How Big Data Helped Atlanta during the I-85 Bridge Collapse

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Response, Recovery & Resiliency
by
Guy Rousseau, Atlanta Regional Commission
Matt Pettit, Citilabs
• March 30: Fire underneath I-85 caused the bridge to collapse and altered the commutes for hundreds of thousands of commuters.

• Around 243,000 trips go through the impacted area each weekday.

• Eastern half of the I-285 perimeter impacted the most, but travel was impacted all throughout the region, with a minimum of 30% increase in volumes across network.

• Many MARTA stations, especially those in the northern part of the region, have experienced large increases in ridership after the bridge collapse.

• 75% of the businesses in the area have experienced a loss of customers due to the collapse.

• Bridge reopened on May 15, 6 weeks later ...
Historic Traffic Counts

- Around 243,000 trips travel through the affected area daily

Source: Georgia DOT Traffic Counts
2015 Average Annual Daily Traffic (AADT)
http://geocounts.com/gdot/
HOW BIG DATA CAN HELP

How to Leverage the Strength of All Available Data
Mobile Location Contribution to Streetlytics Fusion Engine
Streetlytics Process
From Data to Insights

- Cellular Data
- GPS Data
- Connected Car Data
- Confidence Metrics
- Demographics
- Travel Surveys
- Traffic Counts
What Can We Understand
Trip Patterns
Select Link Analysis
What Do We Want to Know

• What are the vehicular volumes and trip patterns throughout the day
  • AM Peak vs. PM Peak travel

• What are the vehicular volumes and trip patterns of adjacent roadways

• ArcGIS Online Story Map created to demonstrate impact
  
http://arcg.is/0LC1mW
AM Trip Destinations
AM Trip Origins
Who travels on I-85?

- The affected area on I-85 is a critical link in the transportation network.
- In the morning travel period, trips routinely flow from as far south as Newnan and from as far north as Cumming.

Source: Citilabs Analysis for ARC using Streetlytics

https://www.streetlytics.com/

Green = trip origins
Blue = trip destinations
The Impact: Traffic Congestion

AM Peak Period Traffic Congestion

• System-Wide Impacts
  - Minimum of 30% increases in volume throughout network; some areas 50%
  - Congestion on Arterials
  - Congestion in Unexpected Places
  - Slower Travel Speeds

  “Peak Spreading”: Starting Earlier & Ending Later

Source: ARC Activity Based Travel Model, Network 2015
Model Simulation Parameters: I-85 Closure, Piedmont partially open with operational restrictions
Time Period: AM Peak (6-10 AM)
http://www.atlantaregional.com/transportation/modeling
Transit Usage

This chart uses MARTA ridership data to show the change in average weekday ridership by rail station before and after the I-85 bridge collapse.

• The chart compares the average number of riders boarding stations on weekdays during March 31 – April 29 (after the collapse) to the average number of riders during weekdays March 24 – 31 (before the collapse).

• The MARTA stations in blue had the greatest % increase in ridership. Many of the northern stations experienced large increases, such as the Brookhaven station which had a 67% increase in ridership.
Transit Usage

This map uses the same MARTA ridership data to show the change in average weekday ridership by station.

- The circles are symbolized by the % values shown in the previous chart.

- The MARTA stations symbolized by large blue circles had the greatest % increase in ridership. Many of the northern stations experienced large increases.

Source: MARTA ridership data

*Weekday average ridership during March 24-31 compared to March 31-April 29
Business / Economic Impact

• The red on the map shows commercial parcels within 3, 5, and 10 minutes drive to the site of the bridge collapse under normal conditions.

• The Invest Atlanta “I-85 Business Impact Survey” found that 75% of impacted businesses in the area had experienced a loss of customers due to the I-85 closure.

<table>
<thead>
<tr>
<th>Issue</th>
<th>Percentage</th>
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</thead>
<tbody>
<tr>
<td>Loss of customers due to closing</td>
<td>75%</td>
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<tr>
<td>Delays in workers accessing business</td>
<td>63%</td>
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<tr>
<td>Delays in delivery times</td>
<td>55%</td>
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<tr>
<td>Increased transportation costs</td>
<td>36%</td>
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<tr>
<td>Other</td>
<td>29%</td>
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<tr>
<td>Delays in project development</td>
<td>19%</td>
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<tr>
<td>No noticeable impact at this time</td>
<td>6%</td>
</tr>
</tbody>
</table>

Source: ARC analysis, Fulton County parcels; Invest Atlanta

Data as of May 2, 2017
Examples of Responses

- Detours, Reroutes & Closures in place
  - Alter Signal Timing
  - Increase Capacity Substantially on Arterials

- Local governments adding police to intersections to ensure that people “Don’t Block the Box”

- City of Atlanta suspending all non-essential roadwork

- Transit systems have implemented route adjustments to avoid the I-85 closure

- MARTA has increased headways on rail system during peak travel periods and added nearly 1,200 new parking spaces

- Gwinnett County and GRTA added routes from park and ride lots to MARTA’s Chamblee and Doraville stations
Conclusion & Lessons Learned

• Invest in “Big Data” & Traffic Models
• Work with Planning Partners & Stakeholders
• Analyze Effective Connections between Specific Origin-Destination Pairs
• Freight Planning & Distribution Logistics
• Develop a Resiliency Framework:
  – Network Redundancy
  – Travel Alternative Diversity
  – Network Spare Residual Capacity