TRANSEARCH Data for Planning in Tennessee

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Scope of My Presentation

- Our Data Related Project Tasks
- The Data’s Characteristics
- Examples of Analysis Results
- Lessons Learned
- Remaining Work
Our Tasks

• Provide Assistance to in Procuring and Maintaining Commodity Flow Data

• Determine How The Large MPOs Can Use Freight Flow Data For Regional Freight Planning and Identify Analytical Tools
  – Example applications
  – Analytical tools

• Provide Assistance To TDOT And MPO’s In Carrying Out Freight Planning Studies
  – Examples: review documents, process Transearch data
Freight Data - Vehicles or Commodities?

- **Commodities**
  - Manufactured goods, Construction materials, Petroleum
  - Consumer goods: TV, furniture, etc.
  - Small packages and Mail, etc.

- **Vehicles**
  - Panel Trucks and Vans
  - Single Unit
  - Combination units from “Pup” trailer to double and triple trailers
TRANSEARCH Data

- TRANSEARCH is one of the most complete sources of commodity flow data. It is based on > 100 sources including way bills, surveys etc.
- "Snap Shoot" of Single Point in time
  - But some components may be a base-year plus growth
- Uses conversion rates by commodity to translate from tons to truckloads (trucks on hwy)
TRANSEARCH Data Specs

- Annual Tonnage (2001) of freight flows by
  - 3 digit (238) and 4 digit (728) Standard Transportation Commodity Classification (STCC)

- Extent of Movements include
  - TN Origins
  - TN Destinations
  - Movements Thru TN

- Modes
  - Hwy: Truckload & Less than Truck Load (LTL) & Private Truck
  - Rail
  - Intermodal
  - Water
  - Air
  - River Drayage
TRANSEARCH Data Specs continued....

Geographic Coverage
- TN County-to-County Flows & some within county
- Thru movements for Truck and Rail Between external U.S. origins/destinations
  - Traffic between US and Mexico (Including TN O/Ds)
  - Traffic between US and Canada (Including TN O/Ds)
- Rest of US Geography at 4 levels – Key Adjacent Counties, Key States, Key City BEA areas, Census Regions
TRANSEARCH — Geographic Aggregations
TRANSEARCH — Geographic Aggregations
General Highway Flow Statistics

- Loaded Hwy Flow Table has 724,197 records
- Hwy Network has 102,407 links
- Largest single movement appears to be within Shelby county - 1,060,227 truck loads of empty semi-trailers
- Most tons moved appears to be 16,607,160 tons of nonmetallic minerals between Hawkins County and Sullivan County
Terminology

- **Truck Tons** – The annual tonnage of a specified commodity that flows between an O/D - Truckloads, LTL and Private
- **Truck Loads** – The annual number of loads of a commodity that flows between an O/D - Truckloads, LTL and Private.
- **Carloads** – net short-tons (2000 lbs.) moving in carloads
- **Warehouse & Distribution Center** - represents traffic coming out from this kind of operation, but no detail on commodity is available
Example Queries

Top 10 Commodities Originating in TN
Destination All of US (Including TN) Moving by Highway

Commodities

- Nonmetallic Minerals
- Warehouse & Distribution Center
- Ready-Mix Concrete, Wet
- Rail Intermodal Drayage
- Nonmetallic Minerals, Processed
- Misc. Field Crops
- Primary Forest Materials
- Motor Vehicle Parts Or Accessories
- Potassium Or Sodium Compound
- Metallic Ores

Tons (millions)
Top 10 Commodities Originating in US Destination Tennessee (Including TN) Moving by Highway

- Nonmetallic Minerals
- Warehouse & Distribution Center
- Misc. Field Crops
- Potassium Or Sodium Compound
- Primary Forest Materials
- Oil Kernels, Nuts Or Seeds
- Grain
- Misc. Prepared Food
- Coal
- Potash, Phosphate Or Sulfur

Chart shows tons (millions) moving by highway.
Top 10 Commodities Originating in Tennessee Destination US (Including TN) Moving by Air

- Mail And Express Traffic
- Drugs
- Constr Machinery Or Equipment
- Electronic Data Proc Equipment
- Motor Vehicle Parts Or Accessories
- Engrg, Lab Or Scientific Equipment
- Books
- Blankbook, Loose Leaf Binder
- Paper Or Building Board
- Conveyors Or Parts

Tons (millions) vs Commodities
Top 10 Destinations of Commodities Moving by Highway from Knox County

- Shelby County, TN: 1,200,000 tons
- Davidson County, TN: 600,000 tons
- Hamilton County, TN: 400,000 tons
- North Carolina, Rest of State: 300,000 tons
- Census Region 5: 200,000 tons
- Census Region 3: 100,000 tons
- Sullivan County, TN: 100,000 tons
- Census Region 7: 100,000 tons
- Census Region 2: 100,000 tons
- Georgia Portion of Atlanta, GA: 100,000 tons

Tons (thousands)
Top 10 Origins of Commodities Moving by Highway to Knox County

- Shelby County, TN
- Hamilton County, TN
- Davidson County, TN
- Census Region 3
- North Carolina, Rest of
- Census Region 7
- Georgia Portion of Atlanta, GA
- BEA
- Census Region 5
- Mississippi Portion of Jackson, MS
- BEA
- Georgia, Rest of
Truck Loads Destined for Nashville MPO Area by Commodity

- Semi-Trailer Returned Empty, 41.46%
- Warehouse & Distribution Center, 14.26%
- Ready-Mix Concrete, Wet, 4.88%
- Nonmetal Minerals, Processed, 3.11%
- Grain, 2.23%
- Potassium Or Sodium Compound, 1.75%
- Concrete Products, 1.27%
- Motor Vehicle Parts Or Accessories, 1.20%
- Miscellaneous Agricultural Chemicals, 1.03%
- Miscellaneous Plastic Products, 1.12%
- Rail Intermodal Drayage, 1.13%
- Electrometallurgical Products, 1.19%
Truck Loads Destined for Nashville MPO Area  
by Commodity Excluding Empty Trailers

- Warehouse & Distribution Center: 24.36%
- Motor Vehicle Parts Or Accessories: 2.99%
- Concrete Products: 2.05%
- Ready-Mix Concrete, Wet: 24.36%
- Potassium Or Sodium Compound: 2.17%
- Grain: 3.81%
- Nonmetal Minerals, Processed: 5.31%
- Electrometallurgical Products: 2.04%
- Concrete Products: 2.17%
- Misc Plastic Products: 1.92%
- Rail Intermodal Drayage: 1.93%
Distribution of Truck Flows in TN
Annual

- Internal, 17,331,824 (29%)
- TN Destination, 9,014,442 (15%)
- TN origin, 8,551,197 (14%)
- Through, 25,151,749 (42%)
Distribution of Truck Flows in TN
Daily

- Internal: 55,551 (29%)
- TN Destination: 28,892 (15%)
- TN Origin: 27,408 (14%)
- Through: 80,615 (42%)
Nashville MPO Area
Annual Truck Loads by Movement
Key Definitions

- **First Segment-Last Segment** – The first/last section of hwy used on the probable route
- **Network**
  - Hwy = Older version of NHPN
  - Rail = Older version of FRA network
- **Routing**
  - Initial performed by ORNL for Reebie using least impedance algorithms
  - “Re-Routing” performed by UT using TransCAD
  - UT Daily Flows based on 312 days a year
- **Tools** – Access, Excel, TransCAD & “Add-In”
Network in Preparation for Routing
TransCAD “Add-In” Screen

![Import Reebie Data screen](image)
Annual Truck Flows in Tennessee
Annual Flows
Routed Based on Distance
Daily Truck Flows
Links with Truck Volume >8000
Annual Truck Volumes Moving Through TN
Daily Trucks Moving Through TN

Links with Truck Volume >5000
Daily Flows US to Canada
Links with Truck Volume > 250

[Map showing daily flows between US and Canada with specific links indicated by truck volume.]
Issues with Routing Transearch
Ex. Motor Vehicles Originating in TN
Data Issues

- No Formal Documentation Provided
- Routing – difficult to implement
- Flows on Network
  - Corridor assignment rather than a facility
  - Our flows are course
  - Annual vs. Daily
- Multimodal Shipments are not clearly linked
- Within county and county-to-county (in close proximity) may be not be extremely reliable
  - Not all trucks are counted
  - Some over represented?
- Some double counting in U.S.-Mexico tables
- Data does not include dollar value of commodity
Next Steps

- Complete development of documentation
- Continue to Implement Routing Options
- Cross-Check Flows with other data
- Develop “standard” queries and charts
- Analyze flows in some corridors on network compare with TRIMS data
- Investigate Canadian and Mexican flows in more detail
Concluding Remarks

- Transearch data is useful and can be very powerful
- It requires more effort than expected
- Disaggregate Applications Need Verification
- It will need to be supplemented with other data for some analyses
- Applications are broader than Transportation
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