea Oil Corp.	1969
g.	Tengan (Okinawa)	U.S. Army	1970
h.	Okinawa	Toyo Gasoline	1970
i.	Himeji	Idemitsu Oil	1970

7/ May no longer be in use.

Unlike sea berths where there are many manufacturers,[8] the SBM terminal is supplied by only a few firms. For capability, SBM terminals can perform tanker unloading, bunkering, and deballasting operations simultaneously. Sketches and pictures of SBM terminals are shown in Plates 20 to 29 in Chapter IV.

The advantages of monobuoy systems are quite apparent. These are movable systems that can be relocated as the need arises. They can be installed in navigable water at many points off any coastline. The construction and installation time is usually one year or less; whereas, jetties, wharfs, or offshore platforms may take several years. SBM's can be located in open seas without breakwater protection. Tugs are not required to berth tankers to an SBM. This is a saving in dead time for vessel maneuvering.

The capital costs for SBM are significantly less than offshore sea berths. For instance, an SBM system for handling a 250,000 dwt tanker is approximately 2 million dollars.[9]

In spite of these advantages, the technical staff at the Bureau for Ports and Harbors was less than enthusiastic about monobuoy systems.

8/ Sea berths involve no patent rights on the service platforms. Only some breasting and mooring dolphin designs are covered by patents.

9/ Cost provided by IMODCO, Inc., Los Angeles.

Their past experiences indicate operational difficulties in adverse weather. In fact, the Bureau employs a criteria where monobuoy systems should not be used when mean wave height (MWH) is 1.5 meters or greater. It is notable that most of their monobuoy systems are either in protected areas (e.g., Inland Sea) or the Sea of Japan. There are none operating in the open seas facing the Pacific Ocean where most of Japan's sea berths are located.

One important problem about monobuoys seems to be high maintenance costs. For instance, the mooring chains need to be replaced frequently. There are past examples where annual maintenance costs have been excessively high, exceeding 10-15% of capital costs. Presumably, these problems can be overcomed by improved designs and practices.

Containers and LASH Terminals. This is the only area in marine transport where Japan is not ahead of the U.S. Japan began to introduce containerships in late 1968, while U.S. ports were already entering the container market. In 1971, the U.S. introduced LASH (lighter aboard ship) vessels which will probably revolutionize cargo transport. So far, Japan has not yet entered the LASH field although the Sumitomo Heavy Machinery Company built the world's first two LASH vessels and is constructing more LASH vessels for other countries.

The major obstacle appears to be opposition by stevedores and lighter owners, who stand to lose their means of livelihood. Apparently, this obstacle will be overcome with some guarantee of livelihood.

This is based on the massive ongoing container projects at the ports of Kobe, Osaka, and Tokyo. Innovative construccion efforts were observed in these ports for container berths (300 meters in length) and back-up facilities for container stacking.

Dredging. There is probably more dredging and dredge hoppers operations in Japan than any other country. With approximately 80 major ports, the Bureau staff indicated that each of these ports has ongoing dredging or construction programs. Nearly all of the dredge spoils are used for reclamation. There is very little ocean disposal in Japan. One exception was Kobe Harbor where the dredge material was mostly clay and unsuitable for reclamation.

In the past, there was little concern over the use of polluted or toxic spoils. Now, because of the increasing environmental awareness of the public, practices using polluted dredge spoils will probably be discontinued. At the time of the visit, Japan had few regulations, if any, concerning the use of dredge spoils. Environmental opposition to dredging is not as great as those experienced in the U.S., but changes in public attitudes were occurring.

Pier Piling. Pilings installed in Japan are considerably deeper than required for existing channel depths. The reasoning is that every port expects to dredge deeper than their existing channel depths. This may be an anticipatory practice not commonly done in other countries, although there are cases in the U.S. where this is true.

Ship Clearance Criteria. In Japan, the criteria of 1.8-meter clearance between ship hull and harbor floor is utilized for bulk ships. Cargo ships have only a 1.0-meter clearance criteria. Japanese regulation and enforcement of these standards are unknown.

New Technologies. Finding out about new technologies was a difficult task. Only the most general information is available. In this category are two technological developments which could have significant impacts for the future.

The first is an ocean floor blasting system under development by the Taisei Construction Co., Ltd., one of the five largest construction firms in Japan, and the Oki Electric Industry Co., Ltd., a major producer of electronic equipment. They are developing a remote controlled system for blasting on the ocean floor by the use of microwave signals.

The intended use is for deepening harbors and ship channels. Microwave blasting can minimize the impact on underwater life considerably more than conventional techniques. No divers are required and the work is done from a ship. The applications of this experimental technique would be on harbors with hard or rock ocean floors.

A more recent technological development is an announcement by the Hitachi Shipbuilding and Engineering Co. It has experimentally shown that a VLCC can be built with a light draft. A miniature model tanker test indicated that a 500,000 dwt vessel with a draft of 72 feet could be built. If VLCC design can be made for light draft ships, the implications for the U.S. would be substantial.

C. Environment

To the Japanese, their phenomenal economic growth and expansion is both satisfying and of concern. It is satisfying because of the unprecedented productivity and world economic status. On the other hand, it is a matter of great concern because of the environmental degradation.

The most severe problems of environmental pollution can be found in Japan. From Hokkaido in the north to Kyushu in the South, the narrow Japanese landscape has become studded with air, land, and water pollution problems. The concentration of harbors, industrial plants, and metropolitan areas is one of the most compact in the world. This combination has caused very adverse environmental consequences for Japan.

Externally, the great consumption of the world's natural resources by Japan's economy is also becoming an environmental and social problem. Unfortunately, time did not permit any exploration into this subject.

According to those interviewed, there are no formal environmental opposition groups in Japan similar to the Sierra Club, Environmental Defense Fund, etc. In harbor reclamation projects, the main opposition has come from students and fishermen. To pacify opposition to harbor projects, large indemnifications (cash) have been paid to those directly affected by dredging and landfill. It is unlikely, however, that this mitigative measure would suffice in the near future.

At the time of the visit, environmental awareness had become quite strong in Japan. However, the dilemma of heavy industrial growth and desires for environmental esthetics have not yet resulted in any trade-offs.

No harbor projects have been affected and the related secondary developments of heavy industry continue.

One of the reasons for the lack of environmental action is that Japan has no system for dialogue with their public to deal with frictions between industrial development and concern for the environment. Another reason is the absence of strong legislation. For example, the 1967 Basic Law for Environmental Pollution Control has a clause which states that antipollution measures will be "reconciled with the sound development of the economy." Japan until recently had no strong environmental legislation.

In Japan, the word "Kogai" means pollution or literally public hazard. The usage of the word has become commonplace now in the Japanese vocabulary. However, it will remain only a word until Japan achieves a balanced trade-off between heavy industrial growth and environmental quality. For the time being, it appears that imbalances between macro-economic growth and environment will continue to be a problem of major proportions.

III. JAPAN'S GLOBAL REQUIREMENTS AND ITS MARITIME SYSTEM

Being a land of scarce resources, Japan has been, and will continue to be, heavily dependent on foreign sources of supply. Recognizing this resource problem, Japan's industrial sector concentrated production plants on tidelands where bulk resources can be imported and finished goods exported by a highly efficient maritime system.

In a real sense, maritime transport can be considered the "lifelines" of Japan's industries, permitting industries the flexibility of buying natural resources from the most competitive world sources.

On the other hand, it makes growth precarious since disruptions to the sources or movements of raw materials would have serious consequences on the economy. This is a matter of continual concern in Japan.

A. Foreign Resources Requirements

Being the world's third largest economy, Japan has become a very large consumer of natural resources. Their economic structure is concentrated in heavy industries, e.g., steel, chemicals, and manufacturing. These industries utilize enormous quantities of natural resources such as petroleum, iron ore, coking coal, and others. Accordingly, Japan has recently become the world's largest importer of natural resources.

The statistics in Table 2 bear this out. Additionally, Table 3 reveals the extent of Japan's dependency for foreign bulk resources.

B. Vessel Requirements

The most crucial resource requirements are petroleum and natural gas for energy production. The Japanese energy structure is decidedly dependent on foreign sources.

By 1985, crude petroleum requirements are expected to range between 678 and 756 million kiloliters. Natural gas demand will increase by five-folds between 1970 and 1985. Nearly all of these vast energy needs will be imported by large tankers.

Oil Tankers. These requirements pose the problem of how to attain maximum efficiency in waterborne transport of primary energy resources. For petroleum, the 1975 demand would require the use of more than 165 tankers of the 200,000 dwt class, assuming that each of these vessels can make nine annual round trips between the Persian Gulf and Japan.

To attain maximum transport efficiencies, the approach has been increasing the tanker size, rather than the number of ships. This is why Japan has pioneered the development of mammoth tankers.

However, as the size of tanker designs is increased, the operational economies involve more cost factors. One of these factors is increased costs for central terminals used in unloading crude from the tanker to refinery. Another is ocean depth limitations in navigation routes. The

TABLE 2
WORLD'S NATURAL RESOURCES TRADE

Year	Natural resources imported by: Japan		U.S.A.		U.K.		Soviet Bloc		Others	
1965	$39[1/]	9.1%	$52	12.2%	$43	10.1%	$41	9.6%	$252	59.0%
1966	46	11.8	55	14.1	42	10.8	41	10.5	205	52.8
1967	55	11.9	52	11.3	42	9.1	40	8.7	272	59.0
1968	61	12.9	58	12.2	44	9.3	39	8.2	272	57.4
1969	67	11.8	63	11.4	45	8.2	42	7.6	332	61.0
Average Growth Rate		14.5		4.9		1.1		0.6	---	

1/ Unit: $100 million for SITC Sections 2, 3, and 4

Source: Montly Bulletin of Statistics (United Nations) March 1970

TABLE 3
JAPAN'S ESTIMATED SUPPLY AND DEMAND IN MAJOR NATURAL RESOURCES

		Fiscal 1970					Fiscal 1975					
			Domestic supply					Domestic supply				
	Unit	Demand	Domestic production	Scrap, etc.	Total	Dependence on imports	Demand	Domestic production	Scrap, etc.	Total	Dependence on imports	Average annual demand increase 1970-1975
Copper	1,000 tons	880	116	99	215	76%	1,420	139	86	225	82%	10.0%
Lead	"	216	63	35	98	55	303	66	97	163	46	7.0
Zinc	"	681	258	52	310	55	1,149	302	192	494	57	11.0
Aluminum	"	885	0	0	0	100	2,000	0	0	0	100	17.7
Nickel	"	91	0	0	0	100	150	0	0	0	100	10.5
Iron ore	Million tons	111	(13.2)1/		13.2	88	200	(18)1/		18	91	12.5
Coking coal	"	59.2	(12.8)1/		12.8	79	106	(18)1/		18	83	12.4
Petroleum	Million kiloliters	204.1	0.7	0	0.7	99.7	323	0.8	0	0.8	100	9.6
Natural gas	Million cubic meters	3,662	2,387	0	2,387	35	9,500	2,500	0	2,500	74	21.0
Uranium	1,000 short tons	0.7	0	0	0	100	3.5	0	0	0	100	63.5

1/ Combined amount - no separation for domestic production and scrap.

Source: Ministry of International Trade, White Paper on "Prospects of Natural Resources Problems in Japan".

maximum draft in the Malacca Straits is about -21 meters which limits tanker passage. Tankers with drafts greater than -20 meters must go through the Lombok Straits near Java. This increases trip time by about two and one-half days (one-way). To compensate for these extra costs, tanker size would have to be substantially increased.

The Globtik Tokyo (477,000 dwt), when it enters world service between the Persian Gulf and Kiire, is expected to provide some answers. The Ministry of Transport plans to monitor the operational economies of this vessel presumably to determine whether increased size can cover additional cost factors, i.e., the transport of an additional two and one-half day trip and secondary transportation costs.

Since the current optimum size of tankers is constantly changing, it would be premature to rule out the possibility of one million dwt tankers. In fact, Japan has three dock yards which will be able to build a one million dwt tanker. One of these facilities is the Mitsubishi dock yard at Nagasaki. The expectation is that a one million dwt tanker would probably be built sometime in the future.

LNG Vessels. The vessel transport of liquified natural gas is still in its infancy and a large number of economic and technical problems must be worked out. Currently, there are only three LNG transport projects in the world. One of these projects involve movements between Alaska and Japan.

A major problem with LNG is uncertainty about shipping costs. Shipping costs, which are subject to considerable fluctuations, comprise a great part of LNG costs. Labor costs are high since highly skilled engineers are

required aboard LNG ships.

So far, there is a great deal of skepticism about LNG transport technology despite the desirable quality of natural gas as a non-polluting energy source. If technical problems are resolved, very large LNG vessels may be built (exceeding 180,000 cubic meters in capacity).

The economy of scale achieved by Japan in petroleum transport is being applied to other bulk resources, particularly for ore. Iron ore vessels several years ago were 20,000 dwt in size. Ore carriers are expected to be in the 300,000 dwt class shortly. In the future, the application of large scale transport is foreseeable for many other resource requirements.

IV. PORT AND SHIP TECHNOLOGY

Japan has 1,058 ports. Slightly more than 80 of these are considered to be major commercial ports.

Japanese port and fleet developments are so intense and widespread that keeping abreast of current activities is a major problem even for the Bureau for Ports and Harbors. With a limited survey time, it was decided that visits be made to select ports which are important now and most likely to be important in the future.

A. Important Japanese Ports

The short listing shown here has no official status. It was arbitrarily developed to provide U.S. port planners with an overview of those Japanese ports with interesting facilities. One overriding selection factor was the type of facilities for accommodating deep draft vessels. Other factors included harbor configuration, landfill or reclamation projects, volume and composition of waterborne commerce, proximity to market and metropolitan areas, and future development plans. A list of the important ports follows:

Port	Port Features
a. Shigoma	Crude petroleum port with -21 meter channel depths.
b. Kashima	Industrial port handling dry bulk ores and crude petroleum with -22 meter channel depths. Kashima is unique

		since it was created in 1970 by excavating inland to create a water basin. This differs radically from standard port configurations which are usually surrounded by breakwaters.
c.	Chiba	Crude petroleum port serving Tokyo with (Keijo) sea berth facilities at -20 meters.
d.	Tokyo	General cargo port (discussed in following sections).
e.	Kawasaki	Industrial port (discussed in following sections).
f.	Yokohama	Industrial port (discussed in following sections).
g.	Yokkaichi	Crude petroleum port with depths of -21 meters.
h.	Osaka	General cargo port (discussed in following sections).
i.	Kobe	General cargo port (discussed in following sections).
j.	Kure	Iron ore port with -18 meter channel depths.

k.	Tokuyama	Crude petroleum port with facilities at -20 meters.
l.	Oita	Iron ore port (discussed in following sections).
m.	Kiire	Crude petroleum port with sea berths at -28 meters. This is the only port designated to service the 477,000 dwt tanker being built in Japan.
n.	Niigata	Crude petroleum port with (IMODCO) buoy system at -21 meters.
o.	Fushiki Toyama	Crude petroleum port with new (IMODCO) buoy system at -23 meters.
p.	Hakodate	Crude petroleum port with (IMODCO) monobuoy system at -15.5 meters.

Added to this list should be the new industrial harbors cited earlier in Chapter II. For any future surveys of Japanese ports, it is suggested that Chiba, Kashima, Kawasaki, Kiire, and Fushiki Toyama be given special attention because of their different methods for handling transfers of crude petroleum. They are important deep-water ports.

All of the listed ports are further described in Annex A.

B. Iron Ore Facilities

Steel is the foundation of Japan's industrial progress. To accommodate

the requirements of the steel industry, some of the most modern plants, equipment, and harbor terminal facilities can be found in Japan.

1. Oita

The best example of Japan's steel capacity is the Nippon Steel Works at Oita. Oita was easily the most impressive experience of the trip.

To avoid confusion, it should be noted that there are two ports in Oita; one is a public port and the other is a private port developed by Nippon Steel Corporation with some government funding. This section will only be concerned with the latter port facilities.

The Oita Works is located on the northern part of Kyushu Island facing the Inland Sea. Adjacent to Oita is the resort town of Beppu. Plate 2 shows the general location of Oita.

Background. The basic scheme for construction of the Oita Works was drawn up in 1961, and work was then begun on conditioning and leveling the land for the Works. Construction of the Works, however, did not commence until late 1961. The Oita Works is one of the two new steel works called for in Nippon Steel's Third Modernization and Expansion Program;[10/] the other being the Kimitsu Works.

The first stage plan for Oita envisions an annual output of 7.8 million tons of crude steel with two basic oxygen furnaces. The Works

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10/ 1970 Nippon Steel Report, Nippon Steel Company, Tokyo, Japan.

utilizes computers from the receipt of orders, on through iron and steel making and rolling processes, and finally, out to product shipping. For raw materials unloading, a gigantic sea berth has been built capable of accommodating 300,000 dwt class ore carriers. Installed on the sea berth are three 2,500-ton unloaders.

The first stage construction for the plant and equipment, including the two blast furnaces and harbor facilities, cost approximately ¥250,000 million ($830 million under the recent exchange rate of ¥301 per dollar). Successive stage plans for the Oita Works are unknown. At the time of the visit, plant operations had not begun. They were scheduled to start shortly.

Sea Berth Facilities. Plate 3 shows the layout of the plant and sea berth facilities. The plant encompasses approximately 6.6 million square meters of reclaimed tidelands.

The sea berth is built offshore with a connecting bridge-conveyor belt system of approximately 400 meters (1,300 feet) from the iron and coal yards. The sea berth is secured by vertical and incline piling 90 meters (290 feet) long. The ocean floor between -30 and -65 meters is silt and clay. Below -65 meters is sand and gravel. The entire length of the sea berth is 900 meters (2,900 feet) which includes mooring dolphins. The basic platform length, alone, is 620 meters (2,000 feet) capable of berthing two 250,000 dwt vessels and one 200,000 dwt vessel simultaneously.

The offshore side of the sea berth, capable of accommodating two 250,000 dwt carriers simultaneously, has an initial water depth of -25 meters.

Eventual water depth will be -30 meters. The shoreside of the berth, capable of berthing only one 200,000 dwt vessel, has an initial water depth of -20 meters. Eventually, this will be dredged to -25 meters.

The three unloaders on the sea berth have an operating capacity of 2,500 tons per hour for iron ore and 2,000 tons per hour for coal. The grab buckets for iron ore can take 17.2 cubic meters; whereas the grab buckets for coal range from 25-43 cubic meters. The belt conveyor to the ore yards has a capacity of 6,500 tons per hour.

The Works also has a product harbor for shipping finished steel; however, product ships are comparatively small and located away from the sea berth.

Plates 4 to 8 show these facilities in more detail.

The Oita Works will be initially supplied by ore carriers in the 150,000 dwt class since these are the largest in service. Sometime between 1972-1973, Nippon Steel plans to have 250,000 dwt carriers servicing Oita. Eventually, 350,000 dwt ore carriers will be built to supply Oita. A cross-section of future iron-ore vessels for Oita is shown on Plate 9. Plates 10-12 show existing ore carriers.

Environmental Safeguards. The Oita Works is designed to be one of the most pollution-free steel works ever built in Japan. A number of safeguards have been installed to minimize public hazard. Landscaping, with many trees, has been added to enhance appearances; however, a steel works of this size is difficult to change visually. The real test will come when the

operations begin.

The facilities shown at Oita were awesome. It is one of the most advanced steel plants in the world and is indicative of the future for the Japanese industrial capability. It also confirms the direct correlation between maritime development and industrial growth in a country of scarce natural resources.

C. Crude Petroleum Facilities

There are three basic methods of crude petroleum transfers. The first is to provide dockside facilities for berthing a tanker. Another is to use offshore buoy systems with submersible hoses and pipeline to shore. The third method employs fixed offshore sea berths (platforms). All three basic methods are employed in Japan.

Also, Japan has built jetties for loading and unloading petroleum. The Port of Iwakuni has a refined petroleum loading jetty. The Port of Karatsu has a jetty for handling liquified natural gas. Not much is known about their jetty systems except that most of them do not service VLCC's. Apparently, their jetty systems service comparatively light-draft vessels. Some jetties, e.g., Port of Shimotsu, service 80,000 dwt class vessels but there do not appear to be any vessels over 100,000 dwt serviced by this method.

1. Dredged Facilities

The dredging of deep ship channels to accommodate large oil tankers is becoming infeasible in Japan. Although most of Japan's harbors

have soft bottoms (sand and/or clay composition), environmental and economic costs are becoming too great. There are a few harbors in Japan with shoreside berths that are capable of handling VLCC's.

The most notable exceptions are the Ports of Kashima and Yokohama. Kashima, as mentioned earlier, is a new port with the water basin created by dredging inland from the shoreline. This is a striking example of how the landscape was altered to create an artificial port. Present depths at Kashima are -22 meters (72 feet); however, there are plans to further deepen the channels. The reasoning is that Kashima is planned as an industrial port to handle dry bulk vessels as well as oil tankers. Plate 13 shows the excavated entrance.

Yokohama is one of the best equipped ports in terms of harbor facilities not only for crude petroleum but other heavy cargoes and containers. The shipping activities at this port matches any port in the world. It is situated in one of the world's most densely populated spheres, lying some 27 kilometers (17 miles) from Tokyo.

The Port of Yokohama has two configurations. The main port is adjacent to the Port of Kawasaki, divided only by a political boundary. It is served by the Tsurumi Fairway and the Yokohama Fairway (main ship channels). Outside of the Daikoku Breakwater are several sea berths. The other configuration is Negishi Bay. Here, the channel depths are greater and there is no breakwater system. Negishi Bay is

surrounded on three sides by reclaimed land. Plate 14 shows the harbor configuration.

Many refineries are located in the Port of Yokohama. These refineries are served by offshore sea berths and shoreside piers. This section will only be concerned with the shoreside piers for crude petroleum.

For dredged facilities, Negishi Bay has a ship channel at -17 meters (55 feet). This depth permits 150,000 dwt tankers to dock at the Negishi Refinery Pier A. The private pier is operated by the Nippon Petroleum Refining Co., Ltd. It is 420 meters (1,365 feet) long and has two berths for 150,000 dwt class tankers. Plate 15 shows an oil staging pier in Negishi Bay.

While further deepening is possible, present plans for future development of the Port of Yokohama do not include more shoreside piers for crude petroleum. This suggests offshore alternatives as being more feasible.

Comments. Dredging harbors for VLCC's appear unlikely for most Japanese ports. The only exceptions seem to be those ports located away from densely populated areas and also involved in dry bulk commodities. If a port must accommodate supersize ore carriers as well as VLCC's, dredging deep channels may be a real alternative.

2. Offshore Sea Berths

Fixed offshore sea berths are the principal means of crude petroleum

transfers from ship to shore in Japan. This is the preferred transfer method.

The basic structure of a sea berth was described earlier in Chapter II. Berth designs will vary somewhat depending on the manufacturer. There appears to be significant differences in the design of mooring loads. The number and spacing of mooring dolphins depends on the size and range of vessels to be accommodated. The same is true for the breasting dolphins. Apparently, the design criteria for berthing impacts is still controversial among engineers. More statistical information is becoming available. This is one specific area where Japanese port planners can be a good source of data.

A major construction item for sea berths is the installation of piles. Costs and construction time are greatly influenced by pile installation. Approximate site installation time is about two years or less. Construction methods employed by the Japanese could be quite valuable information.

There are a growing number of ports in Japan with sea berths. The two deepest sea berths, -28 and -30 meters, at Kawasaki and Kiire, were mentioned earlier. For Tokyo Bay, most of the sea berths located there are not protected by breakwater systems. However, the geographical configuration of the Bay affords some protection from open sea.

Plates 16 to 19 show pictures of Japan's deepest sea berths at Kiire. 10/

10/ Assistance in obtaining information and plates on sea berths were provided by Mrs. Jeremy Potash, Japan Trade Center, 1737 Post St., San Francisco, California.

3. Offshore Buoy Systems

Unfortunately, the trip did not include any visits to monobuoy sites. However, a great deal of subsequent information was generously provided by one of the principal manufacturers, IMODCO, Inc. 11/

In several ways, the monobuoy system for accommodating VLCC's may be the least costly. First, their initial capital investments are considerably lower than the dredging or sea berth method. However, opinions and experiences seem to vary on operation and maintenance costs.

No dredging or fixed offshore structures are associated with monobuoys. They are not permanent structures and can be removed in the event that conditions change. Monobuoy systems seem to have the least environmental impacts.

One uncertainty about monobuoy systems is accidents during operations. An oil spill by a VLCC would be catastrophic. Of course, the chance of accidents with shoreside facilities and sea berths could be just as great or even greater. Environmental safeguards associated with each system should be overriding considerations.

Plates 20 to 29 describe monobuoy systems and show some specific SPM's in Japan.

11/ Technical information and Plates 20 to 29 were provided through the courtesy of Mr. Dennis L. Graves, IMODCO, International Ltd., 11661 San Vicente Blvd., Los Angeles, California.

D. Container Terminal Facilities

Since 1969, Japan has taken long strides to catch up with the U.S. in container traffic. Port extensions and improvements are being hastened on the two commercial spheres of Japan - Tokyo Bay and Osaka Bay.

The Port of Tokyo is undergoing major improvements in container facilities. In Osaka Bay, the Ports of Kobe and Osaka are entering the containerization age with massive projects of their own.

The Ports of Osaka and Kobe have been the leading trade ports of Japan. They are general cargo and passenger liner ports. No accommodations are provided for deep draft ships. The future plans of these two ports will focus on the container trade.

1. Osaka

In September 1969, container terminal operations were begun in the Port of Osaka. Its two container berths are being fully utilized by eight containerships plying between Japan and Australia.

By 1975, Osaka will have seven container terminals (including the two berths already constructed and operated) and 63 conventional vessel wharfs. The construction of these new container terminals are well underway.

The breakwaters in Osaka, 6.5 meters, (21 feet) high, are the highest in Japan. Apparently, their container berths need to be well protected. The main ship channel has a depth of -12 meters (40 feet) and a width of 300 meters (975 feet). The south channel has a depth of -10 meters (33 feet) and also a 300-meter width.

Plates 30 to 32 show the layout of the port and container facilities.

2. Kobe

The Port of Kobe has constructed a 4.3-million-square-meter Port Island for container berth facilities. Plans call for the completion of nine container berths and 21 general cargo berths by 1975.

The Port Island was constructed by excavating Suma Hill, belt conveyor excavating material to barges and then the barges traveling 20 kilometers (12 miles) to dump their loads. The Port Island is protected by a breakwater system. The MWH outside the breakwater is 4.75 meters.

In late 1972, the port will start construction on a second island project called Rokko Island. It will be six million square meters and will have container terminals. The number of terminals is not yet known. The Rokko Island project will have a construction period of 1972-1981. It will be protected by a breakwater system.

Plates 33 to 36 provide further details on the Port of Kobe.

Container Stacking System. At both ports, mention was made of installing vertical stacking systems. This would permit the stacking of containers thirteen-high or higher utilization of valuable port land. However, plans were not firm for installing these systems and are only in the planning stage.

E. Container and LASH Vessels.

Currently, Japan has container routes to Australia, Europe, and West

Coast of the United States. Plans are underway to establish a permanent route to New York. Serving these routes is a small fleet of containerships.

Unlike U.S. containerships which carry 35-foot containers, Japanese containerships use both 20-foot and 40-foot containers. One containership can carry as many as 1,000 20-foot equivalent containers. The Japan Ambrose, scheduled for service in late 1972, will have a capacity of 1,500 containers.

Table 4 provides some data on containerships. Plate 37 shows a typical container carrier.

Looking ahead to more revolutionary transport systems, it appears the Japanese are moving slowly in the use of LASH vessels. So far, there are no LASH ships operating in their merchant marine fleet.

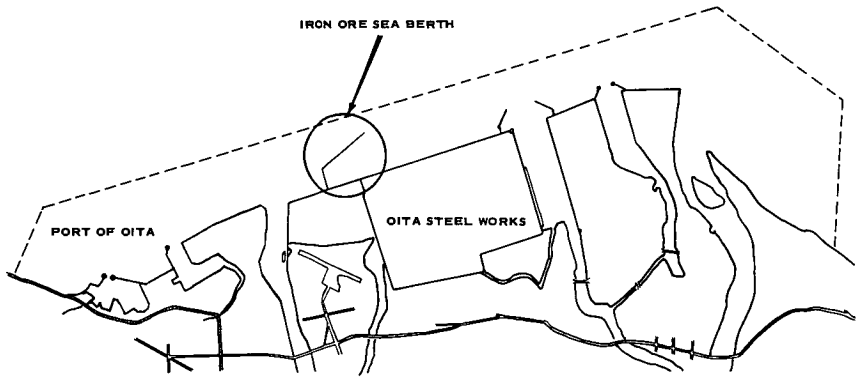
LASH is a recent innovation for carrying cargo aboard ships in lighters (floating containers). Lighters are carried to the stern of the ship by a high capacity traveling crane and discharged into the water. Tugboats will tow the lighters to discharge piers. The loading process is the reversal. It cuts cargo handling and voyage turn-around time down drastically. For example, a LASH ship can be loaded in 24 hours compared to a 5-10 day period for conventional ships. The typical American LASH vessel can carry about 50 lighters and 350 containers simultaneously. Most of the LASH vessels in service today are owned by American shippers.

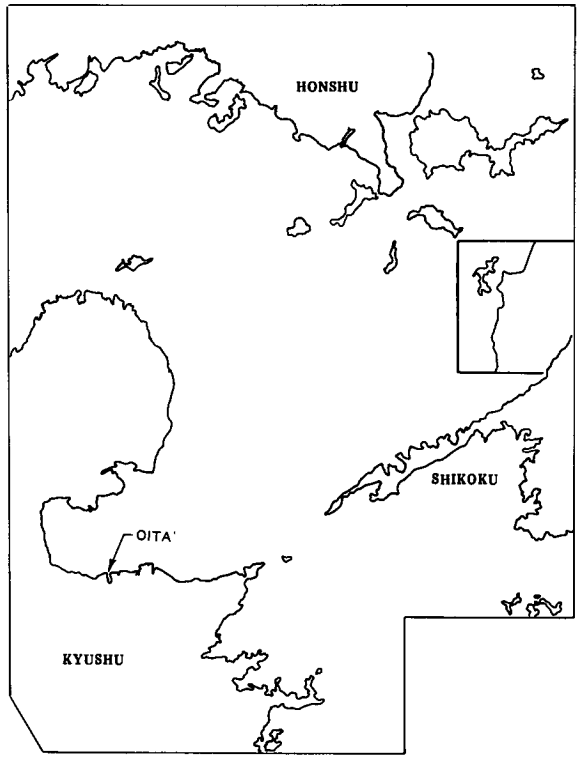
Although Japan has no LASH ships, it is significant that the world's first two LASH vessels were built in Japan. Thus, the entry of Japan into the operational use of LASH vessels is only a matter of time. Plate 38 shows one of these vessels.

TABLE 4
CONTAINERSHIP DATA

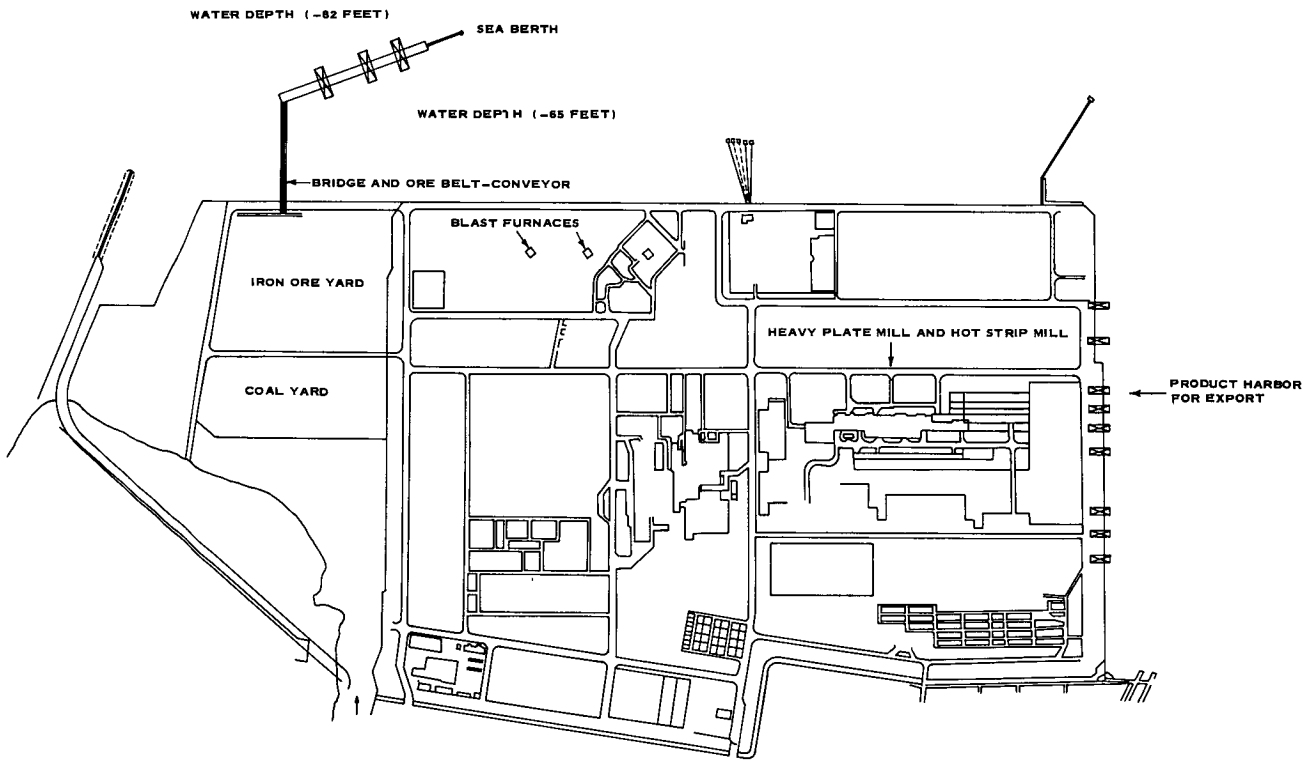
Containerships	Japan Ace	Golden Arrow	Australia Maru	Silver Arrow
Length	188 meters (617 feet)	185 meters (607 feet)	213 meters (699 feet)	226 meters (740 feet)
Width	25 (83)	25 (83)	29 (95)	31 (101)
Draft	10 (32)	11 (36)	11 (36)	12 (38)
DWT	16,796	19,090	23,312	30,465
Speed	22.8 knots	21.7 knots	26.4 knots	22.8 knots

Source: Information provided by Japan Line.



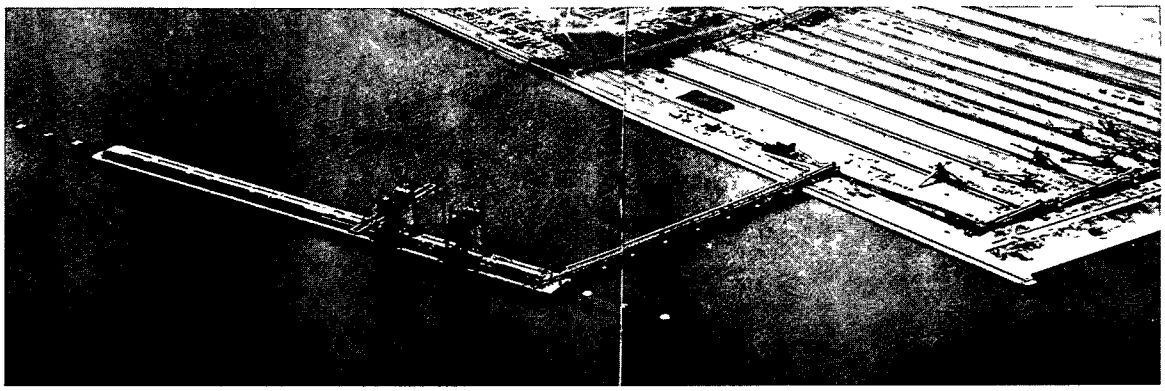


GENERAL LOCATION



LAYOUT OF THE OITA STEEL WORKS

Plate 4

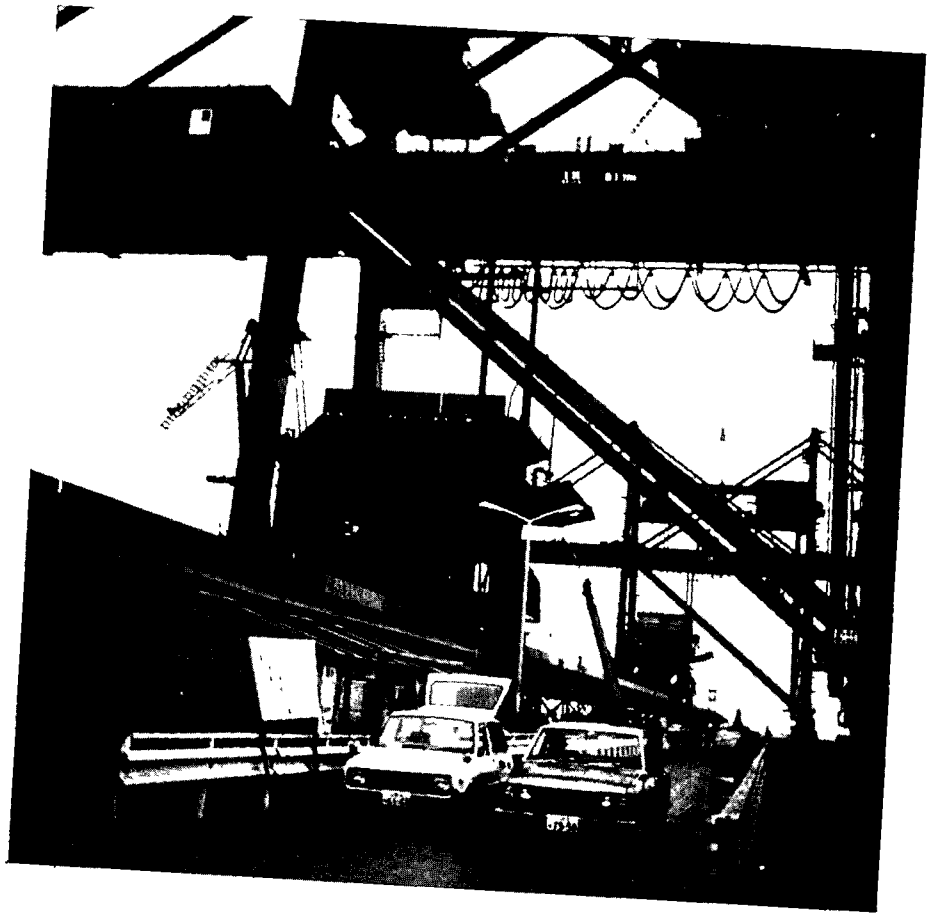


Aerial view of sea berth at Oita

Plate 5

View of iron ore unloaders on sea berth

Plate 6



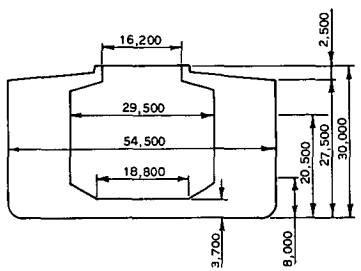
View on the sea berth

Plate 7

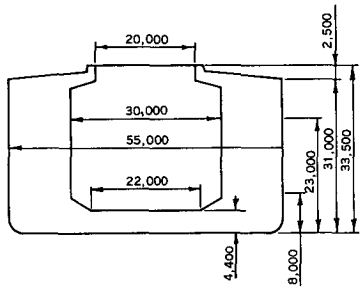
View of iron ore belt-conveyor connecting the sea berth to shore.

Plate 8

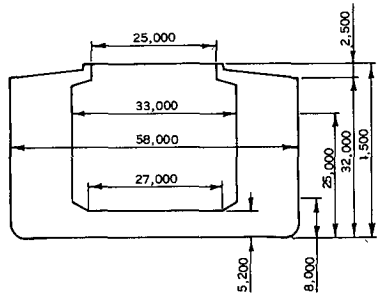
Product harbor at Oita where
finished steel is exported



250,000 DWT



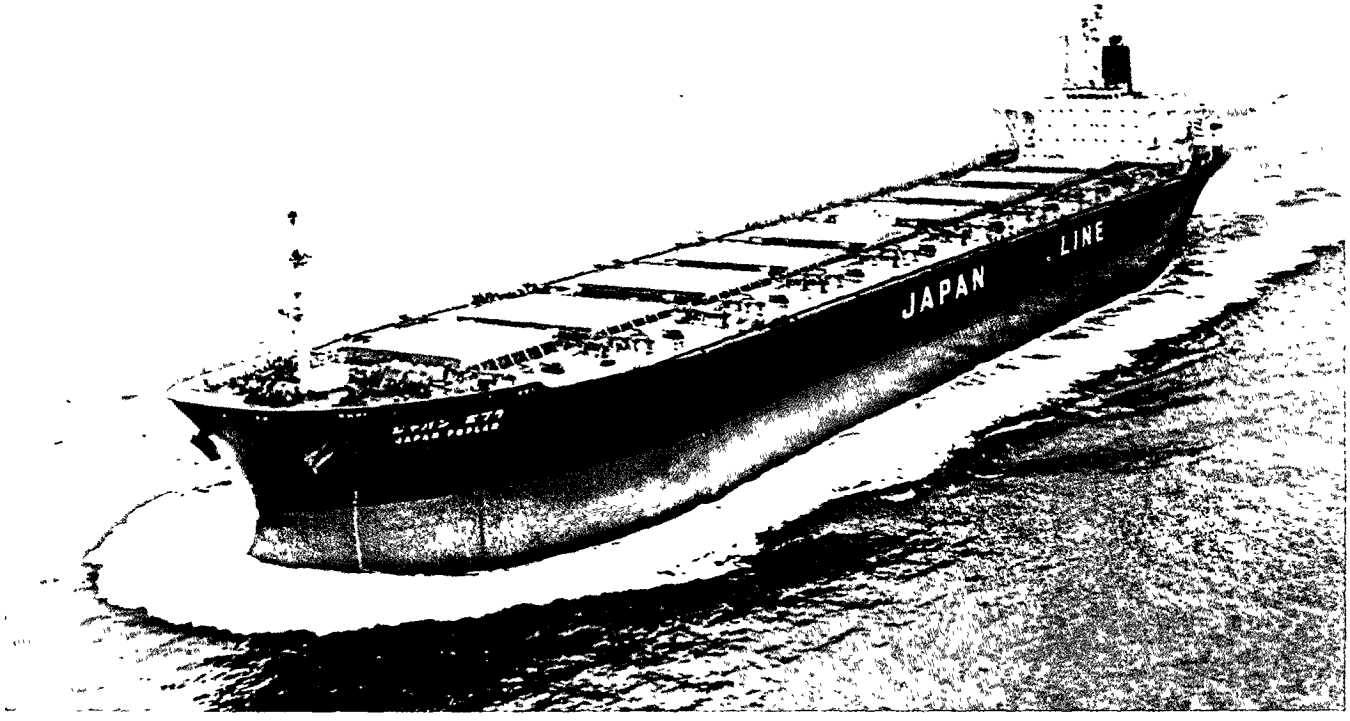
300,000 DWT



350,000 DWT

CROSS SECTION OF IRON ORE VESSELS FOR THE OITA STEEL WORKS

Plate 10



Ore carriers

Plate 11

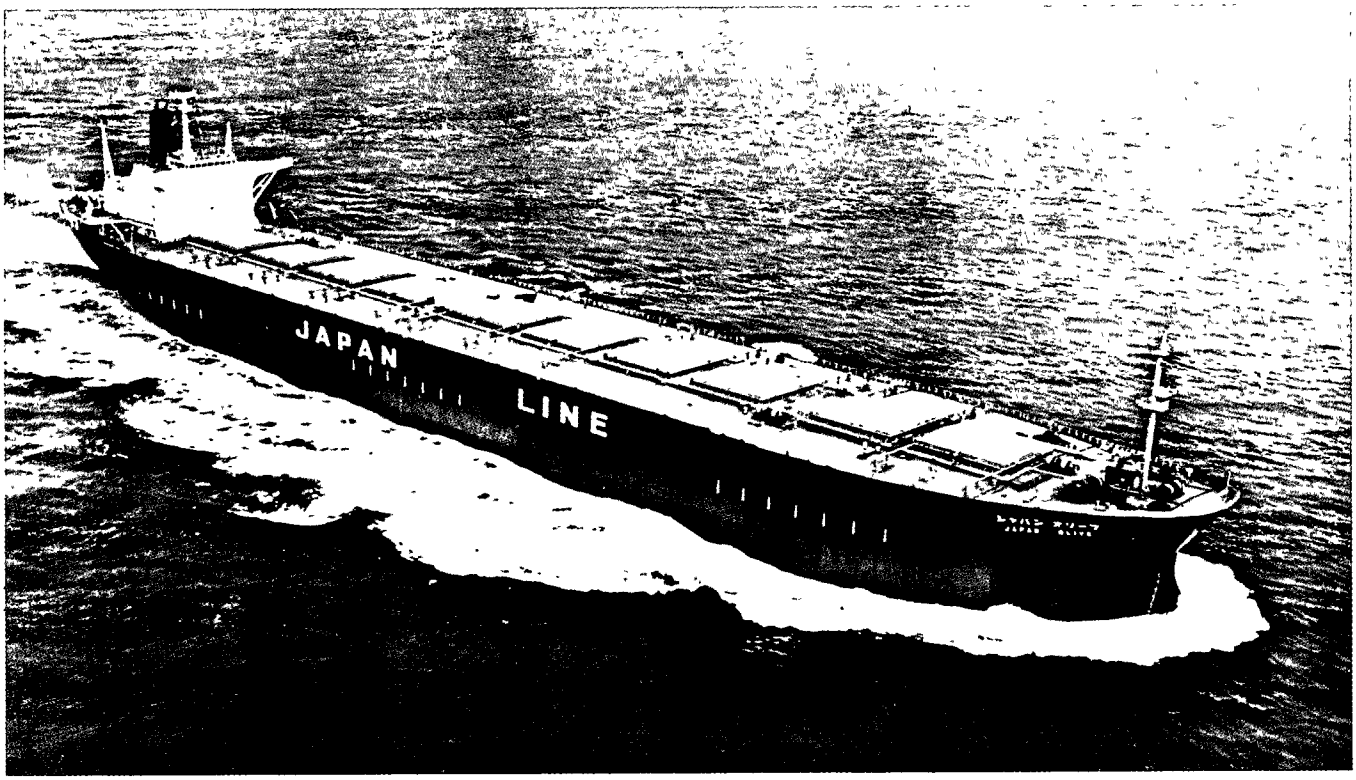
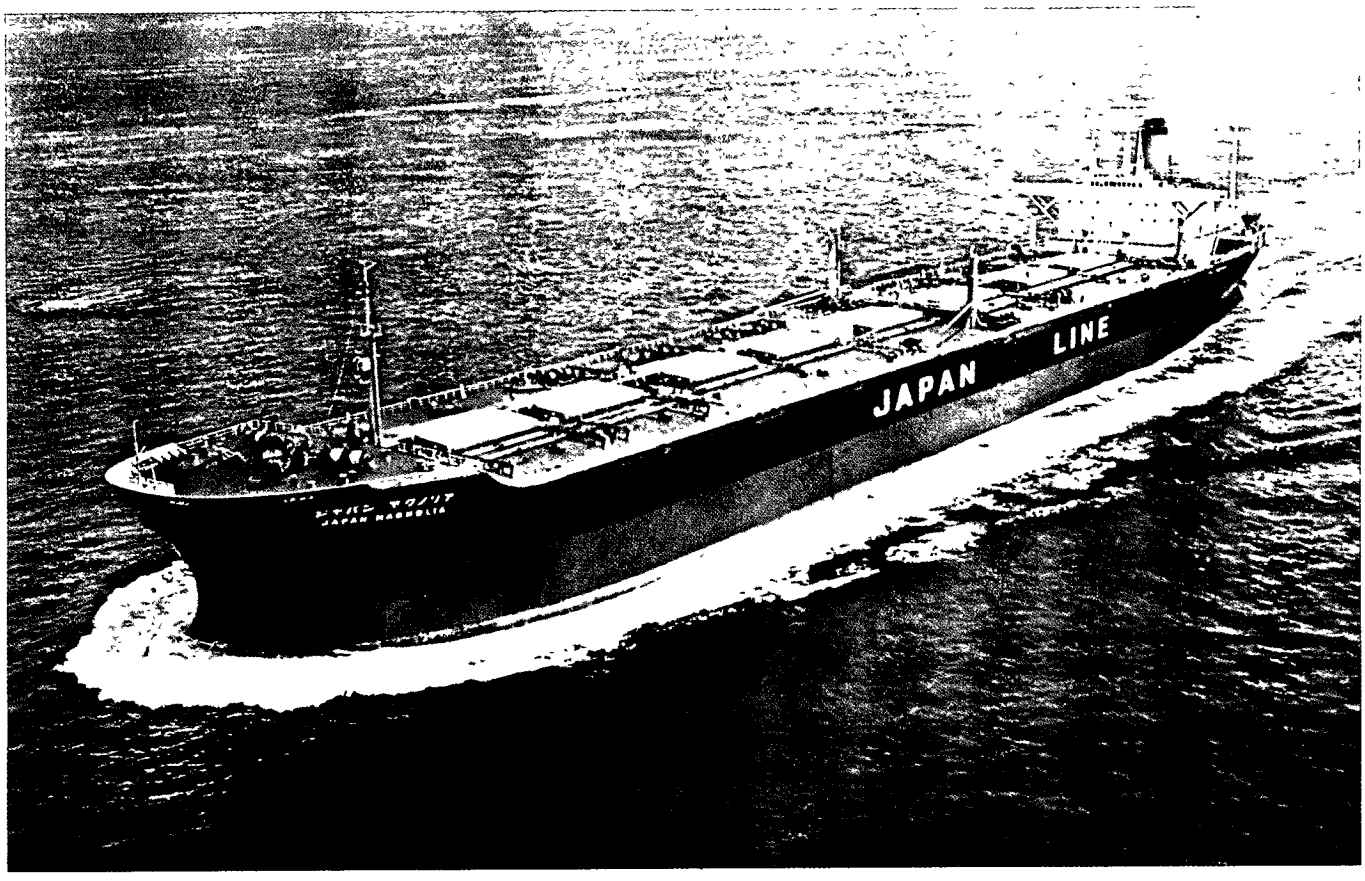


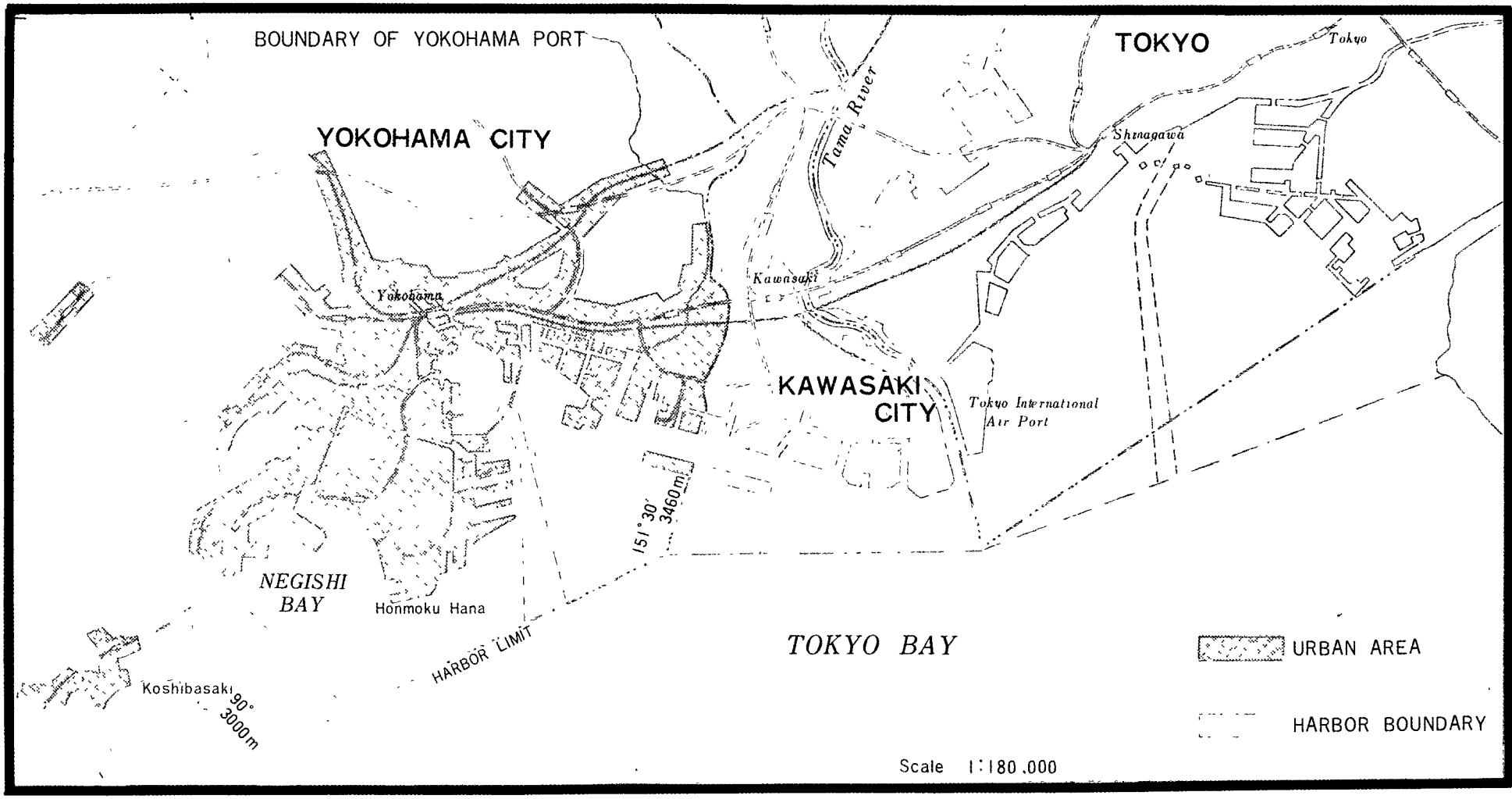
Plate 12



The M.S. Japan Magnolia at 94,465 dwts. is a combination carrier which carries cargo of raw materials: coal, ore grains, cereals and other bulk goods.

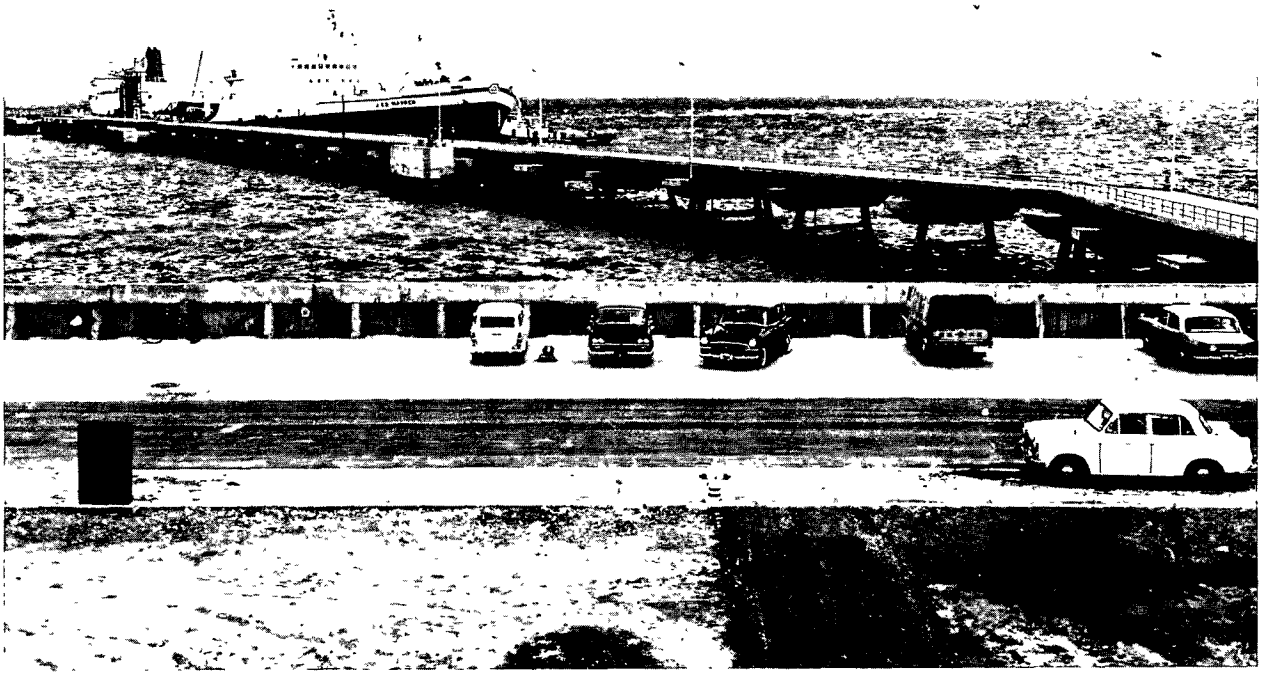
Excavated fairway at the
manmade port of Kashima

Plate 14



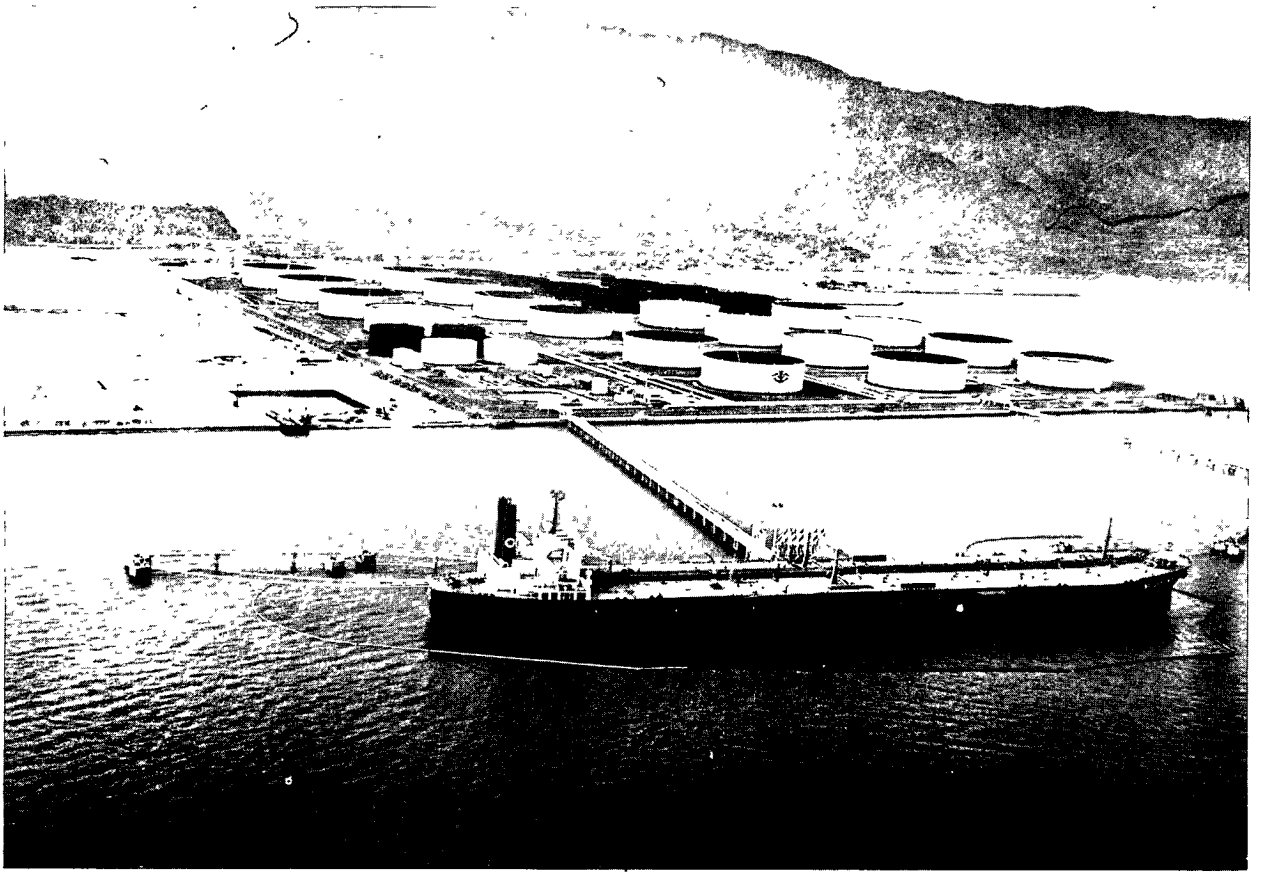
Layout of Yokohama Harbor

Plate 15



Oil staging pier in Negishi Bay

Plate 16



Sea berth at Kiiri, Kagoshima. The tanker is the Nisseki Maru, currently the world's largest (372,400 dwts.) in service.

Plate 17

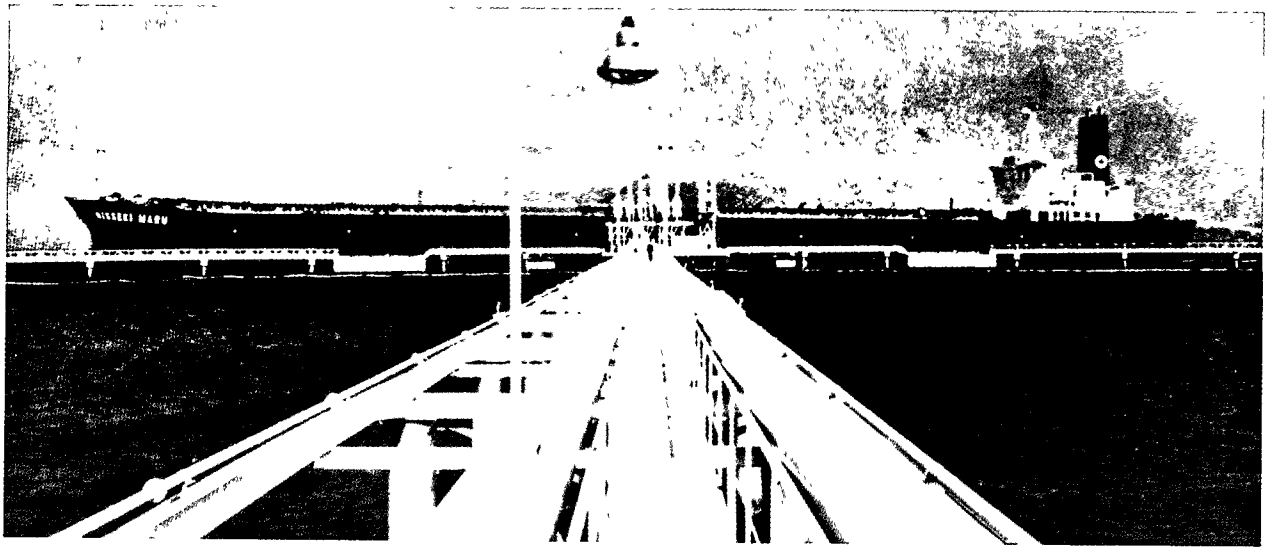
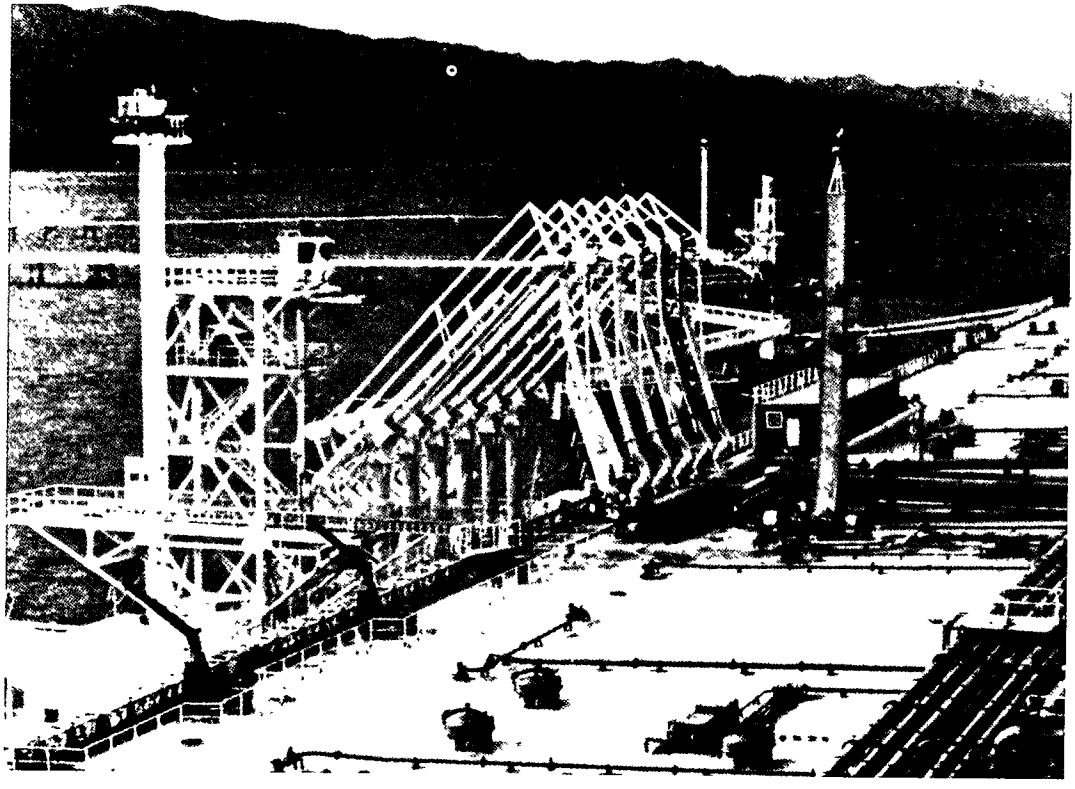
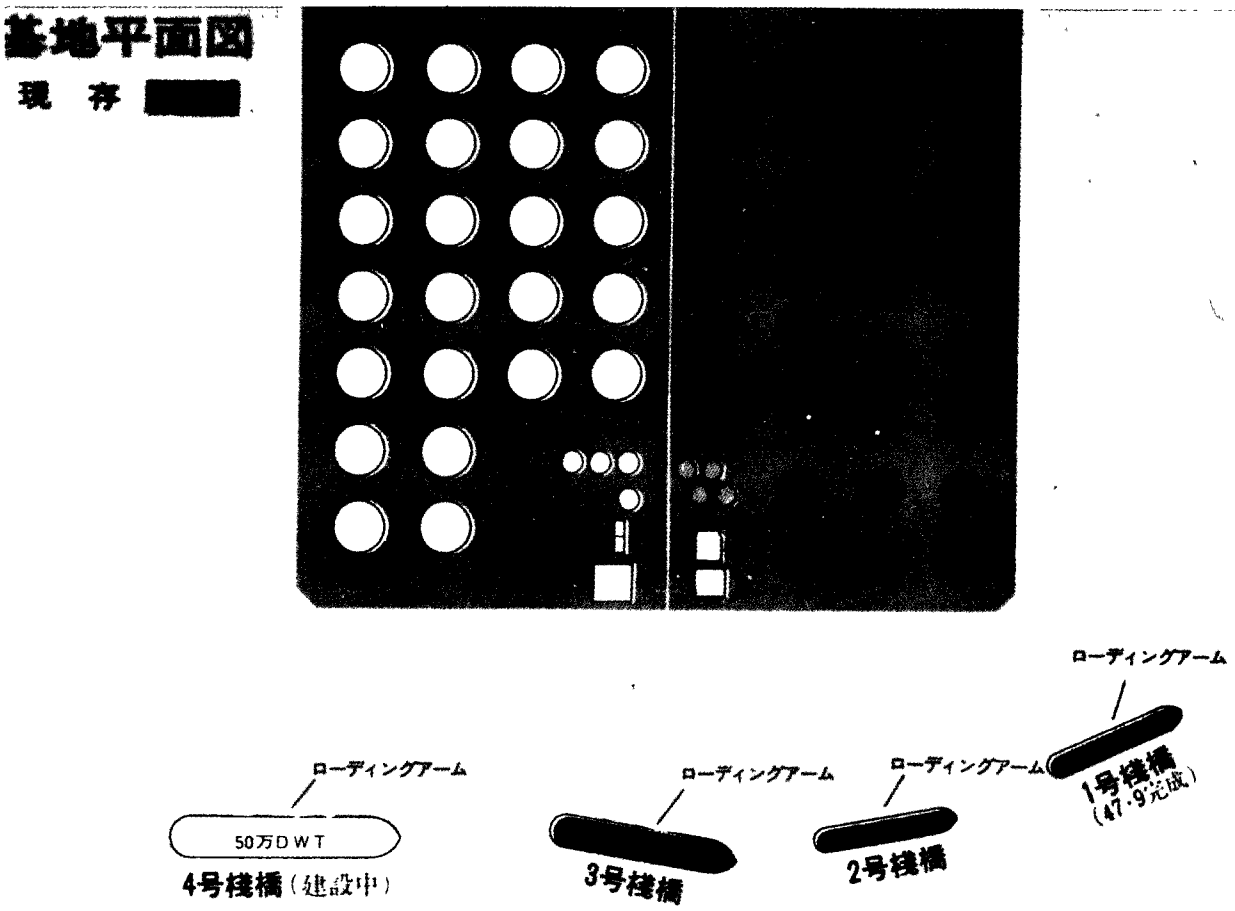


Plate 18



Shore views of Kiiri sea berths



Layout of the Nippon Oil staging terminals at Kiiri. Two of the sea berths can accommodate 150,000 dwt tankers. Another can handle 450,000 dwt tankers. The final sea berth being built will accommodate 500,000 dwt tankers.

Plate 20

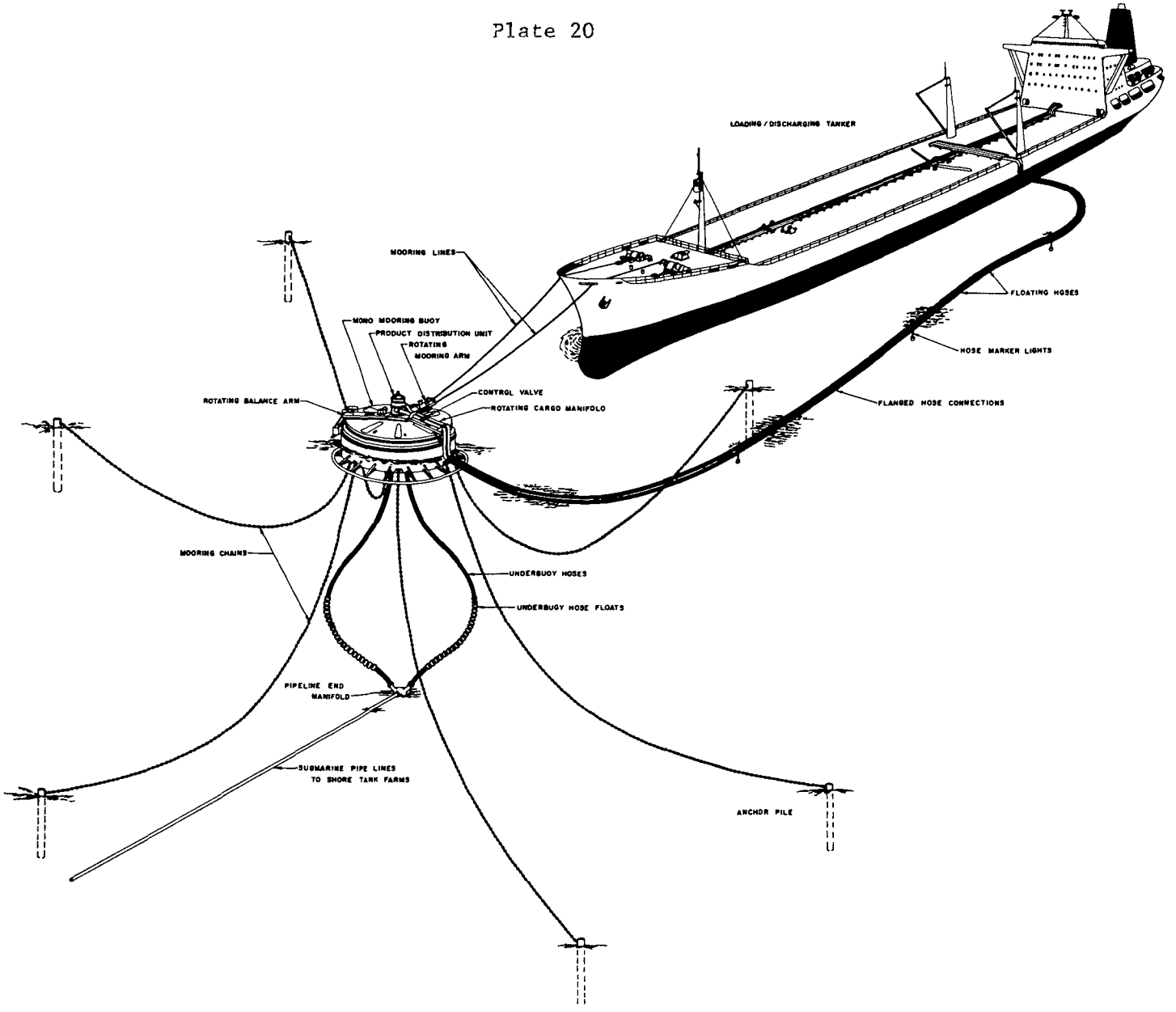
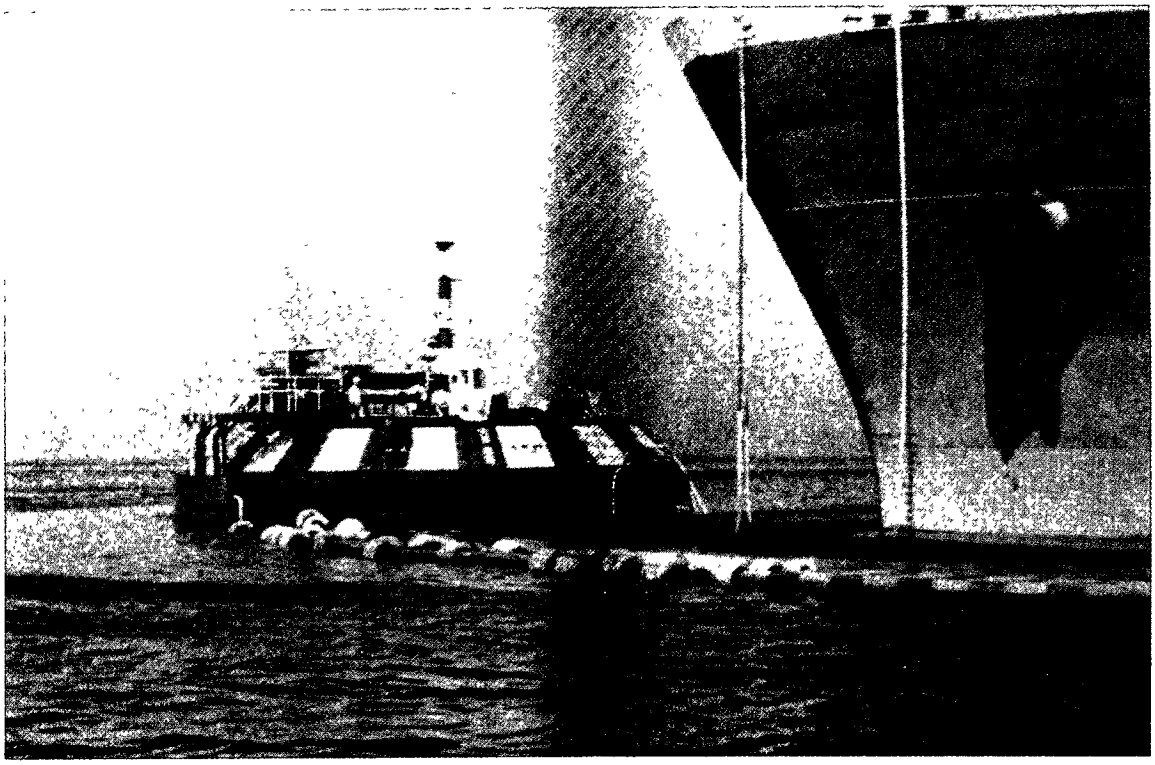

LOADING / DISCHARGING TANKER
MOORING LINES
FLOATING HOSES
MONO MOORING BUOY
PRODUCT DISTRIBUTION UNIT
ROTATING
MOORING ARM
HOSE MARKER LIGHTS
CONTROL VALVE
ROTATING BALANCE ARM
ROTATING CARGO MANIFOLD
FLANGED HOSE CONNECTIONS
MOORING CHAINS
UNDERBUOY HOSES
UNDERBUOY HOSE FLOATS
PIPELINE END
MANIFOLD
SUBMARINE PIPE LINES
TO SHORE TANK FARMS
ANCHOR PILE

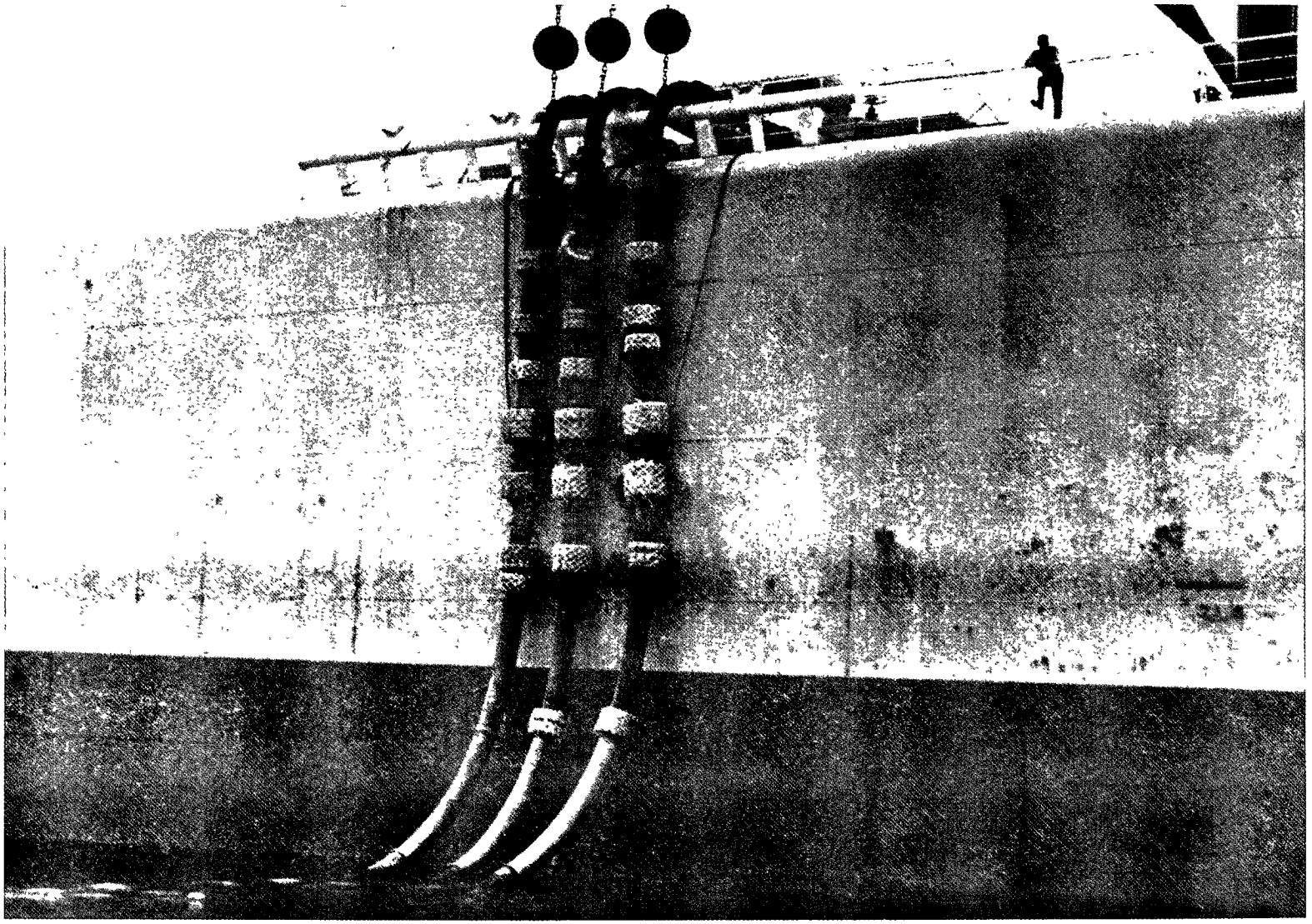
Plate 21



MARUZEN TERMINAL

Location:	Chiba, Japan
Operator:	Maruzen Oil, Chiba Refinery
Installation:	Completed December, 1964
Diameter:	15.0 Meters - Weight 200 tons
Mooring capacity:	100,000 DWT
Cargo:	Crude oil
Hoses:	Underbuoy: 3 x 12" (ID) x 27 meters Terminal-to-ship: 3 x 12" (ID) x 230 meters. Float/sink hose system
Pipeline:	5600 meters 30" (ID) single grade. (Buried 1 meter). Fitted with cathodic protection and coated with glass cloth and coal tar enamel.
Moorings:	Four mooring legs, each consisting: 10 shackles 88mm, diameter chain 3 shackles 76mm, diameter chain 2 x 10 ton mooring anchors 1 x 10 ton concrete clump.
Equipment:	Two diesel engines 32 PS. (For driving compressor and motor). One air compressor three air bottles, two generators (DC 150V - 8KW and DC 18V - 1KW). Signal lights, fog horn (with remote control), air operated winch (1 ton capacitiy), batteries.

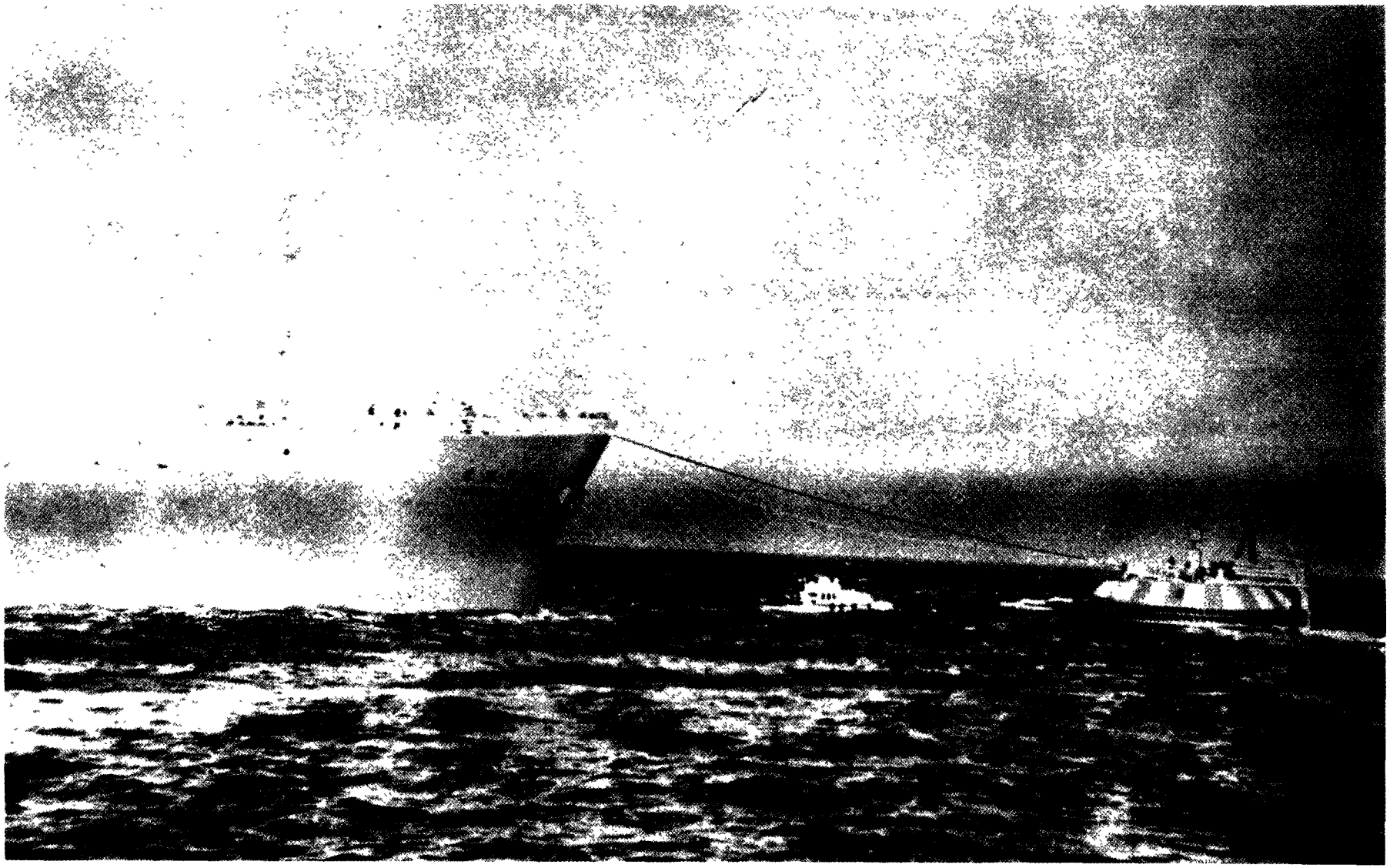
Plate 22



CHIBA JAPAN, TERMINAL

HOSE HOOK-UP (TO SHIP'S MANIFOLD)
3 x 12" HOSES

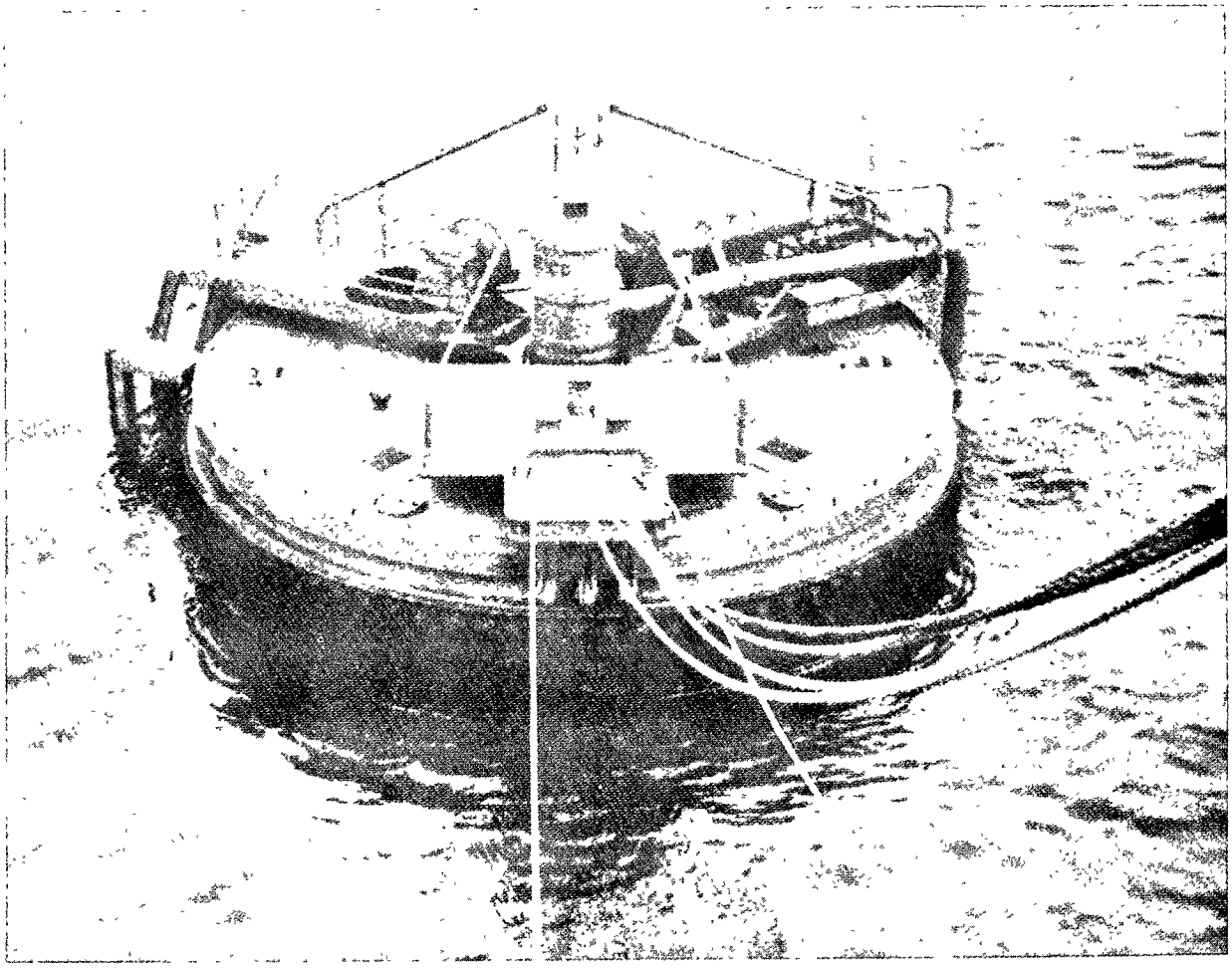
Plate 23



Chiba (Japan) Terminal - 15.0 Meter

MARUZEN OIL COMPANY

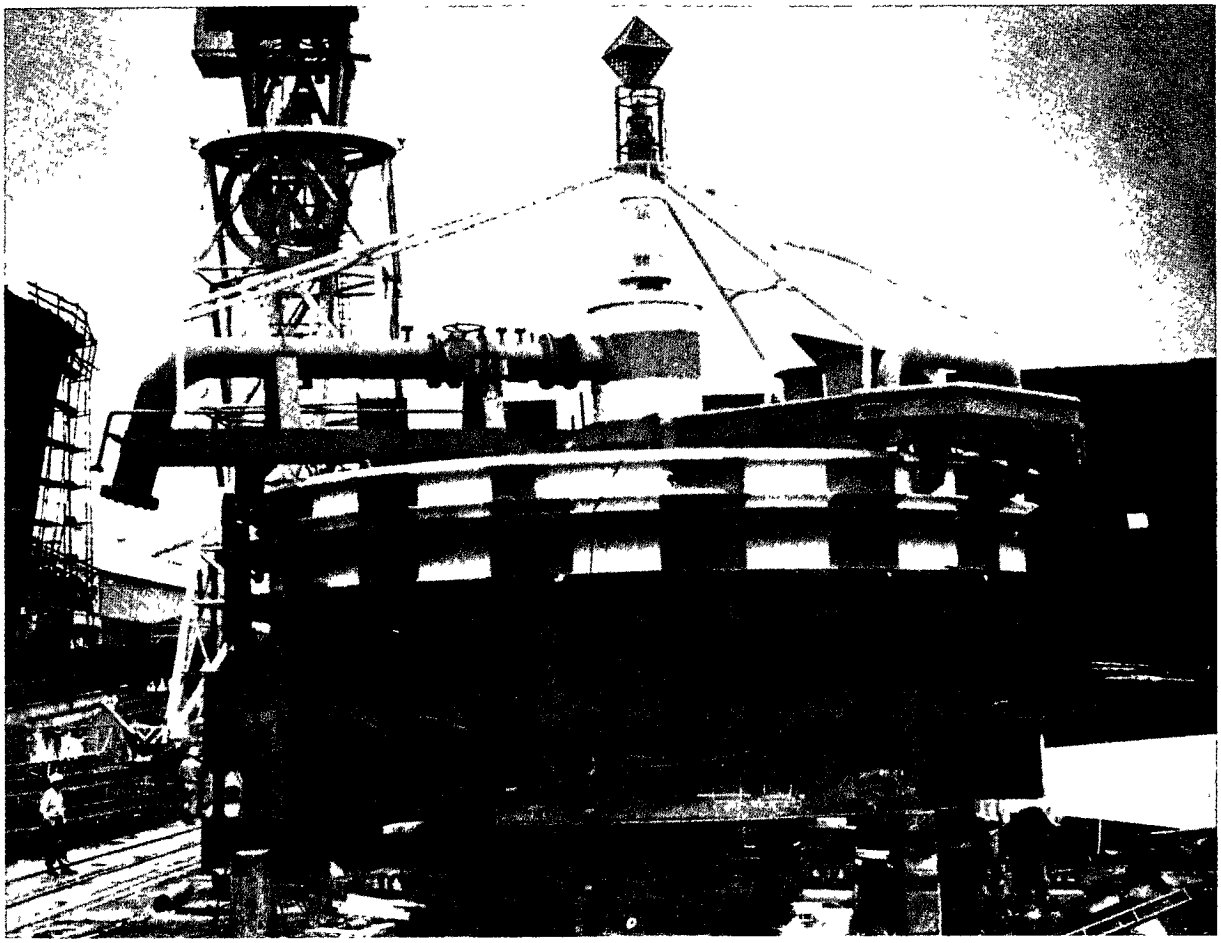
Plate 24



KOSHIBA TERMINAL

Location:	Koshiba, Japan
Operator:	U.S. Army
Installation:	Completed December, 1967.
Design Conditions:	60 knots Wind velocity 3 knots Current 65 feet Water depth (MLW)
Diameter:	10 Meters
Mooring capacity:	100,000 DWT
Cargo:	NSFO, JP-4
Hoses:	Underbuoy: 2 x 12" Terminal-to-ship float/sink system: 2 x 12" x 725' product hose 1 x 12" x 665' satellite hose
Pipeline:	2 x 12" (ID) submarine pipelines
Moorings:	Four mooring legs consisting: 3-3/8" and 3-3/4 stud link chain 2 - 10 ton mooring anchors 1 - 10 ton concrete clump
Equipment:	Navigational signal light, fog horn, 37.5 kw diesel generator, air compressor, volume tanks and water pump.

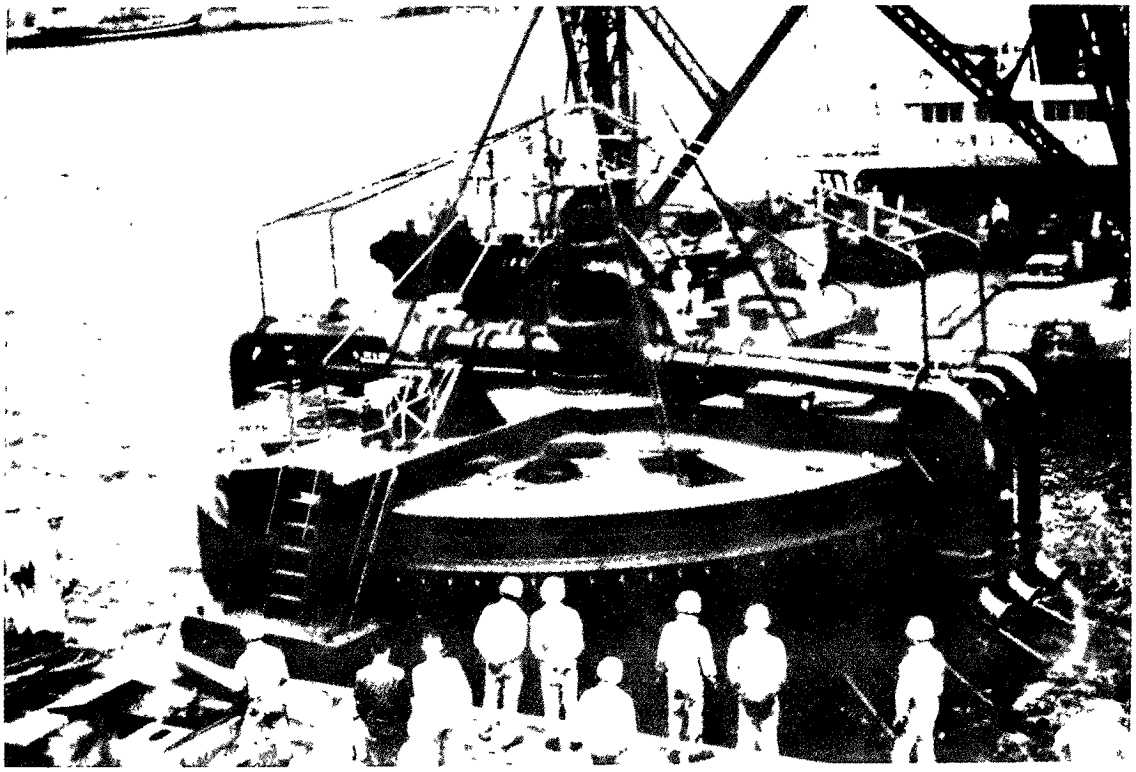
Plate 25



HAKODATE TERMINAL

Location:	Hokkaido, Japan
Operator:	Asia Oil Company
Installation:	Completed November, 1968
Design conditions:	58 knots Wind velocity 5 knots Current 49.20 ft. Water depth (MLW)
Diameter:	8.0 Meters
Mooring capacity:	Up to 32,000 DWT
Cargo:	Crude
Hoses:	Underbuoy: 2 x 12" Terminal-to-ship float/sink system: 1 x 16" x 656 feet double cylinder hose
Pipeline:	1 x 6,560 ft. x 20" (ID) submarine pipeline
Moorings:	Four mooring legs, each consisting: 3-7/8" and 3" stud link chain 2 - 12 ton mooring anchors 1 - 6 ton concrete clump
Equipment:	Fog horn, radar reflector.

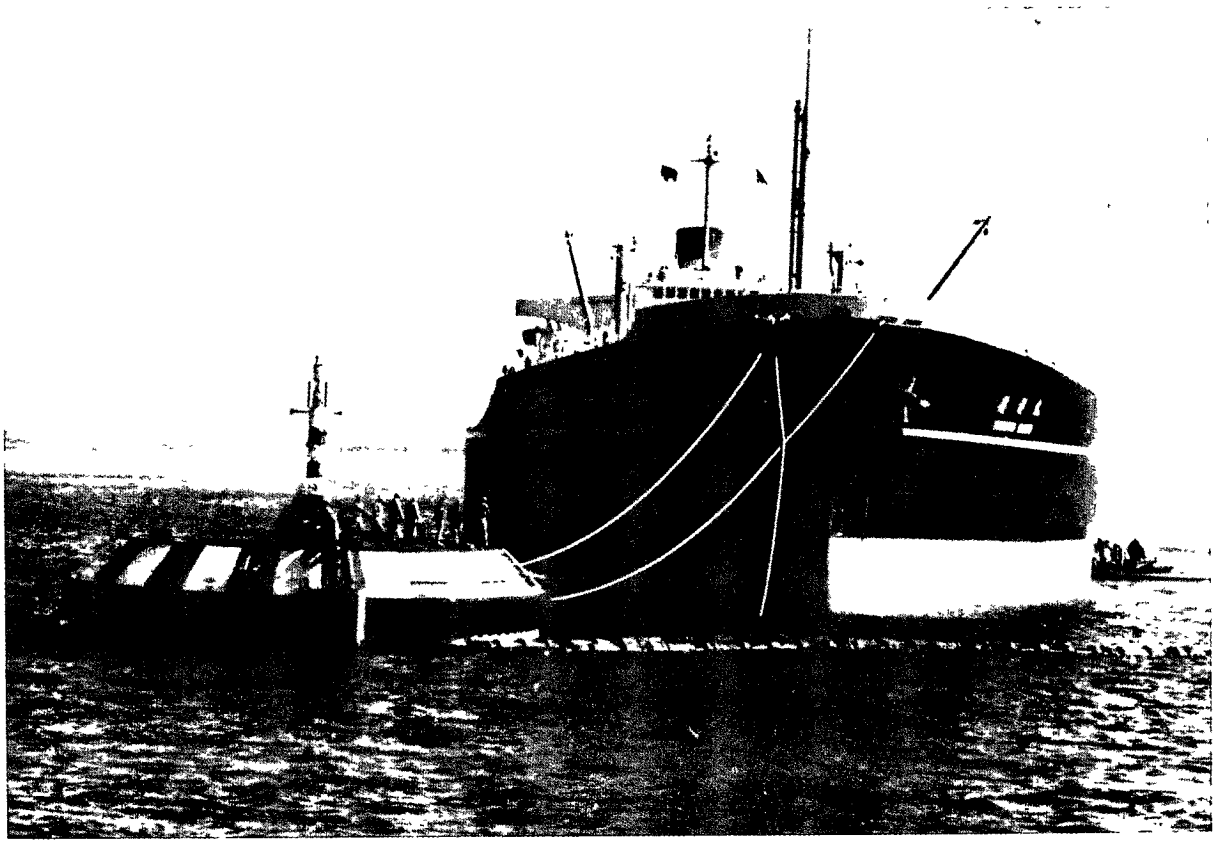
Plate 26



HAKOZAKI TERMINAL

Location:	Hakozaki, Japan
Operator:	U.S. Army
Installation:	Completed September, 1968.
Design conditions:	60 knots Wind velocity 3 knots Current 60 feet Water depth (MLW)
Diameter:	12.5 meters
Mooring capacity:	100,000 DWT
Cargo:	NSFO, JP-5.
Hoses:	Underbuoy - 2 x 12" 2 x 16" Two Terminal-to-ship float/sink systems System #1: 2 x 16" x 725' product hose 1 x 16" x 665' satellite hose System #2: 2 x 12" x 725' product hose 1 x 12" x 665' satellite hose
Pipeline:	2 x 4,260 ft. x 16" (ID) submarine pipelines 2 x 4,260 ft. x 12" (ID) submarine pipelines
Moorings:	Four mooring legs, each consisting of: 3-5/8" and 4-1/8" stud link chain 2 x 12 ton mooring anchors 1 x 10 ton concrete clump
Equipment:	Signal light, fog horn.

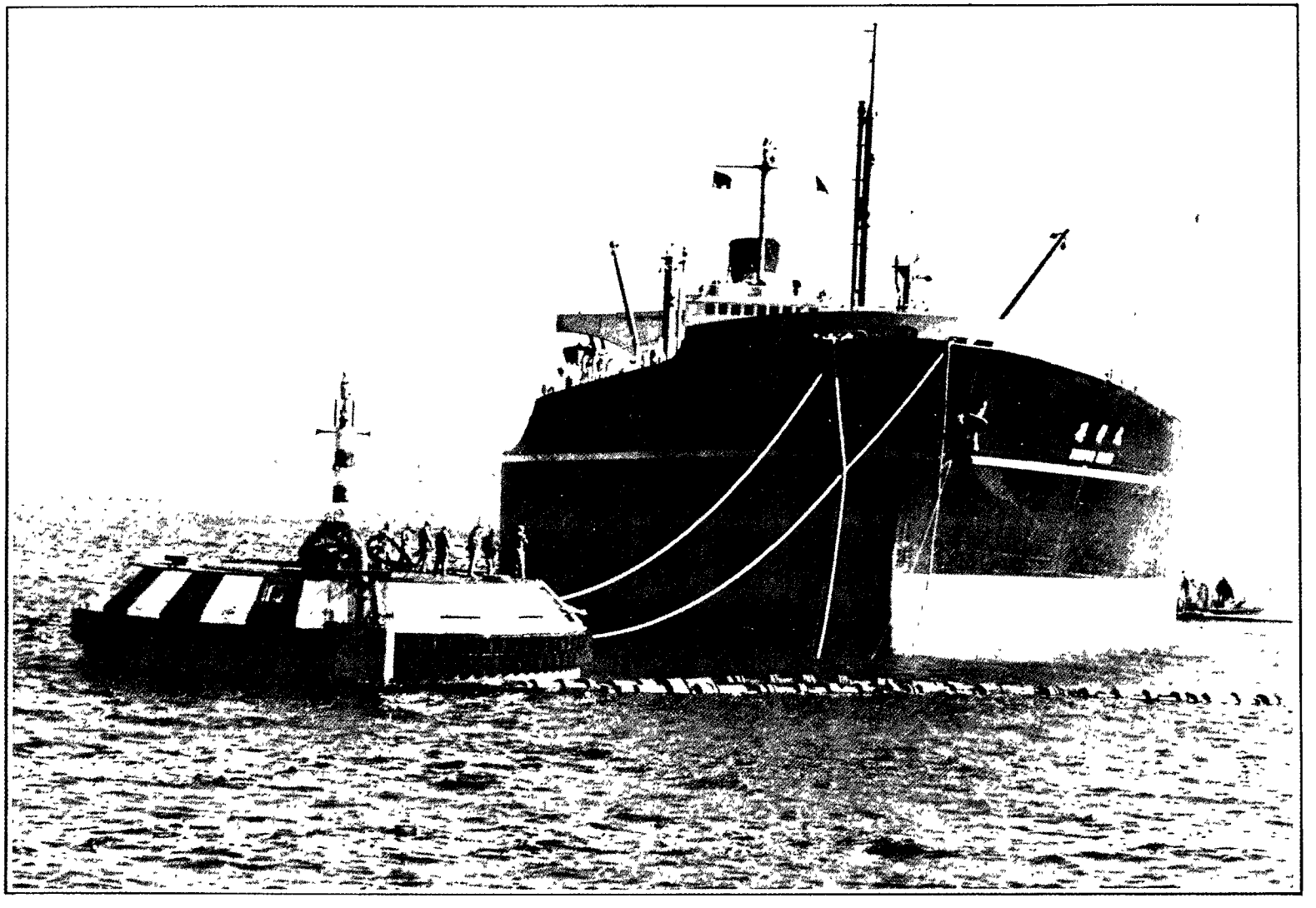
Plate 27



KYUSHU TERMINAL

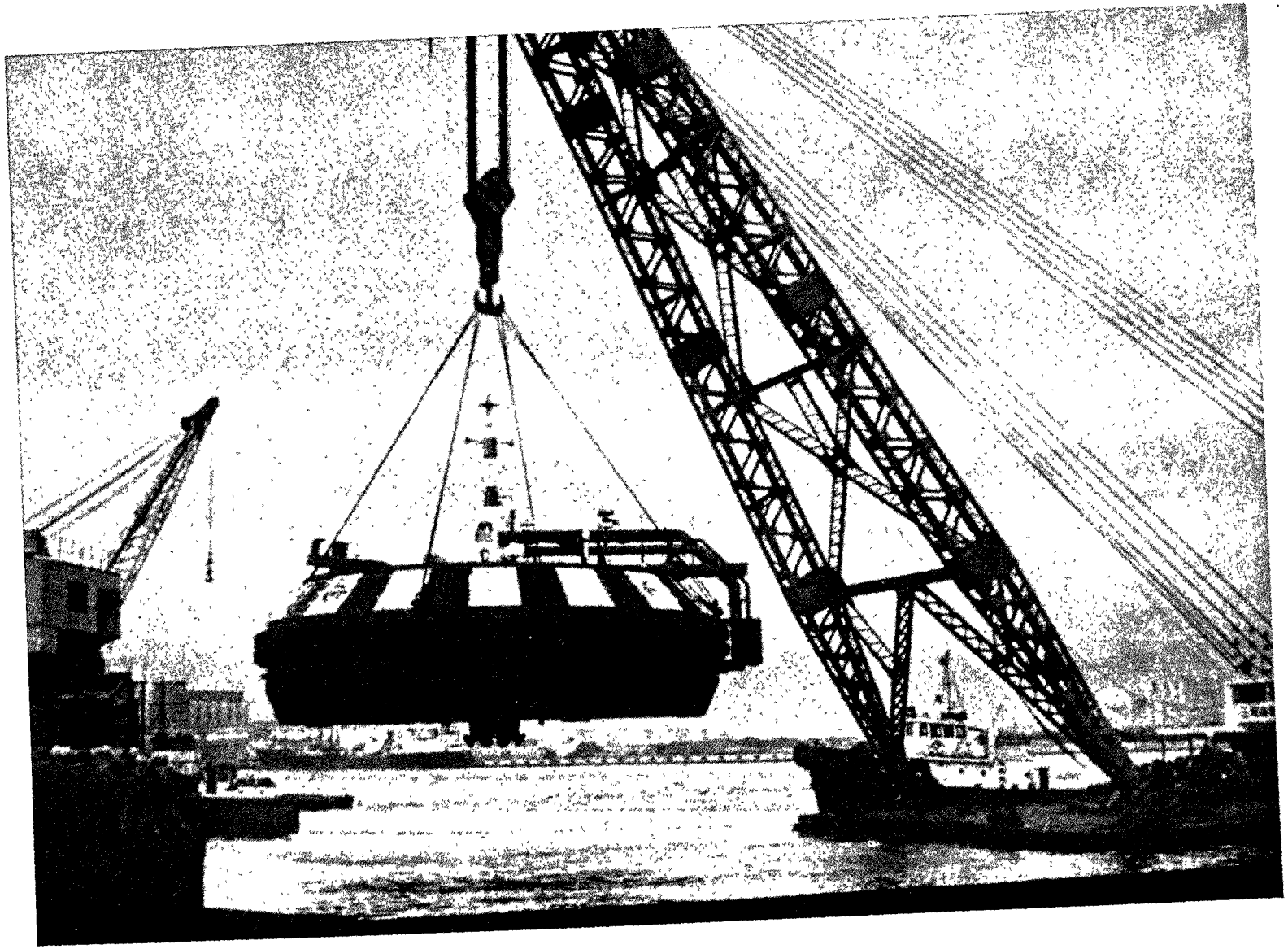
Location:	Oita, Kyushu, Japan	
Operator:	Kyushu Oil	
Installation:	Completed November, 1963	
Design conditions:	Maximum vessel	100,000 DWT
	58 knots	Wind velocity
	4 knots	Current
	54 meters	Depth
	2.4 meters	Tidal range
Diameter:	15.0 Meters	Weight 181 tons
Mooring capacity:	100,000 DWT	
Cargo:	Crude oil	
Hoses:	Underbuoy:	3 x 12" (ID) x 60 meters
	Terminal-to-ship:	2 x 12" (ID) x 230 meters. Float/sink hose system
Pipeline:	900 meters, 24" (ID) single grade	
Moorings:	Four mooring legs, each consisting: 15 shackles 88mm diameter chain 2 x 10 ton mooring anchors 4 x 10 ton concrete clumps	
Equipment:	Diesel engine 32 PS. (For driving compressor and motor). Compressor, air bottles, generator, signal lights, fog horn.	

Plate 28



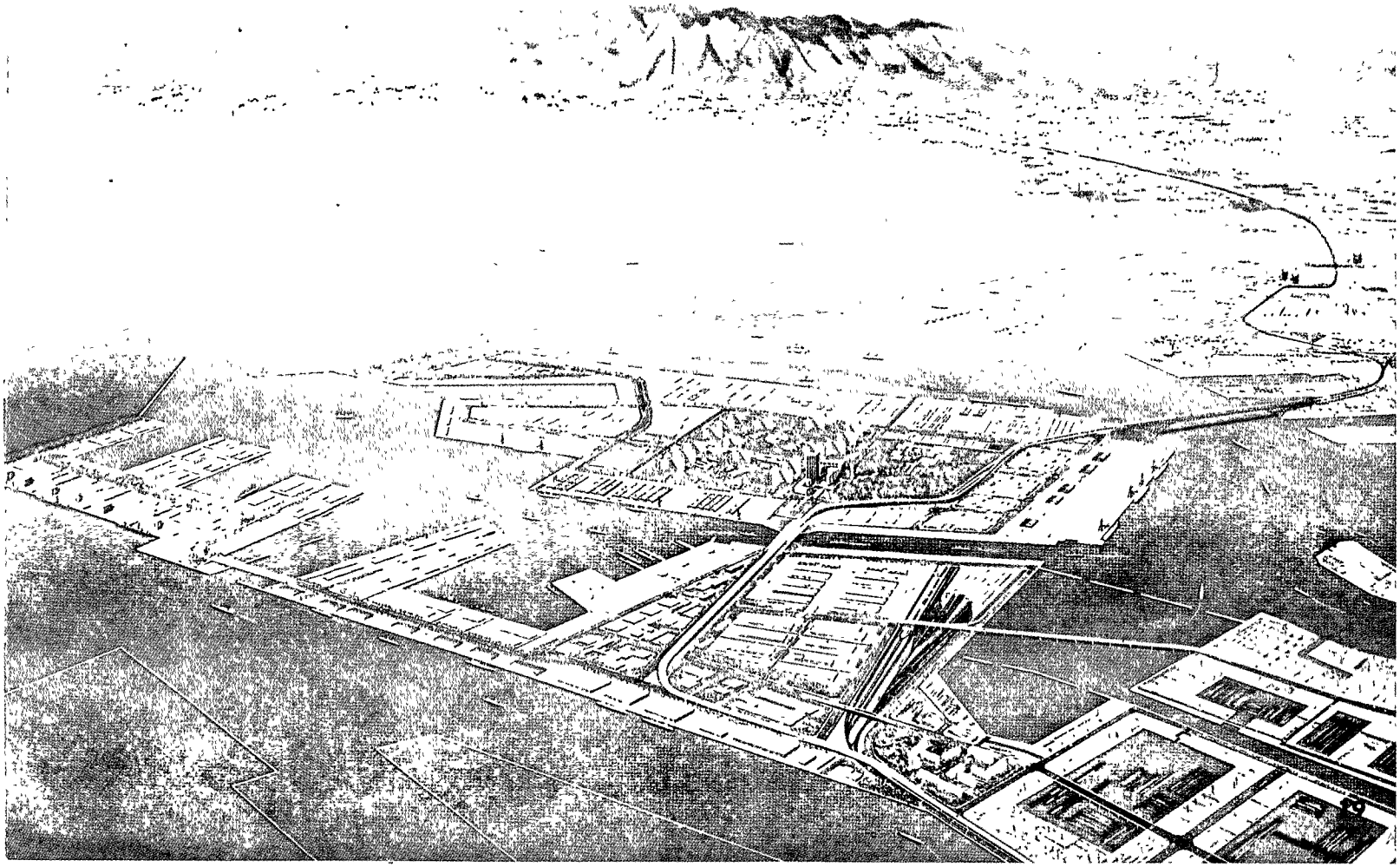
TOKUYO MARU (50,747 DWT)
MOORED TO OITA, JAPAN TERMINAL

Plate 29



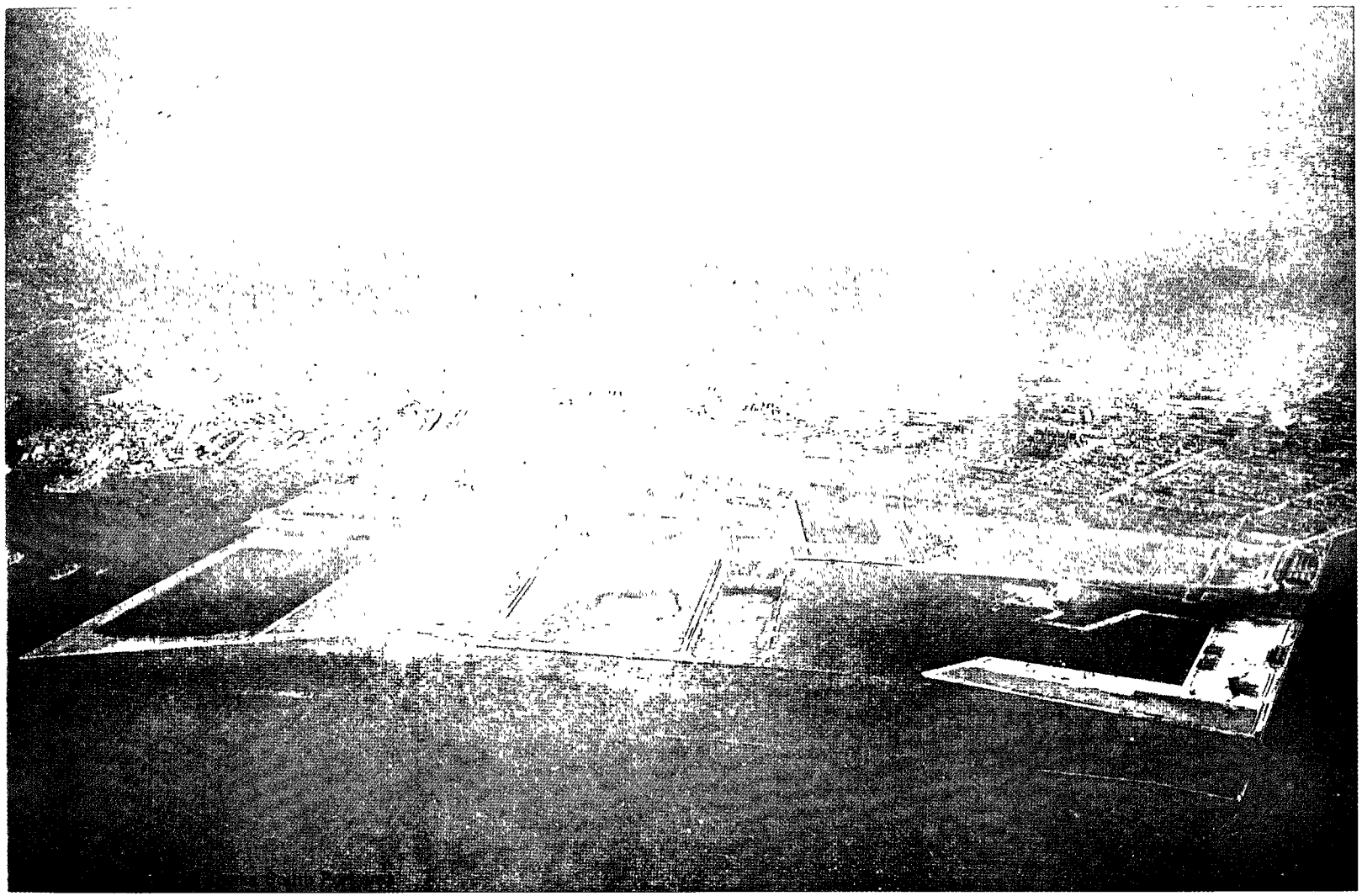
THE OITA, JAPAN TERMINAL
BEING WATERBORNE

Plate 30



Landfill projects at the Port of Osaka

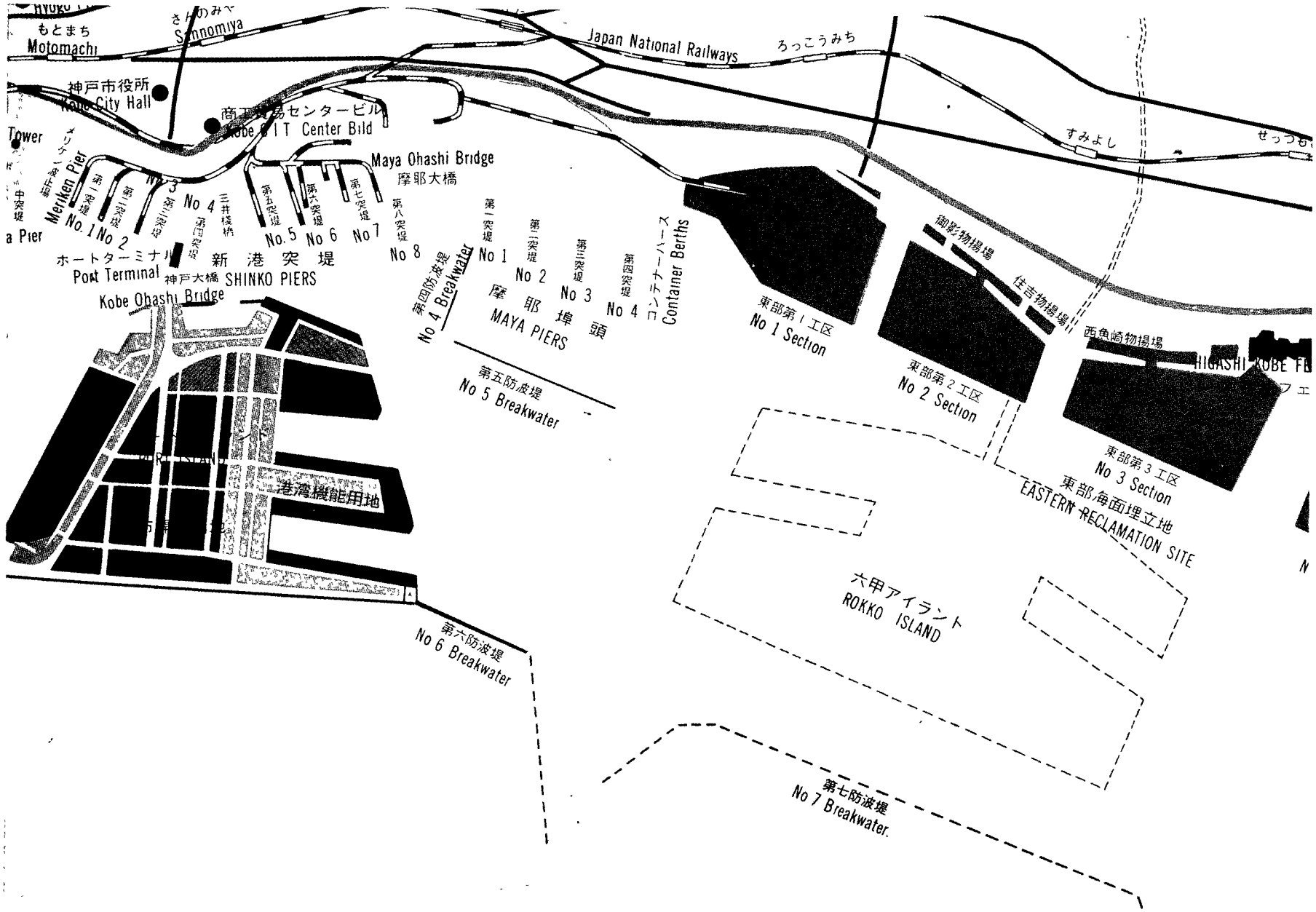
Plate 31



Breakwaters at the South Port of Osaka

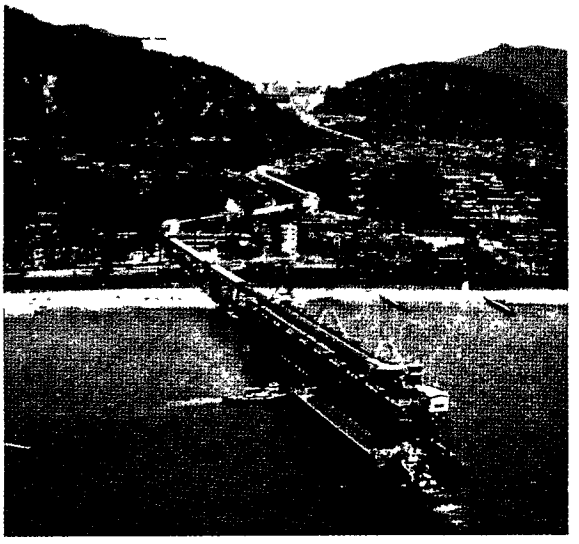
Container berths at the Port of Osaka

Plate 33



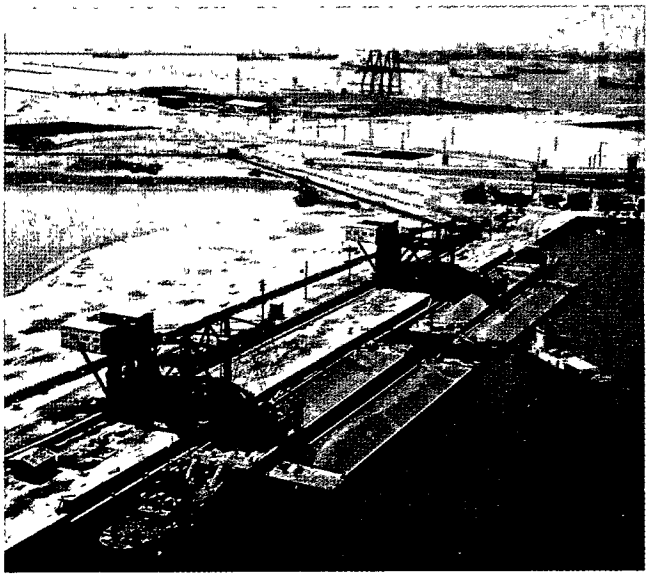
Layout of the container facilities at Kobe

Plate 34



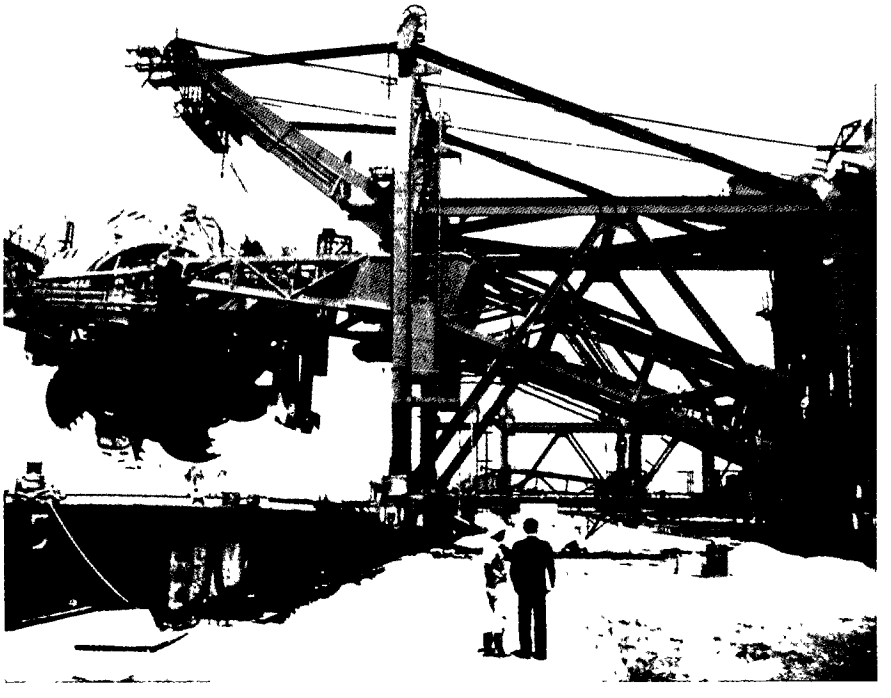
Belt conveyor system at Suma Hill. Suma Hill is being excavated for fill material.

Plate 35

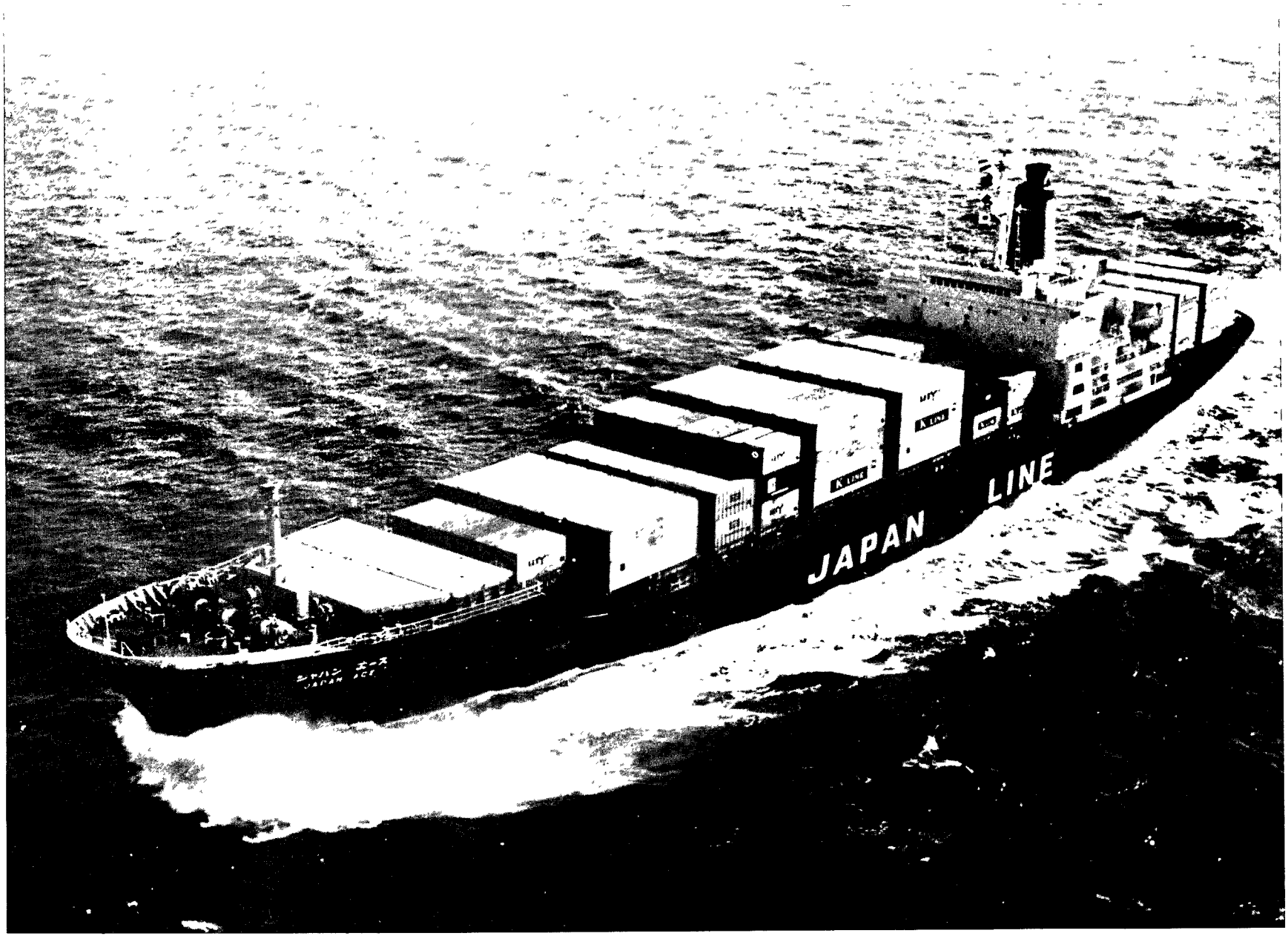


Bucket wheel system unloaders used in reclamation of Port Island. Fill is barged from Suma Hill.

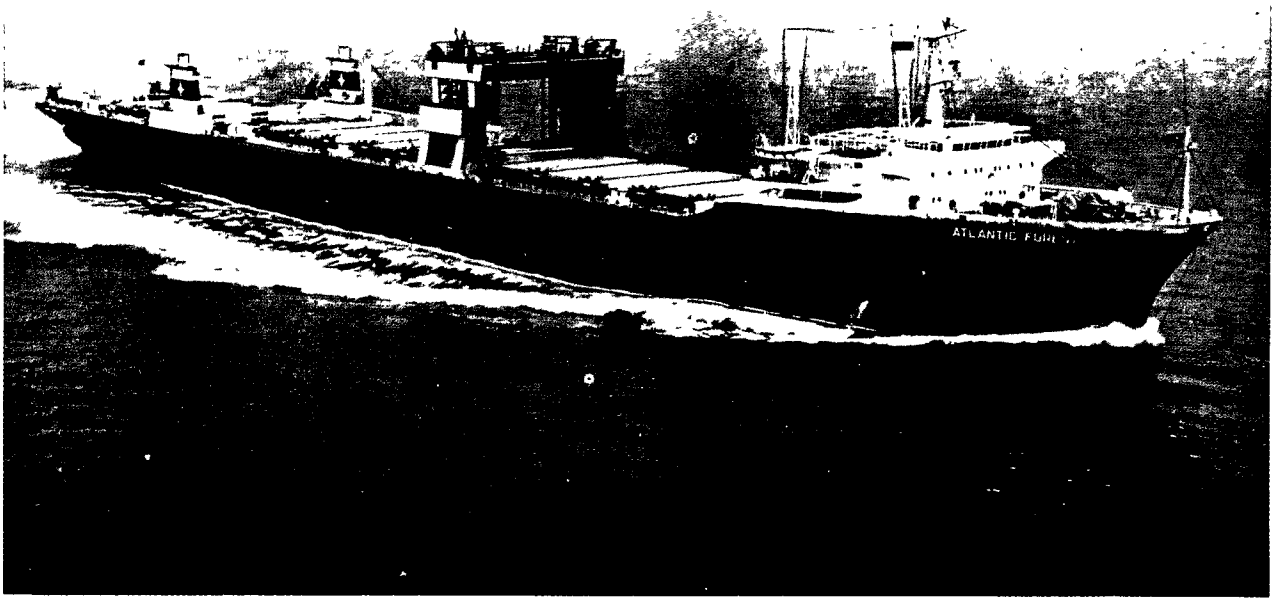
Plate 36



Close-up view of fill unloaders at the Port of Kobe.



Containership - Japan Ace.



Atlantic Forest, 43,000 dwts. LASH vessel, built in Japan.

V. ENVIRONMENT

The great uncertainty in Japan's future growth is associated with environmental pollution. The severity of their pollution problem is obvious even to the most casual observer.

The heavy industrial expansion of the past decade has greatly altered the environment landscape. There are many contributing factors to the environmental problem. The main contributor appears to be the concentration of population, industrial plants, and harbors in congested spheres - Tokyo Bay and Osaka Bay. Recently, strong dispersion efforts have been made to locate new facilities, harbors, and industrial plants away from congested areas.

Discussions of the environment seemed to be a very sensitive subject; particularly with those involved with the future industrial development of Japan.

Unfortunately, not a great deal of formal information was obtained on the environmental problem related to harbor projects.

A. Past Practices

In the 1960's, when port developments were greatly accelerated in Japan, there was little evidence of environmental concern. Dredging was considered a fact of life.

For any dredging or reclamation projects, fishing grounds had to be bought from fishermen. This was merely an accepted compensation practice but it offered no solution to degradation. Dredge spoil disposals were

made within harbor areas.

Also, many Japanese harbors have oil residues from refineries and petrochemical plants located on the shoreline. Ship bilges contributed to this problem. There were no major restrictions on oil effluent discharges into harbor waters in the past. Apparently, there are some restrictions now. But according to some individuals, the degradation problem could worsen further before improvement measures begin to take effect.

The waters in all the Japanese harbors visited were discolored affecting visual esthetics. Discolored water and periodic patches of oil slicks were observed even in the Inland Sea. The most severe problems of marine pollution are found in Tokyo Bay. In Tokyo Bay, there used to be boat tours of the Bay; however, the Bay waters have become so polluted and odorous that most boat tours have ceased to operate. Fishing is no longer allowed in the Bay. Plate 39 shows an example of the photochemical smog around Tokyo Bay.

B. Public Awareness

The realization of environmental pollution has become very widespread in Japan. Public reaction was great enough to result in 14 Bills being passed in special session of the Diet in December 1970 dealing with environment. One of the 14 Bills passed placed ecology ahead of economic growth and revised the 1967 Basic Law for Environmental Control. These and subsequent actions now provide for positive measures against environmental pollution. These governmental measures include:

a. legal control, e.g., setting up of water standards.

b. financial aid and preferential tax treatment.

c. development of anti-pollution technology.

d. surveillance and measurement of pollution.

e. industrial plant siting.

f. relief for victims of pollution.

The metropolitan government of Tokyo has announced a 10-year plan to clean up and enhance the environment where photochemical smog and pollution of surrounding waters have reached crisis proportions. A similar program was announced for Osaka.

Public awareness of pollution problems has been combined with rising consumerism and other social demands. This may lead to important structural changes affecting both the Japanese economy and society.

C. Growth and Imbalances

The heavy industrial growth of Japan has created an imbalance with the environment. Private industry, which is largely responsible for both Japan's prosperity and pollution, is accelerating investments in pollution control for production facilities. Anti-pollution measures are now prerequisites for the future growth plans of private enterprise.

In many ways, Japan is responding to the pollution problem as other countries have responded. The difference is that their pollution problem is so much greater. Some drastic measures may be needed to alleviate the worsening problem of pollution.

VI. SUMMARY

The challenges facing port planners in the United States will require innovative solutions. The solutions must provide for future economic requirements and be consistent with environmental quality.

The realization of sound and innovative solution can come only if port planners in this country are aware of the efforts being made in other countries. This does not necessarily mean that the U.S. port planner should emulate the practices of others. Rather, it suggests an eclectic process where the best solutions can be chosen from many maritime systems.

Throughout the trip, many Japanese port planners were personally knowledgeable about port developments of other countries. Unfortunately, the same cannot be said about U.S. port planners in general. Few port planners here have had the rare privilege to learn about foreign experiences on a first-hand basis. This makes the task at home more difficult, since planning in navigation has so many global dimensions.

Plate 39

View of smog layer which is continually present at the Port of Tokyo.

ANNEX A
MAJOR TANKER BERTHS AND PORT FACILITIES

INTRODUCTION

This Annex is an analect of published and unpublished information on Japan ports. Most of the information comes from private sources and the Transportation Corps of the United States Army in Yokohama.

Objective

This Annex is intended to provide the reader with an appreciation for the intensity of port developments in Japan. Furthermore, the reporting is to illustrate the many different kinds of port facilities existing in Japan.

Content

With more than 80 major ports covered, only the most essential data is provided. Descriptive information, in a narrative sense, was avoided to minimize the volume of an already lengthy Annex. Most of the data presented is current up to early 1971. Port planners should find this information useful, although further verification of the technical data is advised.

The port presentations are arranged in alphabetical order. Those ports with significant tanker activities have a section entitled "TANKER BERTH INFORMATION."

Although 80 major ports are surveyed here, there remains 976 ports and private terminals not included. A complete coverage of all the commercial facilities in Japan would be a monumental task.

ANNEX A

TABLE OF CONTENTS

PORTS OF JAPAN

Akita	A-1
Amagasaki	A-3
Aomori	A-5
Chiba	A-6
Fukuyama	A-13
Funakawa	A-15
Fushiki	A-16
Gamagori	A-18
Hachinohe	A-19
Hakata	A-21
Hakodate	A-23
Hirohata	A-25
Hiroshima	A-27
Hososhima	A-28
Ishinomaki	A-29
Iwakuni	A-31
Kagoshima	A-33
Kakogawa	A-35
Kamaishi	A-37
Kashima	A-39
Kawasaki	A-42

Kikuma	A-50
Kimitsu	A-51
Kinuura	A-53
Kishiwada	A-55
Kobe	A-56
Kokura	A-64
Komatsujima	A-67
Kudamatsu	A-68
Kure	A-70
Kushiro	A-72
Maizuru	A-73
Matsunaga (Onomichi)	A-75
Miike	A-76
Minamata	A-77
Misumi	A-78
Miyako	A-79
Mizushima	A-80
Moji	A-83
Muroran	A-86
Nagasaki	A-89
Nagoya	A-93
Nanao	A-98
Naoetsu	A-99
Naoshima	A-100

Niigata	A-101
Niihama	A-105
Ofunato	A-107
Oita	A-109
Onahama	A-111
Osaka	A-113
Otaru	A-117
Owase	A-119
Saganoseki	A-120
Sakai	A-121
Sakaide	A-124
Sakata	A-126
Sasebo	A-128
Shikama (Hemeji)	A-130
Shimizu	A-131
Shimonoseki	A-134
Shimotsu	A-136
Shiogama	A-138
Susaki	A-140
Tagonoura	A-141
Takamatsu	A-142
Tanabe	A-143
Tobata	A-144
Tokuyama	A-146

Tokyo A-150

Toyama A-153

Toyama Shin-ko (Toyama New Port) A-155

Tsukumi A-156

Tsuruga A-157

Ube A-159

Uno A-160

Wakamatsu (Makiyama) A-161

Wakayama A-163

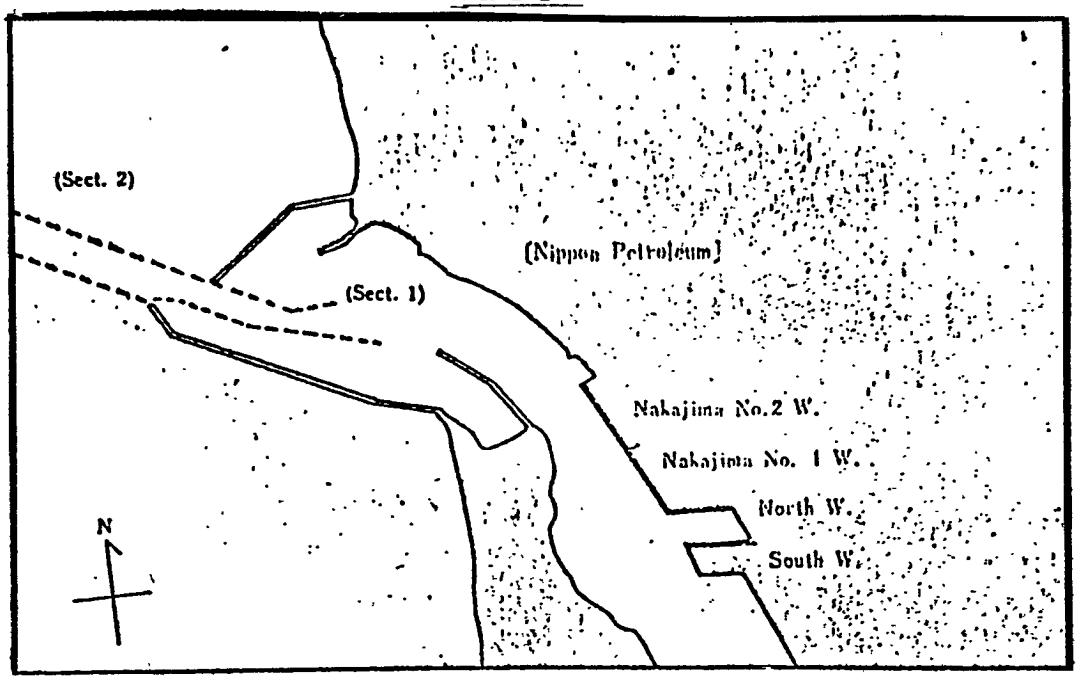
Yawata A-165

Yokkaichi A-167

Yokohama A-171

Yokosuka A-179

A K I T A



LOCATION:
Latitude N. 39°46' Longitude E. 140°03'

HARBOUR PROTECTION:
Breakwaters

BOTTOM:
Clay covered with sand

MINIMUM DEPTH OF WATER AT EXTREME LOW WATER (SPRING TIDE):
In passage: 9.0 meters.
At anchorage: 9.0 meters. (breakwater)

PARTICULARS OF EACH WHARF:

NAME OF WHARF:	LENGTH:	DEPTH:	BERTHING CAPACITY:	FACILITIES:
Nakajima No. 1	180 m	9.0 m	10,000 G/T	One 6.3-tons shore crane, max. reach 25 m, max. height 13 m, 200-270 tons per hour (phosrock), 150-170 tons per hour (grain)
Nakajima No. 2	200 m	9.1 m	10,000 G/T	(Ship's gear also used)
North Pier (Coal, ore & logs)	227 m	7.5 m	3,000 G/T	One 8-tons mobile job crane, max. reach 17 m, max. height 13 m, (Ship's gear also used)
South Pier	227 m	5.5 m	1,000 G/T	Ship's gear or shore mobile crane.

AVERAGE RATE OF LOADING/DISCHARGING FOR CARGOES HANDLED:

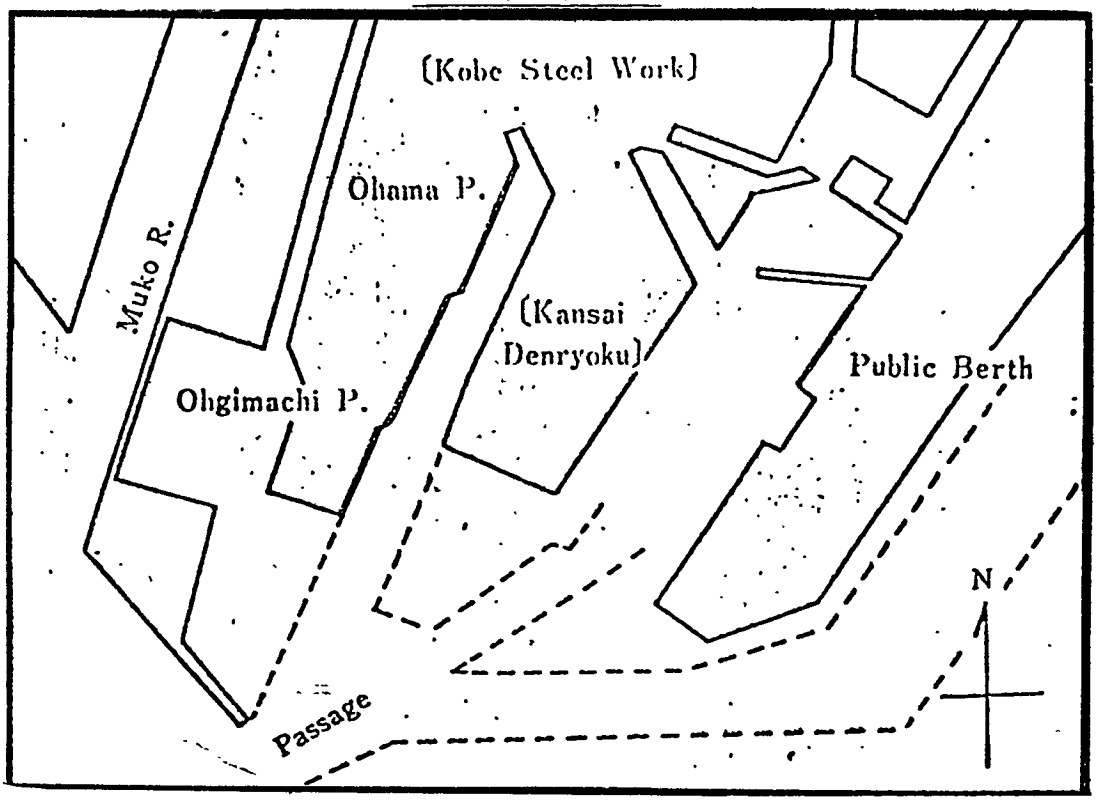
Fertilizer in bags:	300 tons per gang
Phosphate Rock:	200-270 per hour by shore crane
Grain:	150-170 tons per hour by shore crane
Logs:	200,000 BM per gang

PORT IMPROVEMENT PLANS (EXPANSION PLANS):

New berth, 1,400 m in length, 10 m depth, to be completed by 1972, for one 30,000 DW or two 15,000 DW.

Anchorage to be dredged up to 12.5 m with completion expected in 1972.

A M A G A S A K I



LOCATION:
Latitude N. 34°41' Longitude E. 135°23'

HARBOUR PROTECTION:
Breakwater

BOTTOM:
Sand

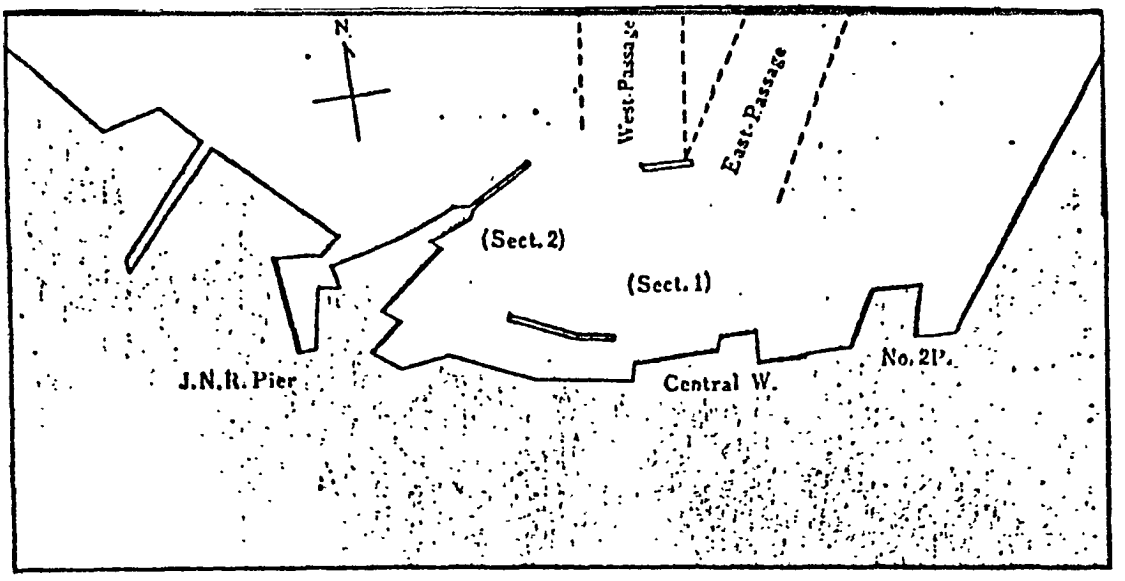
MINIMUM DEPTH OF WATER AT EXTREME LOW WATER (SPRING TIDE):
In the passages: 11 m
At anchorage: 11 m

PARTICULARS OF EACH WHARF:

NAME OF WHARF:	WHARF LENGTH:	MINIMUM DEPTH:	RESTRICTIONS ON SHIPS LENGTH:	BERTHING CAPACITY:
KOBE STEEL MILL				
Ohama Berth	366 m	10.4 m	176.8 m	One 16,000 GRT
Coal & Ore	Two 5 ton Level Luffing Cranes max. reach 19 m, max. height 16 m			
	Two 5 ton Rope Trolley Cranes max. reach 17 m, max. height 16 m			
	Coal: 300 tons per unit hour		Ore: 250 tons per unit hour	
Coal & Ore	One 4 ton Gear Trolley Cranes max. reach 15 m, max. height 12 m			
	Coal: 180 tons per unit hour		Ore: 150 tons per unit hour	
Ohgimachi Berth	200 m	11.7 m	206 m	
Coal	Three 4 ton Cranes max. reach 21 m, max. height 20 m			
	Coal: 900 tons per hour			

PUBLIC BERTH				
Scrap & Pig Iron	170 m	10 m	180 m	Max. draft 9.60 m (H.W.) 10 T x 1 crane Ship's gear also used.

A O M O R I



LOCATION:
Latitude N. 34°42' Longitude E. 135°24'

HARBOUR PROTECTION:
Natural. (Inside the bay)

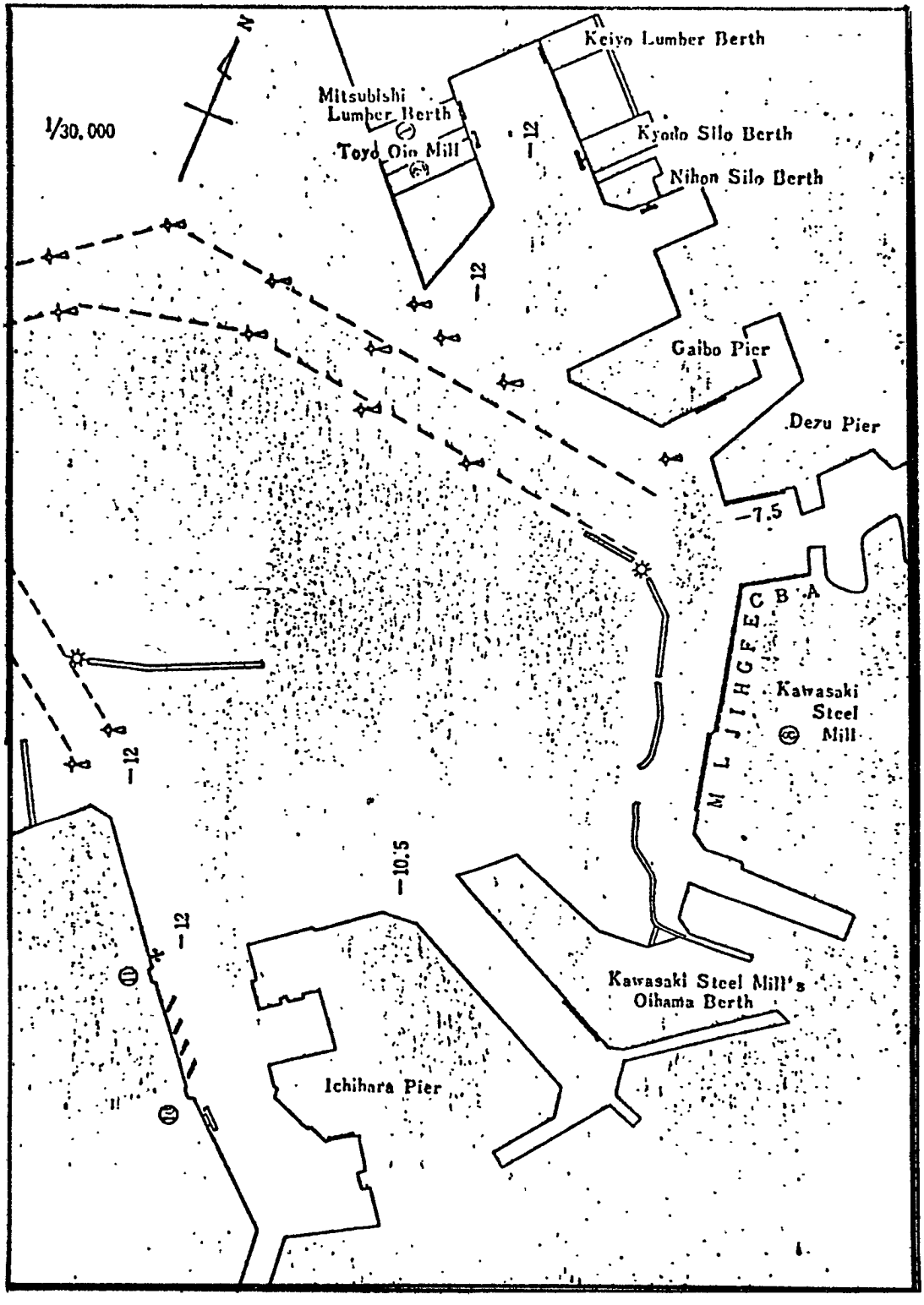
BOTTOM:
Mud with sand

MINIMUM DEPTH OF WATER AT EXTREME LOW WATER (SPRING TIDE):
At anchorage: 30 m.
In the passage: 9 m. (There is a shallow spot, 8.5 m deep, in the shipping lane to berths)

PARTICULARS OF EACH BERTH:

NAME OF BERTH:	WHARF LENGTH:	MINIMUM DEPTH:	FACILITIES:
3,000-ton berth	108 m	7.0 m	
5,000-ton berth	300 m	7.5 m	
5,000-ton berth	155 m	7.5 m	One 10-ton crane
10,000-ton berth	168 m	9.0 m	One 8-ton crane
10,000-ton berth	199	9.0 m	Two 13-ton cranes One 18-ton crane One 35-ton crane

C H I B A


N
1/30,000
Keiyo Lumber Berth
Mitsubishi Lumber Berth
Toyo Oil Mill
Kyodo Silo Berth
Nihon Silo Berth
Gaibo Pier
Dezu Pier
-12
-12
-7.5
C B A
M L J H G F E
Kawasaki Steel Mill
-12
-10.5
-12
Kawasaki Steel Mill's Oihama Berth
Ichihara Pier

C H I B A

LOCATION:
Latitude N. 35°35' Longitude E. 140°064'

HARBOUR PROTECTION:
Only Kawasaki Steel Mill's berths are sheltered by breakwater.

BOTTOM:
Sand mixed with silt

MINIMUM DEPTH OF WATER AT EXTREME LOW WATER (SPRING TIDE):
At anchorage: 9.0 - 16 m
In the passage: Max. 12 m (Officially 11.8 m)

PARTICULARS OF EACH BERTH:

NAME OF BERTH:	BERTH LENGTH:	BERTH DEPTH (MAX. DRAFT):	BERTH CAPACITY:	SHORE FACILITIES:
KAWASAKI STEEL MILL				
"A" (Loading Steel Products)	200 m	9.4 m (9.0 m)	15,000 TDW	1x10-ton Crane (outreach: 15.75 m) (height: 14.0 m)
"B" (Loading Steel Products)	150 m	10.5 m (10.0 m)	15,000 TDW	3x20-ton Cranes (outreach: 16.4 m) (height: 14.5 m)
"C" (Loading Steel Products)	139 m	10.4 m (10.0 m)	20,000 TDW	1x22-ton Crane (outreach: 19.5 m) (height: 14.5 m)
"E" (Dolphin) (Scrap and Pig Iron)	180 m	10.5 m (10.0 m)	15,000 TDW	
"F" (Coal and Coke)	270 m	12.0 m (11.8 m)	50,000 TDW Max. LOA-250 m	2x16-ton Cranes (outreach: 22.5 m) (height: 14.0 m)
"G" (Coal and Coke)	167 m	9.4 m (9.0 m)	10,000 TDW	4x10-ton Cranes (outreach: 15.5 m) (height: 24.0 m)
"H" (Coal and Coke)	167 m	9.4 m (9.0 m)	10,000 TDW	2x10-ton Cranes (outreach: 13.6 m) (height: 14.0 m)
"I" (Iron Ore)	167 m	9.4 m (9.0 m)	10,000 TDW	
"J" (Dolphin) (Scrap and Pig Iron)	169 m	8.9 m (8.6 m)	10,000 TDW	

NAME OF BERTH:	BERTH LENGTH:	BERTH DEPTH (MAX. DRAFT):	BERTH CAPACITY:	SHORE FACILITIES:
"L" (Ore)	280 m	12.0 m (12.0 m)	50,000 TDW Max. LOA-250 m	2x15-ton Cranes (outreach: 23.7 m) (height: 14.7 m)
"M" (Ore)	310 m	12.0 (12.0 m)	50,000 TDW Max. LOA-250 m	2x16-ton Cranes (outreach: 22.3 m) (height: 14.7 m)
KAWASAKI STEEL MILL Oihama "C" (Scrap and Pigiron)	240 m	10.5 m (10.0 m)	15,000 TDW	2x15-ton Cranes (outreach: 14.0 m) (height: 14.0 m)
MITSUBISHI LUMBER BERTH (Logs and Lumber)	180 m	12.0 m (12.0 m)	Max. LOA-220 m	Only 4 labourgangs available
KEIYO LUMBER BERTH (Logs and Lumber)	120 m	12.0 m (11.5 m)	Max. LOA-150 m	Only 4 labourgangs available
TOYO OIL MILL BERTH (Grain)	160 m	12.0 m (12.0 m)	Max. LOA-180 m	One pneumatic unloader with discharging capacity 400 t/h
KYODO SILO BERTH (Grain)	150 m	12.0 (12.0 m)	Max. LOA-230 m	One pneumatic unloader with discharging capacity 600 t/h
NIHON SILO BERTH (Grain)	160 m	12.0 (11.4 m)	Max. LOA-120 m	One sucker with discharging capacity 400 t/h
ASAHI GLASS BERTH (Salt, Phosphate and Potash)	125 m	9.0 m (8.9 m)	Max. LOA-160 m	Ship's gear used. Shore hopper available within the limit of 115 m
NIHON PHOSPHATE ACID BERTH (Phosphate Rock)	260 m	10.5 m (10.2 m)	Max. LOA-250 m	One crane

NAME OF BERTH:	BERTH LENGTH:	BERTH DEPTH (MAX. DRAFT):	BERTH CAPACITY:	SHORE FACILITIES:
PUBLIC BERTH Gaibo Pier No. 1	200 m	10.0 m (9.8 m)	Max. LOA-160 m	None
DEZU PIER	300 m	7.0 m (7.0 m)	Max. LOA-140 m	None
ICHIHARA PIER	240 m	7.2 m (7.2 m)	Max. LOA-120 m	None

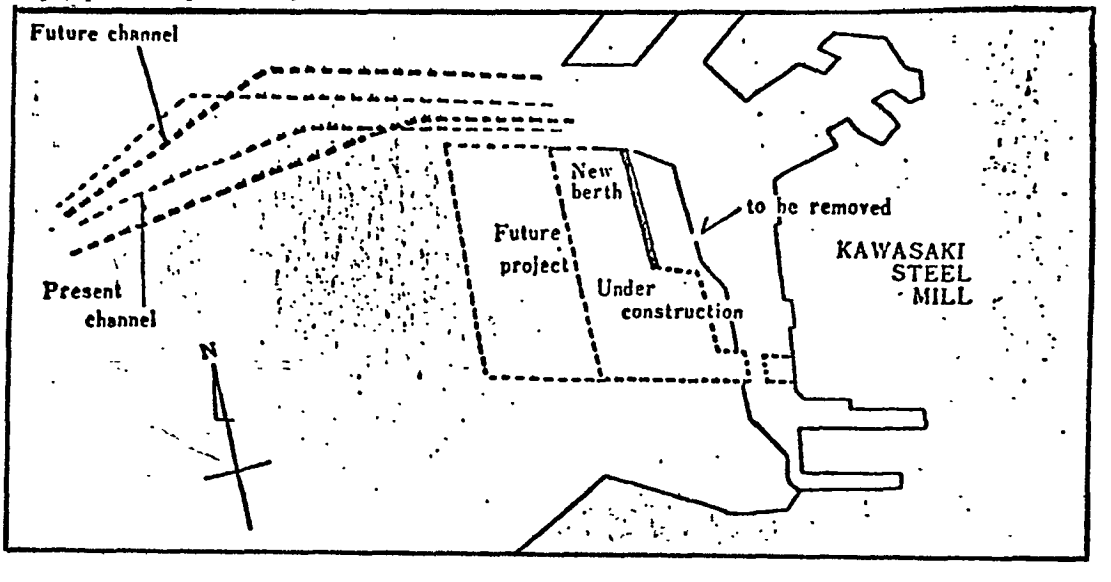
PORT IMPROVEMENT PLANS

New Berth - expected completion in October 1971. Particulars are:

APPROACH WIDTH:	DEPTH:	NAME OF BERTH:	BERTH LENGTH:	BERTH DEPTH:	SHORE FACILITIES:
350 m	140 m	No. 1-2	360 m (Max. LOA-312 m) (Max. draft-14 m)	18	1800 T x 1

Before Oct. 1972-Depth: 16 m New crane 1800 T x 1
Before Oct. 1973-Depth: 17 m

. (Upon completion, breakwater to be removed)



Kawasaki Steel Mill is now dredging in order to accommodate 150,000 DWT with completion expected in 1973.

TANKER BERTH INFORMATION

IDEMITSU KOSAN, CHIBA

No. 1 PIER

Depth of water (approach/alongside):	16.00 meters at low tide.
Maximum permissible draft:	15.50 meters at high tide.
Length of berth:	200 meters. Bollard-200 T x 9 (Dolphins).
Restrictions on LOA:	280 meters.
Berthing capacity:	120,000 TDW.
Buoy & mooring capacity:	Buoy-150 T x 2.
Number/size of manifold:	12" x 2-for crude oil and fuel oil. 30" x 1-for crude oil. 18" x 1-for crude oil.
Discharging capacity:	5,500 k/liters per hour for crude oil. 2,000 k/liters per hour for fuel oil.
Estimated back-pressure:	5 kg/cm^2.

No. 2 PIER

Depth of water (approach/alongside):	16.00 meters at low tide.
Maximum permissible draft:	15.50 meters at high tide.
Length of berth:	150 meters. (Dolphins).
Restriction on LOA:	245 meters.
Berthing capacity:	120,000 TDW.
Number/size of manifold:	12" x 4-for fuel oil, crude oil & propane. 24" x 1-for crude oil. 16" x 1-for propane.
Discharging capacity:	4,000 k/liters per hour for crude oil. 1,500 k/liters per hour for fuel oil. 2,000 k/liters per hour for propane.
Estimated back-pressure:	5 kg/cm^2.

MARUZEN OIL CO., LTD., CHIBA

No. 2 PIER

Location:	35°-32'-31.8" N. & 140°-05'-00" E.
Depth of water (approach):	11.70 meters at low tide.
Depth of water (alongside):	12.00 meters at low tide.
Maximum permissible draft:	11.60 meters at high tide.
Restriction on LOA:	240 meters.
Berthing capacity:	50,000 TDW.
Number/size of manifold:	10" x 3-for crude oil, fuel oil & propane. 26" x 1-for crude oil. 10" x 1-for fuel oil.

Discharging capacity:	2,000 k/liters per hour for fuel oil. 3,000 k/liters per hour for crude oil. 1,500 k/liters per hour for naphtha.
Estimated back-pressure:	5 kg/cm^2.

IMODCO BUOY

Location:	35°-31'-36.5" N. & 140°-00'-22.4" E.
Depth of water (approach/alongside):	16.00 meters at low tide.
Maximum permissible draft:	15.50 meters at low tide.
Restriction of LOA:	290 meters.
Berthing capacity:	130,000 TDW.
Number/size of manifold:	12" x 2-for crude oil. 30" x 1-for crude oil.
Discharging capacity:	4,000 k/liters per hour.
Estimated back-pressure:	8 kg/cm^2.

KYOKUTO PETROLEUM INDUSTRIES, CHIBA

KYOKUTO PIER

Depth of water (approach):	14.00 meters at low tide.
Depth of water (alongside):	14.70 meters at low tide.
Maximum permissible draft:	14.00 meters at high tide.
Length of berth:	100 meters. (Dolphins)
Restriction on LOA:	230 meters.
Berthing capacity:	80,000 TDW.
Number/size of manifold:	12" x 4-for fuel oil and crude oil. 30" x 1-for crude oil. 20" x 1-for fuel oil.
Discharging capacity:	4,500 k/liters per hour for crude oil. 1,300 k/liters per hour for fuel oil.
Estimated back-pressure:	6 kg/cm^2.

FUJI OIL CO., LTD., CHIBA

FUJI OIL PIER

Depth of water (approach):	15.80 meters at low tide.
Depth of water (alongside):	15.00 meters at low tide.
Maximum permissible draft:	15.00 meters at high tide.
Length of berth:	100 meters.
Restriction on LOA:	260 meters.
Berthing capacity (max.):	100,000 TDW.
Number/size of manifold:	12" x 3-for crude oil. 30" x 1-for crude oil.
Discharging capacity:	4,000 k/liters per hour.
Estimated back-pressure:	5 kg/cm^2.

KEIYO SEA-BERTH CO., LTD., CHIBA

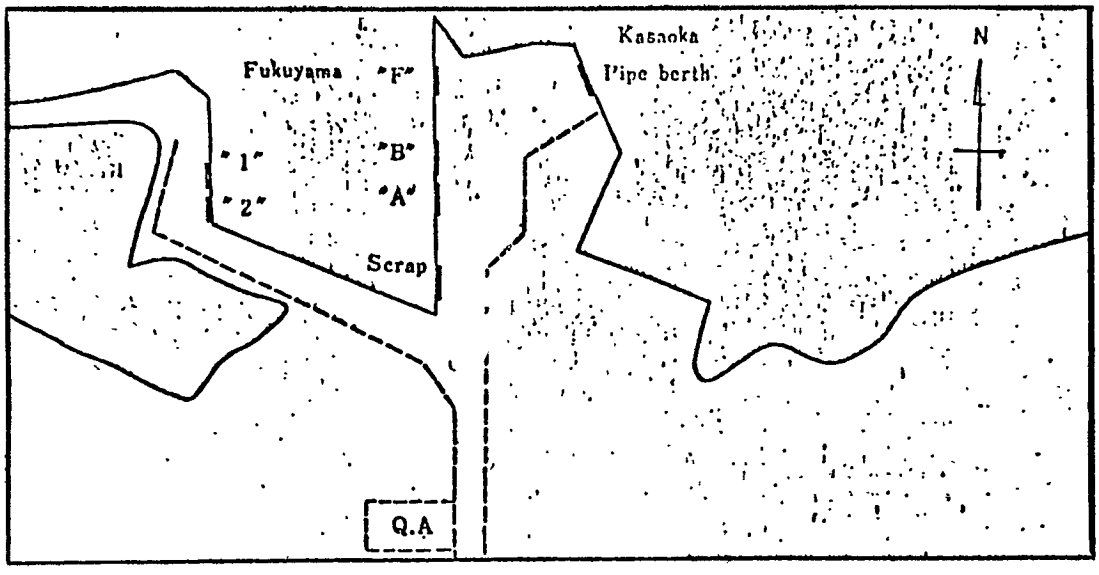
KEIYO SEA BERTH

Location:	35°-30'-30" N. & 139°-56'-25" E.
Depth of water (approach):	20.50 meters at low tide.
Depth of water (alongside-westside):	20.50 meters at low tide.
Depth of water (alongside-eastside):	20.00 meters at low tide.
Maximum permissible draft:	19.30 meters at high tide.
Length of berth:	470 meters.
Restriction on LOA	350 meters.
Berthing capacity:	200,000 TDW.
Number/size of manifold:	16" x 3-(West side). 16" x 3-(East side).
Discharging capacity:	13,000 k/liters per hour for crude oil only.
Estimated back-pressure:	Negligible.

TUG-BOATS: Pilot requires tug boats as follows:

	FOR MOORING:	FOR UNMOORING:
Up to 45,000 d/w	2 or 3 x 2500 HP	2 x 2500 HP
70,000 d/w	3 or 4 x 2500 HP	3 x 2500 HP
100,000 d/w	4 x 3000 HP	3 x 3000 HP
120,000 d/w	4 or 5 x 3000 HP	4 x 3000 HP
150,000 d/w	4 or 5 x 3000 HP	4 x 3000 HP
Over 150,000 d/w	5 or 6 x 3000 HP	4 x 3000 HP

F U K U Y A M A



LOCATION:
Latitude N. 34°27'13" Longitude E. 133°26'50"

HARBOUR PROTECTION:
Natural

BOTTOM:
Mud

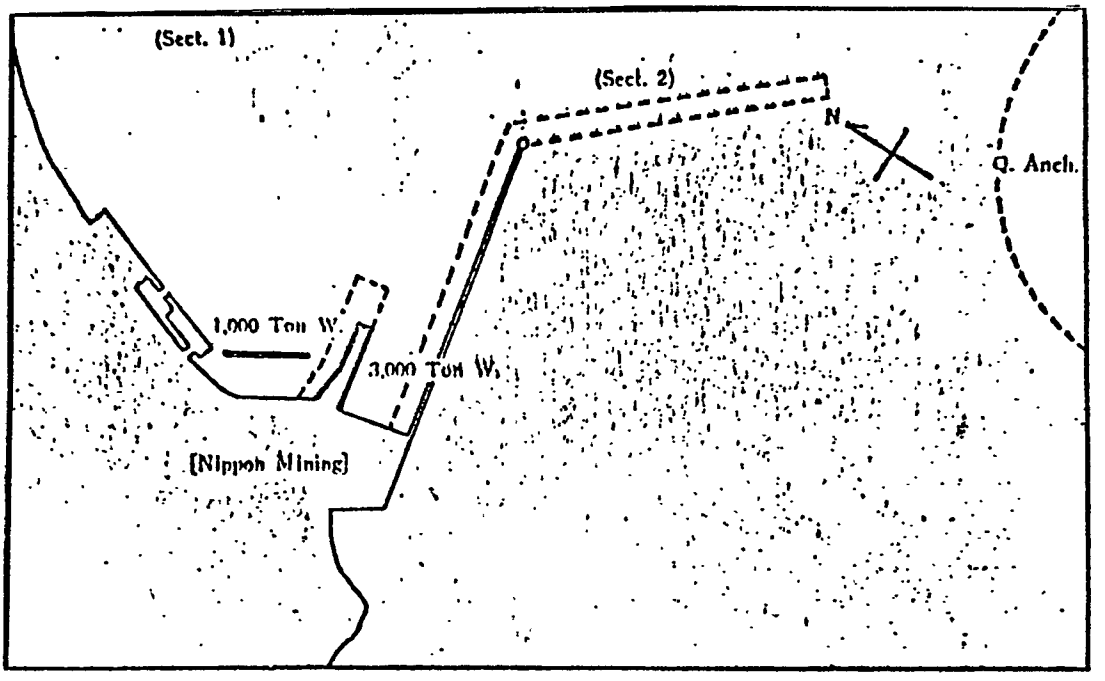
MINIMUM DEPTH OF WATER AT EXTREME LOW WATER (SPRING TIDE):
In the passage: 15 m (at high tide)
At anchorage: 17 m

PARTICULARS OF EACH BERTH:

NAME OF BERTH:	BERTH LENGTH:	BERTH DEPTH:	BERTHING CAPACITY:	FACILITY:
Raw Materials berth "A" (Ore & Coal)	300 m	17 m	150,000 DWT	2x40 Gantry Cranes Lifting capacity Ore-1,500 tons/H each Coal-800 tons/H each
"B" (Ore & Coal)	280 m	16 m	100,000 DWT	2x40-ton Gantry Cranes
"F"	180 m	11 m	20,000 DWT	2x10-ton Level Luffing Cranes Lifting capacity Coal-300 tons/H each

NAME OF BERTH:	BERTH LENGTH:	BERTH DEPTH:	BERTHING CAPACITY:	FACILITY:
Scrap Berth (Scrap & Pig Iron)	180 m	13 m	35,000 DWT	2x20-ton Level Luffing Cranes Lifting capacity Scrap-50 tons/H each -100 tons/H each
Export Berth "1" (Steel Coil & Plate)	234 m	11 m	30,000 DWT	2x30-ton Level Luffing Cranes
"2" (Steel Coil & Plate)	230 m	13 m	35,000 DWT	1x30-ton Level Luffing Cranes 1x20-ton Gantry Crane
PIPE Berth	200 m	13 m	35,000 DWT	1x20-ton Level Luffing Crane

F U N A K A W A



LOCATION:
Latitude N. 39°52' Longitude E. 139°51'

HARBOUR PROTECTION:
Breakwaters

BOTTOM:
Clay mixed with rock

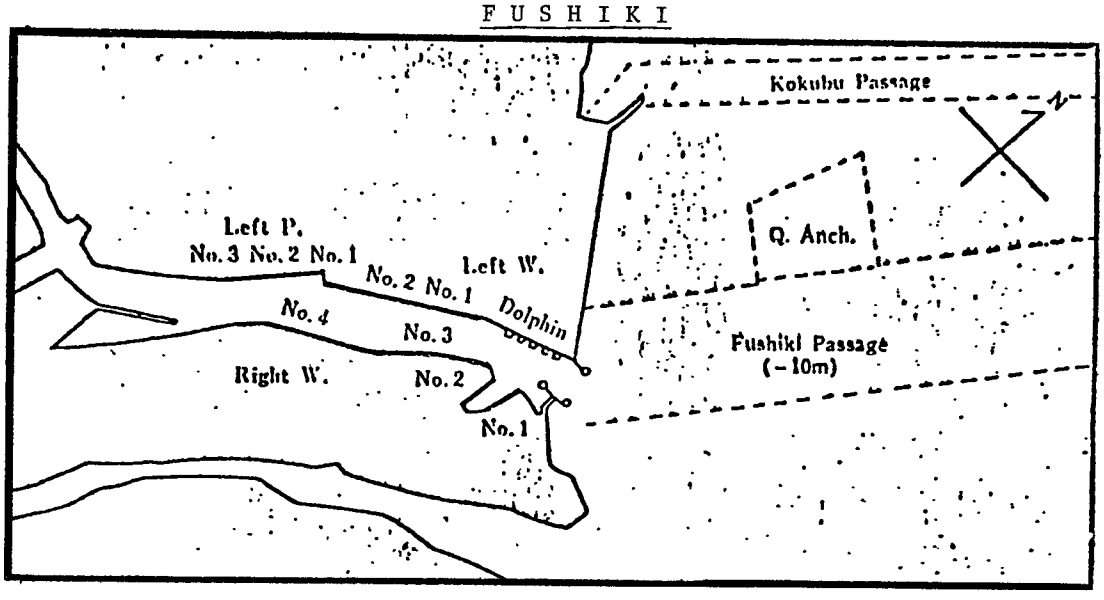
MINIMUM DEPTH OF WATER AT EXTREME LOW WATER (SPRING TIDE):
At anchorage: 15.2-16.0 m

PARTICULARS OF EACH WHARF:
Ocean-going vessels unable to dock are discharged at anchorage.

AVERAGE RATE OF DISCHARGE FOR CARGOES HANDLED:
Oil: 700 tons per hour by two 10" pipelines (at Tanker Buoy)
Logs: 30-40 tons per gang hour (at anchorage)

NUMBER OF BUOYS AND MOORING CAPACITY OF EACH:
Tanker Buoys (4 buoys): One 30,000 DWT

F U S H I K I



LOCATION:
Latitude N. 36° 47' Longitude E. 137° 4'

HARBOUR PROTECTION:
Natural

BOTTOM:
Mud over hard sand and clay

MINIMUM DEPTH AT EXTREME LOW WATER (SPRING TIDE):
In the passages: 9.5 m
At anchorage: 8.5-10.5 m

PARTICULARS OF EACH WHARF:

NAME OF WHARF:	WHARF LENGTH:	MINIMUM DEPTH:	BERTHING CAPACITY:	DISCHARGING FACILITIES:
Left Bank Wharf No. 1 (Coal, Coke, Ore)	160 m	9.5 m	One 10,000 GRT	One 5-ton mobile level crane max. reach 12 m max. height 13 m
Left Bank Wharf No. 2 (Ore)	170 m	9.5 m	One 10,000 GRT	One 5-ton mobile level crane max. reach 14 m max. height 12.6 m
Ken-ei Wharf (Salt, Phosphate & Chloride)	220 m	7.5 m	Two 4,000 GRT	

Right Bank Wharf No. 1 (Coal & Ore)	220 m	7.5 m	Two 3,000 GRT (After lightening at Left Wharf No. 1)	One 5-ton mobile level crane max. reach 9 m max. height 12 m
Right Wharf No. 2 (Coal & Ore)	220 m	7.5 m	Two 3,000 GRT	
Right Wharf No. 3 (Salt & Rock Phosphate)	185 m	10.0 m	One 15,000 GRT	
Right Wharf No. 4	185 m	10.0 m	One 15,000 GRT	

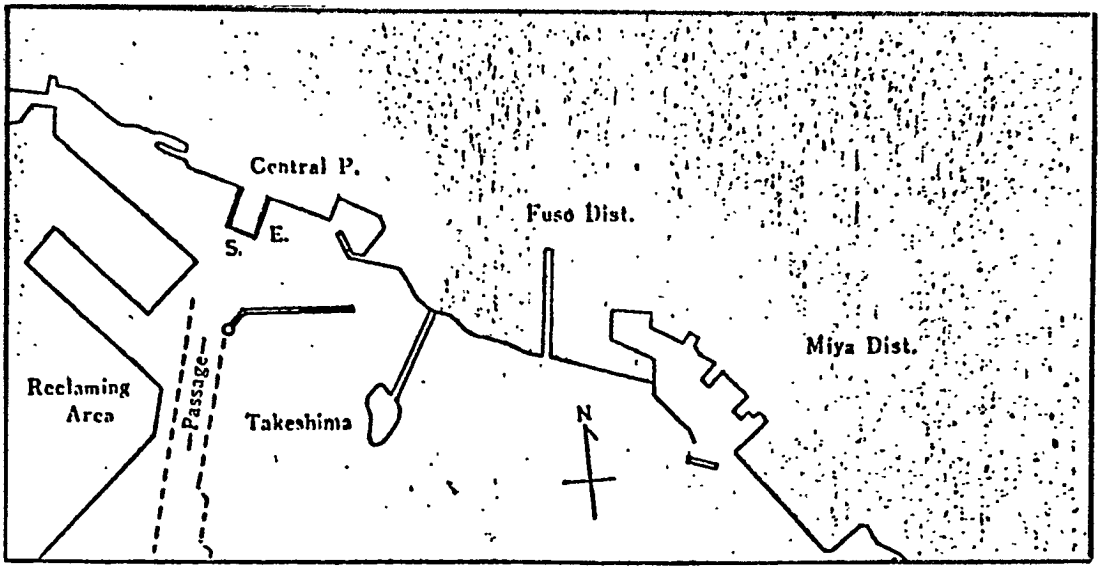
AVERAGE RATE OF DISCHARGE FOR CARGOES HANDLED:

LOCATION:	CLASSIFICATION:	USE:	LIFTING POWER:	NUMBER GEARS:	DAILY CARGO WORK CAPACITY:
Wharf for large sized vessel:	1. Level luffing crane.	Coal.	5 tons	2	1,000 tons
	2. Level luffing crane.	No limit.	5 tons	1	1,500 tons
	3. Bridge style crane.	Do.	3 tons	1	600 tons
	4. Hammer Head crane.	Do.	2.5 tons	1	200 tons
	5. High legs Jib crane.	Do.	5 tons	1	350 tons

NUMBER OF BUOYS AND MOORING CAPACITY OF EACH:

None, but anchorages available for one 10,000 G/T, one 5,000 G/T and one 2,000 G/T for discharging logs.

G A M A G O R I



LOCATION:
Latitude N. 34° 46.7' Longitude E. 137° 13.2'

HARBOUR PROTECTION:
None

BOTTOM:
Mud

MINIMUM DEPTH OF WATER EXTREME LOW WATER (SPRING TIDE):
At the passage: 6.5 m
At anchorage: 40-90 m

PARTICULARS OF EACH WHARF:

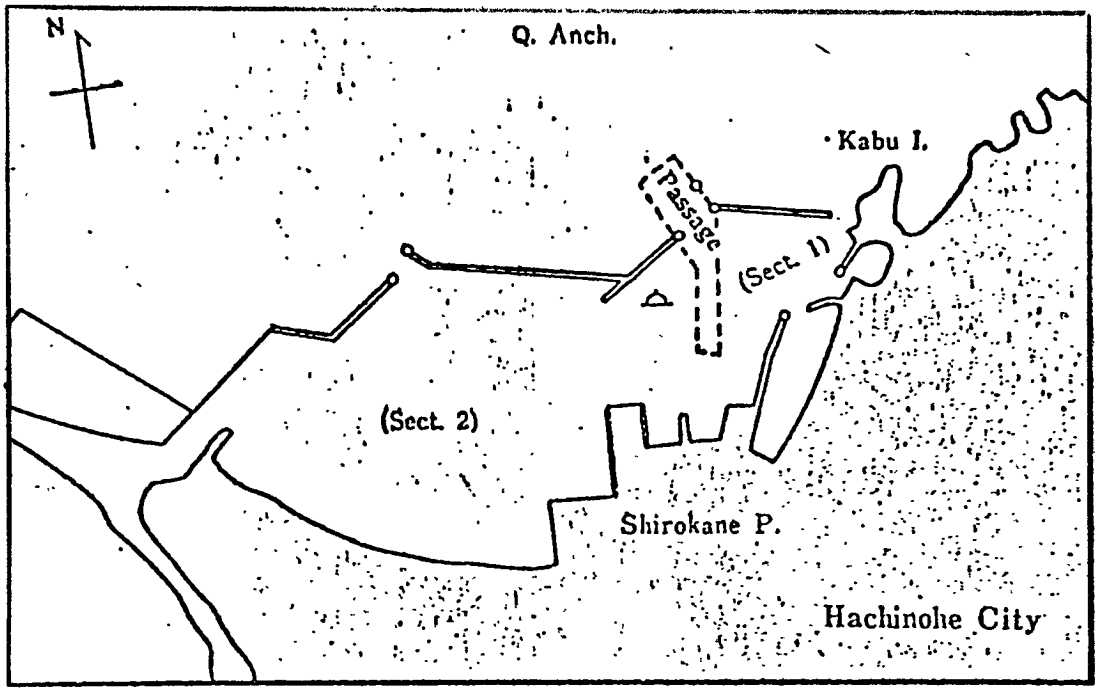
NAME OF WHARF:	WHARF LENGTH:	MAX. PERMISSIBLE DRAFT:	BERTHING CAPACITY:
Center Pier South	130 m	7.4 m	Max. 5,000 GRT
Center Pier North	130 m	7.4 m	Max. 5,000 GRT

AVERAGE RATE OF DISCHARGING FOR CARGO HANDLED:

Scrap	Grade No. 1	120 tons	per day	per gang
Scrap	Grade No. 2	80 tons	per day	per gang
Scrap	Bundles	180 tons	per day	per gang
Maize in bulk		500 tons	per day	per gang
Maize in bags		500 tons	per day	per gang
Pig Iron		400-500 tons	per day	per gang
Logs into sea		150,000 B.M.	per day	per gang

NUMBER OF BUOYS AND MOORING CAPACITY OF EACH:
None. Anchorage available for discharging. (Depth 20 m)

H A C H I N O H E



LOCATION:
Latitude N. 40° 30' Longitude E. 141° 30'

HARBOUR PROTECTION:
Breakwater

BOTTOM:
Mud and sand

MINIMUM DEPTH OF WATER AT EXTREME LOW WATER (SPRING TIDE):
At the passages: 9-12 m
At anchorage: 9-12 m

PARTICULARS OF EACH WHARF:

NAME OF WHARF:	WHARF LENGTH:	DEPTH MINIMUM:	DRAFT RESTRICTIONS:	BERTHING CAPACITY:
10,000 ton wharf	180 m	9 m	Max. draft 7.5 m	
20,000 ton wharf	180 m	10 m	Max. draft 7.5 m (There is a shallow spot in the passage)	

(No discharging/loading on wharf)

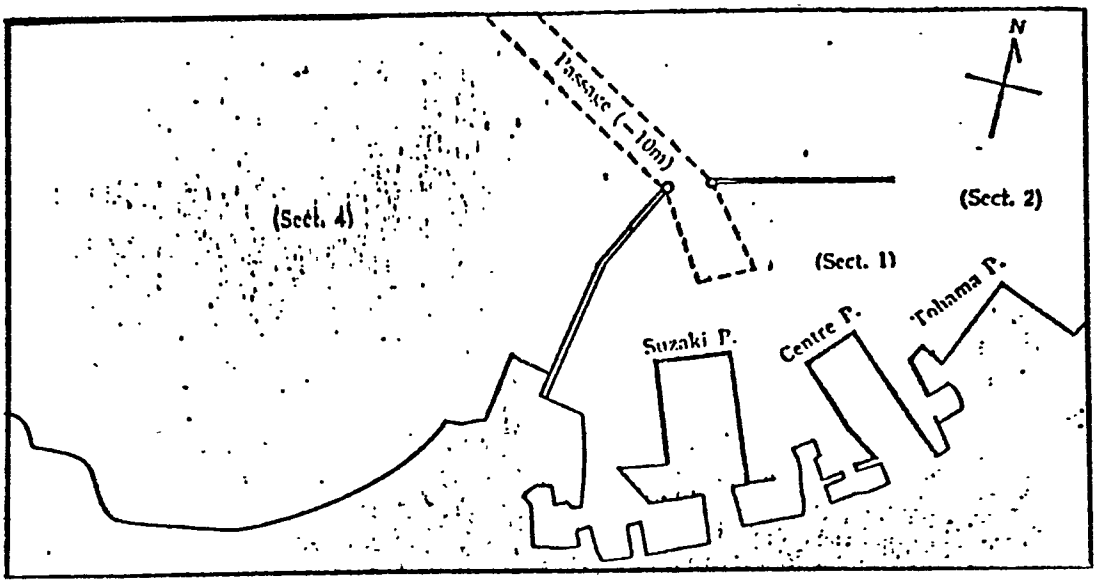
AVERAGE RATE OF LOADING/DISCHARGING:

Ammonium Sulphate in bags:	45-50 tons per gang hour
Rock Phosphate in bulk:	45-60 tons per gang hour
Nickel/Manganese Ore:	40-50 tons G/H
Lauan Log:	126 M^3 per G/H
American Log:	57 M^3 per G/H

(3/4 gangs available and basically working from 0800 to 1600 hours with possibility of working until 1900 hours)

NUMBER OF BUOYS AND MOORING CAPACITY OF EACH:
One (1) buoy with a mooring capacity of 20,000 G/T

H A K A T A



LOCATION:
Latitude N. 33° 36' Longitude E. 130° 24'

HARBOUR PROTECTION:
Protected by breakwater

BOTTOM:
Soft clay

MINIMUM DEPTH OF WATER AT EXTREME LOW WATER (SPRING TIDE):
In the passages: 10 m

PARTICULARS OF EACH WHARF:

NAME OF WHARF:	WHARF LENGTH:	MINIMUM DEPTH: APPROACH:	MINIMUM DEPTH: ALONGSIDE:	BERTHING CAPACITY:	DISCHARGING FACILITIES:
Central Pier					
Berth No. 2	250 m	10 m	7.8 m	6,000 G/T	Ship's gear
Berth No. 3	250 m	10 m	7.8 m	6,000 G/T	Ship's gear
Berth No. 4	150 m	10 m	9 m	10,000 G/T	Ship's gear
Berth No. 5	180 m	10 m	10 m	15,000 G/T	Ship's gear
Berth No. 6	180 m	10 m	10 m	15,000 G/T	Ship's gear
Berth No. 9, 10, 11	400 m	7.5 m	7 m	LOA 160 m	
Suzaki Pier					
Berth No. 2	180 m	10 m	10 m	25,000 G/T	
Berth No. 3	180 m	10 m	10 m	(Using two berths	
Berth No. 4	180 m	10 m	10 m	total length 540)	
Berth No. 5, 6	260 m	7.5 m	7.5 m	15,000 G/T	
Berth No. 7, 8, 9, 10	460 m	5.5 m	5 m	6,000 G/T	

TANKER BERTH INFORMATION

MARUBENI-IIDA CO., LTD., HAKATA

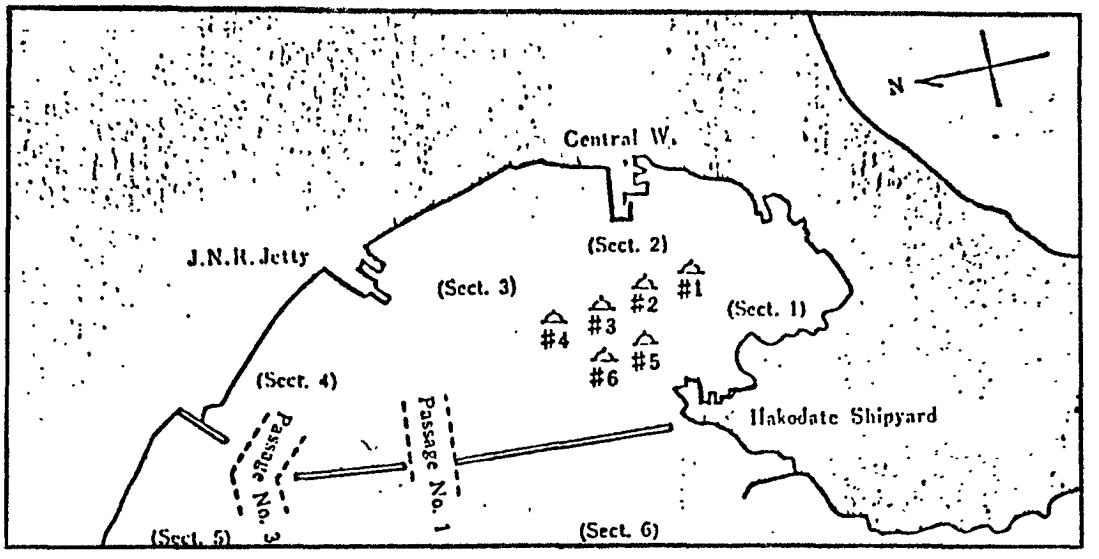
SUZAKI NO. 6 PIER

Depth of water (approach/alongside):	7.5 meters at low tide.
Maximum permissible draft:	7.5 meters at high tide.
Length of Berth:	260 meters.
Restriction on LOA:	Not specified.
Berthing capacity:	20,000 TDW.
Number/size of manifold:	16" x 1 for molasses.
Discharging capacity:	350 k/liters per hour.
Estimated back-pressure:	1-1.5 kg/cm^2.
Remarks:	This berth is owned by the City Authorities, and used mainly for discharging of Molasses.

TUG BOATS: Pilot requires tug boats as follows:

	FOR MOORING:	FOR UNMOORING:
Up to 10,000 g/t	800 HP x 1 & 1000 HP x 1	ditto
15,000 g/t	800 HP x 1 & 1000 HP x 1	ditto

H A K O D A T E



LOCATION:
Latitude N. 41° 47' Longitude E. 140° 43'

HARBOUR PROTECTION:
West and north breakwaters

BOTTOM:
Mud and sand

MINIMUM DEPTH OF WATER AT EXTREME LOW WATER (SPRING TIDE):
In the passages: 8-13 m
At anchorage: 8-13 m

PARTICULARS OF EACH WHARF:

NAME OF WHARF:	WHARF LENGTH:	MINIMUM DEPTH:	BERTHING CAPACITY:	DISCHARGING FACILITIES:
Center Pier				
North Side	171 m	9.0 m	One 10,000 G/T	Ship's gear
Main Side	151 m	8.0 m	Two 1,000 G/T	Ship's gear
South Side	133 m	9.0 m	One 6,000 G/T	Ship's gear
West Side	201 m	7.0 m	Two 3,000 G/T	Ship's gear
North Pier	130 m	7.5 m	One 5,000 G/T	Ship's gear

AVERAGE RATE OF DISCHARGE FOR CARGOES HANDLED:
Oil : 450 Kilolitres per hour 8' pipe.
Wheat : 1,000 tons per daytime only.
Ammonium (Loading): 1,000 tons per daytime.

Discharge sometimes suspended due to rough seas and snow in winter season.

NUMBER OF BUOYS AND MOORING CAPACITY OF EACH:

No. 1-6,000 G/T No. 2-8,000 G/T No. 3-10,000 G/T No. 4-8,000 G/T
No. 5-6,000 G/T No. 6-6,000 G/T Nos. 9 & 10-30,000 G/T
Nos. 11 & 12-3,000 G/T

PORT IMPROVEMENTS PLANS (EXPANSION PLANS):

Extension of Center Pier North Side berth is now under construction with expected completion in Spring, 1971. Upon completion, the length will be 203 meters.

TANKER BERTH INFORMATION:

ASIA OIL CO., LTD., HAKODATE

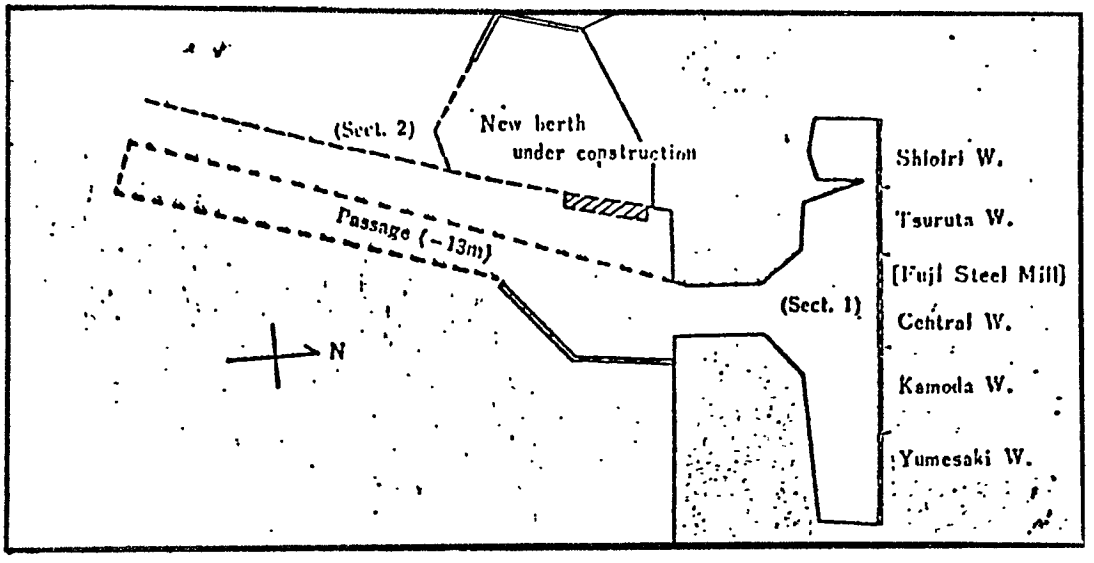
IMODCO BUOY

Location:	41° 48' 8" N. & 140° 40' 54" E.
Depth of water (approach/alongside):	14.50 meters at low tide.
Maximum permissible draft:	14.50 meters at high tide.
Length of berth:	Sea-berth (IMODCO Buoy).
Restriction on LOA:	Not specified.
Berthing capacity (max.):	72,000 TDW.
Number/size of manifold:	12 x 1.
Discharging capacity:	1,500 k/liters per hour.
Estimated back-pressure:	10 kg/cm^2.

TUGBOATS: Pilot requires tugboats as follows:

	FOR MOORING:	FOR UNMOORING:
Up to 50,000 d/w tonner	1100 HPx1 & 800 HPx1	1100 HPx1 or 800 HPx1
72,000 d/w tonner	1100 HPx1 & 800 HPx1	1100 HPx1 or 800 HPx1

H I R O H A T A



LOCATION:
Latitude N. 34°47' Longitude E. 134°37'

HARBOUR PROTECTION:
Sheltered by breakwater

BOTTOM:
Sand

MINIMUM DEPTH OF WATER AT EXTREME LOW WATER (SPRING TIDE):
In the passages: 13 m
At anchorage: 7.5-13 m

PARTICULARS OF EACH WHARF:

NAME OF WHARF:	WHARF LENGTH:	MINIMUM DEPTH:	BERTHING CAPACITY:	DISCHARGING FACILITIES:
Yumesaki Wharf (Steel M.) (No. 1-2 berth)	280 m	7.5 m	Two 7,000 D/W	One 20-ton crane (Heavy Steel Cargo Loading)
Kamoda Wharf (Steel material & coal) (No. 3-7 berths)	722 m	7.5 m	Four 6,000 G/T	Two 9-ton cranes Loading Steel material 1,500-2,000 tons per day Two 5-ton cranes Discharging Coal 10,000 tons per day
Central Wharf (No. 9) (Ore & Coal)	275 m	13.2 m Max. draft 13.0 m	One 45,000 G/T	Two 25-ton Unloaders max. reach 20.5 m max. height 18.5 m Ore 20,000 tons per day Coal 15,000 tons per day

NAME OF WHARF:	WHARF LENGTH:	MINIMUM DEPTH:	BERTHING CAPACITY:	DISCHARGING FACILITIES:
Tsuruta Wharf	503 m		One 20,000 D/W	Four 9-ton cranes
Berth No. 10		9.70 m		12,000-13,000 tons per day
Berth No. 11		8.90 m		two 5-ton cranes
Berth No. 12		9.60 m		1,500 tons per day
(Ore & Scrap)				
Shioiri Wharf	320 m		One 7,000 G/T	Two 6-ton cranes
(Scrap)				
Berth No. 13		8.80 m		
Berth No. 14		7.10 m		
(Pig Iron & Coke)			One 9,000 G/T	Two 5-ton cranes Pig Iron 3,000 tons per day Coke 3,000 tons per day

NUMBER OF BUOYS AND MOORING CAPACITY OF EACH:
One buoy Depth: 7.4 6,000 tons

PORT IMPROVEMENT PLANS (EXPANSION PLANS):
New berth is now under construction, as shown in a dotted line, with expected completion in 1971, particulars of which are as follows:

Length of berth: 300 m Depth of water: 13.2 m
To be deepened
before the end of 1971: 14.8 m
before the end of 1972: 16.0 m
before the end of 1973: 17.0 m

TANKER BERTH INFORMATION:

IDEMITSU KOSAN, HIMEJI

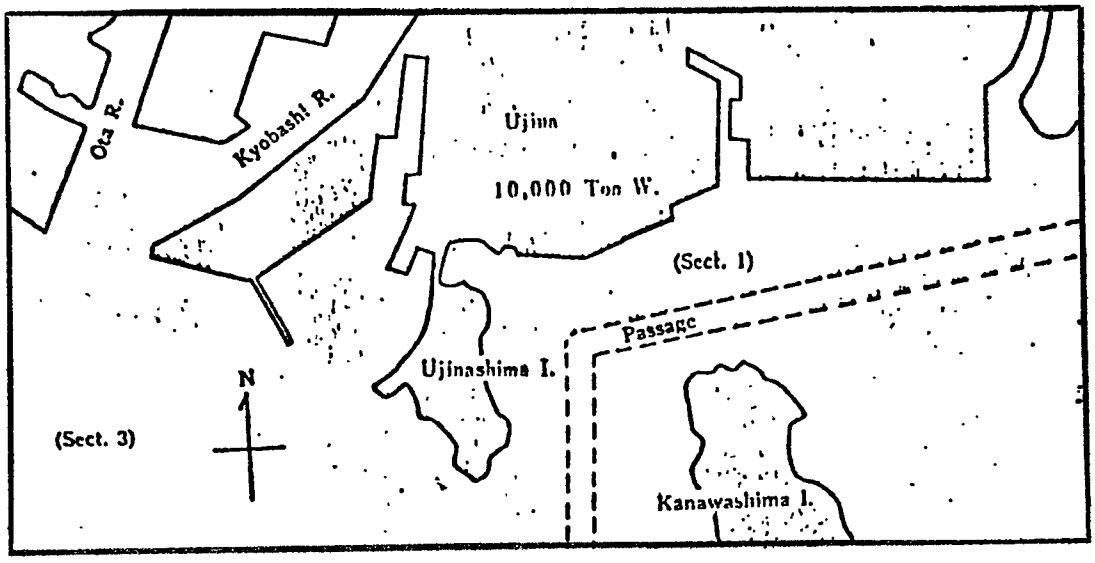
IDEMITSU BERTH

Depth of water (approach):	11.80 meters at low tide.
Depth of water (alongside):	12.00 meters at low tide.
Maximum permissible draft:	11.00 meters at low tide. 11.80 meters at high tide.
Length of berth:	140 meters.
Restriction on LOA:	Not specified.
Berthing capacity:	50,000 TDW.
Number/size of manifold:	12" x 3.
Discharging capacity (max.):	2,000 longtons per hour.
Estimated back-pressure:	5 kg/cm^2.

TUGBOATS: Pilot requires tugboats as follows:

	FOR MOORING AND UNMOORING:
Up to 10,000 g/t	2500 HP x 1
15,000 g/t	2000 HP x 2
20,000 g/t	2000 HP x 2
45,000 g/t	2000 HP x 3

H I R O S H I M A



LOCATION:
Latitude N. 34°21' Longitude E. 132° 25'

HARBOUR PROTECTION:
Natural and breakwater

BOTTOM:
Sand and mud

MINIMUM DEPTH OF WATER AT EXTREME LOW WATER (SPRING TIDE):
In the passages: 14-20 m
At anchorage: 7-20 m

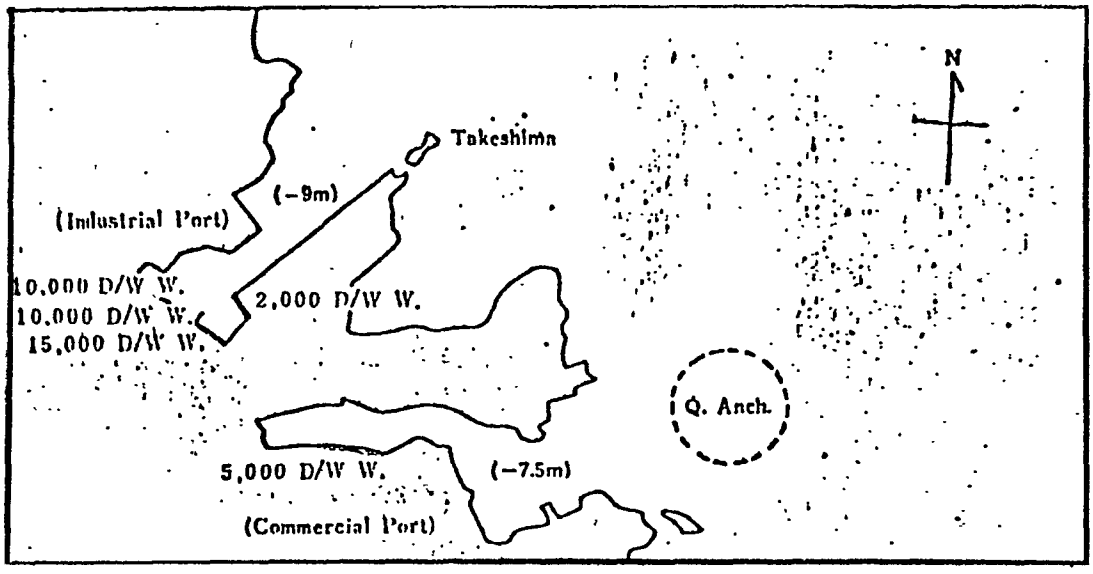
PARTICULARS OF EACH WHARF:

NAME OF WHARF:	WHARF LENGTH:	MINIMUM DEPTH:	BERTHING CAPACITY:	DISCHARGING FACILITIES:
Ujina Pier (Berth No. 1, 2 & 3)	510 m	10 m	No limit	Ship's gear

AVERAGE RATE OF DISCHARGE FOR CARGOES HANDLED:
Grain in bulk 65 tons per gang hour
Logs (at anchorage) 60-70 tons per hour

NUMBER OF BUOYS AND MOORING CAPACITY OF EACH:
None, but 6 anchorages for 10,000 GRT.

HOSOSHIMA



LOCATION:
Latitude N. 32°25'30" Longitude E. 131°40'00"

HARBOUR PROTECTION:
Natural

BOTTOM:
Mud and sand

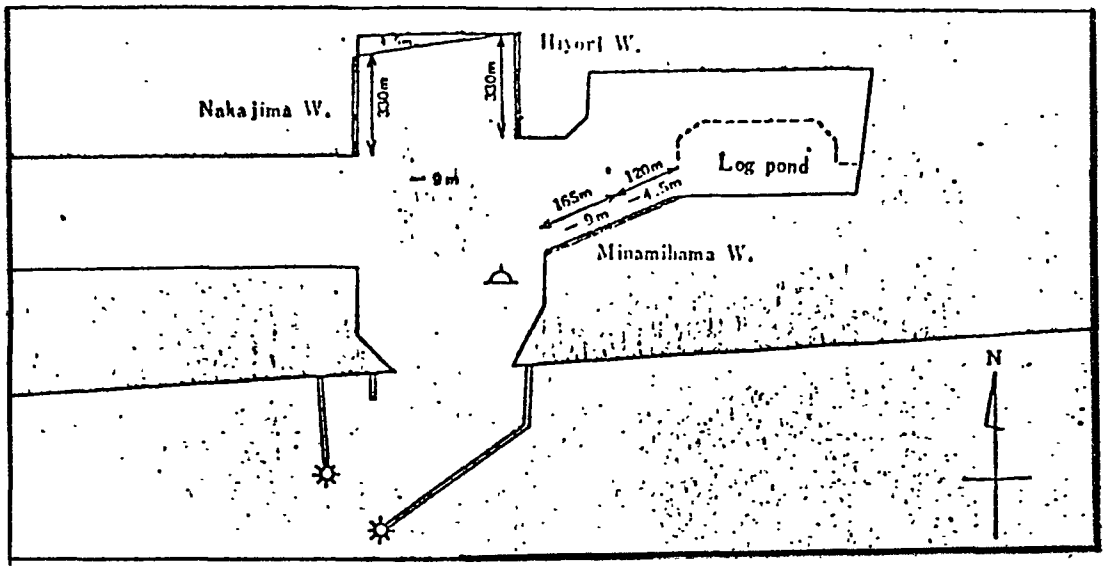
MINIMUM DEPTH OF WATER AT EXTREME LOW WATER (SPRING TIDE):
In the passage: 10 m
At anchorage (Quarantine anchorage): 32 m

PARTICULARS OF EACH WHARF:

NAME OF WHARF:	WHARF LENGTH:	MINIMUM DEPTH:	RESTRICTIONS/ CAPACITY:
INDUSTRIAL PORT (KOGYO-KO)			
Wharf No. 1-2	370 m	10 m	Max. draft 9.6 m
Sugar plant wharf	200 m	10 m	Max. draft 9.6 m
COMMERCIAL PORT (SHOGYO-KO)			
Wharf No. 1	230 m	7.5 m	Max. draft 6.7 m
Wharf No. 2	250 m	7.5 m	Max. draft 6.7 m

NUMBER OF MOORING BUOYS:
None

I S H I N O M A K I



LOCATION:
Latitude N. 38°23' Longitude E. 141°17'

HARBOUR PROTECTION:
Land-locked and breakwater

BOTTOM:
Mud with sand

MINIMUM DEPTH OF WATER:
At anchorage: 9 m
In the passage: 9 m

PARTICULARS OF EACH BERTH:

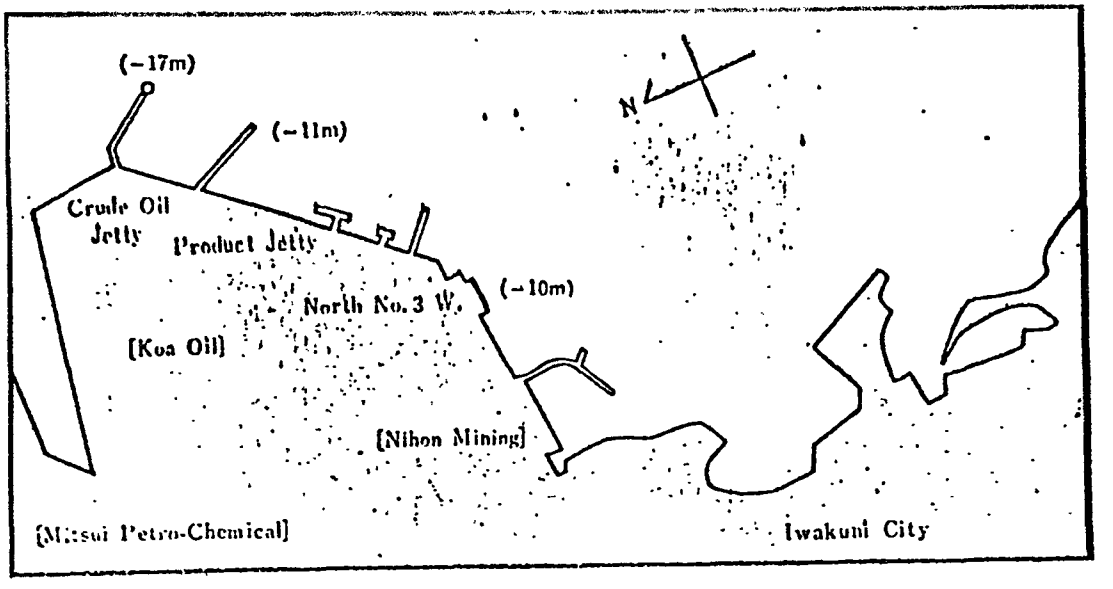
NAME OF BERTH:	BERTH LENGTH:	BERTH DEPTH:	BERTHING CAPACITY:
Minamihama Wharf	285 m		10,000 GRT
	(165 m	9.5 m)	
	(120 m	4.5 m)	
Hiyori Wharf	330 m	9.0 m	10,000 GRT
Nakajima Wharf	330 m	9.0 m	10,000 GRT

AVERAGE RATE OF DISCHARGE:
Lauan log: 50/55,000 BM per gang/hour
American log: 20/25,000 BM per gang/hour
Phosphate Rock: 35/40 tons per gang/hour

(Usually 4/5 gangs arrangeable from 0800 hours to 1700 hours with possibility of working 2/3 hours overtime)

NUMBER OF BUOYS:
One buoy with a mooring capacity of 10,000 GRT

I W A K U N I



LOCATION:
Latitude N. 34° 10' Longitude E. 132° 15'

HARBOUR PROTECTION:
Natural

BOTTOM:
Clay with sand

MINIMUM DEPTH OF WATER AT EXTREME LOW WATER (SPRING TIDE):
In the passages: 18.29-12 m
At anchorage: 9-12 m

PARTICULARS OF EACH BERTH:

NAME OF BERTH:	WHARF LENGTH:	MINIMUM DEPTH: APPROACH:	MINIMUM DEPTH: ALONGSIDE:	RESTRICTIONS ON SHIP'S LENGTH:	BERTHING CAPACITY:
Ken-el Wharf (Oil & Logs)	200 m	10 m	10 m	150 m	10,000 G/T
Sanyo Pulp Chip Wharf	150 m	9.4 m	8.8 m		20,000 G/T

NUMBER OF BUOYS AND MOORING CAPACITY OF EACH:
No buoys

TANKER BERTH INFORMATION:

KOA OIL CO., LTD., IWAKUNI

KOA OIL CRUDE BERTH

Depth of water (approach/alongside): 17.00 meters at low tide.
Maximum permissible draft: 17.00 meters at high tide.
Restriction on LOA: Not specified.

Berthing capacity (max.):	200,000 TDW.
Number/size of manifold:	12" x 3-ASA type.
Discharging capacity:	5,000-8,000 k/liters per hour.
Estimated back-pressure:	Negligible.

KOA OIL FUEL OIL LOADING JETTY

Depth of water (approach/alongside):	11.00 meters at low tide.
Maximum permissible draft:	10.00 meters at low tide.
Length of berth:	260 meters.
Restriction on LOA:	Not specified.
Berthing capacity (max):	25,000 TDW.
Number/size of manifold:	8" x 1-ASA type.
Loading capacity:	700-900 k/liters per hour.
Estimated back-pressure:	Negligible.

KENEI WHARF:

PUBLIC WHARF

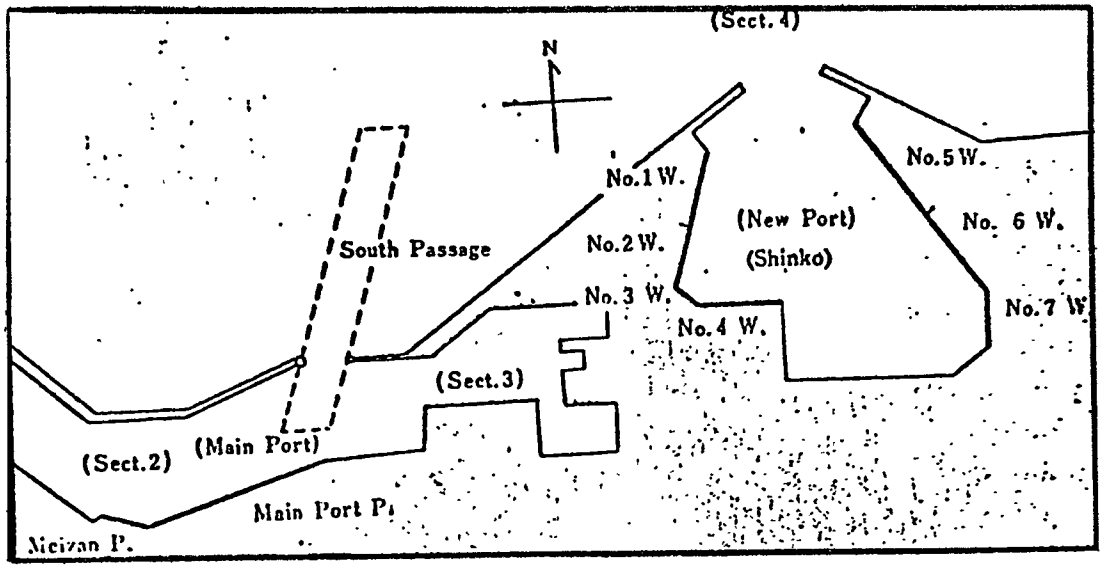
NOTE: This berth is owned by the City Authorities, and mainly used for discharging of chemical products and crude oil.

Depth of water (approach/alongside):	11.30 meters at low tide.
Maximum permissible draft:	11.15 meters at low tide.
Length of berth:	90 meters.
Restriction on LOA:	Not specified.
Berthing capacity:	45,000 TDW.
Number/size of manifold:	10" x 1-ASA type for discharging of crude oil. 4" x 2-ASA type for discharging of chemical products.
Estimated back-pressure:	Negligible.

TUG-BOATS: Pilot requires tugboats as follows:

	FOR MOORING:	FOR UNMOORING:
Up to 3,000 g/t	500 HP x 1	500 HP x 1
6,000 g/t	800 HP x 1 or 400 HP & 800 HP x 1	ditto
10,000 g/t	1,000 HP x 1	ditto
15,000 g/t	1,000 HP x 1 or 800 HP x 1	ditto
45,000 d/w	1,500 HP x 2	ditto

K A G O S H I M A



LOCATION:
Latitude N. 31° 36' 00" Longitude E. 131° 34' 00"

HARBOUR PROTECTION:
Breakwater

BOTTOM:
Sand and Mud

MINIMUM DEPTH OF WATER AT EXTREME LOW WATER (SPRING TIDE):
In the passage: 18.3 m
At anchorage: 16.7 m

PARTICULARS OF EACH BERTH:

NAME OF WHARF:	WHARF LENGTH:	MINIMUM DEPTH:	BERTHING CAPACITY:
Shinko wharf	220 m	7.5 m	LOA 120 m
Shinko Minami wharf	220 m	6.0 m	15,000 G/T

NUMBER OF BUOYS AND MOORING CAPACITY OF EACH:
No buoys.

TANKER BERTH INFORMATION:

NIPPON OIL STAGING TERMINAL CO., LTD.,
KHRE: (KHRE CENTRAL TERMINAL STATION)

No. 2 BERTH

Location: 31° 23' 42" N. & 130° 33' 24" E.
Depth of water (approach): 30-60 meters.
Depth of water (alongside): 18.00 meters at low tide.

Maximum permissible draft:	17.00 meters at low tide.
Length of berth:	Dolphin berth-420 meters.
Restriction on LOA:	Not specified.
Berthing capacity:	150,000 TDW.
Loading capacity:	10,000 k/liters per hour.
Estimated back-pressure:	Negligible-(max. 15 kg/cm^2).
Remarks:	The above berth is only used for loading of crude oil from the oil storage tanks on shore.

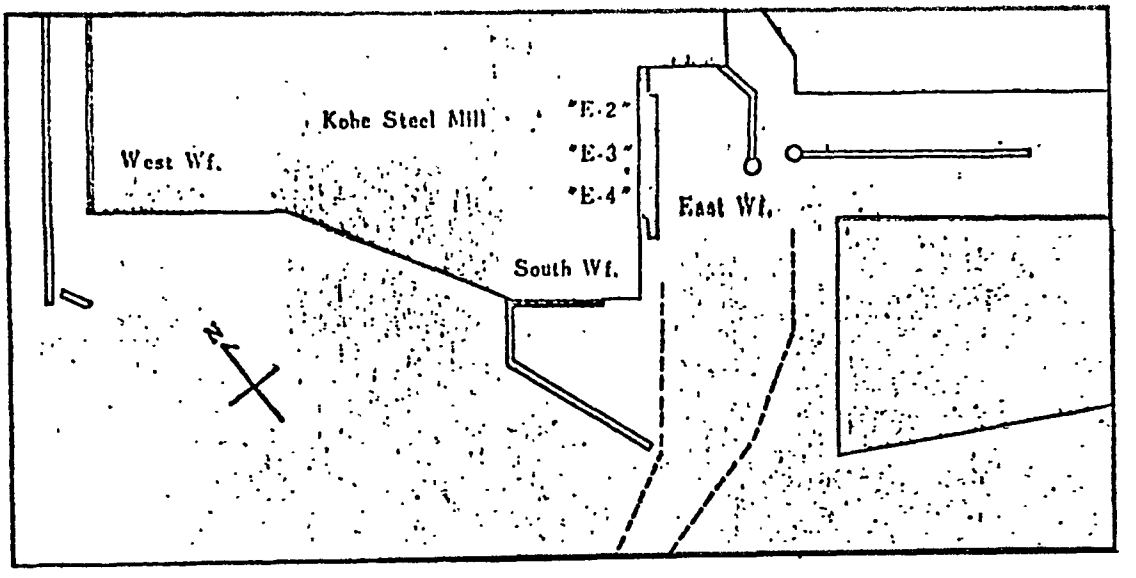
No. 3 BERTH

Location:	31° 23' 26" N. & 130° 33' 40" E.
Depth of water (approach):	30-60 meters.
Depth of water (alongside):	28.00 meters at low tide.
Maximum permissible draft:	27.00 meters at low tide.
Length of berth:	Dolphin berth-540 meters.
Restriction on LOA:	Not specified.
Berthing capacity (max.):	450,000 TDW.
Number/size of manifold:	16" x 6-ASA type.
Discharging capacity:	20,000 k/liters per hour.
Estimated back-pressure:	Negligible.

TUG-BOATS: Pilot requires tugboats as follows:

	FOR MOORING:	FOR UNMOORING:
Up to 100,000 d/w tonner	3800 HP x 2	3800 HP x 2
150,000 d/w tonner	3800 HP x 1 & 5000 HP x 1	3800 HP x 1 & 5000 HP x 1
200,000 d/w tonner	3800 HP/5000 HP x 4	3800 HP/5000 HP x 3
250,000 d/w tonner	3800 HP/5000 HP x 4	3800 HP/5000 HP x 3

K A K O G A W A
(Befu Port)



LOCATION:
Latitude N. 34° 42' Longitude E. 134° 51'

HARBOUR PROTECTION:
Breakwater

BOTTOM:
Mud

MINIMUM DEPTH OF WATER AT EXTREME LOW WATER (SPRING TIDE):
At anchorage: 17 m
In the passage: 15 m

PARTICULARS OF EACH WHARF:

NAME OF BERTH:	WHARF LENGTH:	MINIMUM DEPTH:	SHORE FACILITIES:
Kobe Steel Mill East Wharf "E - 4"	400 m	17 m	1x15,000 t/h Max. outreach: 33 m Max. height: 30 m 1x700 t/h Max. outreach: 28.5 m Max. height: 27 m
"E - 3"	300 m	14.5 m	
"E - 2"	200 m	14.0 m	

NUMBER OF BUOYS AND MOORING CAPACITY OF EACH:
None

PORT IMPROVEMENT PLAN:

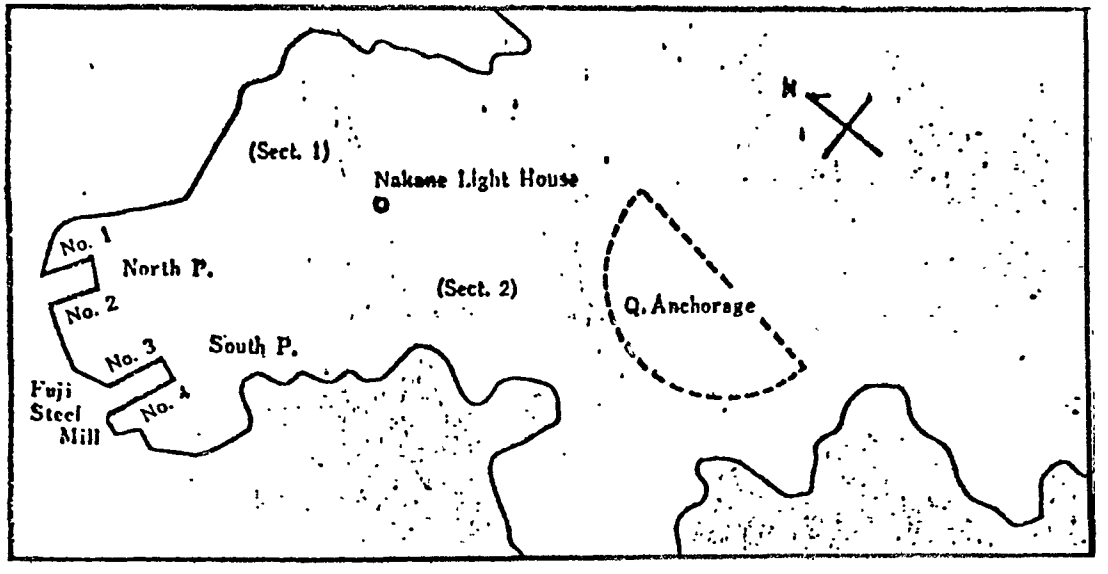
The port is still under construction.
The bottom of sea is now being dredged:
Until February 1971, Max. permissible draft 17 m.

The width of shipping lane is expected to be expanded from 300 m to 400 m.

An additional shore care with a lifting capacity of 2,000 t/h is now scheduled to be installed with completion expected in February 1971.

The particulars of the South and West wharves are still not known.

K A M A I S H I



LOCATION:
Latitude N. 39° 17' Longitude E. 041° 54'

HARBOUR PROTECTION:
Natural

BOTTOM:
Mud and sand

MINIMUM DEPTH OF WATER AT EXTREME LOW WATER (SPRING TIDE):
In the passages: 10-14 m
At anchorage: 31-43 m at Quarantine Anchorage & 20-27 m at discharging anchorage.

PARTICULARS OF EACH WHARF:

NAME OF WHARF:	WHARF LENGTH:	MINIMUM DEPTH:	BERTHING CAPACITY:	DISCHARGING FACILITIES:
Berth No. 3 (Iron Ore)	368 m	8.6 m at Low tide	One 10,000 G/T	Three 7-ton Gantry Cranes & belt conveyer 200-350 tons per hour
Berth No. 4 (Coal)	368 m	8.6 m at Low tide	One 10,000 G/T	Three 7-ton Gantry Cranes one luffing crane 350-400 tons per hour

Scrap, pig iron and manganese ore are mostly discharged at anchorage.

AVERAGE RATE OF LOADING:
Steel: 1,500/2,000 tons per day
(Usually 2 gangs only)

AVERAGE RATE OF DISCHARGE:

Coal:	5,500/6,500 tons per day from bulk carriers.
	3,000 tons per day from conventional vessels.
Iron Ore:	6,500/7,000 tons (dust ore) per day from bulk carriers.
	5,000/5,500 tons (lump ore) per day from conventional vessels.
M. Ore:	1,000/500 tons per day.
Scrap:	600/800 tons per day. Mostly effected at anchorage.
Pig Iron:	1,000/1,500 tons per day.

(Discharging ex gearless vessel is not possible at anchorage)

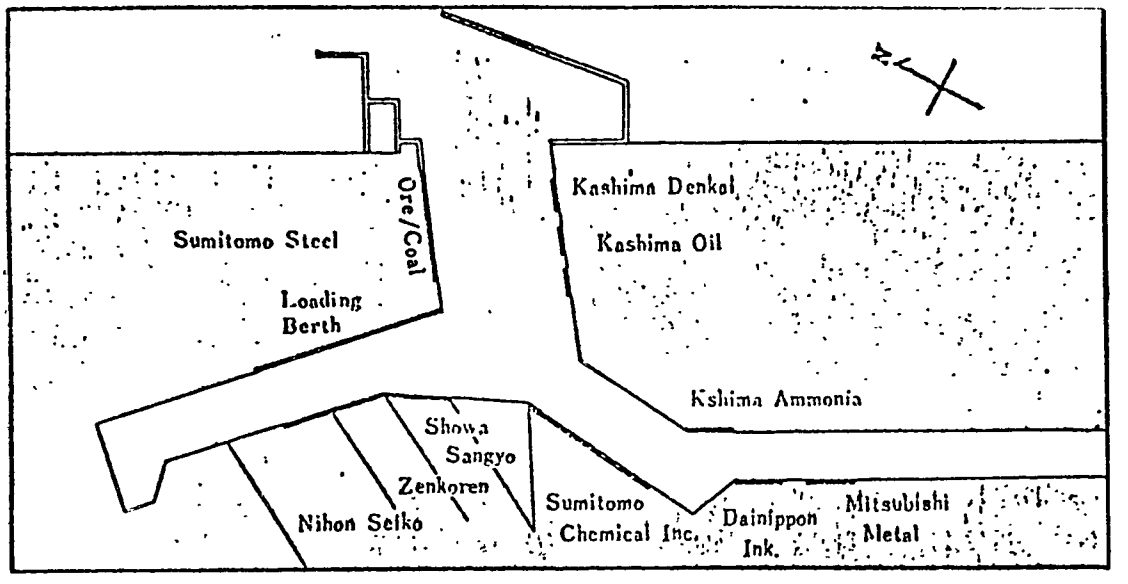
NUMBER OF BUOYS AND MOORING CAPACITY OF EACH:

None

PORT IMPROVEMENT PLANS (EXPANSION PLANS):

Steel Mill plans to dredge up to 14 meters alongside berth with completion expected in 1971.

K A S H I M A



LOCATION:
Latitude N. 35° 55' Longitude E. 140° 42'

HARBOUR PROTECTION:
Breakwater

BOTTOM:
Sand mixed with mud

MINIMUM DEPTH OF WATER AT EXTREME LOW WATER (SPRING TIDE):
At anchorage: Min. 20 m
In the passage: 17 m

PARTICULARS OF EACH WHARF:

NAME OF BERTH:	BERTH LENGTH:	BERTH DEPTH:	SHORE FACILITIES:
Sumitomo Steel Mill Loading Steel Products	400 m	16 m	3x27 T Level Luffing Cranes

The berth extension construction is now being carried out with completion expected shortly. Upon completion, the total length will be 828 meters, of which 400 meters will be temporarily used for loading of Steel Products and 428 meters for discharging of Ore/Coal.

Ore/Coal berth	428 m	16 m	1x850 t/h Max. outreach: 27 m Max. height: 20 m 1x2,000 t/h Max. outreach: 35.5 m Max. height: 20 m
Kashima Denkai Co.'s berth Salt	230 m	16 m	1x800 t/h

NUMBER OF BUOYS:
None

PORT IMPROVEMENT PLAN:
This port is still under construction with expected completion in 1975. Upon completion, the fairway will be opened in a "Y" shape and berths constructed along the fairway. At present, the Center Fairway is opened. Upon completion of the project, berths for ocean-going vessels will be as follows:

NAME OF BERTH:	BERTH LENGTH:	BERTH DEPTH:	MOORING CAPACITY:
Sumitomo Steel Mill			
Ore/Coal	1,000 m	16 m	3x100,000 TDW
Steel products	1,040 m	12 m	3x30,000 TDW
Kashima Denkai Co.			
Asahi Glas Co.			
Salt	300 m	16 m	1x70,000 TDW
Kashima Sekiyu (Oil) Co.	390 m	16 m	1x100,000 TDW
	340 m	14 m	1x70,000 TDW
Kashima Ammonia Co.			
Urea	200 m	12 m	1x20,000 TDW
Mitsubishi Metal Ind., Co.			
Non-ferrous metals	250 m	10 m	1x20,000 TDW
Dainippon Ink Chemical Co.			
Chemical products	300 m	10 m	1x20,000 TDW
Sumitomo Chemical Ind., Co.			
Chemical products	185 m	10 m	1x20,000 TDW
	120 m	10 m	1x10,000 TDW
Showa Sangyo			
Grain	360 m	13 m	1x6/70,000 TDW
Zenkoren			
Grain	300 m	13 m	1x5/60,000 TDW
Nihon Seiko-sho	250 m	12 m	1x20,000 TDW

TANKER BERTH INFORMATION:

KASHIMA SEKIYU CO., LTD., KASHIMA

70,000 D/W BERTH

Depth of water (approach):	16.00 meters at high tide.
Maximum permissible draft:	10.80 meters irrespective of tide.
Length of berth:	Dolphins.
Restriction on LOA:	340 meters.
Berthing capacity:	70,000 TDW.
Number/size of manifold:	10" x 3-for discharging of crude oil.
Discharging capacity:	3,000 k/liters per hour.
Estimated back-pressure:	__kg/cm^2.

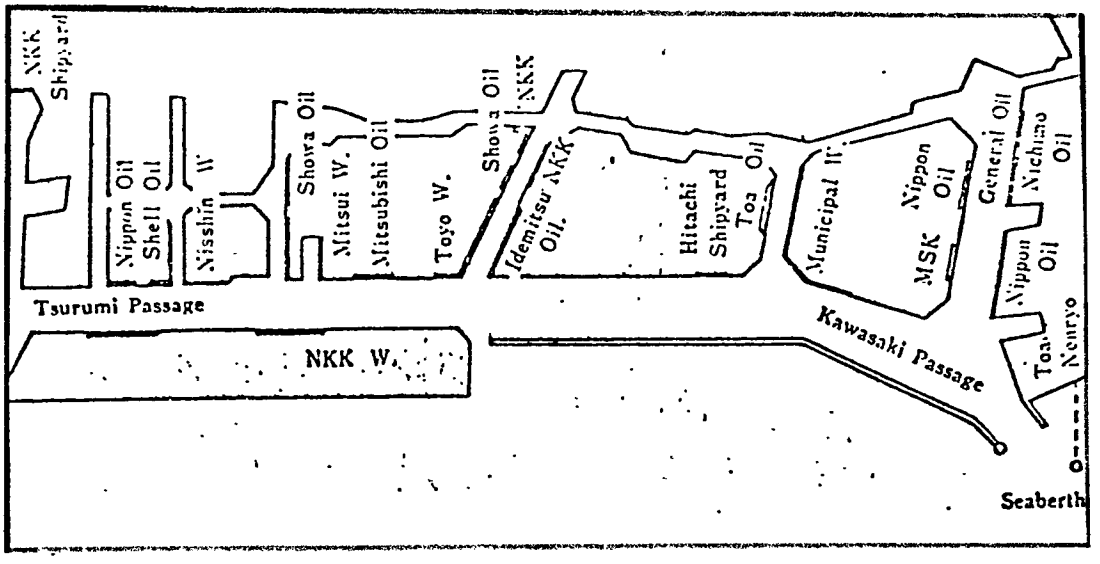
100,000 D/W BERTH

Depth of water (approach):	16.00 meters at high tide.
Depth of water (alongside):	16.00 meters at high tide.
Maximum permissible draft:	10.80 meters irrespective of tide.
Length of berth:	Dolphins.
Restriction on LOA:	390 meters.
Berthing capacity(max.):	100,000 TDW.
Number/size of manifold:	12" x 3-for discharging of crude oil.
Estimated back-pressure:	__kg/cm^2.

TUGBOATS: Pilot requires tugboats as follows:

	FOR MOORING:	FOR UNMOORING:
Up to 50,000 d/w tonner	3 tugboats-total 5,000 HP	3 tugboats-total 5,000 HP
70,000 d/w tonner	4 tugboats-total 6,000 HP	4 tugboats-total 6,000 HP
100,000 d/w tonner	5 tugboats-total 8,000 HP	5 tugboats-total 8,000 HP

K A W A S A K I



LOCATION:
Latitude N. 35° 24' Longitude E. 139° 46'

HARBOUR PROTECTION:
Breakwater

BOTTOM:
Sand and Clay

MINIMUM DEPTH OF WATER AT EXTREME LOW WATER (SPRING TIDE):
In the passages: 9-12 m
At anchorage: 7.3-18 m

PARTICULARS OF EACH WHARF:

NAME OF BERTH:	WHARF LENGTH:	MINIMUM DEPTH:	MAX. DRAFT (HIGH TIDE):	SHORE FACILITY:
PUBLIC BERTH				
City Wharf No. 1	120 m	7.3 m	7.3 m	
No. 2	170 m	9.0 m	9.0 m	
No. 3	190 m	10.0 m	10.0 m	
No. 4	180 m	10.0 m	10.0 m	
No. 5	180 m	10.0 m	10.0 m	
No. 6	180 m	10.0 m	10.0 m	
Nisshin Flour Mill Berth	202 m	10.0 m	10.0 m	2 suckers with a capacity of 100/120 t/h each
Mitsui Pier	330 m	9.5 m	8.4 m	
Mitsui Pier Coal Berth	389 m	10.0 m	9.0 m	Three 5-ton gantry cranes (max. outreach: 22.3 m) 200 t/h each

NAME OF BERTH:	WHARF LENGTH:	MINIMUM DEPTH:	MAX. DRAFT (HIGH TIDE):	SHORE FACILITY:
Toyo Wharf				
Coal Berth	360 m	11.0 m	10.5 m	Two 1-ton gantry cranes (max. outreach: 27.0 m) (max. height: 11.0 m) Total max. 1,000 t/h
Grain Berth	260 m	10.0 m	10.0 m	Ship's gear used
Nippon Kokan Steel Mill				
Ogishima	320 m	13.0 m	12.5 m	
Ogishima	447 m	9.5 m	9.3 m	
Oshima	263 m	9.5 m	9.5 m	Three 3-ton gantry cranes, 100 tons t/h each
Tokyo Electric Berth	300 m	10.0 m	10.0 m	

NUMBER OF BUOYS AND MOORING CAPACITY OF EACH:
One buoy for 8,000 G/T Depth: 8.5 m

PORT IMPROVEMENT PLANS (EXPANSION PLANS):
Nippon Kokan Steel Mill now plans to improve Ogishima Berth in order to accommodate 200,000 TDW with completion expected in 1974.

TANKER BERTH INFORMATION:

BRIDGESTONE GAS CO., LTD.

BRIDGESTONE GAS, KAWASAKI

Depth of water (approach):	12.00 meters at low tide.
Depth of water (alongside):	11.00 meters at low tide.
Max. permissible draft:	10.70 meters at low tide.
Length of berth:	76 meters (Dolphin).
Restriction on LOA:	200 meters.
Berthing capacity:	26,100 GRT.
Number/size of manifold:	12" x11-for discharging of Butane. 12" x 1-for discharging of Propane. 8" x 1-Vapour line.
Discharging capacity:	400 k/liters per hour.
Estimated back-pressure:	7 kg/cm^2 (max.)-vapor pressure 100 mm (water)

TUGBOATS: Pilot requires tugboats as follows:

2,300 HP or 3,000 HP x 2 for mooring and unmooring.

DAITO TSUSHO KAISHA, LTD.

CITY WHARF No. 3

Depth of water (approach/alongside):	10.00 meters at low tide.
Max. permissible draft:	9.50 meters at low tide.

Length of berth:	170 meters.
Restriction on LOA:	250 meters.
Berthing capacity:	15,000 GRT.
Number/size of manifold:	8" x 1-for discharging of fuel oil.
Discharging capacity:	900 k/liters per hour.
Estimated back-pressure:	5 kg/cm^2.

TUGBOATS: Pilot requires tugboats as follows:

1,200 HP or 1,800 HP x 2 for mooring and unmooring.

GENERAL SEKIYU SEISEI K. K.

GSSK BERTH

Depth of water (approach/alongside):	12.00 meters at low tide.
Max. permissible draft:	12.00 meters at high tide.
Length of berth:	
Restriction on LOA:	246 meters.
Berthing capacity (max.):	70,000 TDW.
Number/size of manifold:	12" x 2-for discharging of crude oil. 8" x 1-for discharging of fuel oil. 6" x 1-for discharging of Lub. oil. 12" x 1-for L.P.G.
Discharging capacity:	3,800 k/liters per hour for crude oil. 400 k/liters per hour for fuel oil. 200 k/liters per hour for Lub. oil. 150 k/liters per hour for L.P.G.
Estimated back-pressure:	9 kg/cm^2.

TUGBOATS: Pilot requires tugboats as follows:

1,500 HP or 2,000 HP x 2 for mooring and unmooring.

IDEMITSU KOSAN CO., LTD., KAWASAKI

IDEMITSU No. 1 PIER

Depth of water (approach/alongside):	9.45 meters at low tide.
Max. permissible draft:	9.20 meters at low tide.
Length of berth:	
Restriction on LOA:	250 meters.
Berthing capacity (max.):	46,000 TDW.
Number/size of manifold:	8" x 1-for discharging of fuel oil. 6" x 1-for discharging of Mineral seal oil. 8" x 1-for discharging of Lub. oil. 6" x 1-for discharging of Lub. oil.
Estimated back-pressure:	4 kg/cm^2.

TUGBOATS: Pilot requires tugboats as follows:

1,200 HP or 2,000 HP x 2 for mooring and unmooring.

KEIHIN KAWASAKI SEABERTH, KAWASAKI

KEIHIN KAWASAKI SEABERTH

Location:	35° 27' 83" N. & 139° 46' 27" E.
Depth of water (approach/alongside):	23.00 meters at low tide.
Max. permissible draft:	20.00 meters at low tide.
Length of seaberth:	
Restriction on LOA:	320 meters.
Berthing capacity:	250,000 TDW.
Number/size of manifold:	16" x 2-for discharging crude oil.
Discharging capacity:	10,000 k/liters per hour.
Estimated back-pressure:	13 kg/cm^2.

TUGBOATS: Pilot requires tugboats as follows:

2,500 HP or 3,000 HP x 2 for mooring and unmooring.

Remarks: The seaberth is jointly used by Mitsubishi Oil & Shell Sekiyu.

MITSUBISHI SHOJI KAISHA LTD., KAWASAKI

MSK BERTH KAWASAKI

Depth of water (approach/alongside):	12.00 meters at low tide.
Max. permissible draft:	11.50 meters at high tide.
Length of berth:	
Restriction on LOA:	226 meters.
Berthing capacity:	50,000 TDW.

MANIFOLD:	CARGO:	DISCHARGING CAPACITY (p/hr):	ESTIMATED BACK-PRESSURE:
8" x 2	Crude oil	1,000 k/liters	6 kg/cm^2
8" x 3	Fuel oil	800 k/liters	6 kg/cm^2
6" x 10	Chemical products & Lub. Oil	80/150 k/liters	4 kg/cm^2

TUGBOATS: Pilot requires tugboats as follows:

1,500 HP or 2,000 HP x 2 for mooring and unmooring.

MITSUBISHI OIL CO., LTD., KAWASAKI REFINERY

MITSUBISHI OIL BERTH

Location:	35° 29' 36" N. & 139° 43' 48" E.
Depth of water (approach/alongside):	12.00 meters at low tide.

Max. permissible draft:	11.70 meters at high tide.
Length of berth:	
Restriction on LOA:	250 meters.
Berthing capacity:	78,000 TDW.
Number/size of manifold:	12" x 2-for discharging of crude oil. 12" x 1-for discharging of fuel oil. 8" x 1-for discharging of fuel oil.
Discharging capacity:	4,500 k/liters per hour for crude oil. 700-1,200 k/liters per hour for fuel oil.
Estimated back-pressure:	7 kg/cm^2.

TUGBOATS: Pilot requires tugboats as follows:

1,500 HP or 2,000 HP x 2 for mooring and unmooring.

NIPPON PETROLEUM CHEMICAL CO., LTD., CHIDORICHO

N.P.C. CHIDORICHO BERTH

Depth of water (approach):	7.00 meters at low tide.
Depth of water (alongside):	6.50 meters at low tide.
Max. permissible draft:	6.30 meters at low tide.
Length of berth:	
Restriction on LOA:	111 meters.
Berthing capacity:	5,000 TDW.
Number/size of manifold:	6" x 1-for loading of Butadiene. 4" x 1-for Vapour line.
Loading capacity:	70 k/liters per hour.
Estimated back-pressure:	Not available.

TUGBOATS: Pilot requires tugboats as follows:

1,200 HP or 1,500 HP x 2 for mooring and unmooring.

NIPPON PETROLEUM GAS K.K., KAWASAKI

NP. GAS KAWASAKI TERMINAL

Depth of water (approach):	13.00 meters at low tide.
Depth of water (alongside):	13.20 meters at low tide.
Max. permissible draft allowed:	12.00 meters at low tide.
Length of berth:	
Restriction on LOA:	250 meters.
Berthing capacity:	23,000 TDW.
Number/size of manifold:	12" x 1-for discharging of Propane. 12" x 1-for Vapour line. 6" x 1-for discharging of Naptha.
Discharging/loading capacity:	1,200 k/liters per hour for Propane. 100 k/liters per hour for Butane. k/liters per hour for Naptha.
Estimated back-pressure:	7 kg/cm^2.

TUGBOATS: Pilot requires tugboats as follows:

1,500 HP or 2,000 HP x 2 for mooring and unmooring.

NISSHO-IWAI CO., LTD., KAWASAKI

NISSHO-IWAI MAIN PIER

Depth of water (approach):	12.00 meters at low tide.
Depth of water (alongside):	12.00 meters at low tide.
Max. permissible draft:	12.00 meters at high tide.
Length of berth:	
Restriction on LOA:	240 meters.
Berthing capacity:	60,000 TDW.
Number/size of manifold:	6" x 2-for discharging of A-fuel oil. 10" x 2-for discharging of A-fuel oil. 6" x 2-for discharging of C-fuel oil. 10" x 2-for discharging of C-fuel oil. 6" x 1-for discharging of propane/Butane. 4" x 1-Vapour line.
Discharging capacity:	600-1,500 k/liters per hour for A-fuel oil. 600-1,500 k/liters per hour for C-fuel oil. 100 k/liters per hour for Propane/Butane.
Estimated back-pressure:	7 kg/cm^2.

TUGBOATS: Pilot requires tugboats as follows:

1,500 HP or 2,000 HP x 2 for mooring and unmooring.

SHOWA OIL CO., LTD., KAWASAKI REFINERY

SHOWA OIL BERTH

Depth of water (approach):	9.40 meters at low tide.
Depth of water (alongside):	9.40 meters at low tide.
Max. permissible draft:	9.00 meters at low tide.
Length of berth:	
Restriction on LOA:	177 meters.
Berthing capacity:	21,000 TDW.
Number/size of manifold:	8" x 1-for discharging of crude oil.
Discharging capacity:	900 k/liters per hour.
Estimated back-pressure:	5 kg/cm^2.

TUGBOATS: Pilot requires tugboats as follows:

1,000 HP or 1,500 HP x 2 for mooring and unmooring.

TOA OIL CO., LTD., KAWASAKI

TOA OIL BERTH

Depth of water (approach):	12.00 meters at low tide.
Depth of water (alongside):	12.00 meters at low tide.

Max. permissible draft:	12.00 meters at high tide.
Length of berth:	
Restriction on LOA:	225 meters.
Berthing capacity:	50,000 TDW.
Number/size of manifold:	10" x 3-discharging of crude oil. 8" x 1-discharging of fuel oil.
Discharging capacity:	1,000-1/200 k/liters per hour for crude oil. 800 k/liters per hour for fuel oil.
Estimated back-pressure:	4 kg/cm^2.

TUGBOATS: Pilot requires tugboats as follows:

1,200 HP or 1,500 HP x 2 for mooring and unmooring.

TOA NENRYO KOGYO K.K., KAWASAKI

TONEN No. 1 PIER

Depth of water (approach):	12.00 meters at low tide.
Depth of water (alongside):	12.00 meters at low tide.
Max. permissible draft:	12.00 meters at high tide.
Length of berth:	
Restriction on LOA:	250 meters.
Berthing capacity:	50,000 TDW.
Number/size of manifold:	12" x 2-for discharging of crude oil. 8" x 1-for discharging of Naptha. 8" x 1-for loading of Butadiene. 6" x 1-Vapour line.
Discharging capacity:	4,500 k/liters per hour for crude oil. 400 k/liters per hour for Naptha. 70 k/liters per hour for Butadiene, (loading).
Estimated back-pressure:	10.5 kg/cm^2.

TUGBOATS: Pilot requires tugboats as follows:

1,800 HP or 2,000 HP x 2 for mooring and unmooring.

NIPPON MINING CO., LTD., KAWASAKI TERMINAL

NIPPON MINING No. 1 PIER

Depth of water (approach):	10.50 meters at low tide.
Depth of water (alongside):	12.00 meters at low tide.
Max. permissible draft:	10.50 meters at high tide.
Length of berth:	
Restriction on LOA:	226 meters.
Berthing capacity:	46,000 TDW.
Number/size of manifold:	10" x 3-for discharging of fuel oil. 8" x 2-ditto. 6" x 1-ditto
Discharging capacity:	1,000 k/liters per hour for 10". 800 k/liters per hour for 8". 350 k/liters per hour for 6".

Estimated back-pressure: 5-6 kg/cm^2.

TUGBOATS: A pilot requires tugboats as follows:

1,200 HP or 1,800 HP x 2 for mooring and unmooring.

Remarks: The berth is jointly used by the Kyodo Sekiyu Co., Ltd , and the Toa Oil Co., Ltd., respectively.

TOA NENRYO KOGYO K.K., KAWASAKI

TONEN SEA-BERTH

Location:	35° 30' 22" N. & 139° 47' 35" E.
Depth of water (approach/alongside):	17.00 meters at low tide.
Max. permissible draft:	17.00 meters at high tide.
Length of berth:	-sea-berth-
Restriction on LOA:	300 meters.
Berthing capacity:	150,000 TDW.
Number/size of manifold:	12" x 3-for discharging of crude oil.
Discharging capacity:	7,000 k/liters per hour.
Estimated back-pressure:	13 kg/cm^2.

TUGBOATS: A pilot requires tugboats as follows:

1,500 HP or 2,500 HP x 3 for mooring.
1,300 HP or 2,000 HP x 2 for unmooring.

TOA NENRYO KOGYO K.K., KAWASAKI

TONEN No. 2 SEA-BERTH

Location:	35° 28' 58" N. & 139° 47' 21" E.
Depth of water (approach/alongside):	26.00 meters at low tide.
Max. permissible draft:	24.00 meters at low tide.
Length of berth:	-sea-berth-
Restriction on LOA:	300 meters.
Berthing capacity:	250,000 TDW.
Number/size of manifold:	16" x 4-for discharging of crude oil.
Estimated back-pressure:	__ kg/cm^2.

TUGBOATS: Pilot requires tugboats as follows:

	FOR MOORING:	FOR UNMOORING:
Up to 100,000 d/w tonner	2500/3600 HP x 3/4	2500/3600 HP x 2
150,000 d/w tonner	2500/3600 HP x 4/5	2500/3600 HP x 2
200,000 d/w tonner	2500/3600 HP x 5/6	2500/3600 HP x 3
250,000 d/w tonner	2500/3600 HP x 5/7	2500/3600 HP x 3/4

Remarks:	No harbour configuration sketch available.
Geographical location:	34° 02' N. & 132° 50' E.
Harbour protection:	Natural
Bottom:	Rock and sand.

TAIYO OIL CO., LTD., KIKUMA

OIL BERTH (BUOY BERTH)

Depth of water (approach/alongside):	16.00 meters at low tide.
Maximum permissible draft:	16.00 meters at high tide.
Length between buoys:	380 meters
Restriction on LOA:	200 meters
Berthing capacity (max.):	40,000 TDW.
Buoy & mooring capacity:	4 buoys.
Number/size of manifold:	10" x 2.
Discharging capacity:	1,000 K/liters per hour.
Estimated back-pressure:	5 kg/cm^2.

NEW BERTH

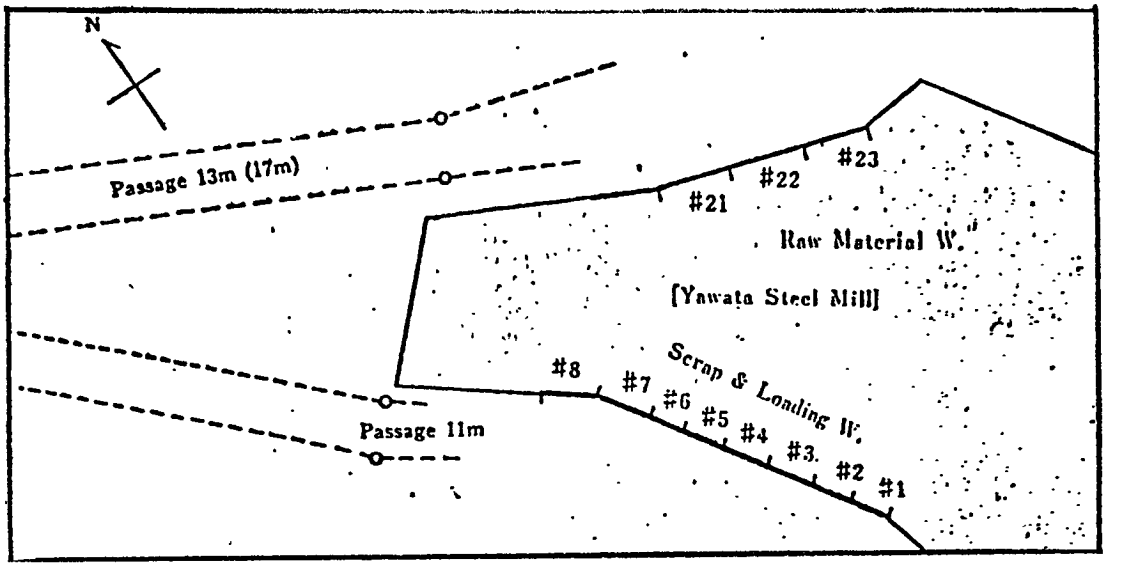
Depth of water (approach/alongside):	30.00 meters at low tide.
Maximum permissible draft:	30.00 meters at high tide.
Length between buoys:	410 meters.
Restriction on LOA:	300 meters.
Berthing capacity (max.):	100,000 TDW.
Buoy & mooring capacity:	5 buoys.
Number/size of manifold:	12" x 2.
Discharging capacity:	3,500 k/liters per hour.
Estimated back-pressure:	5 k/cm^2.

TUGBOATS: Pilot requires tugboats as follows:

	FOR MOORING:	FOR UNMOORING:
Up to 30,000 d/w	1500 HP x 2	1500 HP x 2
40,000 d/w	2000 HP x 2	2000 HP x 2
50,000 d/w	2000 HP x 1 & 3000 HP x 1	2000 HP x 1 & 3000 HP x 1
60,000 d/w	2000 HP x 3	2500 HP & 3000 HP x 1
70,000 d/w	2000 HP x 2 & 3000 HP x 1	3000 HP x 2
80,000 d/w	3000 HP x 3	3000 HP x 2
90,000 d/w	3000 HP x 3	3000 HP X 2
100,000 d/w	3000 HP x 3	3000 HP x 2

Remarks: As the port of Kikuma is a closed port, vessel to obtain custom clearance at Matsuyama before proceeding to Kikuma.

K I M I T S U



LOCATION:
Latitude N. 35° 21' Longitude E. 139° 52'

HARBOUR PROTECTION:
None

BOTTOM:
Mud

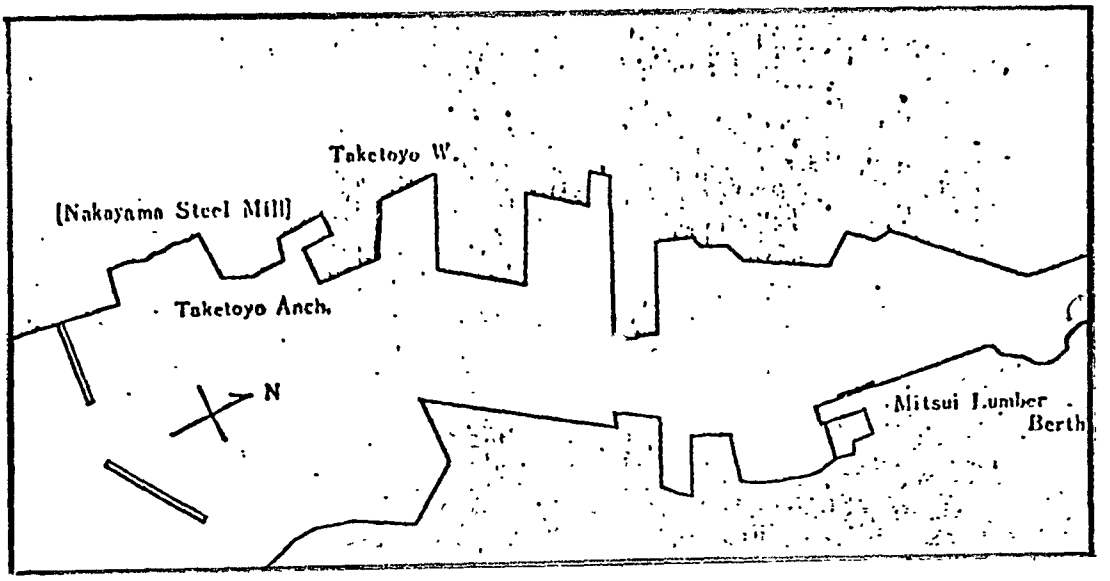
MINIMUM DEPTH AT EXTREME LOW TIDE:
In the passage: 17 m
At anchorage: Min. 17 m

PARTICULARS OF EACH BERTH: (Except berths for coaster)

NAME OF BERTH:	BERTH LENGTH:	BERTH DEPTH:	SHORE FACILITIES:
Coal/Ore			
No. 21	356 m	17 m	2x1,700 T/H Max. outreach: 29 m Max. height: 23 m
No. 22	304 m	7 m	2x1,500 T/H Max. outreach: 29 m Max. height: 23 m
(Above on an extension line)			
Loading of Steel Products			
No. 4	100 m	11 m	1x27 T
No. 5	100 m	11 m	1x20 T
No. 6	100 m	11 m	1x25 T
Loading of Steel products and Discharging Scrap & Pig Iron			
No. 7	240 m	11 m	1x25 T
No. 8	300 m	11 m	1x40 T
(Above on an extension line)			

NUMBER OF BUOYS:
None

K I N U U R A



LOCATION:
Latitude N. 34° 51' Longitude E. 136° 57'

HARBOUR PROTECTION:
None

BOTTOM:
Mud

MINIMUM DEPTH OF WATER AT EXTREME LOW WATER (SPRING TIDE):
In the passage: Open bay (10 m). There is a shallow spot of 8.5 meters and consequently a vessel with draft exceeding 8.5 meters is only allowed to pass at high tide.

At anchorage: 10 m

PARTICULARS OF EACH WHARF:

NAME OF WHARF:	WHARF LENGTH:	MINIMUM DEPTH: APPROACH ALONGSIDE:	BERTHING CAPACITY:
Taketoyo Public Pier	250 m	7.5 m	Two 5,000 T
Mitsui Lumber Berth	150 m	10.0 m	Max. LOA 170 m

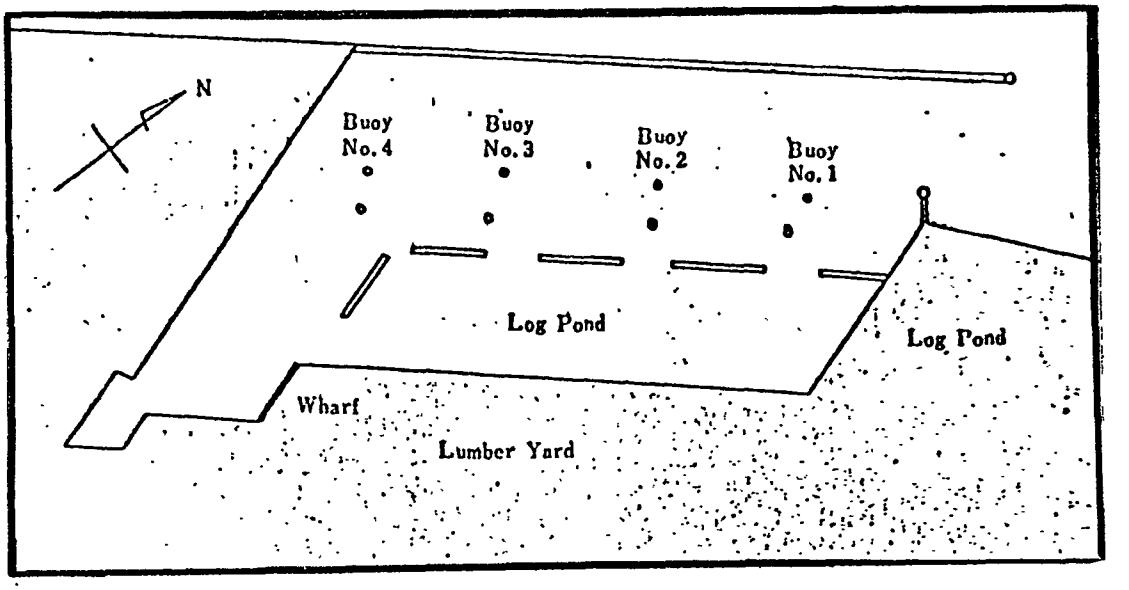
AVERAGE RATE OF DISCHARGING:

Scrap	Grade No. 1	120 tons	per day	per gang
Scrap	Grade No. 2	80 tons	per day	per gang
Scrap	Bundles	180 tons	per day	per gang
Maize in bulks		500 tons	per day	per gang
Maize in bags		500 tons	per day	per gang
Pig Iron		400-500 tons	per day	per gang
Logs into sea		150,000 B.M.	per day	per gang

NUMBER OF BUOYS AND MOORING CAPACITY OF EACH:

Not available. Vessel allowed to discharge at anchorage.

K I S H I W A D A



LOCATION:
Latitude N. 24° 27' 35" Longitude E. 135° 22' 10"

HARBOUR PROTECTION:
Breakwater

BOTTOM:
Mud

MINIMUM DEPTH OF WATER AT EXTREME LOW WATER (SPRING TIDE):
11 m

PARTICULARS OF EACH WHARF:

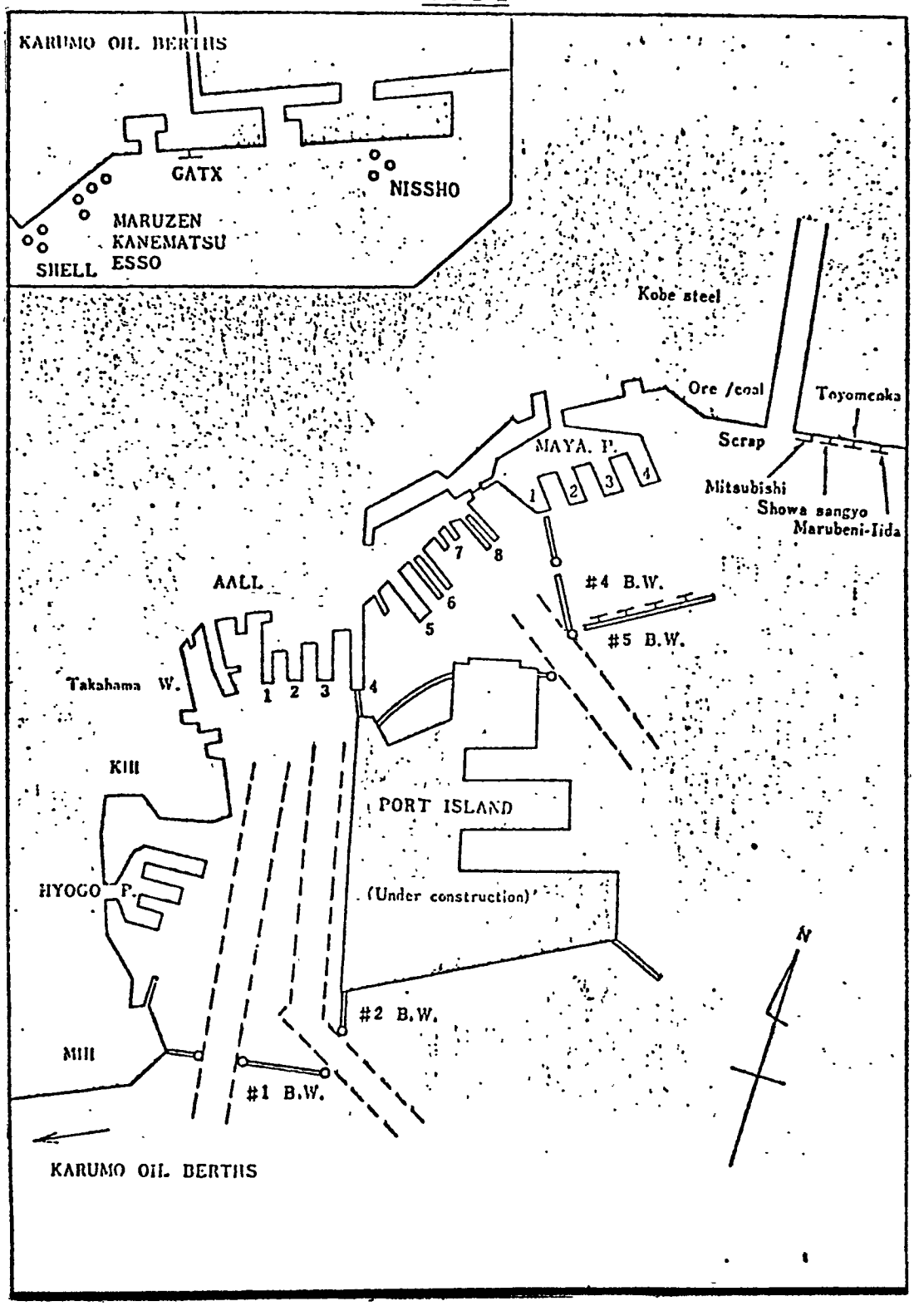
NAME OF WHARF:	WHARF LENGTH:	MINIMUM DEPTH:	BERTHING CAPACITY:	FACILITIES:
	213 m	-10 m	Max. LOA 180 m	NIL

AVERAGE RATE OF DISCHARGE:
2,000 tons of 480 B.M. per day with 5 gangs. (Max. available gangs: 5 gangs)

NUMBER OF BUOYS AND MOORING CAPACITY OF EACH:

Buoy No.	Berthing Capacity	Minimum Depth
1 (Double)	LOA 110 m	10 m
2 (Double)	LOA 165 m	10 m
3 (Double)	LOA 150 m	10 m
4 (Double)	LOA 110 m	10 m

K O B E


KARUMO OIL BERTHS
GATX
NISSHO
MARUZEN
KANEMATSU
ESSO
SHELL
Kobe steel
Ore /coal
Toyomenka
Scrap
MAYA. P.
1
2
3
4
Mitsubishi
Showa sangyo
Marubeni-Iida
7
8
AALL
#4 B.W.
6
5
#5 B.W.
Takahama W.
1 2 3
4
KIII
PORT ISLAND
HYOGO P.
(Under construction)
N
#2 B.W.
MIII
#1 B.W.
KARUMO OIL BERTHS

K O B E

LOCATION:
Latitude N. 34° 40' Longitude E. 135° 12'

HARBOUR PROTECTION:
Breakwaters

BOTTOM:
Mud and shells

MINIMUM DEPTH OF WATER AT EXTREME LOW WATER (SPRING TIDE):
In the passage: 9.0-14.0 m
At anchorage: 7.0-11.0 m

PARTICULARS OF EACH WHARF:

NAME OF WHARF:	WHARF LENGTH:	MINIMUM DEPTH:	BERTHING CAPACITY:	DISCHARGING FACILITIES:
Shinko Pier No. 1 (General Cargo)				
West Side	364 m	9.1 m	Two 8,000 G/T	Ship's gear
South Side	102 m	9.1 m	One 3,000 G/T	Ship's gear
East Side	364 m	9.1 m	Two 8,000 G/T	Ship's gear
Shinko Pier No. 2 (General Cargo)				
West Side	364 m	9.1 m	Two 8,000 G/T	Ship's gear
South Side	102 m	9.1 m	One 3,000 G/T	Ship's gear
East Side	364 m	9.1 m	Two 8,000 G/T	Ship's gear
Shinko Pier No. 3 (General Cargo)				
West Side	365 m	9.1 m	Two 8,000 G/T	Ship's gear
South Side	102 m	9.1 m	One 3,000 G/T	Ship's gear
East Side	378 m	10.0-10.9 m	Two 10,000 G/T	Ship's gear
Shinko Pier No. 4 (General Cargo)				
West Side	391 m	10.0-10.9 m	Two 15,000 G/T	Ship's gear
East Side	444 m	10.0-12.0 m	Two 20,000 G/T	Ship's gear
Shinko Pier No. 5 (General Cargo)				
West Side	448 m	10.0-12.0 m	One 23,000 G/T	Ship's gear
			One 15,000 G/T	Ship's gear
East Side	444 m	10.0 m	Two 15,000 G/T	Ship's gear
Shinko Pier No. 6 (General Cargo)				
West Side	440 m	10.0 m	Two 15,000 G/T	Ship's gear
East Side	444 m	10.0 m	Two 15,000 G/T	Ship's gear
Shinko Pier No. 7				
West Side	200 m	10.0 m	One 10,000 G/T	Ship's gear

NAME OF WHARF:	WHARF LENGTH:	MINIMUM DRAFT:	BERTHING CAPACITY:	DISCHARGING FACILITIES:
Shinko Pier No. 7				
East Side (General Cargo)	200 m	10.0 m	One 15,000 G/T	Silo capacity 8,000 tons. Two units Pnuematic unloaders. 130-150 tons per hour per unit.
Shinko Pier No. 8 (General Cargo)				
East Side	400 m	10.0 m	Two 10,000 G/T	Ship's gear
Hyogo Pier No. 1 (General Cargo)				
East Side	638 m	7.2 m	Six 2,000 G/T	Ship's gear
West Side	435 m	7.2-9.0 m	Two 2,000 G/T	Ship's gear
			One 8,000 G/T	Ship's gear
Hyogo Pier No. 2 (General Cargo)				
East Side	434 m	7.2-9.0 m	One 8,000 G/T	Ship's gear
			One 6,000 G/T	Ship's gear
			One 2,000 G/T	Ship's gear
West Side	434 m	7.2-9.0 m	One 8,000 G/T	Ship's gear
			One 6,000 G/T	Ship's gear
			One 2,000 G/T	Ship's gear
Mitsui Pier (General Cargo)				
East Side	186 m	10.0 m	One 10,000 G/T	Ship's gear
West Side	178 m	10.0 m	One 10,000 G/T	Ship's gear
Takahama Wharf (General Cargo)				
Front Side	325 m	8.2 m	Two 8,000 G/T	Ship's gear
West Side	193 m	8.2 m	One 8,000 G/T	Ship's gear
MAYA PIER (NEW YORK LINERS ONLY)				
No. 1 Pier: A.B.C.	588 m	10.0 m	Three 10,000 G/T	
1 Pier: E.D.	400 m	10.0 m	Two 10,000 G/T	
No. 2 Pier: H.G.	400 m	10.0 m	Two 12,000 G/T	
1 Pier: J.I.	400 m	10.0 m	Two 12,000 G/T	
No. 3 Pier: L.K.	400 m	10.0 m	Two 12,000 G/T	
3 Pier: N.M.	400 m	10.0 m	Two 12,000 G/T	
No. 4 Pier: P.O.	400 m	10.0 m	Two 12,000 G/T	
4 Pier: R.Q.	400 m	10.0 m	Two 10,000 G/T	(For container vessels only) (Crane capacity: 25 tons)

NAME OF WHARF:	WHARF LENGTH:	MINIMUM DEPTH:	BERTHING CAPACITY:	DISCHARGING FACILITIES:
Kobe Steel Works Wharf (Ore)				
Main	210 m	9.5 m	One 10,000 G/T	Three 5-ton unloaders 250-300 tons per unit hour
No. 2	236 m	11.0 m	One 30,000 G/T	Three cranes 6,000 tons per day
No. 3	334 m	13.5 m	One 20,000 G/T	

Showa Sangyo Berth (Dolphin Length 213 m)
Approach: Water Depth 11.50 m Max. Draft: 11.30 m
Alongside: 12.50 m
Discharge by two units of pneumatic unloaders, 300 tons per hour per unit
Silo Capacity: 25,000 tons

Toyo Menka Berth (Dolphin Length 212 m)
Approach: Water Depth 11.50 m Max. Draft: 11.30 m
Alongside: 11.50 m
Discharge by three units of pneumatic unloaders, 3,000 tons per hour per unit

NAME OF WHARF:	MOORING SITUATION:	MINIMUM DEPTH:	BERTHING CAPACITY:	DISCHARGING RATE:
Tanker Berth				
Mitsubishi Oil Berth (Mikage) (Chemical & L.P.G. Tanker Only)	Dolphin	10.5 m	25,000 G/T	80-100 M/T per hour
Nissho Berth	450 m offshore Fore: botu anchors Aft: mooring to 2 buoys	10.5 m	One 17,000 G/T	500-600 kl per hour
Shell Sekiyu Berth	500 m offshore Fore: anchor and mooring to buoy Aft: mooring to 2 buoys	9.7 m	One 18,000 G/T	600-700 kl per hour
Kanematsu	500 m offshore	9.7 m	One 40,000 G/T	700-800 kl per hour
Maruzen Oil	300 m between buoys			
Standard Oil	Fore: anchor and mooring buoy Aft: mooring to 2 buoys			
Idemitsu Oil	Mooring to 2 buoys	9.7 m	One 20,000 G/T	700-800 kl per hour
Nisseki Berth	Mooring to 1 buoy	9.7 m	One 15,000 G/T	500 kl per hour

AVERAGE RATE OF DISCHARGE FOR CARGOES HANDLED:

Grain	: 70 tons per gang hour	by ship's gear (120 tons by sucker)
Sugar	: 40 tons per gang hour	by ship's gear
Ore	: 60 tons per gang hour	by ship's gear
Scrap	: 5-20 tons per gang hour	by ship's gear
Lumber	: 18 tons per gang hour	by ship's gear
Log	: 25 tons per gang hour	by ship's gear
Cotton	: 25 tons per gang hour	by ship's gear
General Cargo	25 tons per gang hour	by ship's gear
Coal	: 50 tons per gang hour	by ship's gear

NUMBER OF BUOYS AND MOORING CAPACITY OF EACH:

NAME OF BUOY:	MOORING CAPACITY:	DEPTH:	SHIP'S LENGTH:
No. 1	One 3,500 G/T	8.4 m	100 m
No. 2	One 3,500 G/T	8.4 m	100 m
No. 4	One 5,000 G/T	8.8 m	120 m
No. 5	One 3,500 G/T	9.2 m	140 m
No. 6	One 7,000 G/T	9.7 m	130 m
No. 7	One 10,000 G/T	9.1 m	150 m
No. 8	One 7,000 G/T	9.6 m	150 m
No. 9	One 12,000 G/T	9.6 m	160 m
No. 10	One 15,000 G/T	10.6 m	130 m
No. 11	One 15,000 G/T	9.2 m	160 m
No. 12	One 12,000 G/T	10.1 m	150 m
No. 13	One 25,000 G/T	10.5 m	160 m
No. 14	One 12,000 G/T	9.7 m	160 m
No. 15	One 30,000 G/T	10.3 m	150 m
No. 16	One 30,000 G/T	10.7 m	160 m
No. 17	One 27,000 G/T	10.2 m	200 m
No. 18	One 30,000 G/T	10.7 m	220 m
No. 20	One 7,000 G/T	7.3 m	150 m
Dolphin No. 1	12,000 G/T	10.5 m	165 m
Dolphin No. 2	12,000 G/T	10.5 m	160 m
Kawasaki Jukogyo			
Buoy A	One 7,000 G/T		
Onoba Cement	One 3,000 G/T		
Buoy Onoda			
K. S. Pier			
Buoy No. 19	One 25,000 G/T		
Buoy No. 20	One 12,000 G/T		

PORT IMPROVEMENTS PLANS (EXPANSION PLANS):
PLANNING OF FOREIGN TRADE PUBLIC PIER

FACILITIES AT:	VESSEL'S CAPACITIES:	DEPTH (METERS):	LENGTH (METERS):	NO. OF BERTHS:	REMARKS:
Port Island	15,000 D/W	-10	5,200	26	For liners
Piers	20,000 D/W	-12	1,500	6	For containers
Rokko Piers	15,000 D/W	-10	4,000	24	For liners
Sninko No. 4	50,000 G/T	-12	200	1	For passenger
Pier	20,000 G/T	-12	200	1	For liners
		TOTAL	11,900	53	

Above plans expected to be completed by 1975.

TANKER BERTH INFORMATION

MITSUBISHI SHOJI KAISHA, LTD., KOBE
MSK MIKAGE BERTH

Depth of water (approach/alongside:	11.50 meters at low tide.
Maximum permissible draft:	10.50 meters at low tide.
Length of berth:	83 meters between two dolphins.
Restriction on L.O.A:	230 meters.
Berthing capacity:	50,000 TDW.
Number/size of manifold:	For discharging of chemical products:- 4"x2 6"x2 8"x1 For discharging of fuel oil:- 10"x1 12"x2 For L.P.G. 8"x1 (ASA 150 Lbs) - vapour line 12"x1 (ASA 150 Lbs) - for propane 12"x1 (ASA 150 Lbs) - for butane
Discharging capacity:	150 - 200 k/liters per hour for chemical products. 500 - 800 k/liters per hour for fuel-oil and L.P.G.
Estimated back-pressure:	2 - 4 kg/cm^2 - for chemical products. 3 - 4 kg/cm^2 - for fuel oil and L.P.G.

NISSHO & CO. LTD., KOBE
NISSHO BERTH

Depth of water (approach/alongside):	11.50 meters at low tide.
Maximum permissible draft:	10.50 meters at low tide.
Length of berth:	Buoy berth.
Restriction on L.O.A:	230 meters.

Berthing capacity	45,000 TDW
Buoy & mooring capacity:	Fore: Dropping both anchors. Aft: Mooring to two buoys.
Number/size of manifold:	8"x3
Discharging capacity:	500 - 700 k/liters per hour.
Estimated back-pressure	6 kg/cm^2.

SHELL SEKIYU K.K., KOBE

SHELL SEKIYU BERTH

Depth of water (approach/alongside):	14.00 meters at low tide.
Maximum permissible draft:	15.00 meters at low tide.
Length of berth:	Buoy berth.
Restriction on LOA:	250 meters.
Berthing capacity (max.):	70,000 TDW.
Number/size of manifold:	12"x2
Discharging capacity:	2,400 k/liters per hour.
Estimated back-pressure	5 kg/cm^2.

MARUZEN OIL CO., LTD., KOBE
KANEMATSU-GOSHO LTD., KOBE
STANDARD OIL CO., LTD., KOBE (ESSO)

MKS BERTH

Depth of water (approach/alongside):	12.80 meters at low tide.
Maximum permissible draft:	11.80 meters at low tide.
Length of berth:	Buoy berth.
Restriction on LOA:	220 meters.
Berthing capacity:	40,000 TDW.
Buoy & mooring capacity:	Fore: Dropping anchor and mooring to buoy. Aft: Mooring to two buoys.
Number/size of manifold	10"x1.
Discharging capacity:	500 k/liters per hour.
Estimated back-pressure:	5 - 6 kg/cm^2.

GATX: (GENERAL AMERICAN TRANSPORTATION EXPRESS)

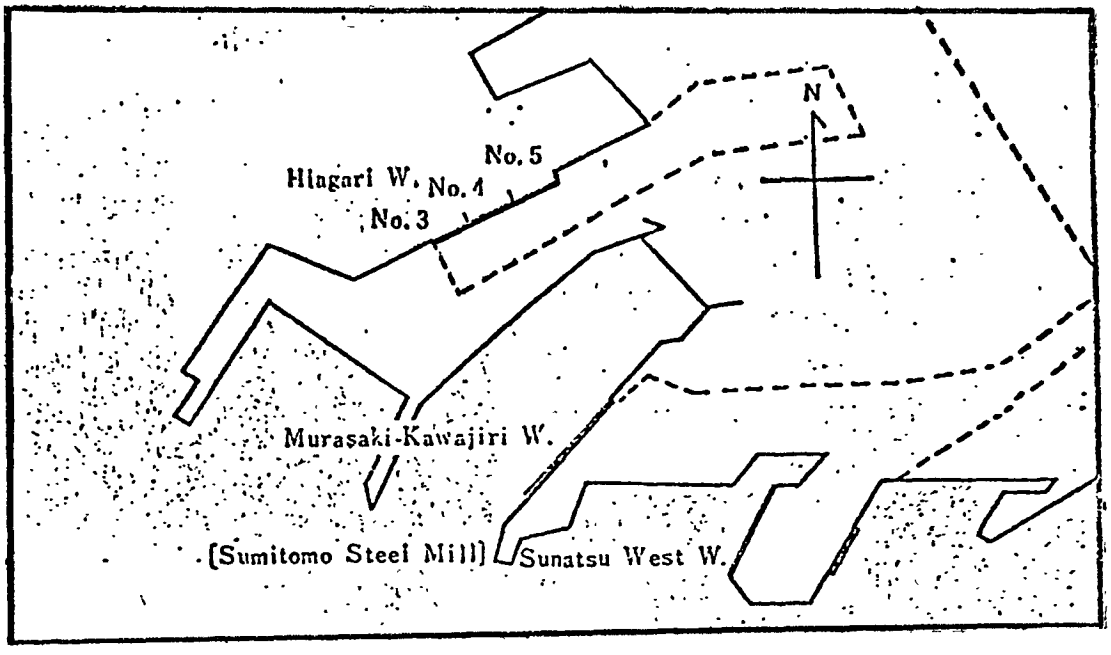
GATX BERTH

Depth of water (approach/alongside):	9.20 meters at low tide.
Maximum permissible draft:	8.20 meters at low tide.
Length of berth:	150 meters.
Restriction on LOA:	180 meters.
Berthing capacity:	20,000 TDW.
Number/size of manifold:	6"x2 - for discharging of semi-dangerous cargo. 6"x1)- for discharging of dangerous/ 4"x3) inflammable cargo.
Estimated back-pressure:	6 kg/cm^2. (max. 10 kg/cm^2)

TUGBOATS: Pilot requires tugboats as follows:-

	FOR MOORING:	FOR UNMOORING:
Up to 10,000 g/t	2000 HP x 2	2000 HP x 2 or 1
15,000 g/t	2000 HP x 2	2000 HP x 2
20,000 g/t	2000 HP x 4	2000 HP x 3 or 2
30,000 g/t	2000 HP x 4	2000 HP x 3 or 2

K O K U R A



LOCATION:
Latitude N. 33°57'00" Longitude E. 130°55'00"

HARBOUR PROTECTION:
Natural

BOTTOM:
Mud and Sand

MINIMUM DEPTH OF WATER AT EXTREME LOW WATER (SPRING TIDE):
In the passage: 9.45 m (9.0 m - 10 m)
At anchorage: 8.20 m - 9.00 m

PARTICULARS OF EACH BERTH:

NAME OF WHARF:	WHARF LENGTH:	MINIMUM DEPTH:	BERTHING CAPACITY:	DISCHARGING FACILITIES:
Sumitomo Kinzoku Sunatsu Wharf (Ore) (Scrap)	(Draft restricted to 8.4 m)	9.0 m	LOA 170 m	Two 5 ton Cranes Ore 100/220 tons per unit hour Scrap 10/20 tons per hour by ship's gear

NAME OF WHARF:	WHARF LENGTH:	MINIMUM DEPTH:	BERTHING CAPACITY:	DISCHARGING FACILITIES:
Sumitomo Kinzoku Murasakigawa Wharf (Coal & Ore)	250 m	11.0 m	LOA 190 m	One 5 ton Crane Coal 150 tons per hour Ore 100/120 tons per hour One 10 ton Crane Coal 250/300 tons per hour Ore 250 tons per hour
KANEMATSU SUNATSU WHARF (Oil)	Dolphin (Draft restricted to 6.5 m)	8.0 m	LOA 170 m	300/500 tons per hour
Hiagari Wharf				
No. 3	195 m	8.0 m	LOA 145 m	None
No. 4	195 m	8.0 m		
No. 5	195 m	8.0 m		
	(Draft restricted to 7.0 m)			

NUMBER OF BUOYS AND MOORING CAPACITY OF EACH:

None

PORT IMPROVEMENT PLANS (EXPANSION PLANS):

New wharf with 7 berths are under construction and will be completed in 1970. Details as follows:
2 berths max. 7.5 m draft
3 berths max. 11.0 m draft
2 berths max. 12.0 m draft

Hiagari No. 1, 2 and No. 6, 7 berths are now under construction with expected completion late in 1970. Particulars as follows:

No. 1 and 2	Length - 330 m.	Depth - 7.5 m.
No. 6 and 7	Length - 445 m.	Depth - 12 m.

TANKER BERTH INFORMATION

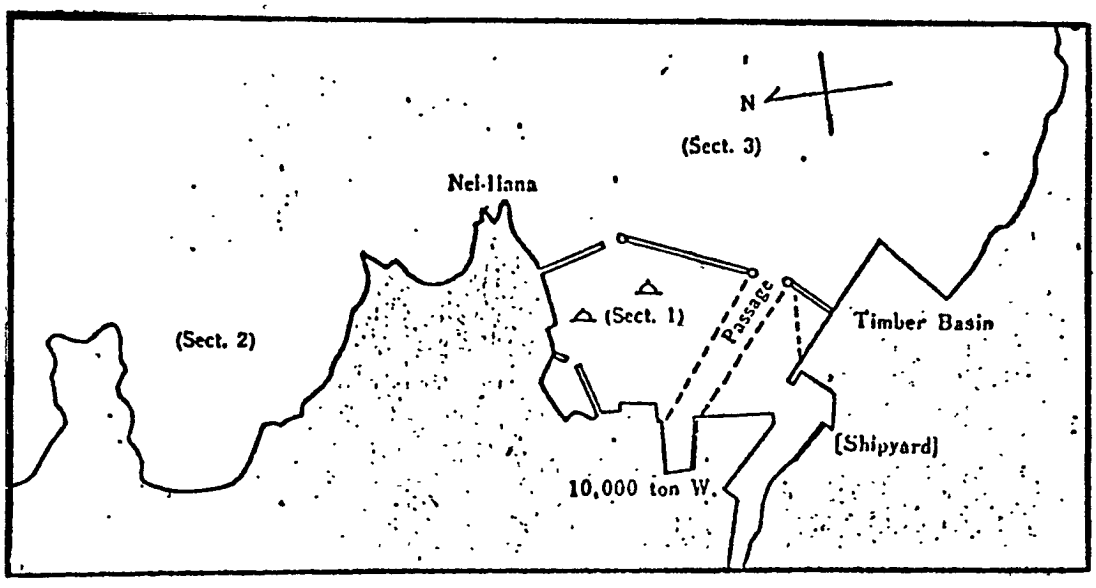
KANEMATSU-GOSHO, LTD., KOKURA
KANEMATSU SUNATSU OIL BERTH

Depth of water (approach):	10.00 meters at low tide.
Depth of water (alongside):	6.60 meters at low tide.
Max. permissible draft:	6.50 meters at high tide.
Length of berth:	Dolphins berth.
Restriction on LOA:	170 meters.
Berthing capacity:	18,000 TDW.
Number/size of manifold:	8"X3 - ASA type.
Discharging capacity:	400 - 800 k/liters per hour.
Estimated back-pressure:	1 - 3 kg/cm^2.

TUGBOATS: Pilot requires tugboats as follows:

	FOR MOORING:	FOR UNMOORING:
Up to 10,000 g/t	2000/3000 HP x 2	2000/3000 HP x 2
15,000 g/t	2000/3000 HP x 2	2000/3000 HP x 2

K O M A T S U J I M A



LOCATION:
Latitude N. 34° 00' Longitude E. 134° 36'

HARBOUR PROTECTION:
Breakwaters

BOTTOM:
Mud and sand

MINIMUM DEPTH OF WATER AT EXTREME LOW WATER (SPRING TIDE):
In the passages: 9.0 m
At anchorage: 6.4 m - 9.0 m

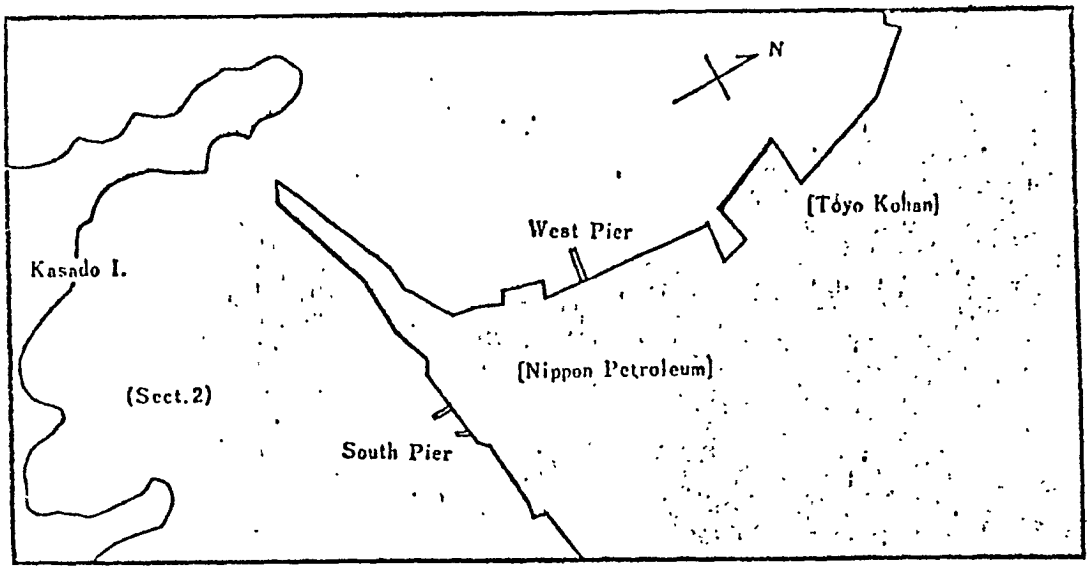
PARTICULARS OF EACH WHARF:

NAME OF WHARF:	WHARF LENGTH:	MINIMUM DEPTH:	BERTHING CAPACITY:	DISCHARGING FACILITIES:
North Pier	230 m	7.0 m	Two 3,000 G/T	Ship's gear
(Generals)				
East Pier	150 m	9.0 m	One 10,000 G/T	Ship's gear
Kanaiso Pier	340 m	10.0 m	Two 10,000 G/T	Ship's gear

AVERAGE RATE OF DISCHARGE:
Salt 460 tons per day gang
Log 200,000 FBM per day gang

NUMBER OF BUOYS AND MOORING CAPACITY OF EACH:
No. 1 - 2 buoys. Max. LOA 130 m. Draft 8.0 m.

KUDAMATSU



LOCATION:
Latitude N. 33°59' Longitude E. 131°52'

HARBOUR PROTECTION:
Natural

BOTTOM:
Soft mud

MINIMUM DEPTH OF WATER AT EXTREME LOW WATER (SPRING TIDE):
In the passages: 20 - 40 m
At anchorage: 14 - 15 m

PARTICULARS OF EACH WHARF:

NAME OF WHARF:	MINIMUM DEPTH ALONGSIDE:	BERTHING CAPACITY:
Toyo Kohan Private Berth	7.5 m	10,000 G/T

TANKER BERTH INFORMATION

NIPPON OIL REFINING CO., LTD., KUDAMATSU
(NIPPON SEKIYU SEISEI K.K., KUDAMATSU)
NISSEKI OIL BERTH

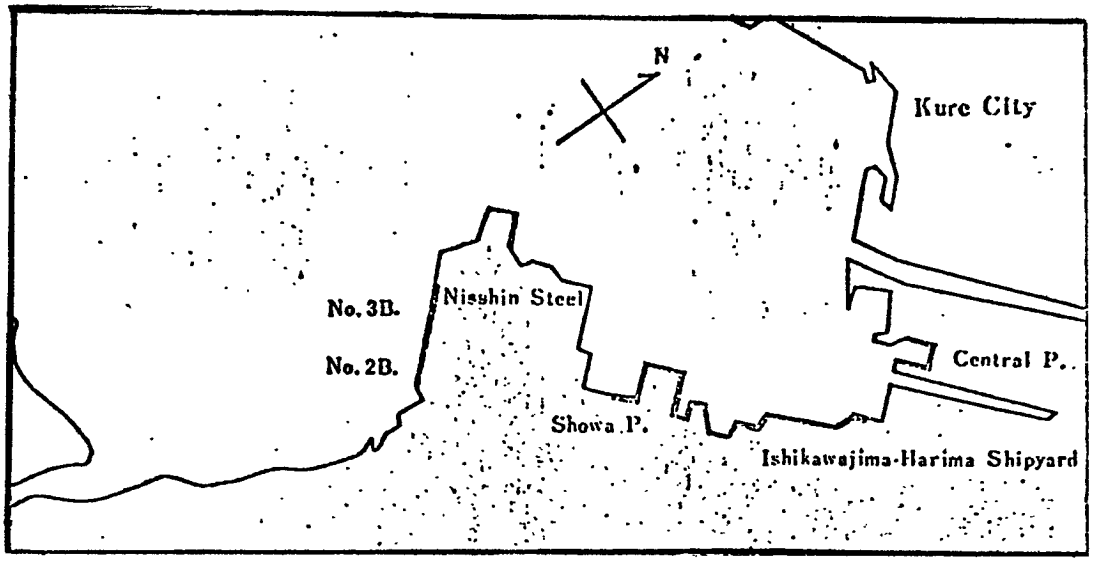
Depth of water (approach):	12.20 meters at low tide.
Depth of water (alongside):	13.00 meters at low tide.
Maximum permissible draft:	12.00 meters at low tide.

Length of berth:	Buoy berth.
Restriction on L.O.A:	222 meters.
Berthing capacity:	50,000 TDW.
Buoy & mooring capacity:	5 mooring buoys.
Number/size of manifold:	8"x2 - ASA type.
Discharging capacity:	800 - 1400 k/liters per hour.
Estimated back-pressure:	1 - 2 kg/cm^2.

TUGBOATS: Pilot requires tugboats as follows:-

	FOR MOORING:	FOR UNMOORING:
Up to 15,000 g/t	800 HP x 1 & 1000 HP x 1	1000 HP x 1
20,000 g/t	1000 HP x 1 & 1200 HP x 1	1200 HP x 1
45,000 d/w	1500 HP x 2	1500 HP x 1
70,000 d/w	1500 HP x 4 or 2000 HP x 3	2000 HP x 2

K U R E



LOCATION:
Latitude N. 34° 14' Longitude E. 132° 33'

HARBOUR PROTECTION:
Natural

BOTTOM:
Mud and clay

MINIMUM DEPTH OF WATER AT EXTREME LOW WATER (SPRING TIDE):
In the passages: 17 - 20 m
At anchorage: 9 - 20 m

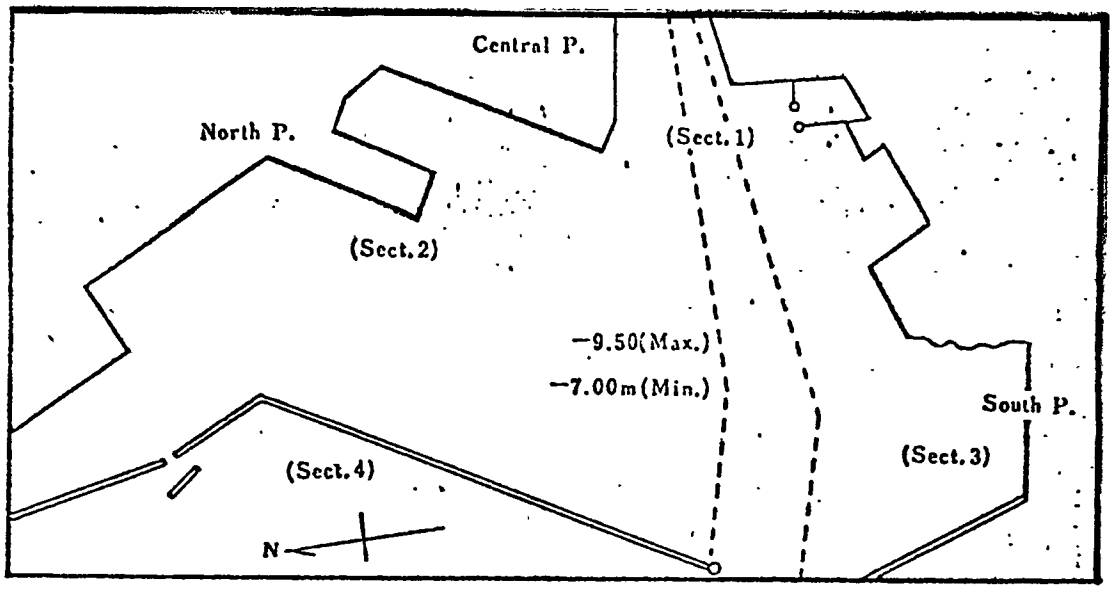
PARTICULARS OF EACH BERTH:

NAME OF BERTH:	BERTH LENGTH:	BERTH DEPTH:	BERTHING CAPACITY:	SHORE FACILITIES
SHOWA BERTH (Dis. : Scrap/Pig Iron) (Load. : Steel products)	110 m	9 m	Max. draft 8 m Max. LOA 150 m Max. beam 20 m	None, but mobile crane available.
NISSHIN STEEL WORKS BERTH No. 2 berth (Iron Ore/Cokes)	190 m	13 m	Max. draft 11.75 m 13.00 m (H.W.) Max. LOA 225 m Max. beam 31.8 m 3 cranes, with total capacity of 24,000 tons per day	

No. 3 berth (Iron Ore)	260 m	18 m	Max. draft 16.3 m 18.0 m Max. LOA 295 m Max. beam 50 m	 (H. W.) 2 cranes, with total capacity of 43,000 tons per day

NUMBER OF BUOYS AND MOORING CAPACITY OF EACH:
4 buoys for 10,000 G/T and 2 anchorages (for scrap and Maize)

K U S H I R O



LOCATION:
Latitude N. 42° 59' Longitude E. 144° 22'

HARBOUR PROTECTION:
Breakwaters

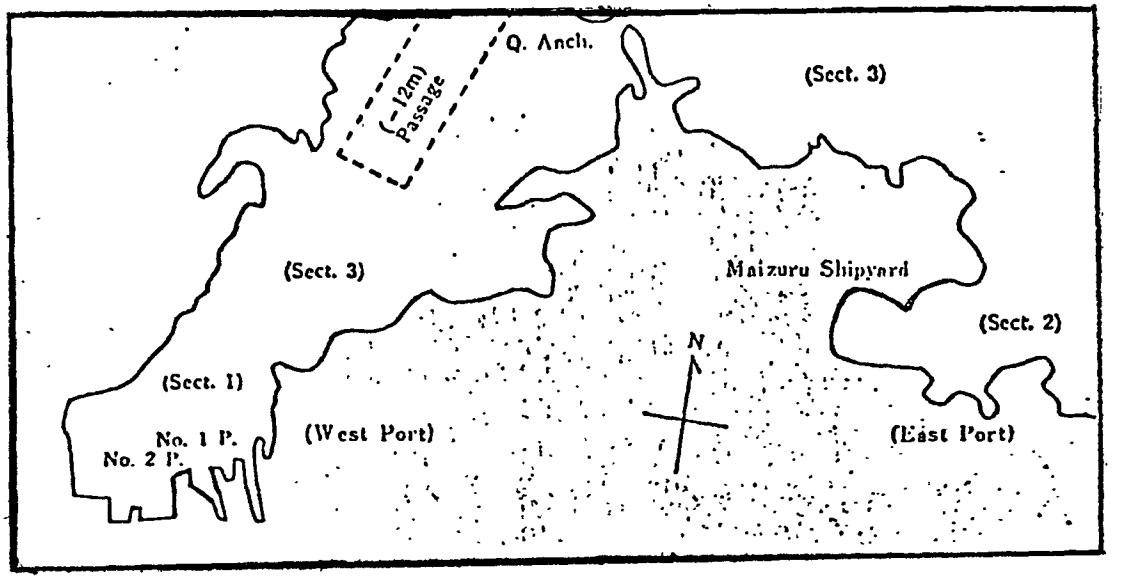
BOTTOM:
Mud and sand

MINIMUM DEPTH OF WATER AT EXTREME LOW WATER (SPRING TIDE):
In the passage: 9 m
At anchorage: 7.5 m - 9 m

PARTICULARS OF EACH WHARF:

NAME OF WHARF:	WHARF LENGTH:	MINIMUM DEPTH:	BERTHING CAPACITY:	DISCHARGING FACILITIES:
North Pier-Head (Heavy Cargo & Oil)	109.45 m	8.10 m	One 3,000 G/T One 7,000 G/T	or One 25 ton Fixed Crane (Tanker Vessel)
North Pier-West (General Cargo)	382.65 m	9.00 m	Two 10,000 G/T	Ship's gear
North Pier-East (General Cargo)	147.70 m	8.10 m	One 6,000 G/T	Ship's gear
North Wharf	148.00 m	8.10 m	One 6,000 G/T	Ship's gear
(Logs & Coal)	161.39 m	8.10 m	One 5,000 G/T	Ship's gear
South Wharf (Coal & General Cargo)	193.00 m	7.50 m	Two 3,000 G/T	Ship's gear
Center Pier-West (General Cargo)	520.00 m	9.00 m	Three 10,000 G/T	Ship's gear
Center Pier-East (Logs & Chip)	490.00 m	7.50 m	One15,000 G/T One 6,000 G/T	(Chip Vessel) Chip Conveyer Ship's gear

M A I Z U R U



LOCATION:
Latitude N. 35° 30' Longitude E. 135° 22'

HARBOUR PROTECTION:
Natural

BOTTOM:
Mud and sand

MINIMUM DEPTH OF WATER AT EXTREME LOW WATER (SPRING TIDE):
In the passages: 11-12 m
At anchorage: 7.3-9 m

PARTICULARS OF EACH WHARF:

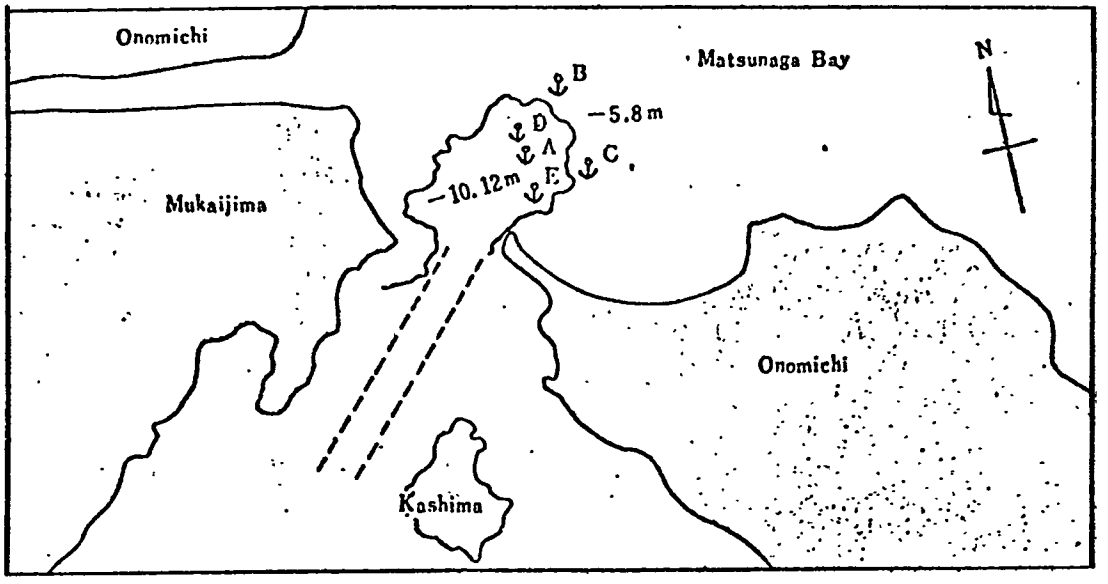
NAME OF WHARF:	WHARF LENGTH:	MAXIMUM DEPTH:	BERTHING CAPACITY:	DISCHARGING FACILITIES:
No.2 Pier-1	110 m	7.3 m	3,000 G/T	Ship's gear
2	120 m	7.3 m	3,000 G/T	Ship's gear
3	185 m	9.0 m	10,000 G/T	Ship's gear
4	105 m	7.3 m	6,000 G/T	Ship's gear
No. 4 Pier	185 m	10.0 m	15,000 G/T	Ship's gear
Onami Pier	154 m	7.5 m	3,000 G/T	Ship's gear
Onami Pier - 2	150 m	10.0 m	10,000 G/T	Ship's gear

AVERAGE RATE OF DISCHARGE:
Log (Discharging at buoy) 250 tons - 300 tons per hour
Rock Phosphate 60 tons - 65 tons per gang hour
Fertilizer (Raw) 50 tons per gang hour

NUMBER OF BUOYS AND MOORING CAPACITY OF EACH:

	MOORING CAPACITY:	DEPTH:
2 Buoys	Two 7,000 G/T	9 m

MATSUNAGA (ONOMICHI)



LOCATION:
Latitude N. 34°24'09" Longitude E. 133°14'48"

HARBOUR PROTECTION:
Natural

BOTTOM:
Clay mixed with sand

MINIMUM DEPTH OF WATER AT EXTREME LOW WATER (SPRING TIDE):
In the passage: 10 m

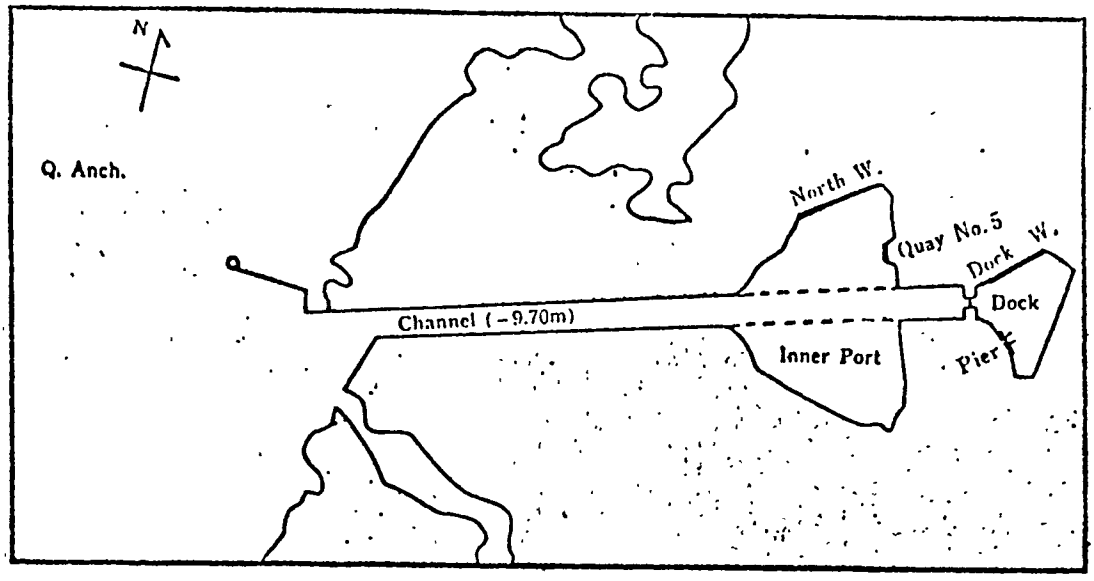
At anchorage: 12 m

PARTICULARS OF EACH WHARF:

Discharging only logs.
Vessel to drop an anchor in Matsunaga Bay.
Two anchorages "A" & "D" with the depth of 10 m at datum water level, in radius of 300 m, and, therefore, only one vessel is allowed to anchor.
Three anchorages, "B" "C" & "E" with the depth of 6.5 m.

NUMBER OF BUOYS AND MOORING CAPACITY OF EACH:
No buoys. 2 vessels can anchor at the same time at Matsunaga Bay for Discharging logs.
Depth: 7.5 m

M I I K E



LOCATION:
Latitude N. 33° 00' Longitude E. 130° 23'

HARBOUR PROTECTION:
Breakwater

BOTTOM:
Sand and Mud

MINIMUM DEPTH OF WATER AT EXTREME LOW WATER (SPRING TIDE):
In the passage: 7 m
At anchorage: 10.7 m

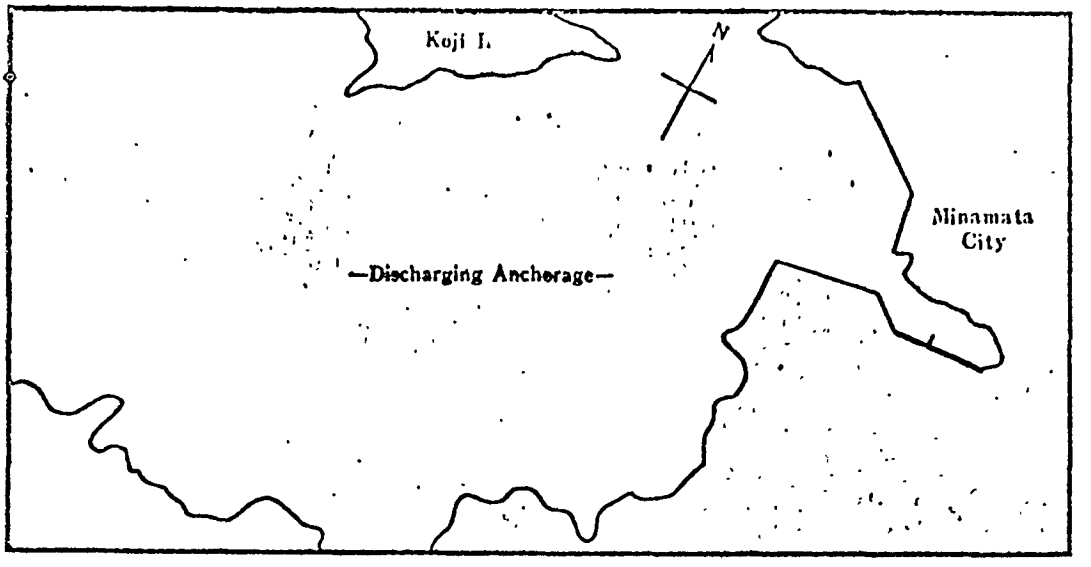
PARTICULARS OF EACH WHARF:

NAME OF WHARF:	WHARF LENGTH:	MINIMUM DEPTH: APPROACH:	MINIMUM DEPTH: ALONGSIDE:	RESTRICTIONS ON SHIP'S LENGTH:	BERTHING CAPACITY:
North Pier	333 m	10 m	9 m	(up to 20,000 TDW)	
			8.5 m	(up to 25,000 TDW)	
			7.3 m	(up to 30,000 TDW)	
Inner Pier	92 m	10 m	10 m		10,000 G/T
Dock Pier	421 m	8.5 m	8.5 m	Max. draft 8.0 m Max. beam 18.5 m	

AVERAGE RATE OF DISCHARGE:
70 tons per hour by cranes (2 cranes available)
40 tons per hour by ship's winch

NUMBER OF BUOYS AND MOORING CAPACITY OF EACH:
None

M I N A M A T A



LOCATION:
Latitude N. 32° 12' Longitude E. 130° 23'

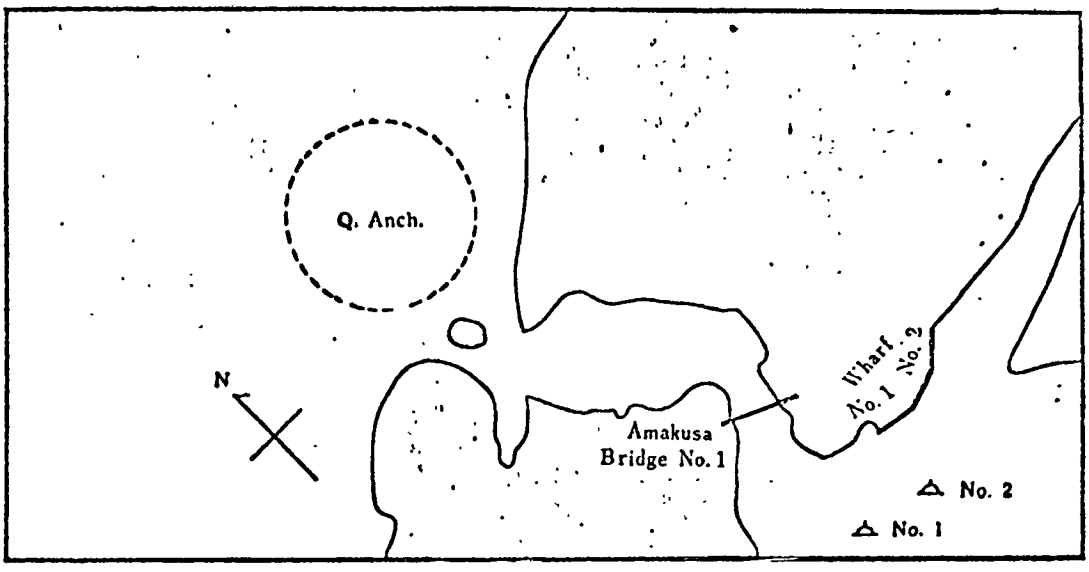
HARBOUR PROTECTION:
Natural

BOTTOM:
Mud and Sand

MINIMUM DEPTH OF WATER AT EXTREME LOW WATER (SPRING TIDE):
In the passage: 17 m
At anchorage: 11.3 m

NUMBER OF BUOYS AND MOORING CAPACITY OF EACH:
One buoy: Max. 20,000 TDW Max. draft 11 m. (36' - 01")
Two vessels at anchorage: Max. LOA 150 m. Max. 10,000 G/T Max. draft 9 m. (29'-06")
Total 5 labour-gangs available
Discharge Potash at rate of 60/80 tons per G/H
Loading Magnesite Clinker at rate of 40/70 tons per G/H

M I S U M I



LOCATION:
Latitude N. 32° 37' Longitude E. 130° 27'

HARBOUR PROTECTION:
Natural

BOTTOM:
Sand and mud

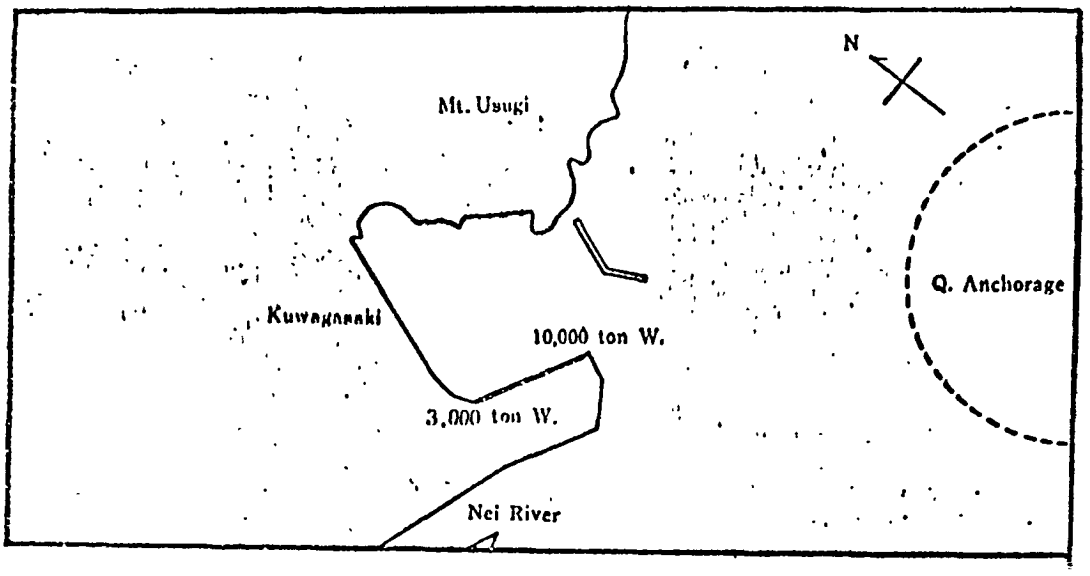
MINIMUM DEPTH OF WATER AT EXTREME LOW WATER (SPRING TIDE):
In the passage: 10 m
At anchorage: 10 m

PARTICULARS OF EACH WHARF:

NAME OF WHARF:	WHARF LENGTH:	MINIMUM DEPTH: APPROACH:	ALONGSIDE:	
9 meters wharf	160 m	10 m	9 m	Usable total 300 m
8 meters wharf	137 m	10 m	8 m	Usable total 300 m

NUMBER OF BUOYS AND MOORING CAPACITY OF EACH:
No. 1 buoy Max. 20,000 TDW Max. draft 9.1 m
No. 2 buoy Max. 7,000 TDW Max. draft 6.5 m
Berthing at slack water

M I Y A K O



LOCATION:
Latitude N. 39° 30' Longitude E. 141° 58'

HARBOUR PROTECTION:
Breakwater

BOTTOM:
Mud with sand

MINIMUM DEPTH OF WATER AT EXTREME LOW WATER (SPRING TIDE):
In the passages: 12 - 30 m
At anchorage: 10 - 20 m

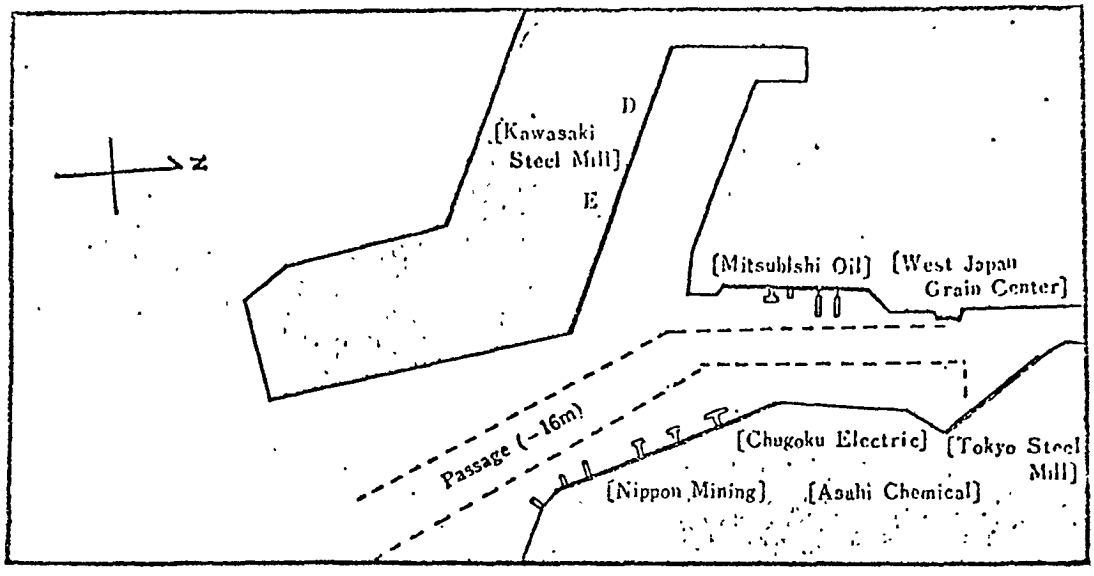
PARTICULARS OF EACH WHARF:

NAME OF WHARF:	LENGTH:	MINIMUM DEPTH:	BERTHING CAPACITY:	FACILITY:
No. 1	218 m	7.5 m	L.O.A. 160 m	7 Hoppers & Jib crane 1x3 tons
	152 m	9.0 m (L.W.)	10,000 G/T	Tower crane 1x33 tons

AVERAGE RATE OF LOADING/DISCHARGING:
Calcium super phosphate in bags 35-40 tons per gang hour
(By ship's gear, all hatches workable)
Phosphate rock in bulk 60-70 tons per gang hour
(By ship's crane all hatches workable)
Lauan & U.S. logs 24,000 - 53,000 BM per gang hour

NUMBER OF BUOYS AND MOORING CATACITY OF EACH:
One: capacity 20,000 G/T for log carrier only

M I Z U S H I M A



LOCATION:
Latitude N. 34° 30' Longitude E. 133° 44'

HARBOUR PROTECTION:
Natural

BOTTOM:
Mud

MINIMUM DEPTH OF WATER AT EXTREME LOW WATER (SPRING TIDE):
In the passages: 16 m There are some shoals of 15 m deep, wherefore vessel with deeper draft only allowed at high tide.

At anchorage: 20 m

PARTICULARS OF EACH BERTH:

NAME OF BERTH:	BERTH LENGTH:	MINIMUM DEPTH:	BERTHING CAPACITY:	SHORE FACILITIES
Kawasaki Steel Mill's berth				
"D"	(Extension length - 600 m)			
(Coaster)	200 m	9 m	Max. 8.5 m	None
(Scrap & Pig Iron)	400 m	11.7 m	Max.11.0 m	16 Tx1 crane 17 Tx1 crane (Ship's gear also used)
"E"	656 m	16 m	Max. 16 m (H. W.)	400 t/hx4 cranes 1,500 t/hx3 cranes
(Coal & Ore)	320 m	18 m	Max. 18 m (H. W.)	

NAME OF BERTH:	BERTH LENGTH:	MINIMUM DEPTH:	BERTHING CAPACITY:	SHORE FACILITIES:
West Japan Grain Terminal				
	162 m	12.3 m		2 suckers with a lifting capacity of 800 t/h
Tokyo Scitetsu (Steel Mill) Berth				
"A" (Scrap)	215 m	12.0 m	Max. 11.5 m	None
"B" "C" (Scrap and Loading).	300 m	9.5 m	Max. 9.0 m	6 Tx2 cranes

NUMBER OF BUOYS AND MOORING CAPACITY OF EACH:
Nil

TANKER BERTH INFORMATION

NIPPON MINING CO., LTD., MIZUSHIMA
No. 1 CRUDE OIL BERTH

Depth of water (approach/alongside):	13.00 meters at low tide.
Maximum permissible draft:	12.00 meters at high tide.
Length of berth:	80 meters.
Restriction on L.O.A:	250 meters
Berthing capacity (max.):	60,000 TDW.
Number/size of manifold:	12"x2
Discharging capacity:	8,000 k/liters per hour.
Estimated back-pressure:	4 - 6 kg/cm^2.

No. 2 CRUDE OIL BERTH

Depth of water (approach/alongside):	17.00 meters at mean tide.
Max. permissible draft:	16.00 meters at mean tide.
Length of berth:	110 meters.
Restriction on L.O.A:	320 meters
Berthing capacity:	194,000 TDW.
Number/size of manifold:	12"x4 - for crude oil. 12"x2 - for L.P.G.
Estimated back-pressure:	4 - 6 kg/cm^2.

MITSUBISHI OIL CO., LTD., MIZUSHIMA

No. 5 PIER (DOLPHIN)

Depth of water (approach):	14.80 meters at low tide.
Depth of water (alongside):	12.30 meters at low tide. 16.00 meters at high tide.
Maximum permissible draft:	12.30 meters at high tide.
Length of berth:	90 meters.
Restriction on L.O.A:	Not specified.
Berthing capacity:	70,000 TDW.
Number/size of manifold:	12"x2 - for crude oil. 6"x1 - for naphtha. 8"x1 - for chemical products.

Discharging capacity:	4,000 k/liters per hour for crude oil. 1,000 k/liters per hour for fuel oil. 600 k/liters per hour for naphtha. 250 k/liters per hour for chemical products.
Estimated back-pressure:	3 kg/cm^2 for crude oil, fuel oil, & naptha. 5 kg/cm^2 for chemical products.

Remarks: Eight inches diameter pipe is owned by the Nippon Gas Chemical Co., Ltd., Mizushima, and mainly used for discharging of kerosene and chemical.

No. 6 PIER (DOLPHIN)

Depth of water (approach):	14.80 meters at low tide.
Depth of water (alongside):	16.00 meters at low tide.
Maximum permissible draft:	16.00 meters at high tide.
Length of berth:	120 meters.
Restriction on LOA:	Not specified.
Berthing capacity:	130,000 TDW.
Number/size of manifold:	12"x3 - for crude oil.
Discharging capacity:	8,000 k/liters per hour.

TUGBOATS: Pilot requires tugboats as follows:

	FOR MOORING:	FOR UNMOORING:
Up to 45,000 d/w	1500 HPx2	1500 HPx2
70,000 d/w	1500 HPx4 or 2000 HPx3	1500 HPx3
100,000 d/w	2000 HPx4 or 2500 HPx3	2000 HPx4
120,000 d/w	2500 HP or 3000 HPx4	2500 HP or 3000 HPx4
Over 150,000 d/w	2500 HP or 3000 HPx5	3000 HPx4

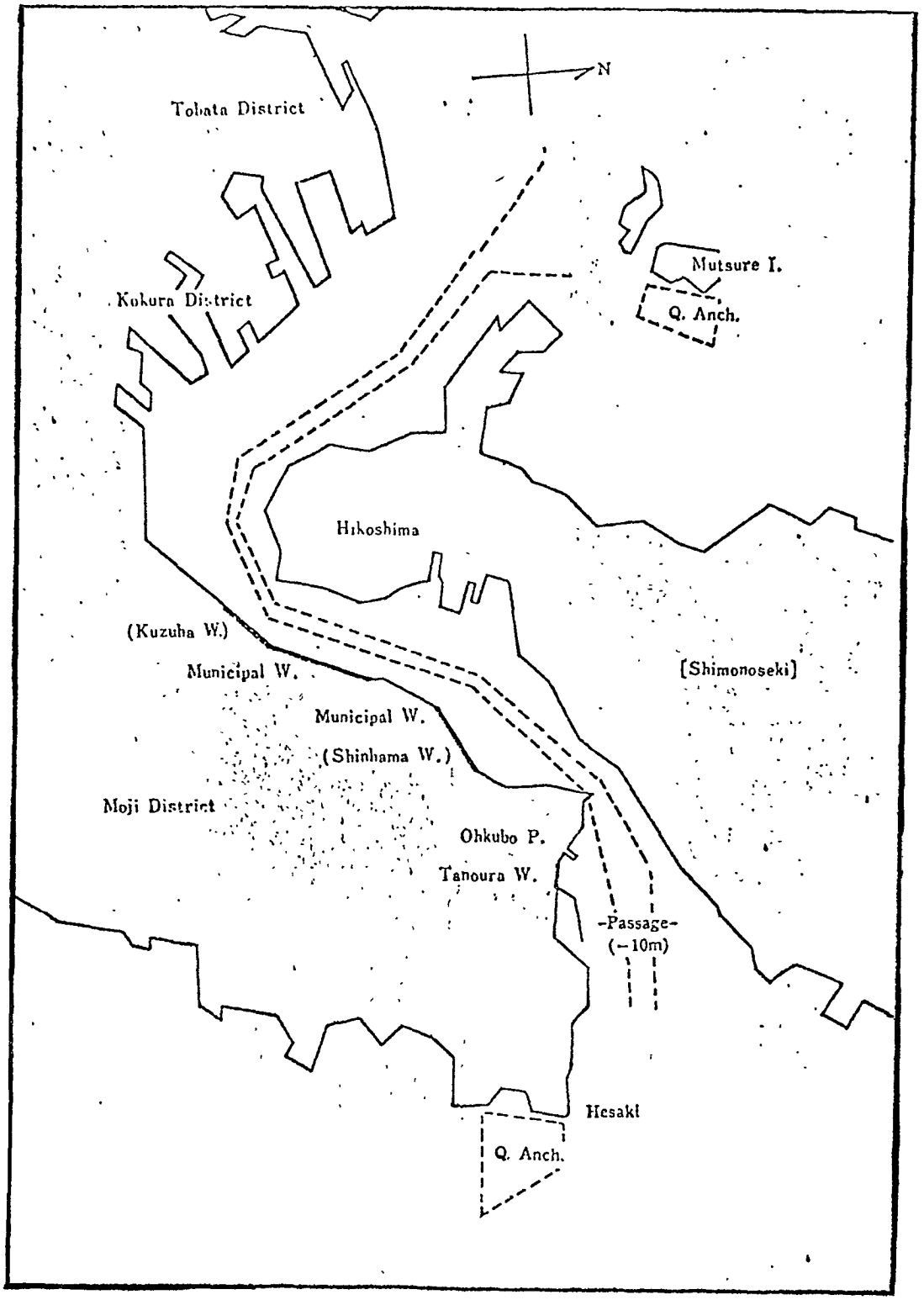
ASAHI KASEI CO., LTD., MIZUSHIMA
SHIONASU BERTH

Depth of water (alongside):	8.20 meters at low tide.
Max. permissible draft:	7.40 meters irrespective of tide.
Length of berth:	48 meters. (Dolphin)
Restriction on LOA:	170 meters.
Berthing capacity:	12,000 TDW.
Number/size of manifold:	8"x1 - ASA 150 Lbs for Liquid line 6"x1 - ASA 150 Lbs for gas (vapour) Line.
Discharging capacity:	200 k/liters per hour.
Estimated back-pressure:	5 kg/cm^2.

TUGBOATS: Pilot requires tugboats as follows:

FOR MOORING:	FOR UNMOORING:
3000 HPx1 & 1000 HPx1	3000 HPx1 & 1000 HPx1

MOJI


N
Tobata District
Kokura District
Mutsure I.
Q. Anch.
Hikoshima
(Kuzuha W.)
Municipal W.
Municipal W.
(Shinhama W.)
Moji District
[Shimonoseki]
Ohkubo P.
Tanoura W.
-Passage-
(-10m)
Hesaki
Q. Anch.

LOCATION:
Latitude N. 33° 57' Longitude E. 130° 58'

HARBOUR PROTECTION:
Natural

BOTTOM:
Sand and Mud

MINIMUM DEPTH OF WATER AT EXTREME LOW WATER (SPRING TIDE):
In the passage: 10.0 m
At anchorage: 9.15 m (Any tide) 10.0 m (High tide)

PARTICULARS OF EACH WHARF:

NAME OF WHARF:	LENGTH:	MINIMUM DEPTH:	BERTHING CAPACITY:	FACILITIES
Gaibo wharf				
No. 1 & 2 (Generals)	450 m	8.0 m	Two 15,000 G/T	Ship's gear
No. 3 - No. 7	877 m	9.0 m	4x10,000 G/T 1x15,000 G/T	Ship's gear
No. 8 & No. 9	390 m	9.0 m		
No. 12 & No. 13 (Generals)	345 m	8.5 m	2x10,000 G/T	2xPneumatic
No. 11	195 m	9.0 m	L.O.A. 180 m 1x10,000 G/T	
Mobil berth	Dolphine	9.1 m	L.O.A. 200 m	
Tanoura				
No. 1 & No. 2 (Generals)	340 m	9.0 m	2x10,000 G/T	Ship's gear
No. 3	181 m	9.3 m		
No. 4	185 m	9.3 m		

NUMBER OF BUOYS AND MOORING CAPACITY OF EACH:
4x15,000 G/T
3x10,000 G/T (Totalling 11 (Eleven)
4x5,000 G/T

AVERAGE RATE OF DISCHARGING FOR CARGOES HANDLED:

Rice	50 tons per gang hour
Grain	60 tons per gang hour (90 tons per sucker P/H)
Fertilizer	45 tons per gang hour
Coal	60 tons per gang hour
Lumber	25 tons per gang hour
Scrap	15 tons per gang hour
Sugar	45 tons per gang hour
Ore	40 tons per gang hour
Salt	70 tons per gang hour

TANKER BERTH INFORMATION

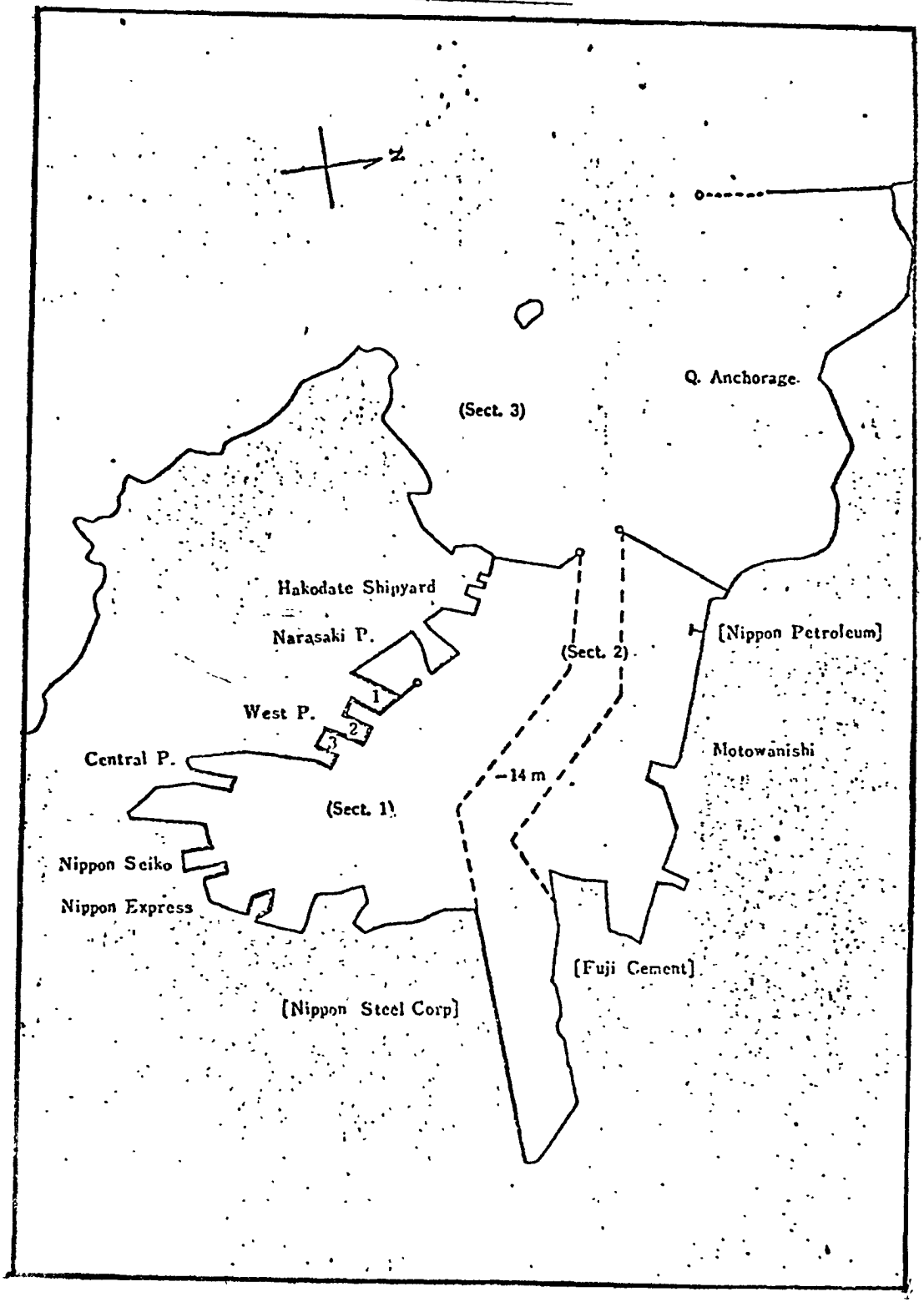
MOBIL SEKIYU K.K. MOJI
MOBIL OIL 'B' JETTY

Depth of water (approach/alongside):	9.30 meters at low tide.
Max. permissible draft:	9.10 meters at low tide.
Length of berth:	Doiphin berth.
Restriction on L.O.A:	200 meters.
Berthing capacity:	33,000 TDW.
Number/size of manifold:	8"x2 - API type.
Discharging capacity:	500 - 1,000 k/liters per hour.
Estimated back-pressure:	1 - 2 kg/cm^2.

TUGBOATS: Pilot requires tugboats as follows:-

	FOR MOORING:	FOR UNMOORING:
Up to 10,000 g/t	2000 - 3000 HPx2	2000 - 3000 HPx2
15,000 g/t	-ditto-	-ditto-
20,000 g/t	-ditto-	-ditto-

MURORAN


N
Q. Anchorage.
(Sect. 3)
Hakodate Shipyard
Narasaki P.
(Sect. 2)
[Nippon Petroleum]
West P.
1
2
3
Central P.
Motowanishi
-14 m
(Sect. 1)
Nippon Seiko
Nippon Express
[Fuji Cement]
[Nippon Steel Corp]

LOCATION
Latitude N. 42° 18' Longitude E. 140° 54'

HARBOUR PROTECTION:
Outer Breakwater & Inner Breakwater

BOTTOM:
Sand mixed with mud:

MINIMUM DEPTH OF WATER AT EXTREME LOW WATER (SPRING TIDE):
In the passages: 16 m
At anchorage: 19 m

PARTICULARS OF EACH BERTH:

NAME OF BERTH:	BERTH LENGTH:	MINIMUM DEPTH:	BERTHING CAPACITY:	SHORE FACILITIES:
Nippon Steel Corp's Berth				
No. 8/10	500 m	6.7 m	Two 7,000 G/T	2x10 T 2X20 T Max. outreach: 18 m Max. height: 16 m
(Steel products)				
No. 12/14	400 m	9.0 m	Two 10,000 G/T	3x12 T Max. outreach: 14.8 m Max. height: 17.0 m
(Scrap & Steel products)				
No. 15/17	742 m	9.0 m	Two 10,000 G/T	3x6 T Max. outreach: 18.0 m Max. height: 18.5 m
No. 18	290 m	14.0 m	One 100,000 TDW	2x30 T Max. outreach: 24.0 m Max. height: 16.75 m (Total capacity: 1,500t/h)
(Coal & Ore)				
No. 19	300 m	16.0 m	One 150,000 TDW	1x30 T Max. outreach: 30 m Max. height: 22 m 1x30 T Max. outreach: 23 m Max. height: 19 m (Total capacity: 2,800t/h)
(Coal & Ore)				
Nippon Seiko Berth				
No. 1	(240 m) 120 m	8.0 m	One 10,000 G/T	1x100 T Ship's gear also used
No. 2	(210 m) 150 m	8.0 m	One 10,000 G/T	1x600 T Ship's gear also used
(Scrap & Steel products)				
Nippon Express Berth				
No. 5	150 m	9.0 m	One 10,000 G/T	
(Nickel concentrate, etc. in bulk)				
No. 6	160 m	9.0 m	One 10,000 G/T	
(Steel products)				Available for above two berths 1x15 T 1X20 T

NAME OF BERTH:	BERTH LENGTH:	MINIMUM DEPTH:	BERTHING CAPACITY:	SHORE FACILITIES:
No. 7/8	170 m	8.0 m	One 10,000 G/T	None
(Dis. Lauan Logs)				
(Loading. Steel products)				
Public Berth				
Central Pier				
No. 1/2	300 m	8.5 m		None
(Salt, etc. in bulk)				
No. 3	120 m	7.0 m		None
West Pier				
No. 1/2	270 m	No. 1 - 8.30 m		None
(For liner vessel)		No. 2 - 10.30 m		None
No. 3	150 m	6.0 m		None
(Coal, etc. in bluk)				
No. 4/5	250 m	6.4 m		None
(Dis. Lauan Logs)				

TANKER BERTH INFORMATION

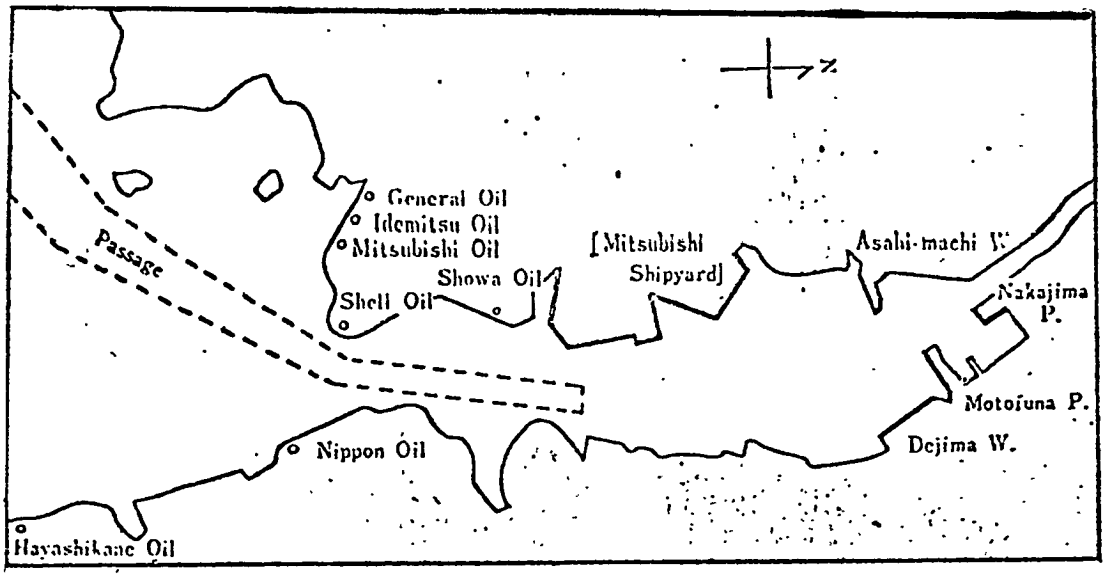
NIPPON PETROLEUM REFINING CO., LTD.
N.P.R.C. BERTH

Depth of water (approach/alongside):	10.80 meters at low tide.
Max. permissible draft:	10.80 meters at high tide.
Length of berth:	72 meters
Restriction on LOA:	200 meters
Berthing capacity:	30,000 GRT.
Number/size of manifold:	10"x2.
Discharging capacity:	3,000 k/liters per hour.
Estimated back-pressure:	7 kg/cm^2.

TUGBOATS: Pilot requires tugboats as follows:

	FOR MOORING AND UNMOORING:
Up to 10,000 g/t	1200 HP x 1 & 1700 HP x 1
15,000 g/t	1200 HP x 1 & 1700 HP x 1
20,000 g/t	1700 HP x 1 & 1900 HP x 1
30,000 g/t	1700 HP x 1 & 1900 HP x 1

N A G A S A K I



LOCATION:
Latitude N. 32°44' Longitude E. 129° 52'

HARBOUR PROTECTION:
Natural

BOTTOM:
Clay mixed with shell and mud.

MINIMUM DEPTH OF WATER AT EXTREME LOW WATER (SPRING TIDE):
In the passage: 20-40 m
At anchorage: 9-17 m

PARTICULARS OF EACH WHARF:

NAME OF WHARF:	WHARF LENGTH:	MINIMUM DEPTH:	BERTHING CAPACITY:	DISCHARGING FACILITIES:
Dejima Wharf (Maize, Wheat bran, Grain)	418 m	9.0 m	2X10,000 G/T	2 ton & 3 ton mobil cranes without bucket Max. reach 14 m Max. height 13 m 30 tons per unit hour ship's gear 150 K/T per day (Per gang)
Kibachi	220 m	13.0 m	1X30,000 G/T	400 L.T./Hr
Idemitsu Kosan	250 m	14.0 m	1X30,000 G/T	400 L.T./Hr
Doinokubi	250 m	14.0 m	1X30,000 G/T	700 L.T./Hr
Shell Oil	250 m	17.0 m	1X30,000 G/T	
Mitsubishi	250 m	17.0 m	1X30,000 G/T	
Nippon Oil Co.	250 m	17.0 m	1X30,000 G/T	700 L.T./Hr

NUMBER OF BUOYS AND MOORING CAPACITY OF EACH:
2 buoys: 7,000 G/T Minimum depth
2 buoys: 6,000 G/T Minimum depth

PORT IMPROVEMENT PLAN:
Kogakura Public Pier: Constructing a public pier at Kogakura to accommodate three 10,000 G/Tonners completion of which is expected in 1971.

I	Wharf length:	270 Meters	Depth of Water:	12 Meters
II	Wharf length:	260 Meters	Depth of Water:	7.5 Meters
III	Wharf length:	180 Meters	Depth of Water:	5.5 Meters

TANKER BERTH INFORMATION

NIPPON OIL CO., LTD., NAGASAKI

KOGAKURA BERTH

Depth of water (approach):	20.00 meters at low tide.
Depth of water (alongside):	16.70 meters at low tide.
Max. permissible draft:	16.70 meters at high tide.
Length of berth:	
Restriction on LOA:	Not specified.
Berthing capacity:	50,000 TDW.
Number/size of manifold:	10" x 2.
Discharging capacity:	700 l/tons per hour.
Estimated back-pressure:	Negligible.

TUGBOATS: Pilot requires tugboats as follows:

	FOR MOORING:	FOR UNMOORING:
Up to 10,000 g/t	2200 HPX1 & 800 HPx1	800 HPx1
15,000 g/t	2200 HPX1 & 800 HPx1	800 HPx1
20,000 g/t	2500 HPX1 & 2200 HPx1	2200 HPx1
30,000 g/t	2500 HPX1 & 2200 HPx1	2200 HPx1
45,000 g/t	2500 HPX1 & 2200 HPx1	2200 HPx1

GENERAL SEKIYU K.K., NAGASAKI

OTAO BERTH

Depth of water (approach):	20 00 meters at low tide.
Depth of water (alongside):	16.70 meters at low tide.
Max. permissible draft:	13.40 meters at low tide.
Length of berth:	
Restriction on LOA:	Not specified.
Berthing capacity:	
Number/size of manifold:	8"x1.
Discharging capacity:	500 l/tons per hour.
Estimated back-pressure:	5 kg/cm^2.

TUGBOATS: Pilot requires tugboats as follows:

	FOR MOORING:	FOR UNMOORING:
Up to 10,000 g/t	2500 HPX1 & 2200 HPX1	2200 HP X 2
20,000 g/t	2500 HPX1 & 2200 HPX1	2200 HP X 2
30,000 g/t	2500 HPX1 & 2200 HPX1	2200 HP X 2
45,000 g/t	2500 HPX1 & 2200 HPX1	2200 HP X 2

IDEMITSU KOSAN CO., LTD., NAGASAKI

KIBACHI BERTH

Depth of water (approach):	20.00 meters at low tide.
Depth of water (alongside):	12.80 meters at low tide.
Max. permissible draft:	12.80 meters at high tide.
Length of berth:	
Restriction on LOA:	Not specified.
Berthing capacity:	20,000 GRT.
Number/size of manifold:	8" X 1.
Discharging capacity:	400 1/tons per hour.
Estimated back-pressure:	1.5 kg/cm^2.

TUGBOATS: Pilot requires tugboats as follows:

	FOR MOORING:	FOR UNMOORING:
Up to 10,000 g/t	2500 HPX1 & 2200 HPX1	2200 HP X 1
15,000 g/t	2500 HPX1 & 2200 HPX1	2200 HP X 1
20,000 g/t	2500 HPX1 & 2200 HPX1	2200 HP X 1

MOBIL SEKIYU K.K., NAGASAKI

KIBACHI BERTH

Depth of water (approach):	20.00 meters at low tide.
Depth of water (alongside):	12.20 meters at low tide.
Max. permissible draft:	12.20 meters at high tide.
Length of berth:	
Restriction on LOA:	Not specified.
Berthing capacity:	20,000 GRT.

Number/size of manifold:	8"x1.
Discharging capacity:	400 1/tons per hour.
Estimated back-pressure:	3.5 kg/cm^2.

TUGBOATS: Pilot requires tugboats as follows:

	FOR MOORING:	FOR UNMOORING:
Up to 10,000 g/t	2200 HPx1 & 2500 HPx1	2200 HP x 1
15,000 g/t	2200 HPx1 & 2500 HPx1	2200 HP x 1
20,000 g/t	2200 HPx1 & 2500 HPx1	2200 HP x 1

HAYASHIKANE OIL CO., LTD., NAGASAKI

DOINOKUBI BERTH

Depth of water (approach):	20.00 meters at low tide.
Depth of water (alongside):	12.80 meters at low tide.
Max. permissible draft:	12,80 meters at high tide.
Length of berth:	
Restriction on LOA:	Not specified.
Berthing capacity:	
Number/size of manifold:	8"x1.
Discharging capacity:	700 1/tons per hour.
Estimated back-pressure:	2 - 3 kg/cm^2.

TUGBOATS: Pilot requires tugboats as follows:

	FOR MOORING:	FOR UNMOORING:
Up to 10,000 g/t	2200 HPx1 & 800 HPx1	2200 HP x 1
15,000 g/t	2200 HPx1 & 800 HPx1	2200 HP x 1
20,000 g/t	2200 HPx1 & 2500 HPx1	2500 HP x 1

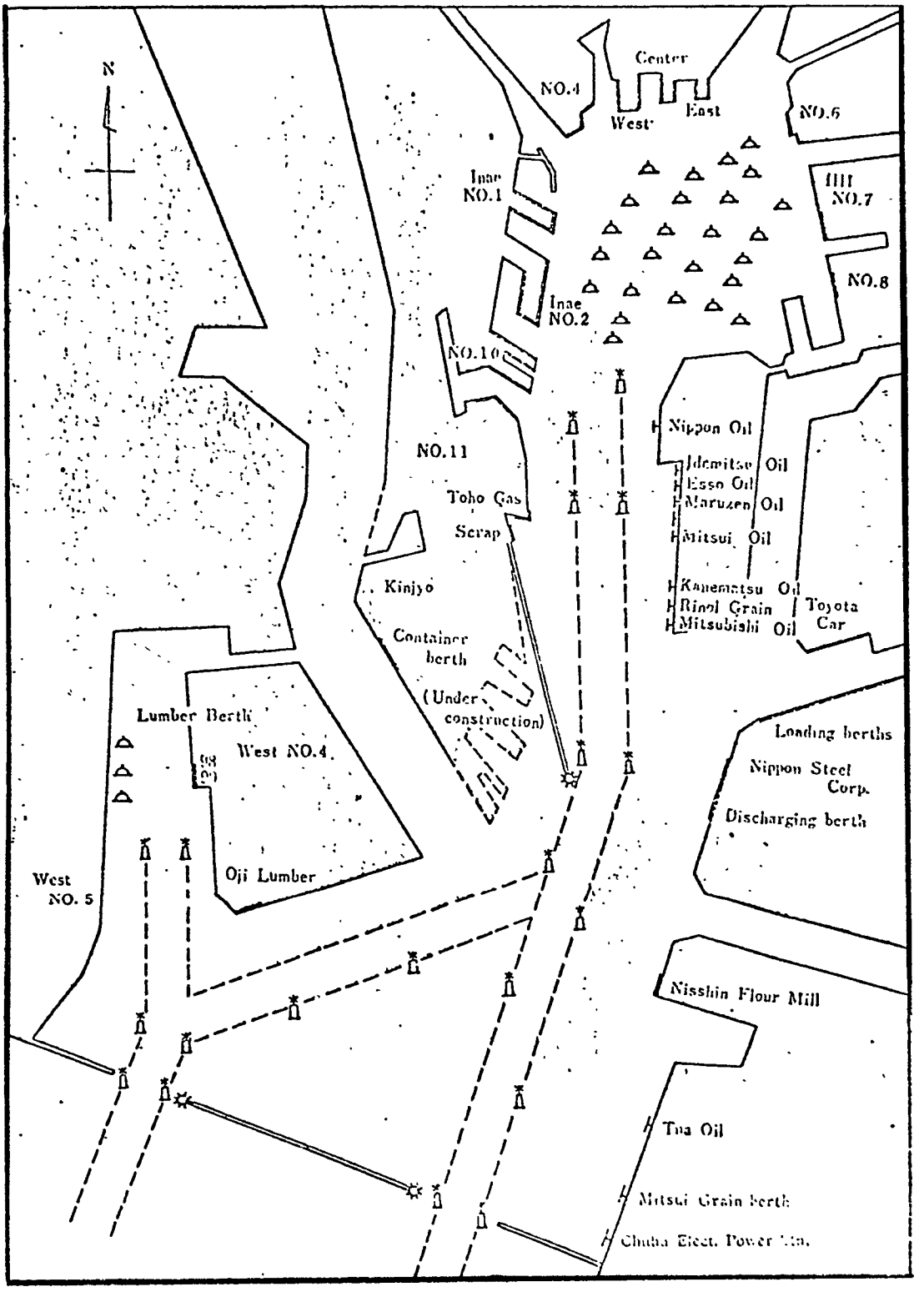
KOZAKI BERTH

Depth of water (approach):	20.00 meters at low tide.
Depth of water (alongside):	16.70 meters at low tide.
Max. permissible draft:	16.70 meters at high tide.
Length of berth:	
Restriction on LOA:	Not specified.
Berthing capacity:	
Number/size of manifold:	8"x1.
Discharging capacity:	700 1/tons per hour.
Estimated back-pressure:	2-3 kg/cm^2.

TUGBOATS: Pilot requires tugboats as follows:

	FOR MOORING:	FOR UNMOORING:
Up to 10,000 g/t	2200 HPx1 & 800 HPx1	800 HP x 1
15,000 g/t	2200 HPx1 & 800 HPx1	800 HP x 1
20,000 g/t	2200 HPx1 & 2500 HPx1	2500 HP x 1

NAGOYA


N
Center
NO.4
West
East
NO.6
Inae
NO.1
NO.7
NO.8
Inae
NO.2
NO.10
NO.11
Nippon Oil
Idemitsu Oil
Esso Oil
Maruzen Oil
Mitsui Oil
Kanematsu Oil
Rinol Grain
Mitsubishi Oil
Toyota
Car
Toho Gas
Scrap
Kinjyo
Container
berth
(Under
construction)
Lumber Berth
West NO.4
Oji Lumber
West
NO. 5
Loading berths
Nippon Steel
Corp.
Discharging berth
Nisshin Flour Mill
Tna Oil
Mitsui Grain berth
Chuba Elect. Power Co.

LOCATION:
Latitude N. 35°5' Longitude E. 136°53'

BOTTOM:
Soft mud mixed with fine sand

HARBOUR PROTECTION:
West breakwater (North to South)
Breakwater against tidal waves (North West to South East)

MINIMUM DEPTH OF WATER AT EXTREME LOW WATER (SPRING TIDE):
In the passage: 9.0 m - 14 m
At anchorage: 7.3 m - 15 m

PARTICULARS OF EACH BERTH:

NAME OF BERTH:	BERTH LENGTH:	MINIMUM DEPTH:	BERTHING CAPACITY:	SHORE FACILITIES:
PRIVATE BERTH				
NIPPON STEEL COPR'S BERTH				
Loading berth (Steel products)				
(On an extension line)				
F - 3	150 m	7.5 m		2X20 T
F - 4	150 m	7.5 m		1X20 T
F - 5	200 m	10.0 m		1X15 T
				1X30 T
F - 6	200 m	11.0 m		1X15 T
				1X30 T
F - 7	230 m	12.0 m		1X15 T
				1X40 T
Discharging berth				
(On an extention line)				
(Coal & Ore)				
F - 11	300 m	14.0 m		1X1,800 t/h
F - 12	250 m	14.0 m		3X1,500 t/h
F - 13	250 m	13.0 m		
(Scrap & Pigiron)				
F - 14	145 m	13.0 m		1X300 t/h
RINORU OIL CO'S BERTH				
(Soybeans)				
	135 m	9.8 m	Max. L.O.A. 155 m	2 suckers 125 t/h each
NISSHIN SEIFUN (FLOUR MILL) BERTH				
(Grain) (Dolphin)	150 m	12.0 m	Max. 50,000 TDW	

NAME OF BERTH:	BERTH LENGTH:	MINIMUM DEPTH:	BERTHING CAPACITY:	SHORE FACILITIES:
TOYOTA AUTOMOBILE'S BERTH				
1 - 2	200 m	11.0 m	Max. 35,000 TDW	
1 - 5	200 m	11.0 m	Max. 35,000 TDW	
1 - 6	200 m	10.0 m	Max. 35,000 TDW	
TOHO GAS CO'S BERTH	143 m	10 m	One 11,000 G/T	2X4 tons 300 t/h each
MEIKO KAIUN'S BERTH	190 m	8.5 m	One 8,000 G/T	None
OJI LUMBER'S BERTH	200 m	10 m		None
PUBLIC BERTH				
General Cargo				
East pier-3 berths	120/200 m	7.1/8.6 m	Two 10,000 G/T	
Central pier-2 berths	213/220 m	7.0/8.7 m	One 5,000 G/T One 10,000 G/T	
West pier-2 berths	274/327 m	7.9/8.0 m	Two 10,000 G/T	
No. 6 Reclaimed land wharf	213 m	8.8 m	One 10,000 G/T	
No. 7 Reclaimed land wharf	220 m	7.5 m	One 8,000 G/T	
Inae Pier-4 berths	170/226 m	7.6/8.8 m	Three 10,000 G/T One 15,000 G/T	
Wheat				
West pier-south	172 m	7.2 m	One 10,000 G/T	
Coal				
No. 10 Reclaimed land wharf (North side)	440 m	8.7 m	One 3,000 G/T Two 8,000 G/T	3X5 tons 150 t/h each
(South side)	378 m	5.7 m	Three 4,000 G/T	2X5 tons 100 t/h each
Iron Scrap & pig iron				
No. 11 Reclaimed land wharf W - No. 50	180 m	9.5 m	One 11,000 G/T	1X10 tons Ship's gear also used
Lumber & Logs				
West No. 4 reclaimed land W - No. 99	185 m	10.0 m	One 17,000 G/T	

There is a shoal of 9.5 meter deep in the shipping lane, wherefore a vessel with draft exceeding 8.5 meters is only allowed at rising/high tide.

NUMBER OF BUOYS AND MOORING CAPACITY OF EACH:

Number of buoys:	Max. L.O.A.:	Max. draft:
4 buoys	up to 150 m	8.1/8.3 m
5 buoys	up to 200 m	7.1/9.5 m

NUMBER OF BUOYS AND MOORING CAPACITY OF EACH:

Number of buoys:	Max. L.O.A.:	Max. draft:
7 buoys	up to 250 m	8.7/9.2 m
2 buoys	up to 300 m	8.7/9.0 m

PORT IMPROVEMENT PLANS:

With completion expected by 1980.

West No. 4 area	- 6	25,000 TDW berths (12 meters deep)
	2	15,000 TDW berths (10 meters deep)
West No. 5 area	- 6	25,000 TDW berths (10 meters deep)
Kinjyo Pier	-24	15,000 TDW berths (10 meters deep)
	2	35,000 TDW berths (12 meters deep)
	1	50,000 TDW berths (12 meters deep)
Lumber port	- 2	15,000 TDW berths (10 meters deep)
	2	5,000 TDW berths (7.5meters deep)

TANKER BERTH INFORMATION

MITSUBISHI SHOJI KAISHA LTD., NAGOYA

MITSUBISHI B - 1

Depth of water (approach):	10.00 meters at low tide.
Depth of water (alongside):	9.80 meters at low tide.
Max. permissible draft:	9.80 meters at high tide.
Length of berth:	190 meters.
Restriction on L.O.A:	180 meters.
Berthing capacity:	20,000 TDW.
Number/size of manifold:	8"X2.
Discharging capacity:	1,800 k/liters per hour.
Estimated back-pressure:	5 kg/cm^2.

ESSO-STANDARD SEKIYU K.K., NAGOYA

ESSO BC

Depth of water (approach):	10.00 meters at low tide.
Depth of water (alongside):	8.80 meters at low tide.
Max. permissible draft:	8.80 meters at high tide.
Length of berth:	180 meters.
Restriction on L.O.A:	150 meters
Berthing capacity:	15,000 TDW.
Number/size of manifold:	8"X2.
Estimated back-pressure:	4 kg/cm^2.

MITSUI & CO., LTD., NAGOYA

BE CHEMICAL BERTH

Depth of water (approach):	9.70 meters at low tide.
Depth of water (alongside);	10.50 meters at low tide.
Max. permissible draft:	9.50 meters at high tide.
Length of berth:	150 meters.
Restriction on L.O.A.:	150 meters.
Berthing capacity:	15,000 TDW.
Number/size of manifold:	6"X2.
Discharging capacity:	400 k/liters per hour.
Estimated back-pressure:	4 kg/cm^2.

NIPPON OIL CO., LTD., NAGOYA

NISSEKI BERTH B - 7

Depth of water (approach/alongside):	9.80 meters at low tide.
Max. permissible draft:	9.80 meters at high tide.
Length of berth:	200 meters
Restriction on L.O.A.:	185 meters
Berthing capacity;	33,000 TDW.
Number/size of manifold:	8"X1.
Estimated back-pressure:	4 kg/cm^2.

KANEMATSU-GOSHO CO., LTD., NAGOYA

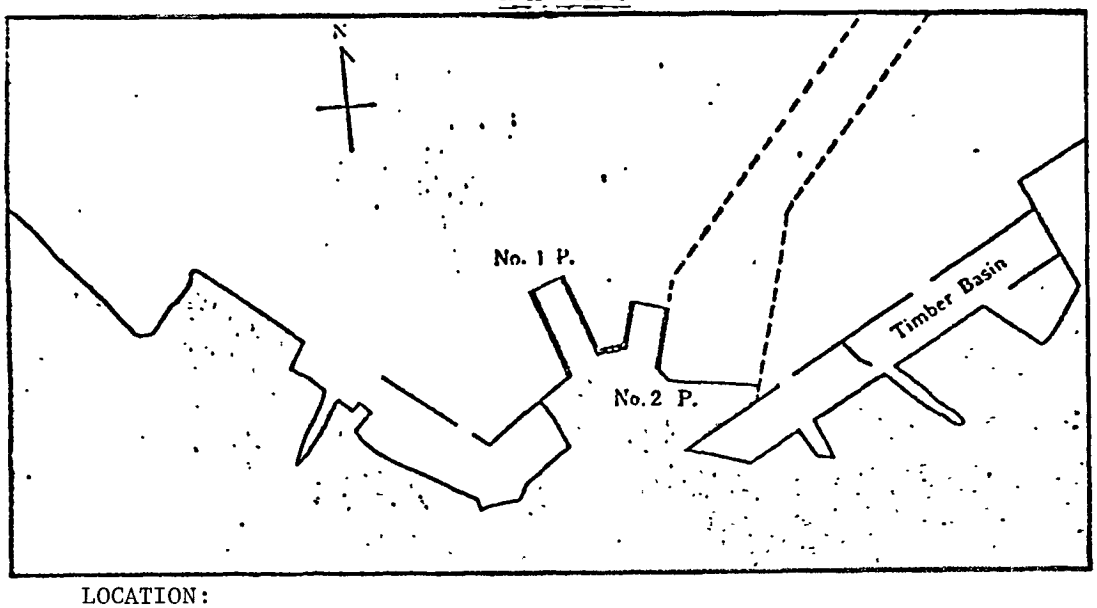
KANEMATSU BG BERTH

Depth of water (approach):	9.50 meters at low tide.
Depth of water (alongside):	9.80 meters at low tide.
Max. permissible draft:	9.50 meters at high tide.
Length of berth:	200 meters.
Restriction on L.O.A.:	180 meters.
Berthing capacity:	25,000 TDW.
Number/size of manifold:	8"X2.
Discharging capacity:	1,700 k/liters per hour.
Estimated back-pressure:	4 kg/cm^2.

TUGBOATS: Pilor requires tugboats as follows:

	FOR MOORING:	FOR UNMOORING:
Up to 10,000 g/t	1500 HP x 2	1500 HP X 2
15,000 g/t	1500 HP x 2	1500 HP X 2
20,000 g/t	1500 HP x 2	1500 HP X 2

NANAO



LOCATION:
Latitude N. 37° 03' Longitude E. 136° 58'

HARBOUR PROTECTION:
Natural

BOTTOM:
Sand mixed with clay.

MINIMUM DEPTH OF WATER AT EXTREME LOW WATER (SPRING TIDE):
In the passage: 10.5 m

At anchorage: 7.6 m

PARTICULARS OF EACH WHARF:

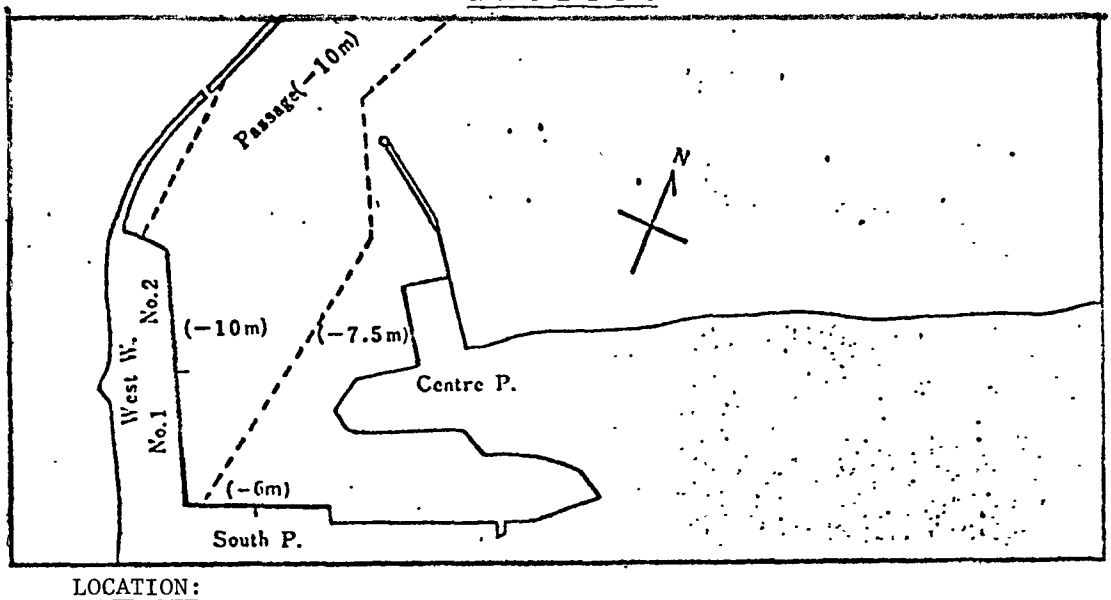
NAME OF WHARF:	WHARF LENGTH:	MINIMUM DEPTH: ALONGSIDE:	RESTRICTIONS ON SHIP'S LENGTH	BERTHING CAPACITY:
No. 1 Wharf (West)	221.5 m	7.5 m	213 m	One 5,000 G/T One 3,000 G/T
No. 1 Wharf (East)	221.5 m	5.5 m	213 m	Two 2,000 G/T Two 1,000 G/T
No. 2 Wharf (East)	220 m	9.0 m	219 m	One10,000 G/T 3 cranes

AVERAGE RATE OF DISCHARGE:

Manganese Ore	30 tons per gang hour	60 tons per hour per crane
Iron Ore	30 tons per gang hour	60 tons per hour per crane
Lumber	40 tons per gang hour	

NUMBER OF BUOYS AND MOORING CAPACITY OF EACH:
No buoys. Vessel allowed to discharge logs at anchorage.

N A O E T S U



LOCATION:
Latitude N. 37° 10' Longitude E. 138° 15'

HARBOUR PROTECTION:
Breakwater

BOTTOM:
Mud mixed with sand

MINIMUM DEPTH OF WATER AT EXTREME LOW WATER (SPRING TIDE):
At anchorage: 10 m (there is a shoal of 9.5 m deep)
In the passage: 10 m

PARTICULARS OF EACH WHARF:

NAME OF WHARF:	LENGTH	DEPTH WHARF	MOORING CAPACITY
South Pier (Wood)	210 m	6.0 m	2,000 G/T
South Pier level	128 m	6.0 m	1,000 G/T
West Pier	370 m	10.0 m	Two 10,000 G/T
Center Pier	130 m	7.5 m	3,500 G/T
	144 m	10.0 m	10,000 G/T

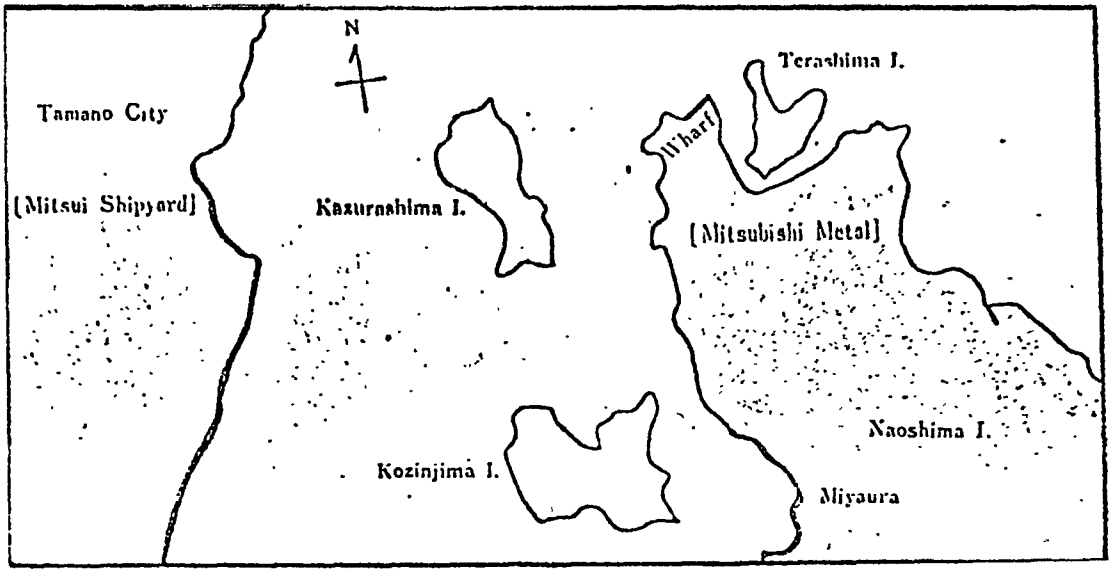
Shore facilities at West Pier

Level luffing crane	1	Capacity	240 tons. (public)
Moving Lifting Machine	1	Capacity	150 tons. (Private)
Tower crane	1	Capacity	150 tons. (Private)

AVERAGE RATE OF DISCHARGE:
Salt 1,500 tons per day by shore unloader & ship's gear

Coal 1,500 tons per day by shore unloader & ship's gear

N A O S H I M A



LOCATION:
Latitude N. 34° 28' Longitude E. 133° 58'

HARBOUR PROTECTION:
None

BOTTOM:
Sand

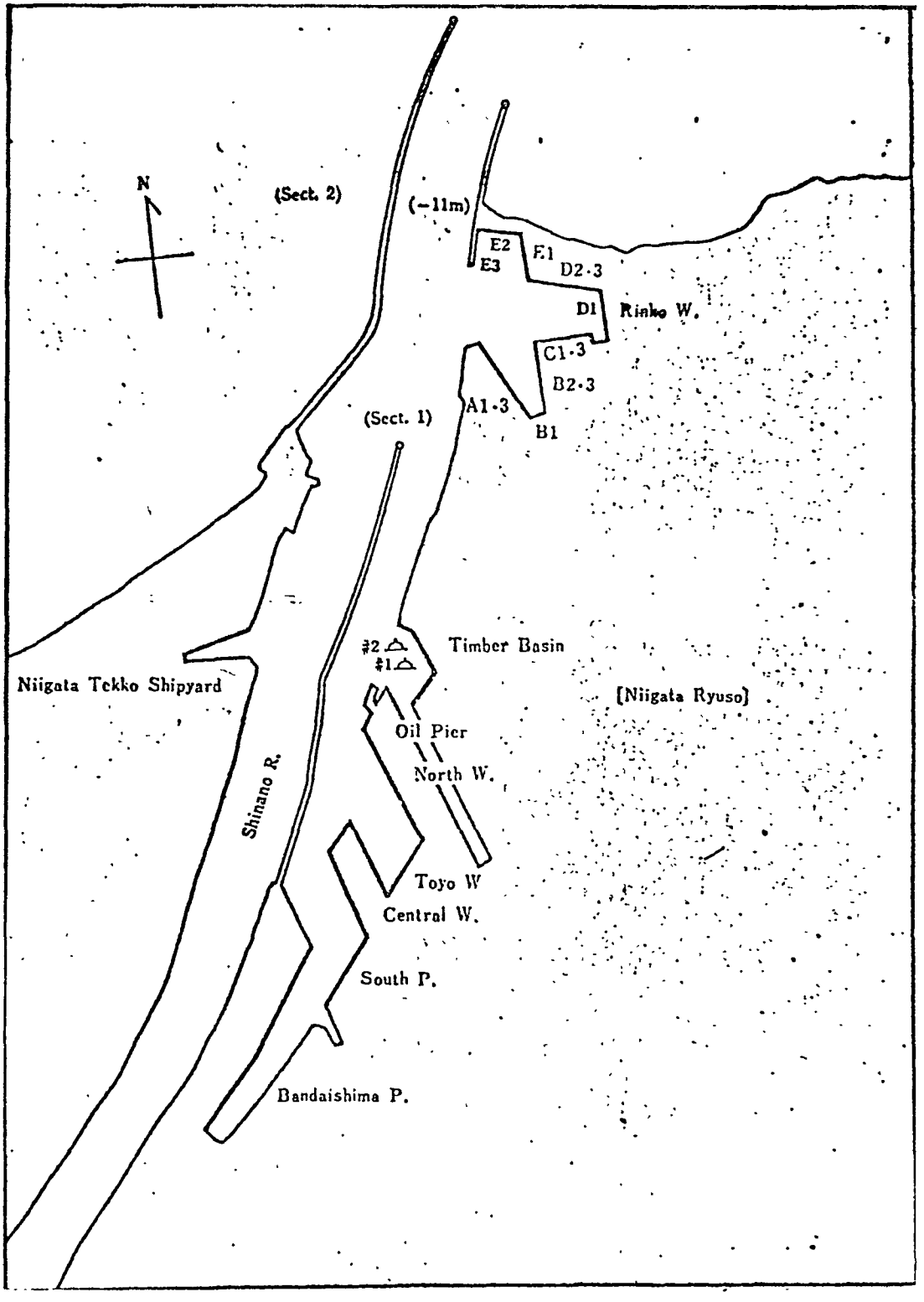
MINIMUM DEPTH OF WATER AT EXTREME LOW WATER (SPRING TIDE):
At the anchorage: 10 m
In the passages: 10 m

PARTICULARS OF BERTH:

NAME OF BERTH:	WHARF LENGTH:	MAX. DRAFT:	SHORE FACILITIES:
Mitsubishi Metal Mining Co. (Smelters) (Copper Concentrate)	150 m	10 m	1X100 T/H crane (Ship's gear also used as case may be).
	Vessel with L.O.A. 180 can be moored alongside, jutting her stern beyond the end of wharf.		

AVERAGE RATE OF DISCHARGE:
(Discharging onto trucks)
100 tons per hour by shore crane. 50?70 tons per hour by ship's gear

N I I G A T A


N
(Sect. 2)
(−11m)
E2
E3
F1
D2·3
D1
Rinko W.
C1·3
B2·3
A1·3
B1
(Sect. 1)
#2
#1
Timber Basin
Niigata Tekko Shipyard
[Niigata Ryuso]
Oil Pier
North W.
Shinano R.
Toyo W
Central W.
South P.
Bandaishima P.

LOCATION:

Latitude N. 37° 57'4" Longitude E. 139°04'3"

HARBOUR PROTECTION: BOTTOM:

Sheltered by the west breakwater Mud mixed with sand

MINIMUM DEPTH OF WATER AT EXTREME LOW WATER (SPRING TIDE):

In the passages: 10 m - 11 m

At anchorage: 9 m - 11 m

PARTICULARS OF EACH WHARF:

NAME OF WHARF:	WHARF LENGTH:	MINIMUM DEPTH:	BERTHING CAPACITY:	DISCHARGING FACILITIES:
North wharf (F)	350 m	8.8 m	One 13,000 D/W	Ship's gear
(General cargo & bulk cargo)			One 6,000 D/W	
Toyo wharf (G)	247 m	7.5 m	One 5,000 D/W	Ship's gear
(Cement tanker)				
Central wharf	295 m	8.8 m	One 13,000 D/W or	Ship's gear
North side (H)			Two 6,000 D/W	
(General cargo & bulk cargo)				
Central wharf	133 m	7.0 m	Two 3,000 D/W	Ship's gear
Top side (I)				
Central Wharf	307 m	7.0 m	Two 3,000 D/W	Ship's gear
South side (J)				
(General & bulk cargo)				
South wharf (K)	212 m	7.0 m	One 3,000 D/W	Ship's gear
(Coal)				
Rinko wharf A1,2,3,	355 m	11 m	One 26,000 D/W	One 6 ton crane
(Bulk cargo)				One 5 ton crane
				Two 8 ton cranes
Rinko wharf B2 & 3	244 m	11 m	One 20,000 D/W	Ship's gear
(Bulk cargo)				
Rinko wharf D 1	164 m	10 m	One 10,000 D/W	One 6 ton crane
(Bulk cargo)				
Rinko wharf D 2&3	258 m	10 m	One 15,000 D/W	Two 6 ton cranes
(Bulk cargo)				
Tanker Berths:				
North Pier (F1)	85 m	10.5 m	One 30,000 D/W	One 10" pipe
(Nisseki pier)				400-450 K/L per hr.

NAME OF WHARF:	WHARF LENGTH:	MINIMUM DEPTH:	BERTHING CAPACITY:	DISCHARGING FACILITIES:
Tanker Berths;				
Rinko wharf C	278 m	11 m	One 30,000 D/W	Two 8" pipes 300-450 K/L per hr.
Rinko wharf E1	165 m	10 m	One 20,000 D/W	Two 8" pipes 450 K/L per hr.

Sea buoy for Ocean Tanker: Located at E. 39-06-04, N. 37-58-45 (Outport about 3,650 m from light house).
Discharging rate per hour: 2,000 kl
Owned by Showa Oil Co., Ltd.

AVERAGE RATE OF DISCHARGE:

Salt, Chrome Ore, Coal, Oil Cokes, Graphite, Zinc Ore	50 tons per hour by ship's gear
Rock phosphate, Potash	50-80 tons per hour ship's gear
Logs, Nickel Ore	30-40 tons per hour ship's gear

NUMBER OF BUOYS AND MOORING CAPACITY OF EACH:

Three buoys for small ships only

TANKER BERTH INFORMATION

SHOWA OIL CO., LTD., NIIGATA

RINKO WHARF - C

Depth of water (approach/alongside):	11.00 meters at low tide.
Max. permissible draft:	11.00 meters at high tide.
Length of berth:	278 meters.
Restriction on L.O.A.:	230 meters.
Berthing capacity:	36,000 TDW.
Number/size of manifold:	12"X1. 10"X1.
Discharging capacity:	1,000 k/liters per hour for crude oil. 800 k/liters per hour for fuel oil.
Estimated back-pressure:	0.5 kg/cm^2. (Pressure limit - 7.5 kg/cm^2)

RINKO WHARF E-1

Depth of water (approach/alongside):	10.50 meters at low tide.
Max. permissible draft:	10.50 meters at high tide.
Length of berth:	165 meters

Restriction on L.O.A.:	180 meters
Berthing capacity:	20,000 TDW.
Number/size of manifold:	6" X 1. 8" X 1.
Discharging capacity:	700 k/liters per hour for crude oil. 500 k/liters per hour for fuel oil.
Estimated back-pressure:	0.5 kg/cm^2. (Pressure limit-6.5 kg/cm^2)

NIPPON OIL CO., LTD., NIIGATA

NORTH PIER F - 1

Depth of water (approach/alongside):	10,80 meters at low tide.
Max. permissible draft:	10.80 meters at high tide.
Length of berth:	85 meters. (Dolphin)
Restriction on LOA:	180 meters.
Berthing capacity:	34,000 TDW.
Number/size of manifold:	16" X 1 for crude oil. 12" X 1 for fuel oil. 10" X 1 for fuel oil.
Discharging capacity:	1,000 k/liters per hour for crude oil. 800 k/liters per hour for fuel oil.
Estimated back-pressure:	0.5 kg/cm^2 - (Pressure limit - 7.5 kg/cm^2)

SHOWA OIL CO., LTD., NIIGATA

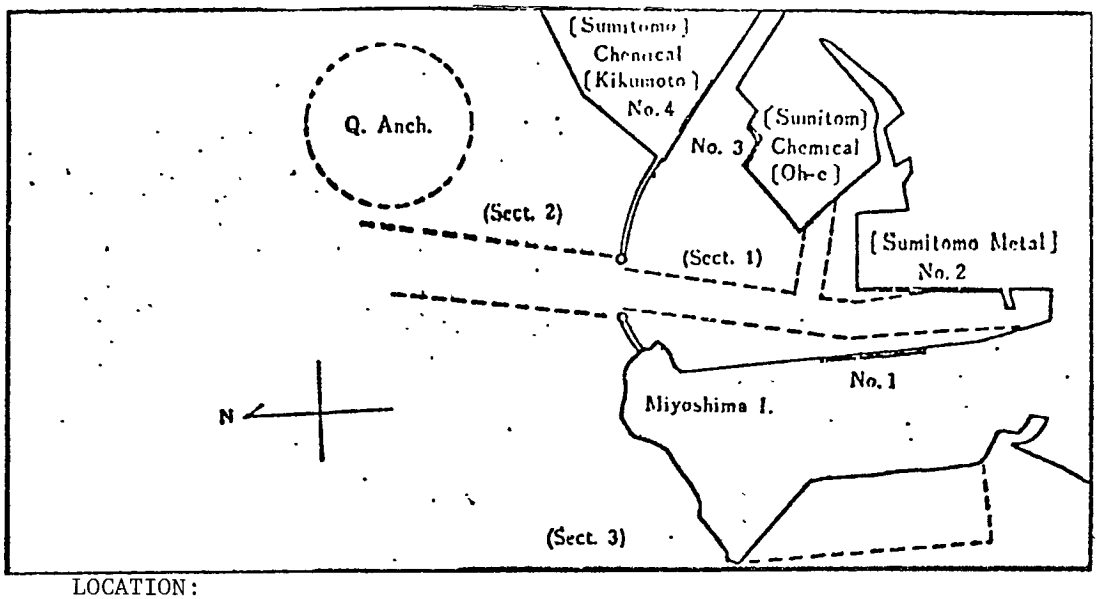
SEA - BERTH

Location:	37°58'45" No. & 139°06'04" E.
Depth of water (approach/alongside):	18.00 meters at low tide.
Max. permissible draft:	15.00 meters at low tide.
Length of berth:	Sea berth.
Restriction on L.O.A.:	240 meters.
Berthing capacity:	90,000 TDW.
Number/size of manifold:	16 X 1.
Discharging capacity:	2,500 k/liters per hour.
Estimated back-pressure:	0.5 kg/cm^2 (Pressure limit - 7.5 kg/cm^2).

TUGBOATS: Pilot requires tugboats as follows:

	FOR MOORING AND UNMOORING:
Up to 15,000 d/w	1800 HP X 1 & 850 HP X 1
20,000 d/w	1800 HP X 1 & 850 HP X 1 (or 1800 HP X 2)
30,000 d/w	1800 HP X 2
35,000 d/w	1800 HP X 2 & 850 HP X 1

N I I H A M A



LOCATION:
Latitude N. 33° 58' Longitude E. 133° 16'

HARBOUR PROTECTION:
Breakwater

BOTTOM:
Mud

MINIMUM DEPTH OF WATER AT EXTREME LOW WATER (SPRING TIDE):
In the passage: 8.5 m - 10 m

At anchorage: 8 m - 8.5 m

PARTICULARS OF EACH WHARF & BERTH:

BERTH:	LENGTH:	DEPTH:	BERTHING CAPACITY:
Berth No. 1	80 m	7.5 m	One 3,000 G/T
Berth No. 2	165 m	10.0 m	One 10,000 G/T
Berth No. 3	dolphin	6.5 m	One 9,000 G/T
Berth No. 4	120 m	9.0 m	One 10,000 G/T
Berth A	anchorage	8.5 m	One 10,000 G/T
Berth B	anchorage	9.0 m	One 10,000 G/T
Berth C	anchorage	9.0 m	One 10,000 G/T
Berth D	anchorage	8.0 m	One 5,000 G/T

Remarks:

Berth No. 1: Owned by Sumitomo Chemical Co., Ltd., Niihama Works and used of fertilizer by ship's gear.

Berth No. 2: Owned by Sumitomo Metal Mining Co., Ltd., and equipped with two 5 ton luffing cranes with maximum reach of 22 m and maximum height of 20 m which is used for discharging of Nickel Ore,

Copper Concentrates, Nickel Copper Concentrates and others. Ship's gear also used.

Berth No. 3: Owned by Sumitomo Chemical Co., Ltd., Oye Works and used for loading and discharging of clean oil only.

Berth No. 4: Owned by Sumitomo Chemical Co., Ltd., Kikumoto Works and used for discharging of Bauxite, anthracite coal, salt, fluorspar and loading of Alumina. Three 5-ton level mobil cranes with maximum reach 22 m, maximum height 20 m.

Berth A : Public berth (anchorage) for general purposes.

Berth B : Exclusively used by Sumitomo Chemical Co., Ltd., Niihama Works for loading of fertilizer and discharging of phosphate and potash. Possible to use for general purposes by permission of Sumitomo Chemical Co., Ltd., Niihama Works. Vessel's stern moored to wharf and two anchors to be dropped in 4 shackles each.

Berth C : - ditto -

Berth D : - ditto -

AVERAGE OF DISCHARGE:

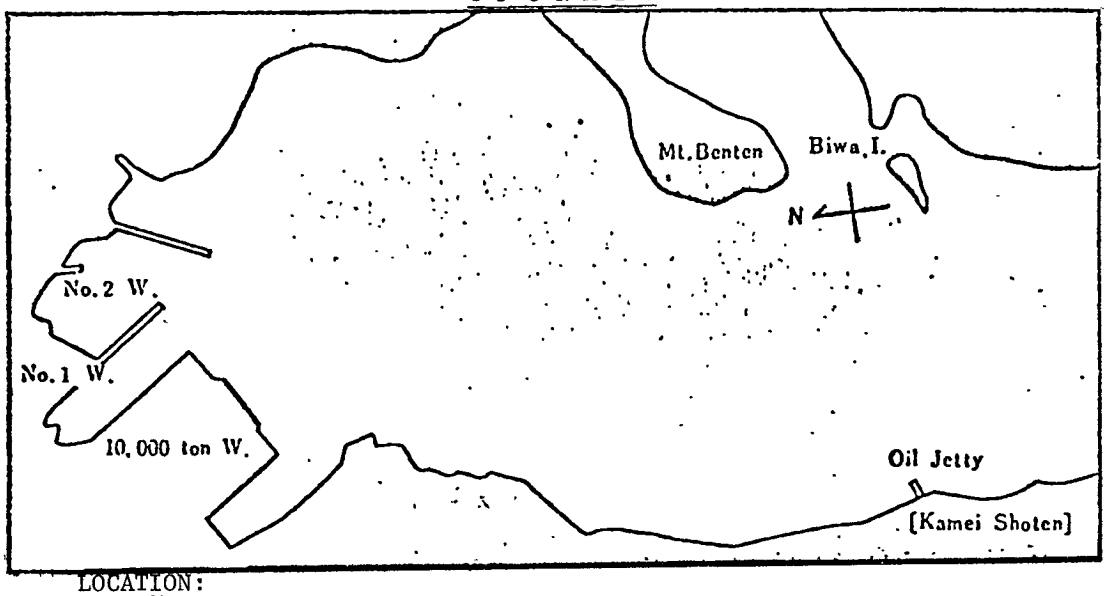
Phosphate	:	70 - 90 tons by ship's gear
Potash	:	40 - 60 tons by ship's gear
Copper Concentrates	:	60 - 90 tons by ship's gear & 130 - 150 tons by crane
Nickel Concentrates	:	70 - 90 tons by ship's gear & 130 - 150 tons by crane
Nickel Ore	:	40 - 70 tons by ship's gear & 40 - 70 tons by crane
Bauxite	:	80 -100 tons by crane
Anthracite Coal	:	50 - 70 tons by ship's gear & 80 - 100 tons by crane
Salt	:	50 -100 tons by ship's gear & 80 - 100 tons by crane
Lumber	:	13,000 - 15,000 FBM by ship's gear

AVERAGE RATE OF LOADING:

Fertilizer in bags	:	30 - 65 tons per hour by ship's gear
Alumina in bulk	:	100 tons per hour by two pneumatic loaders.

NUMBER OF BUOYS AND MOORING CAPACITY OF EACH:
No buoy.

OFUNATO



LOCATION:
Latitude N. 38° 59' Longitude E. 141° 48'

HARBOUR PROTECTION:
Natural

BOTTOM:
Mud mixed with sand

MINIMUM DEPTH OF WATER AT EXTREME LOW WATER (SPRING TIDE):
In the passages: 40 m

At anchorage: 11 m - 15 m

PARTICULARS OF EACH WHARF:

NAME OF WHARF:	WHARF LENGTH:	MINIMUM DEPTH:	BERTHING CAPACITY:	DISCHARGING FACILITIES:
Wharf	400 m	9 m	1 X 10,000 G/T	No facilities at present

NUMBER OF BUOYS AND MOORING CAPACITY OF EACH:
One buoy: For tanker with mooring capacity of 30,000 G.R.T.

AVERAGE RATE OF DISCHARGE:
Diesel oil in bulk: 500 - 800 tons per hour (Working around a clock)
Coal in bulk : 40 - 50 tons per gang hour.
Petcoke in bulk : 40 - 50 tons per gang hour.
Lauan logs : 53,000 FBM per gang hour.
American logs : 24,000 FBM per gang hour.

TANKER BERTH INFORMATION

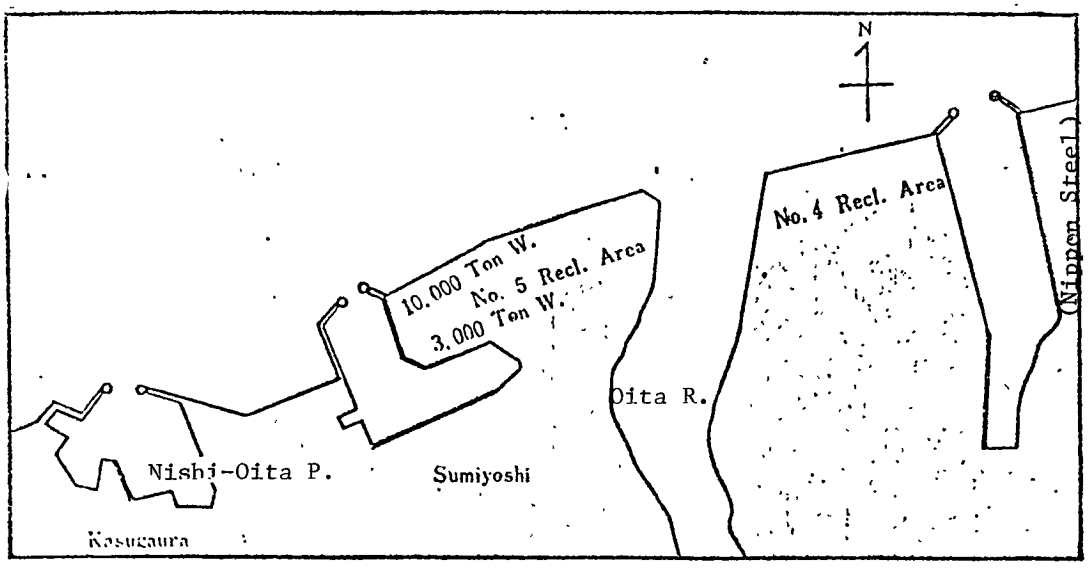
STORAGE CENTER
Depth of water (approach): 40.00 meters at low tide.

Depth of water (alongside):	15.20 meters at low tide.
Max. permissible draft:	12.20 meters at low tide.
Length of berth:	30 meters. (Dolphin)
Restriction on L.O.A:	210 meters.
Berthing capacity:	50,000 TDW.
Number/size of manifold:	8" X 2.
Discharging capacity:	800 k/liters per hour.
Estimated back-pressure:	2 kg/cm^2.

TUG-BOATS: Pilot requires tugboats of as follows:

	FOR MOORING:	FOR UNMOORING:
Up to 10,000 g/t	300 HP X 2	300 HP X 2
15,000 g/t	300 HP X 3	300 HP X 3
20,000 g/t	300 HP X 3	300 HP X 3

O I T A



LOCATION:
Latitude N. 33° 15'00" Longitude E. 131° 36'15"

HARBOUR PROTECTION:
Breakwater

BOTTOM:
Mud and sand

MINIMUM DEPTH OF WATER AT EXTREME LOW WATER (SPRING TIDE):
At anchorage: 35 m (33° 15'20" N. 131° 35'45" E.)

In the passage: 15 m

PARTICULARS OF EACH BERTH:

NAME OF BERTH:	BERTH LENGTH	BERTH DEPTH:	BERTHING CAPACITY:	SHORE FACILITIES:
Sumiyoshi berth	184 m	9 m	Max. LOA-168 m Max. draft - 9 m	None

KYUSYU OIL CO., LTD., OITA

KYUSYU OIL BERTH

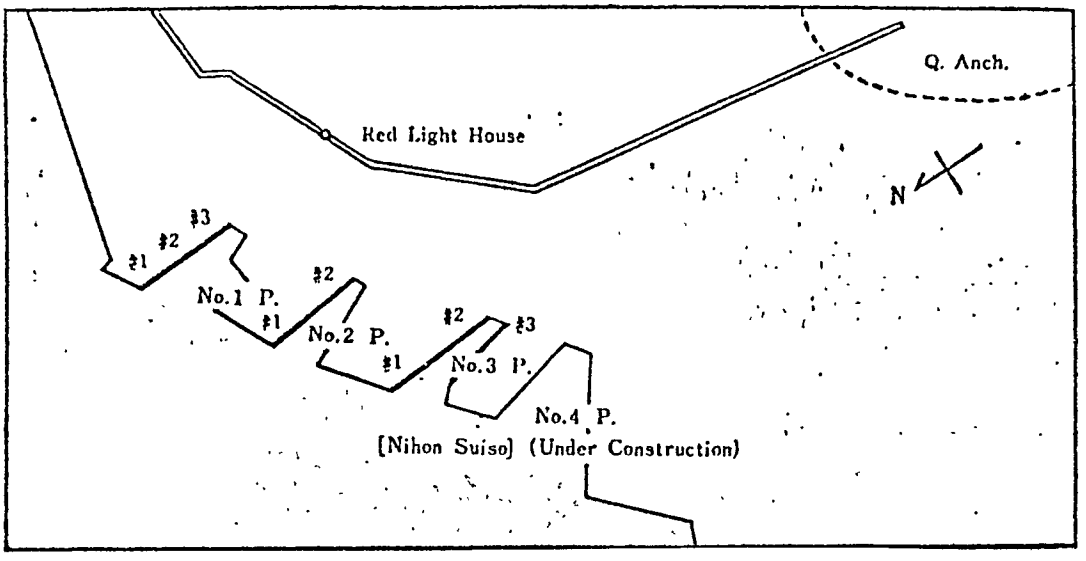
Depth of water (approach/alongside):	20.00 meters at low tide.
Max. permissible draft:	19.00 meters at low tide.
Length of berth:	Dolphin.
Restriction on L.O.A:	330 meters.
Berthing capacity:	200,000 TDW.
Number/size of manifold:	12" X 4. - ASA type.
Discharging capacity:	6,000 - 12,000 k/liters per hour.
Estimated back-pressure:	Negligible.

TUG-BOATS: Pilot requires tugboats as follows:

	FOR MOORING:	FOR UNMOORING:
Up to 45,000 d/w	1500 HP X 2	1500 HP X 2
70,000 d/w	1500 HP X 4 or 2000 HP X 3	1500 HP X 4 or 2000 HP X 3
100,000 d/w	2000 HP X 4 or 2500 HP X 3	2000/2500 HP X 3
120,000 d/w	2500/3000 HP X 4	2500/3000 HP X 3
150,000 d/w	2500/3000 HP X 4	2500/3000 HP X 3

NOTE: The Nippon Steel facilities are described in Chapter IV.

O N A H A M A



LOCATION:
Latitude N. 36°55'42" Longitude E. 140°54'

HARBOUR PROTECTION:
Breakwater

BOTTOM:
Mud with sand

MINIMUM DEPTH OF WATER AT EXTREME LOW WATER (SPRING TIDE):
In the passage: 10 m

At anchorage: 14 - 22 m

PARTICULARS OF EACH WHARF:

NAME OF BERTH:	BERTH LENGTH:	BERTH DEPTH:	SHORE FACILITIES:
No. 1 - 1	238 m	7.6 m	2 X 6 T Ship's gear also used
No. 1 - 2	140 m	9.0 m	1 X 5 T
	There is a shallow spot of 7.6 m deep on way to No. 1 pier.		
No. 2 - 1	165 m	9.0 m	2 X 8 T Ship's gear also used
No. 2 - 2	185 M	10.0 m	
No. 3 - 1	175 m	10.0 m	3 X 8 T Ship's gear also used
No. 3 - 2	175 m	10.0 m	
No. 3 - 3	175 m	10.0 m	2 X 8 T Ship's gear also used
No. 3 - 4	175 m	10.0 m	

N.B. There is bed rock besides the passage on the way from the anchorage to the above piers; details of which are as follows:
Length & Breadth - Approx. 100 m X 30 m
Depth of water - 9.20 m at low tide

AVERAGE RATE OF DISCHARGE:

	BY SHIP'S GEAR:	BY BRIDGE TRANSPORTER:
Rock Phosphate in bulk:	50-60 tons	120-200 tons per gang hour
Salt in bulk:	50-55 tons	120-150 tons per gang hour
Coal/Concentrate:	50-55 tons	150-250 tons per gang hour
Calcium Chloride:	50-55 tons	150-200 tons per gang hour

(Usually 3 gangs only.)

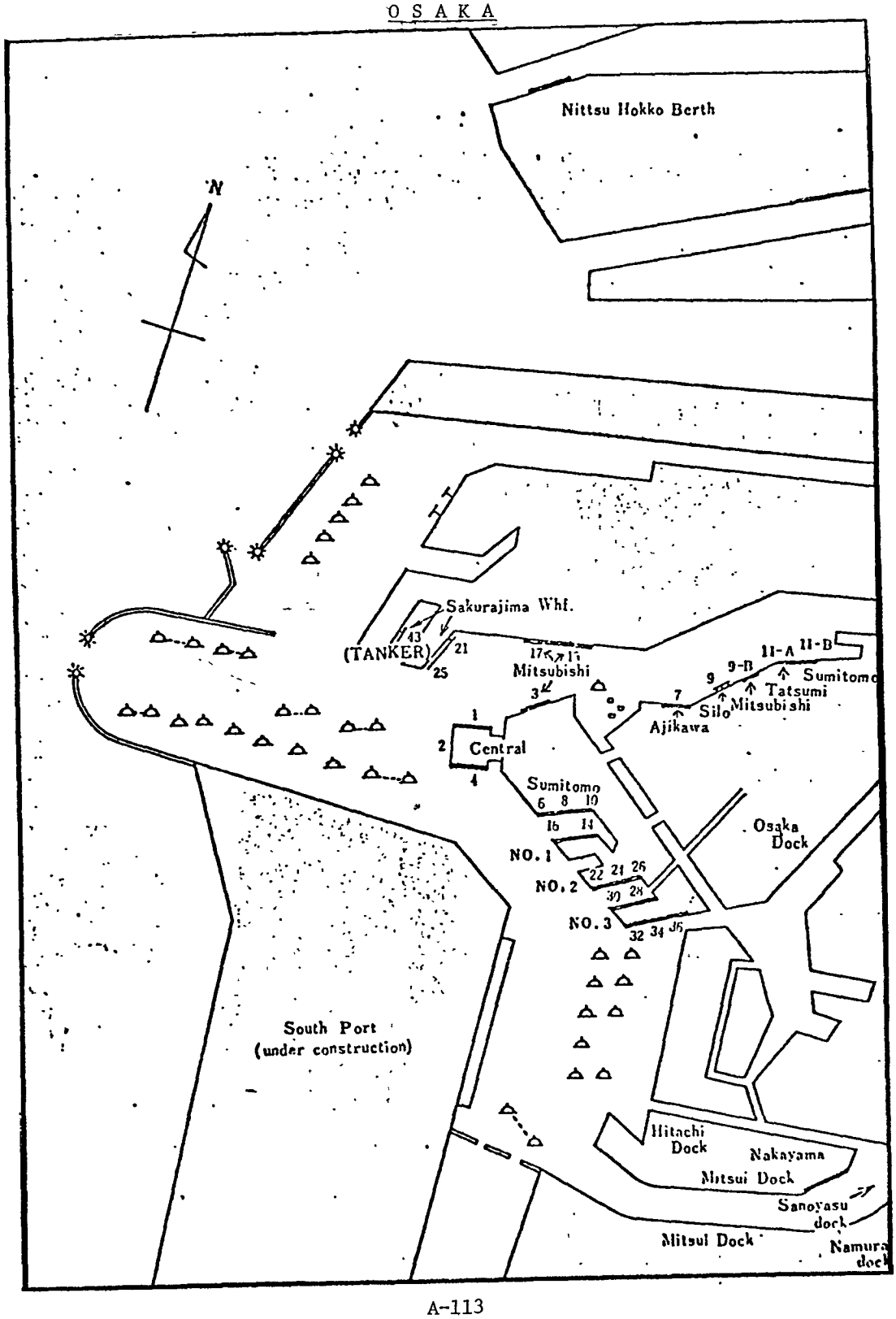
AVERAGE RATE OF LOADING:

Sulphate Ammonium in bag : 45-50 tons per gang hour
Calcium Super Phosphate in bag: 45-50 tons per gang hour
(Usually 3 gangs only, 2 gangs by ship's gear and 1 gang by bridge transporter)

NUMBER OF BUOYS AND MOORING CAPACITY OF EACH:

None

OSAKA


Nittsu Hokko Berth
N
Sakurajima Whf.
(TANKER)
43
21
25
17
13
Mitsubishi
3
1
2
Central
4
Sumitomo
6
8
10
16
14
NO. 1
22
24
26
NO. 2
30
28
NO. 3
32
34
36
11-A
11-B
9
9-B
Sumitomo
Tatsumi
7
Silo
Mitsubishi
Ajikawa
Osaka Dock
South Port
(under construction)
Hitachi Dock
Nakayama
Mitsui Dock
Sanoyasu dock
Mitsui Dock
Namura dock

LOCATION:
Latitude N. 34°39' Longitude E. 135°26'

HARBOUR PROTECTION:
Breakwater

BOTTOM:
Silt over clay

MINIMUM DEPTH OF WATER AT EXTREME LOW WATER (SPRING TIDE):
At anchorage: 8.30 - 12.50 m

In the passages: 9.40 - 12.50 m

PARTICULARS OF BERTH:

NAME OF BERTH:	BERTH LENGTH (MAX. LOA):	BERTH DEPTH (MAX. DRAFT):	SHORE FACILITIES
PUBLIC BERTH			
Central Pier, 1	(200 m)	11.0 m (10.0 m)	None
2, 4	(180 m)	9.8 m (9.8 m)	None
No. 1 Pier, 14, 16	341 m	10.1 m (10.0 m)	None
No. 2 Pier, 22, 24,26	375 m	8.6 m (8.5 m)	None
No. 3 Pier, 28, 30	359 m	10.0 m (9.8 m)	None
32, 34,36	359 m	6.6 m (9.6 m)	None
Ajikawa Wharf, 7	230 m	9.8 m (9.1 m)	None
North Port			
(Dolphine) 11	(170 m)	9.5 m (9.3 m)	None
(Dolphine) 27	(130 m)	7.5 m (6.8 m)	None
PRIVATELY-OWNED/OPERATED BERTH			
Sumitomo Warehouse Co.			
6, 8, 10	500 m	10.1 m (10.0 m)	None
11 - B		10.0 m (9.4 m)	
Mitsubishi Warehouse Co.			
3	(145 m)	7.5 m (7.5 m)	None
15, 17	275 m	9.9 m (9.9 m)	None
9 - B	(150 m)	9.8 m (9.8 m)	None
Tatsumi Warehouse Co.			
11A		9.8 m (9.8 m)	None
Osaka Silo-wharf Co.			
(Dolphine) 9	(196 m)	10.5 m (10.0 m)	2 suckers X 125 T/H
Sakurajima Wharf Co.			
21/25	395 m	12.0 m (10.0 m)	2 X 250 T/H (Coal)
(Coal, Salt, Concentrate, etc.)			1 X 1,000 T/H (Coal)
(Dolphine) 43		10.6 m (10.2 m)	
(Tsnker berth)			

NAME OF BERTH:	BERTH LENGTH (MAX LOA):	BERTH DEPTH (MAX. DRAFT):	SHORE FACILITIES
Nakayama Steel Mill (Ore/Coal)	(155 m)	8.5 m (8.5 m)	
Nippon Express Co. (Located on the outskirts of Osaka Port)			
Nittsu Hokko Berth (Discharging logs/lumber ashore, Scrap into lighters)	256 m	12.0 m	1 X 30 T 1 X 10.3 T

NUMBER OF BUOYS:

MAX. PERMISSIBLE DRAFT:	NUMBER OF BUOYS:
Below 8.0 m	3 buoys
Below 9.0 m	5 buoys
Below 9.5 m	3 buoys
Below 10.0 m	2 buoys
Below 10.5 m	6 buoys

Discharging of logs into water is limited to:

Buoys No. 23	Max. draft:	7.2 m
No. 25		7.4 m
No. 26		7.6 m
No. 27		10.4 m
No. 20 - 21		8.3 m

TANKER BERTH INFORMATION

SAKURAJIMA WHARF

WHARF No. 49

Depth of water (approach/alongside):	10.00 meters at high tide.
Max. permissible draft:	9.00 meters at high tide.
Length of berth:	270 meters.
Restriction on L.O.A:	200 meters.
Berthing capacity:	30,000 TDW.
Number/size of manifold:	8" X 1 - JIS type.
Discharging capacity:	1,500 longtons per hour.
Estimated back-pressure:	Negligible.

TOYO FUTO CO., LTD., OSAKA

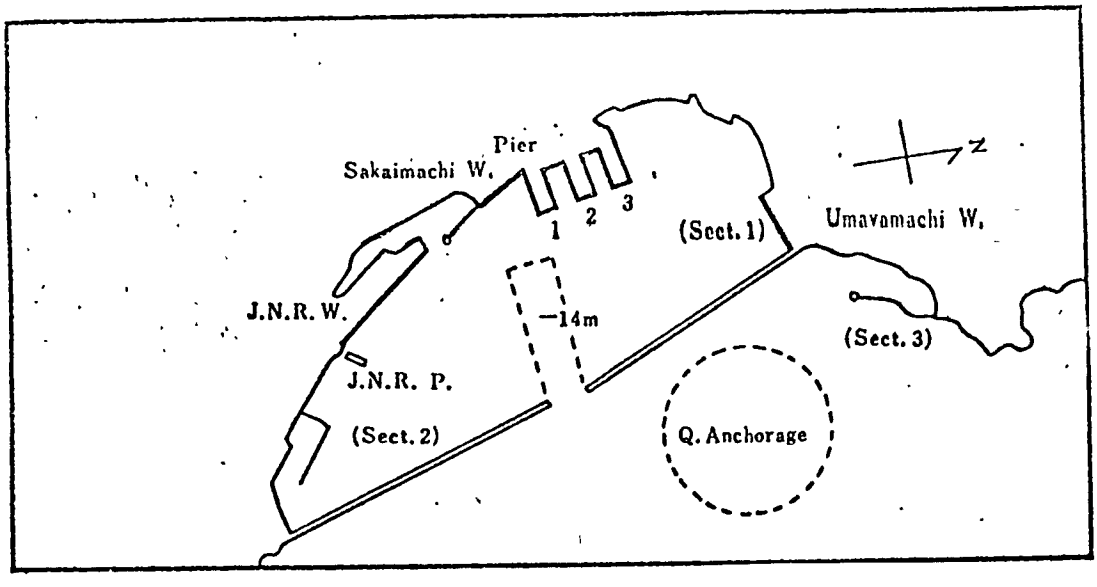
W - 43

Depth of water (approach):	10.20 meters at high tide.
Depth of water (alongside):	10.20 meters at high tide.
Max. permissible draft:	9.20 meters at high tide.
Length of berth:	60 meters between dolphines.
Restriction on L.O.A:	Not specified.
Berthing capacity (max.):	
Number/size of manifold:	8" X 1 - ASA 150 Lbs for Gas 12" X 1 - ASA 150 Lbs for Liquid.
Discharging capacity:	700 longtons per hour.
Estimated back-pressure:	Negligible.

TUG-BOATS: Pilot requires tugboats as follows:

	FOR MOORING AND UNMOORING:
Up to 10,000 g/t	2000 HP X 1 & 1500 HP X 1
15,000 g/t	2000 HP X 2
20,000 g/t	2000 HP X 2

O T A R U



LOCATION:
Latitude N. 43°12" Longitude E. 141° 01'

HARBOUR PROTECTION:
Breakwater

BOTTOM:
Mud with sand

MINIMUM DEPTH OF WATER AT EXTREME LOW WATER (SPRING TIDE):
In the passages: 10 - 15 m

At anchorage: 7 - 14 m

PARTICULARS OF EACH WHARF:

NAME OF WHARF:	WHARF LENGTH:	MINIMUM DEPTH:	BERTHING CAPACITY:	DISCHARGING FACILITIES:
No. 1 Pier (Phosphate, logs & wheat)				
Berth 1 & 2	339 m	9.0 m	One 6,000 G/T	Ship's gear
		10.0 m	One 10,000 G/T	Ship's gear
Berth 3	127 m	10.0 m	One 3,000 G/T	Ship's gear
Berth 4 & 5	293 m	9.0 m	Two 6,000 G/T	Ship's gear
No. 2 Pier (Phosphate, logs & wheat)				
Berth 7 & 8	293 m	9.0 m	Two 6,000 G/T	Ship's gear
Berth 9	126 m	9.0 m	One 3,000 G/T	Ship's gear
Berth 10 & 11	293 m	9.0 m	Two 6,000 G/T	Ship's gear

NAME OF WHARF:	WHARF LENGTH:	MINIMUM DEPTH:	BERTHING CAPACITY:	DISCHARGING FACILITIES:
No. 3 Pier (Phosphate, logs & wheat)				
Berth 13	158 m	9.0 m	One 10,000 G/T	Ship's gear
Berth 14	128 m	9.0 m	One 8,000 G/T	Ship's gear
Berth 15	127 m	7.5 m	One 3,000 G/T	Ship's gear
Berth 16 - 17	361 m	10.0 m	One 10,000 G/T	Ship's gear

AVERAGE RATE OF DISCHARGE:

Grain	50 - 60 tons per ganghour
Phosphate	25 - 30 tons per gang hour
Log	25 tons per gang hour
Fertilizer	35 tons per gang hour

NUMBER OF BUOYS AND MOORING CAPACITY OF EACH:

Five buoys Three 10,000 G/T One 12,000 G/T One 6,000 G/T

O W A S E

Remark: No harbor configuration sketch available

Geographical location:	34°04' N. & 136°14' E.
Bottom:	Sand & mud.
Harbour protection:	No breakwater - surrounded by land and small islands.

TOHO OIL CO., LTD., OWASE

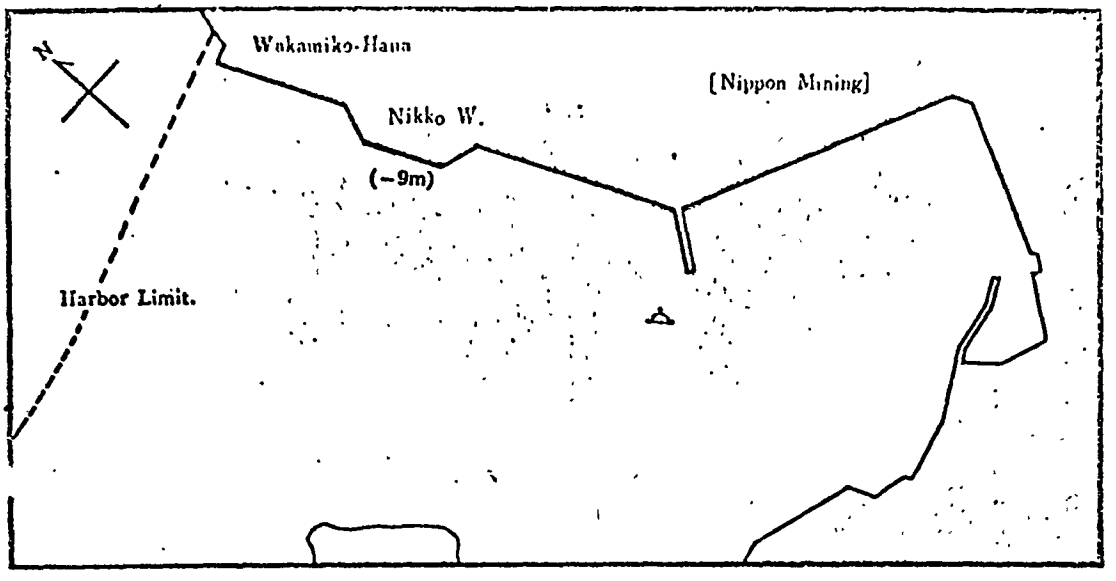
TOHO OIL BERTH

Depth of water (approach):	19.00 meters at low tide.
Depth of water (alongside):	16.50 meters at low tide.
Max. Permissible draft:	15.50 meters at low tide.
Length of berth:	125 meters.
Restriction on L.O.A.	300 meters.
Berthing capacity:	150,000 TDW.
Buoy & mooring capacity:	250 k/t X 2 & 200 k/t X 2.
Number/size of manifold:	12" X 2 - JIS type.
Discharging capacity:	5,000 k/liters per hour for crude oil. 2,000 k/liters per hour for fuel oil.
Estimated back-pressure:	2.5 kg/cm^2.

TUG-BOATS: Pilot requires tugboats as follows:

	FOR MOORING:	FOR UNMOORING:
Up to 45,000 d/w		
70,000 d/w		
100,000 d/w		
120,000 d/w		
150,000 d/w		

S A G A N O S E K I



LOCATION:
Latitude N. 33°14'15" Longitude E. 131°52'00"

HARBOUR PROTECTION:
Natural

BOTTOM:
Mud and sand

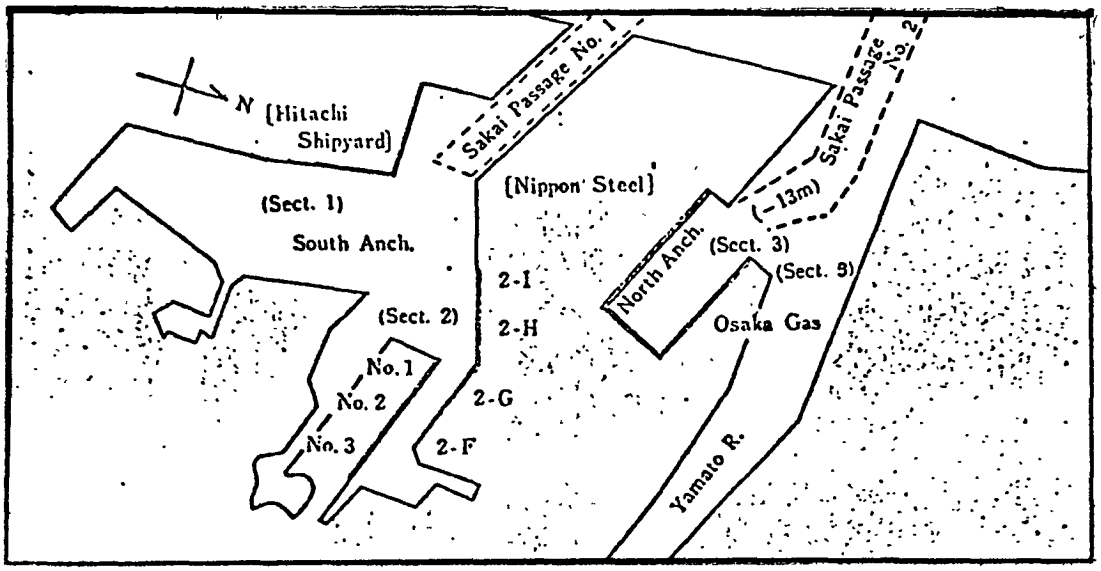
MINIMUM DEPTH OF WATER AT EXTREME LOW WATER (SPRING TIDE):
In the passages: 21 - 15 m

At anchorage: 13 - 12 m

PARTICULARS OF EACH BERTH:

NAME OF WHARF:	LENGTH:	MIN. DEPTH:	MAX. DRAFT:	BERTHING CAPACITY:	SHORE FACILITIES:
OWNED BY NIPPON MINING CO., LTD. (Smelters)					
NIKKO wharf	100 m	9.1 m	8.9 m		5 T X 3 cranes
NIKKO new wharf	200 m	9.1 m	8.9 m		40/70 per hour each.
(Both on an extension line)					

S A K A I (Under jurisdiction of Osaka Port)



LOCATION:
Latitude N. 34° 34' Longitude E. 135°27'

HARBOUR PROTECTION:
Lnadlocked

BOTTOM:
Silt over clay

MINIMUM DEPTH OF WATER AT EXTREME LOW WATER (SPRING TIDE):
At anchorage : 12.5 m

In the passages: 14.5 m

PARTICULARS OF EACH BERTH:

NAME OF BERTH:	BERTH LENGTH:	BERTH DEPTH:	MAX. PERMISSIBLE DRAFT:	SHORE FACILITIES:
Osaka Gas Co. (Coaking Coal)	400 m (Max. LOA - 250 m)	14.5 m	12.5 m	1 X 18 T 2 X 10 T Max. outreach: 20 m Max. height : 20 m Capacity: Total 800 T/H
Nippon Steel Corp. (Ore/Coal)	450 m (Max. LOA - 250 m)	14.5 m	12.5 m	3 X 22 T 2 X 18 T Max. outreach: 23 m Max. height : 14.2 m

NAME OF BERTH:	LENGTH:	DEPTH:	MAX. PERMISSIBLE DRAFT:	SHORE FACILITIES:
(Loading of Steel Product)	220 m	9.2 m		2 X 18 T Max. outreach: 20 m Max. height : 20 m

NUMBER OF BUOYS:
None

TANKER BERTH INFORMATION

KANSAI OIL CO., LTD., SAKAI

KANSAI OIL BERTH

Depth of water (approach/alongside):	16.00 meters at low tide.
Max. permissible draft:	16.00 meters at high tide.
Length of berth:	Dolphin berth
Restriction on L.O.A:	Not specified.
Berthing capacity:	150,000 TDW.
Number/size of manifold:	12" X 3 - JIS type
Discharging capacity:	6,000 k/liters per hour.
Estimated back-pressure:	Negligible.

GENERAL SEKIYU CO., LTD., SAKAI

GENERAL OIL BERTH

Depth of water (approach/alongside):	16.00 meters at low tide.
Max. permissible draft:	16.00 meters at high tide.
Length of berth:	Dolphin berth
Restriction on L.O.A:	Not specified.
Berthing capacity:	150,000 TDW.
Number/size of manifold:	12" X 3 - JIS type.
Discharging capacity:	8,000 longtons per hour.
Estimated back-pressure	Negligible.

KOA OIL CO., LTD., SAKAI

KOA OIL BERTH

Depth of water (approach/alongside):	16.00 meters at low tide.
Max. permissible draft:	16.00 meters at high tide.
Length of berth:	400 meters.
Restriction on L.O.A:	Not specified.

Berthing capacity:	150,000 TDW.
Number/size of manifold:	12" X 3 - JIS type.
Discharging capacity:	7,000 longtons per hour.
Estimated back-pressure:	Negligible.

UBE INDUSTRIES, LTD., SAKAI

UBE L.P.G. WHARF

Depth of water (approach/alongside):	9.00 meters at low tide.
Max. permissible draft:	9.00 meters at high tide.
Length of berth:	32 meters
Restriction on L.O.A:	Not specified.
Berthing capacity	13,000 TDW.
Number/size of manifold:	8" X 1 - 300 Lbs. ASA type.
Discharging capacity:	1,000 longtons per hour.
Estimated back-pressure:	Negligible.

MITSUI TOYO KOATSU INDUSTRIES, INC., SAKAI

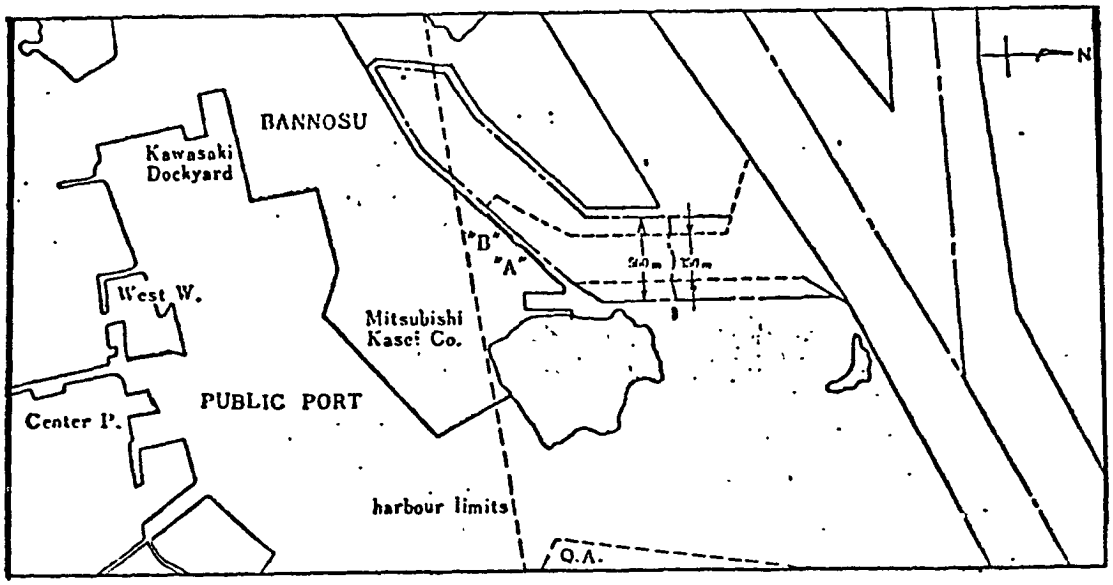
KOATSU WHARF (L.P.G)

Depth of water (approach):	16.00 meters at high tide.
Depth of water (alongside):	14,80 meters at high tide.
Max. permissible draft:	16.00 meters at high tide.
Length of berth:	414 m (OVER ALL)
Restriction on L.O.A:	
Berthing capacity:	49,000 TDW.
Number/size of manifold:	8" X 1 - 300 Lbs ASA type. 8" X 1 - 20 kgs JIS type.
Discharging capacity:	1,000 longtons per hour.
Estimated back-pressure:	Negligible.

TUG-BOATS: Pilot requires tugboats as follows:

	FOR MOORING AND UNMOORING
Up to 45,000 d/w	2000 HP X 2
70,000 d/w	2000 HP X 3
100,000 d/w	2000 HP X 3 or 4
150,000 d/w	3000 HP X 2 & 2000 HP X 3

S A K A I D E



LOCATION:
Latitude N. 34°19' Longitude E. 133°51'

HARBOUR PROTECTION:
At Public Port: Breakwater
At Bannosu Mitsubishi Port: Landlocked

BOTTOM:
Mud mixed with sand

MINIMUM DEPTH OF WATER AT EXTREME LOW WATER (SPRING TIDE):
At anchorage: 9 - 13 m

In the passage: At public port - 9.3 m at high tide
There is one shoal at the entrance into the harbour with the depth of 7.8 m at spring tide; however, the draft of max. 9.3 is permissible at high tide. At Bannosu Mitsubishi Port - 13 m.

PARTICULARS OF EACH BERTH:

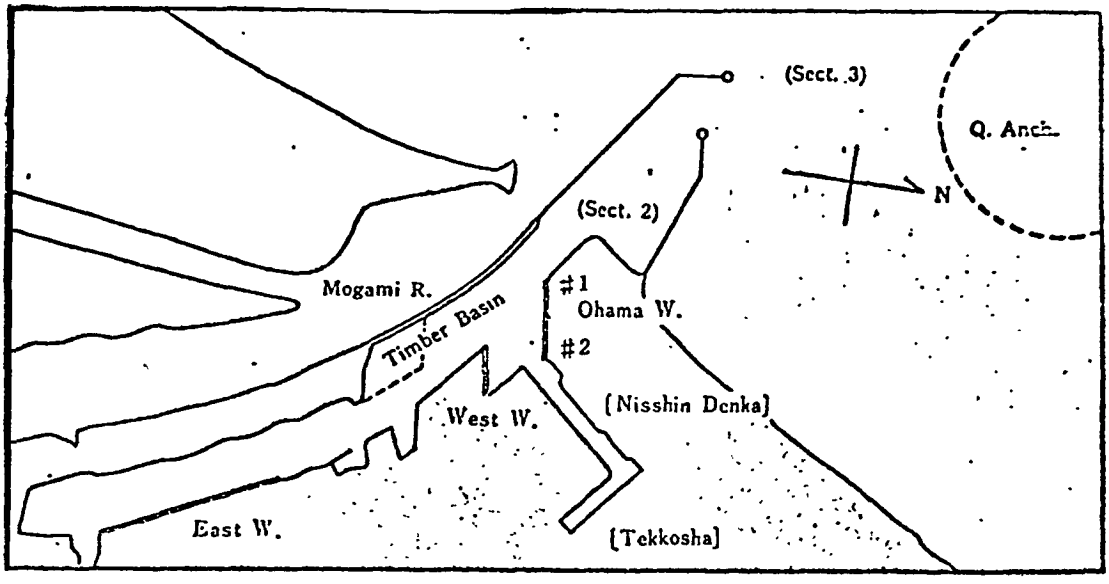
NAME OF BERTH:	BERTH LENGTH:	BERTH DEPTH: (Max draft)	BERTHING CAPACITY:	SHORE FACILITIES:
PUBLIC PORT				
Center Pier East	220 m	10 m (9.3 m)	One 13,000 G/T	Ship's gear
Center Pier North	174 m	8 m (7.5 m)	One 5,000 G/T	Ship's gear

NAME OF BERTH:	BERTH LENGTH:	BERTH DEPTH:	BERTHING CAPACITY:	SHORE FACILITIES:
West Wharf	274 m	7 m (7.0 m)	One 5,000 G/T	Ship's gear
BANNOSU MITSUBISHI PORT (Owned by Mitsubishi Kasei Kogyo Co.)				
"B" Berth	365 m	13 m		2 cranes X 500 T/H Max. outreach: 22.5 m 26.5 m Max. height: 32 m 32 m
The following berth is under construction with expected completion at the end of 1971				
"A"	275 m	13 m		1 crane X 1,500 T/H

BUOYS:
Unavailable

PORT IMPROVEMENT PLAN:
Mitsubishi Kasei Kogyo now plan to dredge the depth of water upto 17 m in order to accommodate 100,000 TDW.

S A K A T A



LOCATION:
Latitude N. 38°57' Longitude E. 139°48'

HARBOUR PROTECTION:
Breakwaters

BOTTOM:
Mud mixed with sand

MINIMUM DEPTH OF WATER AT EXTREME LOW WATER (SPRING TIDE):
In the passages: 9.0 - 9.50 m

At anchorage: 8.0 - 8.50 m

PARTICULARS OF EACH WHARF:

NAME OF WHARF:	WHARF LENGTH:	MINIMUM DEPTH:	BERTHING CAPACITY:
West Pier (General Cargo)	250.0 m	6.70 m	Two 5,000 G/T One 10,000 G/T
East Pier	650.0 m	5.50 m	Eight 1,000 G/T
Ohama Pier (General Cargo)	330.0 m	8.30 m	Two 8,000 G/T

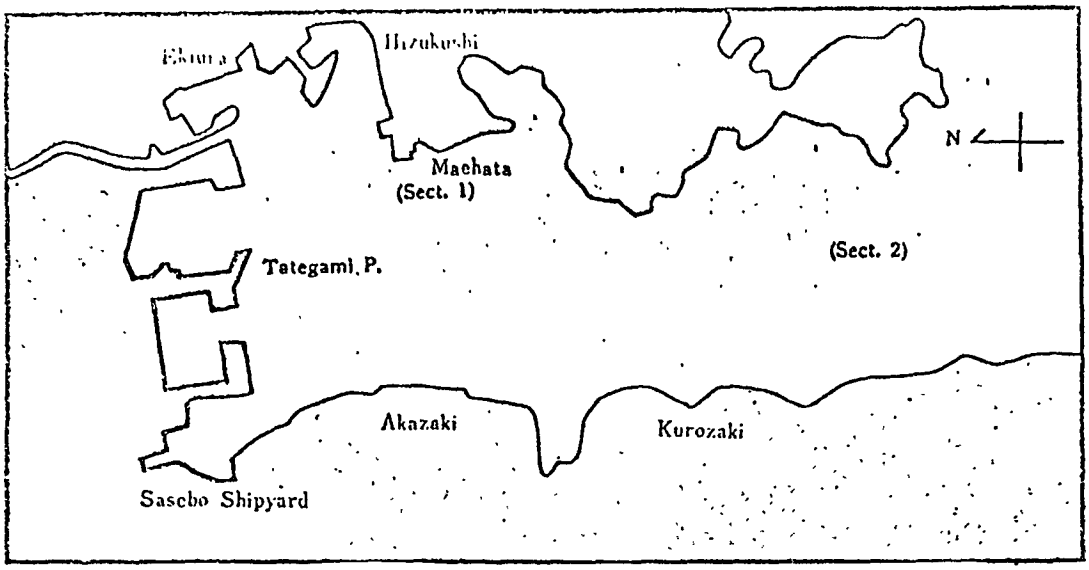
AVERAGE RATE OF DISCHARGE:

Ore	:	50 tons per hour by ship's gear
Coal	:	60 tons per hour by ship's gear
Salt	:	60 tons per hour by ship's gear
Rock Phosphate	:	70 tons per hour by ship's gear
Log (discharge into water)	:	180 tons per hour by ship's gear

NUMBER OF BUOYS AND MOORING CAPACITY OF EACH:
One buoy: 5,000/6,000 G/T class for log discharge

PORT IMPROVEMENT PLAN:
Construction of new port is planned on the North side of the present port, particulars of which are still not known.

S A S E B O



LOCATION:
Latitude N. 33°05'48" Longitude E. 129°40'24"

HARBOUR PROTECTION:
Natural

BOTTOM:
Mud mixed with sand and rock

MINIMUM DEPTH OF WATER AT EXTREME LOW WATER (SPRING TIDE):
In the passage: 23 - 54 m

At anchorage: 9.7 m - 23 m

PARTICULARS OF EACH BERTH:

NAME OF BERTH:	BERTH LENGTH:	BERTH DEPTH:	BERTHING CAPACITY:	SHORE FACILITIES:
AVAILABLE FOR COMMERCIAL VESSELS UNDER U.S. NAVY PERMIT				
Tategami No. 6	192 m	31'	One 20,000 G/T	1 x 15 T
Tategami No. 7	182 m	31'		Ship's gear
Public Berth				
Maehata Gaibo No. 1	185 m	33'	One 20,000 G/T	Ship's gear
Maehata Wharf	143 m	15'		1 X 4 T
Hizukushi Wharf	103 m	15'	One 3,000 G/T	1 x 1 T
Ekiura Wharf	150 m	16'	One 5,000 G/T	Ship's gear
			5/15-ton Mobile Cranes available at the above four public berths	

NAME OF BERTH:	BERTH LENGTH:	BERTH DEPTH:	BERTHING CAPACITY:	SHORE FACILITIES:
EXCLUSIVELY USED BY U.S. NAVY				
Tategami No. 1	254.4 m	31'	One 20,000 G/T	For ship repairs 1 X 10 T
EXCLUSIVELY USED BY SASEBO HEAVY INDUSTRY FOR SHIP REPAIRS				
Tategami No. 2	182 m	31'	One 20,000 G/T	1 X 15 T
Tategami No. 3	182 m	31'	One 20,000 G/T	
Tategami No. 4	192 m	31"	One 20,000 G/T	1 X 10 T
Tategami No. 5	192 m	31'	One 20,000 G/T	1 X 15 T 1 X 250 T

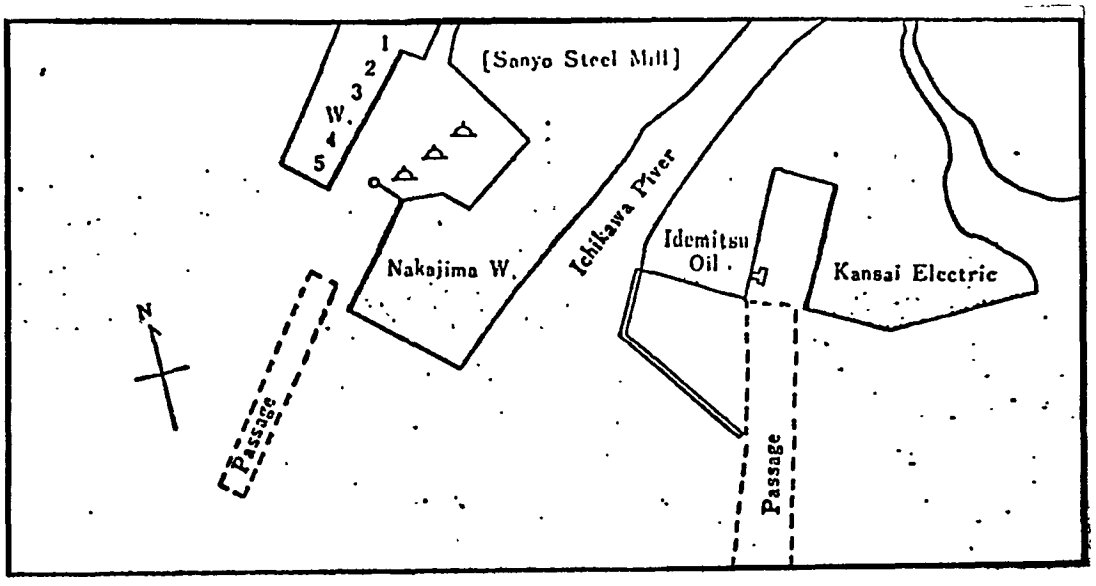
AVERAGE RATE OF DISCHARGE:

Oil:	1,000 - 3,000 tons per hour depending upon nature of oil
Wheat Bran:	2,000 tons per day
Rice and Maize:	
General Cargo:	300 tons per day per gang

NUMBER OF BUOYS AND MOORING CAPACITY OF EACH:

There are 40 buoys in this harbour, and these are for the sole use of the U.S. and Japanese Naval Fleets, but several buoys are used for commercial vessels under the permission of the U.S. Navy.

S H I K A M A (HEMEJI)



LOCATION:
Latitude N. 34°36' Longitude E. 134°38'

HARBOUR PROTECTION:
Breakwater

BOTTOM:
Sand

MINIMUM DEPTH OF WATER AT EXTREME LOW WATER (SPRING TIDE):
In the passage: 9 m

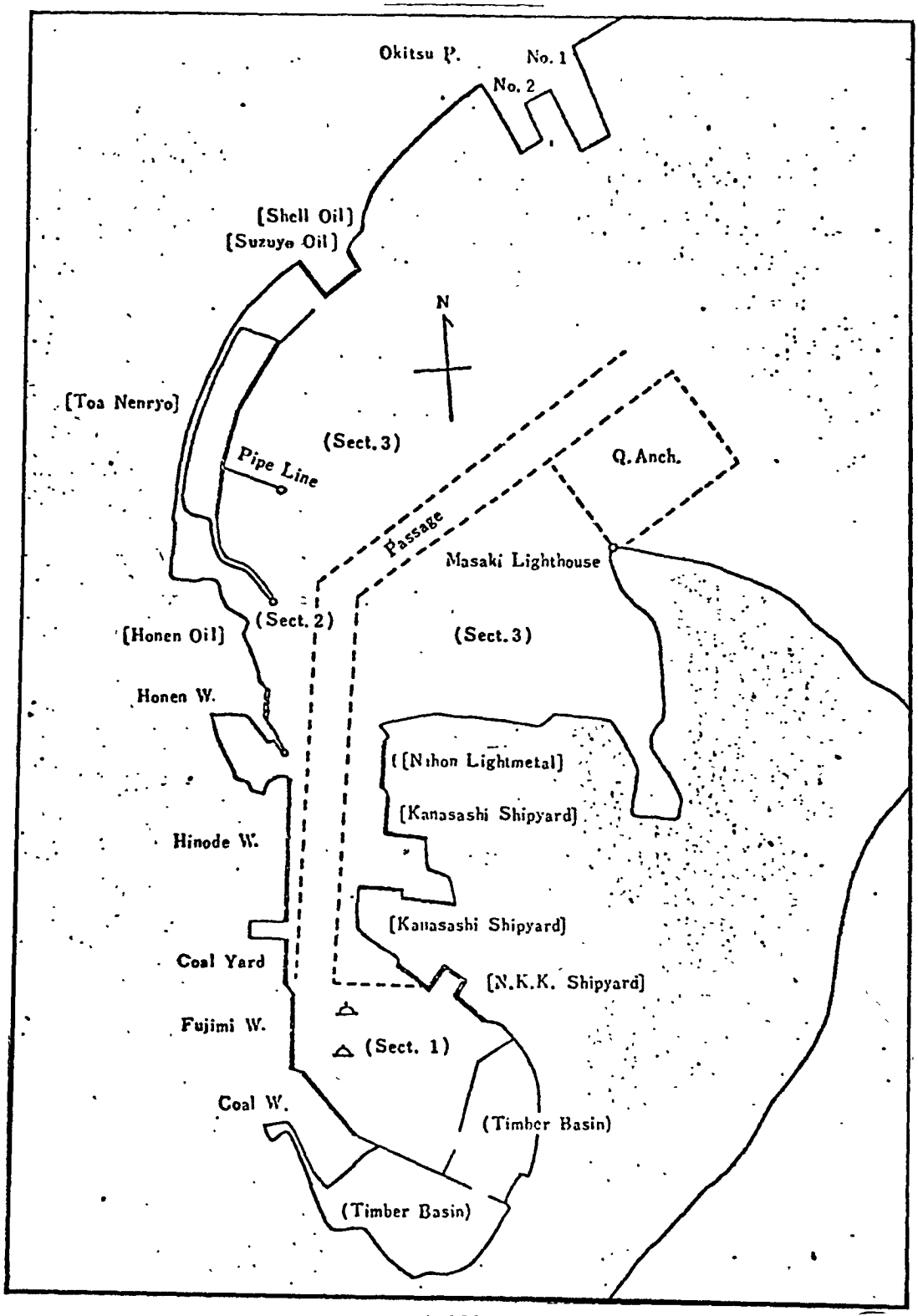
At anchorage: 9 m

PARTICULARS OF EACH WHARF:

NAME OF WHARF:	WHARF LENGTH:	MAXIMUM DEPTH:	BERTHING CAPACITY:	SHORE FACILITIES:
Kansai Denryoku Pier	150 m	9.5 m	One 10,000 G/T	
Pier No. 3	170 m	10.0 m	One 10,000 G/T	1 X 10 T
Pier No. 4	170 m	10.0 m	One 10,000 G/T	2 X 5 T
Pier No. 5	170 m	10.0 m	One 10,000 G/T	

NUMBER OF BUOYS AND MOORING CAPACITY OF EACH:
2 buoys for 10,000 G/T

S H I M I Z U


Okitsu P.
No. 1
No. 2
[Shell Oil]
[Suzuye Oil]
N
[Toa Nenryo]
(Sect. 3)
Pipe Line
Q. Anch.
Passage
Masaki Lighthouse
(Sect. 2)
(Sect. 3)
[Honen Oil]
Honen W.
[Nihon Lightmetal]
[Kanasashi Shipyard]
Hinode W.
[Kanasashi Shipyard]
Coal Yard
[N.K.K. Shipyard]
Fujimi W.
(Sect. 1)
Coal W.
(Timber Basin)
(Timber Basin)

LOCATION:
Latitude N. 35°00'25" Longitude E. 138°31'20"

HARBOUR PROTECTION:
Natural

BOTTOM:
Mud mixed with sand.

MINIMUM DEPTH OF WATER AT EXTREME LOW WATER (SPRING TIDE):
In the passage: 20 m

At anchorage: 9 m

PARTICULARS OF EACH WHARF:

NAME OF BERTH:	BERTH LENGTH:	BERTH DEPTH:	BERTHING CAPACITY:	SHORE FACILITIES:
Hinode Wharf	410 m	10 m	Two 20,000 G/T	Ship's gear
(Soybeans Wheat,	183 m	9 m	One 10,000 G/T	Ship's gear
General cargo	226 m	9 m	Two 5,000 G/T	Ship's gear
Fujimi Wharf				
No. 3 & 4	240 m	9 m	One 10,000 G/T	2 X 5 T Max. outreach: 13.5 m
(Coal, Chip)			or Two 5,000 G/T	Max. height: 19 m 240 T/H (Coal) each 180 T/H (Chip) each
No. 5	185 m	11 m	One 20,000 G/T	Ship's gear
No. 6 & 7	485 m	9 m	Two 10,000 G/T	Ship's gear
(Grain, Sugar, General Cargo)				
Okitsu No. 1 Pier	370 m	10 m	Two 15,000 TDW	Ship's gear
Now under construction to extend the length to 580 m with expected completion in 1971.				
Okitsu No. 2 Pier	348 m	10 m	Two 15,000 TDW	Ship's gear
Now under construction to extend the over-all length to 670 m with completion expected in 1971. Upon completion, 6 berths are available.				
PRIVATE BERTH				
Nippon Light Metal's berth	276 m	9.5 m	One 10,000 G/T	2 X 5 T
(Disch. Bauxite)				Max. outreach: 20.8 m
(Load. Alumina)				Max. height: 19.0 m
Honen Oil Mill's Berth				
(Soybeans, Grain)	255 m	11.5 m	One 20,000 G/T	Tow suckers Total 160 T/H

AVERAGE RATE OF DISCHARGE:

	SHIP'S GEAR (per gang hour)	SHORE CRANE (per hour per crane)
Lumber	20,000 Board feet	--
Soybeans	40 tons	170 tons
Sugar	40 tons	--
Wheat	45 tons	180 tons
Coal	--	250 tons
Bauxite	--	130 tons

AVERATE RATE OF LOADING:

Alumina	--	120 tons

NUMBER OF BUOYS AND MOORING CAPACITY OF EACH:
2 buoys for Two 15,000 G/T of 9.0 depth.

TANKER BERTH INFORMATION

TOA NENRYO KOGYO K.K., SHIMIZU

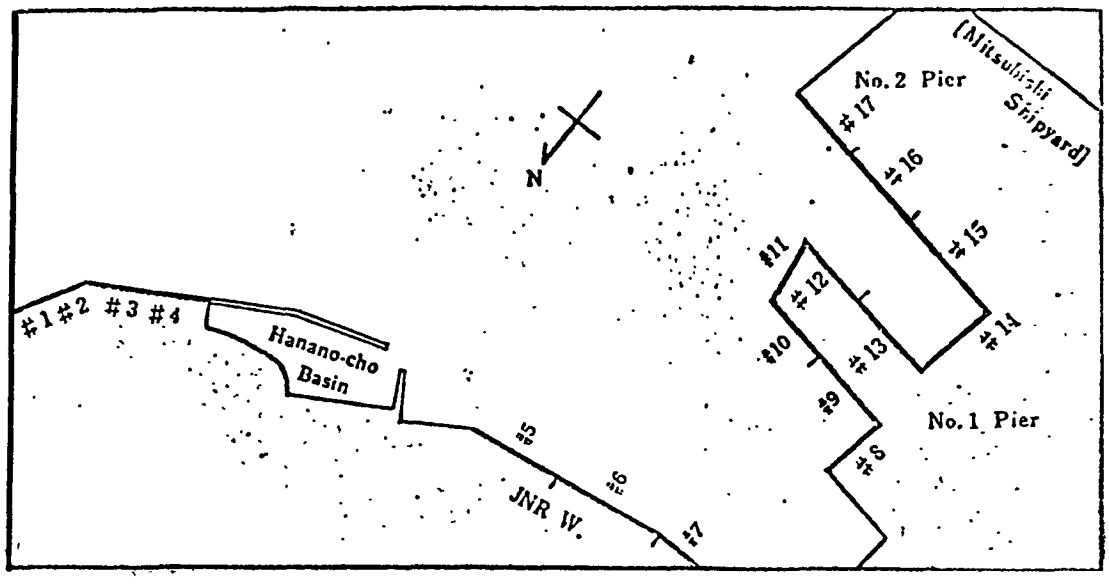
TOA NENRYO BERTH

Depth of water (approach/alongside):	16.50 meters at low tide.
Max. permissible draft:	15.50 meters at low tide.
Length of berth:	Buoy berth.
Restriction on L.O.A:	Not specified.
Berthing capacity:	100,000 TDW.
Number/size of manifold:	12" X 2.
Discharging capacity:	3,700 k/liters per hour.
Estimated back-pressure:	7 kg/cm^2.

TUG-BOATS: Pilot requires tugboats as follows:

		FOR MOORING:	FOR UNMOORING:
Up to 45,000 d/w	1900 HP X 1	1000 HP X 3	- ditto -
70,000 d/w	1900 HP X 1	1000 HP X 3	- ditto -
100,000 d/w	1900 HP X 1	1000 HP X 3	- ditto -

SHIMONOSEKI



LOCATION:
Latitude N. 33°57' Longitude E. 130°56'

HARBOUR PROTECTION:
Natural

BOTTOM:
Sand and mud

MINIMUM DEPTH OF WATER AT EXTREME LOW WATER (SPRING TIDE):
In the passages: 10 m
At anchorage: 9.5 m

PARTICULARS OF EACH WHARF:

NAME OF WHARF:	LENGTH:	MINIMUM DEPTH:	MAX. DRAFT:	BERTHING CAPACITY:	SHORE FACILITIES:
No. 1			5.0 m		None
No. 2,3,4			6.5 m		None
No. 5,6			6.0 m		None
No. 9,10	300 m	9.0 m	8.5 m		One crane 60/100 tons p/h
No. 12,13	340 m	9.0 m	8.5 m	L.O.A. 160 m	
No. 15,16	320 m	9.0 m	8.5 m	L.O.A. 170 m	
No. 17	210 m	8.5 m	8.0 m	L.O.A. 170 m	
Shell Oil Berth	Dolphin	9.3 m	9.0 m	D/W 18,000	

AVERAGE RATE OF DISCHARGE:

Salt	70 tons per gang hour
Grain	50 tons per gang hour
Ore	50 tons per gang hour

NUMBER OF BUOYS AND MOORING CAPACITY OF EACH:
One buoys 7.2 m Max. draft Max. 12,000 G/T type

TANKER BERTH INFORMATION

SHELL SEKIYU K.K., SHIMONOSEKI

HIKOSHIMA SHELL OIL BERTH

Depth of water (approach/alongside):	9.30 meters at low tide.
Max. permissible draft:	9.00 meters at low tide.
Length of berth:	Buoy berth - 4 buoys
Restriction on L.O.A:	Not specified.
Berthing capacity:	18,000 TDW.
Number/size of manifold:	8" X 1 - ASA type.
Discharging capacity:	350 - 600 k/liters per hour.
Estimated back-pressure:	2 - 3 kg/cm^2

NISSHIN TANKER CO., LTD., MUTSURE

MUTSURE OIL BERTH

Depth of water (approach/alongside):	15.00 meters at low tide.
Depth of water (alongside):	12.00 meters at low tide.
Max. permissible draft (alongside)	11.00 meters at low tide.
Length of berth:	Buoy berth - 2 buoys.
Restriction on L.O.A:	225 meters
Berthing capacity (max.):	
Number/size of manifold:	8" X 2 - ASA type.
Discharging capacity:	800 - 1,000 k/liters per hour.
Estimated back-pressure:	1 - 2 kg/cm^2.

TUG-BOATS: Pilot requires tugboats as follows:

	FOR MOORING:	FOR UNMOORING:
Up to 10,000 g/t	2000 HP/3000 HP X 2	2000 HP/3000 HP X 2
15,000 g/t	2000 HP/3000 HP X 2	2000 HP/3000 HP X 2
20,000 g/t	2000 HP/3000 HP X 3	2000 HP/3000 HP X

S H I M O T S U

Remark: No harbor configuration sketch available.
Geographical location: 34°07' N. & 135°08' E.
Harbour protection: Natural.

MARIZEN OIL CO., LTD., SHIMOTSU

BUOY BERTH

Depth of water (approach/alongside):	10.50 meters low tide.
Max. permissible draft:	10.50 meters at high tide.
Length of berth:	243 meters.
Restriction on L.O.A:	210 meters.
Berthing capacity:	35,000 TDW.
Number/size of manifold:	6" X 3. 1 - Calmet/Bright. 1 - Neutral. 1 - Fuel.
Discharging capacity:	1,000 k/liters per hour.
Estimated back-pressure:	5 kg/cm^2.

JETTY No. 5

Depth of water (approach/alongside):	11.60 meters at low tide.
Max. permissible draft:	12.00 meters at high tide.
Length of berth:	392 meters.
Restriction on L.O.A:	250 meters.
Berthing capacity:	60,000 TDW.
Number/size of manifold:	10" X 3 - for crude oil. 6" X 1 - for chemical products.
Discharging capacity:	3,000 k/liters per hour for crude oil. 600 k/liters per hour for chemical products.
Estimated back-pressure:	5 kg/cm^2

TUG-BOATS: Pilot requires tugboats as follows:

		FOR MOORING:	FOR UNMOORING:
Up to 45,000 d/w	2000 HP X 2	& 3000 HP X 1	2000 HP X 2
70,000 d/w	2000 HP X 1	& 3000 HP X 2	2000 HP X 2

TOA NENRYO KOGYO K.K., WAKAYAMA REFINERY

EAST No. 1 Pier

Depth of water (approach/alongside):	16.00 meters at low tide.
Max. permissible draft:	15.00 meters at low tide.
Length of berth:	
Restriction on L.O.A:	270 meters.
Berthing capacity:	80,000 TDW.
Number/size of manifold:	12" X 2. 10" X 1.
Discharging capacity:	4,000 k/liters per hour.
Estimated back-pressure:	5 kg/cm^2.

OGAKE No. 1 JETTY

Depth of water (approach/alongside):	20.00 meters at low tide.
Max. permissible draft:	18.00 meters at low tide.
Length of berth:	
Restriction on L.O.A:	320 meters.
Berthing capacity (max.):	200,000 TDW.
Number/size of manifold:	16" X 3.
	12" X 3.
Discharging capacity:	10,000 k/liters per hour.
Estimated back-pressure:	8 kg/cm^2.

TUG-BOATS: Pilot requires tugboats as follows:

		FOR MOORING:	FOR UNMOORING:
Up to	45,000 d/w	3000 HP X 3	2000 HP X 3
	70,000 d/w	3000 HP X 2 & 2000 HP X 2	3000 HP X 1 & 2000 HP X 2
	100,000 d/w	3000 HP X 3 & 2000 HP X 3	3000 HP X 3 & 2000 HP X 2
	150,000 d/w	3000 HP X 5 & 2000 HP X 2	3000 HP X 4 & 2000 HP X 2
	200,000 d/w	3000 HP X 5 & 2000 HP X 3	3000 HP X 5 & 2000 HP X 2

Remark: A pilot is not available when wind velocity exceeds 10 meters a second.

FUJI KOSAN CO., LTD., KAINAN

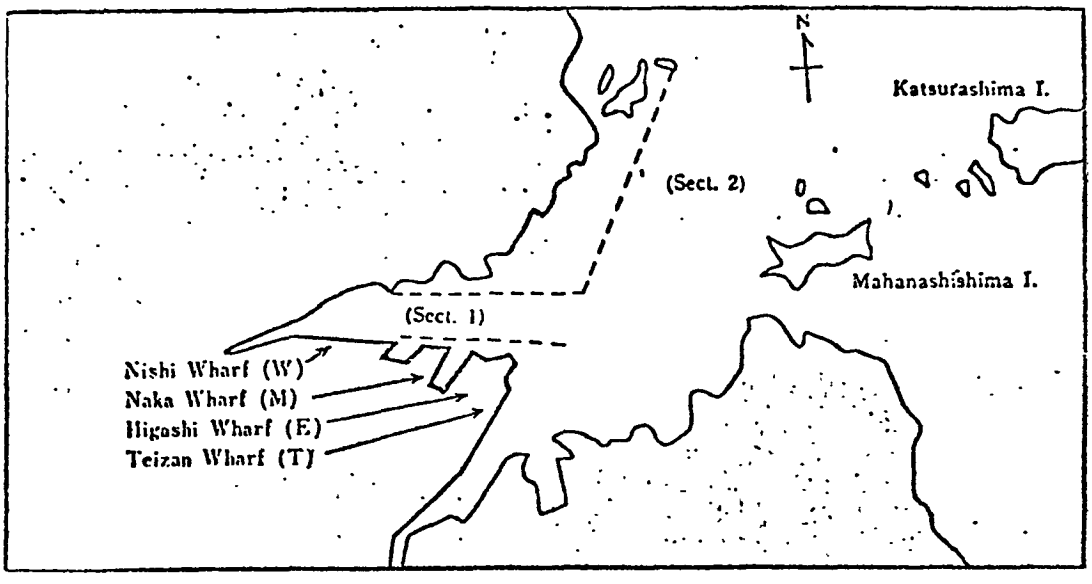
JETTY No. 9

Depth of water (approach/alongside):	13.00 meters at low tide.
Max. permissible draft:	12.00 meters at low tide.
Length of berth:	335 meters.
Restriction on L.O.A:	270 meters.
Berthing capacity:	80,000 TDW.
Number/size of manifold:	12" X 2.
Discharging capacity:	5,000 k/liters per hour.
Estimated back-pressure	5 kg/cm^2.

TUG-BOATS: Pilot requires tugboats as follows:

		FOR MOORING:	FOR UNMOORING:
Up to	45,000 d/w	3000 HP X 1 & 2000 HP X 2	3000 HP X 1 & 2000 HP X 2
	80,000 d/w	3000 HP X 2 & 2000 HP X 2	3000 HP X 1 & 2000 HP X 2

S H I O G A M A



LOCATION:
Latitude N. 38°19' Longitude E. 141°04'

BOTTOM:
Rock

HARBOUR PROTECTION:
Natural. The port is opened to South-East and exposed to swell raised by S-E wind.

MINIMUM DEPTH OF WATER AT EXTREME LOW WATER (SPRING TIDE):
In the passage: 10-13 meters (Shallow spot: 7.5 m)
(About 8 km. in distance and 100 meters in width)
At anchorage: 10-13 meters

PARTICULARS OF EACH WHARF:

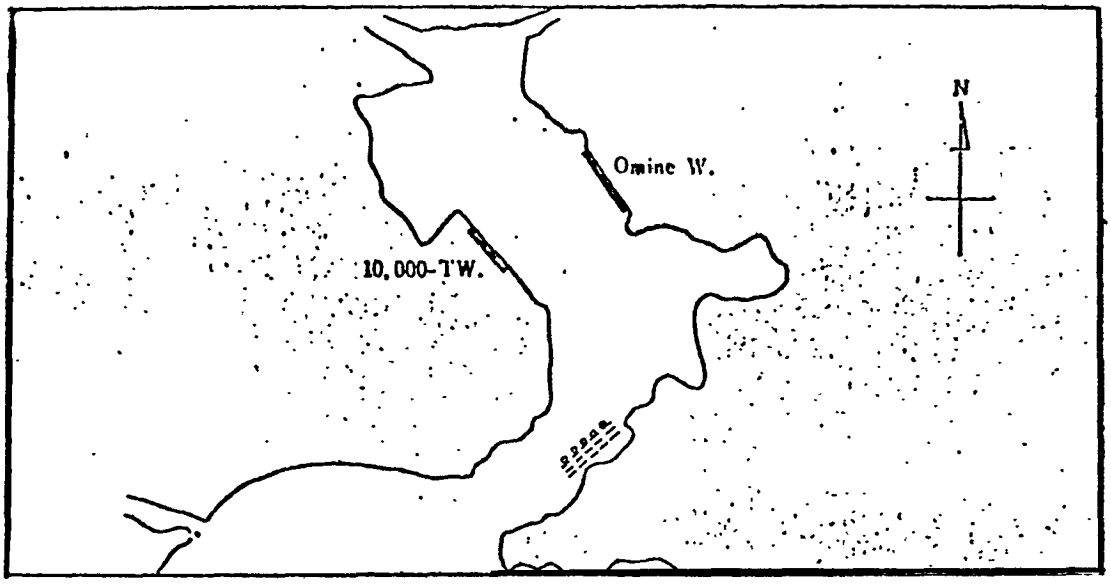
NAME OF WHARF:	BERTH LENGTH:	MINIMUM DEPTH:	DISCHARGING FACILITIES:
3,000-ton-wharf	330 m	6.50 m	One 5-ton gantry crane Two 2-ton jib crane
10,000-ton-wharf	160 m	9.00 m	No shore gear
10,000-ton-wharf	160 m	9.00 m	(Max. draft 8.0 m)No shore gear

AVERAGE RATE OF DISCHARGE:
Salt in bulk : 50-60 tons per gang hour
Potash in bulk: 50-60 tons per gang hour (5 gangs arrangeable)
Usually working from 0700 to 1700 hrs. Overtime work is arrangeable until 1800/900 hrs.

NUMBER OF BUOYS AND MOORING CAPACITY OF EACH:

No buoy

S U S A K I



LOCATION:
Latitude N. 33°20' Longitude E. 133°17'

HARBOUR PROTECTION:
Natural (Inlet)

BOTTOM:
Sand mixed with mud

MINIMUM DEPTH OF WATER AT EXTREME LOW WATER (SPRING TIDE):
At anchorage: 5 m - 15 m

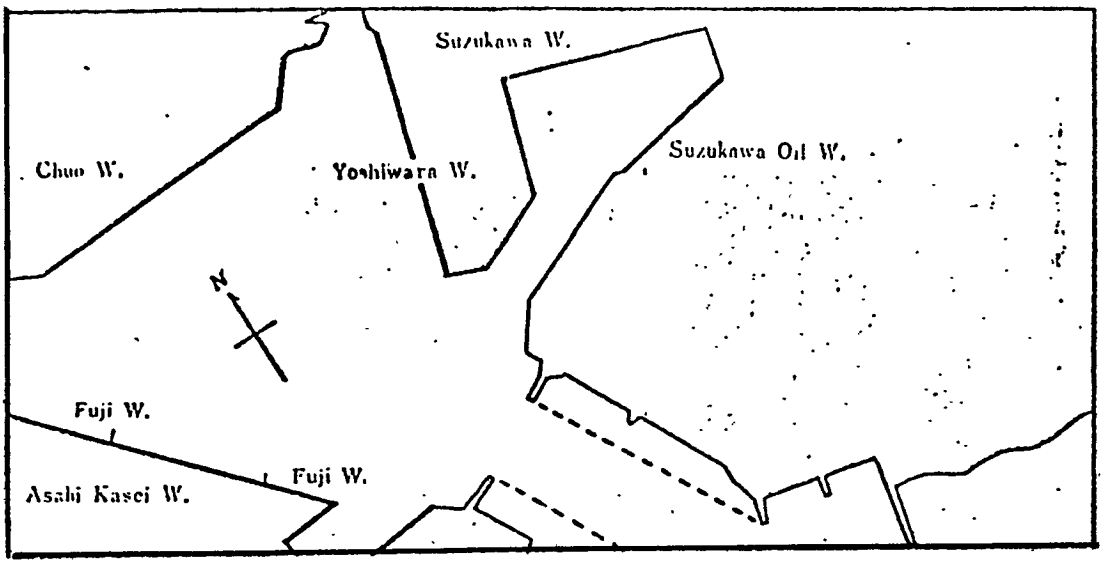
In the passage: 9 m

PARTICULARS OF EACH WHARF:

NAME OF WHARF:	WHARF LENGTH:	MINIMUM DEPTH:	DISCHARGING FACILITIES:
Omine wharf (Load. Cement in bag) (Dis. Logs)	165 m	9.0 m	Ship's gear
10,000-Ton wharf (Dis. Logs)	200 m	5.5 m-6.8 m	Ship's gear

AVERATE RATE OF DISCHARGE:
Cement - Total 400 tons per day (3/4 labour gangs available from 0800 to 2130 hrs.)
Logs - 150/160 M BM per gang/day (5 labour gangs available from 0800 to sunset)
(Discharging on shore)

TAGONOURA



LOCATION:
Latitude N. 35° 08' Longitude E. 138° 42.5'

HARBOUR PROTECTION:
Breakwater

BOTTOM:
Sand, Mud & Rock.

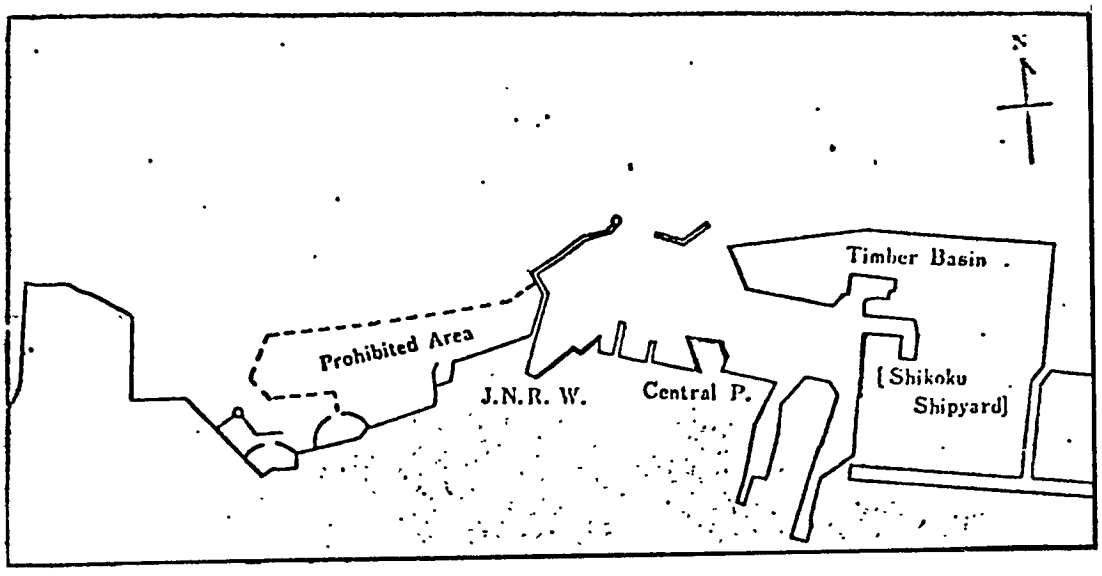
MINIMUM DEPTH OF WATER AT EXTREME LOW WATER (SPRING TIDE):
In the passages: 9.0 m
At anchorage: 7.5-9.0 m

PARTICULARS OF BERTH:

NAME OF BERTH:	BERTH LENGTH:	BERTH DEPTH:	BERTHING CAPACITY:	SHORE FACILITIES:
Chuo Wharf		(Max. draft)		
No. 1 & 2	410 m	9.0 m (8.5 m)	2X10,000 G/T	No. 1-2 suckersX150 T/H No. 2-2X5-T Cranes for chips
No. 3 & 4	250 m	7.5 m (6.0 m)	2X 5,000 G/T	
Yoshihara Wharf	167 m	9.0 m (9.0 m)	1X10,000 G/T	
	125 m	7.5 m (7.0 m)	1X 5,000 G/T	
PRIVATE WHARF				
Asahi Kasei Wharf	250 m	8.5 m (8.5 m)	1X10,000 G/T	
Fuji Wharf	250 m	7.5 m (7.5m)	1X10,000 G/T	

At all the above wharves, the depth of water is to be checked with a pilot before the vessel's arrival in view of inflow of sands from the river.

TAKAMATSU



LOCATION:
Latitude N. 34° 21' Longitude E. 134° 3'

HARBOUR PROTECTION:
Breakwater

BOTTOM:
Sand and mud

MINIMUM DEPTH OF WATER AT EXTREME LOW WATER (SPRING TIDE):
In the passage: 12 m
At anchorage: 7 - 12 m

PARTICULARS OF EACH BERTH:

NAME OF WHARF:	LENGTH:	MINIMUM DEPTH:	BERTHING CAPACITY:
Center Pier, North Side	130 m	7.5 m	One 5,000 G.T
Center Pier, West Side	130 m	7.5 m	One 5,000 G/T
Center Pier, East Side	96 m	4.0 m	One 1,000 G/T
Asahimachi Wharf	364 m	5.5 m	Three 3,000 G/T

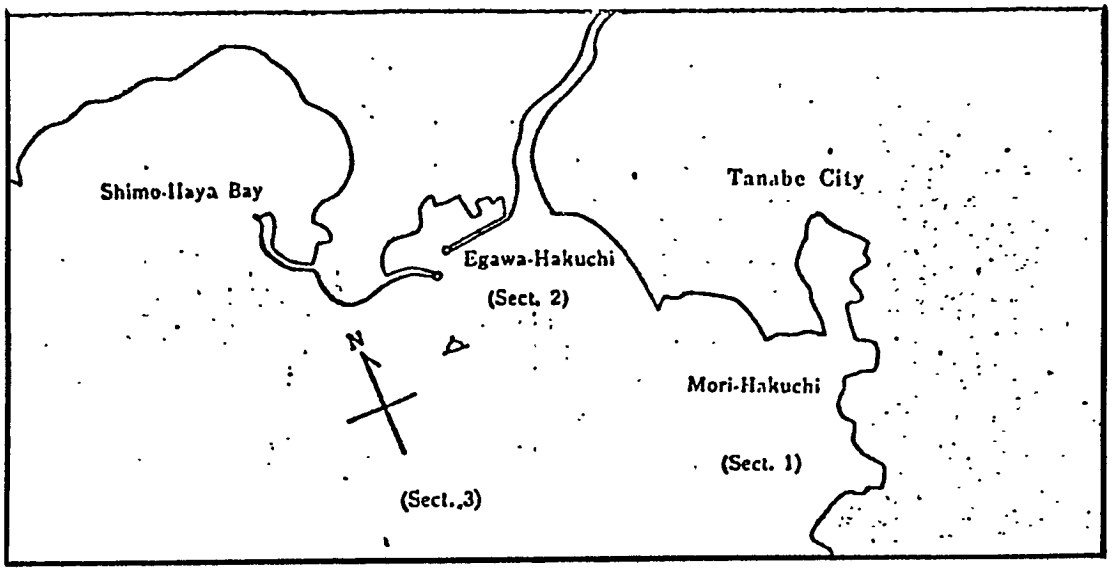
Remarks: All piers governed and managed by the Port Authorities of Takamatsu.

AVERAGE RATE OF DISCHARGING:
Iron scrap in bulk: 30-60 tons per hour by ship's gear

Lumber : 15,000-20,000 F.B.M per hour by ship's gear.

NUMBER OF BUOYS AND MOORING CAPACITY OF EACH:
No buoy, but anchorage available for discharge.

T A N A B E



LOCATION:
Latitude N. 33° 43' Longitude E. 135° 22'

HARBOUR PROTECTION:
Natural, opened to S.E.

BOTTOM:
Sand mixed with clay

MINIMUM DEPTH OF WATER AT EXTREME LOW WATER (SPRING TIDE):
At anchorage: 13 m

PARTICULARS OF BERTH:

NAME OF BERTH:	MAX. DRAFT:	RESTRICTIONS:
No. 1 Buoy	9.5 m	No restrictions on vessel's size

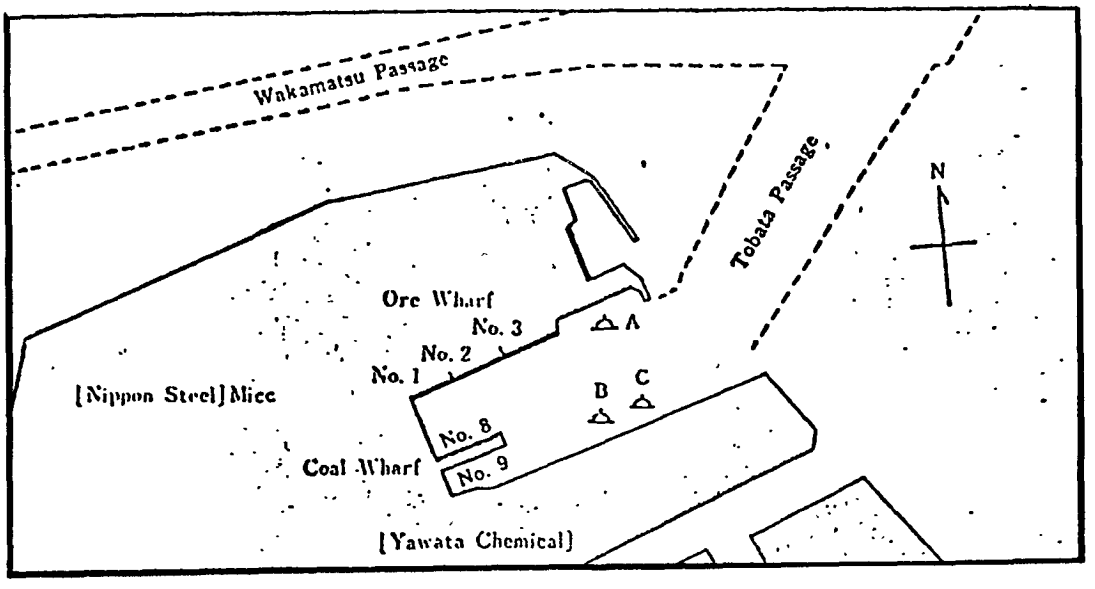
Geographical location:
33°-43'-00" N. 135°-22'-04"

No. 2 Buoy	9.0 m (at berth)	Max. GRT:	11,000 GRT
	7.5 m (in approach)	Max. LOA:	150 m

Geographical location:
About 200 m East by South-East from No. 1 Buoy.

Only discharging logs into water.

T O B A T A



LOCATION:
Latitude N. 33° 55' Longitude E. 130° 52'

HARBOUR PROTECTION:
Breakwater

BOTTOM
Mud mixed with sand

MINIMUM DEPTH OF WATER AT EXTREME LOW WATER (SPRING TIDE):
In the passages: 13.6 m
A anchorage: 13.6 m

PARTICULARS OF EACH WHARF:

NAME OF WHARF:	WHARF LENGTH:	MINIMUM DEPTH:	MAX. DRAFT:	BERTHING CAPACITY:	DISCHARGING FACILITIES:
No. 1 (Ore)	200 m	11.0 m	10.5 m	One 20,000 G/T	Three 30 ton Bridge type cranes. Max. reach 23 m Max. height 20.1 m
No. 2 (Ore)	200 m	11.5 m	11 m	One 50,000 D/W	1,000 tons per hour each One 1,500 T/H Crane
No. 3 (Ore) (Max LOA: 260 m)	250 m	13.6 m	13 m	One 110,000 D/W	Max. outreach: 34 m Max. height: 23 m
No. 8 (Coal) (Max. LOA: 250 m)	280 m	12.0 m	11.5 m	One 70,000 D/W	Two 10 ton Bridge type Cranes Max. reach 22 m Max. height 17 m 400 tons per hour

NAME OF WHARF:	WHARF LENGTH:	MINIMUM DEPTH:	MAX. DRAFT:	BERTHING CAPACITY:	DISCHARGING FACILITIES:
No. 9 (Coal)	280 m (Max. LOA: 170 m)	10.5 m	9.5 m	One 20,000 D/W	Two 10 ton Bridge type Cranes Max. reach 22 m Max. height 17 m 400 tons per hour
Uchiura No. 5 (Loading)	190 m (Max. LOA: 175 m)	8.5 m	8.5 m	One 15,000 G/T	2X25 ton and 1X10 ton cranes Max. reach 16.5 m Max. height 16 m

NUMBER OF BUOYS AND MOORING CAPACITY OF EACH:

	Draft	Max. LOA	Distance between buoys	
Buoy A.	11 m	175 m	220 m	
Buoy B.	11 m	200 m	280 m	for Scrap & Pigiron
Buoy C.	11 m	180 m	225 m	

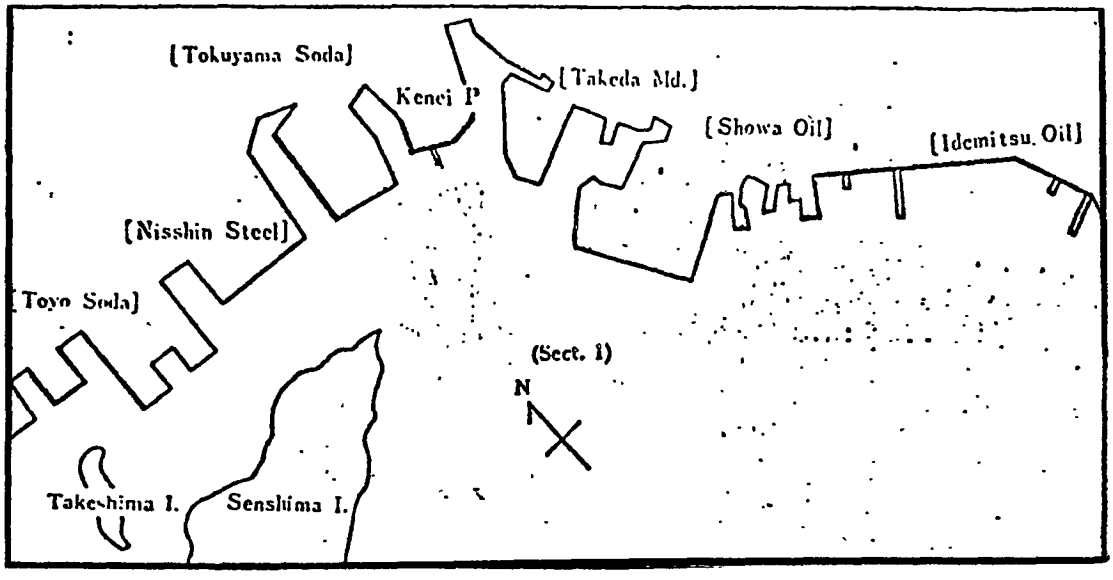
PORT IMPROVEMENT PLANS (EXPANSION PLANS):

1) The Tobata channel is now under dredging operations to deepen the depth to 15.5 m with expected completion at the end of 1971.

2) No. 4 berth is now under construction adjacent to No. 3 berth with expected completion at the end of March, 1971, details of which are as follows:

   Berth Length: 330 m. Berth Depth: 19 m.
   (Upon completion, Buoy "A" to be removed).

T O K U Y A M A



LOCATION:
Latitude N. 34° 01' Longitude E. 131° 48'

HARBOUR PROTECTION:
In the passages: 17 m
At anchorage: 7 - 18 m

BOTTOM
Soft mud

PARTICULARS OF EACH WHARF:

NAME OF WHARF:	WHARF LENGTH:	MINIMUM DEPTH: APPROACH:	MINIMUM DEPTH: ALONGSIDE:	BERTHING CAPACITY:	
Tokuyama Soda Berth (Salt)	120 m	8.0 m	10.4 m	11,000 G/T	Max.LOA:155m Max.draft:8.5m
Toyo Soda Berth (Salt)	120 m	7.2 m	8.9 m	12,000 G/T	Max.LOA:160m Max.draft:8.0m
Toyo Soda Berth (Cement)	120 m	7.2 m	7.8 m	12,000 G/T	Max.LOA:160m Max.draft:8.0m
Idemitsu Private Berth (Tanker Berth)					
Central Pier	300 m	13 m	7 m	10,000 G/T	
East Pier	300 m	13 m	12 m	26,000 G/T	
Oura Berth		15 m	11 m	30,000 G/T	
Sea Berth-4 buoys		25 m	19.5 m	150,000 G/T	
				draft restricted to 17.65 m	
Nihon Seiro Berth	84.6 m	15 m	8.8 m	13,000 G/T	

NUMBER OF BUOYS AND MOORING CAPACITY OF EACH:

PORT IMPROVEMENT PLAN:
Now planned to deepen the depth of water in the channel to 9.3 m with expected completion in 1971.

TANKER BERTH INFORMATION

IDEMITSU KOSAN CO., LTD., TOKUYAMA

IDEMITSU SEA-BERTH

Depth of water (approach):	20.00 meters at low tide.
Depth of water (alongside):	19.00 meters at low tide.
Max. permissible draft:	19.30 meters at high tide.
Length of berth:	Sea berth - 7 buoys for mooring.
Restriction on L.O.A.:	345 meters.
Berthing capacity:	200,000 TDW.
Number/size of manifold:	14" X 1 - ASA type. 16" X 2 - ASA type.
Discharging capacity:	3,500-6,500 k/liters per hour.
Estimated back-pressure:	Negligible.

IDEMITSU EAST PIER

Depth of water (approach/alongside):	12.00 meters at low tide.
Max. permissible draft:	11.00 meters at low tide.
Length of berth:	Dolphins
Restriction on L.O.A.:	
Berthing capacity:	26,000 GRT.
Number/size of manifold:	6" X 1 - ASA type.
Discharging capacity:	
Loading capacity:	700-900 k/liters per hour.
Estimated back-pressure:	Negligible.

IDEMITSU CENTRAL PIER

Depth of water (alongside):	11.80 meters at low tide.
Max. permissible draft:	10.30 meters at low tide.
Length of berth:	Dolphin
Restriction on L.O.A.:	220 meters.
Berthing capacity:	34,000 GRT.
Number/size of manifold:	8" X 2 - ASA type.
Discharging capacity:	800-1,200 k/liters per hour.
Estimated back-pressure:	1-1.5 kg/cm^2.

IDEMITSU OHURA No. 5 BERTH

Depth of water (approach):	12.00 meters at low tide.
Depth of water (alongside):	11.70 meters at low tide.
Max. permissible draft:	12.25 meters at high tide.
Length of berth:	Dolphin
Restriction on L.O.A.:	230 meters.
Berthing capacity (max.):	53,000 TDW.
Number/size of manifold:	10" X 2 - ASA type.
Discharging capacity:	800-1,500 k/liters per hour.
Estimated back-pressure	Negligible.

IDEMITSU OHURA No. 3 BERTH

Depth of water (approach):	12.00 meters at low tide.
Depth of water (alongside):	11.70 meters at low tide.
Max. permissible draft:	11.90 meters at high tide.
Length of berth:	Dolphin
Restriction on L.O.A.:	220 meters.
Berthing capacity:	51,000 TDW.
Number/size of manifold:	12" X 2 - ASA type.
Discharging capacity:	1,000-3,000 k/liters per hour.
Estimated back-pressure:	Negligible.

NIHON SEIRO K.K., TOKUYAMA

NIHON SEIRO OIL BERTH

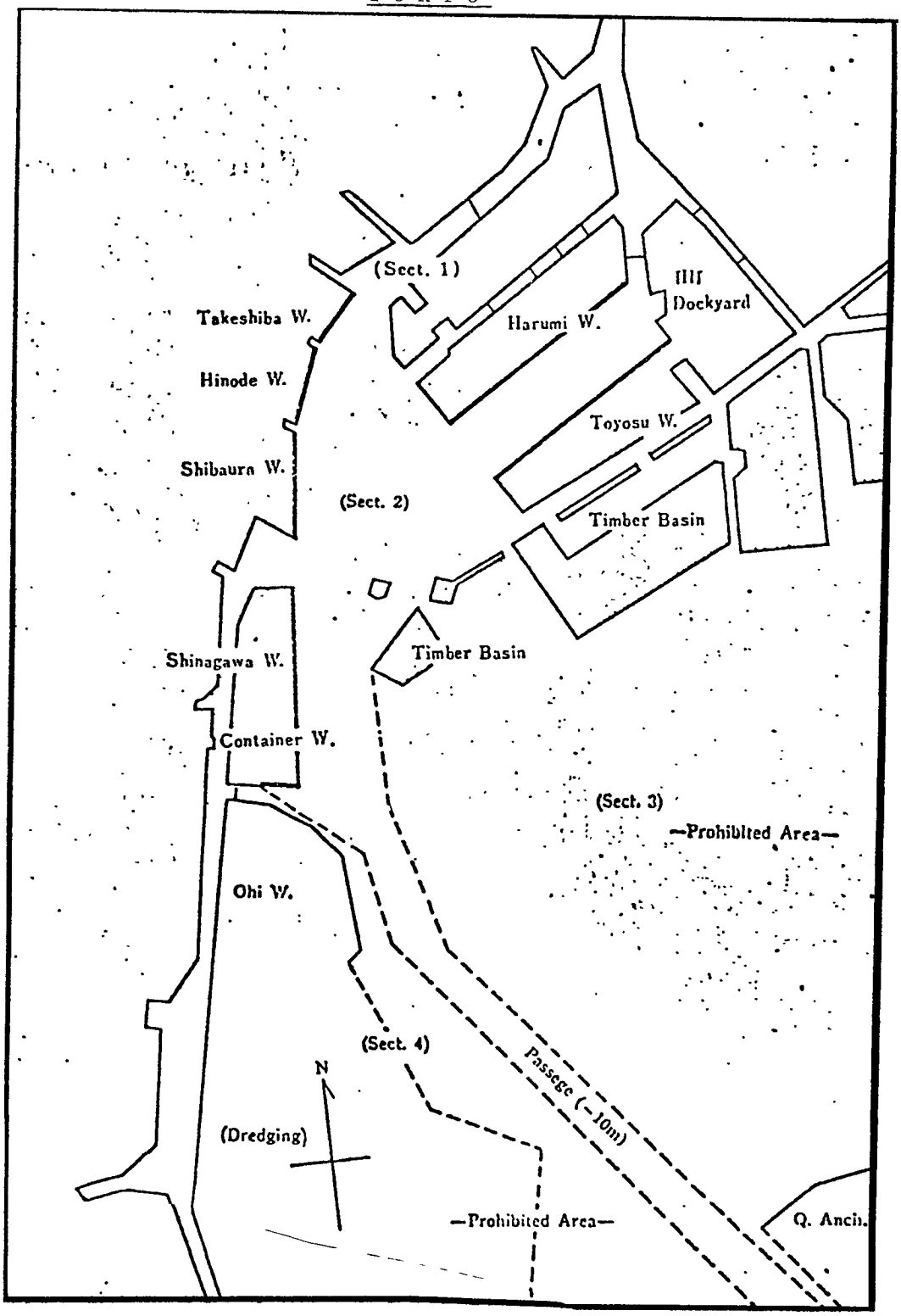
Depth of water (approach/alongside):	12.00 meters at low tide.
Max. permissible draft:	11.40 meters at low tide.
Length of berth:	Dolphin
Restriction on L.O.A:	
Berthing capacity:	30,000 GRT.
Number/size of manifold:	8"X2 - ASA type.
Discharging capacity:	400 - 700 k/liters per hour.
Estimated back-pressure:	1 - 2 kg/cm^2.

NIPPON ZEON CO., LTD., TOKUYAMA

NIPPON ZEON BERTH

Depth of water (approach):	7.00 meters at low tide.
Depth of water (alongside):	8.00 meters at low tide.
Max. permissible draft:	8.00 meters at high tide.
Length of berth:	42 meters. (Dolphin)
Restriction on L.O.A:	145 meters.
Berthing capacity:	10,000 TDW.
Number/size of manifold:	8"X1 - for loading of L.P.G. 4"X1 - vapour line.
Loading capacity:	2,000 - 2,800 m/tons per hour.
Estimated back-pressure:	2 kg/cm^2.

TOKYO


(Sect. 1)
Takeshiba W.
Hinode W.
Shibaura W.
(Sect. 2)
Harumi W.
IHI Dockyard
Toyosu W.
Timber Basin
Timber Basin
Shinagawa W.
Container W.
(Sect. 3)
—Prohibited Area—
Ohi W.
(Sect. 4)
N
(Dredging)
Passage (-10m)
—Prohibited Area—
Q. Anch.

LOCATION:
Latitude N. 35° 38' Longitude E. 139° 48'

HARBOUR PROTECTION:
Natural

BOTTOM:
Mud mixed with sand

MINIMUM DEPTH OF WATER AT EXTREME LOW WATER (SPRING TIDE):
In the passages: 9-10 m
At anchorage: 10-12 m

PARTICULARS OF EACH WHARF:

NAME OF WHARF:	WHARF LENGTH:	MINIMUM DEPTH:	BERTHING CAPACITY:		DISCHARGING FACILITIES:
PUBLIC BERTH:					
Shibaura Wharf	910 m	7.8 m	Six	6,000 D/W	Ship's gear
Harumi Pier	470 m	10.0 m	Two	20,000 G/T	Ship's gear
	492 m	10.0 m	Two	15,000 G/T	Ship's gear 5 ton shore crane
	960 m	9.0 m	Six	10,000 G/T	Ship's gear
	132 m	9.5 m	One	10,000 G/T	Ship's gear
Shinagawa Pier	778 m	10.0 m	Four	15,000 G/T	Ship's gear
	476 m	8.0 m	Three	6,000 G/T	Ship's gear
PRIVATE BERTHS:					
Toyosu Coal berth (Coal)	350 m	8.0 m	Four	10,000 G/T	One 3.5 ton gantry crane 270 tons per hour. Two 2.5 tons gantry cranes 150 tons per unit hour. One 5 ton gantry crane 300 tons per hour.
PRIVATE BERTHS:					
Tokyo Tekko (Steel materials)	280 m	7.0 m	One	5,000 G/T	Two 10 ton rope trolley cranes.
		6.5 m			One 10 tons level mobile crane 80-170 tons per unit hour.
Nissai Pier (Fish etc.)	131.5 m	10.0 m	One	10,000 G/T	Ship's gear
Nitto Flour Mill Berth (Grain)	180 m	9.5 m	One	20,000 G/T	Two penumatic unloaders 200/300 tons per unit/hour.
Tokyo Gas Berth (Coal)	250 m	8.7 m	One	15,000 G/T	Two 4.5 ton gantry cranes 300 tons per unit/hour.

AVERAGE RATE OF DISCHARGE:

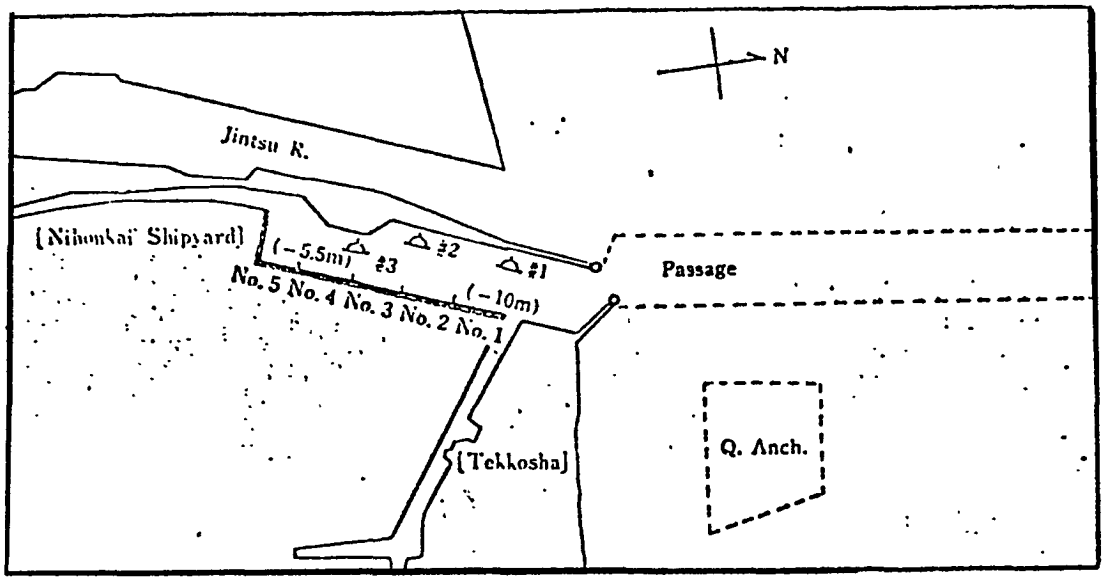
By ship's gear	Grain	45 tons per gang hour
	Coal	60 tons per gang hour
	Salt	60 tons per gang hour
	Coke	40 tons per gang hour
	Logs	600,000-1,000,000 BM per day
	Graphite	35 tons per gang hour
	Sugar	70 tons per gang hour

NUMBER OF BUOYS AND MOORING CAPACITY OF EACH:

4 Buoys for total Two	16,000 G/T	10.00 in depth
8 Buoys for total Five	10,000 G/T	8.00 in depth
5 Buoys for total Four	6,000 G/T	7.30 in depth
5 Buoys for total Seven	3,000 G/T	6.70 in depth
2 Buoys for total Two	1,500 G/T	6.00 in depth

PORT IMPROVEMENT PLANS:
A project to reclaim 22,400,000 m^2 on which piers are to be constructed, is at the planning stage with completion expected before 1975.

TOYAMA



LOCATION:
Latitude N. 36° 45' 45" Longitude E. 137° 13' 43"

HARBOUR PROTECTION:
Breakwaters

BOTTOM:
Sand and Clay

MINIMUM DEPTH OF WATER AT EXTREME LOW WATER (SPRING TIDE):
In the passage: 10 m
At anchorage: 12 m

PARTICULARS OF EACH BERTH:

NAME OF BERTH:	BERTH LENGTH:	BERTH DEPTH:	MAX. DRAFT:	BERTHING CAPACITY:	SHORE FACILITIES:
No. 1 Wharf	170 m	10 m	9 m	1X10,000 G/T	
			9.8 m at H.W.		1X5 T
No. 2 Wharf	220 m	10 m	9 m	1X10,000 G/T	
			9.5 m at H.W.		1X5 T
No. 3 Wharf	150 m	8.5 m	8 m	1X8,000 G/T	1X5 T
No. 4 Wharf	160 m	8.5 m	8 m	1X10,000 G/T	
No. 5 Wharf	180 m	5.5 m	5 m	1X3,000 G/T	

AVERAGE RATE OF DISCHARGE:

	BY CRANE	BY SHIP'S GEAR
Coal	70 tons per hour	40 tons per hour
Phosphate rock	120 tons per hour	70 tons per hour
Salt	120 tons per hour	60 tons per hour
Chrome ore (concentrate)	100 tons per hour	40 tons per hour
Coke	80 tons per hour	40 tons per hour
Logs	-	10,000 BM. (rafting)
Graphite	70 tons per hour	35 tons per hour

NUMBER OF BUOYS AND MOORING CAPACITY OF EACH:

	DEPTH	MOORING CAPACITY
Buoy No. 1	9.5 m	One 10,000 G/T
Buoy No. 2	9.0 m	One 8,000 G/T
Buoy No. 3	5.5 m	One 3,000 G/T

TANKER BERTH INFORMATION:

NIHONKAI SEKIYU CO., LTD., TOYAMA

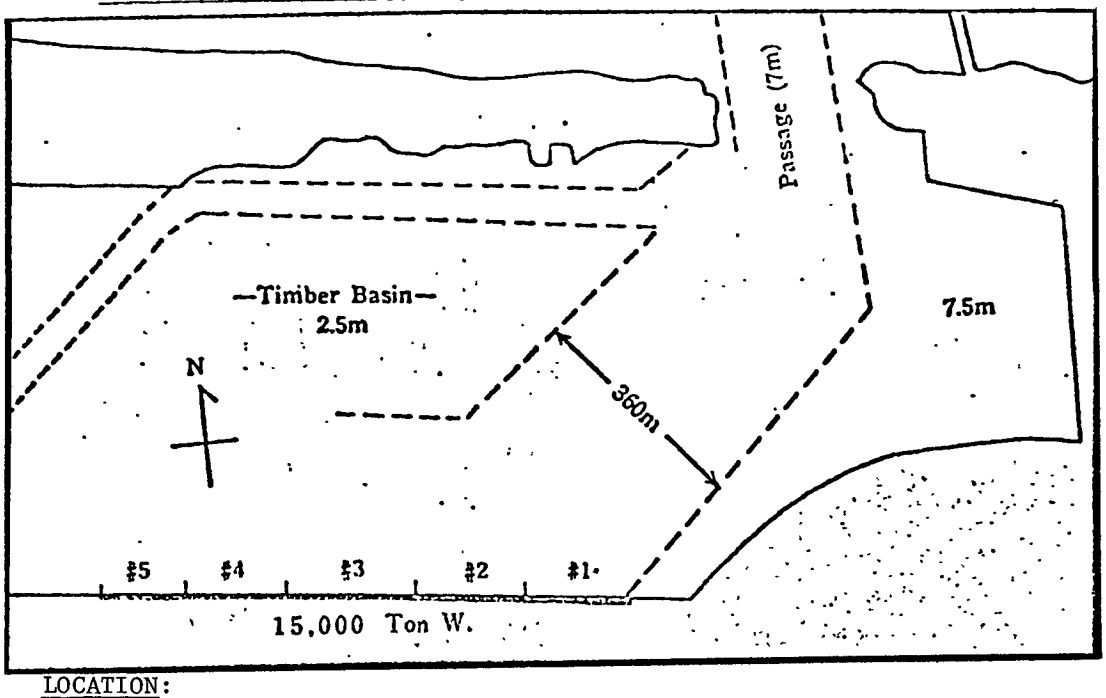
SEA-BERTH

Depth of water (approach/alongside):	27.00 meters at high tide.
Max. permissible draft:	19.00 meters at high tide.
Length of berth:	-sea-berth-.
Restriction on L.O.A:	300 meters.
Berthing capacity:	200,000 TDW.
Number/size of manifold:	16"x2-ASA type.
Discharging capacity:	7,500 k/liters per hour for discharging of crude oil.
Estimated back-pressure:	9 kg/cm^2.

TUG-BOATS: A pilot requires tugboats as follows:

	FOR MOORING:	FOR UNMOORING:
Up to 70,000 d/w	2060 HPx1	2060 HPx1
100,000 d/w	2060 HPx1	2060 HPx1
150,000 d/w	2060 HPx1 & 1800 HPx1	2060 HPx1 & 1800 HPx1
200,000 d/w	2060 HPx1 & 1800 HPx1	2060 HPx1 & 1800 HPx1

TOYAMA SHIN-KO (TOYAMA NEW PORT)



LOCATION:
Latitude N. 36° 46' Longitude E. 137° 07'

HARBOUR PROTECTION:

Landlocked

BOTTOM:

Sand and clay

MINIMUM DEPTH OF WATER AT EXTREME LOW WATER (SPRING TIDE):
At anchorage: 15 - 20 m
In the passages: 12 m

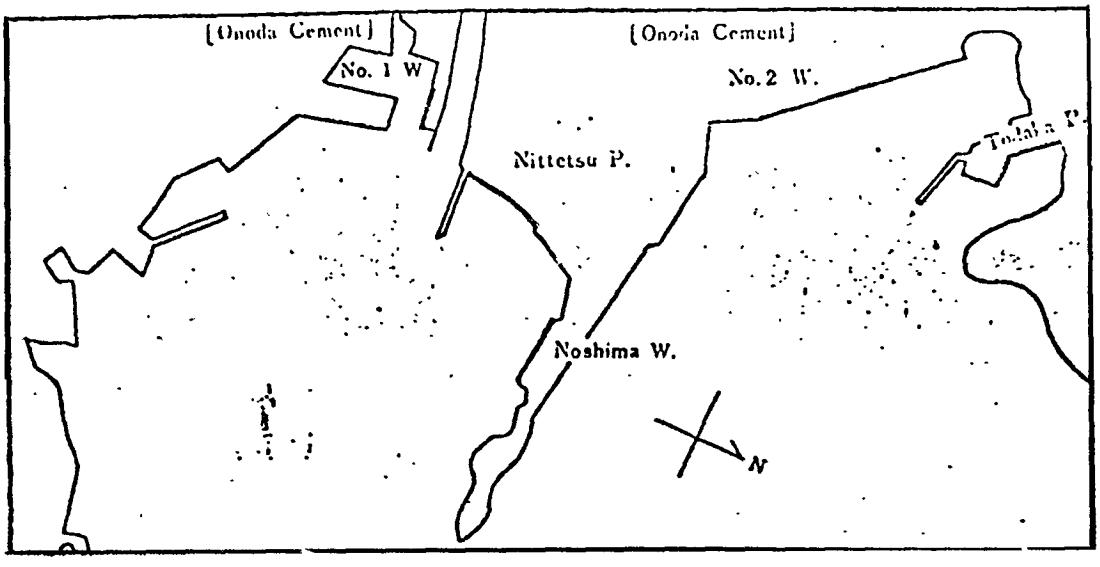
PARTICULARS OF EACH BERTH:

NAME OF BERTH:	BERTH LENGTH:	BERTH DEPTH:	BERTHING CAPACITY:	SHORE FACILITIES:
No. 1 Wharf	280 m	10 m	15,000 D/W	1x12 T
No. 2 Wharf	185 m	10 m	15,000 D/W	
No. 3 Wharf	185 m	8 m	15,000 D/W	
No. 4 Wharf	185 m	8 m	15,000 D/W	1x60 T

PORT IMPROVEMENT PLAN:

New berth No. 5 wharf is now under construction with expected completion in 1971, and No. 6 wharf will be constructed with completion expected in 1972.

T S U K U M I



LOCATION:
Latitude N. 33° 04' Longitude E. 131° 52'

HARBOUR PROTECTION:
Natural

BOTTOM:
Mostly sand

MINIMUM DEPTH OF WATER AT EXTREME LOW WATER (SPRING TIDE):
At anchorage: 27 m
In the passages: 7.5-9 m

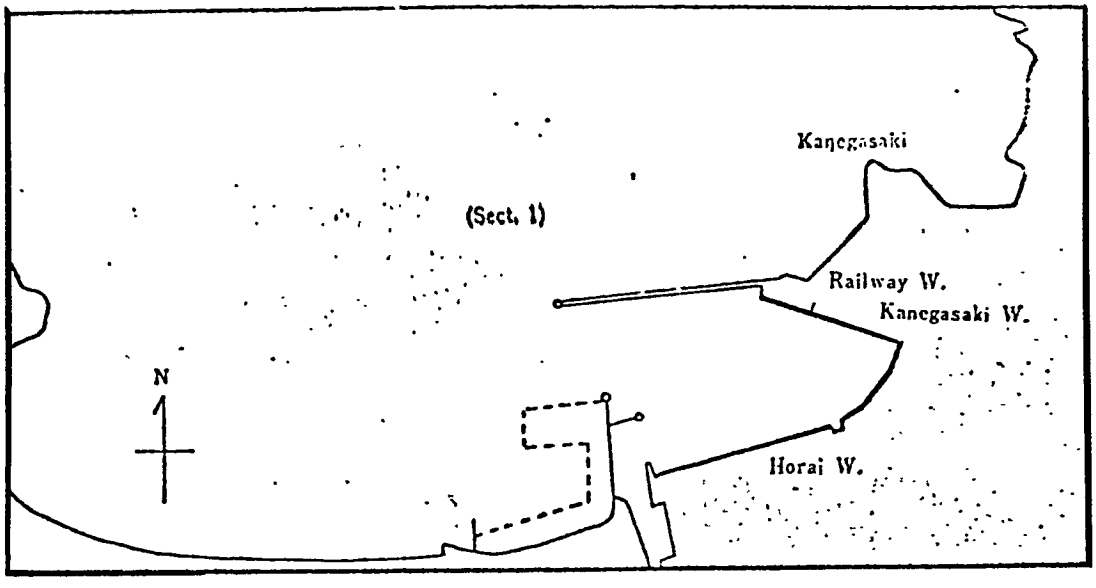
PARTICULARS OF EACH WHARF:

NAME OF WHARF:		WHARF LENGTH:	MINIMUM DEPTH	BERTHING CAPACITY:	DISCHARGING FACALITIES:
Kene-ei Wharf No. 1 (General Cargo		163 m	9.0 m	One 10,000 G/T	Ship's gear
Onoda Cement Wharf (Cement)	No. 1	80 m	8.0 m	One 5,000 G/T	One loader 600 tons per hour
	No. 2	190 m	9.0 m	One 8,000 G/T	
Nittetsu Wharf (Limestone)		150 m	10.50 m (Max. 10.15 m)	One 12,000 G/T	One loader 500/800 tons per hour

NUMBER OF BUOYS AND MOORING CAPACITY OF EACH:

2 Buoys 10,000 G/T and 3,000 G/T

T S U R U G A



LOCATION:
Latitude N. 35° 39' Longitude E. 136° 3'

HARBOUR PROTECTION:
Breakwater

BOTTOM:
Sand and clay

MINIMUM DEPTH OF WATER AT EXTREME LOW WATER (SPRING TIDE):
In the passages: 12-13 m
At anchorage: 7-8 m

PARTICULARS OF EACH WHARF:

NAME OF WHARF:	WHARF LENGTH:	MINIMUM DEPTH:	BERTHING CAPACITY:	DISCHARGING FACILITIES:
Tetsudo Wharf (Coal, Logs & Oil)	164 m	7.3 m	Two 4,000 G/T	Ship's gear
Kanegasaki Wharf	205 m	9.5 m	One 10,000 G/T	One 200 T/H mobile level luffing crane
Horai Wharf G. Berth (General Cargo)	111.8 m	7.3 m	One 4,000 G/T	
H. Berth (Coal)	111.8 m	7.3 m	One 4,000 G/T	One 5 ton mobile level luffing crane max. reach 13 m max. height 20 m 100 - 150 tons per hour (for coal)

N. B. After lightening large vessels can berth Wharf No. H

AVERAGE RATE OF DISCHARGE:

American Logs	30 tons per hour
Russian Logs	40 tons - 50 tons per hour
Coal by ship's gear	40 tons

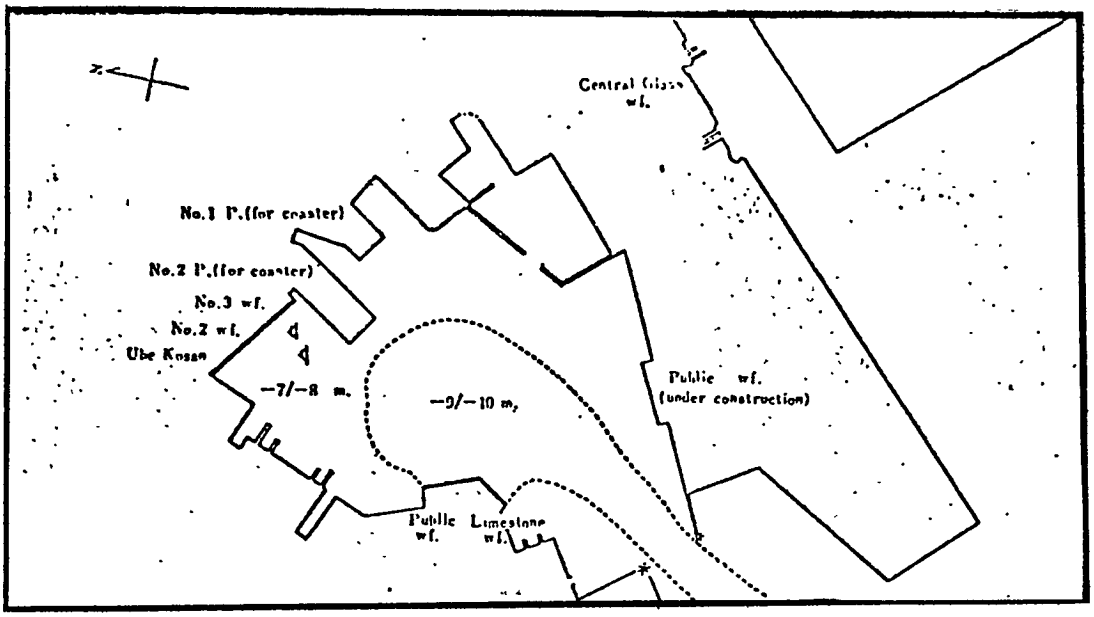
NUMBER OF BUOYS AND MOORING CAPACITY OF EACH:

2 Buoys for 6,000 G/T

PORT IMPROVEMENT PLANS (EXPANSION PLANS):

2 new berths with overall length of 450 m and depth of 10 m will be constructed before 1973.

U B E



LOCATION:
Latitude N. 33° - 56' Longitude E. 131° - 14'

HARBOUR PROTECTION:
Landlocked

BOTTOM:
Sand mixed with clay

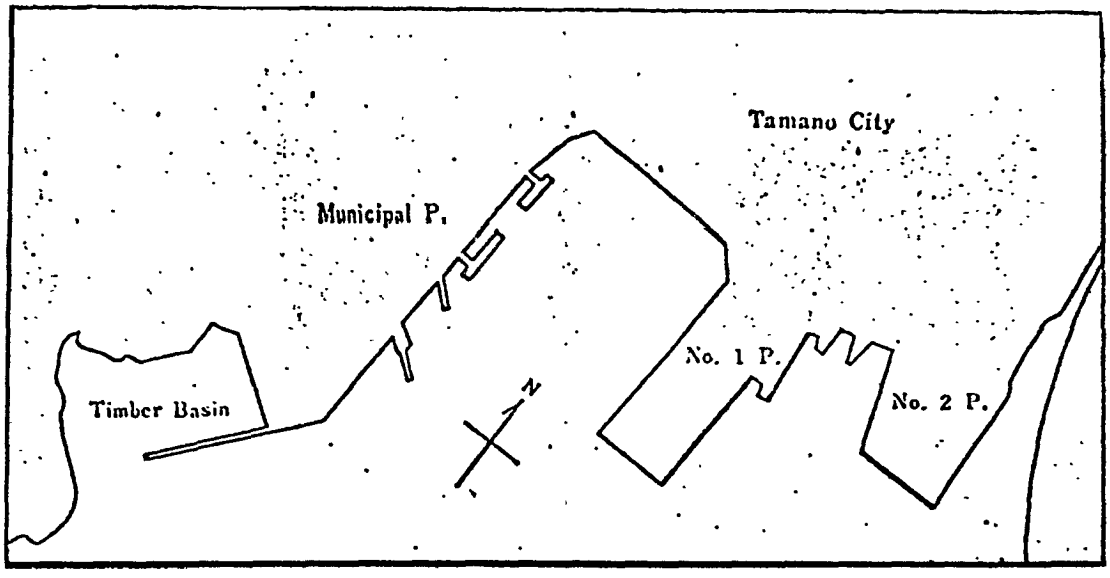
MINIMUM DEPTH OF WATER AT EXTREME LOW WATER (SPRING TIDE):
At anchorage: 8 m - 10 m
In the passage: 9 m - 10 m

PARTICULARS OF EACH BERTH:

NAME OF BERTH:	BERTH LENGTH:	MAX. DRAFT:	SHORE FACILITIES:
Ube Kosan Co. No. 2 - 3 wharves (Loading Fertilizer, Cement)	330 m	7.5 m	Ship's gear
Lime-stone wharf	160 m	10.5 m	1 loader x 1500/1800 t/h
Central Glass Co. (Dis. Salt, Phosphate)	160 m	9.0 m	2 cranes x 5 Tons Ship's gear also used.
Public Berth	185 m	10.0 m	Ship's gear

NUMBER OF BUOYS:
1 buoy berth (twin buoys) available: Depth 7.5 m.
Sea-buoy owned by Seibu Oil Co. located at N. 33°-49'-46" and E. 131°-13'-00"
Max. permissible draft-19.5 m. at high water.

U N O



LOCATION:
Latitude N. 34° 30' Longitude E. 133° 57'

HARBOUR PROTECTION:
Natural

BOTTOM:
Sand and Sand Shell

MINIMUM DEPTH OF WATER AT EXTREME LOW WATER (SPRING TIDE):
In the passage: 10 m - 20 m
At anchorage: See below

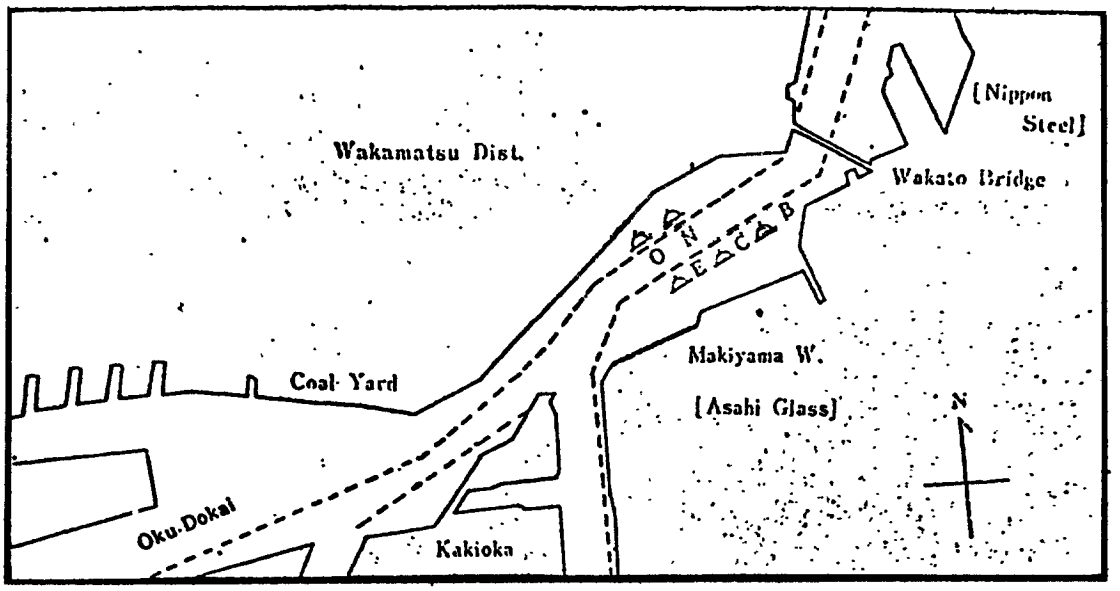
PARTICULARS OF EACH WHARF:

NAME NAME OF WHARF:	LENGTH:	MINIMUM DEPTH:	PERMISSIBLE DRAFT:
No. 1 pier	150 m	8.5 m	8.0 m
No. 3 pier	120 m	7.5 m	7.0 m

ANCHORAGE		POSITION FROM TOBISU BEACON
No. 1 anchorage	Depth of water 19.0 m	320 850 meters off
No. 2 anchorage	Depth of water 13.0 m	300 750 meters off
No. 3 anchorage	Depth of water 13.0 m	40 1,200 meters off
No. 4 anchorage	Depth of water 21.0 m	150 500 meters off
No. 5 anchorage	Depth of water 29.0 m	23 850 meters off

AVERAGE RATE OF DISCHARGING:
Lumber and Logs: 1,300-1,600 BMF per gang hour
Bulk cargo : 50-70 tons per gang hour
(Copper concentrate, sugar, Maize, Iron ore etc.)

WAKAMATSU (MAKIYAMA)



LOCATION:
Latitude N. 33° 53' Longitude E. 130° 48'

HARBOUR PROTECTION:
Breakwater

BOTTOM:
Mud mixed with sand.

MINIMUM DEPTH OF WATER AT EXTREME LOW WATER (SPRING TIDE):
In the passage: 9.0 m
At anchorage: 8.5 m

PARTICULARS OF BERTHS:

NAME OF WHARF:	WHARF LENGTH:	MINIMUM DEPTH:	MAX. DRAFT:	DISCHARGING FACILITIES:	BERTHING CAPACITY:
Asahi Glass					
Makiyama Pier	346 m	8.5 m	8.5 m	Ship's gear	One 5,000 G/T
(Salt & phosphate)				Ship's gear	One 8,000 G/T
					L.O.A. 150 m
Mitsubishi chemical					
Kurosaki wharf	130 m	8.4 m	8.4 m	2 jib cranes	One 10,000/
	(200 m between mooring dolphins)			350 T/H each	12,000 G/T
Onoda Cement					
Kurosaki wharf	170 m	8.0 m	8.0 m	Ship's gear	One 8,000 G/T

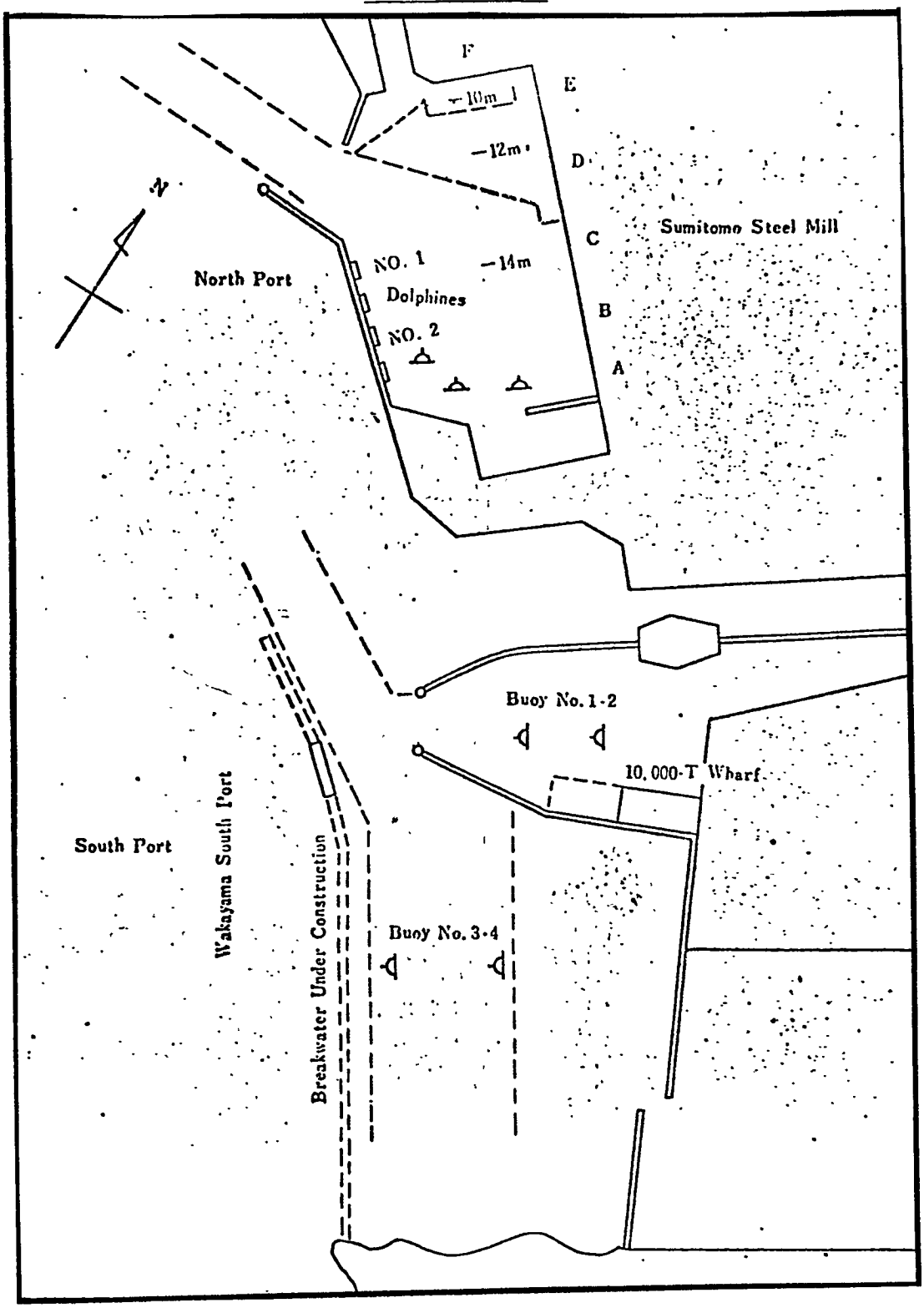
AVERAGE RATE OF CARGO HANDLING:

Coal	: 60 tons per gang hour	Phosphate	: 40 tons per gang hour
Scrap	: 15 tons per gang hour	Lumber	: 25 tons per gang hour
Fertilizer	: 45 tons per gang hour	Coke	: 30 tons per gang hour
Sugar	: 45 tons per gang hour	Salt	: 50 tons per gang hour

NUMBER OF BUOYS AND MOORING CAPACITY OF EACH:

	SHIP'S LENGTH:	MAX. DRAFT:	BERTHING CAPACITY:
Buoy No. B	165 m	8.5 m	One 12,000 G/T
C	160 m	8.4 m	One 10,000 G/T
E	160 m	8.1 m	One 8,000 G/T
N	140 m	6.7 m	One 7,000 G/T
O	140 m	7.3 m	One 5,000 G/T

W A K A Y A M A


F
E
D
C
B
A
-10m
-12m
-14m
N
North Port
NO. 1
Dolphines
NO. 2
Sumitomo Steel Mill
Buoy No. 1-2
10,000-T Wharf
South Port
Wakayama South Port
Breakwater Under Construction
Buoy No. 3-4

LOCATION:
Latitude N. 34° 13' Longitude E. 135° 08'

BOTTOM:
Sand mixed with clay

HARBOUR PROTECTION:
Breakwaters at the North port (Sumitomo Steel Mill).
Natural and breakwaters at the South port.

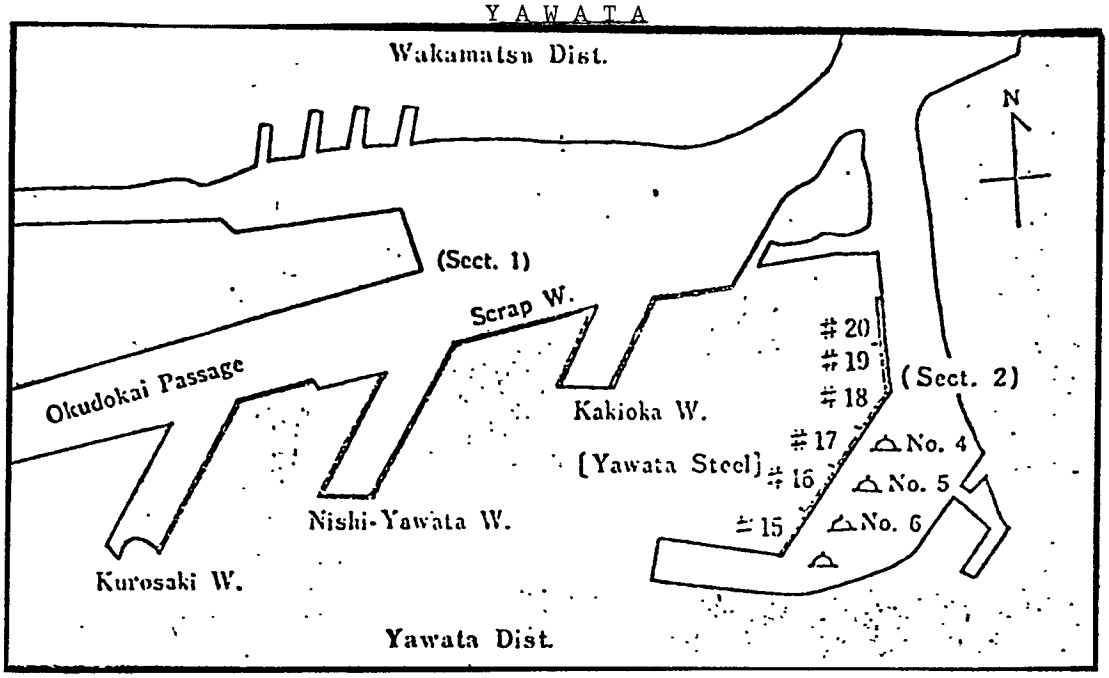
MINIMUM DEPTH OF WATER AT EXTREME LOW WATER (SPRING TIDE):
In the passage: 13.0 - 13.5 m
At anchorage: 9.5 - 13.0 m

PARTICULARS OF EACH WHARF:

NAME OF BERTH:	BERTH LENGTH:	BERTH DEPTH:	MAX. DRAFT:	SHORE FACILITIES:
NORTH PORT				
Sumitomo Steel Mill				
Wharf "A:	172 m	9.5 m	9.0 m	2x10 T
(Coal)	(Max. LOA: 170 m)			
Wharf "B"	365 m	14.0 m	13.0 m	7x700 T/H
(Ore/Coal)	(Max. LOA: 250 m)			Max. outreach: 22 m
				Max. height: 18 m
Wharf "C"	274 m	14.0 m	13.0 m	2x500 T/H
(Ore/Coal)	(Max. LOA: 232 m)			Max. outreach: 17 m
				Max. height: 17 m
Wharf "D"	215 m	13.0 m	12.0 m	
(Coal)	(Max. LOA: 170 m)			
Wharf "E:	218 m	13.0 m	12.0 m	2x20 T
(Loading)	(Max. LOA: 175 m)			
All the above berths are on an extension line.				
Wharf "F"	180 m	10.0 m	9.0 m	2x20 T
(Loading)	(Max. LOA: 175 m)			
Dolphine No. 1		12.0 m	12.0 m	
Dolphine No. 2		12.0 m	12.0 m	
Three Buoys		10.0 m	10.0 m	One 20,000 TDW each
SOUTH PORT (for Public use)				
Discharging of logs into water				
Two Buoys No. 3 & 4		8.5 m	8.5 m (H. W.)	Max. 11,000 GRT
(Located in Sect. No. 1)				Max. LOA: 150 m
Two Buoys No. 1& 2		10.0 m	9.0 m	Max. 13,000 GRT
(Located in South sec.)				Max. LOA: 160 m
Under construction with expected completion in July, 1970				
10,000-ton Wharf	184 m	9.0 m		

PORT IMPROVEMENT PLAN:
SOUTH PORT
Breakwaters are under construction.
Additional 10,000-ton wharf is under construction adjacent to the present wharf.

YAWATA



LOCATION:
Latitude N. 33° 52' Longitude E. 130° 48'

HARBOUR PROTECTION:
Natural

BOTTOM:
Mud mixed with sand

MINIMUM DEPTH OF WATER AT EXTREME LOW WATER (SPRING TIDE):
In the passage: 8.5 m
At anchorage: 8.5 m

PARTICULARS OF EACH WHARF:

NAME OF WHARF:	WHARF LENGTH:	MINIMUM DEPTH APPROACH:	MINIMUM DEPTH ALONGSIDE:	DISCHARGING FACILITIES:
No. 16, 17, 18 (Ore)	479 m MAX. LOA	8.5 m	9.0 m MAX. DRAFT	Eight 12 tons Bridge-type Cranes max. reach 19.8 m max. height 16.4 m 1,200-3,000 tons per day.
No. 16	147 m		8.5 (H.W.)	
No. 17	147 m		8.5 (H.W.)	
No. 18	166 m		8.5 (H.W.)	
No. 19 & 20 (Coal)	300 m MAX. LOA	8.5 m	8.5 m MAX. DRAFT	Four 5 ton jib Cranes. max. reach 17.9 m max. height 13 m 1,200-2,000 tons per day
No. 19	166 m		8.5 (H.W.)	
No. 20	166 m		8.5 (H.W.)	
West Yawata Wharf (Scrap)	220 m MAX. LOA: 180 m Accommodatable up to 200 m. subject to Pilot's confirmation. MAX. DRAFT: 8.5 m (H.W.)	8.5 m	9.0 m	Two 7 ton jib Cranes. max. reach 18 m max. height 14.1 m 100-300 tons per day.

AVERAGE RATE OF DISCHARGE:

Coal	1,200/2,000 tons per day
Scrap	100/300 tons per day
Ore	500/3,000 tons per day

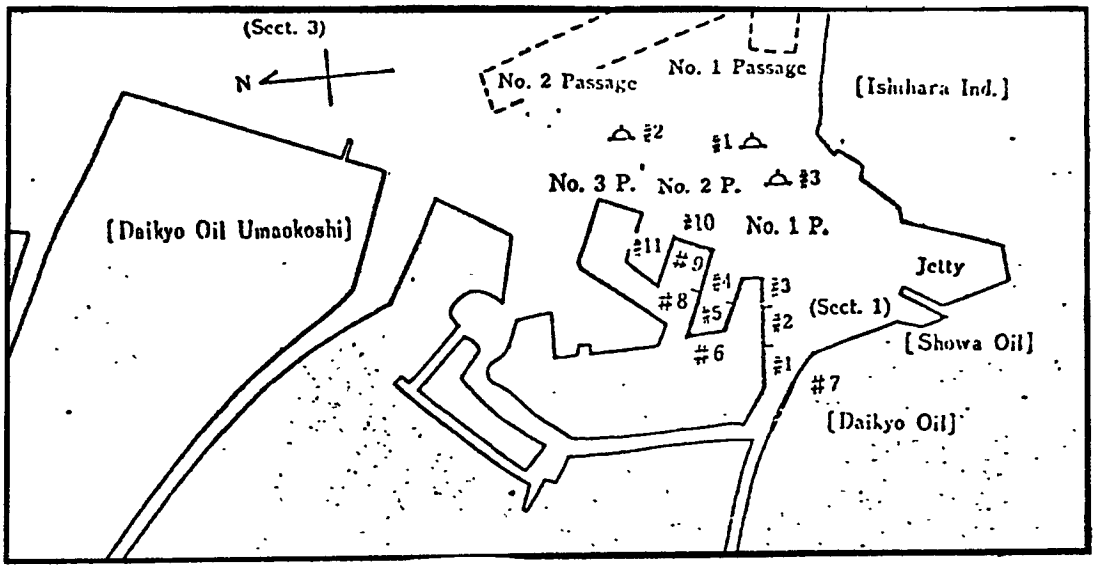
NUMBER OF BUOYS AND MOORING CAPACITY OF EACH:

BUOYS:	MAX. LOA:	MAX. DRAFT:	
Buoy No. 10	156 m	8.5 m	Loading Steel Products
4	155 m	8.5 m	Loading Steel Products
5	145 m	8.5 m	Loading Steel Products
12	134 m	8.5 m	Loading Steel Products

PORT IMPROVEMENT PLANS (EXPANSION PLANS):

Steel Mill now plan to convert all the present berths to facilities for loading of Steel Products before April, 1972.

Y O K K A I C H I



LOCATION:
Latitude N. 34° 56' Longitude E. 136° 39'

HARBOUR PROTECTION:
Breakwaters

BOTTOM:
Mud

MINIMUM DEPTH OF WATER AT EXTREME LOW WATER (SPRING TIDE):
In the passage: 11.5 m
At anchorage: 9.4 - 11.7 m

PARTICULARS OF EACH WHARF:

NAME OF WHARF:	WHARF LENGTH:	MINIMUM DEPTH:	BERTHING CAPACITY:	DISCHARGING FACILITIES:
No. 1 Pier 1 (General cargo)	155 m	8.1 m	One 8,000 G/T	Ship's gear SKT Chain conveyor Grain: 800 tons per 8 hours (Average)
No. 1 Pier 2, 3 (General cargo)	245 m	8.5 m	One 10,000 G/T	Ship's gear
No. 1 Pier 4, 5 (General cargo)	215 m	9.0 m	One 10,000 G/T	Ship's gear
Wharf No. 7 (Coal Berth)	125 m	7.5 m	One 5,000 G/T	Ship's gear
No. 2 Pier 8 (General cargo)	190 m	10.5 m	One 15,000 G/T	Ship's gear
No. 2 Pier 9 (General cargo)	200 m	10.5 m	One 15,000 G/T	Ship's gear
No. 2 Pier 11	200 m	10.0 m	One 15,000 G/T	Ship's gear

AVERAGE RATE OF DISCHARGING:

Beans	by ship's gear	60	tons per hr. per gang
Iron ore	by ship's gear	70	tons per hr. per gang
Wool	by ship's gear	300-340	bales per hr. per gang (to wharf)
Phosphate rock	by ship's gear	50	tons per hr. per gang

NUMBER OF BUOYS AND MOORING CAPACITY OF EACH:

	MOORING CAPACITY:	DEPTH:	
1 Buoy (# 2)	Two 5,000 G/T	5.9 m	General cargo, Grains etc.
1 Buoy (# 1)	One 15,000 G/T	9.7 m	General cargo, Grains etc.
1 Buoy (# 3)	One 15,000 G/T	9.2 m	General cargo, Grains etc.

TANKER BERTH INFORMATION

DAIKYO OIL CO., LTD., YOKKAICHI

DAIKYO OIL BERTH (SHIOHAMA PIER)

Depth of water(approach/alongside):	11.40 meters at low tide.
Max. permissible draft:	11.40 meters at high tide.
Length of berth:	230 meters.
Restriction on L.O.A:	230 meters.
Berthing capacity:	35,000 TDW.
Number/size of manifold:	10"x1 for Propylene Tetramer.
	8"x1 for Heptane.
	8"x1 for Benzene.
	6"x1 for Alpha Olefine.
	16"x1 for Crude Oil.
Discharging capacity/Estimated	500 tons per hour for Propylene Tetramer ($4.5\ kg/cm^2$)
back-pressure:	450 tons per hour for Heptane ($4.5\ kg/cm^2$)
	150 tons per hour for Benzene ($4.5\ kg/cm^2$)
	150 tons per hour for Alpha Olefine ($4.5\ kg/cm^2$)
	7,000 tons per hour for crude oil ($7.0\ kg/cm^2$).

DAIKYO OIL UMAOKOSHI BERTH

Depth of water (approach/alongside):	11.60 meters at low tide.
Max. permissible draft:	11.60 meters at high tide.
Length of berth:	243 meters.
Restriction on L.O.A:	243 meters.
Berthing capacity:	57,000 TDW.
Number/size of manifold:	12"x2.
Discharging capacity:	4,500 k/liters per hour.
Estimated back-pressure:	$5\ kg/cm^2$.

DAIKYO SEA-BERTH

Location:	34°-56'-48" N. & 136°-42'-48" E.
Depth of Water (approach/alongside):	21.00 meters at high tide.
Max. permissible draft:	19.00 meters at high tide.
Length of berth:	Sea berth
Restriction on L.O.A:	Not specified.
Berthing capacity:	200,000 TDW.
Number/size of amnifold:	16"x2.
Discharging capacity:	7,000 k/liters per hour.
Estimated back-pressure:	10 kg/cm^2.

SHOWA OIL CO., LTD., YOKKAICHI

SHOWA OIL "E" BERTH

Depth of water (approach/alongside):	11.40 meters at low tide.
Max. permissible draft:	11.40 meters at high tide.
Length of berth:	230 meters.
Restriction on L.O.A:	220 meters.
Berthing capacity:	30,000 TDW.
Number/size of manifold:	10"x1 for Naptha. 8"x1 for crude oil
Discharging capacity:	1,200 k/liters per hour for Naptha. 700 k/liters per hour for crude/fuel oil.
Estimated back-pressure:	4 kg/cm^2.

SHOWA OIL "D" BERTH

Depth of water (approach/alongside):	11.40 meters at low tide.
Max. permissible draft:	11.40 meters at high tide.
Length of berth:	230 meters
Restriction on L.O.A:	220 meters.
Berthing capacity:	25,000 TDW.
Number/size of manifold:	8"x2.
Discharging capacity:	
Estimated back-pressure:	4 kg/cm^2.

SHOWA OIL SEA-BERTH

Location:	No. 1 (Outer)sea-berth: 34°-55'-05"N. & 136°-42'-03"E. No. 2 (Inner)sea-berth: 34°-55'-06"N. & 136°-41'-07"E.
Depth of water (approach No. 1)	21.00 meters at low tide.
Depth of water (approach No. 2)	19.00 meters at low tide. 21.00 meters at high tide.
Max. permissible draft:	19.00 meters at high tide.
Length of berth:	Sea berth.
Restriction on L.O.A:	Not specified.
Berthing capacity:	220,000 TDW for outer sea-berth. 120,000 TDW for inner sea-berth.

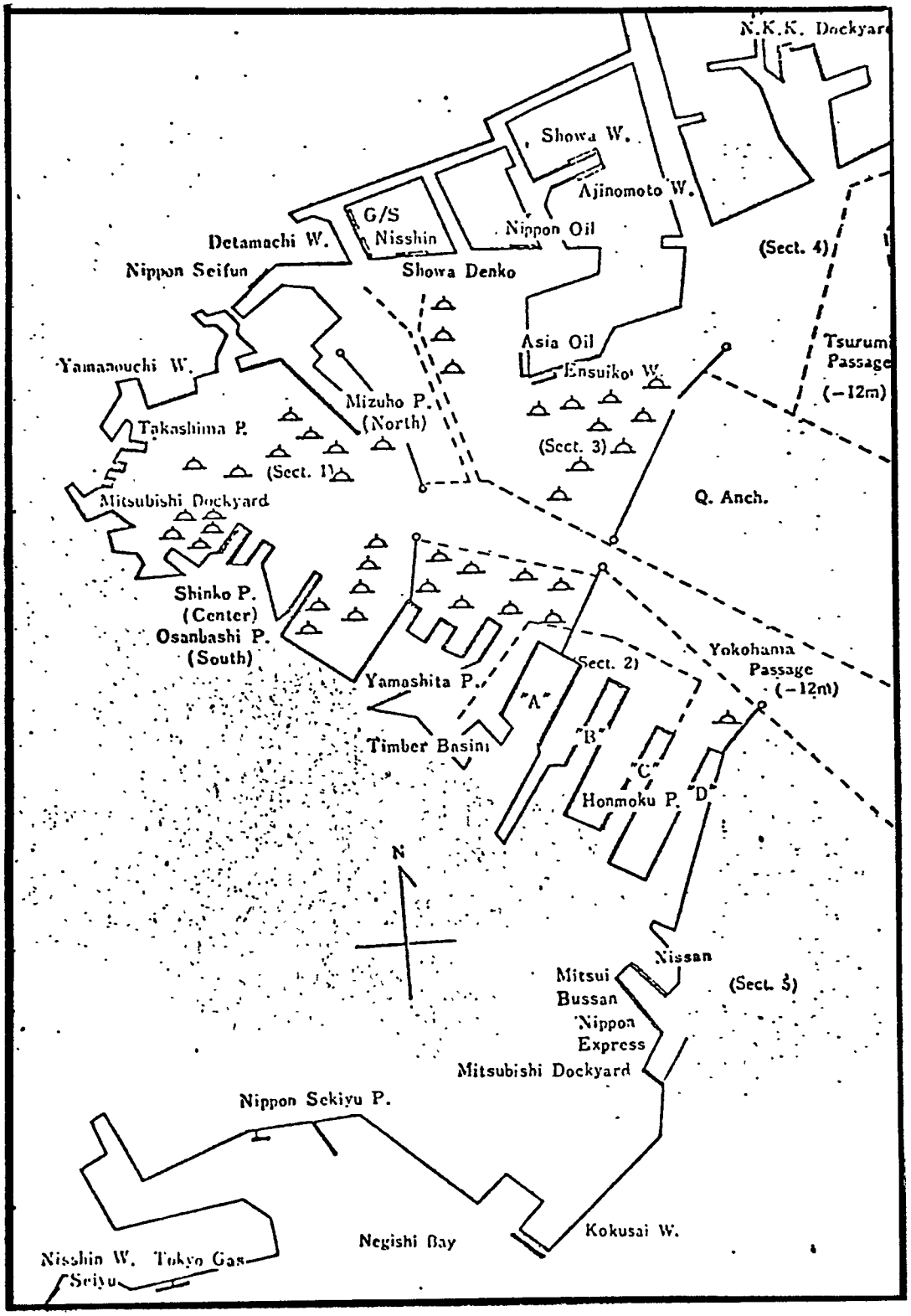
Number/size of manifold:	16"x2 - outer sea-berth. 12"x2 - inner sea-berth.
Discharging capacity:	8,300 k/liters per hour for 16 inches. 4,500 k/liters per hour for 12 inches.
Estimated back-pressure:	

TUG-BOATS: Pilot requires tugboats as follows:

	FOR MOORING:	FOR UNMOORING:
Up to 30,000 d/w	1600 HPx1 and 2400 HPx1	2400 HP x 1
50,000 d/w	1600 HPx1 and 2400 HPx1	2400 HP x 1
70,000 d/w		

	FOR MOORING SEA-BERTH:	FOR UNMOORING (SEA-BERTH):
100,000 d/w	2400 HP x 1	NIL
150,000 d/w	2400 HP x 1	NIL
200,000 d/w	2400 HP x 1	NIL

YOKOHAMA


N.K.K. Dockyard
Showa W.
Ajinomoto W.
G/S
Nisshin
Nippon Oil
Detamachi W.
Nippon Seifun
Showa Denko
(Sect. 4)
Asia Oil
Ensuiko W.
Tsurumi
Passage
(-12m)
Yamaguchi W.
Mizuho P.
(North)
Takashima P.
(Sect. 3)
(Sect. 1)
Mitsubishi Dockyard
Q. Anch.
Shinko P.
(Center)
Osanbashi P.
(South)
Yokohama
Passage
(-12m)
Sect. 2)
Yamashita P.
"A"
"B"
"C"
"D"
Timber Basin
Honmoku P.
N
Nissan
Mitsui
Bussan
Nippon
Express
(Sect. 5)
Mitsubishi Dockyard
Nippon Sekiyu P.
Negishi Bay
Kokusai W.
Nisshin W.
Tokyo Gas
Seiyu

LOCATION:
Latitude N. 35° 27' Longitude E. 139° 40'

HARBOUR PROTECTION:
Breakwater

BOTTOM:
Sand mixed with shell and mud

MINIMUM DEPTH OF WATER AT EXTREME LOW WATER (SPRING TIDE):
In the passage: 11 - 19 m
At anchorage: more than 18 m

PARTICULARS OF EACH BERTH:

PUBLIC BERTH

DISTRICT:	NUMBER OF BERTHS:	MOORING CAPACITY:	BERTH DEPTH:	MAX. DRAFT:
Yamashita Pier	10	15,000 G/T	8.4/10.6	8.0/9.9
South Pier	2	15,000	7.1/ 9.2	6.5/8.7
	2	35,000	9.9/10.5	9.4/9.8
	2	45,000	11.2	10.5
Center Pier	1	10,000	8.6	8.1
	8	15,000	7.5/ 9.1	7.0/8.5
	1 (No. 4)	25,000	10.1	9.6
Takashima Pier	1	7,000	7.7	7.0
	1	9,000	9.0	8.4
	2	15,000	8.9/ 9.4	8.1/8.9
North Pier	3	15,000	9.0/10.6	8.6/9.4
	5	20,000	8.5/ 9.0	8.1/8.6
Detamachi Pier	4	8,000	7.4/ 8.0	5.3/7.1
Hommoku Pier	20	15,000	9.8/10.4	9.4/10.0
	3	20,000	9.7/10.2	9.3/9.8
	1	30,000	10.8	10.4 (Dolphine)

N.B. South Pier and Center Pier No. 4: Passenger vessel has Priority.
North Pier : Under U.S. Navy control.

NUMBER OF BUOYS AND CAPACITY:

DISTRICT:	NUMBER OF BERTHS:	MOORING CAPACITY:	BERTH DEPTH:	MAX. DRAFT:	MAX. LOA:
1st	1	10,000 G/T	7.9	7.1	
	1	12,000	8.2	7.5	
	5	15,000	9.8/10.8	9.0/10.4	145/180
2nd	5	15,000	9.3/10.9	9.1/10.2	155/180
3rd	1	10,000	9.6	9.0	140
	1	12,000	9.3	8.7	155
	4	15,000	9.5/10.5	8.9/ 9.5	180/195
	2	20,000	11.0	10.3/10.5	200

N.B. Discharging of logs/lumber into water only allowed in No. 2 district.

PRIVATE BERTH

PORT DISTRICT	NAME OF BERTH	BERTHING CAPACITY (GROSS TONS)	DEPTH (METERS)	PERMITTED MAX. DRAFT (METERS)	LENGTH	PERMITTED MAX. LOA	DISCHARGING FACILITIES
3rd	Nippon Seifun Berth (Grain)	12,000	9.0	9.0	180	160	2 Vacuum unloaders 100-180 T/hour
"	Norinsho Yokohama G/Silo Berth (Grain)	15,000	10.6	10.0	Dolphin	170	2 Vacuum unloaders 200-300 T/hour
"	Nisshin Unyu W/H Berth (Grain & G/C)	15,000	9.0	9.0	244	170	By Ship's Gear
"	Showa Denko Berth (Iron Ore & Coal)	15,000	10.0	9.5	275	190	One 5-Ton Crane 200 T/hour One 2.5-Ton Crane 85 T/hour
"	Showa Sangyo Berth (Grain)		9.5	9.5	Dolphin	155 163	2 Vacuum unloaders 90-150 T/hour (Aft. Bridge) (Mid. Bridge)
"	Ajinomoto Berth (Grain)		8.1	8.0	Dolphin	155 163	2 Sets SKT 70-130 T/H (Aft. Bridge) (Mid. Bridge)
"	Ensuiko Seito (Sugar)	15,000	9.5	9.1	Dolphin	180	Ship's Gear

PORT DISTRICT:	NAME OF BERTH:	BERTHING CAPACITY	BERTH DEPTH:	MAX. DRAFT:	BERTH LENGTH:
5th	Nissan Car	20,000 G/T	10.0 m	9.6 m	360 m
	Mitsui Bussan	15,000	11.0 m	10.5 m	390 m
	Nippon Express	17,000	11.0 m	10.5 m	390 m
	Kokusai Futo	150,000 TDW	17.5 m	17.0 m	Max. LOA: 300 m 3x30.5 T cranes (1,000 T/H each)
	Nisshin Seiyu (Oil Mill) (Grain)	30,000 G/T	10.8 m	10.4 m	200 m 2 suckersx200/ 300 T/H
	Tokyo Gas Co.	50,000 G/T	10.5 m	10.0 m	

PORT IMPROVEMENT PLANS (EXPANSION PLANS):

Improvements are planned for the next eight years, but actual construction schedules are undecided:

Mizuho pier (New Berth) Length: 800 m Depth: 10 m 15,000 D/W tons 4 berths

TANKER BERTH INFORMATION

ASIA OIL CO., LTD., YOKOHAMA

No. 2 PIER

Depth of water (approach/alongside):	9.40 meters at low tide.
Maximum permissible draft:	9.43 meters at high tide.
Length of berth:	
Restriction on L.O.A:	200 meters.
Berthing capacity:	33,000 TDW.
Number/size of manifold:	8"x3 - for discharging of crude oil.
Discharging capacity:	1,200 k/liters per hour.
Estimated back-pressure:	10 kg/cm^2.

TUG-BOATS: A pilot requires tugboats as follows:

1,200 HP or 1,500 HP x 2 for mooring and unmooring.

No. 5 PIER

Depth of water (approach/alongside):	11.80 meters at low tide.
Maximum permissible draft:	12.00 meters at high tide.
Length of berth:	
Restriction on L.O.A:	250 meters.
Berthing capacity:	72,000 TDW.
Number/size of manifold:	10"x4 - for discharging of crude oil. 10"x2 - for discharging of fuel oil.

GENERAL BUSSAN K.K., TSURUMI &
GENERAL AMERICAN TRANSPORTATION EXPRESS (GATEX)

GENERAL BUSSAN TSURUMI TERMINAL

Depth of water (approach/alongside):	8.2 meters at low tide.
Maximum permissible draft:	8.6 meters at high tide.
Length of berth:	
Restrictions on L.O.A:	210 meters.
Berthing capacity (max.):	20,000 DWT.
Number/size of manifold:	4"x3 - for discharging of chemical products. 6"x2 - for discharging of lub. oil.
Discharging capacity:	700 - 1,000 k/liters per hour for fuel & diesel oil. 100 tons per hour for chemical products. 170 tons per hour for lub. oil.
Estimated back-pressure:	6 kg/cm^2 for fuel oil & diesel oil. 10 kg/cm^2 for chemical products and lub. oil.

TUG-BOATS: A pilot requires tugboats as follows:
1,200 HP or 1,800 HP x 2 for mooring and unmooring.

ASIA OIL CO., LTD., KYODO OIL CO., AND TOA OIL CO., LTD.

KEIHIN YOKOHAMA SEA-BERTH

Location:	35°-27'-03" N. & 139°-43'-53" E.
Depth of water (approach/alongside):	21-25 meters.
Maximum permissible draft:	19.50 meters irrespective of tide.
Length of berth:	-sea-berth-
Restriction on L.O.A:	Not specified.
Berthing capacity:	250,000 TDW.
Number/size of manifold:	16"x2 - for discharging of crude oil.
Discharging capacity:	10,000 k/liters per hour.
Estimated back-pressure:	Max. 15 kg/cm^2.

TUG-BOATS: A pilot requires tugboats as follows:
2,500 HP or 3,000 HP x 2 for mooring and unmooring.

MOBIL SEKIYU K.K., YOKOHAMA

MOBIL TSURUMI TERMINAI

Depth of water (approach):	12.00 meters at low tide.
Depth of water (alongside):	8.10 meters at low tide.
Maximum permissible draft:	9.20 meters at high tide.
Length of berth:	
Restriction on L.O.A:	210 meters.
Berthing capacity (max.):	38,000 d/w tonner.
Number/size of manifold:	6"x2 - for discharging of clean oil. 8"x1 - for discharging of clean oil. 6"x6 - for discharging of dirty oil. 8"x1 - for discharging of dirty oil/others.

TANKER BERTH INFORMATION

Number/size of manifold: (cont'd)	6"x3 - for discharging of dirty oil/ others. 6"x4 - for discharging of chemical/ lub. oil.
Discharging capacity:	1,000-1,200 k/liters per hour for clean oil. 700-1,000 k/liters per hour for dirty oil. 600-1,000 k/liters per hour for dirty oil/ others. 200 k/liters per hour for chemical/lub. oil.
Estimated back-pressure:	7 kg/cm^2 for each line.

TUG-BOATS: A pilot requires tugboats as follows:
1,200 HP or 1,500 HP x 2 for mooring and unmooring.

NIPPON PETROLEUM REFINING CO., LTD., YOKOHAMA

"A" BERTH

Depth of water (approach/alongside):	12.00 meters at high water.
Maximum permissible draft:	11.80 meters at high water.
Length of berth:	
Restriction on L.O.A:	250 m.
Berthing capacity:	80,000 TDW.
Number/size of manifold:	12"x2 - for discharging of crude oil.
Discharging capacity:	3,000 k/liters per hour.
Estimated back-pressure:	10 kg/cm^2.

TUG-BOATS: A pilot requires tugboats as follows:
1,200 HP or 2,500 HP x 2 for mooring and unmooring.

SHELL SEKIYU K.K., YOKOHAMA

SEA-BERTH

Depth of water (approach/alongside):	12.00 meters at high tide.
Maximum permissible draft:	11.70 meters at high tide.
Length of berth:	-sea-berth-
Restriction on L.O.A:	265 meters.
Berthing capacity:	87,000 TDW.
Number/size of manifold:	12"x3 - for discharging of crude oil. 12"x3 - for discharging of fuel oil. x1 - for discharging of clean oil.
Discharging capacity:	4,800 k/liters per hour for crude oil. 1,200 k/liters per hour for fuel oil. 450 k/liters per hour for clean oil.
Estimated back-pressure:	10.5 kg/cm^2 for each line.

TUG-BOATS: A pilot requires tugboats as follows:
1,800 HP or 2,500 HP x 2 for mooring and unmooring.

MAIN JETTY

Depth of water (approach/alongside):	12.00 meters at high tide.
Maximum permissible draft:	10.00 meters at high tide.
Length of berth:	
Restriction on L.O.A:	200 meters.
Berthing capacity:	20,000 TDW.
Number/size of manifold:	8"x - for discharging of crude oil. 8"x - for discharging of fuel oil. 8"x - for discharging of dirty oil.
Discharging capacity:	1,200 k/liters per hour for crude oil. 600 k/liters per hour for fuel oil. 300 k/liters per hour for dirty oil.
Estimated back-pressure:	7.5 kg/cm^2 for each line.

TUG-BOATS: A pilot requires tugboats as follows:
1,200 HP or 2,000 HP x 2 for mooring and unmooring.

TOKYO GAS CO., LTD., YOKOHAMA

NEGISHI BERTH

Depth of water (approach/alongside):	10.50 meters at
Maximum permissible draft:	12.00 meters at
Length of berth:	
Restriction on L.O.A:	250 meters.
Berthing capacity:	50,000 TDW.
Number/size of manifold:	12"x1 - for discharging of Butane. 12"x1 - for discharging of Naptha. 12"x1 - Vapor line.
Discharging capacity:	800 k/liters per hour for Butane. 3,000 k/liters per hour for Naptha.
Estimated back-pressure:	10 kg/cm^2 for each line.

TUG-BOATS: A pilot requires tugboats as follows:
1,500 HP or 2,000 HP x 2 for mooring and unmooring.

NIPPON PETROLEUM REFINING CO., LTD., NEGISHI

NEGISHI "A" BERTH

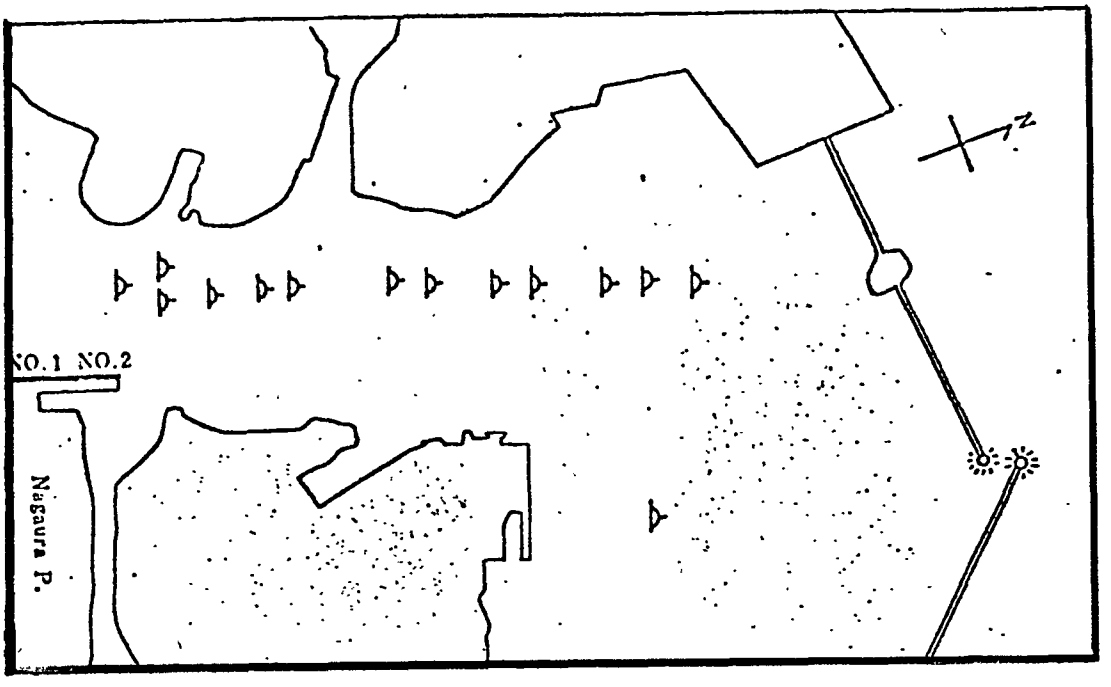
Depth of water (approach/alongside):	17.00 meters at high tide.
Maximum permissible draft:	16.00 meters at high tide.
Length of berth:	
Restriction on L.O.A:	310 meters.
Berthing capacity:	190,000 DTW.
Number/size of manifold:	12"x3 for discharging of crude oil.
Discharging capacity:	10,000 k/liters per hour.
Estimated back-pressure:	14 kg/cm^2.

NEGISHI "B" BERTH

Depth of water (approach/alongside):	13.00 meters at low tide.
Maximum permissible draft:	13.00 meters at high tide.
Length of berth:	
Restriction on L.O.A;	280 meters.
Berthing Capacity:	92,000 TDW.
Number/size of manifold:	12"x2 - for discharging of crude oil. 12"x2 - for discharging of fuel oil. for discharging of clean oil. 8"x1 - for discharging of lub. oil.
Discharging capacity:	2,500 k/liters per hour for crude oil. 2,000 k/liters per hour for fuel oil. 2,000 k/liters per hour for clean oil. 500 k/liters per hour for lub. oil.
Estimated back-pressure:	20 kg/cm^2 for crude oil, fuel oil and clean oil 10 kg/cm^2 for lub. oil.

TUG-BOATS: A pilot requires tugboats as follows:
1,500 HP or 2,000 HP x 2 for mooring and unmorring.

YOKOSUKA



LOCATION:
Latitude N. 35°17' Longitude E. 139°39'

HARBOUR PROTECTION:
Breakwater

BOTTOM:
Mud

MINIMUM DEPTH OF WATER AT EXTREME LOW WATER (SPRING TIDE):
In the passages: 12-15 m
At anchorage: 15-36 M

PARTICULARS OF EACH WHARF:

NAME OF BERTH:	BERTH LENGTH:	MAX. DRAFT:	MAX. L.O.A.:	SHORE FACILITIES:
NAGAURA PIER	345 m			
No. 1 berth (Dis. grain) (Load. Autos, General Cargo)		9.00 M	170 m	2 suckers X 100 T/H
No. 2 berth (Load. Autos, General Cargo)		9.45 m	180 m	None

NUMBER OF BUOYS AND MOORING CAPACITY OF EACH:

	MOORING CAPACITY:	DEPTH:
1 Buoy	30,000 G/T	13.2 m
1 Buoy	25,000 G/T	12.7 m
2 Buoys	15,000 G/T	13.7 m
1 Buoy	7,000 G/T	12.7 m
7 Buoys	3,000 G/T	8.2 m
5 Buoys	1,000 G/T	6.5 m

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