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ECONOMIC COMMISSION FOR LATIN AMERICA
Office for the Caribbean



COMMENTS ON
STEVENSON HARDTKE ASSOCIATES LIMITED
PORT STUDY OF BRIDGETOWN HARBOUR
BARBADOS, W.I.

Prepared
by
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UN Regional Adviser, Ports & Harbours

Comment on the Stevenson Hardtke Associates Limited
Port Study of Bridgetown Harbour, Barbados, W.I.

The Regional Adviser, Ports and Harbours (Adviser) was given a copy of the Port Study of Bridgetown Harbour dated September 1972 (Study), performed by Stevenson Hardtke Associates Limited, (Consultants) upon the occasion of his orientation visit to Barbados on 25-26 October 1972, and he was asked to comment on the Study.

Approval to review the Study was requested of the Consultants, in accordance with professional ethics, and approval was given with the understanding that a copy of the resulting comment would be sent to the Consultants. Accordingly, a copy of these comments is being sent concurrently to Mr. K. U. Hardtke, Professional Engineer, 6 Lansing Square, Willowdale, Ontario, Canada.

Review of the Study has given the Adviser the general impression that it has been competently performed. The objectives of the Study, as set forth in the Terms of Reference, cover short-range and long-range development requirements and the assessment of current operations. The Study achieves these objectives. Every port should have a Master Development Plan that provides for expansion ultimately well beyond the needs that can be currently foreseen, even though such expansion may seem to be remote and improbable. The Study provides such a Master Plan and this is one of the important aspects of the Study. With respect to the whole development plan, the Consultants wisely counsel that the development of

of professional opinion. It appears to the Adviser that the Consultants have been quite conservative in two particular respects: (1) their evaluation of the port's operational effectiveness; and (2) the impact of containerization on future operations of the port. The Adviser's views are somewhat less conservative than those of the Consultants. In view of the implications that the differing views may have on the nature and magnitude of the capital investment that may be required in the near term, a discussion of the Study in these respects may be useful. The Adviser's comments with respect to possible improvement of port operational effectiveness are presented in the following paragraphs.

It is noted that the Consultants conclude that the overall level of labour productivity is relatively good by international standards, and excellent in comparison with other ports of the region. (page 4-09, Vol. 1). Also, the Consultants conclude that an average of seven hours delay at the ship berth for each general cargo ship whose time at berth averaged less than two days is not excessive (pages 6-06/07, Vol. 1). The Adviser notes that this method of comparison, i. e. comparing delay time at berth versus ship time at berth, leaves out of consideration, the amount of time ships waited for a berth. The Consultants apparently have used as a basic guide to port operational effectiveness a parameter entitled, "Ship Productivity in Port", defined as tons of cargo handled per foot of berth occupied per day (pages 6-07/08, Vol. 1). This parameter is valid and useful when considering the effectiveness of cargo handling operations while a ship is

at a berth, but it fails to take into account the time ships may wait to occupy a berth and thus it is usually not a valid indicator of overall port performance.

The Adviser uses a different parameter for measuring overall effectiveness of a port. It is defined as the rate cargo moves between ship and shore per hour of total time ships are in port, and is called the "Port Performance Index". The Adviser considers this parameter is valid and especially useful for evaluating a port's overall effectiveness because it takes into account not only the effects of labour performance aboard ship as well as on shore, but also it reflects the effects of all other factors that influence a ship's turnaround time.

The Port Performance Index (PPI) for general cargo movements at the deep-water harbour during twelve months of 1970 and 1971 has been deduced from the Consultants' findings as presented in Tables 6.2, and 6.12 of Volume 2. From these two tables it is deduced that 700 general cargo ships arriving during twelve months of 1970/71 were in port a total of 1,732 days, an average turnaround time of $1,732/700 = 2.47$ days, including time at anchor. Table 6.2 indicates that these 700 ships handled 337,000 tons of general cargo, which represents a port performance index, $PPI = 337,000/1,732 \times 24 = 8.1$ tons per hour. The Adviser considers this to be surprisingly low performance for a port having modern facilities for handling general cargo, and he does not consider it good by international standards nor excellent in comparison with other Caribbean ports, as is implied by the Consultants' evaluation of the port's overall level of labour

productivity. (page 4-09, Vol. 1). The Adviser did not find in the report an indication of what comparisons the Consultants may have made between the operational effectiveness of the Bridgetown deep-water harbour and of other world and regional ports.

Operational statistics for general cargo operations have been collected by the Adviser from various ports of various sizes, world-wide. These are shown in Sketch No. 1 and have been compared with those of the Bridgetown deep-water harbour. Of 165 general cargo cases analyzed, only 24, (14.5 percent) have performance indices less than that of Bridgetown's deep-water operations in 1970/71. The ports considered were of all sizes, having annual tonnages of general cargo from five thousand up to twenty-five million tons. Considering only the ports having annual throughput equal to or less than that of Barbados; there were 81 cases of which 22, (27 percent), had PPI's equal to or less than that of Barbados in 1970/71. The Adviser was able to make limited comparisons between Barbados' performance and that of other Caribbean ports, as listed below:

<u>Port</u>	<u>Port Performance Index</u>	<u>Approximate Annual throughput</u>
Barbados Deep-Water Harbour	8.1	337,000 tons
Port A	2.0	36,000 "
Port B	5.6	114,000 "
Port C	7.9	43,000 "
Port D	11.4	144,000 "
Port E	8.7	48,000 "
Port F	7.4	84,000 "

The ports, A through F above, are smaller than Barbados and none of them have facilities comparable to those at Barbados. It is the Adviser's conclusion that the general cargo operations at Bridgetown's deep-water harbour are definitely not as effective as should be expected.

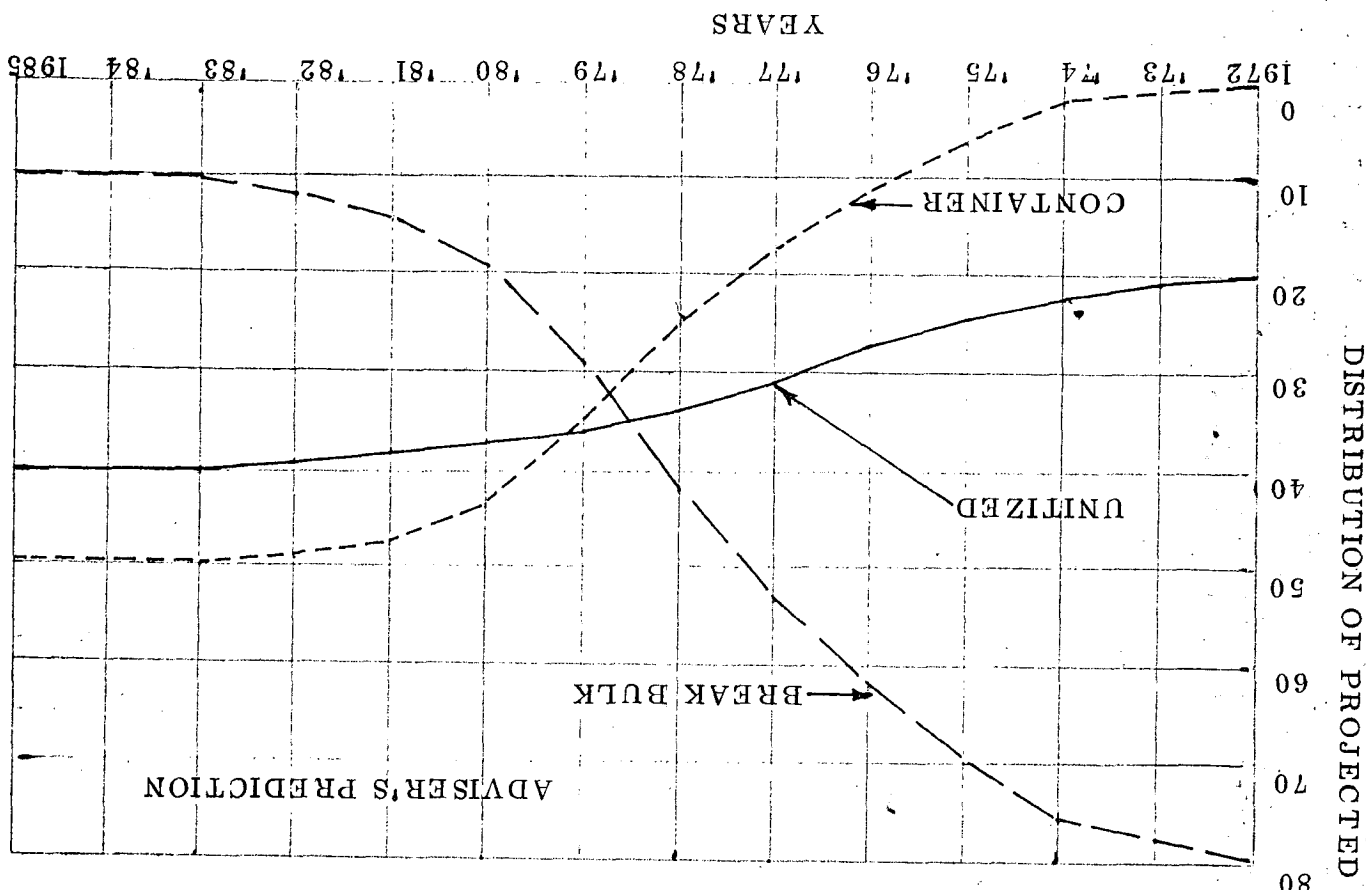
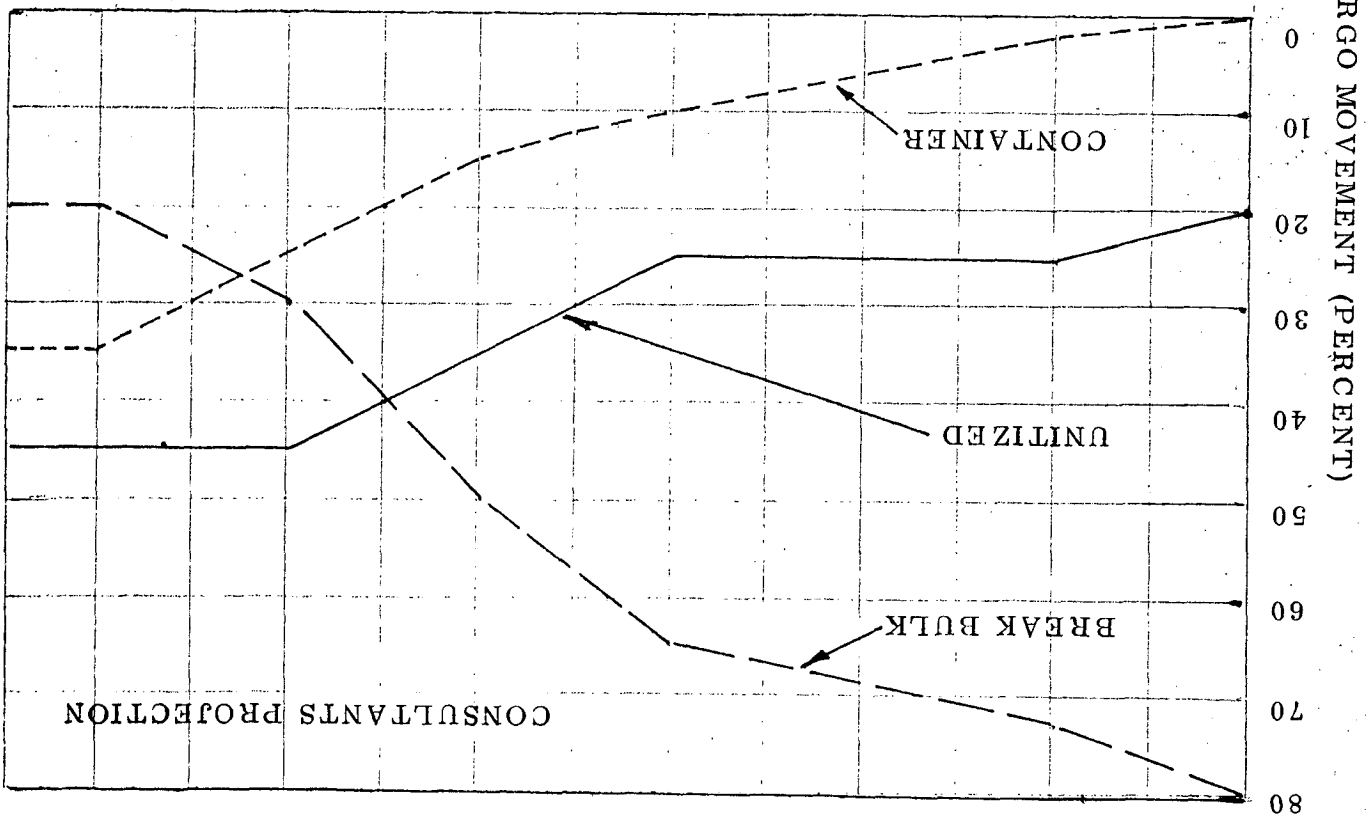
The Consultants have concluded that there is indeed a need for improvement in the use of available facilities at the deep-water harbour and that this should be accomplished before serious thought is given to expanding the port's facilities. The Adviser is in full accord with that conclusion and recommendation. He may differ only with respect to the suggested means for improving present operations and with respect to the urgency for additional port facilities. However, before suggesting ways for improving the operational effectiveness, the Adviser's comment concerning the future use of containers is presented in the following paragraphs.

The Consultants foresee a transition in the forms in which general cargo will be handled through the deep-water harbour, changing from breakbulk (80 percent) and unitized (20 percent) in 1972 to breakbulk (20 percent) and container-plus-unitized (80 percent) by year 1985. The rate of change predicted by the Consultants is rather slow during the first seven years, accelerating during the ensuing six years. The Adviser considers that the Consultants' forecast in this respect is probably ultra-conservative, however, he has no specific facts to site in support of the opinion. It is his subjective view that the amount of container and container-like cargo, such as roll-on/roll-off container-trailers and of unit-loads that may be handled and processed like containers, will rise vis a vis the break bulk form of cargo

more sharply than is foreseen by the Consultants. His feeling in this matter stems mainly from the realization that, historically, the advent of container cargo elsewhere has been definitely more rapid than was predicted by the planners. The Adviser believes that the economies inherent in the use of containers make the early adoption of this form of packaging and handling inevitable within the Caribbean region, as has been done generally throughout the world.

Achievement of the change to a significant amount of cargo moving in containers within the Caribbean intra-regional trade, involving as it does the use of harbours mainly having only moderate depth of water and not having sophisticated container handling cranes, calls for the emergence of shipping capabilities that are mainly non-existent at this time. The Adviser sees every reason to expect that shipping services will emerge to take advantage of the economies offered by container cargo and container-like cargo, as defined above. The Adviser foresees port development planning in the Caribbean region as being coordinated with the development of existing and potential shipping services of the region, possibly resulting in a sharp decline of breakbulk cargo vis a vis the container and container-like cargo. Sketch No. 2 shows the Consultants' projections, graphically, of container, unitized and breakbulk cargo volumes, and illustrates the Adviser's somewhat different view.

The distribution of cargo tonnages between basic forms of cargo: Liquid Bulk; Dry Bulk; Container/Container-like; and of Break Bulk has an important effect on port development planning because it should be



expected that containers and unit loads will move through the terminal with a minimum of delay, usually not requiring the stripping of containers or of the breakdown of unit-loads within the terminal. Most of the container and unit-load form of cargo should not require transit shed space.

It is noted that the Consultants are planning that the transit shed space should be increased about 133 percent, and that accomplishment of the increase is considered most urgent. If the transition to greater tonnages of container and unit-loads should be realized earlier than the Consultants have projected, the amount of additional transit shed space required would be significantly reduced. In addition to the possibility of accelerated use of containers and unit loads, the Adviser foresees a distinct possibility that the rate of moving cargo through the terminal could be otherwise substantially increased, thereby further easing the requirements for both more transit shed space and more ships berth space. How this might be achieved is discussed in the following paragraphs.

The Study shows that there are serious problems in the area of administration that affect the port's overall operational effectiveness. The Consultants make various recommendations with respect to administration of the port, particularly with respect to clarification of responsibilities. Perhaps the most important of these is the recommendation that the Port Department is given greater authority, and the needs for this are well presented in the Study. It is the opinion of the Adviser that the assignment

of responsibility for integrated administration of the port with concomitant authority for discharging the responsibility is imperative, and he considers that such a result is unlikely while administration is performed by a department of Government. The Adviser recognizes that the creation of a Port Authority, in the classic concept, does not automatically ensure effective administration, but he believes the probability that the port will be administered effectively is enhanced under a Port Authority. The Consultants' recommendations concerning port administration seem to have the effect of moving toward a Port Authority by gradual change. The Adviser doubts that a gradual progression toward a more autonomous administrative body is better than an abrupt change. The Adviser suggests that serious consideration should be given to adopting the Port Authority concept for the administration of Barbados' seaports and that this should be given high priority. He believes a Port Authority would be best able to accomplish the administrative reforms that are needed in order to improve port effectiveness. However, the required reforms could be accomplished within the framework of the existing or a modified organization and these should be accomplished in any case. In the following paragraphs the Adviser discusses some ways in which improved effectiveness might be achieved, through administrative action apart from the provision of new facilities.

The Study shows that the movement of general cargo through the deep-water terminal is limited by congestion within the transit sheds, and the causes for the congestion are shown to be complex. The Adviser notes

with special interest the fact that the charges for storage of cargo in the transit shed comprise an important part of the terminal operator's revenue. This is a situation that is not conducive to the most rapid movement of cargo, especially when the terminal is operated by a contractor. In the interest of operating a port terminal most effectively, which means moving the cargo through quickly and thereby minimizing the need for port facilities and possibly obviating the need for expansion, the schedule of charges for storage of cargo within the terminal area should be designed to encourage rapid movement. The cargo storage tariff should not be considered a source of port revenue; to the contrary it should be considered a management tool or device which provides very strong incentives for minimizing the time that cargo remains in the terminal. Such a tariff may be called a penalty tariff. It provides a liberal free period of no charges, followed by sharply increasing rates day by day for cargo remaining beyond the free period, the rates rising so rapidly as to make it imperative that the cargo be removed promptly. Thus the result could be, and hopefully would be, that very little revenue would be received from the storage of cargo in the terminal.

The Adviser suggests two actions with respect to the cargo storage tariff: (1) Adopt a penalty type tariff as described above; and (2) Modify the terminal operator's contract so as (a) to remove storage charges from the contractor's revenue entirely; and (b) to provide instead a schedule of bonus payments whereby the contractor is paid progressively larger bonus payments when storage revenues decline, the maximum bonus being

paid when no revenue is received for cargo storage, should such a performance be accomplished. Thus, strong incentives would be given to both the consignees of the cargo and the terminal operators to move the cargo expeditiously. The Adviser is quite aware that difficult problems remain with respect to the administration of cargo removals. Perhaps the most important of these is the storage of cargo that has not been removed from the terminal within the arbitrary limits set by the terminal storage tariff. Such cargo should move from the terminal to a warehouse outside the port limits. It is suggested that custody of the cargo should at this juncture pass from the port administration to an appropriate department of Government that would be responsible for its disposal.

Overall port effectiveness is affected by port administration in various ways, at various levels, within the operating organization. Thus, a transit shed superintendent's actions are guided by certain criteria while at a higher level in the organization other criteria are more significant. The Adviser considers that the General Manager of the port should be guided by basic parameters which reveal the total effectiveness of the operations. The use of the PORT PERFORMANCE INDEX, as defined earlier in this comment, is recommended for use by the General Manager as the primary indicator of the results of management decisions. Thus, when he notes that performance is trending downward he would be alerted to the necessity for determining the causes and if possible for taking corrective action.

In view of the rate that general cargo moved through the port in 1971, about 8 tons per hour of ships time in port, quite low in comparison with modern ports generally, the port administration may well consider whether there are not some reforms that could be quickly initiated that would raise the index to a more acceptable level. The Adviser suggests that the most immediate problems the port administration should give attention to are those that expedite the removal of cargo from the transit sheds. Of next importance it is suggested that attention should be given to the shortening of ship turnaround time by all means that may be found possible. Toward this objective the Adviser suggests the adoption of a policy that ships having cargo to work will be worked continuously until the cargo movement is completed. Such a policy does not require more man-hours of labour, although it may be necessary to pay a somewhat higher hourly rate for night hours not ordinarily worked under existing policy. The reduced ships time in port that results from continuous cargo handling will justify an increase of port charges as may be necessary to pay premium rates for labour involved in reducing ship turnaround time. Faster ship turnaround, in concert with prompt removal of cargo from the terminal, will affect the island economy in two distinct ways: (1) It will reduce ocean shipping costs, considering all costs from origin to destination; and (2) It will minimize the additional investment for port facilities that may be required to serve expanding trade.

It is suggested that the port administration should actively pursue a

policy of encouragement to all who may consider shipping by means of containers, roll-on/roll-off container-trailers and unit-loads, assuring all concerned that it is the port's intent to provide the facilities that will be required for this mode of transport. The Adviser foresees that substantial amounts of cargo will move in ordinary containers, trailer-containers and unit-loads without the need for an additional ships berth. The Consultants have anticipated that this class of cargo could be moved between ship and shore by roll-on/roll-off methods, utilizing a ship having a ramp door at either the bow or the stern, the ship being berthed at the Cross Berth and having the ship's ramp at the South end of the Quay Wall. The Adviser considers this concept sound and that it would permit the port to handle large amounts of cargo without new facilities except for heavy duty forklifts and straddle carriers that would be required for moving containers and unit-loads between the ship and the stacking area.

The Consultants have estimated that the future increases in the amount of cargo movement will depend upon natural growth of existing industry and the growth of new industry, and they foresee the possibility that entrepot trade may emerge as a new industry. The forecast of increased future port traffic is based largely upon the possible impact of new industry, and especially on the possible entrepot activity. The Consultants consider that existing agricultural industry offers little opportunity for growth.

The need for possible expansion of port facilities depends mainly on the validity of the port traffic projections and since the emergence of a viable entrepot trade is questionable, then the probable need for major expansion is also in doubt. It seems to the Adviser that Barbados is presented with the basic port development problem. Whether to expand to satisfy definite needs? or to expand for the purpose of attracting trade? It appears to the Adviser that Barbados is not strategically situated to command a particular geographic advantage over some other ports of the Caribbean basin that might also aspire to develop an entrepot trade. In such a situation the advantage lies mainly with the port taking the initiative to risk possibly over-building its facilities in its bid to attract the entrepot trade, whether it be called by that name, or as a "free port" or an "export processing zone". The Adviser is not specially qualified to express an opinion whether or not a speculative expansion of the port would attract an entrepot trade of magnitude to justify the investment.

