North American Car Fleet: Trends

Presentation to the North East Association of Rail Shippers

Robert E. Pickel Jr., Senior Vice President, Marketing and Sales, National Steel Car N.A. Inc.
Portland, ME September 22, 2016
Our Company: Certifications

- Founded in 1912, celebrating over 100 years of railcar building excellence
- Largest, single-site railcar manufacturing plant in North America
- All Types of Freight Cars: 12 different car types with over 76 models
- Capacity to produce up to 15,000 railcars annually
- Ongoing plant modernization
- Certified to AAR M-1003 & AAR M-1002
- The only car builder certified to ISO 9001-2008 in North America
- NSC has been awarded the TTX Excellent Supplier Award fourteen consecutive years.
Company Portfolio

All Types of Freight Cars
Class I Railroad Capital Spending and Maintenance Expenses

Over 50% increase over 9 years

Source: AAR Freight Railroad Capacity and Investment
Class I Railroad Capital Spending and Maintenance Expenses

Over 50% increase over 9 years

Source: AAR Freight Railroad Capacity and Investment

Freight Railroad Infrastructure & Equipment Spending Per Mile*

*Capital spending + maintenance expenses per route-mile owned. Data are for Class I railroads. Source: AAR
### 2016 and Beyond:

#### 2016 Class I Railways Capital Investments (in billions $)

- Class I CAPEX budget projected to decline by 14% in 2016 vs 2015

<table>
<thead>
<tr>
<th>2016</th>
<th>2015</th>
</tr>
</thead>
<tbody>
<tr>
<td>BNSF:</td>
<td>$4.30</td>
</tr>
<tr>
<td>CN:</td>
<td>$2.90</td>
</tr>
<tr>
<td>CP:</td>
<td>$1.10</td>
</tr>
<tr>
<td>CSX:</td>
<td>$2.40</td>
</tr>
<tr>
<td>KCS:</td>
<td>$0.58</td>
</tr>
<tr>
<td>NS:</td>
<td>$2.10</td>
</tr>
<tr>
<td>UP</td>
<td>$3.75</td>
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</tbody>
</table>

| TOTAL | $17.13 |

| TOTAL | $19.95 |

*Source: Press Releases*
Existing North American Fleet: Change in Fleet Composition

Source: Railinc

Expressed in 1,000’s
Existing North American Fleet: By Age and GRL

Source: Railinc
## Existing North American Fleet: By Type and Age

### North American Freight Cars by Type and Age*

<table>
<thead>
<tr>
<th>Type</th>
<th>Total</th>
<th>Avg. Age</th>
<th>1-10 yrs.</th>
<th>11-20 yrs.</th>
<th>21-30 yrs.</th>
<th>31-40 yrs.</th>
<th>Over 40 yrs.</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>RR</td>
<td>PVT</td>
<td>RR</td>
<td>PVT</td>
<td>RR</td>
<td>PVT</td>
<td>RR</td>
</tr>
<tr>
<td><strong>Box Cars</strong></td>
<td>89,730</td>
<td>24,032</td>
<td>5,413</td>
<td>9,301</td>
<td>8,556</td>
<td>7,955</td>
<td>9,547</td>
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<tr>
<td><strong>Covered Hoppers</strong></td>
<td>137,479</td>
<td>364,132</td>
<td>35,518</td>
<td>117,729</td>
<td>26,572</td>
<td>13,798</td>
<td>51,685</td>
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<tr>
<td><strong>Open Hoppers</strong></td>
<td>55,701</td>
<td>92,518</td>
<td>11,617</td>
<td>30,759</td>
<td>8,346</td>
<td>26,745</td>
<td>15,466</td>
</tr>
<tr>
<td><strong>Gondolas</strong></td>
<td>114,184</td>
<td></td>
<td>34,719</td>
<td>16,379</td>
<td>35,749</td>
<td>20,328</td>
<td>3,934</td>
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<tr>
<td><strong>Flat Cars</strong></td>
<td>136,089</td>
<td></td>
<td>27,666</td>
<td>34,871</td>
<td>9,648</td>
<td>7,025</td>
<td>14,143</td>
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<tr>
<td><strong>Refrigerator</strong></td>
<td>11,053</td>
<td>2,855</td>
<td>878</td>
<td>502</td>
<td>2,976</td>
<td>378</td>
<td>124</td>
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<tr>
<td><strong>Tank Cars</strong></td>
<td>371,854</td>
<td></td>
<td>171,778</td>
<td>56,465</td>
<td>43,981</td>
<td>145</td>
<td>2,766</td>
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<tr>
<td><strong>All Others</strong></td>
<td>1,149</td>
<td>2,855</td>
<td>101</td>
<td>529</td>
<td>949</td>
<td>818</td>
<td>74</td>
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<tr>
<td><strong>Total</strong></td>
<td>475,339</td>
<td>1,108,526</td>
<td>93,186</td>
<td>173,768</td>
<td>170,313</td>
<td>155,188</td>
<td>39,947</td>
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</tbody>
</table>

* As of January 1, 2015. Note: Totals may not match other sources. RR = Railroad car owners. PVT = Private car owners, including TTX Co.

Source: AAR/UMLER
The Rail Industry in 2016:

Only 47% of the Active Fleet has a 286 GRL*:

* Excludes Intermodal cars and Maintenance of Way cars
The number of cars online has started to decline:

**CARS ONLINE: TOTAL RAILCARS**

Sources: FTR, AAR, Company Reports; Copyright 2016
Shown as a 4 week moving average
The average train speed has been on a decline:
Factors that have a major impact on the network efficiency:

- Track capacity (3% decline 2004 to 2013)
- Better dispatch technology (Centralized Traffic Control)
- Distributed Power & ECP braking system
- Weather
- Traffic mix (e.g. tank car traffic speed limitations)
# North American Car Delivery Projections

## 2015-2019 Car Deliveries Forecast Projections Ranges

### Compare IHS and FTR Projections

<table>
<thead>
<tr>
<th></th>
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<td>IHS</td>
<td>FTR</td>
<td>IHS</td>
<td>FTR</td>
<td>IHS</td>
<td>FTR</td>
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<tr>
<td>Box cars</td>
<td>692</td>
<td>687</td>
<td>2,673</td>
<td>2,200</td>
<td>4,927</td>
<td>1,800</td>
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<td>Covered hoppers</td>
<td>20,332</td>
<td>27,601</td>
<td>23,794</td>
<td>21,900</td>
<td>26,101</td>
<td>19,000</td>
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<tr>
<td>Over 5,500 C/F</td>
<td>2,449</td>
<td>4,063</td>
<td>7,305</td>
<td>7,000</td>
<td>9,815</td>
<td>7,060</td>
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<tr>
<td>3,500-5,500 C/F</td>
<td>4,481</td>
<td>4,380</td>
<td>7,405</td>
<td>7,500</td>
<td>9,658</td>
<td>9,320</td>
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<tr>
<td>Under 3,500 C/F</td>
<td>13,402</td>
<td>19,158</td>
<td>9,084</td>
<td>7,400</td>
<td>6,628</td>
<td>2,620</td>
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<tr>
<td>Flat cars</td>
<td>6,949</td>
<td>8,811</td>
<td>8,806</td>
<td>8,500</td>
<td>9,592</td>
<td>6,200</td>
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<tr>
<td>Conventional</td>
<td>2,767</td>
<td>4,256</td>
<td>3,969</td>
<td>4,240</td>
<td>4,417</td>
<td>3,920</td>
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<tr>
<td>Non-art. Intern</td>
<td>0</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>-</td>
</tr>
<tr>
<td>Art. Intern</td>
<td>4,182</td>
<td>4,555</td>
<td>4,837</td>
<td>4,260</td>
<td>5,175</td>
<td>2,280</td>
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<tr>
<td>Open-top hoppers</td>
<td>719</td>
<td>1,224</td>
<td>1,007</td>
<td>1,900</td>
<td>958</td>
<td>1,800</td>
</tr>
<tr>
<td>Steel</td>
<td>719</td>
<td>1,224</td>
<td>1,007</td>
<td>1,690</td>
<td>958</td>
<td>1,130</td>
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<tr>
<td>Aluminum</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>210</td>
<td>-</td>
<td>670</td>
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<tr>
<td>Gondolas</td>
<td>3,243</td>
<td>2,408</td>
<td>2,648</td>
<td>2,400</td>
<td>1,710</td>
<td>4,200</td>
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<tr>
<td>GB</td>
<td>2,343</td>
<td>1,413</td>
<td>1,648</td>
<td>1,840</td>
<td>985</td>
<td>2,840</td>
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<td>GT-steel</td>
<td>900</td>
<td>800</td>
<td>1,000</td>
<td>560</td>
<td>725</td>
<td>640</td>
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<tr>
<td>GT-aluminum</td>
<td>0</td>
<td>195</td>
<td>-</td>
<td>720</td>
<td>-</td>
<td>1,630</td>
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<td>Tank cars</td>
<td>35,293</td>
<td>38,465</td>
<td>32,004</td>
<td>24,100</td>
<td>13,013</td>
<td>20,500</td>
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<td>Other</td>
<td>7</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>-</td>
<td>-</td>
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<tr>
<td><strong>Total</strong></td>
<td>67,228</td>
<td>79,196</td>
<td>70,932</td>
<td>61,000</td>
<td>56,301</td>
<td>53,500</td>
</tr>
</tbody>
</table>

% Of Difference between FTR and GI:
- **2%**
- **-14%**
- **-5%**
- **21%**
- **34%**
The Rail Industry in 2016:

Car Backlog:

![Graph showing N.A. Railcar Backlogs]

Source: FTR

Car Orders:

![Graph showing N.A. Freight Railcar Deliveries vs. Economically Derived Demand]

Source: FTR
# North American Car Delivery Projections

## Economically Derived Demand

### N.A. Railcar Deliveries

<table>
<thead>
<tr>
<th>Productivity Assumptions</th>
<th>2015</th>
<th>2016</th>
<th>2017</th>
<th>2018</th>
</tr>
</thead>
<tbody>
<tr>
<td>U.S. Avg Length-of-Haul</td>
<td>816</td>
<td>820</td>
<td>821</td>
<td>822</td>
</tr>
<tr>
<td>Avg Tons Per Carload</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>- U.S.</td>
<td>57.1</td>
<td>54.6</td>
<td>54.4</td>
<td>54.0</td>
</tr>
<tr>
<td>- Canada</td>
<td>60.1</td>
<td>59.8</td>
<td>59.4</td>
<td>58.9</td>
</tr>
<tr>
<td>Backhaul Percent*</td>
<td>27.3%</td>
<td>26.2%</td>
<td>24.7%</td>
<td>24.1%</td>
</tr>
<tr>
<td>Miles Per Hour When Moving</td>
<td>18.5</td>
<td>20.1</td>
<td>19.3</td>
<td>19.1</td>
</tr>
<tr>
<td>Carloads Originated Per Year Per Active Car</td>
<td>33.2</td>
<td>36.0</td>
<td>35.0</td>
<td>34.7</td>
</tr>
<tr>
<td>Estimated New Work (000's carloads)</td>
<td>-544</td>
<td>-291</td>
<td>110</td>
<td>263</td>
</tr>
<tr>
<td>Estimated New Cars Required</td>
<td>-64,042</td>
<td>-33,488</td>
<td>12,468</td>
<td>30,269</td>
</tr>
<tr>
<td>Active Cars (Cars In Use, Millions)</td>
<td>1.240</td>
<td>1.076</td>
<td>1.125</td>
<td>1.159</td>
</tr>
<tr>
<td>Replacement Rate</td>
<td>3.4%</td>
<td>3.6%</td>
<td>3.5%</td>
<td>2.2%</td>
</tr>
<tr>
<td>Replacement Units Needed</td>
<td>41,851</td>
<td>38,297</td>
<td>39,357</td>
<td>25,105</td>
</tr>
<tr>
<td>Economically Derived Needed</td>
<td>-22,191</td>
<td>4,810</td>
<td>51,826</td>
<td>55,374</td>
</tr>
</tbody>
</table>

### Adjusted EDD

| Adjusted EDD | 51,815 | 23,035 | 17,889 | 43,395 |
| Actual/Forecast Deliveries                     | 82,296 | 56,064 | 39,050 | 41,700 |
| Actual Unmet Demand (Negative Means Overbought Equipment / Positive Means Underbought) | -30,481 | -33,029 | -21,161 | 1,695 |

*Additional Loaded Miles Above Empty Miles as a Percent of Total Loaded Miles

**Estimated New Cars Required + Replacement Units Needed = Economically Derived Demand (EDD)**

Source: FTR
The Rail Industry in 2016:

Highest Car Deliveries since the 1979 record year:

Car Deliveries

Source: RSI
The Rail Industry in 2016:

Delivery Car Mix in 2015-2017:

Source: NSC from average of IHS Global and FTR Transportation Intelligence projections
The Rail Industry in 2016:

Fleet Attrition:

Source: NSC from data UMLER and IHS
The 2016-2020: Car deliveries on a decline but expected to rebound:

Source: FTR
The New Center Beam Car?

Fleet Has Almost Doubled in Past 5 years – 60,000 to 100,000 Plus Cars

Traditionally A Cement Car

Workhorse of Frac Sand Market

Despite Depressed Energy Market, Demand May Hold & Even Grow
3280 Cu. Ft. Covered Hopper Car
3280 Cu. Ft. Covered Hopper Car

Physical Data

- Gross Rail Load: 286,000 lbs
- Light Weight (est.): 52,000 lbs
- Load Limit (est.): 234,000 lbs
- Volume: 3,280 cu. ft.
- Length over P.F.O.C.: 42’ 0”
- Truck Centers: 29’ 0”
- Side slope Sheets Angle: 50°
- Int. Slope Sheets Angle: 44°
- Gates (bolted application): Bolted 13” x 42”
- Hoppers: 2
Plastic Pellet Market

$100 to $170 Billion Investment in Next 5 Years

250,000 – 375,000 Carloads

500,000 – 850,000 Container Loads

New Growth Both Domestic and Export

Mix Will Affect Utilization – Export Much Shorter Distance

Shell Planned Beaver, PA Plant
6245 Cu. Ft. Covered Hopper Car
6245 Cu. Ft. Covered Hopper Car

Physical Data

- Gross Rail Load: 286,000 lbs
- Light Weight (est.): 65,000 lbs
- Load Limit (est.): 221,000 lbs
- Volume: 6245 Cu.Ft.
- Length P.F.O.C.: 67’ 0”
- Truck Centers: 54’ 0”
- End Slope Sheets Angle: 37°
- Hopper Side Angle: 51°
- Gates (bolted application): 27” x 63”
- Hoppers: 4
4300 Cu. Ft. Covered Hopper Car

- North American Potash Market
- Saskatchewan Market
- New Entrants
- Mergers
- Expansion
- Ideal Fertilizer Car
- Best in class carrying capacity due to light weight and car length
- More than 11,000 Cars in service
- Best ROI
4300 Cu. Ft. Covered Hopper Car
4300 Cu. Ft. Covered Hopper Car

Physical Data

- Gross Rail Load: 286,000 lbs
- Light Weight (est.): 56,000 lbs
- Load Limit (est.): 230,000 lbs
- Volume: 4,300 cu. ft.
- Length over P.F.O.C.: 47’ 0”
- Truck Centers: 34’ 0”
- Upper Slope Sheets Angle: 41°
- Lower Slope Sheets Angle: 52°
- Gates (welded): 30” x 30” (nominal)
- Hoppers: 3
5431 Cu. Ft. Covered Hopper Car

- North American Grain Market Workhorse
- Replaces 4,750 Cu’ Capacity Car
- Shorter Car Versus 5,150’s – 55’8” vs. 59’0”
- Record Harvests
- Record Inventories
- South America Market Off
- Grain Traffic Up 6% Over 2015
- Grain Traffic Up 26% Week Over Week
- Increased Demand for Grain Covered Hoppers
- One of Few Bright Spots for 2017
5431 Cu. Ft. Covered Hopper Car
5431 Cu. Ft. Covered Hopper Car

Physical Data

- Gross Rail Load: 286,000 lbs
- Light Weight (est.): 60,000 lbs
- Load Limit (est.): 226,000 lbs
- Volume: 5,431 cu. ft.
- Length over P.F.O.C.: 55’ 8”
- Truck Centers: 42’ 8”
- Side slope Sheets Angle: 42°
- Int. Slope Sheets Angle: 40°
- End Lower Slope Sheet Angle: 40° & 38°
- Gates (bolted application): Bolted 30” x 30”
- Hoppers: 3
2400 Cu. Ft. Open Top Hopper Car

- Infrastructure Player
- Workhorse of Today’s Aggregate Market
- High Capacity, Small Foot Print
- Replaces Cascaded Coal Cars
- 53’ to 45’ Length
- 4,000 Cu’ to 2,400 Cu’ Capacity
- 263,000 Lb. to 286,000 Lb. Gross Rail Load
- Manual to Automatic Doors
- Independent Gate Operation
2400 Cu. Ft. Open Top Hopper Car
2400 Cu. Ft. Open Top Hopper Car

Physical Data

- Gross Rail Load: 286,000 lbs
- Light Weight (est.): 56,000 lbs
- Load Limit (est.): 230,000 lbs
- Volume Level full (est.): 2400 cu. ft.
- Length over P.F.O.C.: 44’ 11-1/2”
- Truck Centers: 31’ 11-1/2”
- Max Height Above Rail: 13’ 3-1/2”
- Extreme Width: 10’ 8”
- Slope Sheet Angle: 60 degrees
- Door clearance from TOR (closed): 13.5”
- Door clearance from TOR (open): 5.5”
6400 Cu. Ft. Gondola Car

- Plate C
- Best in class carrying capacity
- Best ROI
- Ideal two-way car- waste, scrap metals, finished metals
- Municipal Solid Waste, Construction & Demolition (C & D), Scrap Metals and Finished Metals
- 286,000 Lb. Gross Rail Load
6400 Cu. Ft. Gondola Car
6400 Cu. Ft. Gondola Car

Physical Data

- Gross Rail Load: 286,000 lbs
- Light Weight (est.): 73,000 lbs
- Load Limit (est.): 213,000 lbs
- Volume: 6400 Cu.Ft.
- Length P.F.O.C.: 68’ 6-1/2”
- Truck Centers: 46’ 3”
Municipal Solid Waste Container on Flat Car

- Best in class car length = additional siding capacity
- Ideal for Limited Track Capacity
- Unit Train Service
- Handles 4 20’ Containers
- 286,000 Lb. Gross Rail Load
- Provides Flexibility @ Origin & Destination
Municipal Solid Waste Container on Flat Car
## Municipal Solid Waste Container on Flat Car

### Physical Data

- **Gross Rail Load**: 286,000 lbs
- **Light Weight (est.)**: 62,300 lbs
- **Load Limit (est.)**: 223,700 lbs
- **Length P.F.O.C.**: 86’ 2-3/4”
- **Truck Centers**: 66’ 0”
- **Capacity**: 4x 20’ Containers
Conclusion

- Energy Cars, Tank and Small Covered Hoppers, Dominated New Car Market – Two-Thirds of Market
- “Normal” Market Returns
- Grain & Plastic Pellet Covered Hoppers Will Be Major New Car Types in Demand
- Infrastructure Needs – Aggregate Cars
- Waste, Scrap, C & D – Infrastructure
- What Does Energy Independence Mean for the Railroads?