IMPACT OF PAPAL VISIT ON TRANSPORTATION SYSTEM OF US-MEXICO BORDER CITIES

Sushant Sharma
Luis David Galicia

Texas ITE Fall Meeting, Fort Worth
23rd September 2016
Special events

- High levels of congestion as attendees overload streets and highway network
- Negatively affect surrounding traffic operations
- Perceived impacts of special events
- Impact varies by type of special event, geography, supply constraints, and demand uncertainty
Manage Traffic During Special Events

• Published guidelines
  – State departments of transportation
  – Metropolitan planning organizations
  – Transit Agencies

• Interagency coordination and interoperability for special events
Pope Francis’ Visit

- Pope Francis’ visit to various cities in the United States in September 2015
  - Washington, D.C.
  - New York
  - Philadelphia
- Managing transportation system and Moving people in an urban area
- Complexity, Uncertainty - Gridlock traffic Predicted
Pope Francis’ Visit to Juárez
(17th Feb 2016)
Pope Francis’ Visit to Juárez

• Rare international event on the US-Mexico border with unknown impact

• Different from Recent Pope Visits
  – Unique transportation system of El Paso
  – Group travel involved crossing the border
  – Multiple LPOEs in El Paso
  – Tolls and No Tolls on Bridges
Transit Arrangements

Legend:
- Mass in Juárez
- Park and Ride Service in El Paso
- Color coded transit stations in Juárez

Transportation Operations Group
Questions

• How will this event impact transportation system in El Paso and Juárez?
• How will the performance of freeways, state routes, and major arterials get impacted?
• How many pedestrians will travel across LPOEs to see the pope, and how will this number compare to pedestrians crossing on a normal weekday?
• When will pedestrian traffic peak? What would be the duration of the span?
• Which LPOE will experience the maximum pedestrian traffic due to the mass gathering?
INRIX Data
Data Collection
Data Collection

• Pedestrian Data: Passive infrared pedestrian counters
• Transit Data: Ridership
• Social Media Data: Twitter Feeds
Performance Measures

• Travel Time

• Buffer Index
  – Additional time to ensure on-time arrival
  – Buffer Index of 0.4 means that, for a 20-minute average travel time, a traveler should budget an additional 8 minutes \((20 \times 0.4 = 8\) minutes\) to ensure on-time arrival most of the time.

• Comparative Speed
  – Speed as a percentage of the historic average speed for a particular time of day and day of the week.
Corridors Selected

Legend

- I-10
- US-62 (E. Paisano)
- TX-20 (Mesa St.)
- I-110
- US-54 (Gateway Blvd)

Sun Bowl Stadium
El Paso

LPOEs

Mass in Juárez
(El Punto)

Texas A&M Transportation Institute

Transportation Operations Group
Section of I-10 (9-miles)

Travel Time (Minutes)

- Morning Peak (7-9am)
- Afternoon Peak (11am-1pm)
- Evening Peak (4-6pm)
- Before Mass (1-3pm)
- After Mass (6-9pm)

Legend:
- Average Weekday
- Average Weekend
- Pope Visit Day
- Monster Jam Day
Section of I-10

Travel Time (Minutes)

- Average Weekday
- Day Before Pope Visit
- Pope Visit Day
- Day After Pope Visit

<table>
<thead>
<tr>
<th>Time Period</th>
<th>Travel Time</th>
</tr>
</thead>
<tbody>
<tr>
<td>Morning Peak (7-9am)</td>
<td></td>
</tr>
<tr>
<td>Afternoon Peak (11am-1pm)</td>
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<td>Evening Peak (4-6pm)</td>
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<td></td>
</tr>
<tr>
<td>After Mass (6-9pm)</td>
<td></td>
</tr>
</tbody>
</table>
Travel Time Reliability on I-10

Buffer Index (Reliability Measure)

- Average Weekday
- Average Weekend
- Pope Visit Day
- Monster Jam Day

- Morning Peak (7-9am)
- Afternoon Peak (11am-1pm)
- Evening Peak (4-6pm)
- Before Mass (1-3pm)
- After Mass (6-9pm)
US-62 (Paisano Dr.)

Travel Time (Minutes)

- Average Weekday
- Day Before Pope Visit
- Pope Visit Day
- Day After Pope Visit

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<th>Morning Peak (7-9am)</th>
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<th>Evening Peak (4-6pm)</th>
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<th>After Mass (6-9pm)</th>
</tr>
</thead>
</table>
US-62 (Paisano Dr.)

The graph shows the Buffer Index (Reliability Measure) for different times of the day and days of the week.

- **Morning Peak (7-9am)**: Average Weekday, Average Weekend, Pope Visit Day
- **Afternoon Peak (11am-1pm)**: Average Weekday, Average Weekend
- **Evening Peak (4-6pm)**: Average Weekday, Average Weekend
- **Before Mass (1-3pm)**: Average Weekday, Average Weekend
- **After Mass (6-9pm)**: Average Weekday, Average Weekend

The graph indicates variations in reliability measures across different times and days.
TX-20 (Mesa Street)
TX-20

![Bar Chart]

- **Travel Time (Minutes)**
- **Categories**:
  - Morning Peak (7-9am)
  - Afternoon Peak (11am-1pm)
  - Evening Peak (4-6pm)
  - Before Mass (1-3pm)
  - After Mass (6-9pm)

- **Legend**:
  - Average Weekday
  - Average Weekend
  - Pope Visit Day
  - Monster Jam Day
I-110 and US-54
I-110 and US-54

![Travel Time Graph]

- Morning Peak (7-9am)
- Afternoon Peak (11am-1pm)
- Evening Peak (4-6pm)
- Before Mass (1-3pm)
- After Mass (6-9pm)

- Average Weekday
- Average Weekend
- Pope Visit Day
- Monster Jam Day
Land Port of Entries (LPOEs)
Land Port of Entries (LPOEs)
Stanton Bridge LPOE

- **Average Weekday**
- **Average Weekend**
- **Pope Visit Day**

<table>
<thead>
<tr>
<th>Time Period</th>
<th>Passenger Cars</th>
</tr>
</thead>
<tbody>
<tr>
<td>Morning Peak (7-9am)</td>
<td>150</td>
</tr>
<tr>
<td>Afternoon Peak (11am-1pm)</td>
<td>450</td>
</tr>
<tr>
<td>Evening Peak (4-6pm)</td>
<td>1000</td>
</tr>
<tr>
<td>Before Mass (1-3pm)</td>
<td>600</td>
</tr>
<tr>
<td>After Mass (6-9pm)</td>
<td>700</td>
</tr>
</tbody>
</table>
Stanton Bridge LPOE

Pedestrians

- Morning Peak (7-9am)
- Afternoon Peak (11am-1pm)
- Before Mass (1-3pm)
- Evening Peak (4-6pm)
- After Mass (6-9pm)
- Early Morning Peak (5-7am)

Legend:
- Average Weekday
- Average Weekend
- Pope Visit Day
BOTA LPOE

![Bar chart showing passenger cars for different time periods and days.]

- **Morning Peak (7-9am)**: NB Cars on Typical Wednesday (red), NB-Cars on Pope's Visit Day (green)
- **Afternoon Peak (11am-1pm)**: NB Cars on Typical Wednesday (red), NB-Cars on Pope's Visit Day (green)
- **Evening Peak (4-6pm)**: SB Cars on Typical Wednesday (red)
- **Before Mass (1-3pm)**: SB Cars on Typical Wednesday (red), NB-Cars on Pope's Visit Day (green)
- **After Mass (6-9pm)**: SB Cars on Typical Wednesday (red), NB-Cars on Pope's Visit Day (green)
- **Early Morning (5-8am)**: NB Cars on Typical Wednesday (red), NB-Cars on Pope's Visit Day (green)
All LPOEs

<table>
<thead>
<tr>
<th></th>
<th>Northbound (Entering the U.S.)</th>
<th>Southbound (Exiting the U.S.)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Average Weekday</td>
<td>11,107</td>
<td>11,856</td>
</tr>
<tr>
<td>Average Weekend</td>
<td>10,182</td>
<td>11,188</td>
</tr>
<tr>
<td>Pope Visit Day</td>
<td>8,342</td>
<td>10,265</td>
</tr>
</tbody>
</table>

Legend:
- **Red**: Average Weekday
- **Blue**: Average Weekend
- **Green**: Pope Visit Day
Transit – BRT Route

![Graph showing ridership at different times of day: Morning Peak (7-9am), Afternoon Peak (11am-1pm), Evening Peak (4-6pm), Before Mass (1-3pm), After Mass (6-9pm). The graph compares Average Weekday, Average Weekend, and Pope Visit Day.]
Transit- All Routes

![Bar chart showing ridership for different times of day and days of week]

- **Morning Peak (7-9am)**
- **Afternoon Peak (11am-1pm)**
- **Evening Peak (4-6pm)**
- **Before Mass (1-3pm)**
- **After Mass (6-9pm)**

Colors:
- Red: Average Weekday
- Blue: Average Weekend
- Green: Pope Visit Day

Ridership ranges from 0 to 7000.
Sun Metro's Daily Ridership for Selected Routes a Week Before the Papal Visit (February 10, 2016)

Legend
Passengers/day
2_10_2016
- 92 to 1,000
- 1,001 to 2,000
- 2,001 to 2,886

Sources: Esri, DeLorme, NAVTEQ, USGS, InteMap, IPC, NRCAN, Esri Japan, METI, Esri China (Hong Kong), Esri (Thailand). TomTom, 2012
Sun Metro's Daily Ridership for Selected Routes a Week After the Papal Visit (February 24, 2016)
TWITTER ANALYSIS

#papaenmexico, juarez, elpapaenjuarez, 915pope, popevisit, pope, papa, francis, juarez, chihuahua, elpapaenjuarez, elpaso, popeinjuarez, papaencdj, pope915, papaenmexico, papaenmex, papaenmèxico, juárez, elpapaenjuárez, popeinjuárez and papaenméx.
Twitter Analysis

Twitter HashTag Analysis

- chihuahua
- papaenmexico
- juarez
- pope
- elpapaenjuarez
- papaenmexico
- popeinjuarez
- papa
- juarez
- elpaso
- 915pope
- pope915
- papaenmex
- francis
- papaenmex
- popevisit
- papaenmd
Conclusions

• Demand and supply interaction during special events can also lead to unexpected low congestion.
• Real and perceived supply constraints for traffic led to the low usage of private cars.
• People relied on public transit and walking, while many may have chosen to watch the televised event at home.
• The travel time reliability was high on all major corridors compared to any day.
Recommendations

• Develop a demand responsive incremental approach for implementing countermeasures and staffing.

• Flexible approach may be more cost-effective way of addressing a special event given the demand uncertainty.
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