

# Modeling Commercial Vehicle Travel

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William G. Allen, Jr., P.E.  
Transportation Consultant

Paul Agnello  
Baltimore Metropolitan Council

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# Definitions

- Heavy Truck: 3+ axles, more than 6 tires
- Medium Truck: 2 axle, 6 tires
- Commercial: light/medium duty vehicles used for business



# What is it?

- FedEx/UPS, postal vehicles, taxis, plumbers, carpenters, couriers, government vehicles, service technicians, meter readers, landscapers, light/medium delivery trucks
- Trips not counted elsewhere (not in HTrk, MTrk, or NHB)

# Why bother?

- 8% of total traffic
- Current model:  
COM = 0
- Not hard to improve on that

# Calibration Procedure

- Adapt starting model from another area
- Synthesize COM counts
- Use counts to get “observed” trip table
- Work backwards to revise starting model

# Data Challenges

- There isn't any
- O/D surveys infeasible
  - Diverse population, hard to survey
  - Low budget = inadequate sample size
  - Difficulty defining "trips" vs. "tours"
- No count data
- Not included in home interview surveys

# New Count Program

- New manual counts – vehicles with text or logo, or carrying equipment
- 113 locations; 1-2 hours at midday
- Use classification count and other link data to create model of COM share
- Apply model to 600 locations with classification counts

# COM Share Model

- Simple logit model
- COM share increases with:
  - ↑ capacity, speed, lanes, % bus
  - ↑ count of type F1, F7, F11, F12 vehicles
- Bias coefficients by jurisdiction, facility type, and area type
- $r^2 = 0.43$ , % RMSE = 25%

# Borrowed a Starting Model

- Simple linear regression model, from Lehigh Valley, PA
- Based on employment by type (industrial, office, retail) and HHs
- Modify to account for “truck zones”, area type, jurisdiction

# Truck Zones

- TAZs of high truck activity (113)
  - Higher than average trips/employee
- Downtown, package delivery areas
- Large vs. small
- New zonal variable

# Adaptable Assignment

- Assign a starting trip table
- Compare loads to counts
- Summarize by O/D cell
- Use comparison to adjust trip table
- Repeat
- Result: trip table that matches counts better

# Use of Adapted Trips

- Compare adjusted to starting trip ends
- Relate difference to zonal characteristics
- Adjust starting model and re-run
- Adapted trips / starting trips =  
O/D-specific calibration adjustment

# Results

- 2000: 1.2 million COM trips
  - Avg. trip length: 7.2 mi
- Total adjustment: 55 K trips (5%)
- Total assignment error: -1.9%
- RMS error: 13%
- 2025 est: 1.5 million trips (+31%)
  - Avg. trip length: 8.4 mi

# Wrap Up

- Final model includes generation, distribution, external, through, time of day, and specialized assignment procedures
- Model easily implemented in TP+
- COM model fills important gap
- Creative use of data is the only way