Piedmont Triad Freight Study

“Where we have been and where we are”

Talking Freight – FHWA Webinar
Moving On

Phase 1
- Freight facilities database
- Freight survey data collection

Phase 2
- Develop advanced freight model
- Integrate with existing PTRM

Phase 3
- Travel diary data collection
- Estimate freight model with local data

Collection of behavioral data through local sampling and conduct the re-estimation of freight model components as well as full recalibration and validation of entire freight model.
Phase 1

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Existing Conditions
Freight Facilities Database

- 968 Facilities classified by type
  - Distribution center, intermodal facility, major shipper, retail
- Basic information available for most facilities
  - NAICS classification code, number of truck bays, primary commodity
Out of 158 surveys collected, 48 locations left additional comments/concerns. These concerns were categorized and placed on the map at the facility location or point of concern, depending on the detail of the comment.
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Model Development
Main model components:

– Firm Synthesis
– Freight Truck Touring Model
– Commercial Vehicle Touring Model
The “Tour Based” Approach
- Freight facilities database
- Freight survey data collection

Phase 1

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Data Collection
Combining Freight Data Sources

Important for understanding trucks movements is identifying and blending data sources:

- Smartphone or other types of surveys of truck drivers
- Stakeholder collected data
- Public data sources (FAF, Rail Waybills, etc.)
- Commercial Passive data (ATRI, INRIX)
  - Purchase passive data and match to truckers in rMove to synthesize mode and commodity type

Also important is identifying appropriate approaches to blend data, e.g., combining truck GPS data and surveys, and expansion to truck counts
Which of the following best describes this trip (as shown to you here)?

- This trip is shown correctly
- I made other stops enroute (that rMove doesn’t show)
- I was not actually moving (rMove made a mistake)
- I was still traveling (had not stopped yet)
- Other (e.g., incorrect times, route, etc.)

Previous  Next
## Answers

<table>
<thead>
<tr>
<th>veh_type</th>
<th>Light Duty: 2 axle, 4 tire commercial (car, pickup truck, or va...</th>
</tr>
</thead>
<tbody>
<tr>
<td>purpose</td>
<td>Return home</td>
</tr>
<tr>
<td>work_trip</td>
<td>Yes</td>
</tr>
</tbody>
</table>

## Segments

<table>
<thead>
<tr>
<th>Household</th>
<th>Person</th>
<th>Device segment id</th>
<th>Date(s)</th>
<th>Start Time</th>
<th>Stop Time</th>
<th>Duration</th>
<th>Miles/Km</th>
<th>Points</th>
<th>Drop Likelihood</th>
<th>Map</th>
</tr>
</thead>
<tbody>
<tr>
<td>lbt9</td>
<td>Driver</td>
<td>16_8951</td>
<td>Nov 16, 2018</td>
<td>16:57:28</td>
<td>17:01:06</td>
<td>3 minutes</td>
<td>1.0 (1.666 km)</td>
<td>6 + 1</td>
<td>0%</td>
<td>map</td>
</tr>
</tbody>
</table>

[Map of the route]
Establishment Survey: Overview

- To collect information about **business behavior** in the region
  - Shipping and receiving of freight shipments
  - Operation of freight trucks or commercial service vehicles
- Data will be used to update components of all **four parts of the model**
- Telephone survey with web completion option
- **Sample of businesses from different industries** in the Piedmont Triad region
- Calling and interviewing done by a call center
- Survey recruited drivers for the truck diary survey
Establishment Survey

Company Primary Customer Offering

<table>
<thead>
<tr>
<th>PRIMARY OFFERING</th>
<th>COUNT</th>
<th>PERCENT</th>
</tr>
</thead>
<tbody>
<tr>
<td>Just shipping</td>
<td>110</td>
<td>55%</td>
</tr>
<tr>
<td>Just provides services</td>
<td>29</td>
<td>15%</td>
</tr>
<tr>
<td>Provides both</td>
<td>61</td>
<td>31%</td>
</tr>
<tr>
<td><strong>Total</strong></td>
<td>200</td>
<td>100%</td>
</tr>
</tbody>
</table>

Primary Business

- Manufacturing: 25%
- Wholesale Trade: 24%
- Transportation or Warehousing: 15%
- Retail Trade: 13%
- Construction: 6%
- Health Care or Social Assistance: 5%
- Accommodation or Food Services: 4%
- Agriculture, Forestry, Fishing or Hunting: 3%
- Public Administration: 3%
- Professional, Scientific, or Technical Services: 2%
- Educational Services: 1%
- Other Services: 4%
Truck Diary Survey: Overview

- To collect information about **truck travel behavior** in the region:
  - **Tour patterns** (number of tours per day, number of stops per tours, types of tour – out and back, multi-stop)
  - **Commodities carried, delivery quantities, service activities, other stops**
- Data will be used to re-estimate and/or calibrate the truck touring models (in combination with ATRI GPS data from NCDOT)
- Survey used rMove smartphone app (installed from Google Play/Apple store) to record trips and asked drivers details of each trip
- **Sample of drivers** from businesses in the establishment survey and intercepted in person at truck activity locations
What was done the first time...

- 8,000 survey invitations with NCDOT support letter from deputy secretary were mailed.
- **10 Onsite In-Person Intercepts**
- An incentive was offered.
- Reached out to the North Carolina Truckers Association (NCTA).
- Promoted the Truck Diary Survey at a Triad Business Journal event held in Greensboro.
- Attended the North Carolina League of Transportation and Logistics (NCLTL) spring luncheon on March 21, 2019 hosted at the Charlotte Motor Speedway across the state.
- Promoted the driver survey and distributed recruitment materials at the Piedmont Triad Region Technology and Maintenance Council fleet managers meeting.
- Establishment Mailout and Email Follow-Up
The second time...

- Re-connected with companies that completed the Establishment Survey (two emails)
- Webinar held and Video posted on website
- Contacted Triad Chambers
  - Kernersville
    - OD, Best, EPES, FedEx Ground invited and encouraged to participate
    - EPES and Best attended and commit to participate, FedEx Ground also committed via text to Chamber President
  - Greensboro
    - Digital introductions to R&R, GTCC
    - Spoke with R&R Transportation representative, said they would participate
  - High Point
    - Presented to Chamber staff, Chamber Board Chair is Congdon with OD
    - Held an event on Nov. 19th - No one showed up
  - No response from Winston-Salem or Burlington Chambers
The third time...

- Issued a Press Release and Posted on Social Media
- MPO’s
  - Each MPO sent a reminder to TCC and TA C members
  - High Point Public Works staff participated in Webinar, follow-up Email sent
- Greensboro Field Operations will complete survey with App
- Connected myself the Sam Chinnis at GTCC
- Sent reminders with various prior contacts
  - State ports, NC Trucking Assn., L.J. Rogers Logistics etc.
- Contact with Sandra Collins International Logistics & Trade Compliance Manager at Ennis-Flint through Ahmed and Charles with NCDOT
- Contacted a friend that I recently learned was a truck driver. He pledged to take and share with his co-workers.
# Truck Diary Survey

<table>
<thead>
<tr>
<th>RECRUITMENT TYPE</th>
<th>DRIVERS SIGNED-UP</th>
<th>DRIVERS PROVIDING TRIP DATA</th>
<th>DRIVERS EARNING INCENTIVE</th>
<th>TOTAL DRIVER DAYS</th>
</tr>
</thead>
<tbody>
<tr>
<td>Via Establishment Survey</td>
<td>28</td>
<td>15</td>
<td>14</td>
<td>79</td>
</tr>
<tr>
<td>In-Person Intercept</td>
<td>7</td>
<td>2</td>
<td>2</td>
<td>11</td>
</tr>
<tr>
<td>Leveraged Outreach</td>
<td>52</td>
<td>19</td>
<td>14</td>
<td>91</td>
</tr>
<tr>
<td>Total</td>
<td>87</td>
<td>36</td>
<td>30</td>
<td>181</td>
</tr>
</tbody>
</table>

**Targets**

- 200 Drivers
- 800 Days

## Trip Purpose, by Vehicle Type

- **Light Duty**
  - Provide services: 42%
  - Pick up a shipment: 11%
  - Drop off a shipment: 26%
  - Other (e.g., meeting, lunch break, refueling): 25%

- **Medium Duty**
  - Provide services: 56%
  - Pick up a shipment: 47%
  - Drop off a shipment: 20%

- **Heavy Duty**
  - Provide services: 11%
  - Pick up a shipment: 33%
  - Drop off a shipment: 45%
  - Other (e.g., meeting, lunch break, refueling): 31%

- **Total**
  - Provide services: 29%
  - Pick up a shipment: 22%
  - Drop off a shipment: 34%
  - Other (e.g., meeting, lunch break, refueling): 27%
The Technical Report reasons why it didn’t work

- **Privacy Concerns** – “This information of very confidential.” / “You’re going to track me.”
- **Safety Concerns** – “I can have my drivers distracted by logging their trips on an App.”
- **Reporting Fatigue** – “We Already have to report that information.”
- **Bottom-up Recruiting** - “Sure, I ask our drivers if they want to do it.”
My list...

• *It's not a priority in their world*
  – Truck parking initiative at State level – great participation
  – Never had a forum to fully explain the impacts to the industry beyond having the model
    • Project prioritization

• **I’ll do it for you my friend.**
  – We don’t have a relationship with the industry

• **Hard to get access to the actual drivers**
Beyond Phase 3...

**Phase 1**
- Freight facilities database
- Freight survey data collection

May 2015

**Phase 2**
- Develop advanced freight model
- Integrate with existing PTRM

December 2016

**Phase 3**
- Travel diary data collection
- Estimate freight model with local data

Started January 2019

**Phase 4**
- Regional Freight Mobility Plan
  - Congestion Management
  - Structural Improvements
  - Intermodal Facilities
  - Mega Sites

2021?
Piedmont Triad Regional Modeling Program

Travel Demand Model (4 Step Process)
- Vehicle Miles Travel
- Mode Choice
- Travel Pattern
- Roadway Volume vs. Capacity (Congestion)

Freight Model (Tour-Based)
- Truck and Freight Movements
- Time of Day Distribution
- Commodity Distribution
- Project Evaluation and SPOT

Scenario Planning (Regional CommunityViz Model)
- Population and Employment Projections
- Capital Improvement Plans
- Regional Growth Scenarios
- Economic Development Benefits

Transit Planning & Ridership Projections
(Remix and Transit Boarding Estimation and Simulation Tool aka TBEST)
- Local and Regional Transit Network Designs
- Ridership Projections & PTRM Reference Data
- Title VI Analysis
- Economic Development Benefits

Where this is headed

**What we have**

Freight focused information system

**Big picture benefit**

Used to inform land use planning, transportation planning, and project prioritization

**Specific applications**

Investigate freight clusters
Estimate truck trips
Project prioritization
Inform land use and rezoning decisions
Identify characteristics supporting freight clusters

**What comes next**

Policy scenario analysis
Mode choice
Understanding of dynamics between congestion and freight
Impacts of land use decisions
Questions

Mark E. Kirstner, AICP
Director of Planning
markk@partnc.org
How can these outputs be visualized?

Output dashboard, built at end of each scenario run, provides access to summary charts and maps of outputs from each of the four main freight model components.
How did PTRM handle freight?

PTRM used a typical trip-based process:

- Trip Generation (based on employment by type)
- Trip Distribution (based on trip length)
- Time-of-Day (trips are split into each time period)
- Trip Assignment (auto, single-unit, multi-unit)

Nearly every model in the US uses a similar methodology.
What was the issue?

*The ability to realistically reflect and analyze freight movements was limited.*

1) Truck trips are not strictly based on employment – commodities are important
2) The interaction between distribution centers and businesses were missed
3) Trips aren’t “linked” – Each trip has no memory
What does Tour Based Freight Model do?

- Represent *characteristics* of firms and shipments
- Represent *supply chains* – link buyers and suppliers
- Capture *trip-chaining* - follow truck “tours” throughout the day
- **Differentiate** freight versus commercial vehicles - shipments versus goods and services
Truck Diary Survey

Trip Duration Distribution, by Vehicle Type

Dwell Time between Trips by Vehicle Type
What can we do with it?

– Commodity/shipment movement changes under different growth scenarios;
– Analysis of impacts of new freight intensive development;
– Analysis of impacts of new freight distribution centers; and
– Impacts of regional or large scale modal investments that impact freight mode choice to and from the region.
What was the primary activity of this trip you made for work?

- Provide services
- Pick up material or equipment
- Drop off material or equipment
- Drop off and pick up material or equipment
- Pick up/Drop off material or equipment AND provide service(s)

What was the primary type of goods you were transporting?

- Agricultural products or fish
- Grains, alcohol, or tobacco products
- Stone, non-metallic minerals, or metallic ores
- Coal or petroleum products
- Basic chemicals, plastics, or pharmaceuticals

More specifically, what type of grains, alcohol, or tobacco products were you transporting for this trip?

- Milled grain products and preparations, or baked goods
- Other prepared foodstuffs, or fats and oils
- Alcoholic beverages
- Tobacco products
Truck Diary Survey

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