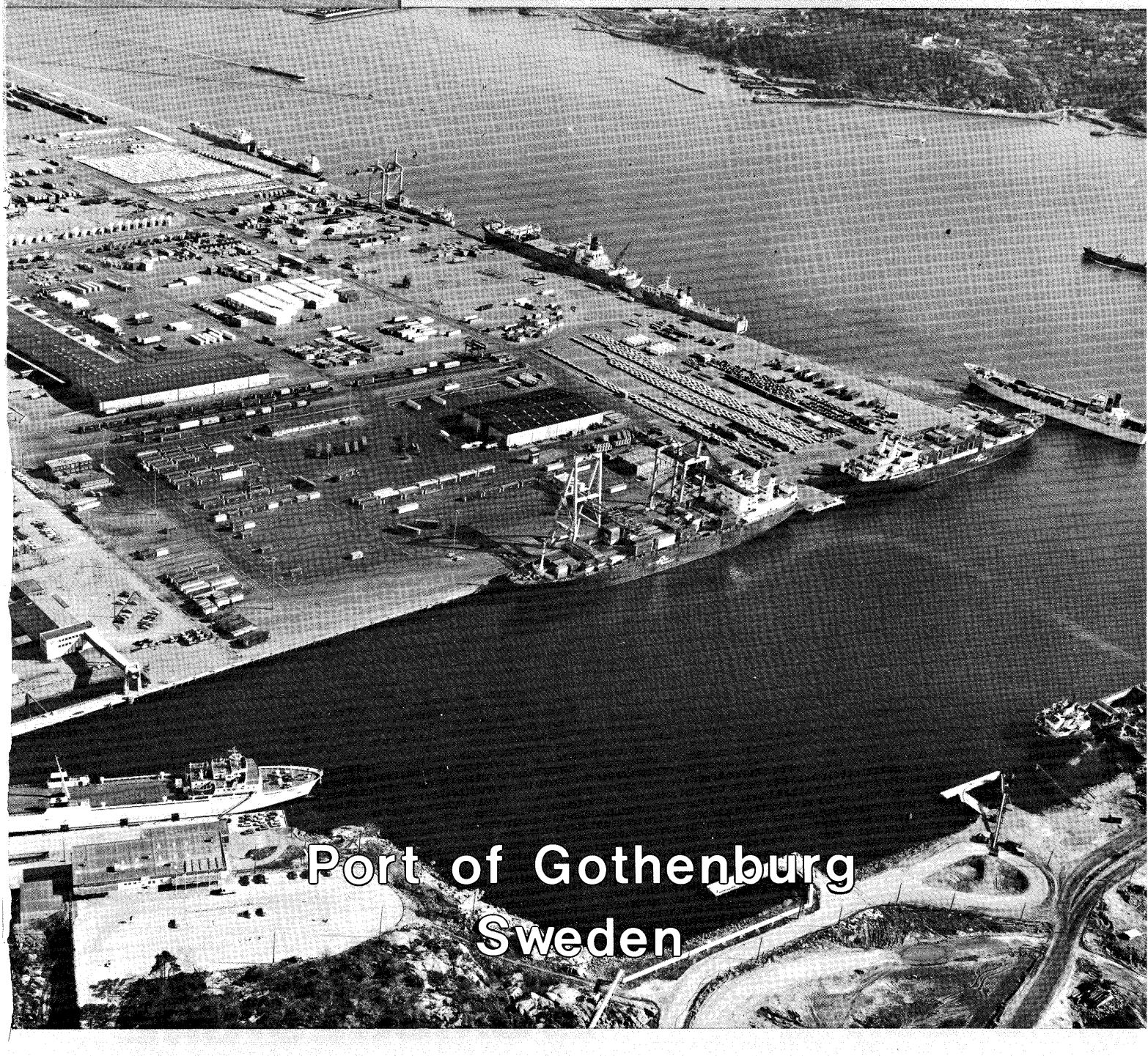
昭和44年11月15日第三種郵便物認可　昭和53年3月号　昭和53年2月20日発行　第23巻第3号（毎月1回20日発行）

PORTS and HARBORS

March, 1978 Vol. 23, No. 3



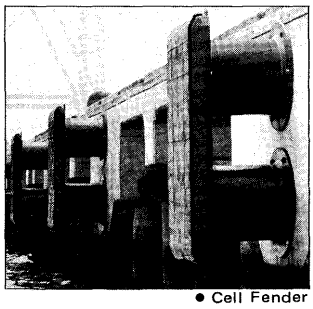
Port of Gothenburg
Sweden

IAPH Conference Le Havre May 1979

The Publisher: The International Association of Ports and Harbors

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

Our Super-M Scrapes the Sky!



● Cell Fender

● Super-M Fender

The new age of general cargo vessels demanding larger, and yet at the same time safer berthing, has brought forth the need for larger fenders. Our Super-M Fender is an answer to this need. It's excellent performance: high absorption of energy, low reactional force and wide application.

Since 1954, Bridgestone has developed many products responding to various conditions of use from the small Cylindrical Type to the world's biggest Cell Type, C3000H Marine Fender.

And now, Bridgestone introduces its Super-M Fender in its continuing efforts to keep the vessels and port facilities safer.

■ BRIDGESTONE'S MARINE PRODUCTS

- Marine Fender
- Oil Fence
- Oil Skimmer
- Marine Hose
- Sleeve-Joint Hose
- Others

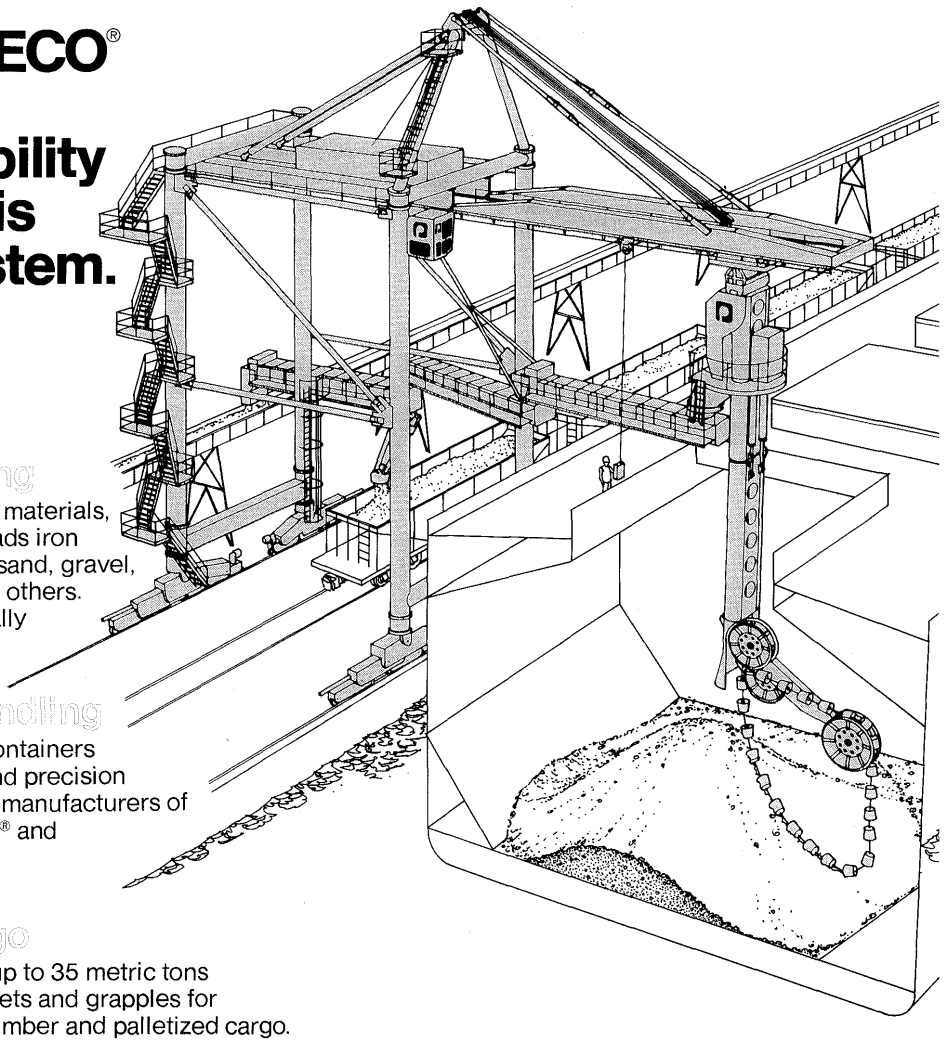
■ For further information, please write or call to our following office.

HEAD OFFICE Bridgestone Tire Co., Ltd.	No.1, 1-chome, Kyobashi, Chuo-ku, Tokyo, Japan Tel: 567-0111 Cable: "BSTIRE TOKYO" Telex: J22217, J23207, J23227 BSTIRE
Bridgestone Tire Co., Ltd. Dublin Office	29, Eaton Square, Monkstown,Co. Dublin, Ireland Tel: 800213 Telex: 4733 BSEI Cable: BSTIRE DUBLIN
Bridgestone Tire Co., Ltd. Bahrain Office	Room 203, Sena Building, Bahrain Tel: 53799 EX.23 Telex: 8215 Kanoo GJ
Bridgestone Tire Co., Ltd. Singapore Branch	No.2, Jurong Port Road, Jurong Town, Singapore,22 Republic of Singapore (P.O.Box 2450 Singapore) Tel. 655875,651777 Cable: BIESUTAIYA SINGAPORE Telex: 21386 BSTIRE RS 21-386
Bridgestone Tire Company of America, Inc.	2160W, 190th Street, Torrance, Calif. 90504, U.S.A. Tel: (213)320-6030, (213)775-8505 Telex: 0691372 Cable: LABSTIREL TRNC

BS BRIDGESTONE®

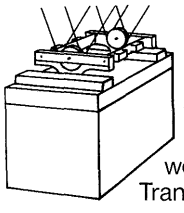
World's first Multi-Purpose continuous Bulk Unloader and Portainer® Crane.

Recognized PACECO® dependability, quality and durability are yours with this versatile new system.



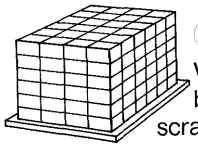
Bulk Unloading

Continuous production of free flowing materials, up to 5500 metric tons per hour. Unloads iron pellets, ore concentrates, coal, sugar, sand, gravel, wood chips, copra, grain, fertilizer and others. Cleans ships wings and corners—usually without mechanical assistance.



Container Handling

Loads and unloads containers with the efficiency and precision you expect from the manufacturers of world famous Portainer® and Transtainer® cranes.



General Cargo

Versatile capability up to 35 metric tons by adaption of magnets and grapples for scrap, lifting beam for lumber and palletized cargo.

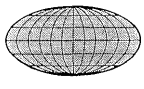
It's here—all these capabilities are available for your terminal in one consolidated unit—the Paceco Multi-Purpose Unloader!

At a low initial investment and with minimal maintenance and operator training, this equipment can increase your port's versatility.

Encourage new business by offering convenience, speedy scheduling and fast ship turnaround. A variety of ship's cargos can be handled in your modern port. No worry about having the appropriate handling equipment—Bulk, Container, General Cargo.

The bottom line results of having the Paceco Multi-Purpose Unloader in your terminal: Greater tonnage and enhanced earnings!

Put our world of experience to work for you.



PACECO, INC.

Write or telephone today. We are ready to schedule your delivery and installation.
PACECO, Dept. 24-C, Alameda, CA 94501, USA. Tel. (415) 522-6100. Telex 335-399.
PACECO INTERNATIONAL, LTD. 20/26 Wellesley Road, Croydon, Surrey, CRO 9XB, England.
Tel: 01-681-3031. Telex 946-698.

TOTAL TRANSPORTATION
A SUBSIDIARY OF FRUEHAUF CORPORATION

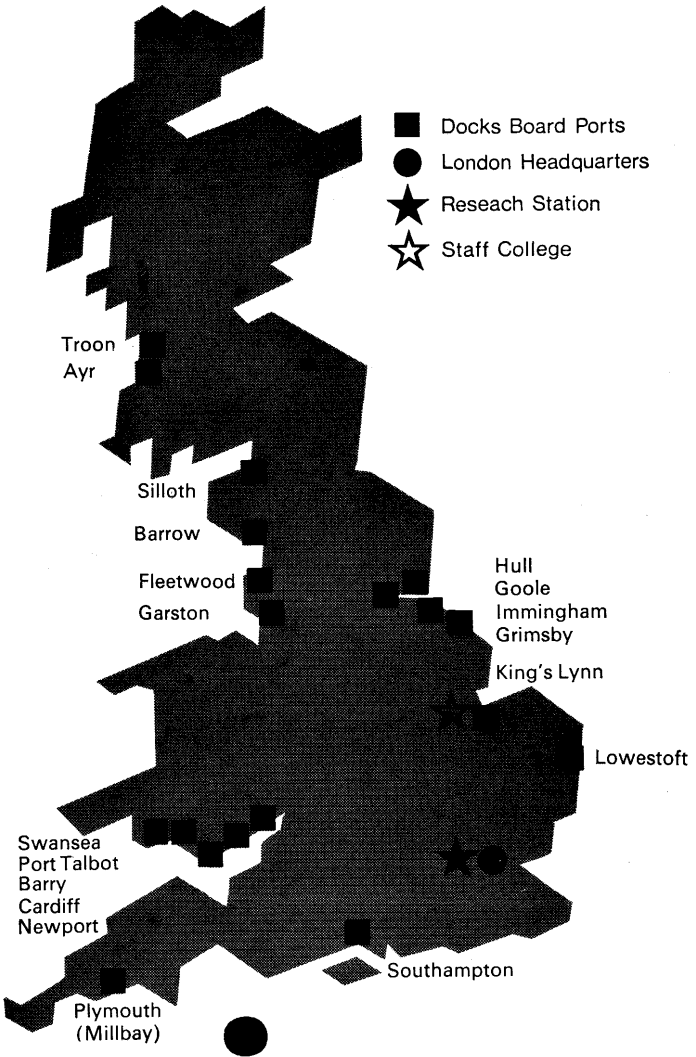
Where trade blossoms you'll find our ships.

Flowers identify the ships of Japan Line's modern tanker fleet. Japan Daisy, Japan Cosmos, Japan Violet . . . and a dozen other floral names signify speed and safety in ocean transportation. Shippers around the world have come to recognize Japan Line for its swift and efficient handling of any type of cargo. Just as flowers are the symbols of our tankers, experience is the hallmark of the crews that sail them and the personnel who care for the customers. Japan Line operates a total fleet of 251 vessels including speedy and sure containerships and a variety of other specialized vessels. Wherever trade blossoms one of Japan's largest fleets is ready to assist the shipper whatever his product, wherever his market.

Japan Line

Head Office: Kokusai Bldg., 1-1, Marunouchi 3-chome, Chiyoda-ku, Tokyo, Japan Tel: (03) 212-8211

Overseas Offices: London Tel. 01-493-3751~4 New York Tel. 212-466-3900 Dallas Tel. 214-741-4946 Houston Tel. 713-223-3030 New Orleans Tel. 504-561-1017 Chicago Tel. 312-298-1850~2 Los Angeles Tel. 213-629-2551 San Francisco Tel. 415-781-6226 Seattle Tel. 206-682-2671 Portland Ore. Tel. 503-227-1621 Atlanta Tel. 404-688-6958 Montreal Tel. 514-842-2261 Toronto Tel. 416-368-4626 Halifax Tel. 902-425-3711 Vancouver B.C. Tel. 604-683-7585 Sydney Tel. 271671 Wellington Tel. Wellington 51-239 Hong Kong Tel. 5-238091/6 Caracas Tel. 520733 Mexico City Tel. 546-55-96 Kuwait Tel. 441481 Teheran Tel. 314156~9



We're investing in the future

A programme of sound commercial investment is essential to keep ports competitive and profitable. That's why the British Transport Docks Board is investing millions of pounds every year in its ports. The money is being spent on building specialised new berths, improving existing facilities and installing new equipment.

In a highly competitive market, the Docks Board has succeeded in increasing its share of UK trade, and today its nineteen ports handle one quarter of Britain's seaborne traffic. At the same time, the Board is generating the cash flow necessary to finance its investment programme from its own operations, without recourse to borrowing. We are proud of our record as a profitable undertaking and we intend to maintain our position as Britain's premier port authority.

British Transport Docks Board

Melbury House, Melbury Terrace, London NW1 6JY Telephone : 01-486 6621 Telex : 23913

DB65

PORTS and HARBORS

Editor: Yoshio Hayashi

Published monthly by
The International Association of Ports and Harbors
N.G.O. Consultative Status, United Nations (ECOSOC, UNCTAD, IMCO)

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

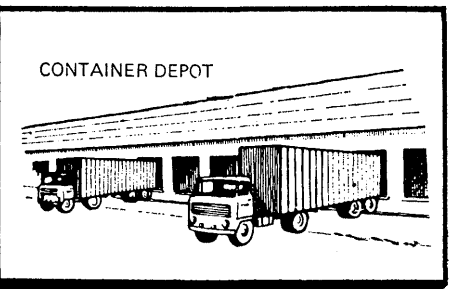
March, 1978 Vol. 23, No. 3

CONTENTS

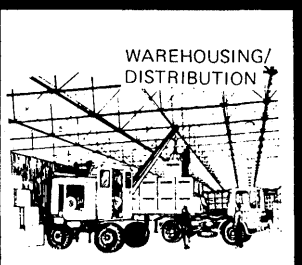
The Cover:

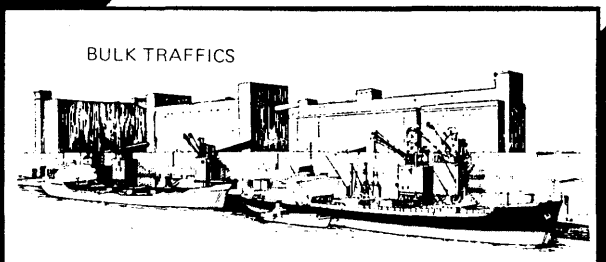
Port of Gothenburg, Sweden. The Skandia Harbour. See also article "Information on The Port of Gothernburg" on page 28.

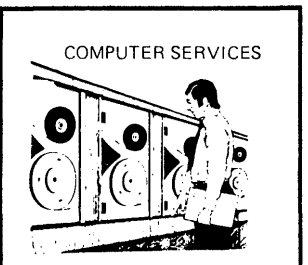
Price US $2.50 per copy
US $25.00 per year

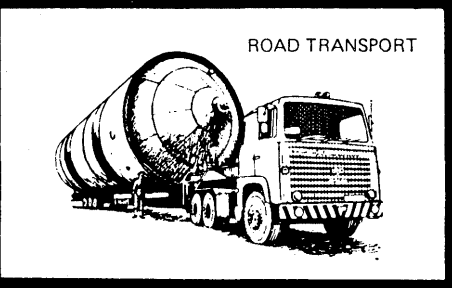


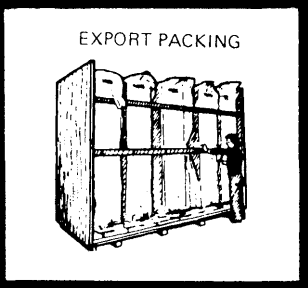
CLYDEPORT

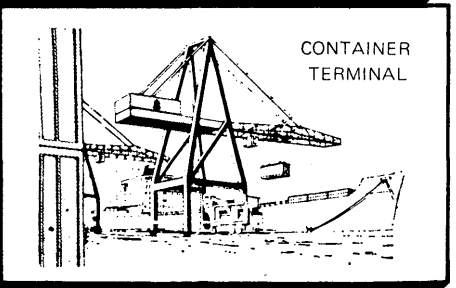


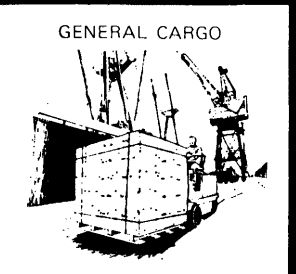


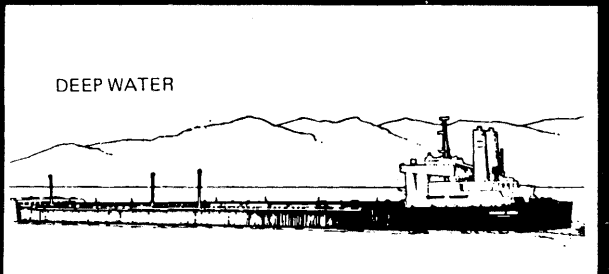


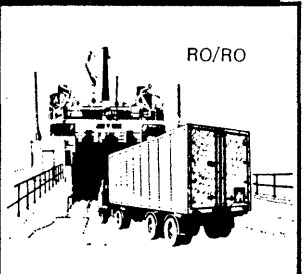












steadily building its services to industry -on land and sea

Clydeport is not only a superb natural estuary with every modern quayside facility. It also offers a growing range of shore-based activities which provide a comprehensive transport and business service.

CLYDEPORT

Marketing Department
CLYDE PORT AUTHORITY
16 Robertson Street, Glasgow G2 8DS, Scotland
Telephone 041-221 8733 Telex 778446

PORTS and HARBORS

IAPH Head Office Announcements : Pages 7 ~ 27

IAPH Observer Reports on the Recent ESCAP Meeting on Shipping, Transport and Communication

The first session of the Committee on Shipping and Transport and Communication of ESCAP (Economic and Social Commission for Asia and the Pacific) was observed on 14th to 22nd December, 1977, by Mr. David Low, Officer, Charge d'Affair, Embassy of the Republic of Singapore in Bangkok, in the capacity of the representative of IAPH.

Mr. Low's appointment to this role was made after consultation between Secretary General and Mr. Howe Yoon Chong, Past President of IAPH, Chairman and General Manager of Port of Singapore Authority.

Mr. David Low's report follows. (TKD)

Purpose

The Meeting was organised by the Economic and Social Commission for Asia and Pacific (ESCAP) for shipping and communications experts in the region to discuss issues which are of common interest to the region.

Attendance

The Meeting was attended by 100 representatives from 19 countries. Representatives from other UN bodies, specialised agencies, intergovernmental organisation and non-government organisations also attended the meeting.

The Minister of Communications of the Royal Thai Government, H.E. Surakij Mayalarp declared the meeting opened and the Executive Secretary of ESCAP, Mr. J.B.P. Maramis also addressed the meeting. The main points in the speeches were the continuing interest paid by ESCAP and national governments on well co-ordinated and integrated transport and communications infrastructures to achieve rapid rates of economic growth for the well-being of the people.

Agenda

There were 27 items on the Agenda. The Meeting was organised into two wings with the first two days reserved for the Shipping Wing. The Agenda is enclosed as Appendix I.

As the IAPH is mainly interested in the Shipping Wing, only the first two days' proceedings were covered.

Development of Ports and Port Management

The above was discussed under agenda Item No. 8. The Committee considered the secretariat's proposal for activities in management planning, technological change and port development, dredging and information and supported the plans.

It was stressed that the development of port information systems should be kept simple. It was also agreed that there was a need to continue to organise seminars for top-level port management personnel. Topics for such seminars had already been suggested by the secretariat and these should also include the training of port operators and supervisors.

It was also suggested that a central institute for the training in labour management, research on port handling costs and interport comparison of efficiency be set up in Sri Lanka for the ESCAP region.

The Committee was of the view that advisory services to port management should continue to receive priority and it was suggested that regional experts be used whenever possible. ESCAP was requested to compile and circulate a list of such experts available.

For the programme of work and priorities for 1978–1979, the Committee had outlined the following projects:–

1) Ship Users' Cooperation Project (SUCOP).
2) Regional Shipping Network and the Liner'77 project with suitable extension to other sub-regions.
3) The full implementation of the L2 scheme of Economic statistics of shipping.
4) Development of and assistance to freight study unit.
5) Survey of training needs in the field of shipping, ports and inland waterways.
6) The design and testing of port information systems.
7) Port Management development.
8) Improvement of inland waterway transport system.
9) Development of information systems and of traffic and operating statistics of inland waterway.
10) An annual review of developments in shipping, ports, and inland waterway as a basis for discussions of the meeting of the Committee.

AGENDA

1. Opening addresses
2. Election of the Chairman and Vice-Chairman
3. Adoption of the agenda

SHIPPING, PORTS AND INLAND WATERWAYS WING

4. Review of developments in shipping, ports and inland waterways
5. Consideration of activities in manpower development
6. Consideration of activities in development of maritime policy and institutions
7. Consideration of activities in development of merchant marine and shipping services
8. Consideration of activities in development of ports and port management

9. Consideration of activities in inland water transport
10. Consideration of activities in shippers' organizations and co-operation
11. Consideration of activities in technical co-operation among developing countries
12. Programme of work and priorities in the fields of shipping, ports and inland waterways, 1978–1979, and the programme of work and priorities, 1980–1981, in the context of the medium-term plan, 1978–1981

TRANSPORT AND COMMUNICATIONS WING

13. Consideration of activities in the field of railways
    (a) Report of the
        (i) Seminar-cum-study tour on railway suburban transport (France)
        (ii) Seminar-cum-study tour on railway rolling stock maintenance and repair (Japan)
        (iii) Joint roving team of railway experts to Iran and Sri Lanka
    (b) Progress on the Trans-Asian Railway project and its extended scope to include intermodal aspects
14. Consideration of activities in the field of highways and highway transport
15. Measures to improve statistical data in the field of transport and communications
16. Consideration of activities in the field of facilitation of international traffic
17. Transport development in the context of the integrated programme for rural development
18. Consideration of activities in the field of telecommunication
    (a) ITU technical co-operation activities in the ESCAP region
    (b) Progress on the implementation of the Asian telecommunication network
    (c) Progress on the establishment of the Asia-Pacific Telecommunity
19. Consideration of activities in the field of postal services
20. Consideration of activities in the field of tourism
21. Development of air transport in the ESCAP region
22. Technical and economic co-operation among developing countries in the field of transport and communications
23. Review of the existing mandates and roles of the organization of the United Nations system in the field of transport
24. Programme of work and priorities in the field of transport and communications, 1978–1981, and consideration of the programme of work and priorities, 1980–1981, in the context of the medium-term plan, 1978–1981
25. Other business
26. Consideration of subjects for discussion at the next session of the Committee
27. Adoption of the report

(Notes by the secretariat: From among the documents prepared by ESCAP secretariat, the section entitled "Port Development" which attempts to highlight the developments of some of the ports in the difference subregions of ESCAP, will be introduced in the forthcoming issue of the journal. (E/ESCAP/STC. 1/31, November 11, 1977))

Joint Report to IMCO well received

Our joint report on "Automatic Shutdown System" was well received and constructively discussed by the IMCO Bulk Chemicals Subcommittee last December, Mr. A.J. Smith, IAPH Liaison Officer with IMCO, reported in his letter to the Secretary General recently.

The report to IMCO was prepared by an international study group, of which IAPH was a member, and presented last October from the office of the International Chamber of Shipping.

Extracts from the joint report was published on pages 9–11 of the January issue.

Mr. Smith's letter follows. (TKD)

Dear Dr. Sato, 4th January, 1978

Automatic Shutdown Systems

You will wish to know that the joint report on Automatic Shutdown Systems to which IAPH was a party, was discussed by the IMCO Bulk Chemicals Sub-Committee during December last. The paper was generally well received and the discussion on it was constructive.

It was accepted that in some cases dangerous surges could be created, and a modification of the IMCO Gas Codes was drafted which permits alternative safeguards to be approved by the Ship and Shore Administration in such circumstances as an interim measure. IMCO felt that ship and shore systems should be modified where possible to eliminate the problem with the intention of withdrawing the concession at the earliest practical opportunity. It was recognised that there were engineering solutions to the problem, and the UK reported progress of an investigation into the question of valve actuator modification.

The question of chemical carriers was discussed and a draft Code amendment was prepared. This permits the removal of the valve for these cargoes not needing one. An alternative to the "fail-closed" arrangement is also proposed, and this could apply equally to gas carriers.

I enclose a copy of the proposed amendment for your information.

Yours sincerely,
A.J. Smith

SRI-Australia Program Announced

Stanford Research Institute, California USA, announces a program called "SRI International Program for senior business executives from throughout the world to be held in Australia, June 27–July 5, 1978.

The Program is a unique event including sessions in Sydney, Brisbane and Perth on a World Resources theme and visits to several major resource projects in Queensland and Western Australia. For further information, please write to:

Mr. Weldom B. Gibson, Executive Vice-President, Stanford Research Institute, Menlo Park, California 94025, USA

The basic purpose of the Program including the Sydney, Brisbane and Perth Sessions (and major project visits) is to provide information and an exchange of views in the

following two broad areas:

1) The prospects for various world resources and implications for world business
2) The outlook for business in Australia during the next few years.

The Program will deal with a wide range of world resource topics, such as,

- Supply-demand-price prospects for the world's principal mineral resources
- Resource development policies and potentials in Australia and several other countries
- Investment and other financial considerations on new major resource developments in various countries
- Prospective trends in development, beneficiation, transportation and international marketing of the world's principal mineral resources
- Management and operation of large-scale resource development projects.

Visitors

On January 10, 1978, Mr. Li Feng-Ming, Magistrate of I-Lan County, Taiwan, Republic of China, accompanied by Mrs. Li, Mr. Bor Twu-Yan, Director of Construction Bureau and Mr. Shenh Ming-Dor, Government Engineer, visited the Head Office and were received by Dr. Hajime Sato, Secretary General and his staff.

The main object of their trip to Japan was to study the similar cases in Japan of industrial port development and its town planning in connection with their new construction project of Suao National Harbor in I-Lan County.

After exchanging information on the matter and being provided with the referential material, Magistrate Li and his party inspected the Port of Tokyo and Yokohama. (D.S.G.)

Membership Notes

New Members

Regular Members

Okayama Prefecture
2-4-6, Uchisange, Okayama City
Okayama Prefecture, Japan
Office Phone: 0862-24-2111
(Mr. Shiro Nagano, Governor)

Ports & Harbors Division, Public Works Department
168 Exhibition Street, Melbourne, Victoria 3000
Australia
Office Phone: (03) 662-3588
Telex Number: PREMVIC 32636
Cable Address: PORTHARBOR
(Mr. A.J. Wagglen, Director)

Port Everglades Authority
P.O. Box 13136, Port Everglades, FL33316
Office Phone: 305 523-3404
Cable Address: PORTGLADES
(Mr. Paul D. deMariano, Port Director)

Associate Members

DeLong Corporation (Class A)
60 Rue de Londres
75008, Paris, France
Office Phone: 522-22-12, 387-49-89
Telex Number: 6606919F
Cable Address: GEMHER-PARIS
(Mr. Christian Fonlladoa, European Representative)

Resinex S.p.A (Class A)
via per Rovato, 20, 25049-ISEO (Brescia-Italia)
Office Phone: (030) 980961
Telex Number: 30549 (Resinex)
Cable Address: RESINEX
(President)

Bertlin and Partners (Class A)
Congreve House, 86 Station Road, Redhill, RH1 1PL
Surrey, England
Office Phone: Redhill 67166
Telex Number: 946570 Conbet G.
Cable Address: CONBERT, REDHILL, SURREY
(Mr. J.D. Mettam, Partner)

International Association of Independent Tanker Owners (Class B)
P.O. Box 1452—Vika, Oslo, Norway
Office Phone: (472) 41 60 80
Telex Number: 11363 Nored N
(Mr. T. Rafgård, General Manager)

Mr. Yoshinobu Takahashi (Class D)
2340-19 Sakamoto-cho, Kagoshima City 892, Japan
Telephone: (0992) 47-6009
(Professor, The Institute for Regional Economy, Kagoshima College of Economics)

Mr. Leonard E. Bassil (Class D)
National Academy of Sciences MTRB
2101 Constitution Avenue N.W., Washington, D.C. 20418
USA
Telephone: (202) 389-6738
Telex Number: 710-822-9589
(Project Manager)

Change of Name

Korea Maritime and Port Administration

Mr. Kang, Chang Sung, Administrator, Korea Maritime and Port Administration, informed the Secretary General on October 27, 1977 that the official title of his organization, which was established on 13th March, 1976, has been revised from "Korea Maritime and Port Authority" to "Korea Maritime and Port Administration" as of October, 1977, and that the official titles of various positions of the organization have been changed as of the same date as follows;

Director General → Administrator, Deputy Director General → Deputy Administrator, Director → Director General, Chief → Director, Assistant Chief → Chief.

Mr. Kang also says that these changes have been made in accordance with the government standardization policy of official titles written in English of various governmental agencies in Korea.

Crude Oil Washing/Segregated Ballast Retrofit

By George Thebaud, Managing Director
Societe Maritime Shell (Member, IAPH Special Committee on Large Ships)
29 rue de Berri, 75380 Paris Cedex 08, France

Introduction

This report summarises the various phases in the work which has been in progress since January 1977 involving the study of crude oil washing and segregated ballast retrofitting on board oil tankers of 70,000 DWT and over.

It is divided into the following main chapters:

1. **Crude Oil Washing**
   - 1.1 Background,
   - 1.2 Technical facilities needed for crude oil washing,
   - 1.3 Crude oil wash methods,
   - 1.4 Safety procedures,
   - 1.5 The pollution control consequences of crude oil washing.
2. **Segregated Ballast Retrofitting on Oil Tankers of 70,000 DWT and over**
   - 2.1 Ballasting requirements of VLCCs,
   - 2.2 Segregated ballast,
   - 2.3 The pollution control consequences of segregated ballast,
   - 2.4 Comparison with crude oil washing.
3. **Conclusions**

1. Crude Oil Washing

1.1 Background

The basic fact. for 50% of every voyage a tanker is sailing without any cargo in her tanks, and in order for her to be able to reach her destination, she must have her tanks ballasted. The medium used for this purpose is the most natural in the world: sea water. This is precisely where the major difficulty arises, since the ballasting water in contact with the oily residue left in the tanks cannot be discharges in that state when the vessel next takes on cargo. Firstly, from pollution control considerations, and secondly, in our age of costly energy, because the quantities involved are by no means negligible. The tanks that are going to contain ballast water therefore have to be washed, and since this operation is intricate and time-consuming it cannot be carried out in port after the discharge of cargo. The washing operation is therefore complicated by the fact that there must be some ballast on departure, to enable the tanker to leave the port of discharge under proper conditions of seaworthiness, and this ballast must of necessity be placed in dirty tanks; and there must also be an arrival ballast in washed, clean tanks, after the washing of certain selected tanks. The departure ballast is then discharged at sea during the crossing and, in compliance with international conventions, the dirty portion of this ballast is decanted into a special tank so that the crude is kept on board, and only clean water is discharged into the sea. This is the "Load-on-Top" technique, a name derived from the fact that the next cargo is loaded "on top" of the crude recovered from the departure ballast water and from the washings.

The advent of very large crude carriers (VLCCs, 150,000 tdw and over) raised problems for the use of this technique. In view of the enormous tank capacities, these tankers have been fitted with fixed high-output washing guns. This leads to one initial difficulty during washing: the powerfully mixed emulsion of water and crude does not settle out so easily, and a large tanker therefore may end up with somewhat larger quantity of water/oil emulsion than a small tanker, in proportional terms.

This quantity of emulsion also poses problems for the refineries, whose processing costs go up as a result.

In view of the size of these tankers and the very long distances that they have to travel (round the Cape of Good Hope), the amount of sediments deposited in their tanks increases. These sediments are a nuisance for several reasons:

- tank washing takes longer and requires more care,
- the amount of sediments accumulated in the unwashed tanks reduces the carrying capacity,
- the accumulation of these sediments increases the quantity of umpumpable crude oil. This reduces the carrying capacity still further and makes washing more difficult besides increasing the risk of polluting the seas.

These residues thus represent a cumulative phenomenon which is very annoying from the points of view of vessel operation, tank washing and pollution control.

Now for some time the oil industry had been aware of the solvent properties of crude oil. Putting them to practical use on board a tanker involved finding a safe method, and the idea was given a boost by the studies following explosions on board 3 large tankers in December 1969. These explosions (on the Mactra, the Marpessa and the Kong Haakon VII), one of which resulted in the total loss of the vessel, brought to light several facts:

- the atmosphere in the tanks of large tankers was difficult to control,
- the use of fixed high output guns and the method of recycling the washing water increased the electrostatic fields within this atmosphere.

The fact that it was clearly impossible to rule out with any certainty the risks of fire breaking out in an explosive atmosphere led to the decision to keep the atmosphere inside the tanks non-explosive.

As a result, the owners of large tankers installed inert gas plants. The inert gas is captured at the boiler stack outlet (or produced by separate inert gas generators burning gas oil on motor-driven vessels which do not have a suitable boiler), washed, freed from dust, cooled, rid of its most corrosive constituents and pumped into the tanks using fans and inlet pipes.

The owners of large tankers then had at their disposal fixed washing guns and inert gas plants. There was nothing more to prevent them from using crude as the tank-washing

medium. Moreover, the experiments carried out, first on a small and then on a larger scale, enable us to state that the technique has been perfected and is now fully operational.

1.2 Technical facilities needed for crude oil washing

1.2.1 Washing guns

These guns are fixed under the deck, and their delivery rate is 150 m^3/h per gun for a pressure of 12 kg/cm^2. Various systems exist on large tankers, but they all have one thing in common: the washing fluid (water or crude oil) is supplied to the gun via a fixed pipe.

A. The single-jet gun: the nozzle of the gun, which has a spray opening of about 40 mm, can cover an arc between 0° (nozzle pointing vertically downwards) and about 140° (nozzle 50° above the horizontal). The whole gun rotates about a vertical axis, and this rotation alters the elevation by means of a system of gears; the combination of these two movements enables the washing jet to cover a sector of a sphere described by a solid angle of about 280°. This type of gun is classified according to the drive motor used.

A(a) Air motor: this motor is located on the gun shaft protruding above the surface of the deck, and once it is keyed on to the shaft it brings about the rotary movement. There are stops on the motor to limit the alteration in the elevation, so that it is possible to concentrate on a well-defined zone. This system is very flexible in use, and very economical because there need only be a small number of motors. In the case of crude washing, which is carried out in the port of discharge there is no possibility of increasing the workload of the crew, so the number of motors has to be increased;

A(b) Hydraulic motor: the driving force is provided by water under pressure, taken either from the washing gun line, or from the fire-main. With crude washing, of course, it is only possible to use the fire-main, and, in addition, it will be necessary to discharge the water overboard once it has been used for the motors. This can be done using fairly long hoses, but it complicates the task of changing the motors from one gun to another. Furthermore, these motors weight about the same as air motors and the number installed must be appropriate for the washing operation in question, either water washing at sea or crude washing in the port of discharge;

A(c) Gun with integral drive motor: this is the most recent type. The washing fluid (water or crude oil) is also used as the drive fluid for a small turbine which powers the circular movement of the gun through a system of gears. The elevation is adjusted by means of special-shaped cams inserted in one of the motor casings, each type of cam adjusting the elevation in a specific way. This solution is elaborate and costly, but is undoubtedly the most practical one for crude washing. There is no handling to be done, the crew merely fulfils a supervisory role and starts and stops the guns by means of a valve (which may even be remote-controlled).

B. The twin-jet gun: the two jets face in opposite directions, 180° apart. The rotary movement about the vertical axis causes the jets to rotate in a vertical plane. The main rotation around the vertical axis is brought about by a small turbine driven by the washing fluid (water or crude oil). The washing jets cover a sphere, without any possibility of elevation adjustments. This system is simple and cheap, but generally speaking the output and efficiency are less great than those of single-jet guns. The most obvious advantage is the extreme simplicity of use, as there is only one valve to be opened for each gun. During crude washing, this system has two disadvantages. Time is wasted covering the entire sphere, whereas only part of it needs to be covered in the washing sequence; also the system is less efficient because for the same delivery rate as a single-jet gun, the force of each jet is halved.

As well as classifying the types of gun and the types of drive they have, we must also consider the number and position of the guns. Some large tankers have been equipped with washing guns only in the tanks intended for ballast, the other tanks being washed by the conventional system of portable machines and flexible hoses. This equipment was perfectly justified in the case of water washing, giving a saving in installation costs, but if crude washing is to be used in tanks other than those intended for ballast there must be fixed guns available. It is therefore necessary to make arrangements to fit washing guns in all the tanks, which has already been done in most of the large tankers fitted with the old washing system.

As a partial conclusion to these remarks about washing guns, we would say that:

- fixed guns are essential at the present time in order to be able to crude wash;
- crude washing means that the whole vessel is washed during one or more calls in port, and this necessitates having guns in all the tanks;
- the additional workload represented by crude oil washing may be offset either by having a large number of drive motors, or by installing modern washing guns (see A(c)). All types of gun may be used, but some involve more limitations than others and some are more efficient than others.

1.2.2 Inert gas systems

While these systems generally rely on the same principle, there are differences in implementation, and the way they are used is not uniform either. First of all, we would remind you that the inert gas is obtained from the boiler conbustion gases (this is generally the case on board VLCCs), and that this gas is washed, cooled, freed from dust, rid of the sulphur-based compounds, dehumidified and pumped into the cargo tanks using fans and inlet pipes. This is where the first difference arises between the types of system:

- The single-fan system: the maximum rate of inert gas delivery is required during discharging, as it is then that the crude oil removed from the tanks has to be replaced by at least an equivalent volume of inert gas. For safety reasons, the fan installed generally has a rate of gas delivery equal to 125% of the maximum pump output. There is thus certain to be a slight overpressure in the tanks at all times, which can offset any leaks. However, although this fan is necessary for discharging operations, it is too powerful for other operations in which inert gas is required,

e.g. inerting/pressurising tanks, pressurising and/or purging tanks before and after washing, etc. The principal advantage of this solution is that the fan is economical to install, but it does have one major disadvantage: as there is only the one fan, it must not break down, especially when crude washing is involved. This installation has little to recommend it, but it is found on some of the earliest VLCCs.

– The two fan system: the fans may have the same rate of delivery (usually 2 x 75% of the maximum pump output) or different rates (generally 1 x 125% of the maximum pump output and 1 x 60/65% of the maximum pump output).

The choice made depends on type of trade for which the vessel is intended. The trade may involve lightening of the vessel, which means that the pumps will not be used at maximum output during all discharging operations, or alternatively the trade may chiefly involve single-parcel consignments and a single type of voyage (Persian Gulf to Bantry Bay, for instance).

In this two-fan type of system, whenever inert gas is required for purposes other than discharging, it can be supplied by a single fan, which leads to economy of use as well as the security of a second fan, which is a major consideration during crude oil washing. Another difference is that some inert gas systems have no vent pipes, while others have vent pipes in every tank. In the first case, the tanks can be vented by using the cargo pipelines and leading the gases to the cargo manifolds, or by pushing them from aft to forward, via the bulkhead valves, on free-flow vessels.

This operation of purging the hydrocarbon gases from the tanks is not universally carried out, sometimes for very good reasons. In the case of crude washing in particular, purging may result in volatile fractions of crude oil being released into the atmosphere, which is a form of pollution. However, whenever air gets into the tanks, or there is a risk that it may get in, either on account of work that has to be done in the tanks, or because of the possibility of a collision in congested waters, purging the hydrocarbon gases until they represent 2% or less is the only way of ensuring that the atmosphere inside the tank is always below the lower explosivity limit.

As a partial conclusion to these remarks on inert gas systems, we may say that:

– two-fan systems double the safety factor, and when crude washing is involved this point is worth taking into consideration;
– purging the hydrocarbon gases with inert gas is the only way of ensuring that the atmosphere in a tank will be always below the lower explosivity limit should any air be introduced.

1.3 Crude oil washing methods

The washing methods depend on the operators, their previous experience and their degree of initiative. The habits acquired while operating water washing systems also affect the crude washing methods. To start with, let us establish a few basic facts:

– generally speaking, the centre tanks of oil tankers are less complicated than their wing tanks. Sedimentary deposits will thus be less great, and easier to get rid of, in the centre tanks;
– the vertical bulkheads of tanks are almost always smooth in the centre tanks, whereas they have horizontal stiffeners in the wing tanks;
– the bottoms of tanks, which have complicated structures and are a long way from the washing guns, are the difficult parts to wash.

From another point of view, the washing methods have to be adapted to suit the various types of tanker:

– free-flow tankers;

Lastly, the piping circuits and pump arrangements will affect the details of the crude oil washing method. At the present time, these methods may be divided into two groups:

a) Cargo tanks washed with crude oil stored in one or more slop tanks, with the washing oil containing sediments being returned to the slop tank via the stripping lines. This is the recycling method, and means that tank washing only starts when the tank is undergoing stripping. This is a practical method in the case of a conventional tanker with a pipe system, since the tanks are emptied one after the other, or in pairs following a given sequence. This method, however, is a little more difficult to implement on board a free-flow tanker, since all the tanks reach the stripping phase at about the same time. From the point of view of the washing results, recycling the crude oil has the effect of gradually loading it with sediments, and it appears from the measurements that have been taken that elimination of the sediments from the tanks washed is not perfect, especially in the case of the last tanks to be washed. This method was the first to be used, but in view of the above disadvantages a new method has been developed.

b) Cargo tank washing with crude oil starts as soon as there is enough space, about 6 to 10 metres, above the level of the liquid. The washing crude is taken from the delivery of the main pumps by a pipeline leading to the washing gun line. There obviously has to be adequate pressure at the guns to ensure efficient washing (in the region of 12 kg/cm^2) and this can be achieved by throttling either the pump delivery valves or the valves at the manifold. The time taken to clean the upper parts of tanks may vary according to the type of drive used for the guns, and the best results are obtained with guns with an elevation that can be programmed or those that can be adjusted by regulating the motor. In general, one or two passes are sufficient to eliminate all the sediments from the upper parts of the tanks. These sediments fall into the crude oil in the tank, are either diluted or at any rate held in suspension, and are discharged with the bulk of the cargo.

When it comes to washing the bottoms, two cases have to be considered:

1) Conventional tanker with pipe system: the tanks are emptied in a certain sequence and the bottoms are washed tank by tank, generally with two to three passes over an arc from 60°–0°–60°. The number of guns to be used depends on the capacity of the vessel's stripping facilities and the crude oil used for washing is sucked into the stripping system with the sediments, discharged into a slop tank or an after cargo tank, taken up again by the main discharging pumps and pumped ashore. With a careful washing programme, there is no recycling of the washing crude. There are two schools of thought regarding the implementation of this method:
– the first recommends completely stripping the tanks before starting to wash the bottoms. The washing

process then really takes advantage of the solvent properties of the crude, but if there is excessive accumulation of sediments there is a risk that the mud boxes of the stripping pumps may be fouled up;
- the second advocates starting to wash the bottoms while there is still between 50 cm and 1 metre of crude oil in the tanks. If the pressure in the washing gun line is in the region of 10/12 kg/cm², the gun jets will be sufficiently powerful to stir up the liquid in the bottom and mix it with most of the bottom sediments. Dilution is better and the stripping systems are less likely to be obstructed.

2) Free flow tanker: if the entire cargo consists of one parcel, the considerable extent to which this type of tanker goes down by the stern will make it possible to wash the bottoms of all the forward tanks (half to two-thirds of the vessel) while the main discharging pumps are still taking suction from the after section. In general, the slop tanks are kept full until the final phase of the discharging operation of these tankers, and it is possible to wash the entire vessel without stripping the forward part, and without recycling any crude, the aftermost tank being washed while the discharging pumps are emptying the slop tanks. Given good equipment and efficient operation, a free flow tanker is the easiest type to wash with crude oil.

This last method of crude washing, without recycling, is the most efficient from the points of view of quality of results and minimum time-wasting in the port of discharge. However, depending on the type of vessel and the equipment on board, it can be a constricting method, requiring careful planning and sequencing of operations.

From a practical point of view, taking into account the above considerations and also the safety regulations generally adopted, the crude oil washing technique may be summarised as follows:
- use crude oil with no water in suspension for washing (so as to avoid creating an electrostatic field) and hence empty the slop tanks ashore, and empty the first 2 or 3 metres in each tank;
- once the slop tanks are empty, wash their bottoms as quickly as possible with 3 or 4 30°–0–30° passes;
- with the method without recycling, start washing the upper parts of the tanks as soon as there is 6 to 10 metres of ullage. Start filling the slop tanks with "dry" crude oil, using the stripping system which is not in use during this phase of the discharging operation. With the recycling method it is necessary to start by filling the slop tanks with "dry" crude oil, but washing cannot start until at least one tank reaches the stripping phase;
- whichever method is used, it is necessary to distinguish between washing a centre tank bulkhead and washing a wing tank bulkhead, and between washing the bottom of a tank and washing the bulkhead of a tank. Generally speaking the bottoms need 2 to 3 times as much washing as the vertical bulkheads, and the bulkheads of wing tanks need twice as much as the bulkheads of centre tanks. Depending on the various types of drive for the guns, this means either a larger number of complete cycles, or repeated adjustments to the elevation;
- the washing programme must be worked out in detail and adapted according to the result desired: routine washing to get rid of the majority of the sediments, washing in order to take on clean ballast (with or without preliminary flushing), washing prior to repairs and hot work in the tanks, etc.

As a partial conclusion to this section, we may say that:
- the crude oil washing method without recycling the washing crude is undoubtedly the most efficient way of getting rid of sediments, and is the method which results in the least increase in time spent in the port of discharge.
- the washing techniques are fully developed, the general principles are well known, but every vessel is virtually a prototype, and it is therefore impossible to define a method which will apply throughout a heterogeneous fleet. In addition, every variation in loading alters the washing sequence and it is in the last analysis up to the vessel's officers to devise the washing method appropriate to the vessel, to her loading arrangement and to the discharging schedule, etc. Which prompts one last comment:
- crude oil washing is a relatively new and therefore little-known method so the knowledge and skills of the Officers of VLCCs needs to be brought up to date in this respect. Training programmes have already been undertaken within the largest tanker fleets, but this updating of knowledge will have to be extended to all VLCC users in order to guarantee implementation of a method that has been properly assimilated.

1.4 Safety procedures

The previous remark brings us to the question of safety procedures during crude washing. The ICS, the large fleet owners and the Oil Companies have already drawn up safety procedures, all fairly similar. Hitherto, these procedures have applied to vessels—a logical approach since crude washing is their responsibility. The fact remains, however, that in most cases, except for washing between lightening operations at sea, or during the part of the voyage between lightening and entering the port of discharge, crude oil washing takes place when the vessel is at a discharging berth, and the shore installations will be involved in the event of accidental pollution.

From the vessel's point of view, outline safety procedures have been internationally formulated and are published in the ICS/OCIMF booklet "Guidelines for tank washing with crude oil". The procedures, generally, can be divided into 3 stages:

1) Before the vessel arrives and before crude washing commences. The procedures consist of tests, forming the technical portion of the check-list, and the following programme, which is already applied by some VLCCs, could well be made general:
   - test the washing gun line (hydraulic test);
   - test the washing gun valves for tightness;
   - check on the proper operation of the washing gun motors;
   - test the Butterworth heater shut-off valves (if applicable);
   - check on the proper operation of the inert gas system; O_2 content, fan delivery, safety devices, etc.;
   - calibration and checking of the measuring equipment: O_2 analyser, gas detector, HC gas analysers, etc.;
   - check on the proper operation of the tank remote level indication systems and on the high level indication systems (if applicable);
   - check that the O_2 level in the tanks is less than 5%;

– drawing up and circulation of the washing programme.

2) After the vessel has arrived at the berth but before the start of the washing operation. The procedure involves checking a sequence of start-up operations, and in most cases a check-list can be drawn up in the following pattern:
   – discharge slop-tanks ashore;
   – discharge the first 2 or 3 metres from the tanks containing the crude to be used for washing, so as to avoid the risk of any water being held in suspension in it, and thus the risk that an electrostatic field may be formed;
   – check that there is adequate ullage in the tanks to be washed;
   – check that the valves of the washing guns which are to be started up are open;
   – check that the inert gas system is operational, with correct inert gas pressure in the tanks.
3) During the crude oil washing. Continuous supervision must be maintained and the following are the most important points:
   – a man on watch must keep an eye on any leaks from the washing gun line;
   – the inert gas pressure in the tanks and the oxygen level must be checked;
   – the level in the tanks which are not being washed must be checked (so as to detect the opening of a gun or any leaks);
   – the pressure in the washing gun line must be checked;
   – the start-up/stop sequence of the washing guns must be monitored.

Some procedures are more detailed, also including a check on the operations that have to be done after crude washing. These include flushing and isolating the gunclean line and ensuring that the inert gas pressure does not exceed the maximum permissible. At this stage of the operation accident risks are virtually nil, but these procedures facilitate the smooth operation of the vessel after she leaves the port of discharge and it is always useful for the users to have a known procedure which is easy to implement.

At the reception terminal itself, safety procedures vary considerably. They range from total control being left to the vessel to full supervision of operations by a representative of a shore authority. In this field there is a great deal of standardisation to be done, which could only be achieved by an international industry effort.

The following points would have to be taken into consideration:

1. The authorisation for crude washing depends in the last resort on the port of discharge, since only the authority responsible for allocating berths at the wharf can sanction the extra occupation time that a tanker generally needs for this operation. There may be no extra time required, but on the other hand up to twelve hours extra may be needed. Direct ship-to-shore communications, a few days before the vessel arrives (the period of time would depend on the reception planning flexibility of the terminal) would enable the shore authorities to let the vessel know whether or not the operation was feasible and perhaps to inform her of the maximum time allowed for it, and this would help the vessel to draw up her washing programme. This is a communications problem, which ought to be easy to solve in our day and age. Furthermore, direct communication between ship and shore would save time that would otherwise be lost in circuitous dealings involving Port Authorities, Shipowner/Charterer, Shipping Agency and vessel.
2. Once the vessel has arrived at the port of discharge, she must prove that she is capable of crude washing in perfect safety. This may be done very simply:
   – the vessel may give a shore authority at the port of discharge a signed copy of the list of technical checks carried out before arrival at the port. This list would entail the vessel's (and hence the shipowner's) responsibility for the proper implementation of the tests, and this is already current practice in almost all the oil terminals in the world for standard I.O.T.T.S.G. check-lists;
   – the vessel may also hand over the washing programme, which would state in addition the name of the officer responsible and the expected extra time needed at the wharf;
   – lastly, the person in charge of the terminal may check the oxygen level in the vessel's inert gas, which is a simple and very quick operation.
3. At this stage in the checks, it is up to the shore installation to have its own safety procedures. Generally speaking, these should concern:
   – the delineation of shore responsibilities in relation to the combined ship discharge/shore reception/ship washing operation;
   – checks on the shore installations;
   – check on the mooring;
   – check on the crew's supervision of the crude washing operation;
   – communication to the vessel of emergency procedures in the event of an accident;
   – check on the pollution control facilities.

All the oil terminal procedures and checks described above should be developed internationally and standardised. It would be sensible if the ship and shore procedures were then published together in one document such as the Oil Tanker and Terminal Safety Guide or in a reissue of the ICS/OCIMF Guidelines.

1.5 The pollution control consequences of crude oil washing

The potential sources of sea pollution by a tanker are:

1) Ballast changing, i.e. the discharge into the sea of water settled out from the dirty departure ballast, after clean ballast has been taken on board ready for arrival. On a VLCC, the oily layer (crude oil, emulsion) is on average 20 cm thick. At a very rough estimate, it may be reckoned that this 20 cm represents 200 m^3 per tank, so that with 3 tanks ballasted on departure the total is 600 m^3. Experienced operators know that the vortex created by the suction of a cargo discharging pump during deballasting starts when the level in the tank is about 2 metres, and that as soon as this level is reached it is necessary eigher to discharge the bottom of the ballast tank into a settling tank, or to deballast very slowly, using a stripping pump, for instance, so as to get rid of still more of the water that has settled out.

This implies repeated adjustments and loss of time, and there is no denying that, if there is no

control, this becomes a significant source of pollution. However, crude washing tanks that are to contain departure ballast gets rid of almost all the sediments, and thus makes it possible to strip the tanks more efficiently, since the crude oil runs down freely into the bottom structures. In the opinion of all those who have had an opportunity of verifying it, ballast water in a tank that has been crude washed has only a thin film of oil on top of it, provided that clean pipe-lines are used to introduce the ballast.

Consequently with this method, discharging dirty ballast into the sea no longer gives rise to virtually any risk of pollution, and even if no precautions were to be taken when deballasting, only small quantities of oil would appear within the limits laid down by International Conventions.

2) The settling process in the slop tank or slop tanks and the discharge of the water that has settled out. Crude oil and emulsion to be found in the slop tank come from three sources:
   - the washing water that has been used to clean the tanks, in order to take on clean ballast, or for a routine wash to prevent sediments from accumulating, or for washing a tank where valve and pipe maintenance is to be carried out;
   - the oily part of the dirty ballast, in the case of correct implementation of the Load-on-Top procedures;
   - the flushing of the lines.

   As we have seen earlier, the use of high output, guns increases the quantity of emulsion on large tankers and it is very difficult to "break" this emulsion, which takes a very long time to settle out; the crude oil/water separation is never complete. Using water to wash the enormous tanks of VLCCs involves considerable quantities of water, and the slop tanks will more often than not be used to their full capacity. In view of this, discharging the water after settling requires a lot of handling, a lot of measuring, and a lot of time. Here, then, is another obvious source of sea pollution when Load-on-Top procedures are not scrupulously followed. The crude tank washing system, on the other hand, by eliminating almost all the sediments, makes it possible to use only a very small amount of water, solely for flushing out tanks that are to contain clean ballast. When applied as a matter of routine, this method makes it unnecessary to wash the other tanks with water, and even when maintenance operations are needed inside the tanks, a tank that has been washed with crude oil properly ventilated and stripped, is quite safe for access by the ship's crew. The amount of water is very greatly reduced, generally in the ratio 1:5 and very often in a greater ratio. The oily part of the dirty ballast is almost non-existent, if the tanks in question have been washed with crude oil, being reduced to a few cubic metres of "greasy" water, instead of several hundred cubic metres of oil residue. The advantage of this method as a sea pollution control measure can thus be clearly seen, in that the slop tank (s) will contain little oil either in the oily layer or in the fore water beneath. Also because of the much less handling of water and oil together the dispersion of oil in the free water is less and will settle the more quickly.

3) Flushing of the lines: this operation is one of the most difficult to perform correctly, and the carelessness sometimes observed with certain VLCC operators is most frequently due to lack of time and lack of available capacity in the slop tanks. With crude washing, the time taken to flush the tanks with water is very much reduced, and only a small proportion of the capacity of the slop tanks is used. In addition, the emptying of the lines by the stripping system is made easier by the fact that crude washing takes place in the port of loading and usually compels the vessel to remain at the wharf for a few hours longer.

   A conscientious operator can therefore flush the lines, while at sea, with all due care and attention and pump the flushing water into the slop tanks, where he will then have all the capacity he needs. Here again, crude washing contributes to the control of sea pollution.

2. Segregated Ballast Retrofitting on Oil Tankers of 70,000 DWT and Over

Before proceeding to study segregated ballast retrofitting, we must have as precise an idea as possible of the ballasting requirements of a large tanker.

2.1 Ballasting requirements of VLCCs

First of all, we should specify that the term "VLCC" is generally used to refer to any oil tanker of 150,000 DWT and over. It is therefore necessary to draw a distinction between the classes 70,000–150,000 DWT and 150,000 DWT and over. Tankers in the 70,000–150,000 DWT class have been either extrapolated versions of "small" tankers, or "scaled-down models" of large tankers. And, with a few exceptions, those built during the 1960s already displayed the features of the VLCCs of the next generation, i.e. a small number of large size tanks. We will therefore not go far wrong if we consider all tankers of over 70,000 DWT as a single category.

The amount of ballast a VLCC will take on depends on several factors:
- the state of the sea;
- the number of tanks to be ballasted, depending on the stresses the vessel's structure will have to undergo;
- the trim of the vessel, which varies depending on the operations carried out on board: tank washing, for example, requires a trim of about 3 to 6 metres;
- the propeller immersion needed, which is linked to the preceding factor;
- the speed of the vessel.

This list is not exhaustive, and we could mention the vibrations encountered with certain types of ballast, bunker fuel consumption engendered by too large a quantity of ballast, time needed to deballast at port of loading, etc. In addition, these large vessels are, on account of their length, very sensitive to the phenomena of "springing" and "slamming" and serious structural damages may be caused.

Shipowners are split in two schools of thought holding differing views on ballasting arrangements. It would be possible to say that one category believe into the necessity of using heavy ballast to avoid damages caused to the ship structure due to the heavy weather. The tanker, at nearly every voyage meeting heavy seas, it is necessary to increase the amount of ballast to 50% and even to 60% of the deadweight. The other category believe, after series of tests with actual ships, that occurrence of bad weather is broadly

speaking, limited to a maximum of 5% of the total sailing time. Light ballast at levels mentionned in IMCO rules would be acceptable much of the time at full speed. Otherwise, it would be possible to reduce speed and even to change heading for safety accepting heavy weather. The necessity of ballasting in excess of regulation would be necessary only occasionally. Although reduction in speed and change of heading suggest loss of time, it is thought that such periods would not need to be of great duration and would be recompensed by the higher speed generally obtained by the lighter draft in the better weather.

Retrofitting

2.2 Segregated ballast

The mandatory provision of segregated ballast tanks in new oil tankers of 70 000 tons dwt and above is incorporated in the 1973 convention. The object of this provision is obvious by aiming to reduce or to virtually eliminate operational pollution by a design feature inherent to the ship and not depending of the skill and discipline.

The retrofitting of segregated ballast on existing oil tankers of 20 000 tdw and above is proposed to IMCO mainly by the U.S. governments representative. The object is similar to the precedent.

The practical problems which could arise, should such a requirement for conversion be introduced, are of importance.

The first difficulty will be to select the position of the segregated ballast tanks, neccessitating in a number of cases, great alterations of the structure, as the fitting of new bulk heads. Many VLCC are suffering, at full speed, of important vibrations which are sensitive to the distribution of loads in the tanks. Very often the choice of ballast tanks was made after some months of direct experience. In spite of progress made in the analysis of vibration, it is still very difficult to forecast in advance the best position of ballast tanks to avoid unacceptable vibrations.

Two other technical problems are as well of importance:

- Strengthening the forward structure of tankers to avoid slamming damages on minimum draughts may be necessary and must be fully considered.
- Tanker with bulbous bow, designed to sail on a ballast draught submerging the bulb, may suffer a loss of speed and so a loss of overall earning capacity. Solution must be found but will involve additional costs.

2.3 The Pollution control consequences of segregated ballast

According to the principle on which they are designed, segregated ballast tanks ought to prevent any contact between ballasting water and crude cargo, thus completely eliminating sea pollution during the operations carried out on board a tanker in service. At the present time there are scarcely any vessels to which this principle can be applied with absolute strictness. Limiting our remarks to tankers of 70 000 DWT and over, we admit that the principle of segregated ballast helps to some extent to prevent sea pollution, but certainly does not prevent it altogether.

2.3.1 The systematic, routine washing of cargo tanks is in no way affected by the installation of segregated ballast. Allowing the sediments to accumulate in the tanks reduces the efficiency of the stripping operations, increases the amount of unpumpable crude oil (a potential source of danger and accidental pollution), and, unless risks of fire and explosion are accepted, involves compulsory manual cleaning before the vessel goes in for repairs. For all these reasons, the cargo tanks must always be washed according to an annual schedule, generally requiring Load-on-top procedures in any case, whether the vessel has segregated ballast tanks or not. In this category of tanker operations, the contribution of segregated ballast to sea pollution control is nil or virtually nil if the fact that, for the same total capacity, a segregated ballast tanker has a smaller cargo tank capacity to be cleaned, is taken into consideration.

2.3.2 Lastly, the maintenance required for the valves, pipes, hydraulic systems and remote measuring systems means that people have to gain access to the cargo tanks. It should not be forgotten that most VLCCs operate with a reduced crew and that their cargo installations have accordingly been automated to some extent. Thus, not to mention repairs to defects, a far greater amount of more thorough maintenance is required than is the case with manually operated systems. Here again, washing one or more tanks in order to carry out work inside them involves using Load-on-Top procedures, thus incurring the usual risks of sea pollution, whether the tanker in question is a present-day one or has segregated ballast.

On the cost side of the segregated ballast conversion, there is no dispute about the considerable economic and commercial consequences, not only for the shipping industry, but also more widely. It is generally accepted that availability of capital for conversion and problems with charter party agreement will be the major difficulty. But even now, the main question must be to assess if the low cost effectiveness of the retrofitted segregated ballast as a counter-pollution measure is not justifying the alternative constituted by the association of load-on-top and crude oil washing.

2.4 Comparison with crude oil washing

Referring back to chapter 1, we can make the following comparisons with the pollution control consequences of crude oil washing:

2.4.1 The current programmes of routine crude washing have, for the majority of oil tankers using this method, been devised on the following basis:

- washing the departure ballast tanks;
- washing the arrival ballast tanks;
- washing one-third or one-quarter of the remaining tanks; which represents 60 to 75% of the total capacity of the vessel. We can thus see that a tanker that regularly practices crude washing **permanently** has enough capacity available to take on all the ballast she needs for her operations, in any weather. Moreover, the water in a tank that is only washed with crude oil only has an oily film on top of it, which scarcely represents pollution even if load-on-top procedures are not properly applied. Here, the contribution of crude washing

(Continued on next page bottom)

Industrial Ports and Economic Transformations

Series No.1

By Paul Hanappe and Michel Savy

Head Office Note:–Under the above title this journal, beginning with this issue to last eight months, will carry a treatise by two eminent French economists, Mr. Paul Hanappe and Mr. Michel Savy whose careers are briefly introduced here with their portriats.

Of Mr. Paul Hanappe, he is a scientific manager of a consortium of firms specializing in long term forecasting and regional planning, and simultaneously teaching economics at the University of Paris.

Mr. Hanappe presently is an Associate member of IAPH who presented to the 10th Conference in Houston a paper entitled "Industrial Area Facing the Crisis". He also acted as a panelist for the Working Session No. 3 discussing "Port Contribution to International Trade and Development.

The first installation of the series includes the contents of the treatise in full for readers' preliminary information and attention.

Any comments or impressions of this serial treatise will be warmly welcomed by Secretary General. (TKD)

Mr. Paul Hanappe

Mr. Michel Savy

Paul HANAPPE, aged 46, studied economics in the Universities of Louvain (Belgium) and Princeton (New-Jersey–USA). His main interests and his publications are in the fields of international economics, transportation, industry location and long term developments.

As a consultant, in the sixties, he was the chief adviser to the steel companies for deciding the construction of the steel plant in Fos-Marseille. In the early seventies he was a member of the French governments team on long term forecasting. He is the author of books on the multinational companies, forecast of the state of France in the year 2 000, industrial developments in Western Europe, and of various articles on similar topics.

Presently, he is research director at "Development et

---

to sea pollution control, form the point of view of this part of the problem, comes near to maximum efficiency.

2.4.2 **Routine crude washing** means washing one-third or one-quarter of the tanks, in addition to those which are to contain the departure ballast and the arrival ballast. This makes it possible to combat the accumulation of sediment and all the consequences that result from it, as seen earlier.

This washing gives surprising results, without using sea water, and consequently without incurring pollution risks through the possibly inefficient use of Load-on-top procedures. Compared with segregated ballast, which made no contribution to sea pollution control at this stage of tanker operations, crude oil washing radically eliminates this source of pollution.

2.4.3 Lastly, there is the aspect of maintenance or repairs to a faulty system inside a tank. Take the extreme case of a tank that has not been included in the washing programme, whether it be water washing or crude washing. Here, both types of vessel, the one washing her tanks with sea water and having segregated ballast, and the one washing her tanks with crude oil, are on an equal footing–both are obliged to use load-on-top procedures. However, the tanker that has washed her other tanks with crude oil will be at an advantage, because she will have made little use of the capacity in her slop tank and will therefore be able to implement the load-on-top method more easily.

3. CONCLUSIONS

At the present time, leaving out of account the political, sociological and psychological aspects of the matter, a most cost effective adjunct to the control of pollution of the seas by oil tankers proves to be crude oil washing. The method can be implemented using equipment already available on VLCCs, or capable of being installed at a cost commensurate with its many commercial advantages. The various techniques for utilising the method have been perfected and there is really only one aspect which requires further attention on the part of industry international organisations: the further standardisation of safety procedures. Crude washing is usually implemented in the port of discharge, and this means that a task which has always been considered a part of the operation of tankers needing particular skill and care–the washing of the tanks–is brought within the reach of expert supervision. Moreover, it will also be necessary for vessels to know what procedure to follow, what items to put on their check-lists and what safety regulations to apply, in any port of discharge. Just as the I.O.T.T.S.G. has done on an international basis for loading and discharging operations, the use of this means of minimising sea pollution must be regularised by the introduction of safe procedures that are internationally accepted. Once this has been done, the effectiveness and safety afforded by the method will no longer be in doubt.

(Note: This is the reproduction of paper which was sent to the members of the COLS as the attachment to the Chairman's report on the New York meeting.)

Aménagement" in Paris and teaches Economics at the University of Paris-Dauphine.

After completing this work on industrial harbours, which was the result of an extensive study, conducted by Michel Savy and himself, in the main harbours of Western Europe and Japan, he now works further on the long waves in the economy and their impact on ground transportation.

Paul Hanappe lives in Paris, where he is married and has two children, aged 8 and 5; his wife is also a transportation economist.

Michel SAVY, aged 31, is an engineer from the Ecole Centrale (Paris). He also studied physical planning (Institut d'Urbanisme) and economics (Paris-Sorbonne University). His main interests deal with regional science, international economics, the role of the State and public policies. He is a researcher in Developpement et Aménagement (Paris), and a lecturer in the National School for Civil Engineer of the State and in the Paris-Dauphine University (applied economics).

He has published, in cooperation with various other authors:

- L'Industrie en Europe, 1974
- Europe médiane, 1975
- Restructuration de l'appareil productif français, 1976
- Le scénario de l'inacceptable, 7 ans après, 1977

all those books being edited by the Documentation Française.

He is now taking part, in cooperation with Paul Hanappe in a research program about international economics and transport policies, in which the maritime industrial areas study takes place. He will presently lead, in cooperation with Prof. L'HUILLER, from Aix-Marseille University, a research program about sea transports facing the new international division of labour.

CONTENTS

"And over every nation of this earth the high winds, High winds rejoicing in their might, showing neither care nor restraint, and leaving us like men of straw, Dummies in the wake of their path . . . Such high winds, reflected in the eyes of every living man."

Saint-John Perse

INTRODUCTION

Since the end of the Second World War there has been a quite amazing growth in maritime transport. Those ports which have kept pace with this trend, and have adapted themselves to it, have seen their roles expand and change: certain of them have, in fact, undergone a total transformation, changing from points for the trans-shipment and transit of merchandise to powerful magnets for industrial growth.

For several years now the economies of the capitalist industrialised countries have experienced a serious slowing down in their rate of growth, sometimes to the point of no growth; they are the victims of monetary, energy, ecological and other crises: in fact the victims of a general crisis, the nature and duration of which are now the subject of many discussions.

This situation has had its repercussion on port economics: there has been a slowing down in the rate of growth of traffic, leading to difficulties in financing capital investments and to reductions in industrial expansion programmes. This is the framework which preoccupies those responsible for ports and, more generally, all who are concerned with transport, industrial and regional development policies, in particular it imposes its constraints on the drafting and implementation of the Seventh French Plan.

These recent changes cannot, however, be reduced to a simple quantitative slowing down in the rate of growth, which would have simple and direct consequences, of the type of an elasticity factor, on transport and port activities. There are also the more fundamental changes which qualitatively affect the data of the problem.

The geographical distribution of industrial activities is, at the present time, experiencing considerable change; in many industrial branches part of the production process is now carried out in various under-developed countries. There are many mechanisms involved in these movements, and they operate in different ways according to the industrial activities concerned; behind all this diversity one can however see a general phenomenon of a dispersion of production, certain phases of which tend to be located in under-developed countries, whereas others are in countries which have been industrialised for many years. This evolution has direct and inevitable repercussions on international transport, and on the content of port industrial zones. It is not possible to analyse and to understand them if we are content to extrapolate, using lower rates of growth, the trends shown in the two previous decades.

More fundamentally it is necessary to identify as the deeper cause of these phenomena the reduction in profit levels which has been shown in certain respects ever since 1966 or 1967. The very considerable expansion which took place after the Second World War was based on the vigour and high profitability of certain branches of activity which may be termed "dominant" in the period being considered: this is the case with petroleum, petrochemicals and the automobile industry. It is also necessary to ask if, as a result of the crisis, one or more new dominant branches will emerge, able to influence most of the economic adjustments and, in particular, the transport activities; in this context the group consisting of data processing, teleprocessing and telecommunications comes to mind. We know from our previous work on this subject[1] how transport effectively lends itself to a vector role in the dominance of such a branch over the whole of the economy. However, as observation of contemporary facts, and recourse to economic history and to the theories of general economic movements, suggest, a little less than ten years ago the capitalist world entered on a long phase of depression and reduced growth; at the present time it is premature to envisage any massive sectorial redeployment in the next few years. The crisis has reduced opportunities for profit, and it will not therefore be until its still far-off end that we can hope for any major development of new activities. Meanwhile, and to use contemporary terms, redeployment during that period will be carried out mostly in the existing branches of activity, in seeking new outlets and some compression of production costs.

[1] P. Hanappe and M. Savy—Internationalisation of the economy and national transport policies, Paris, duplicated document, Prospective et Aménagement, 1975, 35 pages and two appendices (in French).

The antithesis between these two possible types of redeployment is not, however, so clear cut: it will be during the crisis that the foundations for the following period of prosperity will, if it is at all possible, have to be laid.

The following pages set out a tentative interpretation of the future of the port industrial zones and, more generally, the ports which give rise to them, in the face of the development of these new trends. The reply given is undoubtedly neither exhaustive nor definitive. Our first aim is to justify the relevance of this way of looking at the new challenge to maritime ports, and to show that it is impossible to consider the precise and concrete problems affecting the ports and the transport industries associated with them in the future if we evade the more fundamental questions of the economic future. We hope in this way to have traced out the pathways, undoubtedly provisional and uncertain, which will nevertheless make it possible to advance in our understanding and in our consideration directed towards future action.

☆ ☆ ☆

It can be seen quite clearly from this approach that the ambition of the present document does not go beyond this attempt to provide an answer. Obviously it does not include the enumeration of all the facts which influence port industrial zones, nor does it provide an exhaustive summary of recent trends.

It is as a function of their pertinence to the problem which will be sketched out that various facts and trends have been retained. It is also as a function of this pertinence that the geographical field of our observations has been established.

The geographical field covered

Matters concerning the sea extend beyond national frontiers. Even if we wished to centre our work specifically on France the necessity to take into account the phenomena which occur at a world scale, and of which the effects are shown at a continental scale, would make it necessary to look beyond the frontiers. As far as the analysis of the general economic movements which condition maritime and port developments is concerned these are

of world amplitude, and will be examined as such. In the face of these general movements behaviour and adjustments are not limited to one country, but to a group existing within a similar situation; the developments which directly affect port economy occur at a Western European scale. All the countries in this unit were affected in a similar way by the wave of internationalisation of the economy which followed the Second World War; in all of them there was a more or less rapid replacement of raw materials extracted from the national soil by imported raw materials: American multinational companies have developed to differing extents in each of them; all have been affected by the growth of trade in intermediate and finished products between the larger components of the developed capitalist industrial world, and the same applies to the more recent trends linked with the monetary crisis, the energy crisis, the "new international distribution of work", and other factors. This is why a satisfactory analysis of the influence of these factors on port economy cannot be restricted to the national level and must also include observations made on the North Sea ports and the ports of Great Britain and the north-west Mediterranean.

Unlike the situation in other fields any comparison with the United States of America runs the risk of introducing more confusion than elucidation unless we consider the detailed studies, in areas so diverse that they largely fall outside the framework of the work which is being undertaken.

One of the major reasons for this is that the United States is not only the largest of the capitalist industrial countries; it is also one of the largest world producers of raw materials; their introduction into the world economy and, in particular, the patterns of their maritime and port activities, are very different from those of the countries of Western Europe.

Japan, by contrast, is in a much more similar position to that of the Western European countries. It has been forced even more rapidly to substitute imports of raw materials and energy resources, brought over long distances, for its traditional sources, whether national or neighbouring; it has taken an even more vigorous share in the increase in international trading in intermediate or finished products. These are not the only analogies, but they are very basic ones where the problems of port economies are concerned. The differences are of course not negligible: firstly there is the geographical structure of the country and its consequences both on the importance of maritime traffic in trading and also on the organisation of land space (shortage of land, urban concentration); its particularly rapid rate of growth, later and more vigorous than that of Europe, has highlighted problems such as pollution, and has resulted in protective measures and similar reactions. From a methodological point of view such differences, within the framework of a situation which presents such fundamentally similar traits, nevertheless form a particularly favourable ground, by reproducing conditions similar to those of a laboratory in which one can measure the intensity of the causes and then compare these with the effects produced. This is why the Japanese ports, and all the factors connected with them, have been deliberately introduced into the geographical field of our research; observation of them makes it possible to be assured of the generality of the trends and phenomena observed and so to appreciate, far better than if we confined ourselves to Western Europe, the relative weight and interaction of the various factors and, in certain cases, to extrapolate the trends which can be seen on that side of the globe with more confidence.

CHAPTER I

THE NATURE AND GENERAL FRAMEWORK OF THE PROBLEM

1.1. THE DEVELOPMENT OF PORT INDUSTRIAL ZONES SINCE THE SECOND WORLD WAR

The increasing internationalisation of the economy during recent centuries, and in particular since the industrial age, was only made possible by the constant growth of international transport and, in particular, maritime transport. The growth of ports was the necessary corollary of this, both in the developed industrial countries and also in those Third World countries which were subject to their influence.

Up to the middle of the twentieth century the main function of the ports was transit, whilst commercial activities developed simultaneously in the port towns. Industrial development linked with port activity remained modest and only involved a few specific activities, generally related to the treatment of "colonial" products, of which palm oil is obviously the most striking example.

After the Second World War there was a new wave of internationalisation of the economy which accompanied, in a classical manner, a phase of long and sustained expansion of production. It was already possible to observe that phases of major economic expansion in the past were accompanied by a more than proportional increase in international trading.

Trading, however, of different kinds. During the two decades which followed the Second World War there was a particularly marked growth:

- in trading in goods, and in particular in finished industrial products, between the countries of Western Europe;
- in trading in finished or intermediate industrial products between the subsidiaries of the same company, spread over several countries or even over several continents. The European subsidiaries of the American multinational companies were largely the recipients of this traffic. This resulted in a change in the actual nature of international trading; the latter had traditionally involved sales of goods between distinct economic agents located in different countries; it now became increasingly composed of transfers of products between the subsidiaries of the same company;
- in the importing of massive quantities of metallic raw materials and energy products, largely from the Third World countries. It is this latter phenomenon which was the origin of the development of the port industrial zones. It must therefore be examined in greater detail.

For most of the time these latter imports replaced the consumption of domestic energy products and raw materials. This was particularly true for those western European industrial countries which had, in their soil, coal, iron ore, etc., and which changes in price ratios caused to be progressively abandoned in favour of imported petroleum and iron ores from Africa, Latin America, or other areas. Similar processes can be seen in the United States and in Japan with, however some differences. The United States, which have in their country abundant and economically exploitable raw materials and petroleum, whilst still importing massive quantities, are less dependent on these imports;

Japan on the contrary has few natural resources and was cut off from its traditional nearby sources of supply (Korea, Manchuria, China); it therefore based its industrial development much more rapidly and completely on imports of raw materials and hydrocarbons.

These changes have fundamentally affected port economies. The tonnages handled by ports, or rather by certain of them, increased to a very considerable extent. The structure of port traffic was profoundly changed, as can be seen from figure 1.1., dealing with goods entering French ports from 1950 to 1974. The considerable increase in tonnage is due mainly to the increasing volume of petroleum products and metal ores[1], as may be seen in the following table which indicates the relative importance of these materials in absolute tonnages and in percentages for the years 1938, 1951 and 1974.

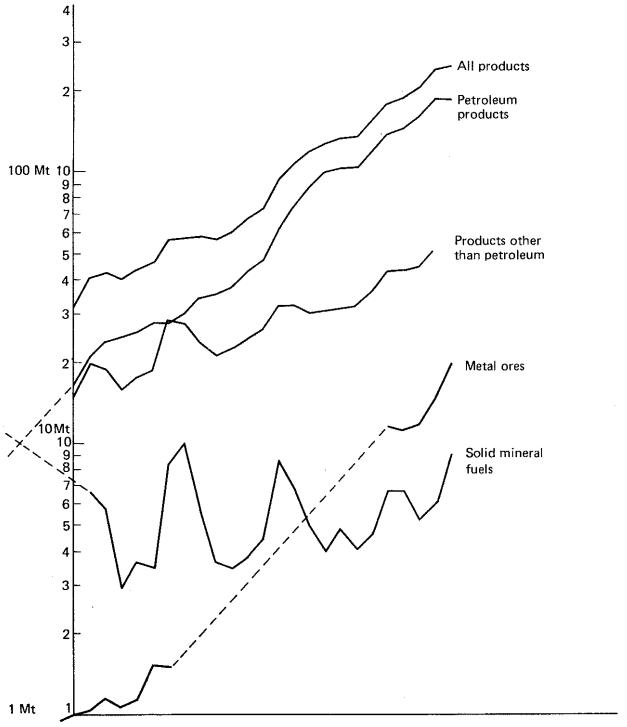
[1] amongst these, and out of a total tonnage of 19.6 million metric tonnes discharged in 1974, iron ore accounted for 16.3 million tonnes or 83%, manganese ores for 1.4 million tonnes or 7.3%, and bauxite for 0.9 million tonnes or 4.8%.

Table 1.1.

Relative importance of the goods entering French ports

Year	Solid mineral fuels		Petroleum products		Metal ores		Total tonnages entering	
	tonnes	%	tonnes	%	tonnes	%	tonnes	%
(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)
1938	10,755,000	32.1	9,021,400	26.9	814,000	2.4	33,500,000	100
1951	6,572,700	16.1	21,019,437	51.3	1,039,300	2.5	40,936,946	100
1974	9,210,907	3.7	185,552,401	75.2	19,588,322	7.9	246,628,079	100

Figure 1.1. Goods entering metropolitan French ports (Source: Direction des Ports Maritimes et Voies Navigables)



These two categories of bulk goods, which in 1951 represented scarcely half the total traffic, accounted for more than four-fifths in 1974. The increase in the tonnage entering French ports between these two dates is accounted for by an 80% increase in petroleum products and a 9% increase in metal ores[1].

These raw materials and energy products have to be subjected to a first conversion (refining of petroleum, production of steel, aluminium, etc.), for which the influence of location factors obeys a largely Weberian logic[2]: the choice of the site of production results principally from taking into consideration the costs of the raw materials and the finished products, and where the aspects related to labour costs, the industrial fabric, the technological environment, etc. play only a secondary role.

How and why these considerations have operated in favour of the location in port areas of petroleum refineries and (in a second logical, if not chronological, phase) of a large part of the chemical industry, the production of steel, aluminium and sometimes certain first conversion activities of these materials, is a question which will largely be answered in the second chapter of this book.

[1] These figures would be even higher if one considered all bulk transport, in particular solid mineral fuels. In fact on a world scale the maritime transport of coal increased during this period at rates which were hardly lower than those for petroleum products and metal ores. In the case of France, however, maritime imports of coal, whilst being subject to the influence of major world movements (and in particular the phenomenon of coastal iron and steel production), have been more affected by changes in French energy policy. For this reason it is better not to take them into account when illustrating a phenomenon of world size.

[2] Alfred Weber, **On the location of industries–Part I. Pure location theory,** Tubingen 1909 (in German): American translation by Carl J. Friedrich: **Alfred Weber's theory of the location of industries,** University of Chicago Press, First edition 1929, Second edition 1957.

What is important to note at this stage is that, at the conclusion of the very intensive internationalisation of the market for raw materials and energy products[1], industrial activities of a new type have been installed in the port zones, often even bordering the quayside itself. These are not confined, as before the Second World War, to activities involving the conversion of colonial products, relatively marginal in the economy of an advanced industrial country, but involve an increasing share in the initial conversion of materials playing an essential and central role in the industrial economy.

In order to deal only with the main activities we will look at petroleum, chemicals and iron and steel.

As far as petroleum is concerned the first refineries were established in France from 1930 onwards in the port zones. It was however after the Second World War that this trend became established to a massive extent in all the European countries. Practically all the French refining capacity was located in port zones up to 1966 (see figure 1.2.). The increasing part which petroleum has taken in the energy supplies of the industrial countries since the Second World

War (some 60% of the requirements of the EEC in 1973) is well known. On a world scale the contribution of petroleum increased from some 15% in 1929 to about 40% in 1971.

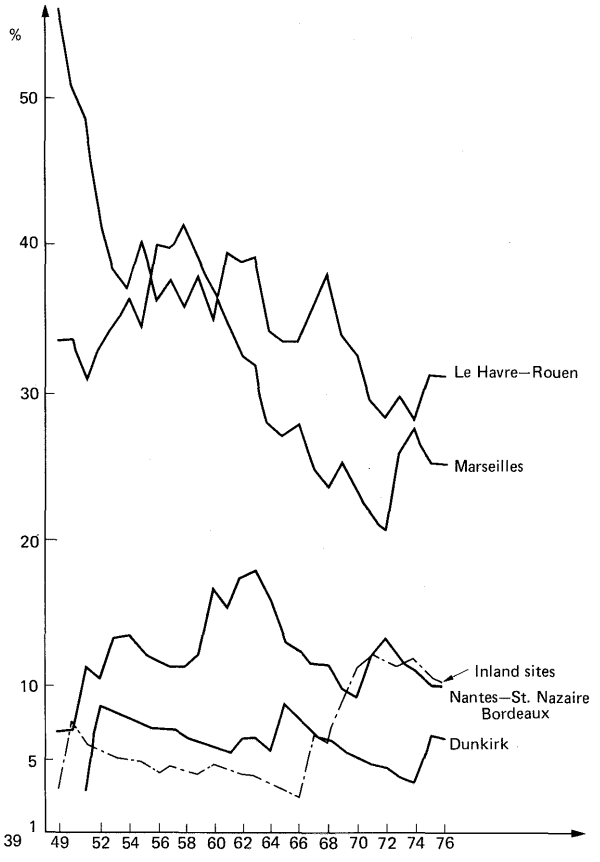
The importance of petroleum has increased in areas other than the energy field: as a raw material it conquered a large part of the chemical industry. Table 1.2. shows that most of the factories producing the principal first generation chemical products are located in port zones.

As far as the iron and steel industry is concerned the phenomenon of coastal iron and steel works of which Dunkirk and, more recently, Fos are an illustration in France is also well known. In fact most of the large units commissioned in Europe since 1950 have been in port zones[2]. Similar developments have taken place in Japan, but even more rapidly and spectacularly than in Europe. This arises from the fact that this country was suddenly cut off, at the end of the war, from its sources of raw materials in Korea and Manchuria.

[1] itself directly linked to changes in maritime transport, as shown in the first phase of this research work, during the examination of the iron and steel industry: P. HANAPPE and M. SAVY, op. cit.

[2] see on this subject the volume devoted to the iron and steel industry in the first phase of this research work, in particular pages 10 et seq.

Figure 1.2. Location of refining capacity in France (as percentages)



The extensive destruction due to the war demanded the almost total reconstruction of the productive apparatus. This destruction "liberated" land, particularly in the port zones, the preferred targets for bombing raids by the Americans; the war in Korea led the latter to construct new ports for military use, and these became generally available at the end of this war. The inertia observed in Europe, due to the existence of the old heavy industrial areas, which were far from being completely destroyed, and which still had their local sources of raw materials (the Ruhr, Lorraine, Wallonia, etc.) did not therefore operate in Japan. The port industrial zone transformation was therefore far more rapid in this country.

In the United States, on the contrary, the phenomenon, although not absent, was masked by the existence of competitive raw materials (petroleum, natural gas, coal, iron ore, etc.) in the country.

The main industries for which establishment in port zones is the normal and general solution have been looked at. In the other industrial branches one sees less generalized port location: this is the case with automobile manufacture. Traditional locations for this activity were by no means in port zones; as far as new factories established in Europe after the Second World War are concerned port installation was certainly not the most widespread nor the commonest solution. With the increasing internationalisation of the industry[1], however, a significant number of these new factories were situated near the large maritime ports, rather than in the port industrial zones themselves. The movement was relatively hesitant in France (Renault at Cléon and at Sandouville, Simca at La Rochelle, Ford at Bordeaux); by contrast the greater part of the Belgian automobile industry[2] is located near the port of Antwerp. In Japan the greater part of all automobile production is to be found in the coastal urban areas, but only the Toyota plant at Nagoya and the Mazda plant at Hiroshima can be considered as in port zones.

[1] See the volume devoted to the automobile industry in the first phase of this research work.

[2] consisting of the subsidiaries of foreign firms, particularly American.

The result of this overall movement is that certain maritime ports have become magnets for industrial development. Sometimes they were grafted onto a pre-existing industry; in other cases they have developed on land which was free from any industrialisation: heavy industries have also been established in a port as part of a deliberate policy of industrial development, but such policies have not always been crowned with success[1].

We can already see that these industrial branches figure amongst those which have most influence in the economy of the industrial countries; after the Second World War three of them, petroleum, chemicals and the automobile industry, figure amongst those which will be described later (in paragraph 1.2.1.) as the "dominant branches" which were characteristic of this period.

One aspect of the phenomenon which is of considerable importance, particularly in relation to the transport policies, is concentration in port zones. This results firstly from the technical and financial requirements of maritime transport itself (the increase in the size of bulk carriers making it necessary to select ports as a function of depth of water, and the concentration of the considerable financial resources required for terminal installations, the cost of which is more than proportionate to capacity[2]) and secondly from the influence of scale economies in the converting industries, to which we will return in paragraph 2.1.3. of this volume.

[1] See "The industrial platforms of Fos and Calais-Dunkirk"–F. Dussart, P. Hanappe, B. Haumont, M. Savy–**Annuaire d'Aménagement du Territoire**, CERAT, Grenobles, March 1977 (in French).

Table 1.2.

Location in France of the production of the main first generation chemical products (1974)

Port zone or industrial area	Location of the factory	Producing company	Products manufactured (*)							
			olefins				aromatics			
			(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
1	2	3	4	5	6	7	8	9	10	11
Le Havre	Gonfreville	Total-chimie						x	x	
	Gonfreville	ATO Chimie	x	x		x		x		
	Gonfreville	CFR	x	x	x	x	x			
	Oudalle	Hydrocarbures de St-Denis					x	x		
Rouen	Port-Jérôme	Esso-chimie	x	x	x	x			x	x
Nantes-St-Nazaire	Donges	Antar-Pétroles de l'Atlantique					x	x	x	x
Bordeaux	Pauillac	Shell-chimie		x						
Marseilles	Lavéra	BP					x	x		
	La Mede	CFR		x						x
	Lavéra	Naphtachimie	x	x	x	x				
	Berre	Shell-chimie	x	x	x	x	x	x	x	x
All port industrial zones			5	7	4	5	4	6	5	5
Lyons region	Feyzin	Elf-France					x	x		
	Feyzin	Union-chimique Elf Aquitaine	x	x		x	x	x		
East	Carling	CdF Chimie	x	x			x			
	Herrlisheim	Raffinerie de Strasbourg (CFR, BP, Antar)								x
North	Drocourt	CdF Chimie					x			
South-West	Lacq	SNPA	x				x			x
All inland areas			3	2	–	1	5	2	–	2
Overall total			8	9	4	6	9	8	5	7

(*) Product code:
(1) ethylene (3) butylenes (6) toluene
(2) propylene (4) butadiene (7) xylenes
(5) benzene (8) sulphur

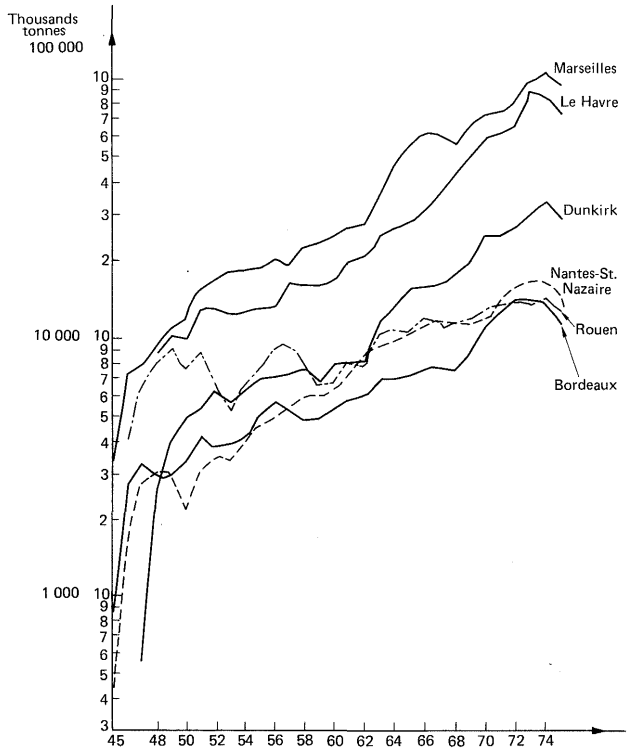
[2] Whilst the inverse is true for maritime transport itself. Cf. P.M. Fourt, Cost of sea transport of mineral substances, **Les Annales des Mines,** volume III, p. 177 to 261–1957 (in French)

The concentration of port traffic in the principal ports, and particularly in Marseilles and Le Havre, can be seen from figure 1.3. In fact whilst this concentration has continued in a relatively steady manner during the period observed it should nevertheless be noted that the choices were made very early on, and that the strong position of these two ports could be seen from the beginning of the fifties. This arises both from the natural advantages (depth of water, situation in relation to sources of supply) and to the influence of the hinterland. As a result the advantages acquired tended to be consolidated and increased, in particular because the high volume of traffic gave the ports concerned the financial resources which allowed them to keep pace with the increasing size of vessels and of port installations more easily; thus the general cumulative mechanisms of spatial economy reinforce this effect.

Port concentration does not only affect the traffic. It is even more noticeable when one observes the location of port industries. There is, as is logical, a direct link between the points of entry of crude petroleum and the location of petroleum refineries. The areas of Le Havre and Marseilles are therefore preponderent where refineries are concerned; but here also the relative positions were established very early, and the subsequent saw-tooth variations result from the large mass of the unit investment tranches, whether involving the commissioning of a new refinery or the extension of the capacity of an existing refinery. It is necessary to take into account, as from the middle of the sixties, the appearance and fairly rapid growth of the phenomenon of inland refineries, which will be analysed in paragraph 2.2.1. below.

In petrochemicals the concentration at the two "chemical platforms" of Le Havre and Marseilles is also clearly shown (see Table 1.2.). It is only on these two sites that one can see the production of the whole range of first generation chemical products. As we will see in chapter II, external economies are important where chemicals are concerned; it is one of the branches where the cumulative effects of industrial concentration have considerable in-

Figure 1.3. Distribution of traffic between the autonomous ports



fluence on the location of new capacities.

In the iron and steel industry there have been, sometimes since the beginning of the century, some coastal plants, the positioning of which resulted either from the presence of local ore (Mondeville steelworks near Caen) or from strategic considerations (the blast furnaces of Rouen, built during the First World War and finally closed down in 1967) or other special considerations. Coastal iron and steel works after the Second World War were a phenomenon of another order of size; they are all located near one of the principal European ports[1].

[1] The following is a list of the largest units in Europe with the date of their commissioning; Port Talbot (Great Britain, 1951); Ijmuiden (Holland, 1952); Cornigliano (Italy, 1953); Bremen (West Germany, 1957); Ghent (Belgium, 1959); Dunkirk (France, 1962); Taranto (Italy, 1965); Fos-sur-Mer (France, 1973).

It can be seen therefore that port concentration is a phenomenon which is more marked in the industrial establishments than in respect of the traffic, and that to a large extent it is port industrial zone concentration which is the motor influence on the concentration of traffic.

This movement towards the establishment of heavy industries in the ports began to slow down as from the second half of the sixties. If we consider the dates of commissioning of the major iron and steel plants in port areas[1] it can be seen that, between 1951 and 1965, seven plants were commissioned in Western Europe, and average of one every other year. Since 1965, in a period of twelve years, only one unit, that of Fos-sur-Mer, has been built; this was in 1973. Similar observations can be made in Japan.

[1] See previous footnote

As far as petroleum refineries are concerned figure 1.4. shows that, in France at least, the vigour of the growth of this dominant branch was such that the increase in capacities followed a generally sustained rate up to 1975. A halt in the creation of new refineries in ports from 1960 onwards can, however, be seen (with the exception of the refineries at Fos in 1965 and Dunkirk (Mardyck) in 1974). Since this date increases in capacity have taken the form either of the creation of new inland refineries or of extensions of the capacity of previous port refineries.

More recently it is the overall increase in traffic which has been affected. As can be seen in figure 1.5. the increase in the tonnages handled stopped in 1973. This was undoubtedly a result of the energy crisis, and then of the world crisis. However these crises are not exogenous phenomena; they must logically enter into the general explanation which we will attempt later. It will be recalled that the increase in the tonnages handled in ports since the Second World War is largely due to imports of petroleum and metal ores which were largely converted in the same port (cf. Table 1.1.), and it is not therefore surprising that the stagnation in investment in heavy industries in ports, as observed in recent years, ends up by having repercussions on the traffic.

This raises the more fundamental question: is the volume of port activity and of industrial port activity a simple function of the overall volume of economic activity, or does it obey its own laws which are no doubt involved in the overall economic explanation, but of which the repercussions are not likely to be linear in respect of the major macro-economic developments?

Figure 1.4. Location of refining capacity in France (in thousands of tonnes)

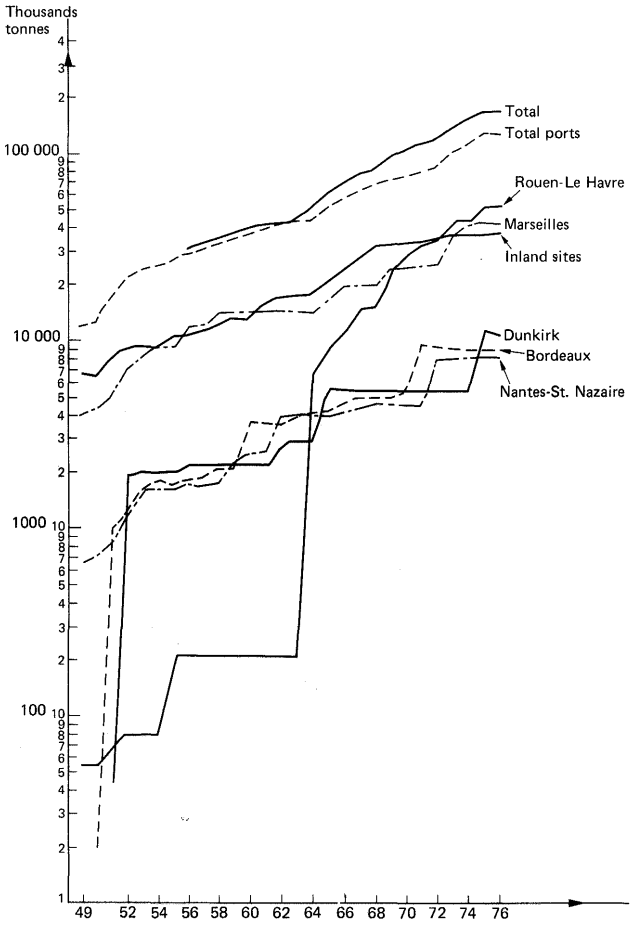
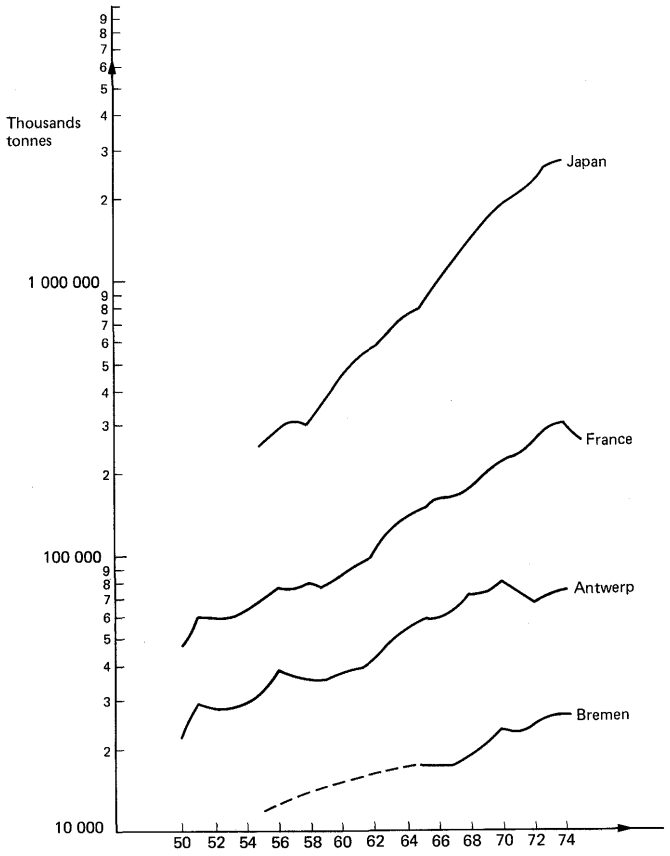


Figure 1.5. The growth of port traffic



In the first case it is the observation and forecasting of these magnitudes which anyone concerned with the short and medium term future of ports must consider; the art of the forecaster would then be sufficient to clarify the plans of the port engineers. We should immediately point out that this is not our position. Without going as far as to state that they defy analysis it is nevertheless certain that the relationships between general economic development and the future of the ports and port industrial zones are much more complex. Our proposal here is precisely to examine them so as to understand their structure, we believe that we have shown that it is in this way, and in this way alone, that it is possible to understand the effects of the crisis, and of the slowing down of growth, on port industrial zones and on what is already appearing as a re-orientation of the activities of the principal ports.

However this implies that, parallel to the observation and the analysis of what is happening in ports, we must plunge into those murky waters where general economic movement laws are organised and that, beyond the controversies which flourish there, we will be able to discern a body of hypotheses and interpretations which are coherent and usable for our purposes. This is the object of the following paragraph.

1.2. THE GENERAL ECONOMIC FRAMEWORK

From 1973 to 1976 the advanced capitalist countries, grouped within OECD, saw their production increase by less than 2% per year; in many countries growth was nil over the last two years. The number of unemployed, without rising to the proportions of 1929, nevertheless rose to 14 million in the OECD countries. This contrasts sharply with the rate of growth in the previous decades, which were in excess of 5% per year for more than twenty years; certain countries, such as Italy and Japan, even sustained rates of the order of 8% for ten years or more. It was imagined that unemployment had been finally reduced to the role of a marginal phenomena.

This brutal slowing down in growth crowned, if one may use that word, a group of crises and the difficulties which were shown in an acute manner in previous years. The international monetary system, established at Bretton Woods in 1944 and which ensured a modest inflation of international currencies, reached its limit with the devaluation of the dollar in 1971; from that time onwards the monetary crisis became a permanent one. The energy crisis served for many as a revelation of the tensions created by the international division of work in the previous decades. And one can add to these the ecological crisis and the urban crisis.

An increasing number of economists, belonging to very different schools, interpret these phenomena as a manifestation of a return to long-term economic movements of the Kondratieff type. The phase of high prosperity which followed the Second World War was of comparable duration to previous long expansion phases (of twenty to thirty years) and the difficulties and crises, the origin of which can be traced back to 1967, showed coherent traits with those of the previous long depression phases. Without claiming to be comprehensive one may mention authors as diverse as P. Boccara[1], J. Bouvier[2], P. Dockès[3], L. Dupriez[4], Jay Forrester[5] and E. Mandel[6].

Undoubtedly their theoretical bases and their interpretations diverge considerably. This is not the place to discuss them in detail. We will simply indicate what is our interpretation[7], and to show clearly what are amongst the fundamental characteristics of the present Kondratieff movements, those which may elucidate the history of the port industrial zones.

[1] Paul Boccara, Studies on State monopolist capitalism, its crisis and its result, Paris, Editions Sociales, 1973, 451p (in French)

[2] Jean Bouvier, The late François Simiand? Economic situations and social structures, E. Labrousse, Paris, Mouton, 1974, pp. 59 to 78 (in French).

[3] P. Dockès and B. Rosier–Factors towards an interpretation of the crisis–Monde en devéloppement, 1970 (in French).

[4] L. Dupriez, 1945–1971: An ascendant phase of a Kondratieff cycle? In: Diagnosis and prognosis (Volume in honour of Hans Kangelutkes) IFO-Studien, Munich, 1972, pp. 503-516 (in German).

[5] Jay Forrester, Business Structure, Economic Cycles and National Policy–Futures, volume 8 no. 3, June 1976 pp. 195-214.

[6] Ernest Mandel, The emergence of a new Arabian and Iranian financial capital, Critiques de l'Economie Politique, no. 22, October-December 1975, pp. 41 to 54 and 86 to 108 (in French).

[7] Paul Hanappe–The contemporary crises–Are we experiencing a Kondratieff reversal? Metra, XIV no. 3, 1975 (in French).

1.2.1. The ascendant Kondratieff phase after the Second World War. Its specific forms

As L.H. Dupriez[1] has so clearly shown each Kondratieff cycle has its essential forms and its contingent forms: essential forms corresponding to the gneral characters and the deeper necessities of the adjustments involved, and contingent forms from the historical times and the responses which are made to each situation as a function of the fundamental options.

We will not expand here on the essential forms, that is for an ascendant phase a sustained level of growth, economic variations in which the periods of rise are strong and extended and those of fall are brief, involving stagnation rather than recession, a slightly inflationary monetary

system so that expansion is not held back by a shortage of currency but which still inspires confidence in its users, etc.

In the contingent forms there are, in our opinion[2], characteristics which, in their essence, are found from phase to phase but with specific attributes. We will mention the three principal ones; it will be seen in chapter II that they are in a direct relationship with the appearance and development of the port industrial zones.

[1] Léon H. Dupriez. General economic movements, Louvain, IRES and Nauwelaerts, 1947 (1st edition) and 1951 (2nd edition), 2 volumes 552 and 648 pp., and The philosophy of economic situations, Louvain, same publishers, 1959, 504 p. (in French).

[2] Paul Hanappe, The genetics of dominant sectors and the growth of hierarchisation in the productive system, subject of research work financed by CORDES, duplicated note dated 20 April 1976 and supplementary note dated 31 May 1976 (in French).

a. the modes of internationalisation of the economy

Each ascendant Kondratieff phase is marked by an advance in the internationalisation of the economy. However, if one may summarise history in a few adjectives one could say that it was essentially commercial in the ascendant phases of the 19th century, that the exporting of capital was the dominant characteristic from 1896 to 1913, whilst internationalisation of the production process has characterised the latest ascendant phase. The massive recourse to raw materials and energy sources imported from the Third World, and the spectacular development of multinational firms with American capital, have been the two most notable forms.

b. the motive role of one or more dominant branches

Here we will again use the provisional definition which we gave in the summary report of the first phase of this research work. "A dominant branch is, during a particular phase of long-duration expansion of the economy, the area of operation of the most active fractions of capital, retained as a function of the requirements of the productive forces (needs themselves generated by the social system and, in particular, by the dominant branches of the preceding phase), of the state of the technology and science, of the financial structures and of the conditions of exploitation.

Its situation within the economy allows it to direct, to its own advantage, certain strategic aspects of social life; its influence is exerted on the economy well beyond what its directors consciously seek in relation to their own interests. This definition does not imply that the dominant branch or branches are the only explanatory factor in a given period of economic history".

Historically, and according to Schumpeter[1], the role of dominant branches (or rather, for him, of motor branches, introducing innovation) has been played by steel and by textiles (from 1792 to 1815) by the railways (from 1849 to 1980) and by electricity (from 1896 to 1913). For the ascendant period which interests us, and which can be approximately dated from 1947 to 1967, we may select the branches of petroleum, petrochemicals and the automobile industry.

c. the establishment of effective mechanisms for fighting the trend towards reduced profit levels. For P. Boccara[2] this role was played, during the last ascendant phase, by the devalorisation of capital fractions and their assumption by the State; in this way it is possible to explain, in particular, the wave of nationalisations which followed the Second World War.

These three forms are, obviously, not independent one of another, but one must not expect to find rigorously mechanical links, as observation of the last ascendant phase has suggested. During the latter the branches which appeared as dominant were those in which the internationalisation of the production process has been most clearly shown: this is obviously the case with petroleum and chemicals; the automobile industry experienced considerable Europeanisation of its markets and then, somewhat later, the Europeanisation and, more recently, the internationalisation of the production process[3]. We will see, in chapter II, that the port industrial zones form a point of convergence for the interplay of forces from these three specific forms of the latest Kondratieff ascendant phase.

[1] J.A. Schumpeter, **Business Cycles,** New York, McGraw Hill (2nd edition) 1964, 461 p.

[2] **op. cit.**

[3] Electronics and data processing, which are also at a peak of internationalisation of the production process, also experienced considerable growth during this period. One should not however attribute to them the character of a dominant branch, since their overall influence on the economy of this period is still relatively small. One may however legitimately consider that, as candidates for this title, they have every chance in the next ascendant period, undoubtedly in a different form, and including the new and extended field of telecommunications.

This is not the place to set out a general theory of Kondratieff movements and, in particular, to explain the causes of phase reversal. We will simply point out that the processes involved cannot be indefinitely cumulative, and that the forces which allow the rapid development of the economy meet their own limits, exhaust their own virtues, and see the latter changed into vices. An example of this is given by the Bretton Woods monetary system which allowed, over a period of twenty years, the moderate inflation necessary for the efficient operation of the system, but which contained within itself the seeds of its own destruction, namely the accumulation of deficits in the United States balance of payments which slowly but surely led to the monetary crisis of 1971. We will see in the second part of chapter II other examples of this kind in which the forces favourable to the development of the economy finally result in the reversal of their beneficial effect, or at the very least come up against the limits to their own development.

We can therefore immediately move on to an examination of certain aspects of the descendant phase.

1.2.2. The recent Kondratieff reversal and the new international division of work

The fundamental component of entry into the descendant Kondratieff phase is the reduction in profit levels. Certainly this is not easy to measure and it would be naive to rely on figures published in balance sheets. The "historical panorama" of INSEE[1] shows that, in France and for all branches, the productivity of capital consumed dropped significantly after 1964; in 1972 it stood at 85 on a 1959=100 basis. It fell even more in the intermediate and consumer industries; it rose only in energy and transport-telecommunications and remained stable for the equipment industries.

[1] Christian Sauter et al. Historical panorama of the productive system, Paris, INSEE, collection E, no. 27, 1974, 231 p. (in French).

Here is the key to the reluctance to invest which we have seen in the iron and steel industry in particular. Here is the origin of the behaviour patterns which have developed to produce the existing crisis and the high rates of unemployment.

But this is not all. In the face of threats of a worsening of the situation implied by this development entrepreneurs have naturally reacted by trying to hold down costs and to increase their sales. In the second half of the sixties they sought a remedy in the under-developed countries which had politically, sociologically and geographically appropriate characteristics. According to the branches it was a question of locating lower wages, expanding markets or anti-pollution legislation which was less constraining than that which was developing in Japan, northern Europe, the United States and, to a lesser extent, in western Europe. Even more frequently it was a question of a combination of these factors. Another factor intervened more recently: the oil-producing countries, or at least the more populated ones, attempted to establish an industrial base with the additional revenue arising from the price rises of 1973. The question therefore arose of knowing whether this was an attempt to ensure autonomous development or if the true masters of the game were still the large oil companies or other companies in the capitalist countries[1]. Whatever the position this was an additional reason for the location of certain parts of the production process in various under-developed countries. Most frequently it was only a part of this process. The branches which were transferred were those which had the highest pollution levels; it was often a question of components situated upstream of the production process. The branches affected were diverse, from the automobile industry to textiles, from paper-making to electronics. The first section of chapter III gives detailed descriptions of the trends in those branches which are of interest to the port industrial zones, and on the consequences of this in relation to transport. It will be seen that, in this descendant phase also, the content of the port industrial zones is a valuable indicator of the emergence of this new international division of work, as it is generally termed, now that public opinion has become conscious of it.

[1] J.J. Chevalier, The new petroleum stakes, Paris, Calmann-Levy, 1972, 305 pp. (in French).
– E. Mandel, op. cit.

The question therefore arises of knowing if the port industrial zones, as they have appeared in the last twenty-five years, were merely an intermediate stage in a multi-continental explosion of industrial activities: are they able to maintain their existing activity, if not to develop it, according to the same trends as formerly? Does the new international division of work, whilst reducing this basis of their development, offer another in the form of elements situated further downstream in the production process: the second or third conversion of materials which now, and to an increasing extent, are undergoing their first conversion in the countries producing the raw materials?

One can find the elements of a reply to these questions in the observation of recent trends in industrial localisation in ports, as will be shown in chapter III. One must not, however, expect to find results as spectacular as those which were shown in the phase of explosive development of the port industrial zones during the last Kondratieff ascendant phase. This results from the very nature of the descendant phase in which we are now. The slowing down of growth and the reduction in profitability of investments, which are the major cause, reduce the overall volume of investments and in particular those involving ports, on one side of the water or another, both in the former and the latter manner. The crises, which in the descendant Kondratieff phase are more serious and more lasting, demonstrate excess production capacity and therefore hold back the implementation of the consequences of the new economic rationality. The operations of disengagement and re-engagement of capital which are observed[1] occur within the framework of several years of almost stagnant overall industrial production, and the redistribution of activities between developed and under-developed countries, although still real and clearly detectable, is also slowing down. Certainly the stagnation of production does not imply immobilisation in the productive apparatus; on the contrary it is in the depressive phase that the reduction in profitability, the efforts to reduce costs, and the necessity to seek new markets often unhappily result in reorganisations which could be held back when prosperity was more general. But things occur in a less spectacular manner, and it is the true nature of the descendant Kondratieff phase that it does not offer clear, evident and universal solutions to the problem of the valorisation of capital. For the most active fractions of the latter it is a period of caution in the search for solutions capable of replacing those of the previous epoch which have exhausted their usefulness; this tentative searching means that, along with the successes, there will be errors; observation of trends shows false paths intertwined with those which subsequent history will show to be the most appropriate solutions to the crisis[1].

[1] M. Savy, J.P. Delilez, C. Durand, P. Hanappe, C. Henry: Industrial charge and the role of the State in "The restructing of the French productive apparatus". Collection Travaux et Recherches de Prospective no. 65, Paris, Documentation Française, 1976 (in French).

[1] It is for this reason that the factors which made it possible to establish the prosperity of the last ascendant phase have, to a large extent, appeared during the depressive phase between the wars. In Italy the pillars of the period of expansion, the so-called "Italian miracle", were I.R.I. and E.N.I. and these were established between the two wars as a happy solution to heal the breaches caused by the crisis and to attempt to organise, in an ordered manner, an industrial withdrawal. May the nationalisation of the French SNCF in 1937 perhaps be considered as a "cautious" precursor of the major wave of nationalisation which followed the Liberation?

Information on The Port of Gothenburg

(See front cover also)

by Mr. Sven Ullman, General Manager Port of Gothenburg, Sweden Presented on September 27, 1977 at the "Port Forum" during The 15th International Congress of FIATA in Los Angeles, Calif., U.S.A.

Ladies; gentlemen!

I am honoured and pleased to have this opportunity to talk to you about the port of Gothenburg, Sweden. I will use my time to tell you a little about what part the port plays in transport, and also how we intend to meet the demands of tomorrow.

First of all: in case you did not know, Gothenburg and Göteborg are the same thing. The city is located where a river meets the sea, as is the case with many ports. I think it is fair to say that the port gave birth to the city of Gothenburg, and not the other way round. The city is some 350 years old, but there had been a port and a trading point at the mouth of the Göta River for centuries before the present city was founded.

The geographical location is, I think, the most important reason why Gothenburg has grown to become the biggest port in Scandinavia. It is as close to the oceans as you can get without leaving Sweden, and it has excellent hinterland connections. Also, it happens to be on the "front" side of the foremost industry nation in Scandinavia, namely Sweden.

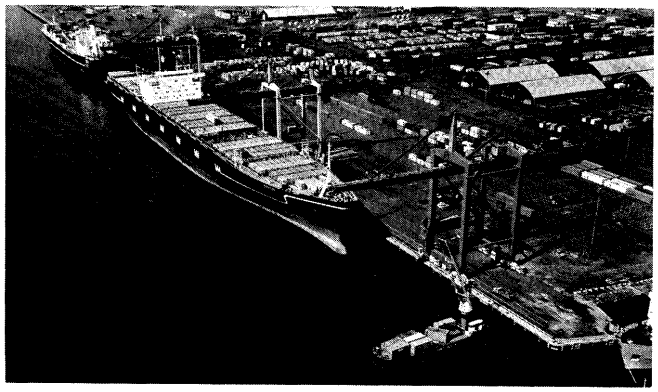
With a cargo turn-over in 1976 of 22.6 million tons, Gothenburg is certainly not among the biggest ports in the world, but it is the biggest port in the Nordic countries—that is, Sweden, Norway, Denmark and Finland. In fact, Gothenburg's cargo volume roughly equals that of the combined volumes of the next five ports on the Swedish "ranking list".

In the mid-sixties, evolution in transport methods was interrupted by revolution, that is, containerization. I do not have to inform this audience of the effects this revolution had on the transport world. As far as ports were concerned, this was a time of rapid adoptation: berths had to be converted, new facilities had to be built, container cranes were bought, roll on/roll off ramps constructed, and so on.

Container traffic brought a new pattern of port calls. The fast and expensive deep-sea container carriers could be profitable only if they called at a few selected ports and let feeder vessels and land transport do the rest.

The container revolution came at a very convenient time as far as the port of Gothenburg was concerned. Looking into the future, the harbour board had decided, as early as in 1961, to build a new, spacious harbour facility on the northern bank of the river estuary. Planning was already under way, and in the spring of 1966, the Skandia Harbour was opened for short-sea ro/ro transport. One year and a half later, the first deep-sea container vessel berthed at the harbour to load containers and cars for the U.S. North Atlantic coast.

The fact that Gothenburg already had a new harbour in the planning process gave the port a flying start into the container era.



This aerial photograph shows a part of the Skandia container harbour in Gothenburg, Sweden. In front of ScanDutch's KORRIGAN, a converted cross-river ferry is loading containers for within-the-port distribution. Fitted with a 25-ton deck crane, it can load 22 TEU's and has proven to be a valuable complement to container cranes ashore. It also does a great job handling containers in the conventional part of the port, where there are no container cranes.

The past ten years have seen Gothenburg establish itself as the container centre of all the Nordic countries. The number of containers imported and exported via Gothenburg last year was one hundred and sixty thousand, expressed as twenty-foot equivalent units.

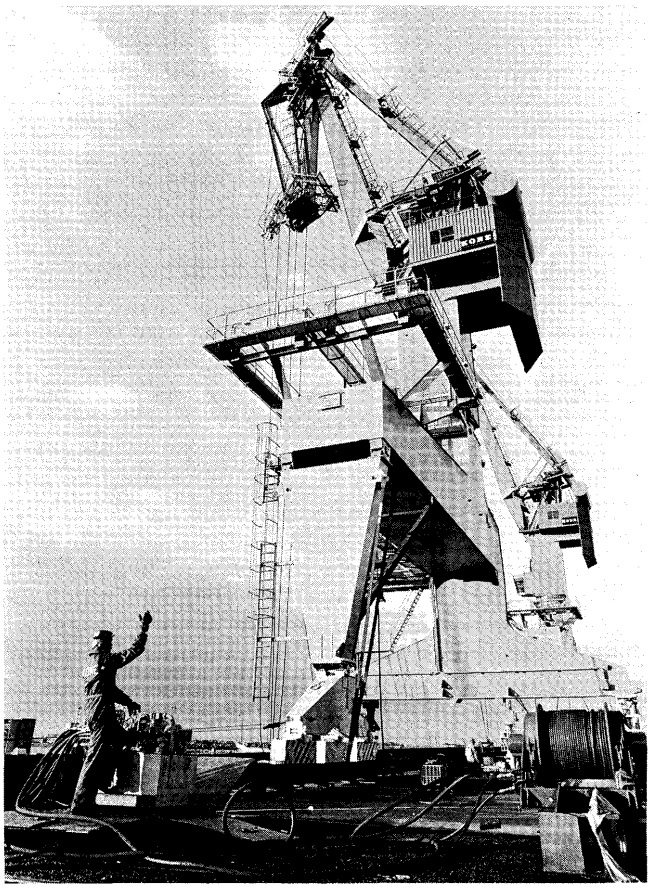
There is ample proof that Gothenburg really acts as an all-Scandinavian transport hub. The feeder network is one example. There is a twice-weekly connection with Western Norway ports, and the same frequency applies to Finland. Other Baltic nations also use Gothenburg as a transhipment point, for example Poland. Denmark has excellent ro/ro connections with Gothenburg, in fact, ten per day in both directions!

Another proof is the well organized railway services. Special container trains serve Stockholm, Oslo and Copenhagen with up to five scheduled connections per week in both directions.

Transhipment cargoes add up to about fifteen per cent of all dry cargo imported and exported via the port of Gothenburg. This is a percentage that has more than doubled since the mid-sixties. The reason is, of course, the supply of shipping lines offering direct trans-oceanic services to and from Gothenburg.

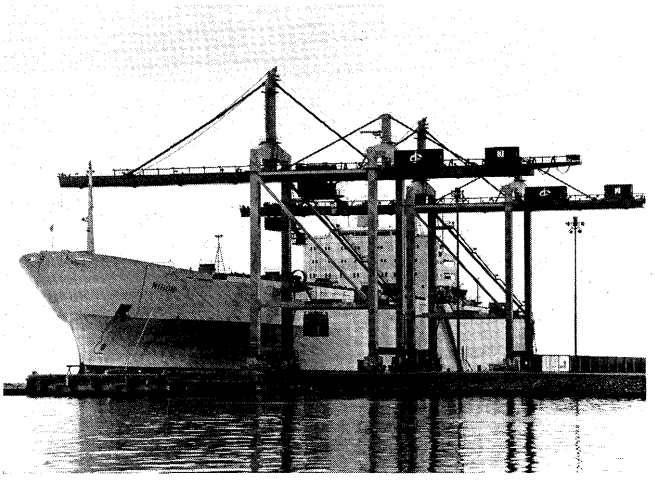
The impact of containers and roll on/roll off technique is clearly visible in the port's statistics.

Let us use the term "unit loads" for containers, flats, trailers and loads carried by lorries in ro/ro traffic. In 1965, the last year before unit-loads really began to flow through the port, unit loads accounted for five per cent of imported and exported general cargo. Last year, the figure was seventy-one per cent! We believe it could reach eighty or eighty-five, but hardly more.



Port of Gothenburg, The Skandia Harbour; A new combined container and general cargo crane.

Port of Gothenburg, The Skandia Harbour



Port of Gothenburg, The Skandia Harbour

Traditionally, Gothenburg has been a port with the ambition to cater for all types of traffic. There is the general cargo, unitized as well as conventional; there is some bulk cargo, and there is oil. Oil is very important to the port's economy. It accounts for nearly three fourths of the total cargo turn-over, and it gives the port a good financial back-bone.

Speaking of finance, there are a few facts I would like to mention. First of all, the port of Gothenburg is owned by the city of Gothenburg. The port tariffs are levelled so that the port's net profit will be zero. If there still is a profit, it has to be re-invested in port facilities. There is a law in Sweden that forbids a city council to demand that its port's profit be paid to the city. This is a unique thing for port authorities, and it does not apply to other local authorities.

"Well", you ask, "what about cities giving their ports subsidies? Is that forbidden, too?"

No, it's not, although the prevailing standpoint among Swedish ports is negative towards subsidies.

The port of Gothenburg receives no subsidies from anybody. This has some interesting effects on the port's competition situation. Not nationally, since Swedish ports work under equal conditions, but internationally.

Gothenburg is a port of call for most deep-sea shipping lines working on Scandinavia, and for all but a few direct deep-sea container services, it is the only Scandinavian port.

This puts Gothenburg in a competition situation with the main North Sea ports in Germany, the Netherlands, and Belgium. For these ports, Scandinavian cargo is a welcome complement to the Continental cargo volumes.

Only trouble is, many of these ports receive ample subsidies from their countries, states or cities. The philosophy is, of course, that a thriving port boosts trade, industry and employment.

There you see our challenge: to remain the central port in Scandinavia for direct deep-sea traffic in competition with heavily subsidized Continental ports.

Now, what are we going to do about it? Some measures are only natural, like marketing and putting pressure on politicians to create good conditions for shipping.

But the biggest step we are taking is one that will increase efficiency in the port work. Sweden has a high wage level, so the more work that can be done per man hour the better—even if it takes very expensive equipment. Dismissal of personnel is a measure that is only thought of when a company is in a crisis in Sweden. So, what we want is more and better work done with the present number of men.

I cannot show you any map of our port here. If I could, you would see a river flowing from east to west and reaching the sea via a trumpet-shaped estuary. The new harbours are in the western part, the "outer" harbour; the river banks are lined with berths, ranging in age from twenty-five years to one hundred and twenty-five. The oldest berths are on the southern side.

What we will do now is to concentrate our port activities in order to boost efficiency. Today, there are general cargo berths as far apart as five miles. Much time and money could be saved if we did not have to move personnel and equipment from one harbour area to the other.

Furthermore, if port activities were concentrated to a

few or even one area, this would justify heavy investments in the area because of the intensity of traffic there.

We believe this process could take five years or more, and it will cost the equivalent of one hundred million U.S. dollars.

The process has already begun, really. Five years ago, a century-old quay on the southern river bank was closed for traffic and is now on the reserve list. Others have followed, and today only one harbour area is operating on the south side, apart from two ro/ro and passenger terminals. By the end of the next year, these terminals will be the only harbour facilities in regular use on the south side.

These things have not just happened—we have made them happen. The southern quays are mostly old and narrow, blocked from expansion by office buildings and traffic systems. We move the ships to the northern bank inner harbour facilities instead, because they are more modern and more spacious. There, we will create some kind of "centre for conventional cargo" where break-bulk traffic will be concentrated.

This concentration is possible only because shipping lines are moved from the inner to the outer harbour as they acquire new ships geared to modern cargo-handling.

Our container harbour—Skandia—has been operating for over a decade. By now, it is rather crowded with cellular vessels and ro/ro's, deep-sea and feeder, as well as semi-container vessels. The containerization of the Europe-to-Africa and Europe-to-South America trades is just around the corner. Skandia could not swallow those cargo volumes in addition to the existing ones.

The problem has a solution that lies near at hand. Immediately to the west of the Skandia Harbour, there is a new development approaching completion.

In due time, we intend to let Skandia take care of the cellular containerships. The new development, called the Älvsborg Harbour, will be used for other types of unit-load traffic—roll on/roll off, new cars and the like.

We even have the ambition to concentrate almost all general cargo in the port to these outer harbours. This will take its time, of course—port authorities cannot push development in shipping, they have to adopt themselves to it.

One of the main reasons behind our development scheme is that we know what is going to happen to the fleets of the big Swedish trans-oceanic shipping lines in the near future.

The Broström group of companies has announced that twentyeight of their conventional vessels are for sale, and that nine ro/ro vessels have been ordered for delivery before 1980. The ro/ro's will be used in North Sea service, in Northern Europe-to-Mediterranean traffic, and in the group's cross-trade commitments.

The Transatlantic Shipping Company is going to replace all its conventional liners by ro/ro vessels before 1980. This will give a new structure to the company's Africa and New Zealand traffic.

And, for South America, the Johnson Line has the intention to "introduce a more modern cargo handling philosophy" in a not too distant future.

With this in mind, and with these shipping companies being the port's biggest customers, we have to act quickly to offer suitable facilities, geared to the new efficiency demands that these vessels create.

Our means of creating a more effective port are concentration and flexibility.

I have dealt some with the concentration, but the flexibility is just as important. In fact, concentrating almost all dry cargo to one single harbour area demands flexibility. You cannot, for example, allot a certain berth to a certain ship which is due to arrive two weeks from now. That means you cannot let export cargo pile up at this berth either, because the ship may not berth there at all.

We are thinking of a system where we assemble all export and import cargo at one point in the Skandia/Älvsborg facility. The transports between this area and the single berths would be carried out with the help of big tractors, moving cargo frames with a capacity of up to six forty-foot containers. The frames could also carry specially prepared cargo platforms—that is a kind of unit-loads for within-the-terminal use only.

Prototypes exist of these high-capacity vehicles. They have gone through tests in our port, and although it needs refinement we feel the idea is right. After all, with terminal distances that could reach a mile or more, you need ways to carry more than one container at time!

Another sign of our flexibility ambitions is the two socalled combi-cranes that we have ordered for delivery during 1978. They will be able to handle general break-bulk cargo as well as containers. We intend to use them for semicontainer vessels, and we also intend to order more of them if experience is favourable.

All in all, I have the feeling that what we are trying to do in Gothenburg should be of interest to many of those who take an interest in good transport. We have not found a system in any other port that seems to give a solution to our problems, so we are inventing our own system. Keep in touch with us, and we will be glad to tell you how we are doing!

Thank you!

San Francisco, Calif., 1/24/78 (Marine Exchange of the San Francisco, Bay Region):—With a background mural of the Northwest Argentine province for which it is named, the Motorship JUJUY II was recently welcomed at the Port of San Francisco on her inaugural voyage to the Golden Gate. Greeting Capt. J. Trivelin were the Marine Exchange's Kathy Pisani, William Jetter, line manager for Transpacific Transportation Co., agents for ELMA Argentine Lines, and Consul General A. Nanclares.

Terminal Design for High Throughputs

by Paul Soros, President
Soros Associates, Consulting Engineers
New York, U. S. A.

Introduction

The trend in major bulk movements is for large bulk terminals to load or unload vessels up to 300,000 DWT and handle tens of millions of tons a year in more sophisticated ways and with better environmental protection than ever before.

The major problem with these terminals is their high capital cost. Of the per ton costs of moving materials through these terminals, the capital charges are by far the largest item, greater than all operating costs such as labor, electricity, maintenance, insurance, etc.

It is our belief that, in the absence of subsidies, be they by the taxpayers, or by loans to developing countries that will never be repaid, the key to successful high capacity terminals is minimum capital cost.

In the following we shall discuss some of the basic approaches available to attack this problem.

Integrated Design

Any savings from using less than the highest quality equipment have only a minor impact on overall project costs and are pennywise and pound foolish. The real and substantial capital cost reductions lie in a broader integrated system-type approach. There are two areas that can usually be attacked most successfully: one is the integration of the material handling system in its relation to the civil works; the other is the performance of the material handling system as part of the integrated port or transportation complex.

Development of offshore terminals represent a broad example of the integration of the material handling and civil concepts, and the developments in loading berth designs represent a more specific example.

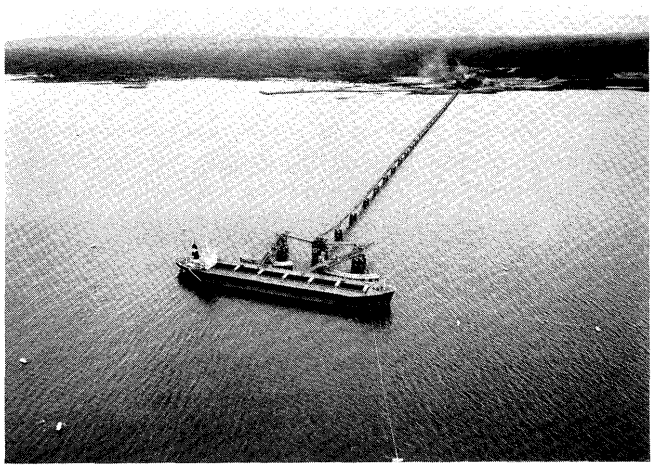


Figure 1–Port Latta, the first installation to load 120,000 DWT ships in the open sea.

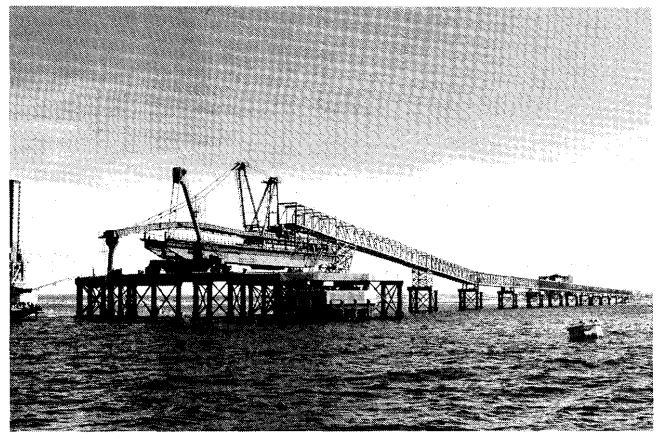


Figure 2–First multiple oriented berth allows vessels to head into waves that vary seasonally.

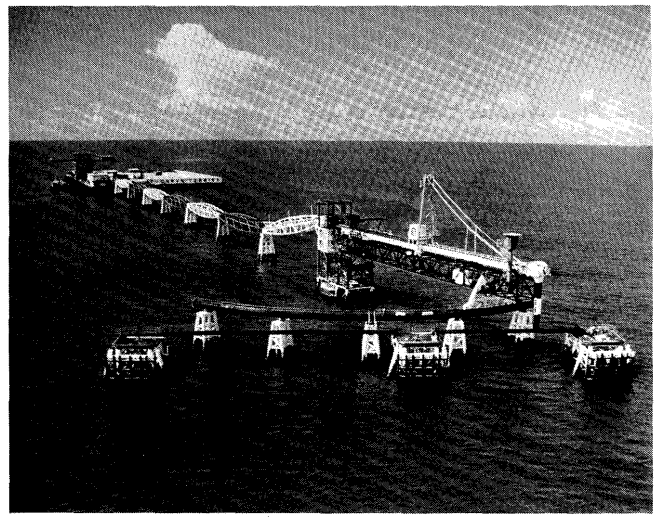


Figure 3–Solar salt is unloaded from small coastal vessels in lee of artificial island and loaded into bulk carriers at open-sea berth.

Offshore Technology

There are few new sources of raw materials or industrial sites left in proximity to natural protected deepwater harbors. The conventional approach of dredging a channel and creating a protected harbor may require very large investments depending on site conditions. To load or unload in the open sea, with only partial or no protection, is a possible alternative.

Early installations of this type were for small vessels in relatively calm waters (1). The first breakthrough was Port Latta in Australia where 120,000 DWT vessels are loaded a mile from shore without harbor protection (2), at a breast-on/breast-off type berth (Fig. 1). Great efforts have been made in the last ten years to develop these concepts further, evolving a relatively new and specialized technology. The main problems in this field are to design berths that can operate under increasingly difficult sea state conditions (3) and to develop designs for these installations which permit economical and fast construction in the open sea, particularly as they become located further and further from shore. The following examples illustrate the current

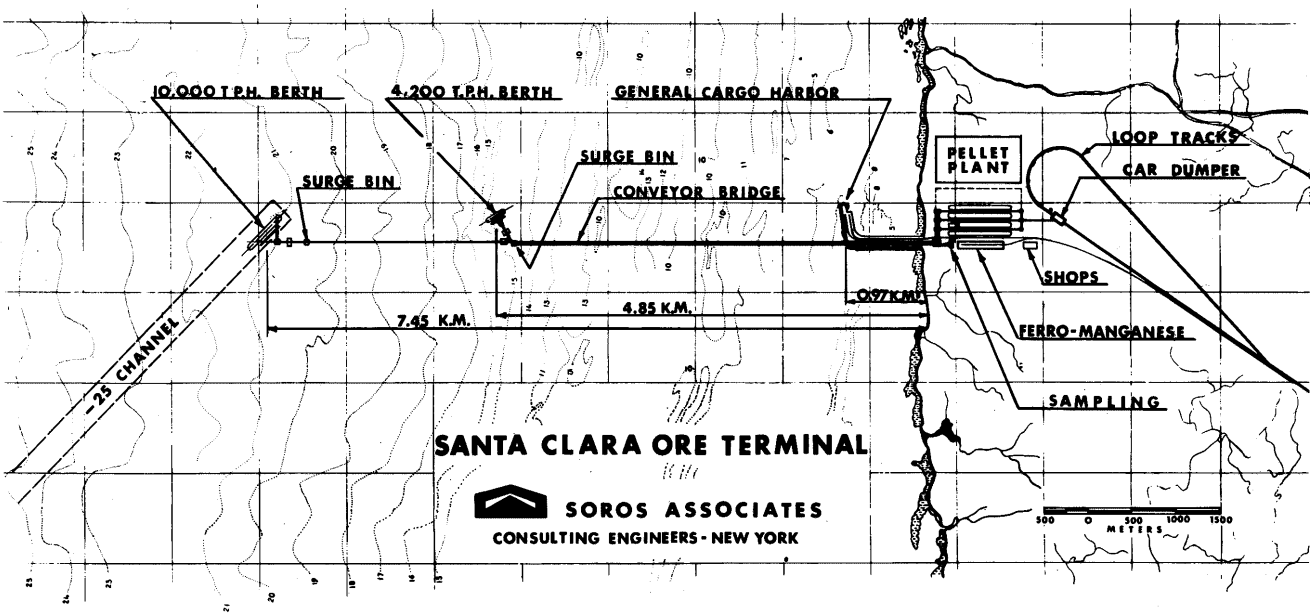


Figure 4–7.5 Kilometer offshore terminal is designed to be constructed in stages for handling 25 million tonnes per year.

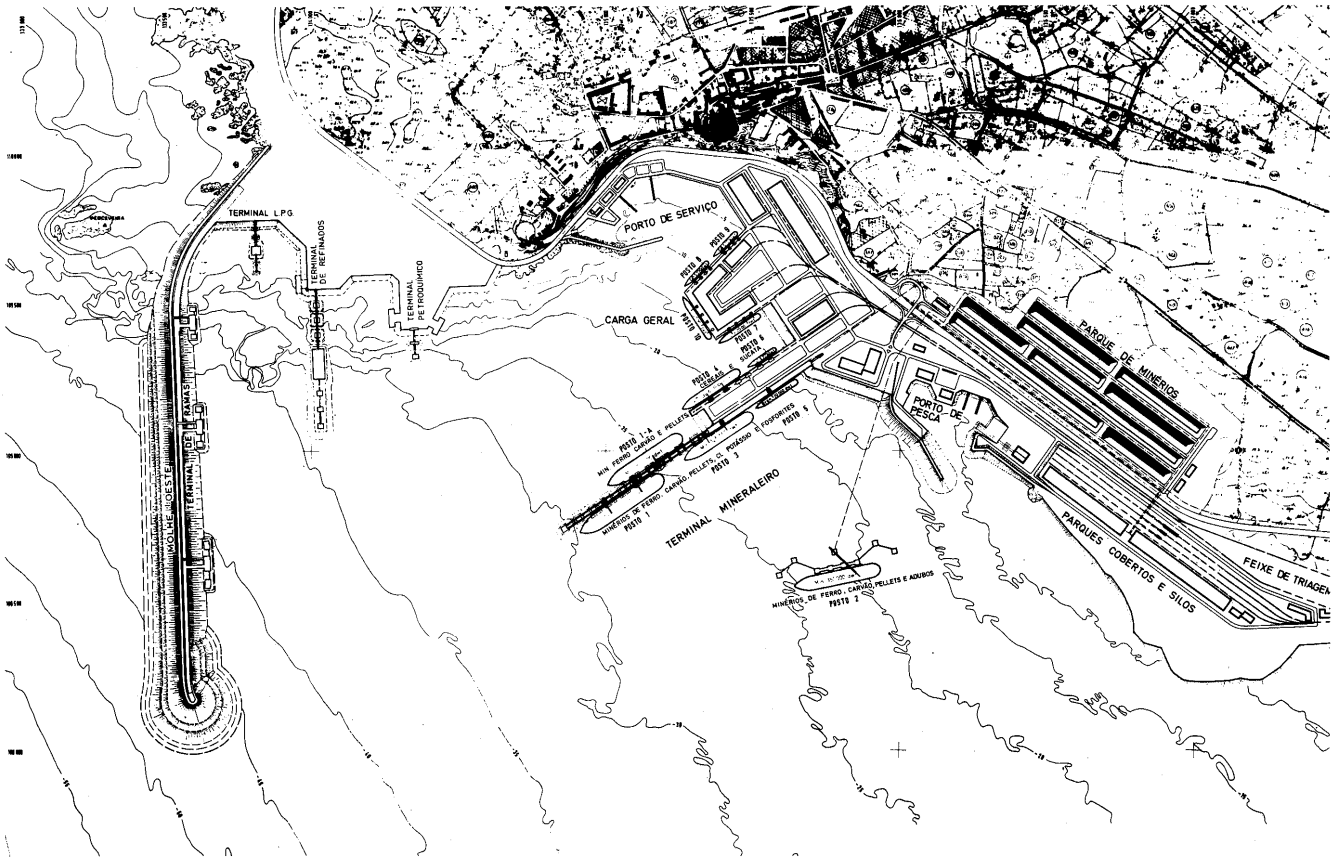


Figure 5–Semi-protected bulk unloading complex in the Atlantic. Vessels head into the waves, with protection from single breakwater arm and the berths themselves.

state of the art:

Multiple Oriented Offshore Berth (Fig. 2)

This facility off the difficlut Patagonian coast of Argentina allows vessels to head into the waves that vary in direction according to the season (5).

Artificial Island Port (Fig. 3)

This installation off the Northeast coast of Brazil was too far offshore to construct an approach conveyor bridge. Solar salt is collected in small coastal vessels from an entire region and unloaded in the lee of an artificial island which acts like a breakwater. The salt is stockpiled on the island and loaded into large bulk carriers through an open sea berth (6) (7).

7.5 Kilometer Offshore Terminal (Fig. 4)

This terminal in Gabon is now in the detailed

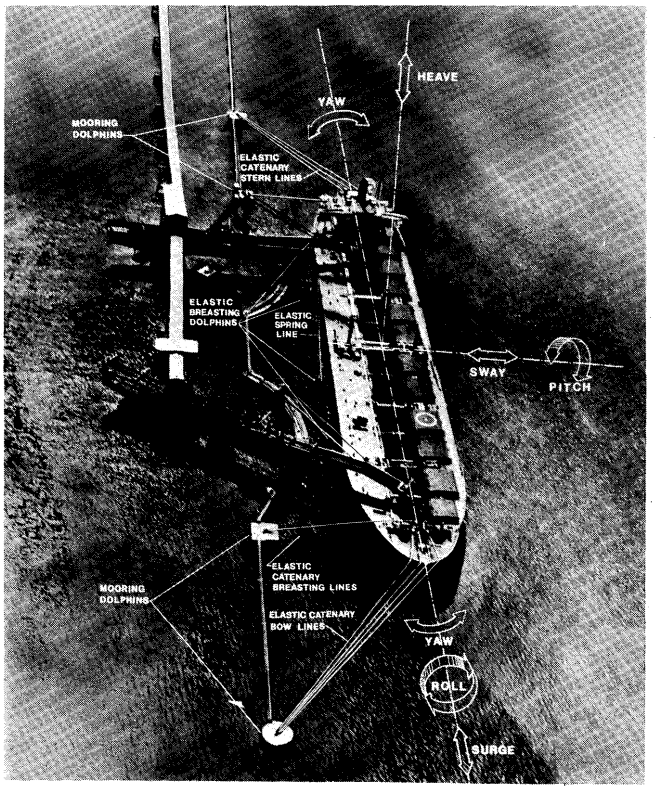


Figure 6—At Tubarao, one 20,000 tonne per hour approach conveyor feeds two 20,000 tonne per hour slewing bridge loaders. Second approach conveyor can be installed without interrupting operations.

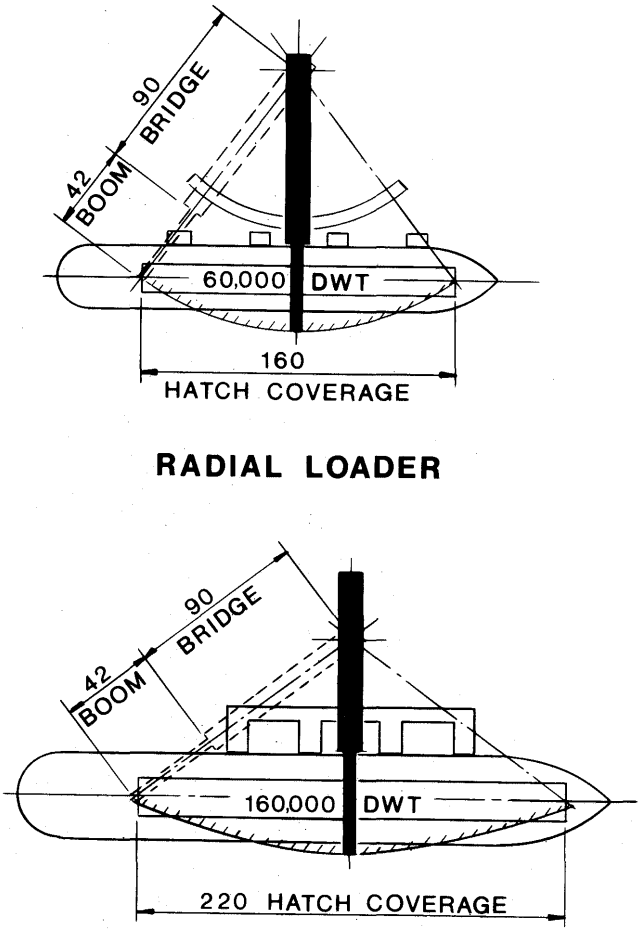


Figure 7—Linear Loader has simpler foundations and increased hatch coverage.

engineering phase. To be constructed in stages, it is designed for a capacity of 25 million tonnes per year of iron ore, manganese, ferromanganese and general cargo.

Semi-Protected Bulk Unloading Complex (Fig. 5)

The Sines project, on the Atlantic coast of Portugal, will have only one breakwater arm instead of the two planned initially. Vessels to be unloaded head into the waves and are protected to a degree by the main breakwater and by the unloading piers themselves.

Loading Berth Development

The conventional loading berth has a traveling loader fed by a moving transfer from a conveyor running the length of the dock. This design runs into technical problems when dusty materials require complete environmental protection. It runs into economic problems where marine construction is expensive, for instance offshore, in bad soil, in remote locations and in deep water, i.e. for large vessels.

The slewing bridge type radial loaders were developed by Soros Associates in the 1960's to reduce the cost of marine construction (8). The largest installation of this type is at Tubarao, Brazil, designed just before the invention of the Linear Loader Fig. 6 shows a 279,000 DWT OBO being loaded at Tubarao. There are two radial loaders, each with 20,000 tonne per hour capacity, fed by a single 20,000 tonne per hour approach conveyor (9).

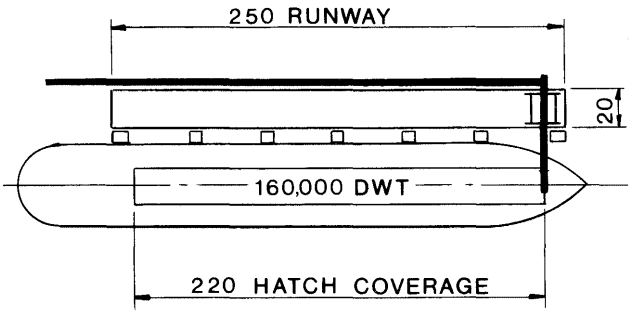
The reason for two loaders instead of one is the hatch coverage obtainable by one loader of this type within economical limits imposed by the size of the loading boom and the span of the slewing bridge. The Linear Loader has simpler foundations and increases hatch coverage to such an extent (see Fig. 7) that one unit can take the place of two radial loaders, also saving two additional conveyors and two additional transfer stations (10).

Fig. 8 illustrates the difference in the size, and therefore cost, of the marine foundations required for the Linear Loader versus the conventional traveling loader.

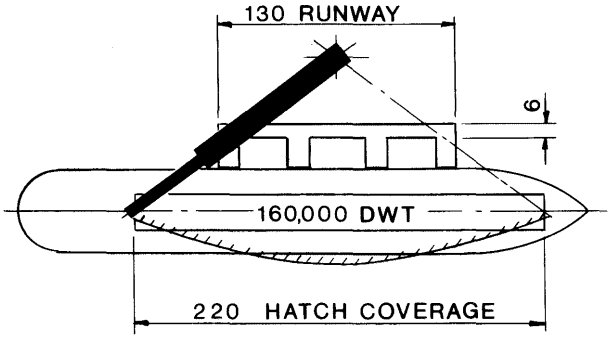
Fig. 9 illustrates a recently completed Alcoa installation for the dust-free loading of alumina at 2,200 tonnes per hour. Some of the technical features of this installation are indicative of the caliber of environmental protection features and operating, maintenance and reliability standards realized in modern installations today:

The Alcoa installation has an 1,800 mm. wide conveyor belt. The bridge span varies between 40 and 60 meters. The loading boom conveyor is 38 meters long, has a shuttling motion of 35 meters, and can support 25 tonnes in an extended position, as part of dust control requirements. The entire installation is completely sealed and equipped with three dust collecting systems, with a capacity of 430 cubic meters per minute.

There is backup and emergency equipment for all functions. Either mechanical or electrical failure of any shuttle, travel or hoist drive does not interrupt operations. All main motors for travel, shuttle and hoisting are identical, for maximum standardization of mechanical and electrical components. The operator's cab is located so as to



TRAVELING LOADER



LINEAR LOADER

Figure 8–Linear Loader requires narrower and shorter pier with fewer breasting dolphins and less fenders.

permit complete loading and trimming without boarding the vessel and is protected by a dual hoist and dual brake system plus an independent boom limit support. Minimum labor is required for cleanup, as the entire installation is completely sealed and serviced by a vacuum cleaning system.

Advanced Handling Concepts

A typical example is Conneaut, the largest coal and ore terminal in the United States (Fig. 10). It is a profitable operation, with some of the lowest per tonne tariffs in the world. This is possible only by achieving high capacity at minimum capital investment (11). These are some of the advanced handling concepts that went into the design of the Conneaut Coal Terminal:

1. A small portion of the 4 million tonne coal storage is capital intensive and handles a large percentage of the turnover at high rates, at minimum operating cost.
2. One superior berth costs less than two good ones. The shiploading rate is 10,000 tonnes per hour. The actual rate achieved inclusive of all delays is over 7,200 tonnes per hour into vessels of less than 30,000 DWT with 19 to 27 hatch openings.
3. The 10,000 tonnes per hour variable speed and intermittent service portion of the system is limited to the last 100 meters before the berth. The many kilometers of conveyors making up the balance of the facility are low capacity with a combined maximum rate of 5,400 tonnes per hour at very large savings in capital cost.
4. How does a system with 5,400 tonnes per hour nominal capacity achieve over 7,200 tonnes per hour actual performance? All shiploading is from live surge capacity contained in two bins of 6,300 tonne capacity each, and the time between vessels as well as between hatches is used to preload the surge.
5. All low capacity systems work against the surge, free of interruptions, the key to sustained productivity.
6. Recirculation between surge and storage.

The operator can load the ship at full speed without having to slow down in order to finish with an empty conveyor system.

Between ships, material left on the conveyors and in one of the 6,300 tonne bins can be moved back to storage, while the other 6,300 tonne bin is filled with material for the next ship without loss of time.

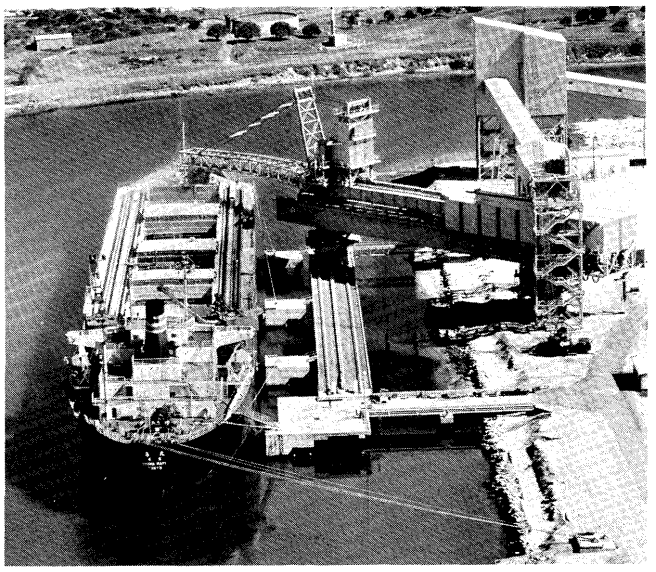


Figure 9–Linear Loader berth for 2,200 tonnes per hour of alumina achieves maximum environmental protection and operational reliability at low capital cost.

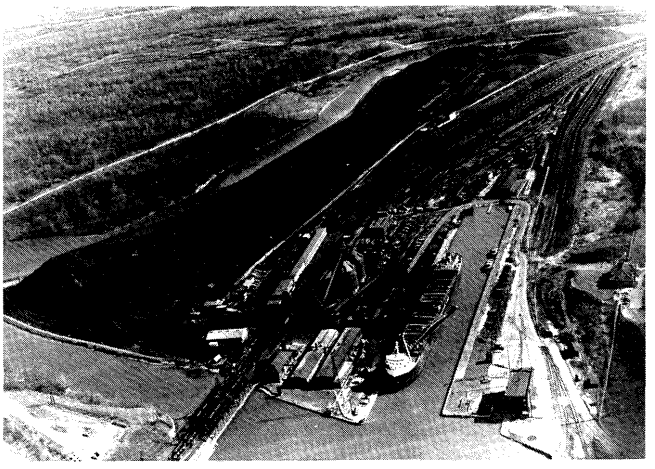


Figure 10–The Conneaut Coal Terminal achieves high capacity at low minimum capital cost through advanced handling concepts explained in the text.

Phased Expansion

In an unsubsidized situation, it is usually essential to begin operation with minimum capital investment.

(Continued on page 36)

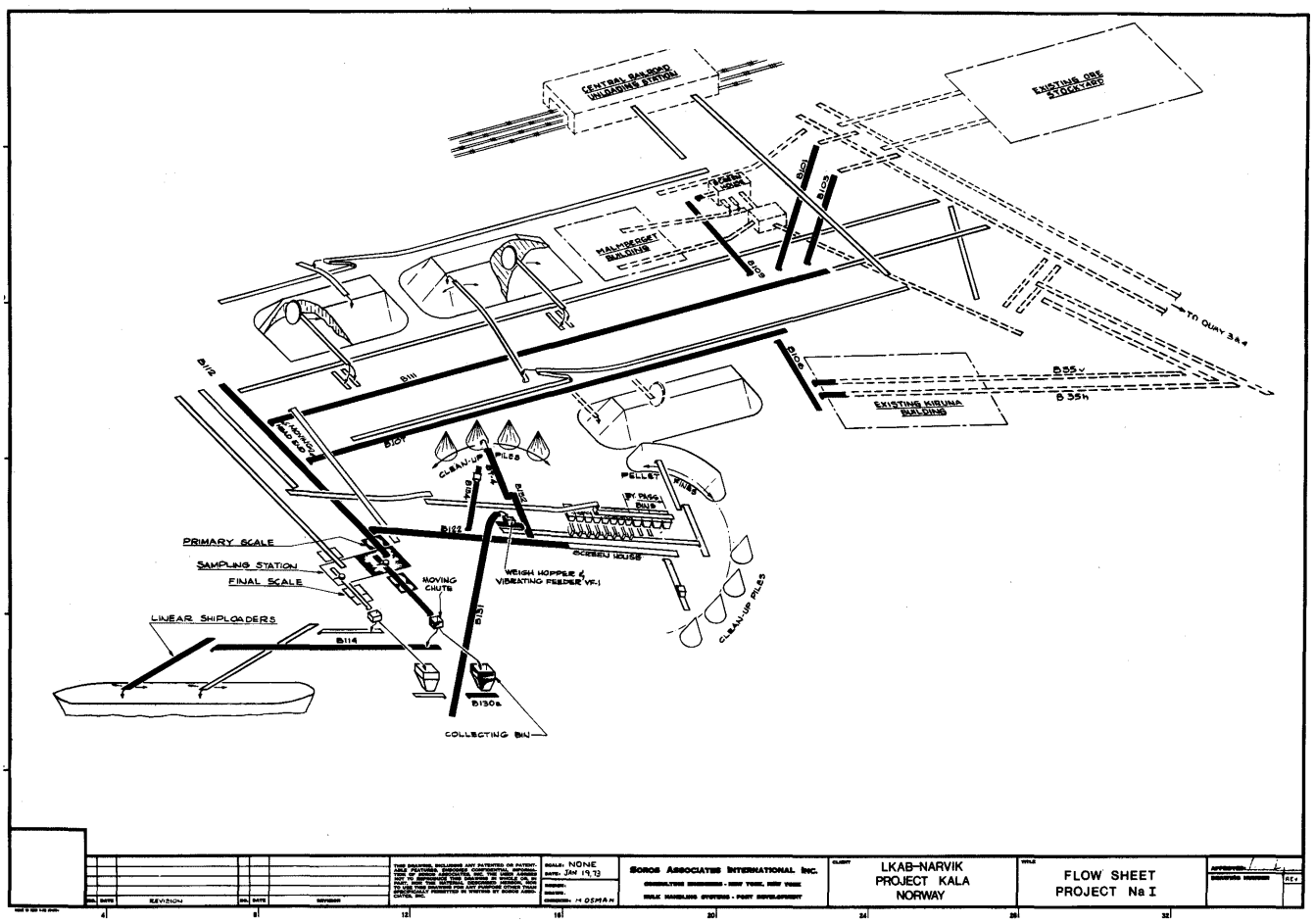


Figure 11–First step in LKAB's Narvik Master Plan was construction of new loading berth with inter-connections, sampling, weighing and recirculation.

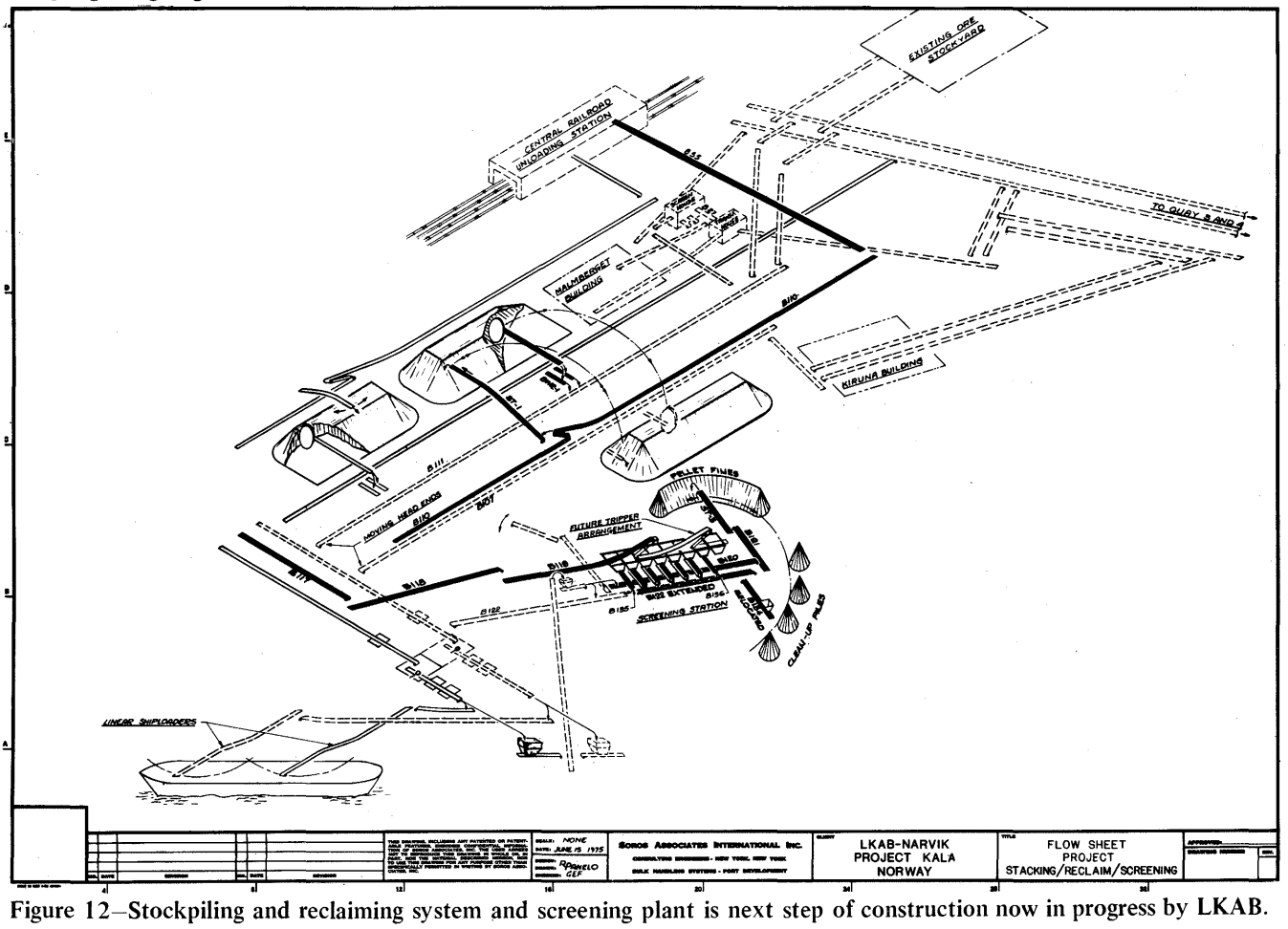


Figure 12–Stockpiling and reclaiming system and screening plant is next step of construction now in progress by LKAB.

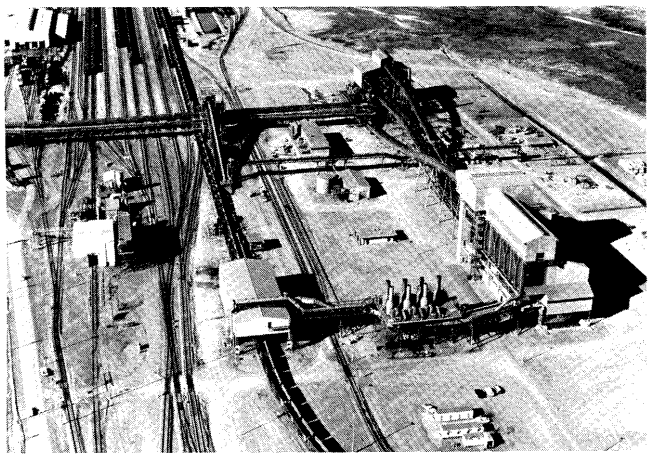


Figure 13–The new number two ore handling plant at Port Hedland features computer controlled car dumpers, screening and crushing plants and conveyors.

A master planning approach can provide for future expansion, in steps, without interruption of the already built and operating facilities. This can be accomplished at a small incremental cost for additional engineering and a minor increase in initial construction. This approach has been successfully applied at Tubarao, Conneaut, Narvik, and many others. Fig. 11 shows the new LKAB shiploading berth at Narvik, interconnecting conveyor system, sampling, weighing and recirculation facilities just about completed as part of a Master Plan. Fig. 12 shows the next step, the stockpiling and reclaim system and the screening plant now under construction. Such an expansion would have been a practical impossibility unless everything was engineered and planned in advance.

Contracting Based on Integrated Engineering

The traditional approach is to place equipment orders first, and wait 6-12 months for final loadings and dimensions to complete the civil designs.

This approach is not too bad on projects where the civil engineering is simple, such as Conneaut or the bulk terminals of Rotterdam, but where the civil works are substantial, such as at LKAB's Narvik terminal, it poses two problems.

One is the additional interest cost during construction, due to more time required for construction when the critical path runs through the civil works.

The second is budget control. There have been many painful experiences around the world where the handling system has been contracted and it is a year before the owner finds out that his civil works budget will overrun 100%. He is stuck and has to try to raise the money for the overrun.

One way out is to complete the civil design before placing any orders. This will save construction time and will enable the owner to have a firm price on the entire project, before placing any equipment or other contracts.

We are not suggesting this as applicable for every situation, but we had good success with this approach both in the United States and around the world. The Narvik project of LKAB is about the most complex project of this type that we know of and it is an example of both the phased expansion and the firm price simultaneous contracting approach (12).

Computer Applications

The computer is a wonderful toy and it was inevitable that it would find its way into bulk handling terminals.

Its biggest impact has been on planning. It is possible to simulate an entire port complex, including the shipping sources, the connecting railroad system, the material handling layout at the port, the storage capacities, multiple berths, the variation in demand and fleets that call on the port, channel, weather, tug boat, labor or other restrictions and operating practices.

This entire field is relatively new. We have analyzed over 50 ports around the world with our PORTLOG and YARDLOG computer programs and started to publish technical papers this year that treat the subject in depth (13) (14). Suffice it to say, that the ability to simulate the operation of one layout versus another and to measure the effect of an additional tug boat versus changing the dimensions of the turning basis versus increasing the capacity of a conveyor versus limiting or not limiting a certain product to a certain berth, etc. has brought a new dimension to terminal and port planning.

Another application for computers is to monitor and control the operation of complex bulk handling systems. The new 10,000 tonne per hour railroad unloading, crushing and screening operation at Mount Newman, Australia, is computerized (Fig. 13). So is the railroad loading system at Conneaut. In Narvik, LKAB uses the computer in combination with an electrical system utilizing programmable controllers instead of conventional wiring and magnetic circuits and relays.

Another application is in running of a terminal, particualrly in the planning and organization of preventive maintenance, including spare parts inventory control. This is also a relatively recent development (15). It has been pioneered at Conneaut and a number of major terminals are negotiating to adapt this computerized preventive maintenance system, to their needs.

Future Trends

We expect that future development of bulk terminals will diverge from what has happened up to now. The new factors will be stricter environmental control requirements and the increasing difficulty and delay in obtaining permits for construction at new sites in the industrialized countries. Accordingly, we expect to see the development of systems with very high capacity at existing sites and covered storage for activities that now take place in the open. We have in the planning stage two projects that involve more than a million tons of covered storage, and it is clear that such systems will lead to the development of new technology.

References

1. Soros, P., "Trends in Bulk Port Development", Third World Conference of the International Association of Ports and Harbors", New Orleans 1963.
2. Soros, P., "Port Latta–Open Sea Loading Terminal", Civil Engineering, January 1969.
3. Sugin, L. and Seidl, Ludwig H., "Seaberth–A Program for the Calculation of Motions and Mooring Forces", Third Ocean Engineering Specialty Conference, June 1975, Newark Delaware.
4. Soros, P. and Koman, B., "A New Generation of Offshore Bulk Terminals for the 1980's", Offshore

(Continued on next page bottom)

" Marseilles/Fos Europort South "

The Monthly magazine of The Port of Marseilles Authority September 1977

EDITORIAL

A busy summer is drawing to its close. A summer which has been rich in port and industrial events–some of them excellent, some of them troubling and others frankly worrying.

The most worrying of all is the future of the ship repair industry in Marseilles, an industry of international importance which affects 10,000 people in Marseilles. All the efforts of the leaders of the industry have again had to be directed at fighting competition from other countries with lower labour costs. President TERRIN, for his part, has been obliged to devote all his time to this industrial restructuration and has consequently had to resign his position as President of the P.A.M. in favour of Mr. Paul FABRE. The business and port world of Marseilles can only support this courageous decision and wish him every success in his efforts to revitalize this critical local industry.

Also troubling is the stagnation of the port's oil traffic–a universally felt result of the current world crisis. The revenues of the Port of Marseilles are directly linked to this traffic, and the 2% drop in throughput over the first seven months of the year gives cause for concern.

On the other hand, the summer has been excellent, historic even, for general cargo traffic. In the first seven months of the year, throughput has increased by nearly 24%. At Fos alone, the increases in June and July were 118% and 140% respectively. Marseilles has thus confirmed its position as a leading Ro/Ro port and the gateway to the Arab markets.

Finally and above all, this summer has brought great news for the industry of our region: the announcement of Shell Chimie's decision to build a new vapour cracking unit in its chemical complex at Berre.

These subjects, which could be decisive for the future of Marseilles, are commented on further in the columns of this issue of Europort South.

Links Between the Rhone and the Gulf of Fos

In 1979/80, the work of bringing the Rhône between Fos and Lyons, and the Saône between Lyons and Auxonne (to the South of Dijon), up to international waterway standards will be completed; thus opening a continuous navigable waterway of 530 kilometers to modern river traffic.

It is therefore important that a permanent and safe link between the Rhône and Gulf of Fos should be established at the same time.

Although it is already possible to pass from the Rhône to the industrial zone of Fos and the Berre region, either by the St-Louis Canal to the South or by the Arles-Fos Canal to the North, neigher of these waterways is adapted to the modern river traffic, including pushed convoys 190 meters long, which already exists on the Rhône and which is bound to increase as the waterway is developed.

The canal from Arles to Fos, which supplies the zone of Fos with industrial water and drains the low land lying between the Durance and the sea, can only take barges up to 38.50 meters (300 tonnes). Whereas the sea lock on the St-Louis Canal, although it is 135 m long by 22 m wide and can take self-propelled barges and pushed convoys of one barge, cannot accommodate pushed convoys 190 m long without uncoupling.

Moreover, this lock opens onto the harbour area of Port St-Louis in the middle of its busy port activities, and experience in the North of Europe has proved that it is preferable, for reasons of safety, to keep river and sea traffic separated.

It should also be noted that taking the Southern waterway involves crossing the Gulf of Fos, which can present hazards for small river craft. The statistics show that for self-propelled barges of 38.50 m, navigation in the Gulf can be interrupted on more than 70 days in the year due to bad weather conditions.

The new mordern canal link to be built between the Rhône and the Gulf of Fos must therefore fulfil the following conditions:

- avoid the crossing of the Fulf of Fos,
- avoid mixing sea and river traffic,
- ensure the drainage of the low land around Arles,
- supply the zone of Fos with industrial water.

It is for these reasons that after studying various

(Continued on page 49)

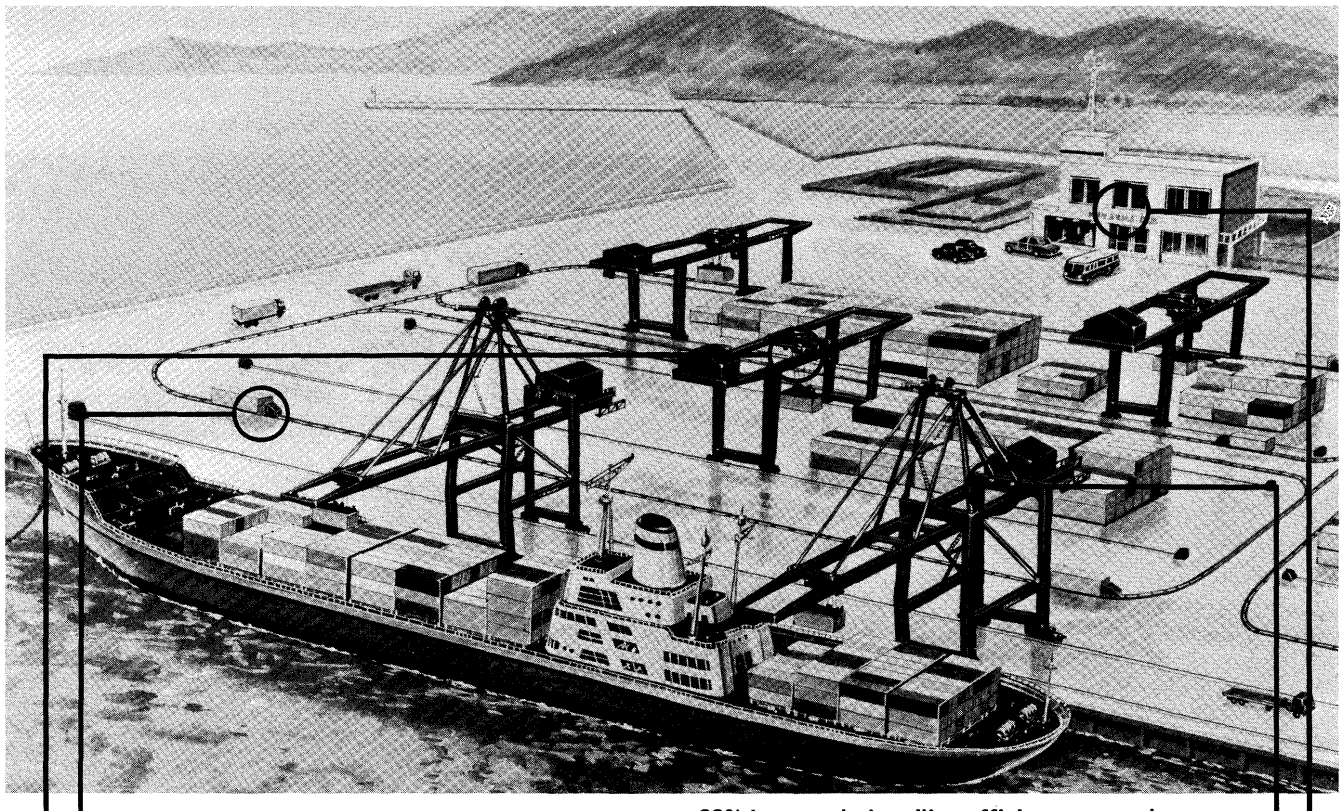
Technology Conference, May 1976, Houston, Texas.
5. Soros, P. and Koman, B., "Offshore Berths with Multiple Orientation", Second Offshore Technology Conference, April 1971, Houston, Texas.
6. Cardoso, Luiz de Lima and Sabino, Leandro Mendes and Koman, B., "Construction of the First Artificial Island Trans-shipping Terminal in the Open Sea", Ports and Harbors, April 1974.
7. Soros, P. and Koman, B., "Artificial Island Transshipment Terminal", Sixth Annual Offshore Technology Conference, May 1974, Houston, Texas.
8. Soros, P., "New Iron Ore Loading Facility of Santa Barbara at Huasco, Chile", Skillings Mining Review, April 1968.
9. Soros, P. and Koman, B., "World's Largest Ore Port at Tubarao, Brazil", AIME Fall Meeting, September 1974, Acapulco, Mexico.
10. Soros, P., "The Linear Loader", Skillings Mining Review, March 5, 1977.
11. Soros, P., "First Rail-To-Ground-To-Water Coal Terminal in the U.S.", XXIInd International Navigational Congress, Paris 1969.
12. Soros, P., "Expansion Program at the Iron Ore Port of Narvik", Skillings Mining Review, December 1975.
13. Soros, P. and Zador, Andrew T., "Port Planning By Computer Simulation", 1977 ASCE Ports '77 Conference, March 1977, Long Beach, California.
14. Soros, P. and Zador, Andrew T., "Bulk Port Simulation Methodology", Summer Computer Simulation Conference, July 1977, Chicago, Illinois.
15. McGuirk, C.H., "Computerized Preventive Maintenance System", 1977 ASCE Ports '77, March 1977, Long Beach, California.

Hitachi container terminals.

Computer designed. Computer controlled. Efficiency oriented.

Computerization is the key to utmost container terminal efficiency. Hitachi achieves it. In design, with computer simulation analyses to develop the optimum layout and equipment capacities. In operation, with computer control of all terminal functions and equipment to minimize manpower requirements, speed handling and increase accuracy.

Hitachi achieves container terminal efficiency like this through its experience as a leading maker of cranes and handling systems. Computers and computer systems. And electrical machinery and equipment. So we supply everything. And that's about as efficient a system as you can find.



Unmanned marshalling equipment

Intra-yard transport can be accomplished by automatically controlled linear motor cars in place of conventional chassis units or straddle carriers to reduce manpower requirements.

60% increase in handling efficiency, container sway reduced to ±5 cm in 5 seconds

Quay cranes are equipped with Hitachi's exclusive Sway Stop System which dampens container sway to ±5 cm in 5 seconds, a Memory System for high-speed cell guide positioning and an Independent Loading/Unloading System for ships and trucks which increases handling efficiency of container buffers by 60%.

Completely automated yard cranes

Cranes are rail-mounted for easy positioning for gantry and trolley travel, and equipped with sensors on the spreaders to allow unmanned operation. Multi-stage stacking greatly improves stacking efficiency.

Centralized computer control

Used to monitor and control all yard and equipment operations, prepare lists for ship loading and unloading, manage containers in the yard, and handle clerical operations for optimum terminal efficiency.

HITACHI

Hitachi, Ltd. Industrial Machinery Dept. International Sales Div. No. 6-2, Otemachi 2-chome, Chiyoda-ku, Tokyo 100, Japan
Phone: Tokyo (03) 270-2111 Telex: J22395, J22432, J24491, J26375

Orbiter Probe

AAPA Presidency

Montréal, Quebéc, Canada, Fall 1977 (Port of Montréal Bulletin):—Mr. Nicholas Beshwaty, Port Manager of Montreal Harbour, received deserved recognition from his fellow port operators when he was elected President of the American Association of Port Authorities at its 66th annual convention held in Mexico City in October.

The membership of this prestigious organization consists of operators of a large number of ports in the USA, Canada, Mexico, numerous countries in South and Central America and the Caribbean region.

Mr. Beshwaty is also a past president of the Canadian Port and Harbour Association.

New Ports Policy Coming

Nanaimo, British Columbia, Canada, December 1977 (Nanaimo Harbour News):—A federal Government bill, designed to set up a new port administration structure in Canada, is still being targeted for spring 1978 enactment.

The legislation follows closely the ports policy announced by Transport Minister Otto Lang late last year and contains no surprises in its general outline.

Bill C-61, introduced in the House of Commons in mid-July, will place the country's 20 major ports under a single authority.

Canadian ports are governed at present by a variety of government departments and agencies and local harbour commissions. The bill will replace several acts now applying to these ports.

The 11 main Ottawa-directed National Harbours Board (NHB) ports will be spun off under their own three-to-seven-member boards of directors or local port commissions. All the major ports in the country, including the nine existing commission ports, will be brought under the same administrative framework.

These ports include St. John's, Nfld.; Saint John, N.B.; Halifax, N.S.; Quebec, Montreal, Trois-Rivieres, Chi coutimi-Baie des Ha! Ha! and Septlles, Que.

Others are Toronto, Hamilton, Oshawa, Windsor and Thunder Bay, Ont.; Churchill, Man.; and Nanaimo, Port Alberni, Prince Rupert, Vancouver, Fraser River and North Fraser, B.C.

Baltimore Yearend Round-Up

Baltimore, Maryland, January 1, 1978 (News From Maryland Port Administration):—The port of Baltimore experienced a decline of almost four-million tons of foreign waterborne commerce during 1977, a year which was scarred in the closing months by a 61-day longshoremen's strike.

Even without a strike, however, the port would have underwent a decline in commerce with the exception of container cargo movements which were moving ahead of the previous year at the outbreak of the dock workers walk-out, the Maryland Port Administration reported in a year-end statement.

W. Gregory Halpin, Acting Maryland Port Administrator, revealed that the port of Baltimore moved 30,769,493 tons of import-export cargo during 1977. This was a 11.1 per cent decline from last year's net foreign commerce tonnage of 34,595,827. The MPA's statistics are based on 10 months actual figures and projections for the final two months of the year.

The biggest turn-around came in the area of container cargo which was 17 per cent ahead of last year at Dundalk Marine Terminal alone after the first nine months of the year. "We had every right to expect a record year in container tonnage," Mr. Halpin said, "but the strike which wiped out all container movements for two months eliminated any hope of that."

Nevertheless, Mr. Halpin contends container traffic remains one of the most optimistic areas of continuing growth in the port of Baltimore.

The Maryland Port Administration expected to have a total of 3.5 million tons of container cargo portwide during the year. The strike eliminated an estimated 700,000 tons which otherwise would have passed through the port. This brought the final container total to 2.8 million tons.

Mr. Halpin said "this is a disappointing conclusion to a year in which we expected to have about a 10 per cent increase in container cargo." Strike or no strike, the overall statistics for the port were destined to be reduced in 1977 because of a serious decline in the movement of bulk cargo through the port during the year.

In 1977 import-export break-bulk cargo accounted for 25,895,325 tons, a decline of 3.6 million tons from the previous year. This by itself virtually accounts for the total tonnage decline in the port for the year. Total general cargo decreased only 140,000 tons to 4,874,168 from the previous year. "The biggest single decrease in tonnage relates directly to the decline in steel production in the U.S.," Mr. Halpin said. "During the year the 4.7 million ton decline in import ore neutralized substantial increases in petroleum imports and coal exports."

Grain exports were also down by nearly 700,000 tons. In the end, although there was a 17 per cent increase in petroleum imports and 8.4 per cent increase in coal exports during the year, the overwhelming decline of 43 per cent in importation of ores and 12.1 per cent dip in the shipment of grain out of the port resulted in the total negative figures for 1977.

The Acting Port Administrator predicted that the bringing into service of two new terminals during 1978 could spur an upward trend in the port in the years ahead. "With Locust Point Marine Terminal—South coming on line early in 1978 and with the opening of the new Datsun facility at Atlantic Terminals, it is our expectation that the port of Baltimore, and the industry which benefits from it, will show a much healthier posture this time next year," he said, "providing the national economy does not take any further severe dips in the coming 12 months."

Los Angeles, Calif., 010378 (Port of Los Angeles):—Mrs. Gene Kaplan, center, vice president of the Los Angeles Board of Harbor Commissioners, welcomed Japan's first all-container ship, the Hakone Maru of Nippon Yusen Kaisha Line, to the Port of Los Angeles on the occasion of the ship's 100th arrival at the Port.
Mrs. Kaplan presented a special 100th Arrival plaque to Captain T. Kojima, master of the Hakone Maru, while standing before the plaque given to the ship on its first call at Los Angeles Harbor on September 19, 1968.
Shown from the left during the presentation are: Fred Thompson, manager of Matson Agencies, Inc.; Captain Kojima; Commissioner Kaplan; T. Shimura, the ship's chief engineer and N. Saitoh, resident representative of NYK Line.
Since its first arrival at the Port of Los Angeles the Hakone Maru has sailed more than 1,000,000 miles and carried over 126,000 TEU containers.
Matson Agencies, Inc., serves as general agent for NYK in West Coast ports, Alaska and Hawaii.

The port had a relatively even paced year in general cargo—gaining in imports, losing in exports. There was a healthy 9.4 per cent gain of 249,688 tons in imports to a total of 2,892,381. At the same time, export general cargo dropped 388,831, or 16.4 per cent, to 1,981,787 tons.

The Acting Port Administrator said the longshoremen's strike definitely left its mark in this category. The strike, which ran more than a full two months, was directed at container cargo movements but also had a related damaging impact on break-bulk, or conventional general cargo shipments.

Referring to the losses resulting from the strike, Mr. Halpin said, "Based on the best estimates we can gather at this time, a month after the dockworkers returned to work, the port of Baltimore appears to have suffered the loss of about 120,000 tons of breakbulk and 700,000 tons of container cargo.

"This, we estimate," he asid, "can be converted into an economic impact loss of about $26,237,000. Although the sum is not as high as first expected, it still is business the port and the Maryland area can ill afford to squander."

In another important area of trade associated with the port, Baltimore is better than holding its own in the important U.S.-Puerto Rican trade. In a year when all U.S. ports experienced declines in this business, Baltimore is expected to accumulate about 630,000 tons of cargo by years-end. Although this is a 10 per cent decline from last year, it will move Baltimore from third to second place in

Los Angeles, Calif., 010678 (Port of Los Angeles):—Nate DiBiasi, second from left, a member of the Los Angeles Board of Harbor Commissioners, presented a plaque commemorating the first arrival of the Wallenius Lines ship M/S Rigoletto to Captain Bertil Bojsten, master of the vessel, when the ship made its first call at the Port of Los Angeles.
Seen from the left during the ceremony are: Fred F. Noonan, president of the Fred F. Noonan Co.; Commissioner DiBiasi, Captain Bojsten and Bill Clocksin, assistant general manager of the Port of Los Angeles.
Rigoletto is a ship type called Pure Car Truck Carrier (PCTC) which is a modification of the Pure Car Carriers (PCC). The difference is found in the deck arrangement which allows loading of heavy high vehicles as well as cars. The twelve deck ship has a capacity of 5,300 average Japanese cars, or 3,140 autos in combination with 430 larger vehicles.

---

ranking of U.S. ports doing business with the Caribbean island.

"The significance here is that the port of Baltimore is gaining in its relative position to competing U.S. ports in handling cargo in this vital trade corridor," Mr. Halpin said.

Maritime Traffic Manager

Boston, Massachusetts, January 9 (News From Massport):—The Massachusetts Port Authority recently announced the appointment of Rino Moriconi to the position of Maritime Traffic Manager. He was formerly assistant to the Port Director of the Authority.

Mr. Moriconi's experience in traffic and other port related responsibilities is extensive and varied. As assistant to the port director he was primarily responsible for the development of a Foreign Trade Zone proposal which was approved by the U.S. Department of Commerce in April 1977; the preparation of Boston Harbor dredging applications as well as a wide variety of administrative and traffic functions.

He originally joined the Massachusetts Port Authority in 1969 as a maritime assistant to organize and administer a maritime statistical research department.

Prior to 1969 Mr. Moriconi advanced over a five year period from routing clerk to rate clerk to claims adjuster in the traffic department of Sears Roebuck and Co. in Boston.

Los Angeles, Calif., 011278 (Port of Los Angeles):—Newest members of the Los Angeles Harbor Commission were introduced to the Harbor communities at a recent Board Meeting. They are Fred Heim, center, a former Board member, and Jun Mori, right, both appointed by Mayor Tom Bradley to fill out current five-year terms of office of former Commissioners. They are joining Vice President Gene Kaplan and President Roy Ferkich, seated and Commissioner Nate DiBiasi, standing.

During that time he also completed courses at Northeastern University in traffic management and Interstate Commerce Commission practices and procedure.

Mr. Moriconi is vice-chairman of the Traffic Board of the U.S. North Atlantic Ports Association; a member of the Propellor Club of Boston, and; chairman of the Port of Boston Emergency Planning Committee.

He served in the U.S. Air Force for five years.

Mr. Moriconi resides in Billerica with his wife and young son.

N. Y. Regional Manager

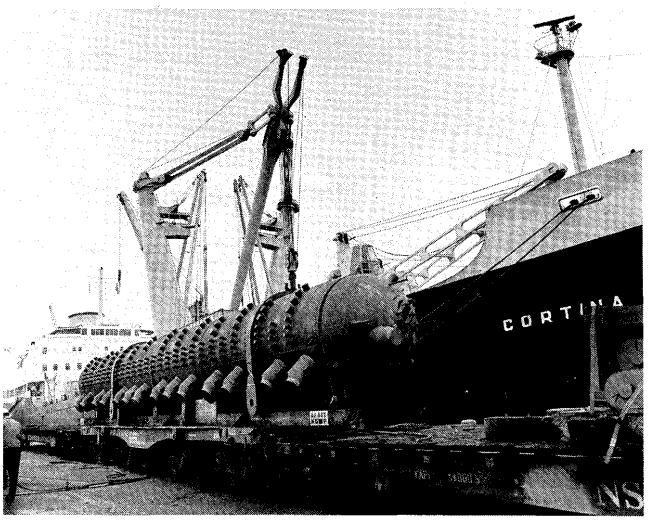
Charleston, South Carolina (Trade News, South Carolina State Ports Authority):—Kenneth J. Harris has been named New York regional manager of the Sough Carolina State Ports Authority (SPA).

Harris, formerly New York assistant regional manager, succeeds Edward R. Berti who has resigned.

Prior to joining the Ports Authority in February 1977, Harris served four years as U.S. project/traffic manager for Exporters Forwarding Co., Inc., where he worked primarily in major projects shipping. His background includes 17 years in international sales, marketing and traffic positions with several leading firms in the United Kingdom and other parts of Europe and in the United States.

In announcing Harris' promotion, SPA Trade Development Director Charles A. Marsh said, "We are confident that Mr. Harris will continue in his new post with the same proficiency and enthusiasm that have marked his progress since he joined the Ports Authority. We know he can continue to develop new business and take care of the needs of existing clients throughout the New York and northeastern regional areas."

In addition to the New York office, the Charleston-headquartered SPA also operates U.S. Trade Development offices in Greenville, S.C., and Chicago, and overseas offices in Brussels, Tokyo, Sydney and Hong Kong.



New York, N.Y., January 1978 (News from The Port Authority of New York & New Jersey):—This big boiler drum enroute to Spain is typical of the many oversize cargo pieces that pass through the New York-New Jersey Port where highly experienced longshoremen daily demostrate their prowess at handling general cargo of every shape and size. This particular item is bound for Andorra, in Spain's Teruel Province, where it will be a vital part of a coal steam generator under construction for Empresa Nacional de Electricidad, S.A. The photograph was taken at Port Newark, one of the numerous cargo facilities in the New York-New Jersey Port, shortly before the 65-foot-long steel drum was hoisted aboard Costa Line's Cortina, which would discharge it at the Port of Tarragona.
Clearly evident in the photo is the special heavy-duty railroad car used to transport the 195-ton drum from its place of manufacture, the Foster Wheeler Energy Corporation plant in Mountain Top, in the state of Pennsylvania. The two flat cars, one in front of, and one behind the heavy-duty car, were utilized to protect the overhanging portions of the boiler drum during its journey to the port.

Port of Corpus Christi, Texas

• AAPA Convention

(Port Corpus Christi News & Events, November, 1977):—Harry G. Plomarity, Port Director, and Duane Orr, Director of Industrial Development and Port Planning, recently returned from Mexico City where they attended the 66th Annual Convention of the American Association of Port Authorities.

During the weeklong meeting panel discussions were held on various port-related topics including environmental awareness, security, port design and construction, insurance and tariffs.

At the conclusion of the convention, Plomarity was elected to the Board of Directors of the Association for the coming year.

• Administration of the Port

(Port of Corpus Christi Port Book, 1977):—The Port of Corpus Christi is operated by a Commission of five

Mr. Frank G. Strachan

members who serve without pay, and who are appointed for two-year terms by a joint Board comprised of the County Judge and Commissioners of Nueces County, sitting with the Mayor and City Councilmen of Corpus Christi. Under this Navigation Commission the affairs are handled by the Director of the Port. The Commission's authority extends throughout Nueces County Navigation District No. 1, which includes all of Nueces County. The Commission controls all commercial activities of the Port, the construction and maintenance of the Port terminal facilities and, through cooperation with the Federal Government, the maintenance and further improvement of the navigable waterways within the district.

Board Chairman Awarded

New Orleans, La., December 16, 1977 (Port of New Orleans):—Frank G. Strachan, chairman of the board of Strachan Shipping Company, has been chosen to receive the 1977 C. Alvin Bertel Memorial Award. The award is presented annually to a member of the New Orleans maritime community who has contributed significantly to the effort of keeping the Port of New Orleans competitive.

The announcement was made by the New Orleans Traffic and Transportation Bureau, which created the award in 1967 in memory of the late Mr. Bertel, a well-respected activist in the maritime industry.

Gilbert H. Vorhoff, president of the bureau, said the award will be presented to Strachan at the organization's Annual Bertel Award Luncheon on January 19, 1978 in the Plimsoll Club of International Trade Mart. Arrangements for the luncheon are being handled by a committee chaired by William A. Reeder.

Strachan, a native of Savannah, Georgia, rose through the ranks of the company founded in 1886 by his grandfather, the late Captain Frank G. Strachan. He worked as a stevedore and clerk during summer vacations while a student at Princeton University, where he was awarded a bachelor of science degree in 1927.

He began fulltime work with the shipping firm immediately after graduation, and, except for wartime service and overseas duty with C.E. DeWolf & Co. (a shipping company headquartered in London) he has worked continuously with the firm ever since.

Oakland, Calif., January 20, 1978 (Port of Oakland):—RETURN TO OAKLAND—The Fesco Lines containership M.V. Kapitan Bakanov paid her first call to the Port of Oakland recently, although for her master, Captain I. Starygin (center), it was the second visit in 35 years. The first was during World War II, aboard a vessel loading war relief supplies. Captain Starygin said he found the port a bit changed in the interim. Soviet Maritime Consul Vladislav Krymov (left) admired the commemorative print of the famous steam-sailer Bear of Oakland presented to Starygin by Port of Oakland Deputy Executive Director Thomas G. Bertken. With 10-day container service between Oakland and the Far East, the Fesco ship's master will become increasingly familiar with today's Port of Oakland, the Pacific Coast's largest containerport.

Strachan was decorated in 1971 with the Order of the Mayo, highest civilian honor of the government of Argentina, and in 1962 he was named to the Order of the Knight of Vasa by Sweden. He served as honorary consul of Sweden in New Orleans from 1951 to 1971.

He was president of the New Orleans Steamship Association in 1959 and in 1960. In April, 1972 Strachan was appointed for a five-year term to the Board of Commissioners of the Port of New Orleans by Governor John J. McKeithen of Louisiana.

An active participant in United Fund and other charitable activities, Strachan is also a member of the Metropolitan Area Committee, New Orleans Board of Trade, Chamber of Commerce, Traffic Club of New Orleans, Foreign Policy and Foreign Relations Association of New Orleans, Economic Development Council, and other civic and maritime organizations.

The New Orleans Traffic and Transportation Bureau is an organization devoted to protecting the competitive posture of New Orleans. The bureau represents the city and the port in all cases involving transportation rates and practices before various regulatory and legislative bodies. Greg B. Perry is its general manager.

Constituent bodies of the New Orleans Traffic and Transportation Bureau are Board of Commissioners of the Port of New Orleans, Chamber of Commerce of Greater New Orleans, City of New Orleans, Forwarding Agents and Foreign Freight Brokers Association, Green Coffee Association of New Orleans, International House, International Trade Mart, New Orleans Board of Trade, Ltd., New Orleans Grain and Grain Products Trade, New Orleans Public Belt Railroad, New Orleans Steamship Association

Oakland, Calif., January 20, 1978 (Port of Oakland):—OAKLAND DIT BONJOUR—The new 534-foot, 20,000-ton containership M.V. Soufflot was recently introduced by the French Line into the Euro-Pacific Joint Service it operates with three other ocean carriers. Greeted on a rainy morning at the Port of Oakland were the ship's master, Captain Michel Pesme (center), Jacques Grevin, Pacific Coast Representative of the French Line, and Guy Flandreau, former French Line owner's representative at the local office of Balfour, Guthrie & Co., agents for Euro-Pacific Service. Bestowing gifts of welcome to the vessel on her maiden voyage were (at left) Robert Langner of the Marine Exchange of the San Francisco Bay Region and John Verheul of the Port of Oakland. M.V. Soufflot, with a container capacity of 667 TEU, is the first of two new ships that will serve Oakland on the Euro-Pacific Service route to North Europe, and the latest of four sister vessels built in Japan for the French Line. All are named for famous French architects, the Soufflot for the 18th century designer of the Pantheon in Paris.

Oakland, Calif., January 25, 1978 (Port of Oakland):—AIR CARGO LOADER LOADED FOR SEA—A mammoth main deck container/pallet loader destined to serve Air France B-747 jumbo jet freighters at Charles de Gaulle Airport in Paris was among the first heavy-lift cargoes taken aboard the new French Line containership M.V. Mansart at the Port of Oakland, California. The ship—third of four new 20,000-dwt cellular vessels recently built for the French Line in Japan and named after famous French architects—was on her maiden voyage between Oakland, United Kingdom and North European ports as a member of Euro-Pacific Joint Service. The model MDL air cargo loader was manufactured in San Jose, California, by FMC Corporation, and is capable of handling air freight weighing up to 40,000 pounds, including a full 20-foot eight-by-eight intermodal container or two 125-inch eight-by-eight air containers simultaneously.

and New Orlenas Sugar Refining Group.

The Bertel Award recipient is selected by the presidents of the constituent bodies of the Bureau. Previous recipients include W. James Amoss, Jr., James E. Smith, the late A.C. Cocke, Lt. Governor James E. Fitzmorris, Richard B. Montgomery, U.S. Congressman F. Edward Herbert, Erik F. Johnson and Jerome Goldman, Robert Barkerding, the late George S. Dinwiddie and former Governor John J. McKeithen.

New Trans-Pacific Container Service

Oakland, Calif., January 12, 1978 (Port of Oakland):—Germany's largest shipping company today launched an ambitious new trans-Pacific container service from the Port of Oakland, with the first of four big cellular ships it had originally intended to use in a joint European service from the Pacific Coast.

Instead, Hapag-Lloyd's four 659-foot, 17,000-ton finstabilized vessels will now offer sailings on a 10-day schedule between Oakland, Long Beach and Tacoma-Seattle, and Tokyo, Kobe and Hong Kong—with feeder service to Busan, Singapore-Malaysia, Taiwan and Manila.

M.V. Alster Express, veteran of nine years in the North Atlantic trade with a capacity of 1,100 20-foot equivalent container units, today inaugurated the semi-independent Hapag-Lloyd trans-Pacific service, to be followed by sisters Elbe Express, Mosel Express and Weser Express.

Within the year Hapag-Lloyd says it plans to add two additional ships, to increase the frequency of sailings to a weekly basis.

Non-conference westbound, and non-conference eastbound from Southeast Asia (but a conference member from Japan, Korea and Manila), Hapag-Lloyd will handle containers of all types, including high-cube, bulk and reefer boxes, and will offer minibridge services through Oakland's Seventh Street Public Container Terminal to Atlantic and Gulf Coast ports.

Bay Area headquarters for the new service will be in the offices of Balfour, Guthrie, general agents—the first time Hapag-Lloyd has established an office outside its home city of Hamburg, according to Michael Peters, Managing Director, Transpacific Service, Hapag-Lloyd A.G.

With the French Line, Hapag-Lloyd is a member of Euro-Pacific Joint Service, a longtime Port of Oakland caller offering sailings every 10 days to Northern European ports. Ironically, Peters noted, it was a protest by three U.S.-flag carriers against Hapag-Lloyd's plans to bolster this service with the four ships that spurred the German line to sidestep into the new trade.

Blocked before the Federal Maritime Commission by the American steamship companies' protest, and faced with the arrival of four newly-built vessels ordered previously from the yards for the North Atlantic trade route, Hapag-Lloyd decided to redeploy and reinstitute U.S.-Far East sailings, a cross-trade it had last engaged in briefly during the 1930s.

Founded in 1847, Hapag-Lloyd today employs 11,000 people and operates 78 ships offering regular liner services to 231 ports around the world. Included in its fleet are two 500,000-ton supertankers, the cruise passenger liner Europa

(Continued on next page bottom)

News from The Port Authority of NY & NJ

1. Steamship Service Directory

January 5, 1978:—The 1978 edition of the **Port of New York and New Jersey Scheduled Steamship Service Directory** is now available for use by exporters, importers, freight forwarders and business and governmental agencies as a primary information source on the ocean shipping services available at America's leading port.

The Directory is updated and published annually by the Port Promotion Division of the Port Authority and lists the names, office addresses, telephone numbers and pier locations for the 138 steamship lines and agents offering regularly scheduled cargo, passenger, or cruise service at the New York-New Jersey Port.

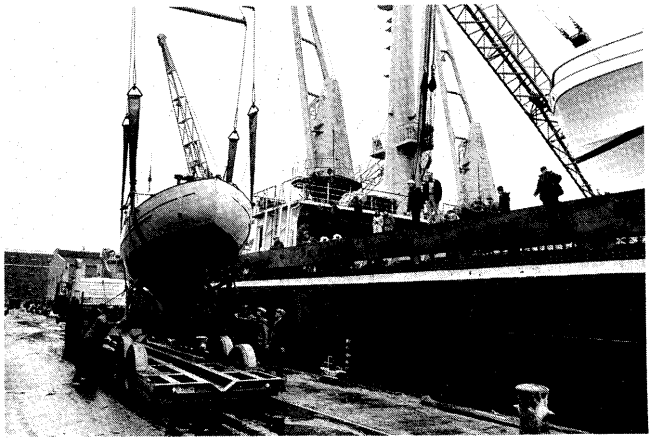
The Directory lists the post office addresses of all the active piers in the port along with the ocean carriers, terminal operators and railroads at each waterfront facility. It also identifies those cargo lines which also carry passengers at the Port of New York and New Jersey.

A cross-index, identifying by nation over 350 ports around the world, precedes a list of all the countries to which scheduled service is provided from the Port of New York and New Jersey, combined with the names of the related steamship lines. This arrangement enables Directory users to pinpoint quickly ocean carriers and the trade routes and ports they serve.

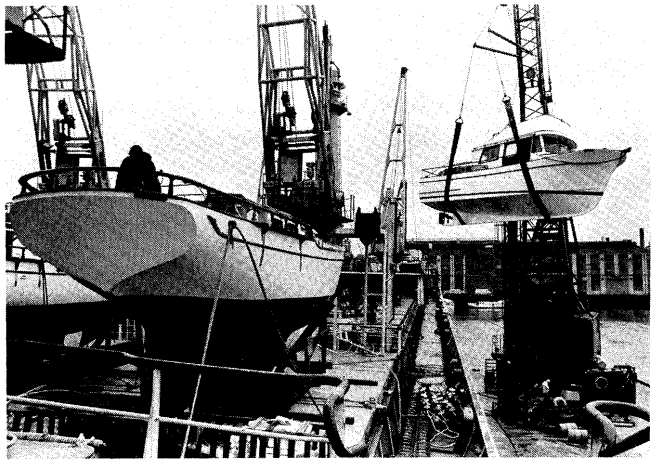
Free copies of the Directory may be obtained from the Port Promotion Division of the Port Promotion Division of the Port Authority at One World Trade Center, Room 62 West, New York, New York 10048.

2. Unusual Cargo

January 1978:—Even at the Port of New York and New Jersey where unusual cargoes are commonplace, all eyes turned toward Vishva Asha, a freighter operated by the Shipping Corp. of India, Ltd., as she sailed by Lower Manhattan to her nearby berth at the Hoboken-Port Authority Marine Terminal. The reason was easy to see, for secured to the deck of the Indian-flag vessel were 28 sleek pleasure boats recently manufactured in Keelung and Kaoshiung in the Republic of China. The yachts, ranging in



New York, N.Y., January 1978:—One of the first of 28 Taiwanese-made boats to leave the deck of Vishva Asha after arrival at the New York-New Jersey Port is lowered to an awaiting trailer-truck. The sling holding the boat is of special no-mar canvas; it insures fast, safe handling of the valuable craft.



Sixteen of a shipment of 28 Taiwanese-made boats were recently unloaded at a New York-New Jersey Port pier directly into the Hudson River to cruise down the New Jersey coastline to the importer's distribution center. The boats arrived on the Indian-flag freighter Vishva Asha. (Photo Credit: The Port Authority of New York & New Jersey.)

---

and four containerships which are among the biggest in the world, boasting capacities of 3,000 TEU and operating between Europe and the Far East.

Hapag-Lloyd also owns a passenger airline by that name, operating charter flights in Europe. The firm has over 400 agents and freight offices worldwide. Its trans-Pacific general agent for the United States is Balfour, Guthrie & Co., Ltd., with Biehl & Co. acting as agents on the Gulf Coast, and United States Navigation, Inc. serving ports on the Eastern seaboard.

"We believe Oakland is one of the keystones, the backbone of this service," Peters declared. "Oakland will be the center of our local, OCP (overland common point rail) and minibridge operations.

"We have high hopes," he added, "that Oakland can perform as well as the port has assured us it can for inbound and outbound mini-bridge cargo operations to and from the East Coast, and outbound mini-bridge service from the Gulf Coast."

Responded Walter A. Abernathy, Executive Director of the Port of Oakland: "Our catchword is 'the Fastest Port in the West.' Both shippers and steamship operators have endorsed the accuracy of that slogan by making Oakland the base for more liner container services than any other port on this coast.

"We're eager to prove our capabilities once again to Hapag-Lloyd, and to other lines which will be coming to Oakland for the first time in the next few weeks," he said. "We warmly welcome Hapag-Lloyd's decision to begin this promising trans-Pacific service from a Port of Oakland terminal."

length from 30 to 44 feet, comprised one of the largest shipments of its kind ever to arrive in the United States aboard one freighter.

Eight boats of the shipment were already consigned to private owners. The remaining 20, however, were being shipped to a boat sales company on New Jersey's Atlantic Coast. The large single shipment was necessary at this time to assure that an adequate supply was on hand for expected sales during the fabulous January boat show in New York.

Those yachts off-loaded pierside were lowered by ship's gear, while on the offshore side, a floating derrick simultaneously performed the unloading duties. One dozen of the sailboats in the shipment were placed directly onto specially designed trailers for direct over-the-road delivery to their owners or for the two-hour run to the sales company's showroom. The remaining 16 vessels were lowered into the Hudson River by the derrick to be sailed away under their own power.

3. New York Cruise Guide

January 16, 1978:—A 1978 New York cruise guide, featuring a list of all passenger ship sailings from the Port of New York during the year, has been issued by The Port Authority of New York and New Jersey.

The handy, free reference brochure entitled "Cruises-New York", lists a total of 203 sailings by ten cruise ships from the New York City Passenger Ship Terminal on the Hudson River between 48th and 55th Streets. These include 19 transatlantic crossings originating in New York.

"Cruises-New Yrok" is updated and published annually by the Port Promotion Division of the Port Authority. It contains useful information on New York sight-seeing attractions, theaters and concerts, restaurants and shopping for passengers sailing from the Passenger Ship Terminal. Many of these attractions can be viewed when promenading in midtown Manhattan close to the Ship Terminal. Others are located in easily reached areas of Manhattan such as Chinatown, Greenwich Village and the downtown Financial District, including the World Trade Center.

Material is included on automobile parking for ship cruises as well as transportation available to and from the Passenger Ship Terminal and the New York-New Jersey Airports.

The guide also provides information on direct motorcoach service by Greyhound Lines between the Ship Terminal and points in the Eastern United States.

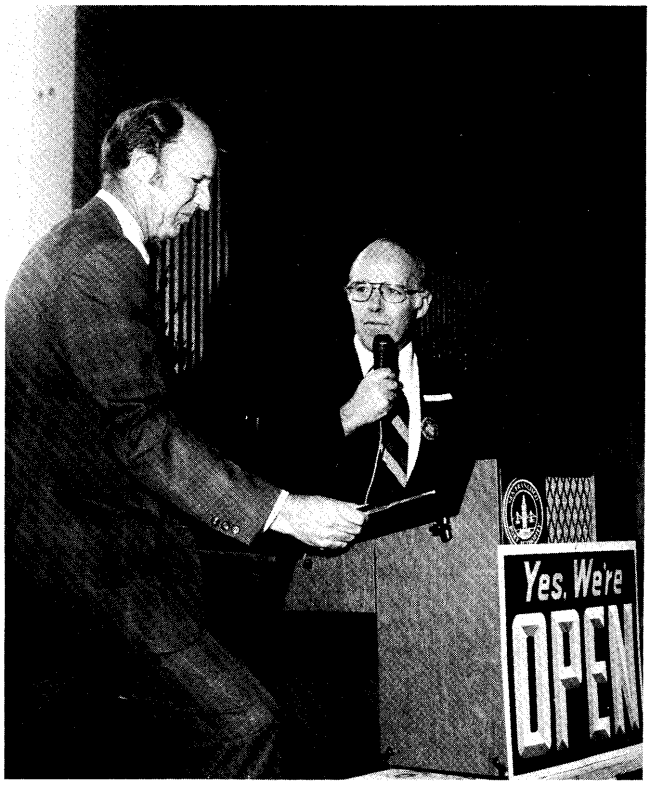
Copies of "Cruises-New York" may be obtained without charge from the Marine Terminals Department, The Port Authority of New York and New Jersey, One World Trade Center, Room 71 West, New York, New York 10048, Telephone: (212) 466-7956.

4. Sunday Departure Cruises to Bermuda

January 18, 1978:—The decision by Holland America Cruises to initiate weekly cruises from New York to Bermuda departing on Sundays was hailed today by Peter C. Goldmark, Jr., Executive Director of The Port Authority of New York and New Jersey, as a forward looking move for the cruise industry in this Port. The cruises feature calls at both Hamilton and St. George's.

Beginning Sunday, April 30, the 680-passenger luxury cruiseship, SS VOLENDAM, will sail on Sundays from the ultramodern New York City Passenger Ship Terminal on the Hudson River between 48th and 55th Streets.

"The Port Authority has been trying for some time to convince the cruise industry that Sunday cruise departures would be an excellent way to increase the cruise market from New York," Mr. Goldmark said. "We believe it will introduce new travelers to cruising, and make cruises more enjoyable by avoiding the Saturday 'rush'.



San Francisco, Calif., 12/20/77 (S.F. Customs Brokers & Freight Forwarders Association):—The holiday season prevailed with the recent, festive "rebirth" of the nation's third foreign trade zone, at the Port of San Francisco. Edgar Osgood received commendation and praise as president of Foreign Trade Services, Inc., new zone operators, from William Bosque, president of the San Francisco Customs Brokers and Freight Forwarders Association. Opened in 1948 at Pier 45 adjacent to Fisherman's Wharf, the "free zone" followed similar, federally-chartered operations at New York and New Orleans. Patterned upon the free trade cities of Europe's Hanseatic League, the depression-born legislation authorizing U.S. foreign trade zones was designed to promote commerce by freeing their world trade from immediate application of Customs and other regulations. Success forty years later is indicated by the existence of 25 zones and subzones, and recent movement of the San Francisco unit from its last, smaller Berry Street location to piers 19 and 23, with 240,000 square feet of space. Osgood, veteran local warehouseman, and his associates plan immediate development of the facilities, to include office, storage, processing and other unique operations permitted in the "extra territoriality" zone area. The Port of San Francisco—zone grantee—will receive a minimum of $100,000 annually during the ten-year lease agreement.

"Previously nearly all travelers wanting to visit Bermuda cruised from New York on a Saturday or flew to the isalnd," Mr. Goldmark continued. "The VOLENDAM Sunday departures to Bermuda are expected to tap an entirely new travel market in the New York area."

Officials of the Port Authority and Holland America Cruises are excited by the new Sunday departures. They are predicting that both seasoned travelers and those who have not cruised before will respond favorably to the new cruise program.

John R. Berry, President of Holland America Cruises, pointed out that the Sunday sailings of the VOLENDAM from New York would offer a minimum of traffic congestion to reach the ship. From a marketing standpoint, he said the new departure date could be a welcome boost for cruise travel.

"Now such potential Bermuda-bound cruise passengers as newlyweds being married on Saturday will be able to take advantage of a Sunday cruise departure," Mr. Berry said. "In addition, cruise travelers who cannot begin their vacations on Saturday, and those who would prefer the convenience of a relaxed Sunday sailing will also welcome the new schedules."

Holland America Cruises has scheduled the new series of 23 seven-day cruises from New York to Bermuda between April 30 and October 1, 1978. There is an inaugural five-day cruise departing April 25 to St. George's and a final five-day cruise on October 8 to Hamilton.

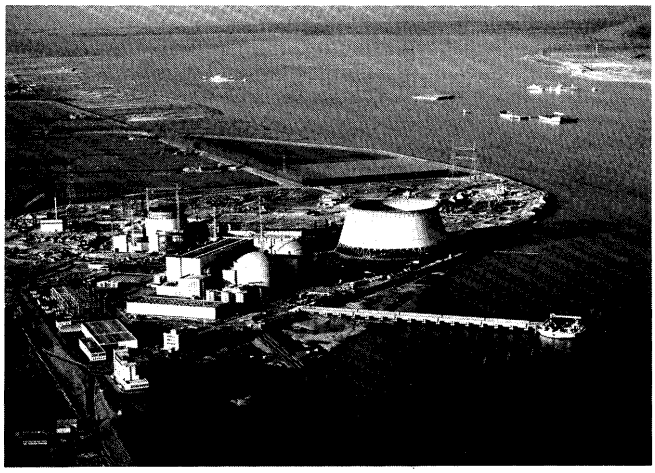
The line utilized the results of an in-depth study of cruise travel just completed by the Port Authority. Travel agents and cruise passengers, as well as potential travelers, provided data in survey questionnaires regarding Sunday departures.

Nearly 6,000 travel agents were surveyed by the Port Authority. Seventy-seven percent of those responding to questions on seven-day cruises felt their clients would be interested in starting their cruise on a Sunday.

In addition, of 10,000 potential cruise travelers receiving the survey, 52 percent of the respondents said they would be interested in a Sunday departure date for a seven-day cruise. Almost a third of the survey respondents aboard Saturday cruises said that they would be interested in a Sunday departure for a seven-day cruise.

Investments in Ports

Caracas, Venezuela, November-December 1977 (Carta de la C.A. Venezolana de Navegación):—For the improvement and extension of national ports the Government has spent this year 167 million Bolivars and it is intended to spend during the coming year 730 million Bolivars, according to a statement of the Minister of Communications and Transportation, Dr. Jesús Vivas Casanova. At Puerto Cabello, especially, new berths are being installed provided with floating wharves. The Department of Communications and Transportation shall invest in highways airports, maritime and air navigation, traffic engineering, communications equipment and other items 1 billion 620 million Bolivars during 1978.



Nuclear power plant in Antwerp port area.
The nuclear power plant at Doel (Northern limit of the port extension zone on the left bank of the river Scheldt). Two reactors of 390 Megawatt each are in operation, a third reactor of 900 Megawatt is nearing completion, construction of a fourth reactor (1.000 Megawatt) is prepared. The existing reactors are cooled with water from the river (installations in the center of the picture) while for the new reactor a cooling tower is under construction (when completed it will be about 170 m high). Nuclear power now accounts for 21% of Belgian's electricity production. In the port area the electricity consumption amounts to some 4.000 million kwh.

Antwerp Maritime Traffic

During 1977 a total of 17.703 seagoing vessels called on the port of Antwerp. Maritime cargo traffic is estimated now at 69 million tons, about 3% more than in 1976.

Increase in Port Charges

Bristol, England, January 11th 1978 (From "Portfolio" A Newspaper for the Port of Bristol):—With effect from 9th January, 1978, the rates and charges levied by the Port of Bristol Authority have been increased by the percentages shown below.

The increase is made necessary by the increase in wages to Registered Dock Workers following their annual review and also by the increase in the cost of services and materials supplied to the Authority during the past year.

Increases applicable to the charges specified in the various schedules of charges issued by the Authority are as follows:

Dues on vessels	14%
Dues on Goods	14%
Labourage charges for Grain in bulk	12½%
Animal feeding stuffs in bulk	12½%
Dry cargo in bulk	12½%
Timber	10%

Other goods 15%
Overtime and sundry labour services 10%
Crane hire and transport services 15%
Warehouse rents 10%

Flexibility is essential in the face of change

Glasgow, January, 1978 (by James P. Davidson, Deputy Chairman and Managing Director, Clydeport Authority, in "Clydeport News"):—At last the tide of inflation shows signs of being on the turn. It is, however, early days and we cannot yet escape from the fact that the country is still precariously balanced on an economic tightrope with annual wage settlements within the Government's guidelines a prerequisite of future stability.

During the year trade was sporadic and at times wholly without pattern. Until the middle of the summer, traffic in the upper reaches maintained a high level to the point that on occasions we suffered from labour shortages. The boom, however, fell away in the late summer and it is only now there are signs that conditions may be returning to a more normal pattern, albeit the present depressed state of the steel industry—a situation not peculiar to this country—has resulted in imports of iron ore well below the levels we have enjoyed in the past.

At Greenock, container traffic increased considerably beyond the 1976 tonnage until October and November when the two-months' strike on the U.S. eastern seaboard reduced trade to a minimal level. During the spring and summer we encountered major problems of congestion due to a high level of straddle carrier breakdowns and urgent steps were taken to purchase five new Peiner carriers, three of which were delivered early in October. A further two will be brought into service in the spring of 1978.

In line with our constant aim to improve our performance, the whole method of operation and handling at the terminal is currently being further studied since we cannot afford a recurrence of this year's spring and summer situation whereby our efficiency was impaired and our customers inconvenienced.

At Ardrossan we have, with some small measure of success, sought trade in areas beyond those traditionally handled at the port and it is encouraging that we have also participated in the spin-off from North Sea oil development.

Our warehousing and haulage subsidiaries continued to widen their scope of activities during the year as an integral part of our development strategy of being able to provide our customers with a complete service.

No year seems complete without its share of misfortune and on 4th January the Clyde Container Services Customs' consolidation depot at Braehead was destroyed by fire. It is to the credit of all concerned with the company that the depot was able to recommence operations in another of the Authority's sheds at Braehead by the middle of March.

In addition, the floating breakwater at Rhu Marina suffered severe damage during a gale at the end of October. This has regrettably delayed the development of the marina facilities but we are hopeful that they should again be in operation in 1978.

In conclusion, I make no apology for once more referring to the need to provide service to our customers. As each year comes and goes it becomes more apparent that if we cannot provide our customers with the service they are entitled to expect we will not retain, nor do we deserve, their business.

We live in a time of great change and must be prepared to be flexible to meet change as it arises. If we are not prepared to do so, then the benefits which can accrue from change will pass us by and never has it been more true than it is today to remind ourselves that one does not receive a second chance in business. What is lost is seldom, if ever, regained.

Changes there will have to be in 1978 in some spheres of our operations but, if we are prepared to recognise and accept the need for those with flexibility, then we will be able to maintain our place as an efficient and reliable port able to offer its customers the standard of service which they are entitled to expect.

The burden, therefore, of creating and maintaining our prosperity rests squarely on our own shoulders.

To all who have contributed to the wellbeing and success of Clydeport during 1977 in whatever sphere, on behalf of the Authority, I extend best wishes for the New Year.

Engineering Management Changes at Hull

London, 13 January 1978 (British Transport Docks Board):—Mr. B. Hardaker, Docks Engineer, Hull, is shortly to retire from the British Transport Docks Board. Mr. A.D.M. Bellis, at present Estuary Engineer, Humber, and previously Assistant Chief Docks Engineer, Hull, will assume the new post of Hull Docks and Estuary Engineer, which is to be created from 1 February 1978.

In this new post Mr. Bellis will retain some of his present responsibilities, including those for planning and research in the Humber estuary, in addition to the duties of Docks Engineer, Hull. Other functions at present the responsibility of the Estuary Engineer, principally dredging and marine engineering, will in future come under Captain G. Smith, Harbour Master, Humber.

Mr. Hardaker, who is retiring after 23 years' service, is a chartered civil and municipal engineer and chartered surveyor. He joined the Board's predecessors at Barry Docks, South Wales, in 1955; was appointed Engineer Maintenance, Chief Docks Engineer's Department, Hull, in 1965 and became Docks Engineer, Hull, in 1972.

Assistant Docks Manager for Ayr and Troon

London, 17 January 1978 (British Transport Docks Board):—The British Transport Docks Board have appointed an Assistant Docks Manager for their twin Scottish ports of Ayr and Troon. He is Mr. Peter Eccleston, who has been the Board's Safety Officer at the Port of Southampton for the past two years; he will take up his new appointment on 30 January.

Mr. Eccleston, who is 33, was born in Solihull, and educated at Tudor Grange Grammar School and at Southampton University, where he obtained a B.Sc. (Hons.) Degree in Social Sciences. He then went to Leeds University to undertake a two-year study of dock labour.

He joined the Docks Board in September 1968 as a Management Trainee and spent various periods during the next three years at the Board's London headquarters and at

various ports before being appointed to a post in the Development Manager's Office at the Port of Southampton in 1971.

Mr. Eccleston became Operations Manager (Town Quay and Royal Pier), Southampton in March 1974, and the following year was appointed as a Superintendent (Container Operations).

He is a Member of the International Institute of Safety Management and of the Industrial Law Society, and he holds the British Safety Council's Diploma in Safety Management.

Humber Estuary Serious Marine Emergency Plan

London, 24 January (British Transport Docks Board HUMBER):—The British Transport Docks Board which is the port authority for the Humber ports of Hull, Goole, Grimsby and Immingham and the navigation and conservancy authority for the Humber estuary and parts of the rivers Trent and Yorkshire Ouse, has produced a plan to facilitate the rapid mobilisation and co-ordination of emergency services in the event of a serious marine emergency occurring in the Humber Estuary.

The plan has been prepared in consultation with other organisations in the area concerned with the provision of emergency services. It is divided into sections dealing with the various types of emergencies which might occur, and specifies in each case the method by which the alarm should be raised and the communication procedure to be followed to ensure the proper co-ordination of the activities of the many organisations involved, who would continue to be responsible for their own functions.

Copies of the plan are being distributed widely to local authorities and other organisations concerned with the provision of emergency services. Operators of port services and ship's agents who will receive a copy are asked to ensure that masters of vessels visiting the estuary are acquainted with the plan.

An early opportunity will be taken of testing the plan in an exercise, after which any lessons learned will if necessary be incorporated. Further reviews and exercises will be held from time to time to ensure that the plan is kept up-to-date.

Mr. Ken Bantock, Port Director, Humber, said today "Strenuous efforts are made by all concerned to promote safe navigation in the estuary. It is prudent, however, that if a serious accident should occur in the river or at a wharf, all the resources which are available for the saving of life and protection of property can be brought into action quickly and effectively. This plan is designed to provide the machinery to do this."

Some 80 regular shipping services now operate from the Humber ports providing a wide network of seaborne freight services to all parts of the world. These services together with other shipping movements amount to about 27,000 passages in and out of the estuary each year excluding fishing vessels, tugs and harbour craft.

Further information and copies of the plan can be obtained on application to the Port Director, Humber, Kingston House Tower, Bond Street, Hull, HU1 3ER.

Marseilles—(Continued from page 37)

solutions to the South:

- either deepening and widening the Arles-Fos canal, but apart from the considerable expense involved, it is difficult to reconcile the functions of drainage, supplying industrial water and use as a navigable waterway,
- or lengthening the sea lock of the St-Louis canal by some 60 meters, but apart from the stoppage of navigation that this work would cause, this would still not avoid mixing sea and river traffic or crossing the Gulf of Fos,
- or cutting a new canal parallel and to the South of the St-Louis canal, which would still not avoid crossing the Gulf,

it was decided to study possible solutions to the North, that is to say solutions linking the Rhône to the Northern end of the Fos Docks, the most interesting of which was that considered by the Ministry of Equipment on 31st July 1975.

This solution consists in building a lock close to the Rhône, at kilometric point 310, in conformity with the standards of the Cie Nationale du Rhône:

- length 195 m
- width 12 m
- minimum draught 4.80 m

This lock would give access to a canal crossing the Western section of the Fos zone of expansion, using over part of its length the area planned for the extension of Dock 2, and which would join the existing Arles-Fos canal to the South of the industrial water pumping station.

A simple structure would have to be build downstream to prevent the inflow of salt water to the pumping station.

Later, when the planned relocation of R.N. 568 A to the North has taken place, it would be possible to make a direct link from the Rhône to the Gulf through Dock 2.

On completion of the necessary administrative enquiries, whose proceedings have been somewhat slowed down in recent months, the public utility enquiry should start before the end of the summer, leading to a declaration of public utility before the end of 1977.

If this programme is adhered to, the construction work could start in the second half of 1978 and lead to the opening of a direct link between the Rhône and Fos by the end of 1980.

• New Editions

The brochure ‹‹Containers via Marseilles-Fos›› (English—French - 12 pages) has just been re-edited after being revised and updated to June 1977.

The new Pilotage Tariff for the Port of Marseilles was also published in June 1977.

The VILLE DE REIMS Calls at LE VERDON

Bordeaux, France, 13th January 1978 (Port of Bordeaux Authority):—The new containership belonging to French shipowners "Navale et commercial Havraise Péninsulaire" (N.C.H.P.), the VILLE DE REIMS recently made her first call at the Container Terminal of Le Verdon.

With a tonnage of 24,400 t.d.w. the new vessel is 173 m

(Continued on next page bottom)

Le Havre, A Platform for International Trade

Port of Le Havre Series No.1

(IAPH 11th Conference at Le Havre May, 1979)

Port of Le Havre–General View

Le Havre, France, 3 January 1978 (Port Autonome du Havre):–The 11th Conference of the I.A.P.H. will take place from the 12th to the 18th May 1979 at Le Havre, Our magazine will, therefore, issue at regular intervals articles on the Port of Le Havre in order to make it better known to our readers. To start with, we are giving them today a general presentation of this Port.

The Port of Le Havre is situated at 49°29 latitude North, 0°06 longitude East, on the right bank of the Seine Estuary. This Port was almost entirely destroyed during the second World War, and a tremendous effort of reconstruction had to be undertaken, and this effort went on, unceasingly, up to 1964. While the global traffic did not exceed 10 million tons when the war ended, the cap of 20 million tons was got over ten years later in 1964; it was doubled in 1968 with 40 million tons, and in 1976 the traffic exceeded 80 million tons. This accelerated progression has raised Le Havre to the third rank among the European Ports after Rotterdam and Marseille. Of course, the oil traffic in the first line and the industrial traffic to a lesser extent play a big part in this growing traffic. But in the field of general cargo, all goods in bulk excluded, which is particularly important owing to the value added by the transit of a ton of general cargo in a Port with regard to the employment it gives rise to, the progression was spectular too in the last ten years.

The trumps of the Port of Le Havre in their simplicity are undeniable, and they were determining factors of the Port's expansion. Le Havre is the first of the important Ports met by the importing vessel sailing in the Eastern Channel and from there in the North Sea. It is also the last Port called at on the export side, whence reduction of routing times and smaller immobilization of capital incurred by consignees and shippers. Located at the outlet of

---

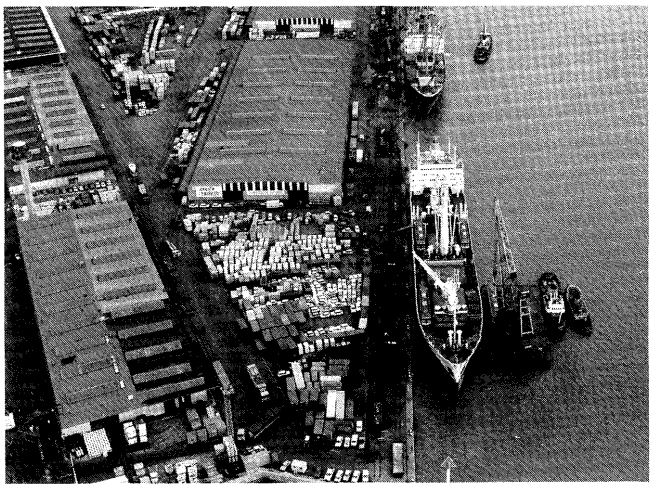
long. Apart from a mast crane of 135 tma capacity, she carries three cranes of 25 tonnes and one of 22 tonnes.

At the French Atlantic Seaboard Container Terminal she loaded thirty containers destined for the Indian Ocean Islands.

N.C.H.P.'s agents in Bordeaux are WORMS SERVICES MARITIMES, who run the 15 day N.C.H.P. service from Le Verdon.

Port of Le Havre–Container Terminal with seven container-carriers berthing there.

Port of Le Havre–The Third Container Terminal (Quai Bougainville)



Port of Le Havre–General Cargo traffic

the most frequented sea of the globe, Le Havre attracts the vessels in search of remunerative freights, and this without lengthening their route. That is why the modern vessels with a high productivity rate for which the least loss of time is to be avoided, are resolute users of the Port of Le Havre. Its nautical possibilities enable it to accommodate at any time the biggest vessels in a minimum calling time. The position of the Port of Le Havre can only be strengthened in the future, especially because of its location upstream the more and more congested shipping routes of the Straits of Dover.

On the other hand, Le Havre is situated close by one of the most important consumption areas of Western Europe: a quarter of the French population lives within a radius of 200 km around Le Havre. A dense and diversified communication network links Le Havre to the main economical activity areas of France as well as to some of the most important economical poles of Western Europe, in particular the Belgian, German and Swiss ones.

At a time when it has become essential to turn to account the maritime fronts and to develop French exports, it is, therefore, reasonable to hope a bright future for the Port of Le Havre. The global traffic reached in 1976 81,7 million tons, that is to say an increase of 10,6% as against the year before. When proceeding to a detailed examination of the various traffic lines, it is interesting to follow the evolution of the general cargo traffic, all goods in bulk being excluded, showing an increase by 10% in 1976 in comparison with 1975 and the development of which constitutes the main objective of the Port of Le Havre. The traffic of containerized goods has made a spectular progression of 45% with 327.910 containers T.E.U. as against 231.675 the year before. 380.000 containers ought to be handled in 1977. Le Havre remains the first Port for container traffic. The oil traffic is important. Indeed, 45% of the oil necessary for the French consumption is imported through Le Havre and the new off-shore petrol harbour Havre-Antifer which was opened to traffic in April 1976. Situated at 20 km to the North of Le Havre and accessible to the biggest ships in service all over the world, viz. to tankers with a deadweight of 550.000 tons, the Havre-Antifier Port accommodates many tankers which owing to there particulars and size could not have been accommodated in the present installations of the petrol harbour of Le Havre. Numerous lightening and transshipping operations are carried out overthere and thus confirm the international vocation of the Terminal.

Among the specialized traffic lines, the coal traffic is equally increasing steadily and came up in 1976 to more than 3 million tons, which justifies the new investments made in that field, since a new ore handling wharf will be put into operation in April 1978 and will be accessible to 120.000-ton vessels.

In 1976, twenty new regular lines were opened showing thus that the tooling constituted by the port equipment and that of the stevedoring Companies is, in fact, particularly competitive.

One of the main reasons of the progression of the Port of Le Havre is to be found in the fact that it has at an early date already been able to adapt itself to the new technics of packaging, conditioning and transport and has made investments by creating new equipments. With three terminals specialized in the traffic of containerized goods, Le Havre occupies today a first-class among the amin European Ports. The position of Le Havre in the traffic of containers has kept improving. In fact, during the last five years the tonnage of containerized goods has increased by 300%, the

(Continued on next page bottom)

Bremen News

Bremen International

• President Koschnick visits Australia and New Zealand from

Bremen, 16.1.78 (BremIn). Following invitations of the Australian and New Zealand governments, the President of the Senate of the Free Hanseatic City of Bremen, Burgomaster Hans Koschnick, will pay official visits to those lands between Jan. 16th and Feb 10th. Koschnick intends taking this opportunity to discuss questions of wider and closer political and economic cooperation. He will be accompanied by a 16-man delegation of Bremen import and export merchants and representatives of the port-economy, shipping, deepsea fishing, banking and the Chamber of Commerce, including: Senator Karl Wilms, Consul Gerhard Beier, bank-director F.W. Bracht (Bremen Bank/Dresdner Bank), bank-director Peter Hartmann (Deutsche Bank), Egon Kähler (BLG-port operating company), director Dieter Koch (Hanseatische Hochseefischerei), Rainer Kohlrausch (Messrs. Carl Prior), Klaus Eberhard Momm (Messrs. Kühne & Nagel), bank-director Axel Reeh (Bank für Gemeinwirtschaft), Hartmut Rüger (Messrs. Kurt A. Dede), Walter Willich (Messrs. Kulenkampff & Konitzky), Wilhelm-Herbert Wunder (Messrs. Wunder & Co.) and Dr. Carl Freiherr von Schröder (Chamber of Commerce).

The Federal Republic of Germany is one of Australia and New Zealand's most important partners. Wool, ore, pelt-products, grain and tropical fruit are imported from these countries through Bremen and Bremerhaven and onforwarded. Machinery, iron/steelgoods, cars, ships, electronic, chemical and plastic goods, glass and unmanufactured tobacco go via Bremen/Bremerhaven to Australia and New Zealand; from Bremen firms alone goods moved in 1977 to the tune of over DM166 millions to Australia and DM1.7 millions to New Zealand.

• 1977 Container-Handling again Up by 13.1%

Bremen/Bremerhaven, 16.1.78 (BremIn). Despite the 8-week long-shoremens strike on the USA East-coast which had a negative affect on cargo-handling, due to the considerable USA-trade of the Bremen ports, the Bremen/Bremerhaven port-group broke a new record in 1977, with a 13.1% increase over the 1976 container handling figure. 1977 result: 503,402 containers = +7.9%; with 4.2 million tons = +13.1%. The container proportion of total-handling rose, from 14.7% in 1976, to 18% in 1977, and particularly general cargo, from 25.8% in 1976, to 30% in 1977. Thereby the proportion of general-cargo to the total-cargo handled rose to (unique for Europe) 63%–as the port-group suffered a noticeable fall in bulk-cargo handling in 1977, from 9.7 (1976) to 8.5 million-tons (1977) = –12.4%. This is to be attributed to steel production stagnation. Bremerhaven ore imports were 1.3 million tons = 43%, down on 1976.

The marked trend towards the Bremen ports being for general-cargo is also apparent from the increase to 446 in the number of liner services–which offer 475 sailings a month to some 1,000 ports around the globe–declared Bremen's Senator for Ports, Shipping and Traffic, Oswald Brinkmann, recently to the press. Brinkmann in this connection stressed the considerable difference in quality between generals and bulk-cargoes. For the port economy one ton of generals is worth 12 times that of a ton of crude oil. He is no believer in 'ton-ism'-and Bremen/Bremerhaven counter this with a 'tailored, individual Service'. (More from: Port Senator, Kirchenstr. 4/5, 2800 Bremen. tel: Detken, 0421/361 2235).

• LASH-Handling Increased nearly 30% in 1977

Bremen/Bremerhaven, 16.1.78 (BremIn). Whilst the first 6 years of LASH-trading in the Bremen ports evinced increased handling-figures–more frequent sailings and new trading areas (additionally to USA, Red-Sea and Arabian/Persian Gulf), it nevertheless dragged behind the container-traffic increase of 13.5% (1971) to 30% (1977), proportionally to the total general-cargo movements. During the same period, the number of parent-ships grew from 19 to 66 and the barges from 428 to 1,894. Even more important than the LASH-handling increase of 370,000 tons (1976) to 480,000 tons in 1977 (plus 30%) is the balance achieved in 1977, for the first time, between receipts (235,000 tons) and dispatches (245,000 t) which has resulted in a considerable improvement in the, until now, lagging dispatches–to give a rise, for 1977, of over 74%.

---

share taken by the containers in the traffic of general cargo, all goods in bulk being excluded, having increased from 20% in 1971 to 45,4% in 1976.

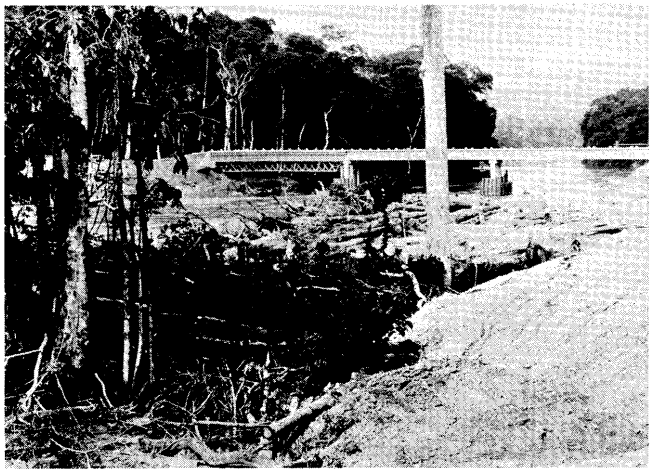
During the years to come, Le Havre is going to intensify its endeavours in view to improving the quality of the service and developping its traffic. The aim to be reached in 1980 is the handling of 9 million tons general cargo and, to do so, the Port must go on equipping and investing, taking into account the new datas of International Trade. The equipment works of the third container terminal will be proceeded with. Since the month of July 1977, 622 m quay have come into operation. At the end of the year 1978, an additional length of 500 m quay will be put into operation.

The Port of Le Havre avails at the same time of an industrial zone of 10 000 hectares (about 25 000 acres) where a certain number of Firms have installed their Works. By importing raw materials or by exporting their finished products, these Firms contribute to the growing of the port traffic. Three canals irrigate this area which is connected to the Western part of the port through the biggest lock in the world, e.g. "l'Ecluse Francois 1er", thus allowing sea-going vessels to moor at berths located at the very doors of the works.

Le Havre has also equipped itself with installations capable of meeting the traffic of capital goods. Since the month of August 1977, the Port avails of a shore-installed derrick-crane able to handle the heaviest load units anticipated.

As years go by, the Port of Le Havre has become a stronghold of the French Maritime Foreign Trade and one of the main European Ports. It will constantly go on endeavouring to get its equipments and installations permanently adapted to the new datas so as to be competitive at all times. This requires a watchful commercial policy led jointly with all users of the Port.

Port Consultant Services Provided By Consulting Firms Based in Hamburg



This bridge in Gabun, West Africa, was designed and constructed with the assistance of a consulting firm based in Hamburg.

News Release from The Representative of The Free and Hanseatic City of Hamburg

Tokyo, December 27, 1977:—"Port consulting Made in the Port of Hamburg" is the quality seal of services provided by Hamburg consulting firms for port construction and port operating according to a recent announcement by the Hamburg Port Information. They supply surveys, analyses and plans for new ports and port-related traffic systems in Asia, Africa and Latin America. Their success is based on the know-how acquired by the Port of Hamburg during reconstruction of its completely destroyed facilities, the reorganization of infrastructure and the introduction of industrial transport techniques. Although the firms are basically in competition with each other, they pool their special knowledge in bidding on major projects.

The rich oil producing countries in particular make use of their assistance. Their ports and coastal centers cannot cope with the influx of material and equipment needed to realize major industrialization projects. Other countries of the third world have the same problems. Their development is also hampered by the lack of efficient ports.

Even before the oil countries became wealthy clients, one Hamburg engineering firm was already cooperating with them. Under its direction, in this region and in other overseas countries, numerous infrastructure and suprastructure projects with an investment value of several billion Marks have been completed or started—port and highway construction in Nigeria, Egypt, Saudi Arabia, Guatemala, Costa Rica, Iran and the Philippines. The firm has interests in companies in Bandar Shapur, Dammam, Cairo and Lagos.

At the same time, inland activities are not neglected. Most of the infra—and suprastructure measure of the Port of Hamburg were prepared and carried out with the collaboration of this office. It cooperated with leading German shipping companies and port operators, thus acquiring valuable experience in revising the sectors of "organization" and "operating processes". This is now proving of benefit in the work for foreign clients.

Another still quite young firm is backed by the know-how of one of the biggest and most experienced German port undertakings. Together with a Bremen consulting company it is working in Saudi Arabia on establishing a central port administration for the kingdom's fourteen ports. This firm also has a 16-man team working on another project, where in addition it will undertake operating management—the organization and technical equipment for the new Tin Can Island Port now under construction near Lagos.

Other port consulting firms are also utilizing the organizational and technical knowledge which they gained in the Port of Hamburg. They have models for handling and traffic problems of ports. In order to exploit this knowledge in designing new facilities, staffed teams are formed specifically on a case-by-case basis, which can be regrouped as the project progresses.

Economic Impact of Port

Amsterdam, December 1977 (Amsterdam News Letter):—The Port of Amsterdam makes a significant contribution to Holland's economy, even more so than first figures might indicate.

Ports are rated worldwide by the amount of international sea-going goods traffic they handle. While this gives a fairly good indication of a port's role in the imports and exports of the country, this international figure (which for Amsterdam in 1975 was 18.4 million tons) does not give the full picture. Other cargoes generated by a port, usually very labor-intensive, give an indication of the economic impact any port has.

Therefore, a port's relative importance to the nation's economy must include other modes of transport, both international and domestic. For example, in 1975, the latest year for which all figures are available, Amsterdam handled 16.2 million tons of domestic cargoes in addition to the 10.0 million tons of international cargo, other than sea-transport handled that year.

As impressive as these additional figures are, they do not include cargoes shipped through the Port of Amsterdam which is served by two major canals, the North Sea Canal to IJmuiden and thus the open sea, and the Amsterdam-Rhine Canal, connecting the Capital Port to the Dutch branches of the Rhine and other inland waterways throughout Holland.

Then too, products made in the Zaan region north of the city and shipped to Utrecht or to the Ruhr area, or steel made at the Hoogovens plant at IJmuiden are not included in any of these figures. Nevertheless, these cargoes pass physically through the Port of Amsterdam.

Thus, in 1975, the Port of Amsterdam loaded or discharged in all modes of transportation a total of 28,331,000 metric tons of international cargo, while over 16 million tons of domestic cargo were also handled.

When the North Sea Canal area is taken as a whole, the economic impact is even greater. The North Sea Canal Ports of IJmuiden/Velsen, Zaanstad and Amsterdam handle some

35 million tons of international sea-going goods traffic each year, and total inland transport probably amounts to 65% more.

Rotterdam's New Port Emblem

Rotterdam (Rotterdam Europoort Delta, 77/4):—The Port of Rotterdam has joined the numerous companies which have modernised their emblems in recent years. The new emblem is introduced on the cover of this issue. It has been designed by graphic artist John Stegmeijer, whose studio also does the layout of our magazine.

Water, the movement of waves, quays, pipelines—all the activities within a big and modern port have been symbolised by him in this combination of three cylindrical figures in blue. In the centre is a three dimensional figure representing packing: a closed box.

'Though symbolism is indispensible, the shape of an emblem is of paramount importance', the designer explains. 'It must be so characteristic, so specific, that it is readily recognised and remembered. It is above all the shape that must be original'.

'The relation with the name: Port of Rotterdam, is another important aspect', he adds. 'A general example of port symbolism would not suffice; after all, it is not a Chinese character in which the name 'Rotterdam' has to be incorporated. The fact that it refers to Rotterdam must be quite clear. The coordination of the activities is the most essential aspect and must be visible'.

The new emblem will enable the new External Affairs Department of the Port of Rotterdam to give its publicity more relief—a more distinct image.

Oil Cuts into Port of Rotterdam Operating Result

Rotterdam, January 25, 1978 (Port of Rotterdam Press Release):—A sharp fall in imports and exports of crude oil depressed the 1977 operating results of the Port of Rotterdam. At 272 m tonnes (provisional), total cargo volume for the year was down 11 m tonnes, or 4%, on 1976, with oil contributing 10 m tonnes of this shortfall.

Liner services maintained their position despite the US dock strike, which paralysed the main container route for 2 months. The downturn in the steel industry was once again reflected in lower figures for ore transhipment.

"A year of mixed results, but the port stood up well to the economic headwinds", was the verdict of Henk van der Pols, Rotterdam's Alderman for Port Affairs.

On the positive side there was the continued growth of container traffic. In the first 8 months of the year containerised cargo was up by 20%, and although this was cut back by the US dock strike the container sector closed the year showing a growth of 13%. In 1977 Rotterdam handled 900,000 containers (as against 816,000 in 1976—an increase of 10%). Roll-on/roll-off was up by 9%, while LASH traffic showed a buoyant rise of 21% (partly due to the new LASH route to the Middle East). Total volume by liner service showed a slight rise to 27.7 m tonnes. Although containers, LASH and roll-on/roll-off took a greater share of this total, conventional general cargo fell by 12.5% (from 13.8 m to 12 m tonnes).

The volume of crude oil moved in and out of the port in 1977 was down by 10 m tonnes, a fall of 7%. Remarkably enough, though, incoming shipments for processing in the Netherlands and for pipeline transit to West Germany and Belgium rose by 2.3%. The fall was in transhipped crude for transit (arrival in VLCC and distribution to other West European ports by feeder lines), which was down by 12 m tonnes. There was a sharp increase in coal transhipment, particularly in the closing months of the year. The overall increase for the year was 15%, and was largely accounted for by German coal in transit (up 30%). 1977 Saw a further decline in ore transhipment, despite the progress of transit rail shipment to the Saar region. Total turnover fell by 12% to 29 m tonnes.

Grain and derivatives, a perennially healthy sector, were up another 5% to finish with an increase of 21 m tonnes on 1976.

The estimated operating result for 1977 is summarised below.

	1977	1976	
Total seaborne cargo (excl. bunkering) in metric tons	272,000,000	283,104,000	−4%
Crude oil	138,000,000	148,480,000	−7.1%
Coal	8,100,000	7,006,000	+15.6%
Containers			
number	900,000	816,181	+10.3%
cargo	10,800,000	9,543,242	+13.2%
Ro-Ro	3,400,000	3,117,291	+9.1%
LASH	1,500,000	1,238,271	+21.1%
Grain and derivatives	21,000,000	19,984,000	+5%
Ore	29,000,000	33,100,000	−12%
Number of ships	30,800	31,993	−3.7%
NRT	180,800,000	183,205,000	−1.3%

Helsingborg—Now Largest Dry-Cargo Port in Sweden

Helsingborg, January 17, 1978 (Port of Helsingborg Press-Release):—For the second consecutive year cargo throughput has increased tremendously. The final figure for 1977 came to 7,829,186 tons, meaning a rise of 354,323 tons or by nearly 5 pct. The total increase of the last two years is thus exceeding 1 million tons. Dry-cargo only rose to 6.8 million tons, thus securing Helsingborg the first place between Swedish ports with a broad margin.

As was the case in the year before unitized cargo accounted for the finest addition of 234,800 tons. The throughput at the Container Terminal is now 417,458 tons, up 11 pct from 1976. The three Ro/Ro-terminals obtained

PORT OF HELSINGBORG
The oil harbour can accommodate large-sized product tankers. However, the strength lies in dry cargo, in which Helsingborg now ranks first among Swedish ports.

the following results: Linjebuss 1,084,112 tons, Sundsterminalen 557,895 and DSB-SJ-Terminal 492,154 tons.

The cargo volume at the bulk harbour Kopparverkshamnen increased by appr. 8 pct to 1,682,711 tons, while conventional general cargo decreased somewhat to 431,441 tons and ferried railway cargo practically ended on a dead level of 1,920,852 tons. Bulk cargo at the port also remained firm with small variations. In addition to the bulk goods recorded at Kopparverkshamnen 1,233,563 tons bulk was handled, out of which petroleum products came to 987,563 tons.

Ferry Traffic

New top figures could also be recorded for motor vehicles and passengers using the different ferry lines of Helsingborg in 1977. The number of vehicles rose to 1,457,114 and travellers to 17,647,267 corresponding to 4.6 and 8.3 pct respectively. The figure for passengers hereby took a leap upwards with a sensational 1.35 millions in 12 months. The total figure for ferried railway waggons came to 210,895.

Gray Mackenzie Monthly Bulletin

NOVEMBER 1977

• Abu Dhabi

There has been no significant change in the port. Throughout the month there being no berthing delays. vessels have received prompt despatch.

The Abu Dhabi Government has suspended US $73.1 million contract, following a decision to shelve plans for a 34 berth outerport. This move is mainly seen as a response to the slowing in the rate of imports as a result of an economic pause in U.A.E. A5 berth extension is now being built by Howard Al Geemi Construction Company, a U.K.–U.A.E. joint venture. The Government has however awarded a job worth about US $40 million to Dong Ah-of Korea (who were originally contracted for the 34 berth outer port) for building a breakwater opposite Abu Dhabi Corniche. Dong Ah will also build a dhow harbour at the port. It is reported that the outer harbour contract may yet go ahead but not for some time. More immediate plans are for a final eight berth extension to the inner harbour, where Howard Al-geemi are working. A decision has already been made to concentrate on containers, the 5-berth extension will, it is said, have two berths for shallow-draught container ships, the 8 berth extension on present plans, will, when it is tendered next year, have two berths for "third generation" container ships.

Tenders have been invited to build reinforced block–work partition walls in merchants' warehouses at Mina Zayed.

• Khorramshahr

During November, 81 vessels discharged a total of 340,775 tons of import cargo.

Berthing delays ranged from two to six days.

Ports of South Australia

"Introduction" from Annual Report 1975-76 from Mr. J.G. Griffith, Director of Marine and Harbors to the Hon. The Minister of Marine:–Financial returns for the year disclosed a net deficit of $3 020 807 (compared with a net deficit of $1 364 642 for the previous year) with cash receipts of $10 705 028 and payments of $13 725 835. Total funds employed in the undertaking advanced to $81 777 781. Cash receipts were less than those of the previous year by an amount of $183 596, due mainly to a decline in the amounts received for wharfage, tonnage rates, conservancy dues, pilotage and miscellaneous services, partly offset by an increase in receipts for bulk handling services. Increases occurred in all areas of payments, particularly salaries and wages, operation and maintenance costs and fishing industry facilities. Interest charged to the Department increased considerably on that for the previous year.

During the year 3 000 ships arrived at South Australian ports (both State and private), 262 fewer than during 1974-75. The gross tonnage of the vessels involved was 19 121 815, a decrease of 162 303 tons from the figure for the previous year. The amount of cargo handled at all such ports (imports and exports) decreased by 443 846 tonnes to 18 190 359 tonnes with imports increasing by 269 029 tonnes and exports decreasing by 712 875 tonnes.

The main increases in imports were timber (29 370 tonnes), limestone (62 367 tonnes), and crude petroleum (338 075 tonnes), offset to some extent by decreases in phosphate rock (38 394 tonnes), iron and steel (64 691 tonnes) and motor vehicles, caravans and trailers (64 216 tonnes).

The decrease in exports was due mainly to a decrease in the shipments of ores and concentrates (3 790 788 tonnes), motor vehicles (49 833 tonnes), gypsum (51 049 tonnes), wheat (387 827 tonnes) and salt (144 483 tonnes), offset by the increased export of barley (116 381 tonnes), refined petroleum (254 626 tonnes) and dolomite (222 138 tonnes).

The construction of the new berth (No. 6) for the cellular container ships at the northern end of the Outer Harbor continued and the civil construction works, comprising the wharf, stacking area and ancillary buildings were completed. Erection of the 45 tonnes portainer-type crane was commenced by the contractor whilst the new spur line

from Osborne to serve the new berth was completed by the South Australian Railways and used to transport the larger of the crane components.

The approach channel and the swinging basin opposite the berth were deepened to 12.3 meters at low water and work on the extension of the existing breakwater on the northern side of the channel was commenced, using some 239 000 cubic metres of dredged material.

Dredging the new approach channel to the Outer Harbor to a depth of 12.3 metres was commenced under contract. Approximately 1 000 000 cubic metres of soft material had been removed by the end of the year.

Because of the limited space available for the Port Adelaide fishing fleet and the uncertain future of the Birkenhead Bridge, the Parliamentary Standing Committee on Public Works recommended the construction of a fishing haven in the North Arm of the Port Adelaide River. Work commenced on the project in February, 1976.

Construction work on the new bulk loading plant at Port Lincoln during the year concentrated on the erection of the conveyer system and the first of two loading gantries. Civil construction work was restricted to the bitumen surface being placed on the concrete deck units.

Major repairs to the shipping pier at Wallaroo continued, work during the period having been concentrated on the provision of a new steel bracing and fendering system.

After protracted negotiations with fishing representatives, agreement was reached on the design of a stone breakwater to protect the fishing boat moorings at Port Mac Donnell. Construction commenced in December, 1975, and by the close of the period, one-third of the designed length of the breakwater had been completed.

Development planning included the preparation of final details for a new Head Office building at Port Adelaide; proposals and estimates for a new berth for the bulk loading of cement clinker at Birkenhead; assistance to the Premier's Department for alternative schemes at Redcliffs for the disposal of liquids from the Cooper Basin in Central Australia and planning for development on the eastern side of the Port Pirie River following the erection of a new access bridge at Solomontown.

Plaque for Maiden Voyage

Adelaide, South Australia, Thursday 5/1/78 (Minister of Marine Press Statement):—The container ship Anro Temasek became the second vessel to operate the new service connecting Port Adelaide with South East Asian ports when she berthed heretoday (Friday).

To mark her maiden voyage to South Australia, a plaque will be presented to her skipper, Capt. Lim.

Anro Temasek follows Anro Australia which inaugurated the service on October 17 last. (Both have the capacity to carry up to 725 containers and 150 refrigerated units).

Welcoming the ship, the Minister for Marine, MR. DES CORCORAN, said the institution of the 11 day service between the Port of Adelaide and South East Asia was one of the most potentially productive developments in local shipping in recent years.

MR. CORCORAN said it was up to importers and exporters to make themselves fully aware of the service now being offered by the consortium of shipping companies concerned with the Anro line.

Anro Temasek and her sister ships (as well as Anro Australia a further vessel is due to come into service shortly) provided South Australian commercial organisations and industries with valuable new trading opportunities.

MR. CORCORAN suggested manufacturers time their production and delivery to conform with the 11 day sailing cycle and the fully containerised service.

As the vessels were also designed to carry timber in unitised form, there was now the chance for importers to bring in South East Asian timber more economically.

The Anro service links the Port of Adelaide and other major Australian ports with Djakarta, Singapore, Port Kelang and Penang.

Gladstone Harbour Board Chairman's Review 1976/77

Gladstone, Queensland, Australia (From "Gladstone Harbour Board Annual Report 1976/77"):—The year which ended on 30th June, 1977 might well be described as one of renewed optimism for the Port of Gladstone.

Such optimism arises from increased trade during the year, expansion of industry in the area, and beneficial seasons in the hinterland.

Whilst the National economic worries have spread throughout the entire country, Central Queensland is blessed with such magnificent natural resources, that the depressed economic effects have been minimised by the enthusiasm of all concerned in ensuring that this part of the country is developed to the optimum advantage.

The Gladstone Harbour Board has been proud to play a significant part in this development and will continue to do so.

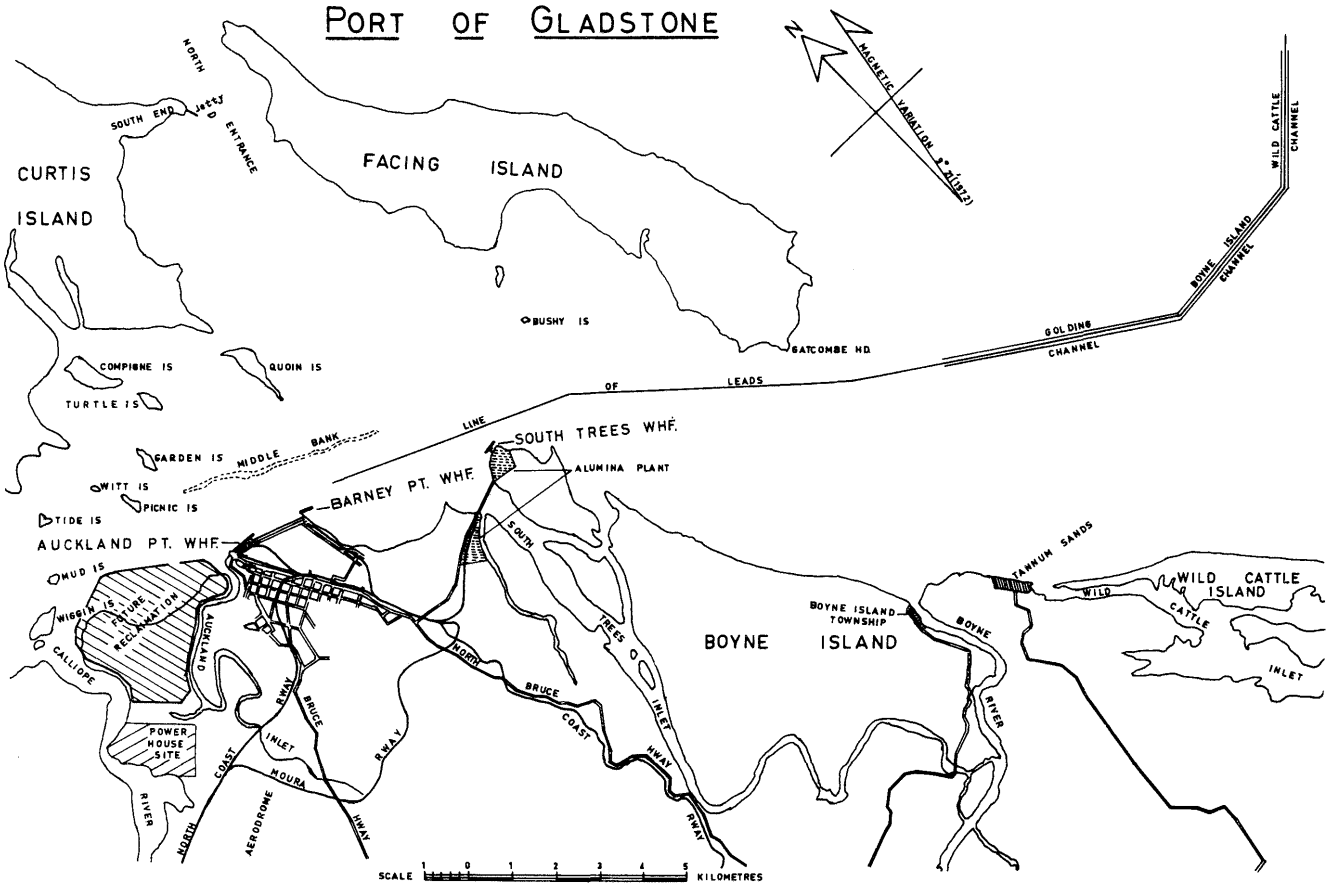
Cargo handled at the Port during the year totalled 15,112,253 tonnes—an increase of 5.38% over the previous year. Coal exports from the rich mines of the Bowen Basin still head the list of commodities handled, whilst Grain exports show a steady increase.

In direct correlation with the development in the hinterland has been the increase of petroleum products shipped into the Port. The tonnage of these products imported in 1976/77 was 276,571 tonnes which represents an increase of approximately 50% over the last five years.

Whilst dealing with the trade of the Port, mention must be made of the great contribution provided by Queensland Alumina Limited to the tonnages presently being handled at the Port of Gladstone. Over 50% of the total trade is represented by products consumed and produced at Queensland Alumina Limited's.

Refinery. We congratulate the Company on celebrating its 10th Anniversary of successful operations in Gladstone.

The optimistic outlook which was mentioned earlier was evidenced during the year by the full developmental Works Programme undertaken by the Board. In particular, reference must be made to the massive reclamation scheme being undertaken in the Clinton area west of Auckland Point. The immediate concentration has been at the site of a proposed Coal Handling complex which it is anticipated will be commenced during the 1977/78 year. Full details of this project are to be found elsewhere in this Report, but it must be stressed here that the Board strongly believes the establishment of this Facility will provide capacity for the handling of Coal produced in Central Queensland without the proliferation of additional rail lines and Ports within the



State.

Prospects of two other major developments in the Port appear bright. Discussions have continued throughout the year with Queensland Cement and Lime Company Limited in relation to the Company's proposal to establish a Clinker Works with Port facilities at Fisherman's Landing, in the western section of the Port.

Comalco Limited have also continued to express interest in the establishment of an Aluminium Smelter on Boyne Island in the eastern part of the Port. Whilst the Company has not yet made an official announcement on the plant, there is considerable confidence that the Smelter will eventually be established.

The aforementioned and other industrialists continue to show interest in the Port. There is no doubt that with the commodious Harbour and ample Port orientated land available, the Port of Gladstone has much to offer establishing industry.

Another attraction which can now be added is the availability of power from a giant Power Station established only a few kilometres from the Port proper. It was a historic occasion when the Deputy Prime Minister, The Honourable J.D. Anthony, M.P., officially opened the Power Station on 17th September, 1976.

Through prudent management, the Board continues to retain a sound financial position. Some Port charges were increased during the year, but in accord with longstanding Board policy, charges in the Port of Gladstone are more than competitive.

The operation of a modern Port must be on a co-operative basis in order to obtain and preserve efficiency. My Board is acutely aware of the co-operation it receives from the many sources which combine to present this highly efficient Port.

Our thanks are extended to the Queensland Government, and especially to the Minister for Tourism and Marine Affairs, Hon. A.M. Hodges, M.L.A., for continued support.

We appreciate the interest and helpful consultation provided by the Director, Department of Harbours and Marine, Mr. A.J. Peel, and his Officers.

Appreciation is also extended to the Harbour Master, Captain M. Hanson, and his Pilots, for the efficient manner in which they have handled shipping movements at the Port during the year.

Railways play an important role in the transport of goods to and from the Port. Our gratitude is expressed to the Commissioner for Railways, Mr. P.J. Goldston, and the Officers of his Department for the very ready co-operation which has been offered to the Board.

The thanks of the Board are also extended to the administrative and operational staff for their loyal and devoted service throughout the year.

Finally, we must acknowledge and thank our many Port users for their faith in Gladstone and for their continued support for the Port.

We face the ensuring year with confidence that the plans formulated in the past will come to fruition, and that the

Port of Gladstone will move to greater heights in the World maritime scene.

W.R. Golding
CHAIRMAN

1977 Cargo Throughput

Gladstone, Queensland, Australia, 4th January, 1978 (Press Release by Mr. W.R. Golding, C.M.G., M.B.E., F.R.G.S., Chairman, Gladstone Harbour Board):—Cargo throughput at the Port of Gladstone for the year ended 31st December, 1977, was an all time record.

The total cargo handled was 15,716,436 tonnes which eclipsed the previous record set in 1973 by 272,702 tonnes.

The year's cargo consisted of 8,977,694 tonnes of exports and 6,738,742 tonnes of imports.

The major commodities handled were—

Coal	6,556,500 tonnes
Bauxite	5,739,820 tonnes

The record cargo showed a 4.13% increase on 1976 when 15,092,617 tonnes were handled.

The number of cargo carrying vessels to visit the Port in 1977 was 436, an increase of 29 over the previous year.

Largest Cargo of Oil Seed

Gladstone, 13th January, 1978 (Gladstone Harbour Board):—What is understood to be the largest cargo of oil seed ever to leave Australia is presently being loaded on to the M.V. Genista at Auckland Point, Gladstone.

The vessel will sail tomorrow evening after taking on 14,300 tonnes of safflower seed. It will then move to Brisbane to accept 5,000 tonnes of linseed.

The 19,300 tonnes cargo is destined for Europe, with the safflower seed going to Lisbon, Portugal, and the linseed to Hamburg, Germany.

The safflower seed for the shipment was grown in the central Queensland area, with most of the cargo coming from the central highlands. A small proportion was grown in the Callide/Dawson Valley and the Rockhamption area.

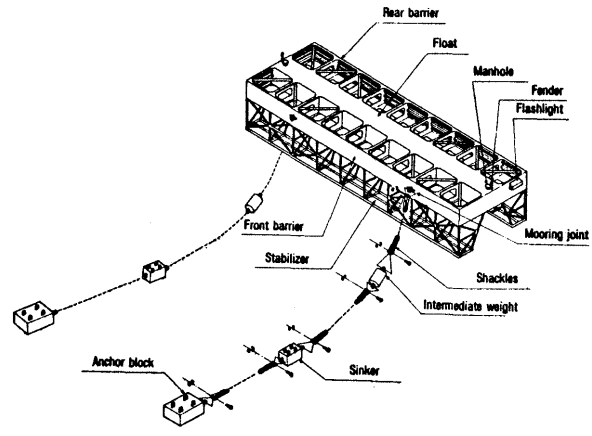
Unique floating breakwater tests series begun by IHI

Tokyo, December, 1977 (IHI Bulletin, Ishikawajima-Harima Heavy Industries Co., Ltd.):—IHI recently started a series of tests on the sea of a newly developed floating breakwater with a stabilizer which is scheduled to last for about two years in Kataura Bay, Kagoshima Prefecture.

The new floating breakwater (LH10-25 type) is designed to be more durable and efficient in breaking up the force of waves than the conventional one hitherto in practical use.

The marine tests involve (1) the confirmation of technical skill in setting up a floating breakwater without resorting to diving operations in comparatively deep water, (2) to make sure of the mooring tension and decreasing effects of mooring parts abrasion by the stabilizer attached to the floating breakwater, and (3) to reduce cost through all these achievements as a measure to step up overall durability and breakwater efficiency.

In these tests, one LH10-25 type floating breakwater unit (25 m long x 10 m wide x 2.2 m high barrier and 125 tons in weight) is moored by the chain catenary method (a mooring method to damp tension by chain weight). After completing this work, the breakwater's durability will be checked for about two years (Nov. 1977-Sept. 1979) with



Arrangement of floating breakwater.

stress laid on the investigation of (1) wave data, (2) position slip of the mooring anchor, and (3) the adhesive condition of living things.

Various propagation and culture facilities as well as port and harbor facilities which used to be set up in the shallows of a bay tend to be expanded these days to the open sea where natural conditions are rough. Accordingly, such breakwaters are required.

Better Services

Kuching, September 1977 (Kuching Port Magazine):—THE KUCHING PORT AUTHORITY'S berths and other shore facilities at Pelabuhan Datuk Sim Kheng Hong are now well on their way to their third full year of operation. Completed in March 1975 with financial assistance from the Asian Development Bank the facilities there are gradually becoming a major centre of operations as bigger and better ships are increasingly a feature of the port scene at Pending. With the expected rise of cargo traffic in the next few years larger and specialised ships on direct trade routes will make Pending, now ready for containerisation on a feeder basis, a regular port-of-call.

The Authority's facilities at Pending have several advantages over the facilities at Tanah Puteh. Designed for handling vessels with a deeper draught and the transit shed sited only sixty feet away from the marginal wharves' edge, the facilities there are ideal for handling larger palletised and general cargo ships of the MISC category.

Cargo operations at Pending, unlike at Tanah Puteh where tractors and trailers are generally used for every class of cargo discharged from the ship, are more mechanised. Cargo are landed from the ship's hold on to waiting pallets at the pitching point on the wharves.

The forklift will then remove the pallets and stack the cargo in the transit shed nearby thus dispensing with the use of trailers and workmen for the shed-side works, so characteristic of the work arrangement at Tanah Puteh. Cargo delivery, generally a slower process at Tanah Puteh has been found by consignees at Pending to be something so convenient that at one delivery point six lorries can be alloted in bays thirty feet away from the shed and served simultaneously with a minimum number of men, usually one, at the delivery door.

(Continued on next page bottom)

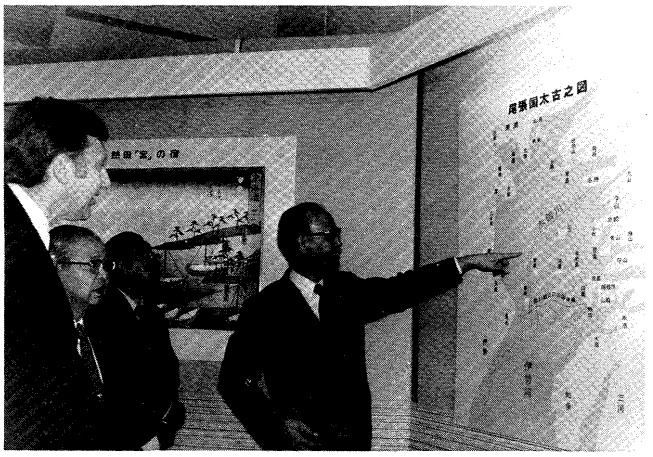
Port of Nagoya at the 70th Anniversary Mark

Nagoya Port News December 1977

Port of Nagoya was officially opened to the world in 1907, and this year commemorates the seventieth since that event. It has encountered many trials and tribulations, but now has grown to stature as one of Japan's leading fully integrated ports, making a great contribution not only to the economy of the Chubu Region but to that of the nation as a whole.

Celebrating the anniversary from October 14th to the 24th were a series of events held in the port area. A public exhibition was opened which profiled the past, present and future of the modern international Port of Nagoya. A commemorative monument, the gift of Nagoya's sister port of Los Angeles, was unveiled, and the port was visited by the sailing ship "Nippon Maru" also. Used as a training ship by the Ministry of Transport's Institute for Nautical Training, the "Nippon Maru" is the world's largest sea-going sailboat. It took part in the American Bicentennial Sailing Ship race. Tying up for two days in fine weather at the port, the ship was visited by many sightseers and added much interest to port touring trips.

The photo shows the opening ceremony of the Nagoya Port Exhibition.
Cutting the tape at the Nagoya Port 70th Anniversary Exhibition are, from left to right, Mr. Yamada, Chairman of the Port Authority Assembly, Mr. Ferkich, Los Angeles Board President, Mayor Motoyama, Port President, and Mr. Kohmura, Executive Vice President of Port of Nagoya.



Authorities of both ports touring the Port Exhibition. Mr. Kohmura, Executive Vice President of Nagoya Port Autority, explains an old map of Owari on display.

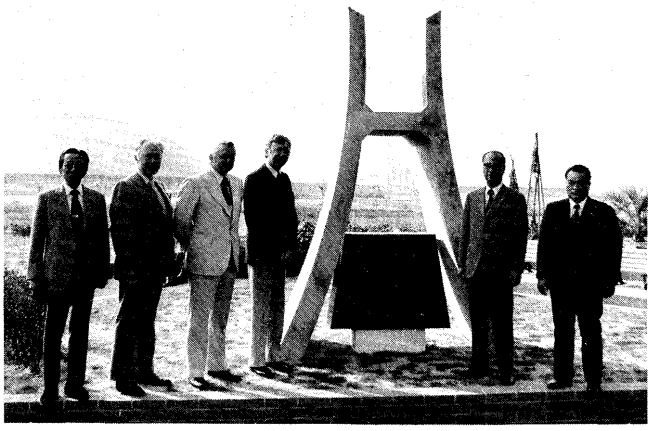
As fine weather continues, droves of people visit the port and drop in for a look at the Exhibition.

A danger store has recently been added to the facilities at Pending and plans are on the way for the construction of a transit shed for dirty cargo. Cargo handling equipment have been improved and better machines have replaced old ones. And with the recent completion of Kuport 2 the Authority now has two tugboats.

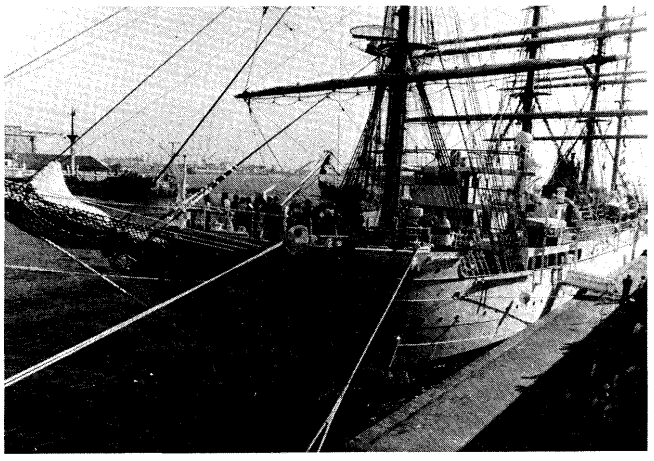
Thus with improved port facilities coupled with sound work arrangement the port has been able in the last few years to compensate for the limitations of the facilities at Tanah Puteh and to provide for the standard of service that has helped to considerably improve the competitive position of trade for Kuching and the State as a whole.

In a green plot at Kinjo Pier, the heart of Port of Nagoya, the commemorative monument presented by the Port of Los Angeles is unveiled.

Presentation of the commemorative painting by Mr. Ferkich, Los Angeles Board President, to Mr. Kohmura, Executive Vice President of the Nagoya Port Authority.



Representatives of both ports by the commenorative monument. From left to right, representatives of Port of Los Angeles and Port of Nagoya, respectively.



The sailing ship "Nippon Maru" ties up at Port of Nagoya in commemoration of its 70th anniversary as a port. More than ten thousand people flocked to see it on the two days it was open to the public, October 22nd and 23rd.

Nagoya Topics

Los Angeles Mayor Visits Port of Nagoya

Mayor Tom Bradley of Los Angeles, a city with whom Nagoya has a Sister-Port relationship, visited the Nagoya Port Authority on September 9th, 1977. After shaking hands all the way around and an exchange with everyone, the Los Angeles group took a boat tour of the port. Some enviously remarked about the sheer size and facilities of the port, which were more than they had anticipated.

Georgia Mission Drops in on Port

The Mission, headed by Mr. George J. Nichols, Executive Director of the Georgia Ports Authority, the governing body of Ports of Savannah and Brunswick, paid an official visit to the Nagoya Port Authority on September 27th, 1977. After a chat with Fumio Kohmura (Port Authority Exec. Vice Pres.) and others in charge, the group got a good boat tour of the port. Both ports are bases for the New York container routes, and both heartily agreed to strengthen mutual ties in days to come.

Consistently Remarkable Growth at Port of Nagoya

Recent growth at Port of Nagoya has been remarkable. The '76 cargo handling figure was a record-breaking 99 million tons, and foreign trade tonnage topped totals among the nation's leading five liner ports for the first time. It also was the first time its foreign cargo tonnage overtook domestic tonnage, making Nagoya rather unique among Japan's five great ports. During the quarter of a century from 1951 to 1976, while cargo handling grew 9.42 times at Japan's eight major ports (Tokyo, Kawasaki, Yokohama, Nagoya, Osaka, Kobe, Shimonoseki, Kitakyushu), it shot up 18.72 times at Port of Nagoya.

Growth of Traffic in Port of Nagoya and 8 Major Ports in Japan

Year	Cargo Volume (in 1,000 tons)				Ship Arrival (in 1,000 tons)			
	Foreign	Domestic	Total	Ratio	Foreign	Domestic	Total	Ratio
1951	23,152 1,637	46,354 3,649	69,506 5,286	100 100	50,115 5,931	65,389 2,869	115,504 8,800	100 100
1961	81,402 6,894	130,288 13,017	211,690 19,911	305 377	199,362 28,878	124,530 7,299	323,892 36,177	280 411
1971	215,052 33,623	364,362 36,034	579,415 69,657	834 1,318	414,161 62,585	289,459 21,717	703,620 84,302	609 958
1976	238,567 52,304	416,269 46,631	654,836 98,935	942 1,872	463,582 81,701	337,319 30,875	800,901 112,576	693 1,279

Note: 1. The upper numbers are totals of Japan's 8 major ports (e.g. Tokyo, Kawasaki, Yokohama, Nagoya, Osaka, Kobe, Shimonoseki, Kitakyushu).
2. The lower numbers are Nagoya's sole records.
3. 1951: The Nagoya Port Authority was established.

Obituary

Port of Tauranga, Mount Maunganui, New Zealand (The Bay of Plenty Harbour Board):—**It is with regret we advise the death of Mr. Brueton (Mr. Leonard H. Brueton, M. Inst. M., M.I.E.) at Tauranga on December 7 1977. Mr. Brueton was internationally known in shipping and transport fields and since June 1974 had been resident Port Marketing Consultant to this Board.**

In view of his extensive contacts throughout the world of shipping, I would be grateful if you would consider publishing in your journal an obituary notice. I enclose a synopsis of Mr. Brueton's background and a photograph.

Len Brueton is a specialist in port and transportation marketing with unique international experience in this field. He has been deeply involved in worldwide container, unit load and bulk carrier operations, and also the associated port and land transportation developments essential for an integrated and profitable operation from origin to consumption point.

His early career included service in the Royal and Merchant Navies where he reached the rank of Captain.

Following intensive training and experience in marketing and general management in America and elsewhere, he spent several successful years in international marketing in the consumer durable field, directing and developing exports and distribution in 70 countries, including the setting up and operation of six overseas subsidiary companies.

This was followed by five years as Group Marketing Director of a medium sized conglomerate of engineering companies, during which time he was also simultaneously Divisional Managing Director of the three transportation equipment manufacturing companies within the group. This development included successful application and implementation of industrial marketing techniques extended through company investigations and acquisitions along a defined marketing development strategy unique in the international industrial marketing field.

During the last few years Len Brueton has worked for a number of international ports, transport facility and operating companies, advising them on business development programmes including the creation of marketing techniques for transportation and has implemented these with considerable success.

He is well known internationally as a public speaker in the transport and general management field and has lectured on transportation marketing at many universities all over the world.

He is currently full time residential Marketing Consultant to the Port of Tauranga, New Zealand, and is working exclusively for the Port on a five year contract which commenced in June 1974.

Good Operational Results at Auckland Despite Container-Age Pressures

For 'Ports & Harbors'
Auckland Harbour Board
Auckland, New Zealand
28 December 1977

Good trading results at the Port of Auckland and an over-all revenue surplus of $NZ2.8 million for the 1976-77 year have been reported by the Auckland Harbour Board.

Commenting on what he called pleasing operational and financial results, Mr. R.W. Carr, Chairman of the Auckland Harbour Board, warned there could be "no relaxation of the administrative safeguards which contributed so much to the satisfactory overall results of 1976-77."

He said: "The $2.8 million surplus loses some of its glow when it is realised approximately $1.8 million of it came from property holdings and transactions.

"The actual surplus on port operations at Auckland and at our subsidiary (mainly coastal and inter-island) west coast port of Onehunga slightly exceeded $1 million.

"This represents trade increases of only 5.78 per cent at Auckland and 7 per cent at Onehunga and reflects the tight budgetary controls applied throughout what was a difficult year in which we were under constant pressure.

"The higher cargo tonnages carried by the various types of ships had to be handled as expeditiously as possible.

"At the same time heavy concentration of Board resources in capital, plant and labour were required to push ahead port projects which must be completed in the shortest possible time to ensure future operational efficiency."

Mr. Carr said major works in this category include wharf and other extensions at Fergusson container complex in the port area and more rapid development of the Wiri inland terminal designed to complement operations at Fergusson and so relieve growing strain on port facilities there.

"By the end of the year approximately $46 million had been spent on, or committed for, the requirements of container trades through Auckland," said Mr. Carr.

"This covers all stages of the Fergusson complex now well advanced, the completion of the Wiri terminal and the provision of fixed and mobile plant necessary for working container ships and handling container cargo on the waterfront and at Wiri.

"This is a massive investment for any port authority. It spans a construction and development period from the 1960s to beyond 1990 but this does not lighten the servicing and repayment burden. It does spread the responsibility over a period and to that extent makes it somewhat easier to bear.

"Justification for such heavy expenditure on wharves, land, buildings, plant and other facilities is simply this:

"Without them the Port of Auckland, long a predominant one in shipping services linking the South Pacific with the rest of the world, could gradually disappear from all international schedules except minor ones for the conventional ships already making fewer appearances at Auckland.

"The nation as well as the city and region would be the loser if the Board had not accepted the container challenge."

Mr. R.W. Carr (standing), Chairman of the Auckland Harbour Board, outlining Port of Auckland operations to (in front, right) Messrs E. Andersen (nearest camera), General Manager, J.H. Zeuthen (next to Mr. Andersen), Chairman, and other members of a Copenhagen Port Authority party when they reached New Zealand from Denmark.

Mr. Carr reminded that today more than 90 per cent of the North American trade is containerised. Next year 80 per cent of cargo moving between New Zealand and Japan will be in containers while 70 per cent of the European traffic is expected to be containerised by 1979.

In the last year container cargo tonnages through Auckland rose by more than 66 per cent. By the end of September the port was exchanging containers at the rate of 85,000 boxes a year, this rate being achieved nearly 12 months earlier than forecast.

Roll-on roll-off cargo rose in volume by more than 10 per cent. Other unitised cargo added to the container and ro/ro tonnages made the joint total in these categories higher for the first time than the volume of break-bulk cargo moving in and out of the port in conventional ships.

Mr. Carr reported another berth for quarter-ramp vessels was being arranged at the shore end of Freyberg West.

"Similar berths of a more permanent nature must feature in plans for the redevelopment of old King's Wharf on the western side of Bledisloe Terminal as the worldwide trend towards more ro/ro shipping is gaining pace," he said.

"The struggle to cope with the demands of changing trades will continue in the year ahead but, as the various container improvements come into use, it is hoped there will be progressive easing of some pressures in the final months of 1978."

Timber, Fishing Hold Promise for Future

Whangarei, New Zealand ("Points North" published by The Northland Harbour Board, Whangarei):—A "total study" of the whole transport system, involving all aspects of the transport situation is being undertaken by the Northland Regional Development Council. It could result in a new port being developed for the export of timber from Northland.

Mr. J. Carney, Board Chairman, said this in a brief review of the board's future after his election as chairman at the new board's first meeting in October.

The report, expected to be available about March next year, would have considerable bearing on the selection of a future timber port, Mr. Carney said.

"It may be another port or it may be more viable to bring the timber to Whangarei when the whole exercise is done."

Once the decision was made, considerable work would follow in planning facilities and communications.

Mr. Carney's first objective is to weld together a team, both of board and staff, to work towards common goals for the betterment of the Northland Harbour Board.

FIRST AIM

"It's first aim must be to operate effective and efficient ports at Whangarei and Opua," he said.

"We shall follow an aggressive policy towards attracting new industry to Northland—particularly industry based on indigenous raw materials.

"I refer specifically to the forestry and fishing industries.

"The board is already carrying out detailed soil investigations for possible fish processing plants.

"We have started looking for future ports for the shipment of timber from Northland."

On the controversial container port at Marsden Point issue, Mr. Carney said he intended to bring down a proposal for board approval to engage a firm of consultants to examine the whole of the board's port structure and report on the viability of Northland's existing ports and on the feasibility of a container port at Marsden Point.

"We urgently need to meet with the producer boards and shipping companies and discuss with them their policies with regard to our ports, particularly Opua, which is vital to the Bay of Islands," Mr. Carney said.

NOT CLOSED

He emphasised that the wharf at Opua is not closed but, with restricted load limits, is being used for loading out products.

Touching on operating costs, Mr. Carney said the net income of the board had been badly eroded from 1965 to the present time. Operating expenses had risen by 415% and income by only 207%.

"Expenditure has risen twice as fast as income," Mr. Carney said.

"The slow rate of our income growth is basically due to the price for handling cargoes through our ports having remained static since 1963."

The board has been working on this for the past one and a half years and it has been before the House since the beginning of this session.

This Bill has now had its second reading in Parliament and was expected to be passed into law this session.

The passing of this Bill would enable the board to get a better return for the services it supplies, Mr. Carney said.

Expenditure must continue to be curtailed and costs contained where possible.

Mr. Carney stated emphatically that he has no affiliation with oil companies and that his loyalties are entirely with the Northland Harbour Board and the people of Northland.

To devote greater time to harbour board affairs, Mr. Carney has resigned from the Northland Regional Planning Authority, the Northland Catchment Commission, the Northland Regional Development Council and from the chairman-ship of the Regional Resources Survey.

ADB Approves Technical Assistance to Burma for Outports Study Project

Pasay City, Philippines, 22 December 1977 (ADB News Release No. 98/77 from Asian Development Bank):—Burma's efforts to rehabilitate and improve its outports (coastal ports) will be assisted with a technical assistance from the Asian Development Bank.

Under the Bank's technical assistance approved today, an overall development strategy for all outports and a Master Development Plan up to the year 2010 for each outport will be developed and prepared. An optimum investment program will then be developed for the rehabilitation and improvement of the outports to meet traffic requirements up to the year 1990.

At the same time, a plan for the improvement in the operations, management and financial aspects of the outports (including tariffs) to make the physical improvements fully effective will be prepared.

The technical assistance study will be carried out by five experts to be provided by the Bank in collaboration with the Burma Ports Corporation, a government-owned corporation. The study is expected to start in mid-March 1978 and to be completed towards the end of November 1978.

The eight outports along the Burmese coastline, along with the Rangoon Port which is the largest seaport in the country, form the basic sea transport links of the country. Owing to the long coastline of about 1,700 miles, the outports play an important role in the context of the overall transport system of the country as they serve areas which are either not linked with other national transport network or where alternative transport modes are unreliable.

Total cargo traffic at the eight outports in Burma amounted to about 420,000 m.t. in 1976/77, of which about 30 per cent was accounted for by exports (mainly rice and some timber) while the remaining 70 per cent was accounted for by coastal traffic. The four major outports (Akyab, Bassein, Moulmein and Mergui) handled about 86 per cent of the total outports traffic.

Because of age and lack of necessary repair and maintenance, most of the facilities at the outports are reaching the end of their useful life. This has had the effect of seriously slowing down the turn-around time of ships calling at these ports. For these ports to continue to serve coastal shipping, rehabilitation work is urgently required.

Improvement in port facilities to handle ocean-going ships and to encourage further growth in direct exports from outports (rather than trans-shipment by coastal ships to Rangoon Port) will also be needed.

Maiden Voyage Inaugurates New Liner Service

Singapore, 19 January 1978 (PSA Press Release):—A new liner service catering exclusively for trade between Singapore and Iran via Khorramshahr was inaugurated early this month with the maiden voyage of the vessel "Kriti Diamond".

M.V. "Kriti Diamond", 10,832 DWT is first of the four identical new buildings to be put on this service by Shahyad Lines. These semi-container vessels built by Mitsubishi heavy Industries, Nagasaki Shipyard are capable of carrying 213 TEUs or 14,200 DWT of break bulk cargo.

Shahyad Lines belongs to Shahyad Shipping & Trading Co. Ltd. of Tehran, an Iranian company jointly owned by prominent Iranians and Varnima Corporation International a leading Greek shipowner. The Singapore agents are Wallem Shipping (Singapore) Pte. Ltd.

During a reception on board the "Kriti Diamond" to mark the occasion, Mr. Choo Wee Liang, Traffic Manager (Keppel Wharves), PSA (left) presented a commemorative pewter tray to the Master, Capt G Pappas (2nd from right). Looking on in the centre is Mr. Tan Yang Seng, Managing Director of Wallem Shipping (Singapore) Pte. Ltd.

M.S. Thermopylae, one of the Barber Lines newbuildings, arrived at Singapore Keppel Wharf, at 1600 hrs on 30 Nov. 77.

The 21,990 deadweight ton general cargo vessel, under the command of Captain Harold Lovik, is accomplishing her maiden voyage round the world, after being delivered from TSU shipyard, Japan.

Following the usual custom, the captain (left) is making a presentation to Mr. Willie Rasiah, the Assistant Director (Staff Relations) of the P.S.A., to commemorate the occasion.

MITSUI Computer Control System for Container Terminals

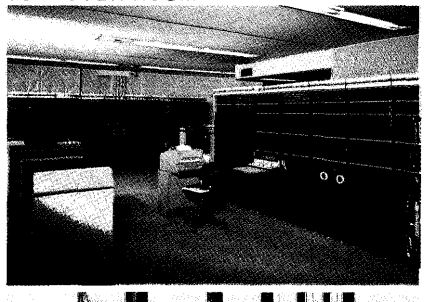
Huge piles of data!
How do you process them for efficient handling of containers?

Our System can help solve your problems and enable you to reap the true benefits of container transportation.
Developed in 1972, this System has proved its efficiency at the busy Ohi Pier, Port of Tokyo, and we are now prepared to aid you in solving your terminal problems, particularly those in the fields of cargo information and operations systems.

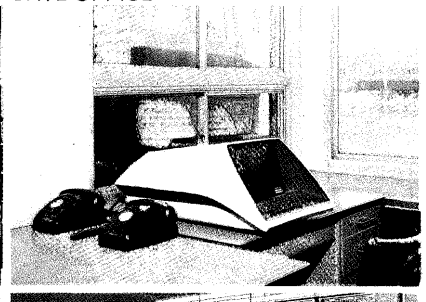
Major Application Software

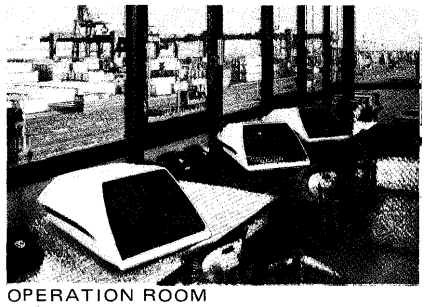
1. Planning Support & Management System
2. Receiving/Delivery Operations System
3. Loading/Unloading Operations System
4. Marshalling/Shift Operations System
5. Report Generating System
6. Inquiry System
7. Back up & File Control System

COMPUTER ROOM

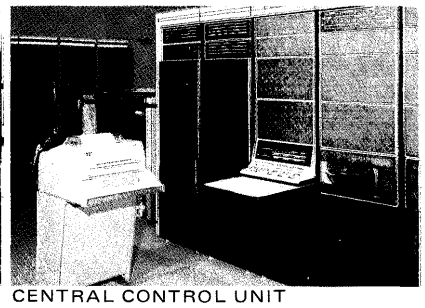


GATE OFFICE





OPERATION ROOM



CENTRAL CONTROL UNIT

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 Offices: New York, Los Angeles, London, Duesseldorf, Vienna, Hong Kong, Singapore, Rio de Janeiro

昭和四十四年十一月十五日第三種郵便物認可　誌名「PORTS and HARBORS」
三月号　第二十三巻第三号　昭和五十三年一月二十日発行（毎月一回二十日発行）
発行所　東京都港区虎ノ門二丁目二の八　〒一〇五　国際港湾協会
定価六〇〇円