**Time of Day Pricing Initiative**

- Implemented in March 2001
- Before: flat toll rates
- After:

<table>
<thead>
<tr>
<th>Type of vehicle</th>
<th>Passenger cars</th>
<th>Trucks</th>
</tr>
</thead>
<tbody>
<tr>
<td>Cash peak hours</td>
<td>$6.00 / car</td>
<td>$6.00 / axle</td>
</tr>
<tr>
<td>Cash off-peak hours</td>
<td>$6.00 / car</td>
<td>$6.00 / axle</td>
</tr>
<tr>
<td>E-ZPass peak hours</td>
<td>$5.00 / car</td>
<td>$6.00 / axle</td>
</tr>
<tr>
<td>E-ZPass off-peak hours</td>
<td>$4.00 / car</td>
<td>$5.00 / axle</td>
</tr>
<tr>
<td>E-ZPass overnight hours</td>
<td></td>
<td>$3.50 / axle</td>
</tr>
</tbody>
</table>
Objective

- To assess behavioural impacts of two major user groups: **passengers** and **carriers**
Methodology

- Sampling Procedures and Data Collection
  - Passenger survey (Jun-Jul, 2004)
    - Single stage random sample using random digit telephone calls (New Jersey and Staten Island)
  - Carrier survey (Nov-Dec, 2004)
    - Sampling frame: Dun and Bradstreet (DNB) database
    - Letters sent for participation
    - Telephone interview
    - Carriers in New Jersey and New York
Methodology (cont.)

- Sample Expansion
  - Purpose: to represent the collective behavior of the universe of users
  - Expansion factor: the reported trip frequency
  - Unit: car trips/month for passenger cars and truck trips/day for carriers
I. Impacts on Passengers
Summary of Passenger Survey

- Target population
  - All individuals who have used any of the PANYNJ toll facilities on a regular basis (at least once per week) since March 2001 (current regular users); and
  - Individuals that regularly used toll facilities before March 2001 and stopped doing so about that time (former regular users).
  - Focused on residents of New Jersey and Staten Island.
Summary of Passenger Survey (cont.)

- Sample size: 505 individuals
  - User status: 467 current regular users (92.5%) and 38 former regular users (7.5%);
  - Geographical distribution: 392 respondents (77.6%) from New Jersey and 113 respondents from Staten Island (22.4%).
Characteristics of Interviewed Passengers

- **Individual characteristics**: middle-aged white man with above average level of education

- **Household characteristics**: typically car-oriented with above average household income

- **Indication**: inelastic towards small changes in tolls or other travel cost
Characteristics of Car Trips

- Work related trips dominated: 61.5% of trips
- Peak-hour trips dominated: 54.1% of trips
- Small flexibility of time of travel
  - Within 20 minutes on average

Indication
- Current regular users have constraints that make it difficult to shift their current time of travel
E-ZPass Awareness and Usage

- High E-ZPass usage (78.3%)

- Low awareness of time of day pricing (17%)

- Extremely low awareness of the amount of tolls paid among E-ZPass users
  - 17.4% of E-ZPass users correctly reported the actual tolls they paid while 60.5% of cash users did so.

- Indication
  - Low awareness time of day pricing may constrain the E-ZPass penetration level and the effectiveness of the time of day pricing program.
Impacts of Time of Day Pricing on Passengers

- Impacts
  - 35 out of 505 respondents (7.4% of car trips) changed behavior because of time of day pricing

- Passengers who changed behavior are more likely to:
  - be younger;
  - have relatively lower education level;
  - have relatively lower household income;
  - be female;
  - have smaller families.
Behavioral Changes Reported by Passengers

- Multiple changes reported

- Key dimensions of changes:
  - a shift to public transportation
  - a reduction in the frequency of car trips
  - a shift to carpooling
  - a shift to the E-ZPass system

- Key reasons for not changing behavior:
  - have no choice, no flexibility to change
  - travel whenever they want to
II. Impacts on Carriers
Summary of Carrier Survey

- **Target population**
  - Same criteria as passengers
  - Focused on carriers in New Jersey and New York.

- **Sample size: 200 carriers**
  - By user status: 182 current regular users (91%) and 18 former regular users (9%);
  - By carrier type: 103 for-hire carriers (51.5%) and 97 private carriers (48.5%);
  - By geographical distribution: 165 carriers (82.5%) from New Jersey and 35 carriers from New York (17.5%).
Characteristics of Interviewed Carriers

- Company characteristics of the average carrier:
  - Provide LTL or FTL service;
  - Operate medium to large fleets: 53.9 trucks on average;
  - Venture in New Jersey and New York, not far from the Mid-Atlantic region;
  - Patterns vary by carrier types.

- Commodities delivered
  - Household goods/various (25%), textiles/clothing (22.4%), food (20%), machinery (14.6%) and others
Operational Attributes of Interviewed Carriers

- Peak-hour trips dominated
  - 68.4% of trips -- peak,
  - 19.6% -- day time off-peak, and
  - 10.2% -- overnight

- Majority did not have flexibility of time of travel
  - 74.4% did not have any flexibility;
  - For those who have flexibility, they could arrive about 49 minutes later and 37 minutes earlier on average;
  - **Indication:** Majority of carriers have difficulty to shift their current time of travel.
E-ZPass Awareness and Usage

- **High E-ZPass usage**
  - 85.5% of current regular users use E-ZPass

- **Low E-ZPass awareness**
  - 25.4% knew about off-peak hour use discounts, and only 2% knew about overnight use discounts.

- **Indication**
  - Low awareness may constrain the E-ZPass penetration level and the effectiveness of the time of day pricing program.
Impacts of Time of Day Pricing on Carriers

- Impacts
  - 36 out of 200 carriers (20.2% of truck trips) changed their behavior because of time of day pricing.

- Carriers that changed behavior are more likely to:
  - Focus on full truckload (FTL) services;
  - Own smaller fleets;
  - Venture in the areas out of New Jersey and New York.
Behavioral Changes Reported by Carriers

- Multiple operational adjustments reported
- Key dimensions of changes:

**Significant**
- Switching to or increasing use of E-ZPass;
- Increasing shipment charges to their customers (15.5% increase in shipment charges on average);
- Decreasing frequency of using the toll facilities;
- Changing delivery routes.

**Less Significant**
Reasons for not changing behavior

- No flexibility (75.3%)
- Cost paid by others (19.8%)
  - Customers absorb travel cost (18.2%), or the cost is paid by shippers (0.1%) or receivers (1.5%)
- Toll difference is not that much/can afford it (2%)
- There is no change in the cost for off-peak travel (0.4%)
Conclusions

- 7.4% of passenger car trips changed behavior because of time of day pricing
  - The main behavioral changes were: shifting to public transportation, reducing the car trips frequency, shifting to or increasing the use of car-pooling, rather than shifting to off-peak periods.

- 20.2% of truck trips changed behavior because of time of day pricing
  - The main strategies include switching to or increasing use of E-ZPass, increasing shipment charges, reducing truck trips, and changing their routes to avoid toll facilities, rather than shifting to non-peak periods.
Conclusions (cont.)

- The relatively small time of travel flexibility indicates difficulties to shift their current time of travel.
- Low awareness of the toll discounts
  - constrains the ability of time of day pricing in balancing traffic throughout the day
  - need for expanded and perhaps improved outreach to disseminate public information.
Acknowledgement

- This research is sponsored by a grant from FHWA, and administered through NJDOT and the University Transportation Research Center.
- Additional support provided by the PANYNJ.
Questions?

For the report and detailed information
Contact: José Holguín-Veras
jhv@rpi.edu
Department of Civil and Environmental Engineering
Rensselaer Polytechnic Institute, JEC 4030
110 Eighth Street
Troy, NY 12180-3590
E-ZPass System