

Port Performance Measures Defined and Applied

Indicator	Performance Measure	Definition & Performance Interpretation	Port Applicability	
			Wilmington	Morehead City
Utilization	Calls	Calls refers to the number of ships entering a port and using its berths to process cargo. The number of calls represents the customer volume of a port and reflects the port's ability to attract new business and maintain previous customers. Increased numbers of calls represent improved levels of volume at ports.	✓	✓
	Crane Hours	Crane hours demonstrate how ports use equipment to process cargo. As throughput changes, corresponding changes in crane hours reflect how ports use employee and equipment hours to process cargo. Increased crane hours reflect greater utilization.	✓	✓
	Berth Occupancy Rate	Berth occupancy rate (BOR) is a measure of a port's utilization of capacity. Increased BOR represents improved usage of port facilities.	✓	
Throughput	Container Moves	Container moves is a measurement of the container volume serviced at a port. Increased container moves are an indicator that throughput is improving.	✓	
	General Cargo Tonnage	General cargo being processed at a port is captured through tonnage. Increased tonnage is an indicator that throughput is improving.	✓	✓
Handling	Claims Value Per Call	Claims amounts paid per call for damaged or lost goods can serve as a measure of the quality of the handling of cargo at ports. Decreased claims value per call represents improved cargo handling quality.	✓	✓
Productivity	Ship Turn Time	Ship turn time shows the time it takes for a ship to be serviced at call. Decreasing values are associated with an increase in efficiency.	✓	✓
	Container moves/hour	Container moves per hour is the best measure of port call productivity. Increasing values are associated with greater efficiency. The industry standard strives for 40 moves per hour.	✓	
	Dwell Time	Dwell time measures yard productivity and is the length of time a port takes to hold and ultimately process containerized goods. Decreasing dwell time represents more efficient use of the yard.	✓	
	Queue Time	Queue time is the length of time a truck waits to enter port. Decreasing gate time is an operational objective.	✓	
	Turn Time	Turn time refers to the total time elapsed between when a truck enters and exits the port. Reducing gate time is an operational objective.	✓	✓
Unit Costing	Cost/Tonnage	Cost per tonnage measures the cost for a port to process a standardized unit of cargo. Gains in efficiency are realized in decreased unit costs.	✓	✓
	Cost/container move	Cost per container move measures the cost for a port to move containerized cargo. Gains in efficiency are realized in decreased unit costs.	✓	

Source: Program Evaluation Division based on a review of literature information provided by the Authority.

Various Port Components Can Restrict Capacity and Throughput

Component	Description	Relation to Throughput and Capacity
Terminal	A terminal is a port facility where vessels are discharged or loaded. Terminals can be defined by their facilities, equipment, the type of cargo handled, physical barriers or boundaries, ownership or operating structure, and other characteristics.	Many ports contain several terminals, each with their own berths, equipment, and land-side storage space, and which may be adjacent to each other or separated by many miles. Terminals vary widely in configuration and infrastructure, and therefore the number and size of terminals alone are not consistent indicators of port throughput and capacity.
Berths	A berth is a place to stop and secure a vessel for cargo transfer or other purposes. Berth locations are often determined by the availability of securement points on the wharf and may not have fixed sizes or boundaries.	Berth length is significant for container and break bulk terminals, where the full length of the vessel must be accessed, but is less significant for bulk and roll-on/roll-off (RORO) terminals, where unloading and loading operations use conveyors, ramps, or other means that do not require accessing the full vessel length. Insufficient berth availability can result in inefficiencies.
Loading and Unloading Equipment	Loading and unloading equipment are terminal equipment used to load and unload different cargo types. These equipment are fixed or mobile and will vary based on the cargo handled and the types of vessels serviced by the port.	Most container vessels are loaded and unloaded with shore-side gantry cranes. Smaller vessels and barges may be handled with on-board equipment or with mobile harbor cranes. RORO cargo and vessels are serviced with ramps. Bulk and break bulk terminals use a combination of fixed and mobile equipment that typically allow for faster loading and unloading of cargo. Operations are limited by infrastructure and operational efficiency.
Waterside Access	Waterside access refers to the waterways, channels, reaches, and anchorages that enable vessels to reach a port.	Limited waterside access can constrain the number and size of vessels that can call at a terminal.
Channel	A channel is a navigable waterway leading from open water to port terminals. Many channels are dredged to accommodate larger vessels and require periodic maintenance.	The shallowest point of a channel can be a limiting factor on the size of ships that can access a terminal. Channel access also may be limited by air draft restrictions imposed by overhead features such as bridges or power lines.
Modal Connections	Modal connections are the connections for moving cargo between vessels and surface transportation modes, including road, rail, and pipeline.	Road access is used for containers, bulk, break bulk, and RORO cargo. Highway capacity and congestion can constrain throughput. Rail is the primary mode of moving dry bulk export commodities such as coal and grain to port terminals and connects coastal container ports to inland import and export markets. For container terminals, rail intermodal connections are described as on-dock, near-dock, or off-dock. More efficient cargo handling is possible when rail facilities exist on dock.
Cargo/container storage and chassis depots	Cargo/container storage and chassis depots are places to store cargo, shipping containers, or container chassis outside of port terminals.	Off-terminal storage can include space for cargo before and after it is transferred to or from vessels. A lack of storage space may constrain the overall capacity of a terminal, as cargo cannot be stored prior to loading or while it awaits pickup after unloading.

Source: U.S. Department of Transportation, Bureau of Transportation Statistics, *Port Performance Freight Statistics 2018 Annual Report to Congress*.