25% of the U.S. GDP is related to international trade and is predicted to grow to 35% in the next 20 years.

From 1980 to 2002, truck travel on US highways grew by 90% while lane-miles of public roads grew by only 5%.

Between 2002 and 2035, the highways carrying 10,000 or more trucks will increase from 10K miles to 34K miles.
No Longer Just an Urban Issue

- Congestion impedes timely and reliable freight movements and threatens business productivity.
- The travel growth rate has been even greater in rural than in urban areas.
- Freight volumes are expected to increase 92% by 2035 from the 2002 level.
- If left unaddressed, by 2035 congestion will clog many major interstate corridors.
FHWA - Office of Freight Management and Operations – Objectives

- Understand the magnitude and geography of freight moving on the nation’s transportation system, including international freight
- Develop strategies, analytical tools, institutional arrangements, and professional capacities for all levels of government to address freight movement
- Understand and promote the economic benefits of freight transportation
- Encourage innovative freight technology & operations
- Enforce commercial vehicle size and weight requirements
Strategic Objective - Global Connectivity
“Facilitate a more efficient domestic and global transportation system that enables economic growth and development”

Goals
• To reduce travel time in key highway freight corridors.
• To reduce delays of commercial vehicles processed at National Highway System border crossings

Outcome Measures
• Travel Time and Reliability on Freight Significant Highways
• Border Crossing Time
What are Freight Performance Indicators?

- *Point-to-point travel times on selected freight-significant highways*
- *Crossing times at international borders*
- *Condition of connectors between NHS and intermodal terminals*
- *Cost of highway freight per ton-mile*
- *Cargo insurance rates*
- *Customer satisfaction.*
- *Hours of delay per 1,000 vehicle miles on selected freight-significant highways*

http://www.ops.fhwa.dot.gov/freight/freight_analysis/perform_meas/fpmtraveltime/index.htm
Freight Performance Measurement – Travel Time on Freight Significant Corridors

- What?
  - Methodology use Trucks as Probes
    - Automatic Vehicle Location (AVL)/Satellite Technology
    - GPS Coordinates (Date and Time Stamped)
    - Unique Carrier ID

- How?
  - Partnership with American Transportation Research Institute, a Satellite Technology Vendors and Carriers
  - Data Cleansing techniques allows collection of collection data from all/most of the vendo(s) carrier subscribers (~300,000 vehicles)
Freight Performance Measurement – Travel Time on Freight Significant Corridors

- **Where?**
  - 25 Major US Interstates
  - Land Border Crossings
    - 5 US/Canada Crossings
    - US/Mexico under development
- **Why?**
  - Provides a quantifiable basis to engage public and private sector and investigate and explore causes of delay
  - One of several analytical tools that helps get us to solutions – target resources where greatest needs exists
25 Corridors
FPM Border Component (US/CN)

Data Collection Began 7/01/05 for 5 Crossings

- Blaine (Pacific Highway): Blaine, WA
- Pembina: Pembina, ND
- Ambassador Bridge: Detroit, MI
- Peace Bridge: Buffalo, NY
- Champlain: Champlain, NY

Effort looks at crossings as well as transportation network that supports the crossings
Data Collection at Ambassador

4 US Approaches
- Michigan Route 3
- Interstate 75
- Interstate 94
- Interstate 96

3 CN Approaches ON
- Provincial 401
- ON Provincial 3
- E.C. Row EXPY
Current Measures -

- Freight Significant Corridors
  - Average Operating Speeds (entire Corridor)
  - Travel Time Reliability (Buffer Index)
- Borders (US/Canada)
  - Total Crossing Time
  - Crossing Time Reliability (Buffer Index)
What is travel time reliability?

- Consistency or dependability in travel times measured from:
  - Day-to-day; and/or
  - Across different times of day
  - For Freight (for a trade lane, origin-destination pair)

- Not focused on typical delay (capacity-demand) so much as unexpected delay
Buffer index

- Definition: **Extra time** (or time cushion) that should add to average travel time to ensure on-time arrival at a given level of confidence (e.g. 95%, 90%)

- Buffer index (%) =

\[
\frac{95\text{th percentile time (55 hours)} - \text{average time (22.69 hours)}}{\text{average travel time (22.69 hours)}} \times 100\%
\]

142%

- Buffer time (hours) = buffer index (1.42) × average travel time (22.69)

For 95% on-time arrival you should add (buffer time)

33 hours

to the average of

22.69 hours
**Planning time index**

- Definition: Total time a traveler should allow to ensure on-time arrival

- Planning time index = \[ \frac{95\text{-percentile travel time (55 hours)}}{\text{Ideal or free-flow travel time (14 hours)}} \]

- Results in index value \( \geq 1 \) (3.93)

- Planning time (hours) = planning time index (3.93) \( \times \) ideal or free-flow travel time (14 hours)

With a desired on-time arrival of 95% on-time you should plan for (planning time) 55 hours
August 2006 Average 8am to 12pm Eastern Northbound & Eastbound
August 2006 Average
12pm to 4pm Eastern
Northbound & Eastbound
• Jeff Add the most appropriate truck parking slide and speaker notes
Other Travel Time Measures

- **Measures of average travel time**
  - Average travel time in peak period in major metro areas
  - City-to-city travel time
  - Shipper point-to-point travel time

- **Measures of delay (or added travel time)**
  - Hours of delay per 1000 vehicle-mile
  - Percent of corridor experiencing AM/PM peak delay

- **Reliability Measures**
  - Annual hours of incident-based delay
  - Annual hours of work-zone based delay
  - Annual hours of weather-based delay
Confidence the Data Can be Applied in the Following Areas

- Decision Making
- Project Analysis and Prioritization
- Trend Analysis and Historical Data (e.g. for performance measurement, public information, engaging freight stakeholders)
- Analysis of the effects of varying operational conditions on the network (e.g. weather, incidents, work zones)
- Investment Decisions at the National Level
- Investment Decisions at the State or Local Level
- Transportation Planning
What We Heard From the States

Potential Value of Data

- Very Valuable: 46%
- Somewhat Valuable: 38%
- No Value: 0%
- Too Early to Tell or Not Enough Information To Conclude: 16%

How Likely to Use

- Very Likely: 38%
- Somewhat Likely: 31%
- Neither Likely nor Unlikely: 11%
- Unlikely: 14%
- Extremely Unlikely: 6%
What We Heard From the States

Decision Making

Too Early to Tell or Not Enough Information To Conclude 25%
Little or No Confidence 8%
Somewhat Confident 56%
Extremely Confident 11%

Project Analysis and Prioritization

Too Early to Tell or Not Enough Information To Conclude 11%
Little or No Confidence 8%
Somewhat Confident 56%
Extremely Confident 11%
Somewhat Confident 52%
What We Heard From the States

**Trend Analysis/Historical Data**

- Extremely Confident: 42%
- Somewhat Confident: 44%
- Little or No Confidence: 6%
- Too Early to Tell or Not Enough Information To Conclude: 8%

**Analysis varying operational conditions**

- Extremely Confident: 31%
- Somewhat Confident: 50%
- Little or No Confidence: 11%
- Too Early to Tell or Not Enough Information To Conclude: 8%
What We Heard From the States

Investment Decisions – National

- Extremely Confident: 31%
- Somewhat Confident: 41%
- Little or No Confidence: 11%
- Too Early to Tell or Not Enough Information To Conclude: 17%

Investment Decisions – State and Local

- Extremely Confident: 17%
- Somewhat Confident: 50%
- Little or No Confidence: 25%
- Too Early to Tell or Not Enough Information To Conclude: 8%
What We Heard From the States

Transportation Planning

- Extremely Confident: 33%
- Somewhat Confident: 48%
- Too Early to Tell or Not Enough Information To Conclude: 11%
- Little or No Confidence: 8%
What We Heard From the States

Future Research

- Collecting and analyzing data for more roadways (e.g. arterials, US Highways, State Highways)
- Building FPM tools and products based on user defined requirements
- Using FPM data as an input to transportation models (e.g. Freight Models, Travel Time Models)
- Collecting data for the other modes (e.g. rail, water, air)
- Improving the Visualization Tool (e.g. adding more layers on things such as weather, work zones, VMT, AADTT)
**Key Next Steps**

- Develop a Web-based tool to disseminate data – primary audiences are State DOTs and MPOs
  - Directional
  - Time of Day
  - City Pairs
- Assess expanding beyond the interstate system
- Enhance data by adding additional vendors/fleets
- Partner with public agencies and universities to apply the results
  - Trend Analysis
  - Demand Modeling
  - Forecasting Models
  - Cost Benefit/Analysis
  - Before and After Assessments
- Expand Border Data Collection to US/MX Border
Additional information

• January 2006 report:
  – *Travel Time Reliability: Making It There On Time, All The Time*

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