

HOUSTON'S TRAVEL RATE IMPROVEMENT PROGRAM

“TOOLBOX” OF IMPROVEMENT STRATEGIES

MANAGE THE CONSTRUCTION AND MAINTENANCE

**Prepared for
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MANAGE THE CONSTRUCTION AND MAINTENANCE

A frustrating aspect of transportation improvement programs is the congestion that sometimes increases during the construction period. Narrower roadways, closed facilities and re-routed bus, auto and pedestrian traffic can make the improved operations seem a long way off. The strategies in this section include methods to improve the construction phase by shortening the amount of time, or moving the construction to periods where traffic volume is relatively low. Some strategies can also be applied to maintenance activities. Also include are strategies to increase transportation funding.

The “tools” included in this category are:

- ◆ Contracting Strategies
- ◆ “Working Day” Adjustments
- ◆ Design-Build Strategies
- ◆ Public/Private Partnerships
- ◆ Toll Roads
- ◆ Road Bonds and “GARVEE” Bonds: Guaranteed Anticipated Revenue Bonds
- ◆ Tax Increment Financing for Roads
- ◆ “Maintenance of Traffic” Strategies
- ◆ Local Option Fees
- ◆ Variable Pricing

Contracting Strategies

Description

A+B contracting procedures require the contractor bidding on a job to bid the number of days required to do the work in addition to bidding on the cost of the construction. The “B” part of the contractor’s bid - the time cost bid - is calculated as the number of days to complete the project multiplied by the daily time costs listed in the request for bids. Critical to A+B contracting are the development of daily time costs based on road user cost estimates which are, in turn, based on estimates of the traveler delay expected given the construction scenario (1,2).

Implementation	
Hurdles:	None
Level:	Area Wide
Sector:	Public
Locations:	Routes

Incentive/disincentive (I/D) contract provisions provide penalties and bonuses based on the contractor’s performance relative to a specified project schedule. As with A+B contracting, the daily value of time is based on road user cost estimates. Bonuses are awarded for the number of days the contractor finishes early, and penalties are assessed for each day the contractor exceeds the deadline.

In many instances, A+B and I/D contracting provisions are used in combination. In such cases, the contractor bids the project price, plus the number of days to complete the project. The contract is awarded based on the contract price, plus a value for the number of days to complete the project. I/D provisions are included, again, based on specified road user costs or some other predetermined value.

Target Market

Senate Bill 370, passed during the 75th Legislative Session mandated that TxDOT “develop a schedule for liquidated damages that accurately reflects the costs associated with project completion delays, including administrative and travel delays”. As a result, guidelines were developed in 1998 by the Construction Division of TxDOT and were provided to highway districts to assist in the process of determining whether Road User Costs should be incorporated into a construction contract. The guidelines specify several potential scenarios in which these strategies might be employed including, “projects that add capacity (including grade separations), projects where construction activities are expected to have a significant impact to local communities and businesses, or rehabilitation projects in very high traffic volume areas.

Benefits and Costs

The benefits of these contracting strategies include the likelihood of contractors maintaining or beating project schedules and/or budgets because of financial incentives to do so and financial penalties failure to do so. The “cost” to public entities in terms of potential increases in bid prices as contractors attempt to “price risk” is more than offset by savings in road user costs associated with longer construction (2).

Implementation Issues

There is a substantial body of literature, supported by real-world experience in Texas and elsewhere that A+B, I/D, and combination strategies can play a positive role in reducing contracting time and cost. In prior years, the major hurdle to these types of contracting

procedures was technical in terms of the validity and accuracy of road user cost and value of time calculations. Significant improvements have been made however in estimating such costs. Further, there is more awareness on the part of contracting agencies, contractors, and the highway users as to the practical reality of road user costs. Those realities, now supported by policy decisions established by Texas Legislature through the passage of Senate Bill 370, provide the necessary structure within which to implement these strategies.

1. McFarland, William F., Kabat, Richard J., and Krammes, Raymond A. Comparison of Contracting Strategies for Reducing Project Construction Time, Research Report 1310-1F, Texas Transportation Institute, Texas A&M University, College Station, TX, March 1994.
2. Daniels, Ginger, Ellis, David R., and Stockton, Wm. R., Techniques for Manually Estimating Road User Costs Associated with Construction Projects, Texas Transportation Institute, Texas A&M University, College Station, TX, December 1999.

“Working Day” Adjustments

Description

Seven-day workweeks, 24-hour workdays, and working on holidays are all methods to compress project time. In addition, “start later” contractor workday strategies can have a significant impact on air quality issues by lessening the impact of congestion and construction equipment operation during critical morning hours. (See “maintenance of traffic strategies” below.)

Implementation	
Hurdles:	None
Level:	Area Wide
Sector:	Private
Locations:	Businesses

Target Market

Working day adjustments can be potentially appropriate on any project where road user costs associated with increased project duration are significant. The higher the road user costs, the greater the savings available to offset the increased costs associated with ramp queuing, lane closures and the like. Further, in instances where there are significant peak periods of traffic, extending the construction work day to include periods prior to and after peaks can yield significant benefits in terms of increased productivity - and subsequently a shorter project duration - at a diminished incremental cost in terms of road user delay.

Benefits and Costs

The increase in contracting costs associated with overtime, double-time, and holiday pay are offset by a reduction in project duration costs (measured in daily road user costs). This is, in effect, a trade-off between cost increases associated with overtime and traveling public cost reductions associated with reduced project duration. As noted above, environmental costs associated with congestion impacts and construction equipment also provide significant potential benefits to this strategy.

Implementation Issues

As with A+B, incentive, and combination A+B/Incentive strategies, the potential cost savings are in large measure a function of the development of defensible values of time and other factors associated with road user cost calculations. There are no other impediments to pursuing workday alteration strategies.

1. ODOT Recognized for Innovative “Maintenance of Traffic” Program, The Urban Transportation Monitor, Volume 14, Number 19, October 2000.
2. Telephone Interview with Oregon Department of Transportation officials, February 2001.

Design-Build Strategies

Description

The design-build concept is attracting increased attention in highway construction. Allowing one firm, or a team of firms, to undertake the project from design to final completion will likely foster shorter project duration, and, in turn, reduce road-user costs associated with project delay.

Implementation	
Hurdles:	State/Federal
Level:	Area Wide
Sector:	Public
Locations:	Routes

Target Market

The majority of design-build experience has been with new construction projects. However, design-build strategies can play an important role in reducing total project time on major reconstruction projects as well. It should be noted however, that because of the relative newness of design-build as a contracting strategy in highway construction, such projects should probably best undertaken on a pilot-project basis in order to gain further experience with the concept.

Benefits and Costs

The benefits of a design-build approach are both cost and time savings associated with permitting one firm, or a team of firms, to undertake the projects from design to final completion of the construction stage instead of the more traditional method dividing the project into two separate phases with two separate bid processes. The I-15 project in Utah and the East Loop in Denver, Colorado provide examples as to the cost and time savings associated with the design-build approach (1).

Implementation Issues

There are no major implementation issues barriers associated with this approach from a legal perspective. The approach would likely require the development of policy guidelines in terms of when such an approach might be most applicable as well as potential policy changes relating to oversight and/or bid review.

1. Flynn, Kevin and Schriener, Judy, Road to Somewhere, in Design-Build, October 1999.

Public/Private Partnerships

Description

Because the private sector requires a return on its investment, toll facilities have been the most common type of facility proposed for public-private partnerships. The Texas Turnpike Authority has the statutory authority to participate in public-private partnerships in several different ways including eminent domain, regulation of tolls, use of tax-exempt debt, and tort liability. In addition, the 1994 Texas Transportation Plan recommended that TxDOT be allowed to purchase right-of-way for highway corridors and transit facilities for later sale, lease, or operation by private enterprise (1).

Implementation	
Hurdles:	Local
Level:	Target Markets
Sector:	Public/Private
Locations:	Sites

Other public/private cost-sharing options include owner contributions of right-of-way or cash. Institutional-based cost-sharing arrangements can involve negotiated developer agreements, impact fees, special assessment districts, and tax increment finance districts (see more on TIF districts below).

Negotiated developer agreements are financing mechanisms where the private developer agrees to contribute resources to a transportation project in exchange for changes in building regulations or for other special permit considerations.

Impact fees are charges imposed on new development as a condition for some regulatory approval of development. This form of alternative transportation capital finance flows out of local government’s power to regulate development. Local governments may exercise their police power to protect the health, safety, and welfare of the public. Thus, exactions are an exercise of the police power in protecting the public from the consequences of onerous traffic delay and congestion.

Special assessments are charges imposed on owners of property to pay for government programs designed primarily to benefit the owners of that property, such as the construction of roads serving previously underdeveloped areas or the expansion of the road system serving rapidly growing areas.

Target Market

Public/private partnerships can strategies can serve as potential tools for transportation improvements under several different scenarios including extension of transportation infrastructure into new areas or the expansion of such services into high growth areas.

Benefits and Costs

Public/private partnerships can provide an approach to transportation expansion that provides a more market-based approach as well as a means for agencies to share the cost of such projects with those who will benefit most directly from the project. Furthermore, there are numerous different approaches available providing the partners with the flexibility necessary to structure a financing scenario that provides each with the maximum benefit. In fact, public/private partnerships may provide the greatest opportunity of flexibility in developing a financing solution tailored to each specific project.

Implementation Issues

Public/private partnerships are not a new concept and have become an increasingly important tool in determining project feasibility. In Texas, the powers of regional tollway authorities are somewhat limited. Specifically, under Chapter 366 of the Transportation Code, a regional tollway authority may, “enter into leases, operating agreements, service agreements, licenses, franchises, and similar agreements with public or private parties governing the parties' use of all or any portion of a turnpike project and the rights and obligations of the authority with respect to a turnpike project.” In addition, and under the same chapter, an authority, “receive loans, gifts, grants, and other contributions for the construction of a turnpike project or system and receive contributions of money, property, labor, or other things of value from any source...to be used for the purposes for which the grants or contributions are made, and enter into any agreement necessary for the grants or contributions.”

1. Economics and Planning Division, Texas Transportation Institute, Legislative Framework and Implementation Issues Relating to Public-Private Partnerships for Highway Development in Texas. Working Papers. Texas Transportation Institute, Texas A&M University, College Station, TX, 1995.

Toll Roads

Description

Toll facilities are undergoing resurgence in the U.S. The advent of automatic vehicle identification or electronic toll collection technologies increases the viability of toll roads. Not only are the delays associated with toll collection eliminated, but also the automated billing technologies tend to reduce popular opposition to tolling. Toll roads are not a unique concept to Texas or to the Houston area. The Sam Houston, Hardy, and Jesse Jones facilities are already operated by the Harris County Toll Road Authority and, in aggregate, are on sound financial footing.

Implementation	
Hurdles:	Local
Level:	Target Markets
Sector:	Public
Locations:	Routes

Target Market

Toll facilities have potential as a strategy on any relatively high volume facility as a means to finance new construction or, under the provisions of Section 180, Chapter 3612 of the Transportation Code, as a means of financing improvements to existing “free” public highways if the facility is transferred to the Turnpike Authority. In fact, over the course of the last 20 years, much of the statistical gains relative to relieving congestions can be attributed to the addition of new lanes miles as a result of toll roads (1).

Benefits and Costs

Tolls serve as a means to finance highways on a more direct road-user cost basis. Through a bonding program, the facility can be paid for “up front” while the debt is serviced by road user fees over the life of the bonds. The additional cost associated with this approach is, of course, the interest on the bonds issued to cover the construction costs.

Implementation Issues

None. Toll roads are a proven concept in Texas. However, toll road opportunities are not infinite. Not all transportation needs can be financed via tolls and even if they could, there is a finite capacity for debt. There are, however, several toll road opportunities in the greater Harris County area.

1. Lomax, Timothy J., Dresser, George B., Ellis, David R., Glenn, Thomas L. Goff, Zane, A., Horton, Ann C., and Turnbull, Katherine F. Refinancing Texas Transportation, Project Summary Report 1728-S, Volume 1., Texas Transportation Institute, Texas A&M University, College Station, TX, June 1998.

Road Bonds and “GARVEE” Bonds: Guaranteed Anticipated Revenue Bonds

Description

Guaranteed Anticipated Revenue or “GARVEE” bonds are a means to leverage future federal highway funds in order to construct roadways. Such bonds are allowed in 10 states. The Texas Senate approved the funding mechanism in 1999 but the Texas House of Representatives took no favorable action. The bonds would allow construction to be financed now with the debt secured by future federal highway fund allocations to Texas (1).

Implementation	
Hurdles:	Local Process
Level:	Target Markets
Sector:	Public
Locations:	Routes

financed now with the debt secured

Target Market

Such bonds are applicable in both new construction and reconstruction projects when such projects would otherwise be eligible for federal funding in current or future years.

Benefits and Costs

The differential between the cost of the bonds and the traditional pay-as-you-go approach is, conceptually, more than covered by the decreased road-user costs associated with the reduced project time. The risk associated with this approach lay in the future availability of federal highway funds sufficient to cover the cost of the bonds plus interest in light of other potential unforeseen demands that might be placed on the State’s highway system in future years.

Implementation Issues

As noted above, currently this approach is not authorized by Texas statute and would require an amendment to the State’s constitution. However, bonding authority for highway construction is expected to be an issue that will receive serious consideration during the next session of the Texas Legislature.

1. Senate Committee on State Affairs, Intermodal Transportation, Report to the 77th Legislature, November 2000.

Tax Increment Financing for Roads

Description

This concept is similar to that of Tax Increment Financing (TIF) districts used primarily for infrastructure improvements associated with economic development projects. An “impact zone” associated with the road project would be designated and, for a specified period of time, the increase in property tax revenue (the “tax increment”) associated with increased property values as a result of the project would be designated for the entity(s) financing the road improvement.

Implementation	
Hurdles:	Local Process
Level:	Target Markets
Sector:	Public
Locations:	Sites

Target Market

TIF bonds can be used with both new construction projects as well as major reconstruction and/or capacity expansion projects. The major criteria are that the project must have a defined area of impact and that the project must have a defensible method of allocating benefit (and subsequently cost) to the defined area.

Benefits and Costs

As with other such funding mechanisms TIF districts allow for a more direct connection between the costs associated with transportation improvements and those who will be the most direct beneficiaries of the improvements.

Implementation Issues

There are no legal impediments to the creation of such districts. In 1997, the Texas Legislature provided TxDOT with the ability to use TIF Districts. However, this approach would probably require the development of guidelines and policies to measure benefits associated with a particular project and thereby allow the allocation of costs. For example, part of the benefit of a particular project may be to provide greater access to a property, thereby increase its value for development, or to provide greater access to existing businesses, thereby increasing sales and value. Those costs might be recovered through a TIF district. However, there may well be other benefits associated with increased capacity or speeds for through traffic. Identifying those benefits which accrue within the district’s boundaries versus those that accrue outside of the district’s boundaries could be problematic (1).

1. Economics and Planning Division, Texas Transportation Institute, Legislative Framework and Implementation Issues Relating to Public-Private Partnerships for Highway Development in Texas. Working Papers. Texas Transportation Institute, Texas A&M University, College Station, TX, 1995.

“Maintenance of Traffic” Strategies

Description

Proper management of work-zone traffic control can have a significant impact in reducing delay time, queue length, emissions, and road user cost. Closing lanes or ramps to decrease the construction time, using Flow Signals to improve traffic flow, using reversible lanes to make the most efficient use of the available road space, increasing transit usage to reduce vehicle demand are among the strategies that might be used. Computer models can use person and vehicle volumes, road designs and operational strategies to estimate the impact on travel delay and emission statistics in work zones (1, 2).

Implementation

Hurdles: Local Process
Level: Area
Sector: Public
Locations: Sites

Target Market

“Maintenance of traffic” strategies can be used on any reconstruction, expansion, or maintenance project. These strategies can have a potentially significant marginal impact not only in terms of traffic flow, but also in terms of safety for both road users and construction crews. In fact, many of these practices are already standard procedure in Texas.

Benefits and Costs

Real costs can be relatively low in that implementation is primarily a function of planning, scheduling, and management as opposed to being a function of construction.

Implementation Issues

Planning, scheduling, and project coordination become even more critical in order to make significant differences in queue length, delay time, and their related costs. Computer modeling of the potential impacts of these management strategies becomes increasingly important to the decision-making process.

1. ODOT Recognized for Innovative “Maintenance of Traffic” Program, The Urban Transportation Monitor, Volume 14, Number 19, October 2000.
2. Telephone Interview with Oregon Department of Transportation officials, February 2001.

Local Option Fees

Description

Houston's residents could be given the option to support transportation programs with direct taxes or fees. Described below are a few techniques that might be used – common elements are the need for State level support for the local option concept and the desirability of dedicating any revenue for specific uses such as mobility improvements. Voter approval would provide additional local matching funds and demonstrate the commitment to attacking the serious mobility problem (1).

Implementation	
Hurdles:	Local Process
Level:	Local
Sector:	Public
Locations:	All

- Local option vehicle registration fees: This initiative would allow an additional vehicle registration fee to fund local roadway improvements. For example, a \$10 local option registration fee per vehicle in Houston would raise approximately \$36 million annually.
- Local option gasoline tax: A cents-per-gallon based gasoline tax would produce approximately \$20 million annually per one cent of tax. This is similar to the current federal and state taxes.
- Local option gasoline sales tax: A sales tax on the sale of gasoline will preserve the current cents-per-gallon taxing mechanism for the State and federal governments. It is estimated to produce in excess of \$20 million per year per one percent of tax.

Target Market

Local option fees of this type can be implemented to help cover the costs of any construction, expansion, or maintenance effort.

Benefits and Costs

Additional revenue may well mean that some projects can be begun earlier than would otherwise have been the case. It is important to note that the marginal value of the fees described above is not just the revenues raised by the imposition of the fees, but also the additional state and/or federal match that might be acquired as a result of the funds.

Implementation Issues

All of the options mentioned above would require legislative approval and represent a significant polity shift, and potentially require a significant voter education campaign on the part of local authorities. In addition, allowing the Authority, a city, or county to impose a cents-per-gallon gasoline tax would likely require an amendment to the State's constitution. Further, it is likely that any such tax on a cents-per-gallon basis would require that ¼ of the proceeds be dedicated to public education. It is unlikely, however, that a sales tax on gasoline would necessitate such a dedication.

1. Daniels, Ginger, Ellis, David R., and Stockton, Wm. R., Techniques for Manually Estimating Road User Costs Associated with Construction Projects, Texas Transportation Institute, Texas A&M University, College Station, TX, December 1999.

Variable Pricing

Description

Variable pricing is the application of user surcharges for using congested highway facilities. Its goal is to provide an additional option for travelers – a reliable high-speed trip. The benefits include decreased travel time, increased transit productivity, and reduced pollution and energy use. Variable pricing could potentially provide additional financial support for other transportation improvements or current operations. Advances in electronic tolling could be used to address negative economic or social impacts (1,2).

Target Market

Variable pricing strategies can be imposed on existing toll roads, new toll facilities in “free” corridors, or on new projects that come on-line at future times.

Benefits and Costs

The benefits of variable pricing strategies include the capability to attach a user fee to a facility that is more reflective of the market as well as allowing price to be used as a tool to help influence transportation decisions across a variety of user options including shifting demand away from peak hours, telecommuting, and flex hours. There is very little cost to implement such a policy.

Implementation Issues

For existing toll facilities, there are no significant implementation issues. For new toll facilities in existing “free” corridors there will be issues associated with collecting fees/tolls and/or distributing permits to authorized users.

1. Sullivan, E. Evaluating the Impact of the SR 91 Variable Toll Express Land Facility – Draft Final Report, Cal Poly State University, San Luis Obispo, CA, January 1998.
2. Wyckoff, P. Turnpike Out to Cut Off-Peak Toll Rates, Star-Ledger Newspaper, June 12, 1998.



Implementation

Hurdles: Local Process
Level: Target Markets
Sector: Public
Locations: Routes