

PORTS and HARBORS

JAN.-MAR., 1966 Vol. 11, No. 1

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Upper Part of Glasgow Harbour Showing Prince's Dock in Foreground

THE INTERNATIONAL ASSOCIATION OF PORTS AND HARBORS

Introducing The Crests of Ports

(Each Issue One Port)

THE PORT OF WELLINGTON





Aerial View of Wharves and City.

PORTS and HARBORS

Jan.-Mar., 1966 Vol. 11, No. 1

PORTS AND HARBORS is quarterly published by the Central Secretariat of the International Association of Ports and Harbors as an official journal of the Association, to provide its members with information concerning port and harbor developments in the world.

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-Know then by face -

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From the Central Secretariat

Port and Harbor Training **Course Opens**

Aimed, as a phase of the technical cooperation scheme under the Colombo Plan in South and Southeast Asia and other international technical cooperation schemes, at Republic of China contributing to the improvement of port and harbor engineering in developing countries as well as to the promotion of mutual friendship and understanding among them, the Third Group Training Course on Mr. Ayyaswamy Ayyar Port and Harbor Engineering was opened in Tokyo with ceremonies on January 18 for 10 participants from nine countries with the attendance of Dr. Hajime Sato, Director, Port and Harbor Bureau, Ministry of Transportation, Mr. Mr. Changiz Wojdani Moghadam Tsutomu Nomiyama, Director, Overseas Technical Cooperation Agency and other guests.

The session was organized by the Japanese Government and the Technical Cooperation Overseas Agency in cooperation with the International Association of Ports and Harbors and includes lectures, free discussions and field trips to major ports and industrial plants in the districts of Tokyo, Nagoya, Osaka, Kobe and Kyushu. Lectures are given by experts from the Ministry of Transportation. The official language of the session is English.

The participants include:

Mr. Alfredo Jorge Budant Port Technical Director, Paranagua Port Administration, Brazil

Mr. Maung Hla Maung

Chief Engineer, Board of Management for the Port of Rangoon, Burma

Mr. Ta-Lung Lin

Civil Engineer,

Design Work of Deep Water Wharves & Port Planning for the Kaohsing Harbour Extension

Project Republic of China

Mr. Su Chi Fu

trv.

Engineer, Fishery Bureau, Ministry of Agriculture and Fores-

Mr. Alfonso Villera Manager, Port of Cartagena

Colombia

Ananthakrishnan Technical P.A. to Development Adviser, Ministry of Transport India

Chief of Contract Department, Ports and Navigation Organization, Iran

Mr. S. O. Ayodeji Civil Engineer, Nigeria Port Authority, Nigeria

Mr. Reynaldo N. Aberin Senior Civil Engineer, Bureau of Public Works, Port Area, Manila, Republic of Philippines

Mr. Said Ahmed Shash

Director of Works, Suez Canal Authority, United Arab Republic

Port and Harbor Seminar **Club Grows**

The Port and Harbor Seminar Club was formed by its participants on the occasion of the First Seminar on Ports and Harbors held in October 1961 in Tokyo with the object of promoting mutual cooperation, friendship and understanding among its members.

members all of whom are still on the membership roster. Currently members are 131 representing the ports in Africa, Asia, Middle and Near East and Latin America.

Meetings by Correspondence of Board of Directors

In accordance with the provisions Sec. 39, Art. IX and Sec. 46 (c), Art. XII, the following meetings by correspondence were called: Executive Meeting On amendment of By-Laws -Nov. 1, '65 Board of Directors Meetings On amendment of By-Laws ---Dec. 2, '65 On membership application —Dec. 17, '65 On ,, -Jan. 19, '66 General Meeting On amendment of By-Laws —Jan. 3, '66

Executive Committee Meets in Los Angeles

At the call of our President Lord Simon, the Fourth meeting of the Executive Committee was held in Los Angeles, Calif., U.S.A. from 13 through 16 February 1966 when the Committee members delivered on many important matters details of which are given in the February issue of our monthly "IAPH International News Letter.'

Visitor to Tokyo

On his way to Singapore, Mr. John D. M. Luttman - Johnson, Greenbush, Mass., U.S.A. who is a member of International Association of Ports and Harbors and United Nations Adviser on industrial port development to the Singapore Government visited Tokyo on February 3 when Mr. Gaku Matsumoto, Secretary General, IAPH When founded, the Club had 19 talked with him about many matters.

FORUM ON PORT PROBLEMS

Containers in the Oversea Trade

By W. H. Brotherson

President, The Maritime Services Board of N.S.W., Sydney

The distance between Sydney and London is about 12,000 miles. It is more than 4,000 miles from Sydney to Tokyo and New York is separated from Sydney by about 10,000 miles. These are just a few examples which indicate that Sydney, in common with the other ports of Australasia, is about as far removed from the world's major market places as is possible.

Because of these great distances it has always been thought that the possibility of introducing containerised traffic would be remote and, even if it be achieved, it would be a very gradual process.

The thinking, based on studies of containerised services in other parts of the world, has been that containers are likely to be an economic proposition only when there is a two way trade and when the containers are full both coming and going.

When an analysis is made of overseas cargo being loaded or discharged in the Port of Sydney—and the Port of Sydney may be regarded as being typical of Australian capital city ports—it is seen that there is a great diversity in the type of cargo handled and in the ports of origin or destination. This is a factor which has always been regarded as a likely barrier to the introduction of containerised trade and has, in fact, contributed greatly to the thought generally expressed that a great number of problems would need to be overcome before effective use could be made of containers in the overseas trade passing through Sydney.

Containers are, of course, used fairly extensively in the Australian coastal trade and, as in other ports of the world, the trade is expanding rapidly. In this service, however, the problem of back loading, although it exists, is by no means as serious as would be thought to be the case when the long hauls such as have already been mentioned between Australia and its main overseas markets are involved. In the latter case, the problem is amplified to such a degree that one is bound to fall into line with the widely held views that a number of major problems will require close study before the successful introduction of such a service.

In recent times, however, the shipping community in Sydney has become container conscious and the Board has become aware of an upsurge in interest so far as the introduction of this traffic is concerned. It has been proclaimed publicly that a consortium of British shipping companies has been constituted and is at present engaged in the final analysis in connection with the introduction of this trade into the Australian service. In addition, investigations are in train, and indication sare that these are of a concerted nature, in connection with the provision of a container service



Mr. W. H. Brotherson

between Sydney and various ports in Europe and the United States.

Recently, a paper was delivered at a conference in Sydney by Sir Alan Westerman, Secretary, Department of Trade and Industry, entitled "The Importance of the Australian Seaport to Australia's International Trade". In this paper, Sir Alan discussed the various impediments to the speedy handling of cargoes in the Australian ports and suggested, among other things, that a possible remedy could lay in a rationalisation of shipping services by the various companies engaged in the trade between Australia and its overseas suppliers and purchasers.

Sir Alan pointed out that, although the various shipping companies making up the Conference Lines liaised to a large extent, this co-operation could go a lot further and they could arrange for the redeployment of vessels on a single fleet basis. In this way, arrangements could be made for a ship loading in, say, London, with cargo for four or five Australian ports, to load a full cargo for only one port and similar co-operation at the Australian end could ensure that a ship be loaded in one Australian port for the return journey to London.

The problems to be overcome in adopting a system such as that proposed by Sir Alan are numerous but, at the same time, there would

(Continued on Page 11)

ROTTTERDAM-roll-on ROTTTERDAM-roll-off

Magnate for North-West Europe

By C. M. L. Roozemond

For untold centuries, sailors have had to depend upon sails and winds. Even to-day, many sailors think that a man who does not know how to sail cannot be a proper navigator, and in shipping circles new ideas are always looked on suspiciously at first. Historical conservatism? Perhaps such conservatism has always been inherent in shipping; this may have been a good thing too, since neither winds nor waves have ever obeyed man-made laws.

Yet, all the ancient wisdom contained in "wait and see" seems to be increasingly ignored by an ever growing number of North Sea shipping companies. Their new ambition is known in all North Sea countries as "roll-on-roll-off" - a transport system based, as a matter of fact, on one of the Allied Forces' most powerful trumps during World War II. The landing-craft enabling the Allied Forces to land vast quantities of men and equipment without the amenities of any properly equipped modern port, turned out to be adaptable to commercial purposes.

The initiative is British. The war-time landing-craft pioneer cautiously began to adapt the same system to carry goods from the Thames to Antwerp. He started with a converted British Navy landing-craft, and as soon as he had shown this method to be feasible for various kinds of cargo, and after having included the Port of Rotterdam to prove his point more convincingly, he continued with vessels specially built for this job. The Transport Ferry Service operates a fleet of blue-funnelled ships now regularly sailing up and down the Nieuwe Waterweg, and soon found other compaines following suit. The North Sea-to keep to this busiest of all seas-has seen the appearance of an ever increasing and ever expanding number of roll-on-rolloff service. These ships open their bellies in ports one side of the sea, allow heavy trucks and trailers to roll on and drive inside, next, the boats sail across to a port the other side of the sea, and all the trucks and trailers just drive off, right into the heart of the Continent. And vice versa.

New services already scheduled

A quick survey last spring revealed about a dozen new roll-onroll-off services being planned in England and Scotland alone, meant establish links with to continental ports in France, Belgium, the Netherlands, West Germany and Scandinavia. Even a direct service from Southampton to Vigo and Gibraltar in Spain is being considered. The Port of London Authority agreed to the expenditure of £800,000 (over two million dollars) for the construction of two new berths at Tilbury Docks, and at that time a big project was already

nearing completion at Felixstowe. Hull's Port Authorities were equally alert to the possibilities and agreed to build a roll-on-roll-off base for a powerful combination of British, West German and Dutch shipping companies, a scheme viewed with much more than routine interest by Weymouth and Aberdeen.

Purely from a business point of view, and quite unbaised, it is, therefore, correct to state that new developments are taking place in British Coast ports, bound to be of considerable interest to Rotterdam, especially so since TFS were first to discover the advantages of a rollon-rool-off centre on the Nieuwe Waterweg.

Special character

Noordzee Veerdiensten (North Sea Ferries), the new international combination mentioned above, is soon to start its Hull-Europoort service with two ultra-modern ships. Even without being a prophet it is easy to prophesy that roll-on-roll-off traffic via Rotterdam is bound to become really big business in the near future.

There is something very odd about this new mode of transport. One of the basic rules for its success happens to be that the actual crossing time of a roll-on-roll-off vessel does not matter much—provided these ferries can manage the crossing within one night. The best paying route, provided the ferries can cross during one night, is not even the shortest, but the longest. Owners of traditional shipping companies would soon go bankrupt if they adhered to this principle. But this just shows the very special character of the roll-on-roll-off ferry system. Provided ferries do not lose any daylight, they make most money for their owners. Said differently: the most profitable route is that which takes all night to cross.

Let's take the Hull-Rotterdam-Europroort service as an example. Say, a Liverpool Works has to delivery heavy engines to Basle as quickly as possible. Soon after noon, the engines, loaded onto a truck and trailer, leave the plant. The driver arrives at Hull just in time to drive his full load aboard the ferry; he has a proper meal aboard, sleeps all thorugh the night, arrives at Europoort next morning at 8 a.m., drives his truck and trailer off the ferry and, with a bit of luck, he can manage to deliver the goods in Switzerland that same day.

Rotterdam strikes the balance

This is not just theory. During the preliminary stages of the formation of the North Sea Ferries, schemes likes the above played an important part. And the fact they turned out to be feasible made the company decide upon Rotterdam for its continental base, since Rotterdam strikes the balance between sea and land transport. What good would a much shorter crossing be with hours to wait at a French or Belgian port for the customs to clear their cargo?

Similar services can, of course, be organized for other ports, apart from Hull and Rotterdam. The Tilbury-Rotterdam service enjoys the same advantages-for the time being still centred at the Merwehaven, but soon to be based in Europoort as well. TSF owes part of its success to this very arrangement; and the Felixstowe-Rotterdam v.v. service is building its future success on the same amenities. What's sauce for the roll-onroll-off goose in cases like Hull, Felixstowe and Rotterdam, will soon turn out to be sauce for the grander

of many more British ports, and so we may well expect a vast new roll-on-roll-off development for the Nieuwe Daterweg.

Plans ...

In general, and especially in the case of this transport system, it is desirable not to lose sight to present and future facts. Some people maintain that there are no limits to roll-on-roll-off traffic, and that it will assume such proportions that all shipping on the seven seas is bound to feel the pinch. The Sea Land Service in the United States is already considering similar plans for trans-atlantic traffic. Just recently Holland-America Line announced plans to start a service between Rotterdam and New York with roll-on-roll-off type of ships in 1967. And what about the plans based on the float-on-float-off system for mammouth ferries, built to carry fully loaded lighters across the ocean?

... and more plans

Even railways are included in these plans. "Via Port of New York", a publication of the Port of New York Authority, disclosed plans for a special container train scheme-TERRE: Trans-European-Road-Rail-Express ---- to start its service this year between North European ports (Rotterdam and Antwerp are being considered), and the ports and industrial centres of Italy. Goods are to be loaded in be "Flexi-Vans", containers to transferred directly from the ship to the train. This means traffic across sea and land of merchandise, packed in a kind of giant cake tin before the, start of its jorney, only to be unpacked after having arrived at its destination.

For the time being, however, back to roll-on-roll-off...

Roll-on-roll-off demands special kinds of cargo and this is bound to apply too for float-on-float-off traffic: general merchandise, and only goods demanding quick road transport and capable of sustaining the latter. The special nature of the cargoes was one of the reasons that made it possible for North Sea Ferries to start last year. By joining forces, it was found possible for each of the companies partaking, to combine smaller suitable cargoes to form a big enough load for this new method.

North Sea services to and from Britain too demand special cargoes. There are plenty of goods to be shipped to the Continent, and plentv of raw materials to be shipped to Britain. But most raw materials are hardly suitable for roll-on-rolloff vessels. Then, customs officials in our ports have been instructed. and have learned to handle incoming goods with ever greater speed, but British companies still seem to complain about delays at the customs, sometimes lasting many days. This too is one of the reasons why at present the most favourable development is expected for the flow of goods to the Continent.

Yet success seems sure. The roll-on-roll-off pioneers know pretty well what they're about since 1945 experience has shown that they are obviously backing the proper (sea) horse.

They are so convinced they will succeed, that they are sure they will be rolling on and rolling off even if and when the Channel Tunnel will have become a fact. For crossing the tunnel too will cost money, and anyone having to take a heavy load from Liverpool to Basle is sure to take the shortest route. Especially so when, by choosing the ferry, you can do half the trip asleep and, moreover, avoid driving a heavy truck and trailer for hours on end along England's busiest roads, a strenuous and exhausting job...Rotterdam-Europoort seems to be ideally suited for these new types of transportation. They need large marshalling yards in order to expedite goods and Rotterdam's new port areas has such extensive sites available. Moreover, Rotterdam-Europoort is situated at the frontdoor of the Rhine and its hinterland making it possible to cut turn-round periods to a minimum. Recently the national minister of transportation announced that work on the Massvlakte project to develop a bit of North Sea into port and industrial sites will be speeded up. It sounded like music in Rotterdam ears. (reprinted from "Rotterdam quarterly")

Clyde Port Authority The First of the New United Kingdom Esturial Authorities

By James P. Davidson

General Manager Clyde Port Authority Glasgow

On 1st January, 1966, the port and navigational facilities of the River Clyde came under the unified control of a new organisation, the Clyde Port Authority. This body takes the place of the constituent Authorities previously in control of affairs on this famous Scottish river, viz. Clyde Navigation Trust, Greenock Harbour Trust and the Clyde Lighthouses Trust, which three bodies were dissolved on the setting up of the overall control.

The Clyde Port Authority has under its jurisdiction an area of more than 300 square miles of water extending from Glasgow to the Isle of Cumbrae in the Clyde Estuary and is responsible for the administration of the ports and harbours, the lighting and conservancy of the river and adjoining lochs and may shortly assume control of the Pilotage Authority.

The Board of the new Authority consists of 15 persons representing Shipowners, Chambers of Commerce, Civic Authorities and Trade Unions giving a broad base on which the users of the Port are adequately represented.

The first Chairman, Mr. Alister G. McCrae, who is the Senior Partner of Messrs. P. Henderson & Company, Shipowners, Glasgow, has expressed the Authority's aims for the future as, "the complete integration of the existing activities,



Mr. James P. Davidson

the preparation of a development plan covering the whole region and the provision at the earliest possible date of more modern facilities to match the increasing requirements of bulk cargoes, containers etc."

The setting up of the new Authority is the culmination of reports and discussions which have gone on for many years, the most recent of which was the Report of the Rochdale Committee arising out of which the Harbours Act. 1964, was born. The Clyde Authorities were able by themselves to rrange for the amalgamation of their interests within the broad concept of the Harbours Act and indeed the Clyde Port Authority is the first estuarial Authority to be



Meadowside Quay, Glasgow, with artist's impression of proposed new berth No. O. to the east.



King George V Dock, Glasgow, with artist's impression of proposed new basin superimposed.

set up in the United Kingdom since the passing of the Act. There is no doubt that the unified control of this world famous shipping area and the tremendous potential which the River Clyde has for future development will lead to greater efficiency in cargo handling with quicker turnround of vessels and a consequent increase in trade.

Although large scale development to provide these more modern facilities will be undertaken as a matter of some urgency, the existing provision is by no means unsatisfactory. The port and harbours are concentrated in the Upper Reaches at Glasgow, near the centre of the City and at Greenock, on the Lower Reaches, near the world famous anchorage of the Tail of the Bank.

UPPER REACHES

The port installations and facilities at Glasgow are an integral part of the vast industrial and commercial area of central Scotland which has a population of over four millions. Glasgow's four commercial docks, riverside quays and wharves extending to a total length of quayage of over 11 miles, are equipped with excellent crane and transit shed facilities and served by first class road and rail connections. The docks are tidal, the tidal range being 12 feet at high water and the depth varies up to 44 feet. In addition the Authority's transit depots comprising seven sheds each 500 feet by 100 feet provide, in total, some eight acres of covered accommodation for the handling, sorting and storage of imports and exports. Each year the tonnage of vessels using the port exceeds 14 million tons and over 7 million tons of cargo are handled over the quays.

Apart from general cargo the principal commodities imported are iron ore, timber and grain, while iron and steel manufactured goods, machinery, whisky, food preparations and motor vehicles are among the main items of cargo in a total export figure of 2 mililon tons.

As befits the main distribution center for Scotland's import traffic, the Clyde's facilities for the rapid discharge of gain, iron ore and timber are among the most modern provided at any port in the United Kingdom.

The Authority's Granary at Meadowside Quay, affords storage capacity for 100,000 tons grain which will be increased to 180,000 tons when a new £1.5 million extension presently under construction is completed early in 1967. The Granary is equipped with nine travelling quay-side suction elevators to permit simultaneous discharge from three vessels and under optimum conditions a discharge rate

of over 1,200 tons per hour can be achieved.

Vessels with cargoes up to 20,-000 tons drawing 31 feet are regularly handled at the Granary.

Iron ore discharge facilities are located at General Terminus Quay in the heart of the City and also at Rothesay Dock, Clydebank, some six miles further down river. 28,-000 ton cargoes are handled regularly at the ore discharging plant at General Terminus Quay where two transporters each of 600 tons per hour discharging capacity ensure a fast discharge. The average bulk iron ore carrier is discharged in less than two days, the highest rate of discharge being achieved when a cargo of 14,000 tons was discharged in ten hours at an average rate per transporter of 693 tons per hour.

Timber cargoes are handled mainly at Shieldhall Riverside Quay and at King George V. Dock. The former is a recently constructed quay, 1,000 feet long, with a depth alongside of 32 feet M.L.D.O.S.T. The quay is equipped with three in number 6-ton and two in number 10-ton electric travelling cranes and adequate rail facilities are also provided for the speedy discharge and handling of timber cargoes. Immediately adjoining the quay is the Shieldhall Timber Yard covering an



Interior of transit depot, Glasgow Harbour.

area of six acres. The breast of the quay and the timber yard are paved in concrete to permit modern mechanical timber handling and stacking equipment to be used throughout. There is in addition two acres of shed accommodation for the storage of valuable timbers and veneers. A second timber yard, located near Prince's Dock, Glasgow, extends to $5\frac{1}{2}$ acres—two acres of which are covered.

In addition to being the main centre of distribution for Scotland's imports, the Clyde is the nautral outlet for the export of manufactured goods from Scotland, the North of England and Northern Ireland, with their combined population of almost 10 millions.

Forty-four cargo liner companies operate regular services from the Clyde to most parts of the world and there are approximately 1,000 foreign sailings each year.

Much attention has been focussed on the need for modernisation of the general cargo berthage and facilities in United Kingdom ports in order to effect the fastest possible turn-round of cargo liners. The National Ports Council's Interim Plan for the Ports of Great Britain, published in July of last year urged the United Kingdom Port Authorities to abandon the older berths in use, to concentrate traffic at a smaller number of modern berths and to utilise more extensively the facilities and cranes at those berths.

During the past twenty years the sum of almost $\pounds 10$ million has been spent on modernisation and new developments on the Clyde in-

cluding a new 50,000 tons capacity extension to Meadowside Granary; timber discharge facilities at Shieldhall; new sheds at King George V. Dock and Prince's Dock and new electric quay cranes at Queen's Dock. Capital works at present under construction include the provision of 22 new electric general cargo cranes at Prince's Dock to be completed by 1968 and the new 80,000 tons capacity extension to Meadowside Granary, to which reference has already been made, should be in operation in 1967.

This process will be continued and accelerated under the new Authority. One of the first items in the plans for development to be carried out over the next five years is the construction of a new general cargo berth at Meadowside Quay at a cost of almost £2 million. Meadowside Quay at present comprises four berths. Berth 1 is a modern general cargo berth completed in 1962/63-it is 600 feet long and is equipped with five in number 6-ton cranes. To the west of this berth are the granary berths 2, 3 and 4. The new berth, to be known as Berth "0", will be constructed to the east of Berth 1. It will be 1,000 feet long and will have a dredged depth of 28 feet at L.W.O.S.T. New electric general cargo cranes and a shed 600 feet by 200 feet will be constructed to serve the new berth. The plans and construciton should be started very shortly for completion within about two years.

The new Authority's plans for concentrating cargo liner facilities into a more compact and economic unit is in keeping with the recommendations of the National Ports Council. The most ambitious scheme and one which has been under serious consideration for some time is the proposal to construct a new dock to the west of the present King George V. Dock at Shieldhall. The new dock, estimated to cost £12 million will provide ten new general cargo berths with crane and shed facilities. The Authority owns land to the south of the site of the proposed new dock which extends to some 100 acres and this would be an admirable site for the construction of an inland storage depot for container traffic.

A further scheme of development on the Clyde in which the Clyde Port Authority and Messrs. John Brown & Company (Clydebank) Limited, the famous shipbuilding concern, have a joint interest is a proposal to straighten the channel at Clydebank and permit the construction of three large docks with capacities for building and drydocking vessels up to 260,000 d.w.t., 1,200 feet long, 180 feet beam with light draft of 371/2 feet. The plans also include the construction of two new iron ore discharging berths each 1,000 feet long with depth of water initially for 45,000 d.w.t ore carriers and eventually for 65,000 d.w.t. vessels. This excellent plan would serve a double purpose-it would enable the Clyde to compete in the world market for the construction of super tankers and bulk carriers on terms comparable with other modern shipbuilding countries and secondly, while the present ore discharging plant is extremely efficient and adequate for today's requirements it seems certain that the larger ore carrier of 45,000 d.w.t./65,000 d.w.t. will eventually be found to be the most economic, and suitable berthage facilities will be necessary. The total cost of this project is estimated at £25 million.

LOWER REACHES

At Greenock, on the lower reaches of the Clyde, the principal import is bulk sugar, for two refineries situated in the area and some quarter of a million tons are imported annually. This is the principal Scottish port for sufar imports and indeed ranks third in the United Kingdom after London and Liverpool.

Other imports are oil seeds and molasses. Bananas are imported and distributed to Scotland and Northern England from this area and the import of tobacco is steadily increasing.

The nearness of this part of the Port Authority's Undertaking to deep water makes it attractive for future development and active consideration will shortly be given to a scheme of development providing nearly 5,000 feet of deep water riverside berths with some 50 acres of ground immediately behind the berths and supported by adequate roads and rail facilities to serve them. The cost of this port development is estimated a $\pounds 8\frac{1}{2}$ million.

The Clyde is, of course, world

Containers–

(Continued From Page 5)

be obvious advantages accruing from the successful introduction of such a system.

Perhaps the greatest advantage of such a system could be derived from the introduction of containerised cargo handling in conjunction. For instance, it appears obvious that the difficulty of two way loading of containers would be minimised under a plan such as that propounded by Sir Alan Westerman. At least the concept of a consortium of British shipping companies to handle a big portion of the trade between Britain and Sydney in containers is a move in that direction. There seems to be a trend also that there will be minimum ports of call for container ships, some of the cargo of such ships being distributed to adjacent less important ports by other means of transport — rail or road or perhaps even interstate steamers.

In recent years, exporters and importers alike have suggested that the Port of Sydney should be redeveloped and the Maritime Services Board has concurred, substantially, in this famous for its shipbuilding activities and some of the finest shipyards are situated on the upper and lower reaches of the river. Names like John Brown & Company (Clydebank) Limited who built the Queen Mary and Queen Elizabeth, Fairfields, Lithgows of Port Glasgow and Scotts of Greenock spring readily to mind and these and the other shipbuilding concerns have kept abreast of modern requirements by expending considerable sums on developments to ensure that their shipyards are among the best in the world.

The shipbuilding industry is supported by modern shiprepairing facilities and one of the world's largest dry-docks has recently been constructed on the lower reaches of the river. This new dock, the Firth of Clyde Dry-Dock is 1,000 feet long with an entrance width of 150 feet and can accommodate vessels up to 150,000 tons deadweight.

From the above it will be obvious that the Clyde has held its place in the world's ports over the years but the inauguration of the Clyde Port Authority will provide the impetus to greater endeavour in the future.

For the first time in history one Authority will be able to take an objective look at the whole river and its estuary and determine developments where can be provided most economically to serve the port users.

It is therefore in a spirit of pride in the achievements of the former constituent authorities and with complete confidence that the trade and commerce of the Clyde will expand more quickly in the future that the Board of the Clyde Port Authority look forward to the way ahead.

suggestion. In fact, a redevelopment programme has been in the course of preparation for some time and, the first stages of its implementation are already in hand. It is expected that this programme will be made on the construction of a number of new berths.

It is, perhaps, ironic that the Board has profited by the delays which, although unintentional, prevented the redevelopment programme being put in hand earlier. The works now contemplated have been planned in broad principles and it will be possible to design the various berths in such a way that they will be suitable for use in handling containers should the need arise. It could well have been that jetty type structures on piles could have been built and that the acceptable wheel loading potential so necessary when handling containers may not have been provided. As it is, however, the Board's plans provide for the reclamation of the waterways, in some cases, to the maximum extent compatible with navigational requirements, to allow of ample level land at the rear of the berths for the manoeuvring of vehicles such as those which would

be used should container services be introduced and the wharf decks will be strengthened sufficiently to accommodate the wheel loading which could be imposed.

The actual methods the shipping companies intend to adopt if and when the container trade is introduced to Australia's overseas imports and exports have, as yet, not been made clear and probably they are still in the formative stage but it appears obvious that current thinking will bring about revolutionary changes in handling methods in the various ports of New South Wales coming under the jurisdiction of the Maritime Services Board of N.S.W. so far as a great deal of the cargo handled is concerned.

Concurrently with the handling of cargo in containers one must contemplate that general cargo will still be handled in conventional ships and these ships will be catered for. There is no doubt, however, that the pattern is changing and the near future will bring with it a new order so far as overseas general cargo is concerned and those who thought the obstacles to be insurmountable will see a large amount of overseas cargo handled in containers.

The Port of Wellington Blessed With Natural Advantages

By G. E. Fisher

Secretary Wellington Harbour Board New Zealand

Wellington Harbour, or, as it is still occasionally called, Port Nicholson, contains an area of about 20,-000 acres, having depths varying from six to fourteen fathoms. The anchorage is good throughout, and the harbour, being landlocked, provides safe shelter. The entrance to this magnificent sheet of water is ample, exceeding in its narrowest part 3,600 feet, and having a depth varying from 7 to 8 fathoms, with a deepwater channel 1,000 feet wide entering into the harbour. The current in the entrance never exceeds 2 knots, and the rise and fall of the tide varies from 2 feet 6 inches to 4 feet 6 inches.

Possessed of many natural advantages in its large and sheltered area, easy access, and sufficient but not

excessive depth of water, the Harbour of Wellington is the most favoured in New Zealand. Its central geographical position on the waterway between the North and South Islands, united with the splendid accommodation and facilities afforded to shipping, combine to make it the chief distributing Port of the country. Being the nearest port in New Zealand and Australia to Panama, it is a convenient port of call for oversea vessels passing through the Panama Canal for or from the United Kingdom, Europe, America and Canada.

The seaward limit of the harbour is the arc of a circle of three nautical miles radius, having its centre on Outer Rock, and running from Fitzroy Bay in the east to Island Bay in the west. The foreshore within the harbour limits extends for approximately 41 miles.

The Wellington Harbour Board was constituted on 1st January 1880 under the Harbours Act and a special Act of Parliament. In February 1880 it took over from the Railway Department the Railway Wharf and adjacent breastwork at Waterloo Quay. In October 1881 it acquired from the City Corporation the Queen's Wharf and Bonded Warehouse. From these small beginnings it has progressively developed the Port and administered its affairs. The present board consists of fifteen elected members, representing a large harbour district.

The area served by the Port extends over a large portion of the



View of Aotea Quay, with Road-Rail Ferry Terminal in foreground and Overseas Passenger Terminal in right background.



The new Roll-on Roll-off Berth for the Wellington-Lyttel ton service, nearing completion.

Tawa & Porirua 74,330 438,280

Within the metropolitan area and in the surrounding districts of the Port of Wellington are located many of the principal manufacturing industries of New Zealand. The growth of the Port is reflected in the steady development of secondary industries within easy reach of port facilities and, during the last twenty years, this industrial expansion has been particularly marked in the Hutt Valley area situated about eight miles by road or rail from Wellington. This area is admirably suited for light and heavy industries. Industrial concerns established there include, motor assembly plants, oil-tank installations, meat and preserving works, woollen mills, and factories dealing with tobacco, timber, cordage and twine, soap and candles, porcelain, metals, a wide range of foodstuffs and large railway workshops. The Board has recently completed a large reclamation of 108 acres which has considerably augmented the area of flat land available to industry. About four miles by level road from the centre of the City, and in proximity to the Miramar and Burnham Wharves in Evans Bay, are a gas-works, an electric power station, oil-tank installations, bitumen plants, brick and pipe works, timber yards, and a number of other concerns requiring easy transport facilities and a conveniently placed Port outlet.

The Board is empowered by statute and by-law to regulate the movements of shipping in the harbour to regulate the use of docks, wharves etc., to levy dues and charges on shipping and goods for the maintenance of the harbour and the provision of facilities for ships and goods, to license ships trading within the harbour and fix fees for such ilcences, to fix pilotage rates and regulate the conduct of pilots, and generally to carry out the provisions of the Harbours Act within the limits of the Port.

Being a public body whose objects are the providing of efficient shipping and cargo facilities and the encouragement of trade at the cheapest possible cost for all services, the Board has framed its charges with a view to producing only such margin of revenue over working expenses as will suffice to cover standing charges and provide a reserve fund for contingencies.

The approaches to the harbour and the channel entrance are clearly marked and buoys and beacons with automatic flashing lights provide adequate leads for entering the Port in perfect safety by day or night. Pilotage is compulsory within that portion of the Pilotage District attached to the Harbour of Wellington lying northward of a line drawn 090° from Gordon Point through Hope Shoal Beacon to the eastern shore for vessels of more than 100 tons and masters of vessels on entering or leaving the Port are required to employ a duly qualified Pilot for their vessels unless the Master of the vessel holds a pilotage-exemption certificate. Pilots are employed and licensed by the Board. The pilot launch meets incoming vessels in the optional area of the pilotage waters which extend to a distance of three miles seaward from Outer Rock of Barret Reef. The pilot launch is not normally on station and vessels requiring the services of a Pilot are required to give 24 hours' notice by radio of their time of arrival in the pilotage waters. A radiotelephone system enables communication to be established between the pilot launches, the signal tower at Pipitea



Passenger liners "Sydney" and "Oronsay" berthed at the Overseas Terminal. In the right background is Lower Hutt City and the Hutt Valley.

Wharf, the outersignal station at Beacon Hill and approaching vessels. The pilot launches "Arahina" and "Tiakina" are fitted with the latest radarnavigational equipment.

Tugs are seldom required by vessels for berthing at or leaving from the wharves. Two privatelyowned ocean-going salvage tugs are available for general towage work.

A duty is placed upon the Board to see that the harbour is kept free from pollution of any kind. The Board takes a serious view of any escape of oil into the harbour and in order to ensure that the strictest precautions are taken on vessels, continual vigilance is necessary.

The Signal Station situated at Beacon Hill (440 feet) on the western side of the harbour entrance is connected by telephone with the Board's Offices in the city. The station maintains a continuous listening radio-telephone watch and vessels can also communicate by International or Morse codes. The station is equipped with a very powerful telescope.

The signal tower, situated at the south end of Pipitea Wharf, is used to signal to vessels the berths allotted to them and to communicate with vessels approaching or using the anchorage. Equipment for morselamp flashing both day and night is installed in the tower. The tower also maintains a radio-telephone listening watch.

The P. & O. Orient liner "Canberra" (45,270 gross tonnage) is the largest merchant vessel to visit Wellington and was berthed at Aotea Quay Breastwork. The deepest draught vessel to enter the Port was the Cunard liner "Aquitania" (44,-786 tons gross) drawing 36 ft. 9 ins., which was safely accommodated at Pipitea Wharf.

Conveniently situated to the main streets of the City, the Board has ten City wharves with almost continuous breastworks and sea-walls extending over $2^{\frac{1}{2}}$ miles of the waterfront. The total lineal berthage is 27,875 feet with depths of water alongside at low water varying from 16 feet for coastal vessels, to 41 feet for overseas vessels. A total of 21,854 feet is used for commercial purposes (excluding Oil Berths) at city and suburban wharves and 8,481 feet is linked up with the railway system. Accommodation at oil berths totals 2,450 feet and other berths at city and suburban wharves not used for commercial purposes amount to 3,571 feet. Wellington has the reputation of being the easiest and safest port in New Zealand for the handling and berthing of large overseas vessels, and the deepest draught merchant vessels that have worked a New Zealand port have been accommodated at the main wharves. Ample depth of water is maintained at the wharves by a self-propelled grab hopper dredge which has a capacity of 200 tons of spoil.

Fresh water, electric power, telephones and a garbage removal service are available to shipping.

The Board undertakes the storage of goods, the examination of goods

and the warehousing of bonded goods.

On the City wharves and adjacent breastworks are thirty-seven stores with a total working storage capacity of approximately 81,615 tons. Two of the largest stores, constructed in reinforced concrete, are Store No. 49 on Aotea Quay (647 feet long and 100 feet wide) with a working storage capacity of 9,000 tons, and Store No. 37 on Pipitea Wharf (758 feet long and 107 feet wide) with a working storage capacity of 8,000 tons.

Seventy-seven overhead electric travelling cranes are installed in the principal stores. These high-speed electric cranes have lifting capacities of from 30 hundredweight to 5 tons. A number of cargo-handling sheds are fitted inside with 15 hundred weight hydraulic jiggers which are handy for stacking cargo and unloading vehicles.

Four electric wool presses are installed in the wool stores.

At convenient intervals on the wharves there are 40 movable hydraulic quay cranes varying in power from 2 to $2\frac{1}{2}$ tons and 12 electrically-operated quay cranes of 3 tons capacity, capable of commanding both road and railway line and adaptable to the loading and discharging requirements of vessels.

At the northern end of Aotea Quay a coal berth is equipped with 6 electrically-operated $4\frac{1}{2}$ -ton grabbing cranes each having an average discharge rate of 50 tons per hour, the coal being delivered to road and rail transport through 4 sixty-ton self-propelling mobile hoppers.

A floating crane with a lifting capacity of up to 80 tons, is available for heavy lifts.

The Board also operates 30 mobile cranes with capacities of from 3 to 25 tons and these are used mainly for the stacking and delivering of cargo in outside storage spaces. To supplement these mobile cranes the Board operates 20 fork-lift trucks which are particularly useful in discharging fruit, sugar and similar commodities which the vessel is able to discharge in complete lines.

Four weighbridges of 20-tons capacity are installed in convenient positions at the city wharves.

Wellington is the only Harbour Authority in New Zealand which provides facilities for the dumping of wool for export to overseas markets. During the year 1965, 310,765 bales of wool were shipped from the Port, and of this number 173,455 bales were pressed in the Board's Stores. Four of the large stores Nos. 21, 27A, 29 and 39 are equipped with modern electric double presses capable of dumping up to 100 bales per hour. These stores are kept very busy during the wool season, particularly over periods following the local wool sales when upwards of 30,000 bales come forward for dumping from the various brokers. Gangs of waterside

workers are engaged to carry out the dumping work and incentive payments are provided for these men according to throughput.

Special facilities for the expeditious handling of bulk cement are provided by a private company. The plant, which has been planned for fast and efficient handling of cement, includes six silos of a total holding capacity of 6,000 tons. The buildings adjoining them house the machinery which includes applianances for delivering cement in bulk to road or rail transport, and a machine for bagging. A vessel capable of pumping 150 tons of cement per hour has been specially built by the Company for the purpose of delivering the cement to Wellington from the Company's works at Tarakohe, situated in the Nelson district of the South Island.

Silos capable of storing 3,500 tons of bulk wheat, situated at the north end of Aotea Quay, are provided by a private company. The system of discharging the bulk wheat from the ship to the silos is by means of a conveyor belt and pneumatic suction plant designed to handle 100 tons of wheat per hour. Up-to-date bagging plant is provided by the Company and a railway siding is laid to the silos to facilitate distribution of the wheat both in bulk and in bags. The installation is also equipped to cater for the requirements of distribution by means of road transport.

The Port of Wellington is favourably situated as a transhipping centre. Vessels passing to and from Australia and desirous of making one call only in New Zealand find that the cargoes for other New Zealand ports can be distributed in an economical and expeditious manner from Wellington.

The uninterrupted lay-out of the Wellington Wharves, with connecting breastworks, is particularly suitable for the movement of goods by tractor and trailers and a large volume of transhipments and other goods are handled by this means. Being easily manoeuvred inside and outside the stores, the tractors are able to shift goods economically and efficiently. They are also used extensively in the work of receiving goods from vessels. The Board's fleet of these vehicles used in the handling of cargo consists of 44 tractors and 579 trailers.

For the safe and convenient handling of petrol and fuel oils in bulk, the Board has provided special berthage accommodation with ample depths of water. At Point Howard on the eastern side of the harbour, the Board has established a wharf for the purpose of berthing oil tankers supplying petroleum and lubricating oil by pipe line to the storage tanks of oil companies situated in the nearby Hutt industrial area. The depth of water here



M.V. "Aramoana" entering the Road-Rail Ferry Terminal. On the left is the floating dock with Aotea Quay right centre.

is ample to accommodate the fully loaded oil tankers at present trading to the Port. Burnham Wharf, located at the eastern side of Evans Bay, also caters for the requirements of the oil industry. Situated adjacent to this wharf on land leased by the Board are special tanks and equipment operated by a private company for the receiving and distribution of bulk bitumen and allied products. At the Dock Mooring Wharf, in the City area, there is another oil berth, and pipe lines extend from this berth to tank storage at Kaiwharawhara.

In Evans Bay is also situated the Miramar Wharf which is connected by pipe line to oil-supply tanks in close proximity. This wharf, the Burnham Wharf and the Dock Mooring Wharf can accommodate deepdraught vessels, and fuel and diesel oils for bunkers are held in ample supply for delivery, either direct, or by means of oil barge to vessels berthed at the City wharves if the vessel does not desire to shift for bunkers.

In accordance with the trend in modern sea transport the Board encourages the use of cargo containers both as stevedoring equipment and privately owned containers specially designed for specific products. Most of the shipping lines in the coastal trade have introduced the use of containers as ships' equipment and a concession is made in the wharfage charges to encourage this means of packaging and forwarding goods. The most apparent advantages are the reduction in packaging costs, less risk of damage or pillage, door to door delivery of the goods, the elimination of intermediate handling and a reduction in wharf labour costs. A concession in wharfage charges is also given to privately owned containers.

Increasing use is being made of pallets particularly for homogeneous types of cargo. The Board owns and operates a fleet of fork lift trucks to cater for cargo shipped in this manner. Here again savings in cost can be achieved where a number of small packages can be strapped together on a pallet. The Board charges wharfage on such units at the ordinary general cargo rate.

Wellington is the North Island terminal port for the Rail/Road Ferry service operated by the New Zealand Railways Motor Vessel "Aramoana" between Wellington and the South Island terminal port of Picton. The "Aramoana" is a vessel of 4,300 gross tons with an overall lengths of 368 feet, a beam of 59 feet and a loaded draught of 15 feet 6 inches. The vessel was built to accommodate 34 rail waggons or, alternatively, up to 85 cars on the train deck and 30 cars in the upper deck garage. In addition the ship normally carries up to 700 passengers. Special terminal facilities are provided by the Board at the northern end of Aotea Quay and these include the mooring jetty and "U" shaped stern berth, the link span, passenger terminal building and passenger jetty ramp with telescopic gangways, car ramp and electrically operated drawbridge. The lay-out provides for the ship to berth stern first alongside the mooring jetty and then be warped back into the "U" shaped stern berth. Here the link span is lowered until the main 71/2 inch diameter connecting pin at the outer end can be inserted into the special socket provided for it in the stern of the ship. The link span carries a single rail track across which the rail waggons are shunted to and from the rail deck of the vessel. At the top of the car ramp is a drawbridge operated by electric winches for hoisting and retraction which enables cars to be driven on to the upper car deck under all normal conditions of tide and loading of the ship. Another feature of the terminal installation is the complete protection from the weather provided for passengers from the time they enter the terminal building until they reach the ship. This is achieved by means of the covered way on the inclined passenger jetty ramp and the enclosed telescopic gangways from the top of the ramp to the ship. The vessel maintains a regular schedule six days per week supplemented by double trips to cater for holiday and other busy periods and is proving a popular mode of transport between the North and South Islands.

A roll-on roll-off shipping service has recently been established over a route of 175 miles from Wellington

to Lyttelton, the port of Christchurch in the South Island. The service is operated by two specially equipped ships, replacing the orthodox ships which operated the service for many years. An attractive terminal has been provided, handy to railway and city transport services, incorporating modern facilities for the movement of passengers, a link span for vehicles and an area for the assembly of palletised cargoes on special trailers.

Wellington is ideally placed as a port of call for overseas passenger vessels. It is the most convenient port for embarkation and disembarkation of passengers and, for through passengers, can offer many scenic and other attractions. To meet the need for an anticipated increased volume of sea-borne passenger traffic and as a practical contribution to the developing tourist industry the Board has constructed a modern Overseas Terminal as part of its port modernization programme. Of 800 feet in length and 116 feet wide, with a depth of 36 feet at low water on either side, it provides 2 berths for the largest passenger vessels calling to New Zealand and is capable of further development if required in the future by lengthening the wharf and adding to the shore area of reclamation. A building 580 feet long and 55 feet wide has been constructed and every effort has been made to make the Terminal attractive for both passengers and visitors. Passengers disembark by covered telescopic gangways on to the upper floor balcony of the two-storey building and enter a lounge and restaurant where they may meet friends after being cleared by Customs. Here passengers may wait until advised over the loudspeaker system that baggage is ready for Customs inspection when they may descend by means of escalators, lift or stairway to the Customs Hall on wharf deck level. An Information Centre is located on this floor and a loudspeaker system is installed for the convenience of passengers. Adjacent to the Customs Hall is the main concourse in which tourist, banking, post office, telephone and other facilities are provided. The exit from the main concourse to the covered

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Management Accounting in a Major Port-Key to Successful Finance Control

By John Lunch,

V.R.D., F.C.A., A.M. Inst. T., Director of Finance Port of London Authority

Mr. John Lunch

Why should we have financial control at all? Does this mean "the dead hand of the Treasury"? Certainly not. As I hope to show you: financial control is very much a creative force.

In the Port of London Authority we aim to provide the best service to port users and this we keep constantly in our minds. But we realise that to provide a service without regard to the financial consequences would, in the long run, preclude us from providing any service at all. Financial weakness in the port benefits nobody. Indeed, the need to be economically viable was realised when the original Port of London Authority Act was passed in 1908. So it is accepted that financial control in the P.L.A. means steering affairs to the best economic advantage.

In the generic sense, management accounting covers the preparation and presentation of a wide range of figures-financial and statistical, both conventionally and diagrammatically-to management at all levels so that it can be readily seen what is happening, and likely to happen, in the various sectors of the business. It provides the individual managers with the results of their past decisions so that they can plan more flexibly and accurately for the future. The essence of management accounting is its emphasis on looking forward and providing another means to help management to shape events, to make achievable plans and to achieve them. To attempt to run any business without the best information and adequate planning would be to speculate, not manage.

I do want to emphasise the fact that management accounting is a part of management, not solely an accounting technique. It is one of the many tools that management in an organisation such as the P.L.A., with their large and widely diversified activities, must have to maintain efficiency. I like to think it is a most important tool, but just as a saw is important to the carpenter, and No. 5 iron is essential to the golfer, they need far more "tools" of their trade to perform efficiently. Similarly, management require the whole range of their tools.

There are a number of important reasons at this particular point in time that make the institution and use of modern accounting techniques in the P.L.A. essential.

A vital part of the U.K. communications system is ports-of which London is the largest, handling one third of all Britain's imports and exports. Ports must be modern and efficient, both physically and economically. In pursuance of this aim, and in particular to provide the additional and modernised facilities needed to handle the increased trade which is so necessary for the prosperity of this country, the P.L.A. are planning to spend £50,000,000 in the next five or six years. This rate of investment expenditure is four times the level of a few years ago.

Before long it may well be that new common financial objectives and accounting arrangemnts for all ports will become law under the Harbours Act 1964. These may well follow the recommendations of the Rochdale Committee which reported to the Minister of Transport in 1962. The Committee, recording the firm conviction that ports should be regarded as commercial undertakings, recommended the pursuit of a modest net revenue surplus after allowing for depreciation to be provided at current replacement cost.

Some of you may have seen the Annual Reports and Accounts of the P.L.A. for the last three years. In each, we added a supplementary statement which converted the statutory net revenue account, which is produced in the conventional way, to that suggested by the Rochdale Committee, i.e. taking account of depreciation on a replacement cost basis. These supplementary statements revealed deficits of the order of $\pounds 1,000,000$ each year. The gap between income and costs must be eliminated. Two ways are available: increased charges and/or increased economic efficiency. The P.L.A. have clearly a strong incentive to step up the search for increased efficiency and they are employing many of the business techniques which are now available. On the expenditure side, work study, O & M, operational research, and value analysis immediately spring to mind; on the revenue side, marketing research and more constructive pricing patterns-these are most important and I do not think ports have fully appreciated the contribution they can make to eco-Linking both nomic efficiency. sides, management accounting has made its debut; to operate closely with (or to supersede where appropriate) the old system of accounting.

Since the aim is to raise net revenue to the new level, through increased economic efficiency, it is essential that each part of the business should seek to pay its own wav. Prima facie, a loss is the mark of inefficiency-but much more study is needed before a balanced view can be formed, and here management accounting plays one of its parts. Finding out which of the P.L.A.'s many activities are profitable and which are not depends on a close analysis of the revenue and of the costs, both direct and indirect, which should be attributed to each sector. And then these must be closely studied in relation to their whole business background. If there is a loss: why? What can be done about it, whether in terms of reduced costs or increased trade (or the latter leading to the former)? Are the facilities inherently unsatisfactory? Would a new clean sweep pay better?

Fortunately the P.L.A. have already made a study of costs in some depth so that it is possible to compare costs of similar operations, in each of their five large dock groups, and point out the methods, and changes in methods, likely to be the most efficient. There are, of course, likely to be the most efficient. There are, of course, snags in this sort of operatio nand discerning and understanding staff are necessary. Comparisons are obviously best where one is comparing like with like, and conditions vary considerably even for similar traffics. However, even with isolated specialised operation it is possible to work out with the managers the 'standard' costs---what the costs ought to be.

If when everything has been done to improve efficiency and adjust charges, some activities are still producing losses, then careful consideration must be given to what is to be done. As a generalisation, it may be said that it is not sound business for profitable operations to subsidise the unprofitable. For this means charging customers on profitable traffics more than necessary and so discouraging these. On the other hand the provision of lossmaking facilities may stimulate the traffics that use them and raise a demand to spend more money on increasing these unprofitable facilities. Naturally every case must be looked at on its merits: for example, a sector that is in the process of modernisation and development may well have to incur a loss to start with and then take some years to build up its profitability. (Incidentally, this is called the "earnings profile".)

Possession of information about revenue, expenditure and costs at the basic level of executive responsibility has the further benefit of allowing greater management delegation. The individual manager can match what he is doing against the results gained by his colleagues and see in concrete terms of profit and loss the end-product of his day to day decisions. In order to help him in his task every manager has to have a budget, formulated in advance by himself with the help of the accountants, to act as a continuous guide to check actual results against his forecast. The object of the budget is to allow the manager to plan ahead flexibly and profitably. He will already have a clear idea of his costs, some of which, like the labour needed to discharge ships coming into his berth, will vary with the level of traffic and types of cargo involved and his own decisions about how to do the job. Others, such as his depreciation figures and the finance charges allocated to his department, are outside his immediate control.

Managers will also have a good idea of what to expect on the revenue side, for the pattern of traffic in a large port is remarkably stable. Moreover there is a tradition of long service in the P.L.A. and many managers have 20, 30 or even more years of experience. However, the managers will also be helped here by traffic forecasting made by the P.L.A.'s economists.

Forecasting the level of future traffic which can be expected is an important part of the economist's job. Many varying factors affect the P.L.A.'s level of traffic, such as the trends of national and world trade, the state of international shipping and other ports, and the pattern of commodity movements. In this work, they must keep their wits about them. Such events as a poor harvest in Asia or political trouble in Indonesia can have marked effects on the grain and oil traffics of London.

The overall budget is designed to reflect the balanced collective views of what is expected and intended to happen—the plan. Not a rigid plan: for situations change rapidly and traffics may not be as expected. There are many factors, such as bad cargo stowage, which are outside the manager's control and will affect his estimates and budget. Just as the operating department's personnel must be flexible and adaptable to meet the changing needs of the day, so must the budget. For these reasons the flexible budget technique is used. This simply means that the variable expenses-those which are expected to vary in sympathy with the level of activity-are increased or decreased to show what the budgeted figure should have been in the actual circumstances. The essential point is that it is only the departures from the budget that need to be reported to the manager. No need to tell him what has gone right-tell him what has gone wrong. Otherwise he may have to spend hours pouring over the figures to find that out. This technique is known as "management by exception", enabling the manager to concentrate his time and attention on the things that matter most.

I have already said that we are planning for substantial investment expenditure. This investment in fixed assets is a long term proposition, not only because most port assets have relatively long lives, but also because today's decisions on large projects largely determine the costs and revenue of tomorrow. A project which does not measure up to a broad but critical economic assessment at the planning stage is "odds against" to improve afterwards by chance. If on a wide marketing view its prospects and profitability should improve, the assessment will take that into account: and express it in the earnings profile I referred to earlier. Every project of any size undertaken by the Authority is economically assessed. The aim of these project assessments is twofold: to ensure that the investment of large sums of money is soundly based financially, and to marshall projects in the best economic order for approval. We think this assessment of projects is most important not only because it enables all aspects of the project to be considered, and the opportunities and degree of risk judged, but because it also enables the various alternatives which may be available to be considered in relation to the project. For example, consideration can be given to the transfer of a trade from its "traditional" locations to be concentrated in improved facilities; or less elaborate construction can be considered. If the utilisation of existing assets can be improved it increases the economic efficiency of the P.L.A., and is often a cheap way of providing additional throughput capacity, although I should make it clear that we turn no opportunities down. If capital expenditure is required and can be justified it goes forward. I will not go into the detail of the techniques that we employ in evaluating projects because indeed we do not apply one standard yardstick, but I do recommend to any of you who are involved in project evaluation to familiarise yourselves with the discounted cash flow (D.C.F.) technique in addition to the more conventional methods.

All capital projects not only those from London but also those from all the other major ports, over £500,000 must be submitted to the Minister of Transport for approval. In such matters the Minister's adviser is the National Ports Council, set up under the 1964 Harbours Act. It is they who recommend, or otherwise, the approval of the project on its individual merit and as part of the overall national plan.

From all this you will realise that we attempt to pick out, and formulate, projects which are economically sound. One of the important factors in considering projects is the future traffic to be handled-and thus the earnings profile. Here market research is a great help. The P.L.A. are using some of the most modern market research techniques in the port industry; indeed we are embarked on what is believed to be the largest market research programme undertaken in the transport field in this country. Other ports are also carrying out market research, and this is to be welcomed because the more research there is the better will be the collective information.

It will be appreciated that, although all the major ports compete against each other for traffic, certain traffics tend to flow naturally through specific ports. We all recognise these facts and because we are all responsible people we seek to ensure the most economic traffic flows, for this helps all the users of all the ports, and aids the national economy. So with the forecasts of likely traffics, the marketing effort required to obtain them, and the economic assessment techniques that I have mentioned, we have eliminated many of the areas of doubt when considering the spending of large sums of money, whereas previously the decisions were based on guesses or judgment.

We certainly do not claim to have displaced good business judgment; there is no substitute for this. But modern techniques can do much to assess the facts that were previously guessed and evaluate them to show whether the investment is likely to be economically worthwhile. Thus the problem of the business decision is reduced. In simple business terms, is the return on the capital sufficient for the risks involved? In the private sector of business, companies are generally not prepared to spend money on new assets unless they estimate they will earn something like 15% a year, or more, before interest and taxation.

In the public sector of business following the lead given by the Government, and bearing in mind social obligations, it is usual to look for something lower, often around 10%. Certainly a return must be at least 8% or the project cannot meet its interest plus the minimal margin for contingencies.

Assessing capital projects involves roughly the same type of analysis that is being done under management accounting for the day to day running of affairs. All the costs must be estimated according to the methods of operation. Traffic and charges must be assessed to provide the revenue forecast.

Where the project is an addition or modification to existing facilities, it is necessary to make two assessments. Firstly, to relate the projected improvement in net revenue to the new capital outlay; secondly, to find the return on both the old and the new capital combined. The latter is to ensure that the charges are right and to highlight the situation where an apparent return on capital is really only the reduction of a loss. Everyone will agree with the sentiments of a Treasury official which were quoted in the report of the Select Committee on Nationalised Industries when he said that "if by investing a lot of money the annual loss of a business is reduced from £90m. to £50m. it would be wrong to describe business policy progressively to eliminate losses by modernisation, but the facts must clearly be known. One cannot build a financially sound undertaking merely by reducing large losses to smaller ones.

It must not be thought that the economist and the accountant are axe-men, who let some projects go by and chop off the heads of others. By association with the planners in the earliest stages, the economic assessors can investigate various alternatives and indicate the most economic of them, thus concentrating planning effort in the most fruitful direction.

I would like to say a word or two about the great changes we have been able to bring about by the use of computers. As has been the usual experience in this country, when we acquired our first computer in 1961 we put the routine job on the machine: payroll, salaries, statistics, some costing work, and the like. In the past year we installed a second generation machine which gives us much more scope and flexibility. We are working up the use of it for more sophisticated work such as mathematic models of the port's trade, as part of our market research, and the processing of sample data, obtained by random sampling processes, to aid our management accounting studies. We are already well advanced with planning for the third and more advanced computer due in some two years time.

To give some idea of the combined impact of the computer and the development of modern management accounting methods, the plan for our financial and economic staff provides for the doubling of senior staff and halving of junior staff over a period of a few years. This will be implemented without staff "redundancies" because the reduction is planned to be closely linked with natural wastage. The overall plan, therefore, is for the machine to take over the routine, repetitive work,

Wellington-

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taxi-way at the shore end is through large glass doors flanked by ornamental concrete columns. A balcony for visitors and friends, which is reached by a stairway at the road approach end of the Terminal, completely surrounds the building on the upper floor and expands into the viewing deck at the other end offering a rewarding outlook over the harbour, city and surrounding hills and of approaching and departing vessels. Ample car parking space is provided immediately adjacent to the Terminal which is situated at the southern end of the inner city.

The Board owns and operates a Floating Dock having a lifting capacity of 17,000 tons.

Its principal dimensions are:-

F	eet
Overall length over platforms5	84
Overall length over keel blocks 5	33
Clear width between fenders	87
Overall length of side wall4	52
Overall height of side wall	
above outer edge of pontoon	35
Depth of water over keel blocks	25
Height of keel blocks	4

The Dock was built by Swan, Hunter and Wigham Richardson Limited, Wallsend-on-Tyne, England. Electric power is used throughout. Four warping capstans capable of exerting a pull of 5 tons at 50 feet a minute are fitted on top of the wall deck. The Dock is also fitted with other facilities such as fire and wash-down services and aircompressors for repair tools. Electric current is available for vessels' or contractors' purposes. An electric crane is installed on the seaward wall of the Dock capable of lifting 2 tons at a radius of 54 feet, and 5 tons at a radius of 27 feet. The freeing staff for much more interesting work—in particular, interpreting the information produced by the computer and passing it on to management.

Such, in broad outline, are the principal functions of modern management accounting that we are applying to all the P.L.A.'s activities. It is a very great task, but in

Dock was towed out to New Zealand, and arrived at Wellington in December 1931, the distance covered being 14,109 miles in 167 days. The Board does not undertake the cleaning, painting or repairing of vessels. Vessels using the Dock and requiring any work of this nature to be done, make their own arrangements with the engineering and shiprepairing establishments in Wellington.

Situated in Evans Bay are two Patent Slips owned by the Board. Normally, the larger one can take vessels up to 2,000 tons, not exceeding in length 280 feet, or of a greater draught than 18 feet at the forward end when going on the slip. The smaller slip has a length of cradle 150 feet, and will accommodate vessels up to 170 feet and 750 tons Vessels displacement. can he cradled at lowest tide drawing up to 6 feet 9 inches at fore end of cradle and 14 feet 3 inches at after end, and at high water spring tide drawing up to 12 feet 3 inches at fore end of cradle and 19 feet 9 inches at after end.

There are several large ship repair and engineering establishments in Wellington, and structural alterations and repairs can be effected by them.

For the year ended 30th September 1965 the total shipping arrivals at the port amounted to 4,680,973 net registered tons. The total tonnage of cargo passing through the port for the same period amounted to 2,823,145 tons.

The principal commodities comprising the trade of the port are petroleum products, vehicles, coal, iron and steel, cement, frozen meat, wool, fruit, timber, wheat, flour, every case a start has already been made and results are being seen. Nevertheless, there is a tremendous amount of work to be done in this large business before all the objectives can be achieved. When it is, the results should be visible in a wider and more effective range of services for port users at economic prices.

bitumen, milk products, cheese, sugar, tallow, tobacco, butter, salt and potatoes.

At Clyde Quay, in close proximity to the City, the Board has provided for the use and convenience of harbour pleasure craft, a boat haven, having an area of about six acres, and depths of water varying from 11 feet 6 inches to 4 feet. Boat sheds and a slipway are also provided. Further facilities for yachting and boating are provided on a reclamation at Evans Bay where yachtsmen may slip their craft for repairs, painting etc. The Board has under construction at the present time in the South Western corner of Evans Bay a second Boat Harbour of approximately 8 acres which will provide 75 mooring sites, 80 boat sheds, a slipway repair area and a launching ramp for trailer craft.

For some years the Board has been carrying out an extensive programme of harbour development in order to keep the facilities of the port up to modern standards. Works recently completed include the Overseas Passenger Terminal, the roll-on roll-off berth at Inter-Island Wharf, a modern cargo store on Aotea Quay, the reconstruction of the northern outer tee of Queen's Wharf including a new cargo store, and a new amenities building for waterside workers. Works in hand comprise the reconstruction of Glasgow and King's Wharves and the southern outer tee of Queen's Wharf, reclamation of land at Evans Bay and the completion of roading and services at the Hutt River Estuary reclamation. Projected works include a new workshop building, three small reclamations and a new boat harbour at Lowry Bay.

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