Darrell Wilson
AVP Government Relations
The Future of Freight Panel
August 26th, 2014
## RR Safety Trends: 2000-2013*

<table>
<thead>
<tr>
<th>Category</th>
<th>Change</th>
</tr>
</thead>
<tbody>
<tr>
<td>Train accident rate</td>
<td>↓ 43%</td>
</tr>
<tr>
<td>Employee injury rate</td>
<td>↓ 47%</td>
</tr>
<tr>
<td>Grade crossing collision rate</td>
<td>↓ 42%</td>
</tr>
<tr>
<td>Hazmat accident rate**</td>
<td>↓ 38%</td>
</tr>
</tbody>
</table>

*preliminary  **through 2010  Source: FRA, AAR
The Norfolk Southern Network

- NS operates approximately 21,000 route miles throughout 22 states and the District of Columbia
- Engaged in the rail transportation of raw materials, intermediate products, and finished goods
- Operates the most extensive intermodal network in the East
- NYSE: NSC
- Active P³ Partner
Norfolk Southern and Our Freight Rail Friends
Carrying the Things America Depends On

NS Intermodal: 3.4 million trailers and containers in 2013

NS Coal: 150 million tons in 2013

Plastics, fertilizers, and other chemicals: 169 million tons (industry)

Stone, sand, gravel: 132 million tons (industry)

Farm products: 147 million tons (industry)

Crude oil: 408,000 carloads (2013 - industry)

And much more!
# America’s Railroads Carry Just About Everything

<table>
<thead>
<tr>
<th>Commodity</th>
<th>Revenue (in billions)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Intermodal*</td>
<td>$15.5 bil</td>
</tr>
<tr>
<td>Coal</td>
<td>$14.3 bil</td>
</tr>
<tr>
<td>Chemicals</td>
<td>$9.9 bil</td>
</tr>
<tr>
<td>Food</td>
<td>$5.6 bil</td>
</tr>
<tr>
<td>Motor vehicles &amp; parts</td>
<td>$5.5 bil</td>
</tr>
<tr>
<td>Grain</td>
<td>$4.7 bil</td>
</tr>
<tr>
<td>Sand, gravel, &amp; other nonmetallic minerals</td>
<td>$3.2 bil</td>
</tr>
<tr>
<td>Steel and other metal products</td>
<td>$2.7 bil</td>
</tr>
<tr>
<td>Pulp &amp; paper</td>
<td>$2.3 bil</td>
</tr>
<tr>
<td>Stone, clay &amp; glass prod. (e.g., cement, ground minerals)</td>
<td>$1.8 bil</td>
</tr>
<tr>
<td>Lumber &amp; wood</td>
<td>$1.8 bil</td>
</tr>
</tbody>
</table>

**Total gross freight revenue in 2013:** $72.1 billion

*Intermodal is estimated; some intermodal revenue is included in individual commodities

Source: AAR (FCS report)
Return on Investment is Crucial

If ROI > cost of capital:
- Capital spending expands
- Stronger physical plant; more and better equipment.
- Faster, more reliable service
- Sustainability

If ROI < cost of capital:
- Lower capital spending
- Weaker physical plant, equipment
- Slower, less reliable service
- Disinvestment
Sharp Increase in Rail Traffic Density

Thousands of Car-Miles Per Mile of Road Owned

Data are for Class I railroads. Source: AAR
What is an Intermodal Facility?

**Intermodal Facility** – A rail terminal for transferring freight from one transportation mode to another, either from truck-to-rail or rail-to-truck for the Crescent Corridor, without the handling of the freight itself when changing modes.
**NS’ Intermodal Network**

Norfolk Southern System

Intermodal Terminal(s)

Market Expansions thru 2010

Market Expansions thru 2012

IM Port Terminal

TCS Terminals

Norfolk Southern System

Intermodal Terminal(s)

Market Expansions thru 2010

Market Expansions thru 2012

IM Port Terminal

TCS Terminals
Drivers: The Growth in Rail Intermodal

- International trade bounce back from recession
- Congestion and population growth
- Truck driver shortages
- Fuel efficiency of railroad vs trucking
- Terminal Investments = more options for shippers: O/D Pairs or Lanes
- Some Conversion of boxcar traffic
- TL Carriers getting invested in the service
- Moving from TOFL to COFC
Heartland Corridor Route

America's first multi-state public-private rail corridor partnership

- Next Day Service to Columbus
- Reduced Transit to Chicago
- Shaved over 200 Route Miles Off Each Container Move to Chicago
- Greater Efficiencies
- High Speed Double Stack
CRESCENT CORRIDOR INTERMODAL FACILITIES
2012 AND BEYOND - FUNDING REQUIREMENTS

Open 2012
- Birmingham, AL; Memphis, TN; Greencastle, PA; and Harrisburg, PA

Open 2013
- Charlotte, NC

Open 2014 and Beyond
- Atlanta, Knoxville, E-Rail, Roanoke, Philadelphia, and Bethlehem
A Solution: Intermodal Rail Transportation

Introducing Norfolk Southern’s Six Corridor Strategy

- Norfolk Southern has employed a “Six Corridor Strategy” focusing on four key principles:
  - Market access
  - Length of haul
  - Asset utilization
  - Productivity
Looming Need for Surface Infrastructure Investment

Peak-Period Congestion (2035)
Market Analysis: Population Migration

Population shift from 2000 to 2010, shown as percentage

*Green indicates growth, Pink indicates loss

Percentage Change

Market Analysis: Surface Freight Volumes

- Dry vanloads of domestic freight only
- Filtered by zip code of origin or destination of shipment in NS footprint
- Single driver transports only
- Domestic freight
- Average trip approximately 1,100 miles
**External Variable: Market Analysis and Potential Public Benefit**

**Current Lengths of Haul on Long-Distance Trucks**

2008 Transearch Dry-Vans in AL, GA, MD, NC, NJ, PA, TN, and TX

<table>
<thead>
<tr>
<th>LOH</th>
<th>Dry-van loads</th>
<th>Percent of total</th>
<th>Weighted by VMT</th>
</tr>
</thead>
<tbody>
<tr>
<td>0 to 100 miles</td>
<td>102,307,182</td>
<td>72%</td>
<td>39%</td>
</tr>
<tr>
<td>100 to 200 miles</td>
<td>18,926,475</td>
<td>13%</td>
<td>15%</td>
</tr>
<tr>
<td>200 to 400 miles</td>
<td>17,149,078</td>
<td>12%</td>
<td>25%</td>
</tr>
<tr>
<td>400 to 600 miles</td>
<td>2,312,247</td>
<td>2%</td>
<td>6%</td>
</tr>
<tr>
<td>600 to 800 miles</td>
<td>1,355,705</td>
<td>1%</td>
<td>5%</td>
</tr>
<tr>
<td>Over 800 miles</td>
<td>1,240,863</td>
<td>1%</td>
<td>8%</td>
</tr>
</tbody>
</table>

- 4% of all hauls are over 500 miles in length
- Hauls over 500 miles represent 20% of total vehicle miles traveled
U.S. Population v. Class 1 Railroad Revenue Ton-Miles
Actuals 1980-2011; Projections 2012-2030

Population in Millions

Rail Ton Miles in Billions

Date


RIGHT AXIS - Rail Ton Miles (in billions)  LEFT AXIS - Population (in millions)
External Variable – Market Analysis
Opportunity for Rail Entrance in the Freight Transportation Market
Crescent Corridor Public Benefits
Long-Term Public Benefits

• Cambridge Systematics (CS) performed a thorough benefit-cost analysis of the Crescent Corridor for the TIGER II grant application.

• Based on benefit categories and factors specified by TIGER II guidance, CS concludes at full operation Crescent will **ANNUALLY** deliver:

  o **$543 million** in Shipping Savings

  o **$566 million** in Congestion Savings (22.5 million hours of travel time savings)

  o **$146 million** in Safety Savings (1,256 fewer heavy truck crashes)

  o **$147 million in Sustainability Savings**
    (162 million gallons of fuel saved & 1.8 million tons of CO₂ eliminated)

  o **$261 million** in Highway Maintenance Savings (1.263 billion truck VMTs reduced)
Crescent Corridor Financial Investment Hierarchy

INTERMODAL TERMINALS

SPEED ENHANCEMENTS

ADDED CAPACITY

ROLLING STOCK

The Future
## Targeted Schedules

<table>
<thead>
<tr>
<th>Origin</th>
<th>Destination</th>
<th>Time</th>
</tr>
</thead>
<tbody>
<tr>
<td>Memphis</td>
<td>Harrisburg</td>
<td>30 hours</td>
</tr>
<tr>
<td>Memphis</td>
<td>Philadelphia</td>
<td>43.3 hours</td>
</tr>
<tr>
<td>Birmingham</td>
<td>Harrisburg</td>
<td>30 hours</td>
</tr>
</tbody>
</table>
Shifts In The Market Require A Very Flexible Network

NS International Length of Haul

NS Domestic Length of Haul

Share growth in points from 2003 to 2013
Recent Trends in NS Length of Haul

**NS East Coast vs. West Coast Market Share**

- **2001**: East Coast 50%, West Coast 50%
- **2003**: East Coast 45%, West Coast 55%
- **2005**: East Coast 40%, West Coast 60%
- **2007**: East Coast 35%, West Coast 65%
- **2009**: East Coast 30%, West Coast 70%
- **2011**: East Coast 25%, West Coast 75%
- **2012**: East Coast 20%, West Coast 80%
- **2013**: East Coast 15%, West Coast 85%

**NS Domestic Local vs. Interline**

- **2001**: Local 80%, Interline 20%
- **2003**: Local 75%, Interline 25%
- **2005**: Local 70%, Interline 30%
- **2007**: Local 65%, Interline 35%
- **2009**: Local 60%, Interline 40%
- **2011**: Local 55%, Interline 45%
- **2012**: Local 50%, Interline 50%
- **2013**: Local 45%, Interline 55%

**NS International Length of Haul**

- **2001**: +8%
- **2003**: +8%
- **2005**: +8%
- **2007**: -16%
- **2009**: -16%
- **2011**: -16%
- **2012**: -16%
- **2013**: -16%

**NS Domestic Length of Haul**

- **2001**: 3%
- **2003**: 13%
- **2005**: 25%
- **2007**: 30%
- **2009**: 35%
- **2011**: 40%
- **2012**: 45%
- **2013**: 50%
## Top Intermodal Freight Rail Corridors

<table>
<thead>
<tr>
<th>Corridor (State to State)</th>
<th>Trailers/Containers</th>
<th>Avg Length of Haul (miles)</th>
</tr>
</thead>
<tbody>
<tr>
<td>CA /IL</td>
<td>2,485,880</td>
<td>2,220</td>
</tr>
<tr>
<td>CA/TX</td>
<td>1,383,520</td>
<td>1,550</td>
</tr>
<tr>
<td>WA/IL</td>
<td>797,480</td>
<td>2,230</td>
</tr>
<tr>
<td>NJ/IL</td>
<td>544,840</td>
<td>950</td>
</tr>
<tr>
<td>PA/IL</td>
<td>498,920</td>
<td>750</td>
</tr>
<tr>
<td>OH/IL</td>
<td>457,240</td>
<td>360</td>
</tr>
<tr>
<td>TX/IL</td>
<td>448,000</td>
<td>1,170</td>
</tr>
<tr>
<td>CA/TN</td>
<td>382,000</td>
<td>2,100</td>
</tr>
<tr>
<td>CA/KS</td>
<td>312,320</td>
<td>1,775</td>
</tr>
<tr>
<td>CA/AR</td>
<td>297,080</td>
<td>2,025</td>
</tr>
</tbody>
</table>
Market Access and ROIC

**MARKETS**
- Demand for Transportation Services
- Opportunities for Growth
- Response to Market Needs

**REVENUES**
- Volumes
- Competition
- Pricing

**COSTS**
- Asset and Employee Productivity
- Operating Efficiency

**PROFITS**
- Revenues > Long-Term Costs
- Sufficient Return to Attract Investment

**Economics of Capital Investments on Class I RR**
Railroads only call some of the shots

- Customers dictate conveyance in many markets
- Geography can be a limiting factor for rail access
- Infrastructure/Capacity is usually approached incrementally
- Operations, Power-Locomotives, O/D analysis, crews, market demand forecasts—ultimately drive investments decisions
Thank You