The CMP is a regional program to address and manage congestion within the 10-county Southwestern Pennsylvania region in order to facilitate the movement of people and goods.

Congestion Management Process

Performance Measures

What are performance measures?

Performance measures are objective ways to determine the degree of success a project, program, or initiative has had in achieving its stated goals and objectives. In other words, they are ways to track progress. In this case, performance measures are what we use to track the region's progress in reducing and managing congestion.

What are the basic considerations for selecting performance measures?

Performance measures should be easily understood by the public, staff, and elected officials so they can be incorporated into the overall transportation decision-making process. They should be sensitive to various modes of transportation such as freight and transit. They should also be sensitive to peaking characteristics and the amount of time that congestion is experienced during the day. Performance measures should be sensitive to congestion mitigation strategies so discernible changes can be detected. Also, it is useful to have performance measures which can be modeled and forecasted in order to estimate future congestion levels. However, the most significant constraint in selecting performance measures is the availability of data and the resources available to undertake data collection. A comprehensive series of performance measures will not be useful without reliable data to back it up.

What performance measures are used in Southwestern Pennsylvania?

SPC's Congestion Management Process (CMP) uses Posted Speed Reliability Index, Expected Travel Time Reliability Index travel time.

How is travel time and speed data collected?

For many years the "floating vehicle method" was standard for collecting this type of data. Using this method, a traffic engineer or technician would drive up and down the corridor and collect data, initially with a stop watch and later by using a computer connected to a global positioning system (GPS) device. The drawback to this methodology is that you gather a relatively small amount of data for the level of resources that must be expended to gather it. In recent years, advancements in technology have provided new ways to gather greater volumes of data for lower cost and in less time.

In the past, for traffic data collection purposes, SPC's Bluetooth readers were installed at various locations along a corridor, and as a Bluetooth-enabled device travels past the readers, a time-stamp is created for that particular MAC address. By matching MAC address time-stamps from different locations, travel times and speeds were calculated for various segments along a corridor. The data was aggregated and individual MAC addresses are not tracked.

SPC's congestion management process uses performance measures such as travel time, posted speed reliability index, expected travel time reliability index, level of travel time reliability, and percent of person miles traveled that are reliable for interstate and other limited access roadways. SPC uses performance measures such as travel time and planning time index for arterial streets.

The emerging source of travel time and speed information is vehicle probe data gathered and compiled by private companies. These companies amass huge amounts of real-time traffic data from public and private sources such as roadway sensors, commercial fleets, in-car navigation systems, and cell phone apps. They synthesize this data and sell it for a variety of uses. PennDOT and FHWA currently have contracts to purchase this data, which allows partners like SPC to access it for planning purposes.

These new methods for collecting travel time and speed data have the distinct advantage of providing 24/7 information, as opposed to the floating vehicle or bluetooth method which typically only focused on peak hour measurements during a limited time period.

What is Travel Time?

Travel time is the amount of time, measured in the field, that it takes to traverse a given roadway.

What is Level of Travel Time Reliability?

Level of Travel Time Reliability (LOTTR) measures the consistency or dependability of travel times from day to day and across different times of day. It is calculated as the 80thpercentile travel time divided by the 50th percentile travel time and the calculation is aggregated over three weekday time periods and one weekend time period. Segments with calculated LOTTR of less than 1.5 for all four time periods are considered reliable. SPC displays LOTTR for freeway segments by direction.

What is Percent of Person Miles Traveled that are Reliable?

This measure is related to Level of Travel Time Reliability. It is one of the PM3 Federal Performance Measures from FHWA. It is calculated as the total person miles that are reliable (with LOTTR less than 1.5) divided by the total person miles. Person-miles take into account bus, auto, and truck occupancy levels. SPC displays the Percent of Person Miles Traveled that are Reliable for freeway segments by direction and as a regional measure for all interstates and non-interstates within the National Highway System.

What is Planning Time Index?

Planning Time Index (PTI) is the extra time required to arrive at a destination on time, 95% of the time. It is calculated as the ratio of the 95th-percentile highest vehicle-hours traveled divided by the vehicle-hours traveled if the same trips could have been completed at free flow speed. For example, a PTI of 1.5, means that a traveler should plan on 50% more time for their trip compared to light traffic conditions for a 95% probability of arriving on time (meaning that 15 minutes should be planned for what would be a 10 minute trip in light traffic conditions). SPC reports PTI for arterial CMP corridors in the region by direction for peak and off-peak times.

What is Posted Speed Reliability Index?

This performance measure is the percentage of time that the measured average speed for a corridor is at or near (within 5 mph) the average posted speed for the corridor. Furthermore, how often are you able to flow freely in the corridor without significant delay. This performance measure is expressed in a percentage. It is calculated by taking the number of hours where the average speed dropped below 5 MPH of the average posted speed limit, dividing it by the total number of hours in a month and subtracting this fraction from 1.

What is Expected Travel Time Reliability Index?

This performance measure is the percentage of time the measured travel time for a corridor is within 10% (or below) of the median weekday travel time for that corridor. Additionally,, how often are you able to travel the corridor in the amount of time you would expect with typical recurring levels of congestion. This performance measure is expressed in a percentage. It is calculated by taking the number of hours where average travel time is greater than 10% of the medium average travel time dividing it by the total number of hours in a month and subtracting this fraction from 1.

Note: Posted Speed Reliability Index and Expected Travel Time Reliability Index are used only for Interstates and other limited-access freeways and expressways.

For more information on data collection and proper data usage, please see the Technical Notes page.