

HOW SHOULD WE ADDRESS THE MOBILITY PROBLEM?

Just as congestion has a number of potential causes, there are several ways to address the problem. Generally, the approaches can be grouped under four main strategies—adding capacity, increasing the efficiency of the existing system, better management of construction and maintenance projects, and managing the demand. The benefits associated with these improvements include reduced delay, and more predictable and lower trip times. Emissions may be reduced due to the reduction in demand or congestion, improved efficiencies and the change in the way travelers use the system. The locations of congestion may also move over time due to the new development that occurs or is encouraged by the new transportation facilities.

More Travel Options

While not a specific improvement, providing more options for how a trip is made, the time of travel and the way that transportation service is paid for may be a useful mobility improvement framework for urban areas. For many trips and in many cities, the alternatives for a peak period trip are to travel earlier or later, avoid the trip or travel in congestion. Given the range of choices that Americans enjoy in many other aspects of daily life, these are relatively few and not entirely satisfying options.

The Internet has facilitated electronic “trips.” There are a variety of time-shift methods that involve relationships between communication and transportation. Using a computer or phone to work at home for a day, or just one or two hours, can reduce the peak system demand levels without dramatically altering lifestyles.

Using information and pricing options can improve the usefulness of road space as well as offering a service that some residents find very valuable. People who are late for a meeting, a family gathering or other important event could use a priced lane to show that importance on a few or many occasions—a choice that does not exist for most trips.

The diversity of transportation needs is not matched by the number of travel alternatives. The private auto offers flexibility in time of travel, route and comfort level. Transit can offer some advantages in avoiding congestion or unreliable travel conditions. But many of the mobility improvements below can be part of creating a broader set of options.

Add Capacity

Adding capacity is the best known, and probably most frequently used, improvement option. Pursuing an “add capacity” strategy can mean more traffic lanes, additional buses or new bus routes, new roadways or improved design components as well as a number of other options. Grade separations and better roadway intersection design, along with managed lanes and dedicated bus and carpool priority lanes, can also contribute to moving more traffic through a given spot in the same or less time. The addition of, or improvements to heavy rail, commuter rail, bus system, and improvement in the freight rail system all can assist in adding capacity to

varying degrees. In growing areas, adding capacity of all types is essential to handle the growing demand and avoid rapidly rising congestion.

Manage the Demand

Demand management strategies include a variety of methods to move trips away from the peak travel periods. These are either a function of making it easier to combine trips via ridesharing or transit use, or providing methods to reduce vehicle trips via tele-travel or different development designs.

The fact is, transportation system demand and land use patterns are linked and influence each other. There is a variety of strategies that can be implemented to either change the way that travelers affect the system or the approaches used to plan and design the shops, offices, homes, schools, medical facilities and other land uses.

Relatively few neighborhoods, office parks, etc. will be developed for auto-free characteristics—that is not the goal of most of these treatments. The idea is that some characteristics can be incorporated into new developments so that new economic development does not generate the same amount of traffic volume as existing developments. Among the tools that can be employed are better management of arterial street access, incorporating bicycle and pedestrian elements, better parking strategies, assessing transportation impact before a development is approved for construction, and encouraging more diverse development patterns. These changes are not a congestion panacea, but they are part of a package of techniques that are being used to address “quality-of-life” concerns—congestion being only one of many.

Increase Efficiency of the System

Sometimes, the more traditional approach of simply adding more capacity is not possible or not desirable. However, improvements can still be made by increasing the efficiency of the existing system. These treatments are particularly effective in three ways. They are relatively low cost and high benefit which is efficient from a funding perspective. They can usually be implemented quickly and can be tailored to individual situations making them more useful because they are flexible. They are usually a distinct, visible change; it is obvious that the operating agencies are reacting to the situation and attempting improvements.

In many cases, the operations improvements also represent a “stretching” of the system to the point where the margin of error is relatively low. It is important to capitalize on the potential efficiencies – no one wants to sit through more traffic signal cycles or behind a disabled vehicle if it is not necessary – but the efficiency improvements also have limits. The basic transportation system—the roads, transit vehicles and facilities, sidewalks and more—is designed to accommodate a certain amount of use. Some locations, however, present bottlenecks, or constraints, to smooth flow. At other times, high volume congests the entire system, so strategies to improve system efficiency by improving peak hour mobility are in order. The community and travelers can benefit from reduced congestion and reduced emissions, as well as more efficiently utilizing the infrastructure already in place.

Among the strategies that fall into this category are tools that make improvements in intersections, traffic signals, freeway entrance ramps, special event management (e.g., managing traffic before and after large sporting or entertainment events) and incident management. In addition such strategies as one-way streets, electronic toll collection systems, and changeable lane assignments are often helpful.

Freeway entrance ramp metering (i.e., traffic signals that regulate the traffic flow entering the freeway) and incident management (i.e., finding and removing stalled or crashed vehicles) are two operations treatments highlighted in this report. When properly implemented, monitored and aggressively managed, they can decrease the average travel time and significantly improve the predictability of transportation service. Both can decrease vehicle crashes by smoothing traffic flow and reducing unexpected stop-and-go conditions. Both treatments can also enhance conditions for both private vehicles and transit.

Manage Construction and Maintenance Projects

When construction takes place to provide more lanes, new roadways, or improved intersections, or during maintenance of the existing road system, the effort to improve mobility can itself cause congestion. Better techniques in managing construction and maintenance programs can make a difference. Some of the strategies involve methods to improve the construction phase by shortening duration of construction, or moving the construction to periods where traffic volume is relatively low. Among the strategies that might be considered include providing contractor incentives for completing work ahead of schedule or penalties for missed construction milestones, adjustments in the contract working day, using design-build strategies, or maintenance of traffic strategies during construction to minimize delays.

Role of Pricing

Urban travelers pay for congestion by sitting in traffic or on crowded transit vehicles. Anthony Downs (35), among many, has suggested this is the price that Americans are willing to pay for the benefits that they derive from the land development and activity arrangements that cause the congestion. But for most Americans there is no mechanism that allows them to show that they place a higher value on certain trips. Finding a way to incorporate a pricing mechanism into some travel corridors could provide an important option for urban residents and freight shippers.

A fee has been charged on some transportation projects for a long time. Toll highways and transit routes are two familiar examples. An extension of this concept would treat transportation services like most other aspects of society. There would be a direct charge for using more important system elements. Price is used to regulate the use and demand patterns of telephones, movie seats, electricity, food and many other elements of the economy. In addition to direct charges, transportation facilities and operations are typically paid for by per-gallon fees, sales taxes or property taxes. One could also include the extra time spent in congestion as another way to pay for transportation.

Electronic tolling methods provide a way for travelers to pay for their travel without being penalized by stopping to pay a fee. Electronics can also be used to reduce the fee for travelers in certain social programs (e.g., welfare to work) or to vary the fee by time of day or congestion level. Implementing these special lanes as an addition to roads (rather than converting existing lanes) has been the most common method of instituting pricing options in a corridor. This offers a choice of a premium service for a fee, or lower speed, less reliable travel with no additional fee.

Importance of Evaluating Transportation Systems

Providing the public and decision-makers with a sufficient amount of understandable information can help “make the case” for transportation. Part of the implementation and operation of transportation projects and programs should be a commitment to collecting evaluation data. These statistics not only improve the effectiveness of individual projects, but they also provide the comparative data needed to balance transportation needs and opportunities with other societal imperatives whether those are other infrastructure assets or other programs.