DEVELOPING STATEWIDE WEEKEND TRAVEL DEMAND FORECAST AND MODE CHOICE MODELS FOR NEW JERSEY

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Outline

• Introduction
• Problem Statement
• Current Practices
• Existing Travel Demand Forecast Models
• Specifications for a Statewide Weekend Model
• Demonstration / Pilot Model
• Summary
Introduction

• Statewide Travel Demand Forecast Models
  – Land Use
  – Intercity
  – Toll Facility Evaluation
  – Freight Movements

• Statewide Weekend Models ?
Need for Weekend Model

- Diversified Trip Purposes
- Different Trip Distances
- Various Spatial and Temporal Distributions
- Magnitude of Trips
- Congestions Occurred
## Weekday and Weekend Trip Rates

<table>
<thead>
<tr>
<th></th>
<th>RT-HIS</th>
<th>NPTA</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Weekday</td>
<td>Weekend</td>
</tr>
<tr>
<td>Sample Size (Number of Households)</td>
<td>4,541</td>
<td>275</td>
</tr>
<tr>
<td>Estimated Mean (Number of Trips per HH)</td>
<td>8.80</td>
<td>7.71</td>
</tr>
<tr>
<td>Difference between Weekend and Weekday</td>
<td>0.4%</td>
<td></td>
</tr>
</tbody>
</table>
Decreasing Shares of Commuting Trips by VMT

<table>
<thead>
<tr>
<th>Year</th>
<th>Percentage</th>
</tr>
</thead>
<tbody>
<tr>
<td>1969</td>
<td>35%</td>
</tr>
<tr>
<td>1977</td>
<td>30%</td>
</tr>
<tr>
<td>1983</td>
<td>25%</td>
</tr>
<tr>
<td>1990</td>
<td>20%</td>
</tr>
<tr>
<td>1995</td>
<td>15%</td>
</tr>
<tr>
<td>2001</td>
<td>10%</td>
</tr>
</tbody>
</table>
Research Objectives

• Examine the state of the art in model development
• Evaluate alternative multi-modal modeling approaches
• Identify data deficiencies and statistical validity of alternative approaches;
• Develop requirements and standards
• Recommend a course for New Jersey;
• Develop and calibrate new models
Current Practices

• TMIP Discussion
  – The differences between weekday and weekend travel
  – The Importance of Analyzing Weekend Travel
  – The Scope of Weekend Travel Demand Model

• MPO Surveys
  – Current landscape
  – Future Plans
  – The Roles of Special Generators
## Existing Travel Demand Models in New Jersey

<table>
<thead>
<tr>
<th>Agency</th>
<th>Platform</th>
<th>WEEKEND MODULE</th>
<th>Weekend Data</th>
</tr>
</thead>
<tbody>
<tr>
<td>NJTPA</td>
<td>TRANPLAN</td>
<td>No</td>
<td>Small Amount</td>
</tr>
<tr>
<td>SJTPO</td>
<td>Cube/TP+</td>
<td>Yes</td>
<td>Some</td>
</tr>
<tr>
<td>DVRPC</td>
<td>TRANPLAN w/ Evans Algorithm</td>
<td>No</td>
<td>Small Amount</td>
</tr>
<tr>
<td>NYMTC</td>
<td>TRANSCAD</td>
<td>No</td>
<td>Small Amount</td>
</tr>
<tr>
<td>NJ Transit</td>
<td>TP+</td>
<td>No</td>
<td>Some</td>
</tr>
<tr>
<td>NJ DOT</td>
<td>Cube</td>
<td>No</td>
<td>None</td>
</tr>
</tbody>
</table>
Travel Demand Models in NJ

• Model Structures of Various MPOs
  – Traditional Four-step Models
  – Expanded Regional Models w/weekend component
  – Freight /Highway Only model
  – Transit Models
  – Tour Based Model

• Expectations of Statewide Weekend Model
Specifications for a Statewide Weekend Travel Demand Model for NJ

- Framework and Typology
- Consistency with Weekday Models
- Design Considerations
- Data Implications / Requirements
- Validation Methods for Weekend Models
1. Activity-Based /
   Type Structure

General Framework an

Model Types

Generation

UI Design / I/O
Consistency with Extension of Weekday Models

• Commonalities:
  – Zonal data
  – Networks – highway and transit
  – Software platform and model application procedures
  – Counts and other validation data
  – Comparable travel performance or measures of effectiveness

• Differences:
Difference from the Weekday Travel

- Lower Proportion of Mandatory Travel,
- Larger Share of Recreational, Religious, and Special Event Travel
- Greater Variation in Day-to-day Travel
- Stronger Impact of Proximate Holidays
- More Variable Diurnal Distribution
Model Components

- Travel Generation
- Distribution or Destination Choices
- Mode and Occupancy Choice
- Time of Day Factors
- Highway and Transit Networks - Path-building and Assignment
Data Implications and Requirement

• Zonal Data
  – Socioeconomic
  – Demographic
  – Land Use

• Survey Sources:
  – Detailed travel diary surveys
  – Intercept Origin-Destination Surveys
  – Stated Preference Surveys
  – National Census and Travel Surveys
  – Counts
Validation Method

• Expanded Aggregate Statistics from HH surveys
• Volume/ Count Deviation by Facility and Area Types
• Transit Boarding by Service Type/Sub-regional Area
• Transit Statistics and Ridership Profiles
• Weekend Traffic and Transit Counts,
• Independent Statistics on Attendance / Capacity of Special Events by Location
Develop Pilot Model for NJ

• Corridor /Travel Market Focus
  – Rail and bus travel to New York
  – Intra-Jersey bus travel on certain routes.
  – Bus travel to Cape May and other NJ coast locations
  – Hudson-Bergen LRT

• Data Development
  – PANYNJ auto surveys (2006)
  – New rail and bus onboard survey – weekend
  – NJT Rail survey follow-up (internet based)

• Application Model Platform

• Validation and Testing