Introduction to Congestion Management

What is congestion?

Nearly everyone who has ever traveled America's roadways has had the experience of idling or moving very slowly in traffic. Congestion is the level at which transportation system performance is no longer acceptable due to traffic interference. The level of acceptable performance can vary by the type of transportation facility, by location within the region, and by time of day. For instance, commuters typically expect and are generally willing to accept a certain amount of traffic during morning and evening "rush hours". However, they may not be willing to accept that same level of performance in the middle of the day.

Highway congestion typically results when traffic demand approaches or exceeds the available capacity of the highway system. The level of traffic demand can vary significantly depending on the season, the day of the week, and the time of day. Also, the capacity of the highway system, which is usually thought of as a constant, can change because of weather, work zones, traffic incidents, train delays, or other non-recurring special events.

What is a Congestion Management Process (CMP)?

Federal transportation legislation (SAFETEA-LU) requires that each metropolitan planning area in the United States have what is called a Congestion Management Process (CMP). The CMP is a regional program developed to identify, address and manage congestion in Ulster County and elsewhere in the Mid-Hudson Valley Transportation Management Area (TMA) to facilitate the movement of people and goods.

The CMP is a broad, regional level planning tool designed to help monitor, manage and evaluate congestion by identifying congested corridors and recommending multimodal strategies for congestion mitigation. The goal of the CMP is to provide information that helps decision makers, transportation planners and others understand overall congestion in individual corridors and throughout the TMA. Data on congestion helps Ulster County and its TMA partners formulate congestion management strategies. Data and information from the CMP benefits the transportation planning process by helping the region focus limited federal transportation dollars where they can have the greatest impact.

How does the CMP work?

One of the main requirements of a CMP is the establishment of a coordinated program for data collection and system performance evaluation to define the extent and duration of congestion. Ulster County's portion of the CMP includes a monitoring program that identifies and measures congestion on highways and at commuter parking facilities. Highway congestion data is collected in the form of current traffic volume counts and land use inventories and then forecasted. Traffic volume vehicle to capacity ratios are analyzed to determine locations of congestion and the need for a detailed corridor and/or intersection study.

Commuter parking facility data is collected during morning peak hours for a one week period annually, which is typically the time when the highest amounts of congestion occur at commuter parking facilities. This data is analyzed in order to get a quantitative measurement of congestion for each parking facility. Once this data is analyzed, it is reviewed in consultation with other agencies and members of the community to compare and validate the patterns of congestion.

The final data is then used to help assess various strategies for managing congestion. The region's transportation agencies and municipal governments then look for ways to implement appropriate strategies into on-going or new projects in those corridors. Once strategies are implemented, a follow-up assessment is often conducted to determine the effectiveness of the improvements.

What is being measured?

The CMP measures travel times between defined points in each corridor called nodes. These travel times are compared to the amount of time it would take to traverse a given roadway segment at the posted speed limit if there were no interference. The difference between the ideal travel time and the actual measured travel time is referred to as delay. The two basic measures of travel time and delay can be used to calculate a variety of performance measures including Delay per Vehicle, Delay per Vehicle per Mile, Total Delay, and Total Delay per Mile.

How often is this data collected?

Because the UCTC's roadway network is extensive, it takes approximately 3 years to gather data on all key corridors in the network, so each corridor is measured about once every 3 years. As the CMP network evolves, this data collection schedule may be adjusted in order to gather data on certain corridors more frequently and others less frequently.

What is not measured?

The CMP is designed to measure what is called recurring congestion; that is, normal, everyday congestion that you would experience on a "typical day". The CMP does not measure non-recurring congestion, which can be caused by special event traffic, traffic accidents, train delays, construction or other short-term or temporary occurrences. The CMP does not yet measure non-recurring congestion. UCTC hopes to integrate non-recurring congestion measures at a later date using an integrated advanced train detection and arrival prediction system concept.