FHWA National Freight Fluidity Monitoring Program

Transportation Research Board
2019 Annual Meeting
Project Update

FHWA Freight Fluidity Supply Chain Monitoring: National Program Design

Issues	Approaches
What we are measuring?	Travel time, travel time reliability, transportation cost Domestic movements – truck, rail, air, water Supply-chains (end-to-end across modes) and component segments
How much are we measuring?	Representative sample of critical US supply chains "Dow Jones Index" of key infrastructure, based on actual industries
How are index supply chains being chosen?	Selected for coverage of primary economic sectors and high-growth sectors Use of all modes, coverage of US regions Short and long-haul moves, domestic/cross-border/global supply chains
How is data being collected?	Target industries identified and recruited Industries tell us their primary supply chain (commodity/mode/O-D) patterns • **No exchange of confidential information** Project team assembles data to tabulate metrics for supply chain patterns • **Real data, not models** • Supply chain level, not regional/area level (like FAF or Transearch) • Public and private sources have been identified
What are the outputs?	Initial "National Fluidity *Monitoring* Dashboard" with continuous quarterly updates

FHWA Freight Fluidity Tool -- Overview

Goal: a database and visualization/mapping tool to track the cost, reliability, and travel time for multimodal freight movement, across selected representative national supply chains, on a quarterly basis

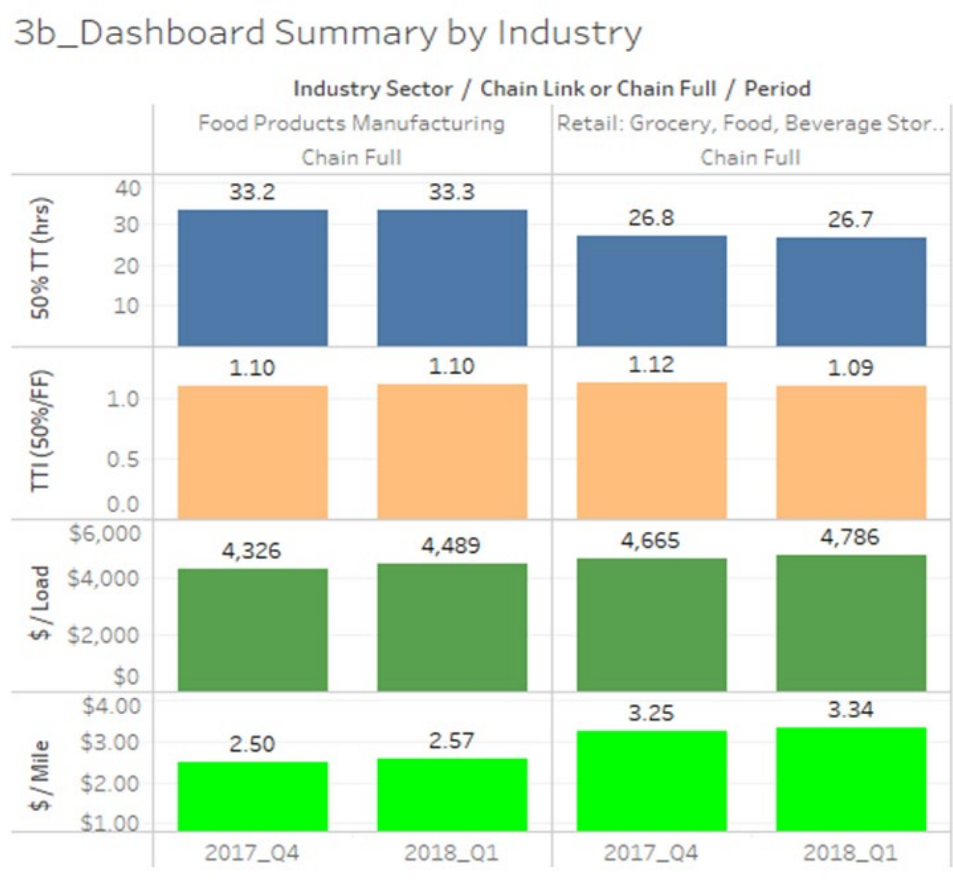
Primary Data Sources	Information Obtained	Metrics Developed by Team
Leading US companies representing 24 freight-dependent industry sectors	Descriptions of most important supply chains – commodities, modes, O/D pairs – not confidential	"Wiring Diagrams" of key trips Database rows describing trips Placeholders for performance metrics
NPMRDS	Highway link speeds	Truck metrics for O/D trips: median speed, median/95%/99% travel time, Travel Time Index, Planning Time Index
Chainalytics	Commercial data on shipment prices, covering primarily truck	Truck metrics for O/D trips: cost per move, cost per mile
STB Waybill / FRA	Confidential rail costs	[in progress]
US Army Corps of Engineers	Waterborne shipping costs and navigation system time/delay	[in progress]

FHWA Fluidity Tool -- Software Platforms

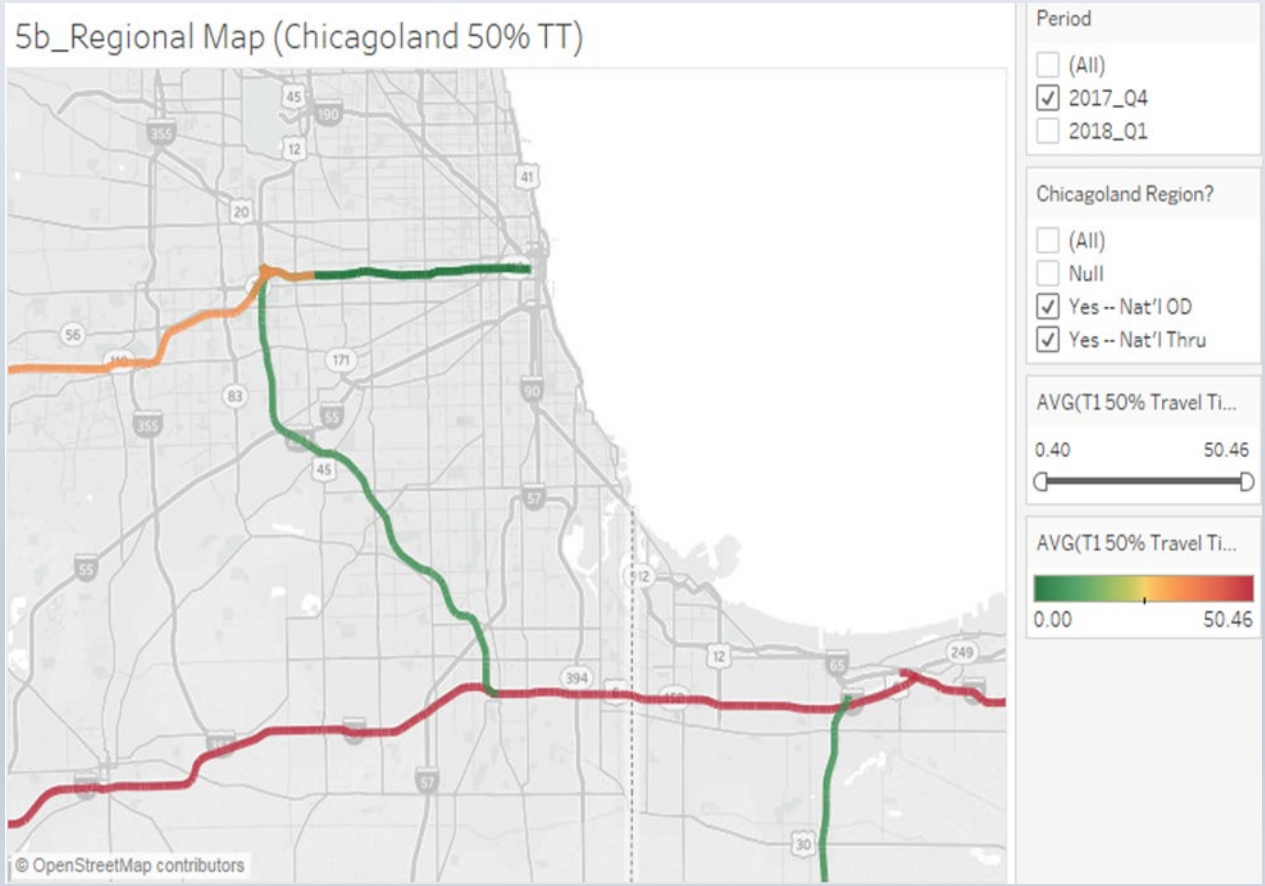
- Two integrated platforms, both from existing suite of FHWA freight measurements tools:
  - Tableau database management, analysis and visualization platform
  - FHWA HEPGIS geographic information system, fed from Tableau
- The software platforms meet key criteria:
  - Ability to hold and process large data sets in time series, easily accept updates, and be versatile in use.
  - Accessibility of data to internal and external users, via export into common formats such as spreadsheet software, and directly on the platform without purchase of special tools.
  - Ability to restrict access to certain types or levels of data for certain groups of users.
  - Varied and high quality graphical and cartographical display must be provided, and the displays must be interactive with the data.
  - Stability as a dependable, tested tool.

Freight Fluidity Tool – Outputs from Tableau

National Summary Metrics: 50% TT, TTI, $/Load, $/Mile, Food and Grocery Truck Trips over Two Quarters



Detail Level Mapping: Median Travel Time, Food and Grocery Truck Trips, Chicagoland



FHWA Freight Fluidity Tool – GIS Display

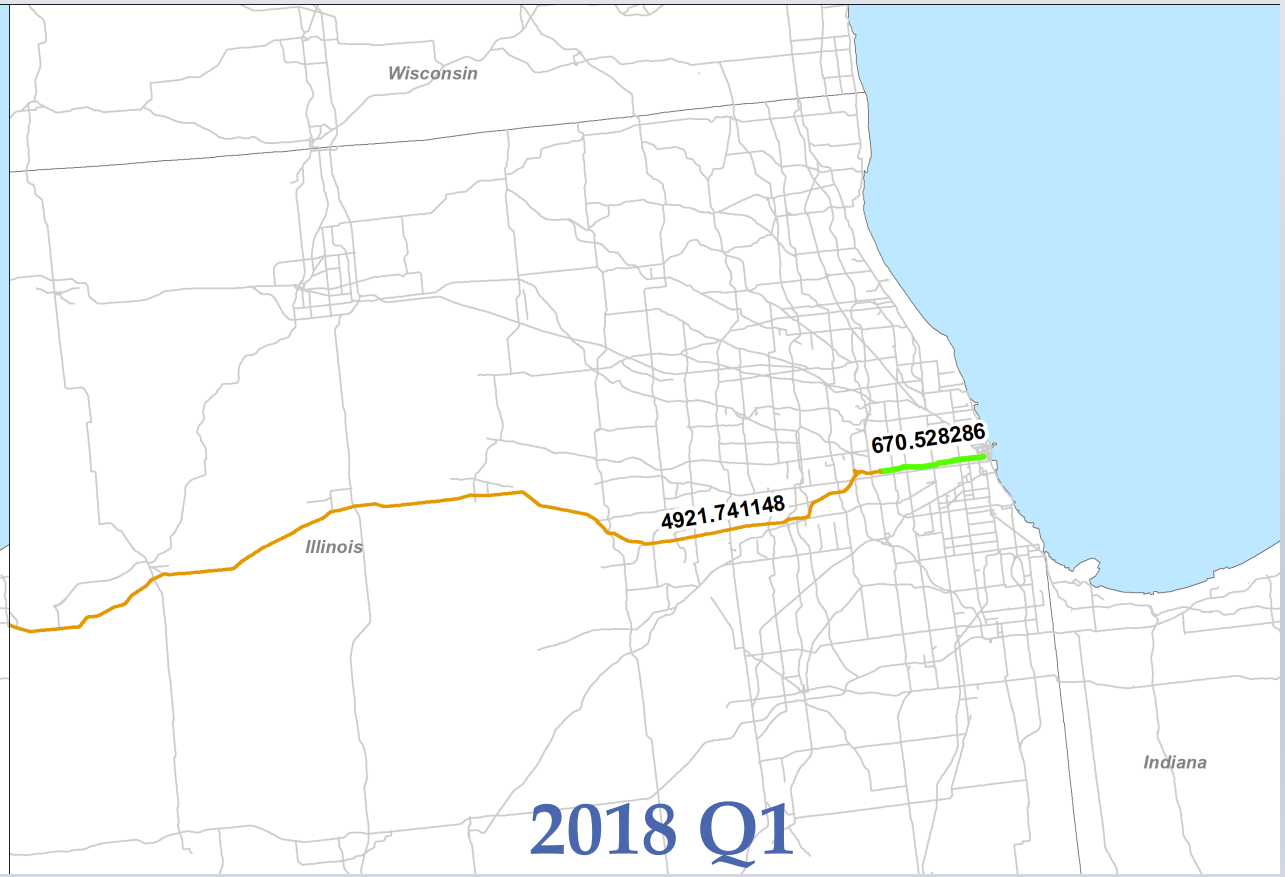
Quarterly Planning Time Index (95%)
Food & Grocery: Chicagoland Detail

2017 Q4

2018 Q1

FHWA Freight Fluidity Tool – GIS Display

Quarterly Transportation Cost
Food & Grocery: Chicagoland Detail



Program Results

Makes supply chain patterns visible *("If you can't measure it, you can't manage it....")*

- Fills in the missing link in USDOT freight transportation data
- Makes supply chain performance visible across jurisdictions
- Provides foundation for state and metro/regional partners working on first/middle/last mile of national supply chains, and local/regional supply chains
- Puts DOTs and users on common ground

FHWA Freight Measurement Toolbox

Economy/ Markets	• **Freight Analysis Framework (FAF)** *Economic output and growth by industry and region; commodity flows between regions by mode*
Logistics/ Operations	• **Freight Fluidity Program (FFP)** *Travel time, travel-time reliability, and cost of representative supply chain freight trips*
Networks/ Flows and Infrastructure	• **Highway Performance Monitoring System (HPMS)** *Condition and performance of the freight highway network* • **National Performance Management Research Data Set (NPMRDS)** *Vehicle speeds and travel times over the freight highway network* • **Rail Carload Waybill Sample (CWS)** *Volume and routing of freight flows over the freight rail network*

Status and Next steps

- Technical Overview was presented to USDOT agencies and federal stakeholders
  - FHWA, BTS, MARAD, FMCSA, Army Corp of Engineers, US Department of Commerce in workshop, November, 2019
- Dialogue and feedback solicited at workshop
  - Additional feedback to be solicited as tool completed
    - Website with materials hosted by I-95 Corridor Coalition
- Continuing with inputs to the tool and refining the data, including examples for subsequent regional pilots/workshops (New York Metro and Chicago)
- Project selected for presentation at Innovation in Freight Data Workshop, Irvine, CA – April 2019

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