



Measures for Congestion at Ports

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MAP-21

(Moving Ahead for Progress in the 21st Century Act)

- Directs the creation of a national freight policy to improve the condition and performance of the U.S. freight network.
- Also directed the development of a freight conditions and performance report which requires measures of the condition and the performance of the national freight transportation system.



Goals of MAP-21

- Increase economic competitiveness
- **Reduce Congestion**
- Increase Productivity
- Increase Safety and Security
- Improved resilience of freight transportation state of good repair
- Use of advanced technology
- Increase economic efficiency
- Reduce environmental impacts



Contributors to Congestion

- Can be operational related
- **Can be capacity related**
- Peak or seasonal demand
- Limited or disrupted hours at gate or terminal
- Regulatory and administrative procedures
- Aging, unmaintained equipment or infrastructure
- **Inadequate channel and berth dimensions**
- Inadequate traffic management and logistics systems



Capacity Related Indicators of Congestion

What Do We Need?

POTENTIAL INDICATORS

- Queues
- Increase in wait time
- High capacity utilization
- Long turn times in terminal
- Full Container yard utilization
- Late deliveries

POTENTIAL MEASURES

- Any queue suggests delay/congestion
- Wait time
- Per cent of capacity utilization
- Turn time
- Per cent utilization in container yard
- Percent deliveries made on time



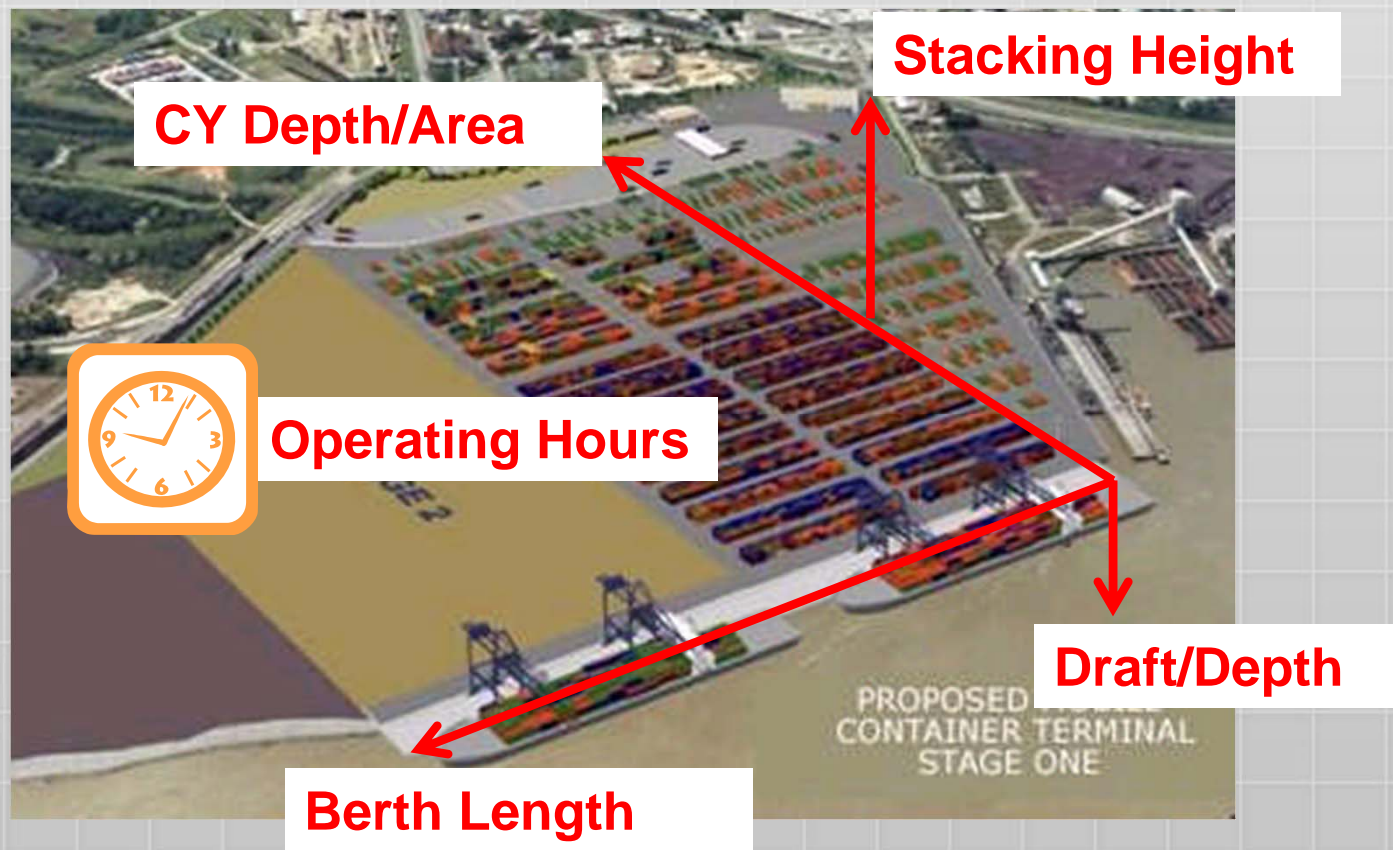
What Do We Have?

- Annual Container Vessel Calls per Container Berth
- Annual TEUs per Container Berth
- Annual TEUs per Foot of Container Berth
- Gantry Cranes Per Container Berth
- Petroleum and Petroleum Products MT per Petroleum Products Berth
- Annual TEU's Per Container Yard Acre
- Average TEU's Per Vessel Call
- Average Lock Delay

Port and Terminal Data Sources

Available Port Data	Source	Available Terminal Data	Source
Always		Always	
Berth Depth	Port, Directories	Berth Depth	Port, Directories, Terminal
Berth Length	Port, Directories	Berth Length	Port, Directories, Terminal
Berths	Port, Directories	Berths	Port, Directories, Terminal
Channel Depth	Port, Directories	Channel Depth	Port, Directories, Terminal
Cranes & Types	Port, Directories	Cranes & Types	Port, Directories, Terminal
Gross Acres	Port, Directories	Gross Acres	Port, Directories, Terminal
Port TEU	Port, Directories, AAPA	Sometimes	
Vessel Calls	BTS	Avg. Crane Moves/hr	Terminal
Vessel DWT	BTS	CY Acres	Port, Terminal
Sometimes		Rail Acres	Port, Terminal
Avg. Crane Moves/hr	Port	TEU Slots	Port, Terminal
CY Acres	Port, Directories	Truck Turn Times	Terminal
Rail Acres	Port, Directories	Trouble Ticket %	Terminal
TEU Slots	Port, Terminals	Estimated	
Estimated		Net BGY Acres	Aerial Photos, Terminal Plans
Net BGY Acres	Aerial Photos, Terminal Plans	Vessel TEU	DWT/TEU Relationship
Vessel TEU	DWT/TEU Relationship	Vessel Length	DWT/Length Relationship
Vessel Length	DWT/Length Relationship	Avg. Dwell Time	Benchmarks, Assumptions
Avg. Dwell Time	Benchmarks, Assumptions	Berth Capacity	Benchmarks, Assumptions
Berth Capacity	Benchmarks, Assumptions	Crane Capacity	Benchmarks, Assumptions
Crane Capacity	Benchmarks, Assumptions	CY Capacity	Benchmarks, Assumptions
CY Capacity	Benchmarks, Assumptions	Confidential	
Confidential		Costs	Modeling?
Costs	Modeling?	Man-hours	Modeling?
Man-hours	Modeling?	Vessel Turn Time	Modeling?
Vessel Turn Time	Modeling?	Rates	Modeling?
Rates	Modeling?	Working Crane Hours	Modeling?
Working Crane Hours	Modeling?	<i>Terminal TEU</i>	Modeling?
		<i>Vessel Calls</i>	Modeling?
		<i>Vessel DWT</i>	Modeling?

Dimensions of Container Terminal Capacity



Measures of Capacity Utilization

Container Yard	CY/Gross Ratio	CY Utilization	Crane Utilization	Berth Utilization - Vessel Call Basis	Avg. vs. Max. Vessel Capacity	Avg. Vessel Util Discharge/Load	Berth Utilization - Avg. Vessel Basis	Berth Utilization - Max. Vessel Basis	Nominal Maximum Channel/Berth Draft (Feet)	Estimated Maximum Vessel TEU
North Atlantic Ports										
Boston	49%	31%	21%	35%	73%	38%	35%	25%	45'	5,183
NY/NJ	59%	75%	36%	43%	53%	55%	43%	23%	50'	7,470
Delaware River	29%	68%	29%	30%	65%	52%	40%	26%	40'	3,420
Baltimore	50%	23%	18%	18%	44%	71%	14%	6%	50'	7,470
VPA	42%	83%	30%	60%	54%	32%	77%	41%	49'	6,967
S. Atlantic Ports										
Charleston	43%	25%	35%	79%	61%	30%	89%	55%	47'	6,031
Savannah	41%	36%	45%	71%	101%	39%	89%	89%	42'	4,067
Jacksonville	33%	24%	17%	13%	69%	104%	13%	9%	37'	3,420
Port Everglades	85%	42%	49%	43%	56%	60%	57%	32%	39'	4,067
Miami	72%	53%	31%	40%	77%	66%	27%	20%	42'	4,067
Gulf Ports										
Mobile	58%	14%	12%	9%	114%	55%	9%	10%	42'	3,420
New Orleans	62%	45%	31%	57%	65%	31%	57%	31%	45'	5,183
Houston	63%	57%	37%	51%	92%	67%	46%	42%	40'	3,420
West Coast Ports										
LA/LB	55%	75%	43%	25%	37%	112%	25%	18%	50'	13,000
Oakland	57%	53%	29%	40%	65%	28%	40%	26%	50'	7,470
Portland	59%	26%	8%	15%	97%	47%	15%	14%	43'	4,419
Seattle	49%	64%	21%	40%	68%	36%	40%	27%	50'	7,470
Tacoma	56%	37%	15%	23%	53%	52%	23%	12%	51'	7,997
U.S. Mainland Ports	51%	51%	34%	39%	n/a	61%	30%	n/a	n/a	n/a
Canadian W. Coast Ports										
Prince Rupert	46%	76%	40%	50%	43%	36%	61%	26%	61'	15,048
Vancouver	56%	63%	52%	40%	40%	64%	46%	19%	51'	13,000

Source: USACE Report to Congress, "U.S. Port and Inland Waterways Modernization, Preparing for Post-Panamax Vessels"



Challenges With Existing Data

- Not homogeneous
- Different collection methods
- Different levels of detail
- Inconsistent timing
- Privacy concerns with proprietary data
- No set standard - measures have no definition or are defined in multiple ways
- Source is entities with different interests and/or requirements



Challenges With Lack of Data

- Sources include entities with competing interests
- Entities providing data are in a narrow market segment (many pieces to put together)
- Data providers are compartmentalized (some data elements fall through the cracks)
- Cost to collect outweighs the benefit



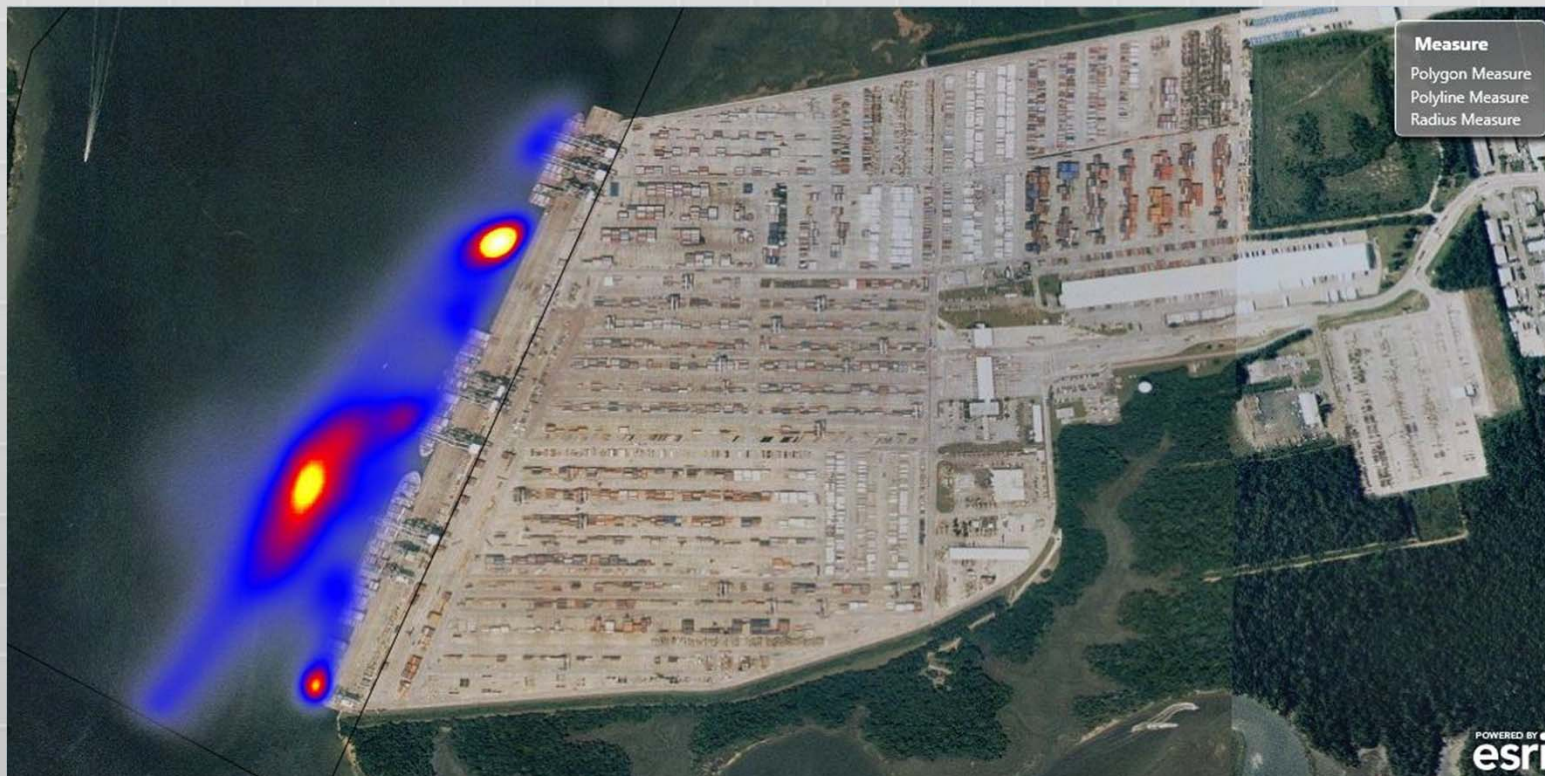
Possible Short Term Solutions

Leverage AIS and Truck Probe Data

- Trip speed, # of calls, turnaround time
- First-Last mile analysis
- Can correlate with other data to separate natural causes of delay
 - Tide gages
 - River stages



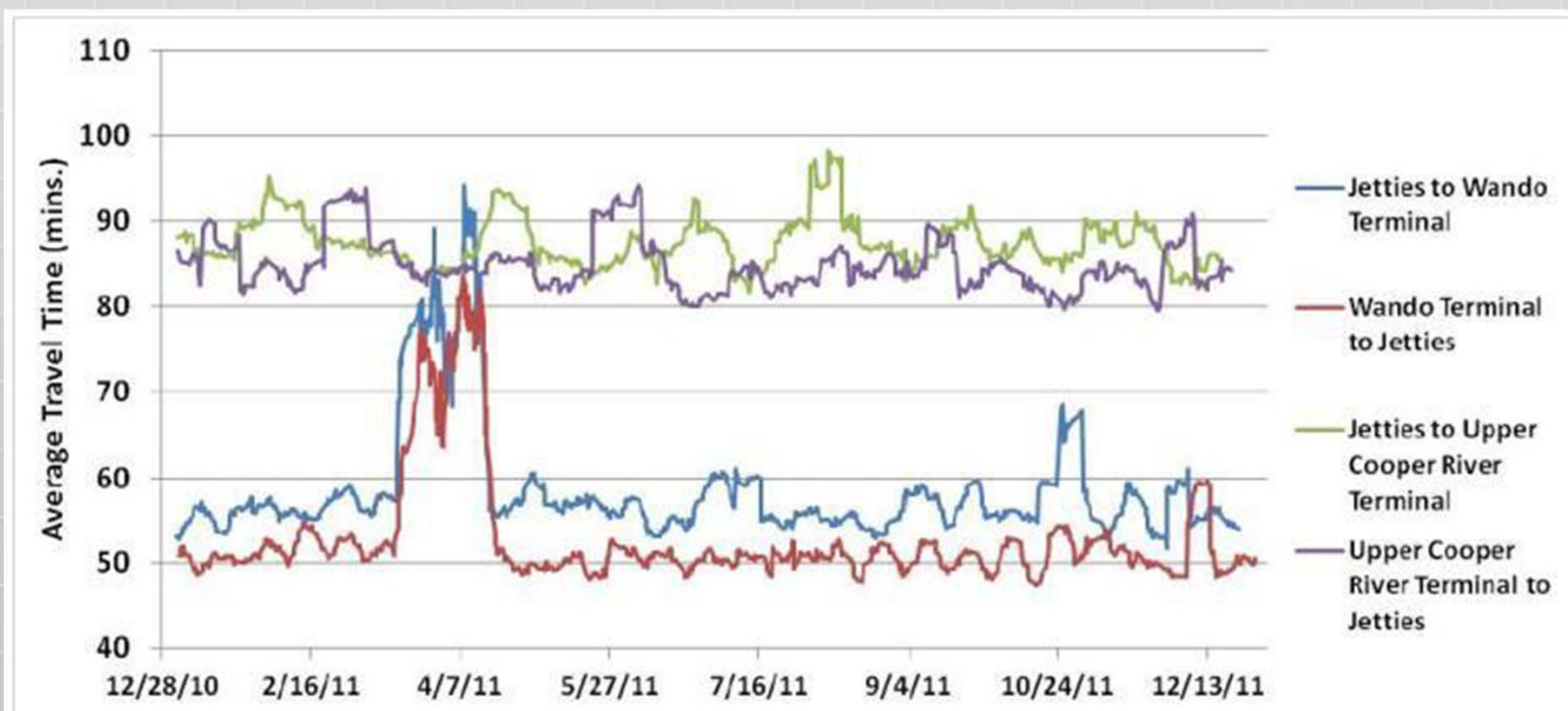
Load or Offload Time at Wando Terminal Can be correlated with truck probe data on land side.



Source: Mitchell - USACE ERDC

Average Travel Times Near Charleston, SC Terminals

(Can be correlated with Tide Data)
Still does not tell you the cause



Source: Mitchell USACE ERDC



Mid-Long Term solutions

- Renew funding and resources for existing authorities
 - Fosters a national approach with consistent standards
 - Provides venue to collect missing data that is not economically feasible for existing entities to collect
- New Authorities – Modify Surface Reauthorization Act
- Standard Definitions and Rule Bases are Essential
 - Same name doesn't mean same meaning
 - Must be same definition and same context
 - Must be common across public and private entities

Federal and Industry Logistics Standardization (FILS)

▶ A joint collaboration between industry and governmental agencies to adopt a uniform nomenclature in order to improve accuracy and efficiency when electronically sharing common information for:

- Standard Location Codes for Dock, Fleets, etc.
- Standard River Names and Mile Points
- Standard Vessel Codes
- Standard Commodity Codes
- **Standard Capacity Measures**



Guiding Principles

- Accepted by Industry
- Accepted by Federal Agencies
- Usable in multiple transmission formats
- Adhere to international standards
- Open Standard

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