

1. Introduction

Federal transportation law¹ requires that a Metropolitan Planning Organization located within a Transportation Management Area institute a Congestion Management Process. Such a process demonstrates how the organization will quantify, evaluate, and manage congestion throughout the region's transportation network. Effective October 1, 2005, the three Metropolitan Planning Organizations (MPOs) of the Mid-Hudson Valley Transportation Management Area (TMA) – the Orange County Transportation Council, Poughkeepsie-Dutchess County Transportation Council, and Ulster County Transportation Council – adopted a single Congestion Management Process (CMP) for the TMA, which was subsequently accepted by the Federal Highway Administration. The CMP outlines the overall commonalities among the three MPOs, such as a single definition for congestion and common types of data collection, but provides enough flexibility to allow for locally derived methods to mitigate congestion in individual communities.

The CMP achieves this through a four step process. Step 1 establishes consistent metrics to identify congested roadways; Step 2 identifies areas of severe congestion; Step 3 identifies and implements measures to manage congestion; and Step 4 evaluates the effectiveness of those measures and integrates the CMP into local and regional planning. This report summarizes an update to the CMP: a travel time survey to better measure and identify areas of congestion in the Mid-Hudson Valley TMA.

2. Measuring Congestion

The 2005 and 2006 CMP reports used Volume-to-Capacity (V/C) ratios, which measure congestion from the standpoint of supply and demand. To calculate a V/C ratio – or percent of use – travel demand models take existing traffic volume data and divide it by roadway capacity, which is based on the road type (functional classification). The OCTC, PDCTC, and UCTC each maintain a travel demand model for their respective county. The 2005 CMP classified recurring weekday, peak hour (4:00-5:00 pm) congestion into three categories: moderate (V/C ratio of 0.80 – 0.89), heavy (V/C ratio of 0.90 – 0.99), and severe (V/C ratio equal or greater than 1.00).

V/C ratios present some limitations, because they do not fully account for speed variations, maneuverability, or travel time. The 2005 report included an action item to explore the use of Travel Time Surveys to define and measure congestion in future iterations of the CMP, in order to better understand travel patterns on severely congested roads.

¹ On August 10, 2005, the Safe, Accountable, Flexible, Efficient Transportation Equity Act (SAFETEA) was signed into law, continuing the tradition of federal transportation investment implemented under the Intermodal Surface Transportation Efficiency Act of 1991 (ISTEA) and the Transportation Equity Act for the 21st Century (TEA-21). SAFTEA maintains the requirement that a TMA actively measure and manage congestion; however, the law uses the new term: Congestion Management Process (CMP).

3. 2011 Regional Travel Time Survey

Though a useful tool, a travel demand model may overlook some areas of congestion due to changes in travel patterns, speed variation, or other variables. In addition, the results of a model are only as good as the model itself. For example, a peak-hour model will only illustrate congestion during that peak hour, which may not reflect the most congested period for a specific road. In addition, each of the three MPOs maintains a separate and different travel demand model.

The TMA's regional travel time survey, completed in 2011, supplements and expands upon the results of the previous CMP reports. The survey responds to the importance that time plays in people's decisions about travel. While volume-to-capacity ratios are based on supply and demand, travel time relates to the reliability of travel and the amount of wasted time spent in traffic. Studies have found that travelers value time more than cost or other variables, and in particular value a consistent, reliable travel time. In addition, while the 2006 Step 2 CMP report focused on recurring PM peak-hour congestion, the 2011 Travel Time Survey covered AM, mid-day, PM and weekend periods.

Survey Design

Staff from the three MPOs identified the major roadways to be surveyed. The portions of each roadway to be surveyed were called sections, and identified by a starting point and ending point. Each section was then divided into many shorter segments, bounded by traffic signals or the starting or ending point of the section.

Fifteen sections on ten major roadways were surveyed in Ulster County, fifteen sections on twelve major roadways were surveyed in Dutchess County, and 45 sections on 22 major roadways were surveyed in Orange County. All roadways were surveyed during typical weekday periods (Tuesdays, Wednesdays, and Thursdays on non-holiday school days) with a few surveyed on weekends.

Survey data was collected during the following time periods:

1. Weekday Morning (AM) – 6:00 AM to 9:00 AM
2. Weekday midday – 9:00 AM to 11:00 AM
3. Weekday evening (PM) – 4:00 PM to 7:00 PM
4. Saturday – 9:00 AM to 3:00 PM
5. Sunday – 4:00 PM to 7:00 PM

Each section was surveyed at least three times during each of its survey periods. The travel time data was collected by a GPS receiver connected to a laptop in the survey car. Data on the car's location and speed was collected each second.

A hybrid of the floating car method and the average speed method was used to better simulate a "real-life" scenario. With the floating car method, the test vehicle stays in the center or right

lane and the driver attempts to pass as many cars as pass the test vehicle. With the average speed method, the driver tries to maintain the average speed of traffic by traveling in either lane. The hybrid methodology maintains the average speed of traffic, but if many cars are passing, the driver will pass some cars also. This method is safer because the driver can stay alert to roadway conditions, rather than focusing on passing cars.

Congestion Metrics

The following metrics were used to evaluate the travel time survey data:

- Travel Time: the time to travel from the beginning point of a section until the end point of the section including any signal delays, congestion, stopped time or other delays.
- Congested Time: the time spent traveling slower than 20 miles per hour.
- Stopped Time: the time spent traveling slower than 5 miles per hour.
- Free-Flow Travel Time: the time to travel the section at the posted speed limit.
- Peak Period Travel Time: the time to travel the section during the weekday morning peak (6:00 to 9:00 AM), midday (9:00 to 11:00 AM), evening peak (4:00 to 7:00 PM), Saturday peak (9:00 AM to 3:00 PM) or the Sunday peak (4:00 to 7:00 PM).
- Travel Time Index (TTI): the ratio of the peak period travel time to free-flow travel time. A TTI greater than 1.3 is considered congested, while a TTI of 1.15 to 1.3 is considered approaching congestion, and a TTI less than 1.15 is considered not congested.

More details of the survey design are provided in the *Mid-Hudson Valley TMA Travel Time Survey Final Report*, prepared by the project consultant and available as a separate document.

4. Travel Time Survey Results

Ulster County

Nine of the Ulster County sections surveyed had average TTIs over 1.3 during at least one of the surveyed time periods. These include sections on Broadway, Albany/Ulster Ave, Washington Ave, US 9W (from Esopus to SR 199), SR 32 (New Paltz), SR 299/Main Street, Burt Street/Hill/Partition/Ulster Ave/SR 212 (Saugerties), and I-587. Washington Avenue from State Route 32 to the Thruway Circle had TTIs exceeding 1.3 in both directions during the AM, Midday, and PM peak periods.

Dutchess County

Four of the 15 Dutchess County sections surveyed had average TTIs over 1.3 during at least one surveyed time period. These include sections on US 9, NY 52, and NY 9D. US 9, NY 52, and NY 9D experienced high TTIs during the PM peak period, NY 9D had high TTIs during the AM peak period, and US 9 had high TTIs during the midday and Saturday peak periods.

Orange County

Twenty-eight of the forty-five Orange County sections surveyed had average TTIs over 1.3 during at least one of the surveyed time periods. Thirteen sections experienced TTIs over 1.3 during all of the surveyed time periods. These include sections on Route 17/32, Route 17M, Route 211, Crystal Run Rd/East Main St, Route 208, Route 52, Route 17K, Broadway/Rte 17K, Route 207/Route 300, Route 300, Dunning Rd (CR 94), Route 94, and Route 207/17A.

Maps and charts detailing the travel time, average speed, range of travel speeds, and travel time index for the sections and segments in each county were produced by the project consultant and are available on the three MPOs' websites.²

9. Next Steps

The travel time survey provides detailed information about congestion on major roadways in the three-county region. The OCTC, PDCTC, and UCTC can use this information to better target their resources to manage congestion. The survey also provides a baseline for tracking congestion over time and data for calibrating each MPO's travel demand model.

The three MPOs may investigate the following ways to manage congestion in their counties:

- Prioritize congested locations/corridors based on travel time data, crash data/PILs (Priority Investigation Locations), traffic volume, economic development opportunities, or other criteria.
- Use the travel time data and other sources to determine the causes of congestion—signal timing, road or lane geometry, lack of access management, or other issues.
- Develop low cost improvements, such as signal timing changes, intersection improvements, access management, signage, and others to address congestion at priority locations. Improvements on State roads should be aligned with NYSDOT's priorities of system preservation and safety.
- Identify congested corridors that warrant more in-depth study, such as a corridor management plan or traffic analysis.
- Recommend transit, park and ride, or other transportation alternatives to reduce the number of single-occupant vehicles on priority corridors.
- Increase public awareness of existing transportation alternatives such as local and regional transit, alternate routes, walking and bicycling, and ride-sharing.
- Evaluate TIP projects based on their ability to reduce congestion at congested locations.

Next steps for the travel time data include:

- Share travel time data with partners and make available on MPO websites.
- Incorporate travel time data into travel demand models.

² PDCTC:

<http://www.co.dutchess.ny.us/CountyGov/Departments/TransportationCouncil/PLpdctcpublications.htm#tma>;

OCTC: <http://www.orangecountygov.com/content/124/1362/1464/3363/8079/default.aspx>;

UCTC: <http://www.co.ulster.ny.us/planning/tdoc.html>.

Future steps for the CMP may include the items below. These items may change based on guidance from NYSDOT, the Federal Highway Administration, and future federal transportation acts.

- Determine changes/additions for future travel time surveys, such as:
 - Additional or different roadways
 - A late-night 'free flow' period
 - A second person in the survey vehicle to classify the type of delay
 - Video of the roadways taken during the survey periods
- Repeat the travel time survey as needed, based on changes in traffic volume, travel demand model updates, long-range plans, or other projects.
- Evaluate effects of projects/measures taken to manage congestion.
- Expand the CMP program to identify congestion related to public transit.