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Guide-Lines for Port Development

by P. E. Stonham *, New South Wales

Circumstances within the last decade have combined to force a review of the economic operations of ports. Technological change in shipping has brought about the introduction of container and unitised ships to carry containerised and unitised general cargo. These ships and their specialised cargo-handling requirements have necessitated considerable port investment in new berthing and cargo-moving facilities. This revolution in shipping general cargo has also caused closer integration of sea and land transport (via the common unit of transport—the container). Ship owners have increased their commercial interests in road transport to maximise gains from faster through cargo transport. The average size of new buildings of bulk carriers and tankers has greatly increased, requiring deeper port approaches and larger accommodation. Bulk handling rates have been improved by the introduction of more efficient bulk-handling equipment in ports. Apart from the quality of port investments, changes in trade flows have caused changes in the volume of port trade and traffic, requiring increases in port facilities.

Consequently, in the 1960's, governments have become much more closely concerned with the costs and conditions of shipping their export and import trade and with minimising port costs and maximising cargo throughput in ports.

Criteria for Development

The most common approach to the development of ports, and that adopted in the past by port authorities, is what would currently be called the Operations Research approach. Port projects are evaluated, on this basis, by studying current and forecast cargo volume and shipping traffic flows in a period together with the distribution of shipping calls over the period so as to calculate port and berth usage. If new projects are being contemplated (because of the need to service new types of vessels like container ships), calculations need to be made about the expected volume of trade suitable for containerisation, the frequency and duration of shipping calls, through-

put of containerised cargo, and so on. Such calculations of non-monetary quantities can be programmed.

Against possible increases in operational efficiency it is then possible to discount estimates of future port revenues receivable, net of operating costs, by the interest rate on loan capital, and deduct initial capital costs. Under current pricing systems the result is unlikely to be a positive value (few port authorities cover their total costs out of revenue), but there will at least be some indication of the extent of public subsidy required. It is possible to compare different systems (e.g. container versus conventional) on this basis.

Social Costs and Benefits

But there are clearly all sorts of social costs and benefits and externalities involved in port development and operations. Governments and port authorities and their advisors have become increasingly concerned over these. The technique of project evaluation is the same as for calculating private costs and benefits, but in this case it is necessary to include social costs and benefits too and discount them back by a social rate of discount¹. Discounting this way allows a comparison of the opportunity cost (or alternative uses) of expenditure on port projects with expenditure in other public sectors (assuming the funds are under the control of the central government). The same technique can be used by port authorities in ranking projects within the port's domain. There are all sorts of intellectual problems in assigning values to the intangible social benefits and costs involved. For port authorities faced with the choice of investing or not, the solution has to be pragmatic. There are parallel examples available—cost/benefit studies of the Channel Tunnel, of water resource systems in the United States, and of the underground railway in London. Social costs are easier to estimate, but social benefits are usually so varied, diffuse and intangible as to allow few general principles to emerge for use elsewhere.

¹ The overall social cost-benefit approach to port investment is discussed in some detail in the excellent article by R. O. Goss, "Towards an Economic Appraisal of Port Investments", *Journal of Transport Economics and Policy*, September 1967.

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In theory, one is concerned to calculate any improvement in the use of domestic economic resources. In the case of ports, improved use of foreign resources (e.g. through lower operating costs of foreign-registered vessels) may result in some benefit being transmitted to home traders (through possibly lower freight rates and improved cargo delivery speeds) as well. Social benefits from port investments will necessitate assigning a monetary value to the following broad changes, if they occur: improved cargo delivery times, increased productivity of port labour and capital facilities, improved returns to home-registered shipping through lower operating costs and increased revenue-earning ability per unit capacity. The calculations can be no more than ad hoc estimates of the monetary value of social costs and benefits. There remains the almost impossible task of estimating the significance of social welfare preferences on projects whose economic value is subsidiary to such considerations as national prestige (elaborate passenger terminals perhaps).

Problems of Port Authorities

Port authorities face very difficult investment decisions. It is not surprising that most authorities tend to make their decisions on the basis of contacts with shipowners. Since shipowners make their own capital decisions on the basis of their estimates of trade flows, it seems reasonable that port facilities should adapt to the changing requirements of traffic and cargo flows. In some cases, the social costs of inadequate investment may be very obvious—congestion of ships in port, even causing shipowners to impose surcharges on freight.

But as well as hazarding estimates of the social costs and benefits in port investment, port authorities have additional pragmatic problems. Although port investment is normally considered a passive activity, in the sense that it is intended to cater for current or expected changes in trade and traffic flows, many port authorities are now considering the place of competitive investment. There is little doubt that ports can compete among themselves for traffic and can actively seek new trade. The black ban put on container handling by labour in the Tilbury docks diverted, without much difficulty, the newly-created container trade between Britain and Australia to Rotterdam port in 1969. Since multi-port calls are less economic in container shipping, there is currently strong competition among ports in the general cargo trade to acquire the designation of a major container terminal. The place of competitive investment depends, to some extent, on geography—it is very strong among the ports on the eastern sea-board of the United States, but much less marked among the widely distant general cargo ports of Australia. This sort of in-

vestment also depends on the ease of obtaining reliable forecasts of trade flows.

In fund-raising, it is clear that unless funds are raised on a commercial basis, at market rates of interest, there is an element of subsidy involved in utilising money transferred from public funds on concessional terms. The economic cost of this includes its opportunity cost, and this must be deducted from social benefits expected and still yield higher net benefit than investment opportunities elsewhere if the allocation of economic resources is to be improved in the economy. Because of the long-term nature of port investments and the hidden social benefits, port authorities are normally obliged to raise concessional public finance. Very few general cargo ports are able to finance new investment out of retained earnings.

Port authorities must also consider their pricing policies in relation to new and existing capital services. Port charges are believed to have got well out of line with any rational system of raising revenues and relating prices to costs², and many authorities and their advisors are currently reassessing the structure and level of their charges. The major omissions are a failure to relate charges to user demand—it is considered that shipowners are frequently subsidised in their operations by low charges—and a failure to relate charges to the social costs of port facilities. In theory, a system of marginal cost pricing, including marginal social costs, is the optimum. But if the ideal is not attainable, through administrative difficulties and problems of measuring costs, it is possible that existing systems could be improved by weighting ships' charges more heavily towards time and berth occupancy than the present capacity basis. It might also be desirable to separate ship and cargo charges more clearly. There is a further need for simplicity, not only are port charges scarcely based on economic rationale and incentives, but they are usually very complex and differ between ports. The correct level and structure of port charges also implies decisions about how far private costs should be covered and whether consumers' surplus should be transferred to shipowners. Incorrectly set charges can also incur social costs, e.g. traffic congestion and cargo delays.

Ownership and Labour

The ownership of ports is mixed. Most are nearly completely controlled by central or local governments or city administrations, others have a higher private participation, and yet others, particularly bulk-handling ports, may be wholly privately owned. In the general cargo ports there are a number of opportunities for leasing and

² See, for example, W. P. Hedden, *Mission — Port Development*, American Association of Port Authorities, 1967, Chapter 5.

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GERMAN PRISM

Opinion of the Council of Experts

According to the forecast of the Council of Experts on Economic Development, growth will slow down in the course of the current year. On an annual average the GNP in real terms will grow by 4.5 p.c. in 1970, after in 1969 it increased by 7.5 p.c. At the same time, the price level of private consumption will rise by 3 p.c. after 2.5 p.c. in 1969. The increase of net incomes, important for the distribution of incomes, according to the Annual Expert Opinion in 1970 will shift again in favour of the wage and salary earners. After in 1968 in nominal terms they received only 5.3 p.c. more than in the preceding year—but entrepreneurs and property owners (excluding the State) 23.7 p.c.—in 1969 their net income has probably grown by 10.5 p.c. and in 1970 will rise by 12.0 p.c. Income from entrepreneurial activities and property will grow by 7.5 p.c. in 1970 after a 7 p.c. increase in 1969.

Moreover, the experts conjure up the danger of an accumulating inflationary process for the current year. Employers and employed, the Federal Government and the Federal Bank within the framework of the „concerted action“ are to make joint efforts to avoid another recession that nobody wants by applying a “strategy of preventive income securing”.

Appointment of the Federal Bank's Presidency

On January 1, 1970, Dr Karl Klasen and Dr Otmar Emminger will take over the office of President and Vice-President, respectively, of the German Federal Bank for the coming eight years. The tug-of-war for the succession to Karl Blessing and Dr Heinrich Tröger has thus ended. The composition of the Federal Bank's new Presidency is considered an optimum solution. Dr Klasen, former President of Landeszentralbank Hamburg and speaker of Deutsche Bank, knows everything about the banking business and was very successful in this branch. His Vice-President, Dr Emminger, has been member of the Federal Bank's Directorate since 1953 and obtained international recognition as an expert for currency problems.

This connection of experiences with commercial banks and international currency policy indicates

that concerning the appointment of the Federal Bank's Presidency the coalition partners SPD and FDP ignored the rules of proportion. The President of the Federal Bank is a member of the Social Democrats and is supported by a Vice-President who sympathises with the Christian Democratic Union, i.e. the opposition. Nevertheless, both men will see to it that the Central Bank will be equal to its work—irrespective of their political opinions. There is no doubt about it, for Dr Klasen as well as Dr Emminger will defend the independent position of the Federal Bank.

Production Increases Below Average

The industrial production increase, usual in September, with a growth rate of 10 p.c. from August to September lagged behind the long-term average (1959-1969: 11.5 p.c.). The growth rate of production in the capital goods industry at +20.4 p.c. was slightly higher than the long-term average (+20 p.c.). The increase was considerably more favourable in building and civil engineering at +5.9 p.c. vis-à-vis +4.2 p.c. in the past ten years. In the foodstuffs and luxuries producing industries the development was particularly unfavourable at -0.2 p.c. (1969).

Hamburg Harbour Stronghold of Liner Traffic

Hamburg is the biggest German seaport and at the same time Germany's most important harbour handling general cargo. Moreover, with more than 290 services to more than 1,100 ports all over the world it is also the largest German liner port. If for once we do not count the mostly international joint services as units but consider the participating shipping companies individually, 94 West German services are outnumbered by 255 foreign ones.

In most cases Hamburg offers the biggest number of departures among the German ports. Regarding Central America, West India, Africa and Australia Hamburg partly offers more than double the departures than the port next in size. In the case of Asia the figure is 150 p.c.

For the transport of containers according to latest figures Hamburg offers monthly 72 departures of full container ships and other units to Euro-

pean ports. On every weekday one or two ships navigate the "traditional" container route to the American east coast. 22 times a month Canada and the Lakes can be reached from Hamburg and about every two days a container departs for the American west coast. Even for the Australian route every four days a departure for containers is available already now.

Berlin's Exhibition Programme for 1970

In the next year, too, the ADB Exhibition Service Berlin will organise several exhibitions in the Europa-Center and the exhibition area at the radio-tower. The first exhibition will be the special display "Electronic Equipment from Poland" in February, 1970. In March the 9th Sample Exhibition Berlin "Export Goods from the USSR" will continue the series of import exhibitions. In September the 10th sample exhibition will take place dealing with Czechoslovakia.

From March 14 to 22 ADB arranges the "4th International Bourse of Tourism". From April 17 to 21 the "Interchic" will take place again together with the fashion show "Berliner Durchreise". The autumn exhibition of Interchic will last from October 11 to 15. The exhibition programme of ADB contains also the 8th overseas import exhibition "Partners of Progress" taking place in the area at the radio-tower from August 25 to 31.

Expansion of Plastics- and Rubber Processing Machinery

While during the last ten years the Federal Republic's total machinery production approximately doubled, production of plastics- and rubber processing machinery more than quadrupled in terms of value. According to data published by the Association of German Engineering Companies (VDMA) in 1969 this sector's value of production has reached about DM 1.5 bn. As compared with 1968 this is an increase by about one third. The value of exports should be around DM 800 mn, i.e. 55 p.c. of production. With that the Federal Republic holds the first place in world exports of this industrial sector. The United States, France, Britain, Italy and the Netherlands are among the important markets. The extraordinarily expansive development of this industrial sector corresponds to the growth that the plastics-processing industry was able to achieve in Western Germany. In the case of rubber-processing machinery the favourable

economic trend in the automotive industry was very stimulating. Orders in hand on average will last for 9 months until late summer of 1970.

Soviet Union Orders Large-sized Tubes

In the name of Mannesmann AG Röhrenwerke and Thyssenröhren-Werke, Mannesmann-Export GmbH provisionally signed an order for 1.2 mn tons of large-sized tubes with the Soviet Promsyrioimport. The tubes have an outside diameter of 1,420 mm and their thickness reaches from 17 to 20 mm. They will be used for the construction of a natural gas line. Delivery will be taken up in July 1970 and end in December 1972. The final signing of the agreement is to be effected after the conclusion of a credit contract which at present is being negotiated between a German banking syndicate and the Soviet Foreign Trade Bank.

Moreover, Mannesmann-Export GmbH booked another order for more than 100,000 tons of large-sized tubes with a diameter of 1,020 mm and a thickness of 14 mm for a Soviet natural gas line. These tubes are to be supplied in the first half of 1970. Altogether this is the largest single order for tubes that the German steel tube industry ever received.

Favourable Annual Balances of In- dustrial Joint Stock Cies

According to the Federal Statistical Office the annual balance sheets for 1968 of 885 joint stock companies indicate a growing total output and an improving profitability. As compared with 1967, these companies' total output increased by DM 12.8 bn (+8.0 p.c.) to DM 174.2 bn. The highest growth rates were registered by motor vehicle construction (+16.7 p.c.), the chemical industry (+11.2 p.c.) and the electrical industry (+9.3 p.c.).

Due to a considerably improved profitability taxes depending on profits also rose by DM 2.0 bn (+40.7 p.c.) to DM 6.9 bn. After addition of DM 2.0 bn to reserves, a profit of DM 3.9 bn (+15.2 p.c.) remained as shown in the balance. True, only 36.5 p.c. of gross profits on sales of all industrial joint stock companies registered were shown by three major economic sectors—power production, chemical industry and motor vehicle construction—but 57.1 p.c. of taxes depending on profits and 56.5 p.c. of profits as shown in the balance fell to their share. The average dividend amounted to 13.6 p.c. (1967: 13.1 p.c.).

renting public land and port facilities. These opportunities have increased with the advent of containerisation of general cargo, and there are good organisational reasons for permitting the whole transport chain to be co-ordinated. At the same time, since the social costs and benefits of port activities are so important, public control of the major part of investment decisions seems essential.

Many port authorities face a particular problem in the accelerating changeover from labour- to mechanical-handling of cargo in ports. The containerisation of general cargo is intensifying the trend in industrialised overseas trading countries. In high-wage countries the substitution of mechanical cargo-handling methods for labour-intensive methods reduces the long-run average total cost of cargo-handling, as well as speeding up rates of cargo-handling and ship turnaround. But at the same time technological change in port operations is causing a severe social problem of the re-employment of port labour, even though retained labour is likely to achieve higher wages and acquire increased skills.

Government Planning

Against the background of the total annual flow of a country's oceanborne trade, it is the sum of the activities of all the country's ports that is important to an optimum allocation of the country's resources to the port transport industry. There may even be simple programming problems—traffic congestion in some ports and under-utilisation of facilities in others. The rise and fall of the economic importance and operational efficiency of ports will be influenced by technical changes in shipping and cargo-handling and by changes in the volume and composition of trade flows. The effects are unlikely to be uniform among the ports. In such a situation there is an important role for the central government to play in co-ordinating investment activities among the ports and maximising the operational efficiencies of all the ports and the social benefits which are gained from speedy and lower-cost cargo transport.

Among several areas in which government planning may be beneficial, e.g. eliminating unnecessary competition, allocating capital funds optimally under capital rationing, uniform pricing procedures, one may pick just two for comment. The effects of redundancy in dock labour and of seasonal trade and traffic may, to some extent, be overcome by increasing the mobility of labour between ports. This policy was introduced by State authorities in some Australian ports with a limited amount of success. Providing the distances and social immobility are not too great, co-ordination of stevedoring requirements in this way can equalise the demand and supply of

labour services more easily. The second point concerns the relationship between port development and road, rail and urban development in the port's hinterland. In some cases, where port hinterlands overlap, there can appear a competitive element. Hinterland development is out of the control of port authorities, but the careful planning of inland transport, which is under government control, can strongly affect port performance. The co-operation of road and rail authorities in locating container depots and creating container services inland is a good example.

While most of these facets of development apply to ports in developing countries, there are some particular problems involved. Technological change in shipping and cargo-handling is encouraging the substitution of capital for labour in port operations, but this shift in factor proportions is not suitable for developing countries short of capital, whose comparative resource advantage lies in the supply of relatively cheap labour. In countries which are short of capital, it is not easy to rank capital-intensive port developments high in investment priorities when cheap labour is readily available, albeit at lower operating efficiency. It is this structure of factor availability that is causing hesitation among port authorities in developing countries to invest in elaborate container facilities. The Port of Singapore is one exception, but a large part of its trade is intermediate trade in manufactures, very suitable to containerisation, and since the economy is very open, speed and low costs of its international trade are of great importance.

The composition of ocean-borne trade of many developing countries is not altogether suitable for unit and container transport. Exports are mostly bulk, and although imports contain a higher proportion of general cargo (like manufactures) suitable for containerisation, the imbalance of general cargo trade decreases the advantages of introducing container ships into the trade.

For most developing countries, the penetration of export markets, reducing shipment costs and speeding export deliveries are more important than cost gains on the import side. Yet the gains from unitising general cargo would be weighted more towards foreign exporters than home exporters with the present composition of trade.

Inland road and rail transport is characteristically underdeveloped in developing countries. Development plans place emphasis on encouraging export trade and thus port-orientated trade, and are likely to rank port investment high. But in most developing countries the port terminal link in the total transport chain is not the only weak one. For this reason the World Bank has emphasised the importance of total country or regional transport planning in its technical assistance programme.