PSRC Truck Model

Truck Model Summary and Validation

Model Users Group
March 18, 2015
Truck Model History

- Developed by CS back in 2000 for WSDOT OUM (Fast Trucks Model)
- Not a goods and commodities flow model
- Purpose is to represent truck traffic on roadways to complement and interact with vehicular demand
Truck Types

• Three trucks categories:
  - Light trucks (small truck or car used for work purpose – 2 axles, <16k lbs)
  - Medium trucks (single-unit semi – 2-4 axles, 16k-52k lbs)
  - Heavy trucks (double/triple-unit semi – 5+ axles, >52k lbs)
Truck Trip Generation

- Generation Rates are applied to PSRC employment sectors
- Subsector shares yield 9 truck employment categories:
  - Ag/Fish, Mining, Manufacturing – prod & equip
  - TCU, Wholesale
  - Retail, FIRES, Gov/Ed
- Yields P’s & A’s by zone
Truck Special Generators

- Truck Special Generators added to Attractions
  - Light Trucks (320 in SR-167 corridor)
  - Medium Trucks (460 in SR-167 corridor)
  - Heavy Trucks (8,800)
    - ~1000 in SR-167 corridor
    - ~1950 in Port of Tacoma zones
    - ~5890 in Port of Seattle zones
Truck P & A factoring

- Resulting Truck P’s and A’s then factored
  - Light  0.554 (Prod)  0.749 (Attr)
  - Medium  0.309 (Prod)  0.500 (Attr)
  - Heavy  0.413 (Prod)  1.375 (Attr)
Truck P & A Maps
### Truck Trip Distribution

- Truck productions balanced to attractions
- Gravity model similar to regular trip distribution
- Resulting Truck Trip Lengths:

<table>
<thead>
<tr>
<th></th>
<th>Observed</th>
<th>Model</th>
</tr>
</thead>
<tbody>
<tr>
<td>Light</td>
<td>26.3</td>
<td>15.4</td>
</tr>
<tr>
<td>Medium</td>
<td>27.6</td>
<td>28.9</td>
</tr>
<tr>
<td>Heavy</td>
<td>31.6</td>
<td>30.7</td>
</tr>
</tbody>
</table>
Truck Trip Tables

• Distribution P-A matrices converted to O-D trip tables

• External truck trips added (TRANSEARCH commodity flow data, 1997)

• Truck trips converted to PCE trips
  • Light Truck = 1.0 PCE
  • Medium Truck = 1.5 PCE
  • Heavy Truck = 2.0 PCE

• Time of Day factors applied
Truck Volumes (med + hvy)
### Truck Volumes - validation

- 30 count locations – WSDOT Annual Traffic Report

<table>
<thead>
<tr>
<th></th>
<th>Observed</th>
<th>Modeled</th>
<th>Difference</th>
</tr>
</thead>
<tbody>
<tr>
<td>Medium</td>
<td>92,200</td>
<td>49,600</td>
<td>-46%</td>
</tr>
<tr>
<td>Heavy</td>
<td>68,800</td>
<td>104,400</td>
<td>+52%</td>
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<tr>
<td>Total</td>
<td>161,000</td>
<td>154,000</td>
<td>-4%</td>
</tr>
</tbody>
</table>
Truck Volumes – Total Trucks (med+hvy)
Truck Volumes – Medium Trucks

Medium truck vehicles

\[ y = 0.4927x \]

\[ R^2 = 0.2243 \]
Truck Volumes – Heavy Trucks

Heavy truck vehicles

\[ y = 1.5129x \]

\[ R^2 = 0.8354 \]
Truck Model – improvements

- Employment sector issues (SIC → NAICS)
- Adjust factors to improve heavy/medium split?
- More and newer data
- Obtain Port trip forecasts?
- Review inputs
Contact info

Questions?

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