



Innovative Technologies for a Resilient Marine Transportation System

NCFRP 42: Integrating MTS
Commerce Data With Multimodal
Freight Transportation Performance
Measures

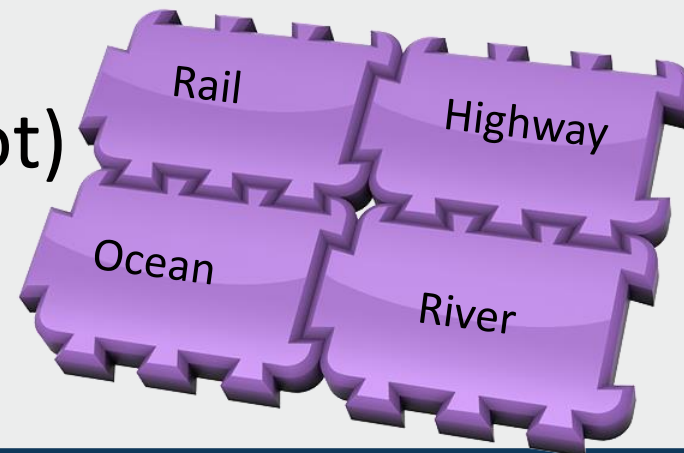
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The Objective

- Move from discrete, modal project perspective to system level, multimodal perspective
- Explore how to do it
- See what the data allow (or not)





Datasets

- Originally:
 - Corps trip data
 - FAF detailed data
- Actual:
 - Channel Portfolio Tool (CPT)
 - FAF3 Public Data
 - FRA National Grade Crossing Inventory
 - Port Data



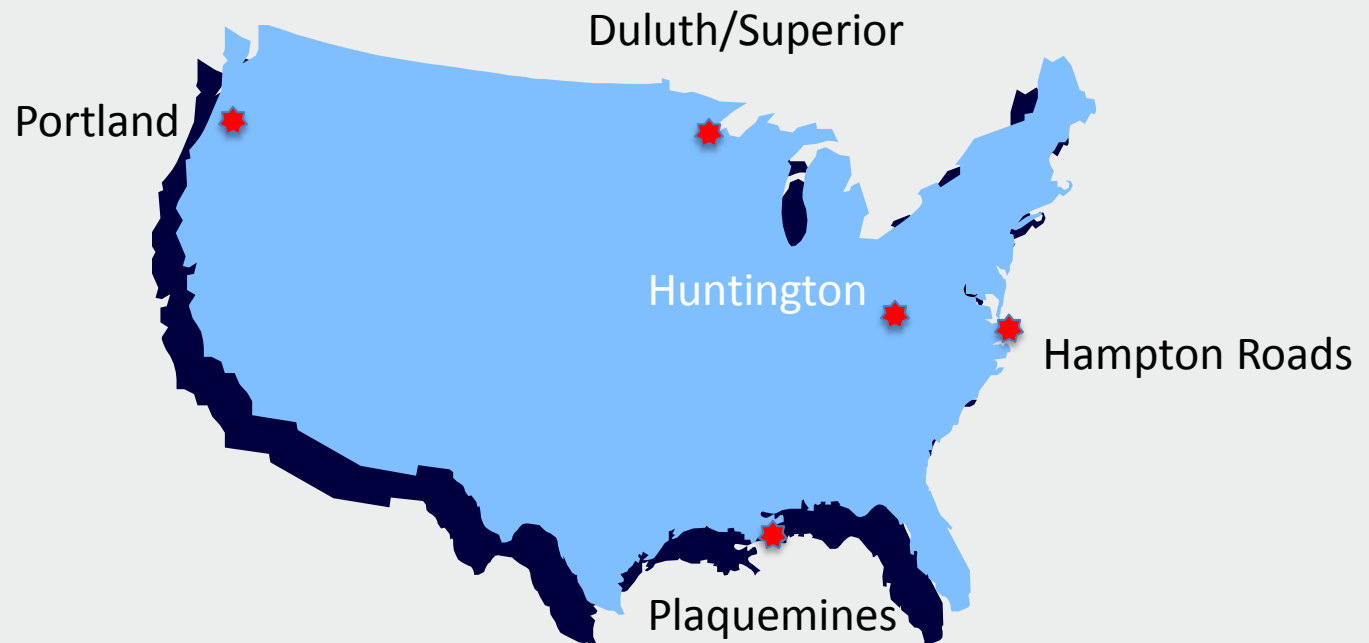
Conceptual Approach

- Make sure the navigation project won't be blocked or diminished by surface transportation issues
- Focus on maintenance, not new construction
- Maximize capacity in terms of tonnage
 - Future research: value and other metrics



Research Approach

- 5 case studies





Research Approach

- Identify primary commodities and their primary origin-destination corridors
- Waterway/Port: Assume loss of depth (2 ft for Huntington, 3 ft all others)
- Using historical CPT data, determine what/how much typically moves in the affect stratum
- Locks: assume maintenance will reduce delays and closures, increasing theoretical throughput capability
- Assume that if waterway/channel is restored, tonnage in that stratum could increase by 30%



Corridors

- Rail: Identify potential choke points on primary corridors and remaining theoretical capacity
- Highway: Use Urban Mobility Report data to determine if trucks would accelerate congestion curve
- Locks: Determine theoretical capacity using historical data and “best year” performance for 2000-2012.



The Model

- Built on a network using network flow techniques
- Each link has maximum capacity and a certain level of current utilization
- Maximize the possible freight throughput with increased system availability
- Analyze various budgeting levels and various project combinations



Findings—Without the Model

- No established methodology for determining effect of maintenance on system utilization
- Wide variation among ports in degree to which bottom strata of water depth are used in terms of tonnage relative to total port tonnage
- Highways are not at all critical in some instances
- Port truck traffic congestion is constraint only in immediate vicinity of port terminals



Findings—With the Model

- Improvement of only a few waterway segments will make a significant difference
- Not all eligible segments need to be fully maintained
- Possible for budgets to be set too high
 - No point spending on segments that may not affect total tonnage throughput due to low demand or landside constraints
- Some maintenance is all or nothing—can't be scaled
- Locks are not system capacity constraint as long as they operate as well as they have historically



Model Limitations

- Only one metric—tonnage
- Doesn't account for shoaling or gradual degradation
- Sometimes necessary to maintain excess capacity to hedge against unforeseen events
- Assumes no landside improvements



For more information

