Freight Transportation Perspectives
State and MPO Focus is Regional and Local;
Private Sector Focus is Increasingly National and Global
Private Sector
(Shippers, Carriers)

Public Sector
(States, MPOs)
The Focal Point of this briefing paper is the interaction between carriers and infrastructure managers.
Public and Private Sector Roles in U.S. Freight Operations

Figure 2
Service and Manufacturing Trends
Rapid Growth in Service Employment, Little in Manufacturing;
But Increased Freight Demand From Both Sectors

Source: US Census Bureau, 1997 Economic Census (No 1987 Census of FIRE and Transportation sectors)

Figure 3
Freight Shipping External Industry Pressures…
“Do More With Less” and Faster Turnaround

- Fewer Dollars, Less Funding
- Increased Safety Concerns
- Increasingly Complex Systems and Technology to Manage
- Global Threats/Competition
- Increasing Information Demands
- Increased Environmental Regulation
- Finite/Constrained Infrastructure

Figure 4
From Push Logistics Systems ...

```
Supplier -> Manufacturer -> Distributor -> Customer
```

**“PUSH” METHODS OF CONTROL**  
(relative importance)

- **Inventory**
- **Transport System**
- **Information System**

Figure 5A
"To Pull Logistics Systems

Supplier → Supplier
Supplier → 3PL
Supplier → Supplier
Supplier → Supplier
Designer → Manufacturer → Marketer

Returns/recycled products
Point-of-sale data

“PULL” METHODS OF CONTROL
(relative importance)

Inventory
Transport System
Information System

Figure 5B
Army Strategic Mobility Requirements
The Military’s Goal is to Reduce Deployment Time by 80 Percent

- Gulf War: 180 Days
- Current Target: 75 Days
- Chief of Staff’s Goal: 30 Days

Source: Adapted from briefing by William Lucas, MTMC, to TRB Annual Meeting, Jan. ’00

Figure 6A
The Evolution of Supply Chain Initiatives

- Electronic Data Interchange (EDI)
- Vendor-Managed Inventory
- Continuous Replenishment Planning
- Information Sharing
- Supply Chain Collaboration (Joint Planning And Action)
Domestic Freight Tons and Value, 1998
Freight Moving into, out of, and within the U.S.

Total Tons: 9.8 Billion
Total Value: $9.1 Trillion

Source: FHWA Multi-Modal Freight Analysis,
Framework Project using Reebie Associates 1998 data (1st Approximation)
Freight Growth by Region, 1998-2020
Preliminary Forecast
(Tons, All Modes, All Commodities)

- **South Region**: 89%
- **Northeast Region**: 79%
- **West Region**: 100%
- **Central Region**: 89%

Figure 8
Freight System Mileage within the U.S.

Highway, pipeline, and air increased modestly;
Class I rail lost mileage

Source: USDOT, Bureau of Transportation Statistics, National Transportation Statistics 1999
Truck Freight Flows, 1998
All Commodities; All Truck Types; Highway Freight Density in Tons

Figure 10
Truck‡ Vehicle Miles Traveled (VMT) - 1980 to 2020

‡Trucks includes both single-unit vehicles with 2-axles and 6 or more tires and combination vehicles.

*Preliminary forecast generated for FHWA, Office of Policy, by WEFA, Inc.
Peak-Period Travel Times Have Increased Significantly Compared to Off-Peak Travel Times in 68 Large Metro Areas

Source: Texas Transportation Institute
Rail Freight Flows, 1998
All Commodities; All Rail Services; Rail Freight Density in Tons

Figure 13
Forecast of Rail Traffic
(By Origins in Tons)

Thousand


Preliminary Forecasts- Railroad Facts and Freight Analysis Framework

Figure 14
Mid-Atlantic Rail Corridor Choke-Points Study
Participants: Amtrak, CSX, NS, NJ, PA, DE, MD, VA, I-95 Coalition

Figure 15
Top Gateways for International Freight, 1998
Exports and Imports in Tons

Functional Classification of Maritime Cargos

All Maritime Cargo

General Cargo
- Containers, Lift On/Lift Off (Lo/Lo), Roll On/Roll Off (Ro/Ro)
- Lumber, Paper, Steel, Autos

Bulk Cargo
- Sacks, Cartons, Crates, Drums, Pallets, Bags
- Lumber, Paper, Steel, Autos
- Containers, Lift On/Lift Off (Lo/Lo), Roll On/Roll Off (Ro/Ro)
- LNG, Petroleum, Molasses, Chemicals, Vegetable Oil
- Grain, Sand & Gravel, Scrap Metal, Coal/Coke, Clinker, Fertilizer

Figure 17
20 Year Containerized World Trade Growth 1988 - 2007

8.5% Average Annual Growth Rate (compounded annually)

Source: Clarkson Research Studies and WestLB Panmure

CAGR = Compound Annual Growth Rate

U.S. Containerized Tonnage Forecast

Source: TranSystems Corporation/
Containerisation International Yearbook
NY/NJ Regional Container Forecast (TEUs)

Source: PANY/NJ & TranSystems, 2000

Figure 19

Figure 20
Container Ship Evolution

1st Generation (Pre-1960 - 1970) 1,700 TEU
2nd Generation (1970 - 1980) 2,305 TEU
3rd Generation (1985) 3,220 TEU
4th Generation (1986 - 2000) 4,848 TEU
5th Generation (2000 - ?) 7,598 TEU

Figure 21

2000 New Build Orders
Expansion of World Post-Panamax Container Fleet

5,000+ TEUs
4,000 - 4,900 TEUs
3,000 - 3,900 TEUs
2,000 - 2,900 TEUs
1,000 - 1,900 TEUs
>1,000 TEUs

62% “Mega-Ships”

Figure 22
Major U.S. Metropolitan Populations

Figure 23
## Major Freight Projects, Examples

<table>
<thead>
<tr>
<th>Project</th>
<th>Cost</th>
<th>Timeline...</th>
</tr>
</thead>
<tbody>
<tr>
<td>The Alameda Corridor</td>
<td>$2.45 Billion (20 miles or rail improvements, and a 10 mile, 33 foot deep trench)</td>
<td>Planned for more than 15 years. In 1989 the Corridor Authority was formed, completion will be in 2002</td>
</tr>
<tr>
<td>Willow Springs, IL BNSF Rail Hub and CACH Facility</td>
<td>$150 million – UPS&lt;br&gt;$15.3 million – Grade crossings&lt;br&gt;$10.8 million – highway interchange&lt;br&gt;$70 million – BNSF</td>
<td>Seven years to build preceded by a 3-year Capital Analysis Plan</td>
</tr>
<tr>
<td>Portway to improve Truck access in Northern New Jersey</td>
<td>$750 million (Phase 1 only, Port to Jersey City)</td>
<td>Early start underway. Expected to be completed by 2011</td>
</tr>
<tr>
<td>Pier 400 – Port of Los Angeles (Maersk/Sea-Land)</td>
<td>$466 Million ($328 Million in dredging and landfill)</td>
<td>A 5-year, 3-phase project totaling 510 acres developed by 2003</td>
</tr>
<tr>
<td>Kill Van Kull dredging KVK channel into Port of NY/NJ to 50 feet</td>
<td>$912 million est.</td>
<td>Underway &amp; expected to be completed by 2009</td>
</tr>
<tr>
<td>Port of NY &amp; NJ Maersk/Sea-land Hub Terminal</td>
<td>$264 Million existing terminal renovation</td>
<td>A two phase, four-year project with a 1.3 million TEU throughput.</td>
</tr>
</tbody>
</table>
After a Long Improvement, Total Logistics Expenditures Have Stalled at About 10 Percent

Source: Cass/ProLogis 10th Annual State of Logistics Report, 1998

Figure 25
Truck, Rail, and Marine Fatalities
Fatality rates are declining, but absolute numbers are not declining significantly

Figure 26
Source: U.S. Department of Transportation, Modal Administration, various sources
Issue: Do the Truck, Rail, and Marine Freight Systems Have the Capacity to Handle the Growing Volume of Freight?

"Building Freight Capacity Through Better Operations: Defining the National Agenda"
July 26-27, 2001 Conference

U.S. Freight System Productivity

Collaborative Freight Operations Research
Performance Data
Infrastructure and Infrastructure
Freight Operations
Public and Private Leadership
Renewed Freight Mandate and Vision

Figure 28
## Highway/Truck Operations, Examples

<table>
<thead>
<tr>
<th>Operations Strategy</th>
<th>Problem</th>
<th>Solution</th>
<th>Example/s</th>
</tr>
</thead>
<tbody>
<tr>
<td>Corridor Traffic Information</td>
<td>Lack of Corridor-Scale Congestion and Routing Information for Truckers</td>
<td>Corridor and National Travel Condition Information Services Targeted to Truckers</td>
<td>I-95 Coalition FleetForward (Operations Test); Rural ATIS Program; Roadway Weather Information Systems</td>
</tr>
<tr>
<td>Incident Management</td>
<td>Delays and Deteriorating Reliability Because of Incidents (e.g., Breakdowns, Crashes,…)</td>
<td>Proactive Response to Incidents and Traffic Management to Minimize Backups; expertise in Clearing Heavy Truck-Involved Incidents</td>
<td>Chicago Minuteman Patrol</td>
</tr>
<tr>
<td>Work Zone Management</td>
<td>Delays and Increased Risk of Accidents at Work Zones; Truck Prohibited from Detour Routes Because of Low Bridge Clearances, etc.</td>
<td>Specific Attention to Maintenance of Truck Flows at Work Zone and Along Diversion Routes</td>
<td></td>
</tr>
<tr>
<td>Automated Border and Weigh Station Clearance</td>
<td>Delays at Ports of Entry and Weigh Stations for Regulatory and Safety Inspections</td>
<td>Automated Credential and Weight Pre-Clearance Screening; Coordination of Customs, INS and DOT Inspection Functions</td>
<td>ITS/CVO Program; CVISN</td>
</tr>
</tbody>
</table>

*Figure 29*
## Rail Operations, Examples

<table>
<thead>
<tr>
<th>Operations Strategy</th>
<th>Problem</th>
<th>Solution</th>
<th>Example/s</th>
</tr>
</thead>
<tbody>
<tr>
<td>Increasing Rail Headway And Capacity</td>
<td>Complex Interoperative Systems Are Needed To Safely Operate Freight Trains At Speeds Greater Than 79 M.P.H.</td>
<td>Positive Train Control</td>
<td>Research Is Underway</td>
</tr>
<tr>
<td>Interchangeable Domestic Container Pools Which Add To Speed And Service On Rail Lines</td>
<td>Equipment Only Available To One Rail Carrier Is Inefficient</td>
<td>Domestic Interline Container Pools</td>
<td>EMP – Participants Are NS, UP, CP, KCS, Wisconsin Central, Etc. NACs – Participants Are BNSF, CN, CP, CSX, IMRL</td>
</tr>
<tr>
<td>Open Platforms For Rail Service Booking Adds To Customer Appeal And Adds To Velocity</td>
<td>Single Carrier Booking Is Time And Labor Intensive</td>
<td>Web-Enabled Communications For Booking And Tracking</td>
<td>ARZOON Members Are US, CSX, NS, And CP</td>
</tr>
</tbody>
</table>

Figure 30
## Port and Terminal Operations, Examples

<table>
<thead>
<tr>
<th>Operations Strategy</th>
<th>Problem</th>
<th>Solution</th>
<th>Example/s</th>
</tr>
</thead>
<tbody>
<tr>
<td>Remote inland ports/depots</td>
<td>Congested port Terminals</td>
<td>Move empty containers to inland site</td>
<td>Virginia Port Authority’s Inland Terminal</td>
</tr>
<tr>
<td>Increase IT Capability/Automation</td>
<td>Low Terminal Productivity and Turn Times</td>
<td>Increased Information/Reservation System</td>
<td>Port of NY/NJ’s FIRST</td>
</tr>
<tr>
<td>Agile Port Technology</td>
<td>Need for increased Port Throughput</td>
<td>IT System Integration Between Ship and Train</td>
<td>USDOD Agile Port Technology Demonstrations</td>
</tr>
</tbody>
</table>

Figure 31
Building a NEXUS for Efficient System Wide Freight Operations

The GAP represents an opportunity for improved operations

The GAP is the NEXUS of Operational Collaboration

Figure 32
Freight Transportation Perspectives
State and MPO Focus is Regional and Local;
Private Sector Focus is Increasingly National and Global
Private Sector
(Shippers, Carriers)

Public Sector
(States, MPOs)

Local
Regional
National
Global
National Freight Productivity Program
Freight System Operations Agenda
Private Sector
(Shippers, Carriers)

Public Sector
(States, MPOs)

Global

National

Regional

Local

Figure 34
National Freight Productivity Program
Freight System Operations Agenda
Private Sector
(Shippers, Carriers)

Public Sector
(States, MPOs)

Global
National
Regional
Local
National Freight Productivity Program
Freight System Operations Agenda
Private Sector
(Shippers, Carriers)

Global
National
Regional
Local

Public Sector
(States, MPOs)

Figure 36