Use of Demand Management Tools in Japan

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Japan
Outline of Discussions

- Definition of TDM and Examples in Japan
- Achievements and Problems of TDMs
- Travel Demand Characteristics
- TDMs in Tokyo Metropolitan Area
- Packaged TDMs in Kanazawa City
- Strategic and Dynamic Toll Settings
- Concluding Remarks
What is TDM?

TDM is a package of various demand-side measures to reduce/alleviate traffic congestion through

1. Travel Time Shift
2. Route Deviation
3. Mode Shift
4. Effective Use of Cars/Trucks
5. Land-use Controls

and mostly done as demonstration projects in urban areas.

Road Bureau of MLIT
Park and Ride in Osaka

Collaboration among Railway Companies, Supermarkets and Osaka Pref.Gov(1999) : Parking facilities of 5 Supermarkets near stations are open to railways commuters with fees.
Promotion of Bus and Cycling in CBD in Hiroshima

Introduction of Express Bus services connecting suburban new towns and CBD, and Rent-a-cycle in CBD, Hiroshima (2000)
Promotion of Cycling in Niigata

Park and Cycle & Ride in 4 stations in Niitsu and Rent-a-Cycle system in Niigata
Demonstration Projects for TDM

From 1999 to 2003, 65 areas are selected for the TDM demonstration Projects.

Examples:

- Park & Ride: Hakodate, Kamakura, Osaka, Kumamoto,
- Promotion of Bus: Iwaki, Hiroshima, Kokubu, ...
- Transit Mall: Gihu, Matsuyama, Naha, ...
- Open Café: Touwa (Iwate), Osaka, Sendai, ...
Intermediate Remarks

- High recognition on the importance of TDMs
- Nationwide and various challenges

But some problems,
Problems of TDM Projects in Japan

1. Dependence on Demonstration Projects
   - Short time period and small scales
   - Consequently, small effects

2. Target and Selection of TDM Measures
   - Stereotype ideas: passenger transport, car traffic reduction
   - Deep considerations on Travel demand characteristics

3. Packaging and Integration of TDMs
Problems of TDM Projects in Japan

2

• Objective and Incentives for Participation
  – In case of Traffic Congestion Relief, contributors and beneficiaries are not same.
  – Goal settings thru Public Involvement
    • Environment
    • Equity (Mobility–Devide Reduction)
    • Central area revitalization
  – Economic Incentives
    • Maximum utilization of existing facilities
    • Strategic settings of public transport fares
Characteristics of Urban Transportation Demand in Japan

Mode Share by City Size
Tokyo Metropolitan Area (TMA)
## Mode Share of Commuting Trips by City Size

<table>
<thead>
<tr>
<th></th>
<th>Railways</th>
<th>Buses</th>
<th>Cars</th>
<th>Bicycles</th>
<th>Walking</th>
</tr>
</thead>
<tbody>
<tr>
<td>Major Metropolitan Areas -2.0mil.</td>
<td>33.7</td>
<td>2.2</td>
<td>28.4</td>
<td>14.4</td>
<td>21.3</td>
</tr>
<tr>
<td>Other Metropolitan Areas 0.3 - 2.0mil.</td>
<td>14.8</td>
<td>8.5</td>
<td>38.4</td>
<td>13.3</td>
<td>21.5</td>
</tr>
<tr>
<td>Regional Cities 0.1-0.3 mil.</td>
<td>56.1</td>
<td>17.1</td>
<td>25.0</td>
<td></td>
<td></td>
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<tr>
<td>Other Cities -0.1mil.</td>
<td>50.0</td>
<td>17.2</td>
<td>22.2</td>
<td></td>
<td></td>
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<tr>
<td>Total</td>
<td>21.6</td>
<td>37.9</td>
<td>15.7</td>
<td>22.6</td>
<td></td>
</tr>
</tbody>
</table>

Source: Nation-wide Person Trip Survey, 1999

Heavier car dependence in smaller cities
Mode Share of Commuting Trips to the Central Tokyo

Source: Tokyo Person Trip Survey
Urban railroad network in Tokyo

Tokyo

Tokyo 23 ward

Pop. 8.28 mil.

Railway Network

1.00km/km2

Car Ownership level

0.3/person
Share of Vehicle Types in Tokyo’s 23 Wards

Weekday

<table>
<thead>
<tr>
<th>Year</th>
<th>Private Cars</th>
<th>Buses</th>
<th>Taxis</th>
<th>Small Trucks</th>
<th>Large Trucks</th>
</tr>
</thead>
<tbody>
<tr>
<td>1990</td>
<td>34.9</td>
<td>2.2</td>
<td>28.7</td>
<td>27.9</td>
<td>6.3</td>
</tr>
<tr>
<td>1994</td>
<td>39.6</td>
<td>1.7</td>
<td>23.7</td>
<td>28.5</td>
<td>6.6</td>
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<tr>
<td>1999</td>
<td>38.8</td>
<td>1.8</td>
<td>30.8</td>
<td>22.9</td>
<td>6.0</td>
</tr>
</tbody>
</table>

Weekend

<table>
<thead>
<tr>
<th>Year</th>
<th>Private Cars</th>
<th>Buses</th>
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<th>Small Trucks</th>
<th>Large Trucks</th>
</tr>
</thead>
<tbody>
<tr>
<td>1990</td>
<td>53.5</td>
<td>2.5</td>
<td>29.9</td>
<td>11.6</td>
<td>2.4</td>
</tr>
<tr>
<td>1994</td>
<td>62.2</td>
<td>2.3</td>
<td>24.2</td>
<td>9.7</td>
<td>1.9</td>
</tr>
<tr>
<td>1999</td>
<td>56.2</td>
<td>2.1</td>
<td>32.2</td>
<td>7.7</td>
<td>1.8</td>
</tr>
</tbody>
</table>

Source: Road Traffic Census
Travel Energy Consumption by Area and Year in Tokyo Metropolitan Areas

- 1978
- 1988
- 1993

Center

Suburbs
Targets of TDMs in TMA

CBD : Trucks, Taxies, Railway Passengers

Difficulties in Truck Transport and Logistics
Peak time shift of Railway Passengers by Flex Time

Suburban Areas : Cars, Public Transit Promotions to shift from cars

Goals: Environment, Equity (Less Mobility Devide)
Packaged and Integrated TDMs in Kanazawa city

Kanazawa City (population: 600,000)
- Historic castle city with narrow streets
- Many visitors for sightseeing
- High dependence on cars partly due to low services of public transit
- Consequently, city-wide traffic congestions

Small streets in CBD

Increase of Car share
TDM Package in Kanazawa

• Bottleneck Improvements
  — Development of ring road and bypasses
  — Improvement of congested intersections

• TDMs
  — Park and bus ride for visitors and commuters
  — Exclusive bus lanes
  — Cycle and Bus/Rail ride

• Promotion of Public Transit
  — Express bus
  — Community bus
Park and Bus Ride for Visitors

- From 1989, every golden week
- Parking facilities with 650 lots near ICs
- Cheap and frequent bus services from Parking to major visiting spots

Reduction in bus travel time

To CBD by Bus
Park and Bus Ride for Commuters --- K. Park

- Park and Bus Ride at the shopping centers
- Cheaper season tickets of bus and parking
  - Cheaper than car commuting (Gas+Parking fee at CBD)
  - Cheaper than bus season tickets
- But, still small number of participants
TDM in Kanazawa

Exclusive Bus Lane
• From 1971
• Public Transport Priority Signal (PTPS) installed in 2003

Cycle and Ride
• 30 Cycle parking facilities at railway stations and bus stops with total 7,000 lots
TDM in Kanazawa

- Express bus from suburban residential areas to CBD
- Community bus in downtown
- Parking Guidance Information System
- No my car day (Every Monday)
Strategic Toll Setting for Higher Utilizations of Expressway
Background

- Many Japanese existing toll roads in rural areas are not used effectively particularly, while parallel arterials are congested.
- Toll roads in Metropolitan areas are congested and have various problems such as road side environmental deteriorations.
- Better and more effective use of expressway thru flexible and dynamic toll setting should be pursued to minimize the bad effects to society.
## Types of Projects

<table>
<thead>
<tr>
<th>Type</th>
<th>Number</th>
</tr>
</thead>
<tbody>
<tr>
<td>1. Peak Hour Congestion Relief in Metropolitan Areas (Time Shift from Peak Hours)</td>
<td>2</td>
</tr>
<tr>
<td>2. Improvement of Roadside Environment</td>
<td>4</td>
</tr>
<tr>
<td>3. Peak Hour Congestion Relief in Medium</td>
<td>14</td>
</tr>
<tr>
<td>4. Congestion Relief in High Tourist Season (Special Tolls for Commuters)</td>
<td>2</td>
</tr>
<tr>
<td>Total</td>
<td>22</td>
</tr>
</tbody>
</table>
Improvement of Roadside Environment

Four Bypasses in Shizuoka Pref. (1)

**Purpose of the project**

To mitigate congestion and improve roadside environments, especially the traffic noise on National Highway NO.1

**Outline of the project**

Discount Measure: The free time zone was extended for 5 hours (from 8:00 p.m. to 9:00 p.m. the next day) for all vehicles
*the toll at these bypasses is usually free from 22:00 p.m. to 6:00 a.m. the next day
Period: Nov.4, 2003 to Jan.30, 2004
Results of the project

- Cut the traffic volume on general roads between 13% and 39% (800 vehicles/toll-free-5h to 1,800 vehicles/toll-free-5h), eliminating the traffic congestion length (maximum 2,000m to 0m).
- Noise was improved between 0.4dB and 5.5dB (FIGURE)
- Required time in the morning (7:00 ~ 8:00 a.m.) on the Iwata Bypass was shortened by about 24 minutes

Comparison of Noise in the Existing Road Section of Hamana Bypass
Purpose of the project
To mitigate congestion on National Highway NO.6 etc in Hitachi City

Outline of the project
Discount Measure:
- about 50% for all vehicles
Period: Nov.10 to Dec.10, 2003
Results of the project

- Average daily traffic volume on National Highway NO.6 and other general roads fell about 4% (spot traffic volume 91,000 vehicles/day to 87,300 vehicles/day)
- Reduced the required time by morning buses max 18 minutes
- Congestion loss on major general roads in Hitachi City was reduced

(FIGURE)

Before Project

- 113 thousand dollars or more /day
- 38 to 75 thousand dollars/day
- 75 to 113 thousand dollars/day
- 0 to 38 thousand dollars/day

During Project

- 38 to 75 thousand dollars/day
- 75 to 113 thousand dollars/day
- 0 to 38 thousand dollars/day

Congestion Loss on National Highway NO.6
Reduced by 142 thousand dollars/day
(Loss of Income on the Joban Expressway: 5.6 thousand dollars/day)

Improvement of Congestion Loss
Concluding Remarks

- Wide and common recognition on the importance of TDMs
- Many challenges in many cities/regions
- Seeking for better results,
  - Shift in objectives
  - Not only traffic congestion relief but also other important values such as environment, city center revitalizations and equity
  - Attractive incentives and educations
  - Full utilizations of existing stocks
  - Change in Time Period: to longer period of challenges from short period demonstration
Challenges are going on!

Thank you for attention.