Major Issues and Trends Facing the Port and Marine Transportation Industry

AAPA MTMTP
Charleston, SC
4-24-06
Objectives

• Cover Some Mega-trends
• Discuss Transportation Industry Challenges
• Touch on Some of the Nuts and Bolts
• Assess Some of the Implications
Some Mega Trends

March 21, 2006
Hemispheric bulk cargo performance has been mixed over the past five years.

2000-2005 Americas' Bulk Cargo Growth

Note: Bubble size indicates 2005 tonnage
Mexico has led the way in terms of growth in hemispheric container trade.
While almost all regions have contributed to overall growth in breakbulk cargoes.
Trade Growth Will Continue to Increase the Pressure on Ports

- At a 5% CAGR, trade doubles every 15 years
- At a 7.5% CAGR, trade doubles every 10 years
- In 2005, the major North American ports handled a reported 44+ million TEUs
- By 2010, this volume will approximate 60-65 million TEUs
The next five years will see sustained growth across the hemisphere.
II. Define the Challenges
Motor Carrier Challenges
Several factors have driven productivity gains

- Trailer size increased from 40’ to 53’
- Truck engine and maintenance cycles lengthened
- Truck engine fuel efficiency increased
- Empty miles were reduced
- Unionized carriers share down
- Improved technology and processes
However, many of these productivity opportunities may be reaching their end

<table>
<thead>
<tr>
<th>Area of Improvement</th>
<th>Inhibitor</th>
</tr>
</thead>
<tbody>
<tr>
<td>• Equipment Gains</td>
<td>• 53’ to 57’ Unlikely</td>
</tr>
<tr>
<td>• Fuel Efficiency Gains</td>
<td>• Environmental Regulations</td>
</tr>
<tr>
<td>• Labor Gains</td>
<td>• Hours-of-Service Regulations</td>
</tr>
</tbody>
</table>

In addition to slower productivity gains, the infrastructure is reaching its capacity
Highway infrastructure is facing significant constraints

Percent of Peak-Period Travel at Congestion Level

1982
- Uncongested: 70%
- Heavy: 8%
- Moderate: 10%
- Severe: 7%
- Extreme: 5%

2002
- Uncongested: 33%
- Severe: 20%
- Heavy: 14%
- Moderate: 13%
- Extreme: 20%

Source: Texas Transportation Institute at Texas A&M University
Rail Industry Challenges
Railroads have more than halved their cost/revenue ton-mile since deregulation

Railroad Expenditures per Revenue Ton-Mile (1982$)

Note: 1980 and 1981 Salaries & Wages Data reflect AAR’s estimate of 95% of total payroll expenses. In comparison year (1982), this measure differs from the 1975,1982-2002 methodology by 0.4%.
Sources: AAR “Railroad Ten-Year Trends.” (various ed.); AAR “Analysis of Class 1 Railroads.” (1981); AAR “Railroad Facts” (various ed.).
Productivity gains have contributed to the decreasing cost/revenue ton mile

Productivity Improvements

- Labor requirements declined
- Networks and track were rationalized following mergers
- Engine fuel efficiency increased
- Railcars increased to 286,000 lb. gross rail load
- Many railcar types were improved
For railroads, some of these productivity opportunities may have reached their limits.

<table>
<thead>
<tr>
<th>Area of Improvement</th>
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<tbody>
<tr>
<td>Equipment Gains</td>
<td>• 315,000 GTW Unlikely</td>
</tr>
<tr>
<td>Labor Gains</td>
<td>• Adding Employees</td>
</tr>
<tr>
<td>Fuel Efficiency Gains</td>
<td>• Future Locomotive Environment Regulations?</td>
</tr>
</tbody>
</table>

In addition to slower productivity gains, the infrastructure is reaching its capacity.
Port Industry Challenges
<table>
<thead>
<tr>
<th>Port Region</th>
<th>2005 Net Position</th>
<th>2010 Net Position</th>
<th>Comments</th>
</tr>
</thead>
<tbody>
<tr>
<td>PSW</td>
<td><img src="image" alt="Yellow" /></td>
<td><img src="image" alt="Red" /></td>
<td>LA/LB face significant capacity challenges during the next five years. Environmental regulation, enforcement and associated costs are key drivers. Oakland will likely have adequate capacity.</td>
</tr>
<tr>
<td>PNW</td>
<td><img src="image" alt="Green" /></td>
<td><img src="image" alt="Yellow" /></td>
<td>Tacoma has largest expansion potential although port-rail and continued PSW diversions pose challenges.</td>
</tr>
<tr>
<td>Atlantic</td>
<td><img src="image" alt="Green" /></td>
<td><img src="image" alt="Green" /></td>
<td>North Atlantic, particularly with the AMPT-Portsmouth terminal should provide adequate capacity. The South Atlantic will need to improve density and reduce dwells. A significant increase in Suez services would pose challenges.</td>
</tr>
<tr>
<td>South Florida</td>
<td><img src="image" alt="Green" /></td>
<td><img src="image" alt="Green" /></td>
<td>Southport expansion, terminal reconfiguration, higher density and lower dwell should accommodate growth.</td>
</tr>
<tr>
<td>Gulf</td>
<td><img src="image" alt="Yellow" /></td>
<td><img src="image" alt="Green" /></td>
<td>Bayport, Choctaw and some combination of Tampa, Texas City, Corpus Christi, Brownsville, Millennium Port will likely generate surplus capacity.</td>
</tr>
</tbody>
</table>
The Port Industry challenge is multi-dimensional and modal

- Harbor deepening
- Environmental
- Labor efficiency and effectiveness
- Berth utilization
- Reducing dwell times/increasing velocity: breakbulk as well as container
- Port-rail interface
- Regional transportation infrastructure
The Challenges

- Needs are increasing
- Environmental challenges
- Modally focused
- Maritime Industry: Fragmented approach
- Maritime visibility
- Finding the Common Ground

Funding shortfalls
Cover Some Nuts & Bolts
The Big Ships—Where Are They Deployed?

6,000 + TEU Vessels by Deployment

Note: Analysis includes 80% of all vessels over 6,000 TEU currently deployed
Big Ship Realities in a Load Center Port

- 6,300 moves
- 26+ to 50 berth working hours at 25-40 moves per hour and six cranes
- 18 to 32 sorts
  - 3 to 4 load ports to 6 to 8 destinations
- 2,500 to 3,200 rail moves
  - 10 to 13 double stack trains
TEUs per Gross Terminal Acre for the World’s Top Ports excluding Major Transshipment Ports 2005

Port name followed by 2003 world gross throughput rank
Estimated Average TEUs per Gross Terminal Acre by Coastal Range*

2004

*For a sample of the larger container ports in each coastal range for which comparable data exists
Operating Realities of 3,000 TEUs per Gross Terminal Acre Per Year

Average Dwell Time

<table>
<thead>
<tr>
<th>Operating Mode</th>
<th>Wheeled</th>
<th>Toppick</th>
<th>RTG_medium</th>
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</thead>
<tbody>
<tr>
<td></td>
<td>11</td>
<td>18</td>
<td>27</td>
</tr>
</tbody>
</table>

Norbridge
American Association of Port Authorities
Operating Realities if the average dwell time is 7 days
The Port Industry Faces Significant Challenges in Financing Capital Investment

- Competition
- Buyers’ Market
- Regulatory Requirements
- Construction Lead Times
- Pace of technological change
In addition, a significant portion of port capital investments do not generate revenues and have long investment lead times.

- Dredge spoil disposal areas
- Landfill
- Environmental remediation (cleanup)
- Mitigation
- Road and rail connections
- Grade separations
- Retention ponds
- Rail marshaling yards
- Utility rights of way
Port-Rail Interface Challenges

Port Productivity Conference
The Port-Rail Interface: Mastering Rubik’s Cube

Reefers
Chicago
Memphis
Dallas

20s
40s
1st Generation
2nd Generation
3rd Generation
The Port-Rail Interface: The Choice Challenge
The Port Rail Interface: Train Equivalents

8,000' DST Equivalents

- Chic
- Mem
- DFW

EB
WB
The Port Rail Interface: Integrating the Players’ Needs & Practices

<table>
<thead>
<tr>
<th>Carrier</th>
<th>Railroad</th>
<th>Port</th>
</tr>
</thead>
</table>
| • Vessel schedule  
• Vessel stow  
• O/Ds  
• Equipment type  
• Service Requirements | • Network structure  
• Network capacity  
• Traffic balance by lane  
• Car fleet  
• Domestic traffic  
• Blocking requirements  
• Schedule | • Landlord or operating  
• Rail terminals  
  – On dock  
  – Contiguous  
  – Centralized or decentralized  
• Load tracks: #, length, config  
• Support tracks: #, length, config |
Assess Some of the Implications
A Systemic Approach is Required

What Does It Mean?
- Focus is on the system, not a link or node
- The objectives are clearly defined
- The responsibilities are mutually established
- Quantifiable measures are established and used

What Does It Require?
- A³ Information
  - Available
  - Accessible
  - Accurate
- Cooperation
- An emphasis on velocity
- Flexibility to adapt
- Contingencies
What Are Some of the Tools

✓ 24/7 for everyone
✓ Just in system time
  ▪ Not my time or your time
✓ Minimum free time, ideally measured in hours on peak days
✓ Peak pricing
✓ Chassis pools & gray boxes
✓ Virtual CYs
✓ Appointment systems
✓ Real time information tools across the supply chain
✓ An acceleration in adaptation of world class work rules and practices to the U.S. waterfront
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April 24, 2006