昭和44年11月15日第三種郵便物認可　昭和58年12月号　昭和58年11月20日発行　第28巻第10号（毎月1回20日発行）　ISSN 0554-7555

PORTS and HARBORS

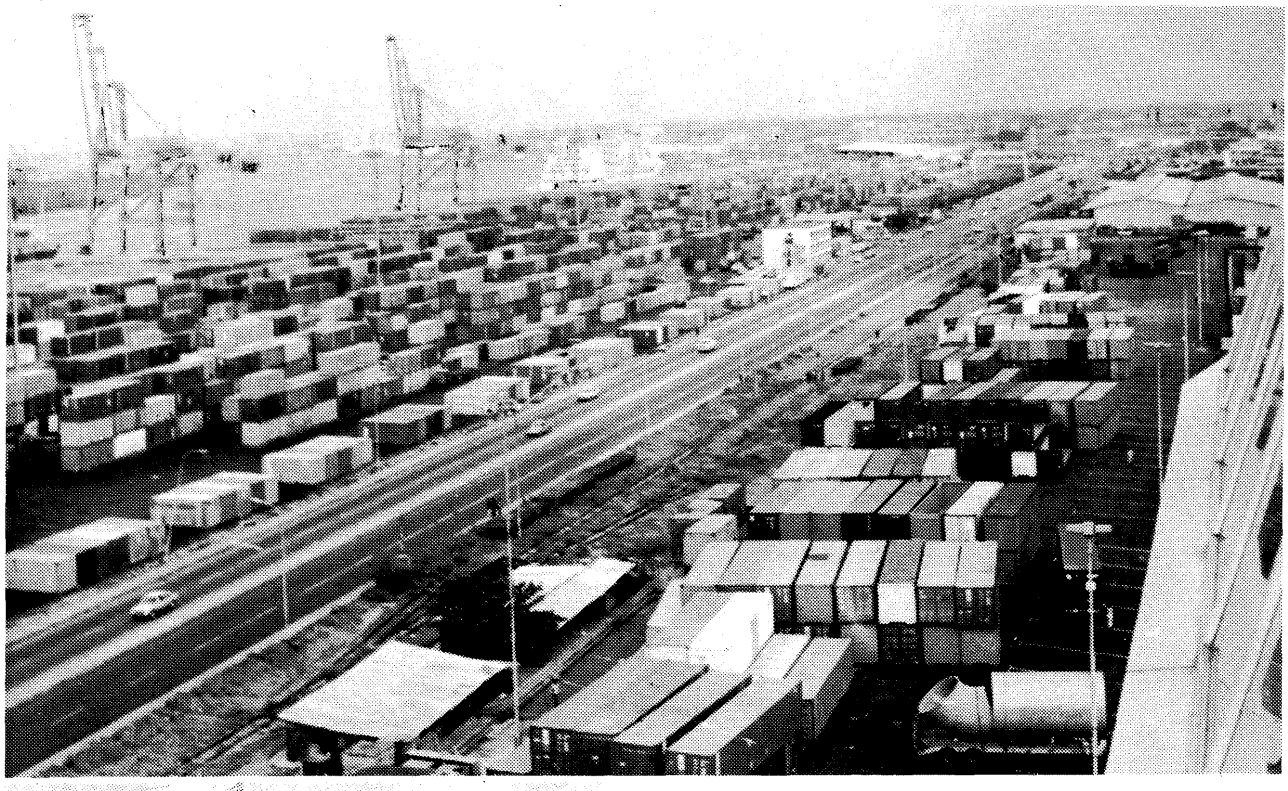
December, 1983 Vol. 28, No. 12

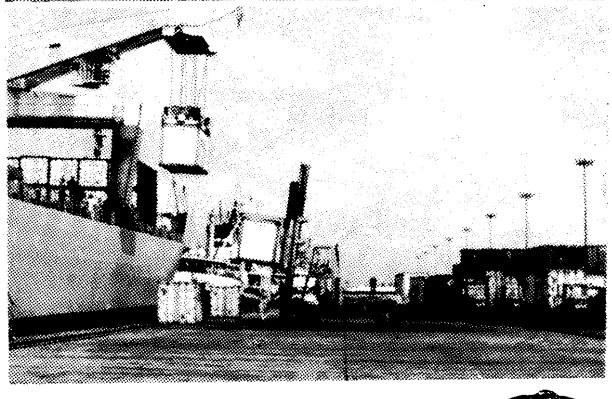
Port of Wilmington

North Carolina State Ports Authority

The Publisher: The International Association of Ports and Harbors

Kotohira-Kaikan Bldg., 2-8, Toranomon 1-chome, Minato-ku,
Tokyo 105, Japan





Nigeria's Seaports are expanding – keeping pace with Industrial Development

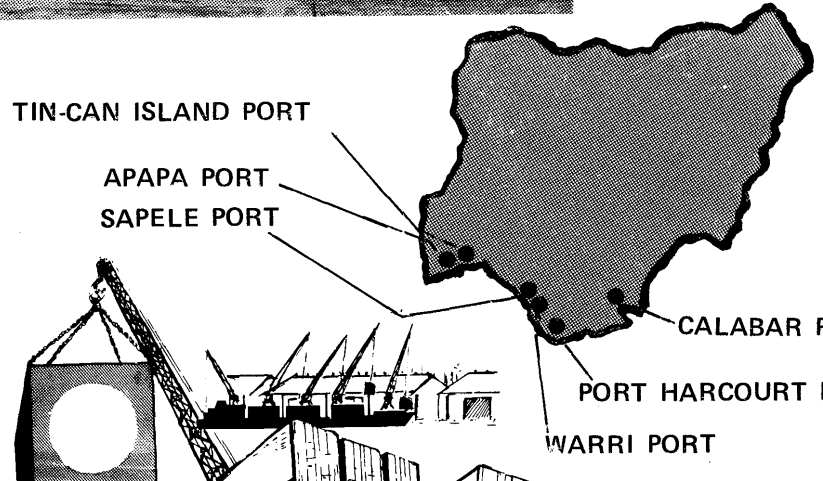
ROLL-ON/ROLL-OFF BERTHS AT

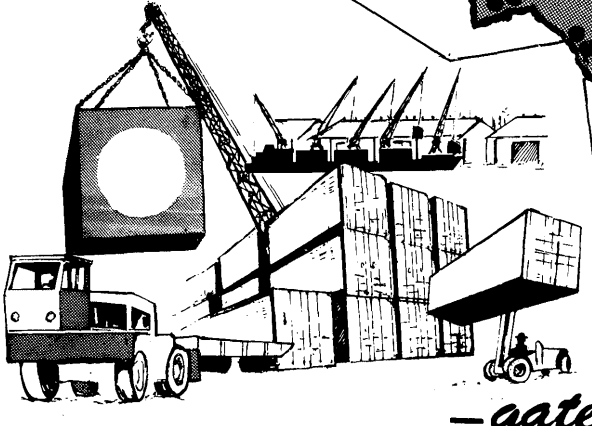
* Tin-Can Island
* Warri
* Sapele

Mechanised Container Berth at Apapa

MODERN GENERAL CARGO BERTHS AT

* Apapa
* Port Harcourt
* Tin-Can Island
* Sapele
* Calabar
* Warri





The Nigerian Ports Authority operates six ports as shown in the above map of Nigeria.

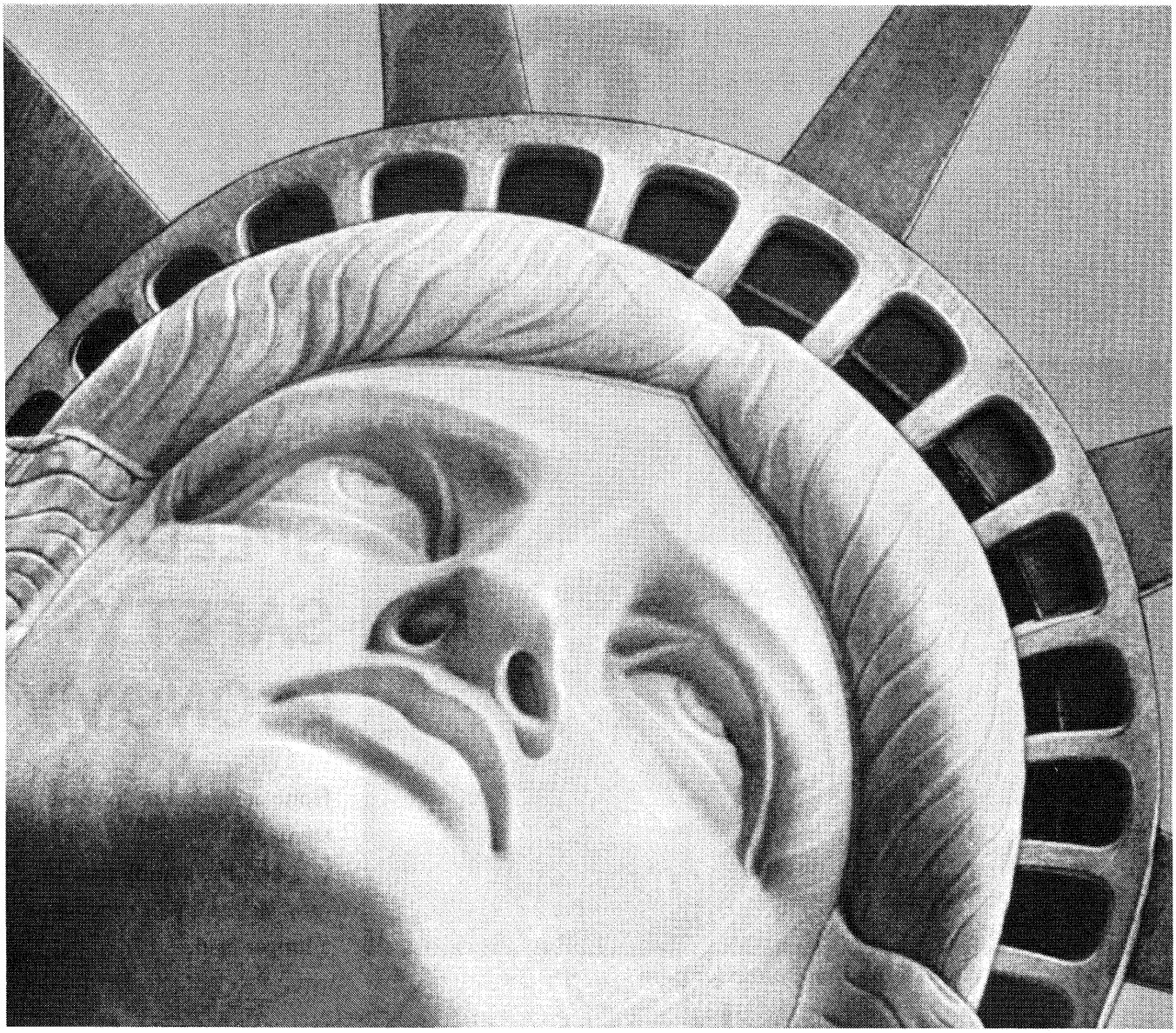
Guaranteeing

* Quick turn round
* Security of Cargo
* Provision of Ancilliary port facilities

–gateway to the nation's economy

TCB0082

NIGERIAN PORTS AUTHORITY 26/28, Marina, Lagos, Nigeria, Private Mail Bag 12588,



From the land of the free-
AN INEXPENSIVE PROPOSITION.

The statue marking the entry to the land of the free stands at the entrance of the Port of New York and New Jersey. Although nothing's free any more, you'll find that our costs are genuinely competitive.

You'll find that our security and cargo handling speed also help better your overall cost.

So before shipping, do some comparison shopping. Get the facts from our sales office.

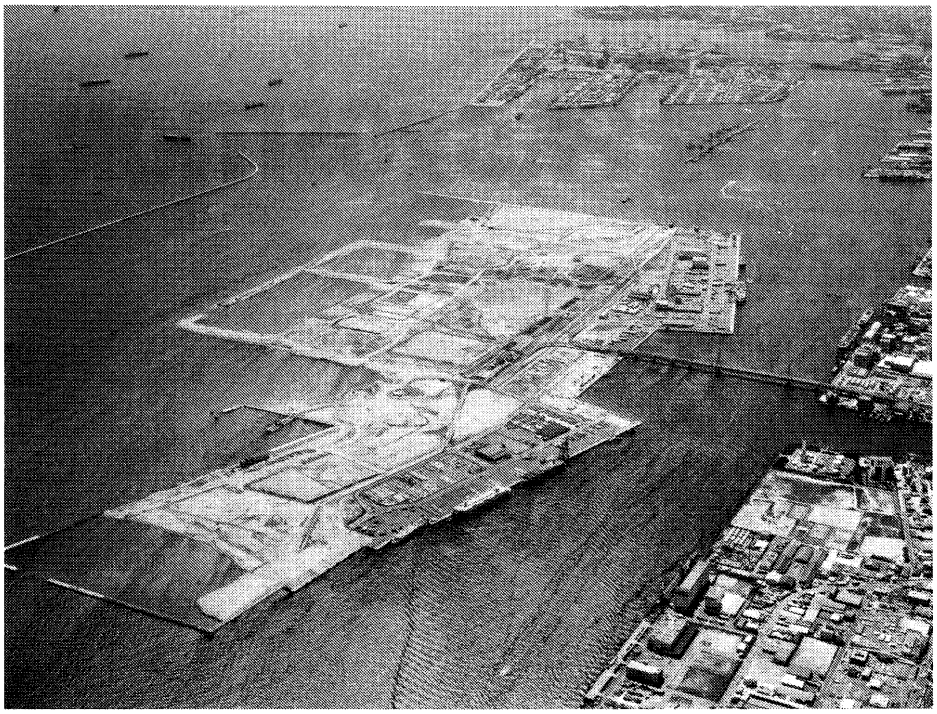
AMERICA'S GREAT PORT.

THE PORT AUTHORITY
OF NY & NJ

One World Trade Center 64E, New York, NY 10048
Telephone: (212) 466-8315

Port of Kobe

PORT ISLAND: World's Leading Container Base



ROKKO ISLAND: New Facilities with Great Potentialities

SPEED
SAFETY
ECONOMY

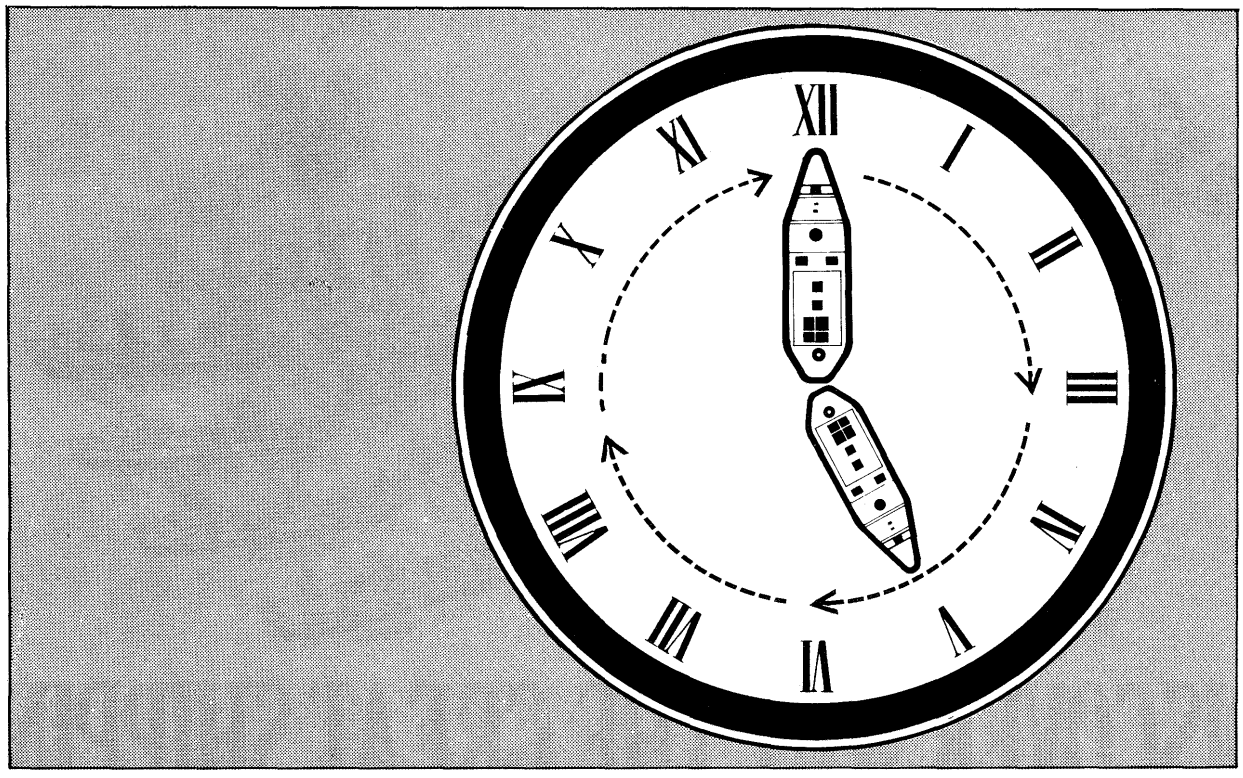
None can excel us in these elements.
. . . And the completion of new facilities will provide us a longer lead.

Main Office:
Port and Harbor Bureau
Kobe City Government
5-1, Kano-cho 6-chome
Chuo-ku, Kobe 650, JAPAN
Cable Address: JAPANGATE
Telex: 78548
Tel: (078) 331-8181

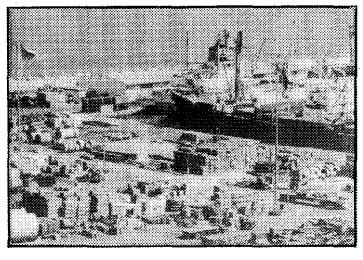
Tokyo Office:
Port of Kobe Authority Tokyo Office
Zenkoku-Toshikaikan
4-2, Hirakawa-cho 2-chome
Chiyoda-ku, Tokyo 102, JAPAN
Tel: (03) 263-6044

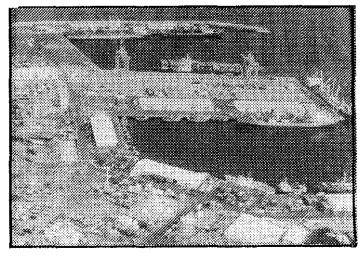
London Office:
Port of Kobe Authority London Office
Plantation House
31/35 Fenchurch Street
London, EC3M 3DX, U.K.
Telex: 897673
Tel: (01) 623-5110

Round-the-clock operations



Port Qaboos: Muscat





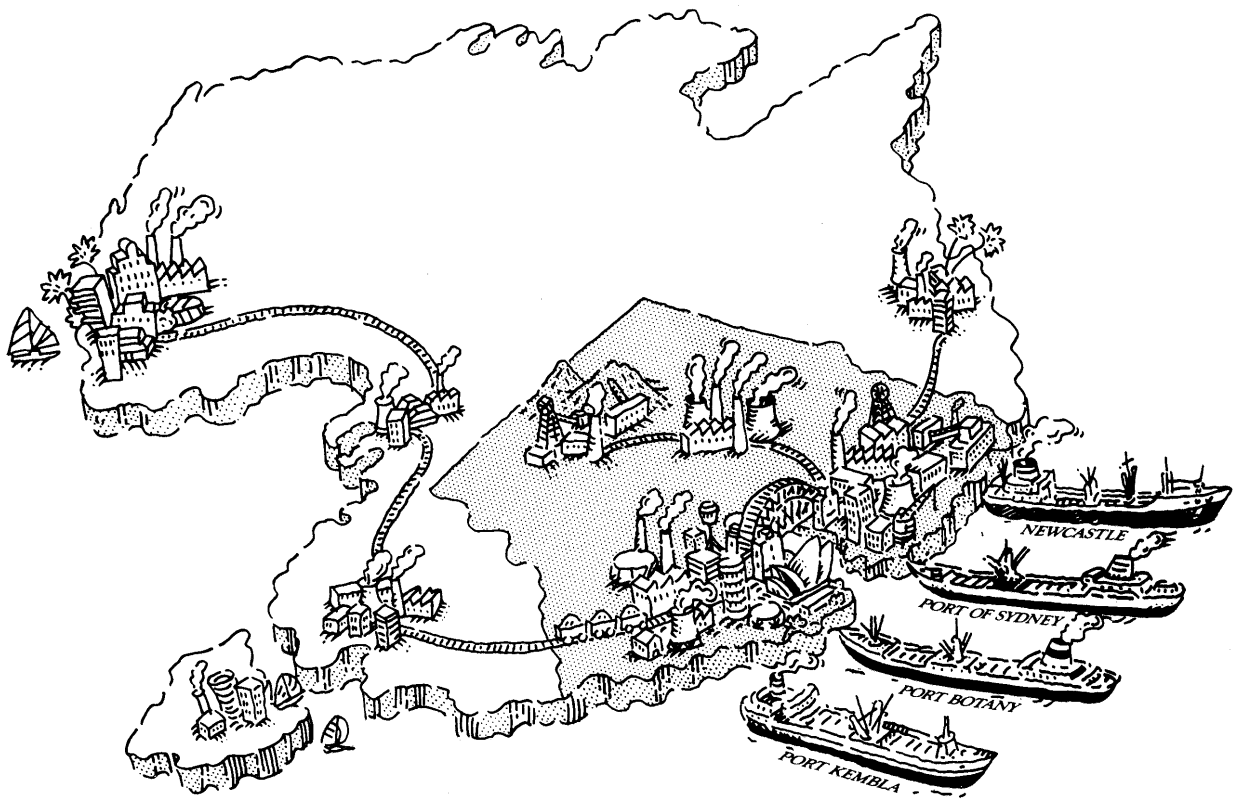
The fastest turn-around port, with excellent transhipment service by land and sea for the entire Gulf region. Port Qaboos container terminal is capable of storing 1600 TEUs and handles container vessels with the help of two 35T gantry cranes with supporting quay equipment. Port Qaboos offers:

- 9 deep water and 4 coaster berths
- Round the clock berthing/unberthing
- 24-hour stevedore operations
- Modern container handling
- Ro-Ro handling
- Cranage upto 150T capacity
- Facilities for reefer storage
- Large covered and open storage area

For more information contact:

The President
Port Services Corporation Ltd
P.O. Box 133 Muscat, Sultanate of Oman
Tel: 734001 Telex: 5233 ON

OHI 317



DISCOVER WHY THE GREAT SHIPPING COMPANIES USE THE GREAT PORTS OF NEW SOUTH WALES.

The largest shipping companies in the world use the ports of New South Wales.

And the reasons are quite simple.

Firstly, New South Wales is centrally located with road, rail and air links to the rest of Australia.

Secondly, our ports have the capacity to handle large tonnage.

Sydney's twin ports (Port of Sydney and Port Botany) have the largest container facilities in the Southern Hemisphere.

And, most importantly, our capacity is increasing all the time.

The Port of Sydney and Port Kembla are maintaining record cargo throughputs. So too is Newcastle, where recent harbour deepening operations have ensured that tonnage figures continue to grow. The development of Port Botany has doubled Sydney's container facilities making it the largest shipping facility in the Southern Hemisphere.

New South Wales' ports are the gateway to Australian business, and they are growing to meet the future needs of world shipping.

For details, contact The Maritime Services Board of New South Wales, Circular Quay West, Sydney 2000, Australia.

Telex: AA24944

THE MARITIME SERVICES BOARD OF NSW.

MSB8039.FMH

PORTS and HARBORS

Published by

The International Association of Ports and Harbors

N.G.O Consultative Status, United Nations (ECOSOC, UNCTAD, IMO)

Secretary General: Dr. Hajime Sato

Head Office:
Kotohira-Kaikan Bldg.
2-8, Toranomon 1-chome, Minato-ku
Tokyo 105, Japan
Tel.: TOKYO (591) 4261
Cable: "IAPHCENTRAL TOKYO"
Telex: 2222516 IAPH J

December, 1983 Vol. 28, No. 12

CONTENTS

The Cover: **Port of Wilmington, North Carolina State Ports Authority**

Price US $3.50 per copy
US $35.00 per year

South East Asia

**One of the fastest growing regions in the world.
An abundance of natural resources and an open market of over 250 million people.**

THE PORT OF SINGAPORE offers you

- Over 12 km of wharves for all types of vessels.
- Over one million square metres of storage space for all kinds of cargo.
- Experienced and disciplined workers.

Add all these to Singapore's advantages as a leading business centre with reliable and regular air and sea links with all parts of the world.

The Port of Singapore is your gateway to success!

PSA PORT OF SINGAPORE AUTHORITY
P O Box 300 Singapore 9005
Telex: RS 21507 Cable: 'TANJONG' SINGAPORE

IAPH announcements and news

President Tozzoli spurs membership campaign

President Tozzoli's campaign letter dated October 31, 1983 has been circulated to 200 non-member ports with the up-dated version of the IAPH brochure, together with application forms (for regular and temporary membership).

Since the creation of the "temporary member" category in 1980, as of the end of October 1983, altogether 36 ports have applied for such membership of IAPH. Moreover, as a result of this campaign, which has been conducted every year since then, a majority of these members have joined as regular members after their one-year trial period.

Our thanks are also due to Mr. Paul Bastard, Chairman of the IAPH Membership Committee, who has been kind enough to take care of the translation of the presidential campaign letter into French for use in the francophone countries.

President Tozzli's letter follows.

This is my first opportunity as President of The International Association of Ports and Harbors to extend an invitation to you and your organization to join the IAPH, an international organization devoted to the exchange of ideas, technical knowledge, and port issues among maritime and port officials throughout the world.

With its ever-increasing membership, the influence of IAPH as a world-wide association of ports and harbors is becoming greater each year. I do hope that you will feel that the time is appropriate for your port to consider the many advantages of membership in the IAPH.

I am particularly pleased to inform you that we are continuing the "temporary membership" status which was introduced by the Association in 1980 at the reduced membership dues of SDR500 for one year, with a view to encouraging new members to join and become familiar with the Association and also enable them to participate in our next biennial conference at Hamburg, Germany, from May 4-11, 1985.

A brochure which describes in detail the structure and activities of IAPH as well as membership requirements is enclosed. I sincerely hope you will favorably consider joining The International Association of Ports and Harbors and also plan to attend the Hamburg Conference. Membership applications can be obtained by writing to the Head Office in Tokyo.

How could IAPH better serve its members and world ports? A questionnaire circulated

In connection with the decision made by the Board of Directors at a meeting held during the Vancouver Conference, followed by the report of the Three Wisemen's Council, Secretary General has recently circulated a questionnaire to all members of the Association with the aim of obtaining their suggestions and advice as to how the Association could better serve them, and further world ports at large.

The three Wisemen's Council consists of Messrs. Paul Bastard (France), Robert L.M. Vleugels (Belgium) and J. den Toom (the Netherlands), who have served on the Association since the 60's in various important capacities. Since it was appointed by the Executive Committee at the Aruba meeting held in May 1982, the Council has been enthusiastically tackling its alloted tasks, and it duly presented its report to the Conference in Vancouver with recommendations on the future work of the Association.

Reflecting the strong recommendation of the wisemen that the Head Office should endeavor to obtain data which is as accurate and comprehensive as possible from all members so as to maxmise the efficiency of its service, the questionnaire had to be prepared in rather a detailed form. The Secretary General in his covering letter dated October 7, 1983, requested all members to help him in this effort and to contribute their replies to the questionnaire as soon as possible.

Mr. Dubois reports on the progress of the No. 2 Vancouver Resolution

In connection with the recommended guidelines for vessel traffic services, article of which appeared in the previous two issues of this journal, Mr. J. Dubois, General Manager of the Port of Le Havre Authority, who has taken over the responsibility as Chairman of the PSEC (Port Safety, Environment and Construction) Committee of IAPH since the Vancouver Conference, recently sent the following report on the progress of the matter for announcement in this issue.

"The Resolution No. 2 of the Vancouver Conference authorized the Port Safety, Environment and Construction Committee, after consultation with and concurrence by the Committee on Legal Protection of Port Interests, to present a position to appropriate and cognizant international bodies which shall detail the means, procedures and regulations by which its following objectives and purposes in the field of Vessel Traffic Services would be achieved in the best interests of ports and harbors:

The VTS should provide for the safety of ports, the environment and navigation through such means as regulation of movements, coordination of actions within a port or harbor, communication of data relating to ship movements and, coordination of all operations within a port or harbor in the event of emergencies or accidents; it should also provide for the respective legal implications of each element of the said System on Vessel Traffic Services Authorities to be taken into account.

Consequently, the IAPH has prepared jointly with the IALA (International Association of Lighthouse Authorities), and in relation with the ICS (International Chamber of Shipping), the IMPA (International Maritime Pilots Associa-

tion) and the IFSMA (International Federation of Shipmaster's Association), a "Guidelines for Vessel Traffic Services".

This document was addressed to the IMO on August 1st, 1983, after being passed by a meeting of the Board of Directors by correspondence, held on July 30th, 1983 (ref. letter 7-83 BD of June 30th, 1983).

This document has thus been examined by the IMO Sub-Committee of Safety of Navigation that met from October 17th to October 21st.

The IAPH was represented at this session by a representative of the PSECC Sub-Committee in charge with maritime safety.

The document was rather well accepted. It was put on discussion for preliminary consideration. And it is expected that it could be finalized and approved by the next session of the Sub-Committee in June 1984."

Implementation of the IAPH/IALA/PIANC Recommendations on Port Signals

Mr. J. Prunieras, Manager of the Lighthouse and Beacons Services (France) has recently advised IAPH of the French Government's acceptance of the IAPH/IALA/PIANC recommendations on Port Signals.

The implementation of the recommendations has been facilitated by France's denunciation of the Lisbon Agreement of October 1930.

The Membership Directory 1984 completed

The 1984 edition of the Membership Directory was completed in late October and was sent to all members from the Tokyo Head Office in the first week of November. Regular Members and Associate Members of Classes A, B and C, in Grade One, are entitled to receive 3 copies per unit (one copy out of which was airmailed, with the remaining copies seamailed), and other members one copy per unit.

If IAPH members wish to receive additional copies, they are available on request to the Secretary General.

HANZ welcomes IAPH members at its 50th Conference

Mr. J. Murray, Chief Executive of the Harbours Association of New Zealand (HANZ) has recently written to the Secretary General, Dr. Sato, informing him that the 50th Conference of his Association will be held in Auckland, New Zealand, from 7 to 9 March, 1984. His letter was to extend to members of IAPH a cordial invitation from the HANZ President to be present at and take part in the Conference deliberations and their associated activities.

According to the information contained in the invitation letter, the venue of the Conference is the Kingsgate Trillos Conference Centre in Auckland, and the host is the Auckland Harbour Board. The registration fee is $90 for each participant and the official hotels are the South Pacific and the Travelodge, the special room rate for both hotels being $75 double or single.

"As is normal", Mr. Murray's letter emphasizes, "the wives of delegates and invited guests are most welcome, and a Ladies' Programme is being arranged which will be forwarded to those concerned at a later date, as necessary. In addition, papers relating to the agenda for the Conference proper will also be forwarded as necessary." In order to ensure smooth organization, those who are interested in participating in the Conference are requested to contact Mr. J. Murray at the following address at the earliest possible date:

The Harbours Association of New Zealand
P.O. Box 1765, Wellington 1, New Zealand
Telex: HARAMZ 30258
Telegraphic Address: HARUNION WELLINGTON

Visitors:

– On October 21, Mr. Norman Arikawa, Risk Manager of the Port of Los Angeles, accompanied by Ms. Tazuko Shimmoto, a staff member of the Port's Far East Representative Office in Tokyo, visited the Head Office and was met by Under Secretary Kimiko Takeda in the absence of other senior members.

Prior to this, Mr. Arikawa had been to Nagoya, where he visited the Mayor's office and the Nagoya Port Authority to have a preliminary conference with leading civic officials and the NPA's top officers concerning the preparations for the events that both cities are planning to hold next year in Los Angeles and Nagoya respectively, in commemoration of the silver jubilee of their sister-city relationship.

– On the morning of October 31, a 7-member trade mission from the Port of New Orleans, USA, accompanied by Mr. Hiroyuki Matsumoto, Director, Far East Trade Development, visited the Head Office and was received by Secretary General Sato and his staff.

The party consisted of Messrs. George J. Schiro, President, the Board of Commissioners; Joseph C. Domino, Commissioner; Norman R. Kerth, Commissioner; Edward S. Reed, Executive Port Director & General Manager; Henry G. Joffray, Assistant Executive Port Director; William Mongelluzzo, Reporter, Journal of Commerce, New Orleans; and Ms. Linda D. Watson, Port Marketing Director. They were on their way to China.

At the meeting Secretary General Sato expressed his sincere thanks to the delegation for the excellent cooperation and support that the Port of New Orleans has so generously afforded to IAPH over many years, especially regarding the recent IAPH Dredging Task Force activity which has been ably led by Mr. Herbert R. Haar, Jr., Deputy Assistant Executive Port Director.

CORRECTION

The Secretary General's circular of July 7, 1983 (ref. No. 1-83-LIA) to Regular Members of IAPH "The Entry into force of the 1973 MARPOL/1978 Protocol Convention" and the relevant article which was published on page 7, 8 and 9 in the September 1983 issue of "Ports and Harbors" contained a factual as well as a spelling error.

The fourth paragraph should read as follows:

"The entry into force of Annex II is deferred for a period of 3 years after the entry into force of the Protocol. Accordingly, it will be effective on October 2nd, 1986."

Please make the above amendment to the relevant document from IAPH.

IMO Reports by Mr. A.J. Smith

IMO Sub-Committee on Radiocommunications

The Sub-Committee on Radiocommunications held its twenty-sixth session from 12–16 September 1983 under the Chairmanship of Capt. V.R.Y. Winkelman (Netherlands).

The Session was attended by thirty-two representatives from Member States and fourteen observers from specialised agencies, inter-governmental and non-governmental organizations, including IAPH.

Given the emphasis necessarily placed by the Sub-Committee on ship-board equipment and activity it is understandable that there were few matters of direct relevance to ports raised in the course of the week's discussion. As is invariably the case however the full progression to finality of some of the matters discussed will almost certainly have a repercussive effect on port functions and activities.

The Maritime Safety Committee had instructed the Sub-Committee on Safety on Navigation to prepare terms of reference for a study on the development of a world-wide satellite position-fixing system for safety of navigation in all areas and for providing accurate position information for the Future Global Maritime Distress and Safety System (FGMDSS). The relevance to port approaches of this work is very apparent. It should be noted in this regard that FGMDSS will very probably apply to all Passenger and Cargo ships of 300 tons gross tonnage and above.

The outcome of the ITU World Administrative Radio Conference for the Mobile Services, 1983, was discussed and note taken of the resolutions and recommendations which required action by IMO. The Sub-Committee for Safety of Navigation and, probably, ports will have a particular interest in Resolution No. 310 on Frequency Provisions for Development and Future Implementation of Ship Movement Telemetry, Telecommand and Data Exchange Systems.

It is understood that ports and harbours will likely be most interested in the discussions of Standardized Data Interface.

The Sub-Committee took note of the information submitted by Japan on its research concerning data interface fitted and used in Japanese ships. Note was also taken of a proposed standard for interfacing marine electronic navigational devices developed in the United States and a CIRM recommendation for the transfer of information between navigational sensors and emergency position signalling systems.

There were widely diverse views in the discussion over whether a short/and or long term solution to Standardized Data Interface was necessary, what element of the problem was best considered in IMO, the essential time scale, whether it should be constrained to the navigation/communication interface through satellite systems, and, most importantly, the detailed nature of the problem. No simple common view emerged. Such discussion was felt to be an essential prerequisite to any detailed recommendation and to provide further guidance to the Sub-Committee on the nature and the extent of the problem.

The Sub-Committee is to consider these matters further. Note should be taken of the fact that with regard to the longer term complex problem of standardizing interfaces for internal ship data communication the Sub-Committee agreed that this was not a task appropriate to IMO.

The Sub-Committee was informed that its twenty-seventh session will be held from 12–16 March 1984.

The Sub-Committee noted with regret that the Chairman, Captain Winkelman, and the Vice-Chairman, Mr. Atserov, would not be available for re-election. Mr. P.E. Kent (United Kingdom) and Lt. Cdr Pitaoulis (Greece) were elected unanimously as Chairman and Vice-Chairman respectively

IMO Sub-Committee on Bulk Chemicals

The Sub-Committee on Bulk Chemicals held its twelfth session from 10–14 October 1983, under the Chairmanship of Mr. F. Wybenga (United States). The Session was attended by twenty-four representatives from Member States and eleven observers from inter-governmental and non-governmental organization, including IAPH.

As is usually the case, subjects dealt with in the session have an impact on the safety of ships and their crews. These included:

Decisions by the MSC and the MEPC

The Sub-Committee noted that the IBC and IGC Codes were adopted and will become mandatory under the amended Chapter VII of the 1983 SOLAS Amendments. It was also noted that the application date for the coming into force of the 1983 SOLAS Amendments and the Codes is 1 July 1986.

Evaluation of hazards including the hazards of new chemicals and the safety hazards of mixed or diluted substances.
Guidelines on annual and intermediate surveys for chemical tankers and gas carriers.
Harmonized system of survey and certification for chemical tankers and gas carriers.
Review and updating of the lists of substances of Annex II to MARPOL 73/78.
Carriage of mixtures of substances of Annex I and Annex II to MARPOL.

In this connection, the Sub-Committee considered the problems of toxicity and emulsification that may arise if oily mixtures containing chemicals such as lube oil additives are discharged to oil reception facilities, especially with regard to the treatment of such wastes. The Sub-Committee recommended that the problems envisaged in sending such substances to Annex I reception facilities should be one of the factors in the criteria for determining whether these mixtures should be treated as either Annex I or Annex II substances.

Procedures and Arrangements for the discharge of Noxious Liquid substances.

The Sub-Committee noted that the Standards as presently written do depend on adequate reception facilities in ports.

Implementation of requirements to provide adequate Reception Facilities.

The proposal for a mandatory prewash scheme had originally been formulated within the Helsinki Convention in preparation for the entry into force on 1 July 1984 of the

Helsinki Convention provisions on noxious liquid substances. In theory ships would be easier to operate as tank washings from tank cleaning following a prewash can be discharged directly into the sea, only taking ship speed, position and overboard discharge location into account. Support was given to the Swedish proposal by the Netherlands, and the United States delegation supported the Swedish concept in principle emphasizing however that a certain flexibility regarding discharges at loading ports/unloading ports should be maintained. Japan in particular was against the prewash on the grounds that the establishment of reception facilities in all unloading ports in Japan would create a tremendous burden and was not feasible.

The Sub-Committee considered and took note of the following conclusions:

1. the scheme would facilitate the assessment by Contracting Parties as to which, and to what extent, ports should be provided with reception facilities;
2. Port States should be allowed some flexibility in deciding where a prewash is to be effected in cases where such operations in unloading ports are impracticable;
3. under the scheme difficulties may possibly arise as regards port regulations and increased turn round times in port;
4. adopting the scheme would possibly require amending Annex II;
5. decisions on adoption of the scheme should be made at the thirteenth session of the Sub-Committee.

The Sub-Committee invited Members to study the mandatory prewash scheme and to submit comments as appropriate with a view to finalizing the scheme at the thirteenth session.

The Greek delegation wished to place on record its disagreement with the reasons advanced for the adoption of the prewash system which will mean that the loading ports will be absolved from providing reception facilities and the whole burden of providing such facilities will be upon unloading ports. Such a course of action will not facilitate the implementation of Annex II, rather the opposite, and will discriminate against the countries importing chemicals.

Extension of the BCH and IBC Codes to cover pollution aspects.
Carriage of oil-like Annex II substances on oil tankers.
Guidelines on safe handling of hazardous substances carried for the purpose of dumping at sea.
Interpretation and updating of the BCH and IBC Codes.
Inert Gas requirements for chemical tankers.

The Sub-Committee reviewed the progress to date on the programme for development of inert gas requirements for chemical tankers.

The inter-industry group. of which IAPH is a member, informed the Sub-Committee that a quantitative risk analysis had been commissioned, and confirmed that the group's report, including the results of the risk analysis, would be submitted to IMO by the end of 1983.

The MSC is invited to take note of the action taken by the Sub-Committee in respect of this agenda item, in particular that it appears impractical to proceed with the assessment of the inter-industry report during the twenty-ninth session of the Sub-Committee on Fire Protection.

Future work programme of the Sub-Committee

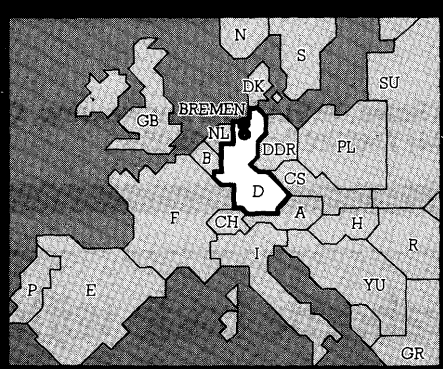
The Sub-Committee noted that their thirteenth and fourteenth sessions are scheduled for the weeks 4–8 June and 3–7 December 1984 respectively.

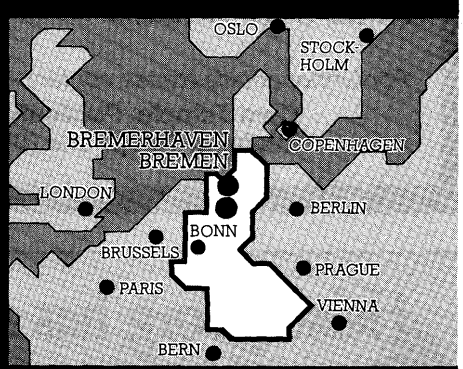
Marketing in Germany.

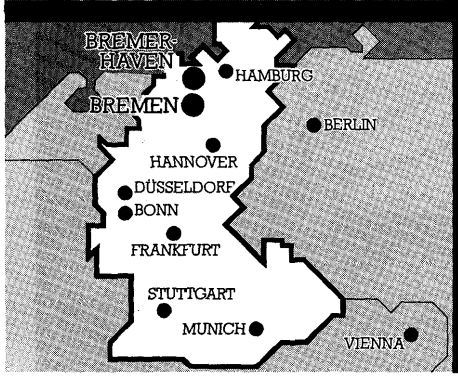
Call Mr. Tsuyama

Do you want to start up business in Germany? Are you looking for someone reliable to import and distribute your goods? And is quick low-cost transport essential? Then contact Mr. Tsuyama, the representative of the Ports of Bremen and Bremerhaven and the Bremer Lagerhaus-Gesellschaft (one of the largest port operating companies in the world). He knows all the right people. In Japan. In Germany. In Bremen. Give him a ring. He'll have time to talk to you. In his office or yours. You can find him in the Sanko-Mori Building 3–1, Atago 1-chome, Minato-ku, Tokyo.

Tokyo (03) 431-8012





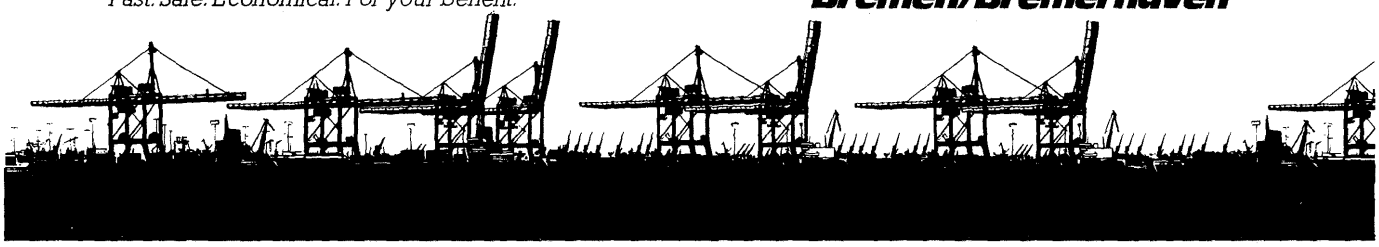


Bremen and Bremerhaven are among the most efficient all-round ports. There are 12,000 sailings a year to 1,000 ports all over the world. Ship your cargo via Bremen and Bremerhaven: it takes only one day to reach its destination anywhere in West Germany.

Fast. Safe. Economical. For your benefit.

BLG

Bremer Lagerhaus-Gesellschaft
Port Operating Company
Bremen/Bremerhaven



Open forum:
Port releases:

The Region and the Port: A Symbiotic Juxtaposition

Anthony J.Tozzoli
Director,
Port Department,
The Port Authority of New York and New Jersey

The New York-New Jersey Metropolitan Region has weathered the world's recession of 1981-82 with remarkable strength and stability, coming into 1983 with less economic declines than most of the United States. The region is the largest and most diversified metropolitan region in the nation, and to say that it centers around the country's most flexible port helps to explain much about the strength and stability of the region.

Fanning out from the New York-New Jersey Port, the seventeen counties of the region – New York City, four New York suburban counties and eight northern New Jersey counties – comprise 3,900 square miles in area where 15.2 million people live and where there is a civilian labor force of 7.2 million individuals. The total personal income of that population last year was $173 billion, and the estimated retail sales for the region was $69 billion.

Although most of the nation felt the thrust of unemployment early in 1982, this region's employment did not begin to drop until April. By December there were 58,000 fewer jobs in the region than in December, 1981. During 1982, employment in the region decreased by 20,000 or 0.3 percent, the first loss since 1976 and a sharp contrast with the 56,000-job gain in the previous year.

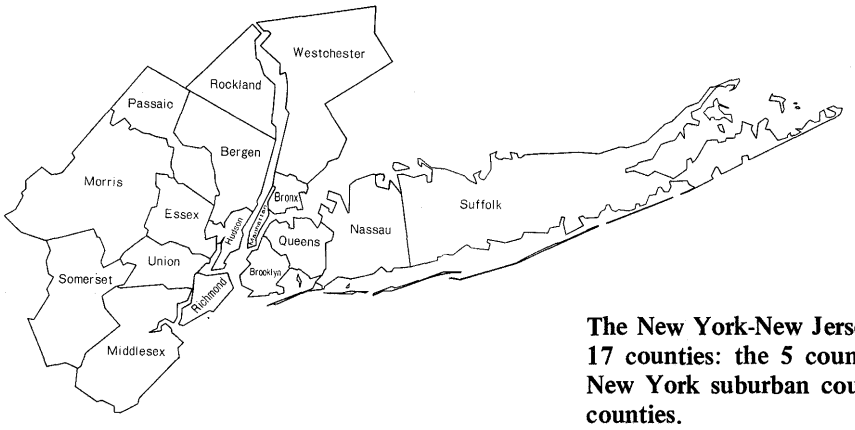
Despite the disheartening losses, the Northeast, and the states of New York and New Jersey in particular, experienced the lowest rates of unemployment in the nation. A 9.3 percentage rate was in apposition to the nation's 10.4 percent and in comparison to the North Central's 12.0 percent, 10.7 percent for the West, and even 9.5 percent for the South.

By examining the major categories in industry, a pattern emerges that in a large part explains this region's ability to withstand this recession with stamina. Unlike many single-industry regions in the country, the New York-New Jersey Metropolitan Region has at least seven industries that have been major indicators of wage and salary employment over the years. For more than two decades, as the region's employment base rose steadily from 5.7 million in 1960 to 6.7 million in 1981, the leading industries have shifted in importance.

In 1960 manufacturing was the prime industry with 1.7 million jobs in the field. Only one other industry, wholesale and retail trade, topped the million mark and that with just 1.1 million jobs. In that same year government had 600,000 jobs and services totaled 900,000 jobs.

The region has changed in these past 20 years, as have other regions in the nation. Now government totals more than a million jobs in the region. Service jobs have increased to more than 1.6 million, and finance has climbed to over 600,000 jobs. It is obvious that unlike many regions that are locked into a narrow industry base, the New York-New Jersey Metropolitan Region has been able to adjust to the shifts in major industries. Losses in the region's manufacturing industries this past year averaged 61,000 or 4.6 percent for the year. The trade and transportation industries also fell, although in lesser amounts. In contrast, however, there were job gains in the service, finance and construction industries.

The relationship, that symbiotic association, between the region and the New York-New Jersey Port is an important aspect in supporting the viable economic state. International trade has been vital to the commerce of this region for hundreds of years, and bi-state port shipping, as a reflection of this region, has been altered drastically to



The New York-New Jersey Metropolitan Region consists of 17 counties: the 5 counties comprising New York City, 4 New York suburban counties, and 8 northern New Jersey counties.

meet each of the changing requirements of the region and the nation. From the dramatic onset of the container revolution more than 25 years ago to today's computerized age, the planners and developers at the New York-New Jersey Port have met the challenges with foresight, imagination, and innovation to cope with the present and look to the future.

The Port Authority of New York and New Jersey, from its inception more than 60 years ago as a bi-state agency of the states of New York and New Jersey, has pursued its mission to promote oceanborne commerce through the Port of New York and New Jersey. It accomplished this by developing and providing physical facilities, and implementing programs to attract and expedite the movement of cargo and passengers through the port. Approximately 154,000 people in this region are employed in waterborne commerce representing an annual payroll of $3.1 billion, $1.4 billion in business income, sales revenues of $7.7 billion, and state and local taxes amounting to $332 million.

The development of the Elizabeth-Port Authority Marine Terminal as a containerport at the start of the container revolution resulted in the bi-state port becoming the nation's Number One Container Port. Additional container capabilities at South Brooklyn Marine Terminal, Howland Hook, Staten Island, Global Terminal in New Jersey and the Port Authority's relatively new Red Hook Container Terminal in Brooklyn, have increased the opportunities for flexible berthing in the New York-New Jersey Port.

An integral part of the relationship among the port, the region, the hinterland, and oceanborne cargo moving through the port is the intermodal transportation system centered at the bi-state port. Railroads, over-the-road motor vehicles, inland waterway craft, airlines and seagoing ships converge at this point with greater frequency and in larger numbers than at any other port in the nation.

Basic elements of service available at major North Atlantic ports shown in the accompanying chart depict the advantages of the New York-New Jersey Metropolitan Region:

North Atlantic Ports Services

	% First Call Inbound	% Last Call Outbound	Piggyback Trains per Daily	Number of Container Cranes	Total Length of Wharf (Linear Feet)	Total Marine Terminal Area (acres)
New York-New Jersey	58	49	11	35	71,420	2,770
Baltimore	18	21	2	10	7,500	619
Boston	8	1	3	3	1,100	178
Norfolk	9	27	4	10	7,665	351
Philadelphia	7	2	2	5	6,276	289
Total	100%	100%				

These, of course, are only the bare statistics indicating the Port's size and ability accommodate the demands of shipping in and out of the bi-state region. In 1982 the bi-state port led the nation in product diversity on both the outbound and inbound sides of oceanborne general cargo. In the 183 export commodities, the New York-New Jersey Port led in 48 commodities or 26.2 percent, more than double the commodities of the second ranking port in the nation. The wide range of these export commodities included frozen fruits, cocoa, raw fur skins, pigments and paints, pharmaceuticals, printed matter, steel wire, tin, hand tools, cutlery, office machinery, electrical machinery, photo supplies, and jewelry.

On the inbound side, the bi-state port led in 70 of 180 commodities, or 38.9 percent, nearly double that of the next ranking port. As similar to the outbound side, the New York-New Jersey Port led in a wide range of import commodities, including meat preparations, bananas, spices, alcoholic beverages, crude rubber, waste paper, soft fixed vegetable oils, sodium hydroxide, inks, pharmaceuticals, leather, plate and sheet glass, steel hoop and strip, tin, scientific apparatus, electro-medical apparatus, and photo supplies.

Because of the diversity of cargo moving through the port, the Port Authority has developed a variety of special-usage facilities. For example, food imports, with their own unique requirements for storage and distribution, are being treated in special facilities: segregated warehousing for pungent spices, coffee and cocoa beans; refrigeration buildings for meats and other perishables; security for high-value alcoholic beverages, temperature- and humidity-controlled warehouses for bananas, pineapples, and other tropical foodstuffs.

The Port Authority has designated many acres of upland for storage of lumber, steel, coal, bulk ores, and scrap iron. It has also constructed tanks for bulk liquid commodities that the region and the hinterland require for imports and exports. Such diverse experts as those in animal husbandry, fish handling, packing and warehousing fragile antiques, and horticulture to care for fresh exotic flowers are at the New York-New Jersey Port ready to extend their knowledge and experience to the welfare of the regions economy.

And for the future of the region and the port? What can be expected in the way of the region's base in manufacturing? The adverse effect of the 1981-82 national recession on manufacturing industries throughout the United States and also in the New York-New Jersey Metropolitan Region may obscure the fact that manufacturing employment in the region has shown remarkable stability and even growth during the 1975-80 period. This growth, among other things, was characterized by an almost dramatic rise in manufacturing jobs in the region's suburban counties and by the emergence of many new industries that are popularly classified as falling into the high technology categories. These include electrical machinery, particularly office equipment and computers; other specialized machine tools and fabricated metals; specialized instruments for either measuring or testing or for use in the health industry; plastics and the pharmaceutical industries.

The Port Authority's facilities have a certain flexibility built into their usage to serve these new "high-tech" industries that are showing increasing growth in the region. Presently there are adequate facilities at the bi-state port either existing or nearing completion to handle the volume and variety of general cargo anticipated through the next ten years. While the immediate future is not expected to require major new general cargo facilities it can be expected that some modernizations or expansion of individual terminals will be needed and conversion of under-utilized breakbulk installations to either container or bulk-type cargo can be expected.

The New York-New Jersey Metropolitan Region together with the Port of New York and New Jersey are ready to move forward in the future with a firm base in manufacturing and the knowledge, experience and marine facilities necessary to maintain their position as the nation's most important region with the nation's leading port.

(VIA Port of NY-NJ)

A Special Report on Application of Classification Criteria to Dredged Material with Emphasis upon Petroleum Hydrocarbons and with Additional Consideration of Lead in Dredged Material

By the International Association of Ports and Harbors

(The report was submitted to IMO on behalf of IAPH by Mr. Herbert R. Haar, Jr., Chairman of Dredging Task Force, Committee on Port Safety, Environment and Construction.)

Contents

Acknowledgements

The International Association of Ports and Harbors (IAPH) wishes to thank its member ports, the IAPH Port Safety, Environment and Construction Committee, and the American Association of Port Authorities for their continuing financial and technical support and to acknowledge the valuable assistance provided by the AAPA Committee on Harbors and Navigation. IAPH would also like to gratefully acknowledge the participation of the Office of Port and Intermodal Development of the U.S. Maritime Administration who provided partial funding required for this project. We further wish to recognize the excellent job done by Dr. Willis E. Pequegnat in preparing this document.

July 22, 1983
New Orleans, Louisiana

Herbert R. Haar, Jr.
Assistant Executive Port Director
Port of New Orleans
IAPH Observer

This paper was reviewed by the following four scientists who have worked with metals and petroleum hydrocarbons in dredged material:

Dr. R.P. Gambrell, Center for Wetland Resources, Louisiana State University
Dr. R.F. Lee, Skidaway Oceanographic Institute
Dr. W.H. Patrick, Jr., Center for Wetland Resources, Louisiana State University
Dr. B.J. Presley, Department of Oceanography, Texas A & M University

Their assistance in recommending literature and suggesting additions and deletions have certainly improved the quality of this submission. IAPH is very appreciative of their assistance. We wish to acknowledge with great appreciation the facility with which Colleen Potter handled final preparation of this document for submission to the Scientific Group on Dumping.

July 22, 1983
New Orleans, Louisiana

Willis E. Pequegnat, Ph. D.
Consultant

Executive Summary

Chapter I. Application of Classification Criteria to Dredged Material

Introduction

The Basis for Classification of Substances to Annexes I and II

The Distribution Between the Annexes

The London Dumping Convention is an international treaty, now signed by 53 countries, whose purpose is to regulate and reduce on a global basis, the pollution of marine waters caused by the dumping of waste and other matter at sea. To achieve this goal, the Convention establishes different degrees of control for different classes of substances, depending upon their hazard characteristics. Annex I substances are prohibited for dumping, unless they are present as "trace contaminants" or are "rapidly rendered harmless" upon disposal. Annex II substances may be safely disposed at sea if special care is used in disposal.

The classification of substances to Annex I or Annex II is a critical issue; it determines whether the prohibitions of Annex I will apply and bar disposal at sea. The effect of this classification is particularly significant regarding dredged material that contains substances listed in Annex I but for which there may be no reasonable alternative means of disposal other than dumping at sea. This could prevent needed dredging, which would interfere with vital shipping and, perhaps, result in port closures.

Adoption of General Guidelines for Classification of Substances

The Contracting Parties of the Convention adopted general guidelines for the classification of substances to Annexes I and II in 1979. Three properties of chemical substances, namely, toxicity, bioaccumulation, and persistence, were focused upon as the basis for classification of substances to the annexes. Annex I substances would be simultaneously toxic, persistent, and bioaccumulative, whereas substances listed in Annex II would exhibit one or more of the above properties but could be safely disposed in the marine environment if special care is used.

Developing Interest in Establishing Additional Classification Criteria

At the Sixth Consultative Meeting in 1981, it was agreed that additional criteria for the classification of substances in the annexes should be developed by the Scientific Group on Dumping. In its 1982 meeting the Group discussed the possibility of developing numerical standards for classification of substances. The IAPH observer pointed out that marine sediments act to mitigate the effects of Annex I substances so that it would be inappropriate to apply numerical standards derived from testing substances in pure chemical form. In fact, it was suggested that these mitigative effects should warrant separate treatment of dredged material under the Annexes. The IAPH observer also indicated that it might be possible for IAPH to undertake a technical study to reveal the reasons why Annex I substances are essentially rendered harmless when present in typical dredged material.

Possible Additional Classification Criteria related to Dredged Material

Although there is little inclination to dispense with any of the existing classification criteria, it is suggested that some qualifiers should be invoked when they are applied to sediments dredged from the marine environment. In practical terms, an Annex I substance such as mercury is very toxic when in water but is essentially harmless when tightly bound in the organic matter and sediments of dredged material. Hence classification criteria should take into consideration the availability of a toxicant to the biota. If a substance even though present in the milieu is not available to the biota it has in essence been rendered harmless.

It is pointed out that "persistence" has another connotation than the duration of its unchanged presence in the environment, namely, how long and in what tissue it persists in the organism. Some toxicants such as lead are depurated rapidly before they reach levels harmful to the organism and, of importance to man, is the fact that some are not stored in the edible parts of marine fishes. For instance, the muscle of albacore (tuna) taken fresh from the open ocean has the lowest level of lead observed in any tissue of any marine species.

Concerns of IAPH Regarding the Regulatory Treatment of Dredged Material Containing Annex I Substances

There are sound scientific explanations for the observed ability of dredged material to sequester a variety of substances, including all of those in Annex I of the Convention. Moreover, there is mounting evidence that the "special care" measures for the disposal of dredged material, such as capping, enhance the effectiveness of these natural mitigative properties of marine sediments. Therefore, IAPH believes that it is inappropriate to derive numerical standards from tests of pure chemical substances in solution and then apply these standards to figures derived from bulk analysis of dredged material. It is for this reason, in part, that IAPH has accepted the invitation of the Scientific Group to delineate those characteristics of dredged material that should be considered when and if additional classification criteria are devised.

Characteristics of Dredged Sediments that Mitigate Environmental Effects of Annex I or Annex II Substances

Physico-Chemical Parameters Promoting Sequestration of Toxicants

The major sediment properties that will influence the interaction between dredged material and contaminants are the type and amount of clay, its cation exchange capacity, organic matter content, general pH of the sediment, the amount of active iron and manganese, its redox potential, the amount of sulfide, and its salinity. These factors serve to bind metals and other substances to particulates or combine to produce insoluble compounds so that they reduce contamination of pore water and essentially eliminate the availability of contaminants to the biota. There follows a brief summary of the chemical processes affecting the availability (mobilization) or sequestering (immobilization) of metals and other contaminants in dredged material.

Redox Potential (Eh) and pH

Two of the most important properties of dredged material that control the behavior of contaminants are its oxidation-reduction condition, which operates in concert with its acid-base or pH status. In general reducing conditions (low Eh) and near neutral pH will markedly reduce the availability of metals and several toxic pesticides. These conditions are found in a mound of dredged material on the seafloor. Upland disposal, on the other hand, favors release of toxic metals as it becomes oxidized and very acid (low pH).

Cation Exchange Capacity

The net negative charge of all clays permits their surfaces to adsorb positively charged ions (cations). This ability is most prominent in montmorillonite clays.

Organic Matter

Humus, which is the residue of organic matter in sediment after it has undergone decomposition, can bind both metal and organic compounds so that they are rapidly rendered harmless and only trace amounts will be in equilibrium with pore water.

Physical Factors that Promote Sequestration of Toxicants in Dredged Material

Mixing and Dilution Effects

Contaminants are rarely evenly distributed in the sediment bed. Generally they are more concentrated in the upper few centimeters. Dredging serves to mix the sediment column and thus dilute the concentrations of contaminants, often to trace contaminant conditions.

Special Care Measures

Such special care measures as capping tend to increase the effectiveness of the physico-chemical parameters discussed and to add important physical conditions.

Mitigative Effects of Dredged Material on Annex I and II Substances

Literature Search for Post-1972 Data

Because of the volume of literature on Annex I and II substances, it has been necessary to severely limit detailed discussion of these substances except for one example from each annex. Petroleum and lead have been selected to represent Annex I and Annex II, respectively. They are treated in Chapters II and III. All other substances under discussion are given somewhat briefer consideration in the present chapter.

Chlorinated Hydrocarbons–Annex I

Chlorinated hydrocarbons of concern in dredged material are polychlorinated biphenyls (PCBs) and various chlorinated pesticides, such as DDT, DDE, aldrin, chlordane, etc. The organochlorines as a group are very toxic, but they have an almost unique relationship between persistence and toxicity. For instance, DDT may be metabolized and broken down by microorganisms but its metabolite is even more toxic and more persistent than the parent compound. PCBs having chlorine numbers of four and under are biodegradable, but those with numbers of six or over are very persistent. Marine organisms do accumulate organochlorines, primarily through some bioconcentration from water.

But except in very contaminated sediments benthic organisms do not show acute toxicity symptoms and appear to live a normal life cycle, indicating only minor accumulation. Chlorinated hydrocarbons are strongly adsorbed on solid surfaces, including clay and other particles in dredged material.

Mercury and Mercury Compounds–Annex I

Hg is one of the most hazardous of the heavy metals. However, in view of this, it is remarkable that there is so little published information on actual effects of Hg on natural populations of marine animals. The U.S. EPA criterion for mercuric is 0.05 ppb to protect marine life. The mercurous salts are less soluble than the mercuric and consequently are less toxic. The alkyl forms are the most toxic in spite of the fact that the methylated compounds are produced by microorganisms. Inorganic Hg compounds are very effectively bound by clay, humus, and sulfide; hence in dredged material its immobilization mitigates its potential impacts on benthic organisms. Elutriate tests on a wide range of sediments contaminated with Hg have shown

that most did not release significant amounts. Laboratory experiments exposing benthic animals to contaminated sediments demonstrated some uptake of Hg but only in a few cases. That which was accumulated apparently entered via the water. Methylmercury is effectively immobilized by sulfide in reducing conditions in dredged material.

Cadmium and Cadmium Compounds

Cd is potentially a very hazardous pollutant in the environment and tends to be more easily taken up and concentrated than other toxic metals. The U.S. EPA criterion for Cd to protect marine life is 5.0 ppb, which is somewhat higher than those of PCBs and Hg and considerably lower than the criterion for Pb. Most 96-hour LC_{50} tests for marine animals require concentrations as high as 320 to 420 ppb. In laboratory tests of marine species, organisms exposed to contamined sediments failed to accumulate Cd. Principal examples of accumulation have come from fresh water exposures. Cd is immobilized in reduced dredged material having humus and sulfide. Elutriate tests show little release of Cd from marine sediments.

Petroleum Hydrocarbons–Annex I

In laboratory tests some of the aromatic petroleum hydrocarbons are very toxic but reference is usually made to aqueous solutions of soluble compounds. In general those toxic aromatics that are not volatile are very insoluble. Hence, except in massive spills near shore, those aromatics that reach sediments are very insoluble. Moreover, many of the toxic compounds are degraded by various biological and chemical agents. In general the concentrations of hydrocarbons required to elicit measureable acute or sublethal responses in marine animals investigated are well above those ordinarily encountered in solution in seawater. For this reason, pelagic species are unlikely to be seriously affected by spilled oil. Numerous studies with petroleum contamined sediments have shown little biological uptake and that benthic organisms in heavily oiled sediments do not show significant acute toxicity during exposure periods of several weeks. Whereas oil concentrations in water of 1 to 20 ppm would encompass the 96-hour LC_{50} of many marine animals, there is a lack of mortality in sediments bearing concentrations of oil over 1,000 ppm. Release of petroleum hydrocarbons into the water column during dredging and dredged material disposal has been shown to be minimal in both laboratory and monitored disposal studies. This results in part because these hydrocarbons have a strong affinity for solids and humic materials in typical dredged material. No evidence has been found that there is any food-chain augmentation involving petroleum hydrocarbons.

Arsenic–Annex II

Although we know somewhat less about the chemical behavior of As in dredged material disposal than for most other potentially toxic metals, it is important to note that few environmental problems with As in marine sediments have been reported. Partly this has resulted from the fact that many inorganic species of As exist in seawater and there are several identified organic forms as well. Trivalent As is quite toxic to freshwater benthic invertebrates, but little definitive evidence is available for marine benthos. Trivalent As is more toxic than pentavalent As but available evidence indicates trivalents are converted to pentavalent forms in dredged material. It is reported that methylated arsenicals are less toxic than inorganic forms. From studies of contaminant release from sediments, it is evident that As has a very strong affinity for solids. As is more effectively immobilized in dredged material by iron and aluminum oxides than by clay particles. Although As compounds may be bioconcentrated (uptake via water) they are not known to be biomagnified up food-chains.

Zinc and Chromium–Annex II

Both Zn and Cr are essential metals to a wide range of animals. It is not surprising, therefore, that their threshold toxicity levels are quite high. Attempts to establish a direct relationship between accumulation of these metals by benthic organisms and total metal concentrations in sediments have yielded some positive results, principally in fresh water, and negative results in marine faunae studied in the field. Elutriate tests have generally shown little or no release of these metals from marine dredged material. Zn in dredged material is usually associated with organic and sulfide complexes under reducing conditions. Also Zn and Cr are very effectively immobilized by hydrous oxides of iron and manganese. Although Zn and Cr are present in plants and animals at all trophic levels, there is no evidence of food-chain magnification.

Lead and Its Compounds–Annex II

Apparently Pb is not an essential element to any metabolic process of plants or animals. There have been few water studies of the potential acute toxicity of inorganic Pb to marine animals, primarily because of the difficulty of maintaining solutions of Pb in seawater at concentrations high enough to cause toxic effects. But ample evidence supports the opinion that because it is so tightly bound to marine sediments, it is unavailable to organisms and thus poses no environmental hazard.

It is not surprising therefore that no definitive correlation between Pb concentration in the sediment and in the benthic fauna has been established. In strongly reduced dredged materials, especially like maintenance-dredged sediments containing humics and sulfides at neutral pH, Pb is not available to the biota. It has been demonstrated very effectively that in marine food-chains organisms higher in the chain tend to contain less Pb than do their precursors due to effective depuration.

Organophosphorus and Carbamate Pesticides–Annex II

Some of the organophosphorus pesticides like malathion, butonate, and phosphamidon are aliphatic derivatives, whereas others such as parathion, diazinon, and endothion are aromatic derivatives. Some of these act directly on organisms, whereas others must undergo oxidative conversions in the organism before they kill. The best known carbamate insecticide is Sevin. All of these compounds are inhibitors of the enzyme cholinesterase. Organophosphates are toxic to a wide range of species among mammals (including man), birds, and a wide variety of marine fishes and invertebrates. Malathion is the least toxic to mammals, while parathion and methyl parathion are the most toxic. In fact, the latter two are generally more toxic to organism than DDT and dieldrin. Fortunately, sediment microorganisms degrade organophosphate compounds quite rapidly, and the breakdown products are not very toxic. Moreover, residues from the breakdown of these pesticides tend to be bound very tightly to sediment particles, especially the clays. It is in this condition that microorganisms achieve optimal degradation. Organisms do accumulate these pesticides from water but in sublethal concentrations they

are either metabolized or depurated through kidneys or gills or both. Hence biopersistence appears to be measured in hours. No evidence of marine biomagnification has come to our attention.

Comparative Analysis of Similarities and Differences Between Substances Listed in Annexes I and II and their Effects in Dredged Material, in Terms of the Scientific Basis for the Differences in Classification

Difference in Effects of Annex I Substances when in Pure Chemical Form and when Contained in Dredge Material

A review of the literature appears to support the belief that with few possible exceptions toxicants enter the bodies of marine organisms via water. Therefore, when the toxicities of substances in Annex I are tested in clear seawater solutions, no sediment barrier to their absorptive availability is presented. Whether they are absorbed and accumulated are determined by the biological barrier imposed by the epithelial covering of the gills and lining of the gut. Such tests of acute toxicity concentrations are satisfactory for establishing certain standards of water quality, but the results should not be applied to dredged material on the basis of total concentrations of toxicants from bulk analysis. The sediments and other components of dredged material mixed in seawater provide another powerful barrier between toxicant and the organism's metabolic systems. Thus, substances producing lethality in physiological tests will not do so now. Bulk analysis shows the toxicant is present, but it is not available to the organism. It has been rendered harmless.

Similarity in Effects Produced by Annex I Substances Contained in Dredged Material and the Effects Produced by Substances Classified to Annex II

Dredged material when properly disposed essentially reduces the differences in environmental effects of Annex I and Annex II substances to a common level of relative chemical harmlessness. In practical terms their established low concentration equilibrium between solid and pore-water liquid phases places them in a category of quasi trace contaminants.

Effectiveness of "Special Care" Measures in Mitigating the Effects of Annex I Substances in Dredged Material

Special care measures such as capping do not add any new chemical parameters involved in toxicant sequestration over those already present in the dredged material mound. Although they may enhance these features, the chief mitigating factors of capping are physical in nature. These involve stabilization of the mound, prevention of diffusive loss of toxicants, and separating recolonizing infauna from the polluted heart of the capped mound.

Chapter II. Lead in the Marine Environment

Introduction

Facts about Lead developed in the Decade 1972-1983

This chapter deals with our present awareness of the relatively low-level hazard of Pb in the marine environment as compared with other toxicants in Annex I. Much of what has been learned in this past decade indicates that in marine ecosystems and especially in disposed marine sediments on the seafloor Pb is essentially innocuous. Dissolved Pb is far less abundant in seawater, by several orders of magnitude, than was thought before about 1976. We now understand the mechanisms by which Pb is so tightly bound to particulates in dredged material (DM). Because of this immobilization of Pb and other toxic metals in dredged material, which can be enhanced by certain special care techniques, we have reason to conclude that bulk chemical analysis of DM for regulatory purposes is useless.

Potential Hazards of Upland Disposal of Lead

Those people who continue to call for the land disposal of contaminated DM, must be unaware of the fact that under some conditions this can lead to a "domino effect" of pollutional consequences. If the material is disposed where it will become oxygenated, the Eh becomes strongly positive, sulfides are oxidized to sulfates producing eventually an acid pH reaction, which in turn leads to mobilization and migration of some toxic metals, possibly into adjacent soils and ground waters. Coastal marine waters may even receive some of the mobilized metals where the disposal site is near the shore, as is often the case.

Serious Effects of Reclassification of Lead

IAPH and related groups have justification for being concerned by the possibility that Pb would be classified as Annex I. Pb is transported to the sea via river and air, so that it is probably ubiquitous in marine sediments. Thus, to prohibit disposal of lead-bearing sediments in the ocean when the land-disposal alternative is not available and is enviromentally inferior, could result in a cessation of dredging of important waterways. Part of the trophoeconomic web of which man is a part includes shipping that depends upon safe ports and harbors that in turn depend upon open waterways that can only remain safely open with maintenance dredging.

Opposition to the Reclassification of Lead

Because the established mitigative features of marine sediments are also effective in binding and isolating Pb within the marine environment, this study has been expanded to demonstrate that the occurrence of Pb in dredged material does not pose a significant risk so as to warrant application of the strict prohibitions of Annex I. The scientific data presented in this paper support the position taken by IAPH that Pb and its compounds should remain in Annex II and that because of its ability to sequester toxicants, DM should be granted an exemption from the provisions of paragraphs 1, 2, 3, and 5 of Annex I, or should be governed by separate criteria under paragraphs 8 and 9 of Annex I that will more realistically take into account the actual effects produced in the marine environment.

Natural and Anthropogenic Sources of Lead in the Ocean

The average value for the lead content of the earth's crust is 15 ug/g. In the period from 1976 to 1979 it was commonly accepted that Pb concentrations in coastal waters ranged between 1,000 and 2,000 ng/kg. Today's accepted values are 5-15 ng Pb/kg in open-ocean waters and up to 50 ng/kg in highly polluted coastal waters. The deep waters of oceans contain only 1 or 2 ng/kg. On a global basis, the principal source of Pb is from the combustion of lead-containing fuels. Lead alkyls emanating from the evaporation of leaded fuels may be adsorbed on the surface of atmospheric particles which may scavenged by dust and converted on such surfaces into solid inorganic Pb compounds. Storm runoff from areas surrounding milling and

smelting operations may become a major transport mechanism in moving lead from terrestrial to aquatic systems.

Toxicity of Lead

The toxicity of inorganic Pb to marine animals is related to the chemical form in which it is present. In seawater it occurs mainly as carbonate complexes so that the uncomplexed and most toxic species occur in extremely low concentrations. There have been few studies of the acute toxicity of inorganic Pb to marine animals, primarily because of the difficulty of maintaining solutions of Pb in seawater at concentrations high enough to cause toxic effects. In general the toxicity of inorganic Pb to aquatic animals yields 96-hour LC_{50} values in soft freshwater as low as 1-10 mg/l and in saline waters as high as 300-500 mg/l.

Most metals in the sea derived from anthropogenic sources are attached to particulates, only rarely do they exist in the sea in the free ionic form usually used in toxicity tests. Studies of the leaching of heavy metals from waterways throughout the U.S. and bioassay tests on the leachates showed that even when the Pb in the waterway sediments would cause them to be classified as very contaminated (bulk analysis), they constituted little or no hazard to aquatic life in the disposal site water column.

Pb nitrate in concentrations of 0.1 and 1.0 ppm in seawater had no inhibitory effect on regeneration of limbs and molting in fiddler crabs. In the same series of tests Cd had serious effects at 1.0 ppm and $HgCl_2$ at 1.0 ppm produced death in 40% of the population and irreversible debility in the remainder. In a study of fin regeneration in killifish and mullet it was found that Pb nitrate at 1.0 ppm had no effect, whereas fish in 0.1 ppm in Cd chloride produced no fin regeneration, and over 50% of the fish in 0.1 ppm Hg chloride died in 10 days or less but fin regeneration was normal up to the time of death. It is important to note that the fish were exposed to ionic solutions without the clearly demonstrated sequestering effects of dredged material.

Bioaccumulation of Lead

Depletion of Lead Compounds in Marine Food Chains (Webs)

Pb is passively sorbed by chelating agents on the surfaces of diatoms. This characterizes the first step in the flow of Pb through all food chains. But this flow is truncated. In passing through higher trophic levels to top carnivore, Pb is not readily absorbed into cellular constituents of organisms; instead only a fraction of the ingested Pb is retained within the organism. Hence the general aspect of Pb in marine food chains is an initial bioenrichment followed by stages of successive reduction. There appears to be little possibility of bioaugmentation of Pb in marine food chains.

Experiments attempting to demonstrate the accumulation of Pb from water have generally shown some accumulation but in many cases not enough to be considered true bioaccumulation where in concentrations in the organism are higher than those in the environment. Results from experiments with marine organisms exposed to sediments spiked with Pb have generally shown low levels of accumulation with the maximum of the range in organisms being far less than that in the sediments.

In the laboratory, alkyl Pb compounds are accumulated from water but tetramethyl and tetraethyl Pb are unstable in seawater and undergo progressive dealkylation to form inorganic Pb; hence they are not accumulated because their existence is too transitory. Trialkyl Pb compounds are soluble in seawater and do not volatilize; hence they may be accumulated during long-term exposures. But after termination of exposure to such compounds as trimethyl Pb chloride the accumulated Pb is lost very rapidly in some species and somewhat more slowly in others.

Comparative Accumulations of Mercury, Cadmium, and Lead from Sediments

The concentrations of heavy metals in the tissues of benthic invertebrates are usually higher than those in the surrounding environment, indicating a net accumulation of these materials from environmental sources. There is an abundance of published information detailing the accumulation of heavy metals from aequeous solution by benthic invertebrates. However there is very little evidence of the direct accumulation and assimilation of sediment-bound metals by marine organisms. In field studies, a correlation between metal concentrations in the sediments and in the benthic biota may indicate transfer of metals from the sediment to the animals or more likely is indicative of a common source of the metals to the sediments and the biota. In laboratory tests of accumulation of metals from polluted sediments, five species of benthic marine invertebrates failed to accumulate ecologically significant amounts of metal. In those cases where a statistical accumulation of Pb was demonstrated, the uptake was quantitatively marginal and of doubtful ecological significance. Accumulation of Hg to a concentration of potential ecological significance was rare even in tests lasting six weeks. The same was true of Cd. The experiments seem to point to the probability that the degree of toxicity of a metal is a function of the amount of free ions, not necessarily the amount of total soluble metal present.

Comparative Toxicities of Heavy Metals, Petroleum, and PCB in the Water Column

In laboratory tests of the comparative toxicities of Hg, Cd, Pb, Aroclor 1232 and 1252, and dissolved petroleum for common marine diatoms, about 50% inhibition of photosynthetic activities of the diatoms was achieved by the following concentrations in seawater:

PCB – 1 ug/l (ppb) (Aroclor 1232 and 1262)
Hg – 5 ppb
PHC – 50-500 ppb
Cd – 500 ppb and over
Pb – 1,000 ppb and over

Tests of the inhibitory effect on diatom photosynthesis of six metals in lessening order of impact at 10 ppb was Hg, Cu, Cd, Pb while Co had no effect and Zn was slightly stimulatory. Pb was found in most tests of effects on zooplankton to be less toxic than methyl Hg, inorganic Hg, Cd, PHC, PCB, and a combination of PCB + PHC.

Lead in Dredged Material

Some elutriate tests and monitoring of water quality at dredging and disposal sites involving sediments containing substantial amounts of Pb have shown either short-term or no increase in Pb levels in the water column. Even when increases do occur, it is likely that the increases are nonreactive particulate rather than the reactive dissolved Pb. Pb like other metals is immobilized in fine-grained sediments by anaerobic conditions and neutral pH. This immobilization is enhanced by the presence of humus and sulfide. These

are generally the conditions found in maintenance dredged sediments.

Chapter III. Petroleum in the Marine Environment

Chemical Nature of Hydrocarbons of Petroleum and Biogenic Origins

Petroleum Hydrocarbons

Crude oils contain hundreds of thousands of different chemical compounds. They are classified into three major categories: (1) aliphatics, which are saturated open-chain compounds (a) normal or n-alkanes, and (b) branched or isoaliphatics such as isoprenoids; (2) alicyclics, which are saturated ringed compounds, the cycloalkanes or naphthenes; and (3) the aromatic compounds consisting of at least one benzene ring. In addition, there are several categories of nonhydrocarbon petroleum constituents that contain some sulfur (thiols), nitrogen (e.g., indols), or oxygen (e.g., phenols), plus asphaltenes of high molecular weight and porphyrins derived from chlorophyll. About 50% of a typical crude oil is composed of alicyclics, 30% of aliphatics, 15% of aromatics, and 5% of the NSO compounds.

Sources of Petroleum and Petroleum Products in the Marine Environment

It is estimated that each year about 2.86 million metric tons of petroleum and petroleum products find their way into the world ocean. There are five major sources of these contaminants: (1) maritime transportation accounts for 1.5 million tonnes; (2) wastes from refineries and municipalities add 0.8 million tonnes; (3) 0.30 million tonnes or perhaps somewhat more enter via the atmosphere; (4) seeps and other geologic processes produce 0.20 million tonnes; and (5) offshore production activities let about 0.06 million tonnes escape into ambient waters.

Chemical Changes in Weathering Petroleum

When oil is spilled into the marine environment it begins to undergo immediately a series of physico-chemical changes called weathering. Some of the steps in the series are significant determiners of the degree of impact that spilled petroleum has upon the marine environment and its biotal components. The principal steps in a time series are as follows:

1. Loss of low boiling aromatic and saturated hydrocarbons from evaporation—this lowers toxicity by removal from seawater. This would be very important in the IXTOC I spill in a warm climate and long travel to the beach, but not in the AMOCO CADIZ spill.
2. Loss of low boiling aromatic hydrocarbons through dissolution. Lowers toxicity because solutes are quickly mixed and diluted.
3. Increased importance of naphthenic and naphthenoaromatic compounds.
4. Depletion by biodegradation of n-alkanes and increased importance of highly branched aliphatics.
5. Increased importance of alkylated phenanthrene compounds due to weathering of other aromatics.
6. Increased importance of polycyclic aliphatic compounds relative to all saturated components.

Photolysis reactions resulting from exposure of spilled oil to sunlight play major roles in altering oil's chemical composition after evaporation ceases to be the major inducer of change.

Microbial Degradation of Petroleum

The ability to metabolize petroleum hydrocarbons is widespread among the biota, including bacteria, yeasts, fungi, harpacticoid copepods, nematode worms, polychaete worms, and some mollusks and crustaceans. Most of the biotic degradation occurs on particulates in the water column or the top 8-10 cm of the sediment bed. It is fastest under aerobic conditions at the water-sediment interface, but will go on slowly under anaerobic conditions in the sediments.

Microbial Metabolism of Hydrocarbons

Enzymatic pathways of degradation of toxicants in marine organisms are presently receiving considerable attention. Bacteria and animals, such as crustaceans and fish, use very different enzyme systems for degrading toxic aromatic hydrocarbons. Bacteria metabolize polycyclic aromatic hydrocarbons to cis-diols; animals degrade these aromatics to trans-dihydrodiols but without ring cleavage. Hence the metabolites excreted by animals retain the aromatic ring. These are used by bacteria as a carbon source. They are eventually degraded to carbon dioxide. Opportunistic meiofaunal polychaetes (e.g., Capitella capitata) have this degrading ability and are often associated with areas of high oil input. The asphaltenes are very resistant to biodegradation; hence the "tars" tend to accumulate in the marine environment. Fortunately they are not toxic.

The Toxicity of Petroleum Compounds in the Laboratory and the Field

The toxicity of oil is due primarily to the chemical toxicity of soluble aromatics. The most toxic compounds in refined and crude oils are the di- and triaromatic components. Some of the polycyclic aromatics, such as phenanthrene and fluoranthrene, have 96-hour LC_{50} values of 0.3 and 0.6 ppm in water. Values of 1 to 20 ppm crude oil in water encompass the 96-hour LC_{50} tests of a wide variety of marine fish and invertebrates. Comparable values for No. 2 fuel oil range between only 0.4 and 6 ppm, revealing the often higher toxicity of refined products. It is important to note that oil in sediments displays little toxicity compared to the above. Various studies have shown the lack of significant mortality during exposure to concentrations ranging from 1,000 to 7,000 ppm. Thus, the studies with oiled sediments presented in the literature indicate that animals display little mortality when living in high levels of oil mixed with sediments. Sediments generally lack the highly volatile components, which are among the principal toxic elements of the crude. In making comparisons between sediments and water we still find that the hydrocarbons are much less available for accumulation to organisms when the oil is sorbed to sediment. It has been suggested that the major route of tissue accumulation and toxicity for organisms living in oiled sediment is via interstitial water and subsequent exchange to the water column. Recent evidence derived from studies of oiled sediments in Narragansett Bay, Rhode Island suggests that there is little movement of oil from oiled sediments directly into organisms. It was found that the hydrocarbon mixture found in the marine benthos of the bay was very different from that of the sediments in and on which they were living.

Persistence of Oil in Sediments

Once on the bottom, oil has three fates: (1) it can

penetrate deeper into the sediment bed, (2) be resuspended into the water column, or (3) be degraded by organisms. Many of the hydrocarbons found in petroleum and petroleum products are only slowly degraded in marine sediments and thus continue to be detected for long periods. The normal paraffins are the most readily degraded followed by branched chain paraffins, cycloparaffins, and aromatics. The low weight aromatics, such as naphthalene and phenanthrene are rapidly degraded in surface sediments, whereas such higher weight aromatics as benzanthracene and benzo (a) pyrene are more slowly degraded. But these are generally not toxic to marine organisms although they are known to be carcinogenic to some organisms.

Bioaccumulation of Petroleum Hydrocarbons

It appears that all species of marine organisms studied to date by numerous investigators accumulated polycyclic aromatic hydrocarbons (PAH) from low concentrations in the ambient water. But it is quite evident that the bioavailability to benthic organisms of sediment-adsorbed PAH is very limited. Thus, animals collected from PAH-contaminated sediments generally have lower concentrations of PAH in their tissues than the PAH concentration in the sediment. When returned to a PAH-free environment most marine animals rapidly released PAH from their tissues to low or undetectable levels. Apparently the more soluble hydrocarbons partition from contaminated sediment to the interstitial water with uptake by the benthic biota followed by rapid metabolic degradation and excretion of metabolites. Hydrocarbons of higher molecular weight, being less soluble, are taken up less rapidly and accordingly have longer persistence in digestive tissues.

Petroleum in Dredged Material

Petroleum hydrocarbons in marine sediments appear not to represent a long-term threat to the quality of surface waters. This is because of the strong association between petroleum hydrocarbons and suspended particulates in sediment-water systems. Release of petroleum hydrocarbons into the water column during dredging and disposal operations has been shown to be minimal. Sediment-bound petroleum hydrocarbons appear to pose little environmental threat. In fact, petroleum is not a toxic substance when in normal marine sediments containing organic matter from other sources.

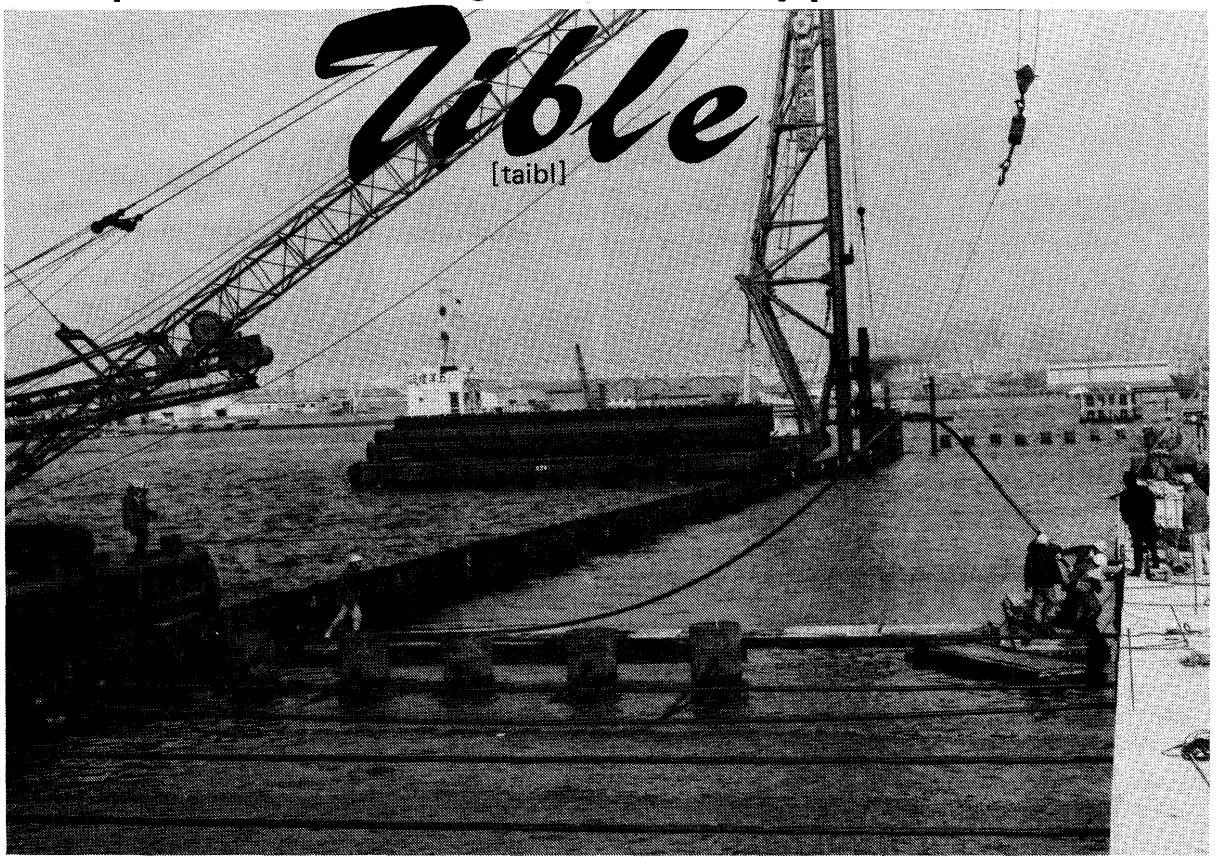
It is evident from the foregoing that sediments and thus dredged material and other particulates have a high affinity for petroleum components. In the case of the typical silt-clay textured dredged material derived from maintenance dredging projects, the petroleum hydrocarbons will be tightly bound to the solid phase. It is important to note also that petroleum hydrocarbons in ports and harbors may well have undergone some degradation so that the more toxic aromatics are no longer present. In most harbors the principal source of PHC is from transportation so that phenanthrene and related compounds are the principal fractions in the harbor sediments. These compounds are readily degraded by microfauna and meiofauna. If levels remain high, it is not because of persistence per se, but because of the amount coming in. If a special care measure of disposal (e.g., mound-plus-cap or subaegueous pit and capping) is utilized the anaerobic conditions created well below the depth of penetration of the benthic infauna will permit very slow degradation of the remaining petroleum hydrocarbons by anaerobic microbial action.

Chapter IV. Summary Conclusions

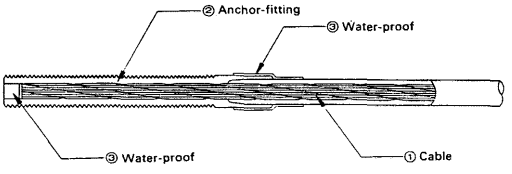
1. There are extremely significant differences in potential environmental effects between the disposal in the ocean of dredged material containing Annex I substances versus the disposal of the same substances in a liquid waste without sediment.
2. There are known physico-chemical characteristics of sediments that act to mitigate and minimize the effect of Annex I substances in dredged material disposed in the ocean. Accordingly, the impacting effects of Annex I substances in dredged material are significantly less than the effects of these substances in their pure chemical form which was the basis for their classification to Annex I.
3. The "toxicity" of a substance in a complex mixture like dredged material should be linked with availability for regulatory purposes. Toxic materials that are immobilized in dredged material disposed in the marine environment even though present in the immediate environment are not available to the biota; hence they have been rendered harmless. It is suggested that "availability" in this context be considered for inclusion as a classificatory criterion.
4. The above characteristics should warrant a separate treatment of dredged material under the annexes. Furthermore, it is particularly inappropriate to derive numerical standards from tests of pure chemical substances in solution and then to apply the standards to concentrations of contaminants derived from bulk analysis of dredged material.
5. It is considered that the use of "special care" measures in the dumping of dredged material containing Annex I substances into the marine environment, in appropriate cases, will "rapidly render harmless" the Annex I substances, within the meaning of paragraph 8 of that annex.
6. Taking note of the above, it is concluded that the effects, if any, of Annex I substances in dredged material are reduced to those of trace contaminants and are thus no greater than the effects produced by Annex II substances in dredged material, which are allowed to be dumped under a special permit.
7. The scientific data presented in the present document support the position taken by IAPH that Pb and its compounds should remain in Annex II. The sequestering of Pb by sediments is further justification for the position that dredged material should be granted an exemption from the provisions of paragraphs 1, 2, 3, and 5 of Annex I, or should be governed by separate criteria under paragraphs 8 and 9 of Annex I that will more realistically take into account the actual effects produced in the marine environment.
8. The actual environmental effects of petroleum hydrocarbons in dredged material disposed in the ocean are considered to be ecologically insignificant. There is very little evidence that true bioaccumulation of petroleum hydrocarbons from dredged material is accomplished by the benthic infauna. The concentrations of soluble petroleum hydrocarbons sorbed on solid components of dredged material may be in equilibrium with concentrations in pore waters but in such small amounts as to be equivalent to trace contaminants.

For more detailed conclusions and those applying to lead and petroleum hydrocarbons in the marine environment, see Chapter IV.

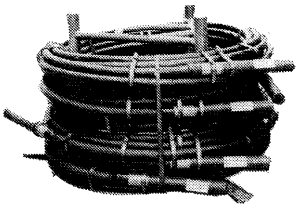
Epoch-Making New Type Tie-Rod



Structure of TIBLE



Transportation form



Advantages:

1. No need of turn-buckles nor ring-joints
2. No need of temporary supports
3. No need of assembling work
4. Simple scaffolding
5. Perfect anti-corrosion
6. Easy handling
7. Easy transportation
8. Lower price than Tie-Rod

Manufacturer

NSE

NEW STRUCTURAL ENGINEERING, LTD.

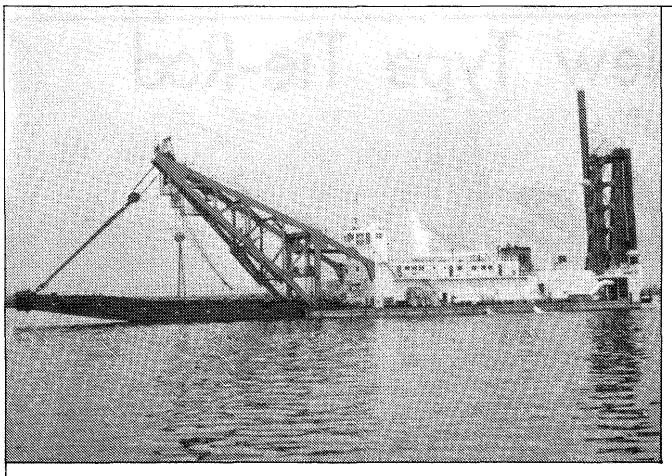
BROAD BLDG., 12, NIBAN-CHO,
CHIYODA-KU, TOKYO, JAPAN

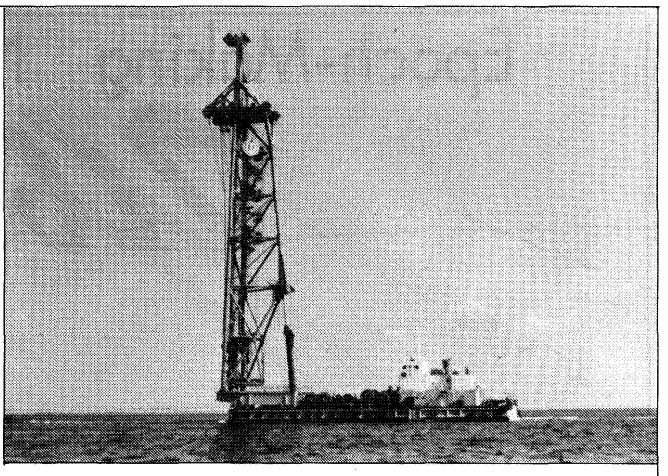
Export agent

INTERNATIONAL NSE

NSE INTERNATIONAL, LTD.

YONBAN-CHO FINE BLDG., 7, YONBAN-CHO,
CHIYODA-KU, TOKYO, JAPAN
PHONE: (03) 230-2150
TELEX: 02322902 SEEJPN





WHAT IS THE BEST WAY TO USE THE LANDS EFFECTIVELY ?

DAITO KEEPS CHALLENGING THE MODERN AGE TECHNOLOGY PROBLEMS OF DREDGING AND RECLAMATION.

with you

"WITH YOU", the mutual understanding and cooperation, is the thing that Daito considers the prerequisite to true entrepreneurship.

GENERAL CONTRACTOR

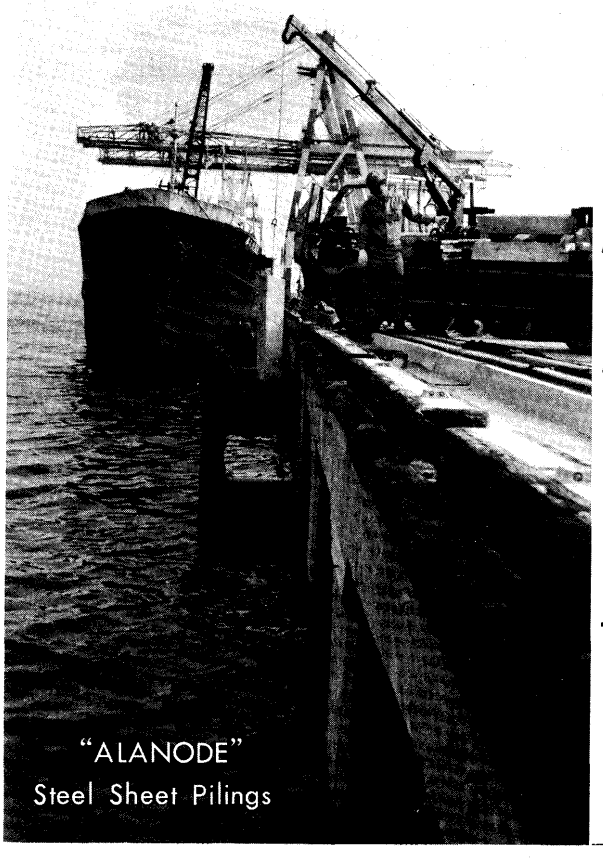
Engineering Consultants

DAITO KOGYO CO., LTD.

President: Yoshihiro Ogawa

Main Office: 1-38-6, Kameido, Koto-Ku, Tokyo, JAPAN

Phone: 03-685-2111 Cable: DAKOTOKYO Telex: J23730 Daito



"ALANODE"
Steel Sheet Pilings

Cathodic Protection

ALANODE

ALUMINUM-GALVANIC-ANODE

Applications:

- Steel Sheet Pilings
- Steel Pile Piers
- Sea Berth, Platform, Rig

Advantages:

- Most economical compared with other anti-corrosion devices
- Simple application
- No maintenance and power cost required after installation
- No danger of short circuiting or power leakage

NCE

THE NIPPON CORROSION ENGINEERING CO., LTD.

(NIHON BOSHOKU KOGYO K.K.)

Head Office: J.T.B. Bldg., 1-6-4 Marunouchi, Chiyoda-ku, Tokyo, Japan

Phone: Tokyo 211-5641 Telex: Tokyo 222-3085

Sole Agent: MITSUBISHI CORPORATION

Changing from Daywork plus Overtime to Two-Shift Working

By Stuart Bradley, Deputy Docks Manager, Port of Hull, British Transport Docks Board*

(* now called 'Associated British Ports')

UNCTAD Monographs on Port Management (UNCTAD/SHIP/494(1) GE. 83-55560) A Series of Monographs prepared for UNCTAD in collaboration with IAPH

INTRODUCTION TO THE SERIES

In the ports of industrialized countries, operating systems and personnel development are based on skills acquired through experience, on emulation of other industries and on the innovation which is easily undertaken in advanced industrial environments. These means are generally lacking in developing countries and port improvements occur only after much deliberation and often through a process of trial and error. Some means is required by which ports in developing countries can acquire skills that are taken for granted in countries with a long industrial history, or can learn from the experience of others of new developments and how to meet them.

Formal training is one aspect of this, and UNCTAD has devoted considerable effort to developing and conducting port training courses and seminars for senior management and to preparing training materials to enable middle-management courses to be conducted by local instructors. It was felt that an additional contribution would be the availability of clearly written technical papers devoted to common problems in the management and operation of ports. The sort of text that will capture an audience in the ports of developing countries has to be directed at that very audience, and very few such texts exist today.

Following the endorsement of this proposal by the UNCTAD Committee on Shipping in its resolution 35(IX), the UNCTAD secretariat decided to seek the collaboration of the International Association of Ports and Harbors, a non-governmental organization having consultative status with UNCTAD, with a view to producing such technical papers. This series of UNCTAD Monographs on Port Management represents the results of this collaboration. It is hoped that the dissemination of the materials contained in these monographs will contribute to the development of the management skills on which the efficiency of ports in developing countries largely depends.

Adib AL-JADIR
Director
SHIPPING DIVISION
UNCTAD

FOREWORD

When UNCTAD first decided to seek the co-operation of the International Association of Ports and Harbors in producing monographs on port management, the idea was enthusiastically welcomed as a further step forward in the provision of information to managements of ports in developing countries. The preparation of monographs through the IAPH Committee on International Port Development has drawn on the resources of IAPH member ports of industrialized countries and on the willingness of ports in developed countries to record for the benefit of others the experience and lessons learnt in reaching current levels of port technology and management. In addition, valuable assistance has been given by senior management in ports of developing countries in assessing the value of the monographs at the drafting stage.

I am confident that the UNCTAD monograph series will be of value to managements of ports in developing countries in providing indicators towards decision-making for improvements, technological advance and optimum use of existing resources.

The International Association of Ports and Harbors looks forward to continued co-operation with UNCTAD in the preparation of many more papers in the monograph series and expresses the hope that the series will fill a gap in the information currently available to port managements.

J.K. Stuart
Chairman,
Committee on International Port Development
IAPH.

CONTENTS

I. PREAMBLE

1. In 1981 the Port of Hull (United Kingdom) decided to introduce two-shift working in an area of the port previously operated on the basis of daywork plus overtime. This monograph describes the reasons for this change and chronicles the steps leading up to the introduction of the

new working method.
2. Changing any long-established pattern of work requires careful planning and implementation if the desired objectives are to be achieved. This paper offers guidance, based on the experience of the Port of Hull, to other ports which may be envisaging a similar change.

II. THE PORT OF HULL – BACKGROUND INFORMATION

A. Facilities

3. The Port of Hull is a major port situated on the River Humber approximately half-way along the east coast of the United Kingdom. It is one of the oldest established ports in the country and ranks among the top six United Kingdom ports. It is a large port complex with some seven miles of river frontage and the various docks within the port comprise the complete range of facilities necessary to handle the wide band of trades which go to make up the traffic pattern for the port. These in-dock facilities include: a purpose-built container terminal; 11 RO/RO berths; a large number of modern transit sheds (served by quayside cranes of varying capacity ranging from 6 to 40 tons); floating heavy lift cranes; modern dry-bulk loading terminal; suction elevators; a large fleet of mechanical handling equipment for moving break-bulk general cargoes and for containers; and specialized equipment for particular trades. On the river frontage there are jetty terminals for liquid-bulk cargoes.

B. Trades – traffic pattern

4. In common with other European ports, Hull has undergone a continuing change in recent years, both in cargo handling methods and in trading patterns. Today, there are a large number of regular RO/RO and LO/LO services to the near Continent (including passenger ferries), container/unit-load services to Scandinavia, the Baltic and the USSR, as well as a great number of regular deep-sea liner services carrying conventional/unit-load cargoes. (mainly exports from the United Kingdom) Despite the ever increasing emphasis on rapid cargo-handling methods (containers, RO/RO, unit loads, etc.), some 25 per cent of the Port's tonnage is still handled by conventional means on and off deep-sea vessels. The latter therefore remains a very important part of the Port's traffic from the point of view of revenue and operational activity.

C. Working patterns

5. Prior to the innovation described in this paper, the work patterns in the Port were based on daywork (08.00 – 16.30 hours) plus overtime (2 hours available each weekday, half-day Saturdays and full day Sundays as required by each vessel). The only exceptions were the common user container terminal and a "private" passenger/cargo ferry terminal complex, both of which operated on a two-shift basis, i.e. 07.00 – 14.00 : 14.00 – 21.00 daily. In terms of human resources approximately 15 per cent of the labour force were engaged on shift work, albeit on the container and passenger ferry terminals only, and only half of that 15 per cent were employed on the common user berths operated by the Port Authority. Thus about 90 per cent of the labour force controlled by the Port Authority was employed on a daywork plus overtime basis. Even allowing for "terminal"*/mannings for some RO/RO berths and certain specialized labour allocations, well over 75 per cent of the work force was allocated to work on this basis day by day.

D. Conventional traffic

6. Competition between ports in the United Kingdom is intense and this is particularly so in the field of conventional cargoes. Prime factors contributing to this situation are:

(a) Over-capacity of conventional berths/ports in the United Kingdom and Northern Europe as a whole;

(b) The accelerating move away from conventional break-bulk cargo handling towards palletized/unit loads, making it easier for less experienced labour forces to compete with long established sophisticated ports, and leading also to a diminishing conventional cargo market.

(c) A below-average productivity rate per day in the Port of Hull by comparison with competing ports (particularly on the east coast of the United Kingdom and North Continent).

Of the above, the first two factors could be said to be beyond the control or influence of the port management: they arise out of the trading environment. The third element, however, is very much the business and responsibility of the port itself and in particular of the port management.

III. OBJECTIVES

7. As with any innovation, in considering the introduction of a change in working systems it is important to set objectives at the outset. But it is worth remembering that objectives will, of necessity, vary from time to time and from place to place. In the Port of Hull, in order to improve (or at least retain) its share of the conventional cargo market the Port Authority was determined to take action in the one sphere of influence open to it: namely to improve the port's performance. The Authority's special objectives therefore were:

(a) To improve productivity per day, and hence ship turnaround time, by at least 70/80 per cent. A marginal improvement is likely to have little effect on the market, in that it takes a long time for the message to reach the ears of customers, and in any case such improvements are often short-lived as old habits tend to creep back in all too easily. The improvement in productivity has to be dramatic if it is to impress the market.

(b) To widen the range of options open to existing and potential customers; i.e. to tailor the port's service to the need of each individual trade.

(c) To provide a smoother transition for those vessels working both break-bulk on conventional berths and requiring specialized container-handling facilities (already working on a two-shift system, as mentioned in paragraph 5 above).

IV. OPTIONS

8. It is relatively simple to identify a short-coming (such as productivity in the case of Hull) but how does one go about rectifying the situation?

9. Taking the example of productivity, one can:

(a) Extend the hours of work to handle more tonnage per day.

Note: Although overtime working by the same group of men beyond their normal working hours will achieve this to some extent, one must bear in mind:

(i) that there is a limit to the continuous

number of hours any one man can work safely and effectively; and

(ii) that customers are already used to overtime working and therefore daywork plus overtime has become the norm.

(b) Handle more tons per hour.

(c) Extend the hours of work (significantly) and handle more tons per hour.

10. It is by no means axiomatic that option (iii) is the best, although it may appear to be so at first sight. For example, if the cost in both wages and allocation of resources exceeds the capacity of the trade to pay for it and of the port to provide for it without seriously impairing other activities, then this option is just not viable.

V. RESTRICTING FACTORS

11. In assessing the means of achieving the objectives best suited to the particular situation at the Port of Hull it was necessary to look at these options in the light of the following factors:

(a) High average age of the Port's labour force (nearly 50 years).

(b) Dock workers in Hull (and in most large ports in the United Kingdom) are paid a fixed rate per day. This system had been introduced some years before, at the same time as all dock workers first became permanent regular employees. It replaced a casual employment system linked to piecework (i.e. the more tons handled, the higher the pay) and was considered by the dock workers to be a "hard won" improvement of their terms and conditions of employment. Even though now permanently employed, they would resist any return to a piecework system or at least one that could be afforded by the employers.

(c) A large part of the Port's conventional work was centred on deep-sea liner traffic where the need is to reduce days in port rather than hours per day. The difference in emphasis may be slight but it is nevertheless measureable.

(d) Cargo-handling costs per ton could stand only as much increase as would still leave sufficient room for a distinct improvement to the shipowner in his overall port costings; in other words, any extra cargo-handling costs must be more than offset by savings on ship time in ports.

(e) Hull had gained a reputation over the years as a port producing good damage-free stowages (particularly important on break-bulk general cargo vessels). The Port Authority had no wish to sacrifice this extremely valuable ingredient in its marketing package; it could not afford to substitute quantity for quality.

(f) Whatever means the Authority eventually decided to introduce, the change had to be made quickly. It could not afford the luxury of a long lead-in time. The change had to take effect in a matter of weeks from decision day rather than months.

12. Balancing all the above factors led to the conclusion that the most effective means of achieving the stated objectives would be to introduce some form of two-shift working in order to extend greatly the number of hours worked per day. Incidentally, the Port management also felt that the secondary objective of handling more tons per hour might also be achieved simply as a result of introducing a change into a long-established pattern of work, although this could not be predicted with any great certainty.

VI. PREPARATION

13. Laying the groundwork for change is as important as the change itself. It is one thing to reach a decision that a certain course of action is necessary; it is quite another to achieve the change in prescribed time. This is particularly the case for port managers, who provide a service to so many differing elements and employ a wide variety of specialized and non-specialized labour. Port managers are never wholly masters in their own house; if the shipowner, shipper, receiver and so on do not like what the port manager is doing they simply take their business elsewhere, or demand better terms. It is not the same as in a manufacturing industry.

14. A change in working patterns in a port therefore greatly affects not only those who work in the port (which in itself is a major factor) but also those external influences which come together in a port area to make it a going concern. A port is the meeting place of, among others, shipowners, agents, shippers, receivers, customs officials, hauliers, railway companies, trade organizations/associations, as well as port management, trade unions and the labour force itself.

15. As a first step in the preparatory work at the Port of Hull a series of meetings were held at which representatives of all the various interested parties were brought together, with the aim of reaching a common understanding on what was needed for solving the Port's particular problem. It is not suggested that meetings bring all the various port elements together simultaneously are the only way of achieving a common purpose; indeed it would be obvious to many that such an unwieldy gathering cannot produce any kind of real conclusion. However, it is easier to introduce change if the atmosphere in the port is conductive to change. So it was that, notwithstanding the widely different views held on many aspects of the Port's operations by those attending the meetings, a consensus was reached identifying poor productivity as the major problem. This in itself could be considered a worthwhile result. The management's assessment that some form of two-shift working was necessary was shared by most (but not all) of the various parties. The next requirement was a detailed proposal to put before the trade on the one hand and the trade unions on the other. But in the meantime there was a good climate to work in.

VII. SHIFT WORK/DAYWORK

16. It would be appropriate at this stage to define more precisely the difference between daywork plus overtime and shift work on a semi-permanent basis.

(i) Daywork

In this system dock workers of various categories (crane-drivers, fork lift truck drivers, deckmen, riggers, foremen, tallymen, clerical superintendents, labourers, lashers, etc.) are required to report to a central point – say on a dock-by-dock basis – for daily allocation to vessels. They would not report for re-allocation until the vessel/job to which they had previously been allocated had been completed. Overtime is worked at the demand of the customer (be it shipowner, shipper, receiver) either on an extended weekday working and/or weekend working (as described in paragraph 5 above).

(ii) Shift work (two shifts) – in the Port of Hull: 07.00 to 14.00; 14.00 to 21.00 hours. In this system, rather than being allocated on a daily basis, the labour force would be detailed for shift work for a minimum period of time (say at least one week), quite independent from the specific demand of any particular day. In other words, the labour force would report for duty at 07.00 hours or 14.00 hours continuously throughout the shift period. Obviously the actual hours of work can be tailored to suit any port's own needs or traditions, but the important point is that shift work effectively allocates men in advance of demand, whereas day work does not.

17. To keep a continuous service running men would be required either (a) to remain in the same shift for however long shift work is required, or (b) to rotate from one shift to another and to other job allocations not involving shift work in a regular pre-determined pattern. In practical terms to the port operator or stevedore, semi-permanent shift work entailing pre-allocation invariably means enhanced payments to the labour force as well. These payments (in addition to normal daywork payments) are paid in recognition of abnormal working hours (and also, to some extent, to make good the abolition of overtime, at least during weekdays). On top of this, overtime on the daywork system is borne by the shipowner/shipper "on demand", whereas shift work virtually eliminates overtime and thus removes the demand nature of the shipowners' costs. The port operator/stevedore therefore takes a greater share of the risk of continuous employment for his labour force than on the daywork system.

VIII. TWO-SHIFT WORKING – FULL OR PART

18. In measuring productivity levels the major factor is of course the rate at which ships are loaded (or discharged), while in assessing the potential throughput for any given berth/port area what needs to be considered as well as ship working speed is the rate at which cargo is accepted into or delivered away from that port area.

19. When working ships direct to/from land transport, the stevedore is dependent upon an optimum supply of vehicles or rail wagons, often outside his own control. The stevedore has much greater control if he is working to or from his own transit sheds, but in either case the overall throughput of a berth is governed to some extent by:

(a) Dwell time of cargo in the port area, either prior to loading or awaiting delivery;

(b) Speed at which land transport (or, for example, river lighters) can move tonnage to and from the berth.

20. However, while recognizing these "constraints", the fact remains that it is very nearly the case that if one doubles the hours of work, one also doubles the throughput, or potentially so. Therefore to introduce two-shift work (thus virtually doubling the hours of port operations) throughput the port can go a long way towards doubling the overall capacity of the port (if there are no other restricting factors, e.g. supply of mechanical plant, etc.).

21. Bearing in mind the higher labour costs and predetermined nature of shift work compared to daywork, plainly one would only adopt full two-shift work (i.e. throughout the port) if there was a real prospect of doubling the total throughput. There would be no point in entering into higher fixed-cost agreements with the labour force if the traffic could not bear it.

22. In addition to these general underlying conditions, there would almost certainly be specific governing factors which would limit the degree to which two-shift working could be introduced without investing in an increased labour force or further plant and machinery, such as:

(a) The ratio of specialist to non-specialist labour is critical. This is particularly relevant in a port which is increasing the amount of mechanically handled tonnage compared to man-handled tonnage. The labour force is also likely to contain an imbalance (in the case of Hull, too much non-specialized labour compared to specialized labour).

(b) Each shift manning level would have to contain elements of all specialized skills required (they could not be left to demand allocation when the vessel arrived for example). There would have to be sufficient specialists (cranedrivers, foremen, clerks, tallymen, riggers, deckmen, fork lift truck drivers) on each shift to cover predicted demand in advance.

(c) What is true in paragraph (b) above for operational staff would also apply to maintenance staff. In effect, each shift would become a self-contained labour force backed up by its own maintenance crew, for all but long-term repairs.

(d) The servicing of mechanical equipment in a shift-work area presents different problems to those found in a daywork area. For example, most fork lift trucks used aboard ships are battery-powered, requiring regular re-charging of batteries. On daywork the standard procedure is to re-charge at night, allowing an 8 – 10 hour working period for the following day. In a shift-work system one would need a continuous supply of these trucks for sixteen hours a day. This means having a rotating supply of trucks re-charged as near the berth as possible to cut down transport time, and requires careful monitoring of the use of this particular resource.

23. Evaluation of the foregoing considerations may well lead a port manager to the conclusion that a partial two-shift operation is all that he either needs or can afford, that is to say the establishment of an area within the port entirely devoted to shift work but retaining daywork areas as hitherto. It was this particular formula that was eventually adopted for the Port of Hull.

24. It may well be possible for a system to be introduced which allows shift work and daywork to operate simultaneously on any one vessel, or indeed for any vessel to change its working pattern as it desires from day to day in any one port visit. However, this was not the case at Hull. Nevertheless, the following points (outlined in section I below), arising from the concept of a shift area contained within a port and operating in conjunction with a daywork area, will be valuable as a measuring device for those who are in a comparable position.

IX. SHIFT WORK – AREA BASIS

25. By establishing an area of the port in which only shifts will be worked, and thus offering customers the choice of working day work as hitherto or shifts, there are a number of factors to be considered:

(a) In many ports (as in Hull) berths for vessels tend to be allocated on the basis of the nature of the trade, which in turn determines the particular facilities necessary to work the ship. These facilities could comprise for example transit sheds, cranage of specific capacity, open storage

areas, rail served or not, etc. Clearly, many different factors are taken into consideration when allocating berths, to which should now be added another overriding factor, namely the method of working arrangement required. A change of emphasis will have to be brought about from a trade orientated berth allocation to a working method basis for allocation.

(b) A greater degree of planning will therefore be required, since the berth situated in a shift area will be called upon to provide all the necessary facilities for all trades which demand to use the system. This compares with the daywork system where a berth/shed tends to gear itself up for one or a group of trade only.

(c) The area chosen for shift work must ideally include the greatest possible range of port facilities that can be incorporated under one area of control. In Hull, for example, the area selected comprises seven berths (deep-sea), three large transit sheds, wide berth aprons, and large open storage area, ro/ro berth, and full range of cranage and mechanical handling equipment manned by 30 per cent of the port's total labour force. The area itself is close to the container berth (two of the seven berths are literally adjacent) and thus no in-dock towage/pilotage charges are incurred when moving vessels from the container berth to the conventional berths and vice versa.

(d) The port management structure may also need to be reorganized in order to assign specific managers/supervisors to fixed port areas. In the case of Hull for example, prior to the introduction of shift work, managers and foremen tended to look after trades rather than physical port areas. However, if a shift-work area is established then it is essential that management and supervisors have clearly defined responsibilities; the system needs to be based upon responsibility for an area, and not for trades (as these may be handled either in or out of the shift working area). In Hull a complete reorganization of the management structure was carried out prior to bringing in shift work, which greatly facilitated the eventual operation.

(e) Although in comparative terms a shift-work area may represent a relatively small proportion of the port's total capability, it must be remembered that there will be almost a doubling of throughput in that area. In effect then, the shift area will attract a proportionately greater percentage of that port's tonnage (certainly this will be so if the innovation is going to prove successful), leading to a move in the "centre of gravity" of the port's operations.

(f) An essential feature of two-shift working is the (effective) pre-allocation of the labour force, i.e. a specific number of men are detailed for shift work for an agreed period of time: the area will be manned by a "self-contained" labour force. This being so, there is no need for shift men to report to a central port control (as possibly hitherto), and it will be necessary to establish reporting points of control within the shift-working area. One does not want to lose time at the start and end of shifts taken up by men travelling to and from their area. They know their area of work in advance. The method of shift allocation is dealt with below.

X. SHIFT-WORK AGREEMENTS

A. General comments

26. The introduction of full or partial shift work will necessarily be based upon some form of agreement with the trade unions (or the labour force itself), the essential points of which must also be well known to the customers – e.g. any restrictions that may be placed on the flexibility of movement of men from one ship to another within a shift is of vital importance to the trade itself.

27. In drawing up agreements, due regard should be given to the following points:

(a) In introducing two-shift working, the opportunity should be taken to adjust manning scales to realistic levels for modern cargo handling requirements (for example, there may be long established gang sizes which are no longer appropriate for current trading methods). It should be borne in mind that any over-manning there may be will be doubled on a two-shift system.

(b) The opportunity for dock workers to earn overtime during weekdays will, by definition, be eliminated. For this reason, and also to compensate for working unsociable hours, a corresponding increase in the basic wage rate will have to be negotiated. At Hull a shift work premium of basic rate plus 11 per cent was initially introduced (subsequently increased to basic plus 15 per cent to provide improved incentive).

(c) Flexibility within the area should be the keynote – movement from hatch to hatch and from ship to ship within a shift is absolutely vital. Unless the total labour force is increased pro rata, on each shift there will be less men available than hitherto as the labour force will have been spread over two separate shifts. Therefore, lost working time is very much more difficult to recover at a later stage in the operation.

(d) Care should be taken to avoid creating in-built slack periods in the two-shift system. For example, if road hauliers cannot match their working hours to the extended port working hours there is no point in manning for forwarding and receiving during "dead" periods. One may find that this activity would be better worked on daywork or one shift per day only.

(e) Certain jobs do not need to be perpetuated through two shifts and can quite easily be done on one shift only per day. An example of this type of job would be daily measurement of cargo in sheds or quays etc.

(f) Welding a "team" together will invite comparison between one group of port workers and another (even if this did not exist before!) which will lead to some adjustment of whatever historical agreements the management may have had with individual trade unions.

(g) Shift-work manning should be self-contained and completely independent of outside resources.

(h) By extending hours of work at both ends of the working day one must not overlook the means of getting the labour force to and from their places of work. The manager/supervisor may find it necessary to arrange transport in the town/city area linked to his own working hours to ensure that his labour force arrives and departs on time. One thing is certain: he cannot afford late starts and early finishes.

B. Area shift agreement

28. The salient features of the arrangement which is based upon the establishment of a shift area (surrounded by a sea of daywork, so to speak) are:

(a) Unless one creates two entirely separate labour forces of shift workers and day workers (this may prove an acceptable solution in some countries but is virtually denied

to management in the United Kingdom) one will need to have some method of moving men in and out of shift working.

(b) The method of allocation adopted in Hull was to detail a specific number of men per shift (comprising an agreed ratio of specialists to non-specialists); each group of men are allocated to shift working for a period of two weeks and change from the a.m. to the p.m. shift each weekend. Men allocated to shifts are taken from the general pool of labour on a rostered basis. A typical cycle of allocation would be:

Week 1	a.m. shift
Week 2	p.m. shift
Week 3	daywork
Week 4	daywork
Week 5	Annual leave
Week 6	a.m. shift, etc.

Note: Owing to the imbalance at the Port of Hull between specialists and non-specialists, certain key workers were of necessity worked over a shorter time cycle than in the example given above.

Allocation to shifts is predictable and, in the Port of Hull, by 11.00 hours each Friday all men for the following two weeks of shift work have been allocated to their respective shifts for the ensuing week.

(c) Allocation to ship/shore work within the shift work area is easily done at the shift control point, bearing in mind that the men are already in their areas of work.

Note: It may be found advisable to institute a system whereby on the first shift of each shift period men report for duty 15-30 minutes in advance of their start time.

XI. TRIAL PERIOD

29. It is as well to check on what has been achieved so far. We have:

(a) identified the problem (in Hull's case low productivity);

(b) gained general acceptance by all parties (i.e. both port users and dock workers) that the problem did exist and that it had to be tackled;

(c) concluded that the best way to improve productivity would be by introducing some form of two-shift working into what up until now has been a full daywork system;

(d) established that there was neither the justification nor resources (physical, financial, human or mechanical) to warrant a complete changeover from total daywork to total shift work;

(e) concluded that the optimum arrangement therefore, i.e. the system most appropriate to meet the Port of Hull's own particular objectives, would be to introduce two-shift working into part of the port only, using 15 per cent of the labour force on each shift;

(f) concluded that this shift work area must be under one management responsibility and offer the greatest range of facilities in the form of berths, transit sheds, cranage, equipment, general layout and back-up land.

30. Since there is no substitute for actual experience, shift working should be introduced initially for a trial period. A three month trial was conducted in the Port of Hull. This period allows sufficient time for the greater part of the work force to rotate through the shift work system and also for sufficient experience to be gained of the new system by the trade and the port operators themselves.

XII. CHARGING STRUCTURE – SHIFT WORKING

31. Break-bulk port handling rates are traditionally based upon a rate per ton (either measurement or deadweight) and of course each port has its own established "tariff" or agreements with its own customers. However, unless the port has worked shifts beforehand (and even that may not be relevant if they have been worked on a casual basis) it will need to devise a new structure of charges.

32. On daywork the shipowner will expect to move X number of tons per day plus (say) $\frac{X}{3}$ in overtime (for which he pays extra). On shift work he will expect to move something like 2X tons per day; but will he expect to pay double the amount he normally pays for day work? The answer, bearing in mind the motive for introducing shift working in the first place, is likely to be emphatically no! He will rightly argue that port costs have not doubled.

33. Consequently, aware of what the market would bear, the Port of Hull introduced a shift work tariff based upon:

The daywork rate per ton (X) plus overtime (Y) plus a small percentage (Z) equating to the original daywork rate (X) plus 15/20 per cent.

The actual formula to be adopted in any given port is of course determined by the market environment of that port. In the Port of Hull the formula proved to have been pitched at about the right level (a) to meet the additional costs, and (b) to prove sufficiently attractive to the shipowner and to improve throughput.

XIII. RESULTS

34. It will be recalled that in the Port of Hull an essential feature of the move from daywork to shift work was the speed with which it could be brought about. The sequence of steps outlined in this paper (i.e. decision, consultations, evaluation leading to detailed shift working plan and final implementation) involved an over-all time span of six weeks, from decision to commencement of shift working. However, having started on a new course, a port needs to ensure that (a) the course is correct, and (b) it is not diverted from it. Hence monitoring of progress is essential.

35. After the initial trial period of three months in the Port of Hull an analysis of the results of the experiment highlighted the following:

(a) Actual output per day increased by over 100 per cent compared to a daywork shift exclusive of overtime. In fact, the output in each of the two shifts equates to that achieved in a day work plus two-hour overtime period, thus doubling output per day. (Actual results described herein exceeded expectation as outlined in section XII.)

(b) The full potential of doubling throughput of a given berth was able to be realized at Hull because the constraining factors discussed above (cargo dwell time, speed of tonnage movement inland) had sufficient built-in slack to accommodate the improved ship working productivity without creating congestion. However, it should be stressed that the speed by which cargo is cleared away from the port (or the converse) must match the demands of ship working if the full shift-working potential is to be realized.

(c) Savings in ship time to the shipowner are progressively greater in proportion to the amount of cargo handled: in-port time is virtually halved and the greater the tonnage the greater the saving in time.

(d) In a port at which arrivals and sailings are restricted to high-water periods, small vessels moving relatively small quantities of cargo are more readily turned round between successive tides. For example, if high water falls at midday:

Shift-work time available before
next high water = 9 hours
(12.00 to 14.00 : 14.00 to 21.00).
Daywork time = 5 hours (13.00 to 16.00 + overtime).

Therefore a vessel with (say) an eight-hour cargo working programme could complete and clear the port by the time of the next high-water period, thus saving the 12 hours port time that would have been incurred had the vessel worked daywork. In the latter case the vessel would have been compelled to complete its prorgramme of work the following morning and sail on the next day tide.

(e) A reduced number of cranes were used to handle a much higher tonnage over greatly extended working hours, putting infinitely more stress on maintenance and incidentally reducing the time span between succeeding crane inspections. Hence the need for on-the-spot maintenance is heavily underlined.

(f) Shipowners' initial caution in opting to use the new arrangements has been replaced by an increasing faith in the system, which has proved itself capable of spectacular performance.

(g) What is good for the shipowner is not, however, necessarily good for every shipper receiver. In a small number of cases, especially those where vessels work direct to transport, shippers and receivers may be reluctant to provide the additional transport required per day. However, this must be seen as a short-term consideration since in the longer term improved productivity in the port is bound to be reflected in the port's reputation and could lead to a beneficial effect on freight rates applicable to the port and the popularity of the port among a wider span of cost customers.

36. In summary, the experiment at the Port of Hull has proved itself by achieving the objectives set at the outset: so much so that at the end of the initial trial period, shift working was extended both in time and in terms of the area involved, and it is still operating today. With the right motivation and an atmosphere conductive to change, and if the sequence of events is followed and due regard is paid to the many factors which arise from this innovation, there should be no reason why it will not work equally well for other ports.

---

*/ "terminal" mannings comprise labour allocated for particular activities on a permanent (or semi-permanent) basis.

NOTE: The views expressed in this monograph are those of the author and not necessarily those of the UNCTAD secretariat.

Other monographs in this series:

No. 2 Planning land use in port areas: getting the most out of port infrastructure

No. 3 Steps to effective equipment maintenance

International maritime information: World port news:

Report on the status of IMO Conventions

(1) International Convention for the Safety of Life at Sea, 1974 (SOLAS 1974)
Entry into force: 25 May 1980
1981 Amendments: not yet in force
1983 Amendments: not yet in force

(2) Protocol of 1978 relating to the International Convention for the Safety of Life at Sea, 1974 (SOLAS PROT 1978)
Entry into force: 1 May 1981
1981 Amendments: not yet in force

(3) Convention on the International Regulations for Preventing Collisions at Sea, 1972 (COLREG 1972)
Entry into force: 15 July 1977
Entry into force of amendments adopted in 1981: 1 June 1983

(4) International Convention for the Prevention of Pollution of the Sea by Oil, 1954, as amended (OILPOL (amended) 1954)*
Entry into force: 26 July 1958
Entry into force of amendments adopted in 1962: 18 May and 28 June 1967
Entry into force of amendments adopted in 1969: 20 January 1978
(a) 1971 (Great Barrier Reef) Amendments: not yet in force
(b) 1971 (Tanks) Amendments: not yet in force

*This Convention will be superseded by 1973/78 MARPOL upon its entry into force on 2 October 1983.

(5) International Convention for the Prevention of Pollution from Ships, 1973 as modified by the Protocol of 1978 thereto (MARPOL 73/78)
Entry into force: 2 October 1983

(6) Convention on Facilitation of International Maritime Traffic, 1965, as amended (FAL (amended) 1965)
Entry into force: 5 March 1967
(a) 1973 Amendment: Entry into force: 2 June 1984
(b) Amendments to the Annex:
Entry into force of amendments adopted in 1969: 12 August 1971
Entry into force of amendments adopted in 1977: 31 July 1978

(7) International Convention on Load Lines, 1966 (LL 1966)
Entry into force: 21 July 1968
(a) 1971 Amendments: not yet in force
(b) 1975 Amendment: not yet in force
(c) 1979 Amendment: not yet in force

(8) International Convention on Tonnage Measurement of Ships, 1969 (TONNAGE 1969)
Entry into force: 18 July 1982

(9) International Convention relating to Intervention on the High Seas in Cases of Oil Pollution Casualties, 1969 (INTERVENTION 1969)
Entry into force: 6 May 1975

(10) Protocol relating to Intervention on the High Seas in Cases of Pollution by Substances other than Oil, 1973 (INTERVENTION PROT 1973)
Entry into force: 30 March 1983

(11) International Convention on Civil Liability for Oil Pollution Damage, 1969 (CLC 1969)
Entry into force: 19 June 1975

(12) Protocol to the International Convention on Civil Liability for Oil Pollution Damage, 1969 (CLC PROT 1976)
Entry into force: 8 April 1981

(13) Special Trade Passenger Ships Agreement, 1971 (STP 1971)
Entry into force: 2 January 1974

(14) Protocol on Space Requirements for Special Trade Passenger Ships, 1973 (SPACE STP 1973)
Entry into force: 2 June 1977

(15) Convention relating to Civil Liability in the Field of Maritime Carriage of Nuclear Material, 1971 (NUCLEAR 1971)
Entry into force: 15 July 1975

(16) International Convention on the Establishment of an International Fund for Compensation for Oil Pollution Damage, 1971 (FUND 1971)
Entry into force: 16 October 1978

(17) Protocol to the International Convention on the Establishment of an International Fund for Compensation for Oil Pollution Damage, 1971 (FUND PROT 1976)
Not yet in force

(18) International Convention for Safe Containers, 1972 as amended (CSC (amended) 1972)
Entry into force: 6 September 1977
Entry into force of amendments adopted in 1981: 1 December 1981
1983 Amendments: not yet in force

(19) Athens Convention relating to the Carriage of Passengers and their Luggage by Sea, 1974 (PAL 1974)
Not yet in force

(20) Protocol to the Athens Convention relating to the Carriage of Passengers and their Luggage by Sea, 1974 (PAL PROT 1976)
Not yet in force

(21) Convention on the International Maritime Satellite Organization (INMARSAT) (INMARSAT C)
Entry into force: 16 July 1979

(22) Operating Agreement on the International Maritime Satellite Organization (INMARSAT) (INMARSAT OA)
Entry into force: 16 July 1979

(23) Convention on Limitation of Liability for Maritime Claims, 1976 (LLMC 1976)
Not yet in force

	1974 SOLAS	1978 SOLAS PROT	1972 (amended) COLREG	Amendments 1954 (amended) OILPOL	1971 (GBR)	1971 (Tanks)	1973/78 MARPOL a/	1965 (amended) FAL	1973 Amendment	Amendments 1966 LOAD LINES	1971	1975	1979	1969 TONNAGE	1969 INTERVENTION	1973 INTERVENTION PROT	1969 CLC	1976 CLC PROT	1971 STP	1973 SPACE STP	1971 NUCLEAR	1971 FUND	1976 FUND PROT	1972 (amended) CSC	1974 PAL	1976 PAL PROT	1976 INMARSAT C	1976 INMARSAT OA	1976 LLMC	1977 SFV	1978 STCW	1979 SAR	1972 (amended) LDC	1978 Amendments
	1	2	3	4	a	b	5	6	a	7	a	b	c	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26	27	a
Number of ratifications, acceptances, approvals or accessions */	b/ 64 (+3)	34 (+4)	b/ 82	69	(26)	(25)	b/ (21)	b/ 52	(36)	b/ 99	(36)	(33)	(26)	58 (+2)	b/ 43	15 (+1)	52	15 (+1)	13	11	11	28	(11)	35 (+1)	(9)	-	b/ 39	c/ 41	(7)	(8)	b/ (27)	b/ (13)	53	(8)
Number of ratifications etc. necessary for entry into force	-	-	-	-	46	46	-	-	-	-	66	66	66	-	-	-	-	-	-	-	-	-	d/ 8	-	10	10	-	-	12	e/ 15	-	15	-	36
Number of IMO Members having ratified, etc. the Instrument	62	36	76	67	26	25	21	50	35	92	34	33	26	57	42	16	48	16	13	11	11	26	11	32	8	-	37	39	7	8	26	13	46	8
Number of non-IMO Members having ratified etc. the Instrument	5	2	6	2	0	0	0	2	1	7	2	0	0	3	1	0	4	0	0	0	0	2	0	4	1	-	2	2	0	0	1	0	7	0
Number of IMO Members not having ratified, etc. the Instrument.	63	89	49	58	99	100	104	75	90	33	91	92	99	68	83	109	77	109	112	114	114	99	114	93	117	-	88	86	118	117	99	112	79	117

a/ In respect of the original 1973 MARPOL Convention there are 12 Contracting States.

b/ Includes signature without reservation as to ratification, acceptance or approval.

c/ Signatures, in accordance with Article 2 of the INMARSAT Convention.

d/ The quantities of contributing oil received in the preceding year by potential contributors within the States parties to the Fund Convention must amount to not less than 750 million tons.

e/ The aggregate of whose fishing fleets constitutes not less than fifty per cent by number of the world's fleet of fishing vessels of 24 m in length and over.

*/ Figures in parentheses indicate ratifications, acceptances, etc. not yet operative.

(24) Torremolinos International Convention for the Safety of Fishing Vessels, 1977 (SFV 1977)
Not yet in force

(25) International Convention on Standards of Training, Certification and Watchkeeping for Seafarers, 1978 (STCW 1978)
Entry into force: 28 April 1984

(26) International Convention on Maritime Search and Rescue, 1979 (SAR 1979)
Not yet in force

(27) Convention on the Prevention of Marine Pollution by Dumping of Wastes and Other Matter, 1972, as amended (LDC (amended) 1972)
Entry into force: 30 August 1975
(a) 1978 (Disputes) Amendments: not yet in force
(b) Amendments to the Annex:
Entry into force of amendments adopted in 1978: 11 March 1979
Entry into force of amendments adopted in 1980: 11 March 1981

The following three instruments have been superseded by subsequent instruments as indicated below:

(1) International Convention for the Safety of Life at Sea, 1948 (SOLAS 1948)
Entry into force: 19 November 1952
This Convention was superseded, with effect from 26 May 1965, by the International Convention for the Safety of Life at Sea, 1960, as between the States Parties to the later Convention.

(2) International Convention for the Safety of Life at Sea, 1960 (SOLAS 1960)
Entry into force: 26 May 1965
This Convention has been superseded, with effect from 25 May 1980, by the International Convention for the Safety of Life at Sea, 1974, as between the States Parties to the later Convention.

(3) International Regulations for Preventing Collisions at Sea, 1960 (COLREG 60)
Applied with effect from 1 September 1965
These Regulations were superseded, with effect from 15 July 1977, by the Regulations annexed to the Convention on the International Regulations for Preventing Collisions at Sea, 1972, as between the States Parties to the later Convention.

Report of the IMO Legal Committee

1. As envisaged in document C/EX. 12/6 the Legal Committee held its fifty-first session from 19 to 23 September 1983. The report of the work of the session is contained in document LEG 51/10.

2. A summary of the conclusions and decisions of the Committee on the session is given below.

Review of the limits of liability and compensation in the 1969 Civil Liability Convention and the 1971 Fund Convention

3. The Committee concluded its work on the preparation of two draft protocols for reviewing the limits of liability

and compensation and related provisions in the 1969 Civil Liability Convention and the 1971 Fund Convention. The Committee requested that the draft articles for the two protocols prepared by it should be collated and circulated in the usual way to the States and organizations to be invited to the diplomatic conference scheduled to be held in April/May 1984.

4. In considering the draft articles the Committee agreed that proposals for future revision of the limitation amounts provided for in the draft protocols should be submitted to and considered by the Legal Committee. In this connexion, it was noted that similar provisions had been adopted for many of the technical conventions and protocols of IMO and that responsibility for adopting amendments to those instruments had been satisfactorily exercised by the Maritime Safety Committee and the Marine Environment Protection Committee. It was furthermore noted that procedure was expressly envisaged in Articles 34(b) and 37 of the IMO Convention relating to the Legal Committee, and in the Rules of Procedure adopted by the Committee pursuant to those provisions.

Draft convention on liability and compensation in connexion with the carriage of noxious and hazardous substances by sea (HNS Convention)

5. The Committee undertook a final review of its work on the draft HNS Convention, which was substantially concluded at the forty-eighth session. The Committee noted and approved the documentation to be circulated by the Secretariat to the diplomatic conference in respect of the draft convention. In particular, draft final clauses for the convention which had been prepared by the Secretariat at the request of the Committee were considered and approved, subject to certain amendments. These draft final clauses are to be circulated to Governments for consideration in conjunction with the draft substantive articles.

IMO's meeting program

1 December 1983–31 December 1984

1983	
5-9 December	Marine Environment Protection Committee–19th session
1984	
16-20 January	Sub-Committee on Stability and Load Lines and on Fishing Vessels Safety–29th session
6-10 February	Sub-Committee on Fire Protection–29th session
13-17 February	Sub-Committee on Containers and Cargoes–25th session
20-24 February	Eighth Consultative Meeting of Contracting Parties to the Convention on the Prevention of Marine Pollution by Dumping of Wastes and Other Matter
27 February–2 March	Sub-Committee on Ship Design and Equipment–27th session
12-16 March	Sub-Committee on Radiocommunications–27th session
2-6 April	Maritime Safety Committee–49th session
30 April–25 May	International Conference on Liability and Compensation for Damage in Connexion with the Carriage of Certain Substances by Sea
4-8 June	*Sub-Committee on Bulk Chemicals–13th session
11-15 June	*Council–52nd session
	*Committee on Technical Co-operation–24th session
18-22 June	*Sub-Committee on Safety of Navigation–29th session
25-29 June	Sub-Committee on the Carriage of Dangerous Goods–36th session
9-13 July	*Sub-Committee on Standards of Training and Watchkeeping–17th session
3-7 September	*Marine Environment Protection Committee–20th session
10-14 September	Legal Committee–52nd session
17-21 September	*Sub-Committee on Radiocommunications–28th session
24-28 September	International Oil Pollution Compensation Fund–Assembly, 7th session
1-5 October	*Facilitation Committee–15th session
22-26 October	*Sub-Committee on Ship Design and Equipment–28th session
12-16 November	*Council–53rd session
26-30 November	*Maritime Safety Committee–50th session
3-7 December	*Sub-Committee on Bulk Chemicals–14th session
10-14 December	Legal Committee–53rd session
17-21 December	*Sub-Committee on Safety of Navigation–30th session

* Tentative

"Port Administration and Operation" PORT MANAGEMENT PROGRAM

March 26–April 20, 1984

The Export Development and Information Group at the World Trade Center/New York

The program begins in the participant's home country where he or she identifies an administrative or operational problem in one of the country's ports. It continues in New York with intensive study, on-site observations and workshops through which the problem is put into focus and possible solutions developed. The solutions are then discussed with experts in the field and prepared for presentation in the participant's home country. The program is structured as follows:

Conceptual Lectures

Port Operations

- Pilotage/Tugboat Operation
- Aids to Navigation/Channel Dredging and Maintenance
- Hazards to Navigation/Off-Shore Drilling
- Flood Control/Harbor and Waterfront Construction
- Port Security
- Safety Inspection of Vessels in Port
- Vessel Documentation

- Vessel Health Inspection/Quarantine
- Vessel Entry Procedures, Fees and Duties
- Export Licensing
- Cargo Inspection and Fumigation Requirements
- Pier Security
- Cargo Security
- Ship Repair
- Foreign Trade Zones
- Pier Operations, Including Cargo Handling Methods and Equipment for:
  - Break Bulk General Cargo
  - Containers and Ro/Ro
  - LASH
  - Bulk Cargoes—Petroleum; Dry Bulks; Chemical Bulks; LNG & PNG
- Electronic Data Processing/Communication Systems
- Public Warehousing and Storage/Reprocessing and Transformation
- Interfacing Between Ship and Inland Port of Origin or Destination
- U.S. Customs operations and procedures for vessel entry, testing, and contraband search and control.

Port Administration

- Planning and Organization
  - Port Planning
  - Organization of the Port Authority
  - Port Construction and Maintenance
- Port Finance
  - Computerization
  - Marketing and Statistical Research
- Personnel Management and Practices
  - Port Authority
  - Waterfront
- Port Promotion and Marketing Services
- Legal Responsibilities of Port Agencies
  - Liability
  - Relationships

Experiential Learning

On-Site Observations and Inspections

- Participate in a Port Orientation Program with port industry representatives, including helicopter inspection of facilities.
- Observe the operation of harbor dredge equipment, the engineering involved and work plans (if dredge is in operation during the program).
- At U.S. Coast Guard headquarters on Governor's Island, with Captain of Port and staff, inspect vessel traffic control methods and procedures and examine procedures used for maintenance of buoys, ranges and lighthouses.
- Observation of actual pilot boarding at sea buoy and methods and procedures up to and including final docking operations.
- Inspect fumigation chamber and procedures for pest and infestation control at Port Newark under supervision of U.S. Department of Agriculture.
- Inspect administrative procedures of the Port Newark Foreign Trade Zone and observe reporting and reprocessing operations.
- Inspect on-site procedures and all cargo boarding techniques together with equipment used in the Port of New York and New Jersey
- Inspect testing procedures, fireboat and other fire fighting equipment used in fire prevention in transit sheds and pier warehouses.

For further information about the program, contact:

Mr. Robert Keller, Director, Export Development and Information Group, The World Trade Institute/One World Trade Center, 55W/New York, NY 10048, U.S.A.

ITT Telex: 427346 NYANDNJ
WUI Telex: 620518 PANYNJ
Cable: WORLDTRADE NEWYORK
Telephone: 212-466-3248

Port Forum and Training Institute: Port of Marseilles Authority

The Port of Marseilles Authority is the leading port of France and the Mediterranean Basin in addition to being the second port of Europe. As such the P.M.A. seeks to develop relations with most of the port throughout the world.

The P.M.A. has implemented this by creating I.F.E.P. that is an organisation that the P.M.A. puts at the disposal of its national and foreign colleagues and that provides experience and know-how gained by P.M.A. staff. I.F.E.P. organises the study and development of port staff requirements, assistance and training programs.

I.F.E.P. is also an international forum and think tank for all those concerned in port design, construction, operation, management, maintenance and promotion in addition to the same themes for Industry-and-Port areas.

Organisation of I.F.E.P.

The Port Forum and Training Institute:

- is a permanent operational unit made up of organisation and training specialists integrated into one P.M.A. Department called S.R.I.S.F. (french acronym meaning Internal Relations and Training Service). This unit is responsible for studies and assistance for matters related to port staff requirements. It is also in charge of organising the training methods and logistics for training programs and liaises with other P.M.A. Departments and Services.
- is a perfectly adapted work tool for training activities as it is fitted out with training rooms that are equipped with all modern communication means and systems,
- is above all the entire P.M.A. staff potential capable of contributing experience gained in situ in contact with real live situations in all fields of port activity.

I.F.E.P. and the Study and Development of Port Staff Requirements

The PORT FORUM AND TRAINING INSTITUTE offers services in matters related to the study and development of port staff requirements via:

- port staff organisation studies,
- functional analysis of a port,
- job analysis,
- evaluation of qualitative and quantitative requirements,
- drawing up a training plan to meet these requirements,
- study of port training:
  - evaluation of qualitative and quantitative training requirements,

- drawing up a training plan to meet these requirements,
- study of port training structure to be set up or evaluation of existing training structure,

– assistance:
- consultancy missions regarding recruitment and training of port staff,
- drawing up port training programs,
- designing and developing teaching aids, especially audio-visual ones.

I.F.E.P. and Training Sessions

– Training sessions organised by the Port Forum and Training Institute are of two types: seminars and courses:
- Seminars are of short duration and intended for French and foreign management or top executives. Seminars can be held in Marseilles or abroad and are organised for up to about 20 trainees.
- Courses are of long duration and are intended for senior or junior staff and are organised for up to about 10 trainees. Courses take place in Marseilles.

These courses can be of two types:

– Seminars and inter-company courses meeting overall training requirements are scheduled each year at fixed dates and are intended for all organisations interested in port or maritime activities.
– Seminars and intra-company courses meeting specific training requirements are designed further to contacts with applicant organisation heads of staff and to detailed analyses of applications put in by prospective trainees. These courses are scheduled at dates requested by the applicant and can only take trainees sent by the applicant organisation.

The training courses go into all sectors of port activities:

– design, construction and maintenance of infra and superstructures,
– design acquisition management and maintenance of equipment,
– commercial operations on port facilities,
– port economy, planning and statistics,
– harbour Master's office,
– personnel management,
– safety and security (re-working conditions, property and human lives, prevention and combat of fires and pollution).

Courses are based on the following principles:

– acquisition of operational methods and behaviour,
– active trainee participation
– sessions are conducted by seasoned port staff,
– permanent readjustment of programs to match trainee requirements,

The language used for work sessions and documents (duplicate copies, brochures, visual and audio-visual documents) is french. On request, I.F.E.P. can organise training courses in any language.

For all requests for seminars or intra-company courses, send your letters to:

PORT AUTONOME DE MARSEILLE
INSTITUT DE FORMATION ET D'ECHANGES PORTUAIRES
23, place de la Joliette
13226 MARSEILLE CEDEX 02
Télex: 440.746 Portauto-Marsl.
Téléphone (91) 91 90 66 ext. 230

Publications

"Canada's Ports and Waterborne Trade" by Karl M. Ruppenthal, Centre for Transportation Studies, University of British Columbia

The book is divided into five sections: Canada's Exports; Canada's Imports; Canada's Ports; their traffic and operation; The St. Lawrence Seaway and the Ships. The port section describes the organization of Canada's systems of ports and their management and includes tonnage for the country's leading ports. Comparative data is offered for the last 10 years. Copies sell for $24 each (Canadian dollars): Centre for Transportation Studies, University of British Columbia, Vancouver, B.C. V6T 1W5. *(AAPAADVISORY)*

"Ships and Shipping of Tomorrow" by MacGregor Publications Ltd.

"The world of ships and shipping has during the past two decades seen technical and economic changes that are unprecedented in human history.

Economic needs and technological advances have led to the introduction of highly versatile and specialised cargo ships, which in turn have fostered spectacular technological advances in shipbuilding, cargo handling techniques and storage and warehousing facilities in the ports. They have encouraged the introduction of novel high-performance transport systems and there is no question that many of the unconventional technical ideas in shipbuilding, shipping and port operation will form the basis for future-developments. Air cushion vehicles, hydrofoil craft, multi-hull ships and nuclear propulsion are only a few which come to mind.

The "new look" ship

To what extent will the demand for maritime transport increase and what will the ships of tomorrow look like? What demands will the cargo handling and warehousing processes place on the cargo handling technology of the ports? How will future developments in ships and ports be able to meet the continuous increase in demand for transport capacity and the growing concern for the protection of the environment?

Authors

The four authors of Ships and Shipping of Tomorrow–Rolf Schonknecht, Jurgen Lusch, Manfred Schelzel and Hans Obenaus–are all scientists in the Faculty of Maritime Transport Economics at the Wilhelm-Pieck University in Rostock, DDR. They have attempted to provide answers to these and many other questions concerned with the world of maritime transport. In so doing they have set themselves a difficult–some would say an impossible–task, since world events have an unhappy knack of upsetting the most painstaking calculations and projections of the experts.

Nevertheless, the march of scientific and social progress is inevitable and delay by world events is but a hiccup along the way! The four authors present an impressive and scientifically-based picture of the development possibilities

for the ships and shipping of tomorrow—and perhaps even the day after tomorrow. With scientific conviction and authority they put forward proposals for completely novel ship types, cargo handling methods and equipment for the ports of the future as well as feasible organisational forms for maritime transport systems in the coming decades. They weigh up the advantages and drawbacks of solutions that are technologically and economically practicable, and at the same time show how it is possible to make use of scientific prediction."

Specification: 240 pages, 230 mm x 260 mm, 107 full-colour, 58 black and white illustrations and 42 tables. Printed on top grade Artpaper. Casebound in Buckram cloth and silver blocking on spine and front board. Full-colour laminated dust jacket.

@£18.00 per copy plus £1.62 per copy postage/packing for overseas (including Europe)

@£18.00 per copy plus £1.20 per copy postage/packing for U.K.

MacGregor Publications Limited, 50 Salisbury Road, Hounslow TW4 6JP, England

Brazilian ports news in brief

- Up to the end of the year all model tests of the two locks designed by Portobrás for the Tucuruí dam shall be finished. Each lock shall have a maximum difference in level of about 36 meters, placing them between the largest of the world.
- This year's program of the Brazilian Association of Port Entities shall place special emphasis on the discussions about debureaucratization and operational rationalization through cargo unitizing systems.
- With the conclusion of the dredging work in one of its loading berths, the Port of Itajaí will start to get new users and to expand its participation in the markets where it is already present, mainly exportation of chicken, sugar, wood, tobacco, textiles and cellulose.
- Codesp has been authorized by Portobrás to contract equipment by leasing, to improve its operational conditions, in a total of 25 sholvels and 15 tractors.

(PORTOS e NAVIOS)

Port of Montreal's publicity program

Publicity is as important to a major port as it is to any other business. In an operation which is faced with stiff competition, it is essential that a port's users be kept informed of its attributes. It is equally important that potential customers be made aware of the reasons why it would be advantageous to use that port.

This is particularly true of the Port of Montreal which successfully maintains a highly competitive position with Canadian and American Atlantic ports for business originating in Canada and the North Eastern and Midwest States. For this reason, port promotion and publicity are carried on vigorously by the Port of Montreal.

The promotional and publicity activities are varied and include press conferences, articles in specialized magazines, promotional tours, brochures, leaflets, an audiovisual presentation, publication of the Port Bulletin, advertising in selected publications, personal contacts and many other means.

Montreal attracts many different types of cargo. This means that publicity must be directed to people directly or indirectly engaged in a great variety of shipping. For example, those involved with general cargo have different interests to bulk cargo shippers. Consequently, the advertising approach must vary with the particular type of shipping activity at which it is directed.

In certain cases, where a limited number of shippers or consignees are involved, it is possible to handle publicity through a personal approach. This is especially true with regard to the handling of major bulk commodities such as grain and petroleum products, where the shippers or consignees are relatively few in number and easily identified.

When dealing with general cargo traffic, the approach is, of necessity, completely different. Montreal is the largest general cargo port in Canada and ranks well up among general cargo ports throughout the world. Due to the large variety of products handled and their widely spread points of origin or destination, the port's actual and potential users are numerous and with very different backgrounds. Also, the people who must be reached occupy different spheres of activity such as importers, exporters, freight forwarders, etc. Furthermore, it is necessary to keep customers in all parts of the globe informed. Due to all these factors, it has been found most practical to reach such a widely separated and varied group through printed communication methods.

The Port of Montreal advertising programs of past years have been evaluated to ascertain their impact. This study made it clear that our publicity efforts should be concentrated on certain markets, and more specifically at the container market.

The North Atlantic trade route is of the greatest importance to Montreal. It is also highly competitive. However, this port has proved that it is competitive for trade between North America and Europe, the Mediterranean and North Africa. Despite the fact that Montreal already has an important share of this business, our advertising has been concentrated in these areas, since they have the greatest potential for growth.

In 1981, most of our advertising was carried in specialized transportation magazines distributed mainly in Europe, while in 1982, we concentrated principally on the American Midwest. This year, our program is divided between Europe and the North Eastern and Midwest States. An important part of our advertising has always been aimed at our basic Canadian markets.

Our advertising has always stressed Montreal's strategic location in the heart of a great industrial region, yet closer to Northern Europe than any American port. Other advantages have also been pointed up. These include the frequency of service offered by regular shipping lines, the excellent Canadian rail and road network and first rate labour productivity and stability. Our most recent advertisement is reproduced in this issue.

Based on the number of enquiries received, our advertising program is considered to be highly successful and it is proposed to extend it in the future.

Port of Québec handles first ever export of wood chips

The first export of wood chips from the province of Québec has been loaded on board the Swedish vessel M/V Forest Wasa at the Port of Québec's Anse au Foulon facilities.

The 30,000 green ton shipment, (15,000 dry tons) destined for Finland was made possible by the ingenuity of the Québec Stevedoring Company, which operates a general cargo terminal at the Port of Québec, and Sovebec Inc., of Ste. Foy (Québec), a consortium of thirty-five Québec and New Brunswick lumber mills. Sovebec provides its shareholders with marketing expertise and research and development in forest products.

While markets have been improving for Canadian lumber producers since the beginning of 1983, the pulp and paper industry continues to be severely affected by the recession, reducing the domestic market for wood chips. According to Mr. Jacques Dion, General Manager for Sovebec, the surplus accumulation of wood chips in the province of Québec has reached at least 100,000 tons.

Faced with an ever-growing surplus of wood chips, Sovebec researched the international market and approached the Québec provincial government's Ministry of Energy and Resources to obtain an export permit.

The Québec crown corporation Rexfor has exclusive rights to market wood chips from the province abroad.

However, Sovebec was granted a permit to make a 30,000 tons overseas shipment of wood chips produced from privately owned forests.

Sovebec succeeded in arranging a sale to Finnish buyers with the assistance of Henderson Lumber Company Limited of Montreal, which had been working to export wood chips since 1975. The partners then tackled the transportation problem.

The five Sovebec lumber mills participating in the export of wood chips to Finland are all located on the lower south shore of the St. Lawrence River in eastern Québec and thus close to a number of small ports along the river. However, deep water, easy access for large ocean-going vessels and a direct link to eastern Québec's major highway system were key factors in the decision to ship through the Port of Québec.

With no existing facilities available to handle wood chips, Sovebec turned to the Québec Stevedoring Company to design a continuous unloading and storage facility for the 1,200 truckloads of cargo to be carried from the sawmills to the terminal at the port.

In the words of Mr. Denis Dupuis, President of the Québec Stevedoring Company, "we were called upon to create an efficient system without making the investment for a permanent facility and to provide rapid unloading for truck loads of wood chips".

Québec Stevedoring designed an ingenious dockside system capable of unloading and stockpiling up to six twenty-five ton loads of wood chips per hour: the truck backs its container over a metal platform, which is in turn lifted by a crane, dumping the wood chips onto the receiving area.

A bulldozer with a twenty-five cubic yard capacity bucket was used to move the chips into a storage pile.

The simple but effective unloading and storage system stockpiled the 30,000 ton shipment which rose to more than forty feet above nearby Champlain boulevard. The M/V Forest Wasa, a vessel specifically designed to carry wood chips, delivered the cargo to the Port of Rauma (Finland).

Sovebec affirms that an immediate market exists for 100,000 tons of Québec wood chips and believes that even after the Canadian pulp and paper industry fully recovers from recession, there will be surplus production available for international sales.

The Port of Québec and the Québec Stevedoring Company have demonstrated that should a decision be made by the Québec provincial government to authorize additional exports, the facilities and the expertise are available to efficiently ship woods chips from the province of Québec overseas.

User fee impact study

The American Association of Port Authorities has managed at long last, and not without some difficulty, to secure a copy of the $166,000 user fee impact study undertaken last December on behalf of the Department of Commerce. The consultant's report was finished early last summer, but its release has been held up by the Reagan Administration for what are now understandable reasons. In fact, we learned that the report was extensively edited by backstage bureaucrats. The reason for the Administration's nervousness is evidently the fact that the report's findings, if nothing else, seriously weaken its contention that its user fee concepts would have marginal impacts on U.S. waterborne commerce.

The report analyzes the economic effects of levying a 25-cent per ton user charge on U.S. foreign and domestic commerce to finance Corps of Engineers operations and maintenance costs for U.S. deepwater coastal and Great Lakes ports. The data base year is 1979. What the author's findings show is that while the user fee would indeed return some revenue to the federal government, there would, nevertheless, be perceptible negative impacts, not only on ports and shipping, but on port hinterlands and on the government itself. For the industries it would mean declines in sales, employment, income and cargo. Customs collections would also decrease, as would federal, state and local income and direct and indirect business taxes. Moreover, since U.S. exports would suffer to a greater extent than U.S. imports, the user fee would also have negative impact on the U.S. balance of trade.

The direct national impacts of the 25-cent charge, based on 1979 data as reported in the study, are summarized below:

Direct Impacts

	Port/Shipping Effects	Hinterland Effects	Total
Direct Sales (millions)	–$39.1	–$126.1	–$165.2
Income (millions)	–$77.2	–$182.9	–$260.1
Taxes (millions)	–$20.1	–$47.0	–$67.1
Commodity Balance (millions)	–$55.8	–	–$55.8
Customs (millions)	–$12.1	–	–$12.1
User Charge Revenue (millions)	$336.9	–	$336.9

Cargo (000s of Short Tons)	−9,512	−	−9,512
Employment (Jobs)	−3,267	−6,846	−10,113

If indirect impacts are counted, the economic losses would be considerably greater. For example, applying the appropriate multipliers to direct sales and adding that to direct impacts of −$26.1 million yields a total loss to the economy of $615.7 million.

On a regional basis, every port range and their hinterland would, according to the analysis, suffer to some extent, with the most severe impacts falling in the Gulf.

The author stresses that this is not a benefit-cost analysis. The measure of economic impact is not commensurate, meaning, for example, in some cases, there is a certain amount of double counting, which makes it impossible to sum them up for cost-benefit comparisons. Moreover, the analysis did not take into consideration how the user charge revenues might be used in the context of the federal budget.

While the study does not directly address the issue of cumulative impacts of all the various Administration-backed user fee proposals—something AAPA has advocated for many months—the author did assess the aggregate impacts of a dollar per ton user fee. What would happen in this case, the author says, is that impacts indentified in the 25-cent per ton scenario would be multiplied four-fold in every case—employment, direct sales, income, taxes, Customs duties, cargo and commodity balance.

The study was performed by the consulting firm of Bushnell, Pearsall and Trozzo of Troy, Michigan. It is expected to be released to the public soon.

(AAPAADVISORY)

CONTAINEPORT lunging forward

The Georgia Ports Authority announced recently that a record-setting two million tons of cargo will move through their CONTAINERPORT this year. Total container tonnage for calendar year '83 through September stood at 1,470,653 tons, up 362,023 tons from CY '82, a 32% increase.

A string of five record breaking months in the spring and summer of 1983 has contributed to the increased tonnage, as each month since February '83 has surpassed the "old record" of 146,545 tons set in May '82. This tremendous pace has produced record first quarter figures for FY '84 totaling 502,535 tons, a 41% increase over FY '83 and ahead of schedule for the two million ton/year mark.

However, Savannah is not content to sit back and watch the records fall. The 1984 opening of container berth 5 will further augment the already impressive facilities. The addition of berth 4 in 1982 spurred the tonnage marks now being recorded. With the completion of berth 5, total berthing will reach 4,675 feet served by 8 high speed cranes and backed up by 240 acres of paved storage, all in one centralized location.

Port activity is showing signs of steady improvement as the recession continues to weaken. Coupled with the constant growth of GPA's CONTAINERPORT facilities, the recovery will provide the impetus for breaking the two million ton milestone.

Houston foreign-trade zone application given approval

The Port of Houston Authority's application for a permit for a United States Foreign-Trade Zone in Harris County was approved recently by the Foreign Trade Zones Board. U.S. Congressman Jack Fields of Humble, Texas hand-delivered notification of the approval to Port Commission Chairman Fentress Bracewell.

Houston's zone is unusual in that it is comprised of multiple sites, making it the largest in the United States. All 29 sites and three expansion areas that were part of the original application were authorized without exception. Manufacturing operations involving steel or steel products are restricted to items produced for export only.

THE HOUSTON FTZ Corporation, under contract with the Port of Houston Authority, will manage the zone. The corporation has executives experienced in dealing with foreign-trade zones and international commerce in general.

(Port of Houston)

Introduction of recreation: Port of Los Angeles

It's not all work and no play around the Port of Los Angeles. In fact, leisure-time use is an important part of the development of the harbor, where a veriety of attractions and activities draw millions of tourists and funseekers every year.

Los Angeles is known for its modern marinas, anchorages and moorings for thousands of small craft, and more of these are on the drawing board. Additionally, the Port encourages the recreational sharing of the waterfront—from planned tours of harbor facilities to setting aside dock space for recreation.

Inside the breakwater there is room for sailing, boating, scuba diving, water-skiing, swimming, and just plain sightseeing. Sportfishing centers provide small-boat rentals, boat-launching ramps, deep-sea fishing, restaurants, cafes, and snack stands—all with vantage points for watching world commerce pass by.

About 3,000 feet of waterfront are devoted exclusively to recreational use and tourist attractions at the Port of Los Angeles.

Within the waterfront area of Berths 75-83, is the famous Ports O' Call Village, where cobblestonned streets front quaint shops featuring exotic merchandise, all resembl-

ing an early California village. Near, and within the Village, are the popular Rum Runner restaurant and the Ports O' Call restaurant, both established Southern California attractions, the latter is renowned for its Polynesian entrees.

South of the Ports O' Call Village is Whaler's Wharf, a replica of a New England whaling village, and the Yankee Whaler Inn, a bit of transplanted Cape Cod atmosphere serving delicious seafood flown in fresh each day.

Just across the Main Channel from Ports O' Call Village is the Princess Louise floating restaurant, a former passenger liner that operated for many years between British Columbia and Alaska. The Princess features a museum-like exhibit of shipboard life of the 20s, unique shops, and a replica collection of the Crown Jewels of England, in addition to entertainment and gourmet cuisine.

For the more adventuresome, two major sportsfishing facilities can be found at the Port of Los Angeles. They are:

San Pedro Sportsfishing at Berth 79, (547-9916), which operates seven days a week and offers all-day and three-quarter day fishing excursions, in addition to scuba diving boats. The facility also includes a bait and tackle shop, fish market and restaurant.

Further down the harbor is Twenty-Second Street Landing at Berth 36, (832-8304), which specializes in fishing and charter boats ranging from three-quarter day on up. The company has boats of all sizes to fit any recreational need from scuba diving to fishing and touring. The facility includes a tackle shop, fish market and restaurant.

In addition, a 950-slip Cabrillo Marina is planned for future construction, which will double the present beach size; setting aside areas for youth camping activities, boating and fishing services, shops and a restaurant.

Also on the planning board is a new park called "Window on the Water." It will occupy two-and-a-half acres and extend along the Harbor's main channel near the old Ferry Building. The park will include a sea wall promenade, flower gardens, walkways and benches.

Presently being developed by the Harbor Department is a Bikeway for use and enjoyment by cyclists riding to work or simply touring the Harbor for recreation.

The dynamic nature of the Port of Los Angeles makes it unique not only as a shipping center but as a tourist and recreational attraction as well.

Long Beach Container Terminal dedicated

Long Beach Container Terminal, Inc., the seventh and newest such facility in the Port of Long Beach, was officially dedicated before hundreds of maritime industry representatives at its 53-acre site at Berths 243-244 on Pier J. A public container terminal with two 40 long ton cranes, six transtainers and a sophisticated computer system, LBCT currently serves Orient Overseas Container Line, Korea Shipping Corporation and Neptune Orient Lines. This facility bring to 450 acres the total containerized cargo capability of Long Beach, which is now the West Coast's busiest container port behind New York/New Jersey and No. 6 in the World.

Cargo tonnage increases at South Locust Point Terminal: Maryland Port Administration

Cargo handled at the port of Baltimore's South Locust Point Marine Terminal increased nearly 11 percent for the first three quarters of this year over tonnage reported for the same period in 1982, according to the Maryland Port Administration.

The terminal handled 529,925 tons of cargo for the period. Comparable cargo handled last year stood at 477,565 tons.

Steel cargo at the terminal jumped 66.7 percent for the period, from 31,583 tons reported in 1982 to 52,653 tons shipped this year. General cargo increased 16.5 percent for the period, from 55,895 tons handled last year to 65,139 tons this year. Container cargo showed a 7.8 percent increase for the period, from 283,152 tons handled last year to 305,296 tons shipped so far this year.

Port makes $3.2 billion economic impact: Port of Oakland

The Port of Oakland area makes a massive $3.2 billion annual contribution to the economy of the Bay Area, according to a new economic impact study of the Port's business operations.

The businesses include the Port's three prime operational and revenue-producing divisions–the Port, Oakland Airport and commercial properties.

The study indicates that by far the largest provider of jobs is the properties division, which enjoyed a net increase of 38 percent over a 10-year period and generated 5,034 new jobs, for a total of 11,159 jobs.

Overall Port area employment increased during the past decade, despite the recession, from 23,059 to 28,982.

There were relatively minor increases in the number of jobs at the airport and in the maritime division with most of the new jobs accounted for by properties department developments–office buildings, restaurants, hotels and motels, and the many new businesses that have located in

the Port's Business Park, Embarcadero Cove, Jack London Square, and the Tidewater/Tidal Canal area.

Employment at the airport increased slightly, from 5,462 to 5,646 over the 10-year span, and at the Port from 4,448 to 5,368. This latter figure includes some 727 positions with shipping lines located outside Port property, but within the City of Oakland. Their existence in Oakland is directly related to the Port's maritime operations.

Army and Navy port installations, and the Southern Pacific and Union Pacific Railroad operations account for a total of 6,809 jobs, down slightly from the figure of 7,024 a decade ago.

The survey also found that 23,499 Oakland jobs are indirectly attributable to Port activity, for a total of 52,489 fulltime positions related directly, or indirectly, to the Port of Oakland.

Total payroll for direct and indirect Port of Oakland employment is more than $1 billion a year. The average annual salary is $19,525. The $3.2 billion impact on the Bay Area economy relates to the total sales of Port area businesses.

The Port area, as defined in the study, and as designated by City Charter and the State Lands Commission, embraces some 20,000 acres of land along the waterfront between the Emeryville line, just north of the Bay Bridge, and the San Leandro line, some 19 miles to the south.

(Port Progress)

Business sparks two construction projects: Port of Portland

Two new construction projects resulting from increases in business at the Port of Portland have begun this summer and will be completed before the end of the year.

A new roll-on/roll-off dock (ro-ro) being constructed at the Port of Portland Terminal 4 will be ready for operation by the end of November. The project, which will cost an estimated $360,000, gives the Port the capability of handling the largest ro-ro vessels now being used in the trade. It will also allow an alternative for steamship customers during the planned rehabilitation of the Port's present ro-ro facility at Terminal 2.

The other project, two new rail spurs at Portland Terminal 6, comes about as a direct result of dramatic increases in the Port's intermodal container business.

The new rail spurs were approved at a recent Commission meeting and increase the Terminal 6 rail switching capabilities by almost 75 percent. This will allow further expansion in the Port's intermodal program which has already grown almost 400 percent during the past year. Total cost of the project is estimated to be $403,000. *(Portside)*

Port and railroad handle record movement of containers: Port of Seattle

The Port of Seattle and the Union Pacific railroad (UP) recently handled a record movement of Far East containerized consumer goods bound for Midwest and East Coast markets, a dramatic example of broad growth in Port business in 1983. About 1,700 containers were unloaded from seven ocean-going containerships at three Port of Seattle terminals.

From the Port's waterfront facilities, the containers were trucked four miles to UP's intermodal railroad yard, where they were assembled into 50- and 60-car "unit" trains. Union Pacific used 832 railroad flatcars to handle the move. Five 60-car unit trains were assembled with containers from three American President Line ships. Two other unit trains and a total of 23 trains moved the containers from the seven vessels. According to UP, this was the largest number ever of successive UP unit trains moving from the Pacific Northwest to inland markets.

Container traffic through the Port in the first four months of 1983 was 240,000 TEUs—nearly seven percent increase over the same period in 1982. First quarter container cargo *volume* increased about eight percent to 1.1 million metric tons. Port of Seattle Executive Director Richard D. Ford cites the improving economy and recent expanded steamship service to the Seattle harbor as reasons for the upswing. *(TRADELINES)*

Record SPA container tonnage

The Port of Charleston's container volume has attained record levels for five of eight months in Calendar 1983 for a total of 1,556,188 tons, a solid nine percent gain over the corresponding period of 1982.

The nation's eight-ranked container port, coming off a record 1983 fiscal year (ended June 30) which broke the two-million-ton mark, appears certain to reach the 2,200,000-ton level for Calendar 1983, a mark which would easily be the port's highest-ever total container volume for a calendar year.

The Port of Charleston's pre-1983 container volume record for a single month (181,353 tons, established in March, 1979) was surpassed six consecutive times from March through August of this year. Only the April 1983 volume of 190,047 tons (6,817 tons less than the March, 1983 volume of 196,864 tons) prevented the port's scoring six consecutive monthly records for the first three quarters of Calendar 1983.

In terms of TEUs (twenty-foot-equivalent units), the port averaged 29,970 per month for a total of 239,759 units during the first eight months of 1983.

Two factors prominent in the gains made by the South Carolina State Ports Authority through its container activities are its new Wando Terminal and its electronic documentation processing system, ORION.

The Wando Terminal, with its four container cranes, 115-acre paved container marshalling area, and 2,740-foot berth, has been serving five container lines which, between January and August of this year, throughput 28 percent of the port's total TEUs.

Viewing possible change: Port of Charleston

A change in the method of handling containers at dockside may be in the offing for the State Ports Authority. It would necessitate the purchase of large, specialized equipment for stacking containers five high—40 feet or more.

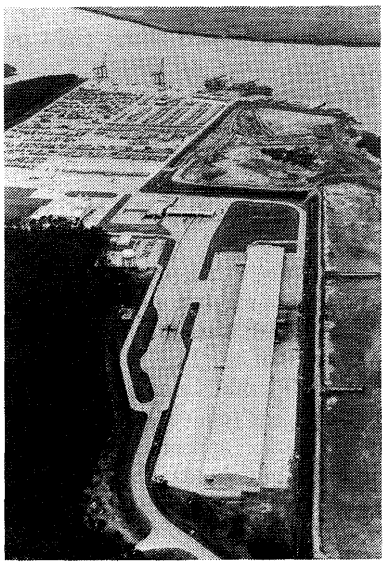
The information was conveyed to the SPA board at its

August 10 meeting by Executive Director W. Don Welch. He said that stacking units cost up to $2.5 million and are used extensively at many other ports, particularly in Japan.

Several containership lines are seeking to decrease the need for storing the boxes on chassis after discharge and before loading. A stacking system would enable quicker offloading and loading while minimizing dock congestion by truck traffic, the lines explained.

Specific recommendations about the proposed system will be presented to the board at a later date, Mr. Welch said.

A recent airscape of Wando Terminal



The Port of Charleston's Wando Terminal, serving five container lines with its four cranes, 2,740-foot berth, 115-acre container marshalling area and 200,000-square-foot container freight station, is the newest of the port's four terminals. The South Carolina State Ports Authority's only pure container facility, the Wando Terminal has handled 29 percent of the Port of Charleston's container throughput during the first eight months of 1983.

Tacoma gains new shipping line

Port of Tacoma Commission Vice President Jack A. Fabulich announced recently that a new liner service will start calling at Tacoma. National Galleon Shipping Corporation, the independent Philippine flag carrier, has scheduled three vessels to call at the Port of Tacoma during the next few weeks.

Galleon offers direct service to Busan, Manila, Hong Kong, and Taiwan every nine days, and also calls at Los Angeles and San Francisco. Galleon vessels are equipped to handle breakbulk and container cargo.

Hamburg — an important European coffee distribution centre

Hamburg handles over 400,000 tones of coffee imports annually and in the first four months of this year was able to extend its leading position in this commodity market. Compared with the same period in 1982 imports of beans jumped up 9% to almost 150,000 tonnes. But volume alone is not the only factor indicating that Hamburg as a discharge, warehousing and distribution centre for coffee is gaining in attraction.

Coffee is handled in Hamburg all the year round since the cultivation areas stretch from 23 degrees north to 25 degrees south of the Equator, giving various harvestring periods. Main sources of supply for Hamburg are Columbia, Brazil, Kenya, El Salvador, Guatemala and Tanzania.

Although most consignments are shipped conventionally containerisation is growing in importance in this trade. About 43% of Hamburg's general cargo handled is in boxes. About 38% of coffee imports are handled in containers and by the end of next year this figure is expected to jump to 60%, since other producer countries are turning to this carriage mode.

Hamburg is not only an important port for coffee imports into West Germany but plays an important role as a transit port for this commodity, particularly for Scandinavia, the Comecon nations, Austria and Switzerland. Cargo handled for third countries in the January/April period increased to 68,000 tonnes from 39,000 tonnes in the same period in 1982.

First piers for the storm surge barrier placed in position: Ministry of Transport & Public Works, The Netherlands

A start was recently made on placing the piers for the storm surge barrier in position in the mouth of the Eastern Scheldt. The rist piers were placed in the northern channel, where will ultimately be 16. This job has to be done at low water, since it is then that there is least interference from currents: the first two piers therefore had to be positioned at night, which was no problem since modern position-finding equipment is very accurate.

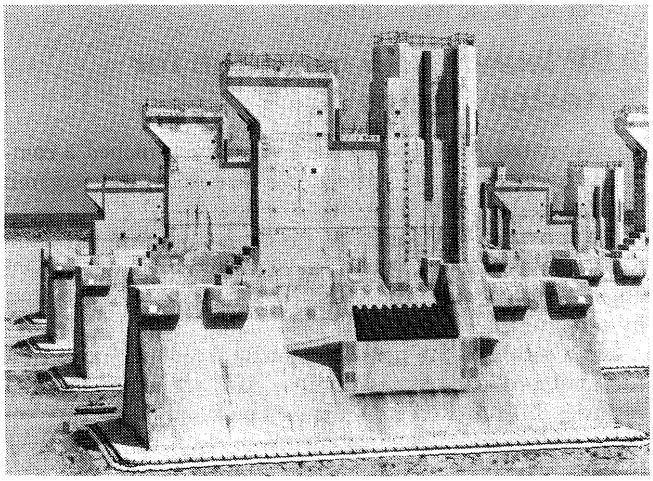
All sixteen foundation mattresses (200 x 42 metres) have now been rolled out on the seabed in the northern channel, using the purpose-built Cardium. Each mattress is covered with another mattress measuring 60 x 30 m, in order to provide sufficient support for the piers, which weigh up to 18,000 tonnes.

The lifting barge Ostrea placed the first pier close to the coast of the island of Schouwen, and the second pier close

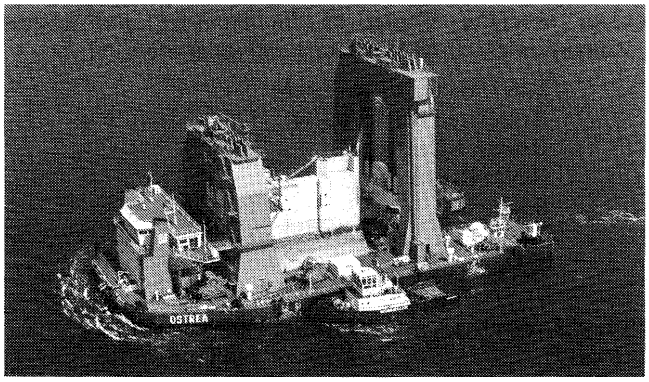
to the first. The positioning was accurate to within a few centimetres and was well within the permissible margin. A start has now been made on dumping layers of gravel and imported rocks round the base of the piers, underwater, so as to ensure that they remain stable. The last of the 66 piers in the three channels will be placed in position by late 1984. At the moment mattresses are being laid in the middle channel. One or two piers are positioned each week, depending on the weather. The seabed between the foundation mattresses is covered with a special protective layer.

Starting in April 1984, the piers will be connected by means of prefabricated hollow concrete sections laid across the top, over which a road will eventually run. Once the storm surge barrier has been completed, road traffic will be able to travel direct between the islands of Schouwen-Duiveland and North Beveland.

A start was recently made on producing the 63 steel gates for the barrier. According to present planning, the first will be hung in position in August 1984. The gates will vary in height from 6 to 12 metres, depending on the depth of the channel, and each will be approximately 42 metres wide. They will move up and down in grooves in the sides of the piers. When all are in the down position, the Eastern Scheldt will be closed to the North Sea, but the barrier will only be shut when exceptionally high water levels are anticipated along the dykes on the islands of Zeeland. Under normal circumstances the gates will be kept open so that tidal movement can be preserved between the North Sea and the Eastern Scheldt. In this way the environment and fish stocks can to a large extent be preserved



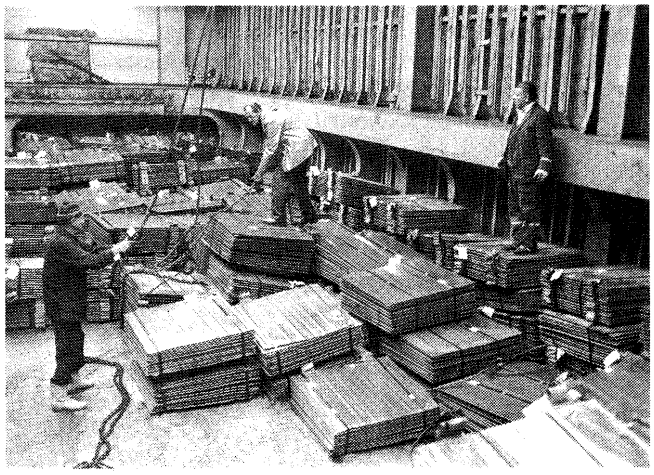
18,000-ton pier blocks



The lifting barge OSTREA

The whole project, which is currently expected to cost over seven billion guilders in total (including secondary dams, locks, sluices, canals etc.) will be completed in 1986 or 1987.

Encouraging bonus wage test for dock labour: Port of Gothenburg



A bonus wage system is currently being tested at the Gothenburg, Sweden port labour scene. Halfway through the testing period, the system seems like a success. Stevedoring productivity has improved by nearly ten per cent.

One prominent quality of the system is that the monthly wage including bonus can never fall below the earlier straight monthly wage. (Gothenburg stevedores quitted piece-work in 1970, when monthly pay was introduced).

Another characteristic is that all bonus money is put into a pool and then apportioned to the dock workers according to their respective number of working hours during that specific month.

The system is built around nearly 60 productivity readings, one for each kind of work. Usually, there is one such reading for every shipping line using the port.

The base reading is defined as the mean productivity achieved during the January–August period in 1982. Whenever the number of tons or units per man-hour exceeds this base reading, a bonus is created.

A Gothenburg Stevedoring Company official said at the introduction of the system in April that there is room for a productivity increase of 20 to 25 per cent in the port. This would give a full-time dock worker a 13-per cent wage increase compared with the straight monthly wage.

The system has an accumulative effect built into it. For instance, bad productivity in one sector will harm that month's bonus, but also that of the following five months. Thus, an incentive for keeping a high and steady productivity is created.

According to a company spokesman, one of the major benefits of the bonus system is the interest it has created among dock workers for smooth, well-planned loading and unloading operations. Consequently, there is much more pressure now on the operations planning department from the part of the dock workers.

Another benefit is the possibility to analyse productivity of each loading or unloading operation. The reporting system needed for the bonus calculation has proven an

excellent tool for pin-pointing productivity flaws and take quick measures against them.

Some of the more prominent productivity boosts since the bonus system was introduced relate to the loading of export cars (productivity up 33 per cent) and certain trailer-based ro/ro operations (+35 per cent).

But also a large section of the Skandia container terminal, handling a number of deep-sea container lines, has achieved better productivity. Section management at first did not think that the bonus system would mean any improvement, since productivity had already been increased by 12 per cent during 1982. However, after three months under the bonus system, productivity had improved by another 15 per cent.

500 Scandinavian and Finnish industrialists and shipping people discussed transoceanic cargo traffic at "Gothenburg's Harbour Day"

In Gothenburg, about 500 shipping people and representatives of Scandinavian and Finnish industries took part in "Göteborgsk Hamndag 1983" (Gothenburg Harbour Day 1983) on Sept. 29th.

The main theme for the conference, held at the Park Avenue Hotel in Gothenburg, was how to maintain direct calls at Scandinavia of the large transocean liner companies especially when the new generation of extra large ro-ro-and container ships come into service.

Mr. Per Bjurström, head of the Port of Gothenburg as well as of the Gothenburg Stevedoring Co., said it was a mutual interest for industry in this northern region and Gothenburg as the largest Scandinavian port (and the base port for the present transocean traffic) to concentrate this traffic to Gothenburg. If it was split up, there would be a risk, said Mr. Bjurström, that the large transoceanic shipping lines would stop to call at any Scandinavian port in the future as they might find the goods quantity insufficient for a direct call.

Transhipment links to and from the industries to some large port on the Continent would mean considerably higher transport costs. It is estimated that this could cost the industry as much as about one billion Swedish Kronor ($128 m) per year, Mr. Bjurström said.

Other speakers at the conference underlined the trend towards a completely new situation on the transocean liner traffic field, the problems involved in the taking in use of the UNCTAD code, profitability for Scandinavian shipping companies and other questions.

ABP announce £400,000 container investment at King's Lynn

Associated British Ports is to invest £400,000 in equipping its East Anglian port of King's Lynn with a new container terminal.

The terminal, scheduled for completion by the New Year, will be built on a secure, two acre concreted site in the port's Bentinck Dock. Equipment will include a high speed heavy lift crane and a fork lift truck of 48 tonnes capacity, fitted with fully automatic spreaders. The dock is rail served and can handle freightliner traffic.

The port already has a weekly container liner service to Northern Europe and the new terminal will provide the necessary capacity to establish King's Lynn as a major centre for short sea container trades.

Situated on Britain's East Coast, within easy reach of the Midlands, King's Lynn is well placed for trade with Northern Europe and Scandinavia. The UK's container trade across the North Sea continues to show healthy growth despite the recession and the new terminal will help cater for this growth.

Announcing the new development during a ceremony to mark the centenary of the Bentinck Dock, ABP Chairman, Keith Stuart, commented: "We have spent £1.4 m over the last decade in new capital projects at King's Lynn, and this significant additional expenditure demonstrates our confidence in the port's future".

ABP launch new campaign for Research Centre

Associated British Ports have recently launched a campaign to attract new business to their scientific research laboratories at Southall in West London.

Scientists at ABP Research, (as the former ABP Research Station is now known), undertake studies in hydraulic civil engineering commissioned both by ABP's own ports and by other organizations.

As a result of the new commercial freedom enjoyed by the group following privatisation, ABP are expanding the facilities of the Research Centre, enabling it to take on more projects from external clients.

The scope of the Research Centre's work, and the facilities available to clients, are described in a new full-colour brochure. Copies of the brochure, and further information about ABP Research, are available from:

The Director of Research,
Associated British Ports,
Research Centre,
Hayes Road,
Southall,
Middlesex. UB2 5ND

The scope of ABP Research

Hydraulic modelling	Dredging and siltation studies
Barrages	Accretion problems
Basins	Density currents
Berths	Drag-head design

Hydraulic modelling
Breakwaters
Coastal protection
Docks
Feasibility studies
Fenders
Flood alleviation
Flume tests
Harbours
Intakes
Jetties
Locks
Marinas
Offshore installations
Open channels
Pipeline protection
Port structures
Reclamations
Siltation problems
Ships
Spillways
Tidal models
Training walls
Waves
Weirs

Hydrographic surveying
Bathymetric surveys
Bed density measurement
Channel surveys
Chart preparation
Current metering
Echo sounding
Electronic position fixing
Field studies
Float tracking
Flow measurement
Isovels
Navigational studies
Precision surveys
Reservoir surveys
Rivers
Salinity measuring
Silt metering
Tidal information
Tide gauging
Tracer studies
Wave recording

Dredging and siltation studies
Dredging
Erosion studies
Estuaries
Fluid mud
Flux/velocity relationships
Grab dredgers
Historical chart analysis
Hopper loads
Impounding
In-situ material
Maintenance dredging estimates
Particle size analysis
PIANC
Pneumatic barriers
Pumped spoil
Regime changes
Sandbanks and channels
Sediment
Siltation rates
Sluicing
Spoil ground
Suction dredgers
Tracer studies
Track plotting

Other services
Appraisals of engineering problems
Data recording and logging
Desktop computing
Docking aids
Dust sampling
Experimental design
Force measurement
Heavy metal pollution
Hire of facilities
Instrumentation
Library and information service
Noise measurement
Numerical modelling
Photograph
Pilot studies
Port development
Ranging of ships
Report preparation and printing
Sponsorship
Ship handling and manoeuvrability
Statistical and probability analysis
Strain gauging
Ultrasonic berthing aids
Underwater package
Video facilities
Wave height forecasting

Improvements to Tees Dock's ro/ro terminal costing nearly £0.5 million authorised

The Board of the Tees and Hartlepool Port Authority has given the go ahead for a further large area of the terminal to be concrete paved–some 14,000 sq metres in all.

The terminal, which is partly paved at the moment, is equipped to deal both with low level ship/terminal trailers and conventional TIR trailers.

Long-established ferry services at the terminal are Ferrymasters' twice-weekly service to and from Sweden and Polanglia's weekly run to and from Poland. Now a new ferry service, Mercandia North Sea Lines, has started operations calling twice a week to and from Denmark. Ferrymasters will be a key customer for the new Danish flag ro/ro service.

Docks Director Neville Britton sees the improvements as important to the future prosperity of Tees Dock which is geographically well placed to serve ro/ro markets in Germany, Scandinavia and the Baltic ports. He is hoping to attract more business from these markets for tonnage generated in the northern half of the UK.

Tees Dock which had been losing £2 m annually has been having a very successful year–it is now profitable with a greater mix of business and workforce numbers at about the right level.

Export sugar trade for Brisbane

A bulk raw sugar export terminal will be built on the banks of the Brisbane River at Colmslie.

The $36 million project was announced on October 3 by the Premier (Hon. J. Bjelke-Petersen) and the Maritime Services Minister (Hon. J. Goleby).

The site is the old abattoirs property, fronting the Quarries Reach and covering about 7.5ha. The terminal will be financed by the Queensland Sugar Board under the terms of the Harbours Act (facilities for loading sugar in bulk). The arrangement is that the terminal and facilities will be signed over to the ownership of the Port of Brisbane Authority which in turn will lease the facility to the Q.S.B. for a "pepper corn" rental.

The terminal will handle excess raw sugar production from south east Queensland and northern rivers area of New South Wales for inter-state refining.

Initial storage capacity will be 60,000 tonnes with provision to increase to 120,000 tonnes and a throughput of 360,000 tonnes by the year 2,000.

Thevenard study now underway: Department of Marine and Harbors, South Australia

A feasibility study is underway into the provision of a deeper and wider shipping channel, swinging basin and deeper twin berths to accommodate larger vessels in the bulk trades at Thevenard, Sough Australia's most westerly deepsea port.

The study was announced by the Minister of Marine, Roy Abbott, MLA, following an inspection tour of west coast ports during early September. He was accompanied by the Director-General of Marine and Harbors, John Griffith, and other members of the departmental executive.

Discussions were held with the Mayor of Ceduna, Des Whitmarsh and with the State Member for Eyre, Graham Gunn, MLA.

The proposed project would cost around $4.5M and may begin in 1984. It would take about six months to complete, using the department's bucket dredge A.D. Victoria and the two dump barges John Sainsbury and Denis O'Malley, currently engaged until the end of 1983 on a similar project at Port Pirie.

Increasing gypsum shipments from large deposits at Lake Macdonnell, just west of Ceduna, and the need to accommodate larger vessels in both the gypsum and grain trades, are the main reasons behind the investigation.

"Thevenard is one of our major deep sea ports", Mr. Abbott said, "and we must be prepared to move with the

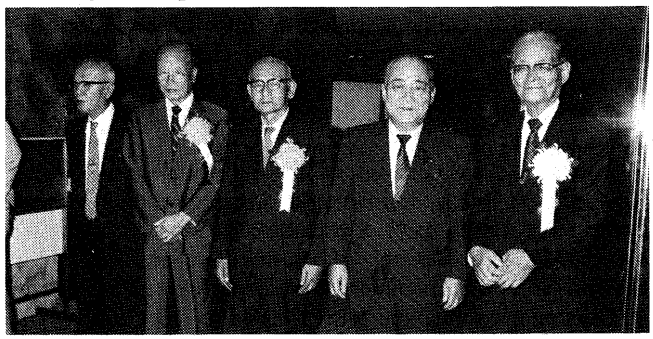
times. During the last peak season of 1979-80, Thevenard shipped out 0.47 m tonnes of grain, 0.56 m tonnes of gypsum and 0.08 m tonnes of salt. In 1982-83, these tonnages were severely pruned by drought and world recession, so Thevenard shipped out only 0.09 m tonnes of grain, but gypsum shipments had risen to 0.8 m tonnes and 0.09 m tonnes of salt was also exported for a total of 1.0 m tonnes. Undoubtedly, gypsum shipments would have been even higher, but for the effects of the world economic downturn.

"However, we are faced with another peak year in 1983-84, with grain exports likely to reach around 0.5 m tonnes and gypsum about 0.9 m tonnes", the Minister added.

South Australia is Australia's largest miner and exporter of gypsum and the Lake Macdonnell deposits are among the largest in the world.

Japanese port circles get together to celebrate Mr.Akiyama's commendation

Mr. Akiyama expresses his thanks to all the participants.



From left to right: Dr. Hajime Sato, IAPH Secretary General; Mr. Gengo Tsuboi, former Executive Committee member of IAPH; Dr. Shizuo Kuroda, IAPH Founder Honorary Member; Mr. Kichizo Hosoda, a member of the House of Representatives and Mr. Akiyama.

On the evening of October 6, 1983, some 200 people gathered together at the Nippon Kaiun (The Japan Shipping) Club in Tokyo in honor of Mr. Toru Akiyama, IAPH Secretary General Emeritus and the President of the IAPH Foundation.

The party was given by Mr. Akiyama's friends and associates in both official and business circles to celebrate the high recognition Mr. Akiyama received from IAPH at the recent Conference in Vancouver for his long and meritorious service to the Association.

Dr. Shizuo Kuroda, President of the Japan Port Consultants Association and former Deputy Secretary General under the late Mr. Gaku Matsumoto, in an address on behalf of all the participants, expressed his feeling that Mr. Akiyama's commendation was indeed a great honor not only for the recipient himself but also for everyone in Japanese port and transportation circles, which have backed up the activities of IAPH. Mr. Masajuro Shiokawa, former Minister of Transport and several other prominent personalities from both Houses of the Diet were there to say "congratulations" to Mr. Akiyama in person.

Port of Osaka news in brief

Foreign trade strong, container up sharply

The volume of cargo flowing through the Port in the first half of 1983 (Jan.-June) reached 41,290 thousand tons. All foreign trade rose by 4% over the same period last year, while container cargo rose by 18% reflecting the start of service over new sea routes.

Unit: 1,000 tons

Port of Osaka First Half Result		( ): $\frac{1983.\ 1\sim6}{1982.\ 1\sim6} \times 100$	
	In	Out	Total
Foreign trade	3,769 (104%)	6,784 (105%)	10,553 (104%)
Containers	1,684 (111%)	1,424 (128%)	3,108 (118%)
Domestic trade	11,038 (94%)	19,699 (94%)	30,737 (94%)
Total		41,290 (96%)	

Nanko Bird Sanctuary Opens

A 19.3 ha bird sanctuary has been opened to the west of Nanko's north wharf. The sanctuary consists of 12.8 ha of tideland that fill with water at high tide, and 6.5 ha of land vegetation. Bird watching can be made from 20 km of paths and from an observation cabin or two observation areas.

The observation cabin features a telescope and explanatory panels. The sanctuary is expected to provide enjoyment watching waterfowl in their natural habitat throughout the year.

Aomi Container Terminal nears completion: Port of Tokyo

When searching for a fast, efficient container terminal to meet your shipping needs in Japan, remember the Port of Tokyo provides a wide range of cargo-handling facilities.

The Port of Tokyo currently has two main container facilities, the Oh-i and Shinagawa Container Terminals, equipped with 10 berths and a total quay length of 2,858 m (4,431 ft.). With a total area of 862,283 sq.m (213 acres), they rank among the world's largest cargo-handling facilities.

Keeping abreast of further containerization, a third terminal, the Aomi Container Terminal, is under construction and the No. 1 berth will be in operation in 1985.

This terminal, situated in the southernmost section of the Aomi Terminal and facing the Oh-i Container Terminal, is part of the Port of Tokyo's efforts to prepare for advances in marine transportation in the coming years.

The Port of Tokyo can respond quickly and provide the best in facilities to meet your container-handling needs in Japan.

Outline of the Aomi Container Terminal

1. One 300 m (990 ft.) long berth is already complete at the No. 1 Aomi Container Terminal. Two gantry cranes and container yards will be installed in 1985.
2. The total area of this terminal is 105,000 sq.m (26 acres), which can be subdivided to conform to the user's requirements.
3. Construction of an adjacent second container terminal with the same capacity as the No. 1 berth is now planned. This new terminal will be built according to your needs.
4. This terminal is located only 10 kilometers from the center of Tokyo and is connected to the coastal highway. It will be a big aid in cargo booking while minimizing the use of inland transportation.

Standard Principal Specifications of the Terminal

1. Quay	
(1) Length	300 m
(2) Water depth	−12 m
2. Terminal	
(1) Water depth	−12 m
(2) Width of basin	300 m
3. Total terminal area	
(1) Surface area	105,000 m^2
4. No. of cranes	2
5. CFS	
(1) Floor area (inside area)	6,000 m^2
6. Maintenance shop	800 m^2
7. Administrative building	1,200 m^2

Capital expenditure for port development in 1984: Port of Singapore

The PSA has budgetted a total of $357 million as its capital expenditure for 1984. Of this total some $293 million are to be spent on existing projects and $64 million on new projects. With a net surplus of $308 million, there is thus a deficit of $49 million.

Despite this however the Authority has decided not to proceed with the tariff revision this year. This is prompted by concern not to further burden the shipping community which is still facing the effects of the world-wide recession despite a general improvement in overall economic conditions. Nevertheless operating costs continue to rise, as reflected in the general spate of increase in rates in the other sectors of shipping. Therefore, efforts will have to be intensified to keep operating costs in port operations, especially labour costs, to a minimum if we are to defer the tariff adjustment as long as possible.

However, long range development plans cannot be postponed if the port is to maintain a high level of service, when trade picks up. The Capital Expenditure for 1984 can be grouped under 3 categories:

I) On-going projects
II) Upgrading of Facilities
III) New Projects

I. Projects already underway

The most significant of these are:–

a) The Container Terminal development projects expenditure for which in 1984 alone would amount to $41.5 m. This includes the conversion of the two conventional berths at Keppel Wharves into Container berths measuring 550 metres. The first berth has been operational since July this year. The second berth is expected to be ready in Sep 1984.

The berths will have a back-up area of some 27 hectares, obtained by filling up two dry docks and demolishing a few blocks of flats at Blair Plain. The back-up space will be ready around January 1985.

The total cost of the whole project is about $220 million. When the project is completed in 1985 the Tanjong Pagar Container Terminal will occupy an area of approximately 100 hectares, and can then accommodate over 60,000 TEUs at any one time. There will then be nine container berths. These will enable the Container Terminal to meet its container traffic projected up to the 1990s.

b) Development of two 10-story warehouses at the junction of Alexandra and Pasir Panjang Roads. This will provide the PSA with an additional 128,000 sq m of warehouse space, and enhance its efforts to promote Singapore as a distribution and warehousing centre. The project costing nearly $100 million is expected to be ready by late 1984.

c) The construction of PSA's 42-storey headquarters–the PSA Building at Pasir Panjang/Alexandra Roads is scheduled for completion in 1985.

II. Upgrading of Facilities

The major items are:–

a) ferry terminal at WTC

b) exhibition facilities at WTC–a new exhibition hall to cater for the growing needs of exhibition organisers and improvements to Hall No. 3.

c) canteen, restroom/toilets at the wharves

d) a navigational aids store

III. The most important new projects to be carried out in 1984 are as follows:–

a) Upgrading warehousing facilities at PPW

b) Purchase of computer hardware–this is to enable more of our operations to be computerised.

c) New computerised telephone exchange–this will enable PSA to improve communication with Port users.

The Port of Singapore Authority Estimates of Recurrent Income and Expenditure and Estimates of Capital Expenditure for the year ending 31st December 1984

	Income S$Million	Expenditure S$Million	Net Surplus S$Million
Tanjong Pagar Container Terminal	243	136	107
Keppel Wharves	89	67	22
Pasir Panjang Wharves	43	26	17
Sembawang Wharves	14	9	5
Warehousing Services	53	28	25
Marine Services	123	88	35
Commercial Services	58	38	20

Other Services	13	5	8
Total Operating Income/ Expenditure	636	397	239
Investment income/debt charges	71	2	69
	707	399	308
Less:			
Capital Expenditure for			
– Existing projects		293	
– New projects		64	357
Deficit			49

Port of Singapore's Police Department

The public knows little about the Port's Police Department. Indeed many people aren't even aware that it exists. But this small, self-contained specialised unit with a history of more than a hundred years is responsible for security, law and order in the Port – a key factor in Singapore's industrial development.

The Police Department is an auxiliary police force under the authority of the Commissioner of Police. Its members however, remain, employees of PSA.

The security of cargo transiting the gateways, and of all vessels alongside PSA's wharves and jetties is its main concern. The five gateways of the Port of Singapore are gazetted free trade zones within which cargo can be stored or moved around without customs duties being levied. They are also declared protected areas – entrances and exits are carefully guarded and stringent checking is carried out on all people and vehicles entering or leaving port premises.

A large part of the Force is deployed at gates and checkpoints. Working in teams, officers ensure that goods taken out of the port correspond in type and amount with those declared in the delivery document, and that the cargo markings tally. It is also their duty to investigate discrepancies.

Criminal Investigation Section

Offences committed in the port, on board vessels berthed alongside the wharves, in warehouses and other commercial properties are investigated by this section.

The offences involve not only theft and pilferage, but also misdemeanours such as traffic violation, assault, trespass and mischief.

Marine Section

This section handles the seaward policing of the port. Equipped with a fleet of patrol boats, it carries out checks on harbour craft and investigates oil pollution offences in port waters. It also supervises the movement of arms and ammunition and other dangerous goods through the harbour area.

Mobile Squad Section

To cope with the large number of container trucks, lorries, vans, cars and motor-cycles that travel along the port's roads and warehouse lots, there is also a Mobile Squad Section for traffic control and regulation.

Security Guard Unit

Like their counterparts in the Singapore Police Force, the PSA Police maintains a 24-hour patrol system. Uniformed personnel in patrol cars, on bicycles, motor-cycles and on foot carry out regular beat duty in port premises. They are assisted by the Security Guard Unit whose primary function is the security of warehouses, cargo stored in godowns and other port property. Formed in 1972, the Security Guard Unit is made up of officers who are unarmed but who have the right to search, detain and evict trespassers.

Dog Unit

More recently, a dog unit with 6 German Shepherds was set up to patrol the World Trade Centre and the port's warehouses and offshore island installations.

Working together with the other sections, the 2 units have helped strengthen overall security in the port area.

Over the years, the Port of Singapore has seen many changes. Expansion of the container terminal facilities and greater automation and computerisation of port operations are expected in the next few years. The administration and organisation of the PSA Police Force will be affected. The organisational structure, the deployment of manpower, equipment and facilities will have to be modified and upgraded to cope with the growing complexity of police operations.

Its role however will remain the same – ensuring the safety and security of all cargo and helping to maintain the port's international reputation for dependability.

(PORT VIEW)

New port for Mina Qaboos

The Oman Ministry of Communications has given the go-ahead to Maunsell Consultants of Britain to prepare a detailed design of a major extension of Mina Qaboos.

This follows a series of discussions the Ministry held with the UK firm. The extent of the work and the exact location of the expansion were agreed upon during the negotiations, said a spokesman for Maunsell in Muscat. The design, he added, would be submitted to the Ministry within 16 months.

The construction work is expected to start shortly after the Ministry approves the design.

Since it is impossible to provide additional facilities within the existing port, Maunsell propose to site the new quays and container terminal in Shutaify Bay, immediately north of the present port.

A 1,000-metre long breakwater will be required which will be in water depths exceeding 35 metres. The large quantities of rock required for this structure will be obtained from hills which surround the bay. The hill now separating Shutaify Bay from the port will be levelled and the area gained will provide space for a container terminal of some 15 hectares, and at the same time allow the old and new quays to be integrated as working units.

The depth of water alongside the proposed new 600-metre long container berth will be sufficient for the largest container vessels afloat to use the port.

There will also be some general purpose berths and there are plans for the construction of a ship repair yard.

The new container terminal and associated container freight station will free the existing port for expanding combined roll-on, roll-off conventional general cargo and non-fuel bulk trades.

A VERY SURE MOVE

The Port of Hamburg: Speed And Accuracy

International economics fluctuates and changes from day to day. The selection of the right port is no easy task when this change is to be fully grasped so as to be positively reflected in one's business.

The Port of Hamburg has regular direct services to all corners of the world. And that for Japan is established at an average of one service a day. If you are having difficulties with losses incurred in relation to time and expenses, then Hamburg is the port to solve your problems.

Conveniently located and having substantial facilities, the port of Hamburg guarantees speed and accuracy in such functions as storage, control, assorting and container handling. Stable labor power is always available since the labor force at the port is virtually strike free. The Free Zone covering all important port areas allows transit cargo to pass through duty-free making the port all the more attractive.

The Port of Hamburg has overseas offices in New York, Tokyo, and in major cities of the world and is ready to service you most efficiently to the final destination of your cargo. The gate-way to Europe cultivated by history .... Port of Hamburg. Consider us first when entering Europe.

Port of Hamburg

The Gateway to Europe's Markets

The Free and Hanseatic City of Hamburg.
Representative Office in Japan.
c/o Irisu Shokai K.K. Toranomon Mitsui Bldg., 3-8-1, Kasumigaseki, Chiyoda-ku, Tokyo 100 Tel. 03/503-5031

The Representative: Mattentwiete 2, 2000 Hamburg 11, Tel. 040/36128-0
Local Representatives in Germany: North Germany Tel. 040/36128-450
Frankfurt Tel. 0611/749007 Munich Tel. 089/186097
Duesseldorf Tel. 0211/482064/65 Stuttgart Tel. 0711/561448/49
Local Representatives outside Germany: Vienna Tel. 0222/725484
New York Tel. (212)-651 39 98 West-Berlin, GDR, CSSR Tel. 040/365620
Budapest Tel. 319769 Tokyo Tel. 03-503-5031

• Send us the coupon on the right. You will receive current information on "Port of Hamburg" and other pamphlets related to the port.

COUPON
PH-12

MITSUI Automated Container Terminal System

Masses of data! But how to process it for efficient handling of containers?

The Mitsui System can speed up and rationalize container handling to give increased benefits from container transportation. Developed in 1972, this system has proved its efficiency at the busy Ohi Pier, Port of Tokyo, and it could be working for you in solving your container terminal problems, particularly those in the fields of cargo information and operations systems.

❶ Computer Room
❷ Gate Office
❸ Operation Room
❹ Portainer®
❺ Rail-Mounted Transtainer®
❻ Rubber-Tired Transtainer®

MITSUI Automated Container Terminal System Consists of 6 sub-systems.

1. Yard Plan Computer System
2. Yard Operation Computer System
3. Data Transmission and Oral Communication System
4. Transtainer® Automatic Steering System
5. Transtainer® Operation Supervising System
6. Portainer® Operation Supervising System

MITSUI ENGINEERING & SHIPBUILDING CO., LTD.

Head Office: 6-4, Tsukiji 5-chome, Chuo-ku, Tokyo, 104 Japan
Cable: "MITUIZOSEN TOKYO", Telex: J22924, J22821
Material Handling Machinery Sales Department Tel. (03) 544-3677
Systems Headquarters Marketing Dept. Tel (03) 544-3272
Overseas Office: New York, Los Angeles, Mexico, London, Duesseldorf, Vienna, Singapore, Hong Kong, Rio de Janeiro