

IMPROVING AMERICAN
COMPETITIVENESS:
BEST PRACTICES BY U.S. PORT
COMMUNITIES

21st Century U.S. Port Competitiveness Initiative
U.S. Department of Commerce

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Message from U.S. Secretary of Commerce Penny Pritzker

To stay competitive in the 21st Century – and encourage economic growth – America’s ports, stakeholders, and supply chains must address a host of new challenges, including increasing trade volumes, vessel sizes, and industry complexity.

Our ports need new ways to achieve efficiencies that speed their operations and the flow of their stakeholders’ cargo. It has become crucial for ports to have an open dialogue with the full range of their stakeholders to address challenges that inhibit operational efficiencies.

The U.S. Department of Commerce’s mission is to promote job creation, economic growth, sustainable development, and improved standards of living for Americans. In an important step towards this mission, the Department is working with U.S. supply chains and stakeholders to help them improve competitiveness, develop innovative technologies, and respond to system shocks and emergencies. Since becoming Secretary in June 2013, I have been personally committed to the Administration’s efforts to achieve this goal.

In the last three years, I have seen first-hand the substantial contributions that our ports make to the U.S. economy, as the gateway for over 70% of America’s international merchandise trade. I have also seen the significant effects of port slowdowns and congestion impacting U.S. economic and job growth. One of my highest priorities has been to help America’s seaports and stakeholders achieve operational improvements that will allow them to reduce port congestion and enhance U.S. supply chain efficiency and competitiveness.

Last March, Transportation Secretary Anthony Foxx, Labor Secretary Thomas Perez, and I held a groundbreaking dialogue with the entire range of U.S. port and stakeholder interests. This event raised the national awareness of the crucial role that ports play as key drivers of the U.S. economy.

At the meeting, I announced that my Department would continue the dialogue by convening regional roundtables with ports and stakeholders to share their best practices in improving port efficiency. This initial report presents our findings to date, together with recommendations of my Department’s Advisory Committee on Supply Chain Competitiveness (ACSCC) and input received from members of the public and other sources.

As 2017 begins, I believe we are entering a moment in which the United States has an opportunity to strengthen its leadership in the global economy. U.S. seaports, stakeholders, and users that take voluntary and discretionary action now to implement these best practices will play a crucial role in improving the Nation’s competitiveness throughout the 21st Century.

Thank you,

Penny Pritzker
U.S. Secretary of Commerce

1. Chapter 1: Executive Summary and Findings

The following report on operational best practices by U.S. port communities reflects findings and lessons learned during regional port roundtables convened by U.S. Secretary of Commerce Penny Pritzker in 2016; recommendations from the Department's Advisory Committee on Supply Chain Competitiveness (ACSCC) in January and October 2016; and input obtained from a May 2016 request for public comment and other sources.

The lessons learned through this process describe operational practices that individual U.S. ports and their stakeholders have adopted, or are considering, to facilitate cargo flow, reduce congestion, address system shocks, and improve competitiveness. The Department is sharing these best practices so that each port community can consider whether they might adopt comparable measures that are appropriate to their circumstances.¹

Key findings and best practices include:

- Working groups with broad port community participation² benefit individual ports by providing forums for productive information sharing and collaboration.
- Customized information technologies based on a standard set of maritime cargo data elements can improve operational efficiency and cargo status data flow throughout the port community.
- Workforce development investment is needed to equip workers to adjust to changing vessel sizes, cargo flow demands, and innovative technologies.
- Public-private investment should be expanded to improve port operations, infrastructure, and information technology.
- Maintaining reliable, predictable operations and financial stability within the ports community creates a more attractive environment for public-private investment in operational, infrastructure, and technology improvement.
- Benchmarks, if used, need to be measurable, voluntarily agreed to by community members, and focused on identifying efficiency problems and evaluating the impacts of improvements.

¹ This Department of Commerce effort is not related to the U.S. Department of Transportation's effort to develop U.S. port performance metrics as required by Section 6018 of the Fixing America's Surface Transportation Act.

² Unless otherwise noted, this report will use the term "port community" to mean individual ports and the full range of that port's stakeholders and supply chains, including labor; terminal operators; maritime, truck, and rail carriers; cargo owners; warehouse and distribution operators; chassis and other operating equipment providers; and other affected local interests.

In addition to highlighting these best practices, the Department is taking steps to support their implementation. Discussed in greater detail in Section Four of this report, these include:

- Helping individual port communities organize roundtables to discuss port-supply chain optimization.
- Implementing a strategic partnership with the University of Southern California (USC) to improve the digitization of America's supply chains and the market availability of port community information-sharing technologies through conferences and hackathons.
- Continuing to convene the ACSCC and supporting further expansion and implementation of its recommendations.

This initial status report includes a number of best practice examples that have already been implemented by individual ports and stakeholders. The Department recognizes that a number of these practices are still being considered by industry. Additional examples, subsequent implementation of these best practices, and further best practices as provided by the ACSCC and as obtained through future port roundtables will be made publicly available.

2. Chapter 2: Background

a. Introduction

The efficiency and productivity of U.S. seaports and their connecting infrastructure is crucial to our Nation's ability to successfully compete in the global marketplace. Seaports are the primary gateway for U.S. merchandise imports and exports, by both volume and value. Over 70% of America's international merchandise trade flows through our seaports, linking our producers and retailers with their sources and customers and our supply chains with the global economy.³

Our ports' ability to facilitate this trade flow is essential to our supply chains' capability to deliver goods to customers on time and at the lowest possible cost. This is crucial to exporters' ability to compete in the global marketplace and take advantage of expanded sales opportunities made possible through new trade agreements. The American Association of Port Authorities estimates that for every \$1 billion in exports that are shipped through U.S. seaports, 15,000 U.S. jobs are created.⁴

Over the past decade, U.S. port stakeholders have continued to report that operational inefficiencies have kept America's ports and supply chains from keeping pace with the growth of U.S. trade and quickly-changing maritime industry and shipping trends. Efforts to resolve these issues have been complicated by limited communication throughout the port community. As a result, port congestion has become an increasingly serious risk to ports and supply chains' ability to compete in the global economy.⁵

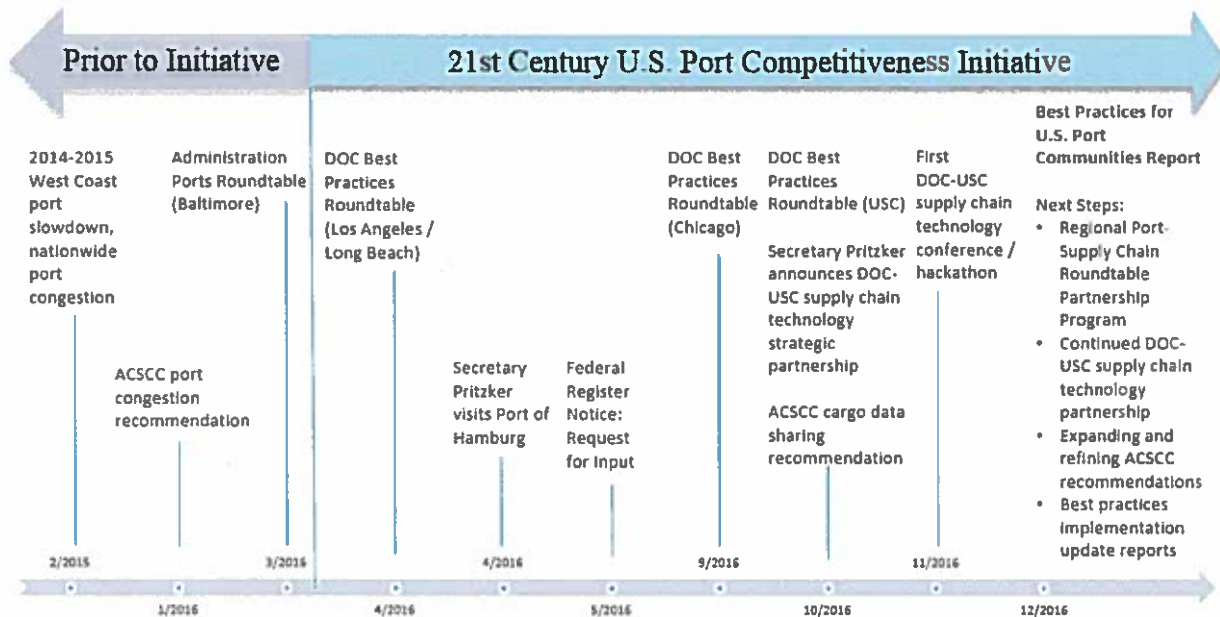
Over the past year, the Department has taken a number of steps to work directly with ports and supply chain communities to identify the underlying causes of port and supply chain inefficiencies and to identify best practices to address these issues.

³ According to the U.S. Department of Transportation's Bureau of Transportation Statistics, U.S. waterborne transportation handled 71.6% of U.S. international merchandise trade tonnage in 2014, valued at over \$1.75 trillion. Please see http://www.rita.dot.gov/bts/sites/rita.dot.gov.bts/files/data_and_statistics/by_subject/freight/freight_facts_2015/chapter2/table2_9_text

⁴ "Exports, Jobs & Economic Growth," American Association of Port Authorities, <http://www.aapa-ports.org/advocating/content.aspx?ItemNumber=21150>

⁵ *U.S. Container Port Congestion & Related International Supply Chain Issues*, July 2015, Federal Maritime Commission, page 2. Please also see <http://trade.gov/td/services/oscpb/supplychain/acsc/Meetings/2016January/Jan%202016/Port%20Congestion%20Recommendation%20and%20Transmittal%20Letter.pdf>

21st Century U.S. Port Competitiveness Initiative Timeline



b. West Coast ports slowdown 2014-2015: operational and national economic impact issues

The impacts of operational issues on U.S. ports and supply chains were dramatically illustrated in 2014 and 2015. U.S. seaports and supply chains experienced a series of major systemic shocks due to a confluence of short- and long-term maritime industry factors, including:

- the breakdown of longshore labor contract negotiations at America's West Coast seaports;
- the arrival of a new and increasingly large class of container vessels at U.S. ports;
- changes in container chassis ownership and distribution patterns, resulting in a shortage of container chassis;
- near-record seasonal cargo volumes; and
- shippers' temporary diversion of their West Coast container trade to East and Gulf Coast seaports during the negotiations.⁶

The combination of these factors led to seaport congestion and supply chain disruptions on the West Coast and nationwide, with U.S. shipping industries reporting losses in foreign market

⁶ Please see *U.S. Container Port and Related International Supply Chain Issues*, Federal Maritime Commission, July 2015, at http://www.fmc.gov/assets/1/Page/PortForumReport_FINALwebAll.pdf, and *U.S. Inland Containerized Cargo Moving through Canadian and Mexican Seaports 2015*, at <http://www.fmc.gov/assets/1/Page/4thAnnualUpdateStudyUSInlandContainerizedCargo.pdf>.

shares, the inability to meet sales commitments, and domestic inventory shortages. West Coast agricultural exporters reported substantial market losses in Asian markets due to their inability to meet shipping commitments during this period,⁷ and manufacturers reported production cuts due to component shortages.⁸ A Department estimate found that seaport congestion on the West Coast alone between November 2014 and February 2015 may have resulted in nationwide losses of \$5.5 to \$11 billion in exports, \$7.2 to \$12 billion in imports, and \$7.8 to \$12.1 billion in Gross Domestic Product, based on the value of trade affected during this period.

In February 2015, at the request of President Barack Obama, Secretary of Commerce Penny Pritzker and Secretary of Labor Thomas Perez met with West Coast port and longshore labor union executives to urge them to resume their stalled contract negotiations.⁹ Subsequent labor-management discussions ultimately led to a new five-year port labor contract for the West Coast, helping to restore normal port operations.

c. ACSCC recommendations on port congestion: January 2016 and October 2016

In January 2016, the Department of Commerce's Advisory Committee on Supply Chain Competitiveness (ACSCC)—a 45-member group of senior U.S. supply chain executives, academic experts, and industry stakeholders, including U.S. seaports, retailers, and manufacturers—adopted a set of recommendations for reducing port congestion and improving port efficiency. The ACSCC's recommendations are included in Appendix I of this report.

These recommendations noted that the Federal Government's ability to directly resolve these issues is limited, as virtually all of the operational and infrastructure elements at each port community are owned by the private sector or by state, local, or municipal government entities. The Committee urged Secretary Pritzker to advance a comprehensive set of best practices for port congestion reduction that the private and public owners and stakeholders of each port could voluntarily adopt as appropriate.

The Committee subsequently adopted an additional recommendation in October 2016 on specific container cargo status data elements that ports and their stakeholders should share with each other to facilitate the flow of cargo from ports into supply chains and improve the operating efficiency of U.S. seaports. The recommendation is included in Appendix II of this report.

⁷ http://www.capitalpress.com/Nation_World/Nation/20150205/port-slowdown-has-damaged-western-ags-export-markets

⁸ <http://money.cnn.com/2015/02/17/news/economy/port-shutdown-impact/>

⁹ http://www.joc.com/port-news/longshoreman-labor/us-commerce-secretary-joins-ilwu-pma-talks_20150219.html

d. Administration Ports Roundtable: Baltimore, March 2016

In March 2016, at the Port of Baltimore, Secretary Pritzker, together with Secretaries Foxx and Perez, convened a ports roundtable with shippers, manufacturers, retailers, organized labor, and port operators from around the country to discuss how to reduce U.S. port congestion and improve efficiency. At the event, Secretary Pritzker announced that the Department of Commerce would build upon the Baltimore dialogue by convening regional port roundtables around the United States. The goal of the roundtables is to bring ports and their stakeholders together to identify best practices for improving cargo flow and facilitating information-sharing between ports and supply chains.

e. Commerce Regional Port Roundtables: Los Angeles, April 2016; Chicago, September 2016; and University of Southern California, October 2016

Secretary Pritzker subsequently convened a series of local port roundtables in 2016, including meetings in Los Angeles (April 2016), Chicago (September 2016), and at the University of Southern California (USC) (October 2016). The roundtables brought together a wide variety of local and regional stakeholders to discuss what they have done to improve their port community's efficiency and competitiveness.

At each of the roundtables, the participants emphasized that ports need to establish local port-supply chain working groups that include the full range of a port's stakeholders and users, and that information-sharing among port community members needs to be improved. The roundtable discussions also highlighted what these port community groups can do to overcome local operational and coordination challenges, with participants reporting a variety of steps that they have taken in their port community. For example, at the Los Angeles roundtable, truckers, terminals, and others described how the San Pedro Bay Supply Chain Working Group helped them find ways to work together to improve the efficiency of container pickup and movement operations. Port labor and management at the Los Angeles roundtable also announced plans to consider extending their West Coast longshore labor contract well in advance of its 2019 expiration, underscoring the importance of open dialogue and working together. The need for an information technology platform to communicate cargo status information throughout the port community was also a key topic at the Los Angeles, Chicago, and USC roundtables. The lessons learned from these roundtables are included in this report.

f. Secretary Pritzker visit to the Port of Hamburg, Germany (April 2016)

On April 27, Secretary Pritzker visited the Port of Hamburg to see how a leading port outside the United States has been able to address congestion and infrastructure challenges. Hamburg has used digitization, inland road sensors, a port community information-sharing platform, and other technologies to improve waterway navigation, reduce truck congestion, and facilitate cargo movement. These technologies have helped Hamburg to improve its ability to handle megavessels and attract global trade.

g. Federal Register Notice: May 2016

On May 27, the Department published a Federal Register notice, entitled “*21st Century U.S. Port Competitiveness Initiative: Request for Public Comment*,” seeking input from the public on U.S. seaport efficiency and competitiveness issues to supplement the roundtables. The notice included the following best practice-related questions:

- What are the most important challenges and opportunities facing U.S. port-related operations and efficiency?
- What are best practices for improving port-related operations? How can the Federal Government help to share these best practices nationwide?
- How can the Federal Government best collaborate with stakeholders (state, local, labor, industry, port authorities, academia, financial institutions, etc.) to enhance U.S. port-related competitiveness?
- How can technology and data be used to improve U.S. port and supply chain performance? What mechanisms, if any, should the Federal Government deploy to promote information-sharing and develop a common technology platform?
- Are there actions that have been taken by specific U.S. or foreign ports or other nations that should be highlighted as best practices for U.S. ports?

The Department received seventeen responses from a variety of groups, including ports, labor unions, cargo owners, retailers, customs brokers and forwarders, and waterfront employers. Their comments reinforced the operational best practices that ports and industry members had raised during the roundtables.

3. Chapter 3: Best Practices

In sharing these best practices, the Department notes that they may be more or less applicable to individual ports, depending on their size, cargo mix, operating model, and the extent of port authority involvement in facility operations.

For the purposes of this report, the following definitions were used to differentiate port operating types.

- *Landlord ports* typically lease public, port authority-owned land to private sector terminal operators, which independently manage terminal facilities at the port and are responsible for day-to-day terminal operations and stakeholder relations. Almost all of the United States' seaports are operated as landlord ports.
- *Operating ports* are typically state government entities that own the port terminals and other facilities and operate them directly through the public port authority. Five of the United States' major seaports – Houston, Savannah, Charleston, Virginia, and Baltimore – are operating ports.

Several major U.S. landlord complexes, including Los Angeles-Long Beach and Seattle-Tacoma, have begun to evolve into “hybrid” ports, where the port authority coordinates closely with its terminal operators and their cargo owner users to facilitate day-to-day operations and cargo movement planning.¹⁰ “Hybrid” operations allow landlord ports to work directly with their stakeholders, as operating ports do. These port authorities report that their direct stakeholder engagement leads to better collaboration to improve cargo flow, respond to port emergencies, react to trade trends, and handle container megavessels.

Port-Supply Chain Working Groups

A number of U.S. ports have achieved operational benefits by establishing comprehensive stakeholder working groups, with broad mandates and regular meetings. Ports and stakeholders at the roundtables emphasized the importance of these working groups to a port's ability to communicate with its stakeholders, collaborate with them on port-supply chain optimization efforts, and react quickly to emergencies.

Stakeholders report that these working groups are most effective when they include representatives of the full range of port community interests, and meet together on a regular basis. These steps promote full, open discussion among ports and their supply chains and support collective action to identify and implement process improvements in cargo movement, system performance, and operational and infrastructure efficiency.

The stakeholders added that these working group discussions often result in better system and cargo flow visibility, predictability, and reliability; better use of advance analytics, planning, and

¹⁰ “Successful U.S. Ports Integrate Shippers Into Operations,” *Journal of Commerce*, March 9, 2016, http://www.joc.com/port-news/us-ports/successful-us-ports-integrate-shippers-operations_20160309.html

forecasting; and the ability to ensure that sufficient manpower, equipment, and yard/terminal space is available and in place prior to megavessel and cargo arrival. The working groups also result in faster and more effective port community responses to factors that result in slowdowns, disruptions, and congestion. Among these factors are rapid changes in trade trends and cargo flows and local or national conditions.

- In 2015, the “hybrid” ports of Los Angeles and Long Beach jointly established the San Pedro Bay Supply Chain Optimization Working Group.¹¹ The Working Group was created to facilitate the ports’ work with their stakeholders to devise cargo conveyance solutions that enhance velocity and efficiency throughout the ports and the supply chains that use them. These solutions include measures that improve the efficiency of marine terminal, trucking, rail and vessel operations. The group provides a framework through which the ports have improved their ability to collaborate and communicate with stakeholders and supply chains.
- The Port of Los Angeles reports that as a result of the relationships developed through the Working Group, the ports and their stakeholders have devised the following efficiency improvements:
 - Creating a port community information-sharing portal at the Port of Los Angeles to provide pre-arrival information on incoming container loads to port stakeholders. The portal, now in pilot stage, allows the Port of Los Angeles and its stakeholders to plan and optimize their container movement operations and resource use weeks in advance of cargo arrival. This permits them to handle increasingly large container vessels without delay or congestion.
 - Establishing “peel-off” container stacking and offsite yards for containers destined to high-volume customers, allowing faster container flow, improved use of limited port and terminal space, and faster truck turn times.
 - Creating a common-use, multiple-provider container chassis pool for both ports (also known as “the pool of pools”) that facilitates chassis pickup and drop off for truckers while improving overall chassis availability.
 - Improving the ports’ use of metrics to analyze how best to measure gate turn times (i.e. time spent by truckers within the port to discharge and pick up container loads).
- The stakeholder relationships developed through the Working Group were crucial to both ports’ response to the Hanjin Shipping Co. bankruptcy in 2016. During this emergency, the Working Group met formally and in daily conference calls to devise immediate solutions to the severe container and chassis displacements resulting from the bankruptcy. The Port of Los Angeles reports that this collaboration helped the ports to remain open despite a twenty-five percent reduction in container chassis availability during the crisis’

¹¹ https://www.portoflosangeles.org/newsroom/2015_releases/news_joint_032515_supply_chain.asp

peak impact. These working relationships also helped the ports and their stakeholders to resolve other Hanjin-related operational impacts in relatively short order.

- In late 2013, the landlord Port of New York and New Jersey established the Port Performance Task Force. The task force served as a mechanism for port stakeholders to discuss areas of common interest; identify challenges to port efficiency and service reliability; and recommend potential solutions and key performance indicators to measure implementation status and impacts. The task force has since been continued as the Port's Council on Port Performance,¹² which meets on a bi-monthly basis.
- The Task Force produced a report with twenty-three recommendations, including the following top-priority items:
 - Implementing chassis and truck management improvement systems;
 - Using an integrated port community system to optimize logistics planning and information-sharing;
 - Aligning terminals' gate hours, including coordinated extended gate hours where possible;
 - Using radio frequency identification technologies to measure and report on truck movements.¹³
- In response, the port implemented its Terminal Information Portal System (TIPS) to improve truck and chassis management, cargo movement, gate operations, and information-sharing at the port. The implementation of other Task Force recommendations is being monitored by the Council's Implementation Team.
- At the Northwest Seaport Alliance (the port management authority for the ports of Seattle and Tacoma)¹⁴, the ports' Executive Advisory Committee has collaborated with their local industry partners on the following key initiatives:
 - Implementing additional gate hours at the terminals, which has increased terminal fluidity and helped decrease gate congestion.
 - Developing local key performance indicators that have helped the ports identify and measure the results of port efficiency improvements.
 - Reaching agreement on the functionality requirements that the ports need to meet when implementing its proposed advance-information port community platform.
 - Establishing a partnership with the ports' longshore labor union local to create a training program to increase the number of available crane operators and boost the productivity of vessel operations.
- Through the Port of Oakland's Efficiency Task Force, port officials are working with stakeholders to prioritize and implement the efficiency measures included in the port's

¹² <http://www.panynj.gov/port/council-on-port-performance-archives.html>

¹³ <http://www.panynj.gov/port/pdf/pptf-final-report-factsheet.pdf>

¹⁴ https://www.nwseaportalliance.com/sites/default/files/nwsa_overview_2015.pdf

plan to move cargo more efficiently. The Task Force, comprised of experts from shipping lines, marine terminal operators, cargo owners, harbor truckers and dock workers, initially identified three priorities:

- Ending vessel backlogs that force some ships to temporarily anchor in San Francisco Bay instead of berthing.
 - Ensuring the availability of enough dockworkers, marine clerks, and equipment to efficiently manage high volumes of containerized cargo.
 - Establishing extended hours and an appointment system to help harbor truckers get cargo in and out of Oakland quickly.
- The Task Force's benchmark subcommittee identified several benchmarks that will help the port focus improving cargo-handling and speed. Two of the recommendations related to driver wait time to pick up loads and chassis fleet availability. The Task Force also conducted a survey of port customers to determine the best way to spread the workload. The survey found that over three-quarters of those surveyed wanted night gates, not weekends, to extend hours for cargo pick-up and delivery.¹⁵
 - In response to Task Force recommendations, the Port's terminals have introduced or increased weeknight gates, resulting in an easing of daytime crowding at the gates.¹⁶ In December 2016, a third terminal began requiring appointments for all import container pick-ups.¹⁷

Other U.S. ports have established issue-specific dialogues with multiple stakeholders to improve collaboration and action to address such issues as port productivity, gate congestion, and truck turn times and their impact on local environmental quality. This less comprehensive approach is more commonly seen at operating ports, where the port authority and its terminals work directly with individual stakeholders on a day-to-day basis.

- The Port of Baltimore, as an operating port, has held regular discussions with truck drivers, community representatives, and other stakeholders to discuss the impacts of truck turn times on truck driver retention, local neighborhood congestion, and local environmental quality. These discussions have led to the following operational and productivity improvements:
 - Implementing radio frequency identification technologies at Baltimore's Seagirt Marine Terminal, which allow trucks and their drivers and their intended transactions to be identified at the terminal gate;
 - Developing a secondary gate at the Seagirt Terminal, which will allow faster truck turn times and container movement when the gate is opened in January 2017;

¹⁵ <http://www.portofoakland.com/press-releases/press-release-496/>

¹⁶ <http://www.portofoakland.com/press-releases/port-oakland-survey-night-gates-best-way-spread-workload/>

¹⁷ <http://www.portofoakland.com/press-releases/third-port-oakland-terminal-mandates-truck-appointments/>

- Identifying handling techniques that help speed container flow and result in less container and cargo damage, through Baltimore's monthly Quality Cargo Handling Action Team meetings;
 - Developing expedited truck lanes for high-volume container cargo owners to improve container flow velocity and optimize terminal space use.
- The Port of Charleston, an operating port, hosts regular contacts with its full range of stakeholders on a formal and informal basis to discuss various port efficiency topics, including port-stakeholder communication, the status of productivity improvements, new equipment and technologies, and cybersecurity.
 - Charleston reports that stakeholders have told the port that communication breakdowns had resulted in operational failures and missed shipping opportunities.
 - In response, the port now holds daily conference calls that are open to all stakeholders. These calls provide opportunities to share information and collaborate on issues that impact port operations and cargo movement.
 - Stakeholder collaboration was key to Charleston's implementation of its new Advanced Gate System and GO!Port truck appointment system at the Wando Welch Terminal in June 2016. Through stakeholder outreach, the port was able to prepare truckers and other port users to use these new systems. Through these systems, gate moves at the terminal have increased by almost 2,000 moves per day.
 - The operating Port of Virginia has established two focus groups – a new Stakeholder Committee, and the existing Motor Carrier Committee – which meet every other month to discuss trucking issues and general port-stakeholder coordination. In addition, the port has organized a number of short-term task forces on specific issues of concern, including congestion, port productivity, and truck carrier-related matters.
 - The Motor Carrier Committee's discussions have led to the implementation of gate improvements that have expedited container flow, reduced truck turn times, and alleviated congestion within the port.

At each of the roundtables, participants urged ports to include the full range of their stakeholders in these working groups and collaborative activities, given the wide number of stakeholder interests and supply chain activities involved. The complex and interrelated nature of supply chains means that port operations and cargo movement can often be affected by unrelated operational or infrastructure breakdowns before cargo arrives at or leaves the port. As such, fully inclusive port-stakeholder outreach and dialogue is needed to improve the efficiency and competitiveness of both the ports and the stakeholders and supply chains that use them.

Benchmarking and Measurement

A number of ports have begun to implement benchmarks that help them better track port operations, and identify the operational improvements that yield the most productive results. In some cases, stakeholder working groups are working with their ports to identify and agree to benchmarks that are appropriate to their port community.

- The Port of Savannah's key performance indicators include truck turn times, truck speed within the port gates, number of gate moves per day, and rail loading times. Savannah's use of these metrics has helped to optimize truck and rail loading activities and has sharply reduced truck wait times.
- The Port of Los Angeles has implemented a set of key local performance measurements that quantify the impacts of port and terminal operational improvements and help achieve port terminal operational objectives. These metrics are used to measure the impacts of these improvements on vessel handling speed, gate wait times, and on-terminal container dwell time.
- As noted, the Port of Oakland's Task Force's benchmark subcommittee identified several benchmarks that will help the port focus on improving cargo-handling and speed. Two of the recommendations related to driver wait time to pick up loads and chassis fleet availability.¹⁸

Port stakeholders recommended that operational improvements made by port communities should be measurable and quantifiable, using key performance indicators agreed to by each community.

Information-Sharing Technologies

A number of U.S. seaports have implemented, or are developing, digital port community information-sharing technologies. These technologies, known as port community systems or port platforms, help ports and stakeholders handle increasingly large container vessels and cargo volumes. Cargo status information-sharing prior to vessel arrival was crucial to the Port of Los Angeles' ability to handle the 18,000-container megavessel CMA CGM *Benjamin Franklin* without disrupting port and supply chain activities or causing congestion when this vessel first arrived in the United States in December 2015.¹⁹

Stakeholders have reported that digital port platforms are critical to ports' ability to share this cargo data with their stakeholders. They added that such systems, which are now emerging in the United States, allow secure, reliable, and cost-effective communication of operational and situational status information.

¹⁸ <http://www.portofoakland.com/press-releases/press-release-496/>

¹⁹ http://www.joc.com/port-news/us-ports/port-los-angeles/port-la-%E2%80%98flawless-handling-largest-mega-ship-call-us-shows-effort-paying_20160118.html

Pre-Arrival Cargo Information-Sharing

- In November 2016, the Port of Los Angeles announced that it has partnered with GE Transportation, APM Terminals, Maersk Line, and Mediterranean Shipping Co. to pilot the first port community information-sharing platform to share pre-arrival cargo data.²⁰ This data includes cargo status elements recommended by the ACSCC in October 2016. The platform will provide this data to the terminal operator, cargo owner, trucker, rail operator, longshore labor, and others involved in moving a particular container through the port. When this platform is implemented, a stakeholder will be able for the first time to use this advance data to optimize how to move its cargo through the port and have the resources in place to do so by the time the vessel arrives.
- Similar advance-data port platforms are now being considered by other U.S. ports, such as Seattle/Tacoma, Long Beach, and Oakland, according to participants at the November 2016 *Supply Chain Digital Transformation: Innovating Port Community IT Systems* conference. This conference, held through a partnership between the Department and the University of Southern California, is further discussed in Chapter 4.

Post-Arrival Cargo Information-Sharing

A number of other U.S. ports have implemented portals that provide after-arrival terminal and container status data to port users, including such information as container availability, vessel schedules, first/last cargo pickup and delivery cutoff dates, gate transaction details, and empty container return locations.

- In 2015, the Port of New York and New Jersey established the Terminal Information Portal System (TIPS), the initial system created by terminals to provide better transparency into the status of terminal operations. TIPS allows truckers, shippers and other service providers to check container availability, export bookings, and other information before dispatching drayage drivers to the terminals. TIPS also provides interactive functionality for empty container return locations and vessel schedules. The post-arrival cargo information available through TIPS permits truckers, cargo owners, and other port users to better schedule and optimize their container pickup operations. The information available through TIPS includes:
 - Import container availability and terminal operations information, including terminal status, container availability, and U.S. Customs and other Federal agency hold and release status.
 - Booking inquiry information, including vessel availability, terminal arrival, and voyage and line information.
 - Vessel schedules, including cargo delivery cut off times.
 - Empty container return options.²¹

²⁰ http://www.joc.com/port-news/us-ports/port-los-angeles/ge-la-port-pilot-program-pursues-mega-ship-productivity-gains_20161115.html

²¹ <http://www.porttruckpass.com/documents/TIPS-FAQ.pdf>

The port is planning to hold a hackathon event in January 2017 to identify how computer systems and other technologies can be further used to address industry challenges, such as planning distribution networks and developing port-wide resiliency plans.²²

- The Port of Houston established the Lynx Customer Portal, which provides accessible information about containers, vessels and trucks that move through Houston's Barbours Cut and Bayport terminals. The information shared through the Lynx platform includes:
 - Visibility to vessel schedules (including first receive dates and cargo cutoff dates)
 - Booking/bill of lading inquiries
 - Container availability queries
 - Gate transaction details
 - Notification features for available containers
 - Equipment details and history
 - Management of container holds²³
- DrayQ – a mobile application developed by the Port of Oakland and now used by a number of U.S. ports – provides visibility into real time port and terminal operating status data.²⁴ This application allows truck drivers and other users to see terminal wait times, street wait times, and overall wait trends. This has permitted drivers to determine the optimal time to enter a terminal and to reduce the time spent in congestion.
- Oakland also introduced DrayLink, a related mobile application that connects harbor truckers with shippers and the companies that dispatch drivers. The application provides validated wait-time reports for the truckers who register and verifies driver compliance with regulations required to access the terminal. The application helps the port obtain confirmable data on how quickly terminals are moving containers for cargo owners. Through the application, shippers and trucking firms are also able to monitor driver location and progress in real time to improve dispatching.
- Oakland commissioned the applications to meet demand for accurate measurement for turn times. It previewed the applications with truckers in its Trucker Work Group and stakeholders in its Efficiency Task Force.²⁵

Port stakeholders noted the importance of sharing pre-arrival container cargo data between the port and broader community. They emphasized that having this data before vessel arrival is critical to ensuring that ports and their stakeholders can plan and optimize their container operations and can have sufficient vessel and cargo handling resources, capacity, and labor in place in time to handle large vessels' cargo efficiently and without port congestion.

²² <http://www.panynj.gov/port/pdf/PPP-Minutes-110916.pdf>

²³ <http://208-110-207-161.biz.houston.comcastbusiness.net/container-terminals/bayport/lynx-access/>

²⁴ http://www.joc.com/port-news/terminal-operators/seattle-tacoma-ports-flex-apps-reduce-terminal-time-waits_20161021.html

²⁵ <http://www2.laufer.com/port-of-oakland-launches-smart-phone-apps-for-harbor-truckers.html>

Stakeholders want information sharing technologies to capture and share a standard set of maritime cargo operational status data elements that are being used by U.S. ports. As noted, in October 2016, the ACSCC recommended a list of key data elements that are fundamental for effective information-sharing among ports and their stakeholders.

Building on these best practices, port stakeholders also stated that the information technologies and standards developed for these technologies should be generally usable by all U.S. ports while customizable as needed to meet the needs of individual ports and their communities.

Separately, port stakeholders recommended that importers and exporters should consider implementing a common platform that would help users identify the location and availability of empty containers. Such a platform would facilitate exports, improve cargo flow, reduce time and travel for empty container pickup, reduce emissions, and increase environmental sustainability.

Environmental Technologies

A number of U.S. ports are meeting environmental goals and requirements by implementing technologies that address adverse environmental effects that may result from port operations and cargo movement. Several of these technologies also help to improve port and cargo flow efficiency.

- In 2006, the Ports of Long Beach and Los Angeles acted to improve air quality in the South Coast Air Basin by adopting the San Pedro Bay Ports Clean Air Action Plan (CAAP), a sweeping plan aimed at significantly reducing the health risks posed by air pollution from port-related ships, trucks, trains, cargo-handling equipment and harbor craft.
- Under the CAAP, the ports set aside money each year for the Technology Advancement Program, which provides funding, guidance, and staff support to test promising clean air technologies. The ports maximize the effectiveness of their investment by leveraging contributions from stakeholder agencies at the local, state, and federal level, including the U.S. Environmental Protection Agency.
- The ports have engaged in a number of demonstration projects under this program that could be used to help improve port and cargo movement efficiency, including the following items:²⁶
 - Evaluating the use of electric terminal tractors to transport containers between docks and terminals;
 - Testing the use of diesel-hybrid yard tractors;
 - Deploying liquefied natural gas (LNG) yard tractors;
 - Developing and deploying the world's first diesel electric hybrid tugboat;
 - Testing diesel-electric hybrid gantry cranes for container stacking operations;

²⁶ <http://www.cleanairactionplan.org/documents/2015-tap-annual-report.pdf>

- Demonstrating the use of compressed natural gas (CNG)-powered drayage trucks to move containers between the ports and nearby freight consolidation yards.
- Under the Maryland Port Authority’s GreenPort of Baltimore program, the Port of Baltimore and its stakeholders have implemented a number of steps that help to improve efficiency while reducing emissions and local environmental and road congestion impacts. These include:²⁷
 - Implementing the port’s Clean Diesel and Dray Truck Replacement Program;
 - Replacing more than 130 older-model dray trucks at the port with new, more efficient models that reduce air emissions;
 - Retrofitting and replacing diesel engines on cargo handling equipment throughout the port;
 - Purchasing alternative energy and “green” vehicles and equipment;
 - Making gate improvements at Seagirt Marine Terminal that reduce gate wait times, thereby reducing idling truck emissions and local road congestion.

Port stakeholders recommended that the technologies implemented by ports, carriers, and users for environmental purposes should be those that both facilitate local environmental standards compliance and improve operating efficiency. They also recommended that, to improve the market availability of these technologies, port communities should play an important role in developing and investing in emissions reduction and other environmental sustainability technologies that improve system operations and efficiency.

Operational Improvements

A number of ports have already implemented other operational improvements that were recommended by the ACSCC, and which stakeholders consider to be best practices. These have included facilitating container chassis availability; expanding the use of common chassis pools (also known as “gray” chassis pools); improving planning and scheduling, through truck appointment systems and other measures; implementing more efficient queuing and container storage methods, such first-available or customer-specific container stacks; and expanding gate hours at ports and terminals.

Facilitating container chassis availability and common chassis pool use

- In March 2015, the Ports of Los Angeles and Long Beach, working with local truck chassis suppliers, implemented the “Pool of Pools.” This gray chassis pool combines the operations of three major chassis pools operating in the ports and permits chassis interoperability for the trucks that serve the ports. The Pool of Pools was established in response to the container availability shortages that helped lead to major port congestion during the 2014-2015 West Coast port slowdown and longshore labor negotiations.

²⁷ http://www.mpa.maryland.gov/greenport/GreenPort_2015_FNL.pdf. See also http://www.mpa.maryland.gov/_media/client/planning/Strategic_Plan%202015.pdf

- The Pool of Pools agreement encompasses a combined fleet of approximately 80,000 chassis, with an expanded set of sixteen common start/stop locations covering the major marine and rail facilities in the Los Angeles-Long Beach port complex. Under the Pool of Pools” operation, any chassis in the combined fleet can be utilized by any party who is an authorized user of one or more of the combined pools. A chassis in the combined fleet can be utilized or returned at any location named in the expanded set of stop/start locations. This “gray fleet” has increased overall efficiency, reduced truck turn times, and improved container movement. It has also improved container availability while alleviating chassis return issues.²⁸
- The Port of New York and New Jersey is finalizing a governance structure that will create a similar gray chassis pool at the port. The pool is expected to alleviate chassis availability concerns and improve pickup/return times at the port. If approved, the New York-New Jersey pool is expected to be implemented in the first quarter of 2017.

Better planning and scheduling

As noted above, port complexes and terminal operators are implementing integrated scheduling programs and appointment systems at major terminals to improve information and data-sharing, forecasting, and cargo flow.

- The Port of Charleston’s GO!Port system was implemented together with the Advance Gate System at Charleston’s Wando Welch Terminal in July 2016. GO!Port provides truckers with the ability to pre-advise the port terminals and facilities for container/chassis drop off and pick up. It also allows participants to verify booking numbers, terminals for empty container return, and provide terminals with status notifications. GO!Port, combined with the Advance Gate System, has helped to increase the number of gate moves at the terminal by almost 2,000 moves per day.
- The Port of New York and New Jersey is piloting an appointment system that will provide for advance digital trucker “check ins” at terminals. The system was jointly designed and funded by the six terminals at the port. The initial pilot, involving one terminal, is expected to expand to other terminals in the port in 2017.
- The Port of Oakland’s largest terminal operator, Oakland International Container Terminal, has implemented a truck appointment system that improves efficiency and cargo flow, together with permanent night gate hours.²⁹ The appointment system gives truckers greater flexibility in scheduling container pickup at the terminal, reducing both waiting times and congestion.

²⁸ <http://www.pop-lalb.com/>

²⁹ <http://www.portofoakland.com/press-releases/port-oakland-executive-director-addresses-supply-chain-advantages/>

Improving terminal space use and truck turnaround times

To speed container movement, port authorities and terminal operators at several major ports have implemented container and terminal management programs that have facilitated container flow, improved port and terminal space use, and resulted in faster truck turn times. These include:

- On-demand or “free flow” programs, through which truckers can pull containers off a stack on a first-available basis for delivery, rather than waiting for a designated customer.
- “Peel off” yards, in which containers for high-volume cargo owners are stacked in a designated area. Through “peel off” systems, truckers can expedite container pickup and delivery to high-volume customers from these dedicated stacks, rather than having to wait for these containers to be located and pulled from the general container stacking area.
 - “Peel-off” yards and “free flow” container stacks are now being utilized by a number of U.S. ports. Press reports note that these systems have been implemented at such ports as Los Angeles, Long Beach, New York and New Jersey, Oakland, and Virginia.³⁰
 - The Ports of Los Angeles and Long Beach’s peel-off yards and free flow stacking of high-volume customers’ containers have allowed faster container flow through the ports, improved use of limited port and terminal space, and enabled faster truck turn times.
 - The Port of Savannah has created a rapid dispatch center and container yard for high-volume shippers. This facility combines customer-oriented container stacking arrangements and an information technology system that provides real-time information on cargo availability to truckers and cargo owner. This improvement resulted in faster container pickup for cargo owners and overall truck turn times at the port.

Extending port and terminal operating hours

A number of U.S. ports have extended their port and terminal operations into night and weekend hours. These additional hours allow supply chains to spread out their pickups and deliveries, helping ports and terminals to better handle growing trade volumes and cargo surges.³¹

- The Ports of Los Angeles and Long Beach initiated PierPass, the United States’ first off-peak hour operating system, in 2005 to address multi-terminal issues such as congestion, security, and air quality at the ports and surrounding communities. Other U.S. ports have since begun to implement off-peak operating hours as well.

³⁰ <http://www.americanshipper.com/main/news/relaxing-terminal-congestion-60830.aspx>

³¹ <http://www.pierpass.org/wp-content/uploads/2016/04/PierPass-2015-Financial-Letter.pdf>

- Under PierPass' OffPeak program, the container terminals in Los Angeles and Long Beach operate additional hours on weeknights and Saturdays. To increase the use of off-peak hours, supply chains are charged a traffic mitigation fee for most cargo movement during the ports' peak hours (Monday through Friday, 3 a.m. to 6 p.m.)³²
- A 2015 Federal Highway Administration analysis³³ reported that PierPass has been successful in distributing the ports' truck traffic over a larger time period. This has alleviated congestion at the ports' gates during the daytime, and has diverted truck traffic at the port from day to nighttime periods, mitigating traffic congestion both within the ports' terminal area and on local roads outside the Port. The PierPass website reports that the percentage of trucks visiting the ports during daytime hours has been reduced from 88% to 50%, with 50% of truck visits to the ports now occurring during less-congested night and weekend hours.³⁴
- The Federal Highway Administration analysis adds that the PierPass program has also led to improved utilization of the ports' terminal space, thereby improving the ports' efficiency and vessel and cargo handling capacity.³⁵
- In September 2016, the Port of Oakland's largest container terminal implemented a permanent schedule of weeknight and weekend gate operations, making Oakland the second port in the U.S. to offer a regular schedule of weeknight or weekend gates. Press reports state that the terminal's night operations are resulting in improved productivity at Oakland, with average truck driver times at the terminal reduced by twenty minutes.³⁶
- The Northwest Seaport Alliance implemented a pilot evening/weekend hour operating program in August 2016, for use during Seattle-Tacoma's summer-fall 2016 shipping season. The pilot program was extended through December 2016 based on positive feedback from the ports' stakeholders.³⁷ Alliance officials report that their implementation of additional gate hours at the terminals has facilitated the flow of containers through the terminals and has decreased gate congestion at the ports.

Port stakeholders have reported that extending port and terminal operations into night and weekend hours can significantly relieve port congestion. They have further recommended that ports, terminal operators, trucking and rail providers, distribution warehouses, and other port and supply chain system segments consider operating on a 24-hour, 7-day basis.

³² <http://www.pierpass.org/about-2/>

³³ <http://ops.fhwa.dot.gov/publications/fhwahop09014/sect2.htm>

³⁴ <http://www.pierpass.org/wp-content/uploads/2016/06/Overview-of-PierPass-and-OffPeak.pdf>

³⁵ <http://ops.fhwa.dot.gov/publications/fhwahop09014/sect2.htm>

³⁶ http://www.joc.com/port-news/us-ports/port-oakland/oakland-terminal-operator-makes-extended-gate-hours-permanent_20160920.html

³⁷ http://www.joc.com/port-news/us-ports/port-tacoma/seattle-tacoma-gives-more-time-extended-gate-pilot_20161110.html

Additional Operational Improvements

In addition, the ACSCC and port stakeholders have recommended the following operational improvements:

- Ocean carriers, through their associations or a third-party data service, can assemble cargo volume data from beneficial cargo owners and provide it to gray chassis pool operators on a scheduled basis, to allow pool operators to improve chassis availability, system capacity, and usage.
- Port authorities, working together with ocean carriers, terminal operators, and shippers, can consider ways to reduce time granted to shippers to store containers at the terminal. However, shippers should not be unduly penalized during periods of high port congestion and/or insufficient container chassis supply.

Workforce Development

A number of U.S. seaports, such as Houston, Los Angeles, Long Beach, and Savannah, are working closely with local high schools and universities to resolve maritime and logistics workforce shortages.

- In 2009, the Port of Houston and local stakeholders formed the port's Partners in Maritime Education program. This partnership, now in operation at six high schools and four area universities, helps to educate the next generation of workers to fill critical career positions in the maritime and logistics industry, and to address impending workforce shortages caused by an aging workforce. The program supports a high school curriculum focused on developing maritime skills and university degrees with professional licensing in maritime and logistics sectors. Over 500 students participate in the program, with enrollment expected to begin to match the port's recruitment needs over the next decade.³⁸
- The Port of Los Angeles is working with the International Longshore and Warehouse Union (ILWU) and the Pacific Maritime Association (PMA) to develop a Workforce Training Center. The Center will introduce new workers to the industry and provide opportunities for "up-skilling" and "re-skilling" current longshore workers to facilitate technology use and the port's transition to near-zero-emission operations.
- The Port of Long Beach Academy of Global Logistics, initiated in May 2016, provides high school students with both an academic education and technical training related to global logistics, supply chain management, and international trade. Students will be provided with extensive career planning resources and networking opportunities that help lead to careers in port operations, trucking and rail operations, and distribution center and warehouse operations.³⁹

³⁸ <http://porthouston.com/portweb/wp-content/uploads/2016/08/Next-Generation-of-Maritime-Leaders-REV2014.pdf>

³⁹ <http://academy.polb.com/academy-of-global-logistics/>

- The Port of Savannah established the Maritime Logistics Education Program in December 2012, in partnership with the local Maritime Logistics Education Taskforce and Savannah’s public school system. This internship program is intended to expand Savannah’s local maritime and logistics workforce by training high school students in the skills needed to move import and export containers through the port and local distribution facilities.⁴⁰

Port stakeholders also called for an increased focus on improving the “human infrastructure” of port communities – i.e., the training, retention, and expansion of the existing port, trucking, and supply chain labor workforce – to accommodate changing vessel sizes, increasing cargo volumes, and the use of new technologies.

Public-Private Partnerships and Investment

Some U.S. seaports, among them Baltimore and Oakland, have entered into public-private partnerships,⁴¹ also known as P3s, to build or improve terminal and off-port service facilities. The P3 model can provide ports with a way to accelerate port facility project delivery while sharing financial and investment risk with the private sector.⁴² Under P3s, a private sector investor can partner with a port to finance, design, build, and/or operate a port facility, often under a long-term concession and revenue-sharing agreement.

- In 2010, the Maryland Port Administration entered into a public-private partnership with Ports America Chesapeake, LLC to enlarge and operate the Port of Baltimore’s Seagirt Marine Terminal under a 50-year lease and concession agreement. Under this \$1.3 billion partnership, Ports America Chesapeake built a 50-foot depth container berth and purchased four state-of-the-art container cranes for the terminal, making Baltimore one of the few East Coast seaports that can handle the largest container megavessels that can transit the Panama Canal.⁴³ Ports America will also invest as needed in highway, bridge, and tunnel projects that connect the port to the inland transportation network. The investment allowed Seagirt to expand its business by 5.8% between 2012 and 2013, while saving the State of Maryland hundreds of millions of dollars it would have had to invest in capital improvements.⁴⁴
- In 2009, the Port of Oakland approved a P3 concession with Ports America Outer Harbor Terminal, LLC to build the Port’s Outer Harbor Terminal, a state-of-the-art container facility at Outer Harbor berths 20-24.⁴⁵ Under the \$700 million concession, Ports America Outer Harbor invested in capital improvements at the terminal and its gates, and managed the terminal’s operations. The P3 agreement expanded the terminal and led to

⁴⁰ <http://www.sccpss.com/Lists/Announcements/DispForm.aspx?ID=448>

⁴¹ U.S. Department of Transportation Maritime Administration and the American Association of Port Authorities, *Port Planning and Investment Toolkit: Funding Strategy Module*, October 2014, https://www.marad.dot.gov/wp-content/uploads/pdf/Funding_Strategy_Module.pdf

⁴² *Ibid.*, page 31

⁴³ <https://www.pachesapeake.com/Seagirt/Default.aspx>

⁴⁴ http://www.mpa.maryland.gov/_media/client/smt15.pdf

⁴⁵ <http://www.portofoakland.com/press-releases/press-release-161/>

increased container volume through the terminal, while freeing the port authority to focus its capital investment funding strategy on other areas of the port complex.⁴⁶

Port stakeholders have recommended that steps should be taken to facilitate and expand U.S. ports' use of public-private partnerships to improve port facilities and ports' operational and information technology. To attract capital investment, stakeholders have urged port community members to work together to avoid communication gaps and to address systemic inefficiencies throughout their community. According to stakeholders, these steps will help ensure the stable operating environment needed to attract investors for projects that improve the port community's operational and infrastructure efficiency. The stakeholders also recommended that ports should target these investments to those projects that provide the greatest benefit in improving the port's system capacity, equipment and resource availability, efficiency, and competitiveness.

⁴⁶ Ports America and the Port of Oakland agreed to terminate the P3 agreement and Outer Harbor Terminal lease in February 2016. Please see <http://www.portofoakland.com/press-releases/press-release-507/>

4. Chapter 4: Department of Commerce Initiatives and Next Steps

Port stakeholders asked the Department of Commerce to support efforts by ports and their communities to implement the best practices described in this report, including:

- Convening additional roundtables in key U.S. port regions to bring together local and national actors involved in local port, stakeholder, and supply chain operations and to facilitate further coordination, communication, and information-sharing at the local level.
- Promoting better coordination across Federal Government agencies to support local port community working group and optimization efforts, and working to expand the availability of Federal funding for port and infrastructure improvements.
- Supporting pilot projects that help port communities develop and implement information technologies and that demonstrate the benefits of investments in technology, operations, and infrastructure improvement.
- Catalyzing the development and market availability of innovative information-sharing technologies for individual port community use, based on the maritime cargo status data elements identified in the ACSCC's October 2016 recommendations.

In response, the Department of Commerce has implemented the following initiatives.

Strategic Partnerships to Support the Establishment of New Local Port-Supply Chain Optimization Roundtables

On October 14, 2016, Secretary Pritzker announced that the Department will support the creation of local port-supply chain optimization roundtables through a new Regional Port-Supply Chain Roundtable Program. This program institutionalizes the Department's 2016 regional port roundtable series. Under this program, the Department will form strategic partnerships with interested ports and local business and supply chain organizations to help them and their port communities find ways to improve operating efficiency, goods movement, competitiveness, and their ability to respond to supply chain shocks that slow or disrupt operations or result in port congestion.

Strategic Partnership to Catalyze the Use of Port Community Information-Sharing Technologies and Support Technology Innovation

On October 14, 2016, Secretary Pritzker announced that the Department has entered into a strategic partnership with the University of Southern California (USC) Marshall Center for Global Supply Chain Management to further the development of technologies that enhance the efficiency and competitiveness of U.S. ports and supply chains. "Phase One" of the partnership was a combined conference and hackathon, *Supply Chain Digital Transformation: Innovating Port Community IT Systems*, held in Los Angeles November 18 – 20, 2016.

At the event, over 200 senior-level corporate technology and supply chain leaders met to discuss recent developments in digitizing and innovating U.S. supply chains and port systems. The conference was followed by a 24-hour hackathon, in which twenty-six student teams competed to design innovative prototypes to share real-time maritime cargo movement data and improve overall supply chain efficiency. Further information on the event is available at <http://uscsupplychain.com/event/digital-innovation-conference-and-hackathon/>.

A subsequent conference and hackathon will be held at USC's 5th Annual Global Supply Chain Excellence Summit in September 2017. Under the partnership agreement, the Department and USC will consider how to improve the availability of innovative market-based information technology solutions for U.S. supply chain use.

Expanding and Refining ACSCC Recommendations

The Department will ask the ACSCC to provide additional best port practices recommendations in 2017, as appropriate, and identify any changes or refinements that would further support the implementation of the ACSCC's 2016 best practices recommendations. The Department will also ask the ACSCC to provide a recommendation on how the Federal Government and port communities can work together to address carrier bankruptcies – such as the Hanjin Shipping Co. bankruptcy in 2016 – and other major supply chain disruptions.

Next Steps

This report includes a number of examples to illustrate how some ports and their stakeholders have implemented these best practices. This is not intended to be a complete list of such examples. Additional examples of these best practices can be shared with Department of Commerce staff directly, or by emailing the Department at its 21st Century Port Competitiveness Initiative email address, at portcompetitiveness@trade.gov.

The Department will provide further updates on the extent of best practices implementation by U.S. ports, as well as additional best practices as recommended by the ACSCC and stakeholders at future port roundtables. For further information, please email the Department's 21st Century Port Competitiveness Initiative email address at portcompetitiveness@trade.gov. Additional information on the ACSCC is available at <http://trade.gov/td/services/oscpb/supplychain/acsccl>.

5. Chapter 5: Department of Commerce Agency Comments

International Trade Administration

The International Trade Administration (ITA) participated in the port roundtables and other events listed in this report. ITA notes that the industry input included in this report offers a set of options that individual ports and their communities can pursue at their discretion and as appropriate. ITA adds that the best practices outlined above can help port communities improve their efficiency and competitiveness and strengthen their ability to catalyze local economic, employment, and trade growth.

To further strengthen America's supply chain workforce, ITA also suggests that port community members consider implementing registered apprenticeship programs and participating in the U.S. Department of Labor's Apprenticeship USA program. This program can help port and supply chain employers attract, train, and retain talented employees. Registered apprenticeship programs combine on-the-job learning with related technical instruction, customized to the precise skills needed by the employer. Apprenticeship USA supports these efforts by providing registered employers with greater access to apprenticeship training funds, technical assistance, and employee credentialing opportunities. More information is available at the Department of Labor's Apprenticeship USA website, at <https://www.dol.gov/apprenticeship>.

National Oceanic and Atmospheric Administration (NOAA)

NOAA urges U.S. port authorities to increase local stakeholder interest and support for the provision and improvement of real-time information and forecasts of oceanographic and meteorological conditions – such as NOAA's PORTS® (Physical Oceanographic Real Time System) – to reduce risk and increase the safety and efficiency of marine operations and port scheduling.

NOAA also urges port authorities to regularly engage with their regional NOAA Navigation managers (<http://www.nauticalcharts.noaa.gov/nsd/rep.htm>) on marine obstructions and other surveying and charting needs that may pose risks or impede the efficiency of port operations. In the event of a major storm or other event, seaports should work through local emergency response structures to advise NOAA Navigation managers on the need to deploy NOAA Navigation Response Teams to conduct surveys and otherwise assist in the rapid re-opening of the port and resumption of commercial activities.

Lastly, NOAA urges port authorities to encourage stakeholders to upload privately-gathered bathymetry and track line information from local users to NOAA navigation managers and otherwise support the updating of nautical charts and other NOAA navigation services.

APPENDIX I

ADVISORY COMMITTEE ON SUPPLY CHAIN COMPETITIVENESS

RECOMMENDATIONS TO THE SECRETARY OF COMMERCE REGARDING U.S. SEAPORT AND CONNECTING INFRASTRUCTURE CONGESTION

January 21, 2016

INTRODUCTION

The efficiency and productivity of United States seaports and their connecting infrastructure is crucial to our nation's ability to successfully compete in the global marketplace and to promote our domestic economy. Approximately seventy-five percent of America's merchandise imports and exports by volume flow through our seaports, linking our producers and retailers with their sources and customers and our supply chains with the global economy.

Our ports' capability to handle this trade flow is vital to our industries' ability to remain competitive in global markets, and to take advantage of the expanded market opportunities made possible through the Administration's new free trade agreements with Asia, Europe, and elsewhere. Any unnecessary delay or cost imposed on our supply chains can lead to lost sales and lost market shares, both globally and domestically, with consequent impacts on America's job base and trade and economic growth.

Congestion at America's seaports and inland infrastructure is an increasingly severe threat to the reliability and efficiency of U.S. industries and supply chains. Over the past decade, it has become evident that the operational systems and infrastructure at our seaports and inland links are not being improved comprehensively and rapidly enough to handle the growth of U.S. trade and quickly-changing maritime industry and shipping trends. Many analysts believe that America's supply chains are losing their competitive advantage in global markets, as congestion and our inability to keep pace with other nations' improvements reduce our supply chains' ability to meet global shipping reliability and cost demands. As a result, congestion at our ports and other points in our intermodal system has become a serious risk factor for both America's supply chains and our Nation's economic and trade growth.⁴⁷

The nationwide effects of port congestion on U.S. supply chains were dramatically illustrated during the 2014-2015 West Coast seaport labor contract negotiations, when a confluence of port congestion factors, exacerbated by the negotiations, caused near-gridlock conditions at ports and infrastructure points throughout the U.S. These conditions led to substantial shipping delays and additional costs nationwide for retailers, manufacturers, and agricultural producers; overseas market share losses in several time-sensitive U.S. export sectors; and a reduction in U.S. gross domestic product growth.

⁴⁷ *U.S. Container Port Congestion & Related International Supply Chain Issues*, July 2015, Federal Maritime Commission, page 2

The Federal Government's ability to directly resolve this issue is limited, as virtually all of the operational, infrastructure, and communications elements at each port and inland link are owned by the private sector or by state, local, or municipal government entities. However, Federal leadership is needed to advance a comprehensive set of best port congestion reduction practices that the private and public owners and stakeholders of each port can adopt as appropriate, so that the Nation can achieve a comprehensive, holistic reduction in port congestion that improves national competitiveness and economic growth. When Federal Government involvement can directly reduce or resolve port congestion issues, Federal action should be swift and decisive.

The Department of Commerce's Advisory Committee on Supply Chain Competitiveness has developed a set of best practices in reducing port congestion for recommendation to the Secretary, for the Secretary to share at her discretion within and outside the Federal Government. These industry recommendations, which represent the consensus view of the Committee, are based on the members' collective experience and expertise in addressing these issues, and their knowledge of congestion solutions that are being implemented by various seaports and their stakeholders in the U.S. and elsewhere.

This document represents the views of Committee members on practices that could improve processes for moving goods through our ports into our domestic transport system. However, this document should not be construed as a call for Federal mandates, whether by regulation or legislation. These recommendations are offered instead for consideration, as appropriate, by a variety of parties in both the private and public sector, with a focus on offering possible remedies in locations where chronic congestion problems have been shown to exist.

RECOMMENDATIONS

Summary

As seen in 2014-2015, congestion at U.S. seaports is caused by a confluence of operational and infrastructure factors. At times of high cargo volume or system stress, these combined factors can substantially delay the end-to-end flow of cargo in and through the U.S. and can impose substantially higher costs on U.S. supply chains and their customers. Unless these factors are addressed, U.S. supply chains may face these conditions on a more frequent basis given the continuing growth of vessel sizes and U.S. and global trade. In developing its recommendations, the Committee members considered the following factors and their impacts:

- Carriers' increasing use of megaships on U.S. port calls.
- Inefficient infrastructure at various seaports (including cargo handling equipment and technology, dredging needs, terminal size and redundancy, and physical layout of the terminals).
- Inadequate intermodal connectors at various gateways.
- Communication gaps and inefficient coordination among shippers, terminals, ocean carriers, and land transport companies in the scheduling and movement of containers in and out of the ports.
- Limited container chassis availability for trucks at various ports, especially on the U.S. West Coast.
- Increased risk of disruption during labor-management contract negotiations.
- Landside infrastructure incapability to handle changing industry and market trends (including megaships, volume surges, trade growth, and shipping flow changes).

The impacts of these factors are:

- ***Carriers' increasing use of megaships on U.S. port calls:*** Massive surges of cargo offloaded at once at a single port terminal, with several carriers' containers often carried on a shared vessel, leading to overloaded terminals, multiple container movements at and among the terminals, and extensive loading and unloading delays.
- ***Inefficient infrastructure at various seaports:*** Slow cargo movement at the terminals, insufficient terminal space, reduced equipment and terminal productivity, and limits on port and terminal handling capability, particularly during vessel and seasonal cargo surges, reducing the velocity of container and cargo movement at the port.
- ***Inadequate intermodal connectors at various gateways:*** Slow movement of cargo into and out of the port due to poor and congested road/rail links between the port and inland transportation system. These increase congestion at the port and may result in delay charges to shippers.
- ***Communication gaps and inefficient coordination among shippers, terminals, ocean carriers, and land transport companies:*** Limits the ability of each stakeholder to manage capacity and equipment demand, and to plan and sequence traffic flow, port and

terminal operations, and container movements, reducing cargo movement flow and operational efficiency.

- ***Limited container chassis availability for trucks at various ports:*** Equipment shortage blocks containers from leaving the port, overwhelming terminal space and leading to delay charges.
- ***Increased risk of disruption during labor-management contract negotiations:*** Disrupts normal cargo movement patterns and leads to diversions to other seaports, often increasing congestion at both the original and diversion seaports.
- ***Landside infrastructure incapability to handle changing industry and market trends:*** Local inland roads and highway infrastructure becomes insufficient to handle peaks and surges in cargo flow volume and long-term trade growth, causing backups and cargo movement delays throughout the system.

Committee members also considered a number of practices that address these impacts. Many of these practices are already being implemented by various ports and their stakeholders. These practices include:

- Improving coordination and communication among shippers, terminals, and carriers, in order to improve terminal / cargo handling efficiency and address megaship impacts on port operations.
- Improving coordination and communication between ports and among ports and shippers to find ways to reduce congestion (for example, through cooperative working agreements).
- Implementing measures to improve container chassis availability (for example, common or “gray” chassis pools).
- Improving operational practices at ports to facilitate cargo flow.
- Expanding the use of technology, information, and data to improve port operations and cargo movement fluidity.
- Improving regulatory coordination and cooperation among state and municipal agencies and ports to facilitate permitting for port congestion relief-related infrastructure projects.
- Better incorporating changing industry and market trends in state and local transportation agencies’ and municipal planning organizations’ planning processes for port links and inland infrastructure projects.
- Developing ways to strategically prioritize and invest in the most important U.S. gateways for domestic and international commerce.
- Merging port terminals in order to expand storage space and improve container handling and cargo flow.
- Incentivizing, and reducing barriers to, public and private investment in port operations and technologies that improve the efficient flow of cargo and promote freight fluidity.
- Improving the funding process to attract more national and international private sector investment in port and connecting infrastructure that reduces congestion.
- Speeding up dredging and securing more private/public partnership funding for it.

- Attracting, retaining, and training more truck drivers.
- Training more people at the ports on how to use technology to reduce congestion.
- Identifying policies that need to be included in national freight policy and North American freight initiatives to reduce port congestion.
- Improving industry-government coordination and cooperation to better prioritize projects that reduce port congestion.

The Committee's recommendations are based on these factors, and on practices that address their impacts. The recommendations are organized in two categories – operational and infrastructure – largely reflecting the private sector and the public sector's respective activities in implementing the best practices recommended in this report.

Recommendations: Operational Improvement

Inbound and Outbound Container Flows

Improving Stakeholder Communication and Data Sharing to Optimize Capacity and Container Flow

- Ocean carriers, through their associations or a third-party data service, should assemble cargo volumes from beneficial cargo owners and provide this data to gray chassis pool operators on a scheduled basis, to allow the pool operators to plan capacity and usage especially at peak shipping periods.

Container Terminal Operations and Dwell Time

Improving Port and Terminal Operations and Container Management

- Terminal operators and operating port authorities should consider adopting best operating practices, including free-flow (customer-specific) container stacks, that allow for a faster, more efficient flow of cargo in and out of their facilities.
- Port authorities, working together with ocean carriers, terminal operators, and shippers, should look at ways to reduce the level of time granted to shippers to store containers at the terminal. However, shippers should not be unduly penalized during periods of high port congestion and/or insufficient container chassis supply.

Improving Stakeholder Coordination and Cooperation to Optimize Port and Terminal Efficiency, Alleviate Megavessel Impacts, and Reduce Congestion

- The Federal Government, including the Federal Maritime Commission, should give port authorities, terminal operators, trucking associations and shippers the authority to create port-level working groups to discuss how to improve operational productivity and efficiencies.

Container Chassis Management

Improving Container Chassis Availability and Container Flow Velocity

- The Federal Government, including the Federal Maritime Commission, should facilitate the establishment of agreements among interested seaports, terminal operators, equipment providers, and other stakeholders to create and operate common (“gray”) chassis pools, at those seaports where such agreements are not already in place.
- Motor carriers that provide port service should be encouraged to acquire and use their own chassis, with initiatives and assistance from industry partners to help financially constrained truckers to purchase or lease such equipment.

Improving Labor-Management Coordination to Improve Container Chassis Availability

- The Federal Government, including the Secretary of Commerce, should reach out to the port labor-management groups on each coast to resolve any jurisdictional questions regarding gray pool chassis inspection and maintenance.

Container Pickup and Delivery Scheduling

Facilitating Port and Terminal Operations and Efficiency to Reduce Congestion

- Port complexes and terminal operators should implement integrated scheduling programs and appointment systems at major terminals, in order to improve information and data sharing, forecasting, and cargo flow.
- To speed container movement, port authorities and terminal operators should consider implementing an on-demand trucking system through which truckers would pull containers off a stack on a first-available basis for delivery rather than waiting for a designated container. This recommendation does not preclude the need for shippers to pull individual containers based on priority.

Motor Carrier Capacity

Facilitating Equipment Availability and Cargo Movement

- Driver compensation needs to be made commensurate with driver effort and turn times need to be improved, to prevent drivers from leaving the industry and to attract more drivers, and better efforts must be made by the trucking industry and supported by others to recruit more qualified drivers and reduce entry-level barriers to the trucking industry.

Capacity Planning

Improving Operating Efficiency and Alleviating Megavessel Impacts

- One or more third-party data services should be established to serve as central repositories for information on freight flow and market trends. These services would aggregate and anonymize data from shippers and ocean carriers on freight flows and market trends for use by both the private and public sectors in short and long-range planning and transportation supply chain performance measurement (freight fluidity) , while respecting private sector confidentiality and competitiveness concerns.

Recommendations: Infrastructure Improvement

Federal Government

Incorporating Industry and Market Trends Into Transportation Agency Planning, to Improve Capacity and Reduce Congestion

- The Department of Transportation should encourage state governments to ensure that their state and local freight plans can accommodate changes in shipping trends and surges in truck and rail traffic from the increased size of vessels and the increased cargo flow from vessel-sharing agreements.

Improving Infrastructure Policies to Facilitate Congestion Relief and Cargo Velocity

- Federal Government prioritization of Federally-funded discretionary freight projects should be headed by a central, multimodal office in the U.S. Department of Transportation and based on the greatest payback or benefit to the supply chain.
- The Department of Transportation needs to establish an office of multimodal freight within the Office of the Secretary.
- Federal Government prioritization of Federally-funded discretionary freight projects should be done in partnership with state and local agencies, with freight movement data and other supply chain trend input provided by third-party data services that can provide aggregated information on market trends/volumes to assist in the prioritization process.
- The Department of Transportation should identify and prioritize goods movement projects of the greatest national significance, with Congressional review. These projects should be considered in the award of competitive grants and the development of national, state, and local freight plans.

Facilitating Project and Dredging Permitting to Alleviate Port Congestion

- In support of Executive Order 13604 of March 22, 2012 (Improving Performance of Federal Permitting and Review of Infrastructure Projects), all reviews by Federal agencies including the Army Corps of Engineers of pending port infrastructure projects should be completed within 12 months of submission. For new port infrastructure projects, all reviews by Federal agencies should take no more than three years to complete, from date of submission to date of completion.

Facilitating Infrastructure Investment to Alleviate Port and Inland Congestion

- Federal freight-generated revenue programs (e.g. the Harbor Maintenance Tax and Merchandise Processing Fee) should have “lock boxes” around them to prevent diversion of these revenues to non-freight or non-goods-movement uses.

- User fees should be employed to generate additional funds for Federally-funded goods movement infrastructure, with all users of the system contributing.

Improving Public-Private Investment in Cargo Movement Infrastructure

- The expanded use of public-private, partnership-friendly municipal bonds should be considered for freight infrastructure projects.
- Infrastructure investment and policy planning must reflect the importance of both exports and imports in order to reduce port congestion.

State, Local, and Municipal Government

Improving Coordination and Cooperation to Improve Infrastructure Efficiency and Cargo Movement

- Port authorities should work in conjunction with terminal operators and municipal planning organizations, and incorporate the viewpoints of stakeholders, to find ways to improve port-related cargo flow and to more fully utilize existing assets for system and infrastructure efficiency and resilience.

Port Authorities

Improving Port and Terminal Infrastructure to Reduce Congestion and Megavessel Impacts

- Port authorities and terminal operators should re-evaluate their physical layout, design and governance structures, including but not limited to consolidation, restructuring, and improving infrastructure access, in order to more efficiently handle megavessels, carrier alliance impacts, and current and future market needs.
- Port authorities and terminal operators should work with Federal, state, and local authorities to achieve changes in trust agreements, as needed, to permit consolidation into fewer but larger terminals.
- Efforts to reduce port congestion should help to support and facilitate the flow of containers to alleviate delays of exports from inland locations.

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APPENDIX II

ADVISORY COMMITTEE ON SUPPLY CHAIN COMPETITIVENESS RECOMMENDATION TO THE SECRETARY OF COMMERCE REGARDING U.S. SUPPLY CHAIN, SEAPORT AND STAKEHOLDER INFORMATION-SHARING

October 20, 2016

The U.S. supply chain community, including cargo owners, ports and terminal operators and their stakeholders, has expressed the need to have broader visibility in cargo movement for planning, fluidity, and operational efficiency purposes. To achieve this goal, standard maritime cargo operational status data elements must be captured and shared among carriers, ports and terminal operators, and cargo and port stakeholders. This is vital to supply chains and their seaports' ability to execute operational plans that meet shippers' objectives, facilitate end-to-end supply chain flows, and improve system efficiency.

The lack of this visibility has had a crucial impact on supply chains and cargo movement. The Advisory Committee on Supply Chain Competitiveness (ACSCC) has cited communication gaps and inefficient coordination among shippers, terminals, ocean carriers, and land transport companies as a key factor in port congestion. The Committee's January 2016 recommendation to the Secretary of Commerce on port congestion-related issues reported that congestion at U.S. seaports has become a serious risk factor for both America's supply chains and our Nation's economic and trade growth.

The ACSCC's recommendations noted that various U.S. seaports and their stakeholders have implemented a number of operational practices that address this factor. These include:

- Improving coordination and communication among shippers, terminals, and carriers in order to improve terminal / cargo handling efficiency that addresses megaship and cargo alliance impacts on port operations;
- Expanding operational practices at ports to facilitate cargo flow; and
- Expanding the use of technology, information, and data to improve port operations and cargo movement fluidity.

The Secretary has requested that the ACSCC provide a recommendation on the maritime container cargo data elements that U.S. shippers, supply chains, and other seaport users and stakeholders need to have to share in advance of vessel arrival in the United States to:

- improve coordination, cooperation, and information-sharing among U.S. supply chains and port stakeholders;
- improve supply chain and cargo logistics, planning, and management;
- ensure the availability of sufficient container movement equipment and workforce; and
- improve the efficiency and flow of cargo and trade throughout U.S. supply chains.

The Secretary's request states that this information will be used in the Department's effort to develop policies and support industry activities that improve the competitiveness and efficiency

of U.S. supply chains under the Department's mission to strengthen U.S. industry competitiveness, promote trade and investment, foster economic growth, and support American jobs.

The Committee recommends the following maritime cargo status data elements, as a best practice, for voluntary and discretionary use by individual seaports, cargo owners, port and terminal operators, carriers, and other supply chain stakeholders that want to implement initiatives that achieve greater visibility in cargo movement in order to improve operational efficiency and facilitate cargo flow. The Committee notes that some U.S. seaports and supply chains have already implemented information-sharing programs for this purpose. This recommendation should not be construed as a call to supplant these programs or for any Federal mandate, whether by regulation or legislation. It is offered instead for consideration for use, as appropriate, by supply chain organizations that seek to implement cargo movement efficiency remedies in cases where efficiency issues have been shown to exist.

**ADVISORY COMMITTEE ON SUPPLY CHAIN COMPETITIVENESS
RECOMMENDATION TO THE SECRETARY OF COMMERCE REGARDING U.S.
SUPPLY CHAIN, SEAPORT AND STAKEHOLDER INFORMATION-SHARING
OPERATIONAL MARITIME CARGO DATA STATUS ELEMENTS**

Import Cargo

Pre-Arrival at Port

Post-Arrival at Port

<p>Vessel name and voyage number Arriving terminal and port Vessel estimated time of arrival (date / time) Cargo identification number (i.e. container number / barge ID) Equipment size and type Expected availability (based on stow / discharge plan) Empty status conditions (drop and pick ups) Rail volume (RR, inland rail terminal destination, box size/type) Destination</p>	<p>Vessel actual time of arrival (date / time) Vessel discharge (date / time) CBP status (cleared vs. non-cleared and exam type) Other holds (government or commercial) Terminal gate exit (date / time) Mode of exit (e.g., dray, rail, barge, etc.) Actual availability, container (date / time) Empty container availability (by container as they are available) Last free day Chassis availability by size Permit required (overweight or out of gauge cargo)</p>
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OPERATIONAL MARITIME CARGO DATA STATUS ELEMENTS

Export Cargo

Pre-Arrival At Port

Post-Arrival at Port

<p>Vessel name and voyage number Vessel estimated time of departure (date / time) Arriving terminal and port Cargo identification number (i.e. container number / barge ID) Equipment size and type Cargo cutoff (date / time) Terminal gate entry (date / time) Mode of entry (e.g., dray, rail, barge, etc.) Booking status</p>	<p>Vessel actual time of departure (date / time) Status with CBP and other government agencies Mode of exit (e.g., dray, rail, barge, etc.) Container loaded (date / time) Last free day</p>
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