

# PORTS and HARBORS November, 1983 Vol. 28, No. 11

## Port of Lyttelton

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The Cover: Port of Lyttelton. Prisoner's built Lyttelton's noted landmark, the time ball station, in 1876. This Gothic castle stands watch over Cashin Quay where the mighty Tolaga Bay is moored at the container wharf.

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## IAPH announcements and news

## Details of the IAPH Bursary Scheme 1983/1985

Mr. J.K. Stuart, Chairman of the IAPH Committee on International Port Development, has recently announced the Bursary Scheme for the period 1983/1985. His message and the conditions for entry are as follows.

"I am pleased that my Committee's proposals for continuation of the IAPH Bursary Scheme during the next two years received the approval of the Executive Committee. The Scheme is considered by the Committee on International Port Development to be a most valuable means of positive support by the Association to developing ports in their efforts to train their personnel in modern management and operational techniques".

#### Conditions for entry:

- 1. The object of the Scheme is to provide financial assistance towards the cost of sending selected applicants on approved training courses overseas. Approved training courses are, for instance, those available in developed ports as set out in the International Survey of Port Training Facilities and Requirements published by the Committee on International Port Development and distributed to all IAPH Members.
- 2. Subject to the availability of funds, up to 15 bursaries not exceeding US\$3,500 each will be awarded to approved applicants from any developing port in all developing countries in membership of IAPH.
- 3. Applicants, must have been employed in an IAPH member port for at least three years, should not be older than 50 years of age, and must already be employed in a junior or middle management capacity. After completion, the application form \*(which may be obtained from the Secretary General of IAPH or can be prepared by the applicant himself) must be sent to the Chairman of the Committee on International Port Development. The form must include a statement confirming the suitability of the applicant for the course he wishes to attend and indicating the benefit both the port and applicant seek to achieve from the course. The statement should also indicate the applicant's potential for future promotion.

4. The application form must be accompanied by a letter from the developed port confirming its willingness to provide the required training and specifying the date of commencement and duration of the course.

5. The Bursay Scheme will be open, subject to the availability of funds, throughout the period between two conferences. Applications may be forwarded to the Chairman of the Committee on International Port Development at any time during this period and will be considered by him. The decision of the Chairman of the Committee on International Port Development will be final. The decision will be notified to the applicant, his Chief Executive, the Chief Executive of the developed port in which the training is to take place and the President of IAPH who will authorize the Secretary General of IAPH to disburse the necessary funds from the Technical Assistance Fund in due course. Fees payable to the host port authority will be remitted direct and the balance of the bursary after travel costs will be deposited with the host port for the applicants use. The host port/applicant will be required to account for expenditure and to reimburse the Technical Assistance Fund any monies not spent out of the bursary award.

- 6. After completion of the course, successful applicants will be required to prepare a brief report indicating how they propose to apply the training to their present employment. The report, which must be sent to the Chairman of the Committee on International Port Development within one month of the completion of the course, will be published at the discretion of the Chairman of the Committee on International Port Development, in "Ports and Harbors" magazine. Successful applicants will also be required to obtain and forward with their own report a letter from the developed port giving their opinion of how he has carried out the course and the benefits he has derived from it.
- \* Note: To save time, applicants are recommended to make up their own forms in accordance with the required contents reproduced below, using A4 size paper, i.e. 295 mm × 210 mm.

#### APPLICATION FOR IAPH BURSARY 1984

#### (PLEASE USE TYPEWRITER)

Form to be returned with evidence of acceptance by host port/college for specified course to:

Mr. J.K. Stuart, Chairman, IAPH Committee on International Port Development Chairman, Associated British Ports Melbury House, Melbury Terrace, London NW1 6JY, England, U.K. Telex: 23913 ABP HQ Tel: 01-486 6621 I, undersigned, hereby submit for your consideration the application for IAPH Bursary with evidence as requested by conditions specified.

- 1: Name of Applicant/Date of Birth:
- 2: Port Authority:
- 3: Present Appointment/Date Appointed:
- 4: Educational qualifications (Please also indicate whether you are fluent in English, French or Spanish):
- 5: Professional/technical qualifications:
- 6: Career history:
- 7: Previous overseas courses attended:
- 8: Course for which application is being made (Specify nature of Course, duration and location of host port/ college):
- 9: Applicant's reasons for selecting required Course:
- 10: Amount of Bursary for which application is made (Particulars of costs should be given in support of the application):

Travel Costs	·
Course Fees	·
Accommodation & Others	ANT
Total	

11: State any other source from which finance for undertaking the course will also be obtained and the amount of finance already obtained (e.g. employing port authority, government, international aid organizations such as UNCTAD, etc.):

#### Date:

Applicant's Signature \* List of Attachment/s

#### IMO Sub-Comm. on Safety Navigation to discuss the Joint Guidelines for VTS

Mr. W. de Goede, Head, Navigation Section of IMO, in his letter addressed to Mr. J. Dubois (T2/2.03), acknowleged the receipt of the paper, which was introduced in the October issue of the Journal, and informed him that it would be submitted to the 28th session of the sub-committee to be held in London from 17 to 21 October, 1983.

#### IAPH paper to the October meeting of the Scientific Group of the London Dumping Convention

Mr. Herbert R. Haar, Jr., Associate Port Director of the Port of New Orleans and Chairman of the IAPH Dredging Task Force, a sub-division of the PSECC, submitted a special report on the "application of classification criteria to dredged material with emphasis upon petroleum hydrocarbons and with additional consideration of lead in dredged material" to the IMO for consideration by the Scientific Group of the London Dumping Convention at its scheduled meeting in London in October.

An Executive Summary of the Report will be published in the next issue.

#### All-out fight against illicit traffic in narcotic drugs

Mr. Tamar M. Oppenheimer, Director, Division of Narcotic Drugs, United Nations (Vienna), in his letter of April 21, 1983, stressed the role of port and harbor police in the interdiction of illicit traffic in narcotic drugs as well as the need for developing efficient drug law enforcement training programmes designed to improve the capacity of the relevant agencies of all states to interdict the growing volume of illicit drug traffic which was a growing danger in many parts of the world. He invited the Association to support the UN's programmes to that effect.

Dr. H. Sato, Secretary-General, in view of the fact that port authorities are not always in a position to assume responsibility for such matters, asked Mr. E.F. Ellen, Executive Secretary, Int'l Association of Airport and Seaport Police (IAPH Member) to monitor the UN activities and furnish appropriate information which could further be disseminated through the IAPH journal. Mr. Ellen assured him that the IAASP would be prepared to monitor and supply articles either through IAASP or IMB (Int'l Maritime Bureau, London), and confirmed their position at Vancouver on the occasion of the 13th Conference.

Dr. Sato, in his letter of September 1, 1983, conveyed to Mr. Oppenheimer, the United Nations of the result of the intra-Association communication and expressed the IAPH's attitude on the matter. In reply, Mr. Michael Davies, Chief, Supply and Demand Reduction Section of the Division, in his September 14, 1983 letter, thanked the Association and other non-governmental organizations which have consultative status with ECOSOC for their positive involvement in this endeavour.

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#### North Carolina State Ports Authority

P.O. Box 9002, Wilmington, N.C. 28402, U.S.A. Office Phone: 919/763-1621 Telex: 5109370330 (Admiral William M.A. Greene, Executive Director)

#### Port of Geelong Authority

P.O. Box 344, Geelong, 3220 Victoria, Australia Office Phone: (052) 22 1644 Telex: AA 38648 (Mr. Neil Graham Samuels, General Manager)

## **Invitation to the IAPH Award Scheme 1984**

How could the efficiency of your port be improved ? Your answer could win you the "Akiyama Prize" (a silver medal and US\$750 in cash) plus an invitation, including travelling costs and hotel accommodation, to attend the 14th Biennial Conference of IAPH, May 4-11, 1985 in Hamburg, Fed. Rep. of Germany

The IAPH Award Scheme is an essay contest held for port staff in developing countries. Since the 11th Conference held in Deauville, France in 1979, one of the most exciting scenes to take place in front of all the delegates attending the plenary session has been the awarding of the first prize to the winner in person. The past recipients of this top prize have been:

Ms. Daphne Phinopoulos, Cyprus Ports Authority (invited to the 11th Conf., Deauville, in 1979); Mr. Carlos Canamero, ENAPU, Peru (invited to the 12th Conf., Nagoya in 1981); and Dr. Josip Kirincic, the Port of Rijeka, Yugoslavia (invited to the 13th Conf., Vancouver, in 1983).

Following the success of the scheme in the past, the call to continue operating the scheme every two years was endorsed at the Vancouver Conference, and Chairman Stuart announced the conditions for entry to the 1984 Scheme, as reproduced in the box below. Enclosed in this issue of the journal is a poster advertising the Scheme and Conditions for Entry. Chief executives of all developing ports are urged to ensure that this is displayed in a prominent position, where it can be seen by those personnel who may wish to submit entries. The decision on the winner of the 1st Prize, named the "Akiyama Prize"\*, will be made no later than 1st January in order that the individual winner or the leader of the winning group entry can be notified in sufficient time to allow him or her to be able to accept the invitation to attend the Conference. In order to meet this timetable, all entries must be received by the Secretary General no later than 1st September, 1984. Failure to submit entries by this date may render them invalid for consideration. Entry papers in English, French and Spanish are acceptable.

#### \* The "Akiyama Prize":

The prize commemorates Mr. Toru Akiyama, one of the Founders and former Secretary General of IAPH, who rendered meritorious services for the establishment and later development of the Association. Mr. Akiyama is currently Secretary General Emeritus of IAPH and the President of the IAPH Foundation. To recognize Mr. Akiyama's numerous achievements, IAPH at its 13th Conference held in Vancouver, Canada in June 1983, commended him with a specially commissioned bronze relief and a scroll of honor, and further named the first prize in the IAPH Award Scheme the "Akiyama Prize". The funds from which the prize is to be provided are to come from money Mr. Akiyama personally donated to IAPH for this purpose.

#### **Conditions for entry**

- 1. Suggestions regarding how the efficiency of your port (or ports in general) could be improved should be presented in English, French or Spanish, typewritten, and submitted to the Secretary General, The International Association of Ports and Harbors, Kotohira-Kaikan Building, 2-8, Toranomon 1-chome, Minato-ku, Tokyo 105, Japan.
- 2. Suggestions may cover any aspect of the administration, planning or operations of ports, such as improving productivity or the utilization and maintenance of equipment and storage areas, reducing delays and damage to cargo, etc. An attempt should be made to quantify the benefits which would result from the suggested improvement together with the costs (if any) involved.
- 3. Entries which should be between 10 and 20 pages in length may be made either by individuals or small groups employed by IAPH member organizations, and should be the original work of the entrant(s). Entries which are the result of official studies or otherwise sponsored projects will not be eligible.
- 4. Entries will be judged by a panel of experts appointed by the Chairman of the Committee on International Port Development of IAPH. The panel will give greater merit to papers identifying and

evaluating specific improvements rather than entries covering a wide range of improvements in general terms.

- 5. The First Prize for the winning entry will consist of:
  (i) the Akiyama Prize (a silver medal plus US\$750 or the equivalent in local currency); and
  - (ii) an invitation, including travelling costs and hotel accommodation, to attend the 14th Biennial Conference of IAPH, to be held in May 1985 in Hamburg, Federal Republic of Germany.
- 6. In addition to the First Prize, Second, Third and Fourth prizes of US\$500, US\$400, US\$300 will be awarded to the next best entries.
- 7. Additional prizes of US\$100 each will be awarded to any other entries judged by the panel to be of a sufficiently high standard.
- 8. A winning entry may be subject to publication in the Ports and Harbors magazine.
- 9. At the decision of the panel, a bursary may be awarded to any one prize winner (subject to agreement of the employer).
- 10. The closing date for receipt of entries is 1st September 1984.

#### IAPH marks 28 years of service

This month our organization marks the passage of 28 years of service to world ports and international transportation. It is perhaps an opportune time to look back over some of the events which have served as landmarks in the progress of our organization.

The first Conference, held in Hollywood, California in 1955, saw the adoption of the IAPH Constitution and By-Laws. The Association's first Officers-the President, 1st and 2nd Vice-Presidents and the Chief of the Central Secretariat-were elected on that occasion. The Board of Directors was established from members of the original 14 countries, namely Brazil, Canada, Rep. of China, West Germany, Japan, South Korea, Liberia, Mexico, Peru, Sweden, Thailand, USA, Venezuela and Vietnam (Vietnamese membership lapsed after the conclusion of the Vietnam war).

The second Conference followed four years later, and it was not long before the IAPH Conference became a biennial event. A list of conference sites and the years in which these events were held follows:

Los Angeles	- 1955	Amsterdam/Rotterdam	—	1973
Mexico City	- 1959	Singapore		1975
New Orleans	- 1963	Houston	_	1977
London	- 1965	Deauville (Le Havre)		1979
Tokyo	- 1967	Nagoya	_	1981
Melbourne	- 1969	Vancouver	_	1983
Montreal	- 1971			

In accordance withe IAPH policy, a new president is elected after every conference. To date the list of IAPH presidents is as follows.

Bennett Roberts	— Canada
John-Iwar Dahlin	– Sweden
Lloyd A. Menveg	- USA
Dr. Jen-Ling Huan	- Rep. of China (Taiwan)
John P. Davis	- USA
Rt. Hon. Viscount Simon	- UK
Dr. Chujiro Haraguchi	— Japan
Victor Swanson	– Australia
A. Lyle King	– USA
R.L.M. Vleugels	— Belgium
Howe Yoog Chong	<ul> <li>— Singapore</li> </ul>

#### Mr. Han, KMPA's new Administrator appointed as Executive Committee member



Mr. Han, Jun Sok

To fill the vacancy created by Mr. Moon, former Administrator of the Korea Maritime and Port Administrator (KMPA), President Tozzoli appointed Mr. Han, Jun Sok, the newly appointed Administrator of the KMPA, to serve on the Executive Committee of IAPH.

Mr. Moon, who has served as a member of both the Executive and the International Port Development Committees since the Nagoya Conference in 1981, attended

George W. Altvater	- USA
Paul Bastard	– France
Arthur S. Mayne	— Australia
Anthony J. Tozzoli	- USA (current president)

The Association has had three Secretaries General. The first was Gaku Matsumoto, who retired in 1967. He was succeeded by Toru Akiyama, Secretary General Emeritus (and the President of the IAPH Foundation), who occupied the post until 1973. Dr. Hajime Sato has served as Secretary General since then.

Under the Board of Directors on which the 75 member countries are represented, IAPH has a 21member Executive Committee, 3 internal committees and 6 technical committees. The efficiency with which these bodies function is testimony to the dedication of the people serving on them. As well as the internal and technical committees, the Association has a committee of legal counselors, whose role is to assist the Secretary General and his staff in their handling of legal matters, both at IAPH conferences and during the inter-conference periods.

IAPH has always made it a rule to foster close links with other international maritime organizations, providing for mutual access to expertise and resources in the respective sectors. At present, the Association has 4 liaison officers with IMO, UNECOSOC, UNCTAD and CCC. With a view to expanding such ties, IAPH concluded an agreement with the British Ports Association under which the BPA would act as representative to other non-governmental international maritime transport organizations based in Europe. The result has been a significant increase in liaison work, and growing international status for IAPH.

The years that have passed since November 7, 1955 have witnessed sterling achievements by the Association in its efforts to develop understanding and cooperation among the world's ports. A key element in our advance has been the untiring enthusiasm of our members in working together towards a common goal. It is this spirit which will assuredly lead the Association to even greater successes in the future.

the Vancouver Conference, heading a big delegation from Korea. Mr. Moon and his colleagues' invitation to have the 15th Conference of IAPH convene in Seoul met with success as a result of their enthusiastic promotion of their cause in Vancouver. However, right after the conference he retired from his posts for health reasons.

Mr. Han's career before he was appointed to take over from Mr. Moon as the Administrator of the KMPA, includes: Secretary of Economic Affairs to the late President, Deputy Administrator of the Korea Advanced Institute of Science and Technology and Managing Director of the Korea Production Technology Corporation.

Mr. Han has shown his willingness to serve on the Executive Committee. Furthermore, he was assured everyone concerned that no effort will be spared in the preparations for the 15th Conference of IAPH that KMPA is hosting in 1987.

## **Gravel Beds for Stacking Containers**

By Marios Meletiou B. Sc. (Tech.) Honours, M. Sc. Senior Civil Engineer, Head, Civil Engineering Section, Cyprus Ports Authority



#### 1. FOREWORD

One tends to expect that new papers will deal with highly sophisticated methods and techniques, preferably involving the use of computers or other developments in science and technology. I hope you will not be disappointed if I, instead of going ahead into the electronic age, make a jump back into the stone age: my paper deals basically with the use of gravel which in common language is just stone, the first building material man ever used. As you will soon realise, however, this primitive building material can be harmonized with the latest development in cargo handling, i.e. containerization.

There is a common prejudice which leads us to equate simple and cheap solutions with bad and inadequate ones. This is often a shortsighted assessment and I believe that the case I am presenting with this paper is a case in point. The gravel bed system, though simple and inexpensive, is not "cheap" in the meaning that is normally attached to this word.

I do not dare to expect that with this paper one would be convinced to adopt blindly the gravel bed system. I am hoping, though, to persuade the readers at least to consider it when they are involved in the next design of a container terminal.

#### 2. INTRODUCTION

A modern container terminal requires extensive areas of paving for stacking containers, the provision of which often proves to be one of the most expensive items, in terms of capital cost, that the port has to bear. It is also highly costly to maintain if it is not designed adequately, with any reconstruction tending to be both lengthy and inconvenient.

#### 3. COMPATIBILITY OF SURFACE MATERIAL TO THE HANDLING EQUIPMENT

#### 3.1 General

There are many different forms of pavement construction, each suited to a particular set of conditions or favoured by a particular port. However, the compatibility of surface material to the handling equipment which operate over it, is today a principal cost consideration for container terminals. With the introduction of containers, a new generation of handling equipment has evolved invariably featuring new characteristics compared to the traditional handling equipment for other types of cargo. Perhaps more than any other factor this has had a detrimental effect in pavement life and maintenance. Before one makes any attempt to match the container handling equipment which will operate in a proposed container terminal with a pavement, it is advisable to consider first of all the available types of both, pavement and equipment. It must be pointed out though that it is generally accepted that the type of equipment plays a more dominant role in the efficiency of the container handling system to be chosen and hence its consideration should be given some priority to that of pavements. However, a good choice of the right equipment coupled with a good choice of pavement will definitely add to the efficiency of the whole container handling system.

#### 3.2 Classification of pavements

Pavements are classified in different ways; some are shown below:

- a) According to flexibility
- i. Flexible;
- ii. Intermediate;
- iii. Rigid;
- b) According to binder type
- i. Bituminous;
- ii. Cement-bound;
- iii. Water-bound;
- iv. Granular;
- c) According to strata
- i. Monolithic;
- ii. Two layer or multilayer systems;
- iii. Sandwich constructions;
- d) Seen from the surface
- i. Asphaltic;
- ii. Concrete slabs;
- iii. Concrete blocks;
- iv. Granular;

The above classification is far from complete and many combinations are possible but since terminal users usually see the surface itself and not the structure, this aspect is chosen for the purpose of this paper which is the most common and understandable to most persons who are not specialists in this field.

#### 3.3 Types of container stacking equipment

The various existing container stacking systems make use of one or a combination of the following types of equipment:

- a) Front Lift trucks (Fork lifts),
- b) Side Lift trucks (Side loaders),

c) Straddle carriers,

d) Yard cranes (on rails, or on tyres).

#### 3.4 Design approach for container yard pavements

The operation of yard cranes is in many ways different from that of the other three types of container stacking equipment. There are two basic operational differences, though, which have a direct effect on the design and construction requirements of the pavement over which the equipment will operate:

- a) Yard cranes travel only on defined travel strips (on corridors in the case of rubber tyred vard cranes or on rail trucks in the case of rail mounted yard cranes). This means yard cranes never enter the actual stacking areas, in contrast to the other types of container stacking equipment which have to travel all over the container yard,
- b) Yard cranes always travel unloaded. This is because the trailer which will receive or deliver a container will always travel to meet the vard crane at the correct point by the stacking area. The main operation of yard cranes is the lifting and lowering and not the horizontal transportation of containers. In contrast, the other types of container stacking equipment are continuously involved in both lifting or lowering and horizontal transportation of containers as they must travel to meet the trailers which wait at a certain point in the container yard to deliver or receive a container.

The above two differences in operation imply a completely different design approach for the container vard pavement. When yard cranes are used there are three different types of pavements to be designed in a container yard. These are:

- a) The container stacking area; this will be designed to carry the static loading resulting from the containers stacked at the maximum possible height,
- b) The travel strips of the yard crane; these will be designed to carry the wheel loads resulting from the operation and travelling of the vard crane.
- c) The travel areas of the tug masters & trailers which will be designed to carry the wheel loads from the operation and travelling of this equipment.

If, however, any one of the other types of equipment is used, then the whole container yard has to be designed in a homogeneous way and must be able to carry the heaviest combination of wheel or static loads considering all equipment that may be present at the yard i.e. stacked containers, trailers, fork lifts, or side loaders or straddle carriers.

#### 3.5 General considerations for a pavement

The vital question is, what is expected of a pavement? There are obviously many considerations, for example:

- Low construction costs, a)
- Low maintenance costs, b)
- High reliability, c)
- d) Design life,
- Type of trafficking-vehicle speed, wheel loads (dye) namic load factors i.e. braking, cornering, acceleration, uneven surface), tyre types and contact pressure,
- f) Static loading-point-loads (shape and type of support),
- g) Impact loading,
- Port layout and operations, h)
- i) Surface pollution-hydraulic oil, de-icing salts,
- j) Strength of subgrade,
- Anticipated settlement-short term & long term, k)
- Climate-rainfall, temperature, frost, 1)
- m) Future uses and developments,
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- n) Availability of local materials,
- o) Permissible slopes in different directions regarding equipment use, stacking and rainwater,
- Drainage, p)
- Available construction time, and q)
- r) Surface characteristics-smooth, even, clean, always dry, never slippery, absolutely horizontal, without single discontinuity.

An ideal surface could be described as the one which would satisfy all the above considerations and a few more which someone will certainly be able to add in order to make the ideal even more unattainable. In practice, however, every design must be a compromise between a number of contradictory requirements.

#### 3.6 Considerations for container stacking area pavements when yard cranes are used.

As it is pointed out above, the compatibility of surface material to the handling equipment is of prime importance but before one makes an attempt to match the most suitable and advantageous pavement with the already chosen type of equipment, must first consider the container layout. Typical container yard layouts when rail or rubber mounted yard cranes are used are shown in figure 1.

Even after a quick study of these layouts it can be easily deduced that when yard cranes are used, many of the general considerations of a pavement which are listed in the previous paragraph can be neglected when designing the actual stacking areas. For example, considerations like trafficking and wheel loads (nothing travels on stacking areas) smooth surface, or surface oil pollution (yard cranes are electric or diesel electric) are not applicable in this case. Furthermore, it will be shown that the majority of the remaining above listed considerations can automatically or fairly easy be satisfied should the designer decide to adopt the gravel bed system for the container stacking areas in conjunction with the use of yard cranes. It is important to point out that in these cases, as it can be seen from figure 1, the actual stacking areas cover about 62% or 69% of the whole container yard area.

Fig. 1: Typical Container yard layouts for rail and rubber mounted yard cranes.

Hards		
		<b>u</b> <u>1</u>
· · · · · · · · · · · · · · · · · · ·		
A Rubber tyred yard crane 8 Rail mounted ya	rd crane	
		1000
	1	<b>D</b> 600
Stacking area: % of container yard area	A 62%	<u>B 69%</u>
Yard crane travelling strips: % of container yard area	A 7.4%	<u>B</u> 2.2%
Trailer travelling lanes: % of container yard area	A 30.6%	B 28.8%

#### **4. AVAILABLE CHOICES FOR A CONTAINER** STACKING AREA PAVEMENT

Trailer travelling lanes: % of container yard area

It would be very unprofessional to insist that gravel beds should, without any comparison to other types of pavements, be blindly considered as the most advantageous paving system for container stacking areas for yard cranes. For this, I make below a concise reference to the other

available types of pavements which are usually adopted in similar cases. The remarks however are of a general character without respect to typical local conditions.

#### 4.1 Bituminous or Asphalt Surfacing

Bitumen bound surfacings have been used extensively for both highway pavements and airports and being relatively cheap and easy to lay, their application to port pavements seemed logical. However, overall performance has been poor. The rolled asphalt similar to that used in highways is too soft to carry the large wheel loads, high contact stresses and low vehicle speeds without severe rutting and indentation. Mainly three characteristics of the asphaltic mix have resulted in this poor performance in port application:

- a) The stiffness, or strength, of a bituminous material decreases as the temperature rises,
- b) The stiffness of a bituminous mix decreases as the loading time increases; i.e. the slower the vehicle speed the lower the strength,
- c) Surface oil pollution slowly dissolves the bituminous binder, leaving it more susceptible to scuff and frost attack.

The first two characteristics are directly reflected by the rutting and indentation that develops in the summer months.

The worst problem in container yards is the one caused by the trailer dolly wheels. These readily penetrate a soft surfacing to a depth in excess of 75 mm, leaving the surfacing open to frost attack and mechanical disintegration. A similar and equally serious problem occurs in container stacking areas with the corner castings of containers. Due to the fact that the static load is repeated many times almost at the same location, indentations are sometimes very deep and as a result of this the centre of the container bottoms first. This also happens because of crossfalls which have to be given to the asphaltic pavement for the drainage of rainwater. Although an asphaltic pavement is considered to be a flexible construction, excessive differential settlement will lead to the cracking and subsequent breakdown of the bound of the layers. There is no cheap solution to this problem in large settlement areas and for this reason, asphaltic construction is often rejected in favour of more durable surfacing, such as concrete rafts or concrete blocks. Traditionally, asphalt has been one of the cheaper surfacing materials but the price of bitumen has risen sharply over the past few years, bringing the cost of construction more in line with other forms of construction.

#### 4.2 In-situ concrete

An in-situ concrete pavement is a rigid form which provides a very durable and hardwearing surface that can withstand high contact stresses, in addition, the surface is smooth giving an excellent riding quality with good skid resistance. Concrete slabs do not show permanent deformations under concentrated loads and are generally resistent to rough usage. Materials are amply available almost in every country of the world and construction equipment and labour do not in most cases impose problems. Furthermore, the surface is not weakened by either oil spillages or high temperatures. But here again drawbacks must be mentioned. There are two problems which make the use of this type of pavement construction many times impracticable. These are:

a) Subgrade settlement cannot be accommodated without excessive cracking. In general concrete slabs can only

function properly if laid on established very stable areas where no settlement is anticipated. Unfortunately this is rarely the case in a modern development where usually new areas are created by reclamation,

- b) Some provisions for thermal expansion/construction must be made,
- c) A high concrete strength, at least 40 N/mm<sup>2</sup>, is necessary to reduce spalling and impact damage,
- d) Repair of broken, or deformed concrete slabs is very difficult, and
- e) Changing of patterns or rehabilitation of the surface, digging trenches for cables or access to services is also very difficult and expensive.

#### 4.3 Precast concrete rafts

A hard concrete surface is ideal in heavily loaded Port areas and the necessary flexibility can be achieved by using a precast concrete surfacing material which can be relaid as settlement takes place. The answer to this is the use of precast concrete rafts which are basically a development of the true rigid construction. These rafts are generally 2 metres squares, reinforced and usually have a protection steel angle surround to stop the concrete from spalling under local stress concentrations. The units are laid on a layer of compacted sand to give a uniform bedding. The subbase is generally granular and must be free/draining to prevent saturation and subsequent development of pumping after periods of heavy rain. Precast concrete rafts offer several advantages:

- a) Good quality control in manufacture,
- b) Full strength achieved in off-site curing,
- c) Little plant needed for laying,
- d) Immediate trafficking, and
- e) They can easily be lifted and relaid to accommodate site settlement.

However, like any other system, this one has some disadvantages as well:

- a) The cost of the rafts is very high and this is aggravated by the large size of the units, weighing around 1.25 tonnes, and haulage is expensive,
- b) The units being larger than the track width of the handling equipment and the corner castings which support the containers, very large hogging bending moments are induced in the rafts. If the supporting subgrade has settled, this can cause cracking accross the corners,
- c) Differencial settlement between rafts must also be controlled as excessive steps may be dangerous for moving handling equipment and may also cause problems to surface drainage of rainwater.

Not all experience with rafts has been bad, in fact some Ports find it an ideal form of construction and use it extensively however the high cost of construction has unfortunately in many cases, not been reflected by good performance record. In general, overall costs are significantly greater than the alternative precast concrete blocks.

#### 4.4 Concrete blocks

Concrete blocks have now established themselves as a successful form of surfacing for Port area pavements and offer the same advantages as the raft system. They have a highly durable and hard surface but they also possess the flexibility associated with asphaltic construction. The individual units are small and providing they have sufficient thickness tensile cracking does not occur. Since the structure is already "cracked" the surfacing can accommodate extensive deformation without damage. In addition in cases of settlement the blocks can be lifted and relaid in a few hours. The blocks are laid on a layer of screeded but uncompacted sand. The surface is vibrated to give the final profile and this forces the sand up into the joints, so converting the individual units into a homogeneous surfacing and at the same time giving the surface its strength and continuity. Once the blocks have been locked together with sand i.e. "interlock", the strength of the surface layer is high. Also since the blocks are made of high quality concrete the surface durability is excellent, it can withstand the very harsh loading from trailer dolly wheels and container corner castings without any problems. The initial cost of construction is usually slightly higher than an asphaltic structure but as existing block pavements required very little maintenance the overall costs may thus prove to be lower.

#### 5. DEVELOPMENT OF CONTAINER YARD PAVEMENTS AND REASONS WHY GRAVEL BEDS HAVE NOT BEEN MORE WIDELY USED.

The traditional types of surfacing e.g. asphalt, concrete and interlocking tiles, were used in Ports long before the introduction of containers into Port operations. Engineers, tried first to use in container stacking areas the known traditional pavements. When problems arose, an effort was made to introduce various improvements to these existing methods of construction. Also, in many cases existing paved areas designed for other operations had to be used as container yards. It seems that the above process of developments led the Engineers to think in a rather narrow way i.e. to concentrate their efforts in improving the traditional types of pavement instead of searching for new types of construction. The most traditional type of pavement, asphaltic, proved to be very problematic in container stacking areas, in various respects which are explained in other paragraphs. Engineers tried to overcome these problems in three different ways:

a) By changing to other types of traditional but more rigid pavements like in-situ concrete, or concrete rafts or concrete blocks. This approach solved many of the problems encountered with the use of asphalt but unfortunately developed some new ones such as provision of joints, cracking, settlement, difficult accessibility to underground services and most important much higher costs.

b) By combining the rigid and flexible pavements i.e. by introducing special concrete standing strips for the containers at 6 m. intervals. This provided satisfactory solutions regarding many problems but in some cases the disadvantages of the rigid system were added to those of the flexible in some respects e.g. ponding of rainwater may occur because of the expected differencial settlement between the neighbouring areas of concrete and asphalt. This solution in many cases proved to be an expensive one.

c) By improving the durability and the effective stiffness as well as the resistance to oil of the asphalt surfacing by changing the initial specification or using special asphalt mixes with the use of epoxy or other additives. It is possible with such special mixes to combine the flexibility of asphalt with the rigidity of concrete to provide a semirigid wearing course which is temperature, oil and penetration resistant. This method provides a satisfactory means of improving asphalt durability, though, the costs of construction are very high and would in many circumstances not be as economic as some of the other surfacings available or even become prohibitive.

Other developments also took place during the recent years in this subject such as the use of various types of base for asphaltic pavements e.g. base with lean concrete; but the latest development in this field which should be mentioned is the new philosophy and method of approach to the structural Design of Heavy Duty Pavements for Ports which can be found in a special Publication, published in 1982 by the British Ports Association. This Publication deals only with the traditional pavements without mentioning the gravel bed system but this does not imply any deficiency of this Publication since gravel beds can only be used in container stacking areas in conjunction with yard cranes.

#### 6. GRAVEL BEDS

#### 6.1 General

An asphaltic or concrete pavement is basically a layer of aggregates glued together with bitumen or cement respectively. In addition they are usually founded on a base with granular material i.e. aggregates again. If the binder is removed from the asphaltic or the concrete pavements then one ends up with just a layer of aggregates which is nothing else than a gravel bed. By doing this one can avoids the pavement disadvantages which are associated with these binders whilst at the same time will maintain those advantages which are really needed in cases where a smooth riding surface is not required i.e. like in container stacking areas where yard cranes are used.

#### 6.2 Description

Gravel beds, being a simple system of paving, are very easy to describe. It is nothing more than a layer of a certain thickness of gravel (crushed or naturally occuring aggregates) of a certain gradation, placed directly onto the underlying subgrade. The subgrade may be either the natural ground after a proper formation, a filling or reclamation material, or a made up sub-base material, according to the special local conditions and design parameters.

Gravel beds, due to the very small units that they are made up, form a surface which behaves like a cushion. This means that they have the ability to adopt a surface profile compatible with that of the underside of the stacked containers, (See figure 2). This situation is similar to the floating conditions. When one refers to flexible pavements usually implies bituminous construction; however, with the introduction of gravel beds into the family of pavements, bituminous pavements must now yield their place at the top of the list of flexible pavements to gravel beds.

## Fig. 2: Surface profile of a gravel bed after lifting stacked containers.



#### 6.3 Design criteria

The design of the gravel beds is a fairly straightforward procedure. First of all one has to know the bearing capacity of the substratum which may vary from solid rock to soft peat and clay. Many Ports are situated in alluvial areas with soft and unconsolidated soil types. In many cases too, the substrata show a great variation in properties over short distances. Also sometimes container terminals are constructed on newly reclaimed areas. Many times the substratum has to be accepted as it is or at least the available filling material has to be. That being so, the designer has to define the maximum bearing capacity of the top layer underneath the gravel bed under relevant circumstances with respect to groundwater, frost and thaw etc. and decide whether a made up sub-base should be provided. It remains then to derive the neccessary thickness of gravel to spread the expected loads to an acceptable value for the underlying subgrade or sub-base. Spreading of loading at an angle of 45° seems logical. However, before doing so one must first decide what the expected loads are going to be. Since the combination of yard cranes and gravel beds permits no moving loads, then the only applied loads will be those resulting from the stacking of containers. Containers will be stacked in blocks, usually no more than four high, with a maximum of five high when yard cranes are used.

The corner castings of a container measure  $178 \times 162$  mm and they project 12.5 mm below the bottom of the container. Since the projection is so little, it is expected, and this has been confirmed in practice, that the container corner castings will sink into the gravel, with a result that containers will be supported over the whole bottom face. Table 1 below gives the maximum loads and stresses for the block stacking arrangement which is adopted when yard cranes are used. Since it is unlikely that all containers in a stack will be fully laden the maximum gross weights are reduced by the amount shown.

Stocking	Reduction	Gravel beds		Asphalt or concrete	
height in gross weight	load Kg	contact stress*	load Kg	contact stress	
1	0	20,000	0.056 N/mm <sup>2</sup>	30,480	2.59 N/mm <sup>2</sup>
2	10%	38,000	0.107 N/mm <sup>2</sup>	54,860	4.67 N/mm <sup>2</sup>
3	20%	54,000	0.15 N/mm <sup>2</sup>	73,150	6.23 N/mm²
4	30%	68,000	0.190 N/mm <sup>2</sup>	85,340	7.27 N/mm²
5	40%	80,000	0.224 N/mm <sup>2</sup>	91,440	7.78 N/mm²

Table 1. Pavement Loads from Container Blocks Stacking

\* Due to the voids between aggregates the actual contact area is assumed to be 70% of the plan area of the channel steel sections which project below and support the floor of the container. This area is about  $5 \text{ m}^2$ .

NOTE. Maximum gross weight of 20 ft. container: 20.17 tons Maximum gross weight of 40 ft. container: 30.48 tons

In the case of gravel beds the 20 ft. container gives the worst loading conditions as the 40 ft. unit has double the plan area but its maximum gross weight is less than twice compared with the 20 ft. unit. In the case of concrete or asphalt pavements as containers are supported on their corner castings, the 40 ft. unit gives the worst loading conditions since it weighs more than the 20' unit but still

has only four corner castings.

Just by inspection, it is very easy for someone to see the big difference of the order of magnitude of applied contact stresses comparing blockstacking of containers on gravel beds and on concrete or asphalt pavements. This ranges from about 46 times for stacking height of 1 to 34 times for stacking height of 5. As it was explained before this is owing to the ability of gravel beds to behave like a cushion.

A reasonable question which may follow the above is whether the floors of containers are designed to carry on their underside their own gross weight plus that of another four. This question can only be answered by the container manufacturers. However, what can be said in this paper is that experience over a number of years in container terminals where gravel beds exist has yielded no evidence of containers sustaining damage as a result of being stacked on gravel. (See figure 3).

Fig. 3: Stacking of full containers on gravel beds (4 high).



#### 6.4 Specification of the gravel material

The gravel beds must be filled with crushed or naturally occuring hard stone of size preferably smaller than 50 mm. This is to avoid the possibility of spillage of the gravel onto the neighbouring paved areas as a result of containers retaining gravel in the underside cavity of the corner castings. Naturally occuring round aggregates, such as beach gravel, are less preferable as these can be displaced much easier than angular aggregates. When a load is applied on their surface, these will more or less behave like billiard balls and tend to roll away under the load. The gravel must be sufficiently resistant to crushing to avoid gradual breaking down into dust which might cause a reduction, in permeability and flooding problems. The grading of the gravel seems not to be an over-important aspect of the design though a smaller and fairly uniform grading (tending towards single size) could be seen as the optimum from both the permeability point of view and also for safeguarding of the containers. Petrographic examination of the stone is not really necessary as there is no question of any undesirable reaction taking place with cement or bitumen.

The suitability of material regarding mechanical and other properties can be examined in a similar manner as that of concrete aggregates. The following relative values and limits could be used:

i) <u>Soundness</u>:-The gravel shall be tested for soundness in accordance with ASTM C88-69. After 5 cycles on sodium sulphate the weight loss must not exceed 18% by weight.

ii) <u>"10 Fines" value:</u>—The "10 fines" value must be not less than 100 KN.

iii) Aggregate Impact value:—The gravel impact value must not exceed 25% when tested in accordance with B.S. 812.

iv) <u>Aggregate Abrasion value:</u>—The Los Angeles Abrasion value must not exceed 25% when tested in accordance with ASTM C131-69.

v) <u>Flakiness Index:</u>—When determined by the sieve method described in B.S. 812 it must not exceed 40 for 40 mm aggregates, or 35 for 20 mm aggregates.

vi) <u>Roundness Index:</u>—As tested in accordance with B.S. 812 it must not be more than 30%.

vii) <u>Deleterious Substances:</u>—The amount of deleterious substances in the gravel must not exceed the following maximum limits:

a) Clay lumps and friable particles	5% by weight
b) Soft particles	5% by weight
c) Fines passing the 75 micron sieve	1% by weight
d) Pyrites expressed as $SO_3$	0.05% by weight

#### 6.5 Method of construction

As you would expect, material tending to a uniform grading does not respond appreciably to compaction but nevertheless some form of compaction is advisable. (See figure 4). To be effective compaction must be carried out in layers not exceeding 20 cm thick. The surface of the bed should be level and significantly below the surrounding pavements and/or upstand kerbing should be provided to inhibit the accidental or premeditated movement of vehicles onto the beds. The beds should be confined within R.C. retaining kerbs. An upstand kerbing should be castellated in order to allow the run-off of rainwater from the adjacent paved areas into the gravel beds, should this be desirable. Of course before constructing the gravel beds some preliminary work should be carried out in connection with the formation or upgrading of the subgrade.

Fig. 4: Compaction of a gravel bed.



#### 6.6 Drainage

One of the prerequisites for a successful pavement design is a careful consideration of stormwater drainage. The proper gradients should be given to the surface and the correct number of catch pits provided at the right places. With gravel beds, however, this aspect is also simplified. Since vertical drainage can be achieved with this system, there is no question of gradients etc. Drainage of gravel beds can be slip into two stages.

Firstly is the stage when the rainwater penetrates into the gravel bed and until it reaches the top of the underlying subgrade. There is simply no design involved here since this is correlated with the natural properties of a layer of gravel to absorb water. In fact the gravel bed can also in some cases play temporarily the role of a buffer storage zone to retain any excess water beyond the capacity of the drainage system under the beds, should any storms of unexpectedly high intensity occur.

The second state is the discharge into the sea of water which has passed through the gravel bed to the top of the underlaying subgrade. This can be achieved in three different ways depending on the permeability characteristics of the subgrade. (See figure 5).

Fig. 5: Drainage through gravel beds.



a) If the whole thickness of the subgrade under the gravel beds down to the natural sea water table, is considered to have sufficient permeability, taking into account the amount of water that can be temporarily retained within the gravel bed and factors like duration of storms and time of concentration, then the whole system can be assumed to be free draining. In such cases no extra drainage provisions are necessary. This may be possible in cases where the land for container stacking areas has been created by filling or reclamation using sandy material. In Port construction, it is a very usual practice to combine dredging and reclamation operations and since in most cases the material dredged from the sea bed is sandy then conditions such as the above may often be created.

b) There are cases when the filling or the existing material which is present in an area to be used for container stacking, though possessing satisfactory permeability characteristics, is not good enough to carry the applied loading spreaded through the gravel bed and hence a sub-base is required. The chosen sub-base may be relatively impermeable which leads to the necessity of providing some kind of drainage facilities. This situation can be faced very easily and at small cost. Vertical gravel drains can be provided at centres of appropriate distances which will aid drainage of water through the impermeable sub-base into the underlying permeable strata.

c) Finally there are cases where the whole thickness of the underlying stratum down to the sea water table does not have sufficient permeability to permit one of the above two solutions and hence a conventional system of collector drains must be provided to carry the water into the sea. The usual practice, should this possibility have to be faced, is to provide a system of perforated pipes to collect and carry away the water as soon as it reaches the top of the underlying sub-grade of the gravel beds. (See figure 6). There are several ways of laying the perforated pipes. One is to lay a number of small diameter perforated pipes transversely through the gravel bed bays, at appropriate centres. An alternative way is to lay one large diameter or a number of smaller diameters perforated pipes longitudinally along the centres of the gravel beds. However, this must be coupled with a special formation of the sub-grade. The sub-grade should have a sufficient downward gradient towards the centrally placed collectors in order to secure the full success of the system.

All the above drainage systems, have been proved to be cheaper than the drainage systems required by the traditional pavements. In addition one can allow water from the adjoining paved areas to drain into the beds, which means that no other drainage provisions are necessary for these areas and hence further cost saving.

Fig. 6: Perforated plastic collector drains ready to be covered with a sand and gravel filter mix of special grading which safeguards the pipes from blockage.



#### 6.7 Maintenance

The available experience dictates that gravel beds require little or no maintenance. Occasional clearing of debris seems to be all that is required. Disruption of the beds by dragging of containers is unlikely to occur, due to the operational characteristics of yard cranes. However should this be the case on a few occasions, then the only work that need to be done is to relevel the gravel bed using one or two unskilled labourers. Settlement of the sub-grade or sinking of some gravel into the underlying stratum will not effect in any way the performance of the gravel bed or the container stacking operations, especially when these occur in a uniform way. If however, due to non-uniform settlement or any other reason the surface of a gravel bed becomes uneven then this can be very easily and cheaply faced without any serious and lengthy obstruction to the container stacking operations, by just adding the required additional quantity of gravel.

#### 6.8 A few other advantages of gravel beds

Gravel beds do not permit casual cross passage by the Port traffic and this has a positive advantage in channelizing the traffic and maintaining the predominantly one way circulations. This is of prime importance for both safety (minimising the risk for accidents) and efficiency of the Port operations especially with regard to horizontal transportation of containers with trailers.

The container stacking bays, do not have to be at any specific level in relation with the neighbouring paved areas, as these function completely independently. They only have to be at a lower level, mainly for drainage reasons. The underground water table permitting, the gravel bed stacking bays can be constructed at levels much lower than those of the yard crane travel strips, provided that deeper surrounding kerbing beams are constructed. This means that you have the flexibility to increase the stacking hight capacity or if this is not required, the legs of the stacking cranes can be made shorter.

#### 6.9 Comparative constructional costs

The table below shows a comparison of contructional costs in various countries between gravel beds and asphalt, the most traditional type of pavement. All costs, which refer to 1982, have been obtained from either contractors or consultants who are or have been involved in projects in these countries. For easy reference these have been converted to U.S. dollars using the prevailing rates of exchange at the time of preparation of this paper. However, the purpose of this comparison is to indicate the order of magnitude of the costs and not the exact costs.

Country	Cost/m <sup>2</sup> of 10 cm Asphalt pavement with 20 cm base and 15 cm sub-base.	Cost/m² of 40 cm gravel bed	Approximate % age saving if gravel beds are adopted
CYPRUS	11 U.S. \$	3.5 U.S. \$	68%
GREECE	9 U.S. \$	3.0 U.S. \$	67%
MALAYSIA	11.5 U.S. \$	4 U.S. \$	65%
U.K.	20 U.S. \$	8.2 U.S. \$	<b>59</b> %
INDONESIA	17.3 U.S. \$	7.7 U.S. \$	57%
OMAN	17 U.S. \$	8.4 U.S. \$	50%
NETHERLANDS	18.3 U.S. \$	9.8 U.S. \$	46%
SAUDI ARABIA	17 U.S. \$	8.2 U.S. \$	45%
U.A.E.	16.5 U.S. \$	9 U.S. \$	45%

Considering a container yard of  $100,000 \text{ m}^2$  where rubber tyred yard cranes are used then approximately  $62,000 \text{ m}^2$  form the stacking bays. The choice of gravel beds instead of asphaltic pavement, would mean a saving of about 465,000 U.S. \$ in Cyprus and Malaysia, 731,000 U.S. \$ in U.K. or 372,000 U.S. \$ in Greece.

In developing countries where projects are usually carried out with loans, any possible saving in construction costs without effecting the performance of projects is of prime importance as this will assist them to achieve a more productive allocation of their limited resources.

#### 7. CASE STUDIES

#### 7.1 Port of Ashdod

The container terminal at the Port of Ashdod was first put into operation about 8 years ago. The terminal processes the container traffic with rail mounted stacking cranes operating over gravel stacking beds (See figure 7) and is designed to deal with 300,000 container movements per annum. The traffic about two years ago was 120,000 movements. The gravel beds are confined between the crane beams which themselves are on spread footings. The gravel depth is only 20 cm laid upon a sub-base of again 20 cm deep. The sub-base was expected to be relatively impermeable and vertical gravel drains were provided at 5 m. centres to aid drainage to the dredged sand reclamation. Two types of gravel were used; initially a rather uniform crushed limestone, between 3/16'' and 1/2'' but thereafter a cheaper naturally occuring pumice was employed. The latter was again fairly uniform, between 3/4" and 3". Both materials were sufficiently resistant to crushing. During construction the gravel has not been compacted but has been left more or less in its loose state, though with a carefully graded surface. Drainage within the container terminal was via the gravel beds, all roads falling towards them on the quay front

The experience gained in these 8 years of operation in Ashdod was briefly the following: the gravel beds present no operational problems and require little or no maintenance; in fact no maintenance has been required until today. The disruption possibility of the beds by dragging of containers is remote; no settlement or sinking problems have been observed; there was no evidence of containers sustaining damage as a result of being stacked on irregular gravel. The beds drained without problem even during the heaviest storms.

Fig. 7: Use of gravel beds in conjunction with rail mounted yard cranes at the Port of Ashdod.



#### 7.2 Haifa Port

A current development in Haifa Port is specifically for the purpose of building a specialized container terminal. The new container area was reclaimed with dredged sand.

The stacking cranes for the new terminal are to be 42 m. span rail mounted, with 3 lane cantilever on each side. They are like the rail mounted cranes in Ashdod but their rail track is fixed on a beam which is supported on pile foundation.

The container stacking beds are to be gravel along the lines of the Ashdod terminal but, unlike Ashdod no drainage facilities are provided for rainwater falling on the beds, i.e. they are taken to be free draining. However, the designers have not allowed water from the adjoining road areas to drain into the beds (as has been done in Ashdod) but instead have gone to a fair amount of trouble to provide an alternative and independent drainage system for the paved areas. There seemed to be a lack of confidence in the self-draining capability of the system. The beds were to consist of 20 cm of gravel on 20 cm of compacted sub-base.

#### 7.3 Limassol Port

The infrastructure of a new container terminal at Limassol Port has been recently completed and this terminal is expected to be fully operational by June 1984.

The new container terminal will be capable of handling 230,000 TEU'S per annum with the possibility of increasing the annual throughput even more.

The works for this project included among other items the construction of gravel bed container stacking bays. (See figure 8).

The 50 cm beds have been graded level (1/2'') over 10 feet) and recessed below the surrounding surfacing to a depth of about 10 cm. A retaining wall was constructed around the beds. The material used was crushed hard stone of size smaller than 50 mm and of the following grading:

maximum	5% by weight to exceed	37.5 mm
maximum	10% by weight to be smaller than	4.75 mm
maximum	2% by weight to be smaller than	2.36 mm

Voids in total mixture 15–25%

Compaction was carried out with vibrating rollers in layers not exceeding 20 cm thick. The gravel is laid on reclaimed land. The permeability of the reclamation material is poor. Drainage within the stacking yard of full con-

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tainers is via the gravel beds, all roads falling towards them.

At the bottom and along the centre of the gravel beds, plastic perforated pipes complying with B.S. 4962 have been laid. A fall has been provided in the sub-grade towards the centrally placed perforated collector drains which have been covered with a sand and gravel filter mix of a special grading which safeguards the perforated pipes from blockage.

#### Fig. 8: Gravel beds for the proposed new container terminal

at Limassol Port.



#### 8. REMARKS

Most of the disadvantages, if not all, which are associated with pavements are connected with the necessity to provide a smooth riding surface. Practice has proved that the most economical method to achieve in an adequate way such a surface is to use bitumen or cement in conjunction with aggregates. However, the use of these two very useful material causes most problems. Cracking, surface damage from oil, difficulty of access to underground services, expensive repairs and maintenance etc. are all due to the presence of these two binders. Once, a smooth riding surface is not a prerequisite, then there is no reason why one should use these two expensive aggregate binding materials. I believe that the alternative solution and the case where such a surface is not required in a container terminal has been covered by this paper.

Considering, however, the merits of the gravel bed system, it is strange to see how many container terminals could make use of this system but have not. There are 93 container terminals in the world which use yard cranes for stacking containers. In particular there are 20 in Europe, 1 in Africa, 8 in the Middle East, 28 in the Far East and Asia, 8 in Australia, 24 in North America and 4 in Central and South America. It is possible that I have missed a few! There are though, only a few remote cases where gravel beds have been adopted.

I am wondering whether the designers of all the above container terminals have considered at all the gravel bed system as a possible solution or used the much more expensive traditional pavements, being unaware of the option.

#### 9. CONCLUSIONS

Gravel beds for stacking containers go hand in hand with yard cranes. This combination, however, offers an effective and economical solution to the intensive and well ordered stacking of containers as required in a modern and efficiently run container terminal.

Given the criterion that all container traffic will be handled with yard stacking cranes, then the most economical solution for the stacking surfaces is the gravel beds.

#### ACKNOWLEDGEMENT

The author would like to express his sincere thanks to Mr. Dan Halber, Chief Engineer of Israel Ports Authority, for discussing the paper with him.

## Port of Gothenburg – Future Developments

#### By Per Bjurström Port Director and President of Gothenburg Stevedoring Co.

In Gothenburg we are presently working at forming one company by merging the municipal Port Authority and the community owned Stevedoring Company. The object is to make the total port activities stronger and more flexible and consequently more competitive. We have great expectations regarding the new company—Port of Gothenburg Ltd.—which will start functioning on January 1, 1985.

Before going into detail regarding the background, objects and methods of the project of coordination, it might be appropriate to present a short review of the Port of Gothenburg.

#### Port of Gothenburg today

Strategically well located on the west coast of Sweden, the Port of Gothenburg has become the largest port within the Nordic countries (Sweden, Norway, Denmark, Finland and Iceland).

From a more global perspective, our harbor is small, and compared to the large ports in the rest of Europe, the Port of Gothenburg—with its 22.7 million tons per year—is placed relatively low on the list (see table below).

#### Traffic information 1982 certain larger ports

Port	Total turnover MM tons	Of which oil prod.	No. teus (000)	Cont. goods MM tons	Avg. Weight
Hamburg	62	20	889	7.8	8.8
Bremen/ Bremerhafen	26	0	801	6.8	8.5
Rotterdam	250	135	1841*	22.1	12.0
Antwerpen	64	21	846	7.2	8.5
Felixstowe	8	0.5	641	4.7	7.3
Gothenburg	23	16	295**	2.6	10.5

\* actual number containers-no teus

\*\* 213.000 loaded + 33.615 empty + 48.000 flats = 295.000

The turnover of goods in Rotterdam and Hamburg, for example, is 250 million tons and 62 million tons respectively. On the other hand, these harbors have a catchment area with 250 million consumers whereas Gothenburg has 20 million.

The port activities in Gothenburg are run by a number of community owned limited companies and a municipal authority. The Stevedoring Company is the largest entity in the harbor with twice the personnel and turnover as compared to the Port Authority.

The Port Authority and the Stevedoring Co. employ approximately 1700 people and the turnover amounts to a total of 550 million Swedish Crowns. For the past fifteen years, the Port Authority has been profitable wheras the Stevedoring Co. has not. Annually the two organizations make capital investments amounting to 100 million Swedish Crowns.

Close to one third of the foreign general cargo shipped via Gothenburg consists of transit goods to and from other Nordic countries, which emphasizes the importance of Gothenburg as the Scandinavian trans-ocean port.

#### Nordic ports, risks

During the next ten years, Nordic ports will be confronted with great changes. Over-capacity and a decreasing traffic basis will increase competition and will necessitate an adjustment of the operative control systems.

There is also another risk. The knowledge within the industry of material handling and administration is increasing. In order not to tie up capital in goods longer than necessary, the industry will use more frequent transports with minor consignments. Since the shipping industry principally handles large scale production, many of those minor shipments will be railed or trucked. This applies to European terminals, as well as to continental ports for trans-shipment to transoceanic markets.

The Port of Gothenburg is trying to make Nordic industry aware of this development. Should the volume of goods decrease in Swedish ports, then the conditions will also change for the shipping lines. In other words, the volume will not justify the extended route from the continental ports to the Nordic ports.

As a consequence, Scandinavian ports would be isolated which would involve extra expenditure for their transport services. This, of course, would be unfair to the Nordic export trade.

Another risk, and this is true for all ports, is that traditionally there are no strong ties between ports and their customers and conflicts no matter what their origin are focused on the ports and the ports suffer as a consequence. Traditionally, ports are also the focus of union actions, type blockades and the like.

#### Combination of Port and Stevedoring-Why?

In order to be ready for structural changes, we have tried for some time to coordinate the overall port activities in Gothenburg. In 1978 the municipality became the principal owner of the Stevedoring Co. which facilitated the coordination effort.

Three years later, the local government administration instructed the Board of Directors of the Port to investigate the possibility of forming a corporation and to work in conjunction with the Stevedoring Co.

The Port Authority was supposed to cooperate with the Stevedoring Co. in a concern relationship. Following extensive investigations it was decided, however, to merge the two entities into one single limited company.

What are the reasons then behind the decision to combine the port activities and form a limited company?

Certain effects of the merger are direct, others are potential. Direct consequences are:

- 1. A joint effort on the market shows that the object of the Port of Gothenburg is to develop its role as a central Nordic port.
- 2. The overall port activities have the same aim, and employees can be motivated to work towards this mutual goal—vital to the success of the project.
- 3. Steering and control systems for marketing, economy, etc. will be uniform.
- 4. The decision making process will be uniform and adopted to the degree of competition present. Today, other demands are being made upon the Port Authority decision makers.

- 5. More efficient financial administration will be possible which will also result in better interest gains.
- 6. Secrecy matters are important in commercial contacts. Port customers have often worried about the possibility of their business secrets being revealed because of the public right of control of municipal authorities (although the exceptions are many). The customers must be able to trust the company, especially when they are in competition with other customers.
- 7. Rapid organizational adoption to structural changes will be possible.

Potential possibilities are more difficult to estimate in economic terms:

- 1. Higher quality decision through combined competence.
- 2. Same degree of result in the overall activity: Easier to make comparisons, stimulate personnel and track down problems at an early stage.
- 3. Improved financial effort.
- 4. Mutual staff policy gives better possibilities for cooperation.
- 5. The company could more easily develop new businesses, among other things through a more flexible decision making process than before.
- 6. Port of Gothenburg's initiative has a psychological value-indicates an offensive attitude.

#### How to accomplish coordination

Port of Gothenburg Ltd., the new corporation, will start its activities on January 1, 1985. The period between decision (March, 1983) and start may seem long. However, this period of time is needed to adjust the economic guidance systems and to define objects and guidance principles and efficient organizational structure.

The object of the work is to decentralize decison making and responsibility so that even great structural changes can be easily managed through changes in organization and direction.

The project work is carried out by means of working teams in which all personnel categories are represented. There are committees in various subject fields, such as Business Development, Company Establishment, Organization, Guidance Systems, Agreements, Subsidiary Companies, etc.

A business consultant has been engaged to help organize. Their aim is to support the working teams and their efforts, as "project secretaries".

When problems have been solved within the working teams and management, they are brought before the Board of Directors of the Port and the Stevedoring Co. for decision. Important issues of principle are brought before the local government councillor for final decision.

The project work has already begun to show results. Personnel in the various organizations now realize each others' problems. As a result we have brought about a better coordination in the daily work and criticism between the organizations is beginning to be replaced by cooperation.

Despite a split trade union picture—seven trade unions and two employers' organizations must cooperate in the new company—the port company project does proceed very well. After the decision by the local government in March, 1983, differences of opinion on issues have been replaced by cooperation and work towards a common goal.

Several of the larger ports in Sweden are now investigating the possibilities of establishing port companies. It remains to be seen whether port companies are the solution to all problems, but already at this stage we notice that the conditions for a profitable port activity are improving—at least here in Gothenburg!

#### **Gothenburg Port Authority**

Municipal Agency		
Municipality of Gothenburg		
To own, maintain and build port		
structures, manage land areas		
and to be responsible for activi-		
ties in oil harbors and crane		
operations in the dry goods		
harbors		
400		
210 million Swedish Crowns		
Port dues, crane rentals, rent and		
tenancy for grounds and prem-		
ises.		

#### Gothenburg Stevedoring Co.

Type of Organization:	Limited Company		
Owner:	Municipality of Gothenburg		
Aims:	To be responsible for goods		
	handling in the dry goods		
	harbors.		
No. of Employees:	Approx. 1300		
Turnover:	340 million Swedish Crowns		
Main Sources of Income:	Payment from shipping lines for performed loading/unloading.		



The Free Port of Gothenburg

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The Lindholmen Harbour of Gothenburg

## Port of Århus

#### **The Central Port**

From ancient times Å rhus has been one of Denmark's best situated places of call: Right on the sea at a point with neither tidal movements, surf, nor currents of any significance. Add to this its central position in Denmark—an essential reason why its harbour has become the largest of the national provincial harbours. It serves not only local transport interests, it is also the centre of contact between the largest part of Denmark and the foreign markets.

For centuries the town made do with the river mouth on whose banks it had grown up. However, well over a hundred years ago breakwaters and piers began to reach out into the sea-at first very modest ones, but then their growth accelerated in step with the developments of modern shipping. Especially since World War II have increasing demands, a constant growth in trade connections, new and more efficient types of transport, and an even increase in the need for a central port brought about very explosive developments.

Even before the war did that farseeing city fathers agree on a long-term plan for harbour extensions. It took 30 years to fill in the frames of that plan—but during that period constant adjustments to the changing demands of time were made. For instance, none of the fathers of the plan had visualized the revolution which containers have brought to the shipping trade. However, as soon as the vague outlines of this trend began to appear the Port tackled the task of creating a container terminal that would meet the demands.

Today the Århus Container Terminal is the largest terminal handling overseas traffic to and from Denmark. Its annual turnover exceeds 100,000 units, and expansions are under way.

The harbour extensions within the bulk sector are based on long-term plans from 1973. They include a new Eastern Division with a quay length of 1.8 km and water depths up to 13.5 metres. The first quay in the Eastern Division began functioning in 1980. It is a tanker berth which has also been designed to accommodate vessels bringing their own ramps for cargo handling, e.g. vessels carrying factory-new cars. Under current construction is a coal terminal with a quay length of 450 meters and a water depth of 13.5 metres. Next follows a 620-metre quay for other bulkturnover, etc.

#### A Scandinavian Entrepot

Denmark has two base ports, i.e. the Port of Copenhagen, whose status as a base port goes back over many years, and

the Port of Århus, whose status dates back to the late 1950s.

The resons for the recognition of the Port of Århus as a base port are its excellent position and facilities combined with growing turnovers of oversea goods for the part of Denmark which is situated west of the Great Belt.

The Port of Å rhus has much to offer, and it has developed into a Scandinavian distribution centre for sea transports—a fact that is underlined by heavy traffic overseas and by European traffic on general, container, and ro/ro routes as well as ferry traffic. And by constant extensions of harbour plants, road connections, etc.

As a natural part of this distribution service and to make sea transportation even more competitive the Port of Å rhus—as the only Danish provincial port—offers duty-free storage of goods in bonded warehouses. A total area of 25,000 square metres of bonded space in warehouses and open storage areas is available, and ordinary warehouses, silos, tanks, etc. offer plentiful capacity.

The brokers and shipping agents of the Port work in close cooperation with forwarding and receiving agents, supervisory enterprises, measurers, etc., and they are all of them situated in or near the harbour.

The container traffic comprises oversea trade by both container vessels and liner vessels with container sections. And feeder-lines by container vessels exist both to Norway, Sweden, Finland, U.S.S.R., Poland, D.D.R., the German Federal Republic, Holland, Belgium, and Great Britain. Also there are many daily ferry departures for Kalundborg/ Copenhagen.

One interesting trend has been ascertained in recent years: Because of its excellent position and its very reasonable rates for warehousing, harbour and labour fees, etc. the Port of Århus has been used to an ever increasing degree as a place of transshipment not only for the large liners, which save the trip to the out-ports of Scandinavia, but also for goods brought to Århus by sea, rail, and road from Southern Europe to Scandinavian destinations.

The Port of Århus—a Scandinavian entrepot and distribution centre!

#### **Investments in the Future**

The new Eastern Division underlines the importance of the Port of Århus as a central harbour: Water depths of 13.5 metres, quay length of 1.8 km, a land area of 45 hectares, easy access by sea, and completely new road connections with the Jutland main roads.

At the far end of the new division the Port of Århus Authority is building a 450-metre quay with a hinterland of 8 hectares. This area has been rented by ELSAM, The Jutland-Funen Electricity Consortium.

In cooperation with three private coal importers, Shell, BP, and the Aalborg Portland-Cement-Works, ELSAM will build a coal terminal there.

The coal terminal will be completed in 1983. Its storage capacity will be 0.6 mio. tons and its annual turnover capacity 2.5-3 mio. tons. It will accommodate fully loaded Panmax-vessels of up to 70,000 dwt and partially loaded vessels up to 150,000 dwt.

Distribution from the terminal will be effected by railway trucks, lorries, lighters up to 7,500 tons, and by vessels up to 15,000 tons. A special discharge pier will be constructed for shipments to power plants and industrial plants, i.a. the cement works at Aalborg.

Opposite the coal terminal a tanker berth has been built capable of accommodating product tankers up to 50,000 dwt. It is linked up with the present Oil Division, and may also be used for other calls.

In the immediate vicinity of the coal terminal new quays and land areas can be completed at short notice, but according to plans the coming quays should comprise 620 metres on the west side of the basin and a ro/ro berth on the south side. There, among other things, a quay with water depths of 12 metres or more will be constructed for the Aarhus Oliefabrik A/S—one of the harbour's large enterprises—and the hinterland will be let to brokers and forwarding and receiving agents, etc.

#### The Port and the City

The harbour of Århus is a self-governing institution with

a self-sustaining and independent economy, but is supreme governing body is the Århus City Council. This arrangement ensures accordance between the city and the harbour, and it is an arrangement which has proved of great expediency to both parties.

The daily management has been entrusted to the City Council's Harbour Board presided over by the Lord Mayor assisted by six councillors.

As it is generally agreed that the harbour is primarily the working place of trade and industry yet another body was set up in 1953, viz. The Advisory Harbour Committee, whose members are the Harbour Board and representatives of trade and industry. This Committee is of major importance when decisions must be made as to harbour extensions, charges, and acquisition of new material.

It is in the interest of everybody that the harbour should function as well as at all possible, and therefore all needs and wishes are conveyed to the Harbour Board and the City Council by the Committee.

The day-to-day administration of the harbour is undertaken partly by the Port of Århus Authority-housed on one floor in a multi-storied building in the harbour-partly by the Harbour Master and his staff.

Practically all stevedore work in the harbour is in the hands of the Århus Stevedore Kompagni, which possess a large number of fork-trucks of all sizes.

Beyond comparison the harbour is the largest working place of the City of Århus with a daily complement of 4,000-5,000 who turn it into a resilient and efficient transport apparatus capable of solving all relevant tasks at any time.

## **Bay of Plenty Harbour Board**

(Extracts from 'Port of Tauranga Annual Report 1982', Bay of Plenty Harbour Board)

#### Chairman's report (extract)

#### Trade

For the last two years, the world economic news has been gloomy and the slow economic growth of the industrial nations has produced a discouraging start to the decade of the 1980's. The volume of international trade increased by only 1.5% in 1980, about 0.5% in 1981 and it is unlikely to exceed 1.5% in 1982 — this is a considerable slow down in trade growth when compared with the 7% average for the years 1960 - 1979. This decline in world trading activity has been accompanied by inflationary pressures on prices of internationally traded goods, instability of both exchange and interest rates and, for many trading nations, current account balances that are at worrisome levels.

Trade pressures in the Pacific Basin have similarly increased since 1980. The United States and Japan are vital markets to all countries within the Pacific Basin and so a satisfactory resolution to some of the present US/Japan trade difficulties will be of benefit to all trading nations of the region. As more than 60% of New Zealand's total overseas exchange transactions are with countries in this

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region, our country has a vital stake in the maintenance of a free and orderly trading system. The Port of Tauranga provides New Zealand with its main connection to Western Pacific markets and also has the ability to service all markets in the Pacific Basin.

It has been within this broad framework of international trade that the Port of Tauranga has provided a service to exporters, importers and shipowners. It is therefore pleasing to report that the problems and challenges created by lower levels of trade, reducing commodity prices and inflationary pressures, both at home and abroad, have served to emphasise the inherent strength of the Port.

Total cargo tonnage throughput for the year, at 3.1 million tonnes, was slightly more than last year and about 5% better than our 1981/82 operating plan. The additional volume came from an increase in import trade, although exports were about 4% lower than the previous year.

The international markets for softwood reflected the feeble state of the world economy in general but in particular it was indicative of the reduced level of new housing construction and the lower demand for packaging material in North America and Japan. This situation created additional pressure on New Zealand's traditional markets for forest products (Japan and Australia). Because of increased competition from North American exporters, and from the Soviet Union in Japan, New Zealand exporters had a particularly difficult trading year. With the exception of woodchips, all forest product exports were at lower levels than in previous years.

It is pleasing to note that dairy products perhaps enjoyed a more buoyant international market compared to other export commodities.

My Board recognizes that some South-East Asian markets for dairy products are introducing an ability (or increasing their capacity) to handle containerised cargoes. In this regard and in view of the Port's ability to handle dairy products presented in containers, in breakbulk or any other form, it is curious to me (and no doubt to many dairy farmers within the greater Port district) that more use is not made of the Port of Tauranga to service not only the South-East Asian dairy trade but also other trades in the Pacific Basin.

I must emphasise that the Board's interest in the South-East Asian dairy trade is not born out of any selfish or parochial ideas but from our belief that the most expeditious and economic route to South-East Asian and other markets is via the Port of Tauranga. Our objective therefore is to ensure that the New Zealand farmer receives the highest possible prices at the farm gate, which in turn means that total transport costs are the absolute lowest possible.

There appears to be a general lack of knowledge of the true costs of internal transport – even the exhaustive efforts of the Exports and Shipping Council have not been able to discover them. These costs are often hidden in freight charges, and thus prevent some exporters from judging the most economic port of shipment for their produce.

#### **Port Operations and Facilities**

During the year the Board: reviewed and approved a number of leases involving land and facilities for portrelated activities; approved the purchase and installation of equipment to convert the Port incinerators from oil to natural gas, and to convert its vehicles from motor gasoline to CNG; approved the purchase and installation of equipment to convert battery-powered navigation beacons and buoys to solar power; and acquired land adjacent to the Port.

Messers Owens, Culley, the General Manager and the Chief Engineer represented the Board at meetings concerning the proposed Tauranga Harbour Bridge.

August 1982 marked the tenth anniversary of the first shipment of woodchips from the Port of Tauranga. The successful development of this export trade involved a number of people connected with the Port of Tauranga and in particular Mr. M.K. Hunt of Wood Export Limited.

#### Marina

On 20 February 1982 His Excellency Sir David Beattie, Governor-General of New Zealand, opened the Tauranga Marina. Construction of this \$2 million complex began in June 1981 and now, as a completely self-financing project, its management and operation is exercised by the Tauranga Marina Society Inc. The policy of "user pays" is paramount in the minds of Board Members and is again proven in this development.

#### General

There are perhaps three issues of particular significance that I should mention. The first issue is a tendency of governments in recessionary times to increase the degree of regulation and State involvement in the economy. This means that the allocation of resources is influenced more by regulations and government intervention than by market forces.

Under such circumstances there is the real danger (especially in the transport industry and port sector) of creating a situation in which it becomes extremely difficult to remain internationally competitive.

An inefficient and overpriced transportation system hinders trade and anything which hinders trade, in the long run, hinders economic development. A perfectly free competitive situation protects users against possible abuses within the system.

The second issue relates to Port capacity and the need for careful planning by port authorities. World shipping tonnage can position itself to serve the needs of international trade wherever it may arise. Ports are fixed. As a consequence, port capacity is not always linked to world trading patterns and therefore the question of facilities and services a port authority should provide must be based on both the volume of trade and on the competitive position of the port in comparison with all other ports serving that same trade.

The third issues relates to the increased pressure on commodity and product prices in the international marketplace. In terms of international competitiveness, transportation is closely related to the production and marketing of products. Therefore simple economic considerations will lead to the greater use of integrated transportation systems where the control of the product from producer to consumer is exercised by one entity. Under such a system there will be a need for greater co-operation by all participants in the transportation chain if they are to reduce the real cost of moving goods and materials to market. The port, as a highly specialized link in this chain, will need to increase its flexibility while maintaining its reliability.

#### The Future

To meet the problems and challenges of the future, the Bay of Plenty Harbour Board has at its disposal the organization and management together with the commercial acumen and a number of natural strengths to appropriately respond to the best possible advantage of Port Users. These strengths include the Port's excellent operational performance in the handling of cargoes, its modern links with the inland road and rail system, ample room for cargo preassembly and transit storage, harmonious industrial relations, and the availability of a skilled Port labour force.

We will continue to encourage the competition on the waterfront, which has engendered the overall efficiency of the Port's operations.

I am confident that we can rely on the expertise and resourcefulness of the Board's employees, the Port Unions and the Port Employers to assist New Zealand producers and manufacturers to improve and maintain their international competitiveness by shipping their products to market via the Port of Tauranga.

> R.A. Owens Chairman

#### **Balance sheet**

#### as at 30 September 1982

	1982	1981
Current Assets	NZ\$	NZ\$
Cash and Deposits	3 718 431	2,385 143
Debtors	1 026 570	881 801
Prepayments	57 098	16 700
Stores and Materials	639 616	<u> </u>
	5 441 715	4 001 631
Less Current Liabilities		
Prepayment	13 000	16 000
Creditors	185 771	221 711
Net Loans Repayable within 1 year	1 447 287	594 267
Working Capital	3 795 657	3 179 653
Investments		
National Provident Fund	1 1 39 0 18	1 033 123
Fixed Assets		
Wherves	13 277 770	
Land Endowments & Reclamations	10 977 542	
Buildings	0 4 80 100	
Harbour Improvements	12 336 879	
Floating Plant & Equipment	2 404 332	
Shore Plant & Equipment	4 061 660	
Vehicles	395 324	
Conitalized Interest	476 056	
Waterfront Industry Commission Building	102 960	
Calter Oil Pinelines	21 4 26	
Callex On Tipennes	53 543 148	15 109 716
	58 477 823	49 622 522
	00 111 020	.,
Less Term Liabilities		
Net Public Debt	16 697 935	18 279 109
Deferred Payment – Land	<u>954 187</u>	<u>    170 446 </u>
	10 925 701	21 172 067

Total Net Assets		
Represented by		
Public Equity	28 818 182	24 789 922
Revenue Reserves	1 1 39 0 18	1 033 123
Asset Revaluation Reserves	10 868 501	5 349 922
	40 825 701	31 172 967

#### **Revenue and appropriation account**

#### as at 30 September 1982

	1982	1981
Port Operations	NZ\$	NZ\$
Revenue		
Cargo Charges	7 369 128	6 169 103
Ships Charges	3 032 199	2 542 796
Plant hire	641 593	533 670
Sundry Revenue	181 376	91 853
	11 224 296	9 337 422
Less Expenses		
Operating Expenditure	6 407 624	5 857 069
Depreciation	1 266 130	1 230 834
Interest	1 767 970	1 808 813
Others	46 742	37 405
	9 488 466	8 934 121
Net Revenue from Port Operations	1 735 830	403 301
Other Income		
Interest on Investments	649 749	512 923
Income from Rentals	341 722	264 947
	991 471	777 870
Exceptional Items		
Contributions – Marina Berth-holders	1 440 288	247 750
Loss on Disposal Fixed Assets	(4 554)	11 036
Revenue before Appropriation to Reserves	4 163 035	1 439 957





## Zanen Verstoep nv Dredging Contractors

Head Office: Holland 29, Surinamestraat, P.O.Box 80549 2508 GM The Hague Tel:(070) 607925 Telex: 31254 zvh.nl.

## International maritime information: World port news:

# Peru is host country for UNCTAD's second "TRAINMAR" seminar for training officers in ports and shipping, Callao/Lima, 3-10 October 1983

UNCTAD's second seminar for training officers in the shipping and ports sector will be held in the Instituto de Formación y Capacitación Portuaria (INFOCAP) under the auspices of the Government of Peru and in collaboration with the Empresa Nacional de Puertos (ENAPU), from 3 to 10 October 1983.

This seminar is an activity of the UNDP/UNCTAD programme TRAINMAR which started in 1981 with the aim of implementing training for ports and shipping managers of developing countries through the development of regional or local Maritime Transport and Ports Training Institutes, and by organising cooperation between them.

The first UNCTAD Seminar for Training Officers was held in September 1981 in Sete in France and gathered 47 participants from 24 countries.

The objectives of the second seminar are:

- to present to the maritime transport community the achievements of the TRAINMAR programme to date (courses developed, etc.);
- to elaborate procedures and programmes of work for future international cooperation amongst the countries represented (exchange and adaptation of material, regional training, etc.);

in order that as many managers of these countries as possible can benefit from the training programmes.

About 70 participants from 32 countries will attend the seminar, which will be conducted in English, French and Spanish. The Director of the seminar will be Michel Couroux, Coordinator of the TRAINMAR Programme.

TRAINMAR activities started in January 1980 in the form of a pilot project which produced the following results:

- production of 5 training courses in the field of: Port Planning, Port Operations, Commercial Aspects of Maritime Law, and Containerised Shipping;
- strengthening of 4 training institutes located in India (2), Ivory Coast, and Kenya;
- production of Training Development Guidelines and course material for the training of course developers and instructors;
- introduction of a system of cooperation through the exchange of training material.

The pilot project having been considered successful, it was decided to implement the same approach on a larger scale. At the end of 1983 it is expected that the TRAIN-MAR programme will have produced the following outputs:

- 12 courses in the fields of Ports (7), Shipping (2), Maritime Legislation (1) and Multimodal Transport (2);

- strengthening of maritime training institutes in India, Ivory Coast, Kenya, Malaysia, Mexico, Peru, Philippines, Tunisia and Central America through the training of about 55 course developers and 40 instructors;
- attendance of about 1200 managers and supervisors at one of the above-mentioned courses.

To organise the cooperation amongst the participating centres, and to associate more countries with the TRAIN-MAR network, a programme of cooperation and a plan of work for the next two/three years have to be established. These questions will be discussed in the second UNCTAD Seminar for Training Officers in Callao (Peru).

#### Publications

#### "MARINAS: A Guide to their Development and Design Third Edition"

#### Auther/Editor: Donald W. Adie

Price and binding: \$79.50 approx. Hardback: Size: 336pp. approx. 360 illustrations; ISBN: 0-89397-170-7; Publication date: January 1984; Published by Nichols Publishing Co. W.G. Nichols Inc. Post Office Box 96 New York, N.Y. 10024

Description:

This is the long-awaited revision of the most complete guide available to the designing and developing of marinas. It has been thoroughly and extensively updated to provide the most comprehensive guidance to the construction, maintenance and management of inland and marine boating facilities. This widely acclaimed reference analyzes and illustrates in detail the complex principles of planning and design. The text is heavily illustrated with photographs, diagrams, charts, tables and lists which supplement the discussion of such fundamental topics as site selection, design principles, engineering needs, boat handling and storage, bunkering facilities and pollution control.

As the patterns of leisure activities have changed, we have seen an increased popularity of all aspects of boating. The high costs involved and the limited water resources available for such activities indicate that planned programs ought to be established in both the private and public sectors which are responsibly aware of both environmental and conservation needs and the needs created by increased leisure time. Adie gives practical advice which emphasizes the engineering, planning, marketing and financial expertise necessary for a successful marina; one which is efficient, attractive and profitable as well.

#### "Container Handling and Transport"

edited by H.K. Dally

A4 format 244 printed pages

ISBN 0 907499 32 5 paperbound £40

ISBN 0 907499 31 7 casebound £45

Published by C.S. Publications Ltd., 54 Cheam Common Road, Worcester Park, Surrey, KT4 8RJ Engrand.

The book, based on work published by the British National Ports Council in 1978, incorporates new and updated material from 30 contributors – all recognised experts in their respective fields; it is edited by H.K. Dally, formerly assistant director of technical services to the National Ports Council and now an adviser to the UK Department of Transport and consultant to the Crown Agents.

The book is divided into eight sections. In the introduction container traffic growth is examined, handling techniques and trends reviewed and future vessel design, in so far as it affects the terminal development, is considered. After examining terminal design with chapters on systems analysis, operational design aspects, terminal capacity and civil engineering aspects, the book goes on to consider operations with chapters on a limited user terminal, multiuser terminals using rail mounted and rubber tyred gantries and the straddle carrier system with, in conclusion, the combi terminal concept.

Terminal equipment is then examined. This section was designed mainly with the less developed countries in mind and provides detailed practical information on how to select, specify, assess and maintain handling equipment, outlining the problems, pitfalls and decisions facing the operator. In the next section, other operating factors – such as manpower, documentation, safety, security and costs and charges – are covered in considerable detail.

The sixth section outlines the operation philosophy of three container shipping companies who provide or lease their own terminals and handling equipment in the deep sea, short sea and ro-ro trades, in an attempt to pinpoint operator policies in relation to terminal operation. The penultimate section concerns itself with the terminal's inland interface and the services provided by road and rail operators – together with inland container depots – are studied.

The final chapter examines the plans which have to be drawn up and the decisions which have to be taken by less developed countries when changing over to container operation and how such changes should be attempted in carefully phased development plans to allow for acceptance of change and to spread capital expenditure over an acceptable period. Nine appendices amplify and clarify a number of aspects of container terminal operations in certain of the chapters; they have been included to make the manual more comprehensive without overpowering the general reader with too much detail.

## Waterfront park project pushes toward completion: Nanaimo Harbour

The changing face of Nanaimo's Harbour waterfront is adding a new dimension to the shoreline as men and machines take advantage of tide and weather to construct the new lagoon park.

The \$1 million waterfront park project announced in March has been moving steadily ahead throughout the spring and summer. The rock berms or dikes enclosing the 78,000 square metre lagoon have just been completed. The low tides of early August facilitated the last phase of forming the structure.

A steady stream of large trucks carrying rock fill dumped a total of 29,000 cubic metres into the sea to create berms which separate the sea from the lagoon. The general shape of the shoreline development is now plainly visible.

#### THREE CONTRACTS

To date one contract has been completed; one is nearing completion and a third is well underway. Hans Hringa was given the first contract which called for removal of more than 3,000 cu. metres of waste material near the shoreline behind the foundry.

Second contract went to Macland Excavating Ltd. It called for placing of rock fill in position to form the berm enclosing the lagoon. A steady stream of trucks dumped load after load of rockfill forming a dike which pushed out a long arm to meet the shore on the other side. Crews worked according to the tides to seal off the deepwater end of the lagoon. The operation required exact timing and close cooperation between two contracting crews.

Third contract is for construction of the weir and the placing of material to form an impervious core section between the seaward side berms. Contractor for this phase is Hub Excavating Ltd. Concrete retaining walls and controls for the weir intake, bulk filling, levelling and grading will be going ahead soon.

#### New autonomy for growing port: Port of Prince Rupert, Ports Canada

Improved capability to serve the needs of a growing port is expected to be a major spinoff from the new autonomy of the Port of Prince Rupert.

This summer the Canada Ports Corporation, the new federal crown agency which oversees Canadian ports, approved the Port of Prince Rupert's submission for Local Port Corporation (LPC) status. The ports of Vancouver, Montreal, and Halifax have also been granted LPC status.

Letters patent for the new Prince Rupert operation are expected to be issued this fall by the federal government and will likely take effect in January 1984. In the meantime, a local implementation committee made up of members of the Prince Rupert Port Authority and Port staff are drafting the by-laws and resolutions necessary to bring the LPC into force.

The LPC will operate under the direction of a five to seven member local board which will be appointed by Order-In-Council this fall. LPCs are given the necessary authority in property management, contract and tendering, setting of rates, personnel and other areas to administer their respective ports on a day to day basis.

Ken Krauter, Port manager, says LPC status will mean the Port of Prince Rupert will be run under the direction of local people and will operate with a much higher degree of local autonomy.

"The key result will be a port operation which is able to respond quicker to changing markets and operating conditions. We're confident that we will be more responsive to existing and future clients."

Joe Scott, chairman of the Prince Rupert Port Authority, says LPC status will create the opportunity for a highly motivated board and Port staff to provide a more efficient and practical service.

## Grain terminal sets throughput record: Port of Prince Rupert

The grain terminal at Prince Rupert set another throughput record this year, topping the previous record set in 1982 by 127,000 tonnes.

The terminal's year-end is July 31 and the total on that date was 1,378,000 tonnes compared to 1,251,000 tonnes for the same period in 1982.

Charlie Paul, terminal manager, says the record throughput results from the fact the operation had enough grain to maintain two railcar unloading shifts for the entire year. "In the past, a second shift was added only when necessary".

The forecast for the next 12 months is even brighter. Mr. Paul says the terminal has targetted for a throughput of 1.7 million tonnes for the 83-84 season.

The terminal, built in 1926, has been upgraded several times over the years and now has a storage capacity of 63,000 tonnes. It is owned by Prince Rupert Grain Ltd. and employs approximately 110 people.

## Deepwater connection: Port of Québec

At the head of one of the world's most important trade routes, the Port of Québec has always been the natural gateway to North America's heartland.

Cargo shipped through the port comes from across the continent: grain from Western Canada, nickel from Ontario, coal from Pennsylvania . . . the Port of Québec has become the great Lakes/St. Lawrence Seaway's deepwater connection for the movement of bulk goods.

The Port of Québec is also growing as an important export center for general cargo ranging from lumber and prefabricated homes to vegetable oils, dairy and forest products. By pioneering new storage and distribution arrangements for shippers, the port has played an active role in the development of its own hinterland. An export terminal launched in collaboration with the Canadian Dairy Commission has helped dairy produces sell their products on international markets by reducing transportation costs, a new feed grain terminal serves the local market while a public liquid bulk terminal offers the flexibility of shared storage facilities to shippers of all sizes. The region's supply of petroleum and chemical products is also ensured at the Port of Québec.

There are many advantages to shipping through our port. It is served by two intercontinental railways and an extensive highway system with connections to a nearby international airport. The port is open to year-round navigation. Labour relations are excellent. Québec is closer to Europe than U.S. East-Coast ports and easily accessible to U.S. and Canadian markets. To top it off, the Port of Québec is the farthest inland point on the St. Lawrence River with 15 meters of water at low tide easily able to accommodate 100,000 dwt vessels.

These factors make Québec an ideal transshipment point between the Atlantic Ocean and the Great Lakes/St. Lawrence Seaway: the volume of bulk goods shipped through the Port of Québec has more than doubled since 1975.

A versatile import, export and transshipment center

which annually welcomes more than 1,000 vessels, the Port of Québec has invested tens of millions of dollars in recent years to stay in stride with rapidly evolving technology in waterborne transportation.

The Board of Directors and management of the Port of Québec are committed to keeping the port a modern and productive center of maritime activity.

(Port of Quebec)

#### Keefer Terminal—new ventures: Port of Thunder Bay

The Port of Thunder Bay's location - in the centre of Canada yet linked by 3,200 kilometres of inland waterways to the Atlantic Ocean - makes it unique in terms of cargo movement.

Add to its strategic location the availability of a worldclass transit facility such as the Keefer Terminal and the growing impact of the Port on world markets takes on a whole new perspective.

Keefer Terminal was completed in 1962 when it was termed a 'crown' for the St. Lawrence Seaway. Operated by the Lakehead Harbour Commission, the general cargo facility flourished through the 60's and 70's, but with the 80's came the recessive years. By 1981 Keefer had felt the blow, and the facility sat idle for two years.

The movement of package freight as we knew it a decade ago will probably never find its way back to the Great Lakes. But not for a minute do we believe that general cargo on the Lakes is dead. As the nation pulls out of the recession, new thinking and innovative ideas are beginning to surface.

Cooperative planning is beginning to pay off, as evidenced by the movement through Thunder Bay's Keefer Terminal in July of Sumitomo's immense 100 tonne and 220 tonne heat exchangers which were off-loaded from the Japanese vessel Regent Tampopo onto CN's heavyduty rail cars for shipment to Shell Canada in Scotford, Alberta.

Special marine and rail conditions were arranged for the oversize cargo by CN Rail and the Lakehead Harbour Commission.

Asked to comment on the decision to ship via Thunder Bay, Sumitomo's Matthew Hart-Machinery Division manager, Calgary said: "The cooperation received from both the Harbour Commission and CN Rail made our decision very easy."

"Our equipment is very large and very heavy, and requires special handling," continued Hart, "the marine facility is excellent, and there is no barrier between Thunder Bay and the Rockies."

Two 91.5m cranes were at dock-side to handle the transfer when the Regent Tampopo dropped anchor at Keefer Terminal.

"Personalized handling of special cargo and the provision of top-of-the-line facilities are what Keefer is all about," explained Terminal Superintendent Phil Mcleod, who emphasized that the Lakehead Harbour Commission is available for consultation and problem-solving as it relates to transportation.

"We are totally flexible," continued McLeod, "and I think first-time users of our facility will find us not only efficient, but innovative." But philosophical considerations aside, the sheer physical attributes of Keefer Terminal make it a natural choice. The world-class facility for marine, rail and truck forwarding offers paved areas for open storage, covered loading areas, cold and heated storage with clearance to 7.62 metres; in all, 30,000 sq. metres of modern, clean, dry warehouse space that is protected by full sprinkler systems and security-patrolled twenty-four hours a day.

Berthing for 3 seaway-size vessels and intermodal connections make the facility particularly attractive.

Modern offices, lunchrooms and Telex services are available on totally flexible lease arrangements with the Lakehead Harbour Commission, who stress that no vessel is too large or too small to share the Keefer facility.

The 196-metre "World Goodwill" recently took on 18,000 tonnes of bleached pulp from Thunder Bay's Great Lakes Forest Products, destined for China, while the 52-metre "Hancock Trader" arrives at dockside regularly with cargoes of calcium for distribution westward.

#### Harbour Park

High on the list of the Lakehead Harbour Commission's priorities at present is the development of a prime 40-hectare section of property adjoining the Keefer Terminal. This new undertaking – named Harbour Park – is designed to be the place for transportation-related industries to come together.

The land is particularly valuable to the transportation industry because of the immediate marine, rail and road connections.

Tenants of Harbour Park will enjoy being in the hub of the Port, with port-related activities taking place on their very doorstep: grain shipments, the movement of various dry and liquid bulk cargoes, forest products, and least but definitely not last, the movement of general cargo.

A development of this magnitude must take into consideration the best interests of all concerned, and detailed and careful planning has already resulted in the land's having been completely serviced.

The focal point of Harbour Park will be a modern office complex "Harbour Place," the construction of which is scheduled for this coming Fall.

Harbour Place offers to the transportation-related operations an opportunity to be where their action is. The new office structure will have many advantages: communication with related industry; the sharing of common facilities such as computers and training areas; adequate parking and a central location. There is no such structure currently in Thunder Bay.

Harbour Park and Harbour Place will operate as commercial ventures and will benefit all concerned. The Port of Thunder Bay is Canada's second largest port, and one of its city's largest industries.

Harbour Park awaits its future ...

(Transport of Thunder Bay)

#### Vancouver Port Corporation created

The Port of Vancouver passed an important milestone July 1 when the new Vancouver Port Corporation officially came into being.

Under terms of the 1982 Canada Ports Corporation Act, the new local corporation will have broad autonomy in setting policy for the Port and running its affairs.

A similar corporation has been established at the Port of Montreal, also effective July 1.

Appointed to chair the Vancouver Port Corporation is Marian Robson of Richmond, B.C. Mrs. Robson also serves as a director of the Canada Ports Corporation (Ports Canada), which replaced the old National Harbours Board last February.

Other members of the board are Vice-Chairman Cecil Cosulich and Directors Alan Campany, Norman Cunningham, Donald Garcia, Robert Lee and Paul Plant.

Under the Canada Ports Act, the Vancouver corporation will have the authority needed to manage and operate the Port – including property management, tendering and contracting, personnel administration and other operating powers. The local board will have control over the Port's revenue and expenses, originate its own bylaws and appoint senior management personnel.

The Port of Vancouver was among the first of Canada's major ports to apply for local corporation status after the Canada Ports Act was proclaimed. The Ports Canada Board and the federal government consider applications on the basis of a port's national and regional significance, its financial self-sufficiency and the indication of local interest in its management.

"The Port of Vancouver easily meets the criteria," said Senator Jack Austin in announcing the new corporation on behalf of Transport Minister Jean-Luc Pepin.

"The credit for the Port's new status should go largely to the members of the Vancouver Port Authority, who worked hard in the interests of the port to create the new legislation."

Bo Ekstrom, Acting General Manager of the Port, said the incorporation is a landmark in the Port's history. He noted that the new local board is made up of people who have extensive Port-related experience.

"This is a strong Board, and one that I am sure will ably serve the best interests of both the Port and its many communities."

#### A modern container terminal under construction in the Port of Cristobal-Colon: National Port Authority, Panama



In order to adapt the port of Cristobal-Colon to changes in world maritime transport technology in the field of containerized cargo handling, the National Port Authority has built a modern container terminal in the port.

The Port of Cristobal is located at the Atlantic entrance to the Panama Canal, at  $9^{\circ}21'$  north latitude and  $79^{\circ}34'$  west longitude.

The facilities with which this container terminal is equipped include a yard for the handling and storage of containers with a surface area of 7.5 hectares and a capacity of up to 3,000 TEUS, including eight (8) racks for refrigerated containers, a container loading and consolidating building with a total area of 6,279.2 square meters, a control building with a 60-ton scale, a gate booth at the entrance to the terminal, container handling equipment, and repair and maintenance shops.

The Port of Cristobal has other facilities that complement the services of the Container Terminal, such as: a docking length of 428 meters, with a depth of 40 feet; supply of drinking water and fuel; reception of contaminants; victualling services; electrical power; and communication services such as radio, telex, and telephone.

The container terminal will be in operation by the end of 1983 and will have two gantry cranes with a 40-ton capacity; the first of these will be installed by the second half of 1984 and the second by the first half of 1985.

#### Bomb threat procedures announced: Panama Canal Protection Division

Over the years, the Canal organization has been the target of relatively few bomb threats and other terrorist activities. However, the possibility always exists that such incidents might occur. The necessity of having general procedures to follow in these situations to ensure the safety of all employees has been recently underscored. In order to avoid the panic and confusion normally associated with this kind of emergency, the Canal Protection Division has developed standard operating procedures for handling a telephoned bomb threat at Commission facilities.

It is the responsibility of all bureau directors and heads of independent units to designate an employee "area security representative" at each work site that might be the target of a bomb threat. These areas include large administrative offices and other public buildings as well as vital installations. The Commission Fire Division will train this individual in procedures to minimize the possibility of a bomb being placed in the area and in detection techniques and the steps that should be taken should a bomb be found.

Although the likelihood that a bomb or an incendiary device has actually been placed is remote, a basic rule is to take all threats seriously and never assume one to be a hoax. The individual who receives a bomb threat over the phone should take the following actions:

- Keep the caller talking and try to obtain specific information regarding the location of the bomb, the type of bomb, when the bomb is supposed to detonate, why the bomb was placed, and so forth.
- While talking, attempt to determine the age and sex of the caller and listen for peculiar characteristics, such as accent, ethnic background, or any other special traits. Also, try to note any background noises such

as music, voices, or street sounds.

- When possible, leave the phone off the hook to provide the Panama National Guard with all investigative opportunities.
- Immediately notify the Commission fire dispatcher at telephone 119, who will alert the Panama National Guard, the senior person present in the unit, and the area security representative.

If the caller states that the bomb has been placed in the immediate area, the senior person present in the office should take the following actions:

- Notify the fire dispatcher, unless the employee receiving the call has already done so.
- Notify the senior official of the building or installation in a manner that will not cause undue attention.
- Request a thorough search by the area security representative if there is sufficient time.
- Calmy direct the evacuation of the office, if appropriate.

If the caller states that the bomb has been placed in another office or area, the senior official should:

- Notify the fire dispatcher, if not already done.
- Notify the senior official in the threatened building in a way that will not create undue excitement.

When an evacuation is called for, all persons in a building should immediately evacuate to a safe distance from the area and proceed to a designated location of assembly.

If time allows, they should first:

- Make a rapid search of clear of their area to determine if it is clear of parcels and containers that do not belong there and report the results of the search to the area security representative.
- Shutt off electrical equipment.
- Secure classified materials.

When it is safe to reoccupy the building, they should do so according to established recall procedures.

## Computer simulator provides data for cut-widening study: Panama Canal

Panama Canal pilots will navigate simulated ships through a simulated Gaillard Cut as part of a comprehensive study on the possibility of widening the Cut and the entrance channels of the Canal. The Panama Canal Commission has arranged for the Computer Aided Operations Research Facility (CAORF) in Kings Point, N.Y., to create the simulation through an interagency agreement with the U.S. Department of Transportation's Maritime Administration (MARAD).

Gaillard Cut – a 7-mile stretch running between Pedro Miguel Locks and the Chagres River crossing – is the narrowest part of the Canal. Because of its 500-foot width and its sharp curves, large vessels cannot meet safely in this section. The one-way traffic restriction has become a matter of increasing concern as the trend toward larger vessels continues. After all other capacity-related projects planned by the Commission have been implemented, the limitations of Gaillard Cut and the narrow channel entrances would put a ceiling on Canal capacity. The current study is aimed at determining the optimal configuration and width that will permit uninterrupted, two-way traffic of the large Panamax-size vessels through the Canal. The solution will take into consideration the cost of the volume of material that will have to be excavated and the degree of safety that will be afforded to transiting vessels.

The study will be accomplished in three phases: hydraulic analysis, computer simulation of Gaillard Cut, and finally, computer simulation of the Pacific entrance channel.

As the optimal navigational channel is being established, the Commission's Engineering Division will conduct geotechnical studies to assess the minimum amount of excavation required. The Commission will also determine the economic and financial feasibility of the project, as well as the necessary environmental assessments.

Successful completion of the study will provide the information necessary for the Board of Directors to render a decision regarding the project. In the meantime, the Board has created the Cut Widening Feasibility Committee to establish guidelines and to monitor the study, which is scheduled for completion in 1985.

#### North American Container Port Performances 1981/1982

#### (Twenty-Foot Equivalent Units)

	1982	1981	% Change
ATLANTIC			
New York	1,909,000	1,860,000	2.6
Baltimore	480,000	483,000	- 0.6
Charleston	357,396	312,077	14.5
Hampton Roads	285,016	312,759	- 8.9
Savannah	223,028	219,525	1.6
Halifax	171,130	217,492	-21.3
Philadelphia	140,000 <sup>a</sup>	136,252	2.8
Miami	134,834 <sup>a</sup>	126,620	6.5
Jacksonville	108,705 <sup>b</sup>	155,545	-30.0
Saint John (NB)	80,903 <sup>c</sup>	73,964	9.4
Boston	87,498 <sup>a</sup>	94,831	- 7.7
Palm Beach	63,530 <sup>a</sup>	62,702	1.3
Port Everglades	51,240 <sup>a</sup>	50,235	2.0
Wilmington, NC	41,741	63,738	-34.5
Sub-Total	4,134,021	4,168,740	- 0.8
ST. LAWRENCE/GREA	T LAKES		
Montreal	316,317	329,618	- 4.0
Chicago	2,114	2,041	3.6
Sub-Total	318,431	331,659	- 4.0
GULF			
Houston	302,699	318,661	- 5.0
New Orleans	276,191	280,964	- 1.7
Galveston	117,671 <sup>a</sup>	62,839	87.3
Mobile	<u>52,756 <sup>a</sup></u>	41,621 <sup>a</sup>	26.8
Sub-Total	749,317	704,085	6.4
PACIFIC			
Oakland	820,218	775,300	5.8
Seattle	803,893	805,084	- 0.1
Long Beach	714,636 <sup>f</sup>	553,709 <sup>f</sup>	29.1
Los Angeles	605,917 <sup>e</sup>	607,362	- 0.2
Honolulu	394,685	261,520	9.2

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Tacoma	125,245	127,176	- 1.5
Vancouver, BC	114,010	132,697	-14.1
San Francisco	109,697 <sup>a</sup>	89,911	22.0
Portland	73,565	79,808	- 7.8
Stockton	6,424	6,524	- 1.5
Sub-Total	3,768,290	3,449,180	9.3
TOTAL	<u>8,970,059</u>	8,653,664	<u>3.7</u>

NOTES

- a Unofficial
  - b Unofficial and excludes private terminals
  - c Laden TEUs only
  - d Conversion from annualized 1st quarter tonnage
  - e Conversion from revenue tons (9.9 tons/TEU)
  - f Fiscal year

SOURCE: Containerization International, July 1983, p. 49 (AAPAADVISORY)

#### The U.S. Stevedoring and Marine Terminal Industry (Executive Summary):

U.S. Department of Transportation Elizabeth Hanford Dole Maritime Administration Adm. H.E. Shear (USN-Ret.) Office of Port and Intermodal Development

#### Preface

This report was undertaken at the request of the National Association of Stevedores to the Maritime Administration (MARAD) for a study of the U.S. stevedoring/marine terminal industry. It was produced by MARAD in cooperation with the association. Technical assistance from the Port Authority of New York and New Jersey and the U.S. Labor Department also is gratefully acknowledged.

This study is consistent with the assigned functions of MARAD's Office of Port and Intermodal Development to assist in the planning, promotion and development of the U.S. port industry to meet the requirements of foreign and domestic waterborne commerce of the United States, and planning procedures to be employed for the utilization of marine terminal facilities in periods of national emergency.

#### **Executive Summary**

The objective of this sudy is to provide an understanding of the U.S. stevedoring/marine terminal industry. This cargo-handling sector occupies a strategic role in the Nation's foreign and domestic trade. It is also a meaningful contributor to the U.S. economy as a generator of employment, wages, and business revenues.

This survey of the industry and its economic impact was achieved by creating a quantitative input-output model.

Two major by-products of the study are the compilation of significant legal cases in Chapter V and the selected bibliography.

#### **MAJOR FINDINGS**

Analysis, using the Regional Port Economic Impact

Model, showed that the stevedoring/marine terminal industry – expressed in 1982 dollars – were responsible directly and indirectly for:

- \$8.4 billion in revenues
- 138,000 jobs
- \$2.5 billion in wages and salaries
- \$1.4 billion in business income
- \$1.0 billion in Federal tax revenues

Because stevedoring/marine terminal operations are vital to the successful conduct of U.S. international trade, it is recommended that:

- MARAD continue to promote and encourage the development of modern management technology at U.S. ports: and
- MARAD and the National Association of Stevedores, in cooperation with other maritime entities, continue their close cooperation in the area of research and development in order to improve the efficiency and productivity of the Nation's waterborne cargo handling systems.

#### 4 Soviet mayors see port, Houston

Houston and Baku, a city in the Soviet Union, have several common interests. Both are oil centers and ports. The two also are sister cities under the U.S. Sister City Program.

The mayors of Baku, Moscow, Minsk and Voronezh, were in the United States recently to attend an international meeting of sister cities in Phoenix, Arizona. The U.S. Department of State helped organize the visit to stimulate trade and cultural exchanges between the United States and the Soviet Union.

During the four days that the group was in Houston, they visited with Mayor Kathy Whitmire and toured museums. They saw famed heart surgeon Dr. Michael DeBakey perform open-heart surgery, visited a western-wear store and inspected the Port of Houston.

Aboard the Port of Houston Authority inspection vessel, M/V SAM HOUSTON, Port Commissioner Howard J. Middleton, J.R. Curtis, director of operations for the Port Authority, and Michael Scorcio, director of community relations and member of the National Sister Cities board, presented the mayors with plaques from the Port Authority and other mementoes commemorating their visit.

Because of large grain shipments, the Soviet Union was the leading destination by tonnage for exports shipped out of the Port of Houston during 1982. Export trade with the Soviets totaled 2,726,961 tons worth \$465,240,138.

Wheat was the leading export, totalling 2,266,212 tons worth \$383,551,047. The other four leading exports were corn, lubricating oils and greases, animal fats and oils, and soybeans.

Imports to Houston from the Soviet Union in 1982 amounted to 56,223 tons worth \$8,971,663. The leading commodity was metallic oxides, 54,056 tons worth \$7,375,926. The other four leading imports were unwrought nickel and alloys, inorganic chemicals, board and wood pulp, and inorganic acids.

(Port of Houston)

## Port of Houston cuts cotton handling charge

The Port of Houston Authority has reduced freighthandling charges for cotton by 12 cents per bale. This reduction, combined with Port of Houston wharfage charges, makes the Port more competitive with other Gulf ports in handling cotton exports.

The current handling charge is 1.72 per bale and the wharfage rate is 30 cents per bale.

The reduction in charges is a signal that a long-term goal of the Port of Houston is to aggressively pursue export cotton business.

Latest figures show that the United States produces 10 million-12 million bales of cotton a year, depending on the success of the harvest. As for 1983, it is estimated that the United States will export 7 million bales.

#### Port's beauty is no accident; MPA workboats clean up harbor debris daily: Port of Baltimore

Baltimore, the only American port with Congressional authority to dredge its harbor channel to a depth of 50 feet, is also one of the few ports nationwide to have its waters cleaned of debris on a daily basis.

The cleanup activities, which are performed by a fourvessel fleet of workboats owned and operated by the Maryland Port Administration, keep Baltimore's harbor aesthetically appealing. More important, the clean-up minimizes navigational hazards to cargo ships entering and leaving the port.

• Over the past four years the fleet has picked up an annual average of 1,706,247 pounds of debris. That comes to over 16 tons per week.

The Port Retriever, Port Recovery, Port Reliance, and Port Labor clean the port from the Inner Harbor to Fort McHenry for up to seven hours a day, five days a week, year-round. The vessels also operate four hours a day on Saturday and Sunday from May 1-October 31.

"The amount of debris is heaviest during the spring and summer because of thunderstorms," says John Poremski, the MPA's manager of marine and environmental services. "The rain washes everything down." The MPA is contracted for weekend work by the Baltimore City government. Weekend cleanup is concentrated on the Inner Harbor area because recreational activity is most brisk there during the warm weather months.

The cleanup operations are held for two primary reasons. First, to provide greater safety and convenience for the thousands of cargo ships which call the port of Baltimore every year. This was the sole motivation behind the MPA's decision to purchase its first cleanup vessels, the Port Retriever, in 1966. While this remains an important goal, it has become increasingly overshadowed by a second concern — keeping waters near the Inner Harbor clean so as to provide a pleasant environment for the millions of visitors who come to Baltimore's most popular tourist attraction annually.

"Originally we were only concerned with cleaning up large debris affecting ships," says Bob Connor, the MPA's chief oil spill coordinator. "Gradually we began picking up small debris at the same time as the port became more of a people place." Carroll Melvin, one of the cleanup fleet's four boat operators, agrees. "Mayor Schaefer wants this Inner Harbor clean," he says.

In fact, responsibility for cleaning up the harbor belonged to the city government until 1966, according to Connor, when the MPA took over the mission. Debris, which had been picked up manually from small boats by two-man crews armed with spears soon became scooped up by the new Port Retriever. The Port Labor was put into service the same year. The Port Recovery was purchased in 1974, and the Port Reliance in 1976.

Today, the Baltimore City government, through its Bureaus of Utilities, Parks and Recreation and Special Services, continues to advise the MPA on harbor cleanup. The federal government also advises the port agency on oil spill cleanup in the harbor.

Art Tittel, Baltimore City's Harbor-master and the person who is responsible for the maintenance of cityowned property around the habor, says the MPA has performed its cleanup task very well and that the city government is happy with the job the port agency has done. "Their people are very responsible and capable. I think they've done an exemplary job. Particularly after storms and rain there is a large amount of flotsam (driftwood) in the harbor and they get this cleaned up regularly," he says. Tittel also advises Connor on oil spills. "I see them (MPA officials) regularly and I know they're doing their job well. They make my job easier by keeping the harbor clean," Tittel says.

Of the four vessels, the Port Retriever and the Port Recovery are retriever class and thus work with just an operator. The Port Reliance and the Port Labor, are labor class vessels and require both an operator and a deck hand. The boats work in teams of two, one from each class. A fourth worker remains at pier 7 where he does maintenance on the two boats not being used. The Port Retriever and the Port Recovery are equipped with maneuverable metal baskets which scoop trash up and dump it into scows hooked onto the sides of both the Port Reliance and the Port Labor.

The Retriever has a lifting capacity of 1,500 pounds. It is 17.5 feet long, diesel-powered and was acquired at a cost of \$26,800 by the MPA from the Liverpool Water Witch Marine and Engineering Company. The Port Recovery has a similar lifting capacity and was purchased from the same company.

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"The Retriever was one of the first vessels of its type ever built," says Poremski. It was also one of the first vessels built by Water Witch. The company had been in existence for only about a year at the time it sold the Retriever to the MPA. The scows on the Port Reliance and the Port Labor can hold up to 9,000 pounds of debris. Rectangular in shape, the scows measure ten feet long and six feet wide.

Most of the port's wastes are indiscernible. "Eighty percent of the debris is found beneath the water line," says Poremski. Most of that debris – paper cups, soda bottles and the like – could just as easily be found in a kitchen waste basket. Occasionally, however, the cleanup boats come across unusual items like bodies (both human and animal) automobile tires, sunken boats and rafts, trees, basketballs, cars, and even the perennial "kitchen sink."

Dislodged pier bulkheads are a common problem. The Port Reliance and the Port Labor wrap chains around these large pieces of wood and haul them back to the pier where the wood is then sawed. A crane truck then scoops up these logs along with the rest of the day's retrieved debris and carries it to a city landfill. "Much of the larger stuff comes from the Patapsco River area," says Poremski. "There are a lot of delapidated piers down there."

(Port of Baltimore)

## Anne Aylward named new maritime director: Massachusetts Port Authority

The Board of the Massachusetts Port Authority recently voted unanimously to approve the appointment of Anne D. Aylward as Massport's Maritime Director. Aylward has served as acting Maritime Director since May, 1983.

As head of the Port Authority's Maritime division, Alyward will oversee the planning, development, operation, marketing, and administration of Massport's commercial seaport properties in the Port of Boston, including Moran Terminal in Charlestown, Conley Terminal, and the Massport Marine Terminal, both in South Boston.

Former Assistant Port Director for Planning and Analysis, Aylward has held management positions in state and local government over the past 12 years, including seven years as a Maritime planner and manager of Massport.

## Jim McJunkin honored for 20 years service: Port of Long Beach

James H. McJunkin, Executive Director of the Port of Long Beach for the last six years and a Harbor Department official since 1963 has been honored by the Long Beach Harbor Commission for his two decades of "outstanding and devoted service". Commission President C. Robert Langslet presented the City of Long Beach 20-year service pin to McJunkin under whose direction Long Beach has become the cargo tonnage leader among all U.S. West Coast ports. "Last year Long Beach handled more vessels and more general cargo, foreign cargo and containerized cargo than any other harbor on the Pacific Coast", Commission President Langslet noted in presenting the City's recognition to McJunkin.

#### Corps of Engineers recognizes Long Beach Port officials

Five members of the Port of Long Beach staff were singled out recently to receive an in-person "thank you" and recognition plaque for working in close cooperation with the United States Corps of Engineers in several harbor related projects. On hand to present a framed pictorial memento to the staffers was Col. Paul W. Taylor, Commanding the Corps of Engineers in Southern California. Shown at brief ceremony during Long Beach Harbor Board meeting are, from left, James H. McJunkin, Port Executive Director; Col. Taylor; Director of Port Planning Lee Hill; Geraldine Knatz, Environmental Specialist and Barry McDaniel, Manager of Master Planning. Charles F. Connors, Chief Harbor Engineer and Deputy Director for the Port was also cited.



#### **3** new Hitachi cranes for APL terminal under construction: Port of Los Angeles

Three of four new Hitachi cranes for the American President Lines Terminal under construction at the Port of Los Angeles' Berths 121-126 stand along one of two 960-foot berths at that site. When the over 100-acre facility is completed in early 1984, it will also contain a 125,000-square-foot container freight station and will accommodate APL's C-9 vessels.



#### Port, Marine Terminal Corp. cement new 5 year pact: Port of Oakland

The Ninth Avenue Terminal - one of three facilities which together propelled the Port of Oakland's market share for northern California steel imports from 56 to 65 percent last year - is the subject of a management agreement approved recently by the Oakland Board of Port Commissioners.

Under the agreement Marine Terminals Corporation, a stevedore and terminal operating company engaged in port operations throughout California, will operate the Ninth Avenue Terminal for a five-year term beginning October 1, 1983.



Marine Terminals Corporation formerly had been operating the facility on a preferential assignment basis.

Commenting on the agreement Particia S. Pineda, President of the Oakland Board of Port Commissioners, said: "The Port's relationship with Marine Terminals Corporation is an excellent example of a private sector, public agency partnership. This management agreement begins a new chapter in what is already a success story for the two organizations."

In addition to the Ninth Avenue Terminal, Marine Terminals Corporation is also the operator of the Port of Oakland's Seventh Street Public Container Terminal.

The Ninth Avenue Terminal is a three-berth, 24-acre facility originally developed in 1929 but extensively modified and expanded over the years. The most recent improvements were completed in 1979 at a cost of \$500,000 and included new, heavy duty paving, additional lighting and upgraded truck access lanes.

The terminal is designed to accommodate a full range of general cargo, including palletized commodity shipments and project-type movements. It encompasses a 177,200 square foot transit shed, more than 72,000 square feet of covered storage area in three other structures and large, open aprons for heavy lift operations and cargo segregation.

#### Lease signed for Port World Trade Center: Port of Tacoma

The Port of Tacoma's long-awaited plans for the development of the World Trade Center Complex moved forward today with the signing of a lease with the World Trade Center Group. The Group is a partnership of three local companies – McGranahan, Messenger and Associates, an architectural firm, the Merit Company, a general contracting firm, and the Riley-Griffin Company, a real estate and development firm.

The estimated \$15,000,000 multi-story World Trade Center will be located on a six-acre site on Port of Tacoma Road, near Interstate 5's main entrance to the Port. The two-phase development plan calls for a minimum of 140,000 square feet of the space for a variety of Port and marine-related businesses. Initial commitments include 22,5000 square feet of space for the World Trade Center and Sea-Land. The complex will also include provisions for banking, a restaurant, and a travel agency. The first phase of the Complex will be ready for occupancy by May, 1985, when Tacoma Terminals will start its operations at the Port. Completion of the second phase will follow shortly thereafter.

The World Trade Center development offers many advantages for the Port of Tacoma. According to Port Executive Director Richard Dale Smith. "This will be the only World Trade Center Office Building in the Pacific Northwest. It gives us the opportunity to bring together a variety of marine-related businesses into one convenient, centralized location. It will allow us to improve our service to our growing number of customers and clients."

With the development of the World Trade Center the Port joins 32 other fully-operating members of the World Trade Center Association located throughout the world. Other World Trade Centers are located in Brussels, Hong Kong, Tokyo, New York, London, Melbourne, and Tel Aviv. The purpose of the Association is to expand international business by fostering the world trade concept. The Port of Tacoma World Trade Center, like its counterparts worldwide, will provide accommodations for domestic and international banking, custom brokers, freight forwarders, importers, consultants, government trade agencies, legal services, insurance brokers, and other segments of the international business community.

## New terminal construction – \$40 million: Port of Tacoma

"With major new facilities being built for both Totem Ocean Trailer Express and Tacoma Terminals, Incorporated, this is a very exciting year of growth for the Port." That is how Port of Tacoma executive director Richard Dale Smith summarized the \$40 million of new terminal construction which the Port is undertaking during 1983.

The construction work, the largest in Port history, will result in three new berths – two new container berths for Tacoma Terminals, and a modern roll-on, roll-off operation for Totem Ocean Trailer Express (TOTE).

According to John Terpstra, project manager at the Port of Tacoma who is working to coordinate the numerous elements of the construction, "Our construction project is really two projects, relocating TOTE to a new Port site and the construction of the Tacoma Terminals facility." TOTE, which offers twice a week shipping services to Alaska, currently leases a 25-acre site from the Port between Sitcum and Milwaukee Waterways. That area will be used as part of the new Tacoma Terminals facility, and TOTE will be relocated on the Blair Waterway. The Port is building modern new facilities for both firms.

Tacoma Terminals, Inc. is a subsidiary of Sea-Land Services, Inc., the world's largest container shipper. Tacoma Terminals recently signed a 30-year lease with the Port on 76 acres of land to be developed into a container terminal. "The facilities," said Ernest Demenna, president of Tacoma Terminals, "are designed to add to the Pacific Northwest a modern, state-of-the-art container terminal operating facility at the Port of Tacoma. The result should be a substantial increase in cargo moving through the Port."

Demenna, who started working with Sea-Land in 1978, had primary responsibility for the design and construction of Sea-Land terminal facilities at Port Everglades, Florida,

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and a major container port at Barbour's Cut, in LaPorte, Texas for the Port of Houston Authority. In 1980 he became Sea-Land's director within the land operations division, having overall responsibility for all engineering and construction projects as well as the worldwide responsibility for all Sea-Land shoreside facilities.

Work for Tacoma Terminals will include the construction of a 1,600-foot-long pile-supported wharf that is 120 feet wide. The marine terminal will consist primarily of parking for over 2,100 container trailers. A marine operations building and marine services building are also included.

The modern design of the facility will offer Tacoma Terminals many advantages, according to Demenna. "The facility has been designed to be constructed in such a manner and according to such plans to enable us to provide services which will eliminate many difficulties currently encountered by terminal operators in older facilities and which were not designed or constructed on the basis of current and anticipated cargo and carrier needs."

The new facility will feature four state-of-the-art 100foot gauge container cranes which are being designed by Tacoma Terminals. "The cranes to be used at this facility," Demenna said, "are a new generation of crane capable of more efficient sustained use and greater lift capacity than most cranes currently in use elsewhere in the United States." The cranes have a productivity rate of 45 moves per hour.

The facility has also been designed with a rail connection for multimodal movements within the terminal area permitting faster movement of containers from vessel to terminal and vice versa. A staging area has also been designed to permit safe and secure grounding of containers within the yard.

TOTE's new facility will cover a 33-acre site on the Blair Waterway, in the southwest portion of the Port's Industrial Yard. Three finger piers and one breasting pier will be constructed on the site.

The site facilities will primarily consist of parking for over 1,100 trailers, refrigeration connections, lighting, and other support for trucking operations. New buildings will include a sheltered entry complex, administration building, maintenance garage, and marine operations control tower.

The total project schedule is 26 months, which covers everything from the initial design effort to moving the tenants into their new facilities. Extensive planning and scheduling has been done to cover all aspects of the construction. According to Terpstra, "The timing on a project of this size is critical. All elements must proceed smoothly for this schedule to be met." The TOTE facility is scheduled to open in June of 1984, and Tacoma Terminals in May of 1985.

When Tacoma Terminals opens, the Port will become the major gateway to Alaska, handling about 80% of the cargo destined for that State. In addition, Tacoma Terminals will increase the Port's total tonnage by two million tons in the first year alone. The Port will move up to sixth or seventh in the rankings of major North American container ports, and up to 22nd place in the rankings of world container ports.

While the TOTE-Tacoma Terminals project is the largest the Port has ever undertaken, it is not likely to be the only one. According to executive director Smith, "The Port of Tacoma has so much excellent land still available for development that we want to see this growth continue in future years as well." (Pacific Gateway)

#### Ten years of traffic: Port of Dunkerque

A survey conducted by the department of Ports and Navigation (French secretariate of state for the sea) shows that overall traffic in French ports rose by 20% between 1977 and 1982 and presents the following patterns by main items:

Oil -17%, refined products +60%, coal +320%, ore +55%, grain +115%, other goods +60%.

As regards the main forms of packing, liquid bulk dropped by 4%, solid bulk rose by 90% and general cargo increased by 60%.

1972 1982 1972/1982 IN-OUT Tonnage (MT) Tonnage Share of Share of % (MT) traffic traffic Ore 9.4 34.3% 8.83 26% 6 % Oil and oil 34.9% 9.55 9.89 30% 3.5% + products Coal 2.05 7.4% 6.47 19% +215 % Sand 1.02 3.7% 0.81 2% Sugar 0.537 1.9% 3% + 87 % 1 Other goods 4.80 17.5% 5.91 18% + 23 % Grand total 27.35 32.91 + 20 %

The chart below shows the trends for Dunkerque.

Noteworthy is the extraordinary increase in passenger traffic (+250%) and which is still rising sharply (+80%) during the first 5 months of 1983). The share taken by coal in Dunkerque's traffic is also truly remarkable. It must also be pointed out that export traffic rose more rapidly than import traffic.

Finally, container traffic made good progress.

#### Number One port for textile imports: Port of Dunkergue

In 1982, 9,433 T of wool were unloaded, compared with 4,468 T in 1981. Thanks to concerted efforts by French partners and shipowners Scancarriers, Australian wool is back (5,629 T in 1982 compared with 564 in 1981). Other countries of origin: Uruguay (2,419 T), Argentina (395 T) and Brazil (227 T) for South America, and Britain (749 T) for Europe.

Cotton imports rose slightly in 1982, mainly from the U.S.S.R. (50,696 T), Togo (2,830 T) and Congo (2,917 T). The Republic of Ivory Coast (9,784 T) and Cameroon (8,027 T) remained at a good level.

Sisal reached 7,133 T, mainly from Madagascar with 4,526 T.

Statistics for the first four months of 1983 show a rise of 10.7% in the overall textile import traffic.

#### Board gives go-ahead to multipurpose bulk centre: Port of Le Havre

At a Board meeting on May 31st the Port Authority gave final approval to the plans for the first stage of the multipurpose bulk centre and authorized expenditure up to 178 million francs, of which 37.2 MF will be provided by the government. The Board is now fully committed and work will begin as soon as the government and the private partners have confirmed that the financial arrangements are operative.

The terminal will consist of a berth 250 m/820 ft long, with one 600 tonnes an hour discharging gantry brought over from the oldest of the present ore berths, one new 1,800 t/h discharging gantry, a conveyor chain with a capacity of 2,400 t/h between the discharging facility and the arrival tower, an angle tower on the quayside and an arrival tower near the CIPHA site.

Following the Ministry of the Sea's provisional approval on December 10th 1982 the usual examination of the technical and operating aspects was made and the process of calling for tenders is now well advanced. The work is included in the 1983 budget of the Directorate of Ports and Shipping.

The terminal will be fully operational in early 1985. The recent decision of the Board is therefore of the greatest importance, as it means that the talking is now over and the work begun.

As we have mentioned before, the operating company, CIPHA (Compagnie Industrielle des Pondéreux du Havre), was set up for the purpose of building and operating a storage and processing centre on the site of the Multipurpose Bulk Terminal, in accordance with the regulations governing the leasing of capital equipment of national importance.

## Hamburg is 9th in world's container port 'Top Ten'

Economic developments have given international oceanborne trade cause to take a deep breath. Increases are not going to be as steep as they were in the past decade. Container traffic, used to a swift rate of increase will now have to be satisfied with smaller rises, and no one knows when, if at all, the old tempo of increases will return. This is a good time to take stock of port affairs, then. What has the "conquering container" achieved?

Let us begin with a few statistics to get some idea of the dimensions involved. In 1981 a good 40 million TEUs were handled in all the world's ports. The figures for 1982 are not yet available. Some ports only make available official figures that are not sufficient for accurate comparison.

Five years ago, in 1977, only 24.5 million TEUs were handled—a 62% increase in this five-year period.

In the course of this period the growth rate lost some of the dynamic it had in the early years. In 1978 container traffic increased 17.5% over the previous year, but in 1981 an increase of only 8.7% was recorded. And in the future there is little hope that the early dramatic increases will be achieved again. Most container growth estimates suggest that container traffic will continue to grow but that the average annual increases will not be more than 9%. Increases will be mainly evident in the ports of the non-industrialised countries. The industrialised countries have already achieved a high level of container development, leaving little room for any spectacular increases in the future.

The important role that the industrialised countries have played in containerisation can be seen from an analysis of the continents or trade routes that were involved in the 40 million TEUs mentioned above. Figures show that 12.6 million TEUs were handled in Europe, 10.6 million in North America, 10.1 million in the Near and Far East, 2.1 million TEUs in Australasia and South Africa and 4.9 million in the Middle East, Africa, Central America and so on.

Europe has held the top position in this container handling list for many years, closely followed by North America. The Near and Far East have recently improved their position considerably and it is possible that in the near future this region will overtake North America into second place.

From the port point of view it is interesting to note that container traffic has tended to concentrate on a limited number of ports throughout the world, although in the five-year period between 1977 and 1982 the number of container ports increased from 150 to 250. Perhaps it should be added here that the ports listed at the end of the 250 do not handle more than 1,000 TEUs per year.

#### The "Top Ten" container ports

Clearly there is a trend towards concentration of container activity, when a closer look is taken at the top ports listed in the 250. The figures show that in 1981 almost a half of the 40 million TEUs representing the world figure, 19.5 million to be exact, were handled by the top twenty major ports. The remaining half of the containers handled total was divided among the other 230 ports.

The "Top Ten" container ports in 1981 were Rotterdam, first, (2.1 million TEUs), in front of New York (1.9 million TEUs). The third and fourth position was taken up by Hong Kong and Kobe, each with 1.6 million, followed by two other Asian ports, each with 1.1 million TEUs, Kaohsiung (Taiwan) and Singapore. After San Juan (Puerto Rico) and Long Beach (the U.S. west coast) comes Hamburg with 900,000 TEUs and Oakland (U.S. west coast again), the last of the "Top Ten".

Hamburg then comes after Rotterdam as Europe's number two container port. Analysing the "Top Twenty" as opposed to the "Top Ten" the two other European ports of Bremen/Bremerhaven and Antwerp would be included.

As container traffic volume has increased and more ports have been included in the sailing schedules of containerised liner services there has, quite naturally, been an increased demand for specialised cargo handling equipment in the ports. This has given the cargo handling equipment manufacturing industry a new market which is even today still a long way from being sated.

#### Container bridges development

According to the "Containerisation International Yearbook 1982" there was at the beginning of 1980 a total of 737 container bridges in operation worldwide and 441 cranes used for handling boxes. By comparison in 1965 there were only nine container bridges in the whole world.

At the beginning of 1980 the world's container terminals operated more than 1,300 van/straddle carriers, 900 forklifts with a carrying capacity of more than 15 tonnes and 330 rubber-tyred gantries. About a third of the container bridges were in operation in European ports.

These figures give some idea of the investment that cargo handling operators have had to make in ports as a result of containerisation. Current price for a containerbridge in West Germany is something between DM 6 and DM 7 million. A van carrier could cost up to DM 1 million, a forklift anything up to DM 250,000 and a rubber-tyred gantry something like DM 3 million.

It can only be hoped that investment in the terminals of this order can be financially worthwhile, even if in the future container development is not so hectic as it has been in the past.

Shipowners are now in a position where through their stalwart endeavours to provide adequate container tonnage they must be having sleepless nights. They now have to face up to the unhappy fact that there is a considerable gap between the container slots they have available and the volume of cargo to be carried.

#### World box fleet grows

Towards the end of 1982 the world's containerships had a capacity for 1.5 million TEUs. By the end of 1984 it is estimated that container carrying capacity world wide will be more than 1.8 million TEUs, an increase of something like a fifth.

An increased carrying capacity of this kind must mean that in the immediate future there will be an even greater discrepancy between cargo volume to be carried and carrying capacities. It is hard to imagine how this increase in slots available can be soaked up even if newbuildings are deployed on routes that are now being containerised or that excess capacity can be answered to some extent by slow steaming or the scrapping of any number of freighters. (Port of Hamburg Topics)

#### More green in the Port needed: Port of Hamburg

Over the past years consciousness has generally grown in the Federal Republic of Germany that many intensively pursued measures are necessary to protect nature, our environment, against the harmful effects of technology and to ward off damage. It goes without saying that in Hamburg this is of inestimable significance also for the Port, which accounts for more than one tenth of the state area.

Senator Volker Lange, of Hamburg's Ministry for the Economy, Transport and Agriculture, explained to journalists in this connection an experts' opinion of the Institute for Verdure Planning at the University of Hanover, dealing with the function of greenery in the port.

"Naturally, we cannot transform the Port into one large park with industrial areas just strewn here and there", said the senator. "But we do want to try to incorporate ecological considerations more strongly and consciously in future in planning than we have in the past." The experts' opinion would make it easier, also in the Port, to achieve meaningful, orderly co-existence between economic and ecological requirements.

Even in the past it had always been part of the work of the Port construction engineers to arrange for the laying out and cultivation of green strips along roads and dikes, as well as for planting the river shore surfaces. The result of this was that the green proportion in the Port was already about five to six per cent.

The experts' opinion now proposes that this share should gradually, and over a long period, be increased to as much as twenty per cent, in order to be able effectively to reduce the burdens on the environment from smoke and exhaust. The opinion has in mind more plants along the shores and roads, the creation of green zones between the industrial complexes, and the retention of agricultural substance during port extension measures. At the same time, it had to be borne in mind that surfaces in the Port are scarce, and altered utilisation would have to be very carefully examined beforehand. (Port of Hamburg Topics)

#### 5 millionth tonne of cargo handled in the Speicherstadt: Port of Hamburg



Warehouse city', Speicherstadt in the Port of Hamburg is actually a paradox. The outer walls of the warehouses reflect designs of another era, but inside the walls there are all the modern facilities associated with cargo handling in ro/ro and containerised traffic. Recently the 5 millionth tonne of high value cargo was warehoused here since the port was rebuilt after the war.

The 'warehouse city', built in 1888, covers an area of 500,000 square metres, the largest warehouse complex in the world. The unique feature of the warehouse space is that it is not on a single level as is usual but is distributed over from five to seven storeys. The metre-thick brick walls give an 'air-conditioned' effect, for the temperature does not vary very much throughout the year.

Merchandise is sorted, marked, labelled, tested, assessed for quality, passed through customs, mixed and cleansed where necessary by the 'Quartiersleute', specialists in warehousing cargo from all over the world. Only in Hamburg port is it possible to find specialists of this kind.

There are 52 'Quartier' firms with approximately 250 personnel -30 of these young people undergoing training - in the complex, usually with the designation '& Cons' in the firm's name. Since the 18th century these firms have

been handling cargo and the box of today is of considerable importance to them. They have moved with the times. Containers are unloaded directly into the warehouses where they are tested for quality, damaged goods being put aside and, if the customer wishes it, a direct claim for insurance is made.

The 'Warehouse city' plays an important role in the facilities available within the Port of Hamburg. Evidence of this significance is shown by the fact that most of the space has been let. Considerable interest has been aroused by the 'Speicherstadt 2000 Project' which involves filling in a part of the harbour basin providing space for the construction of warehousing and distribution facilities.

Proposals to make the Speicherstadt an amusement area with pubs and restaurants and the like have been cooly received by the City of Hamburg and the Quartiersleute themselves, since customs problems aside the protected buildings in the 'warehouse city' have an important part to play in the long list of services provided by the port.

#### Synopsis of 20 prognosis for 1980's: Bremen International

Whereas in the 1980'ies crude-oil shipments will stagnate, or even dip below the 1980 quantity (1.382 milliard tons), the product-tankers can expect at least a 2% cargo increase, in 2nd half of 'eighties. Ore transports (1980: 314 million tons) may look for a 2%-3% rise – as can bulk cargoes; for which an annual increase of 2.5%-3.5% is forecast - with an annual increase of 3% for general-cargo (1980: some 1.1 mrd tons; 1990 some 1.4 mrds) and +4% in the second half of the 1980'ies, after the recession. The short-term prospects for liquid-gas shipments are much better (1980 some 14 mil. tons), with an annual rate increase of up to 10% being anticipated. The share for the container traffic of general-cargo carryings should, from 1980 of some 28, be some 36% by 1990 - rising again by more than 25%. Generally the best forecast concerns the coal trade (1980: some 188 mil. tons), which will about double by 1990, i.e. a some 100% increase.

That is the result of a synopsis of 20 prognoses from scientific institutes, shipbuilding associations, shipyards and consulting firms, etc., which diplomaed politicaleconomist Berthold Volk, of the German Institute of Shipping Economics in Bremen, has just produced in a brochure entitled: 'Seaborne Trade Forecasts 1982/1983 – A Synoptical Review'

## Bremen ports are safeguarding their future

#### The largest container handling facility in Europe was inaugurated

With the inauguration of the northern extension of the Container Terminal Bremerhaven the port of Bremen is safeguarding its competitiveness, also for the future. This was emphasized on August 19th, 1983, to the press by Senator Oswald Brinkmann, politically responsible for the ports, and by Consul Gerhard Beier, Chairman of the Bremer Lagerhaus-Gesellschaft. It was pointed out by both of them on the occasion of a press conference immediately preceding the official inauguration that the demandorientated investment policy practiced up till now had proved to be justified even if the ports of Bremen have not remained uneffected by the present worldwide recession.

The people of Bremen had reason to be proud of the completion of the extension of the Container Terminal Bremerhaven. With courage and judgement the people on the River Weser have built up a high standard of technique, organization and service as prerequisite permitting the ports of Bremen to maintain a leading position in the container business. For this purpose it was necessary to dip deeply into the collector purse. A total of one billion D-Mark was invested by the municipal government and by the terminal operators Bremer Lagerhaus-Gesellschaft into the construction and extension of the container facilities at Bremerhaven since 1968. The result: The largest compact container terminal in Europe, located in a geographically favourable position along the estuary of the River Weser, only a few miles from the open sea.

It is not surprising if the smallest state of the Federal Republic, which is not well-off financially, is placing its stakes on the ports. Every third job, according to reliable studies, depends directly or indirectly on the ports. Bremen, and this includes the satellite town of Bremerhaven, located 60 km down-river does not have a port – it is a port. The special obligation of Bremen to cultivate trade and shipping is even embodied in the local constitution.

Unfortunately, the inauguration is taking place before a background of unfavourable market conditions which are also perceived in the ports where considerable growth figures have been replaced by a retrograde trend since the middle of 1982. The container traffic represents a glorious exception. It remained stable in spite of reduced world trade. Therefore, it is expected that, as in 1982, the container traffic will again reach about 800,000 TEU, or even more, as expected by some forecasts.

A "century investment" of such dimensions, as mentioned by Senator Oswald Brinkmann, can only be reasonably appraised independently of the changing market conditions. It would be essential that Bremen remains capable of satisfying all the requirements of an ambitions worldwide clientele. In addition the BLG-Chairman Consul Beier pointed out that in his enterprise more than 50 percent of the general cargo was containerized, and that this trend would continue.

In Bremen there is confidence, especially after the completion of the extension of the Container Terminal Bremer-



haven, that the ports are well prepared for the challenge of tough competition. This optimism appears to be justified because the ports of Bremen with their organization and technical equipment belong to the most efficient facilities in the world. This efficiency is supplemented by a widespread knowledge of the port industry built up during many years.

In spite of much confidence in their strength the people on the River Weser are not without concern about the present distortions of competition which are detrimentally affecting the cargo flow in comparison with competing European ports. They expect that with regard to the traffic to and from Bremen, and this applies to all German sea ports, they would be treated equally in comparison with other ports, not better, but not worse.

Generally, the picture was optimistic which Senator Brinkmann and Consul Beier demonstrated on the occasion of the inauguration of the northern extension of the Container Terminal Bremerhaven. This also appeared to be the atmosphere prevailing among the more than one thousand guests who attended the ceremony in a tent erected for this purpose, enjoying beer and soup. Everybody agreed with Mayor Hans Koschnick when he concluded his speech with the statement that in spite of all economical problems and worries today there was time to celebrate which should not remain unused.

#### Address by Consul Gerhard Beier, Chairman of the Managing Board of the Bremer Lagerhaus-Gesellschaft, Bremen/Bremerhaven,

on the occasion of the inauguration of the Container Terminal Bremerhaven "Wilhelm Kaisen" on August 19th, 1983

Mr. President,

Gentlemen Members of Parliament, of the Bremische Bürgerschaft and of the City Parliament, Mr. Mayor,

Mr. Lord Mayor,

#### Gentlemen Senators,

dear colleagues in the widest and closest sense, the widest sense meaning collaborators on the project, the closest sense meaning employees of the company, honoured guests from near and far, from home and abroad, Ladies and Gentlemen!

As representative of one of today's hosts, the Bremer Lagerhaus-Gesellschaft, I would like to add my greetings to those of the previous speaker, with equal sincerity and to all present, and then come straight to the point.

Those, who like me have witnessed the commencement of container traffic in the mid-sixties and the start of negotiations in 1965 about calling at the Ports of Bremen, and the success of those negotiations, that is, the first container vessel of an American shipping company in the ports of Bremen, and those who have then repeatedly taken the opportunity these days, even had to take the opportunity to see the Container Terminal Bremerhaven achieve its present dimensions as it officially enters into service, those people cannot remain unimpressed.

The same is true for those who have experienced and participated closely in all the individual stages of this development, which began in Bremen City and led from the Nordhafen to the River Quay and to the Container Terminal of today. This "being impressed" is induced by the conception and the consciousness of the short time in which we realized that in the cargo-handling business our company undertook, the share of container traffic had increased by up to almost 55% from 1966 till today, and thus the business achieved existential importance. There are surely examples in economic history of a comparable rapid development. I have not investigated that. However, in transport, and especially in sea transport, generations yet living certainly have had no experience of a change that can be compared to the present one with respect to its depth and rapidly.

So it is not surprising that in the course of container development up to now, and in future, difficulties cannot be spared for all who are involved in the process. These difficulties simply come from the constraints of conversion originating in the technology and organization of such a phenomenon. These constraints called in question the traditional existential basis of some branches, as often occurs in modern economic history, and at the very least they required and then initiated adaptation processes, and put great demands on the people concerned. It is not to be denied that there have been technical problems here and there, but they were held in check.

That which finally counts, is that in spite of all painful "birth pangs", the realisation was reached, that Bremen and the diversity of the Bremen transport trade, including our company, has to face this development and that, as hindsight has shown to be correct, not in a retarding, but in an aggressive manner.

In the face of the high capital expenditures that were forced on Bremen, which already has a highly developed infrastructure, this aggressiveness, which could not be restricted to its own activities, was and is justified. It could only be carried through politically with the consensus of the sea-transport trade. The development up till today and up to the reason which has brought us here together, has proved this.

From 70,000 tons in 1965 up to 7 million tons a year -

that represents more than half the total amount of general cargo, i.e. 13 million tons, that we handle at present. These figures can only incompletely reflect the variety of international sea-trade markets to which the Federal Republic of Germany is connected, and yet they show that without confidence in this trend, and without the required aggressiveness in the market and with investments, the outstanding position of Bremen in this type of traffic could never have been reached. Today, it is unthinkable that the political authorities of Bremen and the Chamber of Commerce could have denied this development. Thus the most difficult part in view of the realisation of this trend, namely the newly-opened extension, has only been passible because the Chamber of Commerce, led by a number of competent people from the sea-transport trade, could portray persuasively the necessity for this investment in the broader sense. In the face of circumstances that had become incomparably more difficult, the City examined the facts critically and with justification, in order finally to come to a positive decision.

In the history of Bremen and the development of its ports as an instrument of service for Bremen's foreign trade and for that of Germany, the situation has always existed, that Bremen was faced with the decisive question of whether to involve itself with its entire energy it its economic function, that is to say the large projects, up to the limit of financial possibilities. The shifting of port activities downstream, beginning with the building of Bremerhaven in the first half of the last century, the deepening of the Lower Weser as far as Bremen and the construciton of the modern ports in Bremen City in the second half, continuing into the first half of this century, the reconstruction of the installations destroyed in the War, the development of the modern installations on the left bank of the Weser and finally the construction of the largest compact container terminal in Europe to its present dimensions are certainly decisive proofs of a clear-sighted safeguarding not only of its own, but also of the external interests of a community like Bremen.

It would be presumptuous to try and judge the abovementioned various historical points in port development of this city one against the other. Each was of outstanding importance in its own time. We can only try to evaluate in the right way that which presents itself to our judgement from our own experinece.

Here the critical but at the same time confident relations with our employees' representatives, be they works councils or trades unions, proved their worth. The far-reaching change, when one compares the conventional general cargo handling of the old sort and container traffic, has taken place without any disrupting conflicts in the overall development. This was and is not the general case in the world at large, and therefore should not be looked upon as a matter of course.

In this context the statement should be made that the employees of the company and in particular the dock workers, have been willing and able to perform the accommodation process within the organisation, so there was no need to fall back on the personnel of other industries.

I have already mentioned the traditional co-operation of political and commercial interest, as symoblised by the Town Hall and the Haus Schütting. This belongs, however, to the list of special experiences from that time up to the present occasion.

This would not have been possible unless the Chamber of Commerce, based on its close co-operation in fulfilling a service to German foreign trade, had been able to give convincing reasons for this development, had there not been a general consensus. But this also includes attaining the confidence of new clients and old partners for the first time, maintaining this confidence and securing it as valuable substance for future investments through confident cooperation.

Another collaboration, lasting more than a hundred years, namely that with the railway, has proved its worth in all aspects, up to the contribution to capital investment, remarkable by today's standards but necessary, in the railway installations constructed next to the terminal. The German ports in general, including the Ports of Bremen, are linked to a railway-dominated system of in and outgoing traffic, that is, the technically best developed. From this origin in the past a partnership on an economic basis has been founded, which we think has a future, and will only then begin to play its special role.

This statement is not meant to be a devaluation of the other modes of transport in container traffic, especially not of road transport. We are familiar with the complementary function of road transport to the railway system, and our facilities are fitted accordingly. In considerations about incoming and outgoing traffic are included ferry services to the Scandinavian countries and to Great Britain. This factor was taken into consideration in planning right from the start. That it would develop so successfully, was not to be expected.

Until now the forecasts of economic data, on which the construction of this terminal was based, have been realised. In 1983 we can point out a cargo volume which shows that the volume for 1985, projected in 1978, has been almost 90% achieved already. In spite of the effects of the deepest recession for a long time, the growth in the number of our employees in the container terminal is entirely satisfactory, with 1,067 employees compared with the also in 1978 projected figure for 1985 of 1,200. We would gladly have seen the forecast far exceeded. However, given the economic situation in today's world we may be well content if in their main points optimistic forecasts have been realised.

Finally, let me name in the succession of remarkable experiences the readiness of industry to develop with us the technical facilities and equipment, even up to computer programmes, which enable this terminal to be at that high technological and organisational standard required by our clientele.

For giving us the opportunity to gain all these experiences, our special thanks to all who have assisted. Many precisely-tuned cogs had to work together to develop, technically and organisationally, this container volume in such a short time, and then handle it in operation. I hope the thanks of our company will not be looked upon as a routine speech. To be situated at the transition point of sea and land transport and to operate this transition inevitably gives insight into the entire functioning of the system and its complexity, and enables us to appreciate it, so we know that the intensive co-operation and collaboration is not selfevident but deserves thanks.

Finally I would like to work on some thoughts for the future, going on what has been said above. As from the

mid-sixties up till now, nothing is going to fall into our laps in the future either. In this disputed market the greatest effort will still be necessary. And ever less than in the past will the individual or the individual group be able to manage alone the problems arising, whatever they may be. The economic pressures for co-operation for the purpose of optimisation of the entire process will steadily increase. It will be a matter of the fantasy of the individual, but this must be contributed to the overall function of world-wide trade.

The Federal Republic in its state of dependence on foreign trade has to rely on this. It further depends on the possibility for Germany's economy to form and control these functions with all its own available means, that is national ports and national shipping, to avoid dependencies which at some later time could become a hindrance to competition.

But the struggle for the basic conditions for foreign trade and the permanent concern for equal opportunities will also be decisive. Nothing makes more clear the necessity of expressing such a demand than for example the circumstances in the steel industry, with its differing (although forbidden) subsidisation practices, and its distortions of competition to the detriment of German industry. Equivalence in basic conditions in incoming and outgoing traffic has to be established, concerning not only the infrastructure of traffic routes, but also the principles of regulation in the traffic markets in incoming and outgoing traffic with other competitive frontier crossing.

The sea port trade and its services, including this container terminal, offered to the German and international economy is essentially healthy, as has often been said. Everything must be done - in the first place by the seaport trade itself, of course - to maintain this standard of health. Such investments are part of this effort, as is a joint market strategy, especially if one considers the low degree of development in some countries which are the future markets of the industrial nations, and which cannot become accessible without a highly developed transport system.

I close with the optimistic knowledge from Bremen's historical experience, that at all times generations have lived and worked for the future, who knew about the importance of their aims and who did not have less experience in knowledge of the relationships than the generation of the so-called container revolution -I myself prefer the world evolution - and who have always read the signs of their times well. However, this should be remembered at every suitable occasion, so that every reluctance to take things in hand and not leave them to others, is prevented.

After all these justifiably serious words, which are suitable for the inauguration of such a project, let that -I hope - spontaneous cheerfulness come through for the next few hours in each others' company, which all of us who are involved directly or indirectly, have earned. So let us all, at our tables, quite independently from one another and not organised at all, say "prosit !", which literally means "may it be useful !". So in this toast is included everything that we have thought about and wished for on the occasion of today's event.

#### New container terminal at Lowestoft: Associated British Ports

Associated British Ports and the Coastal Container Holdings Group have recently announced an agreement to establish a new container terminal at the port of Lowestoft in Suffolk.

Under the agreement, ABP and Coastal will form a joint venture company, to be called Lowestoft Container Terminal Company Limited, which will operate the terminal. Lowestoft is the UK's most easterly port: situated only 99 miles (160 km) from Rotterdam, it is ideally placed for services to Continental Europe and other routes served by smaller container vessels.

The terminal will be equipped with a 32-tonne capacity container gantry-crane and two rail mounted park-gantry cranes, with a 35-tonne Scotch derrick as a back-up. Rail facilities will be provided and there is capacity available to double the size of the terminal in the future.

Lowestoft is one of ABP's successful smaller ports and handled a record 513,000 tonnes of cargo in 1982. Its location makes it one of the few ports which can service both the Midlands and south-east England on an economic basis.

Commenting on the agreement, ABP's Deputy Chairman, Mr. Donald Stringer, said:

"With its close proximity to northern Europe, Lowestoft has a record of consistent growth in recent years, and this new venture will enable the port to diversify its resources further to satisfy future demand. ABP have an established close working relationship with Coastal at our west-coast port of Garston."

Mr. Kenneth McClelland, Deputy Chairman of the Coastal Container Holdings Group, said:

"Our operations in the past have concentrated on the Irish Sea routes, where we have gained much valuable experience in container handling over the last 16 years. With this new venture, we are expanding our activities to meet the growing demand for specialized container terminal facilities on the east coast."

#### Interim results for first half of 1983: Associated British Ports Holdings PLC

Associated British Ports Holdings PLC, Britain's largest ports business, in its first year as a public company announces a 19% rise in operating profit from  $\pounds 7.9 \text{ m}$  to  $\pounds 9.4 \text{ m}$  for the six months to end-June 1983.

Revenue was £78.5 m (first-half 1982: £76.0 m), and pre-tax profit increased from £1.5 m to £6.8 m. This was achieved after exceptional costs of £2.5 m (1982: £2.9 m) mainly relating to voluntary severance. Earnings per share amounted to 10.7 p.

The directors have declared an interim dividend of 3 p net per ordinary share which will be paid on 9th November 1983 to shareholders registered on 7th October 1983. As indicated in the 1982 annual report, the directors expect to recommend a total dividend in respect of 1983 of not less than 7 p net per ordinary share.

Commenting on the profit figures Keith Stuart, Chairman, says: "I am pleased to report further good progress during the first half of 1983." The Chairman continues: "There was no sign of any overall expansion in Britain's overseas trade in the first half of 1983, but some useful increases were achieved at ABP ports in container traffic, food exports and timber imports. The off-shore energy sector was again an important source of revenue. Our improved results also reflect greater operational efficiency."

The interim report also confirms that ABP's joint venture at Southampton with the C.Y. Tung Group of Hong Kong, Mayflower Container Terminal Limited, has begun operations.

"Our first year as a public company has started well," the Chairman states. "The outcome for the full year will depend in part on trends in UK overseas trading which as yet show no material change on 1982."

#### Ships Information Processing System—A world first: Port of Melbourne

The installation and implementation of the Shipping Information Processing System (SHIPS) computer system will take place during August. SHIPS is designed to provide a comprehensive information bank on all ship movements in the Port of Melbourne.

SHIPS is part of the Port of Melbourne Authority's TRADE-NET, a project which will speed up the flow of information and provide reliable and timely data necessary to increase the efficiency of trade through the Port.

It will involve the recording of all operational activities in the Port as they occur. Apart from all shipping movements, the system will record such details as berths used, ship's agents, ship's status, cargo details and progress of cargo exchange.

#### **Terminals Linked**

The terminals located in the Port area will be linked by tele-communications facilities. The system initially incorporates four display units and a printer at Harbor Control; Victoria Dock and Station Pier will each have one VDU and a printer and three display units and a printer will be located at Head Office. These units will be linked to the computer housed at the World Trade Centre.

#### **Immediate Check**

As SHIPS will be operational 24 hours a day, changes in Port operations can be immediately recorded, enabling PMA Officers to obtain the most up-to-date port situation. Officers at locations connected to the system will therefore be able to immediately check the current Port situation at any time whereas previously there were inevitable delays in disseminating shipping movement information.

SHIPS will considerably reduce clerical effort and work duplication which results from the repetitive handling of shipping movement information.

Another advantage is the comprehensive store of statistics which will be readily available, again eliminating clerical man hours. These statistics will benefit many diverse areas within the Authority such as Accounts, Marketing, Public Relations and the Wharfage Office.

Captain Pat Blamey, an Assistant Harbor Master, who has been involved in the project since March 1980, is enthusiastic over the benefits of the new system. "The current system is very efficient and has worked well for many years", he said. "Any computer system which replaces that must be better than that system. We're confident this system is. From an operations viewpoint, SHIPS will increase efficiency because more information will be available more quickly than before to a wider range of people," he added.

Captain Blamey said the new system had been very well accepted by staff members. Many were ex-service personnel who were already familiar with electronic screens. Everybody involved in the system has been given a familiarisation and training course. The system is extremely simple to operate, as it employs a question-answer method of operation which guides the user. It has a wide-ranging backup system which will ensure the computer functions effectively 24 hours a day.

Discussing the capabilities of the SHIPS programme, Peter Austin, a Computer Systems Officer with the PMA, explained one of the major problems the project team faced was that they did not know of any comparable system in the world operating at the time, and they had the task of developing a new system to meet the particular requirements of the Port of Melbourne Authority. The Authority's team was assisted by computer consultant Mr. John Pawlowski. All computer programmes were written in the PMA's E.D.P. Services Department.

#### Port Users

SHIPS will not be limited to the Port of Melbourne Authority. It is anticipated that other Port operators who are closely linked with Harbor Control will be connected once the system is fully operational. Indeed, a request has already been received from the Port Phillip Sea Pilots. SHIPS could also aid such Port users as tug operators, agents, stevedores and Customs.

By the use of the SHIPS system, the Port of Melbourne Authority will achieve a more rapid, accurate and efficient method of operations control and recording of vessels movements. This in turn will benefit other sections of the Authority, associated Port services and ultimately, all Port users.

#### Pyrmont wharfage redevelopment: Maritime Services Board of N.S.W.

The Maritime Services Board proposes to redevelop the site of the general cargo berths situated at 19-23 Pyrmont.

Preliminary planning and site investigations are nearing completion. An Environmental Impact Statement is being prepared and will accompany a Development Application to be lodged with the Sydney City Council in August, 1983.

The berths were constructed in 1918-19 and are seriously outmoded. They have narrow wharf aprons and restricted stacking areas, while shed storage space is limited.

The Board's proposal is for the existing five berths at 19-23 Pyrmont to be replaced with one 300 metre long general cargo berth. It will feature a 150 metre by 50 metre single-span storage-shed, and 7.9 hectares of pavement with associated drainage and services.

The berth and a wharfshed will be similar to those constructed at Darling Harbour, where the modern No. 4 Berth was commissioned in 1977, and the No. 3 Berth in 1981. The new cargo berth will be specifically designed to accommodate general cargo vessels including stern-quarterramp "Roll on/Roll off" vessels, while some containers will be loaded and unloaded at the berth, as is the case at Darling Harbour.

The modernisation program at berths 19-23 will cost approximately \$30 million, will take about four years to complete, and will make a significant contribution to the general overall efficiency of the Port of Sydney.

Other work to be carried out, at No. 25 Pyrmont, will include the levelling and paving of 8,000 square metres of wharfside area to provide additional space to complement the existing storage shed at No. 24.

Berth No. 25 is currently undergoing structural renewal as part of the Board's ongoing maintenance program. New lighting towers are to be provided at the berth to compensate for the loss of the previous lighting system, which was suspended from the old wharf shed, demolished in 1982.

A description of the proposed improvements will be included in the Board's EIS.

This site will continue to function as a general cargo facility.

#### **Modern Facilities**

The work proposed for the site represents another step in the Board's continuing sequence of major works designed to replace ageing wharf facilities throughout the port and is associated with an obligation to maintain an adequate level of service to port users.

Contrary to some views, seaborne trade through Port Jackson is not on the decline. While the development of Port Botany has allowed some pressure to be taken off Port Jackson, particularly in the accommodation of bulk liquids and fully containerised trades, Port Jackson is still the main cargo port for Sydney and will continue to fill that role.

Over the past 20 years the general cargo tonnage handled through Sydney's port facilities has grown at a rate of about five percent per annum.

While this growth has eased in recent months, due to the worldwide economic downturn, the Board is confident that a similar growth pattern will prevail as soon as world trading conditions return to normal. Port Jackson must be prepared to meet this need.

#### **Ideally Situated**

Shipping activity has occupied the Pyrmont waterfront for more than a century and existing berths at Pyrmont have proven to be ideally situated for shipping operations. In addition to deep water in the vicinity of the berths, the area has excellent rail access.

Pyrmont is the only satisfactory area in Port Jackson available to the Maritime Services Board for provision of additional modern general cargo handling facilities. The ability to make use of the existing rail access at Pyrmont will overcome a deficiency at the Darling Harbour wharves, where connection to the rail system is not possible.

The MSB has set high standards of environmental and ecological control in past developments and will continue to maintain these standards in the Pyrmont area.

The Board's concern for the environment is typified in the landscaping and beautifying of Clyde and Munn Reserves at Miller's Point; development of 28 hectares of recreation and open space along the foreshores of Botany Bay; the Iloura Reserve at Peacock Point at Balmain, and many other like developments.

A portion of the Board's land overlooking the port at No.'s 19-23 Pyrmont will be landscaped and will then be dedicated as a public amenity.

#### **Traffic Study**

A traffic study has been commissioned by the Board to accompany the environmental impact study and the Pyrmont development application, when each are forwarded to the Sydney City Council for consideration.

Elsewhere in Port Jackson, further improvements are in train.

The White Bay wharves will soon be recommissioned for general cargo "Roll on/Roll off" trade, following a recent development consent granted by the Leichhardt Municipal Council.

Glebe Island will continue to function as a container terminal.

Sydney is a focal point for the future development of industry and commerce in the State of New South Wales.

Viable port facilities are essential if the port is to continue to meet demands being constantly generated by modern shipping trends.

The modernisation of the Pyrmont berths will ensure continued efficient handling of cargoes through the port and will help maintain Sydney's position as one of the world's great trading ports.

(PORTS OF NEW SOUTH WALES)

#### New deepwater shipping channel for Queensland coal trade: Transport Australia

The Federal Government will spend \$1.2 million this financial year and \$4.3 million next year on constructing marine navigation aids to mark a new major shipping channel through the Great Barrier Reef.

The channel, to be known as Hydrographers Passage, is located North-east of Mackay, and will reduce the sailing time from coal ports near Mackay to Japan by about 17 hours each way. This is estimated to reduce shipping costs by about \$7 million a year. It will help make coal shipments from North Queensland more competitive on international markets.

The Bureau of Transport Economics has determined that the investment in navigational aids on Hydrographers Passage is clearly justified on economic grounds.

Construction of three stainless steel light-towers required for the project is expected to employ 50 people.

The cost of developing Hydrographers Passage will be recovered through light dues levied on the commercial shipping industry.

It is estimated that the new passage will be completed in late 1984.

## South Australia's shipping chief to retire: Department of Marine and Harbors



Mr. John Griffith

South Australia's Minister of Marine, Roy Abbott, has announced the pending retirement of one of the State's leading public service administrators, the Director-General of Marine and Harbors, John Griffith.

Mr. Griffith will retire on September 23 after 42 years in the Public Service, broken only by WWII service as an RAAF wireless/air gunner in Australia and Europe between 1943 and 1946.

The Minister said Mr. Griffith's service had been distinguished not only within the State, but at the national and international levels. He is currently a Vice President of the Association of Australian Port and Marine Authorities, as well as an alternative director for Australia in the International Association of Ports and Harbors, and Australian ports representative on the National Trade Facilitation Committee.

"In particular, government in South Australia during the past 20 years owes much to Mr. Griffith's administrative and organisational abilities, chiefly through his work with the former Public Service Commissioner's office, the Public Buildings Department and the Department of Marine and Harbors", the Minister added.

"John Griffith (pictured) began his career carrying a messenger's bag for the old South Australian Harbors Board in 1941, but rose quickly to play an increasingly effective role in the broad reorganisation of government departments post-war. As Deputy Director of the Public Buildings Department between 1973 and 1976 he was managing an organisation which he had helped to expand and modernise, and was then called on to undertake the major task of helping formulate and of implementing the new and more aggressive stance of South Australia on the national and international maritime shipping and trade scene", the Minister said.

"As permanent head of the Department of Marine and Harbors since 1976, Mr. Griffith has brought the department forward into the tough realities of the world's shipping and trade marketplace, and has helped forge links between government, private industry and unions which I believe are quite unique in the Australian experience", Mr. Abbott said.

"In the areas of international sea law governing such things as maritime pollution control, Mr. Griffith has not only established one of Australia's leading maritime units within the department, but has considerably enhanced its standing internationally".

The Minister said the present Deputy Director-General, Mr. John Jenkin, would serve as acting Director-General until a permanent appointment was made. Looking back at a hectic working schedule, which will remain so until September 23, Mr. Griffith said there were two things which surprised him continually – one was the goodwill and unstinting effort of people who understood their working aims and were given the chance to use their initiative; the other, the positive achievements possible as a joint effort of government, industry and unions, in the absence of outdated preconceptions and confrontation.

"While I value the opportunity I have had to contribute in the world and national maritime area, and all I have learned from my interstate and overseas port colleagues, I feel especially privileged to have been involved in the very critical campaign to restore South Australia's shipping links", Mr. Griffith said.

"Unfortunately, Australians have little appreciation of how their everyday life is influenced very considerably by the strength or the weaknesses of shipping services between them and the rest of the world. In South Australia, our economy hinges very much on the efficiency of our sea links, for both imports and exports. These links were cut by the vast technological change of containerisation in the late 60's and early 70's, and restoring them is not only extremely difficult, but absolutely essential.

"Oddly enough, while governments are often blamed – sometimes rightly – for the dilemmas the community faces, in South Australia we have had a series of bold government initiatives in the shipping area which have not only enabled us to begin regaining lost ground, but have genuinely amazed the very hard-headed people in the shipping industry. I think I can say, too, that the formation of the South Australian Shipping User Group, a joint effort between the department, the Chamber of Commerce and Industry and by major importers and exporters has been an outstanding example of how South Australians stand together when the challenge is issued.

"Governments of all political persuasions have declared the shipping campaign a bi-partisan issue because of its importance to the State economy, and this has been the keystone of our success", the Director-General added.

"Above all, of course, it is vital that this effort is maintained, despite its complexities and frustrations, for the South Australian port system stands at the centre of our future growth program, in the industrial sense, as well as in relation to shipping. Over many decades, we have reclaimed large areas of land in the Port of Adelaide for use by port-related industry. We are envied by major ports around the world for this facility and the current marketing of these estates internationally should also continue as a matter of State priority", Mr. Griffith added.

"Finally, I would point to South Australia's excellent record of industrial harmony, both within the port system and the community at large. This hasn't been achieved by accident", he said. "It has been my experience that unions respond strongly, given a sense of partnership and rational discussion when problems arise. Anything we achieve in future will depend on that mutual respect continuing". Mr. Griffith is a Fellow of the Australian Society of Accountants, of the Chartered Institute of Secretaries and Administrators, the Royal Institute of Public Administration, the Chartered Institute of Transport, and of the Australian Society of Senior Executives.

A Rotarian, his chief relaxation is golf, but he also plans to study Japanese at University level in his retirement.

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#### Port of Kitakyushu introduces Port Companions

On July 15, appointed by the Port of Kitakyushu Promotion Association were five young ladies, out of some 111 candidates, "Port of Kitakyushu Companions". It is expected that they were to attend port related events and ceremonies, including first call ships to the Port, visitors from overseas countries and many other civic events involving port.

As if to cerebrate the introduction of them, Port of Kitakyushu received several new ships within a week following the appointment, and on July 27, Companions attended a welcome reception held by the Port of Kitakyushu for seventeen participants from fourteen different countries who had visited the Port on a port study seminar organized jointly by the Japan International Cooperation Agency and the Ministry of Transport.



Port Companions on board "Kikuchi", an inspection launch of the Maritime Safety Agency. L to R: Miss N. Kojima, Miss K. Moriyama, Miss M. Taira, Miss Y. Inoue and Miss M. Nagano.

#### Japan's first LNG carrier enters Nagoya Port



Japan's first Liquefied Natural Gas (LNG) carrier, the Bishu Maru, arrived in the Port of Nagoya on August 31 to discharge LNG from Indonesia.

The 280-meter long,100,000-ton vessel is jointly owned by Kawasaki Kisen, Nippon Yusen and Mitsui O.S.K. and is the first of seven carriers scheduled for completion by the end of 1984 for the Japan-Indonesia run.

Japan is the world's largest LNG importer and last year

accounted for 17,454,000 tons of total world imports of 23 million tons. It started importing LNG in 1969, when it bought 53,000 tons from Alaska. Since then the volume has increased annually and the sources of supply have been widened to include Brunei, Abu Dhabi, Indonesia and Malaysia. Of these, Indonesia ranks first and last year provided 9 million tons, or half of Japan's total imports.

Japan began studying the possibility of building its own LNG carriers after the first oil crisis, as part of its policy to reduce its oil-dependence and obtain stable energy supplies. However, because of the high cost of the vessels (¥30 billion each), nearly a decade elapsed before the plans became a reality.

## Port of Yokohama named to preserve a tall-ship "Nippon Maru"

On August 31, 1983, Hon. Takashi Hasegawa, Transport Minister, received a recommendation made by a specially organized 9-experts' council for the future utilization of the trainer sailing ship "Nippon Maru", indicating that she should be preserved at the Port of Yokohama.

"Nippon Maru" (2,279 grt), built in 1930, has been so popular among the Japanese people, nicknamed as "Swan of the Pacific" for her elegant shape, that many port cities throughout the country had been wishing to keep her when she was off commissioned due to age. Yokohama City, one of the first such municipalities which proclaimed to preserve her, staged a series of campaigns since 1972, including the collection of as many as 830,000 signatures of citizens and supporters.

Mr. Michikazu Saigoh, Mayor of Yokohama, appreciating the Council's recommendation in the name of the citizens and supporters, disclosed that she would be preserved afloat in a stone-made dock, one of the oldest ones, created in 1897 by Mitsubishi Heavy Industries' Yokohama Shipyard, as a main feature of the City's water-front area redevelopment project called "Minato Mirai – 21st Century (abbreviated as MM-21)", meaning the Port Future in the next century.



Nippon Maru at the Port of Yokohama

#### More muscle power for ports: Port of Kelang

Port authorities in Malaysia have been given increased powers with the latest amendments to the Port Authorities Act 1983. The 11 amendments to the Act, passed by Parliament in late March, amongst other things, empower a port authority to:

- detain and enforce a lien on a vessel for offences other than unpaid port charges
- board vessels where offences under the Act have been committed
- levy charges for lay-up facilities for vessels
- levy charges for services rendered to firms, individuals other than ships
- impose interest charges on outstanding accounts.

The existing provision limits the power to detain vessels only in respect of port charges not paid by any vessel. However, there have been occasions when the amounts not paid relate to matters other than port charges, for example, penalties for damage to port property. The amendment now gives power to the port authority to detain or enforce a maritime lien on a ship for other monetary amounts which do not fall within the ambit of port charges

Similarly, a new provision has been introduced to empower the chief executive of the port authority or any other authorised officer to board a ship where offences under the Act or its subsidiary legislation have been committed or about to be committed. This provision provides for penalties in instances where authorised officers have been denied access to the ship.

Another provision is the levy of charges for laying up facilities for ships. There are occasions when ships are allowed to stay in port to carry out repairs but there are no specific provisions in the present Act to empower raising of lay-up levies against ships for this facility.

One other amendment allows the Authority to levy charges not only for services to vessels but to persons other than vessels, e.g. provision of fire and ambulance services during emergencies at neighbouring buildings not belonging to the port authority.

Port users who are slow in settling their accounts will find it more costly to owe money to the port. The new provision empowers the port to impose interest charges on outstanding accounts to cover the administrative costs involved in dealing with such accounts.

Finally the Minister concerned may, by order published in the Government Gazette, extend the functions, powers, duties and jurisdiction of one authority to another port. Where Port Kelang is concerned, the KPA will be able to extend its jurisdiction to the port of Malacca by means of a ministerial order. (WARTA LPK)

#### Big turnout at SIKON seminar: Port of Kelang

About 150 people from the shipping, forwarding, haulage and manufacturing sectors were introduced to the new online system for container operations at a seminar held in Kuala Lumpur.

The objectives of the seminar was to brief port users on the SIKON project and its effect on container operations. SIKON is the Bahasa Malaysia acronyn for container information system. Papers for the seminar were presented by the electronic data processing manager Encik Tan Hee Loke, project manager Encik Leong Yee Seng and project member Encik Adnan Bujal. The papers presented covered:

- KPA's computing facilities
- services and facilities under SIKON and
- the impact of SIKON on port users

Participants were also given the opportunity to seek clarification on the new system in an hour-long panel session, chaired by the chief commercial officer, En. Raj Sathivale which attracted more than sixty queries from the participants.

In his keynote address, the Director General Encik Hashir Abdullah described the introduction of the SIKON project as the beginning of a new phase in the port's evolution.

He outlined the benefits to be obtained by port users under the new system and the various implementation stages which are expected to be completed by the end of this year.

Full text of the Director General's keynote address is as follows:

#### Keynote address by the Director General Encik Hashir Abdullah at SIKON seminar

Ladies and gentlemen, container operations at Port Kelang is about to come full circle – And this seminar you are attending is the final step towards that achievement.

The beginning of the circle started on the morning of August 5, 1973 when Port Kelang received the first third generation container vessel thereby ushering in the advent of containerisation in this country.

In its first 5 months of operations, the container terminal had a turnover of just over 13,300 TEUs. In its first full year of operations i.e. 1974, throughput was nearly 42,000 TEUs. This upward trend has been the norm since then as containerisation gathers momentum and each year sees Port Kelang handling an ever increasing throughput. Last year's throughput was again a new record -157,231 TEUs.

The port has come to the stage where nearly a quarter of its total tonnage is containerised.

This year we expect to handle approximately 170,000 TEUs and by 1985, an annual throughput in the region of 220,000 - 250,000 TEUs is expected.

We have the facilities, we have reserved container handling capacities which can be readily converted for such purpose. We have the personnel for the tasks ahead of dealing with an ever-increasing container turnover.

However, with a throughput of over 150,000 TEUs annually, there is a limit to the level of operational efficiency the container terminal can achieve by the present manual system.

Speed is the essence of container operation especially when container turnover is high. The time has come for Port Kelang's container operations to go on-line, more so when at this level of throughput it has become quite impractical to manually register, record and execute the multifarious activities involved.

This is not to say that our present system is so inadequate it is no longer tenable. After all this was the system which launched Port Kelang into container operations and which has served us for nearly 10 years now with little major hitches. But the fact remains: it is a manual system – which means less productive utilisation of human and capital resources. It also possesses certain inherent weaknesses which are potentially serious stumbling blocks to a higher level of efficiency.

To give some examples, whilst container tracking is possible, it is time-consuming. Furthermore, manual production of statistical, accounting and management information is a tediously long process. Then again, excessive document flow between various operational units may result in loss of these documents.

In spite of these inherent weaknesses, we have managed to deal adequately with the large volume handled through the years. However, that does not indicate we are sitting smugly and doing nothing about improving the system.

Being aware of the need for computerised operations and also of the rather long lead time required to gear ourselves towards the demands and discipline of computerised container operations, this on-line project was initiated about three years ago when container throughput had reached the level where computerisation – which requires a high level of utilisation to be economical – is now feasible.

We are now on the threshold of operating a computerised container handling system. Within a decade we have now completed the circle - from the introduction of containerisation to computerised container operations.

We have given our new system a simple name, SIKON, the Bahasa Malaysia acronym for Sistem Informasi Kontena. As some of you might have already known, SIKON is based on the port of Liverpool's Container Information Control System or CONICS, but modified to suit local requirements.

Now you may well ask how the implementation of SIKON will improve operational efficiency and hence benefit you as port users accordingly. I shall leave the details to the officers who will be addressing you this morning. Suffice for me to describe briefly the salient features of SIKON.

The benefits to be obtained from the computerisation of container operations lies in the computer's capability:

• to not only handle a large volume of work but also to handle it speedily and accurately and

• to aid existing manpower to increase productivity.

These are capabilities we have to exploit to meet the objectives of our on-line project namely:

• to maximise usage of resources by eliminating delays due to problems of communications, speed of documentation and inadequate flow of management information,

- to minimise administrative cost,
- to improve security, and

• to provide instant and accurate information on container movements.

Now what does this translate into in actual operations at the terminal?

Basically the new system will see complete automation of:

- tracking of container boxes,
- receiving and delivering,

• documentation, and

• information for port users

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One of the benefits to be obtained by port users is the immediate provision of operational information. In practical terms you need not wait for our staff to go through files for information not carried by the T-Cards. Particulars of ships, and location of LCL cargoes, for example, can be obtained within seconds at the push of a few keys of the Terminal's video/printer units.

Another benefit of direct impact on port users will be a better control and organisation of container yard operations. This, in effect, means faster loading/discharging operations as well as the minimizing of double-handling or restowing.

To put it in a nutshell, because SIKON is a real time system it enables us to have a much tighter control of operations at the terminal.

Information is transmitted immediately and continuously to the relevant officers and with this information readily available these officers are able to assist you without any delays in clearing your cargo.

A port container information system is an expensive, complex and fairly new application.

It not only requires highly specialized and experienced computer and traffic personnel but also a well organized system to cater for as much as possible all exceptions which may arise out of the routine. We have the kind of personnel mentioned just now and we do not anticipate any major hitches. But as with all new systems, caution is the better part of valour.

In order not to disrupt normal operations, SIKON will be applied in stages. The first stage involves a pilot run to be followed by application only on export containers.

The second stage will be SIKON's application on the tracking of empty containers whilst the third stage will involve bringing import traffic into the system. Full implementation of SIKON therefore is expected to be achieved by the end of this year.

However, that is not the end of the SIKON project. We are looking into other possible applications e.g. local tracking of containers for shipping companies, ship planning for shipping lines, access to information in SIKON for Customs, hauliers and operators, and other areas of applications which of course will have to be thoroughly researched into before any concrete decision is made.

Very soon we will be approaching a decade of container operations in Port Kelang. We will then be embarking onto a new phase of containerisation where computers will play the lead role. The Kelang Port Authority is confident of its ability to play a vigorous, innovative role in this new stage of the port's evolution. I have said it before, so bear with me if I say it again: no man is an island, entire of himself; we need each other. We are all cogs in the wheel. New facilities, new applications of technology, can work only if the human element is geared towards the application of such technology.

So let us work together for our mutual benefit. Port Kelang will evolve into a port we can all be proud of and you as port users can accordingly benefit too.

(WARTA LPK)

#### Good six-month trading result: Auckland Harbour

The Auckland Harbour Board achieved a 'very satisfactory' financial result for the first half of the trading year to 27 March, the Chairman of the Finance Committee Mr. T.J. O'Dwyer said at the Board's May meeting.

The port working account surplus of \$1.49 million was \$288,034 above estimate for the period.

Trade tonnage was 2,745,446 (imports 1,941,339, exports 804,107) which was 8.06% less than for the same period last year. This included container tonnage of 721,488 which was only slightly less than last year.

#### Modernization of Devonport Wharf: Auckland Harbour

A scheme plan to modernise Devonport Wharf was adopted by the Auckland Harbour Board at its May meeting and is now subject to approval by the Maritime Planning Authority.

The scheme is estimated to cost \$686,400 and involves removing a large section of the wharf and providing a new covered pedestrian walkway. A new toilet block and launch steps will also be built.

The Board's Chief Engineer Mr. B.R. Le Clerc reported that the scheme proposed to retain and repair the present berthing section of the wharf on the south side and a narrow linkage to the cargo wharf for pedestrians. The remaining section warranted demolition to avoid the high cost of renovation.

Shelter for the numbers of passengers using the ferry service did not demand a building as large as the present one, he said. Most of the present building would be demolished and a new pedestrian way provided along the west side of the cargo wharf approach.

#### Brief analysis: Port of Singapore

- The five PSA Gateways and Jurong Port handled a total of 16.9 million freight tonnes of cargo between Jan and May 1983. This was a decrease of 1.1% over the tonnage for the corresponding period in 1982.
- General cargo amounted to 14.8 million tonnes of which 7.3 million tonnes, or 49%, were shipped in containers.
- Bulk cargo declined from 2.5 to 2.2 million tonnes, or 12.9%, from Jan to May 1983.
- A total of 530,600 TEUs were handled during the past five months of this year. Of the total, 89.4% or 474,200 TEUs were handled at the Tanjong Pagar Container Terminal (TPCT).
- Containerised cargo handled at TPCT reached 6.5 million tonnes for these five months, a substantial 15.9% increase over the same period last year.
- Total containerised cargo handled by TPCT and the conventional wharves amounted to 7.3 million tonnes, an increase of 12.8% as compared to Jan to May 1982.





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