Developing a Resiliency Framework for Regional Freight Platforms

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Trade & Transport Trends

- Continuing global population/trade growth
- MTS consolidation (liner services merging)
- Global supply chain integration
- Changing trade patterns and markets
- Expanding economies of scale/scope
- Business driver of service reliability
- Emerging regional freight platforms (RFP)
- Are RFPs a resiliency strategy?
World Population Growth 1950 to 2050 (projected)

31 Oct 2011 - 7 Billion

Shipping Grows with Trade

Global Seaborne Shipping 1968-2008

TRIPLED in 40 years!

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Marine Transportation System

The Marine Transportation System (MTS) consists of vessels, waterways, ports, and intermodal landside connections, which allow the various modes of transportation to move people and goods to, from, and on the water... and its character is changing.

Source: After MTSNAC: http://www.mtsnac.org
## Global Terminal Acquisitions

<table>
<thead>
<tr>
<th>Date</th>
<th>Terminal</th>
<th>Acquirer</th>
<th>Price ($million)</th>
<th>Volume (TEUs)</th>
<th>Price TEU</th>
<th>Multiple</th>
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<tr>
<td>Sept 04</td>
<td>CSX World Terminals</td>
<td>DP World</td>
<td>1,142</td>
<td>3,300,000</td>
<td>$346</td>
<td>14</td>
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<tr>
<td>Jan 06</td>
<td>P&amp;O Ports</td>
<td>DP World</td>
<td>6,800</td>
<td>22,500,000</td>
<td>$302</td>
<td>16</td>
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<td>Nov 06</td>
<td>OOIL Terminals</td>
<td>Ontario Teacher’s Pension Plan</td>
<td>2,400</td>
<td>2,570,000</td>
<td>$935</td>
<td>27</td>
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<tr>
<td>Dec 06</td>
<td>Halterm</td>
<td>Macquarie</td>
<td>157.5</td>
<td>210,000</td>
<td>$750</td>
<td>23</td>
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<tr>
<td>Feb 07</td>
<td>Montreal Gateway</td>
<td>Morgan Stanley</td>
<td>409.5</td>
<td>995,000</td>
<td>$515</td>
<td>23</td>
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<tr>
<td>Mar 07</td>
<td>Maher Terminals</td>
<td>Deutsche Bank</td>
<td>2,300 (?)</td>
<td>1,900,000</td>
<td>$1,053</td>
<td>~40 (?)</td>
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Carrier Consolidation from 1970 to 2010

<table>
<thead>
<tr>
<th>NYK Line</th>
<th>Showa</th>
<th>Nippon Liner</th>
<th>NYK Line</th>
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<tr>
<td>CP Ships</td>
<td>Canmar</td>
<td>Lykees Lines</td>
<td>CP Ships</td>
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<td>Contship</td>
<td>Avaran Lines</td>
<td>ANZDL</td>
<td>Hapag Lloyd</td>
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<td>CMA</td>
<td>CGM</td>
<td>Australia National Lines</td>
<td>CMA CGM</td>
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<tr>
<td>NOL</td>
<td>APL</td>
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<tr>
<td>Evergreen</td>
<td>Lloyd Triestino</td>
<td>Uniglory</td>
<td>Evergreen</td>
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<tr>
<td></td>
<td>Uniglory</td>
<td>Hatsu Marine</td>
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<tr>
<td>P&amp;O Containers</td>
<td>Nedlloyd Lines</td>
<td>Blue Star Lines</td>
<td>P&amp;O</td>
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<tr>
<td></td>
<td>Farrell Line</td>
<td></td>
<td>Nedlloyd</td>
</tr>
<tr>
<td>Maersk Line</td>
<td>Sea-Land</td>
<td>Safmarine</td>
<td>Maersk</td>
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<td>SCL Line/CMBT</td>
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<td>Sealand</td>
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<tr>
<td></td>
<td></td>
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<td>Maersk/Sealand</td>
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Trade & Transport Trends

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Integration of Supply Chain Relationships

Traditional Supply Chain Model

Logistics Network Model
From “Point-to-Point” Movement to Continuous Flow Pipelines

- Freight transportation is a “systems” issue and must be seen from a regional/national mobility perspective.

- The “logistics system” include waterways and terminals as well as landside access and distribution centers.
Four Mega-Trading Blocks

- Russia
- China
- India
- Europe
Two Mega-Trading Blocks

North America

South America
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Economies of Scale

As quantity of production increases from Q to Q2, the average cost of each unit decreases from C to C1.

Cost of Construction

Cost/DWT per DWT Bulkers

Source: Tradewinds Sales and Purchase Data, November 2009
14k Ship with Eight Gantry Cranes

Source: DPW_Daniela_14k.jpeg
Bigger Ships Mean Bigger Infrastructure - New $5B Panama Canal Expansion Opens in 2014

Total excavation = 133 MCM
Original 1914 construction = 205 MCM
Cost Advantage Comparison with 4000/8000 TEU Ships

- Left of the black line = West Coast has the cost advantage
- Right of the black line = East Coast has the cost advantage

(Source: Worley Parsons, Richard West)
East Coast ports reportedly investing more than $6 billion for expansions...

- Demand for increased capacity
- Driven by ships/expansion of the Panama Canal
- Port & intermodal infrastructure issues
  - Availability of deep water and air draft
  - On-dock intermodal container transfer facilities
  - Seamless road and rail connectivity to nation
  - Access to warehouse & logistics centers
- Increasing business focus on system reliability
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National Export Initiative

- In 2010, President Obama launched the National Export Initiative (NEI), which aims to double exports over the next five years.
- This initiative is envisioned to significantly increase the volume of American products entering the global marketplace.
- Beyond the export of service sector products, these exports include agricultural goods, manufactured products, and natural resources.
- The President declared that exports are important to boost the U.S. GDP, reduce the trade deficit, and help stimulate job creation.
U.S. Exports Transport Cost from Midwest to Northern Europe

US 63.4% Cost
EU 24% Cost
Cargo Owners’ Demands from their Logistics Networks

- Competitive costs
- Velocity to the point of sale
- Reliability in cargo delivery

...and Reliability is KING!

If cargo moves from its current route because of poor performance to a new route, it almost never returns.
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Planning for International (Import and Export) & Domestic Freight Movement
Northeast Multi-state Freight Platform

Imports

Exports

North Port - South Port Corridor
Economies of Scope
or “Bigger is Better”

• Regional Freight Platforms serve expanded *geographic scopes beyond historic tributary cargo flows* to gain logistic efficiencies.

• These transport and distribution networks have redundant infrastructure and distribution capabilities available to *enable the existing supply chain to absorb a shock or disruption without crippling the chain’s ability to meet regional customer’s needs*.

• There will be competition among components.
Formation of a “Port Pole”

• A “Port Pole” is a Regional Freight Platform of collaborating ports that attract cargo because of their combined capacity, enhanced resiliency to shocks, and ability to contribute value through economies of scope and scale.

• Examples of existing port poles include the LA(16)-LB(17) port complex, ports of Rotterdam(9)-Antwerp(13), and ports of Hamburg(11)-Bermerhaven(19).
Creating a New Port Pole
...or RFP

• Collaborations among the Port of New York and New Jersey with the Delaware River Ports of Wilmington-Philadelphia-Camden could form a new port pole that serves the Northeast, Midwest and the nation.
Two Gateways – One Port

• **North Port** (PANYNJ) is the import gateway... moving containerized goods quickly into the region and the hinterlands... and connects to:

• **South Port** (W-P-C) is the bulk cargo and container export gateway... making use of available local land and labor resources in Wilmington, Philadelphia and South Jersey region to increase efficiency.
New Jersey Freight Flows

More than 600 million tons!

- 199 Million Tons entering the State
- 126 Million Tons moving through the State
- 131 Million tons moving within the State
- 165 Million Tons leaving the State
New Jersey’s Proposed Marine Highway & Regional Freight Platform

• Upper New York Bay (Jersey City Hub)
• Newark Bay (Elizabeth Hub)
• Edison/Linden (Raritan/Linden Hub)
• Camden/Gloucester/Paulsboro (C/P Hub)
• Salem (Salem Hub)
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DISRUPTIONS!

MSC Chitra, Mumbai, India (2010)

USS Cole – Oct. 12, 2000
Hole extends from Sheer Strake to Tank Top

Earthquakes: Port Au Prince

Car Float, 2009
Maritime Transportation System (MTS)

- Vessels
- Waterways
- Terminals
- Intermodals
- Users

**Port Security**

- Protection
  - (Detect, Deter, Defend)
    - Physical
      - Guns
      - Gates
      - Guards
    - Technological
      - Sensors
      - Networks

- Resilience
  - (Consider, Mitigate)
    - Proactive Approach
      - Before disruption
    - Reactive Approach
      - After disruption
Balancing Security from Disruptions and Free Movement of Cargo at Ports

Most Protection
No Danger
Stops all Movement

How to achieve the optimum?

No Protection
No Cost
Extremely Vulnerable

If you cannot afford to protect it, what can you do to make it resilient?
What is Resilience?

Resilience is the ability of a system to provide and maintain an acceptable level of service in the face of various major disruptions and challenges to normal operations.
Resiliency Curve

- Preparation
- Disruption
- Recovery Time
- Lost Performance Zone
- Baseline
- Resilience Option
Proactive and Reactive Resiliency Strategies

Proactive Resiliency Strategies
- Reduction in Vulnerability
- Increasing Adaptive Capacity

Reactive Resiliency Strategies
- Agile Response
- Effective Recovery

Disruption / Catastrophic Event
Developing a Modeling Framework

• Define the system
  – Delineate network boundary
  – Identify Unit of Benefit and FOM

• Scenario Analysis
  – Define baseline conditions of current state
  – Determine business model
  – Identify possible disruptive scenarios

• Determine action measures and effects
Selecting Model Parameters

• Unit of Benefit
  – Cargo Throughput

• Figure of Merits
  – Cargo Security
  – Redundant Capacity (and hence Resiliency)
  – Capacity Alternatives
  – Job creation/retention
  – Reduction in congestion
  – Reduction in emissions
  – Asset utilization
  – Highway safety
  – Public-private partnership
  – Profits
Assessing Impact of RFP on Business and Security

Economic Importance

Resilient System

Low Medium High

Low Medium High

1. Cargo security
2. Redundant capacity
3. Job creation
4. Public profits
5. Political obstacles

1. Congestion & Emission reduction
2. Highway safety
3. Environmental requirements
4. Community resistance
5. Asset Utilization

1. Highway & Railway maintenance
2. Adequate infrastructure
3. Adequate equipment
4. Public-Private Partnership
5. Available Finance
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? Are RFPs a resiliency strategy in NJ?
Answer: YES

Any Questions?