CO-135

MODELING AND MAPPING TRAFFIC-CONGESTED CORRIDORS FOR STATEWIDE DECISION SUPPORT

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BACKGROUNG AND OBJECTIVES

As one of the top-ten largest cities in the United States, Atlanta, Georgia recently has experienced significantly increasing traffic congestion, according to the Urban Mobility Report published by Texas Transportation Institute (http://mobility.tamu.edu/). For statewide transportation planners and decision makers, pin-pointing congested bottle-necks geographically is indispensible to developing long-term strategies and short-term solutions.

In the State of Georgia, a pilot study was performed in 2009 by the Georgia Department of Transportation (GDOT) to identify 50 most congested corridors. This research aimed at advancing the pilot study by incorporating more accurate data and additional analyses.

APPROACH AND METHODS

We applied two different methods in identifying congested corridors – volume/capacity ratio (VCR) and volume per lane (VPL). In both VCR and VPL, we used the annual average daily traffic (AADT) as the traffic volume. VCR calculates the capacity values based on functional classification from the engineering design perspective – i.e. 10,000 vehicles for minor arterial street, urban principal arterial, rural minor arterial and rural principal arterial; and 20,000 vehicles for rural interstate principal arterial, urban principal arterial, and urban freeway/expressway. A four lane interstate highway, accordingly, has a total capacity of 80,000 vehicles per day (20,000 vehicles x 4 lanes).

The other approach, VPL, does not consider the engineering design capacity. Instead, it considers speed limits. For example, a 70-miles per hour (MPH) lane would provide 1.75 times more capacity than a 40MPH lane. VPL is calculated as [VPL = (AADT x MaxSpeedLimit) / (Lanes x SpeedLimt)]. In the equation, MaxSpeedLimit indicates the maximum speed limit in the area of study. In the case of Georgia, it is 70MPH.

We used 2008 AADT data along with linearly-referenced roadway characteristics (RC) dataset with the courtesy of GDOT. ArcGIS by ESRI was used to analyze and visualize congested corridors.

RESULTS

In the case of arterial interstate highways and expressways, VCR shows relatively less congestion than VPL. Choke points are quite intermittent in VCR while VPL shows them rather contiguous. VCR and VPL show extremely high congestions along GA-400 at the north of I-285 perimeter. Along I-85, the highest congestion corridor appears above the Hartsfield International Airport in both methods.

I-285 perimeter shows a striking difference between two results. VCR shows a disconnected, less congested pattern. A highly congested corridor appears at the southeast. VPL, however, shows very high congestion at the southeast of I-285 and high congestions on the east and west sides of I-285.

Both results show very similar patterns in the Lakewood freeway at the southwest Atlanta and the Stone Mountain freeway. Many arterial roads that are connected to interstate or express highways also show a similar pattern between two results; however, more arterial roads are congested in VCR. Particularly, the northwest Atlanta area shows a big difference.

Beyond metro Atlanta, there were several places showing congestions in VLP such as I-75 in Macon, Savannah, Columbus and Augusta. VCR, however, showed congestions in most mid to large cities in Georgia.

CONCLUSIONS AND FUTURE PLANS

In this research, we applied two different methods to analyze road traffic congestion corridors in Georgia. The 2008 GDOT datasets were analyzed and visualized. Two approaches showed significant differences; however, the most congested corridors on GA-400 and I-85 above the Hartsfield international airport appeared in similar patterns on both maps. I-285 showed large differences. VCR revealed more congestion in arterial roads and in mid to large cities in Georgia. Decision makers will benefit from the results in planning short-term solutions and long-term strategies. We plan on validating the results with field checks in the very near future. We also plan on incorporating more variables such as exits, traffic signals and curvature in estimating choke points.