A. Ashar, National Ports & Waterways Inst.

Port Productivity Revisited

(Published in Port Development International, November 1997)

I. Background and Objective

All-In Port Pricing

"How many container moves per hour do you do?" This used to be one of the most discussed subjects in a gathering of port and shipping people. Port productivity, especially ship handling productivity, topped the agenda of many port and shipping conferences and was the extensively covered professional literature. The attention recently has shifted away, following privatization of the port industry. In the competitive marketplace of ports, the market price, the terminal charges for box handling, is naturally the focus of attention. As is the case in many other markets, port pricing went through a consolidation process, with tariff items being bundled into one inclusive "all-in" charge. This inclusive $-per-move is now at the center of discussion between buyers and sellers, or shipping lines and terminal operators. Discussing productivity, including cranes, gangs, hatchcovers and spreaders, seems unnecessary and, perhaps, a thing of the past.

Productivity Adjusted Price

Unfortunately, there is no relief for those of us who loathed the perpetual dealing with the nitty-gritty of productivity. An all-in terminal charge accounts only for part of the overall port cost. Calling at a port involves a large, *non-cash cost* incurred by lines -- the cost of ships' time. Lines' cost relates directly to ship-handing productivity; higher productivity results in shorter ships' time and lower cost to lines. Terminal operators' cost also directly relates to productivity. The cost structure of modern terminals includes a large proportion of fixed costs for facilities, equipment and labor. Higher productivity results in lower production cost, which provides for lower handling charges.[1] Altogether, ship-handling productivity remains a critical factor in the privatized port and shipping industry.

A meaningful market pricing system should be based on "productivity-adjusted" charges. A quotation of $-per-move should always be followed by a specification of moves/hour. For example, a terminal handling charge could be quoted as "$150 per ship-to-yard move at an average productivity of 60 moves/hour." Furthermore, the quotation should also include a premium for a higher productivity and a penalty for a lower one. A similar pricing system is common in bulk cargo handling.

Adopting a productivity-adjusted pricing system for containers will better reflect the

---

[1] The terminal (provider) and line (user) costs are components of the so-called system cost. Both are considered when a line is also an terminal operator.

cost structure of both lines and terminal operators. It thus will improve the functioning of the market to the benefit of all parties involved.

Port of Cartagena Competitive Assessment

The Port Society of Cartagena, Colombia, commissioned a study to assess its competitive position in the Caribbean region, following the recent wave of port privatization. A secondary objective of the study was to establish a set of performance indicators to monitor the operational efficiency of Cartagena's container terminal. The study encompassed 13 container terminals: 6 terminals in Colombia and 7 outside Colombia, including Panama, U.S. (Miami), Jamaica, and the Dominican Republic.[2]

Early on in the Cartagena study it became clear that a relevant competitive assessment should include both price and productivity, as claimed in the preceding section. Compiling and comparing terminal charges was relatively simple. Most terminal operators and related entities (pilots, tugs, etc.) had published tariffs, although some adjustments were needed to reflect volume discounts, overtime charges, etc. Calculating ship-handling productivity proved to be much more difficult. Handling rates and performance-related figures were not included in port tariffs, and relevant data on past performance was either kept confidential or, in some terminals, not collected at all.

Moreover, during discussions with terminal managers and line representatives it became evident that there was no agreement on the definition of ship-handling productivity. Lines and operators use different definitions for moves and hours, resulting in different definitions for productivity (moves/hour). It seems that despite the extensive past dealing with productivity, the subject is still in a "fuzzy" state.

Uniform Terminology and Definitions

This paper intends first to re-hash the definitions of the times, activities, and quantities involved in the ship handling process at a marine terminal. Second, it will offer a terminology and a methodology for calculating a set of ship and gang productivity measures. The paper includes some actual data comparing the productivity of 13 terminals in the Caribbean/South Atlantic region. Finally, concluding observations and recommendations are included regarding improving communication in the port and shipping industry.

---

[2] La Sociedad Portuaria Regional de Cartagena, S.A., *Competitiveness Study of the Port of Cartagena*, February 1997.

II. Definitions of Times, Activities, and Quantities

Ship and Gang Times

The services that a ship receives at a port begin when the ship arrives at the entry buoy and ends when the ship passes the buoy on its way out, after finishing loading/unloading its cargo. The actual handling of cargo is performed by one or more gangs, each using a shore-based or ship-based crane. The times and the activities are generally divided into those related to the ship itself, and those related to the gangs or cranes working the ship.[3] The ship handling process involves many activities and times. For simplification, the times are incorporated into 6 functional categories, 3 related to ships and 3 to gangs.

Ship times include:

- ***Port Time*** -- the *buoy-to-buoy* time, the total time that a ship spends at a port, including ship waiting for berth, documents, pilot, tug, bad weather, etc.

- ***Gross Berth Time*** -- the *first-to-last line* time, the total time that a ship is at berth, including ship preparations: waiting for documents, gangs, beginning of shift, change of shifts, availability of cargo, etc.; and major delays during work due to equipment breakdowns, bad weather, etc.

- ***Net Berth Time*** -- the *first unlash-to-last lash* time, or the working time of a ship at berth, during which gangs load/unload the containers and perform related activities such as lashing/unlashing, placing/removing cones, opening/closing hatchcovers, etc. The Net Berth Time includes minor during-work interruptions due to unavailability of cargo, equipment breakdowns, etc.

Gang (crane) times include:

- ***Gross Gang Time*** -- the time that a gang is *available* (assigned) to work a ship and for which the gang is paid, including waiting times before and after work ("stand-by") and interruptions during work.

- ***Net Gang Time*** -- the time that a gang is actually *working*, including handling boxes and performing other, indirect activities, along with during-work minor interruptions.[4]

- ***Net/Net Gang Time*** -- the same as Net Gang Time, but only including the time

---

[3] The paper and study on which it is based only relates to Lo/Lo ships. Gang and crane times are considered to be the same.

[4] An interruption is considered minor if it does not exceed 15 minutes. Interruptions shorter than 5 minutes usually are not recorded at all.