Traffic Engineering and Highway Safety Bulletin

Travel Demand Management

March 2011

Did You Know?

Congestion is not limited to cities, it also affects many rural areas, smaller communities, and military installations. Congestion takes a toll in driving time, vehicle costs, air pollution, and stress/health issues. Some of the stress is caused by the unpredictable nature of traffic, e.g., "Will I be late for that important meeting?" As a motorist, it is easier to accept consistent delays than it is to accept erratic delays.

Many roads were not designed to handle the current traffic demand. With reference to Exhibit 1, except for bottlenecks and poor signal timing, the other sources of congestion are usually temporary.

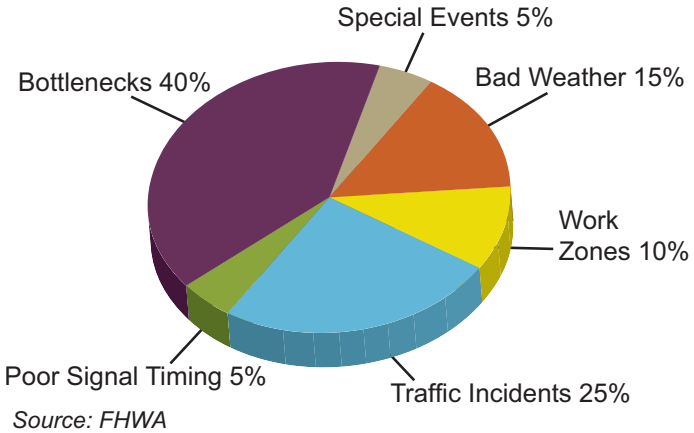
The Cost of Congestion

Congestion is a problem in America's 439 urban areas, and it has gotten worse in regions of all sizes. In 2007, congestion caused urban Americans to travel 4.2 billion hours more and to purchase an extra 2.8 billion gallons of fuel for a congestion cost of $87.2 billion – an increase of more than 50 percent over the previous decade.

Source: 2009 Urban Mobility Report, Texas Transportation Institute

In This Issue...

Exhibit 1. Source of Congestion



Source: FHWA

As illustrated in Exhibit 2, congestion can be reduced by:

1. Building additional road capacity
2. Improving the roadway efficiency
3. Reducing the number of vehicles

Option 1 is the "build option," but experts believe that it is virtually impossible to solely build our way out of congestion. Option 2 includes eliminating bottlenecks, and adding sophisticated traffic signal and intelligent transportation systems that use technology to tweak the capacity. Studies indicate that some of these technologies have a very high return in time and fuel savings. However, the focus of this bulletin is Option 3, which is commonly called either "travel demand management" or simply "demand management." In reality, the best approach is to use all three of these options.

Executive Order No. 13423 (January 26, 2007), entitled "Strengthening Federal Environmental, Energy, and Transportation Management," raises the bar for federal agencies. The order requires federal agencies to reduce their greenhouse gases through a reduction in energy intensity by 3 percent a year through the end of fiscal year 2015, or by a total of 30 percent by the end of fiscal year 2015. Obviously, this puts more pressure on military installations to redouble their efforts to

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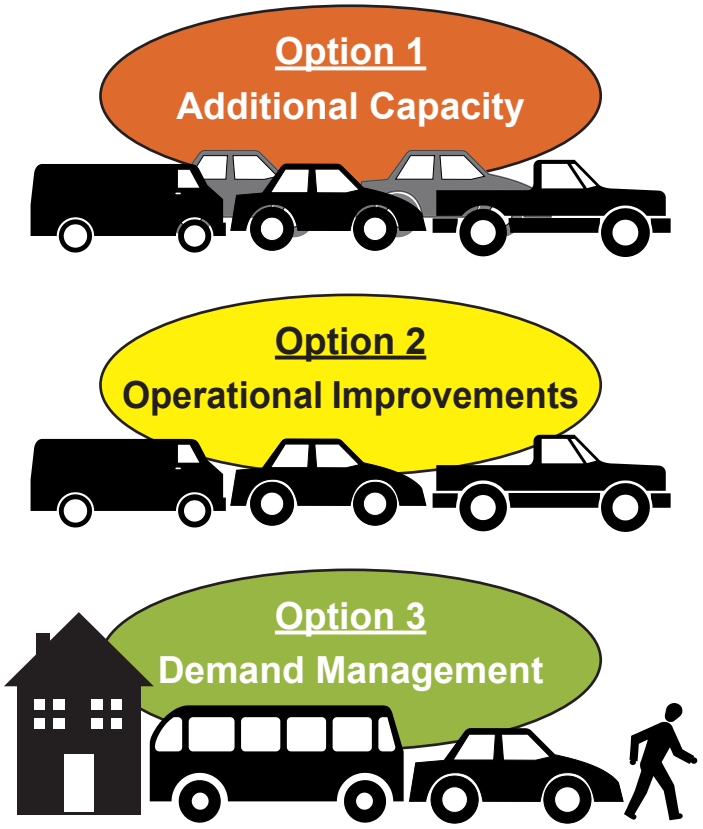
reduce all forms of energy consumption. Although the Executive Order is relative to an agency's energy use, the agency should be cognizant of other ways to reduce energy consumption.

Exhibit 2. Congestion Mitigation Options



Demand management programs attempt to address congestion at the root of the problem by reducing the number of vehicles on the road. These initiatives work to modify driver behavior by encouraging people to make fewer single-occupancy trips, travel in off-peak hours when possible, and support land-use policies that reduce the demand for vehicular travel.

How Do We Measure Congestion?

Drivers generally understand the term "travel time" to describe the performance of the highway system between two points along a highway. It also makes it easy to compare two travel corridors when a traffic reporter identifies the travel time for both corridors. Drivers also understand "minutes of delay," which is the estimate of the current extra travel time between two points as compared to the normal off-peak travel time.

Exhibit 3 shows six typical demand management strategies used to reduce congestion. Of the six strategies, only the first four have typical applications on military installations; therefore, the first four strategies are discussed on the following four pages.

Exhibit 3. Demand Management Strategies

Strategy	Examples
Travel Alternatives	✔ Telework ✔ Flexible work hours/alternate work schedules ✔ Pedestrian/bicycle travel
HOV	✔ Carpooling ✔ Guaranteed ride home program ✔ Parking pricing and cash-out programs ✔ Instant ridesharing program
Transit	✔ Enhanced bus quality and transit stops ✔ Internal shuttle service ✔ Guaranteed ride home program ✔ Subsidized fares
Land Use	✔ "Smart Growth" policies ✔ Pedestrian/bicycle/transit connections
Freight	✔ Truck-only toll lanes (TOT) ✔ Lane restrictions ✔ Delivery restrictions ✔ Availability of rail or barge
Pricing	✔ High occupancy toll lanes (HOT) ✔ Time-of-day pricing ✔ Activity center pricing

As the owner of the road network and as the employer, military installations have a unique opportunity to make a difference for their employees while also eliminating some of the costs for constructing extra travel lanes and parking spaces.

By evaluating the strategies on the next four pages, military installations can assist their employees and other partners in making significant reductions in energy usage, travel time, and air pollution. This truly is a win-win situation for everybody.

continued on page 3

Telework:

Telework is where employees enjoy the flexibility in work location. This is the ultimate in the reduction of travel demand since it allows workers an opportunity to work from home whenever possible. Telework is facilitated by laptop PCs, broadband Internet connections, groupware, conference calling, video-conferencing, and Voice over Internet Protocol (VOIP). Telework can also assist marginalized groups, such as caregivers, employees with disabilities, and people living in remote areas.

Telework tends to be most suitable for jobs that primarily manipulate information, such as software programming, data entry, planning, analysis, and design. In 2008 approximately 2.8 million employees worked from home most of the time, but it has been suggested that 52 million U.S. workers (about 40 percent of employees) could work from home.

Benefits of telework include:

- ✔ Enhances business across multiple time zones.
- ✔ Reduces the spread of diseases, employee turnover, and absenteeism.
- ✔ Eliminates commuting time.
- ✔ Reduces congestion, air pollution, and energy use.
- ✔ Reduces employee and employer costs.
- ✔ Eliminates the effects of weather and terror-related office and road closures.

Most employers believe that teleworkers are more productive than other employees, perhaps because teleworkers will not be part of a group talking around the water cooler or copy machine. Also, teleworkers feel blessed to be able to work from home, and there may be an underlying fear that unless they are super productive, this privilege could be taken away. Because of this indebtedness, teleworkers may be willing to further adjust their schedule to make phone calls earlier or later in the day to talk to individuals in other time zones.

Federal agencies are responsible for formulating their telework policies and procedures in accordance with the U.S. Office of Personnel Management (OPM) guidelines (see http://www.telework.gov). However, OPM's 2009 report indicates that in 2008, only 16,871 DoD employees (2.99 percent) out of an eligible 564,562 employees were teleworkers. Since it is generally estimated that 80 percent of employees who are given an opportunity to telework will do so at least half of the time, the low participation may be because some employees are unaware of the opportunities.

Allegedly, 76 percent of all DoD employees are eligible to telework, and if 80 percent of these would telework half of the time, there would typically be 225,825 teleworkers resulting in a 30 percent reduction in work-related travel.

Flexible and Alternate Work Schedules:

Except for jobs where full teams are required at all times, installations should consider allowing employees to establish their own work schedule. In addition to smoothing out the peak-hour traffic volumes, flexible hours allow employees to be more active in family and community activities, to choose the part of the day that they work best, and to facilitate carpools, transit, and educational opportunities.

Alternate work schedules like the compressed work week can also have major implications. For example, working four 10-hour days instead of five 8-hour days reduces commuting-related travel by 20 percent. Installations should refer to OPM's *Handbook on Alterative Work Schedules* (see http://www.opm.gov/oca/aws/).

Pedestrian and Bicycle Travel:

To further reduce vehicular travel and to promote healthy activities, it is highly desirable to have a good network of sidewalks, walkways, and bikeways. These facilities can be used to go to the PX, commissary, credit union, library, gym, etc., instead of jumping in the car, and they can also encourage walking or biking during the lunch hour as recreation. If employees can have a relaxing lunchtime stroll with shade trees and park benches, it is also likely that they will be more productive when they return to work after lunch.

Typical pedestrian concerns include:

- ✔ Lack of continuous walkways.
- ✔ Walkways are too narrow, have a poor walking surface, and are partially blocked by utility poles, signs, etc.
- ✔ Insufficient lighting.

To encourage employees to walk or bike to work, installations should consider a dedicated entry control facility when the number of pedestrians and bicyclists exceeds ten users per 15-minute interval during the morning peak hour.

Carpooling

The definition of a high occupancy vehicle (HOV) generally means a vehicle having more than one person, and at the workplace this is generally referred to as carpooling. These ridesharing opportunities are an ideal way to reduce congestion and the number of required parking spaces. It also allows carpoolers an opportunity to reduce their commuting costs and save time by using HOV lanes, while at the same time provide extra time for passengers to catch up on sleep, work or reading, or just relax, unwind, and socialize. Sometimes workers know of someone in their neighborhood that works at the military installation and together they can work out their own rideshare arrangements. However, installations can encourage additional ridesharing by developing a website for individuals to express their willingness to share a ride.

Carpooling has risks such as, what happens if a member of the carpool is required to work overtime, or if someone needs to leave work early for unanticipated personal reasons?

When these risks do materialize, the member can sometimes make a quick call and perhaps other members of the carpool can adjust their schedule or make other carpool arrangements, but this will not always work. One concept to alleviate these fears is a Guaranteed Ride Home (GRH) program as discussed in the next column.

To encourage HOVs, installations are encouraged to consider the following actions:

- ✔ Allow alternate work schedules and flex time.
- ✔ Provide an appropriate carpool-matching website.
- ✔ Develop a GRH program.
- ✔ Provide priority parking for HOV vehicles.
- ✔ Charge a daily parking fee or provide a daily cash-out payment for employees that carpool or use transit.
- ✔ Provide express lanes for HOVs through busier entry control facilities.

Guaranteed Ride Home (GRH) Program

The GRH program is where the military installation provides a guaranteed ride to accommodate stranded employees. The method of transportation could be in the form of a government vehicle, a taxi, or a rental vehicle.

Most carpoolers and transit riders consider the GRH program to be important in their decision whether to carpool or use transit, but how “emergency” is defined also affects the attractiveness of the program. Therefore, installations are encouraged to start with a very liberal program and make refinements if they believe the program is being abused. Although carpoolers like the reassurance of a GRH program, on an annual basis employers have found that a very low percentage of carpoolers will actually use the program. It is acceptable to charge a fee for the use of the vehicle.

The GRH program can also be used to assist transit riders when unexpected events come up.

Incentives to Encourage HOV

To encourage the use of HOVs, employees could be charged a parking fee or receive a “cash-out” for using HOV or transit. In both cases, the monetary value should theoretically equal the cost of providing parking.

Instant Ridesharing

In addition to maintaining an appropriate carpool-matching website, an emerging technology is instant ridesharing. Instant ridesharing is a ridesharing arrangement that enables the formation of carpools on very short notice. In instant rideshare matching systems, the employee wishing to obtain a ride sends a ride request to a ridesharing operation network or to a centralized database. The database then searches for a match with trips offered by others who have registered for the program. Instant ridesharing is also known as dynamic ridesharing, ad-hoc ridesharing, real-time ridesharing, single trip ridesharing, dynamic carpooling or casual carpooling.

Nationally, a very low percentage of all commuting is by public transportation. Some of the common reasons for not using transit, include:

- ✔ Transit connections are not convenient.
- ✔ The buses are old and uncomfortable.
- ✔ The bus stops do not have clean safe shelters.
- ✔ An emergency could happen when bus service is not available.

Installations generally cannot eliminate the first two reasons but they can help ensure that bus stops on the installation have acceptable shelters. And as noted on page 4, the GRH program can help more employees participate in a ridesharing program by defusing the last reason.

Employees at military installations tend to be younger and more dependent on public transportation than at most other employment centers. In fact, during basic training recruits generally cannot have privately-owned vehicles on the installation.

There are three transit arrangements to consider:

1. External service provided on the installation with guards riding on the bus during higher force protection conditions. This is the most efficient arrangement but security may be an issue since some passengers may not be going to or from the installation.
2. External service to a location outside the gate where there is a connection to an internal shuttle service. Although internal shuttle service is expensive, it does provide an opportunity to pick up employees who live locally and walk to the transfer location or who are dropped off from an outside carpool.
3. External service to a location outside the gate, with opportunities to walk to their employment center. Unfortunately, this arrangement only works for small installations or for those people that work in buildings near the drop-off location.

A common problem to all transit and shuttle services is the state of existing bus stops. At bus stops, shelters should be provided, particularly at stops where larger groups of riders are expected. An example of a bright and friendly bus shelter is illustrated, although a bench would be desirable. On busier roads, bus pull-offs should be provided so buses do not block the travel lane.

Some of the larger military installations have an internal shuttle service. Since these shuttle buses are frequently old and uncomfortable there may be a benefit to upgrading the shuttle fleet with hybrid buses, buses that run on compressed natural gas (CNG), or buses that have the new clean diesel engines. These newer buses will improve passenger comfort, and be more environmentally friendly and cost effective.

A *Clean Cities Fact Sheet* (the May 2000 issue, as published by the U.S. Department of Energy) says that CNG buses could pay for themselves in just a little more than 3 years, require less maintenance, and emit 97 percent less particulate matter and 58 percent less oxides than conventional diesel buses.

The new clean diesel-powered buses have comparable environment benefits as the hybrids but at a lower annualized cost than either hybrids or CNG buses.

If replacing buses, most installations could consider smaller shuttle buses since existing buses sometimes have trouble making tight turns. Upgrading to new smaller buses should also reduce fuel costs.

It is important to publicize any internal shuttle service, providing the specifics as to who can ride, where it goes and when.

For Arrangements 2 and 3, if a new entry control facility (ECF) is being planned, as a minimum, a transit stop should be considered as part of an ECF design with a bus turnout pocket and a subsequent U-turn capabilities before the ID check area.

Source: Duo-Gard Industries, Inc.

Smart Growth

In an effort to reduce internal travel, military installations should plan for "smart growth," which refers to incorporating land-use considerations into transportation planning to minimize environmental impacts and enhance mobility. The Institute of Transportation Engineers (ITE) has a publication titled *Smart Growth Transportation Guidelines: An ITE Recommended Practice*. This publication provides recommendations that allow a developing community to reduce vehicular dependence by providing more mobility choices.

The following key principles should be considered for future development:

- ✔ Provide extensive street networks, including small grids with intersections spaced every 300 to 500 feet. (Larger grids require more travel for pedestrians, bicyclists, and motorists to reach their destinations.)
- ✔ Provide a well-connected system of facilities for pedestrians and bicycles to promote these types of travel.
- ✔ Mix complementary land uses to reduce trip lengths by putting more origin-destination pairs in close proximity with each other.

Perhaps the central theme is planning for integrated self-contained communities and work areas where everything is within walking distance. In addition, add transit or internal bus loop stops near the center of these "communities."

In addition to the term "smart growth," the term "walkable communities" is also used to indicate how friendly an area is to walking. While the actual evaluation requires the consideration of many subjective factors, the goal is to encourage citizens to rely less on their cars and to choose walking more often as a form of everyday transportation. Well-designed, compact communities where people can walk to school and work, to stores, parks, and restaurants significantly reduce the need to drive.

Obviously, there are many economic, health and environmental benefits of building and sustaining a community that supports walking as a primary mode of transportation.

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