Surface Transportation Policy Project

Road Work Ahead

Is Construction Worth the Wait?

A Transportation and Quality of Life Publication

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Acknowledgements

Road Work Ahead: Is Construction Worth the Wait? was written by Barbara McCann, Bianca DeLille, Hank Dittmar, and Michelle Garland. Ideas as well as editorial assistance were provided by Reid Ewing, Don Chen, and Roy Kienitz. Gwyn Hicks of Environmental Media Services, Valerie Holford of Fenton Communications, and Karen Nozik provided valuable research, comments and suggestions, as well as editing. Janine Bauer, Therese Langer, Nina Dougherty, Marc Heileson, Stewart Schwartz, James Wamsley, and Rob Kennedy and other transportation advocates across the country helped us collect information and verify data reported in the case studies.

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Executive Summary
Road Work Ahead
Is Construction Worth the Wait?

The United States is experiencing a boom in road construction as an infusion of new federal dollars reaches the states. In many cases these road projects are designed to ease traffic congestion by widening or otherwise expanding the capacity of existing roads.

But ironically, the construction projects themselves can create significant congestion and delay. Transportation officials rarely consider the impact of these delays when they promote the congestion-relieving benefits of a new road. To see if these delays ultimately result in better commutes for those who regularly use the roads, STPP conducted case studies of road expansion projects now underway around the nation.

We used figures provided by state Departments of Transportation (DOTs) and selected case studies according to the nature of the project, geographical distribution, and availability of data. We studied both large and small projects that expand road capacity by adding travel lanes and modifying interchanges.

Results from these case studies indicate that road expansion projects often deliver scant time savings to people who use the road everyday, while allowing and even stimulating significantly more traffic once the construction project is completed. In many cases driver delays due to construction are so long, and the time savings predicted from the finished project so minor, that it can take years for commuters to break even and begin to make up the time they lost during construction.

For the massive I-15 highway in Salt Lake City, Utah, we found that commuters now using the road wont break even on the time they wasted during construction until 2010, a full eight years after the project is completed. In Nashville, Tennessee, adding lanes to I-24 is causing delays that current highway users wont recoup until they have driven the new section for more than two years. That puts the break-even point in 2003. In Trenton, New Jersey, the expansion of Route 29 necessitates a detour that costs the average commuter more than 80 hours a year. The new road will save just about 25 hours a year. The break-even point for motorists using this route will not come until 2012, an incredible ten years after completion. Most alarming is the Springfield Interchange located in Northern Virginia outside of Washington, DC. Unless the Virginia Department of Transportation can remove 2,500 cars from the road every day during construction, the average commuter could waste an astonishing 1,750 hours in traffic during the eight years of construction. Motorists who stick it out hoping to realize some time savings once the project is completed will never recoup the hours lost to the reconstruction project.

The results of this study demonstrate how traditional transportation planning fails to focus on what is most important to citizens: their own commute. Engineers focus on increasing road capacity, which they measure through engineering metrics such as

"average daily traffic," (ADT), and "Level of Service," (LOS). Unfortunately, these calculations do not adequately reflect the experience of individual drivers. As a result, road projects that succeed in increasing capacity can fail when it comes to significantly improving individual commutes.

Road construction addresses just one part of the congestion problem. Population growth is often cited as the underlying reason for increasing road capacity. However, in the past 15 years, road building has more than kept up with population growth in metropolitan areas: in fact, the number of miles of roadway per person in those areas has increased by nine percent. But the amount the average person drives has grown much faster than the population, with daily miles traveled increasing two to five percent per year since the 1950s. This increase in driving is in large part a result of sprawling, unplanned development that requires many car trips to meet basic needs.

Project	Construction Delays (per trip)	Years of Construction	Post-Construction Average Time Savings (per trip)	Break-Even Year	Expected Growth in Traffic
Springfield Interchange, Northern VA	30 min	8 years	30 sec	Never	55%
I-15, Salt Lake City, UT	15 min	4 years	7 min	2010 (8 years)	53%
SR-29, Trenton, NJ	10 min	3 years	3 min	2012 (10 years)	56%
I-24, Nashville, TN	15 min	14 months	7 min	2003 (2.75 years)	33%

Road construction may in fact have even fewer benefits than those projected here, because additional highway space can lead to additional traffic. While this study relied on official projections of future traffic from state DOTs, in many cases these predictions do not take into account the increase in driving that the new roads will lead to. This phenomenon, called "induced travel," occurs when road capacity is expanded and drivers flock to the new facility hoping to save time. Also, the new roadways tend to draw people who would otherwise avoid congested conditions or take alternative modes to their destinations. In the long run, this encourages additional development nearby, and that leads to even more traffic. Using a conservative Federal Highway Administration estimate of the impact of induced travel, an STPP analysis found that by the year 2011, a mere decade after construction is completed, average rush-hour speed

on I-15 in Salt Lake County could drop to 45 mph. This is lower than the average in 1996, before construction began.

These case studies indicate that while construction projects are often billed as relieving congestion for residents and workers, what they may ultimately do is encourage more traffic. Current highway users get little benefit.

Recommendations:

We recommend that:

1. Transportation officials tell citizens how their commute will be affected by road building plans. Investments in road expansion projects should not be made until transportation officials consider the effect of construction delays and induced travel.
2. State and local transportation officials place a high priority on reducing delays caused by road construction, by streamlining construction processes and making transit service convenient.
3. Transportation officials find ways to provide congestion relief without inflicting the increased congestion that results from construction projects. Among the many techniques available are providing better transportation alternatives, allowing flexible work hours, and clearing accidents quickly.

Introduction

Every state is engaged in construction projects on their highways. At least 1,500 projects are underway around the country, and motorists are experiencing delays and detours at construction zones.[1] Much of that construction is repair work on roads and bridges. But in addition, the passage of a new transportation bill, the Transportation Efficiency Act for the 21st Century (TEA-21), has sent plenty of new federal money to the states, and many areas have begun building booms that are supposed to ease our congestion woes by adding new capacity to existing roads.

But ironically, the construction projects themselves can create significant congestion and delay. The promise of a more free-flowing commute can take years to fulfill, as many road construction projects proceed in stages that take years to complete. Drivers are being asked to make a tradeoff: sitting through construction on the promise that their commutes will improve later. STPP undertook the analysis presented in this report to see if these delays

re worth it in the long run for the people currently using these roads.

STPP examined several road expansion projects currently under construction to better understand how these projects affect current road users. The case studies presented examine the relationship between construction projects and traffic flow from the

standpoint of individual motorists. The construction sites were chosen according to the nature of the project, geographical distribution, and availability of data. Our case studies indicate that motorists often pay a high price in time and taxes, and realize only modest benefits in time savings.

Our goal in completing these case studies was not to make definitive statements about the performance or benefits of specific projects, but to use these cases to examine whether individual drivers who must wait through construction projects ultimately benefit from these projects. The results we found are approximate and simply point toward the need for further research and study. Indeed, our difficulty in obtaining relevant information from official sources indicates that construction delay is a neglected field of inquiry for transportation planners.

The analyses presented in this report rely on predictions made about the future performance of particular stretches of highway. By necessity, the accuracy of any predictions of this kind cannot be verified for many years. Because we relied on projections provided by transportation agencies, our report is only as accurate as these original predictions.

Chapter One
The Case Studies: What Road Construction Means for Drivers

Springfield Interchange -
Washington, D.C. Metro Area

Every day 375,000 vehicles pass through the Springfield Interchange in Northern Virginia, where I-95, I-395 and I-495 come together outside of Washington, DC.[2] The interchange has been dubbed the "Mixing Bowl" because of the dizzying effect created when cars from all directions are stirred together. To improve traffic flow and address safety concerns at exit and entrance ramps at this heavily congested bottleneck, the Virginia Department of Transportation (VDOT) is spending eight years and $434 million to completely rebuild the interchange. The massive project consists of building more than 50 bridges and overpasses and widening I-95 to 24 lanes in some places.

The Virginia Department of Transportation (VDOT) set a goal of reducing the current daily traffic by 2,500 cars per day during construction to reduce delays to pre-construction levels. To accomplish this goal, VDOT is conducting an incentive and public information campaign to promote alternative modes of transportation (including reduced fares and other special price breaks to encourage motorists to switch to train and subway systems). VDOT, like many state departments of transportation across the country, set up a web site to inform the public about the purpose and nature of the construction project and provide regularly updated information about specific construction activities.

However, VDOT officials estimate that, in late fall of 1999, if traffic remains steady at 375,000 vehicles a day, commuters could begin experiencing between 30 and 60 minutes of delay, each way. (At this time, VDOT cannot state by how many cars per day usage has been reduced.[3]) If this delay persists for the projected seven remaining years of construction, even the low delay estimate of 30 minutes per trip will leave a single commuter stuck in traffic for a total of about 1,750 hours or two-and-a-half months.

Once it is over, the project will provide minimal time savings to individual motorists. Our analysis of VDOTs traffic and capacity projections on the I-95/I-395 corridor shows that commuters will save on average of about a minute per day moving through the rebuilt intersection. Commuters will save only about 90 hours over 20 years time. Those who spent 1,750 hours waiting through the construction process will never get back the time they lost. The project itself has become part of the congestion problem. Even some normally pro-highway observers have expressed doubts about the effectiveness of the project. Northern Virginia Transportation Alliance spokesman Bob Chase laments, "When you get through, the same bottlenecks you face today will be waiting for you."[4]

R**oute 29 -**
Trenton, New Jersey

The stated purpose and need for this project was to alleviate traffic congestion throughout the City of Trenton by eliminating a bottleneck and connecting the regions interstate loop.[5] This 1.7-mile project is replacing the existing two-lane Lamberton Road (designated as state highway Route 29) by constructing a four-lane highway and two full shoulders with a covered section along the banks of and in the open waters of the Delaware River. The project evoked strong environmental opposition nationwide because it destroys the last section of accessible waterfront not already obscured by highway in the City of Trenton. The consumer advocacy group, Taxpayers for Common Sense, listed the $85 million project in their 1999 Road to Ruin report as one of the most wasteful taxpayer funded road projects in the country.[6]

Construction on this project began in October 1998, and will take about two more years to complete. The construction has meant the closure of Lamberton Road (the old Route 29), and New Jersey Department of Transportation (NJDOT) estimates that motorists will experience a 10 to 15 minute delay mainly because of detours.[7] During construction, NJDOT says it has formed a Construction Partnering Team with local community groups, businesses and others to keep them informed of the effects of the construction, and to actively manage congestion.

Given a conservative estimate of 10 extra minutes of travel time per trip over three years, a regular weekday commuter can expect to spend an extra 250 hours in construction-caused delays over the construction period. The project frees up movement by improving two intersections. But NJDOTs traffic study of the corridor indicates little change in travel speed once the road is completed. The new road is projected to provide very modest time savings to drivers -- shaving off about three minutes per trip. As a result, the average commuter wont recoup the time lost to construction delays until the year 2012.

The effect of this construction project will be to permit many new drivers to use Route 29, rather than to provide significant time savings for current drivers. Drivers who were using the old Route 29 wont experience signficant time savings because they will waste so much time in construction-related delays and take so long to make up for that lost time. The new Route 29 will attract many drivers currently using other routes, as well as new trips. Traffic projections show that the number of cars on the new freeway section will grow by almost 60 percent, in large part because of the increase in capacity. Interestingly, NJDOTs projections of traffic growth without the reconstruction are about 25 percent lower than with the project.

Interstate 15 -
Salt Lake County, Utah

Interstate 15 runs through the heart of Salt Lake County and is being widened from six to 10 lanes for 16.5 miles, with an additional two auxiliary lanes between all

interchanges.[8] The massive project includes the complete rebuilding of 130 bridges and a huge multidirectional high-speed interchange with I-80. Utah Department of Transportation (UDOT) is building the road to meet projected traffic growth, create better access to downtown, and provide better links throughout the freeway system. The four year, $1.6 billion project is expected to be completed just in time for the 2002 Winter Olympics.

UDOT has taken an aggressive approach to minimizing traffic delays throughout the construction process. The contractors are working under a "design-build" process that allows construction and design to take place at the same time, so delays are minimized and the construction process dictates the schedule. Under normal design-bid-build procedures, this project would have taken eight or more years to complete. UDOT also established an information network for motorists that includes extensive education on construction plans as well as real-time information on any expected delays.

Road construction is causing about a 15-minute delay per trip.[9] A commuter who now uses this interstate regularly will lose a total of more than 500 hours during the construction process. Once the road is completed, travel speeds will initially improve enough to shave 6 to 8 minutes off of a trip that uses the entire rebuilt segment. But because of the all the time spent in the cone zone, commuters who sat through construction will not break even on their time investment until the year 2010. In addition, this project is expected to increase overall travel speeds across the Salt Lake County highway network by less than one mile per hour.[10]

Interstate 24 -
Nashville, Tennessee

Nashville commuters have been enduring a variety of road construction projects over the past year, including resurfacing projects, bridge construction, and road widenings. The delays from the construction have provoked a public outcry and one traffic reporter characterized the city as being "under siege."[11] One of the projects under-way is the widening of Interstate 24 south of downtown from four to eight lanes, an 8.5-mile project that will cost about $21.5 million.[12]

This widening project is creating rush-hour delays of about 15 minutes per person per trip,[13] primarily because some travel lanes are closed during construction. Tennessee DOT (TDOT) is predicting that travel speeds on the road will improve dramatically immediately after construction is completed.[14] Even so, it will be more than two years before current commuters reach the break-even point and regain the time they lost during the 14-month construction period.

One problem Nashville area drivers face is that multiple major road construction projects are underway simultaneously. So, even when one section of a road is complete, delays continue to occur on other major routes. TDOT explained that

everything has to be done at once because they received more than $40 million in transportation funds and much of the interstate system hasnt been resurfaced in the past 14 years.[15]

A Word about Highway Repair Projects

Many of the highway projects motorists sit through all summer are reconstruction and repairs of existing roadways. This is important and necessary work; 57 percent of roads in the U.S. are in less than good condition.[16] But delays from this work could be dramatically reduced if roads were made to last, using new technologies that allow as many as 50 years between major reconstructions. Fifty-year roads would cost more per mile in initial costs, but would actually cost less if the costs were spread over the life of the road. A recent report on "longer lived pavements" by a committee of the National Research Council concluded that there were no technical barriers to constructing much longer lived pavement, and that such pavements were not only feasible but desirable. A report prepared for the FHWA on construction and maintenance calls for improved designs, use of longer-lasting materials, establishment of performance-based specifications and other attention to details that will result in roadways that last longer.[17] State and local transportation officials can reduce the number of needed construction projects, which will increase safety and reduce congestion, if the actual roadway lasts as long as is technically possible.

Chapter Two
Lessons from the Case Studies

Road construction may deliver few benefits to drivers.

Building new roads and expanding old ones is certainly necessary in some instances, but the case studies in this report illustrate that widening roads offers little relief for current drivers, even when the growth in traffic is taken into account. The construction itself can create so much delay that it will take current motorists years to make up for the time they wasted in the construction zone. The widened, free-flowing highway will deliver such meager time savings that the patience of regular road users who sat through the construction will not be rewarded. For the projects analyzed for this report, the "break-even" point for current users ranged from a low of more than two years after project completion in Nashville to never in the case of the Springfield Interchange in Virginia.

While the roads deliver only small time savings to current drivers, they do permit many more motorists to use the facility. In the case of Route 29 in Trenton New Jersey, traffic volumes are expected to jump by 60 percent. In addition to population growth, one reason for the increased traffic is "induced travel," which occurs when road capacity is expanded and drivers flock to the new road hoping to save time. Our case studies show that while construction projects are often billed as relieving congestion for those currently suffering through it, what they actually do is allow more traffic and more driving. Current highway users get little benefit.

Traditional traffic planning fails to measure what is most important to citizens: their own driving experience.

While motorists expect construction projects to make their commute faster and easier, highway engineers view them differently. They look at the "capacity of a transportation facility [and] the quality of flow" through that facility.[18] They judge projects in terms of Average Daily Traffic (ADT), Maximum Density (passenger cars per mile per lane), Maximum Flow Rate (passenger cars per hour per lane), and the Maximum Volume to Capacity Ratio. In essence, what they measure is how many cars they can pack onto a highway before the highway reaches "Level of Service F," the engineering shorthand for highway failure.

Transportation planners rarely give more than a cursory consideration to the congestion individual motorists will face during the construction period, and they rarely calculate how a project will affect the individual driver. They also often fail to take into account the new traffic the project will create. When asked about these impacts, officials often have no answers. But this study finds that these impacts can greatly detract from the ultimate worth of a project. As a result, road projects that succeed in increasing capacity, can fail when it comes to significantly improving the lot of individual drivers, especially when construction delay is a factor.

Widening roads allows more traffic but not significant time savings

Project	Construction Delays (per trip)	Years of Construction	Post-Construction Average Time Savings (per trip)	Break-Even Year	Expected Growth in Traffic
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I-15, Salt Lake City, UT	15 min	4 years	7 min	2010 (8 years)	53%
SR-29, Trenton, NJ	10 min	3 years	3 min	2012 (10 years)	56%
I-24, Nashville, TN	15 min	14 months	7 min	2003 (2.75 years)	33%

Construction only addresses one part of the congestion problem.

Road builders fight congestion with the tool they know best: road building. But congestion is a larger problem that demands comprehensive solutions. Population growth is often cited as the underlying reason for the need to increase road capacity. However, in the past 15 years, road building has more than kept up with population growth in metropolitan areas: the number of miles of roadway per person has increased by nine percent. But the amount people drive has grown far faster than the population, with daily miles traveled increasing two to five and a half percent per year since the 1950s.[19] People are driving farther, making more trips, and driving alone more often.

This increase in driving is in large part a result of sprawling, unplanned development that requires many car trips. Far-flung subdivisions and office parks isolated from stores and schools leave residents no alternative to driving. One of the unintended consequences of this growth pattern has been a steadily increasing number of short vehicle trips that has served to clog local streets and freeways with traffic and increasingly frustrate residents and workers. And as this report shows, making roads ever wider may do little to help those who must use the roads every day. It seems clear that other approaches are necessary to give Americans the congestion relief that they seek.

Our case studies show that while construction projects are often billed as relieving congestion for those currently suffering through it, what they actually do is allow more traffic and more driving.
Some representatives of the road building industry have suggested that increased road capacity is necessary for economic growth and that failing to build more roads would retard the growth potential of the U.S. economy. However, other studies indicate that

road building in areas that already have an extensive road network may have very modest effects or do no more than shift economic activity from one location to another.[20] In addition, a major study done for the British government states that "any contribution to the sustainable rate of economic growth of a mature economy, with well-developed transport systems, is likely to be modest."[21] The study concludes that generalizations made about the effects of transportation on the economy are strongly dependent on local circumstances and conditions.

Additional highway space can mean additional traffic.

For this study, we used state Department of Transportation figures to estimate projected time savings delivered by the roads studied. But these figures may be very optimistic, because often these projections ignore a phenomenon known as induced travel. New and wider roads tend to generate new traffic. People make additional trips, travel farther, change their routes or change their time of travel when new capacity is made available on highways. In the long run, new residential and commercial development takes advantage of the improved accessibility resulting from road widening, and this new development generates new trips and more traffic. Induced travel means that roads often fill-up long before their projected road life-span.

State highway departments generally expect good traffic flow for ten to twenty years after a construction project is completed, and we used these projections in our case studies. But a growing body of evidence shows that the increased highway capacity can be filled up in as little as a quarter of that time, as induced demand generates additional traffic. According to the Federal Highway Administration, improved travel speeds may "induce" an increase in traffic. Using a conservative FHWA estimate of the impact of induced travel[22], an STPP analysis found that by the year 2011, a mere decade after construction is completed, average speed on I-15 in Salt Lake could drop to 45 mph. This is lower than the average in 1996, before construction began.

Chapter Three
A Better Approach

The case studies in this report suggest that delays caused by road construction can significantly offset the congestion-easing benefits of adding road capacity, especially for current road users. Yet transportation officials rarely take these delays into consideration. Little research is being done to systematically find ways to reduce these delays.[23] For this study, state DOT officials could provide little information or documentation about the extent of travel delays experienced by motorists during construction. This indicates the low priority construction delays are given. We believe this study shows that construction-related delays should be taken seriously and that more creative solutions to road construction should be explored.

STPP offers the following recommendations:

1. Transportation officials should tell citizens how road building plans will affect their commutes.

As this report shows, construction delay and induced travel may dramatically reduce how effectively these projects relieve congestion and improve driving for motorists who use the road every day. The impact of road building should be shared with the public when a road project is under consideration. Decision-makers need to understand the whole picture when they are asked to approve road projects, and citizens deserve to know how construction will affect them as road users.

2. Investments in road expansion projects should not be made until transportation officials take into account the effect of construction delays and induced travel.

The case studies in this report suggest that transportation officials should take construction-related delays into account when they consider the costs and benefits of expanding highway capacity to reduce congestion. In addition, officials should factor in expected levels of induced travel to accurately determine how quickly the roadway will become congested again. Delay costs and new travelers may indicate that other measures are necessary to relieve congestion for current and new drivers. By leaving out construction delays and induced travel, state and local transportation planners present an unduly optimistic picture of the benefits of road building.

3. Transportation officials should put a high priority on reducing delays caused by road construction.

When road expansion and construction projects are necessary, officials should do everything they can to reduce travel delays. According to the Federal Highway Administration (FHWA), road builders should implement an overall strategy which allows construction and maintenance operations to be completed safely with a minimum impact on the motorist, the highway worker, and the adjacent residential/business communities. Motorist delay and safety are closely tied together: crashes cause congestion and congestion causes crashes. Consequently, FHWA recommends that

officials reduce the volume of traffic through the work zone, the length of time that work zones are in place, and the number of times construction is needed.[24]

Road builders can take an aggressive approach to minimizing travel delays. Two of the most effective techniques are the use of innovative contracting techniques and the provision of convenient alternative transportation.

Use innovative contracting techniques.
Streamlining the construction process can slash delay times. Salt Lake County has experienced success with its design-build model, which allows design and construction to happen concurrently. The case study shows how reducing construction delays can shorten the time individual motorists have to sit in construction-related delays. Taking a hard look at construction plans in terms of traveler safety and delay can also make a difference: On the Mockingbird Lane Bridge Project in Dallas, a study team was able to cut the number of traffic re-routings and lane closures planned during construction by 33 percent, significantly reducing detours and delays.[25] Other jurisdictions have had success with simple contractor incentives, fining contractors for extended delays or rewarding them when a project is completed more quickly.

Provide transportation alternatives.
One of the most powerful ways to reduce congestion during construction is to give drivers alternatives in the form of convenient transit service. This gives people the choice of avoiding the delays altogether. One of the advantages of promoting alternative transportation is that commuters can learn to use transit and other modes, which may encourage less driving, and less congestion, in the future.

For example when the Metropolitan Transportation Commission (MTC) and Cal-Trans undertook to rebuild the Cypress Interchange in the San Francisco Bay Area after damage by the 1989 Loma Prieta earthquake, and to add an HOV lane on I-80 in the East Bay, one of the key mitigation actions was to set aside millions of dollars to allow the transit operator to run additional buses to accommodate commuters who were forced off the road. The bus operators cooperated with BART, the region’s rail service, to ensure that transit supply was improved while road delays were in effect.

These alternative services can also help ease congestion in the long run. Construction work on I-94 in Milwaukee last year eventually convinced Wisconsin DOT to pay for extra trips on a bus service called the "freeway flyer" as well as on express runs on a parallel road in regular local service, and on Wisconsin Coach Line, a private bus service. After the construction was over, ridership remained high enough that much of the extra transit service continued.

A comprehensive traffic management approach is the most effective way to reduce travel delays due to construction. Following the Northridge Earthquake in Los Angeles, and the resulting closure of several important freeways, Caltrans improved traffic signal timing on parallel arterial roadways, funded improvements to transit service, and provided financial incentives to contractors to get the freeways up and running ahead of schedule.

4. Transportation officials should find ways to provide congestion relief without inflicting the increased congestion required by construction projects.

Communities wishing to minimize congestion have a wide variety of options beyond expensive road expansion projects. Some regions that have taken a hard look at congestion are tackling the problem in ways that are less expensive, just as effective, and help drivers right now. Here we list just a few of the many possibilities:

Minimizing the effect of accidents and other road incidents.
While many people blame congestion on a lack of road space, much of it is caused by traffic accidents. By some calculations about half of all traffic tie-ups are caused by "non-recurring events" such as accidents.[26] "Incident management" techniques, including roving tow-trucks, constant video surveillance, and real-time traveler information, have proven popular and effective in many areas. For example, in the San Francisco Bay Area, the Bay Area Freeway Service Patrol (FSP) offers the driving public a special team of 50 tow trucks that patrol more than 217 miles of the area's congested freeways during the morning and evening commutes. These services are free to the public and offer help such as jump-starting a dead battery, refilling a radiator, fixing tires, and providing fuel. A federal study indicates that this project is responsible for an 80 percent reduction in time spent in incident-related traffic jams.[27]

Supporting transportation options.
Other regions are seeking to reduce peak-period congestion by giving drivers other travel options. Frequent and convenient light rail, subway, and commuter rail service can help people avoid the daily drive. Dedicated bus lanes can help bus riders fly past the worst highway bottlenecks. Transit already provides huge congestion-relieving benefits, keeping traffic down in urban areas by as much as 20 percent, and preventing millions of hours of delay.[28] Vanpools allow passengers to read or socialize instead of having to concentrate on negotiating clogged roads. Safe bicycle routes allow shorter-distance commuters an alternative to sitting behind the wheel. Flexible work hours allow employees to avoid the worst jams. All of these techniques serve two purposes: they give people the option of avoiding sitting bumper-to-bumper, and they can directly reduce traffic by reducing the number of cars on the road. Such travel demand management (TDM) can clear up congestion at a fraction of the cost of capacity-adding highway projects. In the long term these techniques are effective in combating congestion and improving the quality of life for commuters.

Building communities so people can drive less.
The cause of many of our congestion woes is not simple population or economic growth, but the huge growth in driving itself. Much of this driving can be traced to the sprawling subdivisions, office parks, and strip malls that can only be reached one way: by the automobile. Communities can be constructed to be more convenient to residents and allow more travel choices: children can reach a local store on their bicycles, commuters can pick up a quart of milk near the bus stop. Communities with these characteristics have been shown to generate fewer and shorter vehicle trips.[29] The most effective way to address congestion in the long run may be to design our communities so there is less need to drive in the first place.

Methodology

For this report STPP performed an analysis of each project to examine the effects of construction on individual commuters. This analysis required several pieces of data: existing travel speeds; projected future, post-construction travel speeds; traffic volumes; anticipated delays due to construction; construction segment length; construction period; and, the expected design life of each newly reconstructed roadway. Most of this data was available in traffic studies provided to us by the state departments of transportation. Where travel speed data was not available, we used highway modeling tools to estimate speeds based on average daily traffic (ADT). In all cases, we kept our estimates conservative.

To calculate the effects of construction projects on individual commuters STPP compared the time it took to travel the segment before construction crews broke ground, to the time highway engineers predict that it will take once the segment is completed. In most cases, individual commuters realized several minutes of improvement initially, but this improvement was greatly diminished throughout the years as traffic volumes increased. Summing this improvement over the design life of the newly reconstructed roadway gives us the total projected benefit accruing to each individual commuter.

Delay times were provided to us by state department of transportation officials and added to baseline travel times to arrive at the total travel time for individual commuters. We discovered that in most cases state DOTs have not done any detailed analysis of the construction delay time, an indication of the low priority they give this delay.

We used the most conservative estimates we were given, but delay times may be significantly higher due to unforeseen construction problems, poor weather or other factors. Summing these hours of delay over the construction period (number of years expected to complete a given project) gives us the amount of time each individual lost sitting in traffic because of the project.

The net time savings (or time lost), then, is the difference between the total time savings over the design life of the new roadway and the total time lost over the construction period. To determine the break-even year, we calculated the number of years it would take a typical commuter to accumulate a time savings which was equal to the time lost in construction delays.

Estimates of induced travel were made using DeCorla-Souza and Cohen's speed-flow model of induced and diverted traffic.[30]

Endnotes

For state by state information, check FHWAs website: www.fhwa.dot.gov/trafficinfo/index.htm

Data for this case study was gathered from the Springfield Interchange website (www.springfieldinterchange.com), as well as the Interchange Justification Report (US DOT, FHWA, and VDOT. Interchange Justification Report: I-95/I-395/I-495 Interchange Improvement. Richmond, VA: VDOT, 1997.)

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