# FREIGHT IN DEMAND:
## Facility Data Sheds Light on Freight in a Regional Travel Demand Model



## BACKGROUND AND CHALLENGE

Major industries in the Piedmont region of North Carolina have shifted from the textile industry to the freight and logistics industry. This shift, coupled with the region's proximity to major logistic centers in the southeast and major consumers in the northeast, has increased the need for efficient freight movement through the region.

The existing regional travel demand model, the Piedmont Triad Regional Model (PTRM), does not describe the region's freight flows sufficiently to meet the current need.

The Winston-Salem "Innovations in Local Freight Data" project will set the groundwork for developing a tour-based freight model targeted at improving freight mobility within the region. The project encompasses the first of a three-phased freight model development plan to be carried out in subsequent years.

## APPROACH

This project's goals include:

- Identifying freight model design and future data collection needs for the region,

- Identifying and tabulating regional freight facilities, and

- Conducting a freight carrier survey to support development of a tour-based truck model.

**Project Type:** **Innovations in Local Freight Data**

**Grant Recipient Agency:** **Winston Salem Urban Area Metropolitan Planning Organization (MPO)**

**Location:** **North Carolina**

**Duration of Activity:** **2014 to 2015**

**Budget:** **$150,000 SHRP2 implementation assistance, plus $22,000 contributed by recipient for staff labor/ resources**

| Objective | Work Approach | Outcome |
|---|---|---|
| Understand the data needs for a tour-based truck model. | Conduct a workshop, literature review, and complete interviews with peer agencies. | Model design recommendations and Phase III data collection recommendations. |
| Identify freight facilities in the region. | Complete an extensive review of commonly available data sources to locate freight facilities. | Freight node database. |
| Document characteristics of the region's freight facilities. | Survey freight facilities. | Detailed information on freight nodes in the region. |

## BENEFITS AND IMPACTS

**Key elements that contributed to project outcomes and subsequent impacts include:**

- An established team (the PTRM team) with experience working together for some time to establish goals and identify needs.
- A phased approach to developing an updated freight model.
- Funding from SHRP2 C20 Implementation Assistance Program.
- Staff time for project management.
- A qualified consultant.
- Participation by the project stakeholders.

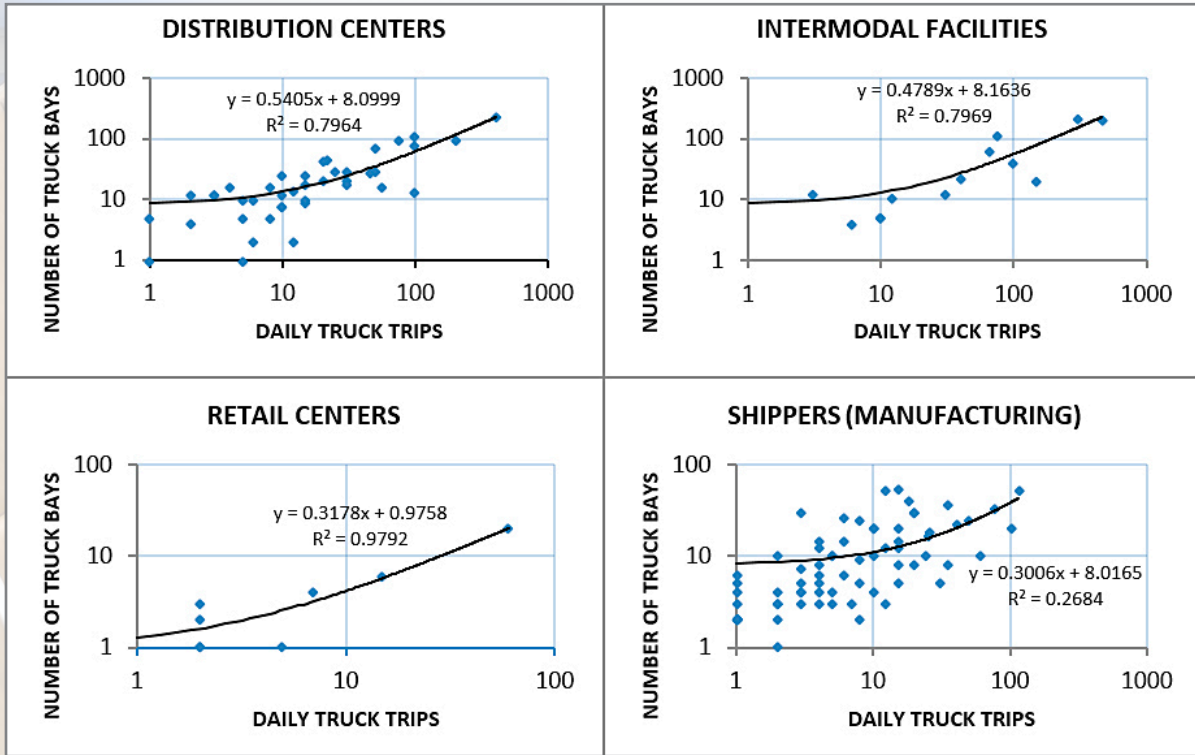**Resources generated by the project include:**

- A freight node database that contains geocoded records for nearly 1,000 facilities in the region.
- Recommendations on the development of a tour-based truck model.
- A survey capturing operational details (e.g., major commodities shipped and received, number and type of trucks used, and recurring destinations) for 151 freight facilities in the region.
- Recommendations that detail the data required to fine tune the tour-based truck model to characteristics specific to the region.

## Benefits

Benefits realized from this project include the ongoing use of the resources it created as well as the changes it may influence in stakeholder behavior.

| Outcome | Evidence |
|---|---|
| **Inclusion/Representation** | Over 800 facilities visited. Data was surveyed for 151 of these facilities.<br>- Highest concentration of freight nodes in Guildford County followed by Forsyth and Alamance.<br>- By classification:<br>  • Major shipper (55%).<br>  • Distribution centers (21%).<br>  • Retail (16%).<br>  • Intermodal (8%) – highest average number of truck trips. |
| **Data Added** | - 968 facilities classified by type (distribution center, intermodal facility, major shipper, retail).<br>- Basic information available for most facilities (NAICS classification code, number of truck bays, primary commodity). |
| **Integration into Business Practices** | Agencies can now:<br>  • Inform land use planning, transportation planning and project prioritization from the standpoint of freight.<br>Piedmont Authority for Regional Transportation (PART)/Piedmont Triad can now:<br>  • Investigate freight clusters (how to they relate to accessibility, land use, traffic. congestion, design concerns, or operations).<br>  • Estimate truck trips (at key freight facilities across the region).<br>  • Assign points during project prioritization (for projects that benefit freight movement).<br>  • Inform land use and rezoning decisions.<br>Other MPOs can now:<br>  • Leverage precedent and "lessons learned report".<br>  • Deploy node database for planning. |

Outcomes also include insights into the use of data. Analysis indicates that a strong relationship exists at retail centers, distribution centers and intermodal facilities between the number of trucks that enter the facility each day and the number of truck bays present. While the statistical strength of the relationship varies with facility type, the relationship is useful information to transportation planners. The number of truck bays can be determined quickly with a visual inspection of publicly available aerial images, creating a means for developing a rough estimate of truck trips that may start or end at a given facility.

**DISTRIBUTION CENTERS**

$y = 0.5405x + 8.0999$
$R^2 = 0.7964$

NUMBER OF TRUCK BAYS
DAILY TRUCK TRIPS

**INTERMODAL FACILITIES**

$y = 0.4789x + 8.1636$
$R^2 = 0.7969$

NUMBER OF TRUCK BAYS
DAILY TRUCK TRIPS

**RETAIL CENTERS**

$y = 0.3178x + 0.9758$
$R^2 = 0.9792$

NUMBER OF TRUCK BAYS
DAILY TRUCK TRIPS

**SHIPPERS (MANUFACTURING)**

$y = 0.3006x + 8.0165$
$R^2 = 0.2684$

NUMBER OF TRUCK BAYS
DAILY TRUCK TRIPS

Relationship between Daily Truck Trips and Number of Truck Bays

## Impacts

Impact measures are the ultimate benefits of using a product. These are longer-term, value-added impacts of the product related to saving time, money, lives.

| Impact | Application |
|---|---|
| Save sampling time/effort/ cost; enhance freight model | Primary information used to help stratify sampling planned for next step. |
| | White paper helps stratify sampling to enhance Piedmont Triad area freight model. |
| Spot safety program | Survey responses highlight issues and trends focused on freight-related operational and/or safety issues. |
| Project prioritization | Data enhance Metropolitan Transportation Plan (MTP) freight project analysis and evaluation criteria. |

## PARTNERSHIPS

**Winston-Salem MPO** – Co-coordinator on the project, lead agency on the SHRP2 C20 implementation assistance, led all project management activities.

**Piedmont Authority for Regional Transportation (PART)** – Co-coordinated the project with the Winston-Salem MPO, served as the model custodian, and provided technical and administrative assistance across the entire domain of the project.

**Greensboro MPO, High Point MPO, Burlington-Graham MPO –** Members of PART Model Team; provided substantial support during project development process; provided technical assistance across entire domain of project.

**North Carolina Department of Transportation (NCDOT)** – Member of PART Model Team; provided support similar to that of MPO partners; acted as sounding board for model development; provided technical support as well as administrative support with agreements and contract management.

**Federal Highway Administration (FHWA)** – Provided coordination support as well as technical and administrative guidance.



**Piedmont Triad Region**

Source: Winston-Salem Urban Area MPO
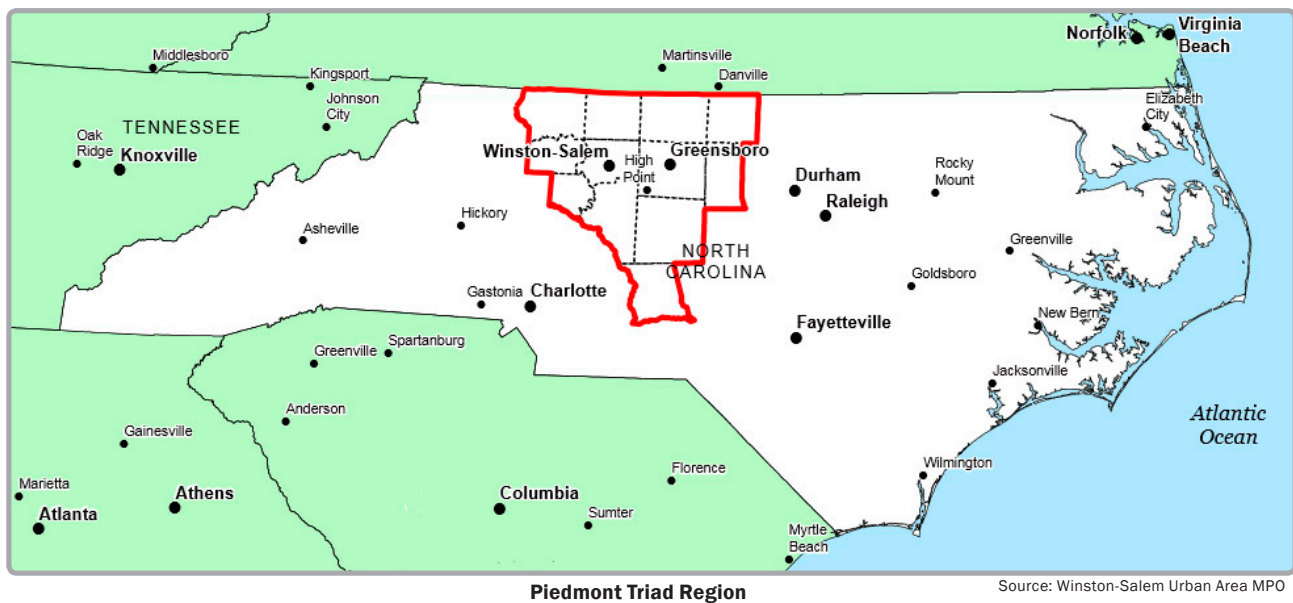
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Learn more about the SHRP2 program, its Capacity focus area, and Freight Demand Modeling and Data Improvement (C20) products at
**www.fhwa.dot.gov/GoSHRP2/**

The second Strategic Highway Research Program (SHRP2) is a partnership of the Federal Highway Administration (FHWA), the American Association of State Highway and Transportation Officials (AASHTO), and the Transportation Research Board (TRB). TRB completed the research, and now FHWA and AASHTO are jointly implementing the resulting SHRP2 Solutions that will help the transportation community enhance productivity, boost efficiency, increase safety, and improve the reliability of the Nation's highway system.

U.S. Department of Transportation
**Federal Highway Administration**

### STRATEGIC HIGHWAY RESEARCH PROGRAM

U.S. Department of Transportation Federal Highway Administration
American Association of State Highway and Transportation Officials - Transportation Research Board